

# **Improving Wetland Mitigation Interagency Consistency to Benefit Wisconsin's Watersheds**

## **Updating the *Guidelines for Wetland Compensatory Mitigation in Wisconsin* with New State and Federal Rules and Regulations**



**Final Report to the USEPA, Region V  
EPA Wetland Protection State Development Grant No. 00E70301**

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## **I) Introduction**

This report is meant to summarize the completed goals from the U.S. Environmental Protection Agency (EPA) Wetlands Program Development Grant #00E70301. The grant was received on December 22, 2008 and hiring for the Grant was completed on March 15, 2011 (delayed hiring was due to a State hiring freeze). This grant enabled the Department of Natural Resources (DNR) to move the State's mitigation program forward primarily by updating the 2002 *Guidelines for Wetland Compensatory Mitigation in Wisconsin* (hereafter, *Guidelines*) and by updating old guidance documents and program implementation documents. In addition to rewriting the *Guidelines*, the DNR mitigation program updated the mitigation tracking database, increased interagency communication on mitigation, and implemented new mitigation laws into the State's mitigation program by updating internal staff guidance, conducting trainings, and creating multiple public outreach and education tools.

Since 2008 with the establishment of the Federal Rule for Compensatory Mitigation for Losses of Aquatic Resources, the State of Wisconsin has seen many changes in the mitigation program. Since receiving the EPA grant, the State Legislature passed the 2011 Wisconsin Act 118 requiring mitigation for any DNR wetland individual permit, which was a significant change to the State's wetland program which heretofore had not required mitigation for permitted wetland impacts. The federal and state regulatory mitigation changes resulted in the 2002 version of the *Guidelines* being out-of-date and no longer an effective tool for communicating mitigation requirements and best practices to the regulated public. Therefore, the five agencies currently making up the Interagency Review Team (IRT) for wetland mitigation banks in Wisconsin (the U.S. Army Corps of Engineers (USACE), DNR, EPA, U.S. Fish and Wildlife Service (FWS), and Natural Resources Conservation Service (NRCS)) underwent the task of updating the *Guidelines*.

The new state and federal mitigation regulations and subsequent *Guidelines* update also spurred the need for staff training, new internal program documents/tools, a new mitigation tracking database, and new outreach/education tools for the public (such as an updated website, educational handouts, and additional mitigation training workshops). The DNR moved forward with each of these goals to make sure that not only was the State's program consistent throughout the state but also consistent, to the greatest extent possible, with the USACE's regulatory mitigation program.

## **II) Changes to Mitigation Rules and Regulations**

Less than six months after the Mitigation Specialist was hired under this Grant, the State of Wisconsin Legislature passed the 2011 Wisconsin Act 118 which obligated the Wisconsin DNR to require mitigation for unavoidable wetland impacts permitted with a Wetland Individual Permit. This significant change to the State's wetland laws resulted in an overhaul of the DNR's wetland mitigation program.

Significant changes to Section 281.36, Wisconsin State Statute, as a result of 2011 Wisconsin Act 118, included: 1) requiring mitigation for unavoidable wetland fills for wetland individual permits, 2) switching the preference of mitigation options from preferring permittee responsible over purchasing bank credits to preferring the purchasing of bank credits or opting into the in-lieu fee program (if/when it is established) over permittee-responsible mitigation, 3) making the minimum mitigation ratio 1.2 credits for every 1 acre of impacted wetlands, and 4) requiring the State to develop a watershed approach to mitigation consistent with the Federal Rule. These statute changes required the DNR mitigation staff to update many of the program's working documents, training tools, and programmatic procedures. First, all DNR Waterway and Wetland Program staff and Water Management Specialists (WMS) were updated with the mitigation program changes and DNR mitigation staff presented field staff with the new process steps in the DNR Waterway and Wetland Handbook, Chapter 200: Wetlands, Section VI: Compensatory Mitigation for Individual Permits. This Handbook chapter outlined in a step-by-step process how the DNR WMS staff and the wetland mitigation staff would work together with the applicant to process wetland individual permits in a timely and consistent manner.

Timing of state statute changes allowed the *Guidelines* update to incorporate both federal and state program changes into the document concurrently. Prior to the *Guidelines* being completed, it was imperative that the State determine how best to implement the statute changes into the State's mitigation program first.

State and Federal law/rule changes resulted in some parts of Chapter NR350, Wisconsin Administrative Code being no longer valid. For example, the minimum ratio established in Section 281.36 is 1.2:1 but NR 350 allows for as low as 1:1; it is understood that the changes to Section 281.36 supersede the older NR 350. Knowing that at some point, Chapter NR 350 will need to be updated, the DNR Mitigation Specialist also identified ways to bring this rule into compliance with new laws. See Appendix A.

### **III) Coordinate State's Mitigation Data Tracking**

The DNR's mitigation tracking database was first developed in 2002 and subsequently revised in 2005 and 2006 and has been used for years to track all forms of state-regulated mitigation projects, including mitigation banks, permittee-responsible mitigation projects, and mitigation bank credits and debits. DNR mitigation staff input data into this program as projects were received and later approved. With the law changes making mitigation a requirement for Wetland Individual Permits, the database required an overhaul.

Between 2008 and 2011, the DNR's mitigation program was temporarily under-staffed, so with the hire of the Mitigation Specialist in 2011, the DNR began the process of updating the mitigation tracking database by surveying the database, an Access database, for inconsistencies, missing information, delinquent information, and trends. In addition, the Mitigation Specialist compiled folders or updated and organized old folders for each mitigation project to combine

like documents in chronologic order. As each project was filed and updated with new documents and correspondence records, the corresponding electronic file in the Access database were completed. For the files that were missing information, the Mitigation Specialist worked with DNR staff (and sometimes USACE staff) to gather the needed data.

After the new state law was passed, it became clear that the Access database was soon to be out-of-date as new steps were created in the permit review and approval process, new timelines on permits were expected, and additional coordination with the DNR Water Management Specialists (WMS) was needed. The Mitigation Specialist identified the ways in which the current Access database was no longer functional and identified other ways to make the database more streamlined and relevant given the new state statute and resulting processes. Using these ideas, a new database will be developed in the next fiscal year to address these needs; this database will be incorporated into the current DNR WMS Waterway & Wetland Permit Tracking Database. By incorporating this information and linking it to the permit database, the mitigation staff will be able to share information with the WMS staff quicker and more efficiently. In addition, mitigation and permit data could be more easily shared with the USACE project managers, which will facilitate consistent regulatory approaches from both state and federal agencies. See Appendix B for specific recommendations on how to increase the usefulness of the mitigation tracking database.

In addition to working with the DNR's wetland tracking database, the Mitigation Specialist worked with the USACE mitigation tracking staff who manage the Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) website. This USACE-managed website is used to inform the public of the availability of mitigation banks and in-lieu-fee programs throughout the country. In addition, the RIBITS website has the ability to offer additional information to IRT members and regulators through a password protected version of the website; this site is used to share IRT documents and track credits and debits. The RIBITS database is new to Wisconsin in recent years and lacked many specifics that would be useful to new users and regulators. The RIBITS website was updated in 2013 with much of the new or missing information identified by the DNR's mitigation staff. The RIBITS webpage will serve as the "official" tracking database of all mitigation credits released to banks and sold to permittees in Wisconsin starting in 2013.

The DNR is also responsible for tracking and reporting on the mitigation program to the state legislature in biennial reports. The DNR submitted the 2011 biennial report which reported on the State's mitigation program from 2007 through the end of 2010 (see Appendix A); the DNR Mitigation Specialist position was vacant for multiple years, so the 2011 report was used to report on the prior four years of DNR-authorized mitigation. This report was also made available to the public on the DNR website. The 2013 biennial report is in the process of being written and submitted. When complete, the 2013 report will be submitted to the legislature for review and posted on the DNR website.

#### **IV) Internal Mitigation Regulation Training**

Before the new law went into effect, the DNR mitigation staff held a Waterways and Wetland training workshop to update the field staff about the new changes ahead and how mitigation processes would be changing after the statute's effective date of July 1, 2012. This was a chance to educate the staff on how mitigation would be handled for each Individual Permit but also an opportunity for the staff to give the mitigation staff feedback on their questions and concerns; the result was a mitigation permit process that could be implemented quickly and efficiently.

The DNR mitigation specialist also generated training tools for other DNR mitigation staff such as template letters for various stages throughout the permittee-responsible and mitigation bank approval process, instructions on how to process a conservation easement for mitigation projects, process flowcharts, training PowerPoint presentations, mitigation bank project tracking files, and numerous mitigation maps.

#### **V) Public Mitigation Training and Outreach**

Public education and outreach was conducted as soon as the new law went into effect. The DNR mitigation staff started by updating the Wetland Mitigation webpage, <http://dnr.wi.gov/topic/Wetlands/Mitigation/index.html>, with information about how new mitigation regulations would change the day-to-day permit process. Training sessions were held for wetland professionals to update them on mitigation processes and the *Guidelines*.

##### *1) Website Fact Sheets and Tools*

To aid in the move from operating under Section 281.37, Wisconsin State Statute, for mitigation to the new Section 281.36 prior to the *Guidelines* being completed, Mitigation staff created and posted additional tools on the website to help the public better understand expectations for a complete wetland individual permit submittal. Documents created included: 1) the "Individual Permit (IP) Wetland Mitigation Applicant Process" document, a one-page document outlining the expected processes for meeting required mitigation through the credit purchase process or the permittee-responsible process and 2) the "Mitigation Submittal Requirements for a Permittee-Responsible Individual Permit (IP) Application", which is a list of the required information that would be requested for a complete compensation site plan.

The DNR also compiled a fact sheet for public use entitled, "Starting a Wetland Mitigation Bank: What You Need to Know" with the basic information regarding the steps involved and expectations for establishing a wetland mitigation bank. This document was placed on the website for public use. The fact sheet also references additional tools on the website such as general mitigation information, information about how to utilize the DNR Surface Water Data Viewer's (SWDV) Potentially Restorable Wetlands (PRW) layer for bank location siting, and

contact information for both the DNR Mitigation Coordinator and USACE project manager staff. See Appendix C.

Information was added to the DNR wetland mitigation webpage for how to utilize the Surface Water Data Viewer for purposes of the mitigation program. Information was added to describe how to use the PRW layer to identify potential permittee-responsible project sites or mitigation bank sites. After discussions with the SWDV webpage manager, the DNR mitigation staff are hopeful that the new Guidelines'-defined bank service area (BSA) layer will be added to the SWDV by 2014. Having this layer readily available to the public will help potential IP applicants and wetland bank sponsors to identify which BSA their project is located in.

## 2) *Training Sessions*

In March of 2013, the DNR wetland mitigation staff held additional training at the Critical Methods seminar for wetland consultants about the new changes to the mitigation regulations and how those would be incorporated in the updated *Guidelines*. Mitigation staff discussed how the *Guidelines* were updated and that the *Guidelines* would outline a process that was agreed-upon by both regulatory agencies in Wisconsin, the USACE and the DNR, so that wetland fill applicants would almost always be required to meet mitigation requirements through the same process for both federal and state permits.

## **VI) Interagency Coordination**

The DNR mitigation staff prioritized interagency coordination and communication, especially after the new state laws went into effect. With two agencies requiring mitigation for many of the same permits (USACE and DNR), communication between the two regulatory agencies was integral to implementing changes quickly. The DNR has also worked extensively with the USACE and other IRT agencies to increase communication and develop more consistent methods in processing mitigation banks.

The DNR and Wisconsin Department of Transportation (DOT) met to discuss their respective mitigation programs on multiple occasions. The DOT did not feel that the agency was ready to adopt the 2013 *Guidelines*. The DOT is in the process of updating the DOT *Wetland Mitigation Banking Technical Guidelines* document. DNR DOT-liaison staff have indicated that the updated *DOT Technical Guidelines* will be rewritten to be more similar to the 2013 *Guidelines*.

## **VII) The Guidelines**

Rewriting the *Guidelines* was a collaborative effort between the DNR, the USACE, and the EPA; IRT members from the U.S. Fish and Wildlife Service and the U.S. Natural Resources Conservation Service were included in all discussions but provided only limited feedback in the development of the document. Multiple meetings were held to discuss the major issues involved

in the document, such as all aspects of the Watershed Approach, adjustments to the base and adjusted credit ratios, options for meeting required mitigation, and adjustments to the bank service area. After multiple drafts and one public notice period, the *Guidelines* update was completed and published online.

### 1) *Process*

The first task in rewriting the *Guidelines* was to identify what parts of the 2002 version was out-of date due to the state and federal rule changes since the last version. The next step was to create an outline for the new *Guidelines*. Next, the rewrite team identified the multiple issues where state and federal rules differ and determine for each one how the *Guidelines* should address it. Over a period of a few months, the Mitigation Specialist worked with the rest of the team members to incorporate changes into the *Guidelines*. The Mitigation Specialist then disseminated each draft to the rest of the *Guidelines* team for comments. After the agencies involved were satisfied with a draft, the *Guidelines* were public noticed by the USACE on February 13, 2013 and expired on March 15, 2013.

### 2) *Changes from 2002 to 2013 Versions*

Some significant changes were made to the 2002 version of the *Guidelines*, mainly the addition of the Federal Rule-mandated watershed approach and a credit ratio system based on the key aspects of the watershed approach. The *Guidelines* watershed approach is based on three aspects: 1) locational factors, 2) wetland cover type factors, and 3) timing factors. The rewrite team considered many watershed levels as the foundation of the bank service areas (BSA), from the DNR's Watershed Management Unit to various Federal Hydrologic Unit Code (HUC) (including the 8-digit, 6-digit, and 4-digit HUC levels). After long discussions, the *Guidelines* team decided to use the 6-digit HUC with some minor modifications; the one large and two very small watersheds in the Lake Superior Basin were combined into one BSA and the very large Wisconsin River 6-digit HUC was divided into two BSAs along one of the 8-digit HUC watershed boundaries. See Figure 2.1 in the *Guidelines* in Appendix D.

The *Guidelines* re-write team also discussed how best to assign the wetland cover type factors to categorize wetland fill and wetland mitigation sites as in-kind or out-of-kind. The discussions began with assessing if the Wisconsin Wetlands Inventory classification system (consisting of more than 30 wetland types) would be sufficient to determine cover type or if using a more simple categorization (three types: forested, shrub-scrub, and herbaceous types) would be more appropriate in Wisconsin. In the end, the team decided to use the Eggers and Reed (2011) categories; ten wetland community types were divided into the following categories: 1) shallow, open water, 2) marshes (deep marsh and shallow marsh), 3) sedge meadows, 4) inland fresh meadows (fresh/wet meadow, wet to wet-mesic prairie), 5) fens, 6) bogs, 7) shrub swamps, 8) wooded swamps, 9) floodplain forests, and 10) seasonally flooded basins.



Ratio adjustment tables were inserted into the document to outline the expectations for mitigation requirements based on the three factors of the watershed approach. The base ratio was set at 1.2 credits for every acre of permitted wetland impacts (per Section 281.36, Wisconsin State Statutes). For bank credit purchases, the compensation ratio starts at 1.7:1 and then is decreased by 0.25 credits per acre if the credits are purchased from a bank within the same BSA as the permitted fill and is decreased by 0.25 credits per acre if the credits purchases are of the same wetland cover type as the permitted wetland fill. For permittee-responsible mitigation projects, the compensation ratio starts at 1.7:1 for herbaceous and shrub-scrub wetland types and at 1.95:1 for forested wetlands types. These ratios are decreased by 0.25 credits per acre for herbaceous and shrub-scrub types or by 0.5 credits per acre if the mitigation site is established and functioning prior to the permitted wetland fill takes place and decreased by 0.25 credits per acre if the mitigation site results in the same wetland community type as the permitted wetland fill.

Additional minor changes were also made to the *Guidelines* in response to public comments in order to make the document more clear and understandable. Additional information on the process steps required for developing a mitigation bank were added, included timelines that the USACE must adhere to when processing mitigation bank proposals. More detailed information on what constitutes a long term management plan and long term financial assurances was added to the 2013 *Guidelines*. The new version also includes additional document outlines such as outlines for management plans and as-built plans that were not in the 2002 *Guidelines*. Finally, many of the terms and descriptions used in the 2002 version of the *Guidelines* were changed to be consistent with the Federal Rule.

### 3) *Public Comments*

In March of 2013, the USACE and the DNR both sent out public notices asking for the public to review and comment on the draft *Guidelines*. Both agencies accepted comments from the public for a period of one month. Twenty-seven individuals, groups, and organizations submitted comments to one or both agencies. The two regulatory agencies reviewed and processed each comment individually to determine which comments would result in changes to the *Guidelines*. Significant changes were made to the *Guidelines* in response to public input.

Many commenters asking that the definition and implementation of the Federally-mandated watershed approach be discussed in greater detail in the *Guidelines*. The USACE took more of the language directly from the Federal Rule and inserted it into both the body of the *Guidelines* and an additional appendix to provide further background information on how the watershed approach would be used to make regulatory decisions in Wisconsin. Multiple commenters also asked that internal references to state and federal rule/statute be inserted into the body of the text to further define what portions of the *Guidelines* were influenced by law and which were not. Originally these references had intentionally been left out of the document as the writers did not want the document to appear too fractured by the two regulatory agencies, but after many

requests, references were inserted through the document. Many more minor changes were made to the *Guidelines* to further clarify unclear statements, better define broad concepts, and generally create a more usable document for all.

#### 4) *Publication*

After the public comment period ended for the draft document, the DNR and USACE worked diligently to incorporate the necessary and important the requested changes in to the *Guidelines*. The final *Guidelines* was included in a USACE public notice on August 1, 2013. The DNR also notified the public that the document was finalized through a press release on August 1, 2013. Both notices indicated that the *Guidelines* would be implemented by both regulatory agencies and that for one calendar year, there would be an open public comment period. That means that for one year, the USACE and DNR would accept comments on how the *Guidelines* were working; the comment period expires on August 1, 2014. The final draft of the *Guidelines* was put on the DNR website.

### **VIII) *Suggested Science-Based Criteria for Site Selection, Design, and Evaluation of Wisconsin Wetland Mitigation Banks***

Over time, it became apparent to the mitigation team that more guidance on the process of establishing performance criteria for mitigation banks was needed. Much of the time spent trading draft CSPs back and forth with bank sponsors was a result of incorrect or inadequate restoration methods and/or performance standards. If sponsors could access suggested methods and performance criteria for mitigation banks, the time it takes to approve an MBI and CSP may lessen. Therefore, a document spelling out suggested criteria for site selection, design, and evaluation of Wisconsin wetland mitigation banks has been added and is included as an Appendix (see Appendix F).

#### 1) *Process*

A team was convened composed of DNR wetland ecologists, the DNR wetland mitigation coordinator, and Drs. Joy Zedler and James Doherty of the University of Wisconsin-Madison Botany Department to prepare science-based recommendations for the document (see Appendix F). The mitigation specialist worked closely with each member of the team throughout the process of writing the document. Team collaboration was done via e-mail, telephone, informal desk meetings, and formal presentations.

A search of peer-reviewed recent literature was conducted to identify hypotheses and tested methods for wetland restoration. Early in the writing process, it became apparent that there should be three sets of recommendations: one for site selection, another for inclusion in the CSP, and the last for performance standards. Therefore, the document is separated into three sections of recommendations.

The document is currently being reviewed internally and will then be sent to Steve Eggers (USACE St. Paul District) for comments. Once WDNR and USACE agree upon a finalized draft, it will be sent for public notice. The final version of this document will become an appendix to the *2013 Guidelines for Wetland Compensatory Mitigation in Wisconsin*.

## 2) Collaboration with USACE

Since the Compensation Site Plan for wetland mitigation banks is approved by both the DNR and USACE, it is imperative that both agencies agree upon the new recommendations. A meeting was held to discuss a draft of the recommendations. Steve Eggers, from the USACE St. Paul district office attended the meeting via teleconference. Two WDNR wetland ecologists and the WDNR mitigation coordinator also attended. By the end of the meeting, many of the recommendations had been agreed upon by all parties and directions in which to move forward were proposed.

## IX) Recommendations for the Future

The completion of the *Guidelines* was a big success and moved the State's wetland mitigation program forward. Upon the completion and review of the *Suggested Science-Based Criteria*, the *Guidelines* will include robust recommendations for designing and evaluating mitigation banks that are based on peer-reviewed literature. The DNR wetland mitigation program still has development possibilities that would further advance the program in a way that better protected the wetland functions mitigated for and create a more cohesive program.

As the state is in the process of developing an in-lieu-fee (ILF) program, there are ways in which this program and the banking program could be made to complement one another. Primarily, the ILF program and banking program should both be using the same watershed approach. Public feedback from the *Guidelines* public comments expressed a concern that wetland function was being narrowly evaluated based on wetland cover type alone and that every watershed may warrant an independent watershed approach. While the watershed approach taken in the *Guidelines* is clear and meets the requirements of the Federal Rule, there is an opportunity to utilize additional ecological and/or biological tools already in existence at the DNR to take the watershed approach to the next level. These tools, such as the ecological landscapes evaluations, should be evaluated for their ability to be used to further target wetland losses and needs within each BSA.

More attention is being paid to evaluating reference wetland sites to base wetland mitigation site performance standards on, therefore it is important to identify a number of reference sites throughout the state that represent the multiple target wetland plant communities that are capable to being restored, enhanced, created, and/or preserved. One possibility for this is to identify DNR State Natural Areas (SNAs) that have these higher-quality wetlands throughout the state. These wetlands could be studied to better understand the functions that they provide to the watershed and more specifically what is the quality of these sites. Many performance standards for wetland mitigation banks and permittee-responsible mitigation sites are based on

vegetative quality and hydrologic conditions. Vegetation surveys could be completed on the SNA wetlands to measure the following: absolute cover of native species, absolute cover of native hydrophytes, absolute cover of non-native species, absolute cover of invasive species, floristic quality index (FQI), mean coefficient of conservatism (mean C), species richness, species dominance, and woody species absolute cover. Monitoring wells could also be installed throughout the wetland to better understand what hydrologic levels exist in functioning wetlands of every community type; measurements include distance from soil level to saturation, level of flooding, duration of saturation, duration of flooded conditions, number of days of saturation and flooding in the growing season, etc.

Finally, it is important to keep the *Guidelines* as a living document and that includes continuing to take comments on how the permitted-public feels the document is working. It is important to keep this document as up-to-date as possible. For example, if the in-lieu fee program is approved and implemented in the State of Wisconsin, the *Guidelines* should reflect this change in the program.

## **Appendix A. 2011 Biennial Report to Wisconsin State Legislature: Status of Wisconsin's Wetland Compensatory Mitigation Program (2002-2010)**

### **Status of Wisconsin's Wetland Compensatory Mitigation Program (2002-2010)**

*Biennial Report from the Wisconsin Department of Natural Resources  
to the Wisconsin State Legislature*

#### **Purpose of this Report**

The Legislature's wetland mitigation bill of 2000 added to the state's wetland regulatory process the concept of *wetland compensatory mitigation*—restoring, enhancing, or creating wetlands as compensation for permitted adverse impacts to wetlands.

This report provides data on the status and activities of the resulting wetland compensatory mitigation program through December 2010, emphasizing accomplishments and information from the past four years. This is the third status report on the wetland compensatory mitigation program as required by Wisconsin Statute 281.37(5) *Report to legislature. No later than January 31, 2003, and no later than January 31 of each subsequent odd-numbered year, the department shall submit to the legislature under s. 13.172 (2) a report that provides an analysis of the impact of the implementation of this section on wetland resources and on the issuance of permits or other approvals under ss. 59.692, 61.351, 62.231, 87.30, 281.11 to 281.47 or 281.49 to 281.85 or ch. 30, 31, 283, 289, 291, 292, 293, 295, or 299.* The first status report was submitted in 2005 reporting on compensatory mitigation activity from 2002 to 2004 and the second in 2007 reporting on compensatory mitigation activity from 2005 to 2006. The Wisconsin Department of Natural Resources (hereafter 'Department') position of Wetland Mitigation Specialist was vacant from 2008-2010 which is why no status report was submitted in 2009. Key information from this report can also be found on the program's website at: <http://dnr.wi.gov/wetlands/mitigation/currentstatus.html>, where the data is updated quarterly.

#### **History and Introduction**

By unanimous vote, both houses of the Legislature passed companion bills AB 859 and SB 447 in May of 2000, granting authority to the Department to consider wetland compensatory mitigation in its wetland permitting decision process. Compensatory mitigation involves wetland restoration, enhancement, or creation to "compensate" for wetland loss either through projects completed by the applicant or through the purchase of credits from pre-approved mitigation banks. On May 10, 2000, Governor Thompson signed into law, 1999 WI Act 147, which created s. 281.37, Wis. Stats.

Following substantial public and Legislative review, rules required by the statute went into effect on February 1, 2002. The new rules involved revisions to NR 103, the state wetland water

quality standards, and a new administrative code, NR 350, which sets requirements for mitigation projects.

The January 2001 report of the National Academy of Sciences' National Research Council entitled *Compensating for Wetland Losses under the Clean Water Act* outlined ecological and administrative pitfalls made by other states and the federal government in designing and implementing their mitigation programs. Mitigation programs can be expensive to run and often result in compensating losses of high-quality, highly-functioning or rare wetland types with degraded, poorly-functioning wetlands. In many other states, wetland compensatory mitigation is a requirement for each wetland permit decision. In contrast, our state decided that mitigation should be a tool to be considered in certain circumstances to improve the regulatory decision-making process. Wisconsin law does not require applicants to replace every acre of wetland that is impacted, nor does it allow any wetland to be destroyed as long as the applicant attempts to replace it elsewhere. Our wetland mitigation law maintains the important steps of avoiding and minimizing wetland impacts where practicable, consistent with federal law. In Wisconsin, compensatory mitigation adds flexibility for the regulated as well as the regulator, especially in cases where a project impacts a small acreage of low quality wetlands. Most mitigation applicants meet their mitigation obligation at mitigation banks.

### **Recent Accomplishments**

#### **Received EPA Grant to improve program**

The Department applied for and received a US Environmental Protection Agency (EPA) Wetland Protection State Development Grant to hire a three-year, full-time position to improve and manage the wetland compensatory mitigation program. During the next three years, the Wetland Mitigation Specialist will work to bring consistency and efficiency to the mitigation program for applicants, consultants, Department staff, and collaborators. This position will update the wetland mitigation database and website, conduct site inspections of mitigation projects (both individual sites and bank sites), review mitigation proposals, and process conservation easements and financial assurances. In addition, the position will conduct research on the ecosystem functions unique to natural wetlands and how they compare to the functions provided by restored, enhanced, and created wetlands.

#### **Continued Consultant and Department Staff Training**

The Department held a quarterly training session in February of 2007 for Wisconsin DNR Water Management Specialists on wetland compensatory mitigation rules and processes. The Department offered training to consultants and staff on wetland compensatory mitigation at annual Wetland Delineation and Critical Methods classes offered jointly with other agencies through UW-LaCrosse.

### **Mitigation Proposals Received Since 2002**

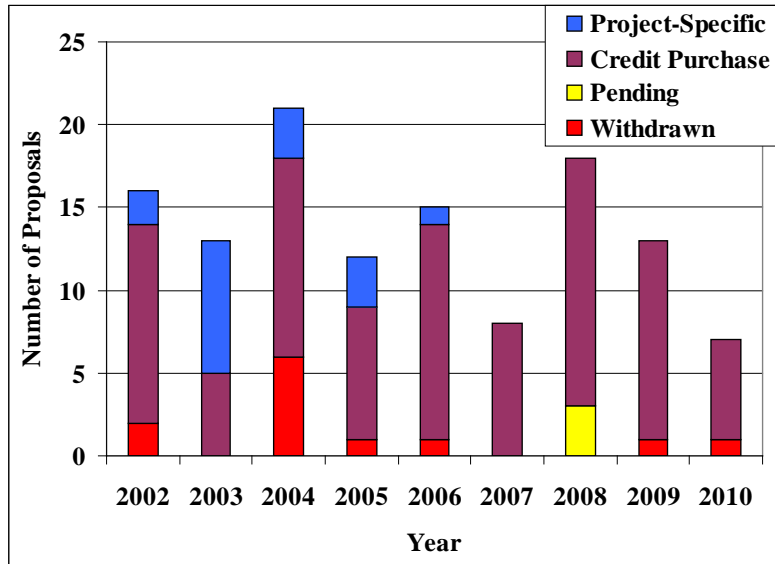
From February 2002 to December 2010, the Department approved 108 water quality certification applications that included compensatory mitigation; 42 of those applications were submitted from January 2007 to December 2010. Table 1 provides a summary of the categories of proposal applications submitted to the Department since the State rules went into effect in 2002. There are four categories of proposals: 1) approved project-specific mitigations are proposals in which the applicant agrees to compensate for the wetland loss by creating, restoring, or enhancing wetlands either at an immediately adjacent plot of land (on-site) or on a nearby plot of land (off-site), 2) approved bank credit purchase are proposals in which the applicant agrees to purchase credits from an approved wetland mitigation bank to compensate for wetland losses, 3) pending proposals are ones that have been submitted as either project-specific or bank credit purchase but the proposal has not been approved by the Department, and 4) withdrawn proposals are those in which the applicant decided to not proceed with the initially proposed project. Eighty-four percent of approved mitigation proposals resulted in the purchase of bank credits; since 2007, 100% of approved applications have resulted in the purchase of bank credits.

**Table 1: Mitigation proposals received from February 2007 to December 2010 and the total number of proposals the program has received since 2002.**

<b>Mitigation Proposal Category</b>	<b>Number of Proposals 2002-2006</b>	<b>Number of Proposals 2007-2010</b>	<b>Total Number of Proposals 2002-2010</b>
Approved Project-Specific Mitigation	17	0	17
Approved Bank Credit Purchase	49	42	91
<b>Subtotal</b>	<b>67</b>	<b>41</b>	<b>108</b>
Application Pending	0	3	3
Application Withdrawn	10	2	12
<b>Total</b>	<b>77</b>	<b>46</b>	<b>123</b>

Figure 1 provides information about the number and category of mitigation proposals received each year. Data is broken down by year and by category of project. Credit purchases make up the majority of projects in almost all years. Three projects remain listed as “Pending”; the Department received proposals for each of these pending projects but since then we have not received any documents showing that on-site construction was completed, bank credits were purchased, or that the project sponsors plan to withdraw the proposal.

**Figure 1. Number and category of compensatory mitigation proposals from 2002 to 2010. Each year's data is broken down into four categories of proposals: 'Project-Specific', 'Credit Purchase', 'Pending', and 'Withdrawn'.**



**Mitigation Proposals Processing Time (2007 - 2010)**

A Department central office Mitigation Specialist conducts the mitigation review, while a regional Water Management Specialist reviews the water quality certification application and alternatives analysis. However, the Mitigation Specialist cannot begin review of the mitigation proposal until the Water Management Specialist makes a preliminary decision that wetland compensatory mitigation can be considered under Chapter NR 103, Wisconsin Administrative Code. What constitutes a complete mitigation plan depends on what mitigation project path is proposed by the applicant. Different plan elements are required for the three mitigation paths of project-specific on-site, project-specific off-site and bank credit purchases. The elements of a complete mitigation application are shown in Table 2.

**Table 2: Elements of a complete mitigation application by project path**

<b>Project-Specific On-site</b>	<b>Project-Specific Off-site</b>	<b>Bank Credit Purchase</b>
<ol style="list-style-type: none"> <li>1. Mitigation Summary Sheet &amp; Start Review Memo</li> <li>2. Compensation Site Plan</li> <li>3. Conservation Easement</li> <li>4. Financial Assurance</li> </ol>	<ol style="list-style-type: none"> <li>1. Mitigation Summary Sheet &amp; Start Review Memo</li> <li>2. Documentation of No On-Site Opportunity</li> <li>3. Compensation Site Plan</li> <li>4. Conservation Easement</li> <li>5. Financial Assurance</li> </ol>	<ol style="list-style-type: none"> <li>1. Mitigation Summary Sheet &amp; Start Review Memo</li> <li>2. Documentation of No On-Site Opportunity</li> <li>3. Bank Purchase Affidavit</li> </ol>

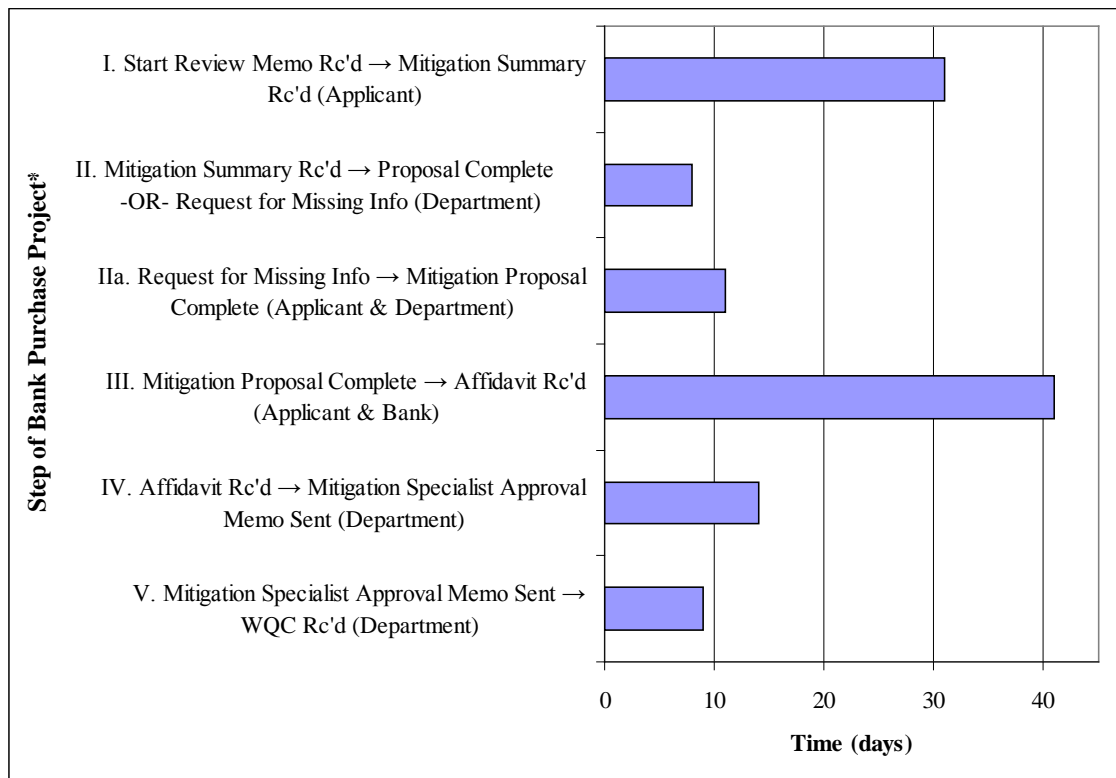


All documentation in the mitigation plan must be of sufficient quality and clarity that it is possible for the Department to prepare a list of specific revisions that must be made for the mitigation application to be approved. The mitigation application can then be approved once the revisions have been made and the finalized legal documents (including a conservation easement and financial assurance, or the affidavit of bank credit purchase) have been received.

Applicants and consultants who are experienced in preparing mitigation proposals and who follow the mitigation guidelines closely are more successful in getting their mitigation proposal approved quickly. When incomplete packages are received the mitigation review process slows greatly. It also slows the process when finalized documents are not submitted promptly.

Since the 2007 Report (based on the program’s status for 2005 and 2006), the average overall time it took for a mitigation review process has decreased from 123 days to 100 days. The 2007 Report’s time of 123 days is an average of all projects, including on-site and off-site projects which have a longer review time; the current report had no on-site or off-site projects during the reporting time. In addition, the average time of 100 days is skewed by one project that was the result of an enforcement case which lasted longer than all other bank credit purchases.

**Figure 2. Average time for each step in bank credit purchase projects (2007 to 2010)**



\* The arrow (→) indicates the transition time between two important steps. The party listed in the parentheses indicates who was responsible for action during the given time period.

The process for purchasing mitigation bank credits and the average time for each step is shown in Figure 2. A description of each step is provided below.

- I. The first step in the process was to receive the “Start Review Memo” from the Department’s Water Management Specialist and the “Mitigation Summary Sheet” from the applicant. This process requires the applicant to get all the application information and materials to the Water Management Specialist and Mitigation Specialist. Often these documents were not received at the same time and required the Department to request the missing document from the applicant.
- II. Once the “Start Review Memo” and the “Mitigation Summary Sheet” was received by the Mitigation Specialist, a letter was sent to the applicant either: 1) approving that all necessary information was received and indicated that the proposal was approved (proceed to step III, below) or not approved or 2) indicating that missing information be provided before the application could be considered complete (applicant had the extra step of IIa, below).
  - IIa. *This step is only required in cases where missing information was requested.* Once the letter requesting missing information was sent, the applicant must provide the Mitigation Specialist with the missing information. When all information was received, the Mitigation Specialist could determine that the application was approved or not.

When an application was approved, a letter was sent to the applicant notifying them that their proposal was approved and that they must purchase bank credits.
- III. The applicant then purchased bank credits from a pre-approved wetland mitigation bank. Then the bank manager sent a copy of the credit purchase affidavit to the Mitigation Specialist.
- IV. Once the Mitigation Specialist received the affidavit, an approval memo was sent to the Water Management Specialist approving the release of the Water Quality Certification.
- V. The Water Management Specialist then granted the Water Quality Certification to the applicant.

The process of purchasing bank credits relies on efficient communication and response from the Department, the applicant (or a consultant on behalf of the applicant), and the mitigation bank manager. Based on the times outlined in Figure 2, the Department’s processing and reviewing time took approximately 32% of the 100 day average, the applicant was responsible for approximately 50% of the time, and the bank manager was responsible for the remaining 18% of the time.

The longest step was waiting for the applicant and the bank to work together to complete the transfer of funds and provide the Department with the credit purchase affidavit. The Department will make the process of credit purchase simpler for the applicant by creating training materials available on the Department website. In addition, the Department will use a new tool created by the Army Corps of Engineers, that tracks credit purchases online decreasing the time between the Department approval of credit purchase and when the affidavit is received.

The second longest step was acquiring the required proposal documents from the applicant. The Department intends to sponsor training for the Water Management Specialists who are the first contact for applicants. This training would provide staff with tools necessary to make clear the initial steps for applicants, so that all materials needed are provided quickly. The Department plans to streamline and clarify the steps taken by the applicant to reduce the overall time to acquire bank credits for mitigation projects.

### Permitted Wetland Loss

Table 3 shows a summary of the state-wide loss of wetlands from Department approved and permitted compensatory mitigation proposals. Sixty-three percent of all permitted wetland losses from 2002 to 2010 are compensated through the purchase of mitigation bank credits. All permitted wetland losses in the last four years (2007 to 2010) were compensated through the purchase of mitigation bank credits. On average, the permitted acres lost per proposal is 1.4 acres for project-specific proposals and about one third that for bank credit purchase proposals at 0.5 acres lost per proposal. Of all approved compensatory mitigation projects, 88% involve wetland fills less than one acre.

**Table 3: Acres lost by approved applications that included a compensatory mitigation proposal from February 2002 to December 2010. The subset of mitigation data from January 2007 to December of 2010 are shown in parentheses.**

Type of Mitigation Approved	Total permitted wetland acres lost		Average acreage loss per proposal		Range of wetland impact acreage	
	'07-'10	'02-'10	'07-'10	'02-'10	'07-'10	'02-'10
<b>Project-specific Proposal</b>	0	23.4	n/a	1.4	n/a	0.07 – 14.3
<b>Bank Credit Proposal</b>	15.5	40.7	0.4	0.5	0.01-1.9	0.01 – 2.9
<b>Total Mitigation Acres</b>	<b>15.5</b>	<b>64.1</b>	<b>0.4</b>	<b>0.6</b>		

## **Compensation Acreage**

Mitigation projects require compensation at ratios of 1.5:1, though the rules allow for 1:1 compensation on a case-by-case basis. From 2002 to 2010, 32% of bank credit purchases were approved with a compensation ratio of less than 1.5:1 and the remaining 68% were approved at a ratio of greater than or equal to 1.5:1. A total of 58.15 credits have been purchased from mitigation banks as a result of the state program between 2002 and 2010. Between 2007 and 2010, 23.12 acre credits were purchased from approved mitigation banks.

Since 2002, there have been a total of 17 project-specific wetland mitigation proposals approved. Ten projects have completed the required monitoring periods and were found to meet all stated project performance standards. The 10 completed projects represent a total of 4.8 acres of filled wetlands. These projects initially proposed restoration, enhancement, and creation of 23.5 acres of wetland and enhancement of 33.7 acres of associated upland buffer communities. At the end of the monitoring process, a total of 20.0 acres of wetlands (and 11.6 acres of upland buffers) were created, restored, or enhanced from these 10 completed projects. Enhanced wetlands made up roughly 16% of the wetlands mitigated through the Department and, therefore, do not represent a gain in wetland acreage but an improvement in function such as plant species diversity, wildlife habitat, water quality enhancement, or flood-water storage.

If the remaining 7 uncompleted project-specific mitigation sites (which represent a total of 18.6 acres of wetlands filled) approved between 2002 and 2010, are successful in producing what the project proposals plan, then a total of 28.9 acres of wetlands would be restored, enhanced, and created and 10.5 acres of upland buffers would be enhanced. Many of the mitigation projects are still in the construction stage or have not completed the monitoring phase of 5 to 10 growing seasons required post-construction. It is difficult to predict what ecological community will result from a wetland restoration or creation; we cannot report final wetland acreages until monitoring periods are completed. Mitigation projects are formally delineated for wetlands at the end of the monitoring period. If the trend holds from the ten completed project-specific sites, restoration, and creations are roughly half as successful as initially proposed, suggesting that project site managers should aim to restore or create at least twice the number of acres that is required by Chapter NR 350, Wisconsin Administrative Code.

## **Mitigation Banks**

By law, when an applicant does not have feasible opportunities for on-site restoration of wetlands (defined by rule as within ½ mile of the wetland loss), that applicant may opt to purchase credits from a pre-authorized bank. Banks are established through a process that is separate from the wetland regulatory decision-making. Bank sponsors can develop bank sites mainly by restoring wetlands and receiving agency approval from the interagency Mitigation Bank Review Team (MBRT is comprised of the Department of Natural Resources, US Army Corps of Engineers, US Environmental Protection Agency, US Natural Resources Conservation Service and US Fish and Wildlife Service) to be in the business as suppliers of mitigation credits. These credits are accrued by completing wetland projects successfully, as defined by mutually agreed upon criteria in the site plan. “Debits” occur when an applicant for a wetland fill permit

purchases credits from a bank at a price per acre determined by the bank sponsor. Bank sponsors have included private companies, non-profit organizations and local governments. The remaining two banks, Glacier Ridge and Emerald Park, have not completed the construction phase and, therefore, have not had any credits released by the MBRT.

The Department maintains a registry of approved banks with credits for sale (available at: <http://dnr.wi.gov/wetlands/mitigation/mitigationbanks.html>).

### **Banks Established Prior to WI Act 147**

The US Army Corps of Engineers (ACOE) approved four banks in Wisconsin prior to passage of the 2000 state law. One of these banks is the bank for Wisconsin Department of Transportation that now includes over 30 individual sites across the state. The other three banks only include one site and had all their credits have been released by ACOE.

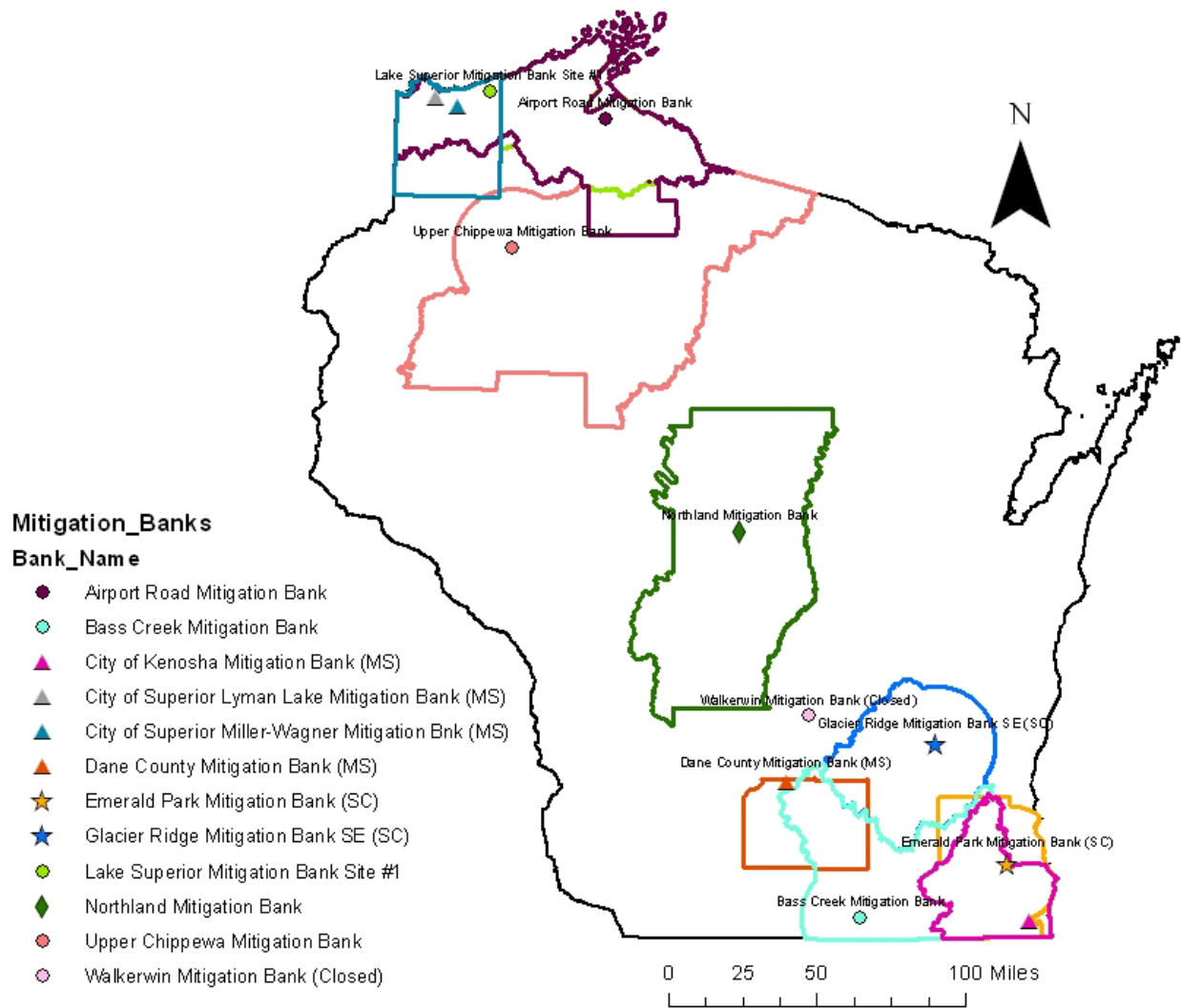
1. A bank site for Dane County, near Lodi, is used only by the county and other municipalities in the county for public projects. By the end of 2010, this bank had 21.65 credits remaining out of the 46.93 credits approved.
2. Walkerwin Bank in Columbia County operated by the Wisconsin Waterfowl Association. This bank has sold out of the 97.75 initially approved credits.
3. Northland Cranberry Bank in Wood County operated by Legacy Bogs, Inc. At the end of 2010, this bank had 84.17 credits remaining out of the 130.15 approved credits.

Chapter NR 350. Wisconsin Administrative Code, recognized that the latter two private banks were operating in good faith before the state rules went into effect and thus were “grandfathered” to allow them to continue to sell credits on a statewide basis. The concept for grandfathering the two pre-existing banks was recommended by the Senate Committee on Environmental Resources. As such, the rules required these grandfathered banks to sign a Memorandum of Understanding (MOU) with the Department that allowed them to sell statewide, but required them to facilitate wetland restoration projects in the Geographic Management Unit (GMU) of their customers, where the wetland loss occurs. Both banks are in compliance with their respective MOUs. All areas of Wisconsin are currently serviced by at least one mitigation bank. Since Walkerwin Bank has sold-out its credits, the Northland Cranberry Bank is the only bank that is still allowed to sell credits state-wide.

### **Banks Approved After 2002**

Banks created after 2002 are allowed to sell credits within the same county as the bank, within 20 miles of the bank site, and anywhere in the major water basin, or GMU of the bank. The Chapter NR 350, Wisconsin Administrative Code, service areas of private and county mitigation banks are depicted in Figure 3. Since February 2002, the Department and the interagency MBRT have approved five banks. Three of these wetland mitigation banks (Upper Chippewa, City of Superior Lyman Lake, and Lake Superior Site #1 Banks) have completed construction of the bank site and have received approval to sell a portion of their credits.

**Figure 3. Private and county wetland mitigation banks and their service regions.**



\*There are two Single-Client (“SC”) banks indicated with a star that only sell credits to one client. There are four Municipality-Specific (“MS”) banks indicated with a triangle that only sell credits within a specific municipality. The remaining banks are General-Use banks, indicated with a circle, which can sell credits to any buyers within the outlined service area (comprised of a 20-mi radius, county of bank, and GMU of bank). Northland Mitigation Bank, indicated with a diamond, is the only bank that can sell credits to buyers outside of the outlined service area.

1. Upper Chippewa located near Hayward (total of 41.5 mitigation credits)  
 This is a general use bank (credits available for the public). By the end of 2010, the MBRT had released 12.45 credits to the Upper Chippewa bank sponsor, Alf Sivertson, and the bank had sold 11.27 of those credits. This bank has a seven-year monitoring period starting in 2005 and ending in 2011.

2. City of Superior's Lyman Lake Road Mitigation Bank in Douglas County (total of 79.95 estimated mitigation credits)

This is a municipality-specific bank in that it was developed to only sell credits to the City of Superior and/or Douglas County. By December of 2010, 10.633 credits have been made available for the bank sponsor, the City of Superior, and 5.347 credits had been sold.

3. Lake Superior Site #1 in Douglas County (total of 29.14 estimated mitigation credits)

This bank is a general use bank. The bank document was signed and approved by the MBRT in July 2010. Currently, 5.828 credits have been released by the MBRT to the bank sponsor, Alf Sivertson, to sell; no credits have been sold by the end of 2010.

4. Glacier Ridge near Horicon (total of 42.27 estimated mitigation credits)

This is a single client bank (credits only available for the Veolia Environmental Services Company, the bank sponsor) consisting of two sites: a Southeast site (23.88 credits) and a Northeast site (18.39 credits). The bank sponsor has informed the MBRT that construction of the Southeast site was completed in 2006. The MBRT approved the release of 30% of the credits in 2008, but with a warning that the floristic quality of the site was too low and should be improved before more credits would be released. The MBRT also stated that after the fifth year of monitoring, the MBRT would re-assess the number of wetland mitigation credits that the site warrants. As of December 2010, the bank sponsor had not yet begun construction at the Northeast site.

5. Emerald Park near Mukwonago (total of 43 estimated mitigation credits)

This is a general use bank. Construction and planting was completed at this site in 2008 but the as-built report was not received by the Department until March 2010. This bank will have 20% of its credits released when the MBRT receives the finalized financial assurance and conservation easement which by the end of 2010, the Department has not yet received. It has been suggested that this bank be changed from a general use bank to a single client bank with credits only available to Veolia Environmental Services Company; this change has not been made official.

### **Banks Under Review**

The Department is currently reviewing four proposals for new banks.

1. Bass Creek Mitigation Bank in Rock County

This is proposed as a general use mitigation bank. The MRBT received the bank document in June 2010 and has been submitting concerns and requests for revisions since then. The MBRT plans to meet in April 2011 to discuss any remaining issues with the bank document, before it can be approved.

2. Airport Road Mitigation Bank in Ashland County

The bank prospectus for this site was received in 2009. It is proposed as a general use bank.

A site visit was performed in November 2009. The MBRT requested a revised prospectus which was under review in December 2010.

3. City of Kenosha Mitigation Bank in Kenosha County

The bank prospectus for this site was received in August 2008. This site is proposed as a municipality-specific bank; the City of Kenosha is the bank sponsor and they plan to sell credits to projects in the City of Kenosha boundaries. The Department sent comments on the Draft plan to the project consultants and as of December 2010 was awaiting an updated plan.

4. City of Superior's Miller-Wagner Creek Mitigation Bank in Douglas County

The site plan for this bank was received in April 2010 and as of December 2010 was still under review by the MRBT. This bank is proposed as a municipality-specific bank that would only sell credits to clients in the City of Superior.

### **Wetland Compensatory Mitigation Compliance**

Approved wetland mitigation banks and project-specific sites all have monitoring periods that last from 5 to 10 years, depending on the project's size and goals. During that period, bank and project sponsors are responsible for implementing their monitoring and maintenance plans and submitting a pre-determined number of monitoring reports to the Department. The monitoring report submitted at the end of the final year in the monitoring period must demonstrate that all of the performance standards (quantitative success criteria determined prior to project implementation) have been met.

Monitoring compliance of mitigation banks and project-specific sites is a must for a well functioning compensatory program. In the mitigation database, staff track when monitoring reports are due and received. Reminder letters are sent to project sponsors when monitoring reports are not received on time. A Department wetland ecologist reviews every monitoring report received for compliance with Chapter NR 350.09, Wisconsin Administrative Code, and completeness according to requirements outlined in individual compensation site plans. Some monitoring reports are missing information and/or are submitted much later than the expected date. When monitoring reports are deficient or late, the Department will send a letter to the project or bank sponsors outlining the issues to be addressed and how to handle future reports.

Site inspections are important to verify accuracy of information found in a monitoring report. Most project-specific sites and bank sites are visited by a Department wetland ecologist every year and all sites are visited at least every other year. While the Department is hopeful that inspecting each mitigation site every year will not be necessary in the long run, inspection results thus far indicate that annual inspections are warranted. During site inspections, Department staff noted many problems with exotic or invasive vegetation colonizing mitigation sites. Only a few mitigation sites were properly implementing maintenance plans to address this problem, and many monitoring reports had understated or inadequately addressed the extent of exotic plant



invasions found on-site. Most mitigation sites have performance standards limiting the acceptable amount of invasive or exotic plant species that can be present within the site and early detection and removal of such species is critical for mitigation site success. All sites have at least one invasive species present and most sites are actively attempting to reduce the presence and/or cover of the invasive plant(s). Thus, the Department needs to take an active role in inspecting sites and notifying project sponsors of problems.

All sites in their final monitoring year were visited and evaluated prior to their release from further mitigation, maintenance, and monitoring obligations. All completed site-specific projects and closed bank sites continue to be protected by conservation easements and some continue to be maintained and managed by their project sponsors.

In order to improve site compliance, the mitigation specialist who reviews project proposals in 2011 and 2012 will require maintenance plans and monitoring plans to be developed in greater detail to assure that the project sponsors promptly respond to site problems.

### **Program Goals for 2011 and 2012**

In 2008, the Department applied for and received a USEPA Wetland Protection State Development grant to improve the wetland compensatory mitigation program. This grant will fund a three-year position that started in early 2011; the position will manage the wetland compensatory mitigation program, provide trainings to Department staff and partner organization staff, and continue the study of wetland functions in enhanced, restored, and created wetlands in Wisconsin.

The goals of the compensatory mitigation program for 2011 and 2012 are to:

1. Develop methods to work closely with other state and federal mitigation agencies to increase communication, decrease the overall application time, and provide clearer understanding of mitigation decisions and reporting/tracking processes.
2. Provide guidance and training for Department and partner organization staff on the compensatory mitigation process and how to make program delivery consistent statewide.
3. Compare and standardize functional assessment tools used in site evaluation.
4. Continue to oversee Wisconsin's Wetland Compensatory Mitigation Program, develop methods for making the program delivery more efficient, and provide training and dialog with applicants.

Achievement of these goals will streamline decision-making, increase consistency and transparency for applicants and staff, and improve the quality of future wetland compensatory mitigation projects.

## Appendix B. Recommended Changes to Chapter NR 350, Wisconsin Admin. Code

NR 350 – Recommended Changes Federal Mitigation Rule and Wisconsin Statute 281.36

Sally Gallagher, DNR Mitigation Specialist

Draft from July 1, 2013

The following changes are recommended to Chapter NR 350, Wisconsin Administrative Code based on the publication of the Federal Mitigation Rule (33 CFR Part 332) in 2008 and changes to Section 281.36 of the Wisconsin Statutes (per 2011 Wisconsin Act 118).

- NR 350 – Changes to make throughout the document
  - Per 33 CFR Part 332: Replace the term “MBRT” with “IRT”.
  - Per Section 281.36: Replace the phrase “restoration, enhancement or creation” with “restoration, enhancement, preservation or creation”.
  - Per 33 CFR Part 332: Replace the term “Project-specific” with “Permittee-responsible mitigation”.
- NR 350.03
  - Per 33 CFR Part 332: Replace “Bank document” with: “*Mitigation banking instrument* means the legal document for the establishment, operation, and use of a mitigation bank.”
  - Per 33 CFR Part 332: Replace “Bank sponsor” with: “*Sponsor* means any public or private entity responsible for establishing, and in most circumstances, operating a mitigation bank or in-lieu fee program.”
  - Per 33 CFR Part 332: Replace “Compensation or Compensatory Mitigation” with: “*Compensatory mitigation* means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of wetland resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.
  - Per 33 CFR Part 332: Replace “Compensation search area” with: “*Service area* means the geographic area within which impacts can be mitigated at a specific mitigation bank or an in-lieu fee program, as designated in its instrument.”
  - Per 33 CFR Part 332: Replace “Creation” with: “*Creation* means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Creation results in a gain in wetland resource area and functions.”
  - Per 33 CFR Part 332: Replace “Enhancement” with: “Enhancement means the manipulation of physical, chemical, or biological characteristics of a wetland resource to heighten, intensify, or improve a specific wetland resource function(s). Enhancement results in the gain of selected wetland resource function(s), but may also lead to a

decline in other wetland resource function(s). Enhancement does not result in a gain in wetland resource area.”

- Per 33 CFR Part 332: Replace “Mitigation bank or bank” with: “*Mitigation Banking* means a system of accounting for wetland impacts and compensation that includes sites where wetlands exist in perpetuity. These wetlands provide transferable credits to be subsequently applied to compensate for adverse impacts to other wetlands authorized by State and Federal permits. In general, a bank sells credits to permittees whose compensatory mitigation obligations are then transferred to the bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.”
- Per 33 CFR Part 332: Replace “Mitigation bank review team” with: “*Interagency Review Team (IRT)* means an interagency group of federal, tribal, state, and/or local regulatory and resource agency representatives that reviews documentation for, and advises the district engineer on, the establishment and management of a mitigation bank or an in-lieu fee program. [Prior to the 2008 federal mitigation rule, this team was known in Wisconsin as the Mitigation Bank Review Team (MBRT).]”
- Per Section 281.36: Change “Mitigation project” to read: “Mitigation project means the restoration, enhancement, creation, or preservation of wetlands to compensate for adverse impacts to other wetlands. “Mitigation project” includes using credits from a wetland mitigation bank.”
- Per 33 CFR Part 332: Replace “Project-specific” with: “*Permittee-Responsible Mitigation* means an aquatic resource restoration, enhancement, creation and/or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility.”
- Per 33 CFR Part 332: Replace “Performance standards” with: “*Performance Standards* means observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives. [Performance standards are agreed to in advance by the bank sponsor/applicant and permitting agencies.]”
- Per Section 281.36: Replace “Practicable” with: “*Practicable* means reasonably available and capable of being implemented after taking into consideration cost, site availability, available technology, logistics, and proximity to the proposed project site, in light of the overall purpose and scope of the project.”
- Per 33 CFR Part 332: Replace “Restoration” with: “*Restoration* means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded wetland resource. For the purpose of tracking net gains in wetland resource area, restoration is divided into two categories: re-establishment and rehabilitation.”
- Per 33 CFR Part 332: Add the following definition: “*Rehabilitation* (a form of restoration) means the manipulation of the physical, chemical, or biological

characteristics of a site with the goal of repairing natural/historic functions to a degraded wetland resource. Rehabilitation results in a gain in wetland resource functions, but does not result in a gain in wetland resource area.”

- Per 33 CFR Part 332: Add the following definition: “*Re-establishment* (a form of restoration) means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former wetland resource. Re-establishment results in rebuilding a former wetland resource and results in a gain in wetland resource area and function.”
- Per 33 CFR Part 332: Add the following definition: “*Preservation* means the removal of a threat to, or preventing the decline of, wetland resources by an action in or near those wetland resources. This term includes activities commonly associated with the protection and maintenance of wetland resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of wetland resource area or function. Preservation may only be used to provide compensatory mitigation only when all the following criteria are satisfied: the resources to be preserved provide important physical, chemical, or biological functions and services for the watershed; the resources contribute significantly to the ecological sustainability of the watershed; the preservation is determined to be appropriate and reasonable; the resources are under demonstrable threat of destruction or adverse modifications; and the site will be protected in perpetuity.”
- Per 33 CFR Part 332: Add the following definition: “*In-Kind* means a resource of similar structural and functional type to the impacted resource. [For purposes of this rule, wetland plant communities are used for the in-kind determination. See definition for wetland cover type.]”
- Per the updated *Guidelines*: Add the following definition: “*Wetland Cover Type* means the dominant plant community types used to evaluate in-kind comparisons. For the purposes of this document, all wetlands are arranged in one of eight community types with two additional difficult to replace wetland sub-types broken out as separate categories as described by Eggers and Reed (2011)<sup>1</sup> for a total of 11 community types: 1) shallow, open water, 2) deep or shallow marshes, 3) sedge meadows, 4) fresh (wet) meadows, wet to wet-mesic prairies, 5) calcareous fens, 6) open or coniferous bogs, 7) shrub-carrs or alder thickets, 8) hardwood or coniferous swamps, 9) floodplain forests, and 10) seasonally flooded basins.”
- Per 33 CFR Part 332: Add the following definition: “*Watershed Approach* means an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of wetland resources in a watershed. It involves consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the

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<sup>1</sup> Eggers, Steve D., and Donald M. Reed. 2011. Wetlands Plants and Plant Communities of Minnesota and Wisconsin, Third Edition. U.S. Army Corps of Engineers, Regulatory Branch St. Paul District. 478 pp.

types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of wetland resource functions and services caused by activities authorized by WDNR permits. The watershed approach may involve consideration of landscape scale, historic and potential wetland resource conditions, past and projected wetland resource impacts in the watershed, and terrestrial connections between wetland resources when determining compensatory mitigation requirements for WDNR permits.”

- NR 350.04
  - 350.04(1): Replace the phrase “pre-proposal conference” with “pre-application meeting” and remove the phrase “or during the permit application process”. Mitigation options should first be discussed during the mandatory pre-application meeting.
  - 350.04(3) and (4): 281.36 establishes a preference for mitigation bank credits over the development of “on-site” or “off-site” (now called “permittee-responsible mitigation”). These sections should reflect that reversal of preference.
- NR 350.05
  - 350.05(2): Clarify that this is referring to what we now call “in-kind” mitigation.
  - 350.05(5): Change to read: “Compensation sites shall include a zone of vegetated upland or wetland buffer adjacent to the wetland that the department determines is adequate to filter run-off entering the wetland.”
- NR 350.06
  - Per 281.36, the minimum compensation ratio was raised from 1:1 to 1.2:1.
  - The changes to 281.36 also appear to have made the entire section under 350.06(2)(b) no longer applicable; remove this section. This section refers to the ten types of communities that the “permitted project will not impact.”
  - This section should also address that based on the watershed approach as described in 33 CFR Part 332, adjustments to the credit ratio can be made on the basis of three factors: 1) locational factors, 2) timing factors, and 3) wetland cover type factors.
    - In the Guidelines, we have tables that outline how these factors result in adjustments to the compensation ratio. Locational factors are defined by the mitigation occurring within the same BSA as the permitted wetland fill. Timing factors are defined in the *Guidelines* only in the context of permittee-responsible mitigation: a project is “in-advance” if interim performance standards are met prior to the permitted wetland fill occurring. Wetland cover type factors are defined as “in-kind” if the mitigation project results in the same wetland community type (using the ten community types defined in the *Guidelines* based on Eggers and Reed, 2011) as the permitted wetland fill.
    - I don’t believe it would be necessary to define each ratio adjustment in NR 350, but it would be good to acknowledge that increase above 1.2:1 are expected based on the above criteria.

- Additional increase or decreases (as low as 1.2:1) can be made based on DNR mitigation staff determination as needed.
- NR 350.07
  - 350.07(3): Per 33 CFR Part 332, edit this section to contain two forms of restoration; restoration via re-establishment and restoration via rehabilitation. The new *Guidelines* says that credit for restoration is “up to 1:1”.
  - 350.07(4): The new *Guidelines* says that credit for enhancement is up to 1:1 but typically credited at 0.75:1. Rephrase this section to be consistent with 33 CFR Part 332 definitions of enhancement.
  - 350.07(5): The new *Guidelines* says that credit for creation is up to 1:1 but typically credited at 0.5:1.
  - 350.07(6): Add that credit may be given to vegetated wetland buffers as appropriate (especially if a buffer is needed but no upland buffer exists on the mitigation property).
  - Add a section for preservation. The new *Guidelines* say that preservation can be credited at a ratio up to 0.125:1 and that is what is typically given.
- NR 350.09
  - 350.09(3)(b): The first performance standard listed, “The number of acres of land delineated in the final monitoring year that meet the wetland definition” is no longer used as a performance standard. It should remain as a requirement to conduct a delineation at the end of the monitoring period, but no minimum or maximum number of acres is defined.
  - 350.09(3)(f): The monitoring period for mitigation banks and permittee-responsible mitigation sites is generally 5 years for the establishment of herbaceous wetlands, 8 years for shrub wetlands, and 10 years for forested wetlands. But monitoring should be continued until all final performance standards are met; monitoring does not end (and credits not automatically given) upon completion of a set number of monitoring years.
- NR 350.10
  - 350.10(1): DNR Legal Services has advised the mitigation program to not accept irrevocable letters of credit and irrevocable trust accounts have never been used. I advise that these two be removed from this list but retain the phrase “or other financial assurance...”.
  - 350.10(2): Replace the term “success criteria” with “performance standards”.
  - 350.10(3): Common practice is to require the level of financial assurance to be set using the fair-market value of that service or material.
- NR 350.11
  - Per 281.36: Throughout this section, replace the phrase “conservation easement” with “conservation easement or comparable legal instrument”.
- NR 350.12
  - 350.12(3)(f): Remove “finalizing a bank document” as this should not end up in the final mitigation bank instrument.

- 350.12(5): Per Section 281.36, the news release “shall be given to each city, village, town, and county in which each proposed mitigation bank site will be located.”
- NR 350.13
  - 350.13(1): Remove the phrase “and the number of available credits determined under sub. (5).” Since it is difficult to continuously update the DNR website every time a credit is debited or credited, I recommend this be removed. In exchange, we could add that the public may check the “RIBITS” website managed by the USACE for an up-to-date credit balance for each bank

DRAFT

## Appendix C. Recommendations for the DNR Wetland Mitigation Tracking Database

### Recommended Changes to the Mitigation Access Tracking Database

Sally Gallagher, DNR Mitigation Specialist

Draft from June 25, 2013

- Incorporate the Access database information into the WMS Waterway and Wetland Permit Tracking database.
- Allow for all mitigation projects to be tracked through this database even though not all projects are tied to a DNR waterway or wetland permit (e.g. mitigation bank restorations).
- Link approved wetland fill permits (and the amount of mitigation required) to each respective mitigation bank credit ledger so that debits are automatically tracked. There should be a section that indicates that the Affidavit of Bank Credit Transfer/Sale was received and has a drop down box to select which mitigation bank the credit was transferred from. The bank should also have an Excel-like table that shows each debit in chronologic order and can be exported to Excel if needed.
- Allow for attaching important documents or correspondences to various sections of the data file. For example, attaching an e-copy of the final MBI to the page that says the final MBI has been signed by the IRT. These documents are often pulled up periodically throughout the monitoring and management period for reference and having them all neatly attached within each project's file would be helpful. Not all documents would need to be attached, but frequently-used information would be helpful.
- In general, it would be helpful to reduce the number of additional pages that require being opened to input data as it is easy to forget that those pages exist and leave information off of the database.
- Specific changes:
  - Mitigation Banks
    - Replace “MBRT” with “IRT”
    - Change “GMU” to “BSA”
    - Change “Bank Doc” to “MBI” or “Bank Instrument”
    - Clarify the titles in the date section.
      - It is unclear if the title “Prospectus Received” is when the USACE receives the prospectus or when the IRT receives the prospectus. Same for “Draft Bank Doc Received”.
      - It is unclear if the title “Draft Bank Doc Complete” is also the same as having a sufficient final draft of the Bank Doc or if that it simply contains all the necessary parts of a complete document.
    - Add “preservation” to a type of wetland to the Acreage Summary” page.



- Add drop-down boxes with the 10 wetland community types to the “Acreage Summary” page.
- Add “Number of Credits Released” and an associated date to the “Site Monitoring” section. Credits may be released based on monitoring reports submitted. This should also be linked to the Excel-like database that indicates how many credits are available for sale by each bank. For those banks that track by wetland types, there should be a box that says how many credits of each type of wetland are released.
- Add a check-box for which IRT agencies signed the final MBI.
- List out performance standards as written in the final MBI or CSP
- Input the credit release schedule into the database for easier access of often-used information.
- Mitigation Projects
  - Split into two categories: one for credit purchases and one for permittee-responsible projects.
  - Replace “Project-Specific” with “Permittee-Responsible”
  - Remove “On-Site” and “Off-Site” from “Compensation Approach” drop-down box. Replace with “Permittee-Responsible”
  - Add a section for an optional USACE permit number
  - Change “GMU” to “BSA”
  - Add a box for “Number of credits required” after “Affected Acres” and “Replacement Ratio” boxes.
  - Add a fill-in box for the number of affected acres and a drop down box next to it with each of the 10 wetland community types. There should be multiple box pairs like this since many sites impact more than one community type with one permit.
  - Remove reference to “Federal” and “Non-Federal” wetland impacts.
  - Clarify the titles in the date section.
    - “WMS Approval Receipt” should be replaced with “Start Review Memo Received by MC” (MC = Mitigation Coordinator)
    - “Initial MitProp Receipt” should be replaced with “Mitigation Summary Sheet Received by MC”
    - “First Review Response” should be replaced with “Mitigation Summary Sheet Complete or More Info Requested”
    - “Mit Prop Complete” should be replaced with “Mitigation Plan Approved”. This is the ‘go-ahead’ from the MC to proceed with purchase of credits or the notice that the permittee-responsible plan is approved and construction can begin after the permit is granted.
    - “Complete response” should be replaced with “Wetland IP granted by WMS”

- “Legal Docs Receipt” should be replaced with “Affidavit received by MC OR Easement and Financial Assurances received by MC”
- “WRE Decision Date” should be replaced with “Notification from MC to WMS that mitigation is complete and IP can be granted”. This would normally happen before “Wetland IP granted by WMS” above. Best to switch these two around to be in more chronologic order.
- “Decision” is sufficient as is.
- Remove the check box titled “NR 350 Sale?” from the “If Banking” section.

In the “If Project Specific” box, clarify what “DNR Success Approval” and “Success Inspection” means; does that refer to the entire site being a success or just the construction phase?

# Starting a Wetland Mitigation Bank: What You Need to Know



A restored wet prairie at a mitigation site near Ettrick, Trempealeau County, WI.

**W**etland mitigation banks are restored, enhanced, or created wetlands whose purpose is to provide credits to offset unavoidable impacts to existing wetlands. A bank can be located on land that historically supported wetlands or currently holds degraded wetlands. Landowners typically work with consultants under guidance from an Interagency Review Team (IRT) to establish and maintain a wetland mitigation bank. This document contains general information about wetland mitigation banks and answers some frequently asked questions. For further information, please read the “*Guidelines for*

*Wetland Compensatory Mitigation in Wisconsin*”\* document found at the DNR wetland mitigation website.

## General Information

A wetland mitigation bank is a system of establishing wetland compensatory mitigation “credits” at a wetland bank site. Credits can be sold to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. A wetland mitigation bank is owned/operated as a private business by the bank sponsor and regulated by an Interagency Review Team (IRT) made up of the Army Corps of Engineers (USACE), Wisconsin DNR (WDNR), Environmental Protection Agency, Fish and Wildlife Service, and Natural Resources Conservation Service.

## Release of Credits

Once the Mitigation Bank Instrument (MBI) is approved by the USACE and WDNR, the bank will receive credits over time as performance standards are met. The final standards must be met to warrant the final credit release.

## Required Documents – submitted to the IRT

**1. Prospectus document** - will allow the IRT to review the proposed wetland mitigation bank site and general wetland restoration plan.

**2. Mitigation Bank Instrument (MBI), including a Compensation Site Plan (CSP)** - which must include a detailed description of:

- ownership of the mitigation bank site
- proposed operation of the bank
- baseline conditions of the site
- proposed construction, restoration, monitoring, management, and long-term management plans
- quantifiable performance standards related to vegetation, hydrology, and other factors
- draft financial assurance document and draft conservation easement

**3. Annual monitoring reports** - submitted for 5 to 10 years after construction.



\*Please read the “*Guidelines for Wetland Compensatory Mitigation in Wisconsin*” document before committing to the process of establishing a wetland mitigation bank. This fact sheet summarizes but does not include all required information necessary for establishing a mitigation bank.





Wetlands support a variety of plant species including (from left to right): Marsh Marigold, Tussock Sedge, and Boneset. A healthy wetland provides many ecosystem services including habitat, soil and shoreline stabilization, groundwater discharge, and flood control.

## Frequently Asked Questions about Wetland Mitigation Banks

### ***I have a wetland on my property. Can I start a wetland bank?***

- Intact and functional wetlands are typically not eligible for banking sites, unless they are of exceptional watershed value.
- A degraded wetland can be a wetland bank if sufficient enhancement is planned.

### ***What is a good/bad mitigation bank site?***

Go to the DNR website and search for “Surface Water Data Viewer”, a mapping program that helps to identify potentially restorable wetlands.

- Good: historic wetlands that are drained, isolated from disturbances, and hydrologically isolated.
- Bad: stormwater features, Wetlands Reserve Program (WRP) sites, and land purchased with state or federal money. These are not eligible for mitigation banks.

### ***How long does it take to start a mitigation bank?***

- The process length varies by project.
- The timeline from submitting a prospectus to having an approved MBI often takes 1 to 2 years.

### ***Who can help me manage and restore my land?***

- Landowners typically work with a qualified consultant knowledgeable in wetland ecology and restoration to plan and implement restoration activities.

### ***What are the long-term plans for a bank?***

- A banking site must be forever protected as a conservation site, usually through a conservation easement.

### ***What is the price of a bank credit?***

- The cost of a credit is independently determined by the mitigation bank sponsor.

### ***Who can buy the wetland mitigation credits?***

- A bank may only sell to a USACE and/or WDNR permittees at the regulatory agencies’ approval.
- Banks sell credits to permittees within a watershed-based Bank Service Area (BSA).
- Bank sponsors may not be able to sell credits throughout the State.

### ***How many credits can a wetland mitigation bank generate for sale?***

The number of credits depends on many factors, including:

- Size of the bank site - a larger site generally generates more credits.
- How the wetland site is restored/enhanced from existing conditions.
  - Restoring a site that was a historic wetland but is not currently a functioning wetland will generate the most credits.
  - Enhancing an existing wetland typically receives less credits.
  - Wetlands that are preserved or created where no wetland was historically found *may* receive some credits but are not preferred.
  - Some credits may also be generated by restoring or enhancing a buffer around the site.
  - No credit will be given to open water/ponds.

### ***Where can I find more information?***

- Additional information about wetland mitigation program is available on the DNR’s website. Go to [dnr.wi.gov](http://dnr.wi.gov) and search for Wetland Mitigation. This webpage also contains a link to the “Guidelines for Wetland Compensatory Mitigation in Wisconsin”\* where you can read a full description of the process of establishing a bank.
- Contact the WDNR Wetland Mitigation Coordinator, Pam Schense, at 608-266-9266 or at [Pamela.Schense@Wisconsin.gov](mailto:Pamela.Schense@Wisconsin.gov) OR contact your regional [USACE Project Manager](#).

**Appendix E. 2013 *Guidelines for Wetland Compensatory Mitigation in Wisconsin***

**Sent for public notice on 1 August, 2013**

**Guidelines for  
Wetland Compensatory Mitigation in  
Wisconsin**

**Version 1**

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## 1) INTRODUCTION

The fundamental objective of wetland compensatory mitigation is to offset unavoidable adverse impacts to wetlands authorized by the United States Army Corps of Engineers (USACE) and/or the Wisconsin Department of Natural Resources (WDNR). The USACE and WDNR have drafted this document to update the 2002 Guidelines for Wetland Compensatory Mitigation in Wisconsin. The United States Environmental Protection Agency (USEPA) Region V and the United States Fish and Wildlife Service (USFWS) Region 3 are participating in the preparation of these updated guidelines.

This document establishes guidelines for providing required compensatory mitigation for permitted wetland impacts in Wisconsin. These guidelines are intended for agency personnel, mitigation bank sponsors, permit applicants, and others in meeting the Department of the Army (DA) requirements of Section 404 of the Clean Water Act including the United States Environmental Protection Agency 404(b)(1) Guidelines at 40 Code of Federal Regulations (CFR) Part 230, and the April 2008 Federal Rule - Compensatory Mitigation for Losses of Aquatic Resources found at 33 CFR Part 332 (Federal Mitigation Rule), Section 10 of the Rivers and Harbors Act, and WDNR requirements in Section 281.36 of the Wisconsin Statutes, Chapter NR 350 of the Wisconsin Administrative Code, 2011 State of Wisconsin Act 118, as well as other applicable federal and state statutes, regulations, guidelines, and ordinances. While use of this document will assist persons in meeting the requirements of the various programs listed above, this document allows for consideration of project-specific information in its application, and is not intended to be the sole source for compensatory mitigation information in Wisconsin. Users of these guidelines are strongly encouraged to refer to regulation such as the Federal Mitigation Rule, Wisconsin State Statutes, and Wisconsin Administrative Codes for additional information.

Further, this document only applies to wetland compensatory mitigation. Federal law requires consideration of compensatory mitigation for all aquatic resource impacts, not just wetlands – including open water systems such as rivers, streams, ponds, and lakes.

This document is not to be used to inform Wisconsin Department of Transportation (DOT) mitigation activities; refer to the Wisconsin Department of Transportation Wetland Mitigation Banking Technical Guideline for regulatory processes associated with Wisconsin DOT activities.

The objective of the wetland compensatory mitigation guidelines is to guide the establishment of successful compensatory mitigation projects. This will be accomplished by describing standards and criteria for development for all types of wetland compensatory mitigation projects. These guidelines are meant to provide consistency to the wetland compensatory mitigation process, but do not supersede established agency rule or law. Final decisions are made on a case-by-case basis at the discretion of the permitting agencies (USACE and/or WDNR) with authority over a given wetland activity.



Further, the guidelines should not be construed to provide opportunities to circumvent other aspects of a permitting agency's review. Both the USACE and WDNR require that all proposed projects avoid and minimize wetland impacts to the maximum extent practicable. Agency regulations presume that most proposed projects (non-water dependent projects) can avoid wetland impacts. To obtain authorization, this presumption must be overcome by the permit applicant. Only after all efforts are made by the permit applicant to avoid and minimize adverse wetland impacts, compensatory mitigation actions are taken to offset unavoidable impacts. These guidelines are focused on this step of permitting agency review.

Federal and state laws direct the agencies to utilize a watershed approach to guide the selection of compensatory mitigation location, and the functions and services the mitigation should provide. Additionally, permitting agencies will require measurable, consistent, and enforceable ecological performance standards regardless of the type of compensatory mitigation pursued (bank, permittee-responsible, etc.).

In Wisconsin, wetland compensatory mitigation may be carried out by one or more of the following methods: re-establishment of a former wetland, rehabilitation or enhancement of existing wetlands, creation of new wetlands, preservation of ecologically important or threatened wetlands, and establishment of vegetated buffers.

State permits and federal authorizations (hereafter referred to as permits) for wetland impacts often require wetland compensatory mitigation. Currently, the following two mechanisms may be used to fulfill this requirement: 1) the permittee purchases credits from an approved wetland mitigation bank; or 2) the permittee is responsible for completing a compensatory mitigation project. State and federal laws additionally describe compensatory mitigation through an in-lieu fee program; however, as of the date of this guidance such a program does not exist in Wisconsin.

Questions regarding compensatory mitigation should be directed to the permitting agencies for clarification. Because each agency has an independent but coordinated process, it is recommended that most questions be directed to both agencies. The USACE provides information on their website at [www.mvp.usace.army.mil/Missions/Regulatory.aspx](http://www.mvp.usace.army.mil/Missions/Regulatory.aspx). Inquiries to the USACE may be emailed to [mvp-reg-inquiry@usace.army.mil](mailto:mvp-reg-inquiry@usace.army.mil), or you may call (651) 290-5525. General information regarding the WDNR compensatory mitigation program is available at <http://dnr.wi.gov/topic/Wetlands/Mitigation>.

## 2) COMPENSATORY MITIGATION APPROACHES

### A. Early Consultation

Those planning to impact wetlands should consult early in their planning process with the USACE and the WDNR to determine if mitigation is required, and to discuss which mitigation options are most appropriate for the proposed project. USACE regulations<sup>1</sup> require project proponents include with their application either a statement describing how impacts to waters of the United States would be compensated, or a statement explaining why compensatory mitigation should not be required. When compensatory mitigation is required, it is the project proponent's responsibility to address this requirement to facilitate the permitting agencies' evaluation. Final decisions regarding the suitability of proposed compensatory mitigation are made by the permitting agencies.

### B. Mechanisms for Providing Wetland Compensatory Mitigation

When considering options for successfully providing compensatory wetland mitigation, consider the options presented in B.1 and B.2 below. In general, compensatory mitigation should be located within the same BSA as the impact site, and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed scale features as aquatic habitat diversity, habitat connectivity, relationship to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses. Finally, the permitting agencies recommend that compensatory mitigation be implemented concurrent with, or in advance of, the authorized wetland impacts to limit temporal loss of wetland functions.

An applicant may choose from the following two options at the discretion of the permitting authorities.<sup>2</sup>

**1. Purchasing Credits from a Mitigation Bank** (see Chapter 3.A for details)

**2. Development of a Permittee-Responsible Mitigation Site** (see Chapters 3.B, 4, and 5 for details)

It is the responsibility of the applicant to propose a method for providing compensatory mitigation when required by the permitting agencies. The permitting agencies retain authority to approve compensatory mitigation proposed. While both permitting agencies programs set preferences for mitigation banking, the agencies ultimately strive for high quality mitigation projects that replace the wetland functions that would be lost. In some cases that may mean the agencies will favor a permittee-responsible mitigation project over a mitigation bank. See Appendix H for additional information regarding each permitting agency's program relative to compensatory mitigation selection.

<sup>1</sup> 33 Code of Federal Regulations (CFR) 325.1(d)(7)

<sup>2</sup> Section 281.36(3r)(a), Wisconsin Statutes

## C. The Watershed Approach

A major emphasis of these guidelines is a watershed approach to compensatory mitigation as described in the Federal Mitigation Rule. The watershed approach uses a landscape perspective that places emphasis on site selection, through consideration of landscape attributes that will help provide the desired wetland resource types and ensure that they are self-sustaining. The permitting agencies will implement the watershed approach with available information to determine the types and locations of compensatory mitigation activities that would best serve the watershed. This information includes current trends in habitat loss or conversion, cumulative impacts of past development activities, current development trends, the presence and needs of sensitive species, site conditions that favor or hinder the success of mitigation projects, chronic environmental problems such as flooding or poor water quality, site conditions, as well as other relevant data. The ultimate goal of the watershed approach to compensatory mitigation is to maintain and improve the quality and quantity of wetland resources within watersheds through targeted selection of compensatory mitigation sites.

A watershed approach considers the importance of landscape position and resource type of compensatory mitigation projects for the sustainability of wetland resource function within the watershed. Such an approach considers how the types and locations of compensatory mitigation projects will provide the desired wetland resource functions and continue to function over time in a changing landscape. It includes the protection and maintenance of terrestrial resources, such as non-wetland riparian areas and uplands, when those resources contribute to or improve the overall ecological functioning of wetland resources in the watershed. Compensatory mitigation requirements determined through a watershed approach should not focus exclusively on specific functions (e.g., water quality or habitat for certain species), but should provide, where practicable, the suite of functions typically provided by the affected resource.

Where practicable and appropriate, the permitting agencies will require that the location and the wetland type of compensatory mitigation be consistent with a watershed-based approach. Where reliance on a watershed plan or other permitting agency-approved approach is not practicable, the permitting agencies will use the watershed approach principles of wetland type, location and timing to evaluate opportunities to offset unavoidable adverse impacts by requiring project-specific compensation and/or credits established by wetland banks.

Three key factors determine the amount of wetland compensatory mitigation required to offset unavoidable impacts: the timing of the compensatory mitigation; the wetland cover type of the compensatory mitigation; and the location of the compensatory mitigation. Compensatory mitigation that is the same wetland cover type (in-kind) and location as the permitted impact, and is completed prior to or concurrent with the permitted loss, has the greatest likelihood of replacing those wetland functions lost; therefore, the compensation ratio is the lowest. When compensatory wetland mitigation cover types that do not match the wetland cover type lost (out-of-kind), the amount of compensatory mitigation required increases because the suite of functions provided by the

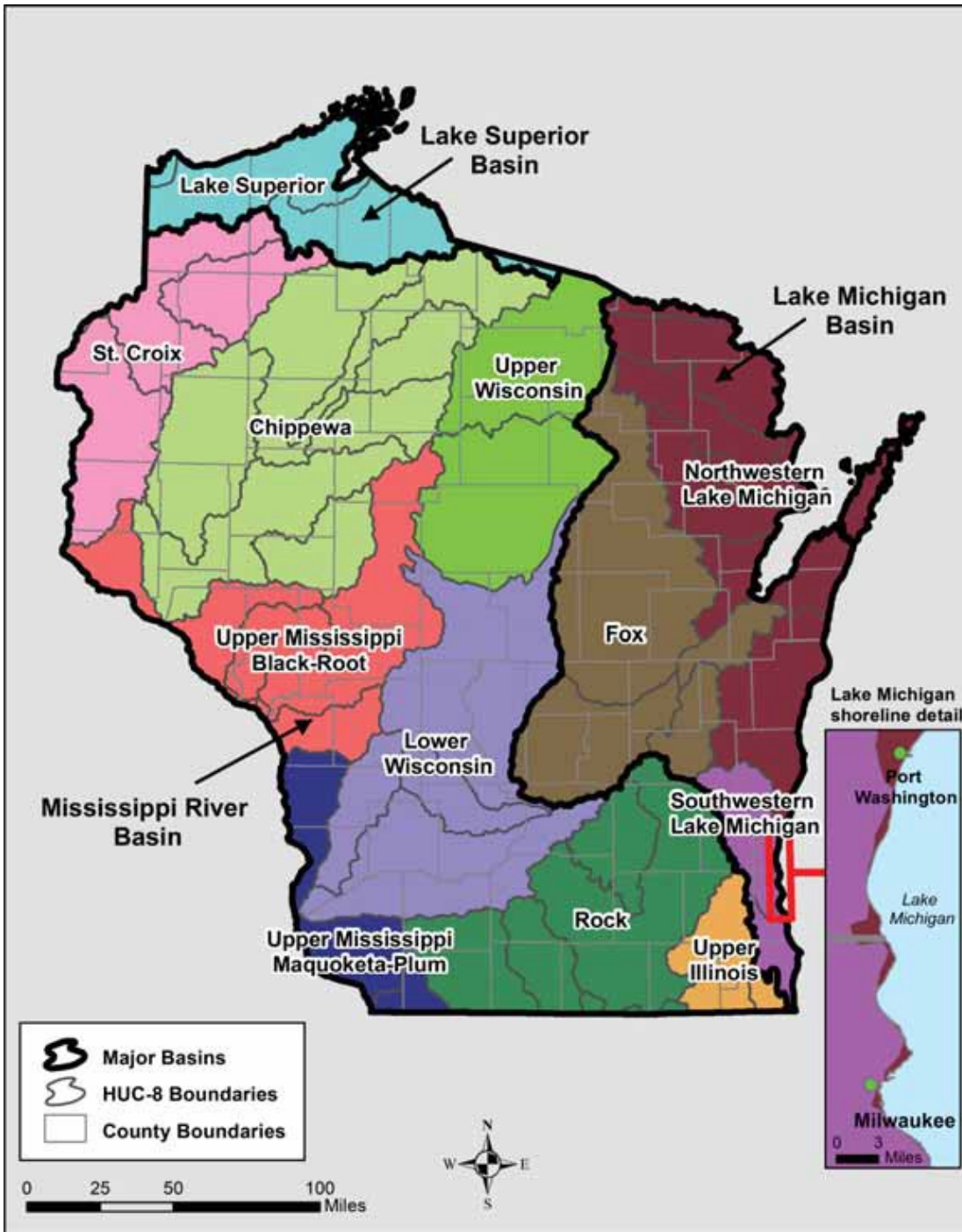
compensatory mitigation are less likely to match the functions lost from the wetland fill. Compensatory mitigation that is not completed prior to or concurrent with authorized impacts is likely to result in a temporary loss of function to the localized area, known as temporal loss. When temporal losses are anticipated, the acres of compensatory mitigation required are higher when compared to the impacted acreage. Finally, the amount of mitigation required increases the further away the mitigation site is from the impact site, from a watershed perspective. See Chapter 3 for more information regarding the adjustments to mitigation ratios.

### *1. Locational Factors*

Use of banking credits is generally considered locationally appropriate if the debits are within the same approved bank service area, or BSA (Figure 2.1), as the impacted wetland. For mitigation banking, permitting agencies prefer applicants to select the nearest practicable bank site relative to the impact site. Optimally, the debit would occur in the same 8-digit Hydrologic Unit Code (HUC). Typically this is viewed as the most likely to replace lost functions, provided all other considerations are equal. See Chapter 3.A for more information.

For permittee-responsible mitigation, the permitting agencies evaluate the location of the proposed compensatory mitigation relative to the term on-site as described in the Federal Mitigation Rule. This is defined to be an area located on the same parcel of land as the impact site, or on a parcel of land contiguous to or near the impact site. All other considerations equal, on-site compensation is prioritized for siting compensatory mitigation given the ecological benefits of immediate geographic connectivity of restored hydrology and vegetation. However, it is recognized that on-site compensation is not always practicable, nor environmentally preferable (e.g., compensation site would be surrounded by a parking lot). Permittee-responsible mitigation sites should be located as close to the permitted fill as possible from a watershed perspective; the initial site search should be conducted within a one-half-mile radius from the permitted fill. In most cases, the search for appropriate permittee-responsible mitigation sites should not be outside the BSA in which the proposed impacts would occur. See Chapter 3.B for more information.

**FIGURE 2.1: Bank Service Areas (BSA's) and Water Basins of Wisconsin (map)**



The color blocks above represent each BSA. The BSA's are loosely predicated upon the 6-digit HUC's. Each BSA generally represents the location in which a given bank may sell credits. They also generally represent the largest search area for permittee-responsible compensatory mitigation projects.

The 8-digit HUC's subdivide the BSA's and are represented by solid dark grey lines.

The BSAs are then grouped into three major water basins: the Lake Superior Basin, Lake Michigan Basin, and Mississippi Basin (outlined in wide, dark boundary lines).



## ***2. Wetland Cover Type Factors***

Fundamental to the in-kind vs. out-of-kind analysis is the fact that different wetland types function differently. Not all wetlands are shoreland wetlands, or flow-through systems, or provide fish habitat, or support amphibians, or have a woody canopy, etc. While some functions are provided by nearly all wetlands, the process and intensity to which those functions occur can be different among wetland types.

The Federal Mitigation Rule defines in-kind compensation as a resource of a similar structural and functional type to the impacted resource. In general, in-kind compensation is preferable to out-of-kind compensation<sup>3</sup> because it is most likely to compensate for the functions lost at the impact site. This preference for in-kind compensation is reinforced in the Federal Mitigation Rule where it states that the required compensation shall be of a similar type as that of the impacted wetland resource.

Vegetation strata are common descriptors for “structural type” (e.g., forested, shrub, emergent, bryophyte, submergent, etc.), while “functional type” addresses what the wetland actually does (e.g., assimilates nutrients, retains floodwaters). For purposes of these guidelines, eleven wetland plant community types adopted from Eggers and Reed (2011)<sup>4</sup> will be used for the in-kind determination. These communities are described briefly in Figure 2.2 and in detail in Appendix G. Compensation that is not the same wetland plant community will be considered out-of-kind.

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<sup>3</sup> Chapter NR 350.05(2), Wisconsin Administrative Code

<sup>4</sup> Eggers, Steve D., and Donald M. Reed. 2011. *Wetland Plants and Plant Communities of Minnesota and Wisconsin*, Third Edition. U.S. Army Corps of Engineers, Regulatory Branch St. Paul District. 478 pp.

**FIGURE 2.2: Plant Community Types to Use in Determining In-Kind Mitigation**

<b>In-Kind Wetland Types</b>	<b>General Description</b>	<b>Wisconsin Wetland Inventory Classification</b>
<b>1) Shallow, Open Water</b>	Permanent to semi-permanent water depths to 6.6 feet; submergent floating, and floating-leaved vegetation	Aquatic bed, submergent and floating
<b>2) Deep and Shallow Marshes</b>	Permanent to semi-permanent water depths of 6 inches to 3 feet; Submergent, floating, floating-leaved and emergent vegetation	Aquatic bed, submergent and floating; and persistent and non-persistent, emergent
	Seasonal inundation to 6 inches; emergent aquatic vegetation (e.g., cattails)	Persistent and non-persistent, emergent
<b>3) Sedge Meadows</b>	Saturated soils; dominated by sedges ( <i>Cyperaceae</i> )	Narrow-leaved persistent, emergent/wet meadow
<b>4) Fresh (Wet) Meadow</b>	Saturated soils; dominated by forbs and perennial grasses	Broad- and narrow-leaved persistent, emergent/wet meadow
<b>5) Wet to Wet-Mesic Prairie</b>	Saturated soils; dominated by prairie grasses and forbs (e.g., prairie cord-grass); rare	Broad- and narrow-leaved persistent, emergent/wet meadow
<b>6) Calcareous Fens</b>	Organic soils saturated by upwelling, calcareous springs/seepages; calcium-tolerant species are characteristic; rare	Narrow-leaved persistent, emergent/wet meadow; and broad-leaved deciduous, scrub/shrub
<b>7) Bogs (Open or Coniferous)</b>	Saturated sphagnum moss mat; sedges, evergreen shrubs (e.g., Labrador tea) and/or black spruce and/or tamarack	Moss; broad-leaved evergreen, scrub/shrub; and needle-leaved deciduous and evergreen, forested
<b>8) Shrub Swamps (Shrub-Carr or Alder Thicket)</b>	Saturated to seasonally inundated soils; dominated by hydrophytic shrubs (e.g., willows, speckled alder, dogwoods)	Broad-leaved deciduous, scrub/shrub
<b>9) Wooded Swamps (Hardwood or Coniferous)</b>	Saturated to seasonally inundated soils; dominated by conifers (e.g., northern white cedar) or hardwoods (e.g., black ash)	Broad-leaved deciduous, forested; and needle-leaved deciduous and evergreen, forested
<b>10) Floodplain Forests</b>	Temporarily inundated, alluvial soils of floodplains; dominated by deciduous trees (e.g., silver maple)	Broad-leaved deciduous, forested
<b>11) Seasonally Flooded Basins</b>	Temporarily inundated flats or basins; often dominated by annuals (e.g., smartweeds)	Flats/unvegetated wet soil; and persistent and non-persistent emergent/wet meadow

**3. Timing Factors**

The permitting agencies prefer compensatory mitigation that is provided in advance of the functional loss associated with permits over compensatory mitigation that occurs after the functional loss. Compensatory mitigation that is in-advance is defined to include: (1) use of USACE and/or WDNR-approved bank credits (as required by necessary permits); or (2) permittee-responsible compensation sites that have established hydrology and appropriate vegetation (as determined by the agencies). At a minimum, the compensation site must have wetland hydrology and hydrophytic vegetation established a full growing season (May-October) prior to the authorized discharge of dredged or fill material. This

means that grading and seeding of the compensation site were completed prior to the growing season of that year. Performance standards applicable at that development stage, usually initial hydrology and vegetation performance standards, must be met to qualify as in-advance.



### 3) COMPENSATION REQUIRED TO OFFSET ADVERSE IMPACTS

This chapter identifies the number of credits generally needed for applicants to offset unavoidable adverse impacts to wetlands and provide the appropriate amount of compensatory mitigation. An appropriate offset minimally achieves no net loss of wetland functions with an adequate margin of safety to reflect anticipated success. In the absence of more definitive functional assessments, a *minimum* of 1.2:1 acreage replacement<sup>5</sup> may be used as a reasonable surrogate for no net loss of wetland functions provided that all other considerations are equal. Due to the limited number of approvable quantitative functional assessment methods for Wisconsin, the guidelines employ acreage surrogates to inform general compensation requirements. Starting ratios shown in this Chapter are higher than the base of 1.2:1 described above, because in practice the compensatory mitigation proposed by applicants is often not in-kind, is outside the watershed of the proposed impact, and/or results in temporal loss. The closer a project proponent is to achieving in-kind, in advance, and on-site compensatory mitigation, the lower the ratio applied.

Project applicants are responsible for submitting compensatory mitigation proposals to the permitting agencies for review and approval. Actual compensatory mitigation requirements are determined on a project-by-project basis to ensure that wetland functions and services provided by the compensation fit the watershed approach. As a matter of public service, the USACE and WDNR will strive to ensure that the mechanism and methods approved to provide compensatory mitigation are consistent.

#### A. Debiting Credits from an Approved Bank

If the applicant wishes to purchase credits from an approved mitigation bank, the proposal must be approved by the permitting agencies. The USACE maintains the official listing of compensatory mitigation banks, including credit ledger information on its Regulatory In-Lieu Fee Bank Information & Tracking System (RIBITS) website at <http://geo.usace.army.mil/ribits/index.html>. The WDNR also maintains a registry of approved bank sites on its web site (<http://dnr.wi.gov>).<sup>6</sup>

Section 3.A.1 below provides information about the compensation replacement ratio (the number of credits needed for an applicant to meet the compensation obligation). The permitting agencies must approve the wetland type and number of credits proposed for debit. A signed Affidavit of Bank Credit Purchase (see Appendix F) must be provided to the permitting agencies per their program requirements; the affidavit may be required prior to issuance of a permit.<sup>7</sup>

<sup>5</sup> Section 281.36 (3r)(d), Wisconsin Statute

<sup>6</sup> Chapter NR 350.13(1), Wisconsin Administrative Code

<sup>7</sup> The DNR often requires that the affidavit be submitted to the Mitigation Coordinator before an individual permit can be granted.

All banks in Wisconsin have bank service areas (BSAs) that guide decisions regarding the suitability of a bank site relative to the watershed location (see Figure 2.1 for a map of BSAs in Wisconsin). The permitting agencies prefer applicants to select the nearest practicable bank site relative to the impact site. Optimally, the debit would occur in the same 8-digit Hydrologic Unit Code (HUC). Typically this is viewed as the most likely to replace lost functions, provided all other considerations are equal. In addition to location concerns, the permitting agencies give preference to in-kind over out-of-kind debits. Because banks are largely established in advance of any proposed debits, negligible temporal losses are typically associated with bank debits.

When banking is approved over permittee-responsible mitigation and there is no bank in the BSA with in-kind credits available, the applicant may propose to debit either out-of-kind credits, or to debit from a bank outside the BSA with in-kind or out-of-kind credits. The permitting agencies will consider the merit of the request, which is likely to be subject to higher debiting ratios if approved. Approval of debits outside the BSA is rare,<sup>8</sup> and advance coordination with permitting agencies is strongly recommended for such proposals.

### ***1. Bank Credit Purchase Compensation Replacement Ratio***

In general, the starting compensation replacement ratio is 1.7:1. This ratio is higher than the minimum ratio of 1.2:1 indicated earlier in this Chapter. The starting compensation replacement ratio presumes the debit is outside of the BSA, out-of-kind, in advance, and that the wetland type compensated for is not rare, subject to historic losses, or difficult to replace. Debits proposed within the BSA or with an in-kind plant community warrant a reduction to the starting ratio. Impacts to rare or difficult to replace types<sup>9</sup> typically warrant an increase to the starting ratio. Additions and subtractions are cumulative, not concurrent. Typical ratios for credit purchases are given in Figure 3.1 below. A few sample calculations based on the table follow. Reductions to the starting ratio may not result in a ratio lower than 1.2:1<sup>10</sup> to comply with state law.

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<sup>8</sup> WDNR has more flexibility than USACE in approving mitigation proposals for bank credit purchases that are out-of-kind and/or outside the BSA.

<sup>9</sup> An example of a rare wetland type is a calcareous fen. An example of a difficult to replace wetland is a sedge meadow. These examples are not exhaustive. Determinations of rarity and replacement success are often locationally specific. Project proponents should consult with the permitting agencies regarding rarity of wetland resource, and information on community type replacement success. Some additional information is also included in Appendix G.

<sup>10</sup> Section 281.36 (3r)(d), Wisconsin Statute

**FIGURE 3.1: General Compensation Replacement Ratios for Bank Credit Purchases**

Impacted Wetland Cover Type	Starting Ratio* (Credits Required : Wetland Acres Impacted)	Reductions to Starting Ratio	
		Within the BSA	In-Kind Compensation
All 11 Community Types (Figure 2.2)	1.7 : 1	- 0.25	- 0.25

\* Starting ratios assume the mitigation is out-of-kind, located out of the BSA, in-advance, and that the wetland impacted is not rare, subject to historic loss, or difficult to replace. If the impacted wetland is located within the same BSA as the bank, the compensation ratio will be reduced by 0.25 credits per acre from the starting ratio. If compensation is in-kind, the compensation ratio will be reduced by 0.25 credits per acre from the starting ratio. In rare cases, debits required by the permitting agencies may exceed the ranges shown.

**Example 1:** The applicant proposes to debit from a bank in the same BSA (see Figure 2.1), but the credits are out-of-kind<sup>11</sup>. The starting ratio of 1.7:1 will be decreased by 0.25 for the location, and the permitting agencies may approve a debit of 1.45:1.

**Example 2:** The applicant proposes to debit from a bank in the same BSA with credits that are in-kind (see Figure 2.2). The starting ratio of 1.7:1 will be decreased by 0.25 due to location, and an additional 0.25 for the cover type proposed; the permitting agencies may approve a debit of 1.2:1.

**2. Responsibilities of the Permittee**

When compensatory mitigation is required, the permit applicant must submit a proposal to the permitting agencies to mitigate for unavoidable impacts to wetlands.<sup>12</sup> This proposal should describe the number of credits to be purchased, type of credits to be purchased, and the approved bank to debit credits from. Once the plan to purchase credits is approved by the agencies, the permittee must purchase the required credits and provide a copy of the Affidavit of Bank Credit Purchase signed by the permittee and the bank sponsor to the WDNR Mitigation Coordinator<sup>13</sup> and the USACE Regulatory Project Manager. The permittee retains responsibility for providing the compensatory mitigation until the appropriate number and cover type of credits have been secured from a bank and the permitting agencies have received documentation that confirms that the bank has accepted the responsibility for providing the required compensatory mitigation. Once completed, the bank assumes responsibility for the permittee’s compensatory mitigation requirement.

<sup>11</sup> Some older banks in Wisconsin do not have credits indicated by cover type. In these cases, reductions to the starting ratio are approved at the discretion of the permitting agencies.

<sup>12</sup> For DNR individual permits, a mitigation summary sheet shall be submitted along with all other pre-application materials. A final mitigation summary sheet (and a complete compensation site plan for permittee-responsible mitigation) will be submitted along with the rest of the individual permit application materials.

<sup>13</sup> Chapter NR 350.04(6), Wisconsin Administrative Code

## B. Determining Permittee-Responsible Mitigation Requirements

Where permitted impacts are not in the same BSA of a mitigation bank that has the appropriate number of in-kind credits available, permittee-responsible mitigation may be the next-best option. Where realistic and likely to be successful and sustainable, the location of the permittee-responsible mitigation should be as close to the permitted impacts as possible and shall utilize the principles of the watershed approach as outlined in Chapter 2.C.

Permittee-responsible mitigation is typically appropriate when located within one half mile of the permitted wetland impact or within the same BSA as the permitted wetland impacts. On *rare* occasions when there are no permittee-responsible options within the same BSA as the permitted impacts, the applicant may propose a project located in another BSA. The permitting agencies will review this option to meet the mitigation requirement. If approved by the permitting agencies, the mitigation ratio will be a minimum of 0.25 higher to account for locational difference between the loss and mitigation site. Appendix E should be used to guide the applicant in the development of a permittee-responsible compensation site plan (CSP). This plan describes the work and performance standards proposed by the applicant for a given wetland compensatory mitigation site.

Section 3.B.1, below, provides information about the compensation replacement ratio (the number of credits needed for a project applicant to meet the compensation obligation).

### *1. Permittee-Responsible Mitigation Ratio*

The starting compensation replacement ratio is 1.7 credits for every 1 acre of impacted herbaceous and shrub/scrub wetland communities, and 1.95 credits for every 1 acre of impacted forested wetland. In practice, permittee-responsible mitigation almost always requires a ratio higher than the base ratio of 1.2:1 because of landscape position, temporal loss, cover type, and site success uncertainties. As an example, the starting ratio for forested communities is higher than for herbaceous communities, primarily because of the increased temporal loss associated with the maturation time of forested communities. In cases where appropriate functional or condition assessment methods or other suitable metrics are available and approved by the permitting agencies, these methods may be used to adjust the acreage surrogates shown in below in Figure 3.2.

Compensatory mitigation requirements are determined by the permitting agencies on a project-by-project basis. The starting compensation ratio may be increased if the wetland fill proposed would impact a rare wetland or a difficult to replace wetland.<sup>14</sup> The

<sup>14</sup> An example of a rare wetland type is a calcareous fen. An example of a difficult to replace wetland is a sedge meadow. These examples are not exhaustive. Determinations of rarity and replacement success are often locationally specific. Project proponents should consult with the permitting agencies regarding rarity of wetland resource, and information on community type replacement success. Some additional information is also included in Appendix G.

watershed approach prioritizes in-kind compensation sited close to the proposed impact. If the permittee-responsible compensatory mitigation would result in an in-kind plant community, the agencies may approve a reduction to the starting ratio. To qualify for a ratio reduction due to avoiding temporal loss, permittee-responsible compensation sites must minimally have established hydrology and appropriate vegetation (as determined by the agencies). The compensation site must have wetland hydrology and hydrophytic vegetation established a full growing season (May-October) prior to the authorized discharge of dredged or fill material. This means that grading and seeding of the compensation site were completed prior to the growing season of that year. Performance standards applicable at that development stage, usually initial hydrology and vegetation standards, must be met to qualify as in-advance. Additions and subtractions to the starting ratio are cumulative, not concurrent. Typical ratios for permittee-responsible compensatory mitigation projects are given in Figure 3.2 below. A few sample calculations of credits required are provided after the table. Reductions to the starting ratio may not result in a ratio lower than 1.2:1 to comply with state law.<sup>15</sup>

Restoration is the preferred method<sup>16</sup> for generating permittee-responsible credits, but a permittee-responsible compensation site plan can include wetland creation, enhancement, preservation and restoration/preservation of vegetative buffers. A combination of methods is typically required for most proposals. The methods for generating credits and general information on how much credit each method produces is in Chapter 4 below.

Permittee-responsible mitigation is tied to a specific permitted activity. Excess credits generated by permittee-responsible mitigation are not eligible for sale, transfer, or use for a future proposed project. If a permittee-responsible mitigation site generates more credits than are needed to meet the requirements for mitigation as required by the given permit, those credits may not be used for a future permit or for sale or transfer unless they are processed as a bank.

<sup>15</sup> Section 281.36 (3r)(d), Wisconsin Statute

<sup>16</sup> Chapter NR 350.05(1), Wisconsin Administrative Code

**FIGURE 3.2: General Compensation Replacement Ratios for Permittee-Responsible Mitigation Projects**

Impacted Wetland Cover Type	Starting Ratio* (Credits Required : Wetland Acres Impacted)	Reductions to Starting Ratio	
		No Temporal Loss	In-Kind Compensation
Herbaceous and Shrub/Scrub	1.7 : 1	- 0.25	- 0.25
Forested	1.95 : 1	- 0.50	

*Starting ratios assume the compensation is in the same BSA, out-of-kind, and not in advance. If compensation is in-kind, the compensation ratio typically will be decreased by 0.25 credits per acre. If compensation is provided in advance of the authorized impacts to the wetland (resulting in no temporal loss), the compensation ratio may be decreased by 0.25 credits per acre of herbaceous or shrub/scrub wetland or by 0.50 credits per acre of forested wetland.*

*Conversely, the starting ratios may be increased if the wetland proposed for impact is rare, subject to historic loss, difficult to replace, or if the compensatory mitigation is located outside the BSA of the proposed wetland impact. These additions to the starting ratio are not shown above, as they are not frequently associated with permittee-responsible compensatory mitigation projects.*

**Example 1:** The applicant proposes a common, herbaceous, in-kind cover type on site. It is ecologically connected to the remnant wetland that would remain after any authorized fill is complete. The permitting agencies believe the project has a high likelihood of success. The mitigation site would be constructed at the same time as the proposed fill would occur. The starting ratio of 1.7:1 will be decreased by 0.25 for providing in-kind cover. The permitting agencies may approve a ratio of 1.45 credits for every wetland acre proposed for impact.

**Example 2:** The applicant proposes a common, herbaceous, out-of-kind cover type on site to mitigate for impacts to a forested wetland. The compensatory mitigation would be ecologically connected to the remnant wetland that would remain after the permitted fill is complete. The permitting agencies believe the project has a high likelihood of success. The mitigation site would be constructed at the same time as the proposed fill would occur. The permitting agencies may approve a ratio of 1.95:1.

**2. Responsibilities of the Permittee**

When compensatory mitigation is required, the permit applicant must submit a proposal to the permitting agencies to mitigate for unavoidable wetland impacts. The applicant should utilize the list of information required as part of a compensation site plan (CSP) in Appendix E. Permittee-responsible compensatory mitigation requires site protections to ensure that the site is protected from incompatible uses in perpetuity and that the compensatory mitigation is completed and maintained per the CSP. Once the compensation site plan is approved by the agencies and any required financial assurances are in place, the permittee is responsible for making sure the mitigation site is protected through a conservation easement or comparable legal instrument and the mitigation site is constructed and monitored and managed according to the approved CSP. Permittee-

responsible compensation sites require years of monitoring and management post-construction, and throughout this period, the permittee is responsible for making sure monitoring reports are submitted within the timeframes stipulated in their permit(s) and/or approved CSP. Any necessary management activities to keep the site compliant with the permits must be completed and coordinated with the permitting agencies' as appropriate. The permittee typically remains responsible for the long-term management of the mitigation site.



## **4) DETERMINING CREDITS GENERATED BY A COMPENSATION SITE**

This chapter describes the generalized process behind determining how many credits a compensation site may produce. This process is used in advance of completing the proposed compensatory mitigation project (permittee-responsible or bank site development) to estimate the maximum number of credits the site is likely to generate.

In practice, the actual credits produced on a site are often not the same as the number of credits originally estimated. The estimated credits a site may produce is adjusted based on how well the site meets the performance standards established for the project as well as the final wetland acreage by cover type produced. Performance standards are required for all compensatory mitigation sites, and are used to assess whether the project is achieving its objectives. Performance standards relate to the objectives of the compensatory mitigation project to evaluate site development into the desired resource type, to evaluate if the site is providing the expected functions, and whether the site is attaining any other applicable metrics (e.g., acres). As such, performance standards must be based on attributes that are objective and verifiable (measurable). The permitting agencies, in consultation with the IRT, are working to develop a list of common performance standards to utilize for compensatory mitigation projects. However, this list is not complete as of the time of this document, but is anticipated to be included in subsequent iterations.

Generalized ratio information can be found in Table 4.1 below.

### **A. Methods of Generating Credits**

#### ***1. Restoration***

Restoration is the preferred compensation method, as it tends to be more successful than other methods. This method includes re-establishment and rehabilitation.

Restoration via re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former wetland. Re-establishment results in an increase in wetland acreage. This form of restoration may involve: re-establishing hydrology and topography on a site by removing fill; re-grading or re-contouring; filling ditches; removing drainage tile; re-establishing wetland plant communities via site preparation, seeding, and planting; and manipulating water levels to restore hydrology. Credit for restoration via re-establishment is often one credit for each acre restored (1:1),<sup>17</sup> as it results in an increase in wetland acreage. Re-establishment of historic hydrology, land contours, and plant communities typically will generate the highest credit.

<sup>17</sup> Chapter NR 350.07(3)-(4), Wisconsin Administrative Code



Restoration via rehabilitation involves the restoration of historic (pre-European settlement) wetland conditions, functions, and services to the maximum extent practicable. Rehabilitation typically occurs in substantially degraded wetlands adversely impacted by drainage, filling, cultivation, grazing, or other disturbances. Rehabilitation occurs in existing wetlands and does not yield an increase in wetland acreage, but typically results in an appreciable increase in more than two wetland functions. Similar restoration techniques may be utilized to rehabilitate a degraded wetland as described above to re-establish a former wetland. Credit ratios may range from no credit to 1:1.

## ***2. Enhancement***

Enhancement activities are conducted in existing wetlands, and typically result in an appreciable increase in one or two targeted wetland functions and values (but yield no increase in wetland acreage). Enhancement projects typically involve the excavation of existing wetlands, but in some cases enhancement of degraded wetlands (such as mowed or cropped wetlands) may also involve: altering existing wetland hydrology and topography on a site by excavation; re-grading or re-contouring; plugging or filling ditches; altering existing wetland plant communities via site preparation, seeding, and planting; and manipulating water levels.

Rehabilitation is typically favored over enhancement because it typically increases a larger number of wetland functions than enhancement.

While credit for enhancement can range from no credit to 1 acre of credit for each 1 acre enhanced,<sup>18</sup> 1:1 is typically not achieved, unless the functional lift proposed exceeds that which could be realized by rehabilitation (returning the wetland to its historical cover type). The appropriate level of credit must be approved by the permitting agencies based on a comparison of the current functions and services of the site to the projected functions and services of the completed compensation site.

Possibly the most common example of an enhancement proposal in Wisconsin would be the excavation of an herbaceous (sedge meadow or fresh wet meadow) wetland to a deep marsh wetland (where the historical condition is not deep marsh wetland). These enhancement projects are rarely preferred by the permitting agencies, as sedge meadows, in particular, are becoming less common in comparison to deep marshes. Sedge meadows are typically difficult to establish, while deep marshes are easier to establish. In these cases, little to no credit is likely to be approved by the permitting agencies.

A more desirable enhancement project would be conversion of a farmed fresh wet meadow wetland to a floodplain forested wetland (historical condition is a fresh wet meadow). In this scenario, the proposed community may be more desirable than the historic extent (particularly in the southern part of Wisconsin), and may warrant the highest amount of credit per acre (1:1 credit production to acreage ratio), provided all other considerations are met.

### 3. Creation

Creation refers to establishment of a wetland where one did not historically exist (based upon geophysical evidence). Mitigation projects primarily centered upon creation are not preferred because they have historically been proven less successful. Creation along the edges of existing wetlands or in landscape settings that are conducive to improving or creating certain wetland functions and services may be more acceptable.

Typically, only creation that is adjacent to existing wetland and/or fits into the natural landscape will be approved for compensation. Crediting at a ratio of 1:1 is rare, but possible for creation if the creation site is low risk, the cover type fits the landscape, and the creation site is connected to other wetlands/aquatic resources and upland buffers/corridors. Lower risk refers to cases where hydrology data is sufficient to ensure that the planned hydrology would be established. This includes data from monitoring wells, surface runoff analyses, modeling and/or connection to the 1- or 2-year flood events of a river. Creation sites on the Lake Superior red clay plain are often considered a lower risk for failure.

Creation sites lacking sufficient hydrology data present a higher risk of failure and will generally be credited up to 0.5:1.<sup>19</sup> Similarly, creation sites that are isolated from other wetlands/aquatic resources and upland buffers/corridors or are otherwise expected to be at high risk will be credited up to 0.5:1, or may not be approved for any credit. Higher risk creation sites will generally be limited to 25 percent of total credits at a compensation site.

### 4. Preservation

Preservation may be used to provide compensatory mitigation only when all the following criteria are satisfied: the resources to be preserved provide important physical, chemical, or biological functions and services for the watershed; the resources contribute significantly to the ecological sustainability of the watershed; the preservation is determined to be appropriate and reasonable; the resources are under demonstrable threat of destruction or adverse modifications; and the site will be protected in perpetuity.

Preservation sites must be providing important functions that significantly improve the sustainability of the watershed. This is not restricted to exceptional natural areas. Wetlands that provide one or more high rated, and/or 3 or more medium rated, functions<sup>20</sup> using a rapid or routine wetland assessment method, can be providing important functions. Suitable wetland assessment methods include the *Wisconsin Rapid Assessment Methodology* (WRAM) or other approvable methodology as determined by the permitting agencies.<sup>21</sup> Additionally, the *Floristic Quality Assessment Methodology for Wisconsin* can be used to determine the condition of plant communities within a proposed preservation site.

<sup>19</sup> Chapter NR 350.07(5), Wisconsin Administrative Code

<sup>20</sup> USACE Special Public Notice: Guidance regarding the use of Wetland Preservation, March 2013

<sup>21</sup> USACE has not evaluated the use of WRAM for this purpose and may recommend use of MnRAM.

Where preservation is used to provide compensatory mitigation, to the extent appropriate and reasonable the preservation should be done in conjunction with restoration, enhancement, and/or creation and should have a long-term management plan developed for the site to address issues to ensure that the preserved area is maintained as a high quality plant community. However, on rare occasions, preservation can constitute the sole source of generating compensatory mitigation at a site with unique characteristics. Crediting ratio is often 0.125:1 (one credit for every 8 acres preserved).

### ***5. Vegetated Buffers***

A minimum amount of vegetated buffer adjacent to wetland compensation sites is ideal to protect and enhance wetland functions and services. While buffers may not be required at every site, a buffer may be required<sup>22</sup> in areas where permitting agencies and/or land managers have concerns that neighboring land uses may be detrimental to the long-term quality of the mitigation site or where the inclusion of a buffer is practicable and beneficial. Vegetated buffers may generate credits at 0.1:1 for unimproved or non-native vegetative cover and at most 0.25:1 when vegetative cover is enhanced to be dominated by native species.<sup>23</sup> The latter involves restoring native buffer plant communities. Maintenance of buffers is required. Vegetated buffers at a bank site or permittee-responsible site shall not exceed 25%<sup>24</sup> of total credits generated by that site.

The ideal buffer is contiguous and at least 100 feet wide. Higher credit ratios are given to buffers that are not a monoculture and are dominated by a diversity of native, non-invasive plant species. For additional information on maximizing buffer credit ratios, see Chapter 5.C.

### ***6. No Credit for Stormwater or Wastewater Treatment Facilities***

Some innovative facilities have been designed for treating stormwater and wastewater, using designs that create the physical, chemical and biological processes that occur in wetlands. These facilities have been referred to as bioretention basins, biofilters, or constructed wetlands and are considered artificial wetlands. While these facilities may serve an important function in alleviating impacts to natural wetlands and waterways by moderating substantially the bounce in water levels and trapping sediment loads, such single-function wetlands do not meet the intent of compensatory mitigation.<sup>25</sup>

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<sup>22</sup> Chapter NR 350.05(5), Wisconsin Administrative Code

<sup>23</sup> Chapter NR 350.07(6), Wisconsin Administrative Code

<sup>24</sup> The WDNR may limit the total amount of vegetated upland buffer credit to 15% per Chapter NR 350.13(5)(b), Wisconsin Administrative Code

<sup>25</sup> Chapter NR 350.07(7), Wisconsin Administrative Code

## B. Credit Ratios

**FIGURE 4.1: Generalized Ratios for Generating Mitigation Credits\***

<b>Range of Credit Ratio</b>	<b>Typical Credit Ratio</b>	<b>Method</b>
Up to 1.0 : 1	1.0 : 1	Restoration via Re-establishment
Up to 1.0 : 1	1.0 : 1	Restoration via Rehabilitation
Up to 1.0 : 1	0.75: 1	Enhancement
Up to 1.0 : 1	0.5 : 1	Creation
Up to 0.25: 1	0.25: 1	Buffer
Up to 0.125:1	0.125:1	Preservation

\* Final credit ratios a site may produce may deviate from the above ratios as deemed appropriate by the permitting agencies. All ratios listed above indicate the number of mitigation credits per acre (credits: 1 acre).

## 5) COMPENSATORY MITIGATION SITE PLANNING AND OPERATION

### A. Selecting a Suitable Compensation Site

This section is applicable to both permittee-responsible compensatory mitigation and mitigation bank projects. While approval of a given site is the responsibility of the permitting agencies, it is the responsibility of the applicant or bank sponsor to propose a site for providing compensatory mitigation for agency review.

Permittee-responsible mitigation sites ideally are located within a one-half mile radius from the permitted impacts and typically are located within the same BSA as the impact location (see Figure 2.1). In rare occasions, a permittee-responsible mitigation site may be located outside the BSA.

All banks in Wisconsin use BSA's to guide decisions regarding the suitability of a bank site to provide compensatory mitigation for permitted wetland fill (see Figure 2.1). The permitting agencies prefer applicants to select the nearest practicable bank site relative to the impact site within the BSA. Optimally, the debit would occur in the same 8-digit Hydrologic Unit Code (HUC). Bank sites should generally consist of a minimum of 25 acres; smaller bank sizes may be considered in certain cases, such as if the proposed site is located in an urban area where larger parcels are difficult to acquire or if the site is an ideal candidate for wetland mitigation.

The compensatory mitigation project site must be ecologically suitable for providing the desired wetland functions. In determining the ecological suitability of the compensatory mitigation project site, the permitting agencies will consider, to the extent practicable, the following six factors:<sup>26</sup>

- Hydrological conditions, soil characteristics, and other physical and chemical characteristics;
- Watershed-scale features, such as habitat diversity, habitat connectivity, and other landscape scale functions;
- The size and location of the compensatory mitigation site relative to hydrologic sources (including the availability of water rights) and other ecological features;
- Compatibility with adjacent land uses and watershed management plans;
- Reasonably foreseeable effects the compensatory mitigation project will have on ecologically important aquatic or terrestrial resources, cultural sites, or habitat for threatened and endangered species; and
- Other relevant factors including, but not limited to, development trends, anticipated land use changes, habitat status and trends, the relative locations of the impact and mitigation sites in the stream network, local or regional goals for the restoration or protection of particular habitat types or functions (e.g., re-establishment of habitat corridors or habitat for species of concern), water

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<sup>26</sup> 33 CFR 332.3(d)

quality goals, floodplain management goals, and the relative potential for chemical contamination of the aquatic resources.

Compensation sites that do not rely on structures which require active maintenance and management are encouraged.<sup>27</sup> If man-made structures are included as part of the design and the site’s long-term viability relies on the structures, the permitting agencies may require some form of endowment or other financial assurance to be used for the maintenance and monitoring of the structure in perpetuity.

Though not applicable to all sites, Figure 5.1 lists some general characteristics typical for viable compensation site (to include bank site) proposals.

**FIGURE 5.1: General Characteristics for a Viable Compensation Site**

a. The site contains drained hydric soils.
b. The site is not too small, and fits into the ecological landscape; generally these sites are contiguous with existing wetland resources or where aquatic resources previously existed. <sup>28</sup>
c. The site chosen has a good potential to maximize functional lift, or otherwise provide functional gains over existing conditions.
d. Ditches, tiles, and other features which impact hydrology that are contained within the property boundaries can be disabled or manipulated without negatively impacting neighboring properties by the bank sponsor or compensation site developer.
e. The site is not likely to receive continual inputs of undesirable vegetative species (invasive and/or non-native species).
f. Upland buffers provide adequate wetland protection from adjacent present and future land uses.
g. The work proposed will not result in an adverse impact to federal or state endangered, threatened, or special concern species.
h. The work proposed will not threaten or degrade high quality upland habitat, such as prairie remnants and oak savannas.
i. The site offers the opportunity to provide or enhance wetland functions and services as well as ecological or hydrological functions and services missing in the surrounding landscape or watershed, such as those identified in regional habitat conservation plans.
j. The site has a suitable reference wetland which can be used to assess the predicted final product of the proposed compensation site.
k. The site will not require long-term maintenance of structures to sustain targeted community types, functions and services.

Federally funded wetland restoration or conservation projects (e.g., Wetland Reserve Program, Conservation Reserve Program, or Partners for Fish and Wildlife Program) undertaken for purposes other than compensatory mitigation, may not be used to generate

<sup>27</sup> Chapter NR 350.05(4), Wisconsin Administrative Code

<sup>28</sup> 33 CFR 332.3(d)(3)

mitigation credits. However, the permitting agencies may allow credit to be generated for activities over and above the scope of a federally funded restoration or conservation project.

## **B. Preferred Target Community Types**

The Federal Mitigation Rule directs agencies to strive for in-kind compensatory mitigation over out-of-kind as part of the watershed approach. When in-kind compensation is not possible, permitting agencies prefer to see sites restored to vegetative communities that have historically experienced the greatest loss in the impacted BSA. Sedge meadows and forested wetlands have experienced the highest occurrence of loss in the state, so it is particularly important to attempt to restore these communities in areas that have experienced high percentages of this cover type loss. While the site often dictates the type of wetland cover possible, persons developing compensatory mitigation site proposals that include these communities will have a higher likelihood of being approved by the permitting agencies.

## **C. Include Vegetated Buffers to Protect the Site**

Upland buffers protect wetlands and provide habitat and corridors that increase ecological functions and services of compensation sites. Adequate buffers may be required as part of approved compensation sites.<sup>29</sup> If no upland buffer is present on site, permitting agencies may require a vegetated wetland buffer of the same width. Site-specific conditions may be considered in determining what constitutes an adequate buffer.

The following general characteristics of successful upland buffers should be considered when selecting a site and planning the compensation site design. An optimal buffer width is at least 100 feet wide or to the edge of the sub-watershed of the wetland, if less than 100 feet. Permitting agencies may require a wider buffer to ensure the upland buffer is large enough to adequately filter run-off entering the site. The buffer area should contain a dense herbaceous ground layer, except when a shrub or forest community is the goal. Rills and gullies due to erosion should not be present inside the buffer area; any area disturbed during construction must be stabilized and vegetated as quickly as possible with an annual grass cover crop. Seed mixes used in the buffer area may not contain reed canary grass (*Phalaris arundinacea*) or giant reed grass (*Phragmites australis*); other invasive species may be restricted on a project-by-project basis. In addition, invasive grasses such as cheat grass/downy brome (*Bromus tectorum*), smooth brome grass (*Bromus inermis*), and quack grass (*Elymus repens*) are discouraged in upland buffer areas because they can make future prairie restoration difficult.

Some additional restoration activities on the adjacent buffer (e.g., restoring appropriate native prairie), if integral to the ecological success of the site, may be appropriate for additional compensatory mitigation credit (see Chapter 4.A.5). Any buffer restoration

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<sup>29</sup> Chapter NR 350.05(5), Wisconsin Administrative Code



efforts that qualify for the higher (0.25:1) crediting ratio must have developed buffer site goals, objectives, performance standards, and appropriate monitoring and management plans in the CSP. If planting is done in buffer zones, the seed should be local Wisconsin genotype, originated in Wisconsin or the first tier counties from adjoining states.

### **D. Creation of Ponds or Open-Water Habitats as Compensation are Discouraged**

Past experience with compensatory mitigation projects in Wisconsin and elsewhere in the United States has shown that creation of small ponds with a ring of emergent vegetation has had a poor track record in terms of species diversity, nuisance species invasions, and water quality problems. The use of scrapes has also been problematic in Wisconsin; when scrapes are dug too deep they often result in creation of an unvegetated pond. Typically, an area that is found to hold water year-round and is not vegetated will not be given credit.<sup>30</sup>

### **E. Completing a Compensation Site Plan (CSP)**

Once a site has been approved by the permitting agencies (in consultation with the Interagency Review Team for banks), the applicant or bank sponsor shall prepare a CSP.<sup>31</sup> The CSP is synonymous with the mitigation plan described in the Federal Mitigation Rule.<sup>32</sup> An outline of this document can be found in Appendix E; all content listed in Appendix E is mandatory for a CSP to be considered complete.

The CSP must include performance standards which are used to assess whether the project is achieving its objectives. Performance standards relate to the objectives of the compensatory mitigation project to evaluate site development into the desired resource type, to evaluate if the site is providing the expected functions, and whether the site is attaining any other applicable metrics (e.g., acres).<sup>33</sup> As such, performance standards must be based on attributes that are objective and verifiable (measurable). The permitting agencies, in consultation with the IRT, are working to develop a list of common performance standards to utilize for compensatory mitigation projects. However, this list was not complete in time for publication of this document, but is anticipated to be included in subsequent iterations. Project proponents should consult with the permitting agencies in advance of completing a CSP to discuss the proposed project, and the performance standards recommended to evaluate project success.

For banking, a CSP is part of the mitigation bank instrument (MBI).

For permittee-responsible mitigation, the CSP is a stand-alone document. Once the permitting agencies approve the CSP, the CSP is either incorporated (physically or by

<sup>30</sup> Chapter NR 350.05(3), Wisconsin Administrative Code

<sup>31</sup> Chapter NR 350.08, Wisconsin Administrative Code

<sup>32</sup> 33 CFR 332.4(c)

<sup>33</sup> 33 CFR 332.5



reference) into any permit issued, or portions of the CSP may be incorporated into the permit as special conditions.

## **F. Legal Requirements (Site Protection and Financial Assurances)**

Permitting agencies require that all compensation sites (permittee-responsible and mitigation banks) be protected with a conservation easement or comparable legal instrument in perpetuity<sup>34,35</sup>. The site protection mechanism proposed must be approved by the permitting agencies.

The legal site protection document must, to the extent appropriate and practicable, prohibit incompatible uses (e.g., clear cutting or mineral extraction) that might otherwise jeopardize the objectives of the compensatory mitigation project. Where appropriate, multiple instruments recognizing compatible uses (e.g., fishing or walking paths) may be used.

The legal site protection document must contain a provision requiring 60-day advance notification to the permitting agencies before any action is taken to void or modify the instrument, management plan, or long-term protection mechanism, including transfer of title to, or establishment of any other legal claims over, the compensatory mitigation site.

Generally the easement should be in place before construction begins. Permitting agency contacts can provide an acceptable conservation easement or comparable template. Often the WDNR will be the grantee of the site protection instrument but on occasion, another entity such as a federal, tribal, state, or local resource agency, non-profit conservation organization, or private land manager may serve as the grantee, subject to permitting agency approval.

In addition to site protection through legal instruments, financial assurances are generally required for construction of all mitigation sites, as well as for subsequent site monitoring and management activities.<sup>36</sup> The applicant or bank sponsor should work with the permitting agencies to determine the specific needs for their proposal. In general, financial assurances are required to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with applicable performance standards. In cases where an alternate mechanism is available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained (e.g., a formal, documented commitment from a government agency or public authority) the permitting agencies may determine that financial assurances are not necessary for that compensatory mitigation project<sup>37</sup>. Any financial assurances required will be conditioned within any permit or MBI executed for the compensation site.

<sup>34</sup> Section 281.36(8m)(a), Wisconsin Statute; Chapter NR 350.11(1), Wisconsin Administrative Code

<sup>35</sup> 33 CFR 332.7(a)(1) provides flexibility on this requirement for government property.

<sup>36</sup> Chapter NR 350.10, Wisconsin Administrative Code

<sup>37</sup> This is a USACE flexibility, see 33 CFR 332.3(n)

The amount of the required financial assurances is determined by the permitting agencies, in consultation with the project sponsor, and is based on the size and complexity of the compensatory mitigation project, the degree of completion of the project at the time of project approval, the likelihood of success, the past performance of the project sponsor, and any other factors the permitting agencies deem appropriate. Cost should be quoted as fair-market value of the materials and services to be rendered. Financial assurances may be in the form of performance bonds, escrow accounts, casualty insurance, letters of credit, legislative appropriations for government sponsored projects, or other appropriate instruments, subject to the approval of the permitting agencies. In determining the assurance amount, the permitting agencies shall consider the cost of providing replacement mitigation, including costs for land acquisition, planning and engineering, legal fees, mobilization, construction, and monitoring.

Financial assurances are phased out once the compensatory mitigation project has been determined by the permitting agencies to be successful in accordance with its performance standards. The permit (or CSP for permittee-responsible) or MBI (banks) specifies the conditions under which the financial assurances are to be released to the permittee, sponsor, and/or other financial assurance provider, including, as appropriate, linkage to achievement of performance standards, adaptive management, or compliance with special conditions.

A financial assurance must be in a form that ensures that the permitting agencies will receive notification at least 120 days in advance of any termination or revocation. For third-party assurance providers, this may take the form of a contractual requirement for the assurance provider to notify the permitting agencies at least 120 days before the assurance is revoked or terminated.

Financial assurances shall be payable at the direction of the permitting agencies to their designee or to a standby trust agreement, assurances are often made payable to the WDNR<sup>38</sup>. When a standby trust is used (e.g., with performance bonds or letters of credit) all amounts paid by the financial assurance provider shall be deposited directly into the standby trust fund for distribution by the trustee in accordance with the permitting agencies instructions.

## **G. Long-Term Management**

The approved CSP (codified in any permit issued for permittee-responsible mitigation) or MBI (for mitigation bank sites) must include a long-term management plan. This plan must identify the legal mechanisms and party responsible for ownership and all long-term management and protection of the mitigation project site<sup>39</sup>.

The responsible party should make adequate provisions for the operation, maintenance, and long-term management of the compensatory mitigation project site. In addition to

<sup>38</sup> WDNR requires financial assurances be made payable to the “State of Wisconsin, Department of Natural Resources” per Chapter NR 350.10(4)(d), Wisconsin Administrative Code

<sup>39</sup> Chapter NR 350.09(4)(b)-(c), Wisconsin Administrative Code

identifying legal mechanisms and responsible parties above, the long-term management plan should include a description of long-term management needs, the annual cost estimate for these needs, and identify the funding mechanism that will be used to meet those needs. In some cases to ensure the integrity of the site, a long-term financing mechanism may be required; appropriate mechanisms include non-wasting endowments, trusts, contractual arrangements with future responsible parties, and other appropriate financial instruments. The applicant or bank sponsor should work with the permitting agencies to determine if a long-term financing mechanism will be required and if so, who the grantee will be, how much will be required, and what mechanism is most appropriate.

The CSP (and/or permit for permittee-responsible) or MBI (for banks) may include provisions allowing the permittee or sponsor to transfer the long-term management responsibilities of the mitigation site to a land stewardship entity (e.g. public agency, non-governmental organization, private land manager), but only when approved in advance by the permitting agencies. The entity need not be identified in the original permit or MBI, as long as the future transfer is approved by the permitting agencies. The CSP (for permittee-responsible) or MBI (for banking) must address the financial arrangements and timing of any necessary transfer of long-term management funds to the steward.

Where needed, the acquisition and protection of water rights should be secured and documented in the CSP (permittee-responsible) or MBI (bank).

## **H. Construction and As-Built Approval**

Once a CSP has been approved and is incorporated into any necessary permit (permittee-responsible) or the MBI is signed (for a bank), construction on the site(s) can begin. The permittee or bank sponsor is responsible for providing an as-built report to the permitting agencies (permittee-responsible) or IRT (mitigation bank) by the date stipulated in the CSP/permit (permittee-responsible) or MBI (mitigation bank)<sup>40</sup>. This report will summarize the construction activities and note any changes to the construction plan that occurred following the format outlined in Figure 5.2. If immediate corrective actions are needed, these must be identified along with a timeline for when the work will be completed. This document will act as the “Year Zero” monitoring report and will serve as the basis for the construction inspection.

<sup>40</sup> Chapter NR 350.09(2), Wisconsin Administrative Code

**FIGURE 5.2: Outline for the As-Built Report**

1. Identify the site (includes the bank name or permit number if for a permittee-responsible site), designer/consultant, and sponsor. Include a written description of the location, including landmarks, perimeter information, and coordinates (lat/long, UTM).
2. Identify the construction contractor.
3. Dates of construction (including completion date) and site inspections by a qualified wetland consultant.
4. Describe any changes to the original plan.
5. Describe problems encountered during construction and what was done to correct the problem.
6. List any follow-up corrective actions needed, provide a schedule, and list who is responsible.
7. Provide the as-built plan sheets.
8. Provide photos showing before and after conditions of constructed area.
9. Provide a description of the existing conditions of all wetlands at the completion of construction activities.

An inspection by the permitting agencies is almost always required before the permitting agencies approve the release of any construction financial assurance or bank credits. Permitting agency inspections are conducted to verify that the project was completed in accordance with the approved plans and specifications. At the permitting agencies discretion (in consultation with the IRT for banks), a list of corrective actions may be developed after the inspection. If corrective actions are required, the permitting agencies may not release the construction financial assurance until after the permittee or sponsor demonstrates that all corrective actions have been satisfactorily addressed.

## I. Monitoring and Reporting

After the construction as-built report has been approved by the permitting agencies, the permittee or bank sponsor will be required to submit annual monitoring reports to agencies on the post-construction monitoring and management activities.<sup>41,42</sup> Generally the first monitoring year is considered the first full growing season after construction is completed. The number and dates of required annual monitoring will be outlined in the signed MBI (for banks) and permit (or CSP, if incorporated by reference for permittee-responsible); generally there are 5 annual monitoring reports required periodically throughout the monitoring period. Monitoring reports are due to the permitting agencies (and all IRT members for banks) by December 31 of each full monitoring year growing season unless otherwise approved by the permitting agencies. Refer to Figure 5.3 for a format outline for monitoring reports. Monitoring reports should inform permitting agencies of the status of the mitigation site, the progress made on the performance standards, and identify any need for corrective actions.

<sup>41</sup> Chapter NR 350.09(3), Wisconsin Administrative Code

<sup>42</sup> 33 CFR 332.6

**FIGURE 5.3: Outline for Monitoring Reports**

1. Identify the site (includes the bank name or permit number if for a permittee-responsible site), designer/consultant, and sponsor. Include a written description of the location, including landmarks, perimeter information, and coordinates (lat/long, UTM).
2. Dates of construction (including completion date) and site inspections.
4. Brief information describing the purpose of the project, acreage and type of wetland resource proposed (if permittee-responsible, also describe, by acreage and type, the wetland impacts authorized by the permit).
4. Describe any changes to the original plan.
5. List any follow-up corrective actions needed, provide a schedule, and list who is responsible.
6. Provide site maps showing cover types and sampling data.
7. Provide photos from fixed vantage points showing monitoring areas, problem areas, or other areas of interest.
8. Provide a description of the existing conditions of all wetlands at the completion of annual monitoring activities. Reports should list the performance standards and describe progress toward meeting the standards using quantifiable monitoring data.

Particular emphasis should be paid to evaluating whether or not the site is meeting performance standards for wetland vegetation and hydrology.<sup>43</sup> Performance standards are quantitative and may be based on variables or measures of functional capacity as defined in the assessment methodology, measurements of hydrology, or other wetland resource characteristics, and/or comparisons to nearby reference wetlands of similar type and landscape position. Performance standards are used by the permitting agencies and IRT (for banks only) to evaluate the success of a compensation site. During the monitoring period, the permitting agencies will provide feedback on site progress. At the end of the monitoring period, the permitting agencies will evaluate whether the compensation project met performance standards. For banks, monitoring reports are often used by permitting agencies in consultation with the IRT to evaluate and respond to a sponsor's request for a release of mitigation bank credits.

## J. Site Failure

The permitting agencies and IRT (for mitigation banks only) review monitoring reports to determine whether a compensation project is meeting performance standards as defined in the MBI and permit (or CSP, for permittee-responsible projects). These standards are measurable objectives set in the project-planning phase. If needed, the permitting agencies will require the permittee or bank sponsor to complete corrective actions if the monitoring reports indicate that performance standards are not being met.

If at the end of the monitoring period, the compensation project is determined by the permitting agencies to be unsuccessful in meeting its performance standards the bank sponsor or permittee shall implement the corrective management strategies as laid out in the MBI and/or CSP and discuss any options with the permitting agencies (in

<sup>43</sup> Chapter NR 350.09(3)(b), Wisconsin Administrative Code

consultation with the IRT for banks) to complete the project. If the site is not meeting standards even after the planned corrective strategies have been exhausted, the permitting agencies or sponsor (as appropriate) should consider pursuing one of several options for permitting agency approval, including, but not limited to the following:<sup>44</sup>

1. The monitoring period may be extended by the permitting agencies while imposing a compliance schedule specifying corrective actions to be taken by the permittee or bank sponsor and deadlines for completing these actions.
2. A third party approved by the permitting agencies may pursue access to the financial assurance funds to complete remedial corrective actions at the site.
3. A third party approved by the permitting agencies may pursue access to the financial assurance funds to develop an alternate site if the permitting agencies determine that the existing site is not a viable compensation site.
4. The number of credits originally estimated to be produced on the site may be reduced to reflect the inability of the site to meet the performance standards. This may reduce the number of credits available for sale (mitigation banks), or may result in insufficient compensation for impacts authorized by permitting agencies (permittee-responsible) – requiring the permittee to provide additional compensation to fulfill permit requirements.
5. The compensatory mitigation project may be modified, or performance standards may be revised. Unless a natural disaster occurs, performance standards may only be revised when the new standards would provide ecological benefits that are comparable or superior to the originally approved mitigation project. This requires approval from the permitting agencies.<sup>45</sup>

The permittee or bank sponsor (as appropriate) must obtain permitting agency approval for the course of action proposed. Permitting agency evaluation is completed on a case-by-case basis, factors considered include: the permittee or bank sponsor's willingness to work with the agencies, past work accomplished on the site, and existing site conditions. The permitting agencies will document the reasons for any course of action selected.

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<sup>44</sup> 33 CFR 332.7(c) contains additional information on adaptive management.

<sup>45</sup> 33 CFR 332.7(c)(4)



## 6) MITIGATION BANKING

Mitigation banking involves a formal administrative framework in which wetlands are restored, enhanced, preserved, or created expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources. Once the plan to purchase credits is approved by the agencies, permittees must purchase the required credits. The permittee retains responsibility for providing the compensatory mitigation until the appropriate number and cover type of credits have been secured from a bank and the permitting agencies have received documentation that confirms that the bank has accepted the responsibility for providing the required compensatory mitigation. Once this is completed, the bank assumes responsibility for the permittee's compensatory mitigation requirement.

Wetland bank credits earned on a given site are initially estimated using the ratios shown in Figure 4.1 (final numbers are determined post-construction and depend on how well the site meets established performance standards and the final wetland acreage provided). These credits are available for use by the bank sponsor or by other permittees to compensate for adverse wetland impacts resulting from permitted activities (i.e. "debits"). Purchase of in-kind credits within the BSA of the permitted impact is preferred. Optimally, the debit would occur within the same 8-digit HUC as the proposed impact. Prospective bank sponsors should not construe or anticipate the establishment of a mitigation bank as ultimate authorization for specific projects, as excepting such projects from any applicable requirements, or as pre-authorizing the use of credits from that bank for any particular project.<sup>46</sup>

### A. Types of Mitigation Banks

**1. *Single Client***— Single client banks are developed to produce credits for sale or use by the bank sponsor or by a single client of the sponsor. The client or sponsor may be an individual, a corporation, a governmental unit, a municipality, or an association.

**2. *General Use***— General use banks are developed to produce credits for sale or use by permittees. General use banking results in a transfer of the legal and financial responsibility for executing compensatory mitigation from the permittee to the bank sponsor. General use banks are described as private commercial banks in RIBITS.

### B. Roles and Responsibilities

#### **1. *Role of the Bank Sponsor***

The bank sponsor prepares the prospectus and the mitigation bank instrument or MBI (Chapter 5.E and Appendix E).<sup>47</sup> Refer to the USACE website for the most current MBI

<sup>46</sup> Chapter NR 350.13(4), Wisconsin Administrative Code

<sup>47</sup> Chapter NR 350.13(2)-(3), Wisconsin Administrative Code

template (<http://www.mvp.usace.army.mil/Missions/Regulatory/MitigationBank.aspx>). See Appendix D and Chapter 6.H below for the process for developing a mitigation bank.

The bank sponsor is solely responsible for setting the cost of bank credits. The bank sponsor is entirely financially responsible for establishing a bank site (or sites) in accordance with an approved MBI, administration of the accounting of debits and credits and submitting ledgers to the permitting agencies, conducting required corrective actions, providing required monitoring and status reports to the IRT, and assuring long term maintenance and protection of the site(s).

Each time an approved credit transaction occurs, documentation is required that confirms that the bank has accepted the responsibility for providing the required compensatory mitigation. The sponsor must provide notification to the USACE and WDNR. This notification may be provided by using the Affidavit of Bank Credit Purchase<sup>48</sup> (Appendix F) signed by the sponsor and permittee. The sponsor may not sell credits without permitting agencies approval to ensure that debits occur only for agency authorized wetland impacts. Each affidavit shall reference the USACE and/or WDNR permit numbers for which the compensatory mitigation was required, the permittee to whom the credit was sold, and the location of the impact site for which the permit is being issued. Mitigation bank sponsors are responsible for tracking the number of credits of each of the eleven plant community types available for sale and shall provide the USACE updates to load into the RIBITS (Regulatory In-lieu fee and Bank Information Tracking System) website.

The sponsor must submit an annual credit ledger report to the permitting agencies by January 30<sup>th</sup> which shows all activity from the preceding calendar year. Annual ledger reports must include the beginning and ending balances of available credits by credit type, all credit deposits and withdrawals, and other changes in credit availability, such as the release of additional credits or the suspension of credit sales. Annual credit ledger reports are mandatory for every year until all credits have been sold and the bank is formally closed.

## ***2. Role of the Interagency Review Team (IRT)***

Representatives of the USACE, U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (FWS), Natural Resources Conservation Service, the WDNR and other state, tribal, or local regulatory agencies, as appropriate to a particular site, may comprise the IRT at the discretion of the USACE as the lead federal agency.

The primary role of the IRT is to provide the permitting agencies feedback for use when considering whether to approve mitigation banks. The IRT reviews the prospectus and MBI, and comments on the expected credits the site may produce. At the discretion of the USACE, IRT members may participate in the execution of an MBI.<sup>49</sup> After site

<sup>48</sup> USACE may accept other forms of notification, such as an updated ledger or contract to purchase.

<sup>49</sup> While WDNR is a member of the IRT, it also has independent authority to review and approve banks per Chapter NR 350.13(2), Wisconsin Administrative Code



construction, the IRT reviews and provides the permitting agencies comments on the as-built, site monitoring reports, site performance, and proposed credit releases. To accomplish its' duties, members of the IRT may visit prospective and existing bank sites during the bank development process, site construction, subsequent monitoring periods, and after monitoring is completed.

The IRT is convened by the USACE. The WDNR may serve as a co-chair if the bank will also be used to satisfy state requirements.

The goal is to reach IRT consensus on the specifics of bank development, the bank instrument, and on preliminary and final credit determinations. However, final decisions are made by the lead permitting agencies.

### ***3. Role of the Permitting Agencies***

The permitting agencies determine the appropriate compensation required for a given permit. If purchase of bank credits is the selected approach, the permitting agencies will determine the compensation ratio (see Chapter 3.A) that is appropriate considering the specifics of the wetland impact and the bank site selected. While permitting agencies strive to require consistent mitigation approaches, these decisions are made independently by each permitting agency in support of their own program requirements. The permitting agencies are responsible for ensuring that all appropriate documentation is received, including the Affidavit of Bank Credit Purchase. The permitting agencies are responsible for enforcement of the conditions of the permit, including compensation requirements.

### **C. Prospectus<sup>50</sup>**

Prior to submittal of a draft MBI, a bank sponsor must submit a prospectus, which is a conceptual plan that summarizes the proposed project.<sup>51</sup> The prospectus must provide information at a sufficient level of detail to facilitate meaningful comments from the permitting agencies, IRT members, and the public. The prospectus must contain the information in Appendix C. The prospectus phase is used to inform the public and permitting agencies about the proposal and provide an opportunity to comment about the proposal, including whether or not a proposed bank site holds potential.

### **D. Mitigation Bank Instrument (MBI)<sup>52</sup>**

The mitigation bank instrument (MBI) is the legal document for the establishment, operation, and use of a mitigation bank. The MBI is the record regarding the objectives and administration of the bank. It also includes the CSP, providing specific information regarding bank site development and performance standards.<sup>53</sup> The terms and conditions

<sup>50</sup> 33 CFR 332.8(d)(2-5)

<sup>51</sup> Chapter NR 350.12(1), Wisconsin Administrative Code

<sup>52</sup> 33 CFR 332.8(d)(6-8)

<sup>53</sup> Chapter NR 350.12(3), Wisconsin Administrative Code

of the MBI may be amended, subject to notification of all IRT members and approval by the signatories. It is strongly recommended that the MBI be developed using the template found on the USACE website (<http://www.mvp.usace.army.mil/Missions/Regulatory/MitigationBank.aspx>), and incorporate the information found in Appendix E.

## **E. Credit Generation for a Bank**

The number of credits a bank site may produce is estimated up front by the sponsor and this estimate is subject to approval by the permitting agencies in consultation with the IRT. See Chapter 4 for more information.

The total estimated credits will be stated clearly in the MBI. No more than 25% of the credits for a mitigation bank site can be the result of creation.<sup>54</sup> Interim credits may be released as interim performance standards are met.<sup>55</sup> Final credit release requires a wetland delineation be completed at the end of the monitoring period.<sup>56</sup> Final credit release amounts may differ from the estimated final release credits based on the actual wetland acreage by cover type delineated on site and the permitting agencies evaluation of how well the site met all final performance standards. If final performance standards are not being met as proposed by the end of the typical monitoring period, the bank sponsor may opt to pursue one of several options as described in Chapter 6.G on site failure below.

The terms of the credit release schedule must be specified in the MBI. The credit release schedule is proposed by the sponsor and approved by the lead permitting agencies, and may provide for an initial release of a limited number of credits once the instrument is approved and other appropriate milestones are achieved. An example of a general credit release schedule is shown in Figure 6.1.

<sup>54</sup> Chapter NR 350.13(5)(a), Wisconsin Administrative Code

<sup>55</sup> Chapter NR 350.13(6), Wisconsin Administrative Code

<sup>56</sup> Chapter NR 350.07(2), Wisconsin Administrative Code

**FIGURE 6.1: General Guidelines for Release of Credits for Sale or Use**

20%	Upon approval of the construction as-built and approval of the monitoring and management financial assurance.* If the Sponsor chooses to acquire construction financial assurances, 10% of the estimated credits are eligible for release upon signing of the mitigation bank instrument and approval of construction financial assurance. Another 10% can be released upon approval of the as-built and monitoring and management financial assurance. <sup>57</sup>
15%	Upon meeting the hydrology performance standards by meeting current USACE Wetland Delineation Manual wetland hydrology criterion but with no more than 15% areal cover of standing water.
30%	Upon meeting interim performance standards.
35%	Ending monitoring year when all final performance standards have been met. <sup>58</sup> At this point the IRT will recommend final adjustments to the final credit amount for approval by the lead agency.

\*Predicated upon construction financial assurances provided upon signing the MBI.

The sale of credits to be used as compensatory mitigation must always be approved by the permitting agencies. Credits sold outside of the Bank’s BSA are subject to increased ratios as defined in Chapter 3.A. Bank sites should generally consist of a minimum of 25 acres; smaller bank sizes may be considered in certain cases, such as if the proposed site is located in an urban area where larger parcels are difficult to acquire, or if the site is an ideal candidate for wetland mitigation.

**F. The Bank Service Area (BSA)**

The bank service area of a mitigation bank is the primary area the sponsor may sell credits within and each is represented by the color blocks in Figure 2.1. On a case-by-case basis, the permitting agencies may approve a purchase of credits from a bank located outside the BSA at an increased ratio. All bank credit sales, inside or beyond the BSA, require approval from the permitting agencies to be used for compensatory mitigation.

**G. Site Failure**

The permitting agencies (in consultation with the IRT) review monitoring reports to determine whether a compensation project is meeting performance standards as defined in the MBI. These standards are measurable objectives set in the project-planning phase. If needed, the permitting agencies will require the bank sponsor complete corrective actions if the monitoring reports indicate that performance standards are not being met.

If at the end of the monitoring period, the bank site is determined by the permitting agencies to be unsuccessful in meeting its performance standards the bank sponsor shall implement the corrective management strategies as laid out in the MBI and discuss any

<sup>57</sup> Chapter NR 350.13(7)(a)-(b), Wisconsin Administrative Code

<sup>58</sup> Chapter NR 350.13(7)(d), Wisconsin Administrative Code

options with the permitting agencies (in consultation with the IRT) to complete the project. If the site is not meeting standards even after the planned corrective strategies have been exhausted, the sponsor should consider pursuing one of several options for permitting agency approval, including, but not limited to the following:<sup>59</sup>

1. The monitoring period may be extended by the permitting agencies while imposing a compliance schedule specifying corrective actions to be taken by the bank sponsor and deadlines for completing these actions.
2. A third party authorized by the permitting agencies may pursue access to the financial assurance funds to complete remedial corrective actions at the site.
3. A third party approved by the permitting agencies may pursue access to the financial assurance funds to develop an alternate site if the permitting agencies determine that the existing site is not a viable compensation site.
4. The number of credits originally estimated to be produced on the site may be reduced to reflect the inability of the site to meet the performance standards. This may reduce the number of credits available for sale.
5. The compensatory mitigation project may be modified, or performance standards may be revised. Unless a natural disaster occurs, performance standards may only be revised when the new standards would provide ecological benefits that are comparable or superior to the originally approved mitigation project. This requires approval from the permitting agencies.<sup>60</sup>

The bank sponsor must obtain permitting agency approval for the course of action proposed. Permitting agency evaluation is completed on a case-by-case basis in consultation with the IRT, factors considered include: the bank sponsor's willingness to work with the agencies, past work accomplished on the site, and existing site conditions. The permitting agencies will document the reasons for any course of action approved.

## H. Process for Establishing a Bank

Establishing a mitigation bank is a 5-step process. Each step in this process is outlined below as required by the Federal Mitigation Rule. Refer to Appendix D for a summary timeline of the bank instrument approval process (steps 1 through 4). While the key steps and approvals below indicate USACE as the lead, sponsors must also receive approval from the WDNR throughout the bank development process if they intend to sell credits to offset authorized impacts under Wisconsin state law.<sup>61</sup>

### *Step 1: Draft prospectus and Scoping*<sup>62</sup>

Bank sponsors may choose to submit a draft prospectus (refer to Appendix C). This is encouraged to identify potential issues early so that the sponsor may address those issues prior to the start of the formal review process. The USACE will provide copies of the draft prospectus to the WDNR and IRT for comments. The USACE must provide

<sup>59</sup> 33 CFR 332.7(c) contains additional information on adaptive management.

<sup>60</sup> 33 CFR 332.7(c)(4)

<sup>61</sup> Chapter NR 350.12, Wisconsin Administrative Code

<sup>62</sup> 33 CFR 332.8(d)(3)

comments back to the sponsor within 30 days of receipt of the draft prospectus, unless notification including the reason for a delay is provided to the sponsor. Any comments from the IRT will also be forwarded to the sponsor by the USACE. A site visit is optional at this stage in the review process but, if determined necessary, should be conducted as soon as feasible.

*Step 2: Prospectus*<sup>63</sup>

The bank sponsor prepares and submits a prospectus to the USACE for review. The USACE will evaluate the prospectus for completeness and notify the sponsor if the submittal is complete or if additional information is required. Within 30 days of USACE receipt of a complete prospectus, USACE will issue a public notice announcing the proposal and share the prospectus with the WDNR and other IRT agencies for feedback. The USACE may schedule a meeting with the IRT to discuss the project. Comments received from the WDNR, IRT, and from others in response to the public notice will be provided to the sponsor. The USACE will make a determination whether or not the project has potential and provide it to the sponsor. If the USACE determines the project has potential, the sponsor will be provided a template MBI (a current template is available at the USACE website <http://www.mvp.usace.army.mil/Missions/Regulatory/MitigationBank.aspx>) and other necessary information (refer to Appendix E). Additional timing information can be found in the Federal Mitigation Rule.

*Step 3: Draft MBI review*<sup>64</sup>

Phase 3 of the bank review process is initiated when the bank sponsor submits the draft Mitigation Bank Instrument (MBI). It is highly recommended that the draft MBI be developed using the template available at the USACE website (<http://www.mvp.usace.army.mil/Missions/Regulatory/MitigationBank.aspx>), it must contain the CSP information in Appendix E.<sup>65</sup> After submittal, the USACE has 30 days to determine if the draft MBI is complete and notify the bank sponsor of the completeness determination (including any request for additional information if required). Once complete, copies of the MBI are distributed to the IRT. The IRT has 30 days to comment on the draft MBI, starting 5 days after the date of distribution to the IRT. A site visit, if proposed, should be completed during this time if seasonal conditions allow (review of draft MBI's submitted in winter may be delayed until the growing season begins). If field review will extend the review period, USACE will notify the sponsor of the delay and the reason for delay as soon as possible. Within 90 days of receipt of a complete draft MBI, the USACE will provide a status update to the sponsor. The update will indicate that the bank is generally acceptable provided that certain changes or updates are provided with the submittal of the final MBI. If the bank is not likely to be approved, USACE will identify the issues that contribute to this position and provide it to the sponsor. The WDNR will provide notice to the public that a complete draft bank instrument has been found generally acceptable and will make copies of any of the plans and other documentation available for review by any person who requests such.

<sup>63</sup> 33 CFR 332.8(d)(2), (4), and (5)

<sup>64</sup> 33 CFR 332.8(d)(6) and (7)

<sup>65</sup> USACE required information is listed at 33 CFR 332.8(d)(6)(ii) and (iii)

*Step 4: Final MBI Approval*<sup>66</sup>

The sponsor will submit a final MBI with supporting documentation that explains how the final instrument addresses the comments provided by the IRT in Step 3 of the review process. The sponsor is also responsible for providing the final MBI directly to the IRT members. If USACE determines that the final MBI has not satisfactorily addressed the comments raised in Step 3, they will determine what actions may be necessary and provide this information to the sponsor. Once an acceptable final MBI has been provided, the USACE will advise the IRT whether or not they intend to approve the MBI. Any member of the IRT may submit a written request for dispute resolution to the USACE within 15 days of this advisement. If no dispute process is initiated, the USACE will inform the sponsor that the signature process for executing the MBI may be initiated. Once three copies of the final MBI have been signed by the sponsor, USACE will obtain signatures from other IRT agencies with an interest in signing the MBI, and will finalize the instrument. One copy of the executed MBI will be retained by USACE, the second and third copies will be provided to the sponsor and the WDNR. The bank will be listed as “approved” on the Corps’ RIBITS webpage and the statewide registry of approved banks on the WDNR webpage. Once all signatures are obtained, the MBI is considered complete and the bank sponsor may begin construction at the bank site.

*Step 5: Credit Release, Monitoring, Report Review and Final Approval*

In order for credits to be released the sponsor must request a release, which requires submittal of documentation to USACE demonstrating that the appropriate milestones for credit release have been achieved. This documentation is typically provided via submittal of an as-built report (which documents construction activities during “year 0”), and subsequent monitoring reports. The Federal Mitigation Rule states that submission of monitoring reports is required to assess the development and condition of compensatory mitigation projects and banks, but the content and level of detail for those reports must be commensurate with the scale, scope, and type of project.<sup>67</sup> The USACE Regulatory Guidance Letter 08-03<sup>68</sup> addresses the minimum information needed for monitoring reports. Monitoring requirements are typically based on the performance standards for the site and thus may vary from one project to another. Upon receipt of a request for credit release the USACE shall provide copies of the request and supporting documentation provided by the sponsor to the IRT.

The IRT agencies must provide comments to USACE within 15 days of receiving the documentation. However if USACE determines that a site visit is necessary, IRT comments are due within 15 days after the site visit. The site visit should be scheduled with the IRT members as soon as practicable. After full consideration of any comments received, USACE must then determine if the appropriate milestones have been achieved and whether credits should be released. The USACE has 30 days from the close of the IRT comment period to make this decision and provide written notification to the sponsor. If a credit release is approved, this notification will detail the number of credits

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<sup>66</sup> 33 CFR 332.8(d)(8)

<sup>67</sup> See 33 CFR 332.6(a)(1).

<sup>68</sup> [http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl08\\_03.pdf](http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl08_03.pdf)

to be released, as well as any additional comments for the sponsor. Adjustments to the estimated credits proposed for release will be explained.

When the sponsor submits a request for the final release of credits (typically associated with the final year's monitoring report and the final wetland delineation and/or as laid out in the MBI), the USACE must complete the coordination required in the two paragraphs above and determine final credit allocation (including consultation with the IRT) for the bank.



## Appendix A. DEFINITIONS

For the purposes of this document the following terms are defined below. Those terms including a “\*” are verbatim from the USACE regulations at 33 CFR Part 332.2. Additions to the federal definitions are indicated by “[ ]” parenthesis. For purposes of this guidance, these definitions should be applied to wetland resources.

**Adaptive Management\*** The development of a management strategy that anticipates likely challenges associated with mitigation projects and provides for the implementation of actions to address those challenges, as well as unforeseen changes to the project. It requires consideration of risk, uncertainty, and dynamic nature of compensatory mitigation projects and guides modification of these projects to optimize performance. It includes the selection of appropriate measures that will ensure that aquatic resource functions are provided and involves analysis of monitoring results to identify potential problems of a compensatory mitigation project and the identification and implementation of measures to rectify those problems.

**Affidavit of Bank Credit Purchase** Legal documentation of proof of credit purchase prepared by the Bank Sponsor and signed by the Sponsor and the Debtor purchasing credits.

**Authorization** In this document used interchangeably with the term “permit.” Can refer to U.S. Army Corps of Engineers Section 10 Rivers and Harbors Act or Section 404 Clean Water Act authorizations or Wisconsin Department of Natural Resources wetland permits.

**Bank Instrument** A document that contains specifications pertaining to the establishment, operation, and maintenance of a mitigation bank, and identification of the goals, objectives, and procedures for operation of the bank.

**Bank Sponsor** Any public or private entity responsible for establishing and, in most cases, operating a mitigation bank.

**Basin** A large region drained by a single lake or river system. There are three basins in Wisconsin: Lake Superior Basin, Lake Michigan Basin, and the Mississippi River Basin.

**Buffer\*** An upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses.

**Compensation or Compensatory Mitigation\*** The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.



**Compensatory Mitigation Project\*** A project implemented by the permittee as a requirement of a DA [and/or state wetland] permit (i.e. permittee-responsible mitigation), or by a mitigation bank or in-lieu fee program.

**Compensation Crediting Ratio** The ratio applied per acre to determine the credits generated by a given wetland compensatory mitigation method.

**Compensation Replacement Ratio** This ratio determines the amount of wetland compensatory mitigation required by the permitting agencies to offset unavoidable adverse impacts to wetlands.

**Compensation Site Plan** A comprehensive document prepared by a project proponent or bank sponsor that provides a thorough description of a proposed compensation project. The information presented in the CSP includes the information required in the “mitigation plan” by the Federal Mitigation Rule and NR 350, Wis. Adm. Code. For permittee-responsible mitigation, the CSP is a stand-alone document. For mitigation banking, the CSP is included in the mitigation bank instrument (MBI).

**Condition\*** The relative ability of an aquatic resource to support and maintain a community of organisms having a species composition, diversity, and functional organization comparable to reference aquatic resources in the region.

**Creation (establishment\*)** The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Creation results in a gain in aquatic resource area and functions.

**Credit\*** A unit of measure (e.g. a functional or areal measure of other suitable metric) representing the accrual or attainment of aquatic resource functions at a compensatory mitigation site. The measure of aquatic functions is based on the resources restored, established, enhanced, or preserved.

**Days\*** Calendar days.

**Debit\*** A unit of measure (e.g. a functional or areal measure of other suitable metric) representing the loss of aquatic functions at an impact or project site. The measure of aquatic resource functions is based on the resources impacted by the authorized activity.

**Degraded Wetland** A wetland subjected to deleterious activities such as drainage, grazing, cultivation, increased stormwater input, introduction of non-native and/or invasive species, or partial filling, to the extent that natural wetland characteristics are severely compromised and wetland functions and services are substantially reduced.

**Enhancement\*** The manipulation of physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but

may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

**Establishment\*** (creation) The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Creation results in a gain in aquatic resource area and functions.

**Functions\*** The physical, chemical, and biological processes that occur in ecosystems.

**Functional Values** This term is used by the WDNR to describe the physical, chemical, and biological processes or attributes that occur in a wetland system and how society finds certain functional values beneficial. See the functions and services definitions.

**In-Kind\*** A resource of similar structural and functional type to the impacted resource. [For purposes of these guidelines, wetland plant communities are used for the in-kind determination. See definition for wetland cover type.]

**Interagency Review Team (IRT)\*** An interagency group of federal, tribal, state, and/or local regulatory and resource agency representatives that reviews documentation for, and advises the district engineer on, the establishment and management of a mitigation bank or an in-lieu fee program. [Prior to the 2008 federal mitigation rule, this team was known in Wisconsin as the Mitigation Bank Review Team (MBRT).]

**Management** Actions taken at a compensation site to establish and maintain desired habitat and human use conditions including water level manipulations, herbicide application, mechanical plant removal, prescribed burning, fencing, signage, and vandalism repair.

**Mitigation Banking** A system of accounting for wetland impacts and compensation that includes sites where wetlands exist in perpetuity. These wetlands provide transferable credits to be subsequently applied to compensate for adverse impacts to other wetlands authorized by State and Federal permits. In general, a bank sells credits to permittees whose compensatory mitigation obligations are then transferred to the bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.

**Mitigation Banking Instrument\*** The legal document for the establishment, operation, and use of a mitigation bank.

**Mitigation Bank\* Site** A site, or suite of sites, where resources (e.g. wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by DA [and WDNR wetland] permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation bank instrument.

**Monitoring Plan** A specific program of data collection, conducted, analyzed, and reported by a project proponent or bank sponsor, which documents the physical, biological, hydrological, and human-use characteristics of compensation site wetlands. The main purpose of the monitoring plan is to document the progress and achievement of performance standards.

**Out-of-kind\*** A resource of different structural and functional type from the impacted resource. [For purposes of these guidelines, out-of-kind refers to a different wetland plant community type than that of the impacted wetland. See definition for wetland cover type.]

**Performance Standards\*** Observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives. [Performance standards are agreed to in advance by the bank sponsor/applicant and permitting agencies.]

**Permit** For purposes of this document, used interchangeably with the term “authorization.” Can refer to Wisconsin Department of Natural Resources wetland permits or U.S. Army Corps of Engineers permits.

**Permittee-Responsible Mitigation\*** An aquatic resource restoration, establishment, enhancement, and/or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility.

**Preservation\*** The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or function.

**Re-establishment\*** (a form of restoration) The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and function.

**Reference Aquatic Resource\*** A set of aquatic resources that represent the full range of variability exhibited by a regional class of aquatic resources as a result of natural processes and anthropogenic disturbances.

**Rehabilitation\*** (a form of restoration) The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource functions, but does not result in a gain in aquatic resource area.

**Release of Credits\*** A determination by the district engineer [and WDNR], in consultation with the IRT, that credits associated with an approved mitigation plan are available for sale or transfer, or in the case of an in-lieu fee program, for fulfillment of advance credit sales. A proportion of the projected credits for a specific mitigation bank or in-lieu fee project may be released upon approval of the mitigation plan, with additional credits released as milestones specified in the credit release schedule are achieved.

**Restoration\*** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

**RIBITS** (Regulatory In-lieu fee and Bank Information Tracking System) An electronic mitigation bank ledger system developed by the USACE with support from the USEPA and the U.S. Fish and Wildlife Service to provide public information on mitigation banking. RIBITS allows users to access information on the types and numbers of mitigation bank sites, service areas, and available credits.

**Riparian Areas\*** Lands adjacent to streams, rivers, lakes, and estuarine-marine shorelines. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality.

**Service Area\*** The geographic area within which impacts can be mitigated at a specific mitigation bank or in-lieu fee program, as designated in its instrument. [In Wisconsin, service areas are defined by the Bank Service Areas (BSA) as shown in Figure 2.1, although impacts may be mitigated outside of a designated service area at an increased ratio.]

**Services\*** The benefits that human populations receive from functions that occur in ecosystems. [By definition, services are not equivalent to functional values but will not be separately distinguished within this document. See Functional Values.]

**Temporal Loss\*** The time lag between the loss of aquatic resource functions caused by permitted impacts and the replacement of aquatic resource functions at the compensatory wetland mitigation site. Higher compensation ratios may be required to compensate for temporal loss. When the compensatory mitigation project is initiated prior to, or concurrent with, the permitted impacts, the district engineer [and/or WDNR] may determine that compensation for temporal loss is not necessary, unless the resource has a long development time.

**Watershed\*** A land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean. [Used interchangeably with “contributing area.” Sub-watershed refers to a portion of a watershed, and this term is often used to mean a localized area.]

**Watershed Approach\*** An analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed. It involves consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic resource functions and services caused by activities authorized by DA [and WDNR] permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources when determining compensatory mitigation requirements for DA [and WDNR] permits.

**Wetlands** Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted typically for life in saturated soil conditions.

**Wetland Cover Type** Dominant plant community types used to evaluate in-kind comparisons. For the purposes of this document, all wetlands are arranged in one of eleven community types as described by Eggers and Reed (2011)<sup>69</sup>: 1) shallow, open water, 2) deep or shallow marshes, 3) sedge meadows, 4) fresh (wet) meadows, 5) wet to wet-mesic prairies, 6) calcareous fens, 7) open or coniferous bogs, 8) shrub-carrs or alder thickets, 9) hardwood or coniferous swamps, 10) floodplain forests, and 11) seasonally flooded basins.

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<sup>69</sup> Eggers, Steve D., and Donald M. Reed. 2011. Wetlands Plants and Plant Communities of Minnesota and Wisconsin, Third Edition. U.S. Army Corps of Engineers, Regulatory Branch St. Paul District. 478 pp.

## Appendix B. THE MITIGATION SUMMARY SHEET

The Mitigation Summary Sheet is required for Wisconsin Department of Natural Resources (Department) Wetland Individual Permit (IP) applications. Compensatory wetland mitigation is required for all Department IP projects. The Applicant, or his/her consultant, shall compile a one-page document with the following information. The Mitigation Summary Sheet shall be submitted as a draft prior to the required pre-application meeting. A copy shall then be submitted along with all other required Department IP application materials.

Mitigation Summary Sheet
1. Applicant's name, address, phone number, and email address:
2. Agent or Consultant's name, address, phone number, and email address:
3. Bank Service Area (BSA) where proposed wetland impact would occur:
4. Brief project description:
5. Brief description of how project will impact wetlands:
6. Proposed/expected wetland impacts by wetland cover type and delineated acreage: ___ acres of shallow/open water ___ acres of deep/shallow marshes ___ acres of sedge meadow ___ acres of fresh (wet) meadow ___ acres of wet to wet-mesic prairie ___ acres of calcareous fen ___ acres of open bog/coniferous bog ___ acres of shrub-carr/alder thicket ___ acres of hardwood/coniferous swamp ___ acres of floodplain forest ___ acres of seasonally flooded basin
7. Compensation Approach (if bank credits are not selected, explain why) ___ a. Purchase credits from an approved bank site. -Has a mitigation bank been contacted? If so: -What bank(s) was contacted? -Is the proposed impact in the primary BSA of the bank? -If not in the same BSA, explain why. ___ b. Permittee-responsible mitigation. -If this option is being pursued, contact the DNR Wetland Mitigation Coordinator for the Compensation Site Plan requirements.

## Appendix C. PROSPECTUS FOR MITIGATION BANKS

The following information is used to review a proposed mitigation bank in Phase 2, and is strongly recommended to be submitted for Phase 1:

- I. **Owner.** Identify the bank sponsor, landowners, and any agent for the sponsor.
  
- II. **Agent.** Identify consultants or experts to be involved in design of the compensation site, and list the qualifications of the sponsor’s team to successfully complete the type(s) of mitigation project(s) proposed, including information describing any past such activities by the sponsor.
  
- III. **Objectives.** Elaborate on the broad purpose and specific objectives of the proposed mitigation bank.
  
- IV. **Maps.**
  - A. Provide a map of the proposed bank service area that shows the location of the bank site, county boundaries, and major municipalities;
  
  - B. Provide a plat or land ownership map with the bank site outlined, and adjacent properties;
  
  - C. Provide soils mapping, topographic mapping and a map with recent aerial imagery with the following information/layers included on each:
    - Boundaries of the proposed compensatory mitigation site;
    - Adjacent county highway information;
    - Public or utility infrastructure such as pipelines, transmission lines, rail lines;
    - Floodways or flood risk insurance zones (if applicable);
    - Hydrologic flow structures on or adjacent to the site including tiles, drainage ditches, berms, weirs, etc.
  
- V. **Narrative.** Prepare a BRIEF narrative that describes:
  - Existing land use;
  - Proposed areas, by plant community, of wetland and upland that will be restored (by re-establishment and by rehabilitation – list separately), enhanced, established (created), or preserved (*e.g.*, “15 acres of shallow marsh restored by rehabilitation, 10 acres of sedge meadow enhanced, 25 acres of wet prairie restored, 20 acres of tallgrass prairie restored, and 5 acres of southern deciduous forest preserved”). **Do not** propose multiple restoration options for a single piece of land (*e.g.*, **do not** propose to “restore 10 acres to prairie **or** savannah **or** deciduous forest”);
  - How the proposed project will increase specific wetland functions and services above the pre-project levels;
  - Ecological suitability of the site to achieve the objectives, as stated above;
  - Proposed ownership arrangements and long-term management strategy for the mitigation bank or in-lieu fee project sites (*e.g.*, “DNR, who manages adjacent



- property, has indicated an interest in owning and managing the site long-term”);
- The technical feasibility of the proposed mitigation bank (e.g., “this kind of restoration has proven successful on XX sites in comparable landscape positions in this ecoregion”).

**VI. Hydrology.** Include documentation of any existing or anticipated right of the landowner or others to remove water, soil, minerals or biomass from within or adjacent to the site boundary (e.g., irrigation pumps or rights to withdraw surface or groundwater that would otherwise be assumed to provide wetland hydrology for the site). Also include documentation of any existing or anticipated right to drain water through, from, or onto the bank site or impound water on the bank site (e.g., tile outlets onto the property, ditches through the property, flooding easements, flowage easements, drainage easements, maintenance easements). Provide assurance that there are sufficient water rights to support long-term sustainability of the wetland mitigation site.



## Appendix D. TIMELINE FOR MITIGATION BANK INSTRUMENT APPROVAL

		Event	# of Days**		
Phase I		Optional Preliminary Review of Draft Prospectus	30		DE provides copies of draft prospectus to IRT and will provide comments back to the sponsor within 30 days.
	<b>Sponsor Prepares and Submits Prospectus</b> ~DE must notify sponsor of completeness w/in 30 days of submission~				
Day 1**		Complete Prospectus Received by DE			
Phase II	Day 30	Public notice must be provided within 30 days of receipt of a complete prospectus	30		
	Day 60	30-Day Public Comment Period	30		
	Day 90	DE must provide the sponsor with an initial evaluation letter within 30 days of the end of the public comment period.	30	15	DE distributes comments to IRT members and sponsor within 15 days of the close of the public comment period.
<b>Sponsor Considers Comments, Prepares and Submits Draft Instrument</b> ~DE must notify sponsor of completeness w/in 30 days of submission~					
Day 1		Complete Draft Instrument Received by IRT Members			
Phase III		30-day IRT comment period begins 5 days after DE distributes draft instrument to IRT members	30		
	Day 90	DE discusses comments with IRT and seeks to resolve issues ~ # of days variable~	60	90	Within 90 days of the receipt of a complete draft instrument by IRT members, the DE must notify the sponsor of the status of the IRT review.
<b>Sponsor Prepares Final Instrument</b> ~Sponsor provides copies to DE and all IRT members~					
Day 1		Final Instrument Received by DE & IRT			
Phase IV	Day 30	DE must notify IRT members of intent to approve/not approve instrument within 30 days of receipt.	30	45	IRT members have 45 days from submission of final instrument to object to approval of the instrument and initiate the dispute resolution process.
		Remainder of time for initiation of dispute resolution process by IRT members	15		
Day 45		INSTRUMENT APPROVED/NOT APPROVED, or DISPUTE RESOLUTION PROCESS INITIATED			

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Total Required Federal Review (Phases II-IV): ≤225 Days

\*Timeline also applies to amendments

\*\*The timeline in this column uses the maximum number of days allowed for each phase.

## Appendix E. COMPENSATION SITE PLAN (CSP)

### OUTLINE

(Additional or different information may be required by agencies on a project-by-project basis)

All proposed permittee-responsible compensatory mitigation plans and mitigation banks must include a discussion of the following items. A compensatory mitigation plan cannot be approved by the permitting agencies until the following items are included. Please provide the following information and a completed copy of this checklist with the submittal of a compensation site plan (CSP):

**I. Executive Summary:** ONE PAGE summary of the proposed site plan containing the following information:

- Site name
- Location of compensation site: County, Basin, BSA, ¼ ¼, Section, Township, Range, Latitude/Longitude.
- Is this a bank site? If yes, name of bank sponsor
- Is this project specific? If yes, this is compensation for which project (include permit numbers)?
- General description of design concept for the compensation site.
- Details of upland buffers. Include surrounding land-uses.
- Restoration work planned in buffer zone.
- Planned hydrology (include expected water depth).
- Planned construction date.

Compensation Site Wetland Type	Acres Impacted (for P-R sites)	Acres Restored or Enhanced	Acres Created	Acres Preserved
Shallow or Open Water				
Marshes				
Sedge Meadows				
Fresh (Wet) Meadows				
Wet to Wet-Mesic Prairies				
Fens				
Bogs				
Shrub Swamps				
Wooded Swamps				
Floodplain Forests				
Seasonally Flooded Basins				
<b>Totals</b>				

**II. Introduction and Purpose:** Identify the development project for which the compensation effort is required. State if the plan is for development of a bank site or a permittee-responsible site. Provide the projected start and end dates for construction of the development project and the compensation site.

**III. Identify Plan Developers and Expertise:** In order to develop a high quality wetland compensation project, a significant level of professional expertise and experience is required. Depending on the complexity of the selected site, a team of experts may be required for planning, design, construction, inspection, monitoring, and maintenance. This interdisciplinary team may include plant ecologists, hydrologists, soil scientists, hydrogeologists, contractors, engineers, and wildlife biologists. The CSP should list the personnel working on the project and include reference to past projects and qualifications. Provide the names and professional experience information for the personnel responsible for investigating the proposed site and preparing the site plan, construction plans, and specifications.

**IV. Site Selection:** A description of the factors considered during the site selection process. This should include consideration of the watershed needs, on-site alternatives where applicable and the practicability of accomplishing ecologically self-sustaining wetland restoration, establishment, enhancement, and/or preservation at the compensatory mitigation site. Explain why the proposed site was chosen of all the site alternatives considered. Provide the detailed site location by County, Township, Range, and Quarter-Quarter section. Locate the site on the USGS 1:24,000 quadrangle map.

**V. Mitigation Objectives:** A description of the wetland type(s) and acres that will be restored, created, enhanced and/or preserved. A discussion of the wetland functions and services and how these functions and services address the needs of the watershed. The watershed approach shall be implemented according state and federal law and Chapter 2.C.

**VI. Baseline Information:** A description of the ecological characteristics of the proposed compensatory mitigation site and, in the case of an application for a federal or state required permit, the impact site. This should include descriptions of historic and existing conditions and other site characteristics appropriate to the wetland resource proposed as compensation.

- survey of current contours;
- summary of historic and current on-site land uses;
- description of current zoning designations;
- description of nearby land uses;
- description of any known historic/archeological resources on the site;
- assessment of the geology and soils on site using the county soil survey and some representative borings;
- description of current hydrology including channelized and un-channelized flows, groundwater, and tiling information;
- description of the present flora;
- description of fauna using the site;
- NRCS and WWI mapping of the site;
- wetland delineation in accordance with the 1987 Corps of Engineers Wetland Delineation Manual and any applicable Regional Supplement(if wetland currently exists on the site);

- wetland functions and services assessment of any wetlands existing on the site;
- floodplain mapping of the site;
- description of any state navigable waters on or near the site;
- description of the site in context of other wetlands, wildlife habitat, and natural areas (corridor concepts); and
- NHI search results.

**VII. Site Map:** The site map should be at a scale of 1 inch = 400 feet and should show 1 foot contours. A map should also be provided showing a clear outline of the property boundaries, showing the boundaries of all current and proposed vegetative communities, and any other pertinent current or proposed land features.

**VIII. Mitigation Work Plan:** Detailed written specifications and work descriptions for the compensatory mitigation project, including, but not limited to, the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water, including connections to existing waters and uplands; methods for establishing the desired plant community; plans to control invasive plant species; the proposed grading plan, including elevations and slopes of the substrate; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as plan form geometry, channel form (e.g., typical channel cross-section), watershed size, design discharge, and wetland area plantings.

**IX. Determination of Credits:** A description of the number of credits to be provided, including a brief explanation of the rationale for this determination (wetland assessment method). For permittee-responsible mitigation, this should include an explanation of how the compensatory mitigation project will provide the required compensation for the unavoidable impacts to aquatic resources resulting from the permitted activity.

**X. Performance Standards:** Ecologically-based standards (hydrology, plant survival, species composition, habitat features, etc.) that will be used to determine whether the compensatory mitigation project is achieving its objectives. Performance standards are a list of quantifiable objectives that must be met so that the project can be objectively evaluated to determine if the site is developing in to the desired resource type, providing the expected functions and services, and attaining any other applicable metric. Specific requirements and additional guidance for performance standards can be provided by permitting agencies upon request but are often set on a case-by-case basis.

**XI. Monitoring Requirements:** Provide a description of the parameters to be monitored, a description of the monitoring methods, and a monitoring schedule. The site attributes to be monitored and level of monitoring effort proposed should be sufficient to determine if the compensatory mitigation project is on track to meet the performance standards and provide the functional improvements described in the site

objectives. Monitoring will also indicate need for corrective actions and trigger points for management activities; therefore, the monitoring plan should also have provisions for determining whether adaptive management is needed at various points throughout the monitoring period and provide alternatives as discussed in the adaptive management plan. A schedule for reporting monitoring results to the permitting agencies must also be included. Specific requirements and guidance on site monitoring can be provided by permitting agencies upon request but are often set on a case-by-case basis.

- XII. Maintenance Plan:** A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.
- XIII. Long-Term Management Plan:** Descriptions of how the compensatory mitigation project will be managed after performance standards are achieved to ensure the long-term sustainability of the resource. The party responsible for the long-term management must be identified. In addition, if the nature of the long-term management proposed is sufficient to warrant funding dedicated to that task, a long-term financing mechanism must also be identified.
- XIV. Adaptive Management Plan<sup>70</sup>:** This plan should address strategies to address unforeseen issues associated with site conditions or other components of the compensatory mitigation plan. This plan will guide decisions for revising the original construction plan and implement measures to address both foreseeable and unforeseen circumstances that could adversely affect the success of the compensatory mitigation project. The plan must identify the party or parties responsible for implementing the adaptive management plan.
- XV. Implementation Schedule:** Provide details on timelines for the construction work, plantings, inspections, and follow-up monitoring. Identify other permits that may be required for the construction work. Except for cases involving after-the-fact permits, construction of the compensation site must occur before or at the same time as construction of the development project.
- XVI. Site Protection Instrument:** A description of the legal arrangements and documents including verification of site ownership used to ensure the long-term protection of the compensatory mitigation site. Contact the permitting agencies for appropriate templates of conservation easements or comparable legal instruments.
- XVII. Financial Assurances:** A description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the compensatory mitigation project will be successfully completed and managed for the long-term, in accordance with the required ecological performance standard. The financial assurance can be in the form of performance bonds, escrow accounts, or other appropriate instruments approved by the permitting agencies. For government agencies or a public authority, permitting agencies may accept a formal, documented

<sup>70</sup> Chapter NR 350.09(4), Wisconsin Administrative Code

commitment to funding the project or bank program as an acceptable assurance on a case-by-case basis (*e.g.*, documentation that funds allocated by a legislature or from bonding are encumbered for a specific project). Contact the permitting agencies for appropriate templates of acceptable financial assurances.

## Appendix F. AFFIDAVIT OF CREDIT PURCHASE

<b>Applicant Information</b>	
Name:	
Address:	
Phone:	
<b>Project Summary</b>	
Brief Description of Project	
Acres of Wetland Impact by Wetland Cover Type	
Permit numbers from all agencies requiring mitigation.	US Army Corps of Engineers: Wisconsin Dept. of Natural Resources: Other:
<b>Location of Wetland Impacted</b>	
County	
BSA	
Latitude/Longitude	
Township/Range & 1/4-1/4 Section	
<b>Compensation Details</b>	
Replacement Ratio by wetland cover type	
Number of credits of each wetland cover type being purchased	

1. I certify that I have purchased \_\_\_\_\_ credits from the \_\_\_\_\_ Wetland Mitigation Bank.

Applicant Signature \_\_\_\_\_ Date \_\_\_\_\_

2. I certify that the \_\_\_\_\_ Wetland Mitigation Bank has sold \_\_\_\_\_ credits to the above named applicant and that such debit has been noted in the bank's accounting system.

Bank Sponsor Signature \_\_\_\_\_ Date \_\_\_\_\_



## Appendix G. PLANT COMMUNITY TYPES

The following eleven plant community descriptions shall be used in applying the requirement that mitigation should be in-kind when possible. The permitting agencies have opted to use the wetland community type classifications as defined in the book, “Wetland Plants and Plant Communities of Minnesota and Wisconsin,” by Steve Eggers and Donald Reed (2011)<sup>71</sup>: 1) shallow or open water, 2) marshes, 3) sedge meadows 4) fresh (wet) meadows, 5) wet to wet-mesic prairies, 6) calcareous fens, 7) bogs, 8) shrub swamps, 9) wooded swamps, 10) floodplain forests, and 11) seasonally flooded basins.

Any permitted wetland impacts will be defined by one of the eleven community types above when evaluating if the compensation proposed is in-kind. The permittee must attempt to mitigate for these losses by generating permittee-responsible credits or purchasing wetland mitigation bank credits that are of the same type as the impacted wetland. Compensatory mitigation done “out-of-kind” shall be subject to a higher credit ratio as explained in Chapter 3.

### *1. Shallow or Open Water*

Shallow, open water plant communities generally have water depths of less than 6.6 feet. Submergent, floating and floating-leaved aquatic vegetation including pondweeds, water-lilies, water milfoil, coontail, and duckweeds characterize this wetland type. Size can vary from a one-quarter-acre pond, to a long oxbow of a river or shallow bay of a lake. Floating vegetation may or may not be present depending upon the effects of the season, wind, availability of nutrients, and aquatic weed control efforts.

### *2. Marshes (Deep or Shallow Marshes)*

Marshes are characterized by emergent aquatic plants growing in permanent to seasonal, shallow water. Species of shallow, open water communities, as well as those found in sedge meadows and seasonally flooded basins, also occur in marshes. Species characteristic of sedge meadows and seasonally flooded basins also occur in marshes and may colonize muskrat lodges, floating mats, and muck soils exposed during droughts or artificial drawdowns. Emergent aquatic plants typically become established and spread when water levels are low or when the marsh substrate is exposed, and then persist when water levels rise. However, if water levels rise too quickly, or rise to levels higher than normal, emergent vegetation may not survive, or may rise to the water surface as floating mats. Muskrats can eat through emergent vegetation, creating open water areas within the marsh that favor waterfowl use. Unchecked, muskrats can eliminate emergent vegetation, leaving an open water area until the next drought or drawdown allows emergent vegetation to recover.

Deep marsh plant communities have standing water depths of between 6 inches and 3 or more feet during the growing season (Shaw and Fredine, 1971). Herbaceous emergent, floating, floating-leaved, and submergent vegetation compose this community, with the major dominance by cattails, bulrushes, pickerelweed, giant bur-reed, common reed, wild rice, pond weeds and/or water-lilies.

<sup>71</sup> Eggers, Steve D., and Donald M. Reed. 2011. Wetlands Plants and Plant Communities of Minnesota and Wisconsin, Third Edition. U.S. Army Corps of Engineers, Regulatory Branch St. Paul District. 478 pp.



Shallow marsh plant communities have soils that are saturated to inundated, by standing water up to 6 inches in depth, throughout most of the growing season (Shaw and Fredine 1971). Herbaceous emergent vegetation such as cattails, bulrushes, arrowheads, and lake sedges characterize this community. Floating and floating-leaved vegetation strata are typically reduced and the submergent vegetation stratum is absent.

### 3. Sedge Meadows

Sedge meadows are dominated by the sedges (*Cyperaceae*) growing on saturated soils. Most of the sedges present are in the genus *Carex*, but also present are those of *Eleocharis* (spike-rushes), *Scirpus* (bulrushes), and *Cyperus* (nut-grasses). Grasses (*Poaceae*), especially Canada bluejoint grass, and true rushes (*Juncus*), may also be present.

### 4. Fresh (Wet) Meadows

Fresh (wet) meadows are dominated by grasses, such as reedtop grass and reed canary grass, and by forbs such as giant goldenrod, growing on saturated soils. The grass family (*Poaceae*) and aster family (*Asteraceae*) are well represented in fresh (wet) meadows. The forbs and grasses of these meadows tend to be less competitive, more nutrient demanding, and often shorter-lived species than the sedges of the sedge meadow community. Therefore, fresh (wet) meadows may represent younger communities that indicate recent disturbances of other inland fresh meadows by drainage, siltation, cultivation, pasturing, peat fires and/or temporary flooding. Once established, the forbs and grasses of the fresh (wet) meadow community may persist for extended periods of time.

Many fresh (wet) meadows in Wisconsin are dominated by reed canary grass (*Phalaris arundinacea*), a very aggressive, invasive species that can form near monotypes persisting for decades. Disturbances such as artificial drainage, plowing, mechanized land-clearing, road construction, excessive sediment and/or nutrient inputs, allow reed canary grass to outcompete native plant assemblages. Not all fresh (wet) meadows in Wisconsin are dominated by non-native and/or invasive species. For example, the native Canada blue-joint grass (*Calamagrostis canadensis*) can dominate fresh (wet) meadow communities that may include a diversity of native forbs.

### 5. Wet to Wet-Mesic Prairies

Wet to wet-mesic prairies are open, herbaceous plant communities dominated by native grass and grass-like species; at least half of the vegetative cover is made up of true grasses (Curtis 1971). These communities are similar to fresh (wet) meadows, but are dominated by native grasses and forbs associated with prairies such as prairie cord-grass, big bluestem, switchgrass, narrow reedgrass, gayfeather, New England aster, culver's root, prairie dock and sawtooth sunflower. Wet to wet-mesic prairie communities predominantly occur south of the vegetation tension zone; however, some prairie communities are found in sandy barrens and wet swales north of the tension zone.

Prior to European settlement, vast expanses of prairie existed in southern Wisconsin. Prairies evolved with fire and fire is essential to maintenance of prairies. Without periodic burns, prairies become subject to invasion by woody vegetation. European settlement brought two things to the

prairie: the plow and fire suppression. Once the prairie sod was broken, and the wet prairies were drained, the deep, black soils proved to be among the most productive farmland in the world. More than 99 percent of prairies in Wisconsin were destroyed by the conversion to agricultural use. Prairies that were not plowed under were hayed or intensively grazed for decades resulting in degradation and changes in species composition. Remaining remnant prairies often suffer because of fire suppression and may be lost without intensive management. Given this nearly total loss of prairie, it is not surprising that many prairie species once common in Wisconsin are now threatened or endangered. Two prairie orchids, the western prairie fringed orchid and white lady's-slipper, are prime examples.

#### 6. *Calcareous Fens*

Calcareous fens are the rarest wetland plant community in Wisconsin, and probably one of the rarest in North America. These are plant communities of saturated, seepage sites that have an internal flow of groundwater rich in calcium and magnesium bicarbonates, and sometimes calcium and magnesium sulfates as well (Curtis 1971). The calcium and magnesium bicarbonates and sulfates precipitate out at the surface, creating a harsh, alkaline soil condition. Only a select group of calcium-tolerant plants, referred to as calciphiles, can tolerate these conditions. Healthy (unaltered) calcareous fens are sedge-dominated by *Carex* species (e.g. sterile sedge (*C. sterilis*), prairie sedge (*C. prairea*), common stiff sedge (*C. tetanica*), Buxbaum's sedge (*C. buxbaumii*) as well as beaked spike-rush (*Eleocharis rostellata*), twig-rush (*Cladium mariscoides*) and hair beak-rush (*Rhynchospora capillacea*). Characteristic grasses and forbs include wild timothy, Ohio goldenrod, Grass-of-Parnassus, common valerian, brook lobelia, and lesser fringed gentian. Shrubby cinquefoil and sage willow are characteristic shrubs. Included are species disjunct from the tundra, alpine meadows, and salt marshes. Therefore, calcareous fens are described as a hybrid community by Curtis (1971).

#### 7. *Bogs (Open or Coniferous Bogs)*

Bogs are a specialized wetland community found on saturated, acidic, peat soils that have low concentrations of minerals (e.g. calcium, magnesium) and essential nutrients (phosphorus, nitrogen). They support a unique assemblage of trees, low shrubs, sedges and forbs growing on a mat of *Sphagnum* mosses (Curtis 1971). In Wisconsin, most bogs are found north of the vegetation tension zone.

Open bogs are composed of a carpet of living *Sphagnum* moss growing over a layer of acidic peat. Sedges, forbs and/or the low shrubs of the heath family (*Ericaceae*) colonize the *Sphagnum* moss mat, usually stunted trees of black spruce and/or tamarack may be present. Lack of forest is probably due to: conditions too wet for the tree species; *Sphagnum* moss mat too thin to support trees; recurrent fires; summer frosts; and/or lack of a seed source for the tree species.

Coniferous bogs are similar to open bogs in plant community composition except that mature trees of black spruce and/or tamarack are the dominant canopy species growing on the *Sphagnum* moss mat. *Sphagnum* moss is the dominant groundlayer species. Sedges, orchids, and pitcher plants that have endured the shaded conditions are typically present, along with the heath family (*Ericaceae*) shrubs.

### 8. *Shrubs Swamps (Shrub Carrs or Alder Thickets)*

Shrub swamps are wetland plant communities dominated by woody vegetation less than 20 feet in height and with a dbh of less than 6 inches. Shrub swamps in Wisconsin are categorized as shrub-carrs and alder thickets depending on the dominant shrub species. Both occur on organic soils (peat/muck) as well as on hydric mineral soils.

Shrub-carrs are plant communities composed of tall, deciduous shrubs growing on saturated to seasonally flooded soils. Dominant shrubs are typically willows, red-osier dogwood, silky dogwood, or gray dogwood. Groundlayer species typically include some of the ferns, forbs, grasses, and sedges of sedge meadow and fresh (wet) meadow communities. The diversity of groundlayer species is dependent on degree of shrub canopy cover, degree of disturbance, water source, and other factors. For example, disturbed shrub-carrs may have a groundlayer dominated reed canary grass, an invasive species. Relatively undisturbed shrub-carrs can have a high diversity of groundlayer species.

Alder thickets are a tall, deciduous shrub community similar to shrub-carrs except that speckled alder is dominant. Speckled alder can pioneer exposed peat or alluvial soils because of its tiny seeds and ability to fix nitrogen. Alder thickets are generally found in and north of the vegetation tension zone.

### 9. *Wooded Swamps (Hardwood or Coniferous Swamps)*

Wooded swamps are forested wetlands dominated by mature conifers and lowland hardwoods. They are usually associated with ancient lake basins and retired riverine oxbows. Wooded swamps include the northern wet-mesic forest and the southern wet and wet-mesic hardwood associations described by Curtis (1971).

Hardwood swamps are dominated by deciduous hardwood trees and have soils that are saturated during much of the growing season, and may be inundated by as much as a foot of standing water (Shaw and Fredine 1971). Hummocky microtopography is a frequent trait. Dominant trees include black ash, red maple, yellow birch, balsam poplar, quaking aspen and, south of the vegetation tension zone, silver maple. Northern white cedar can be a sub-dominant species in stands within and north of the vegetation tension zone. American elm is still an important component of this community, although its numbers have been greatly reduced by Dutch elm disease. Soils are often peats or mucks, but can include hydric mineral soils. Vernal pools often occur in wooded swamps. These consist of depressions within upland forests that are ponded early in the growing season, and then dry down for the majority of the growing season. The herb layer may be sparse to absent given the alternating periods of ponding and drawdown.

Coniferous swamps are forested wetlands dominated by lowland conifers, primarily northern white cedar and tamarack, growing on soils that are saturated during much of the growing season, and that may be temporarily inundated by as much as a foot of standing water. Balsam fir is a component in some stands. Soils are usually organic (peat/muck) but not as acidic and not as poor in nutrients and minerals as those of coniferous bogs. Instead, soils vary from somewhat mineral-poor and acidic, to

mineral-rich and alkaline. Tamarack typically dominates on the former soils, and northern white cedar on the latter. A continuous *Sphagnum* moss mat is not present. Coniferous swamps occur primarily in and north of the vegetation tension zone. However, several large tamarack swamps occur south of the tension zone.

### *10. Floodplain Forests*

Floodplain forests are wetlands dominated by mature, deciduous hardwood trees growing on alluvial soils associated with riverine systems. The soils are inundated during flood events, but are usually somewhat well-drained for much of the growing season (Shaw and Fredine 1971). The most characteristic feature of floodplains is the alluvial soil that is constantly being deposited in some locations and eroded away in others. Floodplain forests typically include the northern and southern wet-mesic hardwood forest associations described by Curtis (1971). Dominant hardwoods include silver maple, green ash, river birch, swamp white oak, plains cottonwood, American elm, and black willow. The shrub layer is typically sparse to lacking because of frequent flooding. Woody vines are more prevalent in floodplain forests than any other forested wetland community. Examples include wild grape, Virginia creeper and moonseed. The herbaceous groundlayer can be sparse and include jewelweed, nettles, and certain sedges. In some cases, reed canary grass has invaded and formed a monotypic groundlayer.

### *11. Seasonally Flooded Basins*

Seasonally flooded basins are poorly drained, shallow depressions that typically have standing water for a few weeks each year, but are usually dry for much of the growing season. These basins include kettles in glacial deposits (e.g. prairie potholes), low spots in outwash plains, or depressions in floodplains. They are frequently cultivated. However, even when cultivated, wetland vegetation can become established if the planted crop is stressed or drowned out. Typical species include smartweeds, beggarticks, nut-grasses, and wild millet. One unique aspect of seasonally flooded basins is that the alternating periods of flood and drought can eliminate perennial plants so that annual plant species typically dominate the community.

## Appendix H. ADDITIONAL AGENCY PROGRAM INFORMATION

In response to the February 2013 public notice soliciting comments on the draft version of these guidelines, the permitting agencies agreed that some additional information was appropriate to include in an appendix to provide members of the public additional insight into the permitting agencies specific program requirements. This appendix has been developed to provide additional information regarding:

1. USACE Watershed Approach (33 CFR Part 332.3(c))
2. USACE “Soft” Preference for Banking Debits (33 CFR Part 332.3(b))
3. WDNR Preference for Banking Debits (Wisconsin State Statute 281.36(3r)(a) and (b))

### *1.USACE Watershed Approach*

The USACE must use a watershed approach to establish compensatory mitigation requirements in permits to the extent appropriate and practicable. Where a watershed plan is available, the USACE will determine whether the plan is appropriate for use in the watershed approach for compensatory mitigation. In cases where the USACE determines that an appropriate watershed plan is available, the watershed approach should be based on that plan. Where no such plan is available, the watershed approach should be based on information provided by the project sponsor or available from other sources. The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites.

a. *Considerations.* (i) A watershed approach to compensatory mitigation considers the importance of landscape position and resource type of compensatory mitigation projects for the sustainability of aquatic resource functions within the watershed. Such an approach considers how the types and locations of compensatory mitigation projects will provide the desired aquatic resource functions, and will continue to function over time in a changing landscape. It also considers the habitat requirements of important species, habitat loss or conversion trends, sources of watershed impairment, and current development trends, as well as the requirements of other regulatory and non-regulatory programs that affect the watershed, such as storm water management or habitat conservation programs. It includes the protection and maintenance of terrestrial resources, such as non-wetland riparian areas and uplands, when those resources contribute to or improve the overall ecological functioning of aquatic resources in the watershed. Compensatory mitigation requirements determined through the watershed approach should not focus exclusively on specific functions (e.g., water quality or habitat for certain species), but should provide, where practicable, the suite of functions typically provided by the affected aquatic resource.

(ii) Locational factors (e.g., hydrology, surrounding land use) are important to the success of compensatory mitigation for impacted habitat functions and may lead to siting of such mitigation away from the project area. However, consideration should also be given to functions and services (e.g., water quality, flood control, shoreline protection) that will likely need to be addressed at or near the areas impacted by the permitted impacts

(iii) A watershed approach may include on-site compensatory mitigation, off-site compensatory mitigation (including mitigation banks or in-lieu fee programs), or a combination of on-site and off-site compensatory mitigation.

(iv) A watershed approach to compensatory mitigation should include, to the extent practicable, inventories of historic and existing aquatic resources, including identification of degraded aquatic resources, and identification of immediate and long-term aquatic resource needs within watersheds that can be met through permittee-responsible mitigation projects, mitigation banks, or in-lieu fee programs. Planning efforts should identify and prioritize aquatic resource restoration, establishment, and enhancement activities, and preservation of existing aquatic resources that are important for maintaining or improving ecological functions of the watershed. The identification and prioritization of resource needs should be as specific as possible, to enhance the usefulness of the approach in determining compensatory mitigation requirements.

(v) A watershed approach is not appropriate in areas where watershed boundaries do not exist, such as marine areas. In such cases, an appropriate spatial scale should be used to replace lost functions and services within the same ecological system (e.g., reef complex, littoral drift cell).

b. *Information needs.* (i) In the absence of a watershed plan determined by the USACE to be appropriate for use in the watershed approach, the USACE will use a watershed approach based on analysis of information regarding watershed conditions and needs, including potential sites for aquatic resource restoration activities and priorities for aquatic resource restoration and preservation. Such information includes: current trends in habitat loss or conversion; cumulative impacts of past development activities, current development trends, the presence and needs of sensitive species; site conditions that favor or hinder the success of compensatory mitigation projects; and chronic environmental problems such as flooding or poor water quality.

(ii) This information may be available from sources such as wetland maps; soil surveys; U.S. Geological Survey topographic and hydrologic maps; aerial photographs; information on rare, endangered and threatened species and critical habitat; local ecological reports or studies; and other information sources that could be used to identify locations for suitable compensatory mitigation projects in the watershed.

(iii) The level of information and analysis needed to support a watershed approach must be commensurate with the scope and scale of the proposed impacts requiring a USACE permit, as well as the functions lost as a result of those impacts.

c. *Watershed scale.* The size of watershed addressed using a watershed approach should not be larger than is appropriate to ensure that the aquatic resources provided through compensation activities will effectively compensate for adverse environmental impacts resulting from activities authorized by USACE permits. The USACE should consider relevant environmental factors and appropriate locally developed standards and criteria when determining the appropriate watershed scale in guiding compensation activities.



## **2. USACE “Soft” Preference for Banking Debits.**

When considering options for successfully providing the required compensatory mitigation, the USACE shall consider the type and location options in the order presented in paragraphs a through e. In general, the required compensatory mitigation should be located within the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses. Compensatory mitigation projects should not be located where they will increase risks to aviation by attracting wildlife to areas where aircraft-wildlife strikes may occur (e.g., near airports).

a. *Mitigation bank credits.* When permitted impacts are located within the service area of an approved mitigation bank, and the bank has the appropriate number and resource type of credits available, the permittee's compensatory mitigation requirements may be met by securing those credits from the sponsor. Since an approved instrument (MBI including CSP and appropriate real estate and financial assurances) for a mitigation bank is required to be in place before its credits can begin to be used to compensate for authorized impacts, use of a mitigation bank can help reduce risk and uncertainty, as well as temporal loss of resource functions and services. Mitigation bank credits are not released for debiting until specific milestones associated with the mitigation bank site's protection and development are achieved, thus use of mitigation bank credits can also help reduce risk that mitigation will not be fully successful. Mitigation banks typically involve larger, more ecologically valuable parcels, and more rigorous scientific and technical analysis, planning and implementation than permittee-responsible mitigation. Also, development of a mitigation bank requires site identification in advance, project-specific planning, and significant investment of financial resources that is often not practicable for many in-lieu fee programs. For these reasons, the USACE should give preference to the use of mitigation bank credits when these considerations are applicable. However, these same considerations may also be used to override this preference, where appropriate, as, for example, where an in-lieu fee program has released credits available from a specific approved in-lieu fee project, or a permittee-responsible project will restore an outstanding resource based on rigorous scientific and technical analysis.

b. *In-lieu fee program credits.* Where permitted impacts are located within the service area of an approved in-lieu fee program, and the sponsor has the appropriate number and resource type of credits available, the permittee's compensatory mitigation requirements may be met by securing those credits from the sponsor. Where permitted impacts are not located in the service area of an approved mitigation bank, or the approved mitigation bank does not have the appropriate number and resource type of credits available to offset those impacts, in-lieu fee mitigation, if available, is generally preferable to permittee-responsible mitigation. In-lieu fee projects typically involve larger, more ecologically valuable parcels, and more rigorous scientific and technical analysis, planning and implementation than permittee-responsible mitigation. They also devote significant resources to identifying and addressing high-priority resource needs on a watershed scale, as reflected in their compensation planning framework. For these reasons, the USACE should give preference to in-lieu fee program credits over permittee-responsible mitigation, where these considerations are applicable. However, as with the preference for mitigation bank credits, these same considerations may be used to override this preference where appropriate. Additionally, in cases where permittee-responsible



mitigation is likely to successfully meet performance standards before advance credits secured from an in-lieu fee program are fulfilled, the USACE should also give consideration to this factor in deciding between in-lieu fee mitigation and permittee-responsible mitigation.

*c. Permittee-responsible mitigation under a watershed approach.* Where permitted impacts are not in the service area of an approved mitigation bank or in-lieu fee program that has the appropriate number and resource type of credits available, permittee-responsible mitigation is the only option. Where practicable and likely to be successful and sustainable, the resource type and location for the required permittee-responsible compensatory mitigation should be determined using the principles of a watershed approach as outlined in paragraph (c) of this section.

*d. Permittee-responsible mitigation through on-site and in-kind mitigation.* In cases where a watershed approach is not practicable, the USACE should consider opportunities to offset anticipated aquatic resource impacts by requiring on-site and in-kind compensatory mitigation. The USACE must also consider the practicability of on-site compensatory mitigation and its compatibility with the proposed project.

*e. Permittee-responsible mitigation through off-site and/or out-of-kind mitigation.* If, after considering opportunities for on-site, in-kind compensatory mitigation as provided in paragraph (b)(5) of this section, the USACE determines that these compensatory mitigation opportunities are not practicable, are unlikely to compensate for the permitted impacts, or will be incompatible with the proposed project, and an alternative, practicable off-site and/or out-of-kind mitigation opportunity is identified that has a greater likelihood of offsetting the permitted impacts or is environmentally preferable to on-site or in-kind mitigation, the USACE should require that this alternative compensatory mitigation be provided.

### **3. WDNR Preference for Banking Debits**

Section 281.36 of Wisconsin Statutes states the WDNR gives preference for wetland individual permittees to complete the required mitigation obligation through the purchase of wetland mitigation bank credits over the establishment of a permittee-responsible wetland mitigation site. An excerpt from Section 281.36 reads as follows:

“(3r) Mitigation; In Lieu Fee Subprogram.

(a) The department shall establish a mitigation program that applies only to the issuance of wetland individual permits and that allows mitigation to be accomplished by any of the following methods:

1. Purchasing credits from a mitigation bank located in this state.
2. Participating in the in lieu fee subprogram, if such a subprogram is established under par. (e).
3. Completing mitigation within the same watershed or within one-half mile of the site of the discharge.

(b) Under the mitigation program, mitigation as specified in par. (a) 1. and participation in the in lieu fee subprogram, if established under par. (a) 2. shall be the preferred types of mitigation.”

***Appendix F. 2013 Suggested Science-Based Criteria for Site Selection, Design, and Evaluation of Wisconsin Wetland Mitigation Banks***

**SUGGESTED SCIENCE-BASED CRITERIA FOR SITE SELECTION,  
DESIGN, AND EVALUATION OF WISCONSIN WETLAND  
MITIGATION BANKS**

Elizabeth Haber<sup>a,b</sup>

**EDITORS**

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**ACKNOWLEDGEMENTS**

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## INTRODUCTION

Wetland compensatory mitigation across the country has not been successful in restoring lost wetland ecosystem structure (NRC 2001) or function (Moreno-Mateos *et al.* 2012). Wetland mitigation projects can fail for many reasons; however, recent research has given scientists and restoration practitioners enhanced understanding of wetland restoration principles with the hope of increasing compliance and functional equivalency of mitigation wetlands.

This document details suggested science-based criteria to assist in the process of establishing a wetland mitigation bank. Beginning at the site selection stage, then progressing to the preparation of the Compensation Site Plan, to assigning quantifiable performance standards to assess wetland restoration progress, this document aims to advise and guide restoration practitioners using scientific literature. Specific suggestions in the text are **bolded and underlined**. For more information about required components of the prospectus and the Compensation Site Plan, please refer to the Guidelines for Wetland Compensatory Mitigation in Wisconsin (WDNR *in review*).

## SITE SELECTION REQUIREMENTS

### 1. LOCATION

Choosing the location for a project is the first step to establishing a mitigation bank. The location of a bank project is arguably the most important decision sponsors can make; it is much easier to establish vegetation and achieve performance standards on a good site than a poor site. Table 1 lists several aspects that describe good and poor potential mitigation bank sites.

Acceptable Wetland Mitigation Bank Sites	Non-Acceptable Wetland Mitigation Bank Sites
The site was historically a wetland, but has since been drained or otherwise altered.	The site is composed of primarily non-hydric soils and requires extensive wetland creation.
The site is isolated from disturbances; i.e. away from high traffic roads and developed areas.	The site is surrounded by disturbed areas.
The site is upstream from invasive species stands to avoid invasive plant seeds and propagules which are spread by flowing water.	The site is surrounded by invasive species which are likely to colonize.
The site is a degraded wetland, but the sources of degradation can be reversed.	The site is an existing, high-functioning wetland.
The site is privately owned, purchased without state or federal money.	The property was purchased with federal or state money.
The site receives no stormwater or can be designed to eliminate or minimize stormwater inputs.	The site is designed to treat storm water or receives storm water as a main source of hydrology.
Restoring hydrology will not affect neighboring properties, or flowage easements have been obtained.	The hydrology of the site cannot be restored without affecting neighboring properties.

Table 1: Attributes of good and poor wetland mitigation sites. This table is for general guidance and does not include all elements of good and poor sites.

The DNR has several tools to help bank sponsors and consultants locate potential mitigation bank sites. These tools are the Potentially Restorable Wetlands layer and the Wisconsin Wetland Inventory layer, both of which can be found in the DNR’s Surface Water Data Viewer. Below is a step-by-step guide to using these tools.

1. Open the DNR’s Surface Water Data Viewer.
  - a. Go to the DNR homepage, [dnr.wi.gov](http://dnr.wi.gov).
  - b. Type “surface water” in the search box.
  - c. You will automatically be taken to the DNR’s surface water website. On the right-side banner, you will see a picture of a map with “Launch the Surface Water Data Viewer” as a caption underneath the map (see Figure 1). Click on the map to launch the viewer.
  - d. The viewer will open in a new browser window. A disclaimer will pop up. Read the disclaimer and click OK to begin using the viewer.



Launch the Surface Water Data Viewer

Figure 1: The Surface Water Data Viewer portal appears on the DNR’s surface water website. Click on the map to launch the viewer.

2. Navigate to an area on the map.
 

You may have an idea of the area where you’d like to focus your search. If so, there are several ways that you can navigate to that area:



- i. Use the “Zoom In” button.
 

On the top banner of the viewer, you will find several buttons. One is the “Zoom In” button. Click on that button and draw a rectangle around the part of the state that you wish to zoom to.



- ii. Use the “Pan” button in conjunction with the mouse scroll wheel.
 

If you have a mouse with a scroll wheel, you can scroll away from you to zoom in, and scroll toward you to zoom out on the map. On the top banner you can find the “Pan” button. Use this button to drag the map to the desired location.



- iii. Search by city, town, or county.
 

If you want to search for a city, county, or township, you can do so by first clicking the orange drop-down menu at the top left corner of the map that says “I want to...”. Click on the arrow and you will see a drop-down menu. The first choice in the menu is “Find Location”. Click that, and you will see a list of parameters that you can search by to the left of the map. If you want to zoom to Iowa County, you can click on the circle next to “County” and click the grey “Find” button. You will then be taken to a drop-down menu. Choose Iowa County and Click “Find”. The map will automatically zoom to Iowa County.

3. Show the Potentially Restorable Wetlands layer.



- i. Click on the “Show Layers” button on the top banner of the viewer. You will then see a list of layers on the left side of the map.

- ii. About half-way down the list, you will see a category called “Wetlands & Soils”. Click on the plus sign next to that category to expand the menu options for wetlands and soils layers.
- iii. Check the box next to the Potentially Restorable Wetlands layer. The potentially restorable wetland layer will show areas with potentially restorable wetlands in orange crosshatch. It may also be useful to check the box next to the “Wetland Indicator” layer. This layer shows areas with wetland soils. Wetland indicators are mapped as areas with hot pink stipple.
- iv. You can find more information about an area on the map by clicking the “Point Identify” button on the top banner of the viewer. Once the “Point Identify” button is highlighted, click on the area of the map that you’d like more information about. This could be an area highlighted as potentially restorable wetland. Once you click on the area you wish to identify, you’ll see a menu to the left of the map detailing information about each layer of the map. If you’ve checked the Wetland Indicator layer, you’ll see what type of wetland soil the area has.

**Help:** I checked a box next to the layer I want to see, but nothing happened!

You may notice that the name of the layer you want to see is greyed and nothing happens when you check the box next to it. This means that you are zoomed out too far for the layer to display. Try zooming in until the layer name turns from grey to black. Then check the box next to it.

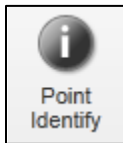


Figure 2 shows an area mapped as potentially restorable wetland in the town of Brigham, Iowa County. To the left of the map are the results of a point identify click on the lower section of the potentially restorable wetland with the letters “Pd” in the center. The two-letter labels in the middle of the wetland polygons are abbreviations for different soil types found in Wisconsin. “Pd” stands for deep peat and muck soils, as shown in the results menu. “Et” stands for Etrick silt loam, a hydric soil. The restoration status of “PRW” means

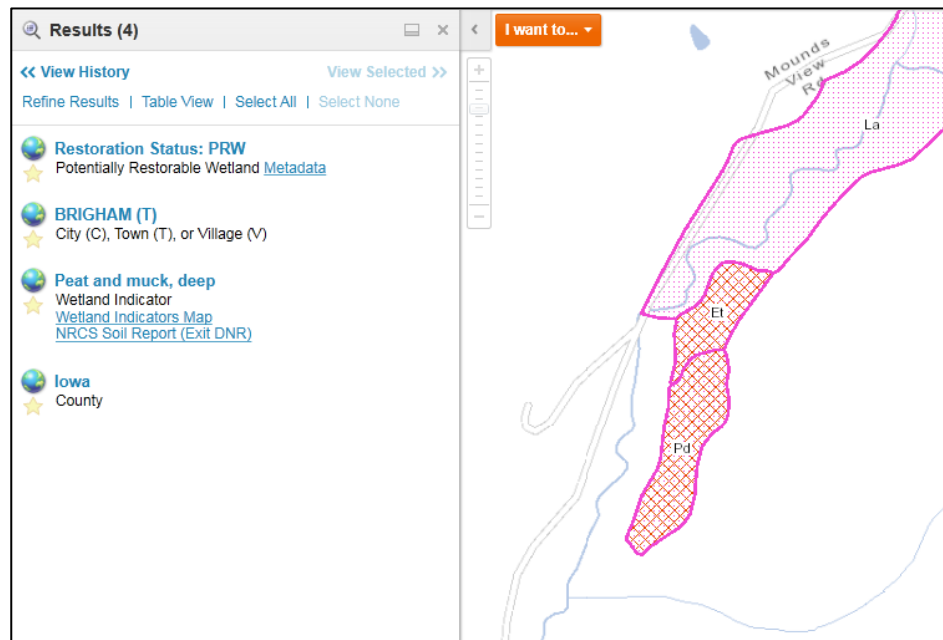


Figure 2: A potentially restorable wetland in Iowa County. The orange crosshatch highlight the potentially restorable wetland while the pink stipple shows areas with wetland soil indicators.

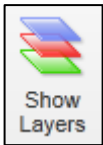
that this is a Potentially Restorable Wetland. This particular site is currently being restored by the Empire-Sauk chapter of The Prairie Enthusiasts.

The Potentially Restorable Wetland layer is a valuable resource for locating potential mitigation bank sites, but sponsors should not rely solely on it to choose a site. One drawback to the Potentially Restorable Wetlands layer is that it only maps areas that are not currently wetlands. Wetlands that are degraded can be potential mitigation banks if sufficient enhancement is planned; however, these types of wetlands would not be included in the Potentially Restorable Wetlands layer. It is recommended that a detailed soil analysis and a site visit be conducted to verify the recommendations of the Potentially Restorable Wetlands layer.

Another layer in the Surface Water Data Viewer that can bank sponsors find potential mitigation bank sites is the Wisconsin Wetland Inventory layer. This layer is particularly useful for finding restorable farmed wetlands. Below is an example of how to navigate the Wisconsin Wetland Inventory layer to find potentially restorable farmed wetland.

1. Turn on the Wisconsin Wetland Inventory layer

a. If you are not already in a Surface Water Data Viewer session, open one by following the instructions above for opening Surface Water Data Viewer.



b. Click "Show Layers" in the top banner of the viewer. Click the "plus" sign next to the "Wetlands & Soils" category. You will see a list of available wetlands and soils layers. Check the box next to "Wisconsin Wetland Inventory" to show the Wisconsin Wetland Inventory layer.

c. Zoom in until the layer is visible. You will see that wetlands are shaded in orange stipple.

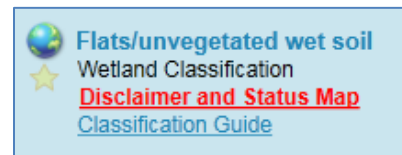
d. Zoom in further and you will see letters and numbers labelling each wetland area. A key to the wetland labelling scheme can be found by doing the following steps.



i. Click the "Point Identify" button on the top banner of the viewer. Then click an area of wetland that you wish to identify.

ii. You'll see a results menu to the left of the map. One of the results will say "Wetland Classification" next to a star.

Below that you will see two links – click on the second link that says "Classification Guide". This guide will show you a key to the wetland inventory labels.



iii. Potentially restorable farmed wetlands can have several labels. The most common labels are FOKf and FOKa. Figure 3 shows an example of several potentially restorable farmed wetlands in Kenosha County.



**Note:** The Wisconsin Wetland Inventory layer is available for most, but not all Wisconsin counties. If, after zooming in, you're still unable to see the layer, then your county may not have the digital layer wetland inventory data available. Use the following steps to see a map of the statewide availability of the Wisconsin Wetland Inventory layer.

1. Go to [dnr.wi.gov](http://dnr.wi.gov) and type "Wetland Inventory" into the search box. Click on the third search result titled "Wetlands Inventory – Wisconsin DNR". This will take you to the Wetland Mapping webpage.
2. Scroll down past the text until you see several hyperlinked bullet points. Click on the third bullet point that says "Wisconsin Wetland Inventory Digital Status Map".

You will then be taken to a map showing the Wisconsin Wetland Inventory status of the state by county. Peach-colored counties do not yet have a digital wetland layer available. DNR is currently working to finish digitizing these counties.

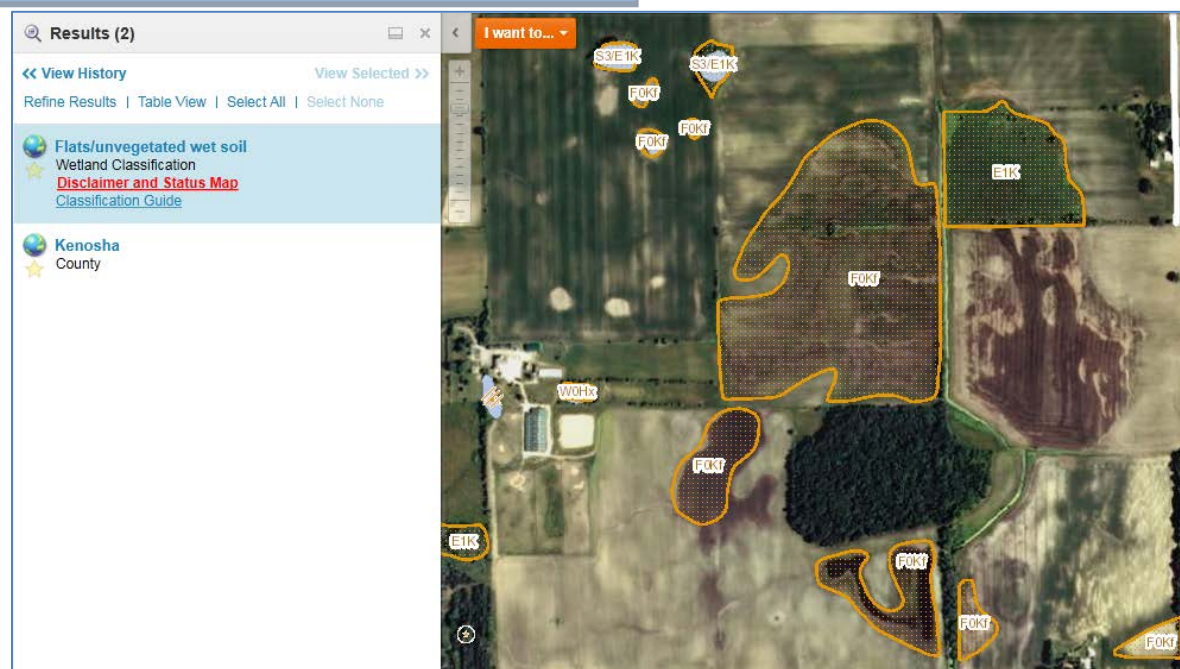


Figure 3: Potentially restorable farmed wetlands in Kenosha County. Farmed wetlands are labeled "FOKf". Data from the Wisconsin Wetland Inventory layer in the Surface Water Data Viewer.

## 2. REFERENCE WETLANDS

Brinson and Rheinhardt (1996) were among the first to argue for using reference wetlands as the basis of standards against which wetland mitigation sites can be graded. By setting performance standards based on an appropriate reference wetland condition, a mitigation site can be evaluated how well it is replacing lost wetland functions. **Therefore, at least one appropriate reference wetland must be specified at the beginning a mitigation bank project.**

Ideally, reference standards should represent the highest functioning wetlands of a geographic and/or community type group (Brinson & Rheinhardt 1996). **Measures of soil, water, and vegetation attributes should be gathered from reference wetlands to help set performace standards for the**

**mitigation bank**. Floristic Quality Assessment variables have been studied for vegetation, specifically FQI and mean C, in the Southeastern Wisconsin Till Plains for sedge meadow, shrub-carr, and lowland hardwood forested wetland types (See section 1.b. under Quantifiable Performance Standards in this document, Bernthal *et al.* 2007). **If a study of reference wetlands is not available in an area of the state where a mitigation bank project is proposed, then sponsors may work with DNR scientists to choose one or more appropriate reference wetlands**. At minimum, an appropriate reference wetland should achieve the following criteria.

- The wetland should be in the same or similar geologic and landscape setting as the mitigation bank site.
- The wetland should contain the same habitat type[s] as is [are] desired to restore in the mitigation bank site.
- The wetland should be as highly functioning and undisturbed as possible.
- The wetland should be within the same Bank Service Area (BSA) and ideally within 20 miles of the mitigation bank site.

### 3. SPECIES OF GREATEST CONSERVATION NEED

It may be desirable to tailor the location and restoration activities at the bank site to match the habitat needs of certain species. Mitigation banks could target habitat needed for Species of Greatest Conservation Need (WDNR 2005). For example, the Yellow Rail (*Coturnicops noveboracensis*) is a state threatened species in Wisconsin. It prefers Northern Sedge Meadow and Open Bog habitats in Wisconsin. Therefore, mitigation bank sponsors who wish to provide habitat for the Yellow Rail can plan to restore Northern Sedge Meadow habitat (open bog habitat is extremely difficult to restore). To view a list of the Species of Greatest Conservation Need (SGCN) in Wisconsin, go to [dnr.wi.gov](http://dnr.wi.gov) and type “Species of Greatest Conservation Need” into the search box. Click on the first link to find a list of species separated by phylum. Clicking on a species name brings you to a website with the species profile, which includes the habitats in which the species can be found.

Re-establishing habitat for SGCN can be included as a goal or objective in a Mitigation Bank Instrument. In some circumstances, re-establishing habitat or the presence of the species themselves may be acceptable performance standards.

### 4. SOIL

Although measuring soil characteristics throughout the monitoring period to assess soil recovery trajectories may not be feasible, using baseline soil integrity measures can help with site evaluation and restoration planning. Soils at wetland creation sites tend to have more sand and less clay than natural reference sites (Bishel-Machung *et al.* 1996; Stolt *et al.* 2000). Higher soil sand content can slow organic matter deposition if the soil is well-drained (but not if it ponds water), which is the basis for many wetland soil functions. Soil organic matter tends to be significantly less in wetland creation sites than in reference sites (Bishel-Machung *et al.* 1996; Stolt *et al.* 2000; Bruland & Richardson 2006). Choosing a site with higher soil organic matter may increase the probability of compliance for a wetland mitigation bank. One study, based on data from a restoration site near Chicago, IL, suggested that a site must have at least 3% soil organic matter in order for adequate soil microbial activity to occur (Vepraskas *et al.*

1995), while Mitsch and Gosselink (2000) indicate that hydrologic conditions are present at 5% soil organic matter. **Soil organic matter levels in creation sites must be above 3% in order to be considered.** Usually it is apparent during a site visit whether or not a soil meets this criterion; however, a lab test may be recommended if a visual inspection of the soil estimates a low amount of soil organic matter.

## COMPENSATION SITE PLAN REQUIREMENTS

It is imperative that much attention be paid to site design and construction for wetland restoration projects. Gutrich *et al.* (2009) found that construction sites with more initial effort tended to have greater plant species richness, number of native species, and number of hydrophytes, as compared to sites with low initial effort. Many mitigation banks have credit releases associated with construction completion. **An as-built report shall be submitted and approved by the IRT before construction credits are released.** This report must include the information outlined in section H and figure 5.2 of the Guidelines for Wetland Compensatory Mitigation in Wisconsin (WDNR 2013).

### 1. VEGETATION

#### a. INVASIVE SPECIES

Invasive species pose serious risks to wetland restoration. Invasions by non-native plants like hybrid cattail (*Typha x glauca*) and reed canarygrass (*Phalaris arundinacea*) can dramatically reduce the plant species diversity found at a site (Doherty & Zedler *in press*; Kercher & Zedler, 2004). Therefore, it is imperative to minimize the presence of invasive species on a site and their potential to colonize a site. See section 1.d. in Quantifiable Performance Standards for maximum allowable percent areal cover of invasive species.

#### i. BEST MANAGEMENT PRACTICES

Excellent guidance exists for reducing the impact of invasive species in wetlands (WDNR *in press*). These guidelines should be followed whenever applicable throughout construction and monitoring activities. To find a copy of the document, go to [dnr.wi.gov](http://dnr.wi.gov) and search for the document titled “Best Management Practices for Preventing the Spread of Invasive Species in Wetlands”. Below are some highlights from this document that are especially relevant to wetland restoration projects:

- Inspect and clean outerwear, footwear, and gear for dirt, seeds, plant parts, and invertebrates before and after wetland activities.
- Inspect and clean machinery and tools before and after wetland activities.
- Scout areas on the site that have invasive species and avoid those areas if possible.
- Avoid unnecessary soil disturbance. Stabilization measures must occur after soil disturbance.
- Do not bring in external fill material unless it can be certified as propagule-free.
- Avoid using fertilizers or nutrient additives.
- Avoid planting invasive species.

- Long-term invasive species monitoring and removal must be written into the Compensation Site Plan.

#### ***ii. REED CANARYGRASS SPECIFIC RECOMMENDATIONS***

In Wisconsin, reed canarygrass (*Phalaris arundinacea*) dominates almost 500,000 acres of wetlands (Hatch & Bernthal 2008). Along with being widespread, reed canarygrass is also extremely successful at both establishing at new locations and persisting to form monocultures. Therefore, it is imperative that control measures be taken if reed canarygrass is present at a site. The Wisconsin Reed Canary Grass Management Working Group has published a guide with detailed treatment and management strategies of reed canarygrass at restoration sites (2009). These strategies include prescribed burning, herbicide application, and mowing, among other suggestions. **We recommend that mitigation bank sponsors use this document as a reference and/or starting point to planning and implementing reed canarygrass control at a mitigation bank site.** To find the report, go to [dnr.wi.gov](http://dnr.wi.gov) and search for “Reed Canary Grass Management Working Group”.

Although mature trees and shrubs can effectively shade out reed canarygrass, a thick carpet of this invasive grass can impede woody plant establishment. To find the most effective method of establishing woody plants in wetlands dominated by *Phalaris arundinacea*, researchers tested four pre-planting treatments and measured woody plant survival (Hovick & Reinartz 2007). They found that a fall herbicide application followed by spring plowing produced the highest woody plant survival of the most species, but the other herbicide treatments (herbicide alone and herbicide followed by prescribed burn) all produced significantly higher woody plant survival than the control. To reduce immediate light competition between planted saplings and potential reed canarygrass re-sprouts, fiber mats (or mats made of other biodegradable material) can be placed around each planted stem. **These practices could help the establishment of woody plants in sites dominated by *Phalaris arundinacea*.**

### **b. SITE PREPARATION**

Several practices can be implemented during site construction to improve the quality of the soil and the likelihood of survival for woody plants.

#### ***1. SOIL COMPACTION AND SOIL BULK DENSITY***

Constructed wetlands tend to have higher soil bulk density than reference wetlands (Bishel-Machung *et al.* 1996). Compacted soils with high bulk density can impair for plant root growth and soil microbial processes. **Although heavy machinery may be necessary for wetland restoration, wetland construction plans should include measures to minimize soil compaction (e.g. swamp mats, restricted routes, and rehabilitation of compacted areas.** For example, heavy machinery could follow prescribed paths when travelling to and from certain parts of a construction site. After construction is finished, those designated paths can be rehabilitated.

## 2. SOIL ORGANIC MATTER/SOIL ORGANIC CARBON

Soil organic matter is correlated with important wetland functions such as denitrification (Ahn & Peralta 2012); however, it does not significantly increase during a typical monitoring period of eight years (Bishel-Machung *et al.* 1996). Therefore, it is imperative that wetland restoration projects take care to preserve the integrity of the soil on the project site. Created wetlands tend to have significantly lower soil organic carbon than comparable reference wetlands (Gwin & Kentula, 1996; Bishel-Machung *et al.* 1996). Tilling exposes the soil to oxygen, thus accelerating microbial decomposition or the soil organic matter. **Adopting a no-till planting plan could reduce loss of soil organic carbon, especially in created wetlands.**

## 3. SOIL AMENDMENTS

Many wetland restoration projects use soil additives to stimulate soil function. Common additives include topsoil, salvaged marsh soil, compost, straw, and biochar. Ballantine *et al.* (2012) tested three of these amendments in wetland restoration sites in New York: topsoil, straw, and biochar, as well as an even mixture of biochar and straw. They concluded that biochar and topsoil were the most effective soil additives in their study because their addition significantly increased soil carbon. Topsoil-amended soils also had significantly higher nitrogen, although higher soil nutrients in restoration sites tend to be conducive to invasive species (Woo & Zedler 2002). A valid concern about soil additives is their potential to introduce propagules from non-native species into the restoration site. **Soil starting conditions and benefits and drawbacks of soil additives must be considered before their implementation in wetland restoration plans.**

## 4. MICROTOPOGRAPHY

Microtopography is an important structural component in natural wetlands that is often missing created and restored wetlands. Natural processes, such as sediment accumulation, erosion, tree fall, root growth, litterfall, animal burrowing, and animal tracks can create microtopography but usually occur over long time periods. Stolt *et al.* (2000) mapped microtopography in constructed vs reference wetlands and found that constructed wetlands had 40-60% less elevational change across the site and less microtopography than reference sites. They concluded that lack of microtopography may limit plant and animal diversity.

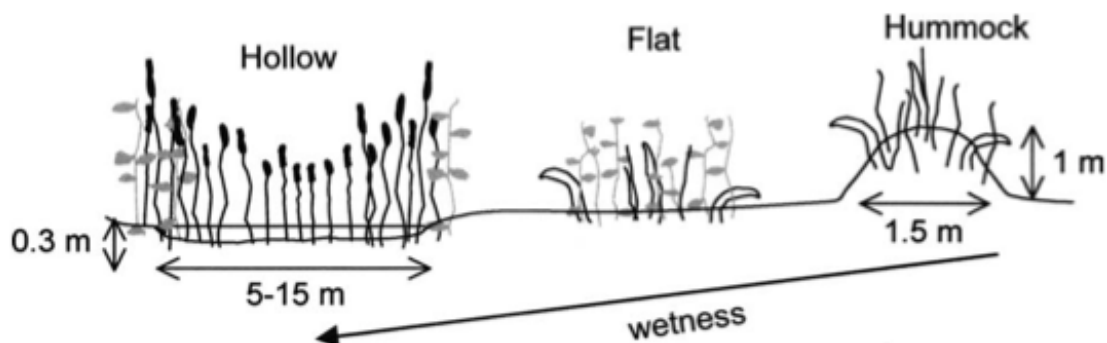


Figure 4: Suggested microtopography template for created wetlands from Bruland & Richardson (2005).

**Although natural changes in microtopography may not be measurable within a typical monitoring period, establishment of microtopography could be a part of site design. Elevational changes and microtopography should be designed according to conditions in reference sites.** Bruland & Richardson (2005) studied microtopography in reference wetlands in North Carolina and designed hummocks to mimic mounds created by treefall (see Figure 4). Barry *et al.* (1996) provide a detailed description of the process they used to create microtopography in a New Hampshire site (see Figure 5 for a diagram of mound and hollow microtopography). Microtopography can increase planted tree survival by allowing for drier environments at the tops of mounds. *Thuja occidentalis* seedling survival was significantly better on hummocks than in hollows in two Northern Michigan mitigation sites (Kangas 2013).

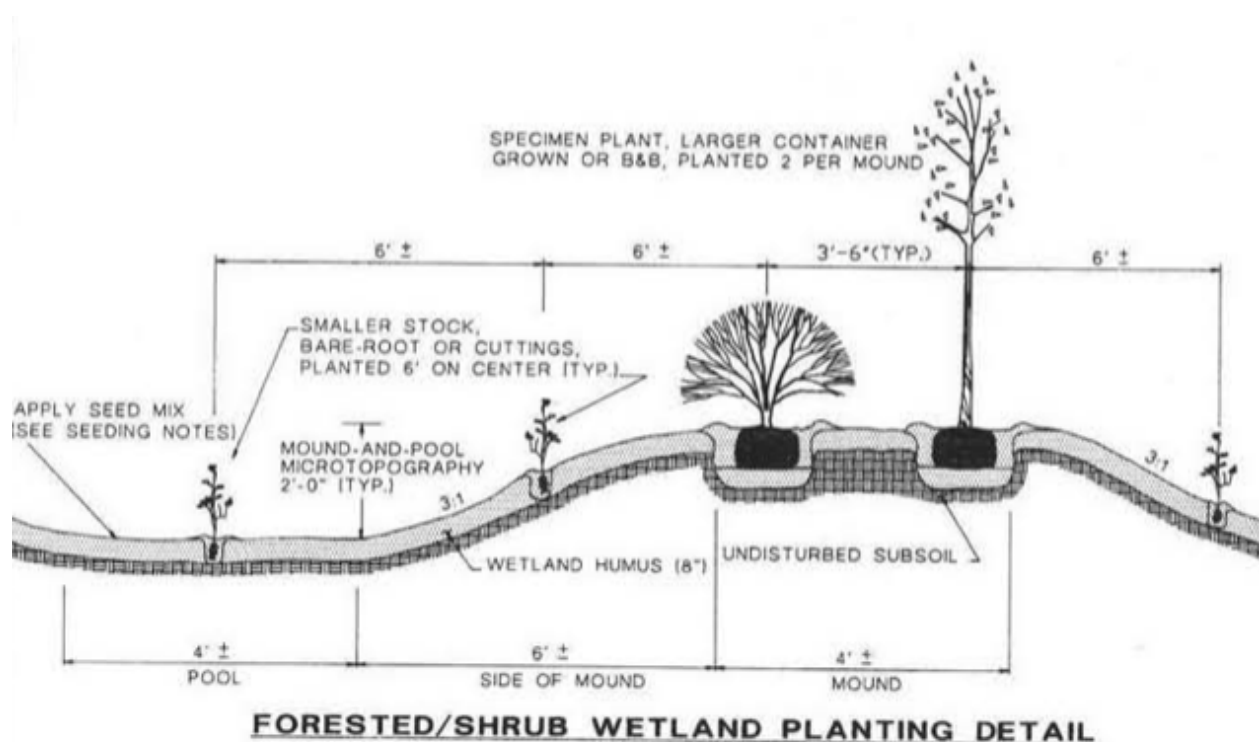


Figure 5: Cross-sectional diagram of mound and hollow design for a New Hampshire wetland (Barry *et al.* 1996). Mounds were designed to have an average width of 4.9 meters and average height of 0.6 meters.

### 5. TREE PLANTING AND MICROTOPOGRAPHY

Microtopography is especially important in forested sites for both planted tree survival and adapting to a changing environment. As a forested wetland matures and hydrologic conditions change, microtopographic variation will help ensure that at least part of the site will experience appropriate hydrology (Bruland & Richardson 2005). **Therefore, it is recommended that trees in forested mitigation sites be planted on mounds.**



## 6. COARSE WOODY DEBRIS

Coarse woody debris provides for critical functions of wetlands by supplying habitat for insects, mammals, and amphibians, fodder for decomposition, and environmental heterogeneity. Woody debris is a natural characteristic of mature wooded wetland habitats, and is often absent in wetland restorations. Coarse woody debris has been shown to increase species richness and biomass of insects, which are an important part of wetland food chain interactions (Alsfeld *et al.* 2009).

Several measurements have been used to quantify coarse woody debris. Total volume of downed logs > 10 cm diameter at the middle point and stumps was measured in Delaware wetlands (Alsfeld *et al.* 2009). Washington wetland performance standards include volumetric measures as well, but also add a size class requirement for 30% of logs, recommend a conifer:hardwood woody debris ratio, and suggest a minimum number of snags per acre (Azous *et al.* 1998). Only one Wisconsin mitigation bank has incorporated coarse woody debris into the construction plan and no mitigation banks have performance standards for coarse woody debris. **Coarse woody debris should be incorporated into Wisconsin mitigation banks where appropriate. Quantifying coarse woody debris should be done using one or more of the following measurements: total volume, size class, and snag density.**

Importing coarse woody debris into mitigation sites must be done carefully. Debris should ideally come from on-site locations to limit the potential for introduced pests. Wisconsin has enacted strict firewood movement laws to combat the spread of tree pests such as the Emerald Ash Borer. **Therefore, woody debris should come from a maximum of 25 miles from the mitigation site and from outside of a quarantine area.**

The following website shows a map of the quarantined counties in Wisconsin:  
<http://dnr.wi.gov/topic/invasives/firewood.html>.

## c. PLANTING PLAN

Appropriate planting is key to achieving restoration goals. Planted species must not only be native to Wisconsin, but must be appropriate for the region and wetland type being restored or created. A GIS-based analysis can be done to help choose a suitable wetland community for a mitigation bank site. This paired with a preliminary soil and hydrology analysis can give a more accurate description of the types of communities that were previously found on the site and/or communities that the site can support.

### 1. SEED BANK VIABILITY STUDIES

It is recommended that sites be seeded with appropriate native seeds in order to establish vegetation. **If a sponsor does not think the site needs to be seeded, the sponsor must conduct a seed bank viability experiment to prove adequate seed bank integrity.** Below is a suggested method for studying seed bank viability adapted from two wetland seed bank studies from the upper Midwest, Frieswyk and Zedler (2006) and Weinhold and van der Valk (1989).



1. Collect soil samples from the site.
  - a. Samples should be collected mid-summer (July) to quantify the persistent seed bank only. Collecting at this time avoids oversampling of transient annual species that germinate during the spring high water period and occurs before most of the current year's seeds have matured (Baskin & Baskin 1998).
  - b. At least one transect should be established that either spans the longest axis of the site, or perpendicular habitat borders. Random sampling quadrats should be placed along the transects and up to five soil samples should be taken at each quadrat.
  - c. Soil samples should be taken to a depth of 5 cm with either a soil corer of at least 5 cm in diameter or with a 200 cm<sup>2</sup> template. Soils with allochthonous soil deposition (by alluvium, topsoil addition, etc...) should be sampled underneath the deposited layer.
  - d. All soil samples from each quadrat should be merged into one composite sample.
2. Process samples.
  - a. Each composite sample should be sorted to remove rhizomes and litter
  - b. The sorted composite samples should then be homogenized.
3. Germinate the seed bank in a greenhouse and identify seedlings.
  - a. Arrange soil in trays and arrange trays randomly in a greenhouse.
  - b. Allow for a control by interspersing trays with sterile soil with the experimental trays. Any species found germinating from the control trays should be removed from the results.
  - c. Watering should be done daily or enough to ensure the soil remains wet for the entire duration of the experiment. Alternatively, samples may be subjected to differing watering regimes to assess the seed germination rates based on a range of water conditions.
  - d. Identify and count seedlings as they emerge. If identification is difficult, allow seedlings to mature for up to 40 weeks, or until positive identification is possible. Count the seedlings that die and remove them from the trays.

The duration of time that a site has been drained has an effect on the number of species present in the seed bank. Weinhold and van der Valk (1989) found that seed bank species richness decreased with time in prairie pothole wetlands; sites that were drained and farmed for 70 years had an average of only 160 seeds/m<sup>2</sup> as compared to reference sites with 3600 seeds/m<sup>2</sup>. Potential mitigation sites in Wisconsin are generally on prior agriculture fields, many of which have been drained and farmed for years. Although recently drained sites (< 5 years) contained more seeds/m<sup>2</sup> than reference wetlands, **sites that have been drained for more than ten years contained less than half of the seeds/m<sup>2</sup> than reference wetlands (Weinhold & van der Valk 1989) and may not have enough of a seed bank to warrant a seed bank study.**

**2. GRADUAL PLANTING**

Drought, torrential rain, and other environmental extremes can occur during the first year of seedling establishment, which can kill or seriously harm much of a planted crop. Also, some later successional species require pioneer species establishment before they can germinate. For these two reasons, **a gradual planting plan is recommended to increase the establishment success of planted seeds.**

A recent study of Great Lakes sedge meadows identifies common plant communities with *Carex stricta* (tussock sedge) as the matrix species. Johnston and Zedler (2013) called these assemblages “preferential associates” to tussock sedge, and suggested planting them along with *Carex stricta* in sedge meadow restorations (see Table 2). **In sedge meadow restorations, we suggest planting a matrix of *Carex stricta*, along with these twelve species, at the beginning of a sedge meadow restoration. As the tussocks develop, more species can be added to the site.** This planting method embraces adaptive management of mitigation banks and will help avoid instances of low seedling establishment that lead to invasions of non-native species.

Species Name	Guild
<i>Campanula aparinoides</i>	Vine-like, stems climb or drape over tussocks
<i>Galium trifidum</i>	
<i>Lathyrus palustris</i>	
<i>Persicaria sagittata</i>	
<i>Acorus americanus</i>	Forbs, can grow in the shaded sub-canopy of tussocks
<i>Cicuta bulbifera</i>	
<i>Impatiens capensis</i>	
<i>Lysimachia thyrsoiflora</i>	
<i>Scutellaria galericulata</i>	
<i>Calamagrostis canadensis</i>	Graminoids
<i>Carex lacustris</i>	
<i>Carex stricta</i>	

Table 2: Preferential associates of tussock sedge (*Carex stricta*) from Johnston and Zedler (2013). Species are grouped alphabetically by guild.

For plant communities other than sedge meadows, it may be helpful to base planting plans on a similar method as described above. For example, if a target community is fresh/wet meadow, practitioners may wish to choose Canada blue-joint grass (*Calamagrostis canadensis*) as the matrix species and plant several other fresh/wet meadow species along with it during the first planting occasion. More fresh/wet meadow species can be added in subsequent plantings to increase diversity.

**3. SPECIES SELECTION**

**Plant species chosen for a mitigation bank shall not only be native to Wisconsin, but native to the part of the state where they are to be planted, as well as being**

**appropriate for the site’s soils and hydrologic regime.** The Wisconsin State Herbarium website displays details for all plant species found in Wisconsin including their native/non-native status and the counties in which they are found. To search for a species’ origin status or county distribution, go to [www.botany.wisc.edu/herbarium](http://www.botany.wisc.edu/herbarium) and click on “Wisflora”. Below is an example of how to search for a species in Wisflora.


1. Go to [www.botany.wisc.edu/herbarium](http://www.botany.wisc.edu/herbarium) and click on the “Wisflora” link.
2. Click on the “Name” link under the “Search” heading in the grey box to search for a species by name.
3. Type in the name of the species that you want to research and click “Search” (Figure 6). You may search using the Latin name or a common name. This example will use *Penstemon digitalis* (false foxglove), a species that is not native to Wisconsin but is often found in prairie seed mixes. Other similar species that are not native to Wisconsin but are commonly found in wetland planting mixes include *Acorus calamus* (sweet-flag) and *Echinacea purpurea* (Eastern purple coneflower).



4. Click on the hyperlinked Latin name of the species you wish to see from the Results list.
5. You will be directed to a species profile page (Figure 7). On that page, you will see a photo of the species (if available), a Wisconsin map highlighting the counties in which the species is found, the species origin status, and other important information such as the species’ coefficient of conservatism and wetland indicator status.

Family:	<input type="text"/>
Genus:	Penstemon
Species:	digitalis
Common Name:	<input type="text"/>
<input type="button" value="Search"/> <input type="button" value="Clear Form"/>	

Figure 6: Example Wisflora searchbox using *Penstemon digitalis* (false foxglove), a species not native to Wisconsin but commonly found in prairie seed mixes.



[View specimen location map](#)

Family: Scrophulariaceae

Taxon: *Penstemon digitalis* Nutt. ex Sims

Common: false foxglove foxglove beardtongue tall beardtongue tall white beardtongue

Introduced - naturalized  
erect perennial forb  
blooms Jun.-Jul.; plant 1'-4'

[View Herbarium Records](#)

Figure 7: Partial species profile for *Penstemon digitalis* (false foxglove) in Wisflora. *Penstemon digitalis* is a non-native species, as indicated by the “Introduced – naturalized” status in the species description. To the left of the description is a Wisconsin map indicating the counties in which this species has naturalized.

### 3. COVER CROP SELECTION

At the beginning of restoration projects, the site is usually dominated by bare ground. A common restoration practice is to plant a cover crop to discourage invasive and non-

native species from dominating the site before the seeded plants can establish. Usually, the chosen cover crop is either oats (*Avena sativa*) or winter rye (*Secale cereale*); although these species do not tend to persist at the site, they are not native to Wisconsin. **As an alternative, annual wetland species could be selected as a cover crop, such as *Bidens cernua* or *Bidens frondosa*** (Doherty & Zedler *in press*). Moreover, native smartweeds (native *Polygonum* spp.) or short-lived native grasses (*Poa palustris*) can also function as cover crops.

#### 4. TREE AND SHRUB SELECTION

Appropriate trees and shrubs should be planted according to the conditions present and envisioned at the site and communities found in appropriate reference wetlands. See Tables 6 and 7 for lists of potential tree and shrub species to plant in mitigation banks.

#### 5. VEGETATION SAMPLING METHODS

##### a. PLOT ESTABLISHMENT

In order to adequately assess the establishment of desired vegetation, permanent vegetation sampling plots or transects are usually constructed following the first planting. The appropriate number of sampling plots per wetland mitigation bank must be high enough to glean an accurate understanding of vegetation dynamics on the site, but not too high so that the understanding gained from extra plots is not offset by the effort spent to sample them. **The minimum allowable number of sampling plots per mitigation bank is eight** (per the methods of Johnston *et al.* 2007). Most mitigation banks will require more than eight plots, based on their size and complexity. **A representative number of plots for each vegetation community type must also be established.** The bank sponsor, consultant, and DNR scientist will agree upon an appropriate number of sampling plots per site after a site visit has been conducted and a planting plan is proposed.

##### b. PLOTLESS TIMED MEANDER

While traditional sampling plots can give valuable information about the density and cover of vegetation, they often fall short of providing a representative list of species found at a site (Huebner 2007; but see Adaptive Cluster Sampling, Thompson 1991). The timed meander method is a way to gather a more complete species list at a site, as it is capable of locating rare species at a site that may be missed when using plots (Goff *et al.* 1982). **If species richness-based performance standards are chosen for a bank site (such as FQI, number of native plant species, etc...), a timed meander survey with percent cover estimates for each species may be required to produce an adequate species list.** Methods for the timed meander process are described in detail in Goff *et al.* (1982) and briefly excerpted below.

1. Delineate different vegetation communities.

Practitioners should perform a timed meander search in each of the separate community types at the bank site. For example, a bank site containing shrub-carr, sedge meadow, and wet prairie community types should have at least three separate timed meander surveys, one in each contiguous community type.

2. Plan the meander tracks.

Meander tracks should have both planned and adaptive components. Tracks should be designed to cover gradients in elevation, hydrologic conditions, and vegetation within each community. Tracks should also traverse throughout the entire site. In the field, practitioners may observe areas with high species diversity. Tracks can be modified to include such areas.

3. Conduct timed meander survey and record species.

- a. Begin recording species at the point of entry for the site. Known species can be written down, while unknown species can be keyed in the field or collected for later keying.
- b. Tracks should be broken down into 10 minute segments. Pause the stopwatch while keying, collection, or any other type of interruption take place. If no new species are added within a 10 minute segment, and an adequate portion of the community has been surveyed, then the track can be considered finished.
- c. The final product should be a list of species found in each track with percent cover estimates for each species.

## 2. HYDROLOGY

The interval at which hydrology data are collected depends on what kind of data is required for computing performance standards. Water level data have been collected daily at midnight (Shaffer *et al.* 2000), daily during the non-growing season and hourly during the growing season (Hunt *et al.* 1999), at 6-hour (Cole & Brooks 2000; Johnson *et al.* 2012) and 12-hour (Cole *et al.* 2006) intervals, at 30-minute intervals (Kurtz *et al.* 2007; Skalbeck *et al.* 2009), and at 15-minute intervals (Booth & Loheide 2012). A preliminary analysis comparing daily measurements to measurements taken every three hours found no significant differences between the two time intervals; therefore, daily measurements were used in one study to consolidate data storage space (Shaffer *et al.* 2000).

Shaffer *et al.* (2000) found that monthly water level measurements are sufficient to perceive general trends in water level for a site; however, more detailed information requires a shorter measurement interval (see Table 3). Measurements requiring enhanced accuracy or capturing infrequent events necessitate a different measurement apparatus or a higher resolution sampling interval. For example, the maximum water level is a transient event and should be measured either using a crest gauge or by daily water level measurements. Approved quantitative hydrology standards for Wisconsin wetland mitigation banks rely on threshold statistics such as minimum soil saturation and maximum inundation periods (see Table 5). For threshold measurements, it not only matters how often water levels are measured, but also the days on which measurements are taken. Therefore, Shaffer *et al.* (2000) suggest

taking **daily measurements if threshold exceedance performance standards are used**. Hunt *et al.* (1999) suggest **hourly measurements to accurately characterize wetland hydrology for at least the first growing season, which can then be used to verify whether a less frequent sampling interval is adequate**.

	Measurement	1-day	2-day	4-day	7-day	14-day	28-day	
Annual and short-term changes in water level	Annual pattern	Reference	Annual pattern is well-defined in all measurement intervals.					
	Short-term change	Reference	Hydrograph conveys high resolution information about short-term changes in water level.	Choppy hydrographs suggest that there is variability in water levels, but there is no information about frequency, magnitude, or duration of short-term changes in water levels.	Hydrographs convey no information about short-term changes in water level.			
Water level stage measurements	Stage distribution (minimum, median, 25 <sup>th</sup> and 75 <sup>th</sup> percentile)	Reference	Mean stage values were consistently close to reference values.					
			Variability is small – all stage estimates were within 0.035 m of reference values				All estimates were within 11% of reference values	
	Stage distribution (maximum)	Reference	Average error consistently increased with increasing sampling interval					
			Average error = 0.11 m				Average error = 0.25 m	
	Stage range estimate error (interquartile range)	Reference	All errors within 2% of reference values.					
	Stage range estimate error (seasonal range)	Reference	Errors within 2% of reference values				Errors within 8% of reference values	
Stage range estimate (total range)	Reference				Average range 87% of reference	Average range 71% of reference		
Monthly mean	Average monthly mean water level error	Reference	0.5%	1.5%	2.5%	5.6%	9.3%	
Threshold statistics	Water within root zone (< 30 cm from surface)	Reference	Average range = 0.5 days	Average range = 2.5 days	Average range = 8 days	Average range = 17 days	Unable to measure	
	Standing water	Reference	Average range = 2.3 days	Average range = 4 days	Average range = 5.3 days	Average range = 12 days	Unable to measure	

Table 3: Description of hydrology graphs, water level stage, monthly mean water level, and threshold statistics for different sampling intervals from Shaffer *et al.* 2000. Stage is defined as the percentile of water level distribution and is measured in five categories: minimum, 25<sup>th</sup> percentile, median (50<sup>th</sup> percentile), 75<sup>th</sup> percentile, and maximum. Cells highlighted in yellow and orange are those where there is significant deviation from reference values; orange cells have high deviance from reference values.



### 3. BUFFER

A buffer needs to function as a protecting strip around the wetland, insulating it from nutrient runoff, invasive species, and other edge effects. Therefore, a buffer must be located at an appropriate place on the site in order for it to function correctly. Below are some recommendations for designing and maintaining a buffer.

#### a. BUFFER SIZE

The desired function of a buffer dictates its appropriate width. For example, buffer widths for intended removal of >85% of sediment load from adjacent land were between 80 and 200 feet, while those effective at removing excess nitrogen and phosphorus ranged from 15 to 300 feet wide (Castelle *et al.* 1994). Since wetland mitigation bank buffers must achieve various functions, Castelle *et al.* (1994) recommend a minimum buffer width of 98 feet to protect chemical, physical, and biological components of wetlands. **A fixed buffer width of 100 feet is recommended for Wisconsin mitigation banks.** According to the mitigation guidelines, buffers can achieve a 0.25:1 compensation ratio and cannot account for more than 25% of the proposed bank credits (WDNR 2013).

#### b. BUFFER COMPOSITION

A buffer must be composed of the appropriate vegetation type for its location. For example, it does not make sense to construct a prairie buffer in a part of Wisconsin that lacks prairies and if the mitigation bank is surrounded by forest. **To ensure appropriate buffer habitat, practitioners may access land cover GIS layers to assess the land cover type within a 20-mile radius of the mitigation site. If historical or remnant prairie does not occur within the radius then it is not a suitable buffer candidate.** Natural community habitat types found in Wisconsin are detailed on the DNR website. Go to [dnr.wi.gov](http://dnr.wi.gov) and search for “Natural Communities of Wisconsin”.

#### c. BUFFER MAINTENANCE

**Adequate buffer maintenance should be included in the monitoring plan.** Budgeting for buffer maintenance could include setting funds aside for one or more of the following activities: prescribed burns to maintain prairie habitat; herbicide applications; and/or possible re-seeding or planting.

### 4. WILDLIFE

Wisconsin mitigation banks provide excellent opportunities to restore wetland wildlife habitat quality since half of threatened or endangered species in the U.S. depend on wetlands in some way (Trochlell & Bernthal 1998).

At times the habitat needs of different animal species may conflict with each other or the guidelines for Wisconsin mitigation banks. For example, amphibians require standing water for most of the growing season, whereas large expanses of open water are discouraged on mitigation sites (WDNR 2013).

Realistically, small wetland restoration sites may not be able to satisfy the needs of every animal species. **If wildlife performance standards are called for, practitioners may wish to tailor those standards to certain animal groups.**

A study of Southern Wisconsin wetland mitigation sites focused on avian and amphibian population monitoring (Wilcox 2009). Monitoring methods for both guilds were tested for accuracy and ease of use. Birds were monitored using callback recordings, while amphibians were monitored using both callback recordings and traps. Detailed information about monitoring methods and efficacy can be found in the report (Wilcox 2009). In concordance with Wilcox's (2009) report, **we recommend that a highly trained biologist be employed to survey the site if species richness performance standards are required, whereas a less-experienced naturalist may be employed if only certain species are targeted.**

## 5. MONITORING REPORTS

Annual or semi-annual monitoring reports shall be submitted on the status of the wetland mitigation bank. **Reports shall be submitted by December 31 of each growing season that requires a monitoring report.** Failure to submit timely monitoring reports will result in delay of approval of any remaining credits, as well as a delay in formal release from future monitoring requirements. Delays will stand until tardy reports are submitted and approved by the IRT.

## QUANTIFIABLE PERFORMANCE STANDARDS

### 1. VEGETATION

Vegetation is usually the easiest structural component of wetland restoration sites to measure. Permanent sampling plots can be established to represent the site and monitor changes in vegetation over time. Thus, vegetation standards are often measured in wetland mitigation sites to assess restoration progress.

#### a. COVER

A simple vegetation parameter to measure is vegetation cover. Thus, performance standards tend to be based on vegetation cover, without knowing if they are measuring wetland function (Cole 2002). Cole (2002) compared vegetative cover to six wetland functions (short-term surface water storage, long-term surface water storage, maintenance of a high water table, transformation and cycling of nutrients, retention and removal of dissolved elements, and accumulation of inorganic sediments). He found that vegetative cover correlated with only one function, retention and removal of dissolved elements. The plants provide a scaffold, both above and below ground, on which microbial reactions take place to remove dissolved elements. Since Wisconsin mitigation banks cannot be constructed to function as storm water treatment sites, the measurement of vegetative cover for the function of water quality improvement may be inappropriate.

Nevertheless, measuring vegetative cover may help assess progress of a mitigation site. Native plant cover performance standards indicate limits to invasive species cover. Vegetation cover standards also indicate limits on bare ground or open water. In a review of performance standards compliance in wetland mitigation banks, Matthew & Endress (2008) found a similarly high compliance rate for vegetation cover of 77%. It is recommended that absolute cover performance standards for vegetation be included in performance criteria to set limits on invasive species, bare ground, and open water at mitigation banks. **Maximum cover of open water and bare soil should not exceed 10% and 5% for an entire site (wetland area plus buffer), respectively.**

Cover for open water and bare soil should be measured and presented as the absolute areal cover of those areas throughout the entire site. The following sentences describe an example of how open water and bare soil could be measured:

Practitioners observe an area of persistent open water at the bank site. They then use a portable GPS device to record a track as they walk around the edges of the open water. This process is repeated for all other areas of persistent open water at the bank site. The practitioners then upload their recorded tracks into GIS software to create a map of open water at the bank site. The total area of open water can also be calculated in the GIS software. The total area of open water can then be divided by the total area of the bank site to present the total absolute areal cover of open water. This process can be repeated for areas of bare soil.

#### **b. FLORISTIC QUALITY ASSESSMENT**

A floristic quality assessment (FQA) is a standardized and repeatable way to measure the natural integrity of a plant community. There are two components to the FQA: the mean coefficient of conservatism (mean C) and the floristic quality index (FQI). The mean C is a value, from zero to ten, given to a plant species based on its likelihood of indicating pre-European settlement conditions in Wisconsin. A species with a low mean C indicates weediness while a high mean C suggests a species that can seldom persist outside of relatively pristine habitats. The FQI for a community takes into account species richness and mean C to produce a numerical metric of habitat quality. The following equation is used to calculate FQI:  $FQI = \bar{C} \times \sqrt{N}$ , where  $\bar{C}$  is mean C and N is species richness. For more information about the Wisconsin floristic quality assessment, see Bernthal (2003).

FQI and mean coefficient of conservatism have been widely used to characterize the vegetation of wetland sites. In a study of restoration trajectories for vegetation indices in restored wetlands, FQI was found to rebound to and even surpass reference levels relatively quickly (Matthews *et al.* 2009). The fast increase of FQI may be misleading; other vegetation indicators such as mean C did not reach reference levels even after nine years, meaning that fewer conservative species were present and indicating that the sites' vegetation had not completely recovered. The decoupling of FQI from vegetation recovery could be explained by the FQI's dependence on species richness. Species richness can be high in restoration sites because of

their disturbed nature (Matthews *et al.* 2009). Mean C may be a more reliable indicator of vegetation recovery because it does not rely on species richness.

A comprehensive survey of wetlands in Southeast Wisconsin produced a set of thresholds for low, medium, high, and excellent quality wetlands (Bernthal *et al.* 2007). **Based on these thresholds, Wisconsin mitigation banks in Southern Wisconsin should strive for at least medium quality in both FQI and mean C by the middle of the monitoring period, and reach high quality by the final monitoring year** (see Table 4 and Figure 8). These figures may be adjusted based on plant community, location, or new data based on more recent research. Threshold values for locations in the rest of Wisconsin are in the process of being evaluated.

Wetland Type	Interim Performance Standards		Final Performance Standards	
	Mean C	FQI	Mean C	FQI
All Wetland Types	≥ 2.4	≥ 12.5	≥ 4.2	≥ 22.8
Sedge Meadow	≥ 2.4	≥ 11.6	≥ 4.5	≥ 26.1
Shrub-Carr	≥ 2.4	≥ 11.6	≥ 4.5	≥ 26.1
Lowland Hardwood	NA	NA	≥ 3.3	≥ 16.5

Table 4: Interim and final mean C and FQI performance standard threshold values for three wetland types in Southeast Wisconsin (sedge meadow, shrub-carr, and lowland hardwood) as well as general wetland thresholds. Table values are adapted from Bernthal *et al.* 2007.

### Floristic Quality Benchmarks and Categories ( $\bar{C}_a$ , $\overline{FQI}_a$ )

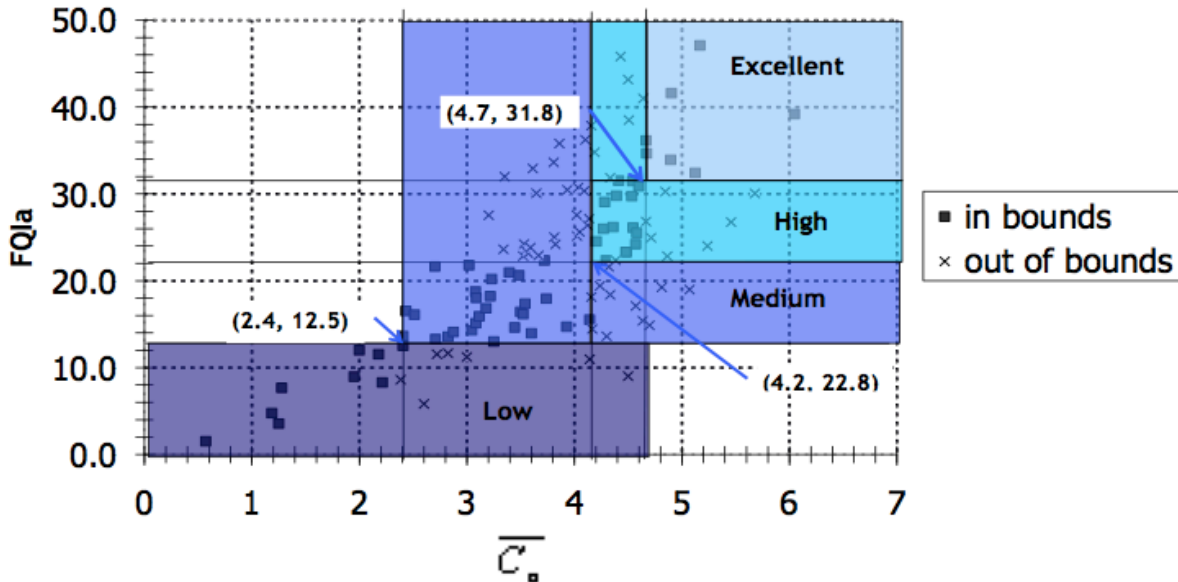


Figure 8: Thresholds for mean C and FQI from Bernthal *et al.* 2007. Thresholds are based on data from 116 wetlands in Southeast Wisconsin.

### c. SPECIES COMPOSITION AND DOMINANCE

A study done by Matthews *et al.* (2009) analyzed the restoration trajectories of various vegetation measurements in constructed and reference wetlands. They found that native species richness, FQI, conservative species richness, *Carex* species richness, and number of native genera in restored wetlands approached or even exceeded those measures in reference wetlands within nine years, though *Carex* species richness increased at the slowest rate among this group. On the other hand, proportion of native species, mean C, proportion of perennial species, and the three importance value measurements in restored wetlands were not approaching reference levels after nine years. The authors concluded that metrics that rely on species richness, such as FQI, tend to be high in recently restored wetlands and can give a false indication of restoration progress, whereas metrics that are based on species composition or dominance were better at distinguishing low and higher quality restoration sites (Mathews *et al.* 2009).

Based on the results from Matthews *et al.* (2009), **we recommend establishing vegetation performance standards based on the following indicators: mean C, proportion of perennials, and proportion of native species. Standards should be set based upon conditions in appropriate reference wetlands.**

Measures of plant dominance could be helpful in quantifying the progression of the plant communities on a mitigation bank site. Ideally, measures of dominance are quantifiable and are known to change as the plant communities change. Three measures of dominance, the 50/20 rule (Federal Interagency Committee for Wetland Delineation [FICWD] 1989), importance values for woody plants, and the Species Dominance Index (SDI) (Frieswyk *et al.* 2007), can be used to quantify species dominance in wetland communities.

### d. INVASIVE SPECIES

To minimize the presence and prevalence of invasive species at a mitigation bank, maximum percent areal cover performance standards may be implemented. Prohibited invasive species, as noted in Wisconsin Invasive Species Rule (Wis. Adm. Code ch. NR 40), are both a large threat to Wisconsin's natural communities and are not yet found in Wisconsin or found in small populations that can be eradicated. Therefore, **prohibited species shall not be present.** Invasive species cover should be measured as absolute areal cover of the vegetated areas over the entire site. See paragraph 1.a. Cover in this section for an example of how invasive species cover can be measured. If invasive species are scattered throughout the site, a timed meander approach will need to be done to estimate absolute percent cover.

Restricted invasive species, as noted in Wisconsin Invasive Species Rule (Wis. Adm. Code ch. NR 40), are both a large threat to Wisconsin's natural communities and are present in multiple areas of the state, making eradication improbable. Although *Phalaris arundinacea* (reed canarygrass) is not listed as an invasive species under Wisconsin's Invasive Species Rule, its prevalence and aggressiveness causes serious problems in wetland habitats. Therefore, for wetland mitigation purposes *Phalaris arundinacea* (reed canarygrass) is treated as an invasive

species. Wetland invasive species may include, but are not limited to, *Alnus glutinosa* (European alder), *Arundo donax* (giant reed), *Cirsium arvense* (Canada thistle), *Lythrum salicaria* (purple loosestrife), *Phalaris arundinacea* (reed canarygrass), *Phragmites australis* (common reed), *Typha angustifolia* (narrow-leaved cattail), and *Typha x glauca* (hybrid cattail). Upland buffer invasive species may include, but are not limited to, *Dipsacus* spp. (teasels), *Elaeagnus umbellata* (autumn-olive), *Euphorbia esula* (leafy spurge), *Pastinaca sativa* (wild parsnip), and *Rosa multiflora* (multiflora rose). **The combined maximum absolute areal cover of invasive species in vegetated areas over the entire site (wetland plus buffer area) shall be no more than 20% by the end of the monitoring period, unless otherwise indicated by the Interagency Review Team.**

## 2. HYDROLOGY

Wisconsin hydrology performance standards are based on saturation within a certain measure of the soil surface for a period of consecutive days (see Table 5). This metric attempts to characterize the soil moisture within the root zone of wetland plants; however, there may be a more direct way of measuring root zone saturation. Shaffer *et al.* (2000) note that water levels in one wetland did not remain within the root zone for a period of 14 consecutive days, but that the root zone was saturated in 19 days out of a 20-day period. This wetland would fall short of threshold hydrology performance standards, although the conditions experienced in the root zone may be similar to what might have occurred if the root zone was saturated for 14 consecutive days. Hunt *et al.* (1999) suggest measuring the “root zone probability”, which is the proportion of measurements where water was at or above the root zone (defined as 30 cm below soil surface). A drawback to relying solely on the root zone probability to characterize water residence time within the root zone is illustrated in the following example:

[A] system where the water table moves into the root zone every other day (50% root-zone probability) will likely differ from one with the water table in the root zone only during the first half of the growing season (also 50% probability) (Hunt *et al.* 1999).

**Therefore, a comprehensive root zone probability by contiguous days of saturation statistic may be more indicative of the root zone saturation regime.** Alternatively, soil surface effective saturation may be a better way to compare soil moisture to wetland vegetation (Booth & Loheide 2012). **Measuring surface effective saturation proved more informative for predicting vegetation composition than depth to water level measurements.**

Although hydrology is measured by depth to water table, Hunt *et al.* (1999) note that we may be ignoring an important feature of soil moisture: capillary fringe. Soils with smaller pore spaces (clays, peat) can pull water above the water table by capillary action. Therefore, the root zone can experience saturated conditions when the water table is well below the root zone. Hunt *et al.* (1999) measured soil moisture potential using a gypsum block installed 15 cm below the soil surface. Though this method may not be appropriate for wetlands restored on coarse-textured mineral soils (which have less capillary fringe potential), it would give a better picture of the moisture content of the soil in the root zone. **Gypsum blocks or soil moisture meters could be used to assess soil moisture in mitigation sites with**

**either thick deposits of lacustrine clay or soils with high clay proportions that preclude water table monitoring with wells.**

#### **ARE WE CREATING WETLANDS THAT ARE TOO WET?**

Two studies from the east coast comparing hydrology in reference and created wetlands and have found that created wetlands are on average wetter than their reference counterparts (Cole & Brooks 2000; Cole *et al.* 2006). Cole and Brooks (2000) compared two floodplain forest reference sites to two mitigation floodplain wetlands in Pennsylvania. They found that created wetlands had a median depth to water table that was much less and had water in the root zone much more frequently than the reference wetlands. In New York, Cole *et al.* (2006) compared three palustrine forest/scrub-shrub wetlands to five palustrine mitigation sites and again found the median depth to water table in created wetlands to be much shallower than the reference sites. They also found that three of the five created wetlands were inundated for considerable lengths of time, something that the reference wetlands rarely experienced. The researchers attribute wet conditions in created wetlands to the practice of scraping the wetland surface down to the groundwater table, thus creating expansive areas of ponded water. The desire to achieve regulatory standards of wetland hydrology, combined with the short term of many monitoring periods, pushes wetland restoration projects to create hydrology that is too wet and therefore may not be indicative of conditions in nearby reference wetlands. **In order to establish appropriate hydrology on a mitigation site, restoration practitioners should focus on filling ditches, removing drain tile, and removing allochthonous material, rather than scraping soil down to the groundwater table.**



Wetland Type	Minimum Soil Saturation to Inundation			Maximum Inundation		
	Saturation (from soil surface)	Inundation	Duration (minimum)	Measure	Duration (maximum)	Storm Event
General	Within 12 inches	≤ 6 inches	28 consecutive days or two 14-day hydroperiods	–	–	–
Shallow Marsh	0 inches	≤ 6 inches	56-60 consecutive days, two 28-30 day or four 14-15 day hydroperiods	≤ 18 inches	30 days	≥ 2 year
Sedge Meadow	Within 12 inches	–	28 consecutive days or two 14 day hydroperiods	≤ 6 inches	14 days	≥ 10 year
Wet Meadow	Within 12 inches	–	28 consecutive days or two 14 day hydroperiods	≤ 6 inches	14 days	≥ 10 year
Shrub-Carr	Within 6-12 inches	≤ 6 inches	28-30 consecutive days, or two 14-15 day hydroperiods	6-12 inches	14-15 days, except in hollows	≥ 10 year
Hardwood Swamp	Within 6-12 inches	≤ 6 inches	28-30 consecutive days, or two 14-15 day hydroperiods	6-12 inches	14-15 days, except in hollows	≥ 10 year

Table 5: Approved quantitative hydrology performance standards for Wisconsin wetland mitigation banks. Performance standards are separated by wetland type. Standards are for normal to wet-normal years. Note: There are no approved individual hydrology performance standards for Wet Prairies and Floodplain Forests in Wisconsin.

Wetland soils are arguably the slowest physical factor to recover after restoration, therefore quantifiable performance standards based on soil characteristics changing with time may not be appropriate. Several studies have shown that soil characteristics are significantly different in created and restored wetlands as compared to reference wetlands (Bishel-Machung *et al.* 1996; Stolt *et al.* 2000; Cole *et al.* 2001; Bruland & Richardson 2006). The time it takes for some soil characteristics, like soil organic matter content, to recover can be very long. A Pennsylvania study found no relationship between soil organic matter and time elapsed since construction, indicating that soil organic matter does not accumulate within the time period usually allotted to monitoring mitigation sites (Bishel-Machung *et al.* 1996).

#### a. HYDRIC SOIL INDICATORS

Several Wisconsin mitigation banks have performance standards requiring a mid-course wetland delineation, usually at year five of a ten-year monitoring plan. Not only does the delineation describe the jurisdictional boundary of the wetland at the mitigation site, but it can also assess the development of wetland soil characteristics. Vepraskas *et al.* (1999) found several indicators of hydric soils to be present within five years of wetland construction. These indicators were presence of organic bodies, loamy gleyed matrix, depleted matrix, redox dark surface, and depleted dark surface (see Table 6 for definitions). **Creation sites in Wisconsin mitigation banks**

**could compare measures of the indicators listed in Table XX, along with other hydric soil indicators such as hydrogen sulfide odor, depleted below dark surface, and sandy redox, with baseline data from the site during an intermediate wetland delineation to assess hydric soil development.** See the Regional Supplement to the Corps of Engineers Wetland Delineation Manual (USACE 2012) and Field Indicators of Hydric Soils in the United States (USDA & NRCS 2010) for detailed descriptions of all hydric soil indicators.

This study was conducted in a constructed deep marsh with relatively stable soil saturation throughout the growing season. Soils in wetlands with a more fluctuating hydrologic regime may experience color change more slowly due to less frequent saturation. It must be mentioned that these are indicators of hydric soils, and not necessarily indicators of soil function. The assumption is that if hydric soil structure develops then hydric soil function will follow, although it is not certain how long soils will take to regain hydric functions.

Hydric Indicator Name	Definition
Organic Bodies	Presence of 2% or more organic bodies of muck or a mucky modified mineral texture, approximately 1 to 3 cm in diameter, starting within 15 cm of the soil surface
Loamy Gleyed Matrix	A gleyed matrix that occupies 60% or more of a layer starting within 30 cm of the soil surface.
Depleted Matrix	A layer at least 15 cm thick with a depleted matrix that has 60% or more chroma 2 or less starting within 25 cm of the surface. Two percent or more redox concentrations are required if the value/chroma are: 4/1, 4/2, or 5/2.
Redox Dark Surface	A layer at least 10 cm thick entirely within the upper 30 cm of the mineral soil that has: <ul style="list-style-type: none"> <li>a. matrix value 3 or less and chroma 1 or less and 2% or more distinct or prominent redox concentrations as soft masses or pore linings, or</li> <li>b. matrix value 3 or less and chroma 2 or less and 5% or more distinct or prominent redox concentrations as soft masses or pore linings.</li> </ul>
Depleted Dark Surface	Redox depletions, with value 5 or more and chroma 2 or less, in a layer at least 10 cm thick entirely within the upper 30 cm of the mineral soil that has: <ul style="list-style-type: none"> <li>a. matrix value 3 or less and chroma 1 or less and 10% or more redox depletions, or</li> <li>b. matrix value 3 or less and chroma 2 or less and 20% or more redox depletions.</li> </ul>

Table 6: Names and definitions of hydric soil indicators that can potentially be measured in Wisconsin mitigation wetlands. Modeled after Table 4 from Vepraskas *et al.* 1999.

### **b. SOIL MICROBIOME**

With the advent of molecular technology, direct characterization and quantification of the organisms responsible for many wetland soil functions is now possible. Although the Wisconsin DNR does not have DNA sequencing capabilities, wetland mitigation banks could partner with research institutions to help characterize the microbial communities in wetland soils. Peralta *et al.* (2013) found soil microbial diversity to be very high in reference wetlands, while microbial

community composition in created wetlands was more homogenous. They also found that soil microbial communities were correlated with different soil conditions. Therefore, characterizing wetland soil microbiomes could be used as a bioindicator of soil microbial processes and soil condition. A review of potential biological indicators used to measure soil function found molecular methods characterizing soil bacteria, fungi, and lipid profiles can be used to measure soil functions such as carbon, nitrogen, and phosphorus cycling, decomposition rates, and soil microbial activity (Ritz *et al.* 2009). **Such measurements change over time as soil microbial communities change and would be good candidates for mitigation bank performance standards.**

## 5. BUFFER

Percent vegetative cover and maximum percent invasive species cover performance standards shall be the same as mentioned in sections 1.a. and 1.d. in Quantifiable Performance Standards. To reiterate those standards, **total areal cover must not exceed:**

- **five (5) percent for bare ground,**
- **zero (0) percent for prohibited invasive species, and**
- **twenty (20) percent for other invasive species.**

These numbers are total allowable percent covers for the entire mitigation site, which means the wetland area plus the buffer percent covers cannot exceed these thresholds.

## 6. FUNCTIONAL VALUES

A functional assessment following the Wisconsin Rapid Assessment Methodology (WDNR 2012) can be done at the beginning and the end of the monitoring period to assess the increase in function of the wetland mitigation bank. If performance standards are adopted based on WRAM functional values, **at least five of the eight listed wetland functional values shall rank as high or exceptional by the end of the monitoring period.**

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Table 7: Desirable native tree species for wetland mitigation bank projects.

Scientific Name	Common Name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Abies balsamea</i>	Balsam Fir	5	FAC <sup>1</sup> FACW <sup>2</sup>	Northern wet to wet-mesic forests in Northern Wisconsin	Prefers acidic soils	
<i>Acer nigrum</i>	Black Maple	5	FACU	Can be found in floodplain forests	Acidic, sandy forest soils	
<i>Acer rubrum</i>	Red Maple	3	FAC	Variable; Southern (and less frequently Northern) hardwood swamps, White Pine – Red Maple swamps, and Floodplain forests	Variable, can survive on a wide range of soils but will not tolerate sedimentation	
<i>Acer saccharinum</i>	Silver Maple	2	FACW	Floodplain forests	Mostly found on alluvial soils, but can grow on other well-drained wet soils	
<i>Betula alleghaniensis</i>	Yellow Birch	7	FAC	Northern and Southern hardwood swamps	Can grow in rocky soil but does best in well-drained loam	
<i>Betula nigra</i>	River Birch	6	FACW	Floodplain forests in western Wisconsin	Found on alluvial soils and is tolerant of sedimentation	
<i>Carpinus caroliniana</i>	Musclewood	6	FAC	Found on edges of deciduous swamps, slopes of floodplain forests	Cannot tolerate prolonged flooding, prefers well-drained alluvial soils	Shade-tolerant; understory tree
<i>Carya cordiformis</i>	Bitternut Hickory	6	FAC <sup>1</sup> FACU <sup>2</sup>	Moist forests, stream banks	Prefers deep loamy soils	

<sup>1</sup> Wetland indicator for Northcentral/Northeast Region according to The National Wetland Plant List (Lichvar 2013)

<sup>2</sup> Wetland indicator for Midwest Region according to The National Wetland Plant List (Lichvar 2013)

Species with no footnote after the wetland indicator have the same wetland indicator for both regions.

Table 7: Desirable native tree species for wetland mitigation bank projects.

Scientific Name	Common Name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Celtis occidentalis</i>	Hackberry	4	FAC	Floodplain forests	Non-acidic soils, but other than that it doesn't have much of a preference	
<i>Crataegus mollis</i>	Downy Hawthorn	2	FAC	Wooded stream valleys	Various soils	
<i>Fraxinus nigra</i>	Black Ash	8	FACW	Northern and Southern hardwood swamps	Prefers peat and muck soils, but can grow on sands and loams if the underlying layer is less permeable. Can tolerate a large range of pH	Susceptible to Emerald Ash Borer beetles; beetles bore through bark and eventually kill the tree. Beetles are spreading throughout Wisconsin.
<i>Fraxinus pennsylvanica</i>	Green Ash	2	FACW	Floodplain forests	Alluvial soils, pH neutral to slightly basic	Susceptible to Emerald Ash Borer beetles; beetles bore through bark and eventually kill the tree. Beetles are spreading throughout Wisconsin.
<i>Gymnocladus dioica</i>	Kentucky Coffee Tree	7	NA	Terraces above floodplain forests	Moist, but not saturated, alluvial soils of neutral or slightly basic pH	Special Concern; uncommon in floodplain forests in Southern Wisconsin
<i>Juglans cinerea</i>	Butternut	6	FACU	Stream banks, very rare	Loamy or alluvial soils, can grow on sandy soils if saturated	Special Concern; severely affected by butternut canker, which eventually kills the trees
<i>Larix laricina</i>	Tamarack	8	FACW	Northern wet forests, Southern tamarack swamps	Moist, well-drained soils (mainly sands and peat), ranges from very acidic pH to circumneutral	

Table 7: Desirable native tree species for wetland mitigation bank projects.

Scientific Name	Common Name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Morus rubra</i>	Red Mulberry	10	FACU	Floodplain forests in Southern Wisconsin, scattered distribution	Well-drained moist soils along rivers or streams	Invasive <i>Morus alba</i> (White Mulberry) looks similar, but leaf undersides are densely hairy over the entire surface in <i>Morus rubra</i>
<i>Nyssa sylvatica</i>	Black Gum	7	FAC	Swamp edges, Stream banks, Wet-mesic forests in Kenosha County	Well-drained alluvial soils	Special Concern - Found only in Kenosha County; climate change may expand range northward
<i>Picea mariana</i>	Black Spruce	8	FACW	Bogs, Northern wet to wet-mesic forests	Slightly to very acidic pH, often found on peat, especially Sphagnum moss	
<i>Pinus strobus</i>	Eastern White Pine	5	FACU	Found on mounds in swamps and floodplains	Can grow on sand, clay, and loam	Cannot tolerate prolonged inundation
<i>Platanus occidentalis</i>	Sycamore	8	FACW	Floodplain forests, stream banks, lake shores	Alluvial, sandy loam, or loam soils that have a high water table except during the growing season	Special Concern - Found in Southern Wisconsin; climate change may expand range northward
<i>Populus balsamifera</i>	Balsam Poplar	4	FACW	Swamps, floodplains, and stream banks of Northern Wisconsin	Mineral soils or alluvium, circumneutral pH	
<i>Quercus bicolor</i>	Swamp White Oak	7	FACW	Floodplain forests, Southern swamps	Variable, can be found on poorly-drained mineral or organic soils	

Table 7: Desirable native tree species for wetland mitigation bank projects.

Scientific Name	Common Name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Quercus macrocarpa</i>	Bur Oak	5	FACU <sup>1</sup> FAC <sup>2</sup>	Floodplain forests, Northern and Southern hardwood swamps	Found on calcareous soils derived from limestone, but also on sandy or gravelly substrates	
<i>Quercus palustris</i>	Northern Pin Oak	8	FACW	Bottomlands, swamp borders, floodplain forests in extreme southern Wisconsin	Variable, occurs on sandy to clay soils, and acidic to basic soils	Special Concern, tolerates saturated conditions in spring but not continuously saturated soils
<i>Salix amygdaloides</i>	Peach-Leaf Willow	4	FACW	Floodplain forests, stream banks	Alluvial soils, can tolerate sedimentation	
<i>Salix nigra</i>	Black Willow	4	OBL	Floodplain forests, Lakeshores, Shallow marshes	Moist sandy or silty alluvial soils	
<i>Thuja occidentalis</i>	Eastern White Cedar	9	FACW	Cedar swamps	Calcareous to moderately acidic peat substrates	Young Cedars are very susceptible to deer browsing
<i>Tilia americana</i>	American Basswood	5	FACU	Elevated portions of river floodplains	Alluvial soils	
<i>Ulmus americana</i>	American Elm	3	FACW	Floodplain forests, Northern and Southern hardwood swamps	Mineral soils, prefers calcareous loams	Susceptible to Dutch Elm disease, which eventually kills mature trees

Table compiled using the following resources: [Michigan Trees \(Revised Edition\)](#) (Barnes & Wagner, Jr. 2004); [Silvics of North America](#) (USDA 1990); [Trees and Shrubs of Minnesota](#) (Smith 2008); Wisconsin Natural Community Abstracts (Epstein *et al.* 2002 [WDNR]).

Table 7: Desirable native tree species for wetland mitigation bank projects. Trees are displayed alphabetically with mean C and wetland indicator status (if known). Several native tree species are purposefully omitted from this table because of their propensity to be extremely weedy. These are (in alphabetical order for Latin name): *Acer negundo*, *Betula papyrifera*, *Populus deltoides*, *Populus grandidentata*, *Populus tremuloides*. Wetland indicator status values are based on the 2013 USACE updates for the North Central/Northeast and Midwest regions.

<sup>1</sup> Wetland indicator for Northcentral/Northeast Region according to The National Wetland Plant List (Lichvar 2013)

<sup>2</sup> Wetland indicator for Midwest Region according to The National Wetland Plant List (Lichvar 2013)

Species with no footnote after the wetland indicator have the same wetland indicator for both regions.

Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	4	FACW	Alder thickets	Acidic soils	Capable of nitrogen fixation, thus conferring a competitive advantage on sandy sites with low nutrients
<i>Alnus viridis</i> ssp. <i>crispa</i>	American Green Alder	8	FAC	Lakeshores, stream banks, prefers drier habitats than Speckled Alder	Sandy or rocky nutrient-poor sandy soils	
<i>Amelanchier sanguinea</i>	Low Shadblow	7	UPL	Found on lakeshores and river banks	Usually sandy or loamy soils, but can be found on clay and peat soils	
<i>Amorpha fruticosa</i>	Desert Indigo-Bush	6	FACW	Open lakeshores, river banks, and shallow marshes in Southern and Western Wisconsin		Good for stabilizing sandy shores
<i>Andromeda polifolia</i>	Bog-Rosemary	10	OBL	Bogs, Black spruce and Tamarack swamps	Acidic substrate, grows on saturated Sphagnum moss	
<i>Aronia melanocarpa</i>	Black Chokeberry	7	FAC <sup>1</sup> FACW <sup>2</sup>	Tamarack swamps	Acidic, sandy soils	Does not compete well with Dogwoods, Willows

<sup>1</sup> Wetland indicator for Northcentral/Northeast Region according to The National Wetland Plant List (Lichvar 2013)

<sup>2</sup> Wetland indicator for Midwest Region according to The National Wetland Plant List (Lichvar 2013)

Species with no footnote after the wetland indicator have the same wetland indicator for both regions.

Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Betula pumila</i>	Bog Birch	7	OBL	Shrub-Carr wetlands, open-canopy Tamarack and Spruce swamps	Prefers calcareous to neutral pH	
<i>Cephalanthus occidentalis</i>	Button Bush	9	OBL	Floodplains, lakeshores, open wet habitats	Variable, but must be saturated	
<i>Chamaedaphne calyculata</i>	Leather-Leaf	9	OBL	Bogs, Muskegs, Black Spruce and Tamarack Swamps	Acidic, nutrient-poor, peat soils (usually Sphagnum spp.)	
<i>Cornus amomum</i>	Silky Dogwood	4	OBL	Shrub-Carr	Non-acidic soils, mostly loams	
<i>Cornus racemosa</i>	Gray Dogwood	2	FAC	Edges of Shrub-Carr wetlands, river floodplains	Sandy or loamy soil, does not tolerate flooding and sedimentation	Weedy species, can be extremely aggressive
<i>Cornus sericea</i> subsp. <i>sericea</i>	Red-Osier Dogwood	3	FACW	Shrub-Carr, swamps, lakeshores, river and stream banks	Cannot tolerate extremely acidic habitats, but otherwise is a generalist	
<i>Dasiphora fruticosa</i>	Shrubby Cinquefoil	9	FACW	Wet prairies, fens, seepage swamps	Calcareous substrates	Many cultivars are available - be sure to choose a native genotype
<i>Decodon verticillatus</i>	Swamp Loosestrife	7	OBL	Edges of deep marshes, Lake shores, grows in standing water	Ranges from very acidic to neutral substrates	

Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Dirca palustris</i>	Eastern Leatherwood	9	FAC	Understory shrub of damp mesic forests	Rocky, sandy, or loamy soil	Understory shrub of mature forests
<i>Euonymus atropurpureus</i>	Eastern Wahoo	7	FACU <sup>1</sup> FAC <sup>2</sup>	Stream banks, Floodplain forests	Alluvial soil, damp sandy soil	Burning-bush ( <i>Euonymus alatus</i> ) is commonly planted but not native. It tends to spread into natural areas and should be avoided.
<i>Hypericum kalmianum</i>	Kalm's St. John's-wort	9	FACW	Calcareous wet meadows, lake shores, and occasionally fens	Sandy or rocky calcareous soil	
<i>Ilex mucronata</i>	Cat-berry	8	OBL	Shrub-Carr, Alder thickets, and Tamarack and Black Spruce swamps	Acidic soils, peat or wet sand substrate	
<i>Ilex verticillata</i>	Common Winterberry	7	FACW	Mainly Shrub-Carr, Alder thickets, and Tamarack swamps. Can also be found on lake shores, marsh edges	Neutral to weakly acidic peat over sand	
<i>Kalmia polifolia</i>	Bog-Laurel	10	OBL	Bogs, poor fens, muskegs	Acidic sites on Sphagnum moss	

<sup>1</sup> Wetland indicator for Northcentral/Northeast Region according to The National Wetland Plant List (Lichvar 2013)

<sup>2</sup> Wetland indicator for Midwest Region according to The National Wetland Plant List (Lichvar 2013)

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Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Lonicera canadensis</i>	Fly Honeysuckle	8	FACU	Wet forests, Swamp forests	Acidic soils, peat or wet sand substrate	A shrub of mesic forest understories that sometimes occurs in wetlands
<i>Lonicera hirsuta</i>	Hairy Honeysuckle	7	FAC	Openings and edges of swamp forests	Often in sandy or rocky substrate, but also grows in peat	A low, scrambling shrub or liana
<i>Lonicera oblongifolia</i>	Swamp Fly Honeysuckle	9	OBL	Conifer swamps, Alder thickets, Shrub-Carr	Moderately acidic pH, wet peat or loam substrate	
<i>Lonicera villosa</i>	Mountain Fly Honeysuckle	10	FACW	Conifer swamps, Alder thickets, Shrub-Carr	Moderately acidic pH, wet peat or loam substrate	
<i>Myrica gale</i>	Sweet Gale	9	OBL	Lakeshores, occasionally Alder thickets, Shrub-Carr	Acidic, nutrient-poor wet substrates	Capable of nitrogen fixation, thus conferring a competitive advantage on sandy sites with low nutrients
<i>Physocarpus opulifolius</i>	Common Ninebark	6	FACW	River banks, lake shores	Sandy, gravelly, or rocky soils	Many cultivars are available - be sure to choose a native genotype
<i>Rhamnus alnifolia</i>	Alder Buckthorn	8	OBL	Conifer swamps, Wet forests, marshes	Weakly to moderately acidic soil, found on peat or mineral substrates	Two non-native buckthorns also occur in Wisconsin: <i>Rhamnus cathartica</i> (common buckthorn) and <i>Rhamnus frangula</i> (glossy buckthorn)

Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	Bogs, Conifer swamps, edges of Alder thickets	Found on Sphagnum moss or wet sand	
<i>Ribes americanum</i>	American Black Currant	4	FACW	Lakeshores, Riverbanks, marshes	Moderately acidic to basic soils; can grow in sand, silt, loam, and peat substrates	
<i>Ribes glandulosum</i>	Skunk Currant	7	FACW	Conifer bogs and swamps in northern Wisconsin	Weakly to moderately acidic soil, found on moist peat or humus	"Fruits taste much like a skunk smells" - Trees and Shrubs of Minnesota
<i>Ribes hirtellum</i>	Hairy-Stem Gooseberry	6	FACW	Tamarack swamps, Shrub-Carr, lakeshores	Weakly to moderately acidic soil, found on moist peat or humus	
<i>Ribes hudsonianum</i>	Canadian Black Currant	10	OBL	Tamarack or Cedar swamps in northern Wisconsin	Peat soil	
<i>Ribes lacustre</i>	Bristly Black Currant	9	FACW	Conifer swamps (Tamarack, Cedar, Black Spruce)	Peat soil	
<i>Ribes triste</i>	Swamp Red Currant	8	OBL	Conifer swamps, especially Tamarack swamps, Hardwood swamps	Moderately acidic peaty soils	
<i>Rosa palustris</i>	Swamp Rose	7	OBL	Lakeshores, marshes, swamps	Slightly acidic, wet peaty soils	

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Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Rubus arcticus</i>	Arctic Raspberry	NA	FACW	Cold conifer swamps in Ashland County	Acidic Sphagnum moss	Rare, small raspberry only found in Ashland County in Wisconsin
<i>Rubus hispidus</i>	Swamp Dewberry	4	FACW	Swamps, peatlands	Grows in acidic peat, also wet sand and wet sandy shores	
<i>Rubus idaeus var. strigosus</i>	American red raspberry	3	FACU	Variable, found in many open wetland habitats	Variable, can grow in sand, loam, rocks, or peat and ranges from circumneutral to acidic	
<i>Rubus pubescens</i>	Dwarf Raspberry	7	FACW	Cedar swamps, fens	Sand, loam, or peat; pH ranges from weakly acidic to slightly basic	
<i>Salix bebbiana</i>	Beaked Willow	7	FACW	Shrub-Carr, Alder thickets, Stream banks, Swamps	Can tolerate almost any wetland condition except for very acidic pH and sedimentation	
<i>Salix candida</i>	Sage-Leaved Willow	10	OBL	Peatlands, fens, minerotrophic conifer swamps	Calcareous or circumneutral substrate	

Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Salix discolor</i>	Pussy Willow	2	FACW	Shrub-Carr, Alder thickets, Conifer swamps, Hardwood Swamps, Riverbanks, Lake shores	Variable, can grow in calcareous to acidic pH (absent from extreme acidic conditions), grows in both mineral and peat soils	
<i>Salix eriocephala</i>	Diamond Willow	4	FACW	Floodplains, lakeshores, open wet habitats	Prefers wet loamy soils, but can be found in sand, silt, clay, or thin peat; does not grow in extremely acidic bogs	
<i>Salix interior</i>	Sandbar Willow	2	FACW	Variable, found in floodplains, river banks, sandbars, lake shores, and shallow marshes	Mineral soils, usually sand, silt, or loam	
<i>Salix lucida</i>	Shining Willow	5	FACW	Lakeshores, Shrub-Carr, Alder thickets, Riverbanks	Slightly basic to moderately acidic pH, does not tolerate sedimentation	
<i>Salix myricoides</i>	Bayberry Willow	8	FACW	Lakeshores, Calcareous swamps	Calcareous substrates; sandy, gravelly, or alluvial soils	
<i>Salix pedicellaris</i>	Bog Willow	8	OBL	Shrub-Carr, Conifer swamps	Moderately acidic pH, Sphagnum substrate	

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Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Salix petiolaris</i>	Meadow Willow	6	FACW <sup>1</sup> OBL <sup>2</sup>	Shrub-Carr, Riverbanks, Lakeshores	Peat or wet loamy soils, pH ranges from calcareous to moderately acidic, cannot tolerate sedimentation	
<i>Salix pyrifolia</i>	Balsam Willow	7	FACW	Conifer swamps, especially Tamarack and Black Spruce Swamps, Shrub-Carr	Wet, acidic peat soils	
<i>Salix sericea</i>	Silky Willow	10	OBL	Stream banks	Moist rocky soils	Special Concern
<i>Salix serissima</i>	Autumn Willow	8	OBL	Fens, Conifer swamps, Shrub-Carr	Weakly acidic to circumneutral pH, can tolerate strongly basic conditions; peat or sometimes wet mineral soils	
<i>Sambucus nigra</i> subsp. <i>canadensis</i>	Elderberry	3	FACW	Floodplains, Marsh edges, Streambanks	Calcareous to circumneutral silt, loam, or peat	
<i>Spiraea alba</i>	White meadowsweet	4	FACW	Shrub-Carr, Shallow marshes, Lakeshores	Weakly acidic to somewhat basic pH, shallow peat or wet mineral soil	

<sup>1</sup> Wetland indicator for Northcentral/Northeast Region according to The National Wetland Plant List (Lichvar 2013)

<sup>2</sup> Wetland indicator for Midwest Region according to The National Wetland Plant List (Lichvar 2013)

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Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Spiraea tomentosa</i>	Steeplebush	6	FACW	Openings in Tamarack swamps, Shrub-Carr, Alder thickets	Acidic habitats, in peat or wet sandy soils	
<i>Staphylea trifolia</i>	American Bladdernut	7	FAC	Floodplain forests	Tolerates sedimentation	Understory shrub or small tree of mature forests
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	Bogs	Strongly to weakly acidic Sphagnum peat	
<i>Vaccinium corymbosum</i>	High-bush Blueberry	10	FACW	Swamps, wet woodlands, borders of bogs	Wet sand or peat	Commerce blueberry; be sure to select a native, non-cultivar source
<i>Vaccinium macrocarpon</i>	Large Cranberry	9	OBL	Tamarack swamps, floating sedge mats	Moderately acidic Sphagnum peat	Commerce cranberry; be sure to select a native, non-cultivar source
<i>Vaccinium myrtilloides</i>	Velvet-leaf Blueberry	6	FACW	Bogs and Conifer swamps	Low-nutrient acidic Sphagnum peat	
<i>Vaccinium oxycoccos</i>	Small Cranberry	9	OBL	Bogs, Black spruce and Tamarack swamps, Muskegs	Very acidic Sphagnum peat	
<i>Viburnum lentago</i>	Nannyberry	4	FAC	Lakeshores, Riverbanks, Floodplains, Pond margins	Mineral soils or sometime shallow peat	

Table 8: Desirable native shrub species for wetland mitigation bank projects.

Scientific name	Common name	Coefficient of Conservatism	Wetland Indicator	Wetland Habitat Preference	Soil Preference	Notes
<i>Viburnum opulus ssp. trilobum</i>	American Cranberry-Bush	6	FACW <sup>1</sup> FAC <sup>2</sup>	Hardwood and Coniferous swamps, Shrub-Carr, Lakeshores, Riverbanks and Stream banks		Subspecies <i>opulus</i> is a non-native invasive
<i>Zanthoxylum americanum</i>	Prickly-Ash	3	FACU	Floodplains	Non-acidic loamy, sandy, or alluvial soils	

Table compiled using the following resources: [Michigan Flora Online](#) (Reznicek *et al.* 2011); [Shrubs of Ontario](#) (Soper & Heimburger 1982); [Trees and Shrubs of Minnesota](#) (Smith, 2008).

Table 8: Desirable native shrub species for wetland mitigation bank projects. Shrubs are displayed alphabetically with mean C and wetland indicator status (if known). Wetland indicator status values are based on the 2013 USACE updates for the North Central/Northeast and Midwest regions.

<sup>1</sup> Wetland indicator for Northcentral/Northeast Region according to The National Wetland Plant List (Lichvar 2013)

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