US Army Corps of Engineers®
St. Paul District

Public Notice

ISSUED: January 23, 2009

REFER TO: 2007-1101-SDE

FINAL
ST. PAUL DISTRICT POLICY FOR WETLAND COMPENSATORY MITIGATION IN MINNESOTA

1. St. Paul District of the U.S. Army Corps of Engineers has finalized its mitigation policy for Minnesota following four years of coordination that included the Minnesota Interagency Wetlands Group, the Minnesota Board of Water and Soil Resources (BWSR), and a public notice comment period in March/April 2007. St. Paul District worked closely with BWSR to reduce the number of differences between compensatory mitigation required for Clean Water Act purposes and that required for Minnesota's Wetland Conservation Act of 1991. This effort towards regulatory simplification led to a Memorandum of Understanding signed by St. Paul District and BWSR in May 2007. The MOU served as a guiding principle for development of the final St. Paul District policy.

The Mitigation Rule published in the Federal Register on April 10, 2008, specifies federal requirements for wetland compensatory mitigation. It has been incorporated and referenced throughout the St. Paul District policy.

2. The St. Paul District policy can be viewed at:

http://www.mvp.usace.army.mil/regulatory/

Click on "Public Notices – Minnesota," and then click "Minnesota Special Notices."

3. Questions on the St. Paul District policy can be directed to:

Steve Eggers
Senior Ecologist
(651) 290-5371
steve.d.eggers@usace.army.mil

CEMVP-CO-R
SUBJECT: Final Wetland Compensatory Mitigation Policy for Minnesota

FOR THE DISTRICT ENGINEER:

Robert J. Whiting
Chief, Regulatory Branch

US Army Corps of Engineers ®
St. Paul District

St. Paul District Policy For Wetland Compensatory Mitigation In Minnesota

January 2009

Executive Summary

The purpose of this policy document is to serve as guidance for Project Managers in the Regulatory Branch of the St. Paul District, U.S. Army Corps of Engineers (Corps). It is necessary to establish a consistent approach for addressing issues such as ratios, crediting, debiting, bank service areas and banking procedures.

A major emphasis of the policy is a **watershed approach** to compensatory mitigation as described in the final Mitigation Rule (33 CFR 332) published in the Federal Register on April 10, 2008. Where practicable and appropriate, the Corps 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 Corps-approved approach is not practicable, the Corps 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. A preference for mitigation banking is stated by the Mitigation Rule.

The Mitigation Rule and Corps guidance specify the fundamental objective of compensatory mitigation for purposes of the Corps regulatory program. That goal is to achieve, at a minimum, 1:1 functional replacement (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 1:1 acreage replacement may be used as a reasonable surrogate for no net loss of wetland functions. Wetland compensation can be accomplished by project-specific compensation and/or by purchase of credits from a Corps-approved mitigation bank. Due to the current lack of a suitable quantitative functional assessment method for Minnesota, this policy employs acreage surrogates to determine compensation requirements.

Three key factors determine the amount of wetland compensatory mitigation required: in-advance vs. concurrent; in-kind vs. out-of-kind; and in-place vs. not in-place. These terms are defined in Section II.B. Compensatory mitigation that is in-advance, in-kind and in-place has the greatest likelihood of replacing those wetland functions lost due to authorized projects; therefore, the compensation ratio is the lowest. Out-of-kind, not in-advance and/or not in-place compensation does not qualify for incentives to lower compensation ratios due to the difference between functions of the impact site and those of the compensation site.

Crediting for restoration, creation, enhancement, preservation and upland buffers is discussed in Section III. One total of wetland credits, including upland buffers, is determined for each project-specific or bank site. Minimum average widths for upland buffers are 50 feet in non-municipal areas and 25 feet in municipal areas.

Eleven bank service areas are established in Minnesota based on watersheds. The first goal is to replace lost wetland functions as close as possible within the same bank service area as that of the impact site. Bank credits in a different bank service area can be purchased if there are no practicable bank credits in the bank service area of the impact site, but the compensation ratio would be higher. Exceptions can be made in specific cases as described in Section II.D.

Federal procedures for mitigation banking involve an Interagency Review Team (IRT) and approval of a prospectus, compensation site plan and mitigation banking instrument. A public notice will be published for each new bank site. Final approval will require a signed banking instrument between the bank sponsor and the Corps (other IRT members have the option to sign). A compensation site that would generate 5 wetland compensation credits is the minimum size for a Corps-approved bank site (acres will vary depending upon crediting). A minimum size is necessary due to the: (1) higher functional levels and

greater resiliency of large sites compared to small, scattered sites; and (2) level of review and commitment of resources required for the Federal banking process.

An important distinction made by the policy is between that area of the state with more than 80 percent of its pre-European settlement wetland acreage remaining as opposed to that area with less than 80 percent remaining. Major differences exist regarding opportunities and types of compensation. Compensation ratios are adjusted accordingly. The base compensation ratio in the greater than 80 percent area is 1.5:1 while the base ratio in the less than 80 percent area is 2.5:1. Incentives for in-kind, in-place and in-advance can reduce these ratios to 1:1 (greater than 80 percent area) and 2:1 (less than 80 percent area).

TABLE OF CONTENTS

Appendix A: MOU Signed by Corps and BWSR May 2007
Appendix B: Comments on Corps Public Notice March 14, 2007
Appendix C: Compensatory Mitigation Plan Checklist
Appendix D: National Academy of Sciences Guidelines for Compensatory Mitigation
Appendix E: Upland Buffer Size in Relation to Wetland Size

List of Acronyms and Definitions

BSA – bank service area
BWSR – Minnesota Board of Water and Soil Resources
CFR – Code of Federal Regulations
Compensation site – location of either project-specific compensation or bank site credits
Corps – U.S. Army Corps of Engineers
EPA – U.S. Environmental Protection Agency
ERDC – U.S. Army Engineer Research and Development Center, Vicksburg, MS
FQA – Floristic Quality Assessment
FWS – U.S. Fish and Wildlife Service
Greater than 80 percent area – Portion of northeast and north central Minnesota with greater than 80 percent of its pre-European settlement wetland acreage remaining
HGM – Hydrogeomorphic Classification System
HUC – Hydrologic Unit Code
IRT – Interagency Review Team (for Federal banking process)
Less that 80 percent area – Portion of Minnesota with less than 80 percent of its pre-European settlement wetland acreage remaining
Mitigation Rule – refers to 33 CFR Parts 325 and 332, and 40 CFR Part 230, published in the Federal Register on April 10, 2008
MnDNR – Minnesota Department of Natural Resources
MnDOT – Minnesota Department of Transportation
MnRAM – Minnesota Routine Assessment Method for Evaluating Wetland Functions (most current version)
MOU – Memorandum of Understanding
Project-specific compensation – permittee-responsible compensation
PVC – Public value credit (WCA provisions)
RGL – Regulatory Guidance Letter from Corps Headquarters
Section 10 – Rivers and Harbors Act of 1899
Section 404 – Clean Water Act
TEP – Technical Evaluation Panel (WCA provisions)
USGS – U.S. Geological Survey
WCA – Minnesota Wetland Conservation Act of 1991

I. Introduction

A. Purpose

The purpose of this policy document is to provide guidance for Project Managers in the Regulatory Branch of the St. Paul District, U.S. Army Corps of Engineers (Corps). It is necessary to establish a consistent approach for addressing issues such as ratios, crediting, debiting, bank service areas, banking procedures and other important components. Project Managers have the discretion, on a case-by-case basis, to make a departure from this guidance provided it is sufficiently documented and approved by the Section Chief/Branch Chief. In particular, matching functions lost with the same type and level of functions at a compensation site calls for the exercise of professional judgment on the part of the Corps Project Manager.

It is important to place compensatory mitigation as the third step in the sequencing approach of the Corps and the U.S. Environmental Protection Agency (EPA). The district engineer will issue a Department of the Army permit only upon a determination that the permit applicant has taken all appropriate and practicable[1] steps to first avoid, then minimize, and lastly compensate, for adverse impacts to wetland/aquatic resources.

Our efforts will focus on enforceable permit conditions, specific performance standards, adequate monitoring, adaptive management, and sufficient legal protection, to achieve the highest degree of success for compensatory mitigation under the Corps regulatory program.

B. Mitigation Rule

On April 10, 2008, the final Mitigation Rule on compensatory mitigation for losses of wetland/aquatic resources was published in the Federal Register (33 CFR Parts 325 and 332, and 40 CFR Part 230). It specifies the fundamental objective of compensatory mitigation for purposes of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (Section 10/404) – offsetting the wetland/aquatic functions unavoidably lost due to authorized impacts (§ 332.3(a)). In general, the required compensatory mitigation should be located in the same watershed as the impact site, and should be located where it is most likely to successfully replace lost wetland/aquatic functions (§ 332.3(b)). A preference for in-kind (similar wetland/aquatic resource type) compensation is stated (§ 332.3(e)).

1. Watershed Approach. A guiding principle of the Mitigation Rule is the watershed approach to compensatory mitigation (§ 332.3(c)). It uses a landscape perspective that places primary emphasis on site selection, through consideration of landscape attributes that will help provide the desired wetland/ aquatic resource types and ensure that they are self-sustaining. Corps district engineers 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/aquatic resources within watersheds through strategic selection of compensatory mitigation sites.

[1] "Practicable" is defined as available and capable of being done after taking into consideration costs, logistics and existing technology in light of overall project purposes (40 CFR 230.3).

A watershed approach considers the importance of landscape position and resource type of compensatory mitigation projects for the sustainability of wetland/aquatic resource function within the watershed. Such an approach considers how the types and locations of compensatory mitigation projects will provide the desired wetland/aquatic resource functions and 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 programs that affect the watershed such as stormwater 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 wetland/aquatic 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 (§ 332.3(c)).

A watershed approach may include on-site compensatory mitigation, off-site compensatory mitigation (including mitigation banks), or a combination of on-site and off-site (§ 332.3(c)).

2. Watershed Scale (§ 332.3(c)). In recognition of the great variability of watershed sizes and conditions throughout the country, the Mitigation Rule does not specify a mandatory watershed size for implementing a watershed approach. The decision on watershed size is best made using a case-by-case analysis based on the factors discussed in 1 above.

St. Paul District policy utilizes the following watershed sizes based on USGS Hydrologic Unit Codes (HUC): 4-digit HUC (4 in Minnesota), 6-digit HUC (10 in Minnesota), 8-digit HUC (81 in Minnesota) and 10-digit HUC (5,600 in Minnesota). For example, modified 6-digit HUC watersheds are used for defining bank service areas[2] while 4- through 10-digit HUC watersheds are referenced in the siting sequence for locating project-specific compensation. Figure 1 illustrates the 4-digit HUC watersheds while Figure 2 illustrates modified 6-digit and 8-digit HUC watersheds in Minnesota.

3. Watershed Plans (§ 332.2). A watershed plan is a plan developed by federal, tribal, state, and/or local government agencies or appropriate non-governmental organizations, in consultation with relevant stakeholders, for the specific goal of aquatic resource restoration, establishment, enhancement, and preservation. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans may also identify priority sites for aquatic resource restoration and protection. Examples of watershed plans include special area management plans, advance identification programs, and wetland management plans.

4. In the Absence of a Watershed Approach. Where a Corps-approved watershed approach is not available and/or practicable, the Corps will consider opportunities to offset unavoidable adverse impacts by requiring timely on-site and in-kind compensatory mitigation (§ 332.3(b)). If this is not practicable, off-site and/or out-of-kind compensation will be considered.

5. Preference for Mitigation Banking. The Mitigation Rule specifies a preference for mitigation banking over project-specific compensation (§ 332.3(b)(2)). An approved banking instrument – including an approved compensation site plan, appropriate real estate agreements and financial assurances – is required to be in place before credits can be used to compensate for authorized impacts. Use of mitigation banks can reduce risk and uncertainty, as well as temporal losses of wetland/aquatic functions. Mitigation banks typically involve larger tracts of wetlands/uplands/riparian corridors that are

[2] An exception is the bank service area for the Twin Cities Metropolitan Area. It employs watersheds as a basis but varies from the 6-digit HUC watershed boundaries.

more ecologically diverse and resilient than the typical project-specific compensation. Banking procedures establish an Interagency Review Team thereby bringing greater scrutiny and scientific review to bank site proposals. Additionally, bank sponsors have a substantial financial stake in ensuring that a bank site is successful. See Section V. Requirements for Mitigation Banking for further guidance.

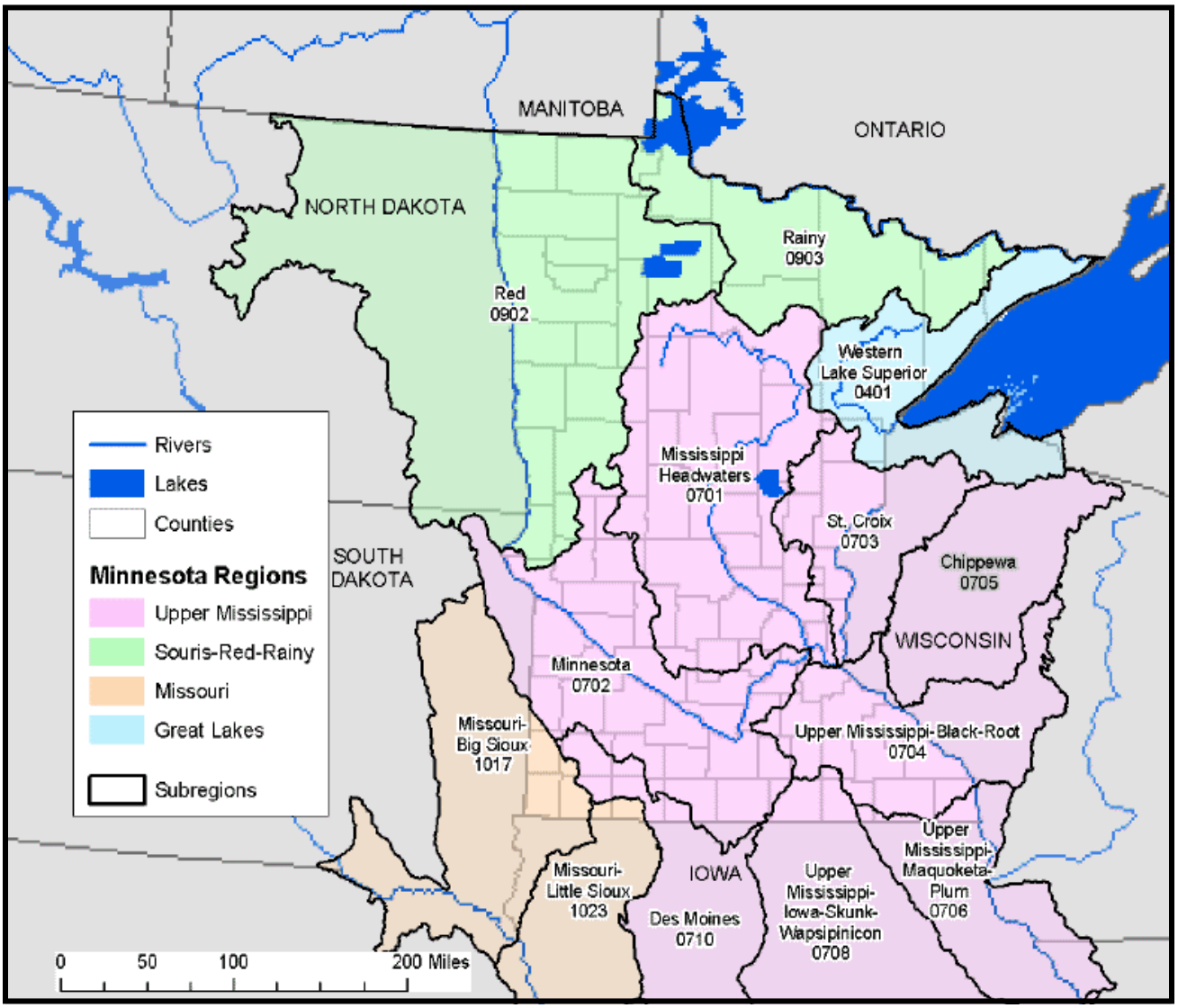
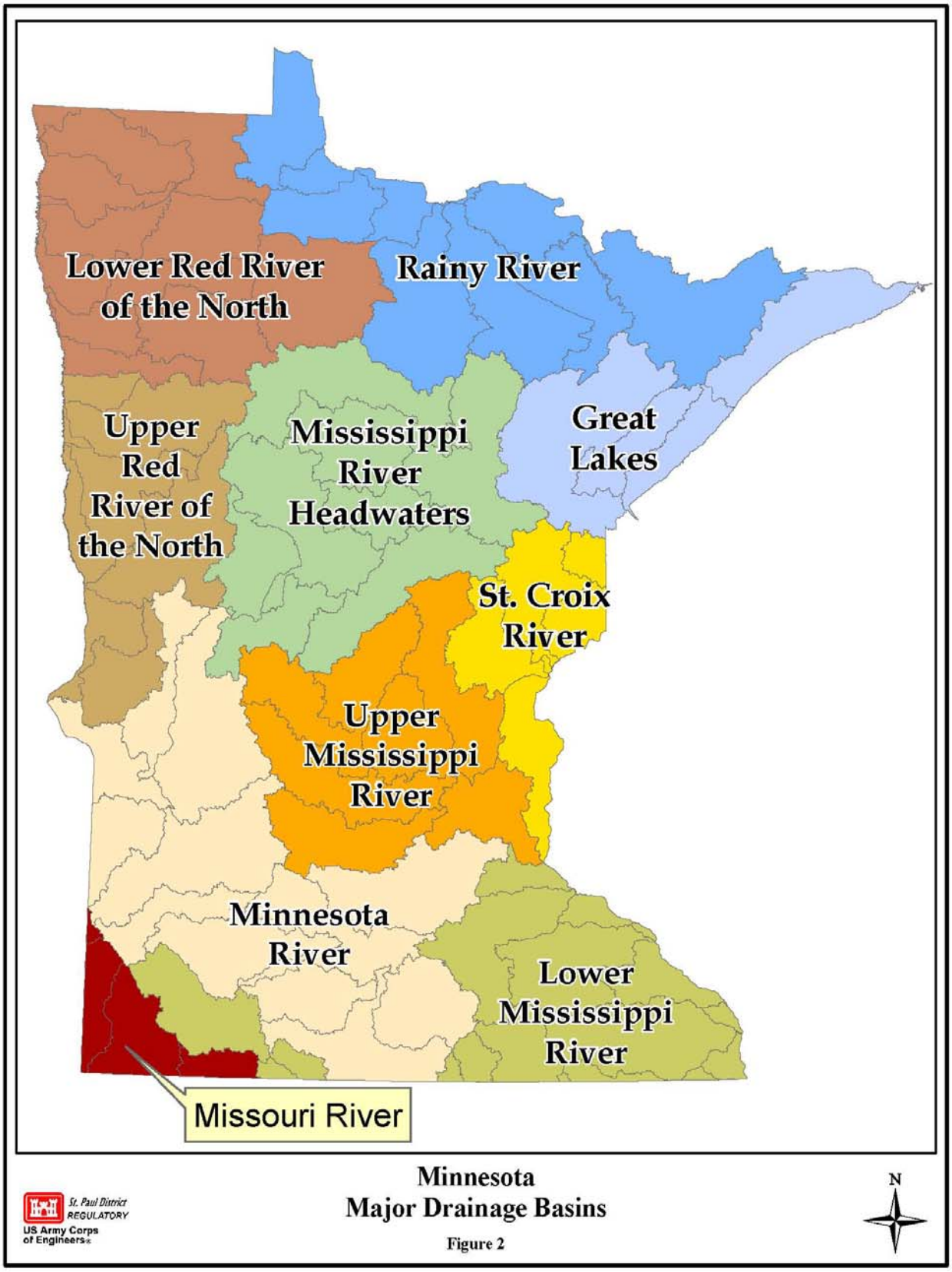


Figure 1
4-Digit HUC Watersheds


Lower Red River of the North
Rainy River
Upper Red River of the North
Mississippi River Headwaters
Great Lakes
St. Croix River
Upper Mississippi River
Minnesota River
Lower Mississippi River
Missouri River
St. Paul District REGULATORY
US Army Corps of Engineers
Minnesota
Major Drainage Basins
Figure 2
N

C. Coordination with Stakeholders 2004-2008

1. Stakeholder Meetings. During the past four years, the Corps worked with the Minnesota Interagency Wetlands Group, and the Minnesota Board of Water and Soil Resources (BWSR), to minimize differences between compensatory mitigation required by the Corps regulatory program and that required by the Minnesota Wetland Conservation Act of 1991 (WCA). Numerous proposals were developed and debated with a goal of regulatory simplification.

2. Memorandum of Understanding with the State. A memorandum of understanding (MOU) between BWSR and the St. Paul District, signed in May 2007 (Appendix A), resolved many key issues during the stakeholder process. From that point through 2008, the MOU served as a guiding principle for agencies and stakeholders as BWSR went through the rule-making process for WCA, and St. Paul District developed its mitigation policy. An important point is that the same compensation ratios and bank service areas were adopted for both state and federal regulatory programs. Ultimately, some differences between WCA and Section 10/404 compensation requirements could not be resolved, such as the amount of credit for upland buffers and use of wetland preservation. Continued coordination and cooperation between St. Paul District and BWSR will strive to implement regulatory simplification to the extent practicable.

The MOU is included as an appendix to this policy because it was a key document guiding the development of both state rule and Corps policy. Modifications/changes to some factors in the MOU were made for the final Corps mitigation policy.

3. Public Notice. A public notice soliciting comments on the draft St. Paul District mitigation policy for Minnesota was issued on March 14, 2007. Twenty-three responses were received including those from nine agencies, four landowners, two wetland consulting firms, two mitigation banking organizations, two Native American tribes or authorities, and two environmental groups. Major issues and the Corps responses are incorporated as part of this policy (Appendix B).

4. Northeastern Minnesota Wetland Management Strategy. Another ongoing effort related to compensatory mitigation in Minnesota is the *Northeastern Minnesota Wetland Management Strategy* (*Strategy*). Originally, it was an ad hoc study addressing the lack of traditional compensatory mitigation opportunities within 18 counties in the northeastern part of the state (greater than 80 percent area, Figure 3). It is now a BWSR effort in its first phase of conducting an inventory of compensation opportunities. The Corps views the *Strategy* as a planning tool that will provide important information for identifying compensation options for the mining industry, which is planning large-scale projects impacting wetlands, as well as the transportation industry. In particular, the recommended actions of developing a cooperative mining mitigation bank, conducting a northeast wetland mitigation inventory and conducting a regional mitigation siting study, are excellent ideas that should provide valuable information and expedite future permit decisions. It is important to acknowledge that the *Strategy* is not a policy vehicle for the Corps nor does it determine the compensatory mitigation requirements of future permit decisions. The Corps does not intend to use the *Strategy* or any of its products in this matter. We do intend to fully consider the information that may be generated from this effort.

D. Policy Approach for Greater Than 80 Percent Area of Minnesota

This policy, as does Minnesota's Wetland Conservation Act, applies special considerations for that portion of Minnesota where more than 80 percent of the pre-European settlement wetlands remain (Figure 3). Portions of this region are wetland-rich to the extent that upland habitats are at a premium. Large wetland complexes remain in a high quality condition offering few opportunities for restoration or enhancement. Extensive ditch systems exist in some peatlands and restoration of hydrology should be vigorously pursued; however, implementing this approach on a large scale has problems that need to be

solved. Preservation of high quality wetlands is an option and may provide the optimum approach for compensation by preventing future degradation of high quality wetland/aquatic resources. However, to date this option has not been implemented on more than a small scale and has issues that need to be resolved.

In contrast, the less than 80 percent area of Minnesota has abundant opportunities for wetland compensation given the extent of ditched, tiled and/or farmed hydric soils and degraded wetlands. Former or degraded wetlands in urban areas offer similar opportunities for wetland compensation.

Therefore, this policy adopts the following special considerations for the greater than 80 percent area: (1) a reduction in the base compensation ratio from 2.5:1 to 1.5:1; (2) a minimum compensation ratio of 1:1 as opposed to 2:1; and (3) an expanded bank service area for impacts in the Great Lakes Basin (Bank Service Area 1).

E. Process

This policy will be periodically updated and amended as necessary.

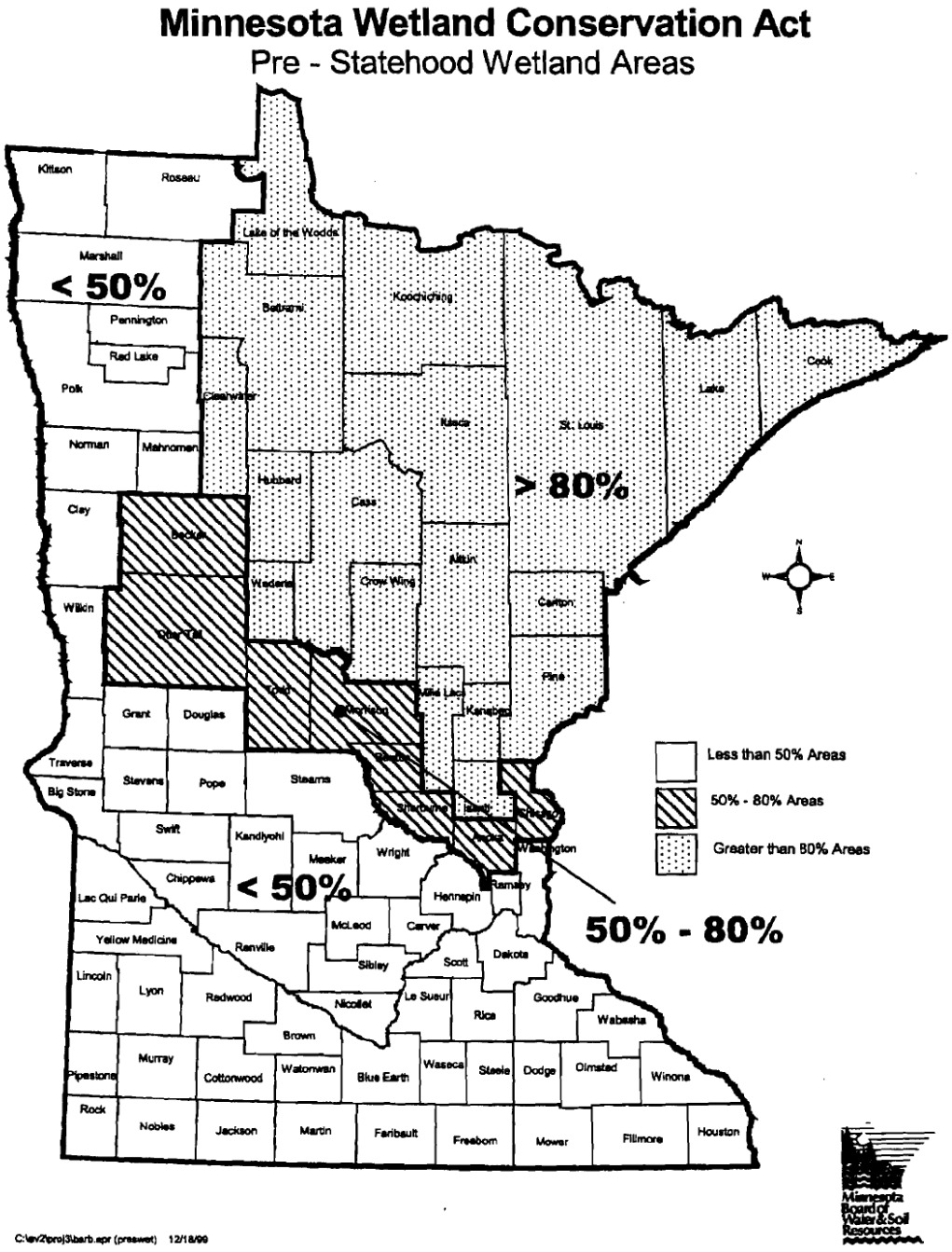


FIGURE 3
Percent of Pre-European Settlement Wetland Acreage Remaining

II. Compensation Required To Offset Adverse Impacts

A. General Compensatory Mitigation Requirements (§ 332.3)

The Corps must determine the compensatory mitigation required based upon what is available, practicable, and capable of compensating for the wetland/aquatic resource functions lost as a result of an activity authorized by a Department of the Army permit. Compensatory mitigation requirements must be commensurate with the amount and type of impact associated with the authorized activity (§ 332.3(a)). Further, all compensation must be directly related to the impacts of the authorized project (33 CFR § 320.4(r)).

B. Types of Compensatory Mitigation

1. Project-Specific Compensation. The permittee, or an authorized agent or contractor of the permittee, retains full responsibility to provide wetland/aquatic resource restoration, creation, enhancement and/or preservation (§ 322.2). Compensation may be provided on-site and/or off-site in relation to the permitted impact area.

2. Mitigation Banking. A site, or suite of sites, where wetland/aquatic resources have been restored, created, enhanced and/or preserved in advance of impacts authorized by Department of the Army permits (§ 322.2). A mitigation bank may be established for a single user (e.g., department of transportation), or as an entrepreneurial venture that sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor.

Eleven bank service areas in Minnesota are based on modified 6-digit HUC watersheds. Each 6-digit modified HUC watershed includes 4 to 15 of the 8-digit HUC watersheds. A special bank service area is adopted to compensate for wetland impacts that occur within the 7-county Twin Cities metropolitan area.

3. In-Lieu Fee. No in-lieu fee programs currently exist or are planned in Minnesota.

C. Preferential Sequencing of Mitigation Rule

The Mitigation Rule specifies the following preferential sequence for compensatory mitigation (§ 332.3(b)):

1. First, use mitigation banking credits;
2. Second, use project-specific compensation that is based on a watershed approach;
3. Third, use project-specific compensation that is on-site and in-kind; and
4. Fourth, use project-specific compensation that is off-site and/or out-of-kind.

D. Factors Determining Compensatory Mitigation Requirements

This policy incorporates the following three factors to determine compensatory mitigation requirements: (1) on-site vs. off-site; (2) in-advance vs. concurrent; and (3) in-kind vs. out-of-kind.

1. On-Site vs. Off-Site. This factor is applied differently for project-specific compensation versus mitigation banking; therefore, it will be discussed separately under the headings for those two compensation types.

2. In-Advance vs. Concurrent. In-advance is defined as: (1) Corps-approved bank credits; or (2) project-specific compensation sites that have established hydrology and initial vegetation (herbaceous cover crop, seedlings of planted species). 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. Success criteria/performance standards applicable at that development stage of the compensation site must be met to qualify as "in-advance."

3. In-Kind vs. Out-of-Kind. 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, or produce cranberries, 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 Mitigation Rule defines "in-kind" compensation as a resource of a similar structural and functional type to the impacted resource (§ 332.2). In general, in-kind compensation is preferable to out-of-kind compensation because it is most likely to compensate for the functions lost at the impact site (§ 332.3(e)). This preference for in-kind compensation is reinforced in the Mitigation Rule where it states that the required compensation shall be of a similar type as that of the impacted wetland/aquatic resource (§ 332.3(e)).

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 this policy, the 12 wetland plant community types modified from Eggers and Reed (1997) will be used for the in-kind determination (Table 1). Compensation that is not the same wetland plant community is out-of-kind.

Corps Project Managers can also consider hydrogeomorphic (HGM) classifications (e.g., depressional, slope, flat, lacustrine fringe, riverine fringe) when considering the in-kind factor. Combining the wetland plant community and HGM class provides a simple yet comprehensive way to address wetland "type."

a. Functional Assessment Methods. The goal of compensatory mitigation is to offset the loss of wetland/aquatic resource functions due to authorized impacts (§ 332.3). In cases where functional assessment methods are available, appropriate and practical to use, the Corps should use those methods to determine the amount of compensation required (§ 332.3(f)). A comparison of the wetland/aquatic resource functions provided by the impact site versus those of the compensation site can be applied to confirm that functions are replaced in-kind. However, an acreage surrogate will be the approach applied in Minnesota due to the lack of a suitable functional assessment method that quantifies compensation requirements. Nonetheless, functional assessments can play an important role in the final determination of compensatory mitigation requirements as discussed in the following paragraphs.

First, it is important to differentiate "functions" from "values." Functions are what the wetland actually does, e.g., detains floodwaters, provides habitat, and assimilates nutrients. These can be measured (e.g., acre-feet of floodwater storage, plant species richness, rate of sediment deposition, uptake of phosphorus in pounds/acre/year). Values are human perceptions, which vary from individual to individual. For purposes of compensatory mitigation, the focus is on functions. The Mitigation Rule specifically eliminated use of the term "values" (preamble, page 19604).

TABLE 1

Wetland Plant Community Types*	Classification of Wetlands and Deepwater Habitats of the United States (Cowardin *et al.* 1979)	Fish and Wildlife Service Circular 39 (Shaw and Fredine 1971)
Shallow, Open Water	Palustrine or lacustrine, littoral; aquatic bed; submergent, floating, and floating-leaved	Type 5: Inland open fresh water
Deep Marsh	Palustrine or lacustrine, littoral; aquatic bed; submergent, floating, and floating-leaved; and emergent; persistent and nonpersistent	Type 4: Inland deep fresh marsh
Shallow Marsh	Palustrine; emergent; persistent and nonpersistent	Type 3: Inland shallow fresh Marsh
Sedge Meadow	Palustrine, emergent; narrow-leaved persistent	Type 2: Inland fresh meadow
Fresh (Wet) Meadow	Palustrine; emergent; broad- and narrow-leaved persistent	Type 1: Seasonally flooded basin or flat; Type 2: Inland fresh meadow
Wet to Wet-Mesic Prairie	Palustrine; emergent; broad- and narrow-leaved persistent	Type 1: Seasonally flooded basin or flat; Type 2: Inland fresh meadow
Calcareous Fen	Palustrine; emergent; narrow-leaved persistent; and scrub/shrub, broad-leaved deciduous	Type 2: Inland fresh meadow Type 6: Shrub swamp
Open Bog or Coniferous Bog	Palustrine; moss/lichen; and scrub/shrub; broad-leaved evergreen; and forested; needle-leaved evergreen and deciduous	Type 8: Bog
Shrub-Carr or Alder Thicket	Palustrine; scrub/shrub; broad-leaved deciduous	Type 6: Shrub swamp
Hardwood Swamp or Coniferous Swamp	Palustrine; forested; broad-leaved deciduous; needle-leaved evergreen and deciduous	Type 7: Wooded swamp
Floodplain Forest	Palustrine; forested; broad-leaved deciduous	Type 1: Seasonally flooded basin Or flat
Seasonally Flooded Basin	Palustrine; flat; emergent; persistent and nonpersistent	Type 1: Seasonally flooded basin or flat

* Plant communities are based on: S. Eggers and D. Reed. 1997. *Wetland Plants and Plant Communities of Minnesota and Wisconsin. Second Edition.* St. Paul District, U.S. Army Corps of Engineers. 264 pp.

(1) Hydrogeomorphic Functional Assessment Method (HGM). Brinson (1996)[3] describes how HGM can be used to determine compensatory mitigation based on a comparison of the functional levels of a wetland proposed to be impacted and the compensation intended to offset those adverse impacts. One HGM guidebook addressing temporary and seasonal prairie potholes is currently applicable to Minnesota.[4] It cannot be used across wetland types so its use is limited to these specific prairie wetlands. An HGM guidebook addressing organic flats in Minnesota and Wisconsin is in preparation.

(2) *Minnesota Routine Assessment Method for Evaluating Wetland Functions* (most current version) (MnRAM). MnRAM is a qualitative approach to identifying wetland functions. Because the input is qualitative the output is qualitative. Therefore, MnRAM results should not be used to quantify impacts or compensation. Experimental cases using MnRAM to compare pre- and post-project conditions showed that it was not sensitive enough for quantifying compensatory mitigation. Major changes (e.g., natural hydrology vs. hydrology altered by a ditch system) resulted in small differences in the ratings that were not useful for quantifying pre- and post-conditions. Therefore, the Corps will not accept such comparisons for purposes of determining compensatory mitigation requirements.

The numeric ratings generated by MnRAM have more to do with standardized formulas to achieve consistency among users as opposed to scientific quantification of data. The numeric ratings should be viewed as placeholders for the general rating categories of exceptional, high, medium and low. In no case should the MnRAM functional ratings be summed or averaged because blending the ratings for disparate functions results in a homogenized "score" that is misleading if not meaningless. The same is true for summing or averaging the ratings of multiple wetlands. MnRAM ratings should be considered function-by-function for each individually rated plant community type

Wetlands may be composed of a single plant community type (see Table 1) or a complex of types. The vegetative diversity/integrity rating in MnRAM has options ranging from individual ratings for each plant community type to averaging the ratings of two or more plant community types. For regulatory purposes, the individual rating for vegetative diversity/integrity should be used. Averaging high and low ratings, for example, yields a medium rating that obscures the high-rated wetland type. The high-rated plant community may prompt important regulatory considerations such as avoidance or special consideration for compensation. Note that the rating for vegetative diversity/integrity is also a factor in the ratings for wetland water quality and wildlife habitat.

In summary, different plant community types naturally have differences in the degree and intensity of functions that they perform. Averaging the MnRAM ratings across widely divergent plant community types dilutes the validity and usefulness of the results. To be scientifically valid, comparison of wetland functions should be between examples of the same wetland type ("apples to apples"). "Apples to oranges" comparisons are problematic and are not recommended for regulatory purposes.

Appropriate uses of MnRAM for regulatory purposes include:

(a) Determining the functions and ratings of individual wetlands. MnRAM is an excellent tool for this purpose.

(b) Determining compensatory mitigation needs based on a MnRAM analysis of a

[3] Brinson, M. 1996. *Assessing Wetland Functions Using HGM.* National Wetlands Newsletter, Vol. 18, No. 1.
[4] Gilbert, M., M. Whited, E. Clairain, D. Smith. 2006. *A Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Prairie Potholes.* ERDC/EL TR-06-05. U.S. Army Engineer Research and Development Center, Vicksburg, MS. 103 pp. plus appendices.

wetland that is proposed to be impacted. For example, if the wetland to be impacted has four high ratings and four medium ratings, the primary focus of the compensation would be to design and establish compensation that replaces those specific high and medium functional ratings. Note, however, that this is a qualitative measure not a quantitative one.

(c) Comparing functional ratings between wetlands of the same type within a project site or study area. Ideally, a reference standard for that wetland type would be compared to other examples of the same type within the project site or study area. The reference standard wetland is the highest condition (least disturbed) example of that particular wetland type in the watershed (or ecoregion). Valid comparisons can then be made between the reference standard wetland and other wetlands of the same type in that watershed (or ecoregion). For example, consider depressional, sedge meadows in a particular study area. MnRAM would rank the other depressional, sedge meadows according to the degree that they attain (or do not attain) the ratings of the reference standard sedge meadow. It is important to remember that this is done for each function separately. Avoidance and minimization could be maximized for the highest rated examples of that wetland type while less rigorous standards could be applied to lowest rated examples.

(d) Evaluation of Compensatory Mitigation via Monitoring. Functional ratings should be broken out by plant community type and function by function. This evaluation uses broad-based ratings of exceptional, high, medium and low that are tied to performance standards specified for the compensation.

(e) Landscape Scale Functional Assessment. MnRAM can be used at this scale as a gross assessment to identify, for example, concentrations of higher functioning wetlands vs. lower functioning wetlands. This may be useful for a gross alternatives analysis.

(3) Floristic Quality Assessment (FQA). FQA uses vegetation as an ecological indicator of condition. It is a tool that can be used to identify areas of high conservation value, monitor sites over time, assess anthropogenic impacts affecting an area, and measure the ecological condition of an area.[5] A coefficient of conservatism, which is a numerical score assigned to each plant species, reflects the likelihood (fidelity) that a species is found in natural habitats.

A FQA for Minnesota wetlands has been published[6] and can be used for specifying and evaluating compensatory mitigation. For example, the Chicago District of the Corps has been using a FQA for performance standards.

E. Project-Specific Compensation

1. On-Site/In-Place vs. Not-in-Place. The Mitigation Rule defines "on-site" as 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 (§ 332.2). On-site compensation is the first priority for siting compensatory mitigation given the ecological benefits of immediate geographic connectivity of restored hydrology and vegetation. It is also

[5] Bourdaghs, M., C. Johnston and R. Regal. 2006. *Properties and Performance of the Floristic Quality Index in Great Lakes Coastal Wetlands.* Wetlands, Vol. 26, No. 3, pp. 718-735.
[6] Bourdaghs, M., J. Husveth and S. Milburn. 2007. *Floristic Quality Assessment for Minnesota Wetlands.* Minnesota Pollution Control Agency, St. Paul, MN. 197 pp.

recognized that on-site compensation is not always practicable, nor environmentally preferable (e.g., compensation site would be surrounded by a parking lot).

St. Paul District policy uses the term "in-place" to include "on-site" as well as the 10-digit and 8-digit HUC watersheds. This is a much larger area than the definition given in the Mitigation Rule for "on-site" and allows considerable flexibility for siting project-specific compensation.

Practicable opportunities for in-place compensation include those that:

- Take advantage of naturally occurring landscape position without the need for dikes or excavation or other alterations of the landscape;
- Have a high likelihood of becoming a functional wetland that will continue in perpetuity; and
- Do not adversely affect other habitats or ecological communities that are important in maintaining the ecological diversity of the area.

2. Siting Sequence. The following compensatory mitigation siting sequence for project-specific compensation is mandatory. The Corps, not the applicant, makes the determination as to what is practicable for locating the compensation. Each step below refers to the location of the wetland/aquatic resource compensation site compared to the location of the impact site.

Siting Sequence for Project-Specific Compensation
Location of Wetland Compensation Site vs. Impact Site

(a) on-site;*
(b) in the same 10-digit HUC watershed (5,600 in MN);*
(c) in the same 8-digit HUC watershed (81 in MN);*
(d) in the same modified 6-digit HUC watershed (10 in MN);
(e) in the same 4-digit HUC watershed (4 in MN); then
(f) statewide.

*Qualifies for .25 incentive for "in-place"

F. Mitigation Banking

1. In-Place vs. Not-in-Place. Use of banking credits is "in-place" if the debits are within the same Corps approved bank service area (Figure 4) as the impacted wetland.

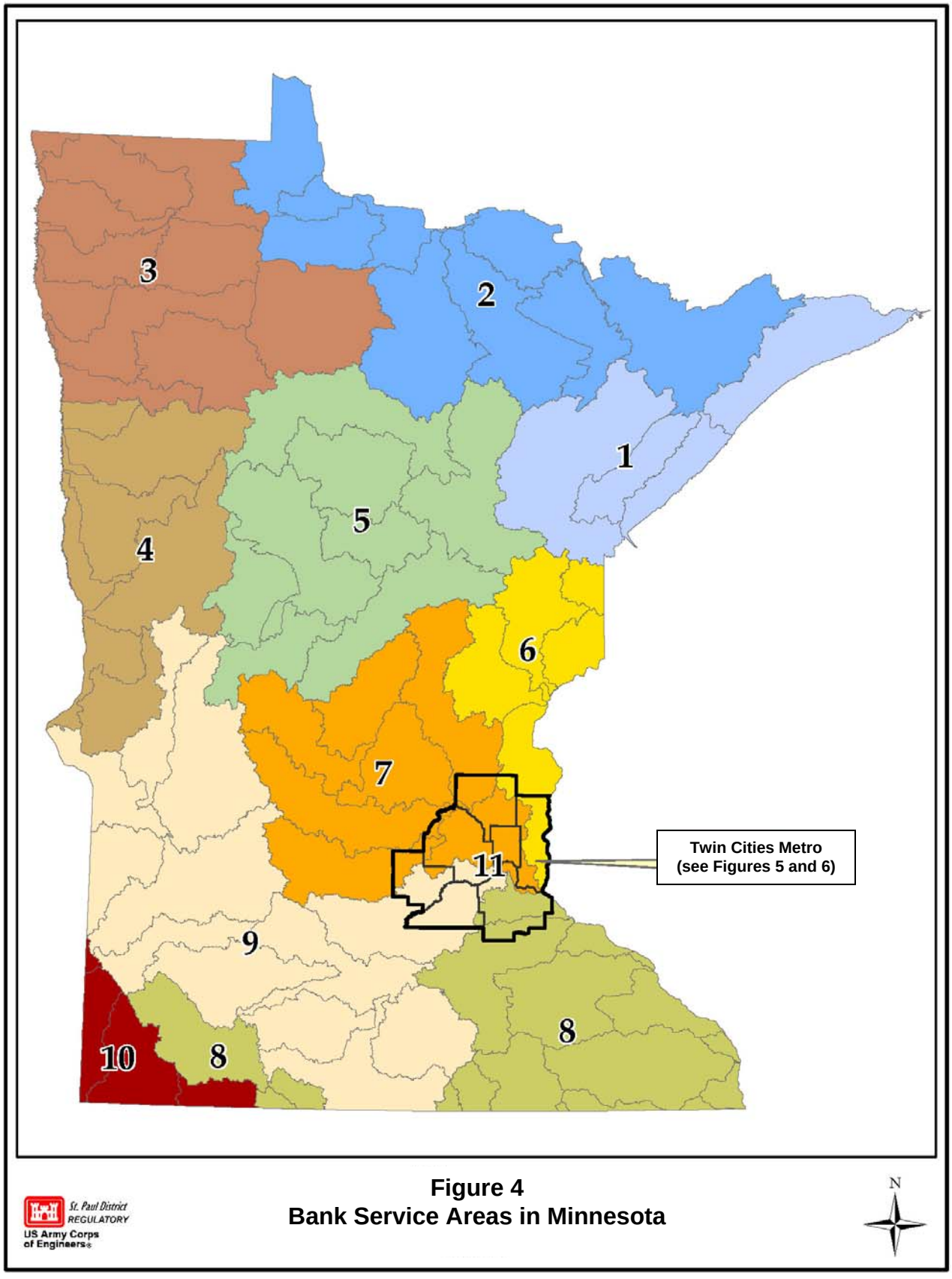


Figure 4
Bank Service Areas in Minnesota

To achieve the highest likelihood of replacing lost functions, Project Managers will direct applicants/permittees to the nearest, practicable bank site in relation to the impact site. The optimum is to debit from the same 8-digit HUC watershed within the larger bank service area (there are 4 to 15 of the 8-digit HUC watersheds within each bank service area). If no bank credits are available or suitable, the search area can progressively widen as shown below. Permit conditions for each authorized activity should specify which bank site(s) is approved.

Cases may arise where an applicant/permittee proposes to debit from a more distant 8-digit HUC watershed even though there are practicable, closer bank credits within that particular bank service area. This should be discouraged and would void qualifying for the "in-place" incentive that would reduce the compensation ratio.

Siting Sequence for Mitigation Banking (Excluding Twin Cities Bank Service Area)
Debits in Relation to Impact Site

(a) in the same 8-digit HUC;*
(b) in an adjacent 8-digit HUC within the same bank service area (BSA);*
(c) anywhere in the same BSA;*
(d) in the same 4-digit HUC; then
(e) statewide.

*Qualifies for .25 incentive for "in-place"

2. Siting Sequence for Twin Cities Bank Service Area. A special bank service area is established for the Twin Cities metropolitan area to strive for replacing wetland losses within the 8-digit HUC watersheds that compose this area (Figures 5 and 6). Sequencing for this bank service area is shown below. Item (d) is different compared to the banking sequence shown above because the .25 incentive still applies if the debit is in a different major drainage basin, but within the Twin Cities Bank Service Area.

Siting Sequence for Twin Cities Bank Service Area
Location of Bank Site vs. Impact Site

(a) in the same 8-digit HUC;*
(b) in an adjacent 8-digit HUC within the same river watershed (Mississippi, Minnesota, St. Croix) of this BSA;*
(c) anywhere within the same river watershed of this BSA;*
(d) anywhere within this BSA;*
(e) in the same 4-digit HUC; then
(f) statewide.

*Qualifies for .25 incentive for "in-place"

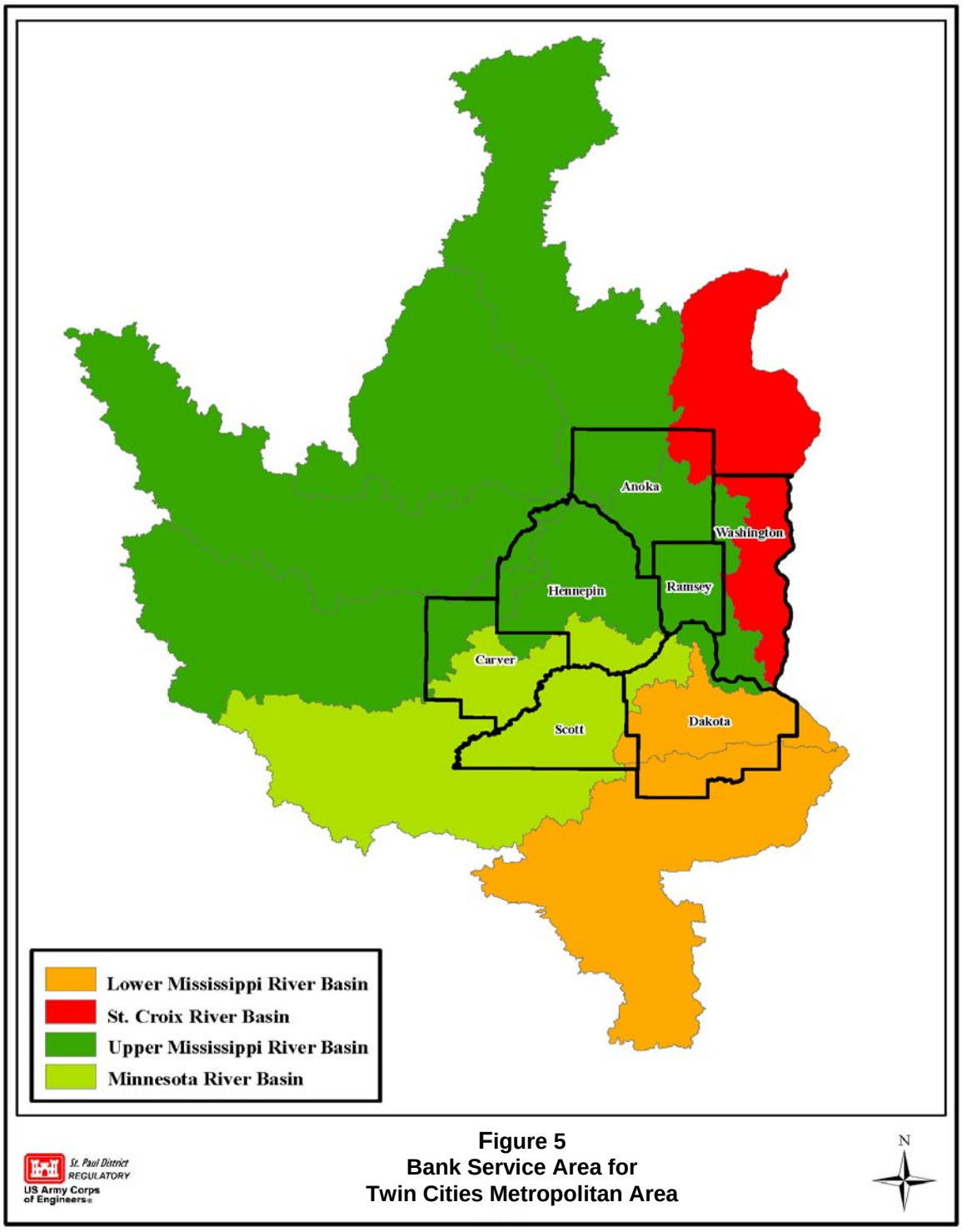


Figure 5
Bank Service Area for
Twin Cities Metropolitan Area

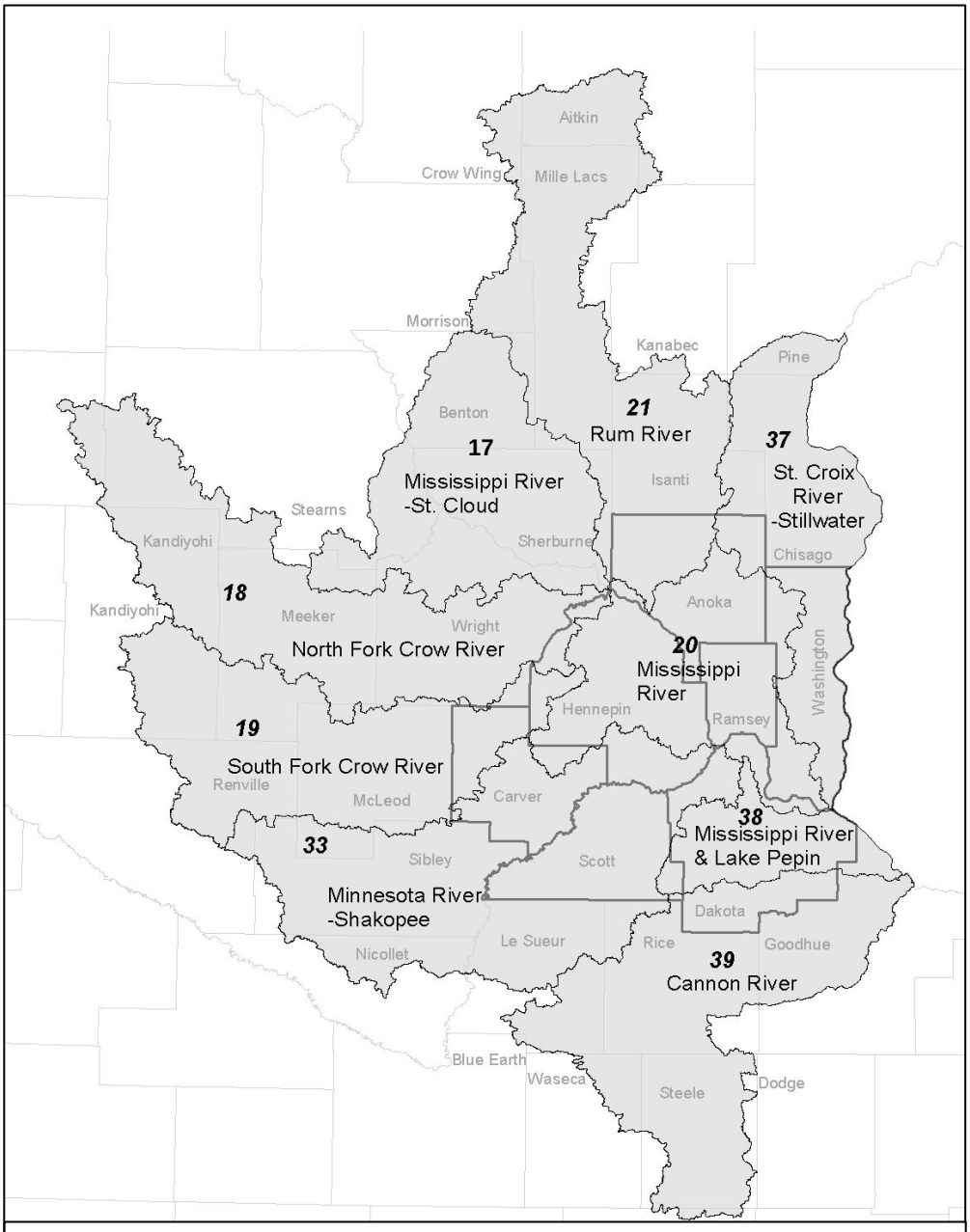


Figure 6

8-Digit HUC Watersheds
in the
Twin Cities Bank Service Area

G. Compensation Ratios

1. Acreage Surrogate. In the absence of a suitable quantitative functional assessment, a minimum 1:1 acreage surrogate for functional replacement is applied (§ 332.3(f)). If the compensation is out-of-kind, concurrent, etc., "The district engineer must require a mitigation ratio greater than one-to-one where necessary to account for…" the following:

a. method of compensation (e.g., restoration vs. preservation);
b. likelihood of success;
c. differences between the functions lost at the impact site and the functions expected to be produced by the compensation site;
d. temporal losses of wetland/aquatic resource functions;
e. difficulty of restoring or establishing the desired wetland/aquatic resources; and/or
f. distance between the affected wetland/aquatic resource and the compensation site.

In Minnesota, the acreage surrogate is the primary approach used by the Corps due to the current lack of a suitable quantitative assessment method.[7]

2. Linear Foot Surrogate. For streams, a minimum one-to-one linear foot surrogate is applied (§ 332.3(f)).

3. Basic and Minimum Compensation Ratios. Table 2 illustrates the basic compensation ratios. The basic compensation ratios reflects the risk and uncertainty of the success of compensatory mitigation, temporal loss of wetland functions, and difficulty in establishing compensation sites that equal the full range of functions attributed to natural wetlands. The reduced basic compensation ratio for the greater than 80 percent area is due to the issues discussed in Section I.D.

Incentives for in-kind, in-place and/or in-advance compensation can reduce the compensation ratios to the minimums shown by Table 3.

Table 2
Basic Compensation Ratios

<80 % Area	**2.5:1**
>80% Area	**1.5:1**

Table 3
Minimum Compensation Ratios

<80 % Area	**2:1**
>80% Area	**1:1**

a. Qualifying for the In-Place Incentive. The ratio shown by Table 2 can be reduced by .25 if the compensation meets the in-place criteria for project-specific compensation, or use of banking credits, as appropriate. Exceptions:

(1) Compensation for impacts in Bank Service Area 1 that are debited in Bank Service

[7] With the exception of the HGM guidebook for certain prairie pothole wetlands.

Area 2 qualifies for the .25 incentive;

(2) Compensation for impacts in Bank Service Area 10 that are debited in Bank Service Areas 8 or 9 qualifies for the .25 incentive; and

(3) Impact sites on the boundary of two bank service areas, as well as linear projects that cross bank service area boundaries, are eligible for the .25 incentive regardless of which bank service area is debited.

b. Qualifying for the In-Advance Incentive. The ratio shown in Table 2 can be reduced by .25 if Corps-approved mitigation banking credits are used. The .25 incentive can also be applied to project-specific compensation sites that have established hydrology and initial vegetation. At a minimum, the site must have wetland hydrology and initial hydrophytic vegetation established a full growing season (May-October) prior to the authorized discharge of dredged or fill material.

c. Qualifying for the In-Kind Incentive. The ratio shown by Table 2 can be reduced by .25 if the compensation is in-kind (same wetland plant community), or the Corps administrative record documents that in-kind compensation is not practicable or environmentally preferable as described below.

(1) In-kind compensation is not practicable or environmentally preferable. It is not environmentally preferable to compensate for impacts to degraded wetlands by deliberately providing degraded compensatory mitigation projects (preamble, page 19632). A compensation project should result in high quality wetlands that provide optimum functions within its landscape context, taking into account unavoidable constraints.

In-kind compensation may not be practicable in cases where, for example, there are no sites available where the necessary hydrology could be restored (e.g., a floodplain forest cannot be established in an isolated pothole). The scope of the search for suitable sites would vary depending upon whether the compensation is project-specific or bank credits.

Value judgments are not appropriate for the determination of what is environmentally preferable, e.g., an opinion that prairie potholes are more “valuable” than conifer bogs.

(2) A watershed plan documents that out-of-kind compensation would reestablish key wetland/aquatic resource functions of the watershed. At a minimum, the watershed plan must consist of adequate data gathering and analysis to determine: (1) historical (pre-European settlement) locations/types/functions of wetlands; (2) current status and future trends of locations/types/functions of wetlands; and (3) strategic siting of wetlands by types/functions where the highest degree of wetland/ aquatic functions would be achieved.

For example, an analysis of historic loss trends finds that tamarack (*Larix laricina*) swamps were once abundant in the watershed but are now rare following decades of drainage and agricultural use. Existing wetlands in the former tamarack swamps consist of wet meadows dominated by reed canary grass (*Phalaris arundinacea*), an undesirable, invasive species. Rather than accomplish in-kind compensation for impacts to those existing wet meadows, out-of-kind compensation consisting of restoration of tamarack swamp communities would be appropriate.

4. Greater Compensation Required. The above ratios can be raised on a case-by-case basis if the impacted wetland provides rare or exceptional functions. Examples include habitat for threatened/ endangered species, a plant community rated “exceptional” by MnRAM, or a plant community with a

high FQA. Unique features may be present such as old growth forest, never plowed prairie and patterned peatlands.

5. Less Compensation Required. In rare situations, the minimum compensation ratio can be lowered if St. Paul District determines that the impacted wetland is so degraded that it provides minimal wetland functions. This would be done on a case-by-case basis and supported by factual information in the administrative record.

III. Determining Credits Generated by a Compensation Site

A. Relationship to Other Federal, State and Local Programs

Compensation can be accomplished on publicly owned lands if credits are based solely on providing wetland/aquatic functions that are over and above those provided by public programs already planned or in place (§ 332.3(a)).

Federally-funded conservation projects undertaken for purposes other than compensatory mitigation, such as the Wetlands Reserve Program and Conservation Reserve Program, cannot be used for the purpose of generating compensatory mitigation credit for activities authorized by Department of the Army permits. However, compensatory mitigation credits may be generated by activities undertaken in conjunction with, but supplemental to, such programs (§ 332.3(j)).

Under no circumstances can the same credits be used to provide compensation for more than one project (§ 332.3(j)).

Also, see the discussion of stormwater treatment facilities (B.7 and 8. below), for which any potential compensation credit is limited to that acreage of the treatment facility that exceeds the size necessary to meet state/local requirements for water quality treatment and/or stormwater detention.

B. Techniques to Generate Compensation Credit

Credits are the currency of compensatory mitigation. All credits are combined into one sum of "wetland credits" including upland buffers.[8]

These guidelines will be used to determine the amount of credit generated by project-specific compensation and mitigation bank sites. Table 4 lists the credits generated by various techniques. The credit ratios shown apply to compensation sites that are adequately protected by legal instruments including covenants or conservation easements, or ownership by a public natural resource agency or private conservation organization. Compensation sites that lack long-term legal protection should generally be rejected because such sites are at risk of degradation or destruction by future actions. Note that permit conditions alone are not adequate for long-term protection of compensation sites because they do not "run with the land" (the title) as do covenants and conservation easements. It is not uncommon for compensation sites to be sold multiple times.

Project Managers will use the following terminology from the Mitigation Rule for determining compensation credits. "New wetland credit" and "public value credit" will not be used in Corps correspondence and bank approvals.

1. Credit for Restoration. Restoration is the preferred compensatory mitigation technique (§332.3(a)). Restoration sites historically supported wetlands and frequently retain some wetland components (e.g., hydric soils) even after man-made disturbances such as drainage and cropping. Restoration also applies to increasing the functional level of existing, degraded wetlands.

[8] Upland buffers enhance certain wetland functions including water quality and wildlife habitat, and help protect wetlands from degradation (e.g., erosion, sedimentation). Therefore, upland buffers are considered "wetland credits."

TABLE 4
Calculation of Compensation Credits

Technique Used	Compensation Credit Ratio (Acres needed to generate one credit)	Comments
Restoration via Re-Establishment	1:1	
Restoration via Rehabilitation	2:1 to 1:1	Credit depends upon degree that existing wetland functions are increased. See discussion in text.
Enhancement	3:1	See discussion in text
Creation	2:1 to 1:1	2.0:1.0 if isolated from other habitats and/or has a higher risk of failure; 1.0:1.0 if hydrology data is sufficient and site is adjacent to other wetland & upland habitats
Preservation	8:1	Wetlands must be under demonstrable threat and providing important functions
Fully Functional Wetlands Not Under Demonstrable Threat	No Credit	
Exchange	No Credit	May cause adverse impacts that require compensation
Upland Buffer: Native Vegetation, Unmanicured	4:1	Up to 25% of total credits at a compensation site can be composed of upland buffers
Upland Buffer: Non-Native Vegetation and/or Manicured	10:1	Includes grazed or mowed upland buffers
Stormwater Ponds: Single Cell or Primary Cell	No Credit	
Stormwater Ponds: Second or Third Cell	If certain qualifications are met, these cells may receive partial credit. See discussion in text.	

Restoration consisting of **re-establishment** involves techniques for returning wetland functions to a location where no wetland currently exists. This technique results in a gain in both wetland acres and wetland functions. One acre of re-establishment generates one compensation credit (1:1).

Restoration consisting of **rehabilitation** involves repairing or increasing the functions of an existing, degraded wetland. This technique results in a gain in wetland functions, but not wetland acres. It is typically applied to hydrologic restoration as opposed to vegetative restoration (for vegetative restoration credit, see the definition of enhancement). Rehabilitation results in a net gain in wetland functions but not wetland acres. Credit will range from two acres rehabilitated for each credit awarded (2:1) to 1:1 depending upon a sliding scale measuring the degree that wetland functions are increased. For example, consider a drainage ditch that reduced the original hydrology of a wet meadow from 100 days of saturation to the surface to 14 days during the growing season of most years. If plugging the ditch restored 80 percent of the original hydrology of that wet meadow, it would warrant 1:1 credit given the substantial degree that hydrology was rehabilitated. If plugging the ditch restored 40 percent of the original hydrology, the 2:1 ratio of credit would be more appropriate. A case-by-case analysis using professional judgment is necessary to determine the degree of credit generated. The rationale used will be recorded in the administrative file.

A specific example discussed by the Corps and BWSR concerned wetlands previously restored under a temporary conservation easement that become legally eligible to re-drain upon expiration of the easement. The issue was whether this approach best fits preservation or extending restoration. Since the easement is temporary, and the lands could be legally re-drained, it was determined that these cases best fit extended restoration. A credit of 1:1 is not warranted as these areas are existing wetlands. It was determined that 1.3:1 credit (75% of the acreage) could be awarded depending upon cropping history prior to enrollment in the conservation easement program. The acreage awarded credit excludes any wetland acreage that existed prior to restoration under the temporary easement.

2. Credit for Enhancement. Enhancement involves activities that heighten, intensify or improve a specific function(s) of an existing wetland. This increase in one or more functions does not result in a gain in wetland acres and may result in a decrease in other wetland functions. In Minnesota, enhancement often takes the form of vegetation management including invasive weed control, prescribed burns, brush removal and plantings of native vegetation. A long-term management plan, financial assurances and/or a dedicated management entity are typically required to ensure that the enhancement activities result in more than a temporary increase in wetland function(s). If the compensation site is going to be managed by a public natural resource agency or private conservation group, financial assurances are still advisable due to the uncertainties of future budgets. An exception could be made if the resource agency or conservation group has the long-term financial capability to continue control of invasive plant species. Generally, these types of enhancements are credited at 3:1 (3 acres enhanced to generate 1 credit) although credits awarded may be increased in certain circumstances as illustrated below.

Example 1: The following addresses credit for herbicide application/hand removal of invasive plant species where financial assurances are considered necessary (otherwise this type of effort would have only temporary benefits):

a. 5 years of control with no financial assurances: 0 credit;
b. 5 years with financial assurances sufficient for 5 more years of control: 3:1 credit;
c. 5 years with financial assurances sufficient for 10 more years of control: 2:1 credit.

Some control methods for invasive plant species have longer-term effects than herbicide applications or hand pulling; therefore, credit may be approved at 3:1 with or without financial

assurances. An example is biocontrol for purple loosestrife (*Lythrum salicaria*) using loosestrife beetles. Once introduced, loosestrife beetles have shown the ability to successfully overwinter and expand throughout an area infested with loosestrife.

Example 2: A scenario discussed by BWSR and the Corps concerns wetlands that are row-cropped (at least 6 years in 10) and have no hydrologic modifications (e.g., no ditching or tiling). The lands would be taken out of crop production for perpetuity and native vegetation would be established. Given the retirement from cropping in perpetuity, the credit for this enhancement can be 2:1.

Floristic quality assessment focuses on vegetation so it could be a viable tool to evaluate vegetation management techniques employed at enhancement compensation sites.

3. Credit for Creation. Creation involves converting uplands to wetlands where no historical wetlands existed since the last glaciation. Creation results in a net gain in wetland acres and functions. Credit at a 1:1 ratio is possible if the creation site is both low risk as well as connected to other wetlands and upland buffers/corridors. Lower risk refers to cases where hydrology data from monitoring wells, surface runoff analysis, modeling, etc., is sufficient to ensure that the planned hydrology will be established. Creation sites lacking sufficient hydrology data are at a higher risk of failure and will generally be credited at 2:1 (2 acres of creation generate 1 credit). Similarly, creation sites that are isolated from other waters/wetlands and upland buffers/corridors are credited at 2:1 due to their diminished level of wetland functions. Financial assurances are even more critical for creation sites compared to low-risk restoration sites. These credits do not apply to stormwater treatment facilities. See numbers 7. and 8. below.

4. Credit for Preservation. Preservation involves removal of a threat to, or preventing the decline of, wetland/aquatic functions by an action that is outside regulatory authorities, e.g., logging of a cedar swamp, or maintenance of an established ditch system. To generate compensation credit, the subject wetlands must perform physical or biological functions that are important to the region and must be under demonstrable threat of loss or substantial degradation due to human activities that might not otherwise restricted (§ 332.3(h)). Preservation is typically credited at a ratio of 8:1 (8 acres preserved generates 1 credit). The compensation credit is derived by continuing existing wetland functions over time by precluding future threats that would otherwise destroy or degrade wetland functions. Preservation must create a difference in positive wetland functions between the existing condition (e.g., demonstrable threats) and future conditions (e.g., removal of demonstrable threats). The compensation credit awarded can be adjusted downward if the difference in the existing condition and future condition is not great.

a. Demonstrable Threat. Demonstrable threat can apply to wetlands within an expanding urban area zoned for development, wetlands that are not jurisdictional, or cases where the least environmentally damaging alternative would likely lead to permit issuance. Plat approval for a development project, watershed district approval for ditch maintenance, or a logging contract, are additional examples of evidence needed to document “demonstrable” threat. Peatlands owned by a peat-mining operation, or available for lease to a peat-mining operation, may also qualify. Another example is a signed AD-1026 form (NRCS form for Farm Bill program participants) indicating that a landowner plans to drain/fill wetlands. No credit is given for fully functional wetlands that are not under demonstrable threat.

b. Providing Important Functions. Candidate sites for preservation are not required to be exceptional natural areas or habitats supporting rare, threatened or endangered species. MnRAM is the recommended tool to determine the functions provided by a particular wetland. Functions rated high and/or medium are potentially important for the aquatic resource and watershed. For example, a wetland with one or more high ratings and/or three or more medium ratings is likely providing important

functions. Professional judgment is also appropriate to identify important functions that a wetland provides.

To establish credits for preservation, it is mandatory that the site be legally protected by covenants or a conservation easement, or transfer of ownership to a public natural resource agency or private conservation organization (§ 332.3(h)). Including an upland buffer is critical for wetland preservation sites.

Preservation is recognized by the Mitigation Rule as one of the tools of the watershed approach to compensation (§ 332.3(h)). It can, in certain circumstances, constitute the entire compensation for authorized wetland impacts (§ 332.3(h)). However, preservation has more utility as part of a package of compensation that also includes restoration, creation, enhancement, upland buffers, etc. (§ 332.3(h)). See Table 5 for an example.

In the greater than 80 percent area, preservation may be one of the few practicable options for compensation. This is combined with the fact that the majority of the highest functioning, least disturbed wetlands in the state are located in this region. Preservation could set aside these high quality wetlands by preventing degradation due to any number of activities not regulated by Section 10/404. Specific examples are buyout of the timber rights on MnDNR Scientific and Natural Area (SNA) peatlands, purchase of additional acreage for SNAs, and purchase of high quality riparian wetlands that would otherwise be converted to residential homes or resorts. There may be state restrictions on the availability of preservation.

5. Credit for Upland Buffers. Upland buffers enhance and protect functions provided by wetlands and other aquatic habitats. The width of the required upland buffer varies depending upon the goals for the site (e.g., water quality, wildlife habitat), adjacent land use (golf fairway vs. parking lot), slope (steep vs. gentle), vegetation and soils. For example, a 25-50 foot width may be adequate to achieve water quality improvements, while a 90-330 foot width may be necessary for certain wildlife habitat functions.

Compensation sites shall include an upland buffer as a condition of receiving Corps approval, unless no uplands are available (e.g., site is surrounded by other wetlands). Minimum average upland buffer widths are 50 feet in non-municipal areas and 25 feet in municipal areas. Appendix E lists the corresponding upland buffer, in acres, surrounding wetlands ranging in size from 0.1- to 50 acres. For example, a 25-foot buffer around a 1.0-acre wetland is approximately 0.47 acre in size while a 50-foot buffer around the same wetland is approximately 1.03 acre in size. In comparison, a 50-foot buffer around a 10.0-acre wetland is approximately 2.9 acres in size.

Upland buffers dominated by native, non-invasive vegetation that is unmanicured (e.g., not mowed or grazed) are credited at 4:1. The minimum standard for “dominated” is at least 75 percent vegetative areal cover composed of native, non-invasive species. An optional performance standard can specify species richness (e.g., the upland buffer shall be composed of at least 15 native, non-invasive species at the end of the second growing season). Upland buffers that are manicured, and/or have greater than 25 percent vegetative areal cover by invasive and/or non-native species, are credited at 10:1. These buffers can be upgraded to 4:1 credit if the permittee or bank sponsor manages the buffer and successfully meets the minimum standards for native, non-invasive vegetative areal cover that is not manicured.

Upland buffer credits are combined with credits generated by wetland restoration, creation, enhancement and preservation, to yield one sum of credits for a compensation site. Because the compensation is intended to offset losses of wetland/aquatic resource functions, upland buffer credits are limited to 25 percent of the total credits at a compensation site.

It is essential that upland buffers are protected by covenants, conservation easements, or ownership by a public natural resource agency or private conservation group. Legal documents should define the "compensation site" as including both wetland and upland portions. In addition, it is recommended that upland buffers bordered by residential lots or actively farmed fields be fenced as opposed to only posted with signs. Chronic problems have been experienced where unfenced upland buffers were subjected to mowing, tree cutting, filling, composting and plowing.

6. No Credit for Exchange. Exchange involves converting one type of wetland to another, for example, excavating a sedge meadow to create a deep marsh, or impounding water over a forested wetland that drowns out the woody vegetation and replaces it with an aquatic bed community. The exchange of one set of wetland functions for another does not generate compensation credit. Excavating an existing wetland or flooding a forested wetland are severe disturbances that typically degrade wetland functions and, if regulated, can themselves require compensatory mitigation to offset adverse impacts.

7. No Credit for Single Cell or Primary Cell Stormwater Treatment Facilities in Uplands. While these facilities have water and may support rudimentary wetland vegetation, they are subjected to continuous disturbances including influxes of sediment, salt, heavy metals, petroleum products, fertilizers, pesticides and trash. They may be contaminant sinks. Further, the "bounce" in water levels often associated with these facilities is destructive to vegetation and wildlife habitat. Mudflats (e.g., sediment plumes) may replace vegetation if the bounce in water levels is frequent and of sufficient magnitude. Periodic maintenance dredging creates additional disturbances and may remove any wetland vegetation that becomes established. These facilities are too degraded to replace the overall functions of natural wetlands.

8. Partial Credit for Second or Third Cells of Stormwater Treatment Facilities Constructed in Uplands. Second or third cells of stormwater treatment facilities are subject to the same types of degradations as those described for primary cells, but to a lesser degree. They do not function as natural wetlands. For example, the hydrology of these cells does not mimic that of natural wetlands due to artificially induced bounce and duration of water inputs. Further, second and third stormwater cells are often subject to excessive sediment and nutrient loads compared to natural wetlands. Vegetation typically includes monotypic stands of the most nutrient- and sediment-tolerant species: cattails (*Typha* spp.), common reed (*Phragmites australis*) and reed canary grass.

However, there may be cases where partial compensation credit is possible for the downstream water quality and floodwater/stormwater attenuation functions of these cells. Because these cells do not replace the multitude of other wetland functions lost when natural wetlands are impacted, only partial credit is warranted. This credit is also limited to that acreage of the cell that exceeds the size necessary to satisfy local and/or state requirements for water quality and/or stormwater retention of the site. This conforms to the Mitigation Rule (§ 332.3(j)) which states that compensatory mitigation must be over and above what would be required under other programs. Without these conditions there would be no gain in wetland functions (i.e., the same size and design necessary to comply with local/state water quality and stormwater management requirements would be double counted as compensation for wetland impacts). If these cells are accepted as compensation, a second compensation site may be necessary to replace the other lost wetland functions (e.g., habitat and vegetative diversity/integrity).

Crediting, for the acreage over and above that required for state and/or local stormwater management purposes, is at 2:1 provided that:

a. Design of the cell incorporates features that promote emergent vegetation to accentuate sediment trapping and nutrient assimilation. Examples include shallow sideslopes and/or shelves with 6- to 12-inch water depths;

b. Normal water levels consist of saturated soils to no more than 3-foot water depths;
c. A bounce in water levels of 12 inches or less, with a duration of 7 days or less, would occur for the 10-year, 24-hour precipitation event.

9. Credit for Stream Restoration or Enhancement. Projects authorized by the Corps include those that adversely impact the aquatic habitat of streams; therefore, a need exists to establish compensatory mitigation to offset those impacts. Credit can be generated by stabilizing stream banks, fencing to prevent cattle access, removing dams, restoring channelized streams to their original meanders, etc. These actions are considered stream aquatic habitat compensation and are credited separately from wetland compensation. Stream aquatic habitat credits are not be used to offset wetland impacts because the functions of wetlands and streams are distinct from one another. Restoration of a channelized stream can restore both the hydrology of adjacent wetlands as well as restore the stream's aquatic habitat. Credits under each category will be recorded accordingly.

Linear feet of stream channel will be used for tracking stream compensation credits (§ 332.3(f)).

10. No Credit. The following are additional activities not eligible for compensation credit:

a. Excavating stormwater treatment facilities in wetlands;
b. Creating deepwater habitats (i.e., greater than 6.6 feet deep);
c. Impounding natural streams (streams that have not been ditched or channelized);
d. Destroying upland forested habitats to create wetlands unless the site is dominated by non-native and/or invasive tree species; and,
e. Destroying any high quality or locally important upland habitat (e.g., upland prairie, savanna).

11. Example Credit Calculation (Table 5). A compensation site plan is proposed for a 120-acre parcel in an agricultural setting. Presently the site is drained by a series of ditches and drain tiles. The site contains: (1) 75 acres of effectively-drained hydric soils (former wetlands) planted annually with corn; (2) 17 acres of partially-drained wetlands (hydroperiod has been reduced to 20 percent of original hydrology) planted annually with corn; (3) 20 acres of uplands planted to corn; (4) 3 acres of existing wetlands with sedge meadow and shrub vegetation; and (5) 5 acres of white cedar swamp under a logging contract. The proposed compensation involves breaking drain tile, plugging ditches, planting the uplands to native prairie, prescribing burns of the prairie and sedge meadow, and placing a conservation easement on the entire parcel including buyout of the logging contract. A long-term management plan and financial assurances are part of the compensation package. The financial assurances will be used to fund long-term maintenance of the ditch plugs as well as conduct management activities within the site. This plan has the potential for 90.13 credits.

C. Banking Credits in the WCA System but not Approved by the Corps for Section 10/404 Purposes

This section applies to bank sponsors who did not receive written confirmation from the Corps that the credits established in the WCA system were accepted for Section 10/404 purposes. A joint Corps/BWSR public notice, "Mitigation Banking Information for Minnesota," dated May 28, 1999, advised prospective bank sponsors of the information that must be submitted to the Corps in order for banking credits to be accepted for Section 10/404 purposes. Bank sponsors who did not coordinate with

TABLE 5
Example Credit Calculation

Technique	Acres	Credit Ratio	Credits
Restoration of effectively-drained wetlands	75.0	1:1	75.0
Restoration of partially-drained wetlands that increases hydroperiod from 20 percent to 50 percent of original hydrology	17.0	2:1	8.5
Enhancement via prescribed burns in shrub-invaded sedge meadow	3.0	3:1	1.0
Upland buffer successfully planted to native prairie vegetation	20.0	4:1	5.0
Preservation of cedar swamp under demonstrable threat	5.0	8:1	0.63
Total	120.0		90.13

the Corps after that date proceeded at their own risk in that their credits may or may not be suitable for Section 10/404 purposes. If debits are proposed from a bank site that has not been previously inspected by the Corps, debiting from that bank site will be put on hold pending: (1) submittal of a complete bank application package by the bank sponsor containing all pertinent information, including pre- and post-project conditions at the subject bank site and evidence of sufficient legal protection (e.g., covenants, conservation easement); and (2) a site inspection by the Corps Project Manager to confirm that credits suitable for Section 10/404 purposes have been established.

D. Conversion of Pre-Existing PVC Upland Buffer Credits to Corps-Approved Wetland Credits

PVC upland buffer credits in the state banking system established prior to December 31, 2008 will be credited at 90 percent on condition that the bank site is approved by the Corps (see C. above). All upland buffer crediting for deposit in the state banking system after December 31, 2008 will use the 4:1 and 10:1 crediting established by this policy.

IV. Requirements for a Compensation Site Plan

A. Compensatory Mitigation Plan Checklist and Supplement

Appendix C is the checklist and supplement outlining the basic information that applicants and bank sponsors need to provide to the Corps to obtain approval of compensatory mitigation suitable for Section 10/404 purposes. The following is a summary of the major components of a complete compensation plan.

1. Compensation Goals and Objectives
- a. Describe functions lost at impact site
- b. Describe functions to be gained at compensation site
- c. Describe overall watershed improvements to be gained

2. Baseline Information for Impact and Proposed Compensation Sites
- a. Provide data on physical attributes of sites (soils, vegetation, hydrology)
- b. Describe historic and existing land uses and resources impacted
- c. Describe reference site attributes if available

3. Compensation Site Selection and Justification
- a. Describe process of selecting proposed site
- b. Describe likelihood of success, future land use compatibility, etc.

4. Compensation Site Plan (refer to Appendix C)
- a. Provide location and legal description
- b. Provide detailed construction plan and schedule
- c. Describe planned hydrology, vegetation, soils, upland buffers, etc.

5. Performance Standards
- a. Identify success criteria
- b. Describe soils, vegetation and hydrology parameter changes between pre- and post-construction activities
- c. Specify standards to confirm that hydrology and vegetation are on the right trajectory to meet site objectives

6. Compensation Site Protection and Maintenance
- a. List parties and responsibilities
- b. Provide evidence of legal protective measures (e.g., recorded covenants)
- c. Provide detailed maintenance plan and schedule

7. Monitoring Plan
- a. Provide monitoring schedule (generally for 5 years, but can be extended as appropriate)
- b. Identify party (-ies) and responsibilities
- c. Specify data to be collected, including assessment tools and methodologies
- d. Document whether target hydrology is established
- e. Document level to which target vegetation is established
- f. Identify adaptive management plan implementation process (i.e., if performance standards are not met)

8. Adaptive Management Plan
- a. Identify parties and responsibilities

b. Identify remedial measures (financial assurances, management plan, etc.) and schedule

9. Financial Assurances
a. Identify parties responsible for assurances
b. Specify type of assurance, contents and schedule

B. Approval Requirements for Authorized Activities Involving Compensation Site Plans

In the past, some permit approvals were made on the condition that the permittee would provide a compensation site plan to the Corps at a later date. This approach will no longer be practiced. As a standard procedure, permits will not be approved until a compensatory mitigation plan is reviewed and approved by the Corps (§ 332.4(c)). The approved compensation plan must be incorporated into the permit by reference. The compensation site plan should include the Corps permit number so that the plan can be incorporated into the permit file.

V. Requirements for Mitigation Banking (§ 332.8)

A. Background

Mitigation banking involves a formal administrative framework in which wetlands are restored, created, enhanced, or preserved expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to wetlands/aquatic resource habitats. Banking is often characterized by transfer of the legal and financial responsibility for executing compensatory mitigation from the permittee to a third party — the bank sponsor. Wetland compensation bank site "credits" are available for use by the bank sponsor or by other parties to compensate for adverse wetland/aquatic resource impacts due to permitted activities.

Prospective bank sponsors are advised that establishment of a mitigation bank does not assure future authorization for specific projects that impact wetlands, does not exempt such projects from any applicable permitting requirements, nor does it pre-authorize the use of credits from that bank as compensation for any particular impact.

In 1994, the state and federal agencies responsible for wetland regulation in Minnesota signed a Memorandum of Understanding whereby the state wetland bank for compensatory mitigation, where appropriate, is in the public interest.

The Mitigation Rule states a preference for mitigation banking versus project-specific compensation (§ 332.3(b)(2)).

B. "Mitigation Bank" versus "Bank Site"

A mitigation bank is the overall system of establishing wetland/aquatic habitat banking credits at one or more sites where those credits and debits are subsequently tracked. A bank site is the actual compensation project. Five wetland compensation credits is the minimum size for a Corps-approved bank (acres will vary depending upon crediting, see Table 4). A minimum size is necessary due to the: (1) higher functional levels and greater resiliency of large sites compared to small, scattered sites; and (2) level of review and commitment of resources required for the federal banking process. The techniques (e.g., restoration, enhancement, creation) for establishing bank sites are the same as those described for project-specific compensation sites. Multiple bank sites by a single entity can be covered by an umbrella banking instrument.

In Minnesota, BWSR is responsible for administering the state wetland banking system. A list of bank accounts with available credits is at:

http://www.bwsr.state.mn.us/wetlands/wetlandbanking/wetlandsummary.pdf

This accounting identifies the various types of credits from bank sites as either approved or not approved by the Corps. Only credits from Corps-approved credits can be used for Section 10/404 purposes.

C. Role of the Bank Sponsor

The bank sponsor is responsible for preparing all documentation associated with establishment of the bank, including the prospectus, compensation site plan and the banking instrument (§ 332.8(d)). The prospectus provides an overview of the mitigation bank project and serves as the basis for public and initial Interagency Review Team (IRT) comment. The compensation site plan, as described in § 332.4(c),

provides detailed plans and specifications for the mitigation bank. The mitigation banking instrument provides the authorization for the mitigation bank to provide credits to be used as compensatory mitigation for Department of the Army permits.

The bank sponsor is also the entity financially responsible for properly recording and reporting debits and credits, conducting required corrective actions, providing required monitoring and status reports to the regulatory agencies, and assuring long term maintenance and protection of the site(s).

D. Role of the Credit Purchaser (Applicant/Permittee)

Before credits are purchased, the applicant/permittee must come to agreement with the Corps as to the number of credits to be purchased and the bank site to be used. As a condition of the permit, the purchaser shall provide the Corps a copy of the purchase receipt, such as a fully executed purchase agreement or credit withdrawal application signed by BWSR indicating debit or credits.

E. Role of the Interagency Review Team (§ 332.8(b))

For Section 10/404 purposes, an IRT is convened and includes representatives of the Corps, EPA, U.S. Fish and Wildlife Service (FWS), and other state, tribal, or local agencies, as appropriate. The Corps will serve as the lead IRT agency. The primary role of the IRT is to facilitate review and approval of the banking proposal. The IRT will visit each proposed bank site, review the proposed design of the site, and determine the expected credits for the site. At various specified stages after construction of the bank site, the IRT will determine the creditable acreage of compensation established.

Six critical points in the IRT review of a mitigation bank:

1. Review of the prospectus for a proposed bank site including a site visit to confirm that the site is suitable for establishing credits for Section 10/404 purposes;

2. Publication of a public notice to solicit comments;

3. Review and approval of the compensation site plan (design and specifications);

4. Signing of the mitigation banking instrument (contractual agreement) and initial release of credits;

5. First post-construction inspection to confirm conformance with design specifications and determine if additional credits can be released; and

6. Additional site visit(s) and determination of final credits established at the bank site.

In Minnesota, the IRT will typically be working parallel to or with the Technical Evaluation Panel (TEP) under WCA procedures. While the Corps may work parallel to the TEP, the Corps is independent of the TEP. The Corps, with input from the IRT, will make the final decision on credits established for Section 10/404 purposes. This may or may not concur with findings by the TEP.

F. Role of the Corps

The Corps will lead the IRT and determine the appropriate compensation required for Section

10/404 permit authorizations. If the use of banking credits is the selected approach for compensation, the Corps will determine the appropriate compensation ratio by considering the specifics of the wetland/aquatic resource losses and the bank site selected. The Corps will use its authority to enforce the compensatory mitigation requirements of Section 10/404 permits, including a permittee's debiting of bank credits.

When a permit is issued, the Project Manager will report, by letter or email, the debits required by that permit to the Corps banking coordinator and the BWSR banking coordinator.

G. Prospectus (332.8(d)(2) and (3))

The prospectus must provide a sufficient level of detail to support informed IRT and public comment. In particular, it must describe the objectives of the proposed mitigation bank, how the bank will be established and operated, the proposed bank service area, and the general need for, and technical feasibility of, the proposed mitigation bank (§ 332.8(d)). The prospectus must discuss how the site will support the planned types of wetlands/aquatic resources and functions. The St. Paul District has determined that Part A of the Minnesota Wetland Bank Plan Application, when complete, has the information necessary for a prospectus and will be adopted as such. The review process begins when the sponsor submits a complete prospectus to the Corps. The Corps shall notify the sponsor within 21 days whether or not a submitted prospectus is complete (§ 332.8(d)).

H. Public Review, Comment, and Initial Evaluation (§ 332.8(d)(4) and (5))

Within 30 days of receipt of a complete prospectus, the Corps will issue a public notice of the proposed mitigation bank. This will be done regardless of whether a Section 10 and/or 404 permit is required to construct the bank. The public notice must include a summary of the prospectus and indicate that the full prospectus is available to the public for review upon request. A 30-day comment period is standard. Copies of all comments received in response to the public notice must be distributed to the other IRT members and to the sponsor within 15 days of the close of the public notice comment period. After the comment period closes, the Corps will review the comments and make an initial evaluation.

I. Compensation Site Plan (§ 332.4(c)(2) through (14))

See discussion under Section IV. and Appendix C. The St. Paul District has determined that the completed Minnesota Wetland Bank Plan Applications (Parts A, B with appendices 1-4), will satisfy federal requirements for this part of the bank implementation process if the following additional information is included in the plan:

1. Performance standards;
2. Credit release schedule tied to achievement of specific milestones;
3. Adaptive management plan;
4. Long-term management provisions that include specific timeframes for proposed activities;
5. Financial assurances proposal; and,
6. Credit allocation proposal consistent with Corps policy.

J. Mitigation Banking Instrument (§ 332.8(d)(6) through (8))

Should the prospective bank sponsor wish to proceed further with the bank review process after receiving the Corps initial evaluation of the banking prospectus, the bank sponsor will submit to the Corps a completed compensation site plan and St. Paul District's standard Mitigation Bank Instrument.

The compensation site plan should be based on the prospectus and must describe in detail the compensation plan and how the bank will be established and operated. The draft banking instrument must include:

1. Compensation site plan (design and specifications for the site) incorporated by reference;
2. Geographic service area of the bank;
3. Credit release schedule (as an appendix or in compensation site plan);
4. Performance standards (as an appendix or in compensation site plan);
5. Accounting procedures;
6. Financial assurances (when necessary);
7. A provision stating that legal responsibility for providing the compensatory mitigation lies with the sponsor;
8. Default and closure provisions;
9. Draft permanent conservation easement (or copy of recorded easement held by such); and,
10. Any other information deemed necessary by the Corps.

Within 30 days of the receipt of the draft compensation site plan and banking instrument, the Corps must determine whether or not the submission is complete and notify the sponsor of any deficiencies. Upon receiving the draft mitigation banking instrument with a complete compensation site plan, the Corps must provide copies to the other IRT members for a 30-day IRT comment period. Following the comment period, the Corps will discuss any comments with the appropriate agencies and with the sponsor. The Corps will seek to resolve any issues with a consensus-based approach. Within 90 days of receipt of the complete draft mitigation banking instrument, the Corps must notify the bank sponsor of the status of the IRT review. Specifically, the Corps must indicate to the sponsor if the draft mitigation banking instrument is generally acceptable and what changes, if any, are needed.

The bank sponsor then prepares a final banking instrument that includes the final compensation site plan. It must be submitted directly from the sponsor to all members of the IRT. Within 15 days of receipt of the final mitigation banking instrument, the Corps will notify the IRT members whether or not the Corps intends to approve it. If no IRT member objects within 30 days by initiating the dispute resolution process (see § 332.8(e)), the Corps will notify the bank sponsor of its final decision. If that decision is to approve the mitigation banking instrument, arrangements will be made for the Corps and bank sponsor to sign the instrument. Other IRT members may also elect to sign the mitigation banking instrument. The Corps will not approve new deposits of credits for a mitigation bank site until a mitigation banking instrument is signed by the Corps and bank sponsor (§ 332.8(d)).

The Corps alone retains final authority for approval of the mitigation banking instrument in cases where the mitigation bank is used to satisfy compensatory mitigation requirements for Section 10/404 (§ 332.8(b)(4)).

A mitigation banking instrument serves as the contractual agreement between the Corps and bank sponsor concerning the bank. In particular, it will definitively address objectives, long-term management, contingency plan, financial assurances, and protection of the site in perpetuity. This is essential for the Corps ability to enforce the provisions of the banking instrument should problems or failures occur. Since failure of a bank site would mean that compensation for wetland losses from several projects would be lost, the review and oversight requirements for bank sites are more rigorous than for most project-specific compensation plans, involving several field reviews and approval steps by the IRT.

Umbrella banking instruments can be used for bank sponsors operating multiple bank sites (§ 332.8(h)). As additional sites are selected, they must be included under the umbrella banking instrument as modifications after IRT review and comment on the prospectus, a public notice and approval of a

compensation site plan (§ 332.8(g)).

K. Release of Credits (§ 332.8(m))

The terms of the credit release schedule must be specified in the banking instrument. Up to15 percent of the projected credits can be certified for deposit in the State's bank as Corps-approved once the banking instrument has been signed, real estate protection provisions implemented (permanent conservation easement for banking recorded, title insurance policy secured), as-built plans with plant material receipts and labels submitted, and the construction approved by the Corps in consultation with the IRT. Release of credits must be tied to performance-based milestones (e.g., construction, planting, establishment of specified plant communities and target hydrology)(§ 332.3(b)(2)). For example, additional credits are released when it is confirmed that wetland hydrology and vegetation are becoming established and submitted monitoring reports show that the site meets performance standards for that particular stage of the compensation plan.

The Corps will provide copies of the bank sponsor's documentation to IRT members for review. IRT members must provide any comments to the Corps within 15 days of receiving this documentation. However, if the Corps determines that a site visit is necessary, IRT members must provide their comments within 30 days. After full consideration of any comments received, the Corps will determine whether the appropriate milestones have been achieved and the credits can be released.

If the Corps determines that the mitigation bank is not meeting performance standards, the number of available credits may be reduced or the Corps credit approval may be suspended. This will be documented in the bank accounting database. The Corps may also require adaptive management and/or direct use of financial assurances for remediation (§ 332.8(o)(10)).

It should be noted that the Corps may limit the use of a particular bank site as compensation, or require a higher compensation ratio, for a specific impact if use of the bank site will not achieve the goal of replacing lost functions. Also, a bank sponsor may limit the service area or clients of a bank site, as identified in the bank document. For example, the bank sponsor may declare that it will only provide credits to certain clients and/or within a certain geographical area.

L. Monitoring (§ 332.6)

The bank sponsor is responsible for monitoring the bank site in accordance with the approved monitoring requirements to determine the level of success and identify problems requiring remedial action (§ 332.8(q)(2)). Monitoring must be conducted at time intervals appropriate for the particular project type and until such time that the Corps, in consultation with the IRT, determines that the performance standards have been met. The standard length of monitoring is 5 years and may be extended to 10 years for establishment of certain wetland types (e.g., forested wetlands), or may be shortened if all performance standards are met earlier than 5 years. Monitoring reports can be submitted less frequently than one/year for bank sites requiring more than 5 years of monitoring.

M. Financial Responsibilities/Assurances (§ 332.3(n))

The bank sponsor must make adequate financial provisions for the operation, maintenance, and long-term management of the bank site. Appropriate long-term financing mechanisms include trusts, contractual arrangements with future responsible parties and escrow accounts. In cases where the long-term management entity is a public authority or government agency, a formal, documented, commitment to accept stewardship responsibilities for the project may be acceptable in-lieu of specific financial

assurances. The legal mechanisms and the party responsible for the long-term management of the bank site must be documented in the banking instrument.

A performance bond may be placed with a third party approved by the Corps. The bond obligation is released when the Corps, with IRT concurrence, certifies in writing that the initial construction and any needed corrective actions have been taken. Financial assurances for post-construction care must be adequate to address the costs of monitoring, maintenance, corrective actions and management (e.g., weed control, prescribed burns). These costs should be estimated as part of the compensation site plan.

To date, few compensation sites in Minnesota have financial assurances for long-term maintenance. This is now recognized as one of the fundamental problems that need to be addressed from this point on. When sites become publicly-owned wetlands, it has been assumed that the management agency will have sufficient funding to conduct maintenance activities for the foreseeable future, which may or may not be the case. Therefore, financial assurances for long-term maintenance shall be included whenever practicable.

N. Protection in Perpetuity

The overall bank site must be protected through appropriate real estate instruments such as covenants, conservation easements, or transfer of title to a public natural resource agency or private conservation organization. If transferred to a public natural resource agency or private conservation group, an MOU on the stewardship and management of the site is highly recommended. Past cases have occurred where the natural resource agency conducted activities that were incompatible with compensatory mitigation for Section 10/404 purposes.

VI. BWSR Wetland Compensation for Local Road Authorities

A. Background

In 1996, BWSR was tasked by the Minnesota Legislature to accomplish compensatory mitigation on behalf of local road authorities – primarily city and county highway departments – for improvements to existing (not new) roads. BWSR implemented the Minnesota Local Government Roads Wetland Replacement program to replace wetlands impacted by road repair, rehabilitation, reconstruction, or replacement projects undertaken by local government road authorities. Funding for the program has been provided on a biennial basis through bonding. Meeting the minimum statutory obligations for wetland replacement requires $3 million to $4 million for each biennium. An average of 225 acres of wetlands needs to be compensated for each year at an annual cost of approximately $1.8 million.

Wetland credits certified for the BWSR Local Road Replacement Program must meet the same standards as that for other banking credits.

On-site compensation required by local government units or other regulatory agencies such as the MnDNR or Corps is not considered a BWSR responsibility.

MnDOT is responsible for satisfying compensatory mitigation requirements for its projects. BWSR and MnDOT are working jointly whereby MnDOT provides funding while BWSR conducts searches for suitable compensation sites and then designs and constructs the sites.

B. Application Form

A combined project application form was created to streamline the reporting process and ensure proper coordination with all regulatory authorities. It is entitled, “Minnesota Local/State/Federal Application Forms for Water/Wetland Projects – Public Transportation and Linear Utility Projects” (also referred to as Public Road Combined Project Application Form), and can accessed from the BWSR web site. Copies of the application are sent to the Corps.

C. Corps Approval of BWSR Local Road Compensation Ratios

It takes an average of two and a half years to find, design, construct and receive initial credits from compensation sites in Minnesota. Since 1996, local road authorities have been filling wetlands without providing compensatory mitigation for those projects that fell into the new BWSR road replacement program. Since no lead time was given to BWSR, a 2.5-year gap was created between wetland impacts and establishing wetland credits to offset those impacts. Figure 7 illustrates surplus and deficits by 8-digit HUC watersheds as of January 2008.

In acknowledgement of the above situation, the Corps adopted a policy to accept the same ratios for BWSR local road replacement as that approved for WCA purposes from April 2005 to April 2008. This meant that compensation in the greater than 80 percent area would more often be at a 1:1 ratio as opposed to 1.5:1. This window of opportunity was to allow BWSR additional time to establish compensation sites, particularly sites in the northern portion of the state.

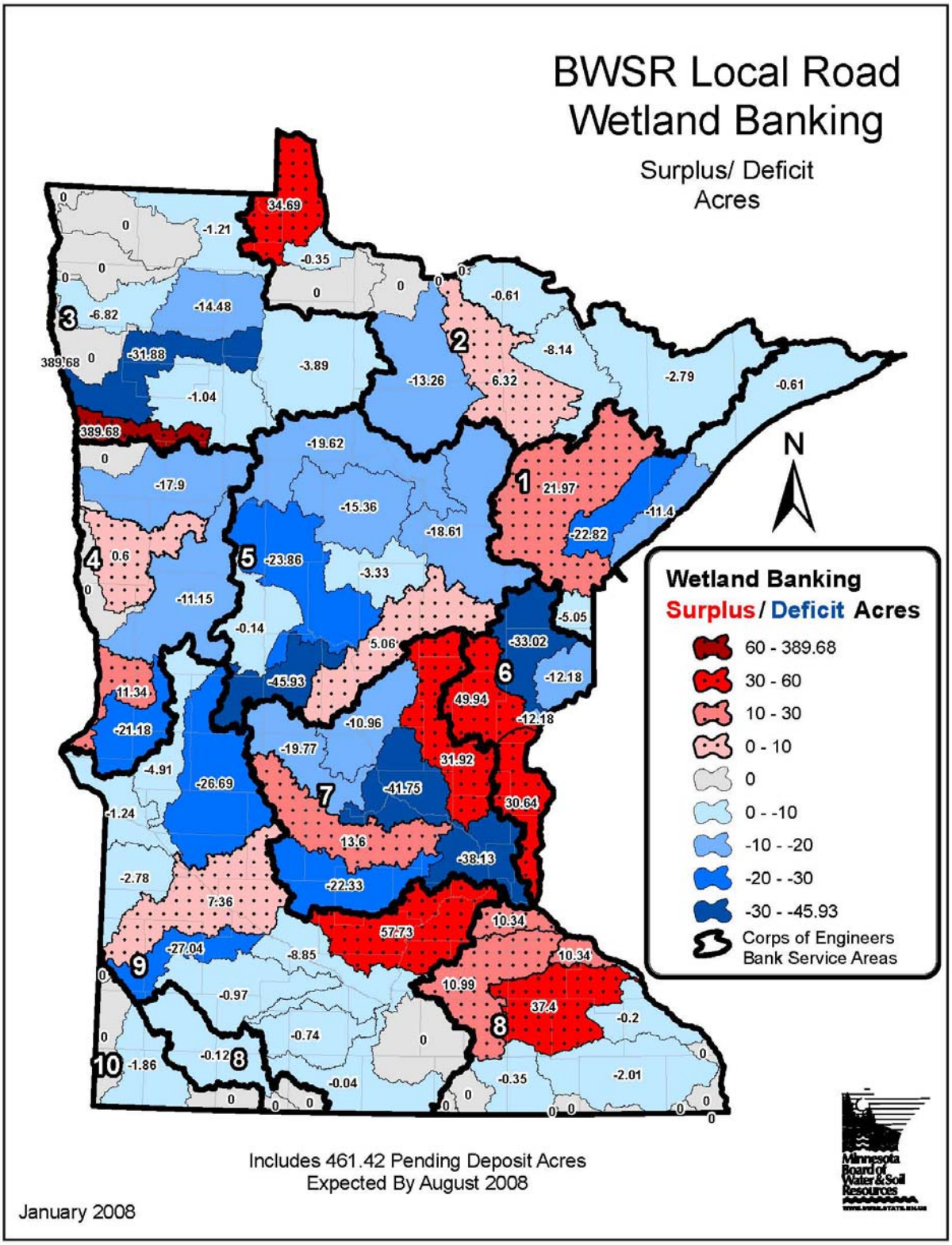

BWSR Local Road
Wetland Banking
Surplus/ Deficit
Acres
N
Wetland Banking
Surplus / Deficit Acres
60 - 389.68
30 - 60
10 - 30
0 - 10
0
0 - -10
-10 - -20
-20 - -30
-30 - -45.93
Corps of Engineers
Bank Service Areas
Includes 461.42 Pending Deposit Acres
Expected By August 2008
January 2008
Minnesota
Board of
Water & Soil
Resources

Figure 7

BWSR responded to the public notice on the draft St. Paul District mitigation policy via a letter dated April 30, 2007 and requested an additional 2.5 years of applying the same ratios for BWSR local road replacements as that approved for WCA purposes. Given that 1.5 years have elapsed since that request (BWSR has had that time to reduce the deficit in credits in certain areas of the state), the Corps will grant an additional two years thereby establishing a new deadline of December 31, 2010 after which point the ratios shown by Tables 2 and 3 of this document will be applied to all compensation required under the BWSR road replacement program.

If compensation by BWSR is not adequate or provided in a timely manner, the responsibility for the compensation falls to the city and county highway departments. Failure to satisfy compensatory mitigation requirements would constitute a violation of the Department of the Army permit conditions and could trigger enforcement actions such as suspension and revocation of the permit, and/or referral of such violations to either the EPA or the Office of the U.S. Attorney for appropriate administrative or civil penalties.

The grace period for BWSR compensation for local road authorities does not apply to MnDOT. MnDOT has been accomplishing compensatory mitigation since the 1980s with its own system of compensation sites and funding. The problematic issues that BWSR faces, given the 1996 legislative mandate involving local road authorities, did not affect MnDOT.

D. Responsibilities of Local Road Authorities for New Roads

Compensation for wetland losses due to new roads must be accomplished by the responsible transportation authority under normal regulatory procedures. This may involve project-specific compensation, purchase of wetland bank credits from account holders in the State Wetland Bank, and/or purchase of credits from BWSR.

VII. National Research Council Guidelines for Compensatory Mitigation for Clean Water Act Purposes

In its comprehensive report, *Compensating for Wetland Losses Under the Clean Water Act* (2001), the National Academy of Sciences' National Research Council (NRC) provided ten guidelines to aid in planning and implementing successful mitigation projects. Appendix D lists those guidelines. All of the guidelines have applicability to wetland compensation success in Minnesota. It is Corps policy to implement the NRC recommendations to the fullest extent practicable.

Compensation has the greatest likelihood of success when it conforms to the natural landscape. This approach epitomizes the NRC's guideline to avoid over-engineered structures in the wetland's design, as well as the design with the landscape philosophy of Mitsch and Gosselink (2000)[9]. Application of this approach would avoid one of the chronic problems observed at compensation sites in Minnesota: over-excavated or impounded sites that failed to replace the wetland functions lost due to authorized projects. The *Ecological Rationale* discusses this in more detail. Excavation, berms and/or water control structures were commonly used to create water levels that were higher than historical conditions (prior to European settlement and subsequent artificial drainage). Instead of restoring the historic wetland hydrology naturally supported by a particular landscape setting, over-engineered structures imposed artificially high water levels on the landscape. This approach is more expensive to construct compared to a ditch plug or tile break and is also more expensive to maintain. Long-term maintenance problems include dike failure and washout of control structures. Overall, there is an acute risk of failure of over-engineered compensation sites. This is particularly true given the time frame – in perpetuity – that the compensation sites are intended to provide wetland functions.

[9] Mitsch, W. and J. Gosselink. 2000. *Wetlands. Third Edition*. Wiley & Sons, Inc., New York, New York. 920 pp.

VIII. Priority for Achieving In-Kind Compensation Within a Watershed Context

A. Reversing Long-Term Trend for Out-of-Kind Compensation

The *Ecological Rationale* described the finding that, during the past 25 years, compensatory mitigation in the St. Paul District of the Corps has been dominated by out-of-kind compensation that failed to replace wetland functions lost due to authorized activities. In particular, losses of the functions provided by forested, shrub, bog and native wet/sedge meadow wetlands were rarely replaced in-kind. Instead, compensation for those losses was dominated by open water ponds and impoundments, often with little to no vegetation and degraded by carp, as well as deep and shallow marshes overwhelmingly dominated by cattails. If saturated soil compensation sites were established, they were typically dominated by nearly monotypic stands of the invasive species, reed canary grass. The result has been a large surplus of the functions associated with open water and marsh systems and a large deficit of the functions associated with forested, shrub, bog and native wet/sedge meadow wetlands.

The loss of natural wetlands and replacement by ponds is a national trend as reported by the FWS in the *Status and Trends of Wetlands in the Conterminous United States 1998-2004.*[10] During that time frame, over a million acres of freshwater emergent and shrub wetlands were lost while freshwater ponds increased by about 695,000 acres. Many of the ponds were golf course features, residential "reflecting ponds," stormwater basins or compensatory mitigation sites. Dr. Joy Zedler referred to this as the "pondification of America" and articulated how ponds do not compensate for the loss of functions provided by natural wetlands.[11] Dr. Zedler further described how a watershed approach can be used to achieve a greater likelihood of compensating for lost wetland/aquatic functions.

An emphasis of the St. Paul District policy is to reverse the previous trend and strive to achieve the fundamental goal of compensatory mitigation – replacing the wetland functions unavoidably lost due to authorized activities. This policy is consistent with the Mitigation Rule as it states: (1) a preference for in-kind compensation (§ 332.3(e)); (2) that compensatory mitigation must be commensurate with the amount and type of wetlands impacted by the authorized activity (§ 332.3(a)); and (3) that the required compensation shall be of a similar type of wetland as that impacted (§ 332.3(e)). However, this does not mean that impacts to degraded wetlands are deliberately compensated with degraded wetlands.

1. For Project-Specific Compensation, Permit Conditions Will Require In-Kind Compensation to the Extent Practicable. Project Managers will review proposed plans and direct the project sponsor to design the site to maximize in-kind replacement of the functions that would be lost should the Department of the Army permit application be granted. Alternatively, a Corps-approved watershed plan can identify and prioritize a specific type(s) of out-of-kind compensation. Either case will be specified and enforced through permit conditions.

"Practicable" will be applied using the same principle as defined by the 404(b)(1) Guidelines. Contractors may find creating ponds is easier, and establishing reed canary grass is less expensive than establishing forested wetlands, but practicable options for compensatory mitigation are not defined by the most convenient and least expensive methods. Restoration/creation/enhancement of forested, shrub, bog and native wet/sedge meadow wetlands may have some degree of higher costs and level of effort

[10] Dahl, T. *Status and Trends of Wetlands in the Conterminous United States 1998 to 2004.* U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 112 pp.
[11] Presentation at Fifth Stakeholder's Forum of Federal Wetlands Mitigation. May 10, 2006, Environmental Law Institute, Washington, D.C.

compared to creating ponds or establishing reed canary grass meadows; however, those options can be achieved at reasonable cost and assurance of success as described in the *Ecological Rationale*. In summary, the Corps, not the permittee, makes a case-by-case decision as to which options for compensation are practicable. Permit conditions will reflect the Corps determination as to practicable, in-kind compensation.

For example, if the unavoidable adverse impacts of a proposed project would destroy two acres of hardwood swamp and one acre of sedge meadow, the primary emphasis would be placed on offsetting the loss of functions by establishing the proper hydrology, substrate and plantings for hardwood swamp and sedge meadow communities as close as feasible to that impact site. Compensation ratios should be higher than 1:1 to account for temporal loss and the risk of failure. If the proposed compensation site is unsuitable for establishing these types of wetlands, the Project Manager should direct the project sponsor to find an alternate site. If there is no practicable alternative site, the resulting out-of-kind compensation requires a higher compensation ratio.

Alternatively, the permittee can purchase credits at a bank site within the same bank service area as that of the impact site. The temporal loss issue is resolved, but the "in-kind" question needs to be addressed. See discussion below.

2. Goals to Achieve In-Kind Compensation at Mitigation Bank Sites. Project Managers will review proposed bank site designs and direct bank sponsors to establish the wetland types most commonly lost within that bank service area due to authorized projects. Proposed bank site designs consisting of ponds, impoundments, and/or deep marshes will be rejected during the IRT review (see exceptions below). Failure to do so would perpetuate out-of-kind compensation and contribute to the surplus of open water and deep marsh acreage in bank sites.

Compensation consisting of open water ponds, impoundments and/or deep marshes is no longer acceptable as a standard practice except when it would:

a. Constitute in-kind compensation in a particular case;
b. Not be practicable to establish any other wetland types due to landscape position and contributing watershed; and/or
c. Constitute 15 percent or less of the acreage of the bank site.

An additional consideration regarding a.-c. above is to avoid one of the principal problems that degrade compensation sites in Minnesota – infestation by carp. If the compensation site would have a surface water connection to waters with populations of carp, even if that connection is a 10-year flood event, it is advisable to avoid creating open water ponds and impoundments that would create habitat for this nuisance species. Monitoring of compensation sites infested with carp found that those habitats were highly degraded due to turbid water conditions and lack of aquatic vegetation.

3. Problems to Avoid by Future Compensation

a. Diverting Clean Water Act Compensation to Promote Production of Game Species. Proposals to restore larger wetland complexes for regulatory compensation often prompted recommendations by wildlife managers to promote production of game species such as waterfowl and sharp-tailed grouse. Cases have occurred where Section 10/404 compensation sites in Minnesota were deliberately designed and managed for out-of-kind compensation for the purpose of producing game

species rather than offsetting the functions lost due to authorized activities.[12] The desire of wildlife managers to produce game species is understandable. However, production of game species is unrelated to Corps responsibilities for offsetting losses of the broad spectrum of wetland/aquatic resource functions due to authorized activities.

The Corps alone makes the final decision on compensatory mitigation for Section 10/404 purposes. Recommendations to design and manage regulatory wetland compensation sites for game species can be acknowledged but carry little weight in the Corps decision.

b. Ponds as Compensation Sites. Ponds that would double as a fishing/reflecting/ stormwater ponds are not appropriate for Section 10/404 compensation. Because an open water pond does not replace the functions of many commonly impacted wetland types (e.g., forested, shrub, bog and native wet/sedge meadow wetlands), compensation site plans including open water ponds are typically unsuitable and inappropriate for replacing the functions of wetlands lost due to authorized activities. When compensation plans are received that include open water, the Project Manager will direct the project sponsor to redesign the site for in-kind compensation, or find an alternative site for the compensation. If that is not practicable, the project sponsor can be directed (via permit conditions) to purchase suitable bank credits.

B. Summary

Achieving in-kind compensation requires a greater emphasis on establishing saturated soil and seasonally flooded hydrologic regimes supporting forested, shrub, bog and native wet/sedge meadow wetland types. Forested wetlands included in this group are floodplain forests, hardwood swamps, conifer swamps and conifer bogs. Standard permit conditions, compensation site plans (banking), planting plans and performance standards, should specify the necessary requirements to establish these wetland types. Technical memoranda will be developed in conjunction with this policy to assist Project Managers in achieving this goal.

Note that permittees and bank sponsors will not be required to monitor/manage compensation sites until mature forested, shrub or bog wetland types develop. Rather, permittees and bank sponsors are required to establish the proper substrate, hydrology and survival of planted stock to ensure that the compensation site is on the right trajectory to develop into these wetland types.

The *St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota* is in accordance with the Mitigation Rule. It is a necessary step to implement the recommendations and direction of the National Academy of Sciences and the Mitigation Rule to achieve the national goal of no net loss of wetlands.

[12] Restoration of forested and shrub dominated wetland communities in northern Minnesota has been far short of that necessary to provide in-kind compensation to offset authorized impacts. Yet, there are hundreds of acres of Corps-approved compensation sites that are being actively managed to prevent establishment of native forested and shrub wetlands. The reason is active mowing/cutting to provide open habitat for an upland game bird – sharp-tailed grouse. This illustrates the extent to which past regulatory compensation for Clean Water Act purposes has been diverted for unrelated activities.

Point of contact. Questions on this compensatory mitigation policy can be directed to Steve Eggers, Senior Ecologist, Regulatory Branch at (651) 290-5371 or e-mail at: steve.d.eggers@usace.army.mil .

Robert J. Whiting *January 22, 2009*

Robert J. Whiting Date
Chief, Regulatory Branch

Appendix A

MOU Signed by Corps and BWSR May 2007

[Note: Subsequent to May 2007, modifications involving some of the factors described by the MOU were made. The MOU is included here to provide readers with an understanding of the process that produced the final Corps mitigation policy for Minnesota.]

US Army Corps of Engineers
St. Paul District

INTERAGENCY MEMORANDUM OF UNDERSTANDING

WETLAND MITIGATION GUIDELINES

Minnesota Board of Water & Soil Resources

This Memorandum of Understanding (MOU) is made and entered into by the Minnesota Board of Water and Soil Resources and the U.S. Army Corps of Engineers.

WHEREAS, the Minnesota Board of Water and Soil Resources has state oversight responsibilities for the Wetland Conservation Act and the rules through which it is implemented (Minnesota Rules Chapter 8420);

WHEREAS, the U.S. Army Corps of Engineers administers Section 404 of the Clean Water Act, which regulates the discharge of dredged or fill material into waters of the United States. Under Section 10 of the Rivers and Harbors Act, the Corps also regulates any work done below the ordinary high water mark of traditionally navigable waters,

WHEREAS, these State and Federal authorities regulate impacts to wetlands/waters and require that unavoidable impacts be offset through compensatory mitigation;

WHEREAS, increased efficiency and effectiveness in program administration, reduced cost to the governments that administer these programs, and reduced cost for the regulated public can be gained through increased consistency between and among these State and Federal agencies;

WHEREAS, the discussions over how to reconcile programmatic differences have led to proposals to increase state and federal program consistency in the following areas:

- Criteria for the use of preservation as a wetland mitigation option;
- Mitigation credit for stream restoration;
- In lieu fee mitigation;
- Definition of in kind, in place, and in advance for wetland mitigation;
- Options for mitigation credit, including credit for water quality treatment areas; and
- Mitigation ratios.

THEREFORE, the undersigned agencies concur that it is in the public interest to implement changes to bring their programs into conformance with the wetland mitigation requirements that are contained within the "Wetland Mitigation Guidelines" and hereby incorporated into this MOU.

GENERAL.

1. The policies and procedures contained within this MOU do not create any rights or obligations, either substantive or procedural, enforceable by any party or any third party. Deviation or variance from the wetland mitigation guidance included in this MOU will not constitute a defense for violators or others concerned with any State or Federal action.

2. Nothing in this MOU is intended to diminish, modify, or otherwise affect statutory or regulatory authorities of any signatory agencies. All formal guidance interpreting this MOU and background materials upon which this MOU is based will be issued after consultation with the signatory agencies.

3. All responsibilities identified in this MOU are subject and dependent on the availability of sufficient funds appropriated and allocated for that purpose.

4. This MOU will take effect on the date of the last signature below and will continue in effect until modified or revoked by the signatory agencies.

5. This MOU is based on the state and federal authorities as they exist on the date of signature. Subsequent changes to these authorities are not binding on the parties to this MOU.

Randy Kramer — Date: 5/20/07
Chair
Minnesota Board of Water and Soil Resources

Colonel Michael Pfenning — Date: 16 May 2007
District Engineer and Commander
St. Paul District
U.S. Army Corps of Engineers

Attachment: Wetland Mitigation Guidelines

US Army Corps of Engineers
St. Paul District

Wetland Mitigation Guidelines
For the State of Minnesota

Minnesota Board of Water & Soil Resources

Introduction.

The Minnesota Board of Water and Soil Resources (BWSR) and the U.S. Army Corps of Engineers (COE), St. Paul District have been leading discussions for the past two years on streamlining wetland compensatory mitigation requirements under the Minnesota Wetland Conservation Act and Section 404 of the Clean Water Act. The purpose of this effort is to increase state and federal regulatory consistency with the resulting programmatic and natural resource benefits.

These guidelines between BWSR and COE represent the programmatic changes that will be pursued to implement the Wetland Mitigation Guidelines. Each agency will make a good faith effort to implement these guidelines, but strict adherence to these guidelines is beyond the authority of the agencies to guarantee.

---

1. ***ISSUE*** – Use of preservation as a wetland mitigation option.

GUIDELINES BETWEEN BWSR AND COE:

- Wetland to be preserved must be under demonstrable threat. Demonstrable threat is defined as follows: A proposed activity or potential activity(-ies) that would degrade or destroy wetland functions that are important to the watershed. Examples that document demonstrable threat include an approved development plat, approved building permit, zoning change or USDA authorization to fill/drain a non-jurisdictional wetland. Important functions can be determined by a functional assessment (e.g. MnRAM 3.0)
- Replacement credit is awarded at minimum 8:1 ratio or 12.5% (1 acre replacement credit for every 8 acres preserved)
- Preservation should be the last priority for compensatory mitigation
- Preservation may be considered for replacement credit statewide

2. ***ISSUE*** – Mitigation credit for stream restoration

GUIDELINES BETWEEN BWSR AND COE:

- Stream restoration projects confined to the channel (the area between the ordinary high water marks on each bank) should not be used as wetland mitigation. Stream restoration projects that include restoration of adjacent riparian wetlands are eligible to receive credit for the area of wetlands restored, enhanced, or created as part of the stream restoration project.

3. *ISSUE* – In-Lieu Fee (ILF) Mitigation

GUIDELINES BETWEEN BWSR AND COE:

- BWSR and the Corps do not support allowing in lieu fee mitigation to be used as a standard wetland mitigation option under the regulatory programs. However, discussions will continue between the Corps and BWSR regarding special circumstances where in lieu fee mitigation may be appropriate, such as for large impacts and enforcement penalties or after the fact compensatory mitigation.

4. *ISSUE* – Definition of In-kind, In-place and In-advance for wetland mitigation

A. GUIDELINES BETWEEN BWSR AND COE – IN-KIND:

- BWSR and the Corps support using the "Wetland Plant Community Types" by S. Eggers and D. Reed that will establish 12 wetland types for purposes of determining in-kind wetland mitigation. This will require establishing guidelines on how to translate these wetland types with those currently recognized in the WCA rule. (See table shown below)

Wetland Plant Community Types[1]	**Classification of Wetlands and Deepwater Habitats of the United States (Cowardin *et al.* 1979)**	**Fish and Wildlife Service Circular 39 (Shaw and Fredine 1971)**
Shallow, Open Water	Palustrine or lacustrine, littoral; aquatic bed; submergent, floating, and floating-leaved	Type 5: Inland open fresh water
Deep Marsh	Palustrine or lacustrine, littoral; aquatic bed; submergent, floating, and floating-leaved; and emergent; persistent and nonpersistent	Type 4: Inland deep fresh marsh
Shallow Marsh	Palustrine; emergent; persistent and nonpersistent	Type 3: Inland shallow fresh marsh
Sedge Meadow	Palustrine, emergent; narrow-leaved persistent	Type 2: Inland fresh meadow
Fresh (Wet) Meadow	Palustrine; emergent; broad- and narrow-leaved persistent	Type 1: Seasonally flooded basin or flat; Type 2: Inland fresh meadow
Wet to Wet-Mesic Prairie	Palustrine; emergent; broad- and narrow-leaved persistent	Type 1: Seasonally flooded basin or flat; Type 2: Inland fresh meadow
Calcareous Fen	Palustrine; emergent; narrow-leaved persistent; and scrub/shrub, broad-leaved deciduous	Type 2: Inland fresh meadow Type 6: Shrub swamp
Open Bog or Coniferous Bog	Palustrine; moss/lichen; and scrub/shrub; broad-leaved evergreen; and forested; needle-leaved evergreen and deciduous	Type 8: Bog

2

Shrub-Carr or Alder Thicket	Palustrine; scrub/shrub; broad-leaved deciduous	Type 6: Shrub swamp
Hardwood Swamp or Coniferous Swamp	Palustrine; forested; broad-leaved deciduous; needle-leaved evergreen and deciduous	Type 7: Wooded Swamp
Floodplain Forest	Palustrine; forested; broad-leaved deciduous	Type 1: Seasonally flooded basin or flat
Seasonally Flooded Basin	Palustrine; flat; emergent; persistent and nonpersistent	Type 1: Seasonally flooded basin or flat

[1] Plant communities are based on: S. Eggers and D. Reed. 1997. *Wetland Plants and Plant Communities of Minnesota and Wisconsin. Second Edition.* St Paul District, U.S. Army Corps of Engineers. 264 pp.

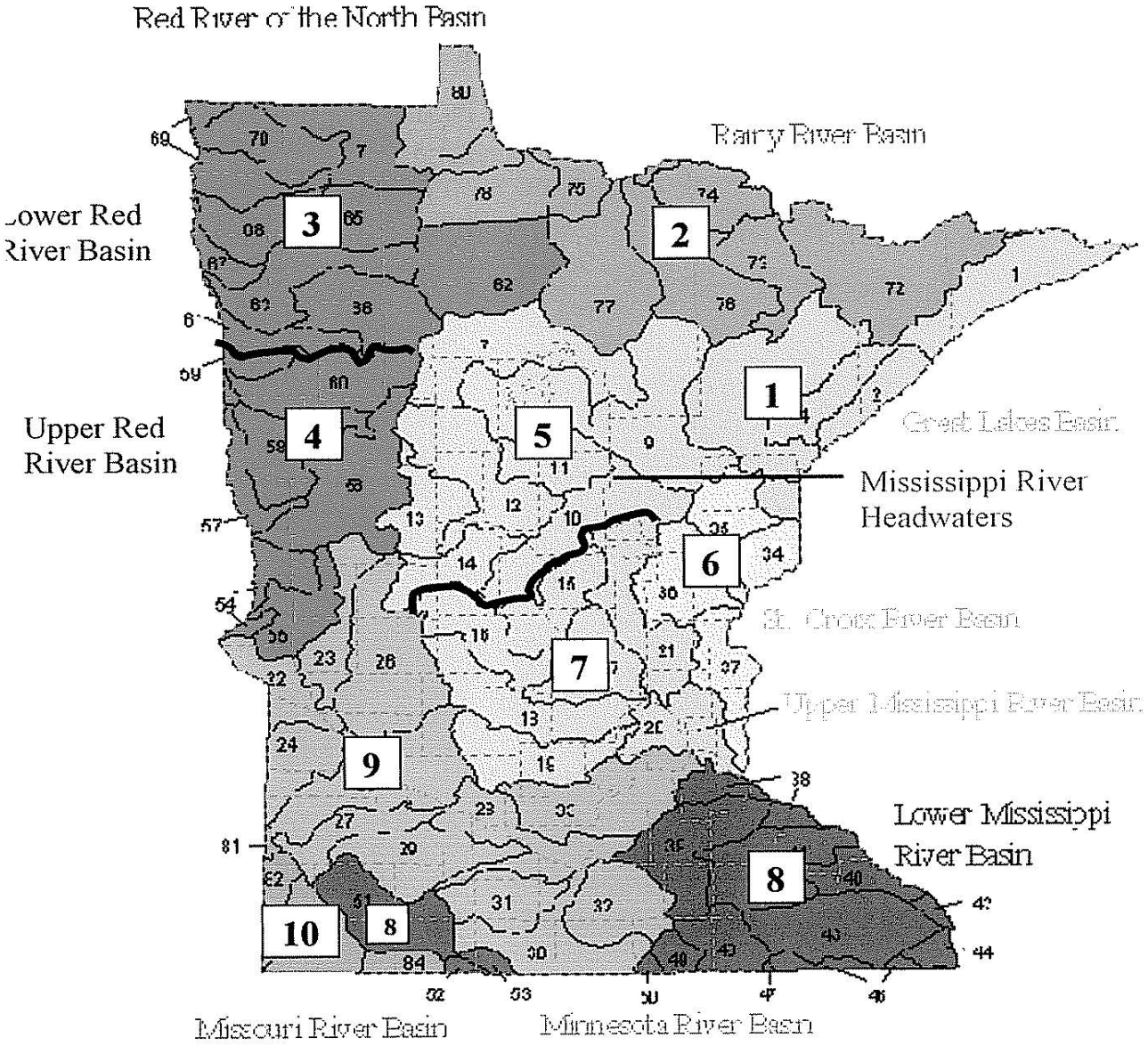
B. GUIDELINES BETWEEN BWSR AND COE – IN-ADVANCE:

- BWSR and the Corps support defining in-advance as: (1) approved bank credits; or (2) compensation sites that have established wetland hydrology and vegetation, but the vegetation may not be mature. The minimum requirement for (2) is that the compensation site has wetland hydrology and hydrophytic vegetation established a full growing season (April-October) prior to the authorized discharge of dredged/fill material. Further, the site must meet all performance standards applicable to that stage of the compensation site.

C. GUIDELINES BETWEEN BWSR AND COE – IN-PLACE:

- In-place means the mitigation occurs within the same major watershed (one of 81 in Minnesota) as the permitted activity or, if debits are withdrawn from a bank site, in the same bank service area as that where the permitted impact occurred. (See map below)
- Replacement for impacts in Bank Service Area 10 can be accomplished in Bank Service Area 9 or the Des Moines River Basin in Bank Service Area 8 with no increase in the replacement ratio.
- Replacement for impacts in Bank Service Area 1 can be accomplished in Bank Service Area 2 with no increase in the replacement ratio.
- A seven-county metropolitan area bank service area may be established in the future to acknowledge land value disparities that are not accounted for under a watershed approach.
- Comprehensive inventories of replacement opportunities may be used to establish special replacement siting criteria.

MAJOR BASINS AND WATERSHEDS OF MINNESOTA



5. *ISSUE* - Options for Mitigation Credit

GUIDELINES BETWEEN BWSR AND COE:

Proposed and Current Replacement Methods and Amount of Credit Under State and Federal Regulatory Programs

	Affected Wetland	Replacement Method	Proposed	Current Amount of Credit (x:1 = x acres of treatment to get 1 acre of credit) WCA / WPP(DNR)	Section 404
Restoration	Completely drained or filled	Hydrologic and vegetative	100% of wetland area restored	New Wetland Credit (NWC): 100% of area restored (MR 8420.0541 Subp. 2)	100% of area restored
	Partially drained	Hydrologic	Based on a percentage of wetland hydrology restored Variable credit is determined by the Technical Evaluation Panel (TEP) and/or Corps based on professional judgment, using a functional analysis as a foundation.	in "<80% areas": NWC: 25% of total wetland area restored (includes areas that remained as wetland); requires establishment of permanent, native, non-invasive vegetation w/in restored wetland area and on upland buffer or Public Value Credit (PVC): 50% of degraded wetland area restored in ">80% areas": NWC: 25% of total area (MR 8420.0541 Subp. 3 and Guidance)	50% or 100% of total wetland area restored, depending on a sliding scale that measured the degree that wetland functions were increased
	Cropped wetlands where hydrology is still intact (i.e., no ditches, tiles, etc.)	Vegetation	Based on percentage of wetland area restored and cropping history (% of years). Variable credit is determined by the TEP and/or Corps based on professional judgment, using a functional analysis as a foundation.	NWC: Up to 100% of area restored if farmed more than 10 years of previous 20; percent based on frequency of farming PVC: Up to 50% of wetland area restored if farmed at least six of previous 20 years (MR 8420.0541 Subp. 5)	33% credit; considered more vegetative enhancement as opposed to restoration

	Affected Wetland	Replacement Method	Proposed	Current Amount of Credit (x:1 = x acres of treatment to get 1 acre of credit) WCA / WPP(DNR)	Section 404
	Wetlands previously restored via conservation easements	Extending restoration	Up to 75% depending on cropping history prior to enrollment in easement program. Excludes any remnant wetland area that existed prior to restoration.	NWC: 75% of wetland area preserved (MR 8420.0541 Subp. 7)	12.5% of wetland area preserved; wetland must be under demonstrable threat of loss
Enhancement	Wetlands dominated by invasive or exotic species	Establish native, non-invasive vegetation	33% credit baseline if escrow account is established to ensure vegetative management plan is implemented for a period of ten years. Credit is determined by TEP and/or Corps based on professional judgment, using Floristic Quality Assessment as a foundation, degree of invasives, and establishment of escrow account to fund maintenance for a period of ten years.	PVC: 25% of total area vegetatively restored (MR 8420.0541 Subp. 8)	33% credit
	Upland buffer areas	Establish native, non-invasive, permanent vegetation	Required minimum upland buffer width of 50 ft. in non-municipal areas and 25 ft. in municipal areas; credit given at 10% (non-native vegetation) to 25% (native vegetation) depending upon quality of buffer; typically, no more than 25% of total credits at a compensation site can be composed of upland buffer.	PVC: 100% of the upland buffer area, up to the size of the replacement wetland it surrounds; must have 50 ft. avg. width in non-municipal areas, 25 ft. avg. width in municipal areas (MR 8420.0541 Subp. 6)	Required minimum upland buffer width of 50ft. in non-municipal areas and 25 ft. in municipal areas; credit given at 10:1 (non-native vegetation) to 4:1 (native vegetation) depending upon quality of buffer; typically, no more than 25% of total credits at a compensation site can be composed of upland buffer.

	Affected Wetland	Replacement Method	Proposed	Current Amount of Credit (x:1 = x acres of treatment to get 1 acre of credit)	
				WCA / WPP(DNR)	Section 404
Preservation	Wetlands under demonstrable threat and providing important functions	Preservation	12.5% credit baseline for wetland area preserved, wetland must be under demonstrable threat and providing important functions based on professional judgment, using a functional analysis as a foundation	NWC: Up to 12.5% of wetland area preserved; must involve restoration of hydrology or vegetation over 25% of wetland area; must be under documented threat PVC: 25% of wetland area preserved (MR 8420.0541 Subp. 4)	12.5% of wetland area preserved; wetland must be under demonstrable threat of loss
Creation	Mineral extraction sites	Established via reclamation	Baseline is 50% to 100% of wetland area created depending on risk of failure and connection (or lack of) to other wetlands and upland habitats. See 404 column at right	Up to 100% of wetland area (MR 8420.0541 Subp. 9)	
	Non-wetland areas	Wetland creation		100% of wetland area created; performance bond required (MR 8420.0541 Subp. 11)	50% credit if isolated from other habitats and/or has a higher risk of failure; 100% credit if has low risk of failure (adequate hydrology data to predict successful hydrology) and connected to other wetlands and upland buffers

	Affected Wetland	Replacement Method	Proposed	Current Amount of Credit (x:1 = x acres of treatment to get 1 acre of credit) WCA / WPP(DNR)	Section 404
	Water quality treatment areas in non-wetlands	Creation	No credit for single or primary cells; up to 50% credit for secondary or tertiary cells based on professional judgment, using a functional analysis as a foundation and after five-year monitoring period	NWC: 100% of normal pool area for downstream cell of two-cell system if certain criteria are met PVC: 100% of isolated one-cell system; upstream cell of two-cell system; or one year design pool of stormwater infiltration area that has native, non-invasive veg. cover (MR 8420.0541 Subp. 10)	No credit for primary stormwater/water quality cells. 50% credit for second or third cells if designed for saturated soils to 3-foot water depths; has less than a 12-inch bounce lasting less than 7 days for the 10-year, 24-hour event; and is successfully planted to native, non-invasive vegetation. Credit is limited to that acreage of the cell in excess of that needed to comply with local/state stormwater management requirements. A second compensation site is typically needed to replace additional wetland functions not adequately replaced by cells.

Notes:

1. The information found in the "Section 404" column of this table is based upon the draft Minnesota guidelines (St. Paul District Compensatory Mitigation Policy for Minnesota dated March 14, 2007).
2. The credit ratios adopted by the Corps are guidelines; they are not regulations.
3. NWC – New Wetland Credit: Must be used for all mitigation requirements up to 1:1. May also be used for mitigation requirement exceeding 1:1.
4. PVC – Public Value Credit: May only be used for the portion of mitigation requirements exceeding 1:1.
5. < 80% areas and > 80% areas refers to areas of the state having less than or more than 80% of their presettlement wetland acreage remaining (see MR 8420.0545).

6. *ISSUE* – Mitigation Ratios

Proposed WCA/Section 404 Mitigation Ratios

Impact Location	Replacement Location (in-place)	Type of Replacement Wetland (in-type)	Replacement Process (in-time)	Minimum Replacement Ratio Proposed WCA/ Section 404 (see notes)
> 80% area (or agricultural land – WCA)	In-Place	Same type as impact wetland	In advance	1:1
			Not in advance	1.25:1
		Different type	In advance	1.25:1
			Not in advance	1.5:1
	Not In-Place	Same type as impact wetland	In advance	1.25:1
			Not in advance	1.5:1
		Different type	In advance	1.5:1
			Not in advance	1.5:1
< 80% area (and non-agricultural land – WCA)	In-Place	Same type as impact wetland	In advance	2:1
			Not in advance	2.25:1
		Different type	In advance	2.25:1
			Not in advance	2.5:1
	Not In-Place	Same type as impact wetland	In advance	2.25:1
			Not in advance	2.5:1
		Different type	In advance	2.5:1
			Not in advance	2.5:1

Note: Ratio guidelines for Section 404 only pertain to < or > 80% areas (not related to agricultural areas). Existing U.S. Army Corps of Engineers Section 404 regulations regarding agricultural areas are unchanged by this MOU.

Unresolved Issues:

1. *ISSUE* – Agency participation in developing local wetland plans

GUIDELINES BETWEEN BWSR AND COE:

- BWSR and the Corps will continue to explore and work on methods to ensure that locally generated wetland plans can be accepted by all state and federal regulatory agencies.

Appendix B

Summary of Comments On Corps Public Notice March 14, 2007

Summary of Comments Received on Draft Wetland Mitigation Policy

1. Watershed Approach. Comments received supported the watershed approach.

Corps response: *No response required.*

2. Upland Buffer Credit. This issue generated the greatest number of comments. Most were opposed to the proposed 4:1 credit for upland buffers (in native vegetation and not manicured) and instead recommended 1:1 credit with the rationale that: (1) more upland buffer is advantageous; and (2) a 4:1 ratio would discourage establishing upland buffers beyond minimum requirements.

Corps response: *Upland buffers are not wetlands, thus they do not provide wetland functions. Therefore, upland buffers are not credited at the same rate as wetland restoration (1:1 to 2:1), wetland creation (1:1 to 2:1) or wetland enhancement (3:1). Clearly, set aside of one acre of upland buffer cannot provide the functional lift of restoring one acre of effectively-drained wetlands. Yet assigning 1:1 credit to both would say that they are equivalent. In the hierarchy of crediting based on the degree of a "functional lift," upland buffers in native vegetation and not manicured are appropriately placed at 4:1 credit. Would set aside of 4 acres of upland buffer be equivalent in functional lift to fully restoring one acre of effectively-drained wetlands? Probably not, but the benefit of the doubt is given because of our position that upland buffers are critical and our experiences with wetlands that were degraded due to lack of an adequate upland buffer. The 4:1 credit maintains a defensible hierarchy where restoration of wetlands, creation of wetlands, and enhancement of wetlands generate greater functional lift than set aside of non-wetlands (upland buffers).Upland buffers are awarded more wetland credit than preservation of wetlands (8:1).*

As part of the regulatory simplification effort that culminated in an MOU between BWSR and the Corps, one crediting system was envisioned for both state and federal wetland regulatory programs. That crediting would consist of one sum of wetland credits including upland buffers (upland buffers are so important they are considered "wetland credits"). The "over the 1:1 wetland replacement" of WCA would no longer be used, which significantly changes how upland buffer credits are applied via WCA. Comments in favor of assigning 1:1 credit for upland buffers failed to recognize the major change from tracking multiple types of compensation (public value credits, new wetland credits, 404 credits) and using "over the 1:1 wetland replacement," versus the MOU approach for regulatory simplification.

The concern that only the minimum upland buffer widths would be established is noted. First, the 25- and 50-foot average widths have been determined to be minimum but adequate widths. For small wetlands, say one acre in size, the 50-foot minimum buffer width doubles the size of the compensation site. The minimum 50-foot upland buffer around a 10-acre wetland would add another approximately 3 acres to the compensation site. These buffer widths are not trivial increases in the size and buffering of compensation sites. Further, additional upland buffer can be added up to 25% of total credits at a compensation site. Finally, Section 404 of the Clean Water Act is a ***wetland*** *regulatory program and is unsuited as a tool for set aside of larger blocks of uplands.*

3. Minimum Upland Buffer Width. A recommendation to set the minimum buffer width at 50 feet was received. This would simplify the upland buffer requirement. An additional comment recommended that buffer widths be determined by adjacent land uses.

Corps response: *We concur that a single width would simplify the buffer requirement; however, the 25-foot width for urban areas was maintained in recognition of the typically much higher real estate costs in urban areas. This was a recommendation from the Minnesota Interagency Group (IWG). On the second*

point, buffer widths can be adjusted upward for site-specific conditions such as slope, soils, vegetative cover, etc. The 25- and 50-foot widths are minimum average widths.

4. Five-Acre Minimum Bank Site Size. EPA recommended raising the minimum bank site size to 10 to 25 acres, as is the case for other states in the region. EPA stated that 5-acre bank sites are not practicable given the IRT process, public notice, banking instrument, compensation site plan and other requirements. In contrast, multiple comments opposed a minimum bank site of less than 5 acres. Some stated that it would be difficult to find a 5-acre or larger bank site in the Twin Cities metropolitan area.

Corps response: *We concur in principle with EPA, but small bank sites have been a fixture in Minnesota's banking system. We also concur with stakeholders who stated support for accepting small bank sites, particularly in the Twin Cities metropolitan area due to the difficulty of finding suitable sites.*

The Corps has to balance the minimum bank size with the Mitigation Rule requirements for formal banking procedures that are much more time- and staff-intensive than previously implemented by St. Paul District. Each bank requires a Corps public notice, formal IRT review timelines, a mitigation banking instrument signed by the bank sponsor and the Corps, financial assurances, and a dispute resolution process (if needed).

A 5-acre bank site could generate less than one credit (8:1 for preservation) or as little as 1.65 credit (3:1 for enhancement) or 2.5 credits (2:1 for rehabilitation). Given the Mitigation Rule requirements, it is not practicable to review, approve and track such small bank sites. Further, small bank sites defeat one of the principal advantages of banking – larger tracts of land that offer greater resiliency to external, deleterious influences – compared to project-specific compensation.

The minimum bank site size should be based on credits, not acres, as credits are the currency of compensatory mitigation. In view of this, and the final Mitigation Rule, our policy decision is to establish 5 credits as the minimum bank site size. This is a compromise between the EPA comments and those in favor of establishing small bank sites.

5. Special Features, Table 3. This table listed special features that the Corps could use as a rationale to raise the compensation ratio. It was nearly verbatim from MnRAM. EPA recommended that impaired waters be added to the list. However, members of the IWG and some comments on the public notice objected to including this table.

Corps response: *This table was deleted.*

6. Compensation Ratios. A comment was received that the increase in compensation ratios was excessive. Conversely, EPA and FWS objected to the caps on the maximum compensation ratios.

Corps response: *The compensation ratios were increased: (1) to match those of WCA as part of the MOU goal of regulatory simplification; and (2) to address the Corps determination that the previous ratios had been inadequate in offsetting the loss of wetland/aquatic resource functions due to projects authorized by the Corps. In regard to the EPA and FWS comments, the Corps retains the option to raise the compensation ratio on a case-by-case basis if warranted.*

7. In-Kind. Comments recommended further clarification of when exceptions to the preference for in-kind compensation could be made.

Corps response: *Additional discussion in the text was added to clarify this point. For example, a watershed plan could identify and prioritize out-of-kind compensation. Additionally, if the impact site is a degraded wetland, in-kind compensation would likely not be environmentally preferable.*

8. Bank Service Areas. Comments recommended that, in northern Minnesota, debiting in a different bank service area should not result in an increase in the compensation ratio. Conversely, the Bois Forte Tribal Government was opposed to allowing impacts in Bank Service Area 1 (Great Lakes Basin) to be debited in Bank Service Area 2 (Rainy River Basin). The latter bank service area includes a large component of Tribal land.

Corps response: *After consideration of all comments received, the final policy makes no change from the draft that was released for public comment. This includes the policy whereby impacts in Bank Service Area 1 can be debited in Bank Service Area 2 with no change in the compensation ratio [due to the relative lack of opportunities to establish compensation sites in Bank Service Area 1, and the similarities in wetland/aquatic resources]. A broader approach with no change in the compensation ratio for out-of-watershed debiting would be contrary to the watershed approach of the Mitigation Rule. In fact, the greater than 80 percent area of Minnesota includes the most significant three-way drainage divide in the Lower 48 States – Great Lakes, Hudson Bay and Mississippi River (see Figure 1). Debiting across these major watershed divides should be avoided to the extent practicable. If allowed, it demands a higher compensation ratio given the Mitigation Rule's watershed approach. For purposes of the Clean Water Act, the watershed approach of the Mitigation Rule takes priority over the fact that northern Minnesota has an abundance of wetlands.*

9. Stormwater Ponds. Several comments supported use of stormwater ponds for compensation credit, while others were opposed.

Corps response: *The unsuitability of the primary cell for compensation credit is discussed in the text. In short, primary stormwater cells do not replace most functions of natural wetlands. The text of this policy also describes when credits could be generated by the second or third cell of stormwater ponds.*

Appendix C

Compensatory Mitigation Plan Checklist

COMPENSATORY MITIGATION PLAN CHECKLIST

This document is intended as a technical guide for Clean Water Act (CWA) Section 404 permit applicants[13] preparing compensatory mitigation plans. Compensatory mitigation is required to offset impacts that cannot be avoided and minimized to the extent practicable. The purpose of this document is to identify the types and extent of information that agency personnel need to assess the likelihood of success of a mitigation proposal. Success is generally defined as: a healthy sustainable wetland/water that – to the extent practicable – compensates for the lost functions of the impacted water in an appropriate landscape/watershed position. This checklist provides a basic framework that will improve predictability and consistency in the development of mitigation plans for permit applicants. Although every mitigation plan may not need to include each specific item, applicants should address as many as possible and indicate, when appropriate, why a particular item was not included (For example, permit applicants who will be using a mitigation bank would not be expected to include detailed information regarding the proposed mitigation bank site since that information is included in the bank's enabling instrument). This checklist can be adapted to account for specific environmental conditions in different regions of the U.S.

1. Compensation Goals and Objectives

Impact Site

a. Describe and quantify the aquatic resource type and functions that will be impacted at the proposed impact site. Include temporary and permanent impacts to the aquatic environment.

b. Describe aquatic resource concerns in the watershed (e.g. flooding, water quality, habitat) and how the impact site contributes to overall watershed/regional functions. Identify watershed or other regional plans that describe aquatic resource objectives.

Compensation Site

c. Describe and quantify the aquatic resource type and functions for which the compensation project is intended to compensate.

d. Describe the contribution to overall watershed/regional functions that the compensation site(s) is intended to provide.

2. Baseline Information - for proposed impact site, proposed compensation site & if applicable, proposed reference site(s).

a. Location

1. Coordinates (preferably using DGPS) & written location description (including block, lot, township, county), HUC number, as appropriate and pertinent.
2. Maps (e.g., site map with delineation (verified by the Corps), map of vicinity, map identifying location within the watershed, NWI map, NRCS soils map, zoning or planning maps; indicate area of proposed fill on site map).
3. Aerial/Satellite photos.

b. Classification – Hydrogeomorphic as well as Cowardin classification, Rosgen stream type, NRCS classification, as appropriate.

[13] The checklist may be used in other federal or state programs as well; however, additional information may be needed to satisfy specific program requirements. For example, Attachment A indicates additional information needed by the Natural Resources Conservation Service (NRCS) to satisfy the Swampbuster provisions of the Food Security Act.

c. Quantify wetland resources (acreage) or stream resources (linear feet) by type(s).
d. Assessment method(s) used to quantify impacts to aquatic resource functions (e.g., HGM, IBI, WRAP, etc.); explain findings. The same method should be used at both impact and mitigation sites.
e. Existing hydrology
    1. Water budget. Include water source(s) (precipitation, surface runoff, groundwater, stream) and losses(s). Provide budgets for both wet and dry years.
    2. Hydroperiod (seasonal depth, duration, and timing of inundation and/or saturation), percent open water.
    3. Historical hydrology of compensation site if different than present conditions
    4. Contributing drainage area (acres).
    5. Results of water quality analyses (e.g., data on surface water, groundwater, and tides for such attributes as pH, redox, nutrients, organic content, suspended matter, DO, heavy metals).
f. Existing vegetation
    1. List of species on site, indicating dominants.
    2. Species characteristics such as densities, general age and health, and native/non-native/invasive status.
    3. Percent vegetative cover; community structure (canopy stratification).
    4. Map showing location of plant communities.
g. Existing soils
    1. Soil profile description (e.g., soil survey classification and series) and/or stream substrate (locate soil samples on site map).
    2. Results of standard soils analyses, including percent organic matter, structure, texture, permeability.
h. Existing wildlife usage (indicate possible threatened and endangered species habitat).
i. Historic and current land use; note prior converted cropland.
j. Current owner(s)
k. Watershed context/surrounding land use.
    1. Impairment status and impairment type (e.g., 303(d) list) of aquatic resources.
    2. Description of watershed land uses (percent ag, forested, wetland, developed).
    3. Size/Width of natural buffers (describe, show on map).
    4. Description of landscape connectivity: proximity and connectivity of existing aquatic resources and natural upland areas (show on map).
    5. Relative amount of aquatic resource area that the impact site represents for the watershed and/or region (i.e., by individual type and overall resources).

3. Compensation Site Selection & Justification

a. Site-specific objectives: Description of mitigation type(s) [14], acreage(s) and proposed compensation ratios.
b. Watershed/regional objectives: Description of how the compensation project will mitigate for the functions identified in the Mitigation Goals section 1(c).
c. Description of how the compensation project will contribute to aquatic resource functions within the watershed or region (or sustain/protect existing watershed functions) identified

[14] That is, restoration, enhancement, creation or preservation: see Mitigation Rule for definitions for these terms.

in the Mitigation Goals section 1(d). How will the planned compensation project contribute to landscape connectivity?

d. Likely future adjacent land uses and compatibility (show on map or aerial photo).

e. Description of site selection practicability in terms of cost, existing technology, and logistics (for project-specific sites only).

f. If the proposed compensation is off-site and/or out-of-kind, explain why on-site or in-kind options[15] are not practicable or environmentally preferable.

g. Existing and proposed compensation site deed restrictions, easements and rights-of-way. Demonstrate how the existence of any such restriction will be addressed, particularly in the context of incompatible uses.

h. Explanation of how the design is sustainable and self-maintaining. Show by means of a water budget that there is sufficient water available to sustain long-term wetland or stream hydrology. Provide evidence that a legally defensible, adequate and reliable source of water exists.

i. USFWS and/or NOAA Fisheries Listed Species Clearance Letter or Biological Opinion.

j. SHPO Cultural Resource Clearance Letter.

4. Compensation Site Plan

a. Maps marking boundaries of proposed mitigation types; include DGPS coordinates.

b. Timing of compensation: before, concurrent or after authorized impacts; if compensation is not in advance or concurrent with impacts, explain why it is not practicable and describe other measures to compensate for the consequences of temporal losses.

c. Grading plan

1. Indicate existing and proposed elevations and slopes.
2. Describe plans for establishing appropriate microtopography. Reference wetland(s) can provide design templates.

d. Description of construction methods (e.g., equipment to be used)

e. Construction schedule (expected start and end dates of each construction phase, expected date for as-built plan).

f. Planned hydrology

1. Source of water.
2. Connection(s) to existing waters.
3. Hydroperiod (seasonal depth, duration, and timing of inundation and saturation), percent open water, water velocity.
4. Potential interaction with groundwater.
5. Existing monitoring data, if applicable; indicate location of monitoring wells and stream gauges on site map.
6. Stream or other open water geomorphic features (e.g., riffles, pools, bends, deflectors).
7. Structures requiring maintenance (show on map) Explain structure maintenance in section 6(c).

g. Planned vegetation

1. Native plant species composition (e.g., list of acceptable native hydrophytic vegetation).

[15] See Federal Guidance on the Use of Off-Site and Out-of-Kind Compensatory Mitigation under Section 404 of the CWA.

2. Source of native plant species (e.g. salvaged from impact site, local source, seed bank) stock type (bare root, potted, seed) and plant age(s)/size(s).
3. Plant zonation/location map (refer to grading plan to ensure plants will have an acceptable hydrological environment).
4. Plant spatial structure – quantities/densities, % cover, community structure (e.g., canopy stratification).
5. Expected natural regeneration from existing seed bank, plantings, and natural recruitment.

h. Planned soils
1. Soil profile
2. Source of soils (e.g., existing soil, imported impact site hydric soil), target soil characteristics (organic content, structure, texture, permeability), soil amendments (e.g., organic material or topsoil).
3. Erosion and soil compaction control measures.

i. Planned habitat features (identify large woody debris, rock mounds, etc. on map).

j. Planned buffer (identify on map).
1. Evaluation of the buffer's expected contribution to aquatic resource functions.
2. Physical characteristics (location, dimensions, native plant composition, spatial and vertical structure.

k. Other planned features, such as interpretive signs, trails, fence(s), etc.

5. Performance Standards

a. Identify clear, precise, quantifiable parameters that can be used to evaluate the status of desired functions. These may include hydrological, vegetative, faunal and soil measures. (e.g., plant richness, percent exotic/invasive species, water inundation/saturation levels). Describe how performance standards will be used to verify that objectives identified in 3(b) and 3(c) have been attained.

b. Set target values or ranges for the parameters identified. Ideally, these targets should be set to mimic the trends and eventually approximate the values of a reference wetland(s).

6. Compensation Site Protection and Maintenance

a. Long-term legal protection instrument (e.g. conservation easement, deed restriction, transfer of title).

b. Party(ies) responsible and their role (e.g. site owner, easement owner, maintenance implementation). If more than one party, identify primary party.

c. Maintenance plan and schedule (e.g. measures to control predation/grazing of mitigation plantings, temporary irrigation for plant establishment, replacement planting, structure maintenance/repair, etc.).

d. Invasive species control plan (plant and animal).

e. Identify adaptive management plan implementation process (who starts what, when).

7. Monitoring Plan

a. Party(ies) responsible for monitoring. If more than one, identify primary party.

b. Data to be collected and reported, how often and for what duration (identify proposed monitoring stations, including transect locations on map).

c. Assessment tools and/or methods to be used for data collection monitoring the progress towards attainment of performance standard targets.
d. Format for reporting monitoring data and assessing compensation status.
e. Monitoring schedule

8. Adaptive Management Plan

a. Party(ies) responsible for adaptive management.
b. Identification of potential challenges (e.g., flooding, drought, invasive species, seriously degraded site, extensively developed landscape) that pose a risk to project success. Discuss how the design accommodates these challenges.
c. Discussion of potential remedial measures in the event mitigation does not meet performance standards in a timely manner.
d. Description of procedures to allow for modifications of performance standards if compensation projects are meeting mitigation goals, but in unanticipated ways.

9. Financial Assurances

a. For each of the following, identify party(ies) responsible to establish and manage the financial assurance, the specific type of financial instrument, the method used to estimate assurance amount, the date of establishment, and the release and forfeiture conditions:
    1. Construction phase
    2. Maintenance
    3. Monitoring
    4. Remedial measures
    5. Project success
b. Types of assurances (e.g., performance bonds, irrevocable trusts, escrow accounts, casualty insurance, letters of credit, etc.).
c. Schedule by which financial assurance will be reviewed and adjusted to reflect current economic factors.

ATTACHMENT A
NATURAL RESOURCES CONSERVATION SERVICE (NRCS) PROGRAM REQUIREMENTS[16]

- ☐ NRCS conservation practice standards and specifications
- ☐ NRCS Environmental Evaluation
- ☐ Mitigation agreement
- ☐ Federal/State/Local required permits
- ☐ Compatible use statement:
  - o Allowable uses (e.g. hunting, fishing)
  - o Prohibited uses (e.g. grazing, silviculture)
  - o Uses approved by compatible use permit
- ☐ Copy of recorded easement
- ☐ Subordination waiver on any existing liens on mitigation site
- ☐ Statement of landowner's tax liability
- ☐ Copy of Warrantee Deed from landowner's attorney (no encumbrances, if so list)
- ☐ Copy of certified wetland determination:
  - o NRCS-CPA-026 Highly Erodible Land and Wetland Conservation Certification
  - o Wetland label map
- ☐ Copy of FSA Good Faith Waiver
- ☐ Copy of easement(s) ingress/egress granted to USDA employees for gaining legal access to mitigation site
- ☐ Copy of NRCS-CPA-38 Request for Certified Wetland Determination/Delineation

[16] For a complete list of the program requirements needed by NRCS to satisfy the Swampbuster provisions of the Food Security Act see the National Food Security Act Manual.

Appendix D

National Academy of Sciences Guidelines for Compensatory Mitigation

Incorporating the National Research Council's Mitigation Guidelines Into the Clean Water Act Section 404 Program

BACKGROUND

In its comprehensive report entitled *"Compensating for Wetland Losses Under the Clean Water Act,"* the National Research Council (NRC) provided ten guidelines to aid in planning and implementing successful mitigation projects ("Operational Guidelines for Creating or Restoring Wetlands that are Ecologically Self-Sustaining"; NRC, 2001). Please note that these guidelines also pertain to restoration and enhancement of other aquatic resource systems, such as streams. Each of the ten guidelines can generally be described as A) basic requirement for mitigation success, or B) guide for mitigation site selection. The following sections include both the original text of the NRC guidelines, in italics, as well as a discussion of how applicants and field staff can incorporate these guidelines into the development and review of mitigation projects.

A. **Basic Requirements for Success**

When considering mitigation sites it is important to note that wetland mitigation is not a precise, exact science and predictable results are not always obtainable. Having an adaptive management attitude is a necessity. One should incorporate experimentation into the mitigation plan when possible. This may mean using experimental plots within a mitigation site with different controls, replication, different treatments, inputs, etc., to determine if specific mitigation efforts are effectively meeting the desired goals. This requires detailed planning, effective implementation of the mitigation project, close monitoring (both short and long term) of the implemented plans and finally adjusting to intermediate results with an adaptive attitude and additional modifications to obtain long range wetland and watershed goals. In addition, researchers have found that restoration is the most likely type of mitigation to result in successful and sustainable aquatic resource replacement. Moreover, numerous studies in a variety of landscapes and watershed types have shown that of all factors contributing to mitigation success, attaining and maintaining appropriate hydrological conditions is the most important. The following NRC guidelines should be considered basic requirements for mitigation success.

A.1. **Whenever possible, choose wetland restoration over creation**.

> *Select sites where wetlands previously existed or where nearby wetlands still exist. Restoration of wetlands has been observed to be more feasible and sustainable than creation of wetlands. In restored sites the proper substrate may be present, seed sources may be on-site or nearby, and the appropriate hydrological conditions may exist or may be more easily restored.*
>
> *The U.S. Army Corps of Engineers (Corps) and Environmental Protection Agency (EPA) Mitigation Memorandum of Agreement states that, "because the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, restoration should be the first option considered" (Fed. Regist. 60(Nov. 28):58605). The Florida Department of Environmental Regulation (FDER 1991a) recommends an emphasis on restoration first, then enhancement, and, finally, creation as a last resort. Morgan and Roberts (1999) recommend encouraging the use of more restoration and less creation.*

The applicant proposes the type of mitigation. However, the Corps and other agencies will evaluate proposals based on the ease of completion and the likelihood of success. Therefore, pure wetland creation will be evaluated using very stringent criteria before being approved for use as compensatory mitigation

for project impacts. Some projects may include creation as part of an overall mitigation effort that involves restoration, enhancement, and/or preservation (e.g., as in a proposed mitigation bank). In these cases, evaluation will be based on the entire proposal and its location in the watershed.

A.2. **Avoid over-engineered structures in the wetland's design**

> *Design the system for minimal maintenance. Set initial conditions and let the system develop. Natural systems should be planned to accommodate biological systems. The system of plants, animals, microbes, substrate, and water flows should be developed for self-maintenance and self-design. Whenever possible, avoid manipulating wetland processes using approaches that require continual maintenance. Avoid hydraulic control structures and other engineered structures that are vulnerable to chronic failure and require maintenance and replacement. If necessary to design in structures, such as to prevent erosion until the wetland has developed soil stability, do so using natural features, such as large woody debris. Be aware that more specific habitat designs and planting will be required where rare and endangered species are among the specific restoration targets.*
>
> *Whenever feasible, use natural recruitment sources for more resilient vegetation establishment. Some systems, especially estuarine wetlands, are rapidly colonized, and natural recruitment is often equivalent or superior to plantings (Dawe et al. 2000). Try to take advantage of native seed banks, and use soil and plant material salvage whenever possible. Consider planting mature plants as supplemental rather than required, with the decision depending on early results from natural recruitment and invasive species occurrence. Evaluate on-site and nearby seed banks to ascertain their viability and response to hydrological conditions. When plant introduction is necessary to promote soil stability and prevent invasive species, the vegetation selected must be appropriate to the site rather than forced to fit external pressures for an ancillary purpose (e.g., preferred wildlife food source or habitat).*

The use of over-engineered structures and maintenance intensive plans for mitigation is not recommended and will be evaluated using very stringent criteria. If these types of plans are ultimately approved, they must include a comprehensive remedial plan and financial assurances [note that all mitigation projects should have remedial plans and financial assurances], along with a non-wasting endowment to insure that proper maintenance occurs.

It should also be noted that aggressive soil and planting plans using introduced plants and soil from outside sources must be closely monitored to prevent invasive plant takeovers and monotypic plant communities. Such failures can be minimized by undertaking both short-term and long-term monitoring, and having contingency plans in place.

A. 3. **Restore or develop naturally variable hydrological conditions**.

Promote naturally variable hydrology, with emphasis on enabling fluctuations in water flow and level, and duration and frequency of change, representative of other comparable wetlands in the same landscape setting. Preferably, natural hydrology should be allowed to become reestablished rather than finessed through active engineering devices to mimic a natural hydroperiod. When restoration is not an option, favor the use of passive devices that have a higher likelihood to sustain the desired hydroperiod over long term. Try to avoid designing a system dependent on water-control structures or other artificial infrastructure that must be maintained in perpetuity in order for wetland hydrology to meet the specified design. In situations where direct (in-kind) replacement is desired, candidate mitigation sites should have the same basic hydrological attributes as the impacted site.

Hydrology should be inspected during flood seasons and heavy rains, and the annual and extreme-event flooding histories of the site should be reviewed as closely as possible. For larger mitigation projects, a detailed hydrological study of the site should be undertaken, including a determination of the potential interaction of groundwater with the proposed wetland. Without flooding or saturated soils, for at least part of the growing season, a wetland will not develop. Similarly, a site that is too wet will not support the desired biodiversity. The tidal cycle and stages are important to the hydrology of coastal wetlands.

Natural hydrology is the most important factor in the development of successful mitigation. Wetlands and other waters are very dynamic, and dependent on natural seasonal and yearly variations that are unlikely to be sustainable in a controlled hydrologic environment. Artificial structures and mechanisms should be used only temporarily. Complex engineering and solely artificial mechanisms to maintain water flow normally will not be acceptable in a mitigation proposal. In those sites where an artificial water source (irrigation) has been used to attempt to simulate natural hydrology there are several problems that lead to reduced likelihood of success. First, artificial irrigation does not provide the dynamic and variable nature of water flow normally found in wetlands or riparian systems. Second, the lack of seasonal flows limits the transport of organic matter into and out of the wetland or riparian system. Without any inflow, the net result of artificial irrigation is transport of organic material out of the system. Third, depending on the timing, the use of flood or sprinkler systems on newly created or restoration sites often promotes the germination and growth of exotic plant species.

Note that this changes the Corps' past policy of accepting artificial irrigation as the sole source of hydrology for mitigation projects. If permitted at all, these projects will require substantial financial assurances and a higher mitigation ratio to offset their risk of failure. Applicants must weigh the potential investment costs of acquiring land suitable for restoration versus creation projects in upland environments that will likely involve higher long-term costs and greater risks of mitigation site failure.

The Corps may approve exceptions dealing with hydrologic manipulations, on a case-by-case basis in highly unusual circumstances. It should be noted, however, that even minor engineering or hydraulic manipulation requiring long-term maintenance will only be approved after the applicant posts a non-wasting endowment, performance bond, or other financial assurance.

A.4. **Consider complications associated with creation or restoration in seriously degraded or disturbed sites**

A seriously degraded wetland, surrounded by an extensively developed landscape, may achieve its maximal function only as an impaired system that requires active management to support

natural processes and native species (NRC 1992). It should be recognized, however, that the functional performance of some degraded sites may be optimized by mitigation, and these considerations should be included if the goal of the mitigation is water- or sediment-quality improvement, promotion of rare or endangered species, or other objectives best served by locating a wetland in a disturbed landscape position. Disturbance that is intense, unnatural, or rare can promote extensive invasion by exotic species or at least delay the natural rates of redevelopment. Reintroducing natural hydrology with minimal excavation of soils often promotes alternative pathways of wetland development. It is often advantageous to preserve the integrity of native soils and to avoid deep grading of substrates that may destroy natural belowground processes and facilitate exotic species colonization (Zedler 1996).

When considering restoration options it is necessary to determine the spatial and temporal scale of the damage: is the damage limited to the water body itself, or is it a predominant characteristic of the watershed or the surrounding landscape? On-site damage may be restorable, whereas regional-scale damage may be more difficult, or impossible, to reverse or obtain historic conditions. Alternate goals may be necessary in order to determine specific goals of the restoration project. Those desired wetland mitigation goals will depend on the resources needed, the level of degradation and realistic mitigation targets as reflected by the watershed and surrounding landscape. This issue points to the importance of evaluating mitigation plans from a broader watershed perspective.

A.5. **Conduct early monitoring as part of adaptive management**

Develop a thorough monitoring plan as part of an adaptive management program that provides early indication of potential problems and direction for correction actions. The monitoring of wetland structure, processes, and function from the onset of wetland restoration or creation can indicate potential problems. Process monitoring (e.g., water-level fluctuations, sediment accretion and erosion, plant flowering, and bird nesting) is particularly important because it will likely identify the source of a problem and how it can be remedied. Monitoring and control of nonindigenous species should be a part of any effective adaptive management program. Assessment of wetland performance must be integrated with adaptive management. Both require understanding the processes that drive the structure and characteristics of a developing wetland. Simply documenting the structure (vegetation, sediments, fauna, and nutrients) will not provide the knowledge and guidance required to make adaptive "corrections" when adverse conditions are discovered. Although wetland development may take years to decades, process-based monitoring might provide more sensitive early indicators of whether a mitigation site is proceeding along an appropriate trajectory.

There are many factors that may positively or negatively influence aquatic resources and the functions they provide, such as urbanization, farming or grazing. Wetlands and other aquatic resources are often subject to a wide range and frequency of events such as floods, fires and ice storms. As with all natural systems, some things are beyond control. Well-crafted mitigation plans, however, recognize the likelihood of these events and attempt to plan for them, primarily through monitoring and adaptive management. In addition, it is important to realize the mobile nature of wetlands and streams. They change over time and over the landscape in response to internal and external forces.

Monitoring and adaptive management should be used to evaluate and adjust maintenance (e.g., predator control, irrigation), and design remedial actions. Adaptive management should consider changes in ecological patterns and processes, including biodiversity of the mitigation project as it evolves or goes through successional stages. Trends in the surrounding area must also be taken into account (i.e., landscape/watershed context). Being proactive helps ensure the ultimate success of the mitigation, and

improvement of the greater landscape. One proactive methodology is incorporation of experimentation into the mitigation plan when possible, such as using experimental plots within a mitigation site with different controls, replication, different treatments, inputs, etc., to determine if specific mitigation efforts are meeting the desired goals.

B. Mitigation Site Selection

The selection of an appropriate site to construct a mitigation project is one of the most important, yet often under-evaluated, aspects of mitigation planning. In many instances, the choice of the mitigation site has been completed by the applicant based solely on economic considerations with minimal concern for the underlying physical and ecological characteristics of the site. While economic factors are important in determining the practicability of site selection, current technology and the following NRC guidelines should also factor into the selection of a mitigation site.

B.1. Consider the hydrogeomorphic and ecological landscape and climate

Whenever possible, locate the mitigation site in a setting of comparable landscape position and hydrogeomorphic class. Do not generate atypical "hydrogeomorphic hybrids"; instead, duplicate the features of reference wetlands or enhance connectivity with natural upland landscape elements (Gwin et al. 1999).

Regulatory agency personnel should provide a landscape setting characterization of both the wetland to be developed and, using comparable descriptors, the proposed mitigation site. Consider conducting a cumulative impact analysis at the landscape level based on templates for wetland development (Bedford 1999). Landscapes have natural patterns that maximize the value and function of individual habitats. For example, isolated wetlands function in ways that are quite different from wetlands adjacent to rivers. A forested wetland island, created in an otherwise grassy or agricultural landscape, will support species that are different from those in a forested wetland in a large forest tract. For wildlife and fisheries enhancement, determine if the wetland site is along ecological corridors such as migratory flyways or spawning runs. Constraints also include landscape factors. Shoreline and coastal wetlands adjacent to heavy wave action have historically high erosion rates or highly erodible soils, and often-heavy boat wakes. Placement of wetlands in these locations may require shoreline armoring and other protective engineered structures that are contrary to the mitigation goals and at cross-purposes to the desired functions

Even though catastrophic events cannot be prevented, a fundamental factor in mitigation plan design should be how well the site will respond to natural disturbances that are likely to occur. Floods, droughts, muskrats, geese, and storms are expected natural disturbances and should be accommodated in mitigation designs rather than feared. Natural ecosystems generally recover rapidly from natural disturbances to which they are adapted. The design should aim to restore a series of natural processes at the mitigation sites to ensure that resilience will have been achieved.

Watershed management requires thinking in terms of multiple spatial scales: the specific wetland or stream itself, the watershed that influences the wetland/stream, and the greater landscape. The landscape in which a wetland or water exists, defines its hydrogeologic setting. The hydrogeologic setting in turn controls surface and sub-surface flows of water, while a variety of hydrogeologic settings results in biological and functional diversity of aquatic resources.

There are three aspects of watershed management that the applicant must address in a mitigation plan: hydrogeomorphic considerations, the ecological landscape, and climate. It should be noted that the overall goal of compensatory mitigation is to replace the functions being lost (functional equivalency) due to a permitted Section 404 activity. By evaluating the hydrogeomorphic setting, ecological landscape and climate, one can determine which attributes can be manipulated (i.e. hydrology, topography, soil, vegetation or fauna) to restore, create or enhance viable aquatic functions.

Hydrogeomorphic considerations refer to the source of water and the geomorphic setting of the area. For example, a riverine wetland receives water from upstream sources in a linear manner, whereas vernal pools exist as relatively closed depressions underlain by an impermeable layer that allows rainfall runoff from a small watershed to fill the pool during specific times of year. Applicants should strive to replicate the hydrogeomorphic regime of the impacted water to increase the potential that the mitigation site mimics the functions lost. Only as a last resort, should applicants prepare plans for constructing wetlands using artificial water sources or placing wetlands into non-appropriate areas of the landscape. In such cases, there should be a contingency plan to prepare for unanticipated events or failures.

Ecological landscape describes the location and setting of the wetland/water in the surrounding landscape. For example, attempting to place mitigation in a dissimilar ecological complex than that of the impacted water is expected to result in a wetland/water unlikely to replicate the functions of the wetland/water that was lost. In all cases, the applicant should evaluate the historical ecological landscape of the mitigation site; for example, if there had been large areas of forested wetland in an agricultural area, then replacement of a forested wetland may be appropriate given other factors that should be considered. In most cases, applicants should plan for a mitigation area that fits best within the ecological landscape of the watershed or region of the mitigation site. Applicants should also consider constructing mitigation sites with more than one type of wetland/water regime, if appropriate, to provide for landscape diversity.

Climate also affects mitigation and is clearly beyond the control of the applicant. Therefore, the mitigation site should be sited in an area supported by the normal rainfall, subsurface and/or groundwater in the region. Climate considerations also can impact other hydrologic issues, sediment transport factors and other factors affecting attainment of desired functions. While climate cannot be manipulated, applicants need to account for it in mitigation plans, including local and regional variability and extremes.

B. 2. **Adopt a dynamic landscape perspective**

> *Consider both current and future watershed hydrology and wetland location. Take into account surrounding land use and future plans for the land. Select sites that are, and will continue to be, resistant to disturbance from the surrounding landscape, such as preserving large buffers and connectivity to other wetlands. Build on existing wetland and upland systems. If possible, locate the mitigation site to take advantage of refuges, buffers, green spaces, and other preserved elements of the landscape. Design a system that utilizes natural processes and energies, such as the potential energy of streams as natural subsidies to the system. Flooding rivers and tides transport great quantities of water, nutrients, and organic matter in relatively short time periods, subsidizing the wetlands open to these flows as well as the adjacent rivers, lakes, and estuaries.*

Applicants should consider both current and expected future hydrology (including effects of any proposed manipulations), sediment transport, locations of water resources, and overall watershed functional goals before choosing a mitigation site. This is extremely critical in watersheds that are rapidly urbanizing; changing infiltration rates can modify runoff profiles substantially, with associated changes in sediment transport, flooding frequency, and water quality. More importantly, this factor encourages applicants to plan for long-term survival by placing mitigation in areas that will remain as open space and not be severely impacted by clearly predictable development. Consideration of the landscape perspective

requires evaluation of buffers and connectivity (both hydrologic- and habitat-related). Buffers are particularly important to insure that changing conditions are ameliorated, especially in watersheds that have been, or are in the process of being, heavily developed. In addition, because wetlands are so dynamic, adequate buffers and open space upland areas are vital to allowing for wetlands to "breath" (expand and/or decrease in size and function) and migrate within the landscape, particularly in watersheds under natural and/or man-made pressures.

B.3. **Pay attention to subsurface conditions, including soil and sediment geochemistry and physics, groundwater quantity and quality, and infaunal communities**.

> *Inspect and characterize the soils in some detail to determine their permeability, texture, and stratigraphy. Highly permeable soils are not likely to support a wetland unless water inflow rates or water tables are high. Characterize the general chemical structure and variability of soils, surface water, groundwater, and tides. Even if the wetland is being created or restored primarily for wildlife enhancement, chemicals in the soil and water may be significant, either for wetland productivity or bioaccumulation of toxic materials. At a minimum, these should include chemical attributes that control critical geochemical or biological processes, such as pH, redox, nutrients (nitrogen and phosphorus species), organic content and suspended matter.*

Knowledge of the physical and chemical properties of the soil and water at the mitigation site is also critical to choice of location. For example, to mitigate for a saline wetland, without knowing the properties of the soil and water sources at the mitigation site, it is unlikely that such a wetland is restorable or creatable. An agricultural watershed where nitrates, herbicides, pesticides, etc., have the potential to reach surface and/or subsurface water sources, may severely limit the success of a mitigation project Certain plants are capable of tolerating some chemicals and actually thrive in those environments, while others plants have low tolerances and quickly diminish when subjected to water containing certain chemicals, promoting monotypic plant communities. Planning for outside influences that may negatively affect the mitigation project can make a big difference as to the success of the mitigation efforts and meeting watershed objectives.

B.4 **Pay particular attention to appropriate planting elevation, depth, soil type, and seasonal timing**

> *When the introduction of species is necessary, select appropriate genotypes. Genetic differences within species can affect wetland restoration outcomes, as found by Seliskar (1995), who planted cordgrass (*Spartina alterniflora*) from Georgia, Delaware, and Massachusetts into a tidal wetland restoration site in Delaware. Different genotypes displayed differences in stem density, stem height, belowground biomass, rooting depth, decomposition rate, and carbohydrate allocation. Beneath the plantings, there were differences in edaphic chlorophyll and invertebrates.*
>
> *Many sites are deemed compliant once the vegetation community becomes established. If a site is still being irrigated or recently stopped being irrigated, the vegetation might not survive. In other cases, plants that are dependent on surface-water input might not have developed deep root systems. When the surface-water input is stopped, the plants decline and eventually die, leaving the mitigation site in poor condition after the Corps has certified the project as compliant.*

A successful mitigation plan needs to consider soil type and source, base elevation and water depth, plant adaptability and tolerances, and the timing of water input. When possible: a) use local plant stock already genetically adapted to the local environment; b) use stock known to be generally free from invasive or non-native species; c) use soil banks predetermined to have desirable seed sources; d) choose soil with desirable characteristics (e.g., high clay composition and low silt and sand composition for compaction

purposes); e) determine depths of final bottom elevations to insure that targeted water regimes are met and the planned plant community can tolerate the water depth, frequency of inundation and quality of water sources.

It is particularly helpful to examine reference wetlands/waters and/or waters near the mitigation area, in order to identify typical characteristics of sustainable waters in a particular watershed or region. This allows one to determine the likelihood of certain attributes developing in a proposed mitigation site. It should be emphasized again that wetland restoration rather than creation is much more likely to achieve desired results than wetland creation, as evidence of a previously existing wetland or other historic data of a previously functioning aquatic resources is a strong indicator of what will return, given the proper circumstances if the opportunity for restoration occurs. Historical data for a particular site, if available, can also help establish management goals and monitoring objectives. Creating wetlands from uplands has proven difficult and often requires extensive maintenance.

B.5. **Provide appropriately heterogeneous topography**

The need to promote specific hydroperiods to support specific wetland plants and animals means that appropriate elevations and topographic variations must be present in restoration and creation sites. Slight differences in topography (e.g., micro- and meso-scale variations and presence and absence of drainage connections) can alter the timing, frequency, amplitude, and duration of inundation. In the case of some less-studied, restored wetland types, there is little scientific or technical information on natural microtopography (e.g., what causes strings and flarks in patterned fens or how hummocks in fens control local nutrient dynamics and species assemblages and subsurface hydrology are poorly known). In all cases, but especially those with minimal scientific and technical background, the proposed development wetland or appropriate example(s) of the target wetland type should provide a model template for incorporating microtopography.

Plan for elevations that are appropriate to plant and animal communities that are reflected in adjacent or close-by natural systems. In tidal systems, be aware of local variations in tidal flooding regime (e.g., due to freshwater flow and local controls on circulation) that might affect flooding duration and frequency.

While manipulations of natural water supply may not be possible or desirable, changes in topography are possible and should be incorporated in the design of a restored or created wetland/water when needed. Varying the depths of the substrate of the mitigation area ensures heterogeneous topography, decreasing the likelihood of homogenous plant communities. Rather than plan on one water level or one elevation of the substrate, in hopes of establishing a specific plant community, it is best to vary the depth of the bottom stratum. This will increase the likelihood of success for a more diverse targeted plant community and desired functions.

Appendix E

Upland Buffer Size in Relation to Wetland Size

Assumes round wetland with uniform 25 or 50 foot buffer on the periphery of the wetland

					Total Area (wetland and buffer)		Area of Buffer Only	
Size of wetland (acres)	Size of wetland (sq. ft.)	radius (ft)	r + 25 ft	r + 50 ft	25 foot buffer	50 foot buffer	25 foot buffer	50 foot buffer
0.1	4356	37.25	62.25	87.25	0.28	0.55	0.18	0.45
0.5	21780	83.28	108.28	133.28	0.85	1.28	0.35	0.78
0.75	32670	102.00	127.00	152.00	1.16	1.67	0.41	0.92
1	43560	117.78	142.78	167.78	1.47	2.03	0.47	1.03
1.125	49005	124.93	149.93	174.93	1.62	2.21	0.50	1.08
1.25	54450	131.68	156.68	181.68	1.77	2.38	0.52	1.13
2	87120	166.57	191.57	216.57	2.65	3.38	0.65	1.38
3	130680	204.00	229.00	254.00	3.78	4.65	0.78	1.65
4	174240	235.56	260.56	285.56	4.89	5.88	0.89	1.88
5	217800	263.37	288.37	313.37	5.99	7.08	0.99	2.08
6	261360	288.51	313.51	338.51	7.08	8.26	1.08	2.26
7	304920	311.62	336.62	361.62	8.17	9.43	1.17	2.43
8	348480	333.14	358.14	383.14	9.25	10.58	1.25	2.58
9	392040	353.35	378.35	403.35	10.32	11.73	1.32	2.73
10	435600	372.46	397.46	422.46	11.39	12.87	1.39	2.87
11	479160	390.64	415.64	440.64	12.45	14.00	1.45	3.00
12	522720	408.01	433.01	458.01	13.52	15.12	1.52	3.12
13	566280	424.67	449.67	474.67	14.58	16.24	1.58	3.24
14	609840	440.70	465.70	490.70	15.63	17.36	1.63	3.36
15	653400	456.17	481.17	506.17	16.69	18.47	1.69	3.47
16	696960	471.13	496.13	521.13	17.74	19.58	1.74	3.58
17	740520	485.63	510.63	535.63	18.80	20.68	1.80	3.68
18	784080	499.71	524.71	549.71	19.85	21.78	1.85	3.78
19	827640	513.40	538.40	563.40	20.90	22.88	1.90	3.88
20	871200	526.74	551.74	576.74	21.94	23.98	1.94	3.98
21	914760	539.75	564.75	589.75	22.99	25.07	1.99	4.07
22	958320	552.45	577.45	602.45	24.04	26.16	2.04	4.16
23	1001880	564.86	589.86	614.86	25.08	27.25	2.08	4.25
24	1045440	577.01	602.01	627.01	26.12	28.34	2.12	4.34
25	1089000	588.91	613.91	638.91	27.17	29.43	2.17	4.43
26	1132560	600.57	625.57	650.57	28.21	30.51	2.21	4.51
27	1176120	612.01	637.01	662.01	29.25	31.59	2.25	4.59
28	1219680	623.24	648.24	673.24	30.29	32.67	2.29	4.67
29	1263240	634.28	659.28	684.28	31.33	33.75	2.33	4.75
30	1306800	645.12	670.12	695.12	32.37	34.83	2.37	4.83
31	1350360	655.78	680.78	705.78	33.41	35.91	2.41	4.91
32	1393920	666.28	691.28	716.28	34.45	36.98	2.45	4.98
33	1437480	676.61	701.61	726.61	35.48	38.06	2.48	5.06
34	1481040	686.78	711.78	736.78	36.52	39.13	2.52	5.13
35	1524600	696.81	721.81	746.81	37.56	40.20	2.56	5.20
36	1568160	706.69	731.69	756.69	38.59	41.27	2.59	5.27
37	1611720	716.44	741.44	766.44	39.63	42.34	2.63	5.34
38	1655280	726.06	751.06	776.06	40.66	43.41	2.66	5.41
39	1698840	735.55	760.55	785.55	41.70	44.48	2.70	5.48
40	1742400	744.92	769.92	794.92	42.73	45.55	2.73	5.55
41	1785960	754.17	779.17	804.17	43.76	46.62	2.76	5.62
42	1829520	763.31	788.31	813.31	44.80	47.68	2.80	5.68
43	1873080	772.35	797.35	822.35	45.83	48.75	2.83	5.75
44	1916640	781.28	806.28	831.28	46.86	49.81	2.86	5.81
45	1960200	790.11	815.11	840.11	47.89	50.88	2.89	5.88
46	2003760	798.84	823.84	848.84	48.92	51.94	2.92	5.94
47	2047320	807.47	832.47	857.47	49.96	53.00	2.96	6.00
48	2090880	816.02	841.02	866.02	50.99	54.06	2.99	6.06
49	2134440	824.47	849.47	874.47	52.02	55.12	3.02	6.12
50	2178000	832.84	857.84	882.84	53.05	56.18	3.05	6.18