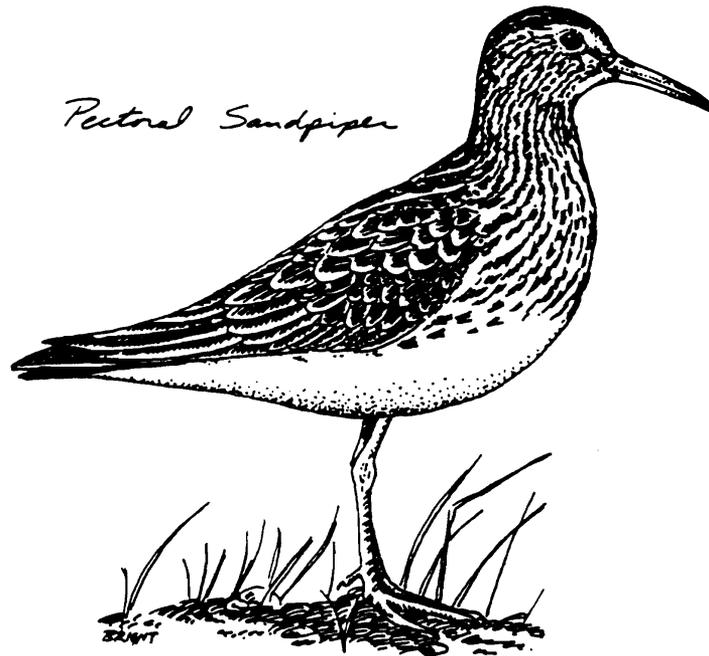


**MITIGATION GUIDELINES**  
**FOR**  
**NEBRASKA'S EASTERN SALINE WETLANDS**



A cooperative project of:

**U.S. Environmental Protection Agency**  
Kansas City, Kansas

**U.S. Army Corps of Engineers**  
Omaha, Nebraska

**Nebraska Game and Parks Commission**  
Lincoln, Nebraska

**Nebraska Department of Environmental Quality**  
Lincoln, Nebraska

**U.S. Fish and Wildlife Service**  
Grand Island, Nebraska

June 1997

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**FOR**  
**NEBRASKA'S EASTERN SALINE WETLANDS**

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## SUMMARY

The eastern Nebraska saline wetlands (saline wetlands) form a regionally unique wetlands complex located in floodplain swales and depressions within the Salt Creek, Little Salt Creek, and Rock Creek drainages in Lancaster and southern Saunders counties. This complex has been subject to extensive losses due to the expansion of the City of Lincoln and agricultural activities. An interagency team, comprised of the Nebraska Department of Environmental Quality (NDEQ), Nebraska Game and Parks Commission (NGPC), U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS), and U.S. Army Corps of Engineers (USACE) developed guidance for mitigating saline wetlands, including the establishment of mitigation banks.

These guidelines represent one approach to aid in the protection of a dwindling natural resource by assisting landowners, developers and organizations in the wetlands mitigation process. Because it is beyond the scope of this document to address the overall conservation needs of saline wetlands, it is recommended that those interested in such conservation join with local, state, and federal agencies to develop additional strategies and programs. Such cooperative effort within the Lincoln area is needed to explore options for further protecting saline wetlands both within and outside of the regulatory arena.

This document is divided into two major sections. The first section explains compensatory mitigation of saline wetlands outside of a mitigation bank, while the second provides a thorough treatment of mitigation banking in the saline wetlands. Recommended mitigation ratios for out-of-bank and within bank wetlands are provided. All mitigation involving saline wetlands, whether required as part of a Clean Water Act (CWA) Section 404 permit or offered as bank credits by an entrepreneur, must be accompanied by a plan. To compensate outside of a mitigation bank for wetland impacts, a project proponent should submit to the USACE for interagency review a Mitigation Concept Plan. A mitigation bank sponsor must submit a Prospectus to the USACE followed by a bank enabling instrument (i.e., Agreement) approved by the interagency team. The Mitigation Concept Plan and Agreement may become part of any required Section 404 permit.

Compensatory mitigation in these guidelines generally is restricted to restoration and enhancement. Mitigation may include wetland preservation, but only when accompanied by other restoration and/or enhancement measures. The creation of saline wetlands is not considered a viable compensatory mitigation option in Nebraska.

The interagency team recommends following a mitigation policy for administration of the CWA Section 404 permitting program in the eastern Nebraska saline wetlands. The policy would allow for in- and out-of-kind mitigation, the establishment of mitigation banks, the use of weighted scores based on the plant associations and acreage, and the application of mitigation ratios - all depending upon the identification of a wetland site as Category I, II, III, or IV. The categories are more fully discussed in the companion document (*Resource Categorization of Nebraska's Eastern Saline Wetlands*, Gilbert and Stutheit 1994) to these guidelines.

These guidelines provide information on evaluating the potential for successfully restoring a degraded or former saline wetland. The objectives for such restoration are:

1. To re-establish wetland hydrology which approximates historic conditions and restores/maintains a salt source that is sufficient to support saline wetland vegetation.

2. To develop a high level of interspersed saline plant associations, water regimes, and wetland classes.
3. To achieve long-term stability of saline wetlands through the maintenance of hydrology, reduction in sedimentation, and control of nonpoint source pollution.

Successful mitigation in the eastern Nebraska saline wetlands complex can be maximized by adhering to a specific set of variables that create a framework for selecting sites for mitigation. The variables are location, soil type, hydrology, wetland classes, wetland-soils relationships, the presence of saline plant associations, surrounding land use and buffers, and size.

Generally, the method for assessing saline wetlands must allow for equitable exchanges of wetland functions and values between a wetland impact site and an out-of-bank or within bank mitigation site. In the eastern Nebraska saline wetlands complex, no formal assessment of wetland functions and values is required; rather, a project proponent or a bank sponsor must consider the area of specific plant associations and the weighted score of each of the associations. Weighted scores, which are based on the relative value and scarcity of the associations, have been established for the saline wetlands complex. Examples are provided for the use of weighted scores and the determination of out-of-bank mitigation units or bank debits and credits as part of the mitigation accounting process.

Entities that are required to provide mitigation for impacted wetlands as part of a Section 404 permit action in the saline wetlands complex have the option of providing such mitigation either outside or within an established mitigation bank. Under either option such organizations or individuals would be required to provide mitigation according to the plant association weighted scores and a ratio scheme developed for these guidelines. Because of the clear advantages of mitigation obtained within rather than outside of a bank, the guidelines favor the former.

The development of a saline wetlands mitigation bank requires the establishment of an Agreement between a bank sponsor and the appropriate state and federal agencies in Nebraska. A potential bank sponsor is required to notify the USACE, Omaha District, of his/her intent to use a site for mitigation banking purposes prior to initiating any on-the-ground activities. Where establishment of a bank requires a CWA Section 404 permit authorizing the discharge of dredged or fill materials, the enabling instrument will be made part of the permit.

The banking procedure involves a number of important components that must be understood to develop a successful mitigation bank. The components include the bank enabling instrument (i.e., Agreement), roles and responsibilities of the bank sponsor and interagency team members, accounting procedures, financial and legal considerations, maintenance and reporting of information, certification of bank credits, transference of bank assets, and modification or termination of an agreement.

Bank sponsor serves in the main role of locating and securing ownership for a bank, and designing, constructing and maintaining the bank site(s). Sponsor may be a public or private entity, or an individual.

The operational life of a mitigation bank terminates under the following conditions: 1) bank credits have been exhausted or banking activity is voluntarily terminated, and 2) it has been determined that wetlands in the debited bank are functionally mature.

The USACE is responsible for providing the final approval for mitigation units established outside of a bank and final certification for credits established within a mitigation bank. A project proponent and a bank sponsor are encouraged to request approval or credit certification, respectively, only after they have determined that mitigation wetlands, whether located within or outside of a bank, are fully functioning. It is recommended that out-of-bank project proponents and bank sponsors coordinate closely and early with the USACE and other interagency team members.

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## INTRODUCTION

This document provides guidance on mitigating impacts to eastern Nebraska saline wetlands (saline wetlands), including the establishment of mitigation banks. Guidelines are provided on evaluation of a site to determine its restoration potential and requirements for establishing a saline wetlands mitigation bank. The companion report, *"Resource Categorization of Nebraska's Eastern Saline Wetlands"* (Gilbert and Stutheit 1994), provides data on the status and location of saline wetlands and supporting information to this document.

Both reports have been developed by an interagency technical team in Nebraska, hereafter known as the interagency team. The interagency team is represented by the Omaha District U.S. Army Corps of Engineers (USACE), Nebraska Department of Environmental Quality (NDEQ), Nebraska Game and Parks Commission (NGPC), U.S. Fish and Wildlife Service (FWS), and U.S. Environmental Protection Agency, Region VII (EPA).

## PURPOSE AND SCOPE

The purpose of this document is to provide guidelines for the restoration of saline wetlands and for saline wetlands mitigation banking. This report is divided into two major sections to reflect this. These guidelines are designed for use in the saline wetland complex located in Lancaster and southern Saunders counties, Nebraska. Restoration guidelines are addressed below under the section entitled, "Guidelines for Saline Wetlands Compensatory Mitigation."

Recently, there has been an increasing practice of establishing mitigation banks to offset wetland impacts. Wetland mitigation banking is a form of compensatory mitigation. General guidelines for saline wetlands mitigation banking are located in the section below, entitled "Wetlands Mitigation Banking." Prospective bank sponsors are strongly encouraged to supplement the banking guidelines herein with the most recent literature on banking and national guidance (Federal Register 1995) developed by the USACE, EPA, FWS, Natural Resources Conservation Service, and National Marine Fisheries Service.

It is beyond the scope of this document to address the overall conservation needs of saline wetlands because it focuses specifically on guidelines for restoring and mitigating this resource. However, the interagency team recommends that the various local, state, and federal agencies work in concert with private individuals and organizations to develop additional strategies and programs which encourage saline wetland preservation and protection. An effort similar to the Rainwater Basin Joint Venture should be considered for the eastern Nebraska saline wetlands complex. Now is the time for creative application of existing programs (e.g., Lower Platte South NRD's conservation easement program; U.S. Fish & Wildlife Service's Partners For Wildlife program) and development of new approaches to address saline wetland preservation. It will require cooperation among federal, state, and local agencies strengthened by the business knowledge of private enterprise and the energy and imagination of local conservation interests to create pro-active programs, incentives, and strategies. It is inappropriate, now that the entire community is aware of the saline wetlands and their importance, to continue to rely solely upon the regulatory arena to protect this valuable resource.

## GUIDELINES FOR SALINE WETLANDS COMPENSATORY MITIGATION

This section generally addresses mitigation that is developed outside of a mitigation bank but also includes important references to mitigation within a bank. Typically, mitigation is required as part of a Clean Water Act (CWA), Section 404 permit action wherein a permittee must compensate the loss of wetlands and their functions to comply with the permit. Section 404 permits have provided the vehicle in most cases for accomplishing mitigation. A detailed Mitigation Concept Plan reviewed by the interagency team is required to ensure full compliance with any required CWA Section 404 permit for the placement of fill into a saline wetland.

Mitigation generally involves the sequential steps of avoidance, minimization, and compensation for the loss of wetland functions and values associated with dredge and fill activities regulated under Section 404. Compensatory mitigation (i.e., compensation) generally follows after all practicable steps have been taken to avoid and minimize adverse impacts to wetlands (U.S. Environmental Protection Agency and U.S. Department of the Army 1990). Compensation provides for the replacement of *any remaining unavoidable* wetland losses (i.e., those losses remaining after avoiding and minimizing impacts) through the restoration of degraded or former wetland areas, or the creation of new sites. Mitigation banking may be an acceptable form of compensatory mitigation.

Compensatory mitigation should be undertaken, when practicable and environmentally desirable, in areas adjacent or contiguous to the discharge site (i.e., on-site). When on-site compensatory mitigation is not practicable and environmentally desirable, compensatory mitigation should take place in the same geographic area (i.e., off-site). For example, the anticipated loss of a saline wetland should be mitigated by the restoration of a nearby, former saline wetland. However, if such mitigation is demonstrated to be impracticable, mitigation should be accomplished by restoring a site within the same watershed (e.g., Salt Creek).

In exceptional circumstances, mitigation could include the preservation of existing wetlands and/or other aquatic resources that are imminently threatened with loss due to natural or anthropogenic causes. Such preservation must be included as part of a larger mitigation activity involving restoration and/or enhancement. Credit for such preservation activities will be addressed on a case-by-case basis by the interagency team.

The interagency team has concluded that saline wetland creation is not a viable compensatory mitigation option in eastern Nebraska for the following reasons: (1) the relationship between the soils and hydrological regimes which created the saline environment in the Salt and Rock Creek basins associated with the saline wetland complex, (2) the uncertainty of success related to wetland creation, and (3) the unique differences that exist between saline and freshwater wetland mitigation. Thus, compensatory mitigation as addressed within these guidelines will be restricted to that which is achieved through wetland restoration or enhancement.

The interagency team recommends the following mitigation policy for administration of the Section 404 program in the eastern saline wetlands:

- If compensatory mitigation is allowed for impacts to Category I<sup>1</sup> wetlands, then in-kind mitigation (i.e., restoration of a Category I wetland) is the preferred alternative.
- If compensatory mitigation is necessary for impacts to Category III wetlands, then out-of-kind mitigation to a Category I wetland is preferred. However, in-kind mitigation to a Category III wetland is allowable.
- The establishment and use of mitigation banks is considered to be a viable option for compensatory mitigation requirements.
- Plant association weighted scores and ratios will be applied for both bank related and nonbank related mitigation activities. This method of accounting encourages the establishment of saline, rather than freshwater, plant associations.

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<sup>1</sup>Category I: Site currently provides wetland functions of high value or has the potential to provide high values following restoration or enhancement measures.

Category II: Given current land use and degree of degradation, site currently provides limited wetland functions and low wetland values. Restoration potential is low.

Category III: Site is functioning as a freshwater wetland having freshwater plant communities on a saline soil. Currently provides freshwater values and no feasible restoration measures exist to re-establish the historic salt source and saline plant associations.

Category IV: Site is functioning as a freshwater wetland having freshwater plant communities on a non-saline hydric soil.

## SITE REVIEW CRITERIA

This subsection provides information on evaluating the potential for restoring a degraded or former saline wetland. Such an evaluation also is a necessary first step toward ensuring the success for any mitigation bank. Generally, it is recommended that a person interested in restoring saline wetlands, either within or outside of a bank, reference these objectives as part of discussions with the USACE and other federal and state agencies. Other factors may need to be evaluated in light of site-specific conditions.

### Objectives

Saline wetlands restoration should be designed to meet the following objectives:

1. Re-establish wetland hydrology which approximates historic conditions and restores/maintains a salt source sufficient to support saline wetland vegetation.
2. Develop a high level of interspersions of saline plant associations, water regimes, and wetland classes.
3. Achieve long-term stability of saline wetlands through the maintenance of hydrology, reduction in sedimentation, and control of nonpoint source pollution.

### Variables for Site Screening Analyses

The interagency team recommends consideration of the following variables when screening potential sites. These variables provide a project target. Sites should demonstrate the potential to achieve successful mitigation and provide sustainability of target vegetation communities.

1. Variable: Location  
Review Criteria: Drainages of Salt, Little Salt, and Rock Creeks.  
Rationale: Potential restoration sites are limited to these drainages based on historic and current saline wetland distribution.
2. Variable: Soils  
Review Criteria: Salmo b or c, or Rauville, mapping units as verified by the Soil Surveys of Lancaster Co. (Brown et al. 1980) or Saunders Co. (Elder et al. 1965), respectively, and/or field analysis. May require soil analysis (soluble salts and sodium concentration).  
Rationale: Salmo b and c, and Rauville, have highest salt content of saline hydric soils. Highest probability of achieving target saline plant communities. Provides information on whether salt source is present, restorable, or depleting.

3. **Variable:** Hydrology  
**Review Criteria:** Presence of spring seeps or restorable spring seeps. Evaluate other water sources, flow patterns, and ground water levels. May require hydrologic modeling of drainage areas.  
**Rationale:** Demonstration of restorable hydrology/salt source. Provides information on hydro- periods, open water/vegetation ratios, and temporal dynamics. Elevation data will likely be required.
  
4. **Variable:** Wetland Classes  
**Review Criteria:** Unconsolidated shore (i.e., salt flats), aquatic beds, emergent classes of the temporarily to seasonally-flooded water regimes (Cowardin et al. 1979). Supports or can support saline plants. Upland plant communities on Salmo soils should be considered. Look at partially drained or drained sites on Salmo soils.  
**Rationale:** Existing wetland class(es) will provide information on site condition, trend, and seed-bank potential of halophytes.
  
5. **Variable:** Wetland-Soils Relationships  
**Review Criteria:** Ratio of existing wetland area to total area of saline soils at the site.  
**Rationale:** Provides an index of restorability and a method to look at potential net acreage gain for assessing site potential.
  
6. **Variable:** Saline Plant Associations  
**Review Criteria:** Presence of the following plant associations: Hordeum jubatum/Iva annua, Salicornia rubra, Suaeda depressa, and Distichlis spicata. Also to be considered are semipermanently flooded and aquatic bed associations of Scirpus maritimus var. paludosus and Potamogeton pectinatus. The saturated water regime largely supporting Typha spp. may be indicative of spring seeps.  
**Rationale:** Presence of these species/associations may indicate plant community viability or available seed source. Goals of site restoration should be to: (1) gain net saline wetland acreage, (2) redistribute vegetational zones to most saline end of gradient, and (3) obtain high interspersions of wetland plant species/associations.
  
7. **Variable:** Land Use/Buffers  
**Review Criteria:** Existing grassland/pasture adjacent to wetland site or restorable to such conditions. Woody vegetation also may be considered as a component when appropriate.  
**Rationale:** Grassland/pasture reduces wetland sedimentation and nonpoint source pollution. Woody vegetation may reduce visual intrusion/disturbance to wildlife using the area.
  
8. **Variable:** Size  
**Review Criteria:** No minimum size required.  
**Rationale:** Resource scarcity requires review of all potential sites. Economics and land availability will determine final site selection in combination with other variables analyzed.

## OUT-OF-BANK MITIGATION

This section addresses the steps for mitigating impacts to saline wetlands outside of a mitigation bank. The steps effectively would be linked to the submission of information to the USACE as part of the CWA Section 404 permit process.

A project proponent would prepare and submit to the USACE a complete Section 404 permit application requesting authorization for an activity that results in the placement of fill materials into a water of the United States, including wetlands. The USACE would issue a public notice to obtain comments and then consider such comments along with a project proponent's Mitigation Concept Plan containing, at a minimum, information identified in Table 1. The Mitigation Concept Plan provides the basis for the proponent and the USACE, with technical assistance from the interagency team, to formulate permit conditions that fully address mitigation. The project proponent is strongly encouraged to submit a Mitigation Concept Plan with the Section 404 permit application to ensure complete and timely evaluation during the public review process.

After receipt of the Section 404 permit, development of the mitigation site(s), and compliance with permit conditions for mitigation, the project proponent must notify the USACE in writing to request approval of the final mitigation units to ensure compliance with the permit. Upon this notification the interagency team would determine if the mitigation site is functionally mature. It is recommended that notification to the USACE not occur until the project proponent believes that the mitigation area has attained functional maturity or met an agreed to performance standard.

Table 1. Minimum recommended items to meet requirements for mitigating impacts to saline wetlands outside of a bank in the eastern Nebraska saline wetlands complex.

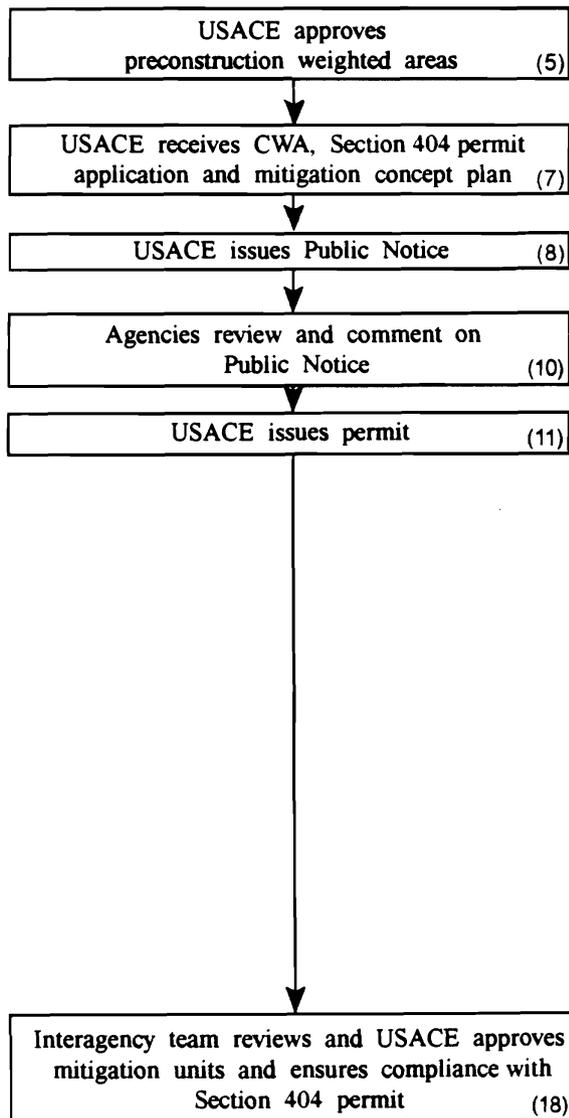
- 
- ▶ Clean Water Act, Section 404 Permit
  - ▶ Mitigation Concept Plan<sup>+</sup>
    - a. Brief project summary
    - b. Goals and objectives
    - c. Affected parties
    - d. Locational information
    - e. Description of affected resources
    - f. Pre- and postconstruction wetland units at impact site and mitigation site
    - g. Schedules and milestones
    - h. Monitoring and reporting
    - i. Current and future land ownership

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<sup>+</sup>See Appendix C for additional information that may be useful for meeting mitigation requirements.

Figure 1 summarizes the general steps that a project proponent would take when it is determined that a project impacting an eastern saline wetland will be mitigated outside of a wetlands bank.

## Responsibilities of the Interagency Team



## Responsibilities of the Project Proponent

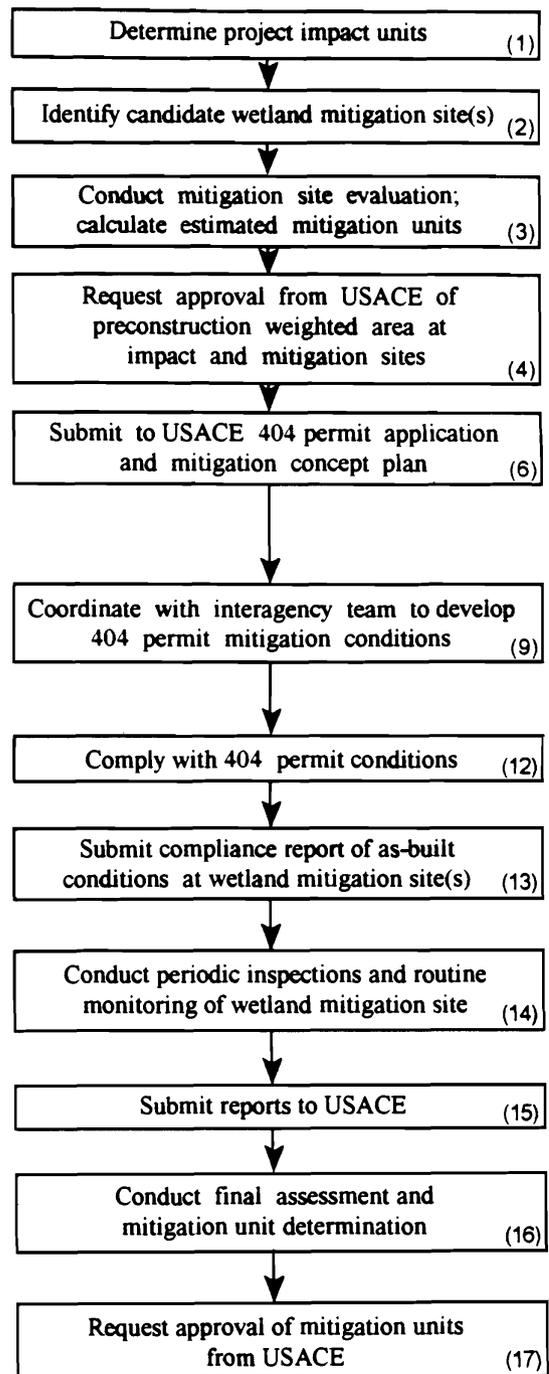


Figure 1. The operational process for establishing a wetland mitigation site outside of a bank for impacted saline wetlands of eastern Nebraska. (Numbers in parentheses indicate the stepwise relationship between a project proponent and the agency team)

Accounting Procedure for Impacted Site and Out-of-Bank Mitigation Sites

The following provides an explanation of how wetlands should be assessed in the saline wetlands complex both at a proposed project impact site and at a mitigation site located outside of a bank. There must be an equitable exchange of wetland functions and values between the impact and mitigation site(s). In lieu of a formal assessment of wetland functions and values, a project proponent must consider the acres of specific wetland plant associations and the weighted score of each of the associations.

A number of plant associations have been identified for the eastern saline wetland complex. The accounting process involving associations requires that a weighted score be assigned each association (Table 2). The scores are based on the relative value and scarcity of the association in the saline wetlands area. It is recognized that this table is not all inclusive. Additional associations or dominants may be identified upon site specific examination and will be assigned a weight by the interagency team based on the best scientific data available at the time. Upland areas generally receive a weighted score of zero. However, upland areas specifically managed as environmental buffers to ensure the long-term quality of wetland areas may receive a weighted score. Any crediting for such areas will be addressed on a case-by-case basis by the interagency team.

Table 2. Weighted scores of common plant associations located in the saline wetlands of Lancaster and Saunders counties, Nebraska.

<u>Weighted Score</u>	<u>Plant Associations</u>
4	<u>Salicornia rubra</u> , <u>Suaeda depressa</u> , unvegetated salt flat*
3	<u>Distichlis spicata</u>
3	<u>Atriplex patula</u>
3	<u>Scirpus maritimus</u> var. <u>paludosus</u> ,
3	<u>Potamogeton pectinatus</u>
2	<u>Hordeum jubatum</u> / <u>Iva annua</u>
1	Other wetland associations (e.g., <u>Typha</u> , <u>Eleocharis</u> , <u>Carex</u> , etc.)
0	Upland

\* By definition, unvegetated salt flats (PUSA - Cowardin et al. 1979) are less than 30% vegetated and may contain one or more of the listed species.

As part of an application for a CWA Section 404 permit to place fill into a wetland, a project proponent would calculate the amount of impact expected to occur at a project site. The calculations are based on the plant associations and their acreages at the impact site:

**EXAMPLE, STEP 1:** Calculate preconstruction impact site weighted area.

	Area (Acres)		Weight		Weighted Area
<u>Distichlis spicata</u>	0.6	X	3	=	1.8
<u>Hordeum jubatum/Iva annua</u>	0.9	X	2	=	1.8
Other wetland plant associations	2.2	X	1	=	2.2
Upland	5.7	X	0	=	0.0
	-----				-----
TOTALS:	9.4				5.8

The project proponent then must determine the weighted area of wetlands expected to remain at the project site following project completion.

**EXAMPLE, STEP 2:** Calculate postconstruction impacted site weighted area.

	Area (Acres)		Weight		Weighted Area
<u>Distichlis spicata</u>	0.0	X	3	=	0.0
<u>Hordeum jubatum/Iva annua</u>	0.2	X	2	=	0.4
Other wetland plant associations	0.7	X	1	=	0.7
Upland	1.4	X	0	=	0.0
Commercial	7.1	X	0	=	0.0
	-----				-----
TOTALS:	9.4				1.1

The total weighted area of wetland impacts at the project site is calculated by subtracting the postconstruction site weighted area from the preconstruction site weighted area:

**EXAMPLE, STEP 3:** Calculate net impact units occurring at project site.

(Preconstruction weighted area)	-	(Postconstruction weighted area)	=	Impact Units
5.8	-	1.1	=	4.7

In this example, the proposed project would be expected to adversely impact 4.7 wetland units. Because of the weighting process, it is important to note that impacted wetland units are not equivalent to acres.

A project proponent, who opts to mitigate for impacted wetlands outside of a bank, must locate one or more sites to achieve such mitigation. The number of mitigation units projected to be available at a mitigation site are determined in a manner similar to that described above in the example for the impact site. The project proponent must calculate the net mitigation units from the difference in weighted area between functioning wetlands at the mitigation site prior to restoration or enhancement and the projected weighted area following implementation of proposed mitigation activities. Upon written request from the project proponent, the USACE approves the available net mitigation units.

After determining the weighted area for the impact site, ratios (Table 3) are used to determine the total amount of mitigation required. Ratios were established for the saline wetlands based on the following rationale:

- a. the value and scarcity of the saline wetland resource;
- b. the uncertainty of wetland performance or response at the mitigation site;
- c. the resulting temporal losses of wetland functions that occur between the time that wetlands are impacted and the time when mitigation wetlands are fully functional;
- d. a preference for achieving higher quality wetlands (i.e., Category I vs. II) and saline type (i.e., Category I vs. III); and
- e. to contribute towards attainment of National goal for no overall net loss of Nation's wetlands.

Table 3. Mitigation ratios for wetland categories identified from Gilbert and Stutheit (1994), in the eastern saline wetlands complex.

<u>WETLAND CATEGORY</u>		<u>REQUIRED MITIGATION RATIO*</u>		
<u>At Impact</u>	<u>At Mitigation Site (After Restoration)</u>	<u>Within Bank</u>	<u>Pre-Crediting</u>	<u>Outside Bank</u>
I <sup>a</sup>	I	1:1	3:1	5:1
II <sup>b</sup>	I	1:1	1.5:1	2:1
III <sup>c</sup>	I	1:1	1.5:1	2:1
III	III	1:1	2:1	3:1
IV <sup>d</sup>	IV	1:1	1.5:1	1.5:1

\*Required ratios for both within and out-of-bank mitigation are based on weighted scores of plant associations, not association acreages.

<sup>a</sup>Site currently provides wetland functions of high value or has the potential to provide high values following restoration or enhancement measures.

<sup>b</sup>Given current land use and degree of degradation, site currently provides limited wetland functions and low wetland values. Restoration potential is low.

<sup>c</sup>Site is functioning as a freshwater wetland having freshwater plant communities on a saline soil. Currently provides freshwater values and no feasible restoration measures exist to re-establish the historic salt source and saline plant associations.

<sup>d</sup>Site is functioning as a freshwater wetland having freshwater plant communities on a non-saline hydric soil.

To determine the kind and amount of required mitigation, the wetland category at the impact site must be known. In the saline wetlands, this general category normally can be obtained from the categorization maps (Gilbert and Stutheit 1994); more detailed, site specific data may be required for a CWA, Section 404 review. If the category is indicated as "NC," then the interagency team must visit the site to assign a category. As indicated in Table 3, different ratios apply depending on whether the mitigation will be achieved outside of a bank or deducted from an established bank (see "Wetland Mitigation Banking" below).

As a continuation of the above example, which illustrated the determination of impact units resulting at a project site and net mitigation units available at a mitigation site, a final determination of required mitigation that includes a ratio is provided below:

**EXAMPLE, STEP 4:** Development at the impact site will result in weighted area impact of 4.7 units. From available maps entitled, "*Resource Categorization of Nebraska's Eastern Saline Wetlands*" (Gilbert and Stutheit 1994) and appropriate field verification, one determines that the impacted wetland has been classified as Category II (i.e., degraded, limited functions). The project proponent chooses to mitigate the wetland impacts by restoring a wetland located outside of a bank. Mitigation will require a ratio of 2 restored or enhanced mitigation units for every 1 unit of impact (Table 3), for a total of 9.4 units of mitigation.

The project proponent would prepare and submit to the USACE the impact and weighted area in a Mitigation Concept Plan that should accompany an application for a CWA Section 404 permit.

### WETLANDS MITIGATION BANKING

The following general guidelines are provided to ensure that saline mitigation banks are implemented with consistency. These guidelines and procedures, in addition to the Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks (1995) will serve as umbrella documents for the preparation of a Prospectus and for the development and implementation of a bank enabling instrument. The enabling instrument is required for each mitigation bank (see Table 4).

Table 4. Documents required for establishing a mitigation bank in the eastern Nebraska saline wetlands complex.

- 
- ▶ Prospectus (see Technical Specifications at Appendix C)
  - ▶ Agreement (i.e., bank enabling instrument)
    - a. Mitigation Plan (see Technical Specifications at Appendix C)
    - b. Banking procedure
    - c. Non-Section 404 permits pending and received
    - d. Agencies concurrence
  - ▶ Clean Water Act, Section 404 Permit (i.e., when the placement of fill into waters of the U.S., including wetlands, is anticipated)
- 

Prospective bank sponsors should initiate formal interagency team involvement in the bank development process by submittal of a Prospectus to the USACE. The Prospectus should include sufficient information to allow the interagency team to provide constructive input for determining the utility of advancing the banking process.

Information provided in the Prospectus will serve as the basis for establishing the bank enabling instrument. Successful restoration or enhancement projects initiated independent of an enabling instrument will not be considered. Notification to the USACE of intent to use a site for mitigation banking purposes is required prior to impacts. The interagency team will provide general assistance to potential bank sponsors

in developing their specific Mitigation Plan as part of the enabling instrument provided the bank sponsors follow these guidelines (see “Bank Enabling Instrument”, below).

The primary goal of establishing mitigation banks is to provide replacement of lost wetland functions and values in a manner that is economically efficient. An additional goal is to increase the functional capacity of remaining wetlands. These goals are consistent with the national policy of achieving no net loss of wetland functions. Under specific circumstances, mitigation banks have several advantages and benefits over individual wetland compensation projects including:

1. Mitigation banks generally provide advanced compensation; that is, the wetlands to be credited can be functioning in advance of project impacts, thereby reducing temporal losses of aquatic functions and uncertainty over whether the mitigation will be successful in offsetting project impacts;
2. Wetland mitigation banks, due to their required comprehensive planning and monitoring, create the opportunity to develop high quality wetlands for mitigation purposes;
3. Development of a mitigation bank can bring together financial resources, planning, and scientific expertise not practicable for many project-specific mitigation proposals;
4. The opportunity exists to use mitigation banks as a part of an overall watershed management or restoration effort coordinated with local, state, and federal planning efforts;
5. Mitigation banks provide planners and developers the ability to both reduce permit processing time for qualifying projects and provide more cost-effective compensatory mitigation opportunities;
6. The existence of mitigation banks can contribute towards attainment of no net loss of the Nation’s wetlands by providing opportunities to compensate for authorized impacts when mitigation might not otherwise be appropriate or practicable.

#### Banking Procedure

The establishment of a successful wetlands mitigation bank requires an understanding of the components of operating the bank. The components include the bank enabling instrument (e.g., Agreement), the role of a bank sponsor, the USACE, and the interagency team in establishing and operating a bank, the accounting procedure, financial and legal considerations, maintaining and reporting information, transferring bank assets, and modifying or terminating an Agreement.

#### Bank Enabling Instrument

All prospective mitigation banks need to have a bank enabling instrument, hereafter known as an Agreement, as documentation of concurrence by involved agencies on the objectives and administration of the bank. The Agreement is established between a bank sponsor and, at a minimum, the USACE. It should describe in detail the physical and legal characteristics of the bank, and how the bank will be established and operated. Information on the scope of work necessary for a technical evaluation of the mitigation bank site is provided in Appendix C, "Technical Specifications for Saline Wetlands Mitigation." The specifications list the minimum level of detail required by the interagency team to provide technical assistance to the bank proponent throughout the banking process. A final scope of work will be negotiated in consideration of existing environmental conditions and suggested restoration methods at the proposed bank site.

There may be cases where the initial establishment of a mitigation bank will involve a discharge into waters of the United States, including wetlands, which requires a CWA Section 404 authorization. In such cases, the Agreement will be made part of the Department of the Army permit (see example in Appendix B). Preparation of the Agreement shall not alter the normal permit review process necessary to evaluate the proposed discharge in such circumstances. The provisions of the Agreement would be made enforceable through a condition of the permit.

#### The Role of Bank Sponsor, USACE, and Interagency Team

The establishment and operation of any mitigation bank will require substantial involvement of a bank sponsor. The bank sponsor is that entity or those entities responsible for locating and securing ownership, and designing, constructing and maintaining the individual mitigation bank site. The sponsor also is responsible for funding the establishment of the bank, conducting site evaluations, preparing and implementing the bank development plan, monitoring the bank's development, and providing reports. The sponsor effectively serves as agent for the bank and shall sign and hold all agreements associated with the bank.

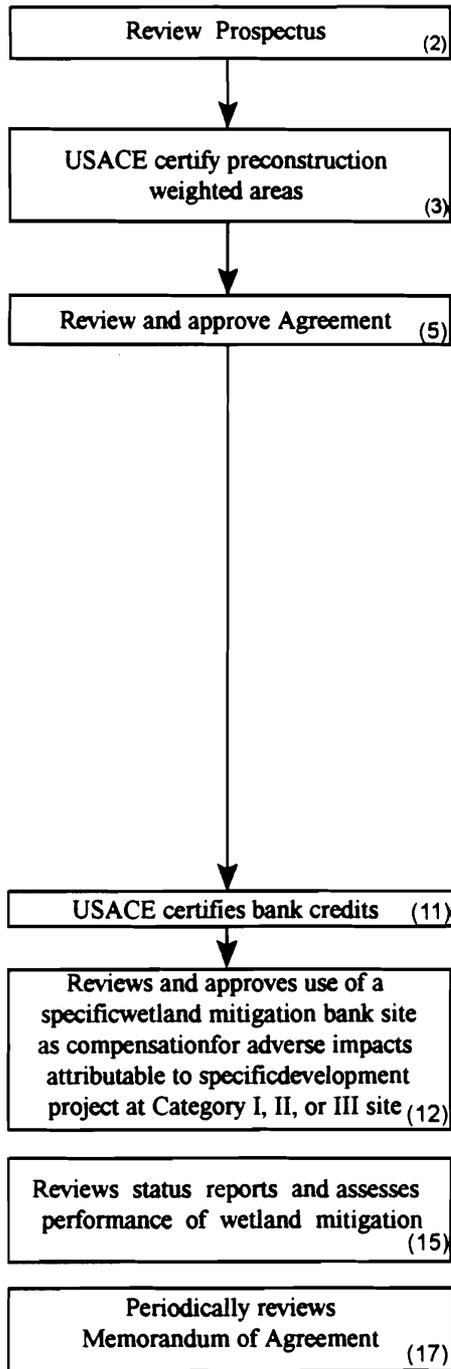
The operational process for establishing a wetland mitigation bank requires considerable coordination between a bank sponsor and state and federal government agencies involved in review and approval of a bank. Figure 2 illustrates the stepwise relationship between a bank sponsor and the interagency team for establishing a mitigation bank in the saline wetlands complex of eastern Nebraska. Although bank sponsors are strongly encouraged to coordinate their planning efforts with one or more agencies on the interagency team, all risks associated with a bank project will be borne by the sponsor(s).

The sponsor may be a public or private entity, or an individual. Public sponsors could be any municipal, county, regional, state, or federal government agency or local governmental agency such as a Natural Resources District. Private sponsors would include both for-profit and not-for-profit groups, such as businesses, corporations, and environmental and special interest groups. Although some states may have restrictions on who constitutes a private mitigation bank sponsor (e.g., they must be incorporated in the state containing the bank), no such restrictions currently exist in Nebraska.

The bank sponsor is responsible for the day-to-day operations of the wetland mitigation bank. These responsibilities include, but are not limited to, those outlined under "Technical Specifications for Saline Wetlands Mitigation (Appendix C)". Such responsibilities could be supported through a contract or other funding mechanism to either a public or private entity. The bank sponsor also is responsible for maintaining the accounting ledgers that track the crediting and debiting of wetland bank units.

Because of the close relationship between mitigation bank Agreement requirements and conditions associated with Section 404 permits that authorize dredge and fill activities occurring in the development of a bank, the USACE, Omaha District, will be responsible for all auditing of bank activities. Such auditing is necessary to assure the accuracy of all transactions (i.e., exchange of wetland debits and credits) associated with the assets of a bank. The USACE will conduct audits on an as-needed basis and provide copies of their audit report to the interagency team. The USACE is responsible for coordinating and conducting compliance inspections at the bank site to ensure that all requirements of the sponsor's Mitigation Plan, as well as their permit conditions, have been met according to schedule and approved by the interagency team. The USACE can use the compliance inspection time also to ensure that all permit conditions have been met. Finally, the USACE is responsible for certifying bank credits, debits, and transfers.

### Responsibilities of the Interagency Team



### Responsibilities of the Bank Sponsor

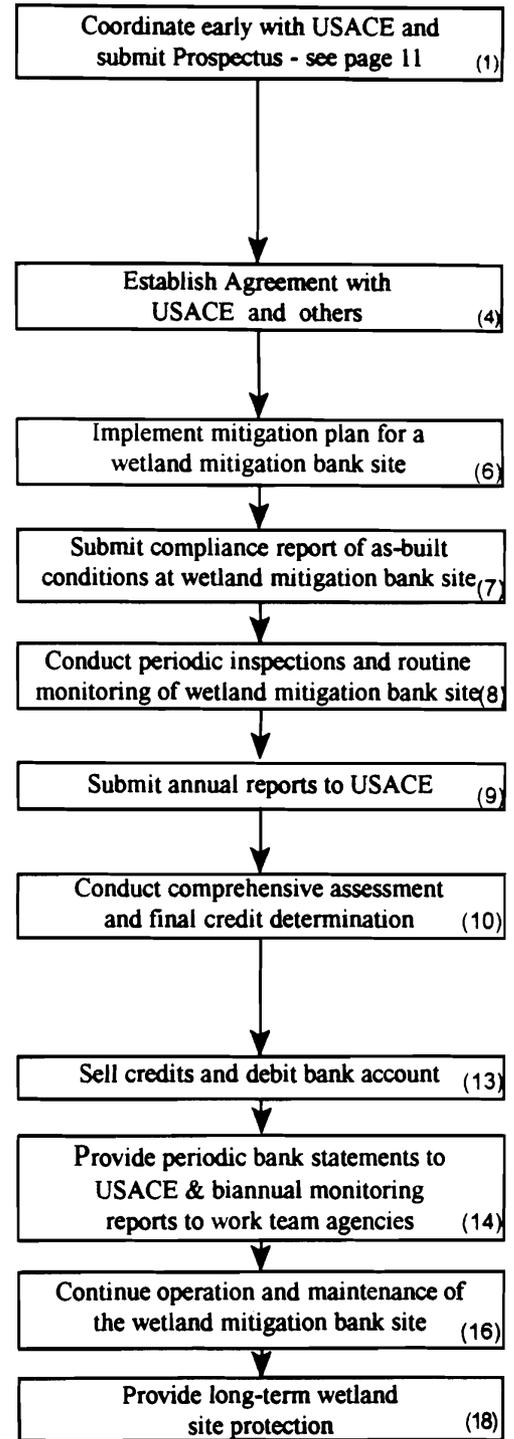


Figure 2. The operational process for establishing a wetland mitigation bank for the saline wetlands of eastern Nebraska. (Numbers in parentheses indicate the stepwise relationship between a bank sponsor and the interagency team.)

Accounting Procedure for Mitigation Bank Sites

This subsection provides an explanation of how wetland credits and debits are calculated for an activity (e.g., a fill) conducted in a wetland regulated under Section 404 of the Clean Water Act, and how the wetland impacts are to be mitigated through the purchase of credits from a mitigation bank. At both the impact site and the mitigation bank site, the area of each wetland plant association must be determined to facilitate the calculation of wetland debits and credits. The process is the same as that used for out-of-bank mitigation.

The currency of the mitigation banking process must allow for equitable exchanges of wetland functions and values between the impact and banking sites. In lieu of a formal assessment of wetland functions and values, the sponsor must consider the acres of specific wetland plant associations and the weighted score of each of the associations.

As in most wetland complexes throughout the state, a number of plant associations have been identified for the eastern saline wetland complex. The accounting process involving associations requires that a weighted score be assigned each association (Table 2, page 8) based on the relative value and scarcity of the associations in the banking area. For banking purposes, upland areas generally receive a weighted score of zero. However, upland areas specifically managed as environmental buffers to ensure the long-term quality of wetland areas may receive a weighted score on a case-by-case basis.

The number of credits available in a bank are first calculated by finding the difference in weighted area of functioning wetlands at the bank site prior to bank development and at the time of the bank certification. This is done to determine the preproject wetland resource and to avoid crediting a bank for pre-existing wetland conditions. At the mitigation site, a preconstruction weighted area is calculated for each plant association:

**EXAMPLE, STEP 1:** Calculate preconstruction mitigation bank site weighted area.

	<u>Area</u> <u>(Acres)</u>		<u>Weight</u>		<u>Weighted</u> <u>Area</u>
<u>Distichlis spicata</u>	1.8	X	3	=	5.4
<u>Hordeum jubatum/Iva annua</u>	10.3	X	2	=	20.6
<u>Scirpus maritimus var. paludosus</u>	1.5	X	3	=	4.5
Other wetland plant associations	7.5	X	1	=	7.5
Upland	<u>18.9</u>	X	0	=	<u>0.0</u>
TOTALS:	40.0				38.0

Following development of the bank, a mitigation bank sponsor must notify the USACE in writing to request certification of the available credits. The credits are based on a calculation of the postconstruction weighted area for each plant association:

**EXAMPLE, STEP 2:** Calculate postconstruction mitigation bank site weighted area.

	Area (Acres)		Weight	=	Weighted Area
<u>Salicornia rubra</u>	5.5	X	4	=	22.0
<u>Suaeda depressa</u>	4.6	X	4	=	18.4
Unvegetated salt flat	10.5	X	4	=	42.0
<u>Distichlis spicata</u>	3.7	X	3	=	11.1
<u>Scirpus maritimus</u> var. <u>paludosus</u>	2.8	X	3	=	8.4
<u>Potamogeton pectinatus</u>	1.2	X	3	=	3.6
<u>Hordeum jubatum</u> / <u>Iva annua</u>	3.9	X	2	=	7.8
Other wetland plant associations	2.1	X	1	=	2.1
Upland	<u>5.7</u>	X	0	=	<u>0.0</u>
TOTALS:	40.0				115.4

It is recommended that the request for certification to the USACE not occur until the sponsor has determined that the bank area has attained functional maturity or an agreed to performance standard. After this determination, credits are calculated and the USACE certifies the credits of the mitigation site as final. If the wetland increases or decreases in size after credit certification due to natural causes or off-site activities over which the bank sponsor has no control, the weighted area will not change. However, because of the responsibility of the sponsor to ensure the protection of the wetland bank as prescribed in the enabling instrument, the MBRT would need to review all information related to such a catastrophic event and determine if it is beyond the control of the sponsor to mitigate the bank loss.

It is to the sponsor's advantage to wait until the mitigation bank site or discrete portions of it are at their fullest potential before requesting the USACE certify the final credits. Selling of advance credits (precredits) for discrete portions of a larger bank site or prior to full establishment of an entire bank may be considered by the interagency team on a case-by-case basis. Any such precrediting can be expected to require financial assurances or mitigation ratios (see Table 3, page 10) that are higher than those for wetlands already established within a bank.

When the established mitigation bank site has been evaluated and certified by the USACE, the weighted area of the preconstruction site is subtracted from the weighted area of the postconstruction site:

**EXAMPLE, STEP 3:** Calculate net credits available at mitigation bank site.

(Postconstruction weighted area)	-	(Preconstruction weighted area)	=	Credits
115.4	-	38.0	=	77.4

This number represents the credits available for that bank site. Following USACE credit certification, a mitigation bank sponsor can now make available 77.4 credits that could be withdrawn to mitigate the loss of wetlands that will occur in the region.

With certified bank credits now established, a Section 404 permit applicant could withdraw the credits to offset wetland losses (i.e., debits) resulting from their dredge and fill activities. As an example, as

part of their permit application, the Section 404 permit applicant should calculate the net debits (i.e., weighted area) that exist at the impact site. The calculations, which are similar to those explained in Steps 1 through 3, above, depend on the plant associations and their acreages at the impact site. The debits from the impact site are then drawn against available credits established at a wetland mitigation bank. Alternatively, a Section 404 permit applicant may choose not to mitigate the loss of wetlands via a bank. The applicant in this case would follow the procedure for mitigating such loss as described above in "Accounting Procedure for Impacted and Out-of-bank Mitigation Sites." The mitigation options available to a permit applicant are illustrated in Figure 3.

After determining the weighted area for the impact site, ratios are used to determine the total amount of mitigation required. Ratios were established within the saline wetlands based on the following rationale:

- a. the value and scarcity of the saline wetland resource;
- b. the uncertainty of wetland performance or response at the mitigation site;
- c. the resulting temporal losses of wetland functions that occur between the time that wetlands are impacted and the time when mitigation wetlands are fully functional;
- d. a preference for achieving higher quality wetlands (i.e., Category I vs. II) and saline type (i.e., Category I vs. III); and
- e. to contribute towards attainment of the National goal for no overall net loss of the Nation's wetlands.

To determine the kind and amount of mitigation required, the wetland category at the impact site must be known. In the saline wetlands, this category normally can be obtained from the maps entitled, *Resource Categorization of Nebraska's Eastern Saline Wetlands* (Gilbert and Stutheit 1994); however, if the category is indicated as "NC," then the interagency team must visit the site to assign a category. Different ratios apply depending on whether the mitigation will be deducted from an established bank or mitigation is achieved outside of a bank. The ratios for mitigating through a wetland bank are more favorable than those for mitigating outside of a bank due to the advantages listed earlier. The mitigation ratios are outlined in Table 3 (page 10).

The interagency team has established a preference that saline wetlands at the mitigation site be Category I when saline wetlands are impacted and that freshwater wetland mitigation (Category IV) occur when freshwater wetlands are impacted (Table 3, page 10). Further, saline wetland mitigation banks generally will be approved for restoring saline wetlands rather than freshwater wetlands. On a case-by-case basis, the interagency team will consider the restoration of freshwater wetlands (i.e., Category IV) which are impacted within the Eastern Nebraska Saline Wetland Study Area (Gilbert and Stutheit 1994) within a saline bank. Such restoration activities will only be considered when they are planned in conjunction with a saline wetland mitigation bank.

As a continuation of the above example, which illustrated the determination of net wetland credits available at a mitigation bank site, a final determination of required mitigation that includes a ratio is provided below:

**EXAMPLE, STEP 4:** Assume that development at the impact site will result in 4.7 debits. From available maps and a field review as appropriate for Section 404 permitting purposes one determines that the wetland to be impacted has been classified as a Category II (i.e., degraded) saline wetland. The project proponent chooses to mitigate the wetland impacts by purchasing credits in an established mitigation bank. In this case, the project proponent will need to mitigate the impacts at a ratio of 1 unit of mitigation for every 1 unit of impact (Table 3, page 10), for a total of 4.7 credits.

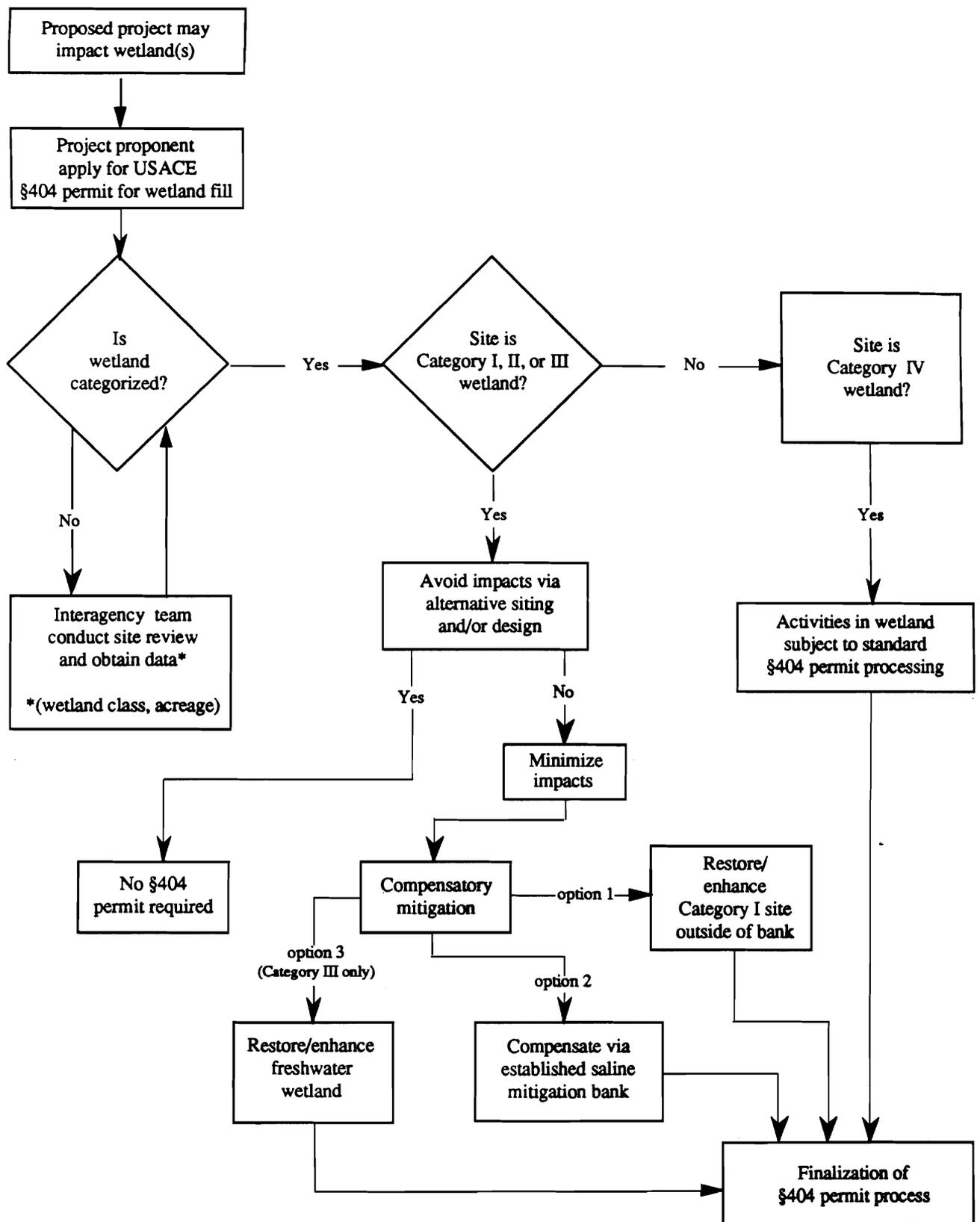


Figure 3. Options available within the Clean Water Act Section 404 process for mitigating impacts to Category I through IV sites in the saline wetlands complex of eastern Nebraska.

Withdrawing 4.7 debits from the bank originally containing 77.4 credits would leave a balance of 72.7 credits. Had the project proponent chosen to mitigate outside of an established saline wetlands bank, the mitigation ratio would have been 2:1, and 9.4 units would be required for mitigation.

### Record Keeping and Reporting

The bank sponsor is responsible for record keeping and all reporting associated with the mitigation bank. Record keeping involves establishing and maintaining records (e.g., ledger system) to document the activities of a wetland bank account. These activities include documenting credits (developed through restoration or enhancement) that are added to an account, debits sold or drawn against an account, and credits transferred or sold.

Reporting to appropriate state and federal agencies must be conducted in a timely fashion. The sponsor must submit transaction statements to the USACE following each credit withdrawal and provide a year-end balance sheet. Further, the sponsor must provide status reports that serve to summarize all activities associated with the bank during the reporting period. Status reports should be provided to the USACE and all other state and/or federal agencies participating in the banking review process (e.g., FWS, EPA, NGPC, and NDEQ). The sponsor will distribute status reports biannually and upon request by the USACE or by other arrangement with the USACE.

Reporting, in general, must include reference to (1) bank location and name, (2) transaction description including customer name, credits/debits, transaction date, beginning and ending balances, and (3) USACE permit number.

### Remedial Action

The enabling instrument should stipulate the procedures for identifying and implementing remedial measures at a bank. The measures should be based on information contained in the monitoring reports as well as site inspections. The USACE will determine the need for remediation after consulting with other interagency team members and the sponsor.

### Certification of Credits

The measurement of success of a mitigation bank requires an evaluation of the performance of the bank with special consideration for vegetation, hydrology, and soils. This evaluation follows the procedure that would be developed as part of post-construction activities (Appendix C). The evaluation provides the basis by which the USACE certifies the availability of bank credits. Certification effectively represents a determination by the USACE, in coordination with the interagency team, that wetlands in the bank are functionally mature (i.e., self-sustainable). The certification of credits and their authorization for withdrawal takes place when the USACE receives written request from the bank sponsor for final certification.

### Bank Costs

The costs associated with a mitigation bank are those set by the bank sponsor to cover the expenses of inventory, monitoring, acquisition, management, remedial actions, and administration. The sponsor may develop those costs based on an economic analysis of an anticipated mitigation bank with consideration of its operational life and the units of exchange (e.g., bank weighted area). The sponsor may adjust bank credit prices to accommodate changing land values and bank costs. The costs also may be adjusted to account for unique features that the sponsor has successfully established within the bank. For example, the costs to

establish a saline wetland community with the saltwort (Salicornia rubra) association that is relatively rare might be greater than the costs associated with a community containing the more common foxtail barley/marsh elder (Hordeum jubatum/lva annua) association.

A bank customer, or 404 permit applicant, who opts to draw on a bank account to cover the debits associated with their project, would reimburse the bank sponsor. This could occur, for example, through a direct monetary reimbursement.

A bank sponsor is required to provide to the USACE some form of financial guarantee (e.g., performance bond, dedicated escrow account) for each bank. This financial commitment should cover the costs associated with monitoring, managing and maintaining committed bank credits in perpetuity or until such time as arrangements are made for the bank's long-term management and protection. The commitment also would cover any replacement costs that might arise if wetland sites already serving to credit another wetland loss fail due to non-natural causes (e.g., near-site hydrological modifications).

### Bank Operational Life

The operational life of a bank is that period during which the terms and conditions of the enabling instrument are applicable, and signatories of the instrument are responsible for carrying out its provisions. With the exception of arrangements that are required for the long-term management and protection of wetlands in the bank, the bank's operational life terminates at the point when (1) bank credits have been exhausted or banking activity is voluntarily terminated with written notice by the bank sponsor provided to the USACE and any other signatories to the Agreement, and (2) it has been determined by the USACE that wetlands in the debited bank are functionally mature (i.e., self-sustainable, see section entitled, "Certification of Credits").

### Long-term Management and Maintenance

A bank sponsor must have sufficient real estate interest and control to assure bank success and the management and protection of the bank during its operational life. Further, wetlands debited from mitigation banks must be protected with appropriate real estate arrangements in perpetuity.

To achieve such protection, a sponsor may own land in fee title, although less than fee ownerships and long-term lease agreements between a bank sponsor and landowners may be appropriate. Conservation easements, deed restrictions, deed transfers of property to the state, county, or local government agency, and other legal instruments may be available for protection of the bank wetlands. There may be cooperative undertakings between a bank sponsor and a public or local governmental agency in which the real estate interest is in the form of long-term leases or easements. Whatever the arrangement, current and anticipated future ownership of a bank site must be clearly described and documented to assure the conservation purpose of the bank.

Instances in which the sponsor transfers long-term operation and maintenance of debited wetlands to another entity should be accomplished by transfer of title or by development of a lease agreement. Transfer of title may include a reversionary clause which will return title to the original owner in the event lands are not managed for their intended use. Land management also is affected by restrictive covenants and conservation easements. Any transfer must be approved by the USACE and any other signatories to the original banking Agreement. Transfers must honor all conditions to such an Agreement.

### Transfer of Bank Assets

A sponsor may sell or transfer mitigation bank assets to another public or private entity, or an individual. All purchases or transfers are subject to USACE approval when such bank assets serve as compensation for wetland losses authorized under Section 404. Transfers generally are subject to approved operational banking guidelines and all conditions of any existing Agreement. The legal instrument for transferring bank assets must contain either a positive or negative statement relative to credit transfer.

### Modification and Termination of Agreement

The procedures established in a banking Agreement between a sponsor and the USACE, and any other signatories to the Agreement, may be modified or terminated upon approval of all parties to the Agreement. Modification may be proposed by one or more parties and must be submitted in writing to the USACE for general circulation to any other signatories for a 45-day review period. Approval of any such proposals will be indicated by written acceptance.

## REFERENCES

1. Adamus, P.R., E.J. Clairain, Jr., R.D. Smith, and R.E. Young. 1987. *Wetland Evaluation Technique (WET); Volume II: Methodology*, Operational Draft Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.
2. American Geological Institute. 1984. *Dictionary of Geological Terms*. Garden City, New York.
3. Brown, L.E., L. Quandt, S. Scheinost, J. Wilson, D. Witte, and S. Hartung. 1980. *Soil Survey of Lancaster County, Nebraska*. U.S. Department of Agriculture, Washington, D.C. 174 pp.
4. Cowardin, L.M., V. Carter, F.G. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service. Washington, D.C. FWS/OBS-79/31. 103 pp.
5. Elder, J.A., T.E. Beesley, and W.E. McKinzie. 1965. *Soil Survey of Saunders County, Nebraska*. U.S. Department of Agriculture, Washington, D.C. 81 pp.
6. Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 100+ pp.
7. *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks*, Federal Register, Volume 60, Number 228, pp. 58605-58614, Tuesday November 28, 1995.
8. Gilbert, M.C. and R.G. Stutheit, eds. 1994. *Resource Categorization of Nebraska's Eastern Saline Wetlands (Includes Maps)*. Prepared for the Eastern Saline Wetlands Interagency Study Project. U.S. Army Corps of Engineers, Omaha District and Nebraska Game and Parks Commission. 18 pp.
9. Kusler, J.A. and M.E. Kentula, eds. 1989a. *Wetland Creation and Restoration: The Status of the Science. Vol. 1*. Environmental Research Laboratory, Corvallis, OR. EPA 600/3-89/038a. 473 pp.
10. Kusler, J.A. and M.E. Kentula, eds. 1989b. *Wetland Creation and Restoration: The Status of the Science. Vol. 2*. Environmental Research Laboratory, Corvallis, OR. EPA 600/3-89/038b. 172 pp.
11. Lewis, R.R., III. 1989. *Wetlands Restoration/Creation/Enhancement Terminology: Suggestions for Standardization*, Pages 1-6 in Kusler, J.A. and M.E. Kentula, eds. *Wetland Creation and Restoration: The Status of the Science, Vol. II: Perspectives*. U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, OR, EPA 600/3-89/038b. 172 pp.
12. Ricklefs, R. 1990. *Ecology*. W.H. Freeman & Company. New York, NY.
13. U.S. Department of the Interior. Undated. National Register Bulletin (Preface). National Park Service, Interagency Resources Division. Document obtained from Nebraska Historical Society.
14. U.S. Environmental Protection Agency and U.S. Department of the Army. 1990. *Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines*. 6 pp.
15. U.S. Fish and Wildlife Service. 1980. *Habitat Evaluation Procedures (HEP)*, ESM 102. p. 102-ESM-3-3.

## **APPENDICES**

## APPENDIX A

### GLOSSARY\*

**Anaerobic** - A situation in which molecular oxygen is absent (or effectively so) from the environment<sup>6</sup>.

**Aquatic bed** - Includes wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water<sup>4</sup>.

**Bank (mitigation bank)** - A mitigation site is a site where wetlands and/or other aquatic resources are restored, created, enhanced, or in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources<sup>7</sup>.

**Bank sponsor** - Any public or private entity responsible for establishing and, in most circumstances, operating a mitigation bank<sup>7</sup>.

**Category I** - Saline wetland site currently provides wetland functions of high value or has the potential to provide high values following restoration or enhancement measures<sup>8</sup>.

**Category II** - Saline wetland site currently provides limited wetland functions and low wetland values and has little opportunity to do otherwise given current land use and degree of degradation. Restoration potential is low<sup>8</sup>.

**Category III** - Wetland site is functioning as a freshwater wetland having freshwater plant communities on a saline soil that currently provides freshwater wetland values, and no feasible restoration measures exist to re-establish the historic salt source and saline plant associations<sup>8</sup>.

**Category IV** - Wetland site is functioning as a freshwater wetland having freshwater plant communities on a nonsaline hydric soil<sup>8</sup>.

**Codominant** - Two or more (plant) species providing about equal area cover which in combination control the environment<sup>4</sup>.

**Complex** - An assemblage of several wetlands located in proximity to one another and characterized by different wetland plant associations, water regimes, and sizes.

**Dominant species** - A plant species that exerts a controlling influence on or defines the character of a community<sup>4</sup>.

**Drained (effectively)** - A condition where ground or surface water has been removed by artificial means to the point that an area can no longer meet the wetland hydrology criterion<sup>11</sup>.

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\*Superscripts after definition identify a numbered reference found in References section.

**Emergent wetland** - A wetland class characterized by erect, rooted, herbaceous hydrophytes. Such wetlands usually are dominated by perennial plants<sup>4</sup>. Also known as marsh, meadow, fen, prairie pothole, and slough.

**Enhancement** - Activities conducted in existing wetlands or other aquatic resources which increase one or more aquatic functions<sup>7</sup>. (Such activities may result in incidental, accompanying decline in other functions.)

**Exotic** - Not indigenous to a region; intentionally or accidentally introduced and often persisting<sup>11</sup>.

**Flooded** - A condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from the adjacent or surrounding slopes, or any combination of sources<sup>6</sup>.

**Flora** - All plant species that may occur in an area<sup>6</sup>.

**Fragmentation** - The partitioning of a natural resource into smaller components as a result of human-induced developments, such as residential, commercial, agricultural, or industrial expansion.

**Functions** - The physical, chemical, and biological processes or attributes of a wetland without regard to their importance to society<sup>1</sup>.

**Ground water** - That portion of the water below the surface of the ground whose pressure is greater than atmospheric pressure<sup>6</sup>.

**Habitat** - The environment occupied by individuals of a particular species, population or community<sup>6</sup>.

**Halophyte** - A plant that is tolerant of saline conditions.

**Headcutting** - The process of channel scouring in an upstream direction as water current accelerates down gradient. This process often is caused or aggravated by an increase in channel gradient resulting from ditching or stream channelization; i.e., the shortening of stream length.

**Historical significance** - Refers to districts, sites, buildings, structures, and objects that were significant in our prehistory and history<sup>13</sup>.

**Hydric soil** - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part that favor growth and regeneration of hydrophytic vegetation<sup>6</sup>.

**Hydrology** - The science dealing with the properties, distribution, and circulation of water<sup>6</sup>.

**Hydroperiod** - The seasonal occurrence of flooding and/or saturated soil conditions<sup>1</sup>.

**Hydrophytic vegetation (hydrophyte)** - Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content<sup>6</sup>.

**Jurisdictional** - Pertaining to the right, power, or authority to administer a law; for example, falling under the authority of the U.S. Army Corps of Engineers which administers the Clean Water Act, Section 404 dredge and fill permitting program.

**Mitigation** - For purposes of Section 10 (Rivers and Harbors Act)/404 (Clean Water Act) and consistent with the Council on Environmental quality regulations, the Section 404(b)(1) Guidelines and the Memorandum of Agreement Between Environmental Protection Agency and Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines, mitigation means sequentially avoiding impacts, minimizing impacts, and compensating for remaining unavoidable impacts<sup>7</sup>.

**Nonwetland** - Any area that has sufficiently dry conditions that hydrophytic vegetation, hydric soils, and/or wetland hydrology are lacking<sup>6</sup>; it includes upland as well as former wetlands that are effectively drained.

**Not Categorized (NC)** - Areas having insufficient data for categorization or that the interagency team was unable to gain access to<sup>8</sup>.

**Nursery potential** - The function of certain wetlands whereby their plant communities are maintained to allow the eventual harvest of seeds or transplant of plant materials to another location.

**Plant association** - A group of plant species living in the same place<sup>12</sup>.

**Plant community** - All of the plant populations occurring in a shared habitat or environment<sup>6</sup>.

**Preservation** - The protection of ecologically important wetlands or other aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms<sup>7</sup>.

**Project proponent** - A public or private entity responsible for an activity that results in adverse impacts to a wetland regulated under the Clean Water Act.

**Restoration** - Re-establishment of wetland and/or other aquatic resource characteristics and function(s) at a site where they have ceased to exist, or exist in a substantially degraded state<sup>7</sup>.

**Saline** - General term for waters containing various dissolved salts<sup>4</sup>. Soils also may be saline.

**Saline wetland vegetation** - Vegetation that is tolerant of saline conditions.

**Salt flat** - see unconsolidated shore.

**Saturated (soil condition)** - A condition in which all easily drained voids (pores) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric<sup>6</sup>.

**Seasonally flooded** - Surface water is present for extended periods (i.e., two weeks or more), especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface<sup>4</sup>.

**Seed bank** - A reservoir of seeds associated with one or more plant species that remain viable in the soil.

**Seep** - A spot where water oozes from the Earth often forming the source of a small trickling stream<sup>2</sup>.

**Sempermanently flooded** - Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface<sup>4</sup>.

**Species of special significance** - Species considered rare or highly restricted in their distribution.

**Surface water** - Water present above the substrate or soil surface<sup>6</sup>.

**Temporarily flooded** - Surface water is present for brief periods (i.e., less than two weeks) during the growing season, but the water table usually lies well below the soil surface for most of the season<sup>4</sup>.

**Unconsolidated bottom** - All wetland and deepwater habitats with at least 25 % cover of particles smaller than stones, and vegetative cover less than 30%<sup>4</sup>.

**Unconsolidated shore** - All wetlands characterized by substrates lacking vegetation except for pioneering plants that become established during brief periods when growing conditions are favorable<sup>4</sup>.

**Upland** - Any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands<sup>6</sup>.

**Values** - Wetland processes or attributes that are valuable or beneficial to society<sup>1</sup>.

**Water (hydrologic) regime** - The sum total of water that occurs in an area on average during a given period<sup>6</sup>.

**Wetland hydrology** - The sum total of wetness characteristics in areas that are inundated or have saturated soils for a sufficient duration to support hydrophytic vegetation<sup>6</sup>.

**Wetlands** - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas<sup>6</sup>.

## APPENDIX B

### DEPARTMENT OF THE ARMY PERMIT

Permittee: W.E.T., Inc. Permit Number: 199100137  
Mr. Arthur L. Burger, Chairman  
420 East Macon Street  
Savannah, Georgia 31402

ISSUING OFFICE: Savannah District  
Corps of Engineers  
Post Office Box 889  
Savannah, Georgia 31402-0889

**NOTE:** The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer. You are authorized to perform work in accordance with the terms and conditions specified below.

**PROJECT DESCRIPTION:** The placement of fill into existing man made drainage ditches for the purpose of restoring or enhancing the natural wetland hydrology to approximately 350 acres of previously drained wetlands. These restored and/or enhanced wetlands can then be used as off-site compensatory mitigation from the established wetland mitigation bank.

**PROJECT LOCATION:** The site is on Millhaven Plantation adjacent to Briar Creek, approximately 12 miles north of Sylvania, Burke and Screven Counties, Georgia, Latitude 32' 58' 22" North and Longitude 81' 40' 54" West.

#### **PERMIT CONDITIONS:**

##### General Conditions:

1. The time limit for completing the authorized work ends on December 31, 1997. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office, for consideration, at least six months before the above date is reached (see special condition 19).
2. You must maintain the activity authorized by this permit in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it, you will be unable to sell any remaining compensatory mitigation credit from the bank. Any area of the bank which has been restored to functional wetland will remain as wetlands.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office and the Georgia State Historic Preservation Officer. The Corps will initiate the Federal and state coordination required to determine if the site warrants a recovery effort or is eligible for listing in the National Register of Historic Places.
4. If you sell/transfer the mitigation bank associated with this permit, you must obtain the signature of the new owner in the space provided and forward a signed copy of the permit to this office to validate the transfer of this authorization.

5. A conditioned water quality certification has been issued for your project and you must comply with conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the State of Georgia water quality certification is attached.
6. The permittee, Millhaven Plantation or the property owner shall provide reasonable access to the Corps of Engineers for the purpose of inspecting the mitigation bank to ensure compliance with the terms and conditions of your permit.

Special Conditions:

1. All dredged or borrowed material used as fill on this project will be from clean, uncontaminated sources and free from cultural resources.
2. All work performed during construction will be done in a manner so as not to violate applicable water quality standards.
3. No oils, grease, materials or other pollutants will be discharged from the construction activities which reach public waters.
4. All work will be performed in accordance with the plans and drawings which are incorporated in and made part of the permit:

“EXHIBIT A”, A portion of a State of Georgia map showing the location of Millhaven Plantation.

“EXHIBIT B”, A map of Millhaven Plantation’s property boundary, dated 8/27/91 at a scale of 1" = 1 mile.

“EXHIBIT C”, A portion of a U.S.G.S. quadrangle sheet showing the location of approximately 500 acres of the property of Millhaven Plantation, Inc., consisting of the ‘core area’ and the ‘proposed additional area,’ within which the wetland restoration will take place.

“EXHIBIT D”, A diagram of a topographic survey of the “core” area of wetland restoration.

“EXHIBIT E”, A diagram of projected area of wetland restoration, enhancement and creation within the “core” area.

“EXHIBIT F”, A diagram of the approximate spacing of ditch plugs on a portion of the “core” area.

“EXHIBIT G”, A diagram showing the plugs of a side ditch into main ditch detail and typical ditch cross section.

“EXHIBIT H”, A diagram of a typical ditch plan and side view section A-A.

“EXHIBIT I”, A diagram of the cross section of terraced water retention system.

“EXHIBIT J”, A diagram of the cross section of terraced water retention system.

“EXHIBIT K”, A list of the canopy species proposed for planting in mitigation areas at Millhaven Plantation.

“EXHIBIT L”, Conservation and wetlands easement document.

"EXHIBIT M", Georgia DNR water quality certification dated February 28, 1992.

"EXHIBIT N", Draft restrictive easement document.

5. The permittee shall perform wetland delineations required under this permit in accordance with the criteria contained in the manual approved for use by the Corps of Engineers, at the time each delineation is performed. The permittee shall perform a delineation of each area to be restored prior to accomplishing any work authorized by this permit. The permittee shall submit to the Corps for verification, a survey of this jurisdictional wetland boundary line.

6. The permittee shall notify the Corps of Engineers immediately after any restoration work has been accomplished in accordance with permit conditions, for a given block of the bank. Notification shall include a description, maps and diagrams of exactly what site work was accomplished, where it was done and when it was completed. Also included shall be a tree planting report with the following information: (a) number of each species of tree planted; (b) the number of trees planted per acre; (c) tree spacing and (d) a map depicting, by species, where the trees were planted.

7. Based on all available information, the Corps of Engineers will make a preliminary determination of the total number of acres of restored, enhanced and/or created wetlands which should result from the permitted work, within a specific block of the bank. The permittee may make 50% of these wetlands available to applicants requiring compensatory mitigation for a proposed project. The permittee shall obtain prior written authorization from the Corps of Engineers prior to the withdrawal of any compensatory mitigation from the bank. An example of how this condition will be applied is as follows. The Corps determines that the permittee's restoration work on a particular block of the bank would result in 50 acres of restored, enhanced or created wetlands. This allows the permittee to immediately make available 25 acres of compensatory wetland mitigation. The breakdown of the wetland acres and types may be as follows:

WETLAND TYPE	WETLANDS	AVAILABLE
Created	8 acres	4 acres
Enhanced	12 acres	6 acres
Restored	30 acres	15 acres
<hr/>		
Totals	50 acres	25 acres

8. The permittee shall secure a corporate performance security bond, issued by a reputable bonding company, prior to the sale of compensatory wetland mitigation from a block of the bank. The permittee shall provide written proof to the Corps of Engineers of having secured such bond. The bond shall be in the amount of \$5000.00 for each acre of compensatory mitigation to be sold from the specific block of the bank. The permittee shall keep this bond in effect, unchanged, until the final wetland delineation (Special Condition 10) of the bonded portion of the bank has been verified by this office. Upon receipt of written final verification from the Corps, the permittee may reduce the amount of the bond, for this block of the bank, to an amount equal to \$1,000.00 for each acre of wetlands verified to exist in the block, which is sold by the permittee for compensatory mitigation. This reduced bond will then remain in effect until the permittee has successfully completed all maintenance requirements (Special Condition 18) for the block of the bank. If during the maintenance period, the permittee fails to perform site compensatory mitigation, the Government may hire a private contractor to perform this maintenance. The permittee's bonding company shall forfeit to the Government's contractor a portion of the bond equal to the cost incurred for maintenance work. Should the Government invoke this condition, the permittee is prohibited from any further sale of compensatory mitigation from any block of the bank.

9. The permittee shall ensure that Millhaven Plantation or the current land owner records a deed restriction in the nature of a restrictive covenant protecting each block of the mitigation bank as wetlands, in perpetuity. Each deed shall be recorded in the designated county office in which the land is located. Each block of the bank that is recorded shall be surveyed by a licensed surveyor and described by metes and bounds. The permittee shall provide the Corps of Engineers a copy of the recorded deed prior to the use of any wetlands for off site compensatory mitigation from the block of the bank. The permittee shall secure the deed restriction on the portion (50%) of the block of the bank which the Corps has determined may be utilized for off site compensatory mitigation or, at the option of the permittee, on the entire block. The permittee shall use this permit or Corps approved, effective and enforceable substitute instrument with equivalent terms.
10. The permittee shall notify the Corps of Engineers as soon as a block of the mitigation bank has been fully restored to its pre-drained wetland hydrology or three years from the date of completion of restoration work, whichever ever occurs first. This notification shall include a written report, data sheets and photographs of the maximum hydrologic function which the area has attained and a survey of the jurisdictional wetland boundary line of the block. At the time wetlands are delineated within each block of the bank, the permittee shall use the criteria contained in the most recent Corps approved manual.
11. Upon verification of the above wetland delineation by the Corps of Engineers, all appropriate agencies, including but not limited to the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S.D.A. Soil Conservation Service, the National Marine Fisheries Service and the Georgia Department of Natural Resources, will be given an opportunity to review and comment of the success of the restoration efforts. Final determination of the exact number of acres of wetlands within the block of the bank which have been restored, enhanced or created will be made by the Corps. The Corp's final determination of the exact number of acres of wetlands in each block of the mitigation bank is final, and will not be increased or decreased throughout the life of the permit.
12. Upon receipt of the above written notice of determination from the Corps of Engineers, the permittee may make available for off site compensatory mitigation the remaining acres of restored, enhanced or created wetlands, if any, within the block. The remaining acres will be the difference between the acres of wetlands from the Corps final determination less the wetlands previously credited from the Corps preliminary determination.
13. Under this permit, the permittee may restore or enhance no more than 350 acres of previously drained wetlands for use as compensatory wetland mitigation.
14. The permittee may make available the restored, enhanced or created wetlands which are established within this bank for the off site compensatory mitigation of unavoidable wetlands impacts which would result from activities authorized by a Department of the Army Individual Permits, provided the Corps of Engineers has determined that the 404(b)(1) Guidelines of the Clean Water Act have been met and that the use of the bank is the best practicable alternative for compensatory mitigation. The use of compensatory mitigation from the bank for unavoidable wetlands impacts resulting from activities authorized by a Department of the Army General Permit would not require compliance with the 404(b)(1) Guidelines. The geographic area of consideration for the use of the bank for off site compensatory mitigation of authorized non-tidal wetland impacts shall be confined to Chatham County, Georgia and the Savannah River Basin north to the limits of the Coastal Plain.
15. The average of the functions and values of wetlands within each block of the bank, or any portion thereof, will be assessed by the Corps of Engineers. The Corps may use any available technology, resource or information it determines appropriate in performing these assessments and making wetlands functions and values determinations. Similarly, the Corps will assess the functions and values of wetlands proposed to be impacted by an authorized activity, as described above. The Corps will make all determinations of the

appropriate compensatory mitigation ratios required from the bank to mitigate the lost functions and values of the wetlands impacted. Once the permittee and an applicant receive written notification from the Corps of the required mitigation ratio, a transaction may proceed.

16. The permittee shall maintain accurate written records of all transaction from the bank. Each time wetlands from the bank are used for off site compensatory mitigation, the permittee shall provide this office a current utilization report with the following information: (a) name and permit number of the applicant utilizing compensatory mitigation from the bank; (b) number of acres of mitigation withdrawn for the transaction; (c) date of transaction; (d) number of acres of mitigation remaining in the block; and (e) the total number of acres of wetland mitigation used from the block, and the bank, as of the date of the transaction.

17. MONITORING:

A. The permittee shall perform quarterly inspections of each restored block of the bank beginning immediately upon completion of work. The permittee shall provide the Corps of Engineers a copy of each inspection report within 30 days of the date of the inspection. The permittee shall perform quarterly inspections on the block until a final survey of the delineated jurisdictional wetland boundary has been provided to and verified by this office. The permittee shall then submit bi-annual inspection reports each September and March. The permittee shall submit inspection reports on the block until the end of the give year maintenance period. Should the applicant fail to provide the Corps with any required inspection report, further sale of the compensatory mitigation form the bank may be suspended.

B. The permittee shall install one groundwater monitoring well (piezometer) on each ten acre parcel of each block of the bank (example: 50 acre block requires five wells).

C. The permittee shall randomly establish a 1/10th acre sample plot (66' x 66'), on each ten acres of each block of the bank (example: 50 acre block required five plots). The permittee shall permanently mark, map and retain these plots for inspections throughout the term of the given year monitoring period.

D. The permittee shall include the following information each quarterly and/or bi-annual inspection report:

- (1) A map showing the location of the sample plots and groundwater monitoring wells.
- (2) Photographs of each sample plot at the time of inspection.
- (3) Mortality rates, by species, of planted trees and growth measurements of survivors, by species.
- (4) Numbers of naturally regenerated living trees by species for each plot.
- (5) Visual estimate of percent ground cover on each plot by species of shrubs and herbaceous plants.
- (6) Groundwater monitor well readings with a map showing the location of each well.
- (7) A written description including: (a) presence, location and depth of any surface water; (b) zone of soil saturation; (c) primary or secondary indicators of soil saturation; (d) condition of ditch plugs and other water control structures and (e) any other information that would be of assistance to the Corps in tracking the progress of the bank.

18. MAINTENANCE:

A. The permittee shall maintain a minimum stocking rate of 300 trees per acre of planted and/or naturally regenerated trees. A minimum of 25% of the dominant trees within the bank shall be of hard mast producing hardwood species. No single species of planted or naturally occurring tree shall at any time exceed 30% of the dominant trees within the bank.

B. The permittee shall take immediate remedial action to correct deficiencies in the required tree survival rates for any permitted ditch plug or other water control structure.

C. The permittee shall perform maintenance on each block of the mitigation bank for five consecutive years with no significant deficiencies. Should a significant deficiency be identified, the five year maintenance and monitoring period shall start again upon completion of required remedial action. A significant deficiency may include, but is not limited to, failure of a water control structure or failure of a block of the bank to meet minimum or maximum tree stocking levels.

19. This permit authorizing establishment, operation, management and maintenance of the wetland mitigation bank will be valid for a period of 5 years. Should it appear that wetlands restoration work authorized under this permit will not be completed prior to permit expiration, the permittee must request an extension. This request must be submitted in writing at least 6 months prior to the permit expiration. The permittee shall include in the request any proposed modifications to the special conditions of the permit. All appropriate resource agencies would be given opportunity to review and comment on proposed modifications to the permit conditions. The Corps of Engineers will complete a re-evaluation and make a decision on whether or not to extend the permit for an additional 5 year period and/or if to modify any of the special conditions.

FURTHER INFORMATION:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344).
2. Limits of this authorization:
  - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
  - b. This permit does not grant any property rights or exclusive privileges.
  - c. This permit does not authorize any injury to the property or rights of others.
  - d. This permit does not authorize interference with any existing or proposed Federal projects.
3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:
  - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
  - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
  - d. Design or construction deficiencies associated with the permitted work.
  - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. **Reliance on Applicant's Data:** The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. **Re-evaluation of Permit Decision:** This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require reevaluation include, but are not limited to, the following:
- a. Failure to comply with the terms and conditions of this permit.
  - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).
  - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision. Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.
6. **Extensions:** General Condition 1 and Special Condition 19 establish a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

\_\_\_\_\_  
(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

\_\_\_\_\_  
Issued for and in behalf of: (DATE)

Donald R. Holzwarth  
Colonel, U.S. Army  
District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities with compliance with its terms and conditions, have the transferee sign and date below.

\_\_\_\_\_  
(TRANSFEREE) (DATE)

## RESTRICTIVE COVENANT

THIS RESTRICTIVE COVENANT ("Covenant") is hereby made this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_\_, by the undersigned \_\_\_\_\_ ("Owner"), owner of a certain tract of real property in \_\_\_\_\_ County, \_\_\_\_\_ which includes the property more specifically described by licensed surveyor in Exhibit A, attached hereto and by this reference made a part hereof (the "Property").

### PREMISES

WHEREAS, Owner has leased the Property to Wetlands Environmental Team, Inc., (WET) and entered into a Deed of Conservation Easement for the purpose of creating a "Commercial Wetland Mitigation Bank."

WHEREAS WET has received a Department of the army Individual Permit (Permit No. 199100137) pursuant to Section 404 of the Clean Water Act for certain dredge and fill activities in order to create the mitigation bank.

WHEREAS in connection with such permit, Owner desires to place certain restrictions upon the Property; and agrees to all special conditions as set forth in above referenced permit.

NOW THEREFORE, in consideration of the premises and the benefits obtained by the Owner from the Permit and for other consideration, the receipt and adequacy of which are hereby acknowledged, Owner does hereby covenant and agree to restrict, and does by this instrument intend to restrict, the future use of the Property as set forth below, by establishment of this Covenant running with the Property:

1. Owner hereby covenants that neither it nor its successors, assigns, agents, employees or servants, or any of them, shall not in any way alter the soils or hydrology of the Property by action or actions taken within or without the boundaries of the Property except as necessary to comply with the terms of the permit. The intent of Owner in placing these restrictions upon the use of the Property is that the Property shall remain a wetland in perpetuity, for the purpose of conservation and the protection of public health and the environment. The actions encompassed as prohibited by this Covenant shall include the terms of the Permit. They shall also include but not be limited to the following: removal of beavers or beaver dams or otherwise interfering with beavers; clearing; earthmoving, grading, cultivation, discing, burning, or filling; placement of refuse, waste, sewage, other debris or any hazardous substances on the Property; draining, ditching, diking, dredging, channelizing, pumping, impounding and related activities; diverting or affecting natural flow of surface or underground waters into, within, or out of the Property; grazing of domesticated animals; or raising of any structure on the property, whether temporary or permanent, except that minimal structures for observation of wildlife and wetlands ecology may be constructed with the prior approval of the Corps of Engineers. Actions encompassed as authorized by this Covenant shall include but not be limited to the following:

A. Timber cutting/harvesting is allowed when the dominant tree canopy of the area has reached an average age of 30 years. The area may be thinned to an average basal area of 80 square feet per acre. No single acre shall be cut below a basal area of 60 square feet. Thinnings shall be conducted to selectively leave dominant mast producing trees with no single species to comprise more than 30% of the remaining dominant canopy.

B. Further harvesting is allowed when the trees reach an average of 80. At this time, the area shall be placed on an 80 year rotation, through the use of single tree selection of limited patch cutting. Any timber cutting within the area shall be for wildlife management purposes. A tree canopy of an age class and species diversity which consistently produce high quality hard mast shall be maintained.

C. The harvesting of timber in these lands shall be accomplished by using and maintaining existing wood roads and by removing single trees out of the area to a log loading deck also located outside the area.

2. Owner, its successors and assigns, shall retain all other customary rights of ownership, including but not limited to the exclusive possession of the property, the right to use the property in any manner not prohibited by this Covenant, and the right to transfer or assign interest in the Property, subject to the conditions of this Covenant. The restrictions and covenants contained in this Covenant constitute a perpetual servitude upon and run with the property. This restrictive covenant shall not terminate if wetland delineation criteria pursuant to federal or state guidelines shall change the definition of "wetlands" in the future. Owner shall keep such real estate described in the survey as a natural, scenic, aesthetic, plant and wildlife habitat and the real property shall be maintained in its natural and wild state and restricted from any development or use other than set forth above.

3. Owner hereby expressly grants the Corps authority to enforce the provisions of this Covenant. Appropriate remedy for violation of this Covenant is contemplated by Owner to include but not necessarily to be limited to termination of the Permit, injunctive relief to restrain such violation of this Covenant, and restoration of the Property to wetland conditions. This authority to enforce granted to the Corps shall not preclude or diminish the rights of any other parties at law or equity to enforce the provisions of this Covenant.

4. The U.S. Army Corps of Engineers, its contractors and agent are specifically granted a right of entry from time to time upon the property described in Exhibit A and existing roads and paths and they exist, for the purpose of insuring compliance with the terms of this permit and maintenance plan, together with a right of access, ingress and egress upon reasonable notice to the Owner.

IN WITNESS WHEREOF, Owner, by its duly designated representative, has hereto set its hand and seal.

OWNER:

Sworn to and subscribed before on this  
\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_.

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Notary Public  
My commission expires:

By: \_\_\_\_\_

Its: \_\_\_\_\_

\_\_\_\_\_  
Witness

Attest: \_\_\_\_\_

## APPENDIX C

### TECHNICAL SPECIFICATIONS FOR SALINE WETLANDS MITIGATION

This appendix provides information summarized from current literature<sup>1,2</sup> to assist those who wish to mitigate wetland impacts outside or within a bank. To compensate outside of a mitigation bank for wetland impacts, a project proponent should submit to the USACE a Mitigation Concept Plan (see Table 1) as part of their application for a Clean Water Act Section 404 permit. A mitigation bank sponsor must submit the following as a prerequisite for approval of a bank (also see Table 4): 1) a Prospectus to the USACE; 2) a banking Agreement approved by the interagency team; and 3) any and all permits (e.g., Clean Water Act Section 404 and 401, floodplain, etc.) that may be required when impacting or restoring wetlands. The Agreement must include a Mitigation Plan that will address the technical specifications contained in this Appendix.

The interagency team will consider the following information in the evaluation of any proposed mitigation projects involving saline wetlands:

#### I. Prospectus

##### A. Project Overview

1. Location of project
2. Brief project summary
3. Responsible and affected parties
4. Goals and objectives - habitat types and functions to be restored or enhanced
5. Pre- and postconstruction weighted areas at mitigation site
6. Financial assurances
7. Anticipated permits
8. Establishment and operation
9. Schedule and milestones

##### B. Preconstruction Description of Mitigation Site (narrative and mapping data)

1. Map and photo data
  - a. U.S. Geological Survey (USGS) 7.5' quad map  
(indicate site location and area of hydrologic influence)
  - b. Soil survey map
  - c. National Wetland Inventory (NWI) map
  - d. City/county blue line aerial photographs and/or Farm Services Agency (FSA) photographs (previous 5 years)

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<sup>1</sup>Kusler, J.A. and M.E. Kentula, eds. 1989a. *Wetland Creation and Restoration: The Status of the Science. Vol.1.* Environmental Research Laboratory, Corvallis, OR. EPA 600/3-89/038a. 473 pp.

<sup>2</sup>Kusler, J.A. and M.E. Kentula, eds. 1989b. *Wetland Creation and Restoration: The Status of the Science. Vol.2.* Environmental Research Laboratory, Corvallis, OR. EPA 600/3-89/038b. 172 pp.

2. Site map
  - a. Physical features
    - i. current dimensions (acreage, length, etc.) of wetland and other aquatic resources as described by the Cowardin et al.<sup>1</sup>(1979) classification system
    - ii. topographic map with 0.1 foot contour lines on a 100' x 100' grid
    - iii. groundwater elevations
    - iv. natural hydrologic features (e.g., spring seeps)
    - v. seasonal pool elevation
    - vi. potential pollutant sources
  - b. Cultural features
    - i. power lines
    - ii. roads
    - iii. fences, gates
    - vi. houses, buildings
    - v. drainage ditches, culverts, tile lines
3. Vegetation/soil data (indicate baseline sampling transects/points on site map)
  - a. Vegetation data
    - i. gross community characterization
    - ii. species list
    - iii. relative abundance
  - b. Soil analysis
    - i. type and profile
    - ii. soluble salts (Mmhos/cm)
    - iii. sodium (mg/kg)

[NOTE: Following completion and submittal of the Prospectus (part I above), USACE certifies preconstruction weighted area for within bank mitigation.]

## II. Site Plan

- A. Mapping data/site analysis
  1. Anticipated postconstruction dimensions (acreage, length, etc.) of wetland and other aquatic resources and class as described by the Cowardin et al. (1979) classification system to the species dominant/codominant level
  2. Plans with 0.1 foot contour lines in 100' x 100' grid
  3. Buffer size (acreage), type of habitat
  4. Hydrologic alterations
  5. Anticipated seasonal pool elevations
  6. Access roads, fencing
  7. Present and known proposed uses of all surrounding property

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<sup>1</sup>Cowardin, L.M., V. Carter, F.G. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service. Washington, D.C. FWS/OBS-79/31. 103 pp.

- B. Site construction activities
  - 1. Water control measures
  - 2. Erosion control measures during and after construction
  - 3. Grading plan
  - 4. Plantings
  - 5. Schedule
  
- C. Site management
  - 1. Vegetation management techniques
    - a. restore failed plantings
    - b. nontarget species removal (i.e., exotics, pest species)
    - c. grazing/mowing
    - d. prescribed burning
  - 2. Hydrologic manipulation
    - a. water control structures
    - b. weirs
    - c. spring seep maintenance
  
- D. Monitoring plan
  - 1. Vegetation
    - a. permanent plots/transects (reference to baseline sampling)
    - b. species composition and vegetative cover
  - 2. Soils
    - a. permanent sampling points (e.g., along vegetation transects)
    - b. soluble salts (Mmhos/cm)
    - c. sodium (mg/kg)
  - 3. Hydrology
    - a. seasonal pool elevations
    - b. seasonal ground water levels (permanent piezometer sampling points)
    - c. water quality
    - d. salt levels (Mmhos/cm)
  - 4. Monitoring schedule
  - 5. Photographs
  - 6. Reporting schedule

[NOTE: At this point, the bank sponsor submits Site Plan (part II above) to USACE.]

### III. Actual Postconstruction Activities

- A. Compliance report of as-built conditions (submit to USACE)
  - 1. Deviations from original design
  - 2. Corrective measures, as needed
  - 3. Basin topography using 0.1 foot contour lines on a 100' x 100' grid
  - 4. Location of constructed features (e.g., water control structures)
  - 5. Photographic record and descriptive narrative
    - a. condition of wetland, buffer area, and surrounding land use
    - b. additional written information as a benchmark for future comparisons

- B. Routine monitoring [Begins first full growing season after the project is completed (year 1); Continue annually until project proponent or bank sponsor requests approval or certification, respectively (e.g., minimum 3 years)]
  - 1. Vegetation
    - a. gross community characterization
    - b. species list
    - c. relative abundance
  - 2. Soils
    - a. soluble salts (Mmhos/cm)
    - b. sodium (mg/kg)
  - 3. Hydrology
    - a. seasonal pool elevations
    - b. seasonal ground water elevations (permanent piezometer sampling points)
  - 4. Photographic record and descriptive narrative
    - a. condition of wetland and surrounding land use
    - b. additional written information as a benchmark for future comparisons
  - 5. Monitoring schedule
  - 6. Annual reports to USACE
  
- C. Comprehensive assessment and determination of approval or credit (Conducted just prior to project proponent's or sponsor's request for approval of mitigation units or bank certification, respectively)
  - 1. Vegetation
    - a. permanent plots and transects (reference to baseline sampling)
    - b. species composition and vegetative cover
  - 2. Soils
    - a. soluble salts (Mmhos/cm)
    - b. sodium (mg/kg)
  - 3. Hydrology
    - a. seasonal pool elevations
    - b. seasonal ground water elevations (permanent piezometer sampling points)
    - c. water quality
    - d. salt levels (Mmhos/cm)
  - 4. Photographic record and descriptive narrative
    - a. condition of wetland and surrounding land use
    - b. additional written information as a benchmark for future comparisons
  - 5. Written report and request to USACE for mitigation unit approval or credit certification

[NOTE: At this point, USACE may provide certification of credits.]

- D. Certified bank monitoring**  
(Begins after credit certification. Ends at bank closure, i.e., when bank credits are exhausted)
1. **Vegetation**
    - a. gross community characterization
    - b. species list
    - c. relative abundance
  2. **Soils**
    - a. soluble salts (Mmhos/cm)
    - b. sodium (mg/kg)
  3. **Hydrology**
    - a. seasonal pool elevations
    - b. seasonal ground water elevations
    - c. water quality
    - d. salt levels (Mmhos/cm)
  4. **Photographic record and descriptive narrative**
    - a. condition of wetland and surrounding land use
    - b. additional written information as a benchmark for future comparisons
  5. **Monitoring schedule**
  6. **Annual reports to USACE**

## APPENDIX D

### SUGGESTED READINGS

- Apogee Research, Inc. 1994. *National wetland mitigation banking study: An examination of wetland programs: Opportunities for compensatory mitigation*. Institute for Water Resources, Alexandria, VA. IWR Report 94-WMB-5. 104 pp.
- Brady, N.C. 1974. *The nature and properties of soils, 8th ed.* MacMillan Publishing Company, Inc., New York, NY.
- Brooks, R.P. and R.M. Hughes. 1988. *Guidelines for assessing the biotic communities of freshwater wetlands*. Pages 276-280 in J.A. Kusler, M.L. Quammen, and G. Brooks, eds., Proc. National Wetland Symp.: Mitigation of impacts and losses. Association of State Wetland Managers, Berne, NY.
- Brumbaugh, R. and R. Reppert. 1994. *National wetland mitigation banking study: First phase report*. Institute for Water Resources, Alexandria VA. IWR Report 94-WMB-4. 96 pp.
- Cooper, D.J. 1991. *Recommended wetland mitigation guidelines and wetland mitigation design standards and specifications for the City of Boulder, Colorado*. Prepared for: U.S. Environmental Protection Agency, Region VIII and the City of Boulder, CO (No. 2 in the City of Boulder Wetland Publication Series). 40 pp.
- Diehl, J. and T.S. Barrett. 1988. *The conservation easement handbook: Managing land conservation and historic preservation easement programs*. Land Trust Exchange, Alexandria, VA.
- Environmental Law Institute. 1993. *Wetland mitigation banking*. Environmental Law Institute, Washington, DC. 207 pp.
- Environmental Law Institute. 1994. *National wetland mitigation banking study: Wetland mitigation banking*. Institute for Water Resources, Alexandria, VA. IWR Report 94-WMB-6. 186 pp.
- Environmental Law Institute and The Institute for Water Resources. 1994. *National wetland mitigation banking study: wetland mitigation banking: Resource document*. Institute for Water Resources, Alexandria, VA. IWR Report 94-WMB-2. 139 pp.
- Erwin, K.L. 1990. *Freshwater marsh creation and restoration in the Southeast*. Pages 233-266 in J.A. Kusler and M.E. Kentula, eds., *Wetland creation and restoration: The status of the science*, Island Press, Washington, DC.
- Gersib, R. A. and G.A. Steinauer. 1991. *A biological inventory and general assessment of eastern saline wetlands in Lancaster and southern Saunders Counties*. Transactions of the Nebraska Academy of Sciences, Vol. XVIII:37-44.
- Gwin, S.E. and M.E. Kentula. 1990. *Evaluating design and verifying compliance of wetlands created under section 404 of the Clean Water Act in Oregon*. EPA/600/3-90/061. U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, OR.

- Gwin, S.E., M.E. Kentula, and D. L. Frosthalm, in conjunction with R.L. Tighe. 1991. *Evaluating design and verifying compliance of created wetlands in the vicinity of Tampa, Florida*. EPA/600/3/91-068. U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, OR.
- Hammer, D.A. 1992. *Creating freshwater wetlands*. Lewis Publishers, Inc. Chelsea, MI.
- Horner, R.R. and K.J. Raedeke. 1989. *Guide for wetland mitigation projects monitoring*. Report Number WA-RD 195.1. Washington State Department of Transportation, Seattle, WA. 265 pp.
- Hruby, T. and C. Brower. 1994. *Guidelines for developing freshwater wetlands mitigation plans and proposals*. Washington State Department of Ecology, Olympia, WA. Pub. No. 94-29. 40 pp.
- Kadlec, R.H. 1988. *Monitoring wetland responses*. Pages 114-120 in J. Kelazny and J.S. Feierabend, eds. *Proceedings of conference: Increasing our wetland resources*. National Wildlife Federation, Washington, DC.
- Kentula, M.E., R.P. Brooks, S.E. Gwin, C.C. Holland, A.D. Sherman, J.C. Sifneos (A.J. Hairston, ed.). 1992. *An approach to improving decision making in wetland restoration and creation*. U.S. Govt. Print. Office. EPA/600/R-92/150. 151 pp.
- King, D.M. 1991a. *Wetland creation and restoration: An integrated framework for evaluating costs, expected results and compensation ratios*. Prepared for U.S. Environmental Protection Agency, Office of Policy, Planning, and Evaluation, Washington, DC.
- King, D.M. 1991b. *Economics: Costing out restoration*. *Restoration & Management Notes* 9(1):15-20.
- King, D.M. and C. Bohlen. 1994. *Making sense of wetland restoration costs*. University of Maryland, Center for Environmental and Estuarine Studies. Solomons, Maryland. 12 pp.
- King, D.M. and C. C. Bohlen. 1994. *A technical summary of wetland restoration costs in the continental United States*. University of Maryland, Center for Environmental and Estuarine Studies. Solomons, Maryland. 24 pp.
- Kusler, J.A. and C. Lassonde, eds. 1992. *Effective mitigation: mitigation banks and joint projects in the context of wetland management plans*. Proc. National Wetlands Symp., Palm Beach Gardens, Florida. June 24-27, 1992. 220 pp.
- Leibowitz, N.C., L. Squires, and J.P. Baker. 1991. *Research plan for monitoring wetland ecosystems*. EPA/600/3-01/010. U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, OR.
- Lind, B. 1991. *The conservation easement stewardship guide: Designing, monitoring and enforcing easements*. Land Trust Alliance, Washington, DC.
- Marble, A.D. 1992. *A guide to wetland functional design*. Lewis Publishers, Boca Raton, FL. 240 pp.

- Mitsch, W.J. and J.G. Gosselink. 1986. *Wetlands*. Van Nostrand Reinhold Company, Inc., New York, NY.
- Murkin, H.R., ed. 1984. *Marsh ecology research program long-term monitoring procedures manual*. Delta Waterfowl Research Station, Manitoba, Canada.
- Murphy, R.A. 1992. *Problem identification and planning strategies for saline wetland protection in Lancaster County Nebraska*. Masters Thesis. Community and Regional Planning. University of Nebraska-Lincoln. 161 pp.
- Novitzki, R.P. 1989. *Wetland hydrology*. Pages 46-64 in S.K. Majumbar, R.P. Brooks, F.J. Brenner, and R.W. Tiner, Jr., eds., *Wetlands ecology and conservation: Emphasis in Pennsylvania*. The Pennsylvania Academy of Science, Philadelphia, PA.
- O'Brien, A.L. 1986. *Hydrology and the construction of a mitigating wetland*. Pages 83-200 in J.S. Larson and C. Neill, eds, *Mitigating freshwater wetland alteration in the glaciated Northeastern United States: An assessment of the science base*. Publication 87-1. Environmental Institute, University of Massachusetts, Amherst, MA.
- Quammen, M.L. 1986. *Measuring the success of wetlands mitigation*. National Wetlands Newsletter 8(5): 6-8.
- Reppert, Richard. 1992. *National wetland mitigation banking study: Wetland mitigation banking concepts*. Institute for Water Resources, Alexandria, VA. IWR Report 92-WMB-1. 31 pp.
- Shabman, L., P. Scodari, and D. King. 1994. *Expanding opportunities for successful wetland mitigation: The private credit market alternative*. Institute for Water Resources, Alexandria, VA. IWR Report 94-WMB-3. 75 pp.
- Short, C. 1988. *Mitigation banking*. U.S. Fish and Wildlife Service Biological Report 88(41). 103 pp.
- U.S. Department of Agriculture, Soil Conservation Service. 1992. *Field handbook*. Chapter 13: Wetland restoration, enhancement, and creation. Washington, DC.
- van der Valk, A.G., ed. 1989. *Northern prairie wetlands*. Iowa State University Press, Ames, IA.
- Washington State Department of Ecology. 1991. *Wetland buffers: Use and effectiveness*. Washington State Department of Ecology, Olympia, WA. Pub. No. 92-10. 171 pp.
- Wenzel, T.A. 1992. *Minnesota wetland restoration guide*. Minnesota Board of Water and Soil Resources.

**APPENDIX E**  
**WETLAND CONTACTS**

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U.S. Fish and Wildlife Service  
Federal Building, Second Floor  
203 W. 2nd Street  
Grand Island, Nebraska 68801  
(308) 382-6468, (308) 384-8835 [FAX]

U.S. Environmental Protection Agency  
726 Minnesota Avenue  
Kansas City, Kansas 66101  
(913) 551-7226, (913) 551-7863 [FAX]

Nebraska Game & Parks Commission  
2200 N. 33rd Street  
PO Box 30370  
Lincoln, Nebraska 68503  
(402) 471-0641, (402) 471-5528 [FAX]

Nebraska Department of Environmental Quality  
1200 "N" Street, Suite 400  
The Atrium  
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U.S. Army Corps of Engineers  
Nebraska Regulatory Office-Wehrspann  
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Omaha, Nebraska 68138-3621  
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USDA Natural Resources Conservation Service  
Federal Building, Room 345  
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