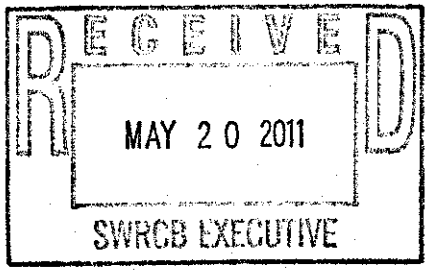
AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

CALIFORNIA
NATIVE PLANT SOCIETY



May 20, 2011

Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
P.O. Box 100, Sacramento
CA 95812-2000

Submitted by email to: commentletters@waterboards.ca.gov

RE: Wetlands and Riparian Area Protection Policy (WRAPP) DEIR Scoping Comments

Dear Chairman Hoppin and Members of the Board:

On behalf of the undersigned organizations we submit the following comments on the State Water Resources Control Board's Notice of Preparation (NOP) and the Initial Study (IS) for its Wetlands and Riparian Area Protection Policy (WRAPP) and proposed dredge and fill regulations (Project).

We are strongly supportive of the State Water Resources Control Board's decision to move forward on this program. We are distressed at its slow pace, however. The NOP and IS are positive steps in moving this program to implementation.

While agreeing with the IS that a full EIR is necessary, we wish to express the following concerns with conclusions reached in the IS and hope the draft EIR responds to these concerns

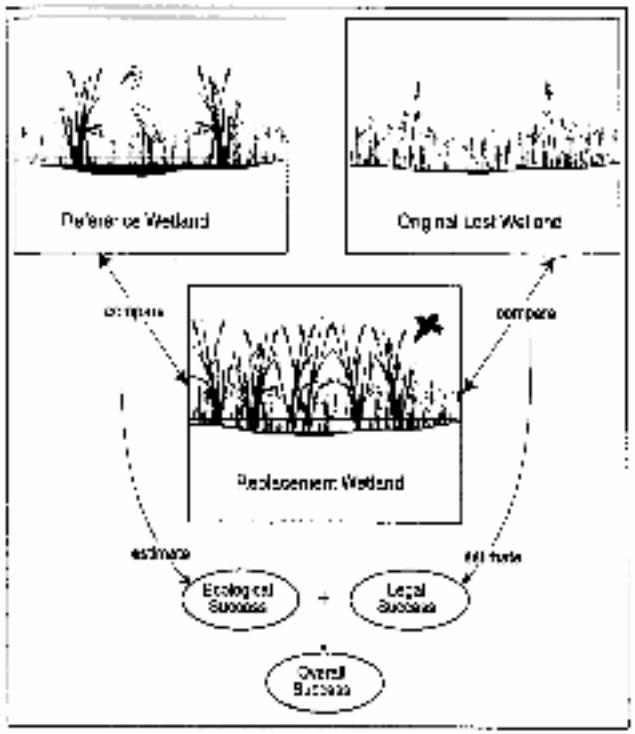
Definition:

While we understand the rationale you have for suggesting a two-parameter approach to delineating wetlands in California, we prefer the adoption of a one-parameter definition of wetlands, i.e., needing only one of the three descriptors of wetlands (standing water or saturated substrate, hydric substrate, predominance of hydrophytic vegetation or no

An Assessment of Mitigation Wetland Performance

Siobhan Fennessy
Kenyon College

Wetland Mitigation



Mitsch and Gosselink, 2000

Key Conclusion of Report by the National Research Council (2001)

- The goal of no net loss of wetlands is not being met for wetland functions by the mitigation program, despite progress in the last 20 years

- This conclusion confirmed by more recent studies of mitigation wetlands and banks
  - In response to studies from 1995 to 2004 in Ohio, ecologically based assessments and performance criteria developed

Ecological Assessment Study Design:

- 10 natural and 10 restored (mitigation) wetlands
- biological assessments made based on vegetation, amphibian and macroinvertebrate community composition
- Ground water and surface water levels monitored
- ecosystem processes measured including biomass production, decomposition rates, and nutrient cycling rates.

Created wetland during drydown

Natural wetland during drydown

Fennessy et al. 2004

Natural

Mitigation - *restoration*

Mitigation - *creation*

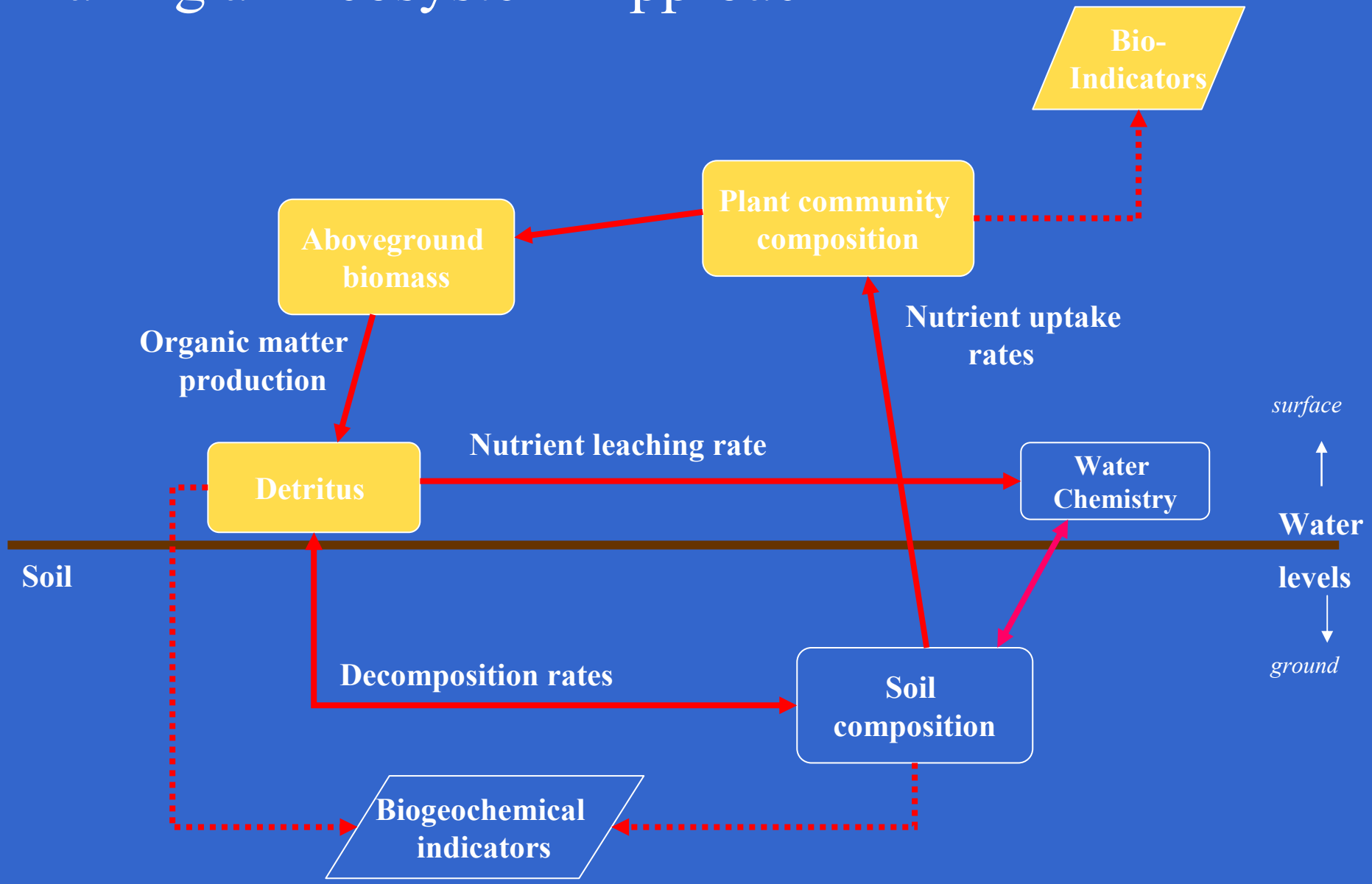
Site Selection

•Natural wetlands chosen over full gradient of ecological condition

•Mitigation wetlands chosen over a range of ages (0-10 years)

Fennessy et al. 2004

Taking an Ecosystem Approach



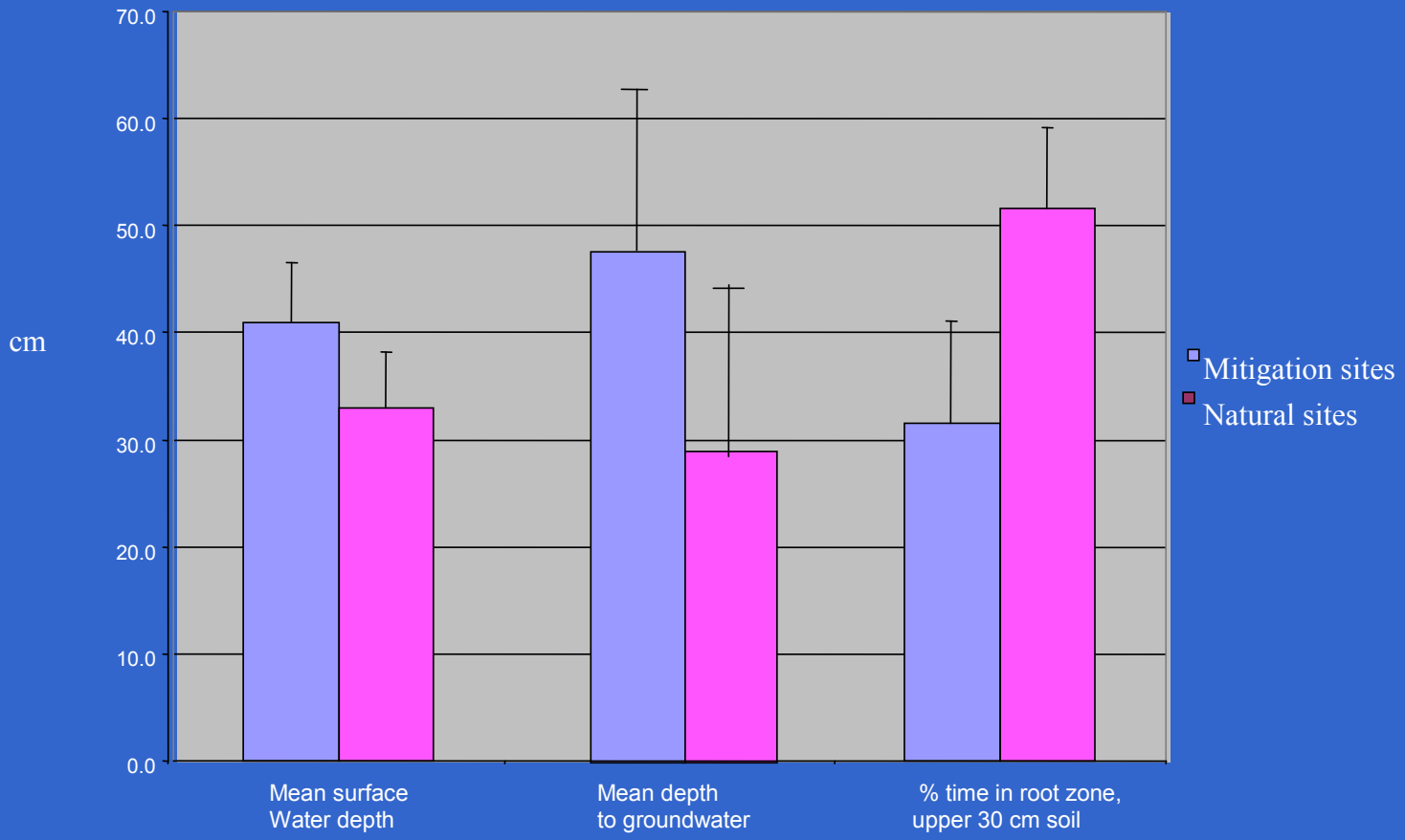
Fennessy et al. 2004

Hydrology: trends in mitigation wetlands

- Created wetlands tend to be deeper with longer hydroperiod (e.g., Magee et al. 1999, Cole and Brooks 2000)

- Hydrological failures lead to mitigation project failure (e.g., Erwin 1991, Galatowitch and van der Valk 1996)

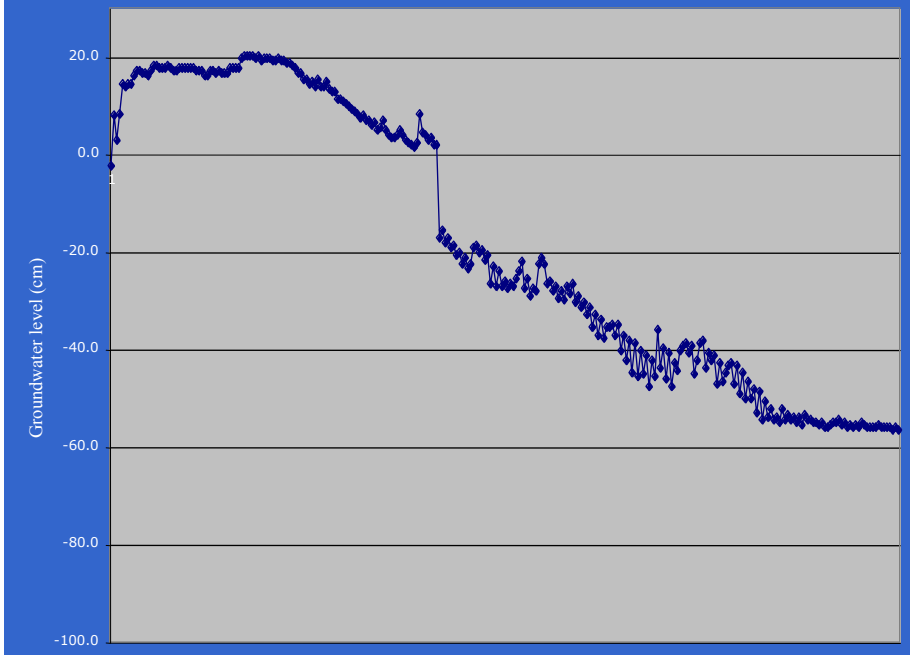
Hydrological characteristics of natural and mitigation wetlands



Fennessy et al. 2004

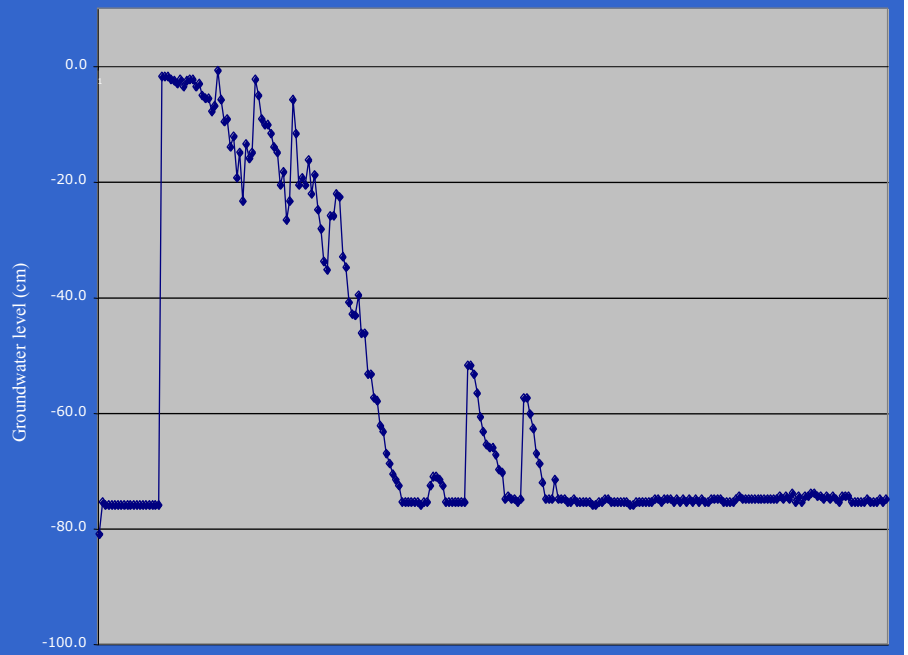
Hydrological characteristics of natural and created wetlands

Calamus (natural wetland)



Days (May 14 to September 30, 2001)

Big Island (mitigation wetland)



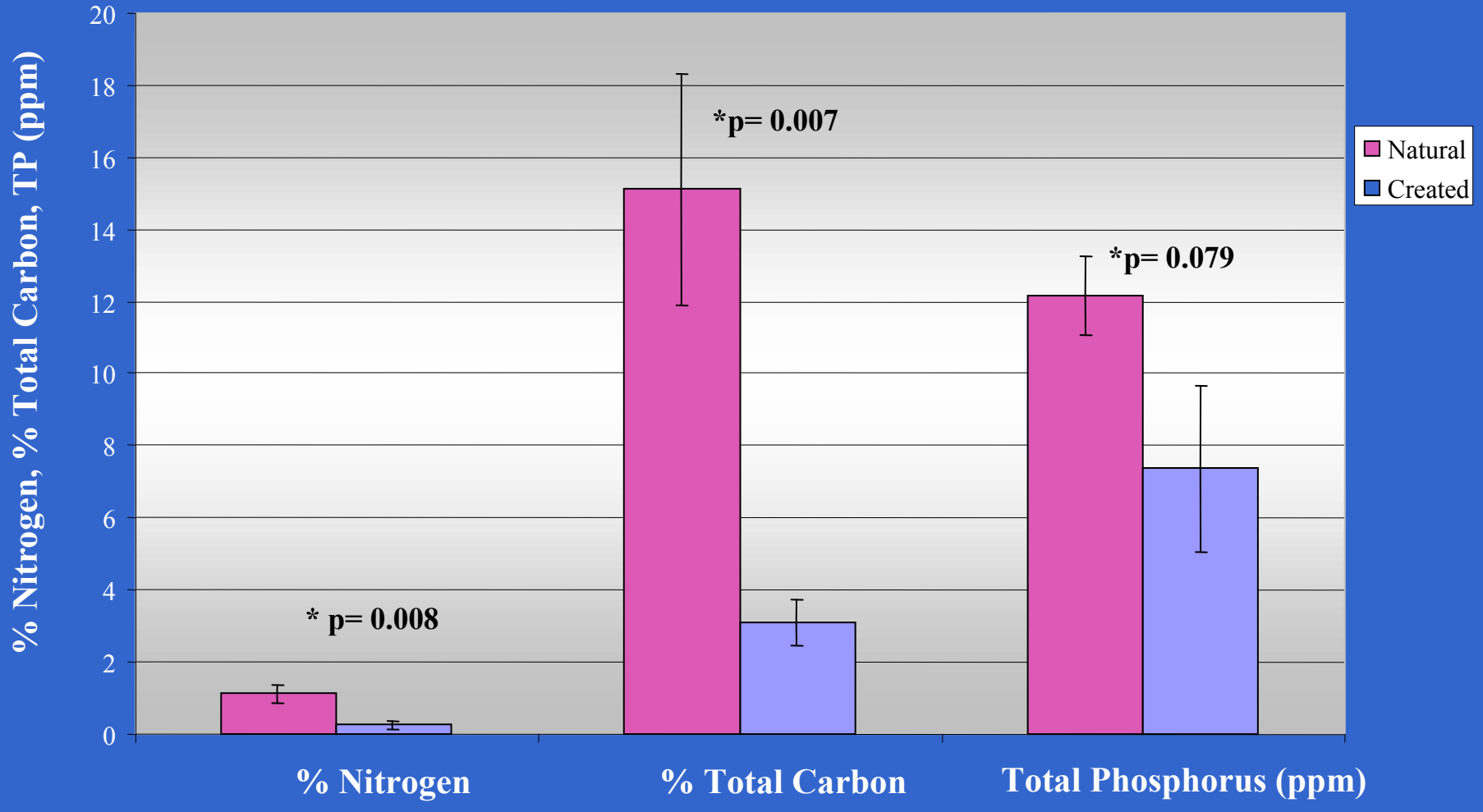
Days (May 27 to September 30, 2001)

Fennessy et al. 2004

Soils: trends in mitigation wetlands

- Soil organic matter (SOM) and nitrogen higher in natural wetlands (Bishel-Machung et al. 1996, Craft 2000)
- Accumulation in SOM and N over time varies:
  1) No significant change (Bishel-Machung et al. 1996, Shaffer and Ernst 1999, Cole et al. 2001, Fennessy et al. 2004)
  2) Detectable increases over time (Craft et al. 1999)
- Bulk density higher in mitigation wetlands (Fennessy et al. 2004)
- Microbial activity lower in created wetlands (Hossler and Bouchard 2006)

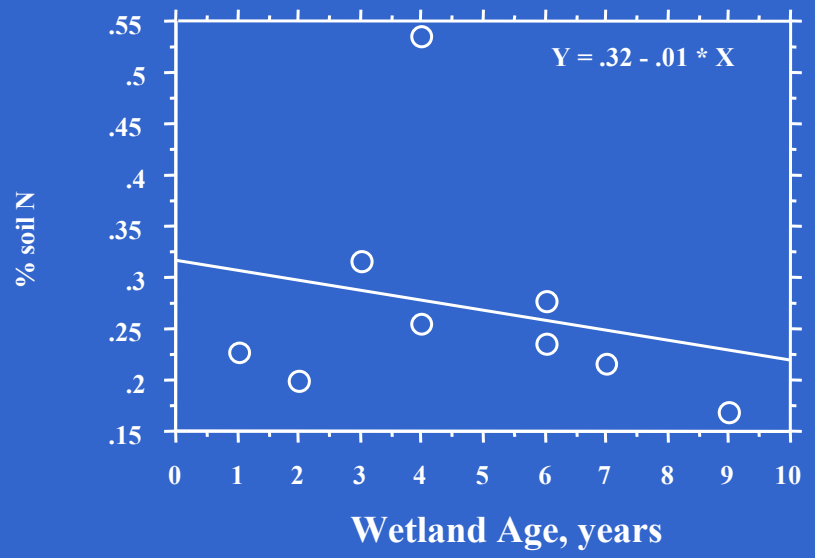
Soil nutrient levels in natural and created wetlands



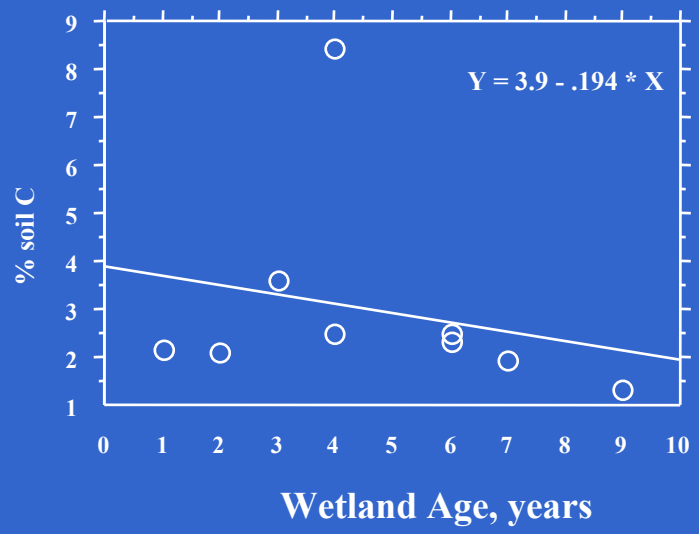
Fennessy et al. 2004

Recovery trajectories in soil composition in mitigation wetlands

% Soil Nitrogen



% Soil Carbon

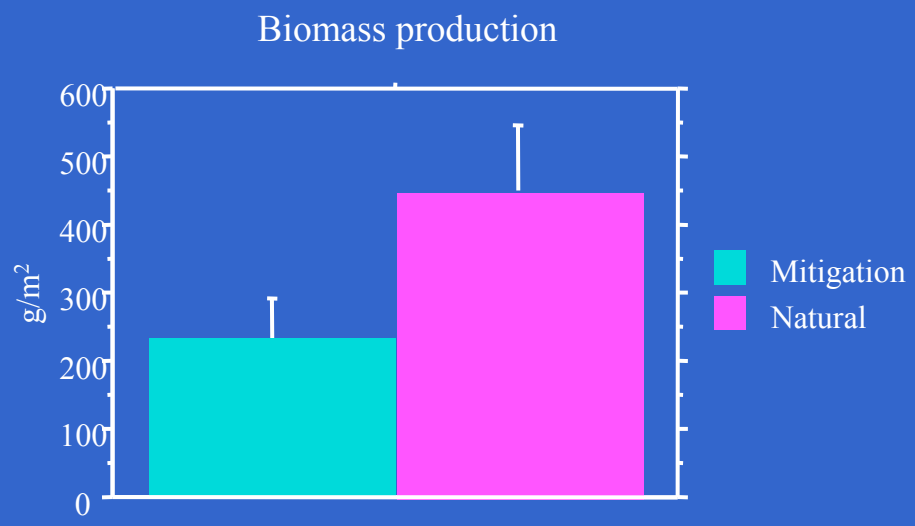


Fennessy et al. 2004

Vegetation: trends in mitigation wetlands

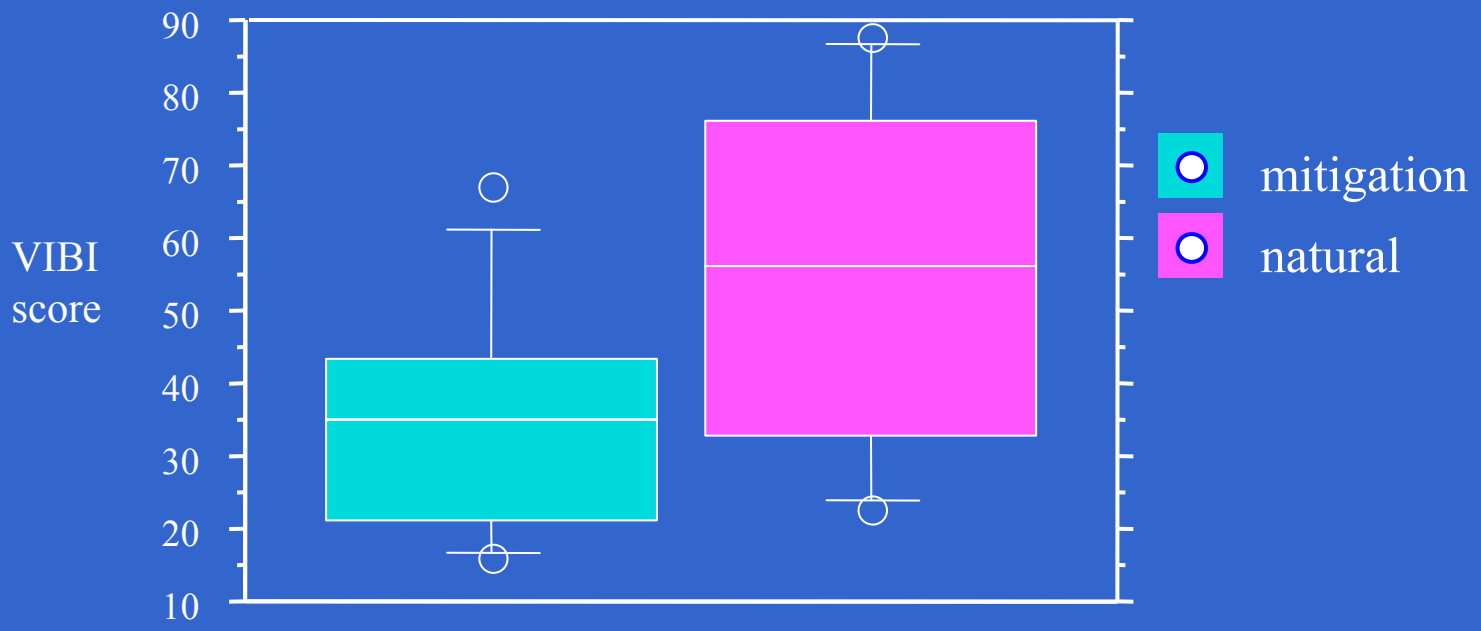
- Macrophyte communities can develop quickly
- Species richness typically lower in mitigation sites with more non-native species (Erwin 1991, Magee et al. 1999, Fennessy et al. 2004, Spiels 2005)
- Biomass production in mitigation sites varies relative to natural sites
  - Equivalence in some studies within 5 years (Craft et al. 1999)
  - Higher production in created wetlands (Cole 1992)
  - Lower production in created wetlands (Fennessy et al. 2004)

Aboveground biomass and nutrient accumulation differs by wetland type



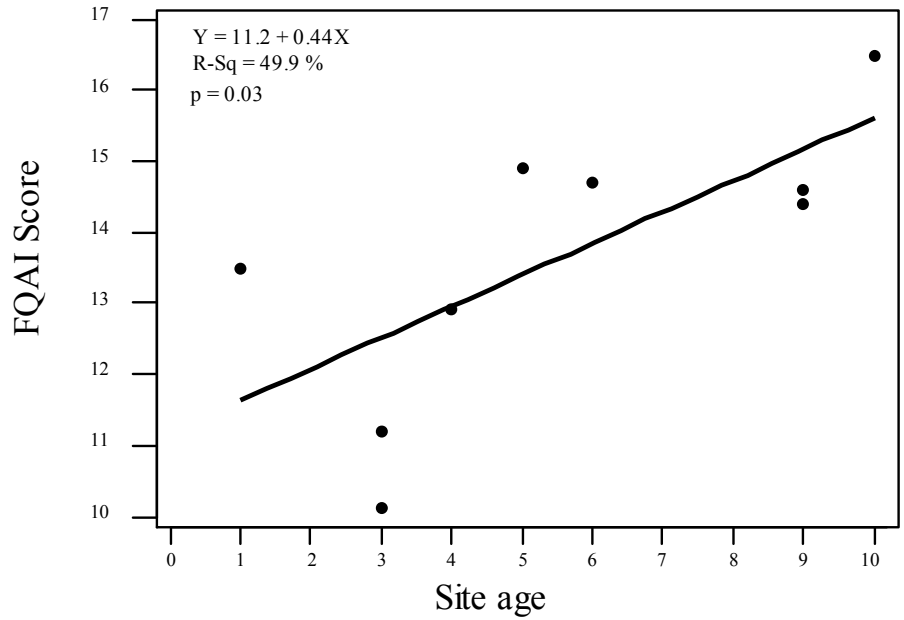
Fennessy et al. 2004

Using biological indicators to assess mitigation success: the Vegetation IBI



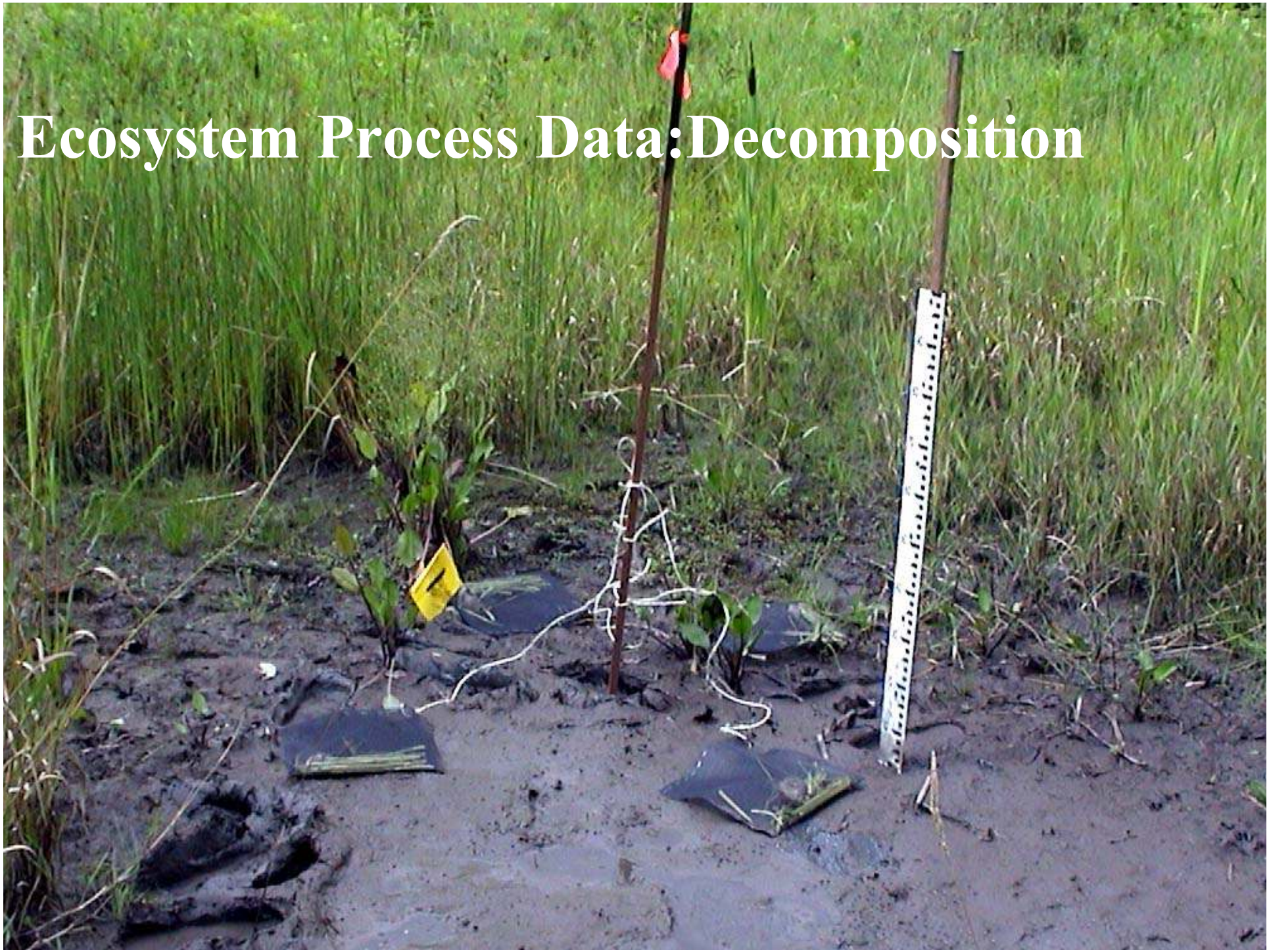
Fennessy et al. 2004

Recovery trajectories for FQAI score



Fennessy et al. 2004

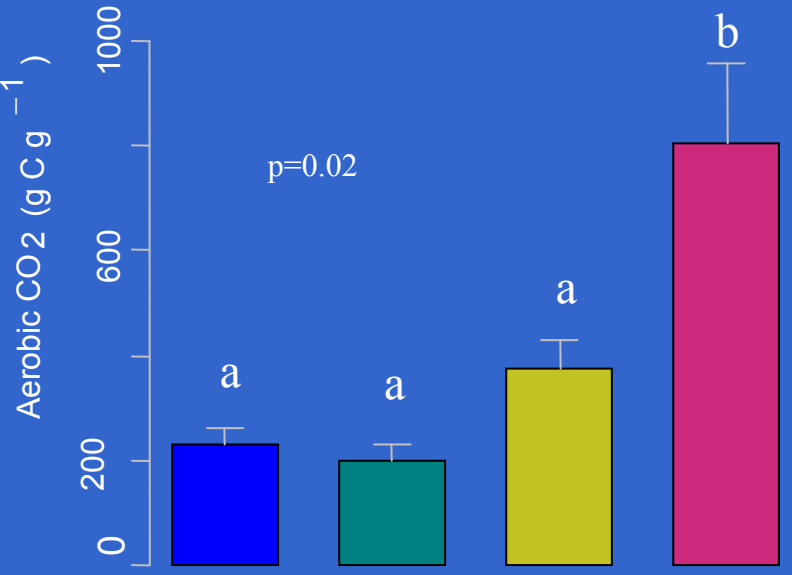
Ecosystem Process Data:Decomposition

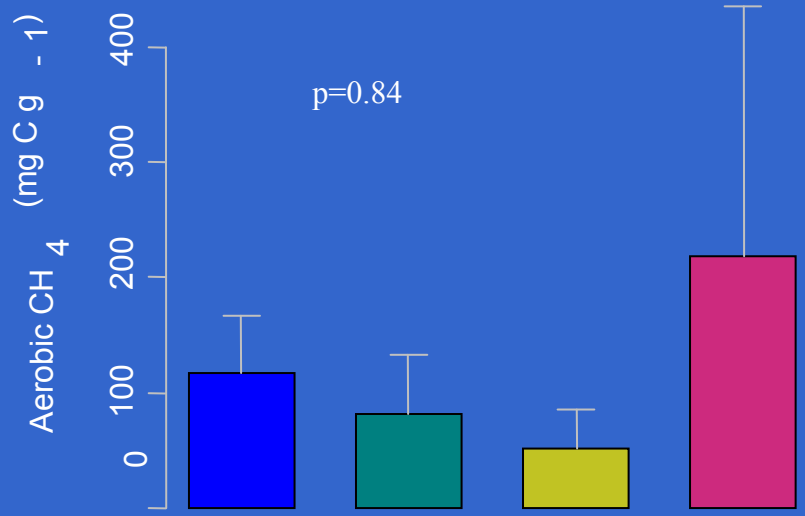


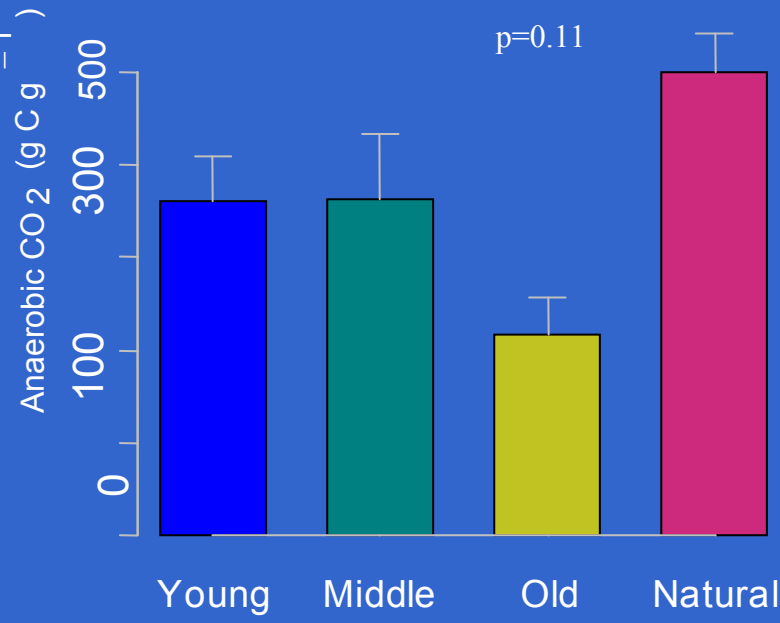
Patterns of Ecosystem development

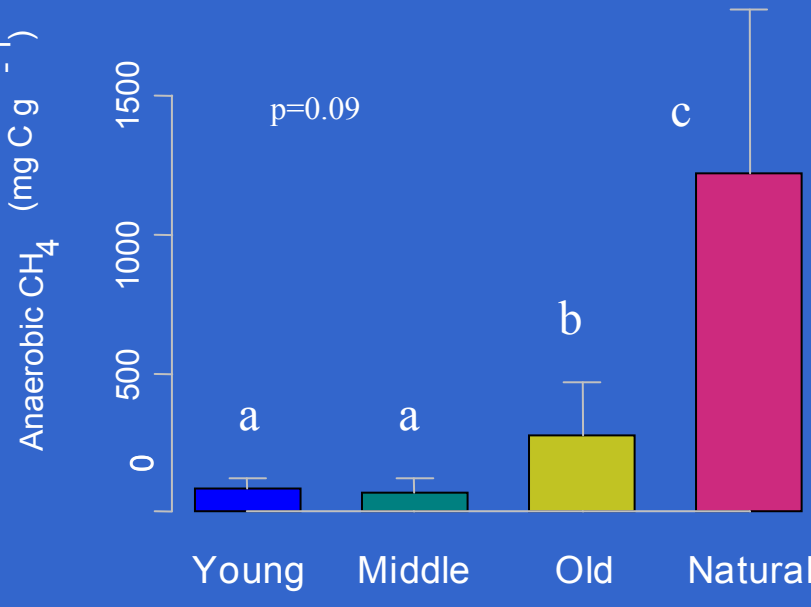
Microbial activity (labile carbon)

(Data from Hossler and Bouchard 2006)

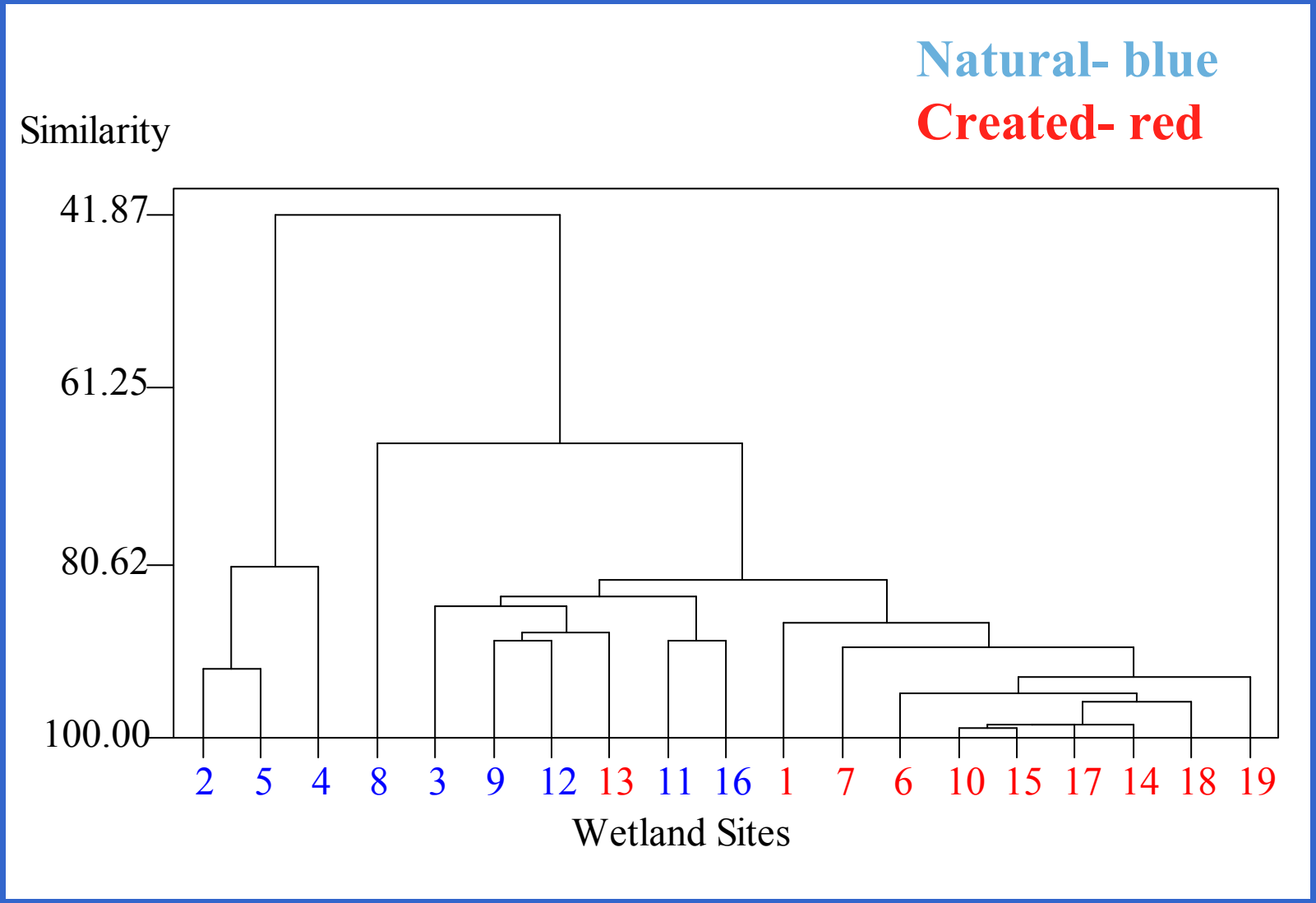








A cluster analysis of natural and created wetlands



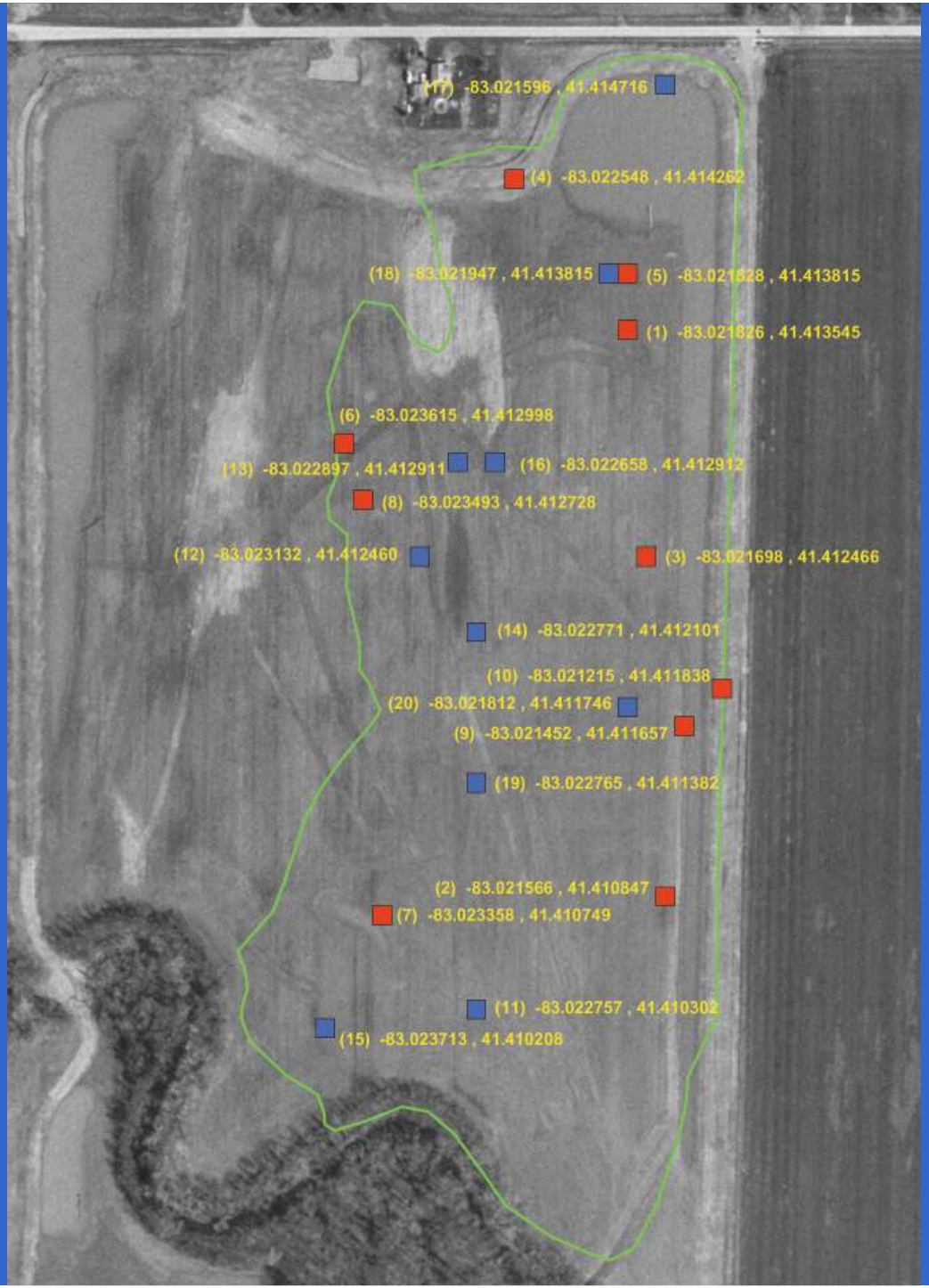
Fennessy et al. 2004

Ecological performance of mitigation banks

- No net loss not being met in many studies
  - Survey of 68 banks found that 26% did not meet acreage requirements resulting in loss of 8,400 ha nationally (Brown 1999)
  - Recent Ohio study found 24% (400 ha) did not meet jurisdictional requirements (Mack and Micacchion 2006)
  - Vegetation establishment judged successful in half of banks surveyed (Spiels 2005)
- Landscape effects
  - Loss of urban wetlands (Ruhl and Salzman 2006)

Ecological Assessment of Wetland Banks in Ohio: Random plot sampling

Ohio EPA, 2006

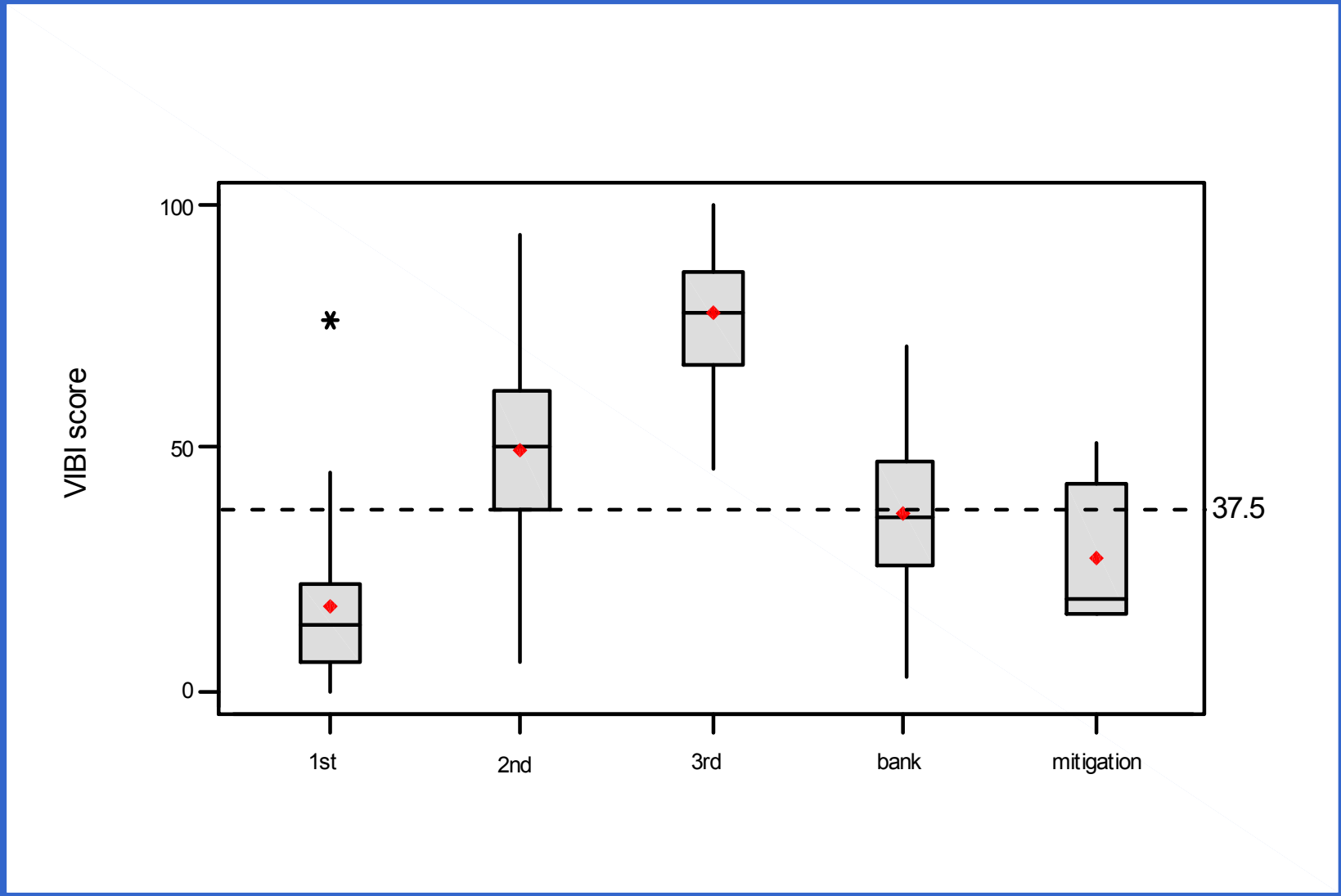


Area of open water at Ohio Banks

site	area(ha)	area(ac)	water (ha)	water (ac)	%total area
Big Island	76.3	188.4	24.4	60.3	32%
Cherry Valley	25.9	63.9	1.7	4.2	7%
Chippewa Centra	38.3	94.5	5.1	12.6	13%
Grand River	21.9	54.2	5.8	14.4	27%
Hebron	11.9	29.3	2.0	4.8	17%
Little Scioto	28.5	70.5	14.6	36.1	51%
Panzner	36.3	89.5	4.8	11.9	13%
Sandy Ridge	44.3	109.4	25.9	64.1	59%
Slate Run	14.9	36.7	5.3	13.1	36%
Three Eagles	26.8	66.1	4.0	9.9	15%
Trumbull Creek	29.2	72.1	18.0	44.4	62%
White Star	38.5	95.0	0.0	0.1	0%
		969.6	net loss (ac)	-275.9	
		percent bank acreage that is not "wetland"		28%	
		net loss from "sold out" banks (ac)		173.6	

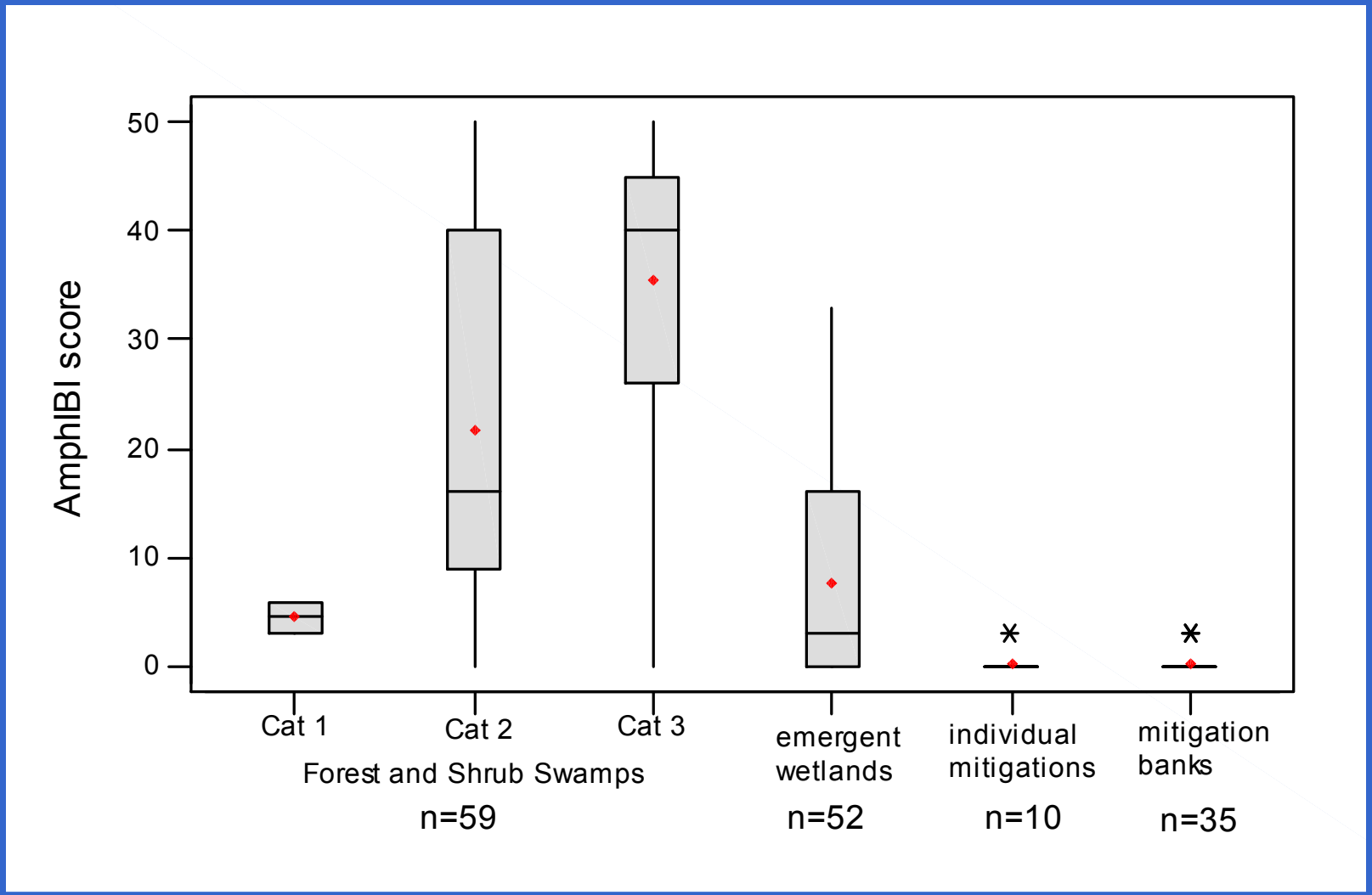
Ohio EPA, 2006

Ecological Quality of Ohio Banks



Ohio EPA, 2006

Ecological Quality of Ohio Banks



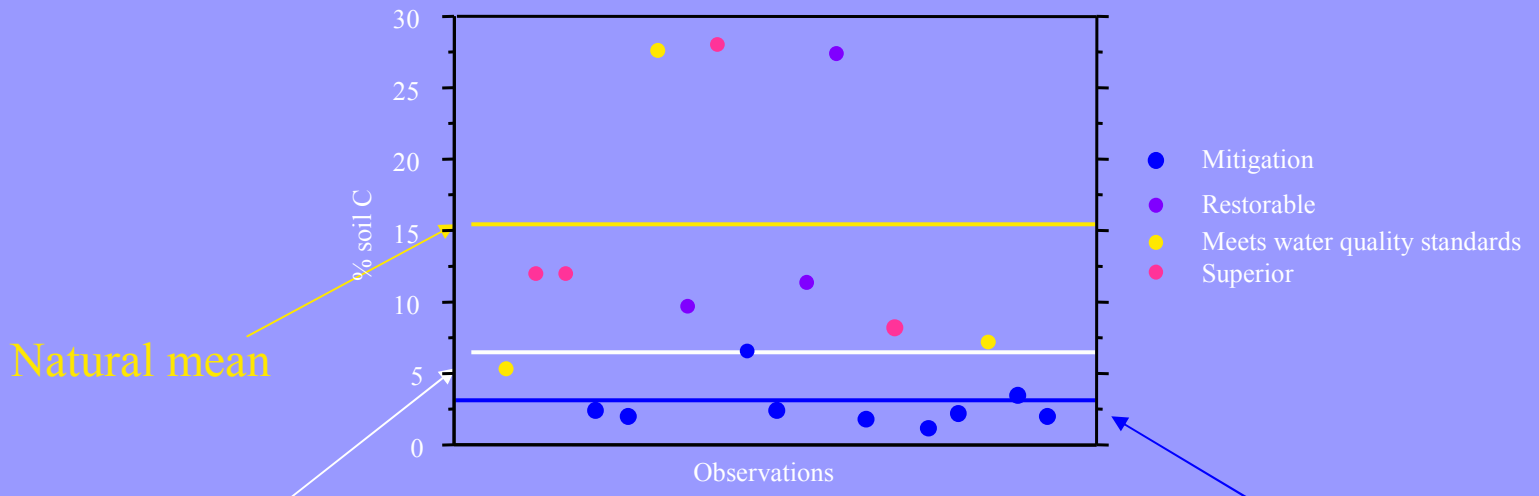
Ohio EPA, 2006

"The establishment of ecological success criteria is not only possible but essential to determine if the objectives of compensatory mitigation are being met"

GAO Report to Congress

Translating monitoring data to performance standards: soil carbon

Natural wetlands: 15.1 ± 9.7 %
Mitigation wetlands: 2.9 ± 2.1%



Proposed performance standard
25th percentile of range of natural sites

Fennessy et al. 2004

Limits to Success

- What we know about good project design and management has not translated well to work on the ground:
  - Soils
  - Landscape setting
  - Ecologically relevant performance standards

Ohio Wetland Program Publications:

http://www.epa.state.oh.us/dsw/wetlands/WetlandEcologySection_reports.html

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Speils, D. 2005. Vegetation development in created, restored, and enhanced mitigation wetland banks of the United States. Wetlands 25:51-60.

AN EVALUATION OF THE NATURAL RESOURCES CONSERVATION SERVICE WETLAND DETERMINATION AND DELINEATION METHODOLOGY FOR AGRICULTURAL LANDS AS CURRENTLY USED IN THE SAN FRANCISCO BAY, DELTA AND CENTRAL VALLEY AREAS OF CALIFORNIA

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December 1996

TABLE OF CONTENTS

This document should be cited as: *An Evaluation of the Natural Resources Conservation Service Wetland Determination and Delineation Methodology For Agricultural Lands as Currently Used in the San Francisco Bay, Delta and Central Valley Areas of California.* December 1996. Prepared by Terry Huffman, PhD, Huffman & Associates, Inc., 700 Larkspur Landing Circle, Suite 100, Larkspur, California 94939. 25pp. plus appendices.

ATTACHMENTS

TABLES:

ATTACHMENTS (Continued)

FIGURES:

EXECUTIVE SUMMARY

The purpose of this study was to evaluate the current Natural Resources Conservation Service (NRCS) wetland determination and delineation methodology for agricultural lands, as articulated in the National Food Security Act Manual (NFSAM), and compare it with the wetland delineation methodology currently in use by the U.S. Army Corps of Engineers (Corps), i.e., the Corps' 1987 Manual. Identified differences between the two methodologies were evaluated with respect to potential impacts at the national level, and, more particularly, on California wetlands conservation in the San Francisco Bay, Delta Area and the Central Valley (e.g., wetlands behind diked baylands and Delta islands). Potential impacts were also examined to determine if they might be reversible. It should be noted that this study documents what the author believes to be the first phase of a methodology NRCS is developing, and which is in an ongoing process of improvement. Nevertheless, the methodology described herein has been, and is currently, used by NRCS personnel within California and throughout the rest of the United States to make wetland determinations and delineations on agricultural lands. It is anticipated that a subsequent report of this type will be prepared in 1 to 2 years that evaluates any changes or modifications to the portion of the current NFSAM that deals with wetland determination and delineation.

Based upon the findings of this study, there appears to be a high likelihood of inconsistencies between wetland delineations made on agricultural lands using the NFSAM versus those made on lands using the Corps' 1987 Manual. Of particular concern is the NFSAM's heavy reliance on off-site analyses, without adequate or limited on-site verification, using aerial photography and/or inappropriate field indicators (especially for wetland hydrology conditions). This approach, while it may well be satisfactory for monitoring agricultural crop production patterns, will likely lead to significant wetland losses within agricultural lands, notwithstanding the commitment to "agency coordination" expressed in various memoranda of agreement between the Department of Agriculture, the Environmental Protection Agency, the Department of Interior, and the Department of the Army.

Equally troubling, is the sequence followed and the criteria used under the NFSAM to determine if an area qualifies for an exemption from Food Security Act (Farm Bill) and Clean Water Act (CWA) regulation as a Prior Converted (PC) cropland. Under the NFSAM, the NRCS performs a determination for the area in question for possible PC classification. A PC determination merely means that the area was converted and farmed before December 23, 1985. PC determinations are made when there is an indication of the removal of woody vegetation and the presence of surface water ignoring other wetland characteristics. This approach appears to lead to a PC determination without adequate, and necessary, on-site investigation as to the presence of wetlands. This can have significant ramifications in terms of wetland losses if a mis-determination or mis-delineation occurs or has previously occurred given that the 1996 Farm Bill contains a new provision which provides that "once a PC, always a PC." Thus, even if farming operations were abandoned and/or there is a lack of adequate maintenance of the drainage, the PC label does not change once assigned by NRCS.

Achieving regulatory consistency between the CWA and Swampbuster is a difficult, if not impossible, goal for the various responsible agencies to achieve in such a manner that wetland protection is not diminished. In addition, the inability to change a PC determination no matter what the circumstance heightens the problem even further. Furthermore, as currently formulated, the NFSAM does not satisfactorily achieve the agencies wetland protection goal, as even with the best aerial photography, accurately placing the line of CWA jurisdiction using the NFSAM requires detailed on-site field investigation in every case.

INTRODUCTION

Purpose

The purpose of this study was to evaluate the current Natural Resources Conservation Service (NRCS) wetland determination and delineation methodology for agricultural lands, as articulated in the National Food Security Act Manual (NFSAM), and compare it with the wetland delineation methodology currently in use by the U.S. Army Corps of Engineers (Corps), i.e., the Corps' 1987 Manual. Identified differences between the two methodologies were evaluated with respect to potential impacts at the national level, and, more particularly, on California wetlands conservation in the San Francisco Bay, Delta Area and the Central Valley (e.g., wetlands behind diked baylands and Delta islands). Potential impacts were also examined to determine if they might be reversible. It should be noted that this study documents what the author believes to be the first phase of a methodology NRCS is developing, and which is in an ongoing process of improvement. Nevertheless, the methodology described herein has been, and is currently, used by NRCS personnel within California and throughout the rest of the United States to identify and delineate wetlands on agricultural lands. It is anticipated that a subsequent report of this type will be prepared in 1 to 2 years that evaluates any changes or modifications to the portion of the current NFSAM that deals with wetland determination and delineation.

BACKGROUND

In 1985, Congress enacted the so-called "Swampbuster" provisions to the Food Security Act (Farm Bill) to discourage further conversion of wetlands to agriculture. The primary means of discouraging such conversions is to bar farmers from receiving agricultural commodity benefits, if they convert wetlands to agricultural commodity uses after December 23, 1985. These benefits include price supports, crop storage payments, crop insurance and certain types of loans. The 1996 Farm Bill amendments eliminated crops insurance and most loans as benefits that can be denied for violating Swampbuster. The Swampbuster provisions of the Farm Bill represented a significant about-face on federal agricultural policy as it relates to wetlands, although non-commodity crop conversions were not affected in the 1985 Farm Bill. The 1990 amendments applied the Swampbuster provisions to anyone who, "After November 28, 1990, the person converts a wetland by draining, dredging, filling, leveling, removing woody vegetation, or other means for the purpose, or to have the effect, of making the production of an agricultural commodity possible." However, the provision still did not apply if the wetland was converted for buildings or other development. The punitive provisions of the amendments do not apply to commodity crops if:

(1) they are grown on land converted from wetlands where the conversion was "commenced" prior to December 23, 1985;

(2) the wetland conversion was the result of the act of a third party over which the producer had no control and such conversion was not the product of a scheme;

(3) the crop production is possible as the result of a natural condition and without action by the producer that destroys a natural wetland characteristic other than herbaceous vegetation; or

(4) the conversion will have "minimal effects" on hydrological and biological aspects of wetlands.[1]

Of course, the denial-of-benefits provisions of Swampbuster do not affect wetland conversions by farmers who do not participate in USDA programs[2].

Subsequent to passage of the "Swampbuster" provision, the U.S. Department of Agriculture (USDA), the Environmental Protection Agency (EPA), the Department of the Interior/U.S. Fish & Wildlife Service (FWS), and the Department of the Army/Corps of Engineers (Corps) signed, in January 1994, a Memorandum of Agreement (MOA) concerning the delineation of wetlands for purposes of Section 404 of the CWA and subtitle B of the FSA[3].

The purpose of this MOA is to specify the manner in which wetland delineations and certain other determinations of waters of the United States made by the USDA under the Farm Bill will be relied upon for purposes of Section 404 of the Clean Water Act (CWA). While the MOA is intended to promote consistency between the wetland programs of the CWA and Farm Bill, the MOA indicates that the process is not intended in any way to diminish wetland protection. In this regard, all signatory agencies to the MOA agreed to ensure that wetlands programs are administered in a manner consistent with the objectives and requirements of applicable laws, implementing regulations, and guidance.

Specifically:

(1) The Administrator of EPA has the ultimate authority to determine the geographic scope of waters of the United States subject to jurisdiction under the CWA, including the Section 404 regulatory program (see Table 1).

(2) The Secretary of the USDA, acting through the Chief of the Natural Resources Conservation Service (NRCS), has the ultimate authority to determine the geographic scope of wetlands for FSA purposes and to make delineations relative to the FSA, in consultation with the FWS, when appropriate.[4]

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[1]Wetland habitats are those areas with a prevalence of hydrophytes (wetland plants) flooded or ponded for 15 or more consecutive days during the growing season; wetland habitats are also those areas with a prevalence of hydrophytes (wetland plants) with soils saturated to the surface for 14 or more consecutive days during the growing season except for pothole, playa or pocosin wetlands when it is 7 days.

[2]Although not addressed by this report, the current general legislative move towards a diminution and/or termination of crop support prices and other longstanding benefits for farmers may significantly affect the present disincentives to converting wetlands, unless loopholes allow the avoidance of the recapture provision which is part of Section 404(f) of the Clean Water Act. Section 404(f) requires that lands converted to agricultural use and converted to non-wetlands as part of an agricultural operation be subject to Section 404 permit authorization if the land use changes from farming to another non-wetland use such as urban, commercial or industrial development.

[3]Memorandum of Agreement - Among the Department of Agriculture, The Environmental Protection Agency, The Department of the Interior, and the Department of the Army - Concerning the delineation of Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act. January 1994.

[4]NRCS is not required to follow any recommendations by FWS that may result from such consultations.

Currently, there also exists an MOA for the California San Francisco Bay Area between EPA, the Corps, the FWS and the USDA/NRCS (California San Francisco Bay Area MOA). Under the California San Francisco Bay Area MOA, the Corps conducts jurisdictional delineations associated with the day-to-day administration of the Section 404 program on all lands, including agricultural lands within all California San Francisco Bay area counties. This coordination, which has been determined to be critical to the success of the California San Francisco Bay Area MOA, is designed to promote accurate and consistent wetland delineations in an area where the difficulty of making wetland delineations is high due to the seasonal nature of many wetlands in this area and the nature and scope of human induced changes in local hydrologic conditions. For this reason, the signatory agencies agreed to work cooperatively at the field level to:

(1) achieve interagency concurrence on mapping conventions used by the NRCS for wetland delineations on agricultural lands;

(2) provide the Environmental Protection Agency and the Corps of Engineers programmatic review of any NRCS wetland delineations made;

(3) certify wetland delineations in accordance with Section 1222(a)(2) of the Farm Bill, as amended.[5]

In April 1996, the new Farm Bill amendments were signed by President Clinton which continued the Swampbuster program. This new bill, referred to as the 1996 Federal Agricultural Improvement and Reform Act (FAIRA), retains the Swampbuster program with some revisions. The revised Swampbuster program continues to discourage farmers from converting wetlands to cropland through the elimination of the ability to receive subsidies, but affords government officials more leeway in resolving wetland violations by allowing the Secretary of Agriculture discretion in deciding how to resolve the violation issue. The 1996 Farm Bill, however, does not provide for a minimum standard for resolution of violations to assure that the goal of the CWA or the goal of the President's White House wetlands policy are met. Rather than a requirement for on-site restoration of the unauthorized conversion of wetlands, for instance, farmers may now mitigate the loss by creating, restoring or enhancing wetlands elsewhere. The mitigation options bring potential mitigation more in line with options available with CWA Section 404 permits, compared to options available in the past under the Farm Bill. In addition, Farm Bill exemptions apply to persons receiving USDA program benefits and except for PC, doesn't exempt them from getting CWA Section 404 permits. Therefore, NRCS should be better able to work with the Corps of Engineers and CWA Section 404 permit applicants to achieve mutually agreeable mitigation. However, it is interesting to note that once the land is converted for agricultural use and mitigation transferred to another site, the ability to recapture the converted wetlands under Section 404(f)(i) of the CWA is arguably lost if the land use later changes from agriculture to another use such as urban development. In addition, the 1996 Farm Bill contains a new provision which provides that once a PC determination is made that determination always stays with the land no matter if farming ceases and/or the drainage is not maintained. Given the normal pattern of development around growing metropolitan areas, i.e., urban uses slowly encroaching on agricultural land, this could represent a

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[5]Section 1222 of the FSA, as amended by the Food Agriculture Conservation and Trade Act, provides that SCS (NRCS) will certify SCS wetland delineations made prior to November 28, 1990. The intent of this process is to ensure the accuracy of wetland delineations conducted prior to November 28, 1990, for the purposes of the FSA. The intent of this certification process is to provide a useful basis for establishing reliance on wetland delineations for CWA purposes. Very few delineations have been certified to date. The 1996 amendments continue certification process. All certifications done after the effective date of the MOA that are done using mapping conventions will use agreed-upon mapping conventions pursuant to the MOA.

significant policy gap in the overall effort to protect wetlands from otherwise avoidable non-agricultural impacts.

Other parts of the bill provide for:

(1) a new Wildlife Habitat Incentives Program which designates $50 million over seven years to promote improvement of wildlife habitat on private lands;

(2) a new Flood Risk Reduction Program which that also allows farmers with land in high flood risk areas to enroll in contracts to enhance the land's habitat potential, perhaps for hunting or fishing, and encourages them not to grow crops there; and

(3) a consolidation of four existing programs into one Environmental Quality Incentive Program, allowing farmers to deal with several types of problems at once, rather than one at a time through various individual programs. The program is designed to aid crop and livestock producers in their efforts to control animal waste, pesticide, fertilizer, and soil run-off from farms. A total of $130 million is allocated for 1996 for this program and $200 million per year thereafter through 2002.

In addition to the three programs identified above, it should be noted that the Wetlands Reserve Program and Conservation Reserve Program (especially potential acceptance of some Water Bank Program lands into the Conservation Reserve Program are programs available for wetland conservation, restoration, etc.

The above-described January 1994 MOA demonstrated clearly that coordination between the NRCS and the Corps of Engineers/Environmental Protection Agency respective Farm Bill and Clean Water Act programs is essential. To assure consistency, the MOA specified that:

> "In the spirit of the agencies' commitment to develop agreed upon methods for use in making wetland delineations, subsequent revisions or amendments to the Corps 1987 manual or portions of the NFSAM [National Food Security Act Manual] affecting the wetland delineation procedures upon which this agreement is based will require the concurrence of the four signatory agencies."

However, the MOA, needs to be revised to account for the new (now in effect for purposes of Swampbuster determination by NRCS) definition of agriculture land that includes rangeland and small tree farms, states that:

> "For agricultural lands, the signatory agencies will use the procedures for delineating wetlands as described in the National Food Security Act Manual, Third Edition (NFSAM)[6]. For areas that are not agricultural lands, SCS (now NRCS) will use the 1987 Corps Wetland delineation Manual, with current national Corps guidance, to make wetland delineations applicable to Section 404."

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[6]Currently using NFSAM, Third Edition, Amend. 2, May 1995.

In other words, USDA Natural Resources Conservation Service (NRCS) personnel will devise a methodology to identify and delineate wetlands and then determine the status of agricultural operations on them for compliance with the Farm Bill.[7] Specifically, personnel from the NRCS will perform wetland determinations (is it PC, FW, etc.) and wetland delineations (boundary of wetlands for FSA or CWA purposes). The Farm Service Agency receives the NRCS wetland determination and copies the outline of the wetlands from the map provided onto the official aerial photos, labeling them as indicated. If the landowner appeals the determination, the FSA County Committee handles the appeal. The County Committee cannot change an NRCS technical determination, but it can ask NRCS to review the determination if it so chooses. In California, NRCS has requested the FSA County Committees to request this review in all cases, in order to provide NRCS an additional opportunity to review the decision at a level higher than the NRCS field office where it was made. It is expected by NRCS that their request will be honored. If the producer appeals the decision to the next level, the Farm Service Agency State Committee, that committee also cannot change the NRCS technical determination, but may ask for additional NRCS review. At both levels, NRCS will be present at the appeals hearing. If the producer is not satisfied with the decision of the FSA State Committee, he or she may appeal to the National Appeals Division (NAD) of USDA. NAD can overturn or change an NRCS technical decision, and its decisions are binding on other agencies as well, such as the Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service.

The Farm Service Agency does have some authorities, though: It determines, with considerable limits on its discretion, the effect of a violation on a person's USDA benefits. It determines which producers are eligible for benefits and which producers' benefits are affected by a violation.

Concerns have been raised that the application of the NRCS Wetland determination and delineation Methodology[8], as compared to the Corps of Engineers Methodology[9], will lead to certain wetland areas not being classified as wetlands and will therefore significantly diminish wetland protection and the ability to meet the goals of the Clean Water Act, which are "to maintain and restore the chemical, physical and biological integrity of the nations waters."

METHODS

This analysis consisted of comparing the two manuals' technical characteristics, criteria and techniques for differences in technical approach and user application.[10] A total of 88 comparative characteristics were identified and evaluated.

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[7]NRCS classifies agricultural land under this approach as either: (a) Prior Converted Croplands (PC); (b) Converted Wetlands (CW); (c) Farmed Wetlands (FW); (d) Farmed Wetland Pasture (FWP); (e) Artificial Wetlands (AW); (f) Wetlands (W); or (g) Non-wetlands (NW). These terms are defined in the Glossary at the end of this paper.

[8]National Food Security Act Manual, Third Edition (Amend. 2, May 1995).

[9]Corps of Engineers Wetlands delineation Manual, January 1987, Final Report, U.S. Army Corps of Engineers, Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi. 100 pp. & attachments.

[10]An evaluation was also made as to which evaluation factors (e.g., flooding, water-stained levees, etc.) could only be used during the wet seasons by the two methodologies.

Based on the above analysis and more than twenty years of nationwide field experience of the author, various ways that the mis-determination or mis-delineation of non-wetlands or wetlands using the NFSAM could possibly occur were also identified and recommended corrective actions have been provided. Additionally, a relative estimate of losses due to mis-determination or mis-delineation of existing wetland areas as nonwetlands was also made comparing the outcome of identifying selected areas within the California San Francisco Bay, Delta and Central Valley using the 1987 Corps of Engineers and 1995 NFSAM Methodologies during both the wet and dry season.

Existing functions that California San Francisco Bay, Delta and Central Valley farmed wetlands perform were also identified by adapting the hydrogeomorphic classification system proposed by Brinson (1993). Values attributed anthropomorphically to these functions were also identified by the author, and a determination was made as to whether or not these functions and associated values could be maintained under the joint operation of the Farm Bill and Clean Water Act programs.

RESULTS

A comparison of the Corps 1987 Manual and the National Food Security Act Manual is presented in Table 2. A total of 42 differences between the two manuals were found and can generally be categorized into the following areas:

1. the definition of wetlands;

2. the factors used to identify wetlands; and

3. the acceptability of on-site versus off-site delineations without field verification.

These fundamental differences suggest that the interagency consistency goals of the national and California San Francisco Bay MOAs will be difficult to achieve.

The Definition of Wetlands

As Table 2 points out, the Corps' definition of a wetland is :

> "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."

Under the NFSAM, this definition is included, but the NFSAM's definition includes additional considerations:

> The term "wetland," except when such term is part of the term "converted wetland," means land that:
>
> (A) has a predominance[11] of hydric soils;

[11]The actual scale of accuracy is yet undefined by the NFSAM.

(B) is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and

(C) under normal circumstances does support a prevalence of such vegetation. [For purposes of this Act, and any other Act, this term shall not include lands in Alaska identified as having high potential for agricultural development which have a predominance of permafrost soils.]

Thus, the NFSAM puts emphasis on finding a predominance of hydric soils, in addition to the prevalence of vegetation adapted to saturated soils that is in some ways the centerpiece of the Corps' definition. In addition, the NFSAM excludes permafrost soils from Swampbuster jurisdiction, if potential agricultural development of such areas could occur. The Corps' definition of wetlands does not exclude any areas for the purposes of the CWA jurisdiction.

The Factors Used to Identify Wetlands on Agricultural Lands

There are a number of differences in allowable determination and delineation factors between the NFSAM and the 1987 Corps Manual (see Table 2 for a complete list of these differences.) Some critical differences, include the number of criteria (soils, vegetation, hydrology) that must be in evidence in order to characterize an area as a wetland. The 1987 Corp Manual allows for less than all three criteria in "problem areas," i.e., areas such as seasonal wetlands that lack one or more criteria due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events. The NFSAM only allows for less than all three criteria in disturbed areas, thus problem areas such as seasonal wetlands are given no special consideration given their difficulty to identify and delineate during the dry seasons of the year.

With regard to individual criteria, the Corps' hydrology criterion may be met when there is evidence of consecutive saturation for between 5 and 12.5 percent of the growing season,[12] whereas the NFSAM requires saturation for 14 consecutive days and flooding/ponding for 7 consecutive days (15 days for converted wetlands) during the growing season, regardless of the length (brevity) of the local growing season. This will result in different delineations everywhere except where the NFSAM's 14-day saturation criterion falls within the range of days captured by the Corps' 5-to-12.5 percent criterion.

The 1987 manual describes hydrophytic vegetation as follows: "..the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present." The NFSAM, on the other hand, uses the Farm Bill definition (16 U.S.C. §3801(a)(9)), which defines hydrophytic vegetation as: "...plants growing in water or in a substrate that is at least periodically deficient in oxygen during the growing season as a result of saturation or inundation by water." Thus the 1987 Manual adopts a vegetation definition based on empirical evidence reflected in actual vegetation patterns, whereas the NFSAM definition is somewhat more formalistic and, arguably, dependent on a factor (oxygen concentration) that is more removed from the criterion of interest (vegetation). This difference in

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[12]The actual requirement for inundation (flooding and ponding) and saturation is consecutive saturation (within 12") ≥5% to 12.5% of the growing seasons in most years (50% change or more) may provide evidence of wetland hydrology, provided soil and vegetation factors are present; wetland hydrology conditions are present for areas with > 12.5% of consecutive ponding or flooding during thawed growing season in most years (50% or more).

approach is necessary as most Farm Bill agricultural land determinations are on croplands where the natural vegetation is highly disturbed.

Another vegetation-related difference between the two manuals relates to the use of the so-called FAC-neutral test.[13] In conducting a FAC-neutral test under the 1987 Manual procedures, one counts the dominant species wetter and drier than FAC, and ignores all the FACs in the determination for the presence of wetland vegetation conditions. This test, when tempered with professional judgment, is useful, for example, in questionable areas or when the determination or delineation relies on the vegetation call in an area that is not otherwise an obvious wetland (i.e., problem area). The NFSAM does not recognize the use of this specific test on agricultural lands, but does have an equivalent FAC-neutral test, which is used for routine determinations. The NFSAM test determines whether the total dominants of OBL and FACW plant species exceed the total dominants of FACU and UPL species.[14] Another significant difference is that the Corps' FAC-neutral test is normally applied to several data points in order to characterize the area in question. The NFSAM vegetation methods, however, allow the use of one FAC-neutral data point to characterize an entire site.

As for differences between the two manuals where soils are concerned, as previously noted, the NFSAM requires the predominance of hydric soils. The Corps' 1987 Manual focuses on the hydric nature of the soil at any given data point, but does not couch it's requirement in terms of a predominance of hydric soils. Another soil-related difference is in the soil depth evaluated in the field. The Corps normally uses 12 inches as the relevant depth that must be examined, but allows the option of using the major portion of the root zone. The NFSAM limits itself to the top 12 inches. The NFSAM approach, therefore, would designate an area as non-wetland if the major portion of the root zone of the dominant plant(s) was in saturated soil deeper than 12 inches.

The Acceptability of On-site Versus Off-Site Delineations For Agricultural Lands

In addition to the definitional and factor-based differences discussed in the previous two sections, a pervasive difference between the two manuals is the greater reliance placed by the NFSAM and subsequently NRCS personnel on off-site determinations. Off-site determinations are only used where the tools and methodology "clearly identify the presence or absence of 'Waters'." When there is a proposed activity requiring a 404 permit, an on-site delineation is required. The NFSAM allows one to make off-site determinations based on limited to no on-site verification of many factors for which the Corps' 1987 Manual requires field verification.[15] This off-site approach, which has served the NRCS and other agricultural agencies well in documenting the nature and extent of crop plantings on an annual basis, is ill-suited to achieving consistent results in wetland determinations following current FSA/CWA regulations, associated interagency

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[13]Plants are classified for wetland determination or delineation purposes based on the likelihood of their occurring in wetlands. The classifications, in ascending order of likelihood of occurrence in wetlands, are: Upland (UPL), Facultative Upland (FACU), Facultative (FAC), Facultative Wetland (FACW) and Obligate Wetland (OBL).

[14]For comprehensive determinations, NFSAM uses the prevalence index, which does not require selection of dominant species. This method makes no allowance for a prevalence of FACU species where wetland hydrology and soil conditions occur. A prevalence index of less than 3.0, using all species present, defines the presence of hydrophytic vegetation.

[15]See Table 3.

memoranda of understanding, and the President's White House policy. Crop patterns typically show up on aerial photographs taken during the dry portion of the growing season as readily identifiable, uniformly shaped monocultures, and the required level of precision does not normally approach the sub-meter accuracy required of typical wetland delineations.

With regard to soil determinations, the NFSAM allows one to rely on published county soil surveys in determining whether hydric soils are present. These soil surveys are generalized maps based on sampling of soils over a wide variety of landscape types and scales. The soil surveys are also often considerably older than recent developments in wetland soil research and rely on aerial photography taken during the dry portion of the growing season. As such, they are not always reliable indicators of nature and extent of hydric soils at a given location. The NFSAM also allows the determination of wetland hydrology without going on the site, and similar reservations to those expressed for remotely sensed vegetation and soils apply to hydrology.

For these and other reasons, the Corps' 1987 Manual allows off-site determinations only in those unusual situations where sufficiently detailed information about all three criteria is already in hand. In practice, this almost never happens, unless the area has already been subject to extensive on-site investigations for other purposes that resulted in the gathering of adequate data to determine the presence or absence of wetland soils, vegetation and hydrology (e.g., the collection of wetland data pursuant to an environmental study or regulatory review requirement.

Likely Sources of Error Associated with Wetland Determinations on Agricultural Lands

Likely sources of error associated with the NRCS wetland determination and delineation methodology for agricultural lands in comparison to the Corps methodology are generally summarized by Table 4, together with suggested corrective measures. It should be noted that the discussion of errors, mis-determinations and mis-delineations in this report refer to errors made using the NFSAM for the identification and delineation of wetlands as compared to the use of the Corps 1987 Manual. It is recognized that the NRCS is also required by the FSA to make PC determinations in a specific manner, as is required by law, that is apart from the manner in which the Corps identifies and delineates wetlands under the CWA. A PC determination under the FSA means that the area under consideration was converted (woody vegetation removed and surface hydrology altered) and farmed before December 23, 1985. Once identified as a PC by the NRCS, the FSA requires this determination to remain no matter if farming or maintenance ceases and the area reverts back to a wetland.

The NRCS wetland determination process primarily involves the use of remote sensing data (low altitude aerial photographs - ≤12,000 feet), or mapping developed from multiple photo dates spanning three to five years, but with limited field verification. Much of the mapping is typically not field verified on the site of interest (Figures 7, 8 and 9). In addition, the Farm Service Agency-taken photos, large-scale black & white, or NAAP infrared photos are neither at a scale, nor taken at a time of year, suitable to establish the presence of flooded or ponded conditions. Without field inspection, even with useable aerial photography (taken within the appropriate wet season for three consecutive years), the prevalence of vegetation (if present at all due to cropping), soil saturation, flooding and/or ponded conditions indicative of wetlands cannot be accurately determined within seasonal wetland areas. There is also no on-going quality control/assurance procedure to determine that within each NRCS office, staff are making correct agricultural (PC, CW, FW, FWP, AW, W or NW)[16] and wetland determinations/delineations. Although, under NRCS procedures,

[16]See Glossary for definitions.

questionable areas are to be labeled, once the NRCS determines that either a PC or AW exemption occurs or finds no wetland (other than PC or AW wetlands), or delineates wetlands with no questionable areas, further action involving field inspections by NRCS technical wetland experts to verify the determination made by the NRCS field office staff is not allowed. Thus, mis-determinations (false negatives) in the form of the under-estimation of the size of wetlands or determinations that wetlands are not present can quite easily occur.

The NRCS determination process is also confusing from the standpoint of how an area under consideration is defined and subsequently evaluated. A PC determination applies to a whole tract only if there are no other determinations on the tract. Often there are W, CW, AW, FW, and PC all on one tract, even on one field. As Figures 10a and 10b illustrate, a 40-acre area of agricultural land within a tract could be evaluated by the NRCS differently depending on how the geographical extent of PC is defined within the 40-acre area. In other words, if PC were only found on a portion of the 40-acre area, would the entire area of agricultural land qualify for PC status (Figure 10a), or would only those portions of the 40-acre area of agricultural land having those characteristics be classified (Figure 10b). This confusion can obviously lead to significant losses wetlands due to inappropriate classification and evaluation of a tract of land.

Other factors contributing to error include:

1. the use of indicators that are not appropriate for the season during which they are used;
2. the failure to use more definitive indicators of wetland hydrology conditions;
3. the reliance on aerial photography not taken during the wet portion of the growing season;
4. the current lack of personnel with an appropriate level of training and experience; and
5. the lack of on-going quality assurance and quality control procedures.

Likely Sources of error Associated with Delineations on Agricultural Lands

Like the process described above, the local NRCS office is responsible for making wetland determinations and delineations. The NRCS performs wetland determinations only where the tools and methodology "clearly identify the presence or absence of 'Waters'." When there is a proposed activity requiring a 404 permit on-site delineation is required. When it has been determined by field office personnel that there is a question, then a request is made for assistance to wetland specialists within the NRCS. As Figures 7 and 8 depict, it is only during the final stages as outlined by Figure 9, that questionable areas are labeled for field determinations, or additional verification is needed. This need triggers assistance by NRCS technical wetland delineation experts. Even though on-site investigations are outlined by Figure 9, NRCS appears at this time to be contemplating heavy reliance on off-site determinations techniques as is evidenced by Figure 7. In addition, an owner of agricultural lands[17] can request a determination or delineation at any time of the year and expect a fairly rapid response. However, the NFSAM has a provision that if site conditions are not feasible for making an on-site determination or delineation, and multiple year photos are not sufficient for making an off-site determination, the landowner has to wait until conditions are favorable. Observation

[17]Includes cultivated, pasture, range and timber lands as well as any lands owned by USDA participants including those who only receive home/property loans.

during the growing season is essential in most cases. Despite this provision, it is believed that the expectation for a rapid response will lead to heavy reliance by staff on off-site techniques, or very difficult to interpret dry season indicators, to interpret the presence or not of wetland hydrology conditions as demands increase for wetland determinations and delineations on agricultural lands.

One of the major problems when Swampbuster determinations are used to satisfy CWA needs is that USDA personnel are usually not concerned over the exact location of the boundary of a wetland. Instead, they typically focus on whether the landowner is in violation, if any drainage is done effecting the area or has legitimately qualified for PC status due to manipulation of the hydrology of the area not an isolated point within the agricultural land being evaluated. In other words, if the field is leveled or drained, the whole field is leveled or drained, not just a portion of the field. Over 500,000 FSA determinations have been conducted nationwide with more than 40,000 being conducted in California alone. In addition, these determinations typically lack appropriate site data to make an accurate wetlands determinations using either the NFSAM or 1987 Corps Manual.

Based on past experiences at the initiation of the 1985 prior-converted cropland wetland exemption program for agricultural lands, it was found through discussions by the author with field staff personnel in various parts of the country that over 1,000 PC determinations were routinely made by local offices by one or two individuals in less than a week's time. With such processing speed, it is doubtful that few, if any, on-site field investigations or necessary documentation was done to accurately verify wetland boundaries. It is highly likely, given budge cutbacks, reduction in manpower and increased workloads due to CWA considerations, that this problem will continue.

With respect to determination and delineation errors, the analysis of data complied in Table 2 reveals that the likely sources of error with the highest potential for leading to a mis-determination of a wetland or mis-delineation of the geographic extent of a wetland boundary are:

1. definitional differences between the two manuals;

2. specific methodology differences;

3. the pervasive reliance on determinations without field on-site verification; and

4. the approach of making agricultural determinations (PC, FW, etc.) first and technical wetland delineations last.

Potential For Negative Impacts Due to Mis-Determination or Mis-Delineation of Wetlands on Agricultural Lands

Due to the reliance on off-site determination methods without on-site field verification, the permanent mis-determination, and loss of wetlands habitat is inevitable, along with the loss of these wetlands' associated functions and values. The only thing the Farm Service Agency can do is reduce or excuse the landowner from the Swampbuster penalties. Although they keep the record copies of the wetland determination/delineation maps for each property, they have no control as to what NRCS puts on them as the Farm Service Agency is a separate agency that operates under a different Assistant Secretary of Agriculture. Neither NRCS nor the Farm Service Agency are subordinate to the other.

Wetland losses will also occur due to the lack of consistency between the NFSAM and the Corps Methodology and approaches to identifying wetlands on agricultural lands (Table 2).

Probable Loss of Wetland Habitats, Associated Functions and Values Attributed by Man

Table 5 provides a general listing of the types of functional wetland habitats as categorized by geographic setting, water source and functional type. Table 6 provides the types of wetland functions that would be impacted due to mis-determination or mis-delineation. Associated values attributed to these types of wetland habitats by man are presented in Table 7. It is estimated that under extreme circumstances as much as 75% error may occur due to mis-determination and mis-delineation of seasonal wetlands during the photointerpretation process (even with three years of useable aerial photography from the growing season) as wetland areas will not be identified or the line demarking the edge of the wetland will not be accurate. It is also possible as much as a 75% error in seasonal wetlands may result due to the application of methodologies that are inconsistent with the Corps' methodology. Table 8 provides acreage loss estimates based on a 75% error factor. As shown by Table 5 and 6, this error potential constitutes a significant wetland habitat loss as well as functional loss for the California San Francisco Bay, Delta and Central Valley Regions of California. Counties within these regions with diked wetlands, such as Marin County and Sonoma County (Figure 4), and leveed-off floodplains (Figures 5 and 6), such as Yolo County and Merced County, will also suffer significant losses.

Potential For Restoration of Wetlands on Agricultural Lands

The potential to restore former or similar wetland conditions on agricultural lands is high provided that engineered drainage features can be removed or partially blocked so as to restore former levels of flooding, ponding and/or soil saturation. This is especially true for diked California San Francisco Baylands and Delta wetland habitats (Figures 4 and 5). For Central Valley wetlands, the same is true if a sufficient water supply can be provided on an annual basis (Figure 6). These engineered drainage features include pump systems, major drainage ditches, tile drains, minor drainage and land leveling with sloping to promote drainage. Costs are obviously significantly lower by partially blocking drainage flows at strategic locations in order to cause wetland hydrology and soil conditions to reoccur. The restoration of former wetland areas as opposed to creation of a new wetland habitat should, in most cases, be recommended as a preferred option. The Farm Bill encourages wetland habitat restoration on prior converted croplands by providing subsidies to restore the wetlands that previously occurred, however, there is no requirement for this to be a permanent conversion.

Under the Wetlands Reserve Program, permanent easements, 30-year easements, or simply providing cost sharing for restoration is allowed. Of these, the permanent easements are, indeed, permanent. However, it should be noted that if the land which was converted and then restored under Swampbuster, the restoration is enforceable only so long as the area is used for agriculture. No "subsidies" are provided to rectify a Swampbuster violation — the landowner must do it as his or her own expense to regain eligibility for USDA program benefits. Mitigation or replacement wetlands can require an easement to insure their protection.

CONCLUSIONS

Lobbyists in support of the "Swampbuster" exemption for PC wetlands had a simple argument that compelled Congress to vote for the provision. Despite the Section 404(f)(1) Clean Water Act exemption for minor discharges associated with ongoing normal farming and silvicultural practices, if a wetland has been so

altered by cropping that it no longer has wetland characteristics, why regulate it and create an unnecessary regulatory burden on farmers? The problem with this rationale has been that many of the wetlands receiving a prior converted classification due to the use of inappropriate wetland determination or delineation methodology and/or the application thereof, are currently seasonal wetlands, have portions of seasonal wetlands on them, or will revert to wetlands if farming practices cease. The likelihood of reversion to wetland conditions if farming/draining activities ceases is not a criteria for PC determination. A PC determination simply means that the area was converted and farmed before December 23, 1985. Also, the 1996 Farm Bill contains a new provision that requires that once a PC determination is made, the PC determination always remains with the land. This new requirement of the law, for NRCS to determine such areas to be PC is a change from the previous Farm Bill in which a PC which was not farmed or maintained might be relabeled W. Therefore, for these types of wetlands on agricultural lands (as well as other waters of the United States), regulation under the Clean Water Act will be lost. The "Swampbuster" provisions, through the various mitigation programs, also provides the means to avoid Clean Water Act regulation under Section 404(f)(2). Under this section of the CWA, the conversion of wetlands from agriculture to another type of land use (e.g., housing development) is a regulated activity requiring a permit from the Corps.

Based on the above technical findings, there is a high likelihood that a mis-determination or mis-delineation of a wetland on agricultural lands as a nonwetland or upland will occur using the current NFSAM approach. If corrections are not made, reliance on off-site analysis, such as using aerial photography with limited to no on-site verification, and the use of inappropriate field indicators (especially for wetland hydrology conditions) will lead to significant wetland losses within agricultural lands of the California San Francisco Bay, Delta and Central Valley of California, despite the commitment to "agency coordination" expressed in various memoranda of agreement between the Department of Agriculture, the Environmental Protection Agency, the Department of the Interior and the Department of the Army. In addition, the NRCS off-site approach to first making a determination on agricultural lands as to Farm Bill exemption status will likely lead to major errors due to the fact that an accurate field determination or delineation of wetlands using appropriate tools and methodology has not been made to form the basis of the determination.[18]

Finally, promoting regulatory consistency between the various federal and state programs will be difficult at best, due to the inherent differences among the Farm Bill and environmental regulatory programs (e.g., CWA, ESA, etc.). This will most likely lead to the lack of recognition of other environmental requirements by USDA personnel, farmers and agricultural support businesses. In fact, the NRCS approach is to first evaluate for a Farm Bill agricultural exemption (PC) then, if necessary, determine the extent of wetlands. The Corps of Engineers approach is the reverse, as areas are first determined or delineated to be wetlands or not and then a regulatory determination is made as to CWA requirements and any CWA exemptions or exclusions that may apply. The NRCS approach creates a situation with a high probability for less than an appropriate level of administration of environmental protection due to inappropriate determinations that are not in the public interest for maintaining or restoring the nation's waters (CWA), but to provide service to their farm customers.

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[18] The FSA makes a PC determination based solely on inundation and removal of woody vegetation, ignoring other wetland characteristics such as hydric soils, saturation, and hydrophytic vegetation that are used in delineating the presence of wetlands.

RECOMMENDATIONS

Recommendations to help reduce the amount of high potential for mis-determinations and mis-delineations are as follows:

1. NRCS should be required to conduct an accurate on-site wetland determination or delineation at the time of year suitable to establish the presence of flooding, ponding or soil saturation indicative of wetland conditions, and the determination and/or delineation should be made prior to making any FSA determination as to an agricultural exemption status such as PC or NW.

2. The NRCS needs to eliminate reliance on off-site procedures without adequate on-site verification. On-site verification is necessary for confirmation of wetlands status to eliminate confusion and to significantly increase agency cooperation, consistency and, most importantly, level of accuracy. In addition, reliance on one data point or location to characterize a site with varying hydrogeomorphic characteristics should be prohibited.

3. The Swampbuster regulations now in effect (the Interim final rule published in the Federal Register: September 6, 1996 (Volume 61, Number 174) Rules and Regulations; Page 47019-47038 and available on the NRCS home page at http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/FBillLnk.html) is now the law. Any landowner can now ask for a "certified" wetland determination or delineation on agricultural lands, now more broadly defined (added range and pasture lands), and if the area is called a PC or a non-wetland it will retain that designation forever now that the concept of abandonment is gone. Although the Act says the designations only apply to Agricultural programs, the MOA makes them applicable to Section 404. Landowners will very soon start catching on that they should get a final certified determination or delineation very soon while there is still some confusion and the local office people are still not trained.

   Using Table 2 or a similar tool, the NRCS and the Corps of Engineers should reach an agreement and use the same criteria and methodology to identify and delineate wetland boundaries while Farm Bill determinations should be kept separate and done after a determination and delineation is made. Furthermore, the current agreement between the NRCS and the Corps should be revised to make the distinction between Farm Bill determination methodology (i.e., PE, CW, FW, AW, NW, etc.) and wetland determination and delineation methodology for FSA and CWA purposes as soon as possible. As long as there are inconsistencies in methodologies, there will be inconsistencies in results, and inconsistent treatment of the regulated community. It is further recommended, to avoid irreversible significant wetland losses in terms of acreage, function and associated values, that a moratorium be placed on wetland determinations and delineations until this agreement is accomplished. Given the large number and significant differences in the two manuals, formulation of the revisions should include a routine, quality assurance and control program on a weekly basis.

   Furthermore, until the Corps of Engineers and NRCS reach an agreement on methodology for identifying and delineating wetlands, the Corps of Engineers, given their over two decades of experience, should continue to make wetland jurisdictional determinations using the Corps 1987 Manual rather than allow the NRCS to use the NFSAM for wetlands

determination and delineation when making FSA determinations as to PC, CW, FW, FWP, etc. land use states.

4. To promote wetland determination and delineation consistency and make the quality assurance/quality control review process easier, it is proposed that the NRCS and Corps of Engineers use the same field data sheets (Figure 11).

5. Given that most of the problems identified by this study apply nationwide, as a starting point it is recommended that this report also be used nationally to resolve likely mis-determination and mis-delineation issues.

6. On a national basis where problem wetlands occur, the Corps of Engineers and NRCS should use a procedure clearly expressed in a MOU similar to the MOA currently in use in the California San Francisco Bay Area.

7. NRCS personnel should immediately inform agricultural land owners of other regulations that may apply to wetlands on their agricultural lands whether or not Farm Bill/Swampbuster exemptions apply. These include, but are not limited to, the Clean Water Act, Endangered Species Act, Coastal Zone Management Act, California Environmental Quality Act, Section 106, Section 10 - Rivers and Harbors Act, Section 401 State Water Quality Certification, California Department of Fish and Game 1603 Stream Alteration Agreement, etc. It is further recommended that an information sheet be prepared to inform landowners and operators, in coordination with local, state and federal regulatory agencies, about general Farm Bill/CWA requirements, prohibitions and conditions, enforcement penalties, and key contact personnel for further information.

8. Develop a computer tracking system similar to the Corps to track all determination, delineation, mitigation, restoration, FSA enforcement and NRCS/CWA enforcement referral activities.

9. Develop a more stringent means to conduct oversight of NRCS determinations given the current manpower constraints and limited training by requiring on-site verification by NRCS personnel and a means to reverse determinations and delineations due to new information or change in site circumstances.

10. Establish minimum and maximum administrative penalties for unauthorized activities and violations with limited discretion with restoration and/or mitigation always required.

11. NRCS personnel should continue to inform owners and operators on agricultural lands where wetlands less than and greater than one acre occur, of the need to comply with Department of the Army General Condition with respect to State 401 Water Quality Certification, Section 106 Cultural Resources issues, and the Endangered Species Act. A copy of these notifications should be forwarded to the Corps, USFWS, State Water Quality Authority, State Fish and Wildlife agencies, and the State Historic Preservation Office.

12. Landowner mitigation and/or restoration agreements should be recorded within the codes, covenants and restrictions portion of the land title.

13. A formal potential unauthorized activity/violation tracking system should be developed for the NRCS and the Corps, or NRCS activities should be incorporated into the Corps existing tracking system.

14. To eliminate confusion, clearer explanations should be developed as to what NRCS means by the terms "determination" and "delineation." Furthermore, separate definitions should be used to describe Food Security Act determinations (PC, FW, etc.), NRCS wetland determinations (off-site) and delineations (off-site and on-site) for the purpose of the FSA and CWA, and Corps wetland delineations for the purpose of the CWA.

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GLOSSARY

Agricultural Lands

Agricultural lands are lands:

- that are intensively used and managed for food and fiber production
- where natural vegetation has been removed and cannot be used in making a wetland determination.
- Examples: cropland, hayland and pasture land composed of planted grasses and legumes, orchards, vineyards, and areas which support wetland crops such as cranberries, taro, watercress, and rice.

In addition, the 1996 Amendment to the Food Security Act (FAIRA) expanded this definition to include range and pasture land.

Artificial Wetlands (AW):

Land that was formerly nonwetland under natural conditions or prior converted croplands, but now exhibits wetland characteristics because of human activities.

Converted Wetlands (CW):

The term "converted wetland" means a wetland that has been drained, dredged, filled, leveled, or otherwise manipulated (including any activity that results in impairing or reducing the flow, circulation, or reach of water) for the purpose or to have the effect of making the production of an agricultural commodity possible if:

(A) such production would not have been possible but for such action; and

(B) before such action:

(i) such land was wetland; and

(ii) such land was neither highly erodible land nor highly erodible cropland.

Farmed Wetlands (FW):

Farmed wetlands are wetlands that were drained, dredged, filled, leveled or otherwise manipulated before December 23, 1985, for the purpose of, or to have the effect of, making the production of an agricultural commodity possible, and continue to meet specific hydrologic criteria. This definition applies if:

(A) such production was not possible before the manipulation (see Part 514.20 d); and

(B) an agricultural commodity has been produced at least once prior to December 23, 1985; and

(C) the area has not been abandoned to agricultural commodity production.

Farmed Wetland Pasture (FWP):

Wetlands that were manipulated and used for pasture or hayland prior to December 23, 1985 and still meet specific hydrologic criteria. Considered farmed wetland pasture when:

- The area is inundated for at least 7 consecutive days (50% chance of occurrence) or is saturated for at least 14 consecutive days during the growing season and has not been abandoned.

- The areas were farmed wetland (FW) that have not been cropped for 5 years but have been used for forage production.

- The areas are prior converted cropland (PC) and meet wetland criteria; have not been cropped for 5 successive years but were used for forage production then; and have not been abandoned.

Non-Agricultural Lands:

Non-agricultural lands are lands:

- that are range lands, forest lands, woodlots, tree farms, and uncultivated pasture and hayland.

Prior Converted croplands (PC):

Wetlands that before December 23, 1985, were drained, dredged, filled, leveled, or otherwise manipulated including the removal of woody vegetation, for the purpose, or to have the effect, of making the production of an agricultural commodity possible and an agricultural commodity has been produced at least once before 12/23/85.

Non-wetlands (NW): Land that under natural conditions does not meet wetland criteria (sometimes called upland). Also includes wetlands that were converted to the extent that wetland criteria were not present as of December 23, 1985, but were not cropped.

Wetlands (W): The term "wetland," except when such term is part of the term "converted wetland," means land that:

(A) has a predominance of hydric soils;

(B) is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and

(C) under normal circumstances does support a prevalence of such vegetation. [For purposes of this Act, and any other Act, this term shall not include lands in Alaska identified as having high potential for agricultural development which have a predominance of permafrost soils.]

NFSAM Wetland Identification Procedures Wetlands are identified through either off-site procedures, or on-site procedures.

- Off-site determinations:
  - must be based on wetland mapping conventions approved by SCS, COE, EPA and FWS, that have been field-tested
  - used only if adequate information is available to identify wetland areas.
- On-site determinations:
  - if the above requirements are not met, such as in the following example, use on-site procedures.

NFSAM Wetland Indicators Wetland indicators are used to verify the criteria for hydric soils, hydrophytic vegetation and hydrology.

In making wetland determinations, these indicators are:

- considered independent variables; but
- evaluated by the preponderance of the evidence.

TABLES

Table No. 1a. NRCS/Farm Service Agency Wetland Determination and Delineation Criteria/Indicators/Procedures for Agricultural & Non-Agricultural Land for Decisions Regarding the Food Security Act and the Clean Water Act

	Agricultural (Ag) Lands, Also Under FAIR Range and Pasture Land		Narrow Bands & Small Pockets in Ag Lands	Non-Ag Land[2]
Agency Lead	NRCS		NRCS[1]	NRCS
Program Purpose	FSA/CWA Jurisdiction		FSA/CWA Jurisdiction	FSA/CWA Jurisdiction
ON-SITE DETERMINATION/DELINEATION (USE FIELD INDICATORS)				
	AGI Land	**Range & Pasture Land**		
MANUAL (Procedures)	NFSAM	COE 87 M*	COE 87 M*	COE 87 M*
CRITERIA	NFSAM			
Soils	NTCHS****	COE 87 M*	COE 87 M*	COE 87 M*
Vegetation	NFSAM	COE 87 M*		
Hydrology				
INDICATORS			COE 87 M*	COE 87 M*
Soils	Field Indicator of Hydric Soils	COE 87 M*		
Vegetation	COE 87 M*			
Hydrology	COE 87 M* & NRCS Hydrology Tools	COE 87 M*		
TRAINING REQUIRED	NFSAM***	COE 87 M*	COE Reg. IV	COE Reg. IV
OFF-SITE DETERMINATION (USE MAPS AND AERIAL PHOTOGRAPHS)				
MANUAL (Procedures)	NFSAM	COE 87 M*	COE 87 M*	COE 87 M*
CRITERIA				
INDICATORS	Approved Wetland Mapping Conventions	COE 87 M*	Approved Wetland Mapping Conventions	Rarely Used Except for Broad Based Planning
TRAINING REQUIRED	NFSAM	COE 87 M*	NFSAM/COE Reg. IV	COE Reg. IV

[1] Where wetlands are greater than 1 acre or 100 ft. wide (narrow bands), Corps (South Pacific Division) has a 45-day review period where they can review and request revisions to a CFSA/NRCS delineation.

[2] USDA Program Participants only.

* Includes use of supplemental guidance documents.

** COE Reg. IV training - highly recommended.

*** NRCS when the request is from a USDA program participant (Ag land or other type of USDA program such as a USDA Home Loan).

**** NTCHS - National Technical Committee for Hydric Soils - Current guidance.

Adapted From: (180-V-NFSAM, Third Ed., Amend. 2, May 1995)

Table 1b. NFSAM Procedure for Wetlands Determinations on Agricultural Lands[1], Range and Pasture Lands

IF...	THEN...	MOA Reference[2]
A wetland determination needs to be made on agricultural lands, range and pasture lands	SCS will use the NFSAM for agricultural lands. SCS will use the COE 1987 Manual for range and pasture lands.	IV. D.
SCS has not made a final written determination and the Corps or EPA is pursuing a potential CWA violation	The COE or EPA as appropriate makes the determination for CWA purposes. SCS accepts this determination for Swampbuster purposes.	IV. K.
The COE or EPA is pursuing a potential CWA violation on land subject to an ongoing SCS appeal	The COE or EPA as appropriate makes the determination for both CWA and Swampbuster in consultation with SCS and FWS to arrive at a single determination. SCS will use that determination to complete an appeal process.	IV. K.
In all other situations	SCS makes the wetland determination. The COE or EPA accepts this determination for CWA purposes.	IV. A.

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1 Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.

2 Memorandum of Agreement - Among the Department of Agriculture, The Environmental Protection Agency, The Department of the Interior, and the Department of the Army - Concerning the Delineation of Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act. January 1994.

Table 1c. NFSAM Procedure for Wetlands[1] Determination on Non-Agricultural Lands (Note: Corps does unless USDA participant)

IF...	THEN...	MOA Reference[2]
A wetland determination needs to be made on non-agricultural lands (Corps would do unless USDA participant)	SCS will use the COE 1987 Wetland Delineation Manual to make determinations (see 513.0 c.)	IV. D.
On narrow bands either immediately adjacent to or small pockets interspersed among agricultural lands	SCS makes the determination for both Swampbuster and CWA.	IV. A.
When a USDA participant requests a determination	SCS makes the determination for both Swampbuster and CWA in coordination with the Corps or EPA. SCS contacts the COE or EPA to provide opportunity for review and comment prior to making a final determination. (COE [or EPA] has 45 days to respond).	IV. A. and B.
On "other waters"	If appropriate, local procedures and guidance have been developed. SCS makes the determination for both Swampbuster and CWA in coordination with the COE or EPA. SCS only makes these determinations on an incidental basis when it is otherwise engaged in wetland determinations for Swampbuster purposes.	IV. C.
In all other situations	COE or EPA makes the determination for CWA. SCS will accept these determinations for FSA.	IV. J.

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1 Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.

2 Memorandum of Agreement - Among the Department of Agriculture, The Environmental Protection Agency, The Department of the Interior, and the Department of the Army - Concerning the Delineation of Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act. January 1994.

Table 2a. Summary of Agreement Differences Between 1987 Corps Manual and NFSAM for the Determination and Delineation of Wetlands on Agricultural Lands[1] (See Table 2b for Detailed Explanation of Differences)

A. Definition of Wetlands for Agricultural Lands

1. How are Physical, Chemical and Biological Conditions Which Constitute a Wetland Technically Defined (N)[1]

B. Factors Used to Identify and Delineate Wetlands on Agricultural Lands

1. Required Combinations of Factors (wetland hydrology, vegetation & soil) (Y)
2. Exceptions to using wetland hydrology, vegetation, and soil factors to identify wetlands (N)

C. What Constitutes Wetland Hydrology Conditions on Agricultural Lands

1. Type of Hydrology Conditions Required (N)
2. Critical Soil/Substrate Depth to Evaluate for Inundation (N)
3. When to Make Observation (Y)
4. Minimum Duration and Frequency Criteria for Saturation At or Near the Soil Surface (N)
5. Minimum Duration and Frequency Criteria for Inundation (Flooded or Ponded) (N)
6. Consider Other Factors (Precipitation, Stratigraphy, Topography, Soil Permeability, Plant Cover) (Y)
7. Classification of Wetland Hydrologic Regime (N)
8. Observation Made of Indirect (Proxy) Indicators of Wetland Hydrology Allowed (Y)

D. On-Site Visual Observation of Wetland Hydrology Conditions That are Presently Occurring on Agricultural Lands

1. Visual Observation of Inundation (Flooding or Ponding--includes season, duration, depth) (Y)
2. Visual Observation of Saturation (Y)
3. Visual observation of depth to Water Table (Y)
4. Visual observation of depth to Soil Saturation (Include Capillary Fringe) (Y)

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[1] (N) = Manuals Don't Agree
(Y) = Manuals Agree

Table 2a. Summary of Agreement Differences Between 1987 Corps Manual and NFSAM for the Determination and Delineation of Wetlands on Agricultural Lands (See Table 2b for Detailed Explanation of Differences) - Continued

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E. On-Site Visual Determination of Field Proxy Indicators of Wetland Hydrology Conditions On Agricultural Lands (P = Primary; S = Secondary)[2]

1. Watermarks (Y)
2. Drift Lines (Y)
3. Water-Borne Sediment Deposits (Y)
4. Drainage Patterns (with Caution) (Y)
5. Observation of Drainage, if any (Y)
6. Oxidized Rhizospheres Associated with Living Roots (Y)
7. Water-Stained Leaves (Y)
8. FAC-Neutral Test (N)
9. Local Soil Survey Data (Y)
10. Aerial Photographs of Site During Wet Portion of Growing Season (Recorded Data at a Specific Point in Time) (Y)
11. Plant Morphological Adaptations (Y)
12. Planted Crop or Native Vegetation Won't Grow Due to Saturated, Ponded or Flooded Conditions (Y)
13. Algal Matts (Sediments) in Lowlying Areas (Y)
14. Bedding Planes (Sediments) in Lowlying Areas (Y)
15. Micro Topography and Soil Drainage Characteristics (Y)

F. Use of Remotely Sensed Data to Identify Long Term Wetland Hydrology Conditions on Agricultural Lands

1. High Altitude Aerial Photography (>12,000 Ft.; Drowned Plants & Standing Water) (N)
2. Low Altitude Aerial Photography (≤ 12,000 Ft.; Drowned Plants & Standing Water) (N)
3. Satellite Imagery (N)
4. USDA-NRCS Soil Survey Maps (1:24,000 Orthophoto Maps) (N)

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[2]1987 Corps Methodology requires 1 primary and 2 secondary indicators for a positive wetland hydrology determination.

Table 2a. Summary of Agreement Differences Between 1987 Corps Manual and NFSAM for the Determination and Delineation of Wetlands on Agricultural Lands (See Table 2b for Detailed Explanation of Differences) - Continued

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G. Use of Data and Interpretive Tools for Identifying Wetland Hydrology Conditions On Agricultural Lands

1. Climatologic and Hydrologic Data (N)
   - (a) US Weather Bureau (USWB)
   - (b) US Bureau of Reclamation (URBR)
   - (c) California Department of Water Resources (CADWR)
   - (d) NRCS
   - (e) NRCS Hydrology Tools
2. NRCS Soil Survey Data (N)
3. USFWS/NWI Wetland Inventory Maps (1:24,000) (N)
4. Other Data (Maps, Studies of Flood Prone Area, Specific Studies and Document Knowledge of Wetland Conditions) (N)
5. Eye Witness Other than Professional Making Wetland Determination (N)

H. What Constitutes Wetland (Hydrophytic) Vegetation Conditions on Agricultural Lands

1. Definition of Wetland Plant Species (N)

I. On-site Visual Observation of Wetland Vegetation Conditions That Are Presently Occurring on Agricultural Lands

1. Visual observation of rooted vegetation growing in flooded or ponded soil conditions (Y)
2. Visual observation of rooted vegetation growing in saturated soil conditions (Y)

J. On-site Visual Determination of Plant Indicator Species of Wetland Vegetation Conditions On Agricultural Lands

1. Use Plant Indicator List (Y)
2. Other Indicators (Y)
3. Use of + and - to modify indicator (Y)
4. FAC-Neutral Option (N)
5. Indirect (Proxy) Indicators of Wetland Vegetation Conditions Allowed (Y)
6. Determining Prevalence (N)
7. Treatment of Prevalent (Dominant) FAC Species and FACU (N)

Table 2a. Summary of Agreement Differences Between 1987 Corps Manual and NFSAM for the Determination and Delineation of Wetlands on Agricultural Lands (See Table 2b for Detailed Explanation of Differences) - Continued

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K. Use of Remotely Sensed Data to Identify Long Term Wetland Vegetation Conditions (Cover Type) on Agricultural Lands

1. High Altitude Aerial Photography (Drowned Plants and/or Standing Water) (N)
2. Low Altitude Photography (N)
3. Satellite Imagery (N)

L. Use of Data and Interpretive Tools for Identifying

1. Eye Witness Other Than Professional Making Wetland Determination (N)
2. Other Data (Maps, Studies of Flood Prone Area, Specific Studies and Document Knowledge of Wetland Conditions) (N)

M. What Constitutes Wetland (Hydric) Soil Conditions on Agricultural Lands

1. Hydric (Wetland) Soils Definition (Y)
2. Minimum Saturation (12" to surface) (Y)
3. Minimum Inundation (flooded or ponded) (Y)
4. Verification of NTCHS Soil Definition Using Proxy Indicators (N)

N. On-site Visual Observation of Wetland (Hydric) Soil Conditions

1. Visual observation of flooding or ponding (Y)
2. Visual observation of saturation (Y)

O. On-site Visual Determination of Field Proxy Indicators of Wetland (Hydric) Soil Conditions That Are Presently Occurring on Agricultural Lands

1. Evidence for Hydric Soils (N)
2. Soil Depth Evaluated in the Field (N)
3. Histosol (Y)
4. Fe and Mn Concretions (Y)
5. Histic Epipedon (Y)
6. High Organic Content in Surface Layer of Sandy Soils (Y)
7. Endosaturation (Y)
8. Episaturation (Y)
9. Reducing Conditions (Y)

Table 2a. Summary of Agreement Differences Between 1987 Corps Manual and NFSAM for the Determination and Delineation of Wetlands on Agricultural Lands (See Table 2b for Detailed Explanation of Differences) - Continued

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10. Gleyed or Low Chroma Matrix Colors (Y)
11. Allows for Other Regional Proxy Indicators(Describe) (Y)

P. Use of Remotely Sensed Data to Identify Long Term Wetland Soil Conditions (Inundation) on Agricultural Lands

1. High altitude aerial photography (N)
2. Low altitude aerial photography (N)
3. Satellite imagery (N)

Q. Use of Data and Interpretative Tools to Identify Wetland Soil Conditions on Agricultural Lands

1. County Hydric Soils List (N)
2. National Hydric Soils List (N)
3. USDA/NRCS (SCS) Soil Survey Map (1:24,000 Orthophoto Maps) (N)
4. NRCS Soil Survey Data (N)
5. Eye Witness Other Than Professional Making Determination (N)
6. Other Data (Maps, Studies of Flood Prone Area, Specific Studies and Document Knowledge of Wetland Conditions) (N)

R. Additional Issues Regarding the Determination and Delineation of Wetlands on Agricultural Lands

1. Disturbed Areas (N)
2. Problem Areas (N)
3. Exceptions (N)
4. Normal Circumstances (N)
5. Modification of Manual Language (Y)
6. Modification of Defined Manual Approach or Technical Method (Y)
7. Who Makes Official Agency Field Determinations and Policy Decisions (N)
8. Level of Training Required (N)

Table 2b. Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).

FACTOR	DIFFERENCES BETWEEN THE MANUALS
A. Definition of Wetlands for Agricultural Lands	
1. How the physical, chemical and biological conditions that constitute a wetland are technically defined	**Corps Manual:** "Wetlands are 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." Source: 1987 Corps Manual, p. 13. **NFSAM:** Same general definition, but explicitly requires a predominance of hydric soils (without describing a methodology for determining such predominance), and includes language that the term wetland "shall not include lands in Alaska identified as having high potential for agricultural development which have a predominance of permafrost soils. " Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend 2., May 1995, pp. 525-71 and pp. 527-67.
B. Factors Used to Identify & Delineate Wetlands on Agricultural Lands	
2. Exceptions to using hydrology, vegetation, and soil factors to identify wetlands	**Corps Manual:** None. **NFSAM:** Always considered wetlands if area identified as pocosins, playas, prairie potholes, vernal pools, white pine bogs, eastern hemlocks, tamarack bogs, others and have a minimum of 7 consecutive days or saturated for a minimum of 14 consecutive days during the growing season. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 527-70 and 71.
C. Wetland Hydrology Conditions on Agricultural Lands	
1. Types of hydrology conditions required	**Corps Manual:** Inundation (flooding or ponding) and/or saturation to the soil surface during the growing season. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Inundation (flooding or ponding) and/or saturation at or near soil surface during the growing season. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 527-70 and 71.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
2. Critical soil/substrate depth to evaluate for inundation	**Corps Manual:** Major portion of root zone, which is usually within 12" of soil surface. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Within 12" of soil surface in accordance with the national hydric soils definition.
4. Minimum duration and frequency criteria for saturation at or near the soil surface	**Corps Manual:** Consecutive saturation (within 12") ≥5% to 12.5% of the growing seasons in most years (50% change or more) may provide evidence of wetland hydrology, provided soil and vegetation factors are present; wetland hydrology conditions are present for areas with >12.5% of consecutive ponding or flooding during the growing season in most years (50% or more); assumes saturation to surface if water table is 0.5 ft. of the surface for coarse sand, sand or fine sandy soils; or 1.0 ft. of the surface of all other soils. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Saturation at or near the surface for ≥14 consecutive days during growing season in most years (50% chance or more); assumes saturation to surface if water table is 0.5 ft. of the surface for coarse sand, sand or fine sandy soils; or 1.0 ft. of the surface for all other soils. (Note: glossary to FSA Manual/Vol. 3 at 525-10 differs). Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994, pp. 514-15.
5. Minimum duration and frequency criteria for inundation (flooded or ponded)	**Corps Manual:** Consecutive flooding or ponding ≥5% to 12.5% of the growing seasons in most years (50% chance or more) may provide evidence of wetland hydrology, provided soil and vegetation factors are present; wetland hydrology conditions are present for areas with >12.5% of consecutive ponding or flooding during the growing season in most years (50% chance or more). Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual, _____. **NFSAM:** If the area is a pothole, playa, or pocosin, or a pasture or hayland with a crop history before 12/23/85, it must be inundated (flooded or ponded)for at least 7 consecutive days (50% chance or more) during the growing season. If the area is not a pothole, playa, or pocosin it must have a 50 percent chance or more of being seasonally ponded or flooded for at least 7 consecutive days (15 days for converted wetlands) during the growing season under normal conditions. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994, pp. 514-15.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
6. Classification of wetland hyrologic regime	Corps Manual: Defines six hydrological zones for non-tidal areas. Source: 1987 Corps Manual, p. 36. NFSAM: Areas that pond or flood for 7 consecutive days (14 days for prior converted wetlands) or more or saturate for 14 consecutive days or more, are considered to have "important wetland functions." Once an area is determined to be Prior Converted (PC), even if it ponds or floods for 15 consecutive days or more or saturates for 14 consecutive days or more, it is considered not to have "important wetland functions." Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 514-15.
E. Field Proxy Indicators for Wetland Hydrology Conditions on Agricultural Lands	No substantive differences, except Corps usually places higher reliance on sheet forming algae and bedding planes where ponded water occurs in the area of study.
F. Remotely Sensed Data to Identify Long Term Wetland Hydrology Conditions (Inundation) on Agricultural Lands	
1. High-altitude aerial photography (>12,000 ft;[1] drowned plants and standing water)	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can be definitive proof of wetland hydrology. No field verification required, even though photographs may be taken during dry portion of the year as part of normal crop monitoring activities. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-22 to 25 and 526-43.

[1] In California, the NRCS and Corps have adopted mapping conventions that require three(3) years of aerial photography at a scale of 1:12000 (1" = 1000' or greater). Photographs must be representative of the growing season and the precipitation season. Rainfall that is within 20% greater or less than the 30-year average for the 4-week period preceding the date of the photograph is considered representative of normal hydrologic conditions. The investigator should use judgement in drawings conclusions based on photography when hydrology is known to be drier or wetter than conditions in most years; however, this is not an adopted practice throughout the United States.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
2. Low-altitude aerial photography (≤12,000 ft; drowned plants and standing water)	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can be definitive proof of wetland hydrology. No field verification required, even though photographs may be taken during dry portion of the year as part of normal crop monitoring activities. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-22 to 25 and 526-43.
3. Satellite imagery	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can be definitive proof of wetland hydrology. No field verification required, even though photographs may be taken during dry portion of the year as part of normal crop monitoring activities. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-22 to 25 and 526-43.
4. USDA/NRCS Soil survey maps (1:24,000 orthophoto maps)	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can be definitive proof of wetland hydrology. No field verification required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-22 to 25 and 526-46.
G. Use of Other Data, Observations or Interpretative Tools to Identify Wetland Hydrology Conditions (Inundation) on Agricultural Lands	
1. Climatologic and hydrologic data	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, pp. 36 and 37. **NFSAM:** Can stand alone as proof of wetland hydrology. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
2. NRCS Soil Survey data	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, p. 45. **NFSAM:** Can stand alone as proof of wetland hydrology. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
3. USFWS/NWI wetland maps (1:24,000)	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, p. 44. **NFSAM:** Can stand alone as proof of wetland hydrology. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-24 and 526-43.
4. Other data	**Corps Manual:** Not definitive proof of wetland hydrology. Field verification required. Source: 1987 Corps Manual, pp. 36 and 43-51 (analysis approach). **NFSAM:** Can stand alone as proof of wetland hydrology. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
5. Eye witness other than professional making wetland determination	**Corps Manual:** Corroborating evidence required. Source: 1987 Corps Manual, p. 46. **NFSAM:** Can stand alone as proof of wetland hydrology. Corroborating evidence not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
H. Wetland (Hydrophytic) Vegetation Conditions on Agricultural Lands	
1. Definition of (Hydrophytic) Wetland Vegetation Conditions	**Corps Manual:** The 1987 manual describes hydrophytic vegetation as follows: "..the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present." Source: 1987 Corps Manual, p. 16. **NFSAM:** NFSAM uses the FSA definition (16 U.S.C. §3801(a)(9)), which states that hydrophytic vegetation is: "...plants growing in water or in a substrate that is at least periodically deficient in oxygen during the growing season as a result of saturation or inundation by water." Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
J. On-site Visual Determination of Plant Indicator Species of Wetland Conditions that Are Presently Occurring on Agricultural Lands	
4. FAC-neutral option	**Corps Manual:** Allowed. Source: 1987 Corps Manual, p. 23; and Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Not used. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994, pp. 526-45.
6. Prevalence determination	**Corps Manual:** Hydrophytic vegetation is present if more than 50 percent of the dominant species are OBL, FACW or FAC on lists of plant species that occur in wetlands. Method is for a discrete data point (i.e., sample plot/single data point). Source: 1987 Corps Manual, pp. 19-23; Corps Memorandum, March 1992; (1989 Federal Manual). **NFSAM:** NFSAM applies the methods of the 1987 manual for routine determinations in the field, following the criteria that the total dominants of OBL and FACW plant species exceed the total dominants of FACU and UPL species. For comprehensive determinations, NFSAM uses the prevalence index, which does not require selection of dominant species. The method makes no allowance for a prevalence of FACU species where wetland hydrology and soil conditions occur. A prevalence index of less than 3.0 using all species present defines the presence of hydrophytic vegetation. NFSAM methodology allows one sample point to represent the entire site. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994, pp. 526-45.
7. Treatment of prevalent FAC and FACU species	**Corps Manual:** According to the 1987 Manual, this option can be adopted by individual USACE districts if the district questions the indicator status of a facultative species and provides documentation to the USACE representative on the regional plant list panel. Guidance issued by USACE in March 1992 on the use of the 1987 manual provides that the FAC-neutral test may be used to help clarify a delineation where evidence of wetland hydrology or soils is weak, but it may not be used to exclude areas that otherwise qualify as wetlands. Source: 1987 Corps Manual, p. 23 and Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** NFSAM does not specifically address wetlands dominated by FACU species. When comprehensive field delineations are done, the delineator uses all species, including FAC and FACU, in calculating the prevalence index. NFSAM incorporates by reference the 1987 manual for vegetation, but the NRCS relies on a prevalence index that uses all species. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994, pp. 526-45.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
K. Use of Remotely Sensed Data to Identify Long Term Wetland Vegetation Conditions (Cover Type) on Agricultural Lands	
1. High-altitude aerial photography (>12,000 feet[2]; drowned plants and/or standing water)	**Corps Manual:** Not definitive proof of wetland vegetation (cover type) . Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can stand alone as proof of wetland vegetation (cover type). Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-24 and 526-43.
2. Low-altitude aerial photography (≤12,000 feet; drowned plants and/or standing water)	**Corps Manual:** Not definitive proof of wetland vegetation (cover type). Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can stand alone as proof of wetland vegetation (cover type). Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-24 ND 526-43.
3. Satellite Imagery	**Corps Manual:** Not definitive proof of wetland vegetation (cover type). Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can stand alone as proof of wetland vegetation. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-24 and 526-43.
L. Use of Other Data, Observations or Interpretative Tools to Identify Wetland Vegetation Conditions on Agricultural Lands	

[2] In California, the NRCS and Corps have adopted mapping conventions that require three(3) years of aerial photography at a scale of 1:12000 (1" = 1000' or greater). Photographs must be representative of the growing season and the precipitation season. Rainfall that is within 20% greater or less than the 30-year average for the 4-week period preceding the date of the photograph is considered representative of normal hydrologic conditions. The investigator should use judgement in drawings conclusions based on photography when hydrology is known to be drier or wetter than conditions in most years; however, this is not an adopted practice throughout the United States.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
1. Other data (literature, biotic inventories, etc.)	**Corps Manual:** Field verification required. Source: 1987 Corps Manual, pp. 24, 44 and 47 (analysis approach). **NFSAM:** Can stand alone as proof of wetland vegetation. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
2. Eyewitness other than professional making wetland determination	**Corps Manual:** Cannot stand alone as proof of wetland vegetation. Corroborating evidence required. Source: 1987 Corps Manual, pp. 23 and 46. **NFSAM:** Can stand alone as proof of wetland vegetation. Corroborating evidence not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
M. Wetland (Hydric) Soil Conditions on Agricultural Lands	
4. Verification of NTCHS soil definition using proxy indicators	**Corps Manual:** Field evidence only. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Field evidence or maps. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
O. On-site Visual Determination of Field Proxy Indicators of Wetland Soil Conditions on Agricultural Lands	
1. Evidence for hydric soils	**Corps Manual:** Uses NTCHS definition of hydric soils and NTCHS field indicators. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Requires a predominance of hydric soils; also, although typically hydric, predominantly permafrost soils are not included in Alaska if identified as having high potential for agricultural development. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
2. Soil depth evaluated in the field	**Corps Manual:** Usually 12", but can use major portion of the root zone. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** 12" as per NTCHS. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
P. Use of Remotely Sensed Data to Identify Long Term Wetland Soil Conditions (Inundation) on Agricultural Lands	
1. High-altitude aerial photography (>12,000 feet)[3]	**Corps Manual:** Not definitive proof of wetland soil conditions (inundation only). Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can stand alone as proof of wetland soil conditions. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp.513-24 and 526-43.
2. Low-altitude aerial photography (≤12,000 feet)	**Corps Manual:** Not definitive proof of wetland soil conditions (inundation only). Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can stand alone as proof of wetland soil conditions (inundation only). Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-24 and 526-43.
3. Satellite imagery	**Corps Manual:** Not definitive proof of wetland soil conditions (inundation only). Field verification required. Source: 1987 Corps Manual, pp. 45 and 46. **NFSAM:** Can stand alone as proof of wetland soil conditions (inundation only). Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-24 and 526-43.

[3] In California, the NRCS and Corps have adopted mapping conventions that require three(3) years of aerial photography at a scale of 1:12000 (1" = 1000' or greater). Photographs must be representative of the growing season and the precipitation season. Rainfall that is within 20% greater or less than the 30-year average for the 4-week period preceding the date of the photograph is considered representative of normal hydrologic conditions. The investigator should use judgement in drawings conclusions based on photography when hydrology is known to be drier or wetter than conditions in most years; however, this is not an adopted practice throughout the United States.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
Q. Use of Other Data, Observations or Interpretative Tools to Identify Wetland Soil Conditions on Agricultural Lands	
1. County hydric soils list	**Corps Manual:** Not definitive proof of wetland soil conditions. Field verification required. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Can stand alone as proof of wetland soil conditions. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
2. National hydric soils list	**Corps Manual:** Not definitive proof of wetland soil conditions. Field verification required. Source: Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Can stand alone as proof of wetland soil conditions. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
3. USDA/NRCS Soil Survey map (1:24,000 orthophoto maps)	**Corps Manual:** Not definitive proof of wetland soil conditions. Field verification required. Source: 1987 Corps Manual, p. 45. **NFSAM:** Can stand alone as proof of wetland soil conditions. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
4. NRCS Soil Survey data	**Corps Manual:** Not definitive proof of wetland soil conditions. Field verification required. Source: 1987 Corps Manual, p. 45. **NFSAM:** Can stand alone as proof of wetland soil conditions. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
5. Other data	**Corps Manual:** Field verification required. Source: 1987 Corps Manual, p. 48 (Approach). **NFSAM:** Can stand alone as proof of wetland soil conditions. Field verification not required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
6. Eyewitness other than professional making determination	**Corps Manual:** Cannot stand alone as proof of wetland soil conditions. Corroborating evidence required. Source: 1987 Corps Manual, p. 46. **NFSAM:** Can stand alone as proof of wetland vegetation. No Corroborating evidence required. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 526-46.
R. Additional Issues Regarding the Determination and Delineation of Wetlands on Agricultural Lands	
1. Disturbed areas	**Corps Manual:** Areas subject to filling, removal of vegetation, levee or dam construction and wetlands newly crested by human action or natural events. Source: 1987 Corps Manual, pp. 83-92. **NFSAM:** Similar to Corps, but follows procedures defined by the 1989 Interagency Manul. Source: Under current methodology, if they make detailed site inspection.
2. Problem areas	**Corps Manual:** Wetlands on drumlins, seasonal wetlands, prairie potholes, vegetated flats, red parent material, mollisols. Source: 1987 Corps Manual, pp. 93-95; and Corps Memorandum, March 1992, regarding Clarification of 1987 Corps Manual. **NFSAM:** Newly created wetlands; wetlands on glacial till; mosaics, cyclical wetlands; vegetated flats; interdunal swale wetlands; springs and seeps; drought-affected wetlands. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
3. Exceptions	**Corps Manual:** None. There are no exclusions for considering an area to be a wetland. **NFSAM:** The following areas considered by the Corps to be wetlands are not considered wetlands: Tundra wetlands and other wetland areas with permanent soils. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.

Table 2b. **Detailed Summary of Differences between the 1987 Corps Manual (including subsequent official guidance) and the May 1995 version of the NFSAM that may lead to significant errors in wetland delineations on agricultural lands (with citations to relevant portions of each manual).- Continued**

FACTOR	DIFFERENCES BETWEEN THE MANUALS
4. Normal circumstances	**Corps Manual:** Refers to the soil and hydrology conditions that are normally present without regard to whether the vegetation has been removed. Corps requires independent verification by Corps staff. Source: Corps Regulatory Guidance Letter 86-9 Regarding Normal Circumstances. **NFSAM:** Refers to the soil and hydrology conditions that are normally present without regard to whether the vegetation has been removed, but CFSA/NRCS allows owner to make "self certification" without CFSA/NRCS independent verification. Source: 180-V-NFSAM, Third Ed., Amend. 1, March 1994 and Amend. 2, May 1995.
7. Who makes official agency field determinations	**Corps Manual:** Trained Regulatory Personnel. Source: Current Operations Procedure. **NFSAM:** Farm Service Agency, but can obtain assistance from NRCS wetland technical specialist on an as needed basis. Source: Current Operations Procedure.
8. Level of Wetlands Training Required	**Corps:** Trained in use of 1987 Corps Manual for all lands. Source: Corps Memorandum, March 1992, Regarding Clarification of 1987 Corps Manual. **NFSAM:** For agricultural lands, trained in use of NFSAM; for non-agricultural lands, trained in 1987 Corps Manual by the Corps. Source: 180-V-NFSAM, Third, Ed., Amend. 1, March 1994 and Amend. 2, May 1995, pp. 513-1.

Sources Cited:

1987 Corps Manual - "Corps of Engineers Wetlands Delineation Manual" U.S. Army Engineer Waterways Experience Station, 1987.

180-V-NFSAM, Third Ed., Amend.1, March 1994 and Amend.2, May 1995.

Corps Memorandum., March 1992, Regarding Clarification of 1987 Corps Manual.

Corps Regulatory Guidance Letter 86-9, Regarding Normal Circumstances.

1989 Federal Manual - "Federal Manual for Identifying and Delineating Jurisdictional Wetlands, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service (now NRCS), Washington, D.C. 1989.

Table 3. Numerical Summary of Differences Between Corps and NFSAM Wetlands Determination and Delineation Methodologies for Agricultural Lands

NUMBER OF FACTORS EVALUATED	NUMBER OF FACTORS IN AGREEMENT ON-SITE OFF-SITE	NUMBER OF FACTORS NOT IN AGREEMENT
88	46 out of 88	42 out of 88

Table No. 4. Likely Sources of Error Inherent with the Current Use of NFSAM Off-Site and On-Site Wetland Determination & Delineation Methodologies for Agricultural Lands

Potential Errors		How Error by Farm Service Agency Can Be Made		Suggested Corrective Action	
		Off-Site	On-Site	Off-Site	On-Site
A.	Classify an Area as Agricultural Lands	Solely rely on testimony by owner/operator without adequate field inspection and associated data review.	Solely rely on testimony by owner/operator without adequate field inspection.	Verify testimony with remote sensing data and field observations made on entire site.	Verify testimony with remote sensing data and field observations made on entire site.
B.	Classify an Area as Prior Converted	Solely rely on testimony by owner/operator without adequate field inspection and associated data review.	Solely rely on testimony by owner/operator without adequate field inspection.	Verify testimony with remote sensing data and field observations made on entire site.	Verify testimony with remote sensing data and field observations made on entire site.
C.	Classify an Area as Farmed Wetlands	Does not conduct on-site inspection during the wet season without adequate field inspection and associated data review.	Fails to use appropriate seasonal indicators.	Conduct on-site inspection using appropriate indicators.	Use appropriate on-site indicators.
D.	Fails to Classify a Site as Having Wetland Hydrology Conditions	Does not conduct on-site inspection.	Fails to use appropriate seasonal indicators.	Conduct on-site inspection using appropriate indicators.	Use appropriate on-site indicators.
E.	Fails to Classify a Site as Having a Prevalence of Wetland Vegetation	Does not conduct on-site inspection.	Fails to use appropriate seasonal indicators.	Conduct on-site inspection using appropriate indicators.	Use appropriate on-site indicators.
F.	Fails to Classify a Field as Having Currently Existing Hydric (Wetland) Soil Conditions	Does not conduct on-site inspection.	Fails to use appropriate seasonal indicators.	Conduct on-site inspection using appropriate indicators.	Use appropriate on-site indicators.
G.	Classify an Area as Non-Wetland by Using Indicators Inappropriate for the Season of the Year	Use Indicators Inappropriate for the Season of the Year (i.e., use data taken during dry season).	Use Indicators Inappropriate for the Season of the Year (i.e., look for ponding during dry season).	Verify Remote Sensing Data with Field Observations with Appropriate Indicators.	Use More than One Appropriate Indicator.
H.	Fails to Identify Other Waters of the United States (Non-Vegetated Aquatic Habitats)	Only Looks for Areas with Emergent Vegetation.	Only Looks for Areas with Emergent Vegetation.	Provide Training on the Determination of Waters of the U.S.	Provide Training on the Determination of Other Waters of the U.S.

Table No. 4. Likely Sources of Error Inherent with the Current Use of NFSAM Off-Site and On-Site Wetland Determination & Delineation Methodologies for Agricultural Lands (continued)

Potential Errors		How Error by Farm Service Agency Can Be Made		Suggested Corrective Action	
		Off-Site	On-Site	Off-Site	On-Site
I.	Fails to Recognize an Existing Unauthorized Activity	Solely Rely on Testimony by Owner/Operator and/or Remote Sensing Data.	Solely Rely on Testimony of Owner/Operator.	Provide Training.	Provide Training.
J.	Fails to Recognize the Potential for an Unauthorized Activity to Occur	Solely Rely on Testimony by Owner/Operator and/or Remote Sensing Data.	Solely Rely on Testimony of Owner/Operator.	Provide Training.	Provide Training.
K.	Fails to Coordinate with the Corps of Engineers, U.S. Fish and Wildlife Service, Regional Water Quality Control Authority and/or State Department of Fish and Game or Natural Resource Agency on Relevant Issues	No Coordination.	No Coordination.	Develop a Strong Intra- and Inter-Agency Coordination and Review Program with QA/QC Personnel (Within and Outside Agency) to Insure Appropriate Level of Action and Accuracy of Determinations.	Develop a Strong Intra- and Inter-Agency Coordination and Review Program with QA/QC Personnel (Within and Outside Agency) to Insure Appropriate Level of Action and Accuracy of Determinations.

Table No. 5. Categories of Geomorphic Setting, Water Source, and Resulting Generalized Functional Habitat Types for the San Francisco Bay, Delta and Central Valley Wetlands of California

Geomorphic Setting	Functional Types
• Depressional - neither inlet nor outlet - surface inlet only - surface outlet only - surface inlet and outlet • Slope • Channel • Floodplain • Fringe	• Surface-water depression • Groundwater depression • Groundwater slope • Low-gradient channel • Stream floodplain • Lake floodplain • Channel fringe • Lake fringe
Water Source	
• Precipitation • Upslope runoff • Groundwater (regional or perched) • Channel flow (perennial and intermittent) • Overbank flow (stream or lake) • Tides (astronomical and wind)	

Adapted from: Brinson, Mark M. (1993). *A hydrogeomorphic classification for wetland* / by Mark M. Brinson; prepared for U.S. Army Corps of Engineers. 101 p.:ill.; 28 cm (Technical Report; WRP-DE-4).

Table No. 6. Four Major Groups of Functions Identified for California Wetlands

Hydrology	Biogeochemistry	Plant Community	Food Web/Habitat
• Flood-peak attenuation • Base-flow augmentation • Wave celerity • Sediment retention • Surface water storage detention storage retention storage	• Nutrient and contaminant retention from: - precipitation - overbank transport - riparian transport • Biogeochemical maintenance of water	• Basal area and stocking • Balanced species composition • Reproductive and gap processes	• Balanced faunal species composition • Interspersion of plant communities and of plant communities and open water • Complex vertical stratification • Detritus stocks intact

Adapted from: Brinson, Mark M.(1993). *A hydrogeomorphic classification for wetland* / by Mark M. Brinson; prepared for U.S. Army Corps of Engineers. 101 p.:ill.; 28 cm (Technical Report; WRP-DE-4).

Table No. 7 **General Summary of Societal Values Attributed to San Francisco Bay, Delta and Central Valley Wetlands of California**

1.	**FISH AND WILDLIFE VALUES**
	• Fish and Shellfish Habitat • Waterfowl and Other Bird Habitat • Furbearer and Other Wildlife Habitat
2.	**ENVIRONMENTAL QUALITY VALUES**
	• Water Quality Maintenance - Pollution Filter - Sediment Removal - Oxygen Production - Nutrient Recycling - Chemical and Nutrient Absorption • Aquatic Productivity • Microclimate Regulator • World Climate (Ozone Layer)
3.	**SOCIO-ECONOMIC VALUES**
	• Flood Control • Wave Damage Protection • Erosion Control • Ground-Water Recharge • Water Supply • Timber and Other Natural Products • Energy Source (Peat) • Livestock Grazing • Fishing and Shellfishing • Hunting and Trapping • Recreation • Aesthetics • Education and Scientific Research

Table No. 8. Estimated Acreage Loss Which May Occur Under Extreme Circumstances Using NFSAM Wetlands Determination and Delineation Methodology for Agricultural Lands in the San Francisco Bay, Delta and Central Valley Areas of California.

Geographic Location	Estimated Current Acreage	Estimated Potential Permanent Loss Under Extreme Circumstances Due to Current Use of NFSAM (% loss/#Ac) [3, 4, 5 & 6]
	Wetlands[3]	Wetlands[3]
San Francisco Bay[1]	142,400	75% / 106,800 ac
Delta[2]	531,000	75% / 398,250 ac
Central Valley[2]	350,000 ac[7]	75% / 262,500 ac
Example of Bay Counties		
Marin County[1]	5,300 ac	75% / 3,975 ac
Sonoma County[1]	19,900 ac	75% / 14,925 ac
Example of Bay - Delta Counties		
Solano County[1]	101,000	75% / 75,750 ac
Contra Costa County[1]	1,200	75% / 900 ac
Example of Central Valley Counties		
Yolo County	5,600 ac	75% / 4,200 ac
San Joaquin County	4,900 ac	75% / 3,675 ac

1 Primarily wetlands separated from San Francisco Bay by a dike or levee system. These reclaimed areas can also be ditched and/or pumped.

2 Primarily wetlands separated from river flows by a dike or levee structure. These reclaimed areas also are often pumped. In addition, these areas may be irrigated during the summer months to grow crops.

3 Due to inconsistencies in jurisdictional determinations and whether minor drainage is allowed as an exemption or not, significant impacts and significant impacts to hydrology and soil conditions occur due to modifications made to the volume and duration of flooding, ponding and/or saturation.

4 Data Source: NRCS, California State Office, 1992 National Resources Inventory.

5 Data Source: Delta-Estuary, California's Inland Coast, A Public Trust Report. California State Lands Commission. May 1991.

6 Likely Source of Error: Photo-interpretation and map generation , due to NRCS not following 1987 Corps Methodology or not field verifying data points.

7 Estimate due to limited data.

FIGURES

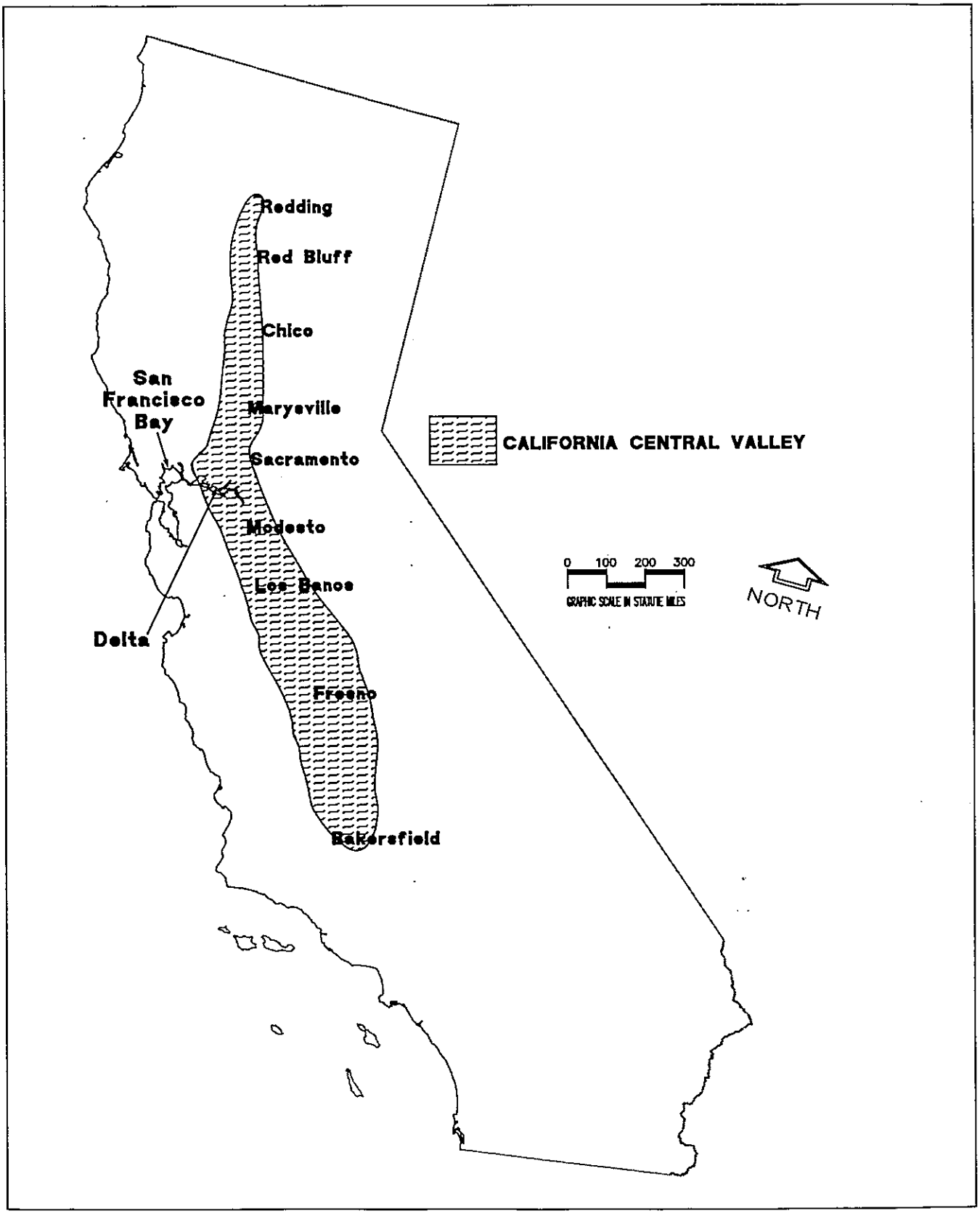


FIGURE 1. Location of California Central Valley.

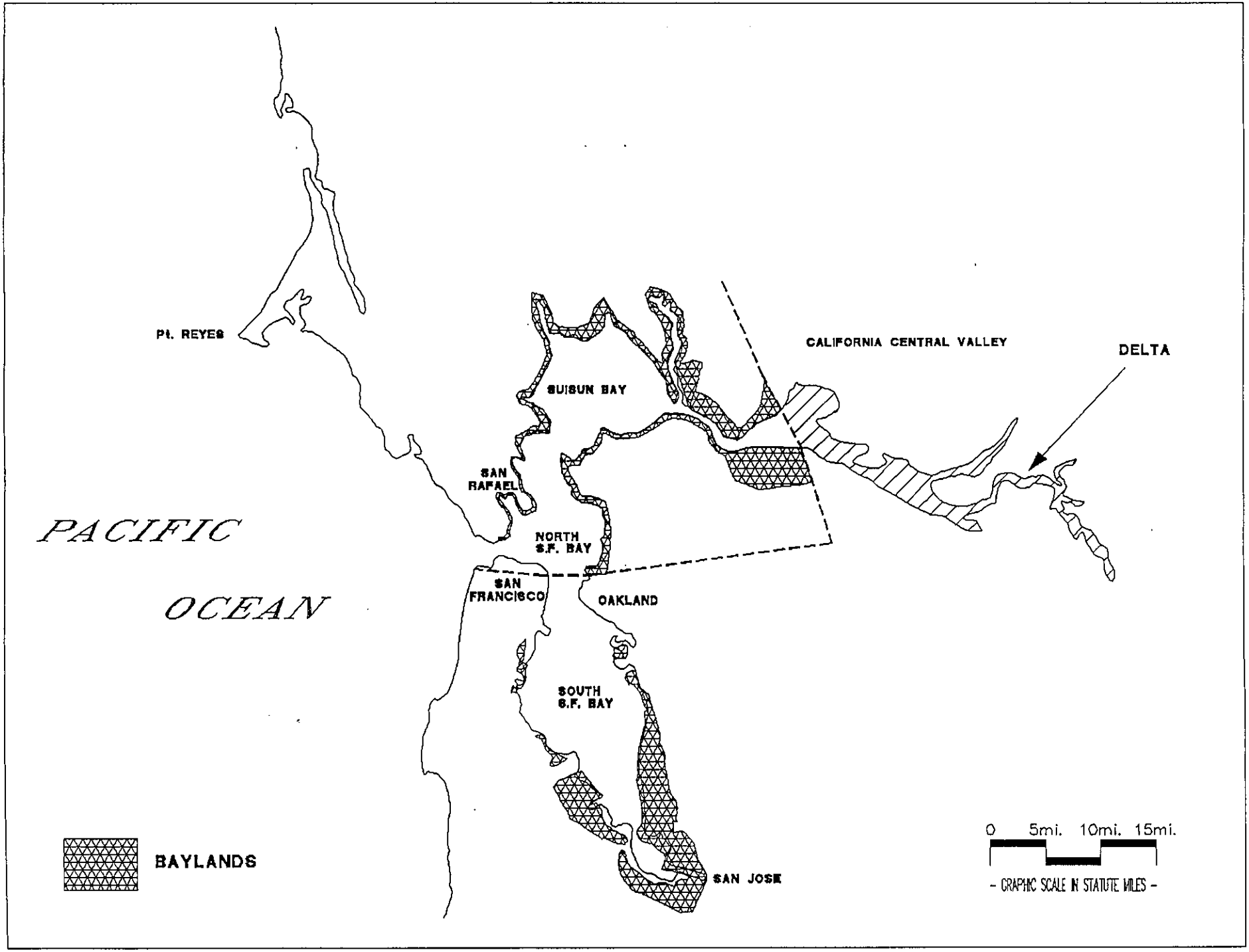
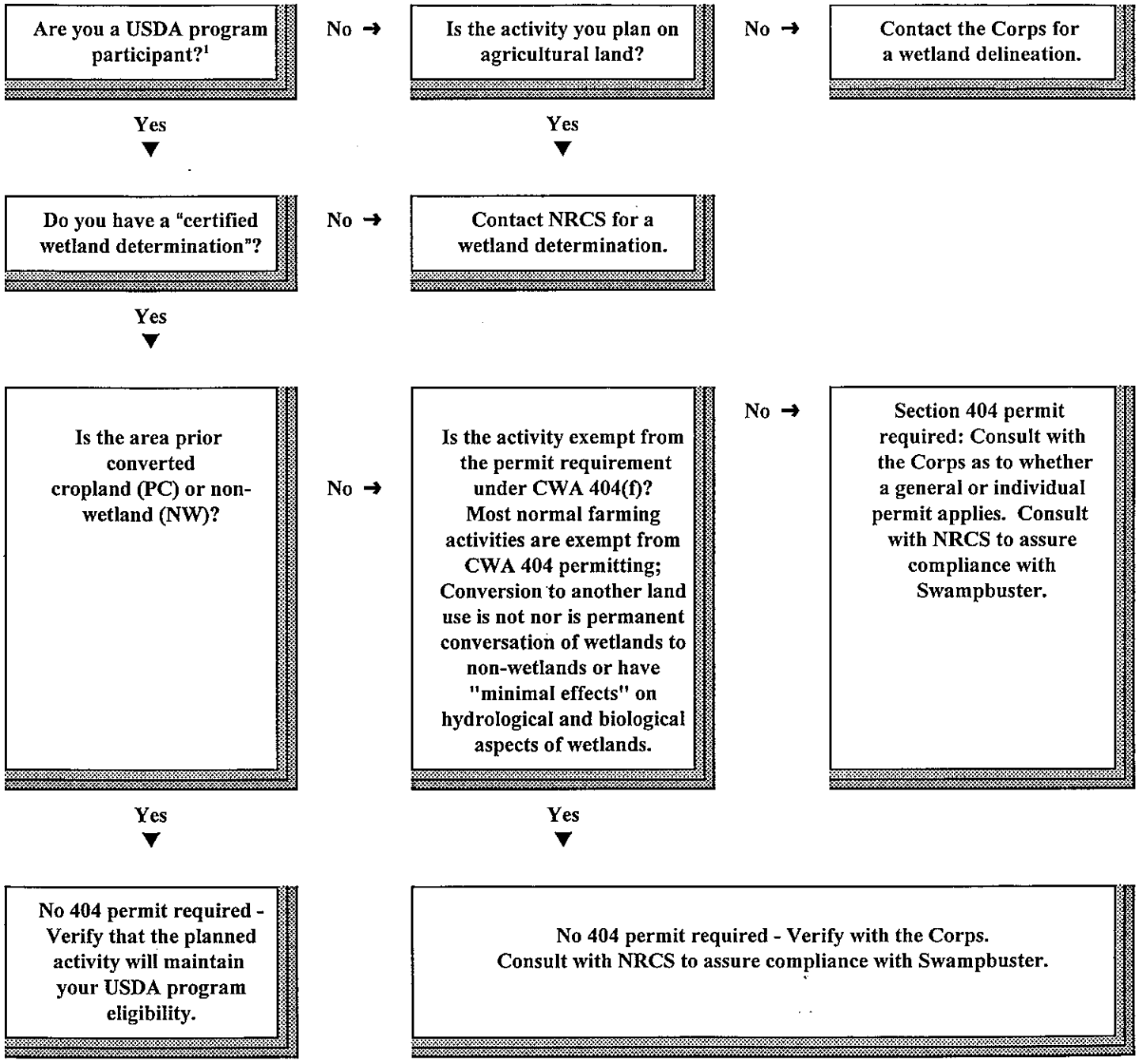


FIGURE 2. General Location of San Francisco Baylands and Delta Areas of California

NRCS GUIDANCE:
QUESTIONS TO ANSWER *BEFORE* STARTING A NEW ACTIVITY



[1] USDA program participants are required to document their intent to manipulate wet areas on Form AD-1026 at the local USDA Consolidated Farm Service Agency office.

Adapted from: NRCS, May 1995: Wetlands & Agriculture: Section 404 of the Clean Water Act/Swampbuster in the Food Security Act. Questions & Answers Brochure.

FIGURE NO. 3

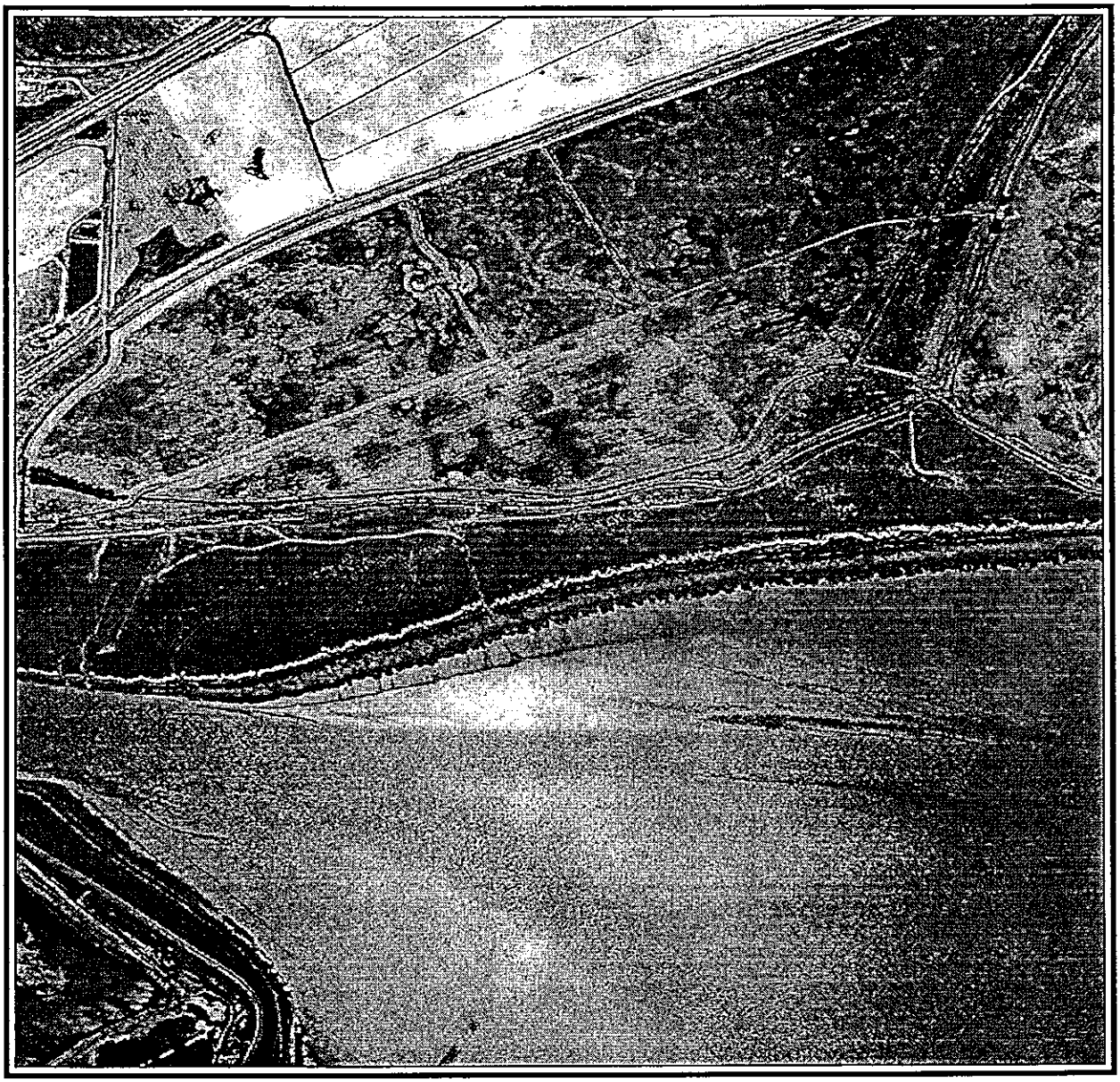


FIGURE 4. Aerial Photograph Depicting Depressional Ponded Areas Within A Diked Baylands of Marin and Sonoma Counties.
Source: Pacific Aerial March 27, 1996

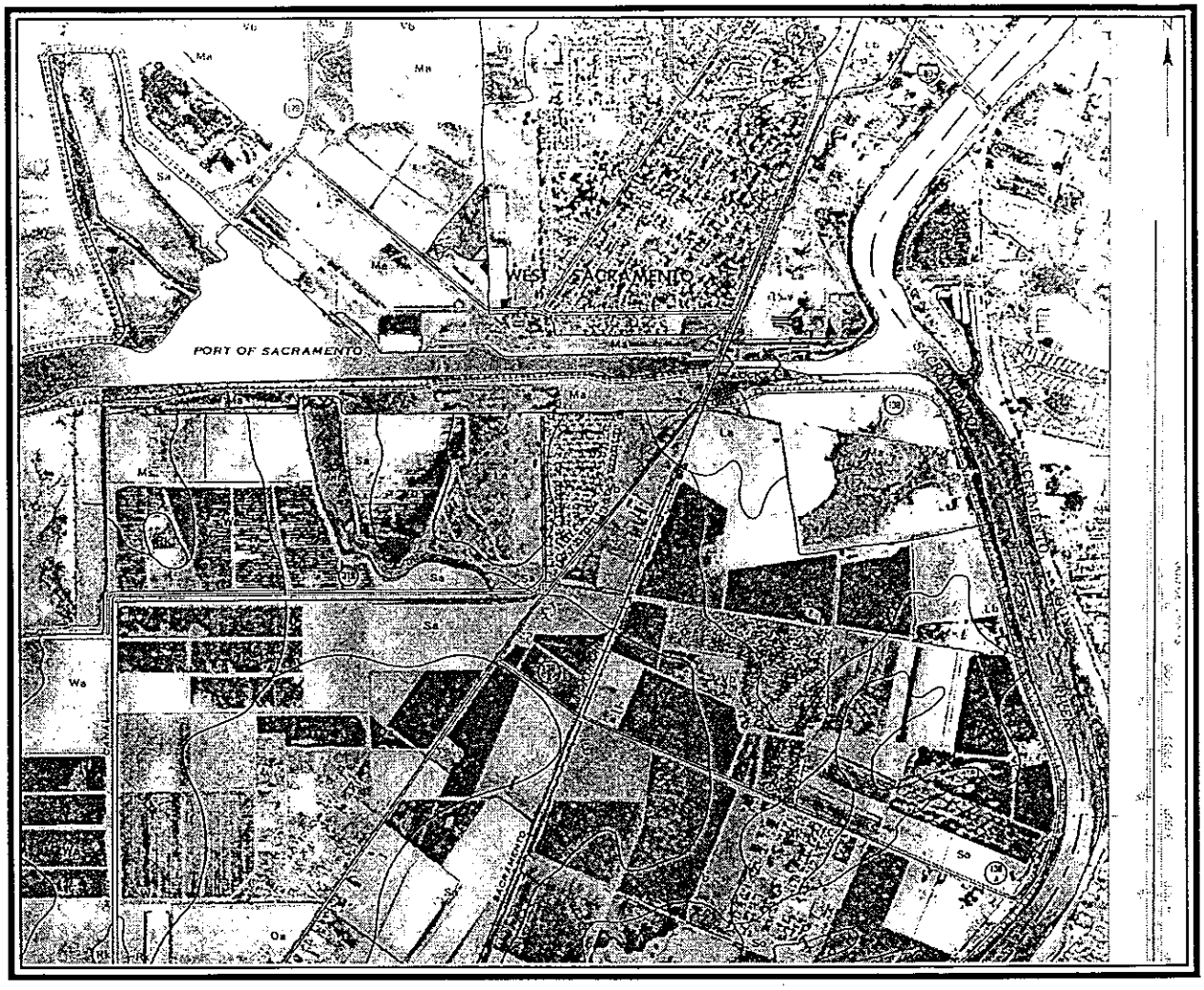


Figure No. 5. Aerial Photograph Depicting Farmed Wetlands in the California Delta behind Reclamation Flood Control Levees Currently Pumped to Allow for Agricultural Production. Source: NRCS Yolo County Soil Survey, 1970.

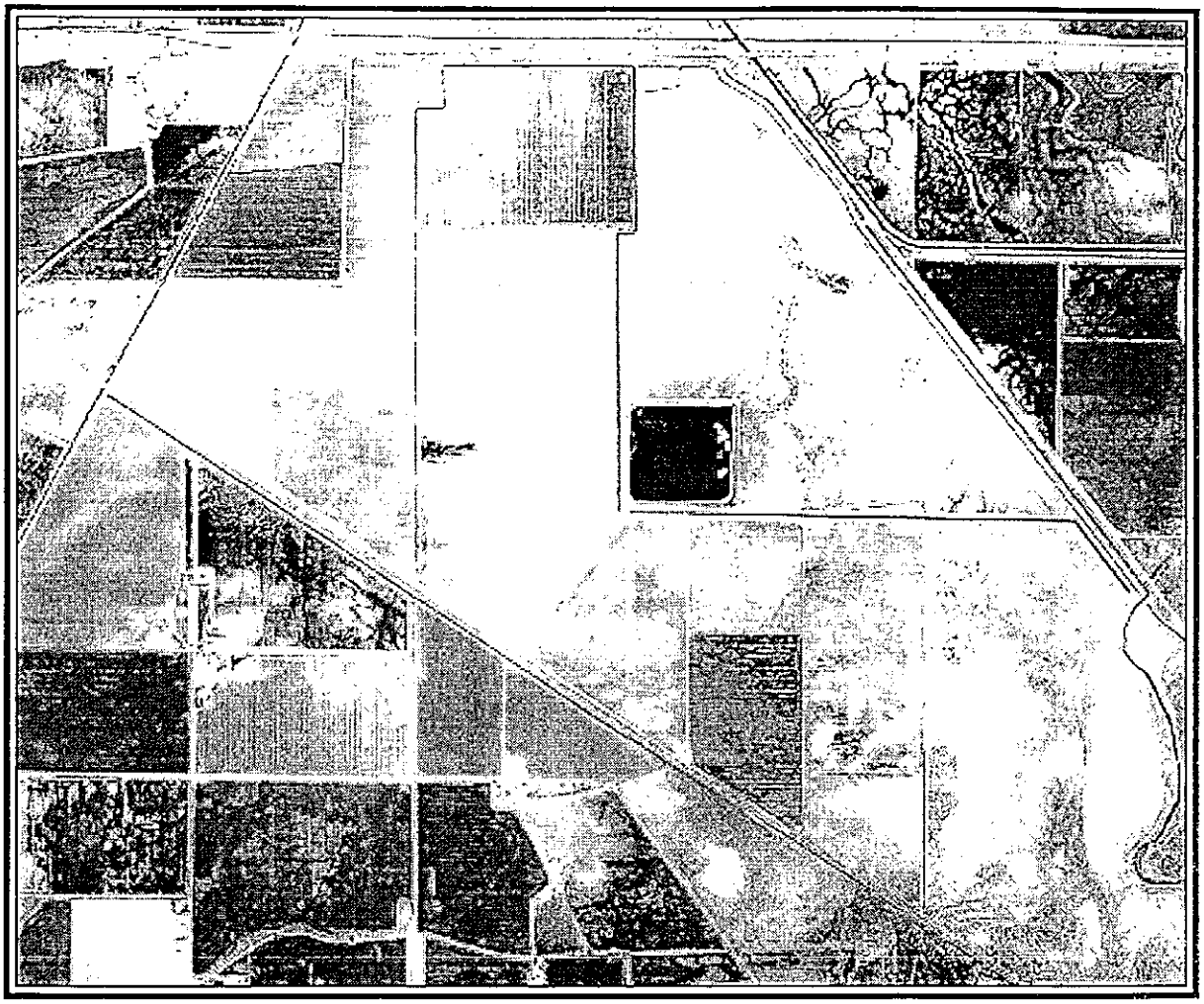
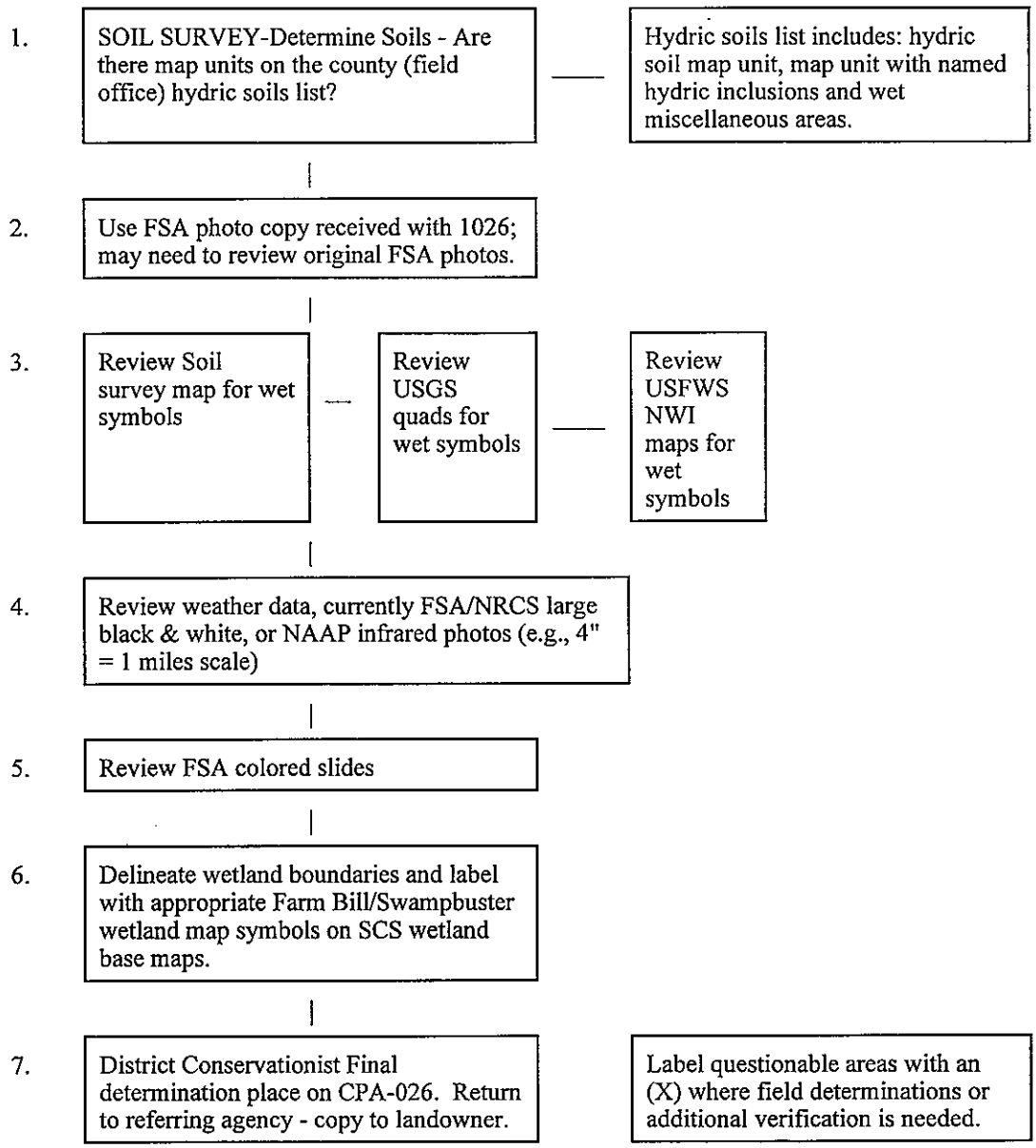


Figure 6. Aerial photograph depicting Central Valley wetlands behind reclamation and flood control levees in Merced County, California. (Source: Pacific Aerial Surveys; dated August 13, 1992)

e:\nfsam\figure6aerial



* Experience over time will normally reveal that some individual sources are more helpful or accurate than others; in which case this flow chart should evolve at each location to facilitate the use of those sources first.

FIGURE NO. 7. NRCS - Wetland Determination Procedures Aid #1 - Flow Chart*

Source: California Inter-Agency Mapping Conventions for Waters of the United States, Memorandum of Agreement Between the Department of Agriculture, the Environmental Protection Agency, the Department of Interior, and The Department of the Army - Concerning Determination and Delineation of Waters of the United States, Including Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act, As Amended, December 1994.

1.	Does this site have hydric soil, and/or hydric inclusions, and/or indication of a wet area?	No→	Swampbuster not applicable.
	Yes ↕		
2.	Will the site, under natural conditions, support a prevalence of hydrophytes?	No→	Swampbuster not applicable.
	Yes ↕		
3.	Was the site hydrologically altered (either onsite or offsite) or otherwise manipulated or woody vegetation removed after 12/23/85?	Yes→	CONVERTED WETLANDS (CW) (Non-compliance only if planted to an agricultural commodity or CW + yr if after 11/28/90)
	No ↕		
4.	Was the site hydrologically altered (either onsite or offsite) or otherwise manipulated or woody vegetation removed prior to 12/23/85?	No→	WETLAND (W) (Does artificial wetland (AW) exemption apply?)
	Yes ↕		
5.	Was an agricultural commodity planted at least 1 year prior to 12/23/85?	No→	WETLAND (W) (Does "AW" exemption apply or, if maintained in pasture or hayland, (FWP)?)
	Yes ↕		
6.	Has the area been abandoned?	Yes→	WETLAND (W) (Does "AW" exemption apply?)
	No ↕		
7.	Is the area a pothole or playa?	Yes→	FARMED WETLAND (FW)
	No ↕		
8.	Does the site flood or pond for 15 consecutive days or more during the growing season?	Yes→	FARMED WETLAND (FW) (Does "AW" exemption apply or MANIPULATED WETLAND (WX)?)
	No ↕		
9.	PRIOR CONVERTED CROPLAND (PC)		

FIGURE NO. 8. NRCS Wetland Determination Procedures Aid #2

Source: California Inter-Agency Mapping Conventions for Waters of the United States, Memorandum of Agreement Between the Department of Agriculture, the Environmental Protection Agency, the Department of Interior, and The Department of the Army - Concerning Determination and Delineation of Waters of the United States, Including Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act, As Amended, December 1994.

Information Needed		Possible Sources
Hydric Soil	1)	County list
	2)	Soil survey - map unit descriptions, wet symbols, streams, springs, etc.
	3)	USGS quads
	4)	Climatological data
	5)	*Landowner interview
	6)	*Site investigation
	7)	*Take a soil scientist onsite
	8)	Flooding maps or inventories
Prevalence of hydrophytes	1)	NWI
	2)	ASCS [now known as Farm Service Agency (FSA)] color slides
	3)	SCS black and white or color photos
	4)	Soil survey vegetative information map unit description tables
	5)	*Site investigation - including similar non-cropped areas
Altered or manipulated?	1)	NWI
	2)	ASCS (FSA)color slides - pre- and post-1985, if possible
	3)	SCS photos
	4)	USGS quads
	5)	*Case file
	6)	*Site investigation including landowner interview
	7)	*Other employee interview
	8)	Landowner interview
Planted prior to 12/23/85	1)	ASCS (FSA) records and slides prior to 12/23/85
	2)	*Case file
	3)	Photo interpret
	4)	Employee knowledge
	5)	Landowner interview
Planted after 11/28/90	1)	ASCS (FSA) records and slides prior to 12/23/85
	2)	*Case file
	3)	Photo interpret
	4)	Employee knowledge
	5)	Landowner interview
	6)	ASCS (FSA) records and slides from 11/28/90
Abandoned?	1)	*ASCS (FSA) records and slides for the past 5 years
	2)	SCS (NRCS) photos
	3)	*Case file
	4)	*Owner interview
	5)	*On-site inspection
	6)	USGS quads
Pothole, Playa or Pocosin?	1)	NWI maps
	2)	Soil survey maps and map unit description
	3)	USGS quads
	4)	ASCS (FSA) slides
	5)	SCS (NRCS) photos
	6)	*Site investigation
	7)	*Field office knowledge
Flooding or Ponding Duration	1)	*Soils 5 (FOTG, Section 2)
	2)	*NWI
	3)	*Field inspection
	4)	*Landowner interview
	5)	*Case file
	6)	*Flood hazard study
	7)	*Watershed investigations
	8)	Climatological data
	9)	*Flooded crops, stressed crops long term use as forage rather than cropland, always plant spring crops?

FIGURE NO. 9. NRCS INVESTIGATION TECHNIQUES FOR WETLAND SWAMPBUSTER DETERMINATIONS

* Sources which (FSA & NRCS) team mappers may not have available and may require field office assistance.

Adapted From: California Inter-Agency Mapping Conventions for Waters of the United States, Memorandum of Agreement Between the Department of Agriculture, the Environmental Protection Agency, the Department of Interior, and The Department of the Army - Concerning Determination and Delineation of Waters of the United States, Including Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act, As Amended, December 1994.

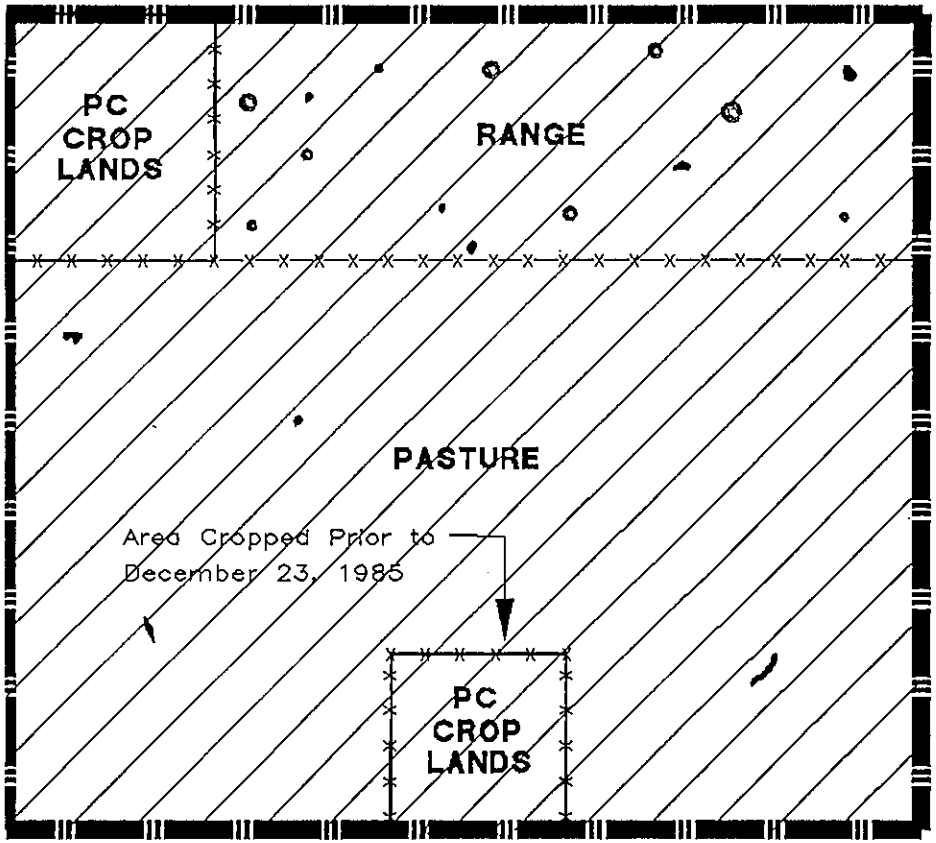


FIGURE 10A.
FSA Example Determination on a 40—Acre Area of Agricultural Lands with Entire Site Found to be "PC" Based on Smaller Areas Qualifying the Entire Tract for Farm Bill "PC" Status

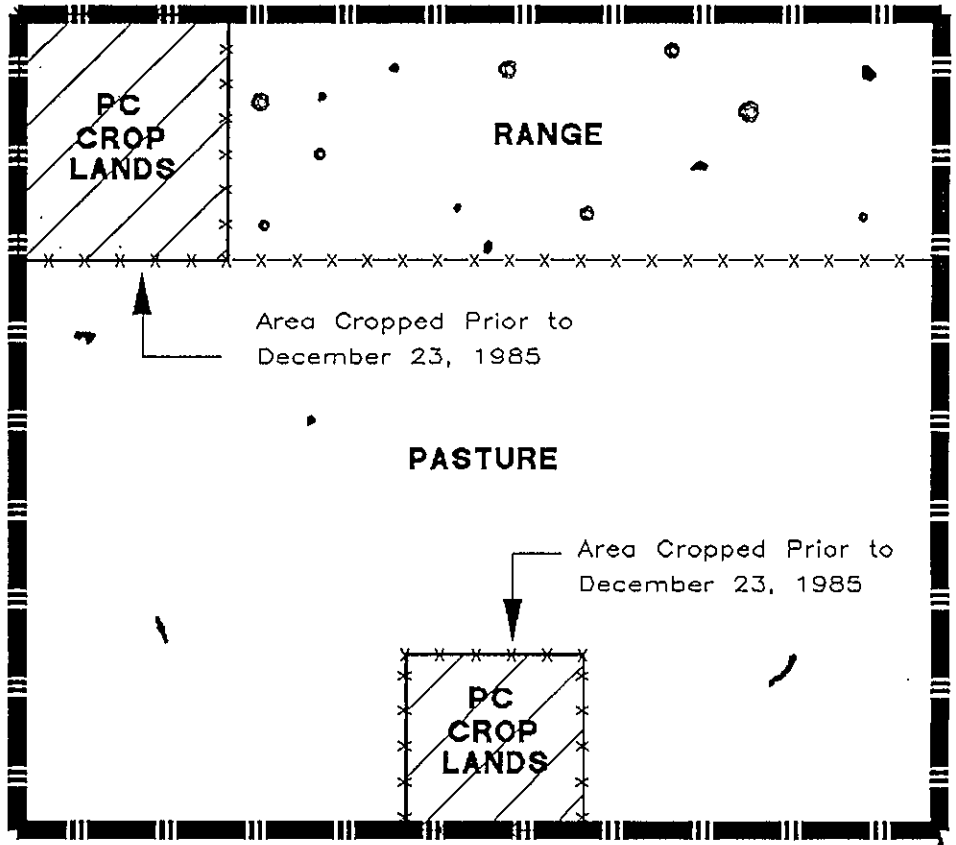


FIGURE 10B.
FSA Example Determination on a 40—Acre Area of Agricultural Lands with Specific Sites Within the 40 Acre Area Identified as Qualifying for Farm Bill "PC" Status

SEASONAL WETLANDS
LESS THAN 1 ACRE TOTAL

SCRUB\SHRUB

CLASSIFIED AS "PC" BASED ON THE PRODUCTION OF AN AGRICULTURAL COMMODITY PRIOR TO DECEMBER 23,1985

(NOT TO SCALE)

FIGURE NO. 11

SUGGESTED FIELD FORM FOR ROUTINE WETLAND DETERMINATION[1]

Project/Site: _____	Date: _____
Applicant/Owner: _____	County: _____
Investigator(s) : _____	State: _____
Do Normal Circumstances exist on the site? ___ Yes ___ No Is the site significantly disturbed (Atypical Situation)? ___ Yes ___ No Is the area a potential Problem Area? ___ Yes ___ No (If needed, explain answer on reverse or attach separate sheet.)	Community ID: _____ Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1.			9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Observatons & Remarks:

1. Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): _____%
2. Assume presence of wetland vegetation? ___ Yes ___ No; or,
3. Visually observed rooted emergent vegetation present? ___ Yes ___ No
4. Taxonomic References:

_____

HYDROLOGY

__ Recorded Data (Attached):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs: Dates: _____
- ___ Other _____

__ No Recorded Data Found

Field Observations:
- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: _____ (in.)
- Depth to Saturated Soil: _____ (in.)

__ Tidal Influence
__ Non-Tidal Influence

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated: ___ Flooded ___ Ponded
- ___ Saturated in: ___ Upper 12" of Soil Profile
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands (Hydrogeomorphic context)

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in: ____ Upper 12"of Soil Profile
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Observations and Remarks:

1. *Filamentous or sheet forming algae present? ___ Yes ___ No*
2. *Surface Sediment with Bedding Planes ___ Yes ___ No*
3. *Slope: ___ 0-2%; or ___ > 2%*
4. *Oxidized rhizospheres: ___ new roots only; ___ old roots only; ___ new and old roots, or ___ none*
5. *Flooding: ___ none, flooding not probable; ___ rare, unlikely but possible under unusual weather conditions; ___ occasional, occurs on an average of once or less in 2 years, or ___ frequent, occurs on an average of more than once in 2 years.*
6. *Continuous flooding duration: ___ None; ___ very brief, if < 2 days; ___ brief, if <5% growing season (GS); ___ long, if ≥5% to 12.5% GS; or ___ very long, if >12.5% GS*
7. *Ponding? ___ Yes ___ No*
8. *Continuous ponding duration: ___ None; ___ very brief, if < 2 days; ___ brief, <5% growing season (GS); ___ long, if ≥5% to 12.5% GS or; ___ very long, if >12.5% GS*
9. *Saturation? ___ Yes ___ No*
10. *Continuous duration of Saturation: ___ None; ___ very brief, if < 2 days; ___ brief, <5% growing season (GS); ___ long, if ≥5% to 12.5% GS; or ___ very long, if >12.5% GS*

1 Adaptation of Form Attached to Corps March 1992 Memorandum on Clarification and Interpretation of Corps 1987 Manual.

**All additions in italics are by Huffman & Associates, Inc.*

SOILS

Map Unit Name (Series and Phase): _____

Taxonomy (Subgroup): _____

Drainage Class[1]: _____

Permeability[2]: _____

Run off[3]: _____

Profile Description (Surface to 12"):

Field Observations Confirm NRCS Mapped Type? ___ Yes ___ No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance[4]/ Contrast[5]	Texture[6], Concretions, Structures[7], etc.

Hydric Soil Indicators:

Historic:
___ Histosol
___ Histic Epipedon
___ Organic Streaking in Sandy Soils
___ Listed on National Hydric Soils List
___ Listed on Local Hydric Soils List
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Gleyed or Low-Chroma Colors
___ Other (Explain in Remarks): _____

Current:
___ Sulfidic Odor
___ Reducing Conditions
___ Aquic Moisture Regime
___ Other (Explain in Remarks): _____

Observations and Remarks:

1. *Smell:* ___ *Neutral;* ___ *Slightly Fresh;* ___ *Freshly Plowed Field Smell; or* ___ *Sulfidic Odor*
2. *Site has been:* ___ *Irrigated;* ___ *Land Leveled;* ___ *Ditch Drained;* ___ *Pumped;* ___ *Graded to drain via slope*
3. *Soils Currently are:* ___ *Flooded;* ___ *Ponded;* ___ *Saturated*[8]
4. *Soils:* ___ *do* ___ *do not, become continuously flooded or ponded or saturated for long (≥15 to 30 days) to very long durations ; (>30 days) during the growing season;* ___ *Unknown*
5. *Soils:* ___ *do* ___ *do not, become continuously saturated for 14 days or greater*

WETLAND DETERMINATION

Hydrophytic Vegetation Conditions Present? ___ Yes ___ No
Wetland Hydrology Conditions Present? ___ Yes ___ No
Hydric Soils Conditions Currently Present? ___ Yes ___ No

Is this Sampling Point Within a Wetland? ___ Yes ___ No

Signature: _____

Remarks:

1. *Possible water of the U.S.?* ___ *Yes* ___ *No*
2. *Possibly exempt from Corps/EPA/CWA regulation?* ___ *Yes* ___ *No (If yes, check item(s) below).*
   - *(a)* ___ *Non-tidal drainage and irrigation ditches excavated on dry land*
   - *(b)* ___ *Artificially irrigated areas which would revert to upland if the irrigation ceased.*
   - *(c)* ___ *Artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.*
   - *(d)* ___ *Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.*
   - *(e)* ___ *Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States (see 33 CFR 328.3(a)).*

NOTES:

Approved by HQUSACE 3/92*

[1] *Drainage class: Excessively drained (ED), Somewhat excessively drained (SED), Well drained (WD), Moderately well drained (MWD), Somewhat poorly drained (SPD), Poorly drained (PD), Very poorly drained (VPD), or Variable (V).*

[2] *Permeability: Very slow (less than 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inch), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), very rapid (more than 20 inches), or Variable (V).*

[3] *Runoff: Slow, moderate, rapid, or variable.*

[4] *Mottle abundance: Few, common, or many.*

[5] *Mottle contrast: Faint, distinct, or prominent.*

[6] *Texture: Sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay.*

[7] *Structure: Platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), or granular.*

[8] *Reliance on visual observation of flooding, or ponding is required, or the use of indicators other than factors such as soil color, the presence of mottles, or hydric soil classification.*

**All additions in italics are by Huffman & Associates, Inc.*

vegetation). There is precedent for this one-parameter approach. The US Fish & Wildlife Service uses this definition and the California Coastal Commission uses it for wetlands regulated by that body in the state's coastal zone. This regulatory definition has been upheld by the judiciary (see *Kirkorowicz v. California Coastal Commission*, 83 Cal. App. 4th 980, 987; 100 Cal. Rptr. 2d 124 (2000). The one-parameter approach is also ecologically sound and addresses the delineation difficulties that result from California's Mediterranean climate.

Even the one-parameter definition, however, will not serve to define "ephemeral" waters and this water type is at great risk. We urge you to move quickly on to Phases 2 and 3 of the WRAPP in order to provide protection for these waters of the State.

For purposes of the DEIR we ask whether the definition will define all wetlands of the State including alkali lakes, salt pannes, mudflats, etc.

Permitting of Discharges of Dredged and Fill Material

Avoidance:

The IS contradicts itself when describing how the Project will determine when to deny permits that impact wetlands. This is generally defined as "avoidance" under the federal 404(b)(1) Guidelines. The Initial Study first states,

> "In general, the Water Boards would deny the issuance of a permit for discharge of dredge or fill material if: There is a practicable alternative to the proposed discharge which would have less adverse impact on water quality (pg. 16)."

This is an unambiguous statement stating that if there is a practicable upland alternative site for a project that has less adverse impacts on water quality the Water Boards will deny that project.

But on Page 17 the Initial Study states:

> "The proposed project would require that permit applicants take actions to first avoid discharges of dredged and fill material to waters of the State. If discharges are unavoidable, applicants would then take actions to minimize discharges and adverse impacts to water quality. For unavoidable impacts to wetlands, the applicant and the appropriate Water Board would develop compensatory mitigation."

In this latter case no mention is made of denying a project if, "[T]here is a practicable alternative to the proposed discharge which would have less adverse impact on water quality"(IS, page 16). **Instead this sentence states that if an applicant can show that its project's impacts to wetlands are unavoidable then the project goes directly to compensatory mitigation, not to project denial if there is a "practicable alternative..."**

To correct this flaw the proposed regulations and associated DEIR should be written to clarify that permitting for dredge and fill activities would take place in a two-tier process. The first tier would address solely the question of whether there is a practicable alternative to the project that has less adverse impact on water quality (called "alternatives analysis" in federal parlance) and only once it has been shown that there is

no such alternative available would the permitting process proceed to the second tier of minimization and compensatory mitigation. We suggest language such as the following:

> "The proposed project would require that permit applicants take actions to first avoid discharges of dredged and fill material to waters of the State. If discharges are unavoidable, ***and there is no practicable alternative to the proposed discharge which would have less adverse impact on water quality,*** applicants would then take actions to minimize discharges and adverse impacts to water quality."

Failure to address this flaw will result in the loss of existing wetlands and, since mitigation wetlands (restored and/or created) have been shown to be inferior to natural, existing wetlands, this will result in a net loss of wetlands functions (*Ambrose, Richard F., Callaway, John C., Lee, Steven F., An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002.)* The Project DEIR will then have to conclude that the Project will result in Potentially Significant Impacts under the following categories:

4. BIOLOGICAL RESOURCES. Sub-headings a, b, c, d and f.

It is well known that wetlands ecosystems play crucial roles in sustaining a large array of plant, invertebrate, reptile, amphibian, avian and mammal species. The California Natural Resources Agency "State of the State's Wetlands Report" acknowledges the tremendous importance of wetlands in maintaining the state's biodiversity, "...When all California wetlands types are considered together, they support more species of plants and animals than any other type of habitat in the state and are the most important stop-off along the Pacific Flyway for millions of migratory birds." Many of the state's listed species or species of special concern are found only in wetlands habitat. For example, "...Of the 450 species, subspecies, or varieties of plants found in California's vernal pools, 44 are vernal pool specialists..." ["Where Rivers Are Born: The Scientific Imperative for Defending Small Streams and Wetlands" 2003.
http://www.rivercenter.uga.edu/publications/pdf/scientific_imperative.pdf]
A net loss of either wetland function or area, or both, will inevitably have a significant impact on the State's biological resources cited under these headings.

If a project for which an alternative that has less adverse impacts to water quality is available is not denied, and only minimization and compensatory mitigation are required, there will be temporal and permanent net losses of wetland functions and potentially acreage. The State Water Resources Control Board's study cited in the IS (Ambrose et. al.) affirms that "restored" and "created" wetlands do not provide the full functionality of natural wetlands. Thus even with compensatory mitigation for impacted wetlands there will be a net loss of function.

- How many permit applications to the RWQCBs are denied annually for each of the RWQCBs?
- What is the acreage of wetlands lost through permit actions in the period from 2001 to the present for each of the RWQCBs?
- What percentage of permitted actions receive in-the-field compliance inspections?

9. HYDROLOGY and WATER QUALITY. Sub-headings a, b, c, d, e, f, and i.

It is well known that wetlands perform essential floodwater attenuation and storage functions and that wetlands provide significant water purification functions. Wetlands remove nitrogen and phosphorous from waters through chemical processes and can also remove many other contaminants through adsorption and sedimentation.

Similar to the case for Biological Resources, if the denial of projects is not a realistic tool in the permitting process; if projects cannot be denied even if there exist project alternatives that have less adverse impacts on water quality and only minimization and mitigation are available as realistic permitting tools, there will be a net loss of wetland function and acreage resulting in a loss of wetland floodwater attenuation, storage capabilities, and water purification. There will be significant adverse impacts resulting from these lost functions.

Wetland functions are often defined by location. Flood water attenuation, stormwater cleansing, ground water recharge, providing migratory and resident wildlife habitat all are specifically related to the wetland's location (the flood attenuation function of a specific wetland no longer exists if that wetland is destroyed and mitigation takes place 30 miles away).

- How will this Project preserve the functions of wetlands if "avoidance" is not given the emphasis described above?
- How will the Project avoid having unmitigable impacts if it fails to provide for an effective "avoidance" component of the regulatory process?

For purposes of responding to the NOP we ask how the proposed Project will protect the state's biodiversity and beneficial uses of its waters if "avoidance" is not given the emphasis described above? How will the Project ensure "no net loss" and how will the project ensure no loss of wetland functionality in the State? How will the Project protect wetland functions that are site specific and how will it mitigate local impacts?

Compensatory Mitigation

The IS is not clear whether the mitigation alternatives "preservation" and "enhancement" are proposed as adequate mitigations, in themselves and solely, for any potential net loss of wetland acreage and function.

Compensatory mitigation for wetland loss that consists only of "preservation" and/or "enhancement" must, by definition, result in a net loss of wetland acreage and may possibly result in net loss of function. "Preservation" clearly provides no new wetland acreage to offset the loss of wetland acreage since it consists solely of preserving

existing wetlands. "Enhancement" provides no new wetland acreage since it only attempts to improve the functionality of existing wetlands and thus provides no new acreage to offset wetland loss. Thus both mitigation methods must result in a net loss of wetland acreage.

"Preservation" must result in a net loss of wetland function since no new wetlands are created and no enhancement of wetland function takes place. "Enhancement" may result in a no net loss of function if successful.

To attempt to fully mitigate impacts to wetlands we believe that any compensatory mitigation requirement under the Project must always include a restoration component of at least a 1:1 ratio of wetland loss to mitigation wetland restored in order to ensure a no net loss of wetland acreage. Wetland restoration creates new wetlands on historic wetland sites that do not support wetlands at the present time. This results in new wetland acreage to offset the loss of wetland acreage.

Establishment (the creation of wetlands on sites that have never sustained wetlands) has been shown to almost never succeed in creating successful wetlands and should not be considered as a mitigation tool.

The Ambrose report, and many others, has shown that " wetland establishment" (the creation of wetlands on sites that did not previously support wetlands) does not result in wetlands that fully replicate the functions of existing, natural wetlands. Other studies (see attached: Siobhan Fennessy, Kenyon College, *An Assessment of Wetland Mitigation Performance; also see National Science Council, Restoration of Aquatic Ecosystems)* support these conclusions and also demonstrate that even "wetland restoration" (creating wetlands on sites that had previously supported wetlands) usually fails to fully restore historic wetland functions.

The DEIR should explain how the compensatory mitigation elements of the Project will result in no net loss of wetland acreage and function. How will compensatory mitigation mitigate the impacts locally of the loss of wetland functions (groundwater recharge, flood attenuation, pollution reduction on local scales?

Mitigation Banks

Several studies (e.g., *Ecological Assessment of Ohio Mitigation Banks: Vegetation, Amphibians, Hydrology, Soils,* Ohio EPA Technical Report WET/2006-1 and Fennessey, above) have demonstrated that mitigation banks often fail to achieve their goals.

> "Based on these criteria, of the 12 banks assessed in Ohio, 3 were mostly successful, 5 were successful in some areas but failed in other areas, and 4 were mostly failed. Unfortunately, this is not the proportion of success and failure that was at least implicitly promised in the Federal Bank Guidance (pg. 8)...", and "[O]bviously, results like this raise serious concerns with one of the fundamental premises of mitigation banking, i.e. mitigation banks are more likely than individual mitigations to be successful, either on a pure acre-for-acre basis or in terms of ecological quality...(pg. 17)"...and ... "[T]oo often, mitigation banks have simply meant more acres of poor quality wetland restoration than a comparable, small individual mitigation site...(Ohio study, pg. 30)."

Furthermore, mitigation banks move wetlands from one location to another. This removes the wetlands functions provided by the impacted wetlands from the wetland's local communities. Several studies have demonstrated this movement of wetlands, often from urban areas to rural and from areas of high land prices to areas where lands prices are low. Such movements will result in the loss of important beneficial uses within the impacted watershed.

Reports by Ruhl, and Salzman, *The Effects of Wetland Mitigation Banking on People,* (National Wetlands Newsletter, Vol. 28, No. 2, pg. 1) and King and Herbert, *The Fungibility of Wetlands,* (National Wetlands Newsletter, Vol. 19, No. 5, pg. 10), show that wetland mitigation banks have moved Florida's coastal wetlands, areas of high land values, to interior locations, areas where land values are cheaper.

Ruhl and Salzman conclude that, " The whole point of wetland mitigation banking – what makes its economic incentives work- is that developers get to wipe out wetland patches in the higher–priced land markets and [mitigation] bankers get to establish wetland banks in the less-pricey land markets...(pg. 9)"

The DEIR must explain how the use of mitigation banks by the Project will not result in a net loss of wetland functions and why the use of such banks will not result in significant impacts to the local communities and ecological systems and watersheds that depend upon the wetland functions provided by wetlands that are destroyed under the Project program and are mitigated through the use of mitigation banks located great distances from the wetlands' original location.

The DEIR must explain how the relocation of wetlands through the use of mitigation banks will not result in significant adverse changes in the ability of the state's wetlands to provide essential functions in appropriate locations, e.g. water recharge, flood attenuation, habitat for migratory wildlife and for sensitive and listed species.

Prior Converted Croplands (PCC)

We challenge the assumption that lands that are identified as PCC for the purposes of the Food Security Act do not provide wetlands functions and values. The DEIR must explain how the exempting of prior converted croplands from regulation will not result in a net loss of wetland function and acreage. The DEIR must defend the assumption that these areas currently do not provide wetlands functions and/or do not have restoration potential.

- What mechanism will be incorporated into the state's regulatory program to verify that lands identified as PCC were converted and farmed prior to December 23, 1985? Does the state have access to documentation that will provide adequate verification or will the state rely on information provided by the Natural Resources Conservation District and/or Farm Services Agency? If so, what type of evidence will the state accept? Does the state or NRCS (federal Natural Resources Conservation Service, Department of Agriculture) have adequate aerial photography to verify crop production prior to December 23, 1985? Does the state or NRCS have access to proof of cropping history such as receipts, etc?

- What measures will be incorporated to ensure that loopholes that existed previously within the PCC process (for the purposes of Section 404) are permanently addressed to protect wetlands from conversion for the purposes of development, vineyards, etc.?
- What measure will be incorporated to protect listed and special status species?
- How will the state define PCC – will rangelands or pasturelands qualify for PCC? What about areas of vernal pools and isolated wetlands?
- If wetlands are properly identified as PCC, will the state provide a more definable process for recapture of these lands if they revert to wetlands?
- Why is the state considering exemption of PCC when extensive agricultural exemptions already exist under the Clean Water Act and in the proposed Project?
- Why is the state considering exemption of PCC when a January 18, 2005 United States Department of Agriculture (USDA) letter requested suspension of the PCC Memorandum of Agreement (MOA) between the Department of the Army, the Environmental Protection Agency (EPA) and USDA, MOA was in conflict with the Food Security Act statute and "differences now exist between the FSA and the CWA on the jurisdictional status of certain wetlands (e.g. prior converted cropland) or *isolated wetlands* may be regulated by one agency, but not the other."[emphasis added, letter attached]

The attached report, *An Evaluation of the Natural Resource Conservation Service Wetland Determination and Delineation Methodology for Agricultural Lands As Currently Used in the San Francisco Bay, Delta and Central Valley Areas of California,* by Terry Huffman, PhD, illustrates the great loss of wetlands, potentially many hundreds of thousands of acres, that may occur in California as a result of a Prior Converted Cropland exemption in the Project,

- the DEIR should provide estimates of wetlands loss that could occur under the PCC component of the proposed Project,
- the DEIR should provide estimates of total wetlands loss that could occur under the proposed Project,
- the DEIR should identify the types of wetlands most vulnerable to loss under the proposed Project.
- the DEIR should provide estimates of impacts of the Project to listed and special status species.

Landscape Approach

Recent studies make it increasingly evident that isolated wetland complexes such as vernal pools, playa lakes, etc., play critical roles in sustaining regional aquatic functionality.

- Caruso, B.S., Haynes, J, *Connectivity and Jurisdictional Issues for Rocky Mountains and Great Plains Aquatic Resources*, Wetlands, (2010) 30:865-877, "...these wetlands [isolated wetlands] often have some type of ecological connection to navigable waters and provide valuable ecosystem services...";

- Lane, C.R, and D'Amico, E., *Calculating the Ecosystem Service of Water Storage in Isolated Wetlands Using LIDAR in North Central Florida, USA*, Wetlands (2010) 30:967-977, "Through water storage and associated ground-water recharge, evaporation and transpiration, as well as biogeochemical processing, wetlands provide numerous ecosystem services that have the potential for significant cost avoidance through the use of natural ecological capital to freely perform functions that are costly for humans to recreate (Millennium Ecosystem Assessment 2005)...These figures suggest that isolated wetlands' influence on watershed level hydrodynamics through water storage and [chemical] processes ...could be substantial (pgs. 973,974)".

- WETLANDS: Texas prairie potholes play 'critical' watershed role -- study *(03/07/2011)*
  Contrary to the federal government's findings, a study has concluded that "prairie potholes," or shallow ponds in the prairies along the Texas Coast, are critical to the watershed of the Galveston Bay.
  The study, which will appear in the journal *Wetlands*, shows that 17 percent of water falling in these potholes reaches a navigable body of water within four years. Ancient rivers and bayous formed the potholes thousands of years ago.
  The finding is different from the Army Corps of Engineers' assessment that these wetlands areas are separated from the watershed and other "waters of the United States." The Army Corps' findings have made the area ineligible for protection under the Clean Water Act following a Supreme Court ruling that wetlands must have a "significant nexus" to a navigable waterway to receive protection.
  A lack of federal protection has made it easier to develop the area.
  "The bottom line is these isolated wetlands are critical to the watershed of Galveston Bay," said John Jacob, one of the study's researchers. "The federal government needs to take a second look" (Matthew Tresaugue, *Houston Chronicle*, March 6, 2011). -- **AP**

These studies also show that wetland complexes that are embedded in a large non-wetland landscape (e.g., vernal pools) require substantial uplands in order to retain their function and values.

Therefore we believe that when applying an avoidance test for wetland-impacting projects within these wetland complexes the Project must take into account the landscape scale in deciding whether any such project is permittable. The Project should provide a mechanism to enable regulators to determine if a proposed project has a practicable alternative offsite that would be superior to the creation of small reserves surrounded by urbanized areas, in which the ecological and hydrological function of these wetland complexes could not be sustained.

Where a conservation strategy (such as an NCCP) has been developed in which such wetlands are embedded in large landscape-scale preserves, such a strategy may serve to sustain ecological/hydrological function on a landscape scale. Off-site mitigation as a part of such conservation strategies may provide a viable alternative if it meets the following criteria:

1. It provides for large, landscape-scale preserves that include wetland resources equivalent or superior to those impacted; and
2. Such preserves are part of a large scale (covering thousands of acres) conservation plan with requirements analogous to those of a Natural Communities Conservation Plan, with enforceable standards and the requirement that mitigation proceed before take; and
3. It is accompanied by a finding that the mitigation would result in better conservation of the resource than any practical on-site avoidance or minimization plan.

To conclude, the State Water Board's proposed Wetland and Riparian Area Protection Policy should provide increased protection for the waters of the State. An ineffective regulatory process will, however, fail to achieve that goal. We believe that the incorporation of our comments into the Project will result in a regulatory program that will achieve the goal of protecting our state's wetlands.

Sincerely yours,

Jim Metropulos
Senior Advocate
Sierra Club California

Carin High
Vice Chair
Citizens Committee to Complete the Refuge

On behalf of

Kimberly Delfino
California Program Director
Defenders of Wildlife

Barbara Vlamis
Executive Director
AquAlliance

Carole Witham
Treasurer
California Native Plant Society