

PROJECT TR-500 FINAL REPORT

**EVALUATION OF THE IOWA DEPARTMENT OF
TRANSPORTATION'S COMPENSATORY
WETLAND MITIGATION PROGRAM**

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Prepared for:

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The opinions, findings, and conclusions expressed in this publication are those of the author and not necessarily those of the Iowa Department of Transportation.

EXECUTIVE SUMMARY

The purpose of this investigation was to evaluate the Compensatory Wetland Mitigation Program at the Iowa Department of Transportation (DOT) in terms of regulatory compliance. Specific objectives included:

- 1) Determining if study sites meet the definition of a jurisdictional wetland.
- 2) Determining the degree of compliance with requirements specified in Clean Water Act Section 404 permits.

A total of 24 study sites, in four age classes were randomly selected from over 80 sites currently managed by the Iowa DOT. Wetland boundaries were delineated in the field and mitigation compliance was determined by comparing the delineated wetland acreage at each study site to the total wetland acreage requirements specified in individual CWA Section 404 permits.

Of the 24 sites evaluated in this study, 58 percent meet or exceed Section 404 permit requirements. Net gain ranged from 0.19 acre to 27.2 acres. Net loss ranged from 0.2 acre to 14.6 acres. The Denver Bypass 1 site was the worst performer, with zero acres of wetland present on the site and the Akron Wetland Mitigation Site was the best performer with slightly more than 27 acres over the permit requirement.

Five of the 10 under-performing sites are more than five years post construction, two are five years post construction, one is three years post construction and the remaining two are one year post construction. Of the sites that meet or exceed permit requirements, approximately 93 percent are five years or less post construction and approximately 43 percent are only one year old. Only one of the 14 successful sites is more than five years old.

Using Section 404 permit acreage requirements as the criteria for measuring success, 58 percent of the wetland mitigation sites investigated as part of this study are successful. Using net gain/loss as the measure of success, the Compensatory Wetland Mitigation Program has been successful in creating/restoring nearly 44 acres of wetland over what was required by permits.

**EVALUATION OF THE IOWA DEPARTMENT OF
TRANSPORTATION'S COMPENSATORY
WETLAND MITIGATION PROGRAM**

INTRODUCTION

Section 404 of the Water Pollution Control Act or Clean Water Act (CWA) requires mitigation for unavoidable wetland losses. Scrutiny of compensatory wetland mitigation programs across the county has taken place in recent years (National Research Council 2001; Storm and Stellini 1994). In the late 1990's, the National Research Council established the Committee on Mitigating Wetland Losses to evaluate how compensatory mitigation required under Section 404 of the CWA is contributing toward satisfying the overall objective of restoring and maintaining the quality of the nation's waters (National Research Council 2002). The committee concluded that the mitigation program fails to meet the goal of no net loss of wetlands for wetland functions. In addition, the committee found that permit conditions fail to clearly define performance expectations and that the mitigation program lacks a suitable mechanism to assure compliance.

Several recent studies have attempted to evaluate the degree of success of compensatory wetland mitigation programs in other states. Brown and Veneman (2001) found over 50 percent of the 114 mitigation sites sampled in Massachusetts were not in compliance with wetland regulations. Sites failed to meet permit conditions largely due to acreage shortfalls and out of kind mitigation (e.g., the mitigation wetland was not the type of wetland specified in the permit). In Tennessee, Morgan and Roberts (2003) found that 72 percent of the mitigation sites reviewed failed to meet acreage requirements. A review of 31 mitigation sites in Indiana found a net gain in wetland acreage of 3.7 acres over the total area lost; however, this only represented 7 percent of the additional area required by the permits (Robb 2002).

With an increased awareness in wetland mitigation failure, regulatory agencies are initiating reviews of programs nationwide. The Iowa Department of Transportation (DOT) has seen a steady increase in non-compliance inquiries over the past several years as a result of a review of Iowa DOT mitigation sites initiated by the U.S. Army Corps of Engineers (Corps).

The purpose of this investigation was to evaluate the Compensatory Wetland Mitigation Program at the Iowa DOT in terms of regulatory compliance. Specific objectives included:

- 1) Determining if study sites meet the definition of a jurisdictional wetland.
- 2) Determining the degree of compliance with requirements specified in Clean Water Act Section 404 permits.

METHODS

Study Sites

A total of 24 study sites, in four age classes (one year, three years, five years, and greater than five years, post construction [six sites per age class]), were randomly selected from over 80 sites currently managed by the Iowa DOT. The location of each site is shown in Figure 1. Specific information regarding each site is presented in Table 1.

Table 1. Study Site Characteristics

Number	Site Name	County	Year Constructed	Mitigation Type
1	255th Street	Henry	2000	Creation
2	Abma Tract	Sioux	2001	Creation
3	Akron Wetland Mitigation Site	Plymouth	1999	Restoration
4	Allbones Wetland Mitigation Site	Linn	1997	Restoration
5	Brush Creek	Marion	1998	Restoration
6	Colo Bogs Cummings Tract	Story	1997	Restoration
7	Denver Bypass 1	Bremer	1994	Restoration
8	Dike Mitigation Site B	Grundy	1999	Creation
9	Dunbar Slough	Greene	2001	Restoration
10	George Wyth State Park	Black Hawk	1994	Creation
11	Hayes Lake	Allamakee	1998	Creation
12	Heartland Fen	Butler	2000	Creation
13	Indian Slough	Louisa	1998	Restoration
14	Lago Tract Welch WPA	Dickinson	2001	Restoration
15	New Hampton Bypass Mitigation Site 1	Chickasaw	2002	Restoration
16	New Hampton Bypass Mitigation Site 2	Chickasaw	2002	Enhancement
17	Palisades Wetland Mitigation Site	Linn	2001	Creation
18	Partridge Meadows	Floyd	1999	Creation
19	Rainsbarger Wetland Mitigation Site	Hardin	2002	Creation
20	Rice Grass B	Marshall	1995	Creation
21	Rice Grass A	Marshall	1996	Creation
22	South Beaver Creek Wellsburg	Grundy	2002	Creation
23	Welton Borrow Site	Clinton	1995	Creation
24	Wickiup Hill Linn CCB	Linn	2000	Restoration

Wetland Delineation Methods

Wetlands at each study site were identified and their boundaries delineated using the Routine On-Site Determination Method as defined in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987). Wetland delineations were conducted in August and September 2003 and from May through August 2004. Wetlands were classified using the Cowardin et al. (1979) system. Wetland boundaries were identified in the field and mapped using a Trimble GeoExplorer CE[®] Global Positioning System (GPS) receiver. Data from the receiver were post-processed using Trimble Pathfinder Office[®] version 3.00 software for an accuracy of <1 meter. The GPS data were then transferred to aerial photography.

Final wetland determinations were made based on recent guidance from the Rock Island District, Corps of Engineers (Scott Marler, Iowa DOT, personal communication). An area was determined to be wetland if it met one of the two following criteria:

- 1) Water depth less than or equal to 2 feet with or without rooted vegetation.
- 2) Water depth between 2 feet and 6.6 feet with rooted vegetation.

If an area had a water depth greater than 2 feet and did not possess rooted vegetation, it was called nonwetland.

Data Analysis

Mitigation compliance was determined by comparing the delineated wetland acreage at each study site to the total wetland acreage requirements specified in individual CWA Section 404 permits, regardless of how the acreage was obtained (creation, restoration, enhancement or preservation).

RESULTS

The results of the data analysis are shown in Table 2.

Table 2. Section 404 Permit Requirement, Delineated Wetland Acreage and Percent Compliance for each study site.

Number	Site Name	Section 404 Permit Requirement (Acres)	Delineated Wetland (Acres)	Net Gain/Loss (Acres)	Percent Compliance
1	255th Street	3.87	4.36	0.49	112.7
2	Abma Tract	1	9.29	8.29	929.0
3	Akron Wetland Mitigation Site	36	63.15	27.2	175.4
4	Allbones Wetland Mitigation Site	6	5.5	-0.5	91.7
5	Brush Creek	16.6	14.11	-2.49	85.0
6	Colo Bogs Cummings Tract	4.77	30.11	25.34	631.2
7	Denver Bypass 1	14.6	0	-14.6	0.0
8	Dike Mitigation Site B	10	14.11	4.11	141.1
9	Dunbar Slough	34	37.32	3.32	109.8
10	George Wyth State Park	23.3	15.3	-8	65.7
11	Hayes Lake	0.6	0.4	-0.2	66.7
12	Heartland Fen	2.5	3.36	0.86	134.4
13	Indian Slough	72.8	72.8	0	100.0
14	Lago Tract Welch WPA	5.1	7.85	2.75	153.9
15	New Hampton Bypass Mitigation Site 1	11	10.51	-0.49	95.5
16	New Hampton Bypass Mitigation Site 2	1.3	2.24	0.94	172.3
17	Palisades Wetland Mitigation Site	3.2	5.08	1.88	158.8
18	Partridge Meadows	7.5	7.69	0.19	102.5
19	Rainsbarger Wetland Mitigation Site	4.5	5.08	0.58	112.9
20	Rice Grass B	2	1.06	-0.94	53.0
21	Rice Grass A	11.9	9.16	-2.74	77.0
22	South Beaver Creek Wellsburg	2	1.6	-0.4	80.0
23	Welton Borrow Site	3.07	4.37	1.3	142.3
24	Wickiup Hill Linn CCB	16.5	13.57	-2.93	82.24
Totals		294.11	338.02	43.91	114.9

Of the 24 sites evaluated in this study, 58 percent meet or exceed Section 404 permit requirements. Net gain ranged from 0.19 acre to 27.2 acres. Two sites, Abma Tract and Colo Bogs Cummings Tract, exceed the requirements by 829 percent and 531 percent, respectively. Net loss ranged from 0.2 acre to 14.6 acres. The Denver Bypass 1 site was the worst performer, with zero acres of wetland present on the site and the Akron Wetland Mitigation Site was the best performer with slightly more than 27 acres over the permit requirement (Table 2).

A total of 338.02 acres of wetland were delineated at the 24 sites. This represents a total net increase of 43.91 acres over the Section 404 permit requirements for the projects. However, as shown in Table 2, the majority of the increase is due to just two sites, the Akron Wetland Mitigation Site and Colo Bogs Cummings Tract. If these two sites were removed from the analysis, it would result in a total net loss of 8.58 acres.

The 10 under-performing sites are split equally between creation and restoration (five each) (Table 1). Five of the 10 (50 percent) are more than five years post construction, two (20 percent) are five years post construction, one (10 percent) is three years post construction and the remaining two (20 percent) are one year post construction. Of the sites that meet or exceed permit requirements, approximately 93 percent are five years or less post construction and approximately 43 percent are only one year old. Only one of the 14 successful sites is more than five years old.

DISCUSSION

The results of this study suggest that the Iowa DOT's Compensatory Wetland Mitigation Program has resulted in an overall net gain of nearly 44 acres of wetland over the area required by the permits for the sites studied. As mentioned above, just two sites account for the majority of the excess acreage. Only one site, Denver Bypass 1, completely failed to meet the definition of a jurisdictional wetland.

The overall success rate by site is just slightly over 50 percent. It is possible, and maybe even likely, that with time some of the younger sites that are currently failing will meet or exceed permit requirements. It is not uncommon for mitigation sites to need time to mature and fully develop, particularly the vegetation component. However, this only represents at most 20 percent of the currently failing sites. In addition, remediation may be an option for bringing some of the sites into compliance (e.g. remedial grading at New Hampton Bypass Mitigation Site 1).

The data indicate a higher success rate for recently constructed sites (those constructed in the last five years) than for those constructed more than five years ago. There is no apparent relationship between success or failure and type of mitigation (creation or restoration). However, more investigation is needed to determine if this is the case.

The exact reason why some sites are successful while others fail is beyond the scope of this study. However, it is possible to speculate as to a cause in a few cases based on the author's personal knowledge of the design of some of the sites. Improper design is the cause in at least one case and a possible cause at a number of other sites.

Based on the as-constructed plans for the New Hampton Bypass Mitigation Site 1, the emergency spillway elevation is set at Elevation 348 meters. Therefore, the maximum area at the site that can support wetland hydrology is represented by the Elevation 348 meter contour and is approximately 10.5 acres. This is supported by two years of groundwater data at the site, which show that wetland hydrology

does not extend above Elevation 348 (Earth Tech 2003; Earth Tech 2004). The Section 404 permit requirement for the New Hampton Bypass Mitigation Site 1 is 11 acres. Therefore, by design the site is 0.5 acre short of its requirement.

Throughout the course of the study, a number of questions and a fair amount of confusion arose concerning the permit requirements, design, and/or the relationship between creation/restoration, enhancement and preservation acres at certain sites. Based on DOT records, it appears that the number of acres planned for some of the sites was less than the number of acres required by the Section 404 permit (e.g., George Wyth State Park – 23.3 acres required, 15.3 acres planned). It is unclear at this time why this was the case. In other cases, the line between mitigation acres and enhancement or preservation acres is unclear, and appears to have been arbitrarily drawn during permitting or design (e.g., Indian Slough). These apparently arbitrary lines make it difficult to determine if permit requirements are actually met. In all but one case, the sites in question are five or more years old.

Conclusions

Using Section 404 permit acreage requirements as the criteria for measuring success, 58 percent of the wetland mitigation sites investigated as part of this study are successful. Using net gain/loss as the measure of success, the Compensatory Wetland Mitigation Program has been successful in creating/restoring nearly 44 acres of wetland over what was required by permits.

What is clear from these numbers is that while the program as whole has been marginally successful, individual sites have done exceptionally well, which has resulted in the large overall net increase. What is also evident from the results of this study is that sites that have been constructed in the last five years are more successful than sites constructed five or more years ago. Of the sites constructed in the last five years, 75 percent meet or exceed permit requirements. Whereas, only 33 percent of the sites constructed five or more years ago meet or exceed permit requirements.

What this suggests is that the Iowa DOT Compensatory Wetland Mitigation Program has been improving with time. The precise reasons for the improvement are beyond the scope of this study, but in all likelihood stem from improved site selection criteria and better site design.

It is recommended that the Compensatory Wetland Mitigation Program take a closer look at what has made certain sites so successful, specifically the Akron Wetland Mitigation Site, Colo Bogs Cummings Tract and the Abma Tract, so that those features can be incorporated into the concept/design of future sites.

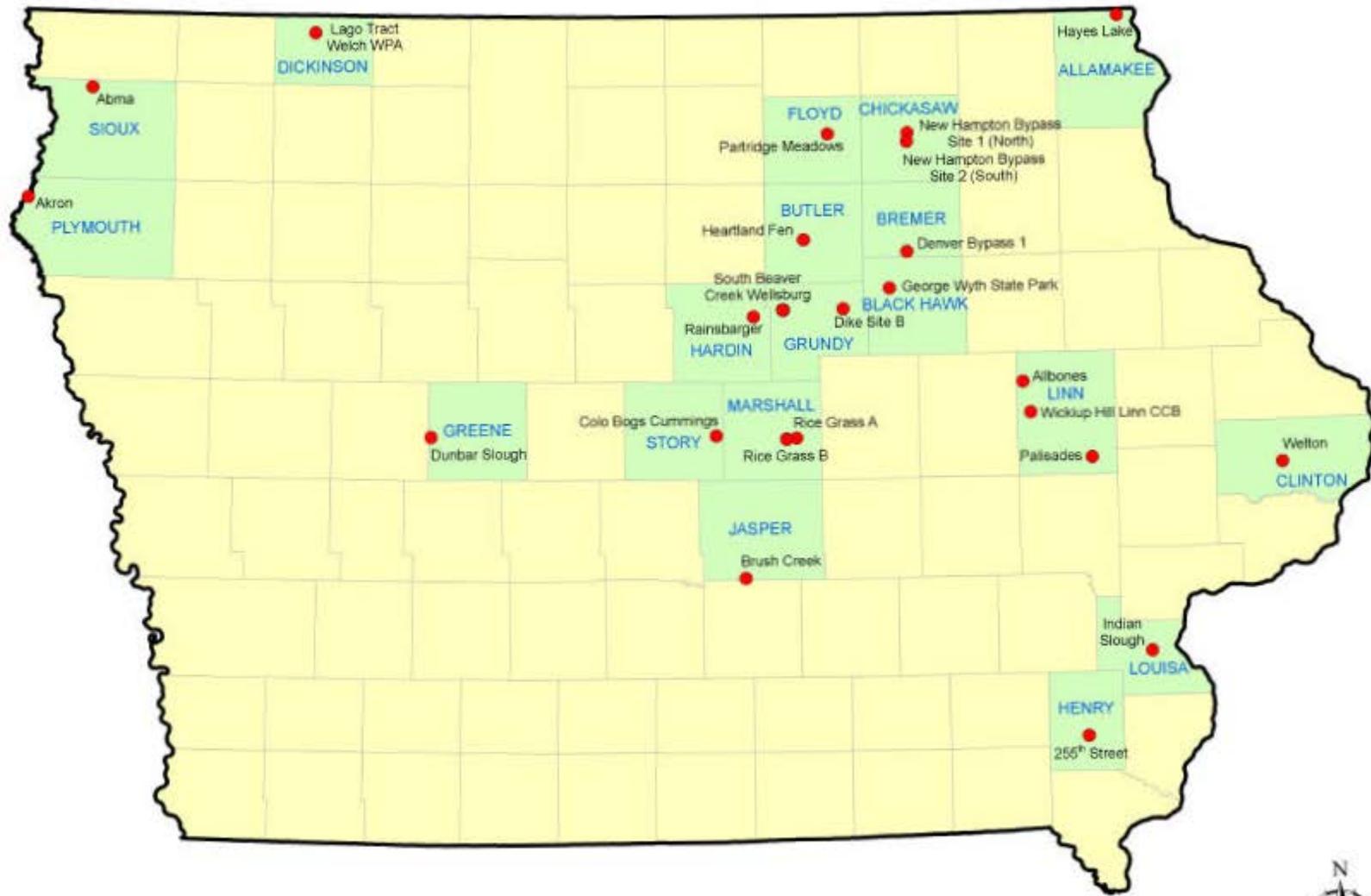


Figure 1. Study Site Locations



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