

**Wetland Activities in Wisconsin: Status Report for 2006
Gains, Losses and Acre-Neutral Activities**

October 2007



Wisconsin Department of Natural Resources

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

INTRODUCTION 3

COMPILING THE REPORT 3

WHAT IS TRACKED?..... 4

FOUR REPORTING CATEGORIES –GAINS, ACRE-NEUTRAL RESTORATIONS, LOSSES, ACRE-NEUTRAL DISTURBANCES..... 4

RESULTS..... 6

 TRACKABLE WETLAND GAINS 6

 TRACKABLE ACRE-NEUTRAL RESTORATIONS 6

 TRACKABLE WETLAND LOSSES 7

 TRACKABLE ACRE-NEUTRAL DISTURBANCES 7

REGIONAL RESULTS 8

STATEWIDE SUMMARY 9

WHAT IS NOT TRACKED? 12

 UN-TRACKABLE QUANTITY LOSS..... 12

Illegal Fill 12

Drainage 12

 IMPACTS THAT DEGRADE WETLAND QUALITY 13

APPENDIX A: TERMS, ACTIVITY CATEGORIES AND EXPECTED IMPACTS A-1

FIGURES

FIGURE 1. WETLAND PROJECTS AND IMPACTS 5

FIGURE 2. SOUTH CENTRAL WDNR REGION 8

FIGURE 3. WEST CENTRAL WDNR REGION 8

FIGURE 4. NORTHERN WDNR REGION 8

FIGURE 5. NORTHEASTERN WDNR REGION 9

FIGURE 6. SOUTHEASTERN WDNR REGION 9

FIGURE 7. STATEWIDE 9

FIGURE 8. EXISTING WETLAND ACREAGE AND 2006 ACTIVITIES AFFECTING WETLANDS, BY WDNR REGION 11

MAPS

MAP 1. TRACKABLE ACRE GAINS FOR 2006..... 6

MAP 2. TRACKABLE ACRE-NEUTRAL RESTORATIONS FOR 2006..... 6

MAP 3. TRACKABLE ACRE LOSSES FOR 2006..... 7

MAP 4. TRACKABLE ACRE-NEUTRAL DISTURBANCES FOR 2006..... 7

MAP 5. PERCENT OF WETLANDS THAT ARE DOMINATED BY REED CANARY GRASS, PER BASIN 14

TABLES

TABLE 1: ACTIVITIES AFFECTING WETLANDS CONDUCTED IN 2006, BY WDNR REGION..... 12

Executive Summary

This is the first annual report that summarizes and shows locations of activities that affect wetlands across Wisconsin. We have collected data from a variety of existing sources and have created a new data collection system for voluntary restorations. The amount of acres we report is based on what we have been able to document and map. There are negative impacts to wetlands that we were not able to track by acre, such as illegal wetland filling and draining, degradation from polluted runoff, and habitat fragmentation. Likewise, it is beyond the scope of the project to track by acre positive management and maintenance activities such as prescribed burning and control of invasive species. Some voluntary restorations done by local groups not yet reporting to us may also be missing. Specific limitations of the data are discussed for each reporting system.

For calendar year 2006 we documented 3,737 acres of wetlands across the state that were affected by trackable activities. We report not only on gains and losses of wetland acres, but also on “acre-neutral” activities that affect existing wetlands. These are activities that can have either positive or negative effects on wetland quality but do not result in a loss or gain of wetland acres. We collected two categories of acre-neutral data:

Acre-Neutral: Positive Benefit. Projects that enhance or rehabilitate existing degraded wetlands are expected to be beneficial, but do not increase the amount of wetland acreage. It is difficult to draw a clear line between enhancement/rehabilitation and ongoing management or maintenance activities.

Acre-Neutral: Negative Impact. Permits are granted for activities that disturb wetlands, such as construction of utilities. These activities may not destroy wetlands but are likely to negatively affect them to some degree. Permits require disturbance to be minimized to the extent practicable. It is difficult to assign a date for when permitted activities actually take place on the landscape, since permits are issued before any activity takes place.

For calendar year 2006, the activities we could track and map show that statewide:

Positive Benefits totaled 2,369 acres.

- **Gains.** 1,946 acres were gained through re-establishment of formerly drained wetlands. Much of the gain is accomplished by a partnership of federal, state and local conservation organizations.
- **Acre-Neutral: Positive.** 423 acres of existing wetlands were enhanced or rehabilitated.

Negative Impacts totaled 1,366 acres.

- **Losses.** 95 acres were lost through permitted fill. Permits for fill are granted only for unavoidable impacts that are minimized to the extent practicable. Transportation projects accounted for 40 acres of direct loss.
- **Acre Neutral: Negative.** 1,271 acres were permitted for construction work in existing wetlands.

The net positive benefit of 1,003 acres is 0.02% of the estimated 4.7 million acres of wetland that have been lost in Wisconsin since settlement. This report provides maps and tables that break down the data by activity type and by WDNR Region.

However, tracking data tell only part of the story on wetland status. Monitoring data are also needed to assess the health of existing wetlands and measure the success of restoration projects. Using satellite imagery we have mapped the location of wetlands throughout the state that are dominated by reed canary grass. This invasive species drives out native wetland plant species,

Wetland Activities in Wisconsin: Status Report for 2006
Gains, Losses and Acre-Neutral Projects

drastically reducing floristic diversity. Reed canary grass dominates 509,989 acres of Wisconsin's wetlands. Map 5 shows the WDNR Regions and water basins that have the largest percentages of their wetlands dominated by this invasive species. While these wetlands have reduced plant communities, they likely perform other important functions for flood storage and sediment trapping that contribute to downstream water quality and aquatic habitat.

Introduction

This report is directed to decision-makers and citizens concerned with the status of wetlands in Wisconsin. Wisconsin has lost 47% of the estimated original 10 million acres present at statehood. It is estimated that roughly 5.4 million acres remain. Until relatively recently, wetlands were regarded as wastelands to be drained for farmland or filled for other uses as quickly as possible. Since the 1970s wetlands have increasingly been recognized as valuable lands for the ecosystem services they provide. Flood control managers and emergency planners utilize the storage of flood water that occurs in floodplain wetlands to reduce flooding. Water quality and fisheries managers recognize the critical role wetlands play in maintaining healthy lakes, streams and watersheds. Hunters, trappers, anglers, and nature enthusiasts appreciate the fish and wildlife habitat that wetlands provide.

The Clean Water Act, first enacted in 1972, set in place legal protections for wetlands that prevent people from filling them if a practical alternative exists for their project. The federal government, instead of encouraging the draining of wetlands, now has many incentive programs encouraging people to restore, enhance and protect them. Water scientists have demonstrated the important roles wetlands play in reducing downstream flooding, and providing cleaner water by filtering and trapping sediments and pollutants.

Debate over wetland policy and management takes place at all levels of government, from the U.S. Supreme Court to the local Town Board. As scientists work to better understand wetland ecosystems, policy-makers and managers struggle with preserving these resources while allowing needed development. At the national level the policy of “no net loss of functions and acres” of wetlands has been revised to seek a net gain of wetland functions and acres.

In 2001, the newly formed WDNR Wetland Team and the Natural Resources Board articulated “Reversing the Loss” as the strategy for Wisconsin wetlands. The strategy took a step beyond “no net loss” to aim for achieving gains in both quantity and quality. Because we have already lost roughly five million acres of wetlands, protecting remaining wetlands and restoring former wetlands are two major goals of the Wetland Team. Success will lead to reduced flooding, cleaner water, more habitat for wildlife, and good hunting, fishing and outdoor recreation. All of these benefits will save money in the long run and keep Wisconsin a great place to live and visit. This tracking report is one first step in measuring our success in this endeavor.

Compiling the report

With this report, the Department seeks to provide the best available data from a variety of sources on wetland activities that took place on the Wisconsin landscape in 2006. The intent is to paint as accurate a picture as possible of the **amount** of wetland gains and losses each year. As we compiled data we recognized that there is a significant amount of activity that affects wetland quality, for better or worse, but does not result in an outright loss or gain of wetland quantity. We describe these activities as “acre-neutral.” These range from projects that are generally positive in their impacts, such as enhancements and rehabilitation of degraded wetland, to projects that can be expected to have a negative effect, such as disturbance from constructing utility lines through wetlands. Some negative impacts can be minimized through careful construction practices and proper restoration following construction.

The information in the report is drawn from a new project tracking system designed and developed with support from a USEPA Wetland Program Development Grant. The grant also supported initial refinements during this first year of reporting. Readers of the report should be aware that projects often take more than one year to plan and complete, and a permit may be

issued in one year for a project that is constructed the next year. For this reason data from multiple years will be required to show the cumulative trend in annual data. If ongoing funding can be secured, we will be able to continue these reports on an annual basis.

Note on Federal Agency Projects

This report is for the calendar year 2006, from January through December. However, the data we collect from two federal agencies, the US Fish and Wildlife Service (USFWS) and Natural Resources Conservation Service (NRCS), are on a federal fiscal calendar year, which runs from October 1, 2005 through September 30, 2006. Therefore, data on some projects completed after September 30, 2006, by these two agencies, may not be included in this report for calendar year 2006. Some October – December projects will still be tracked through WDNR field staff reports, because WDNR often partners with USFWS or NRCS on projects.

Note on Waterway Permits Projects

Due to the design of the waterway permits database, we can only report on projects whose permits were approved during 2006. Staff resources are not sufficient to track the construction completion date for all projects.

Note on Compensatory Mitigation Projects

The numbers reported from this database are taken from as-built reports. These are not the final delineated acreages. They are the estimated acreages post-construction.

Any 2006 data that is entered after the release of this report will be included in an amendment to next year's report. We plan to report annual statistics as well as cumulative statistics with each consecutive year.

What is tracked?

Four Reporting Categories – Gains, Acre-Neutral Restorations, Losses, Acre-Neutral Disturbances

Data was gathered from four different sources: WDNR's new unified tracking database (which includes data imported from the NRCS internal database and the USFWS HabITS – Habitat Information Tracking System database), WDNR's compensatory mitigation database, WDNR's waterway and wetland permit database, and the Wisconsin Department of Transportation (WisDOT) Project File Manager. Figure 1 shows the way we have defined wetland activities, which activity we can currently track, which data source we used to track each activity, and what type of impact is generally expected from the activity. This information is detailed in Appendix A, "Terms, Activity Categories and Expected Impacts." A critical aspect of our efforts is the establishment of a quality control system for counting and mapping project locations to ensure that projects are not double or triple counted.

Wetland Projects and Impacts

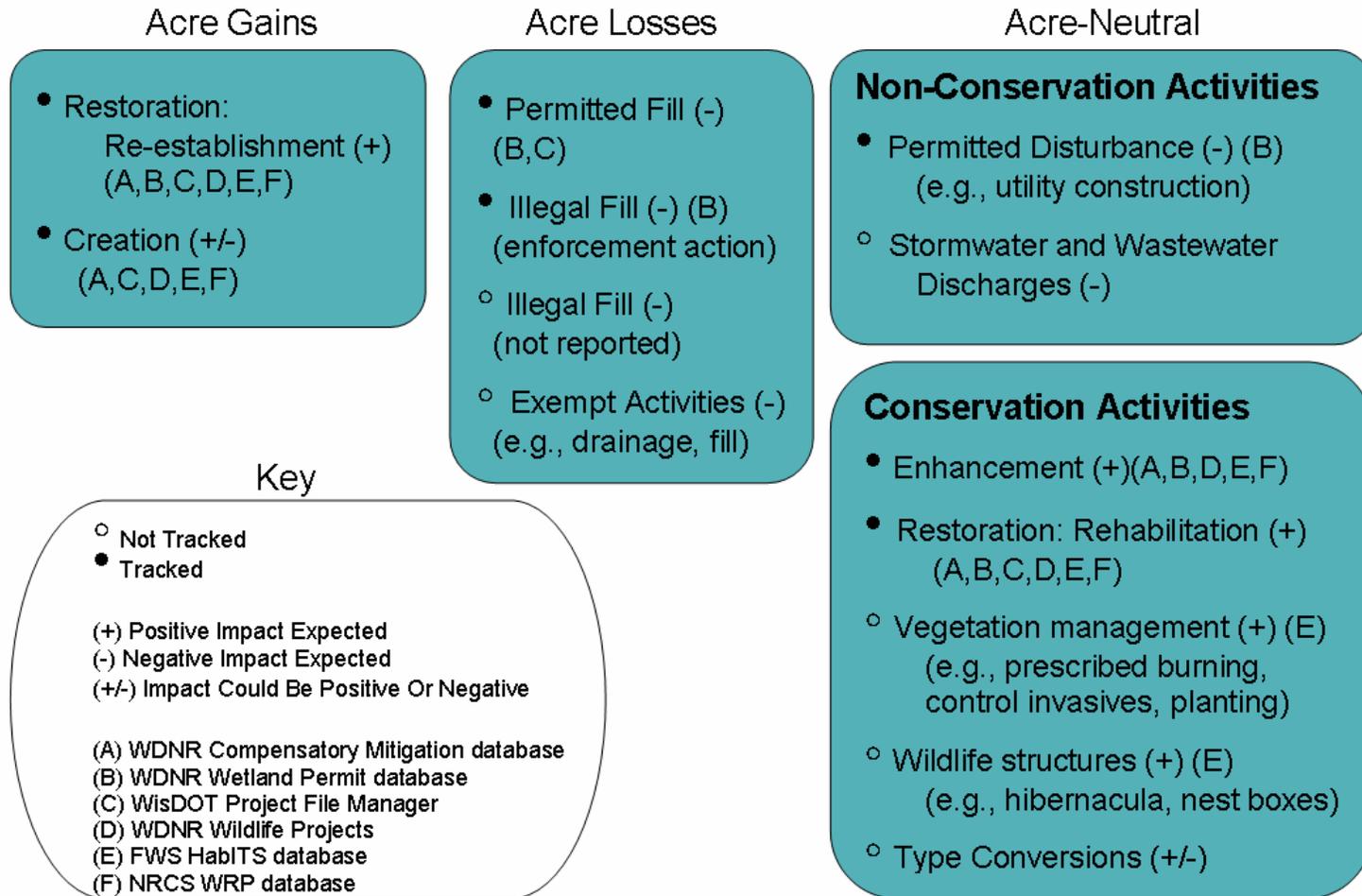


Figure 1, *Tracking Wetland Gains, Losses and Conservation Activities in Wisconsin: A Unified Tracking and Reporting System for Wetland Projects: Permitting, Compensatory Mitigation, and Voluntary Restoration Final Report to US EPA, Region V, 2007*

Results.

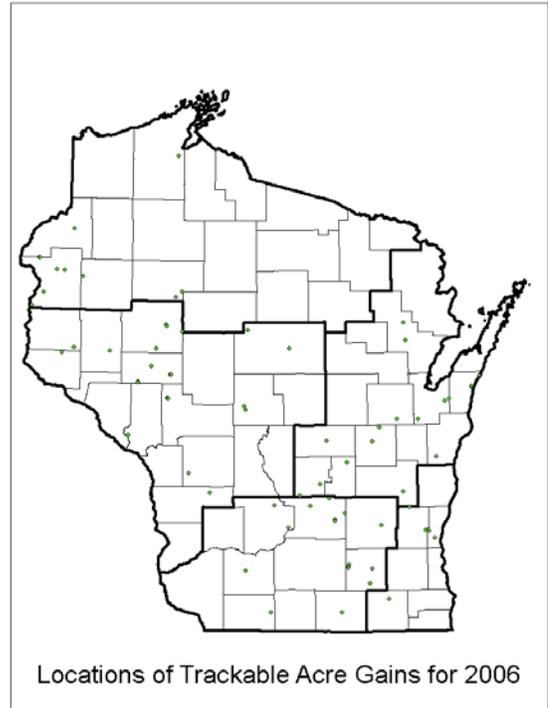
Trackable Wetland Gains

Voluntary Restoration of former wetland (re-establishment). Project data are imported from the major agencies that conduct wetland restoration and track their accomplishments. These are:

- the FWS' HABITS national database
- the NRCS' Wetland Reserve Program (WRP) project tracking national database
- the WDNR Wildlife Management program submits data into the Voluntary Restoration Tracking Database

Data Sources for Restoration Required by Permit

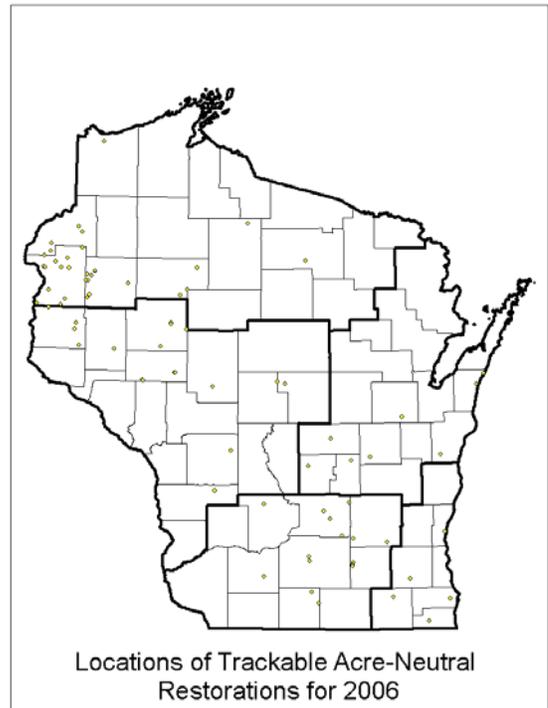
- Compensatory Mitigation
- DOT Restoration
- Mitigation Banks
- Individual Mitigation



Map 1

Trackable Acre-Neutral Restorations

Voluntary Restoration of existing wetland (rehabilitation, enhancement). These are generally expected to have a positive impact on wetland quality. Most projects are done for the purpose of providing wildlife habitat.

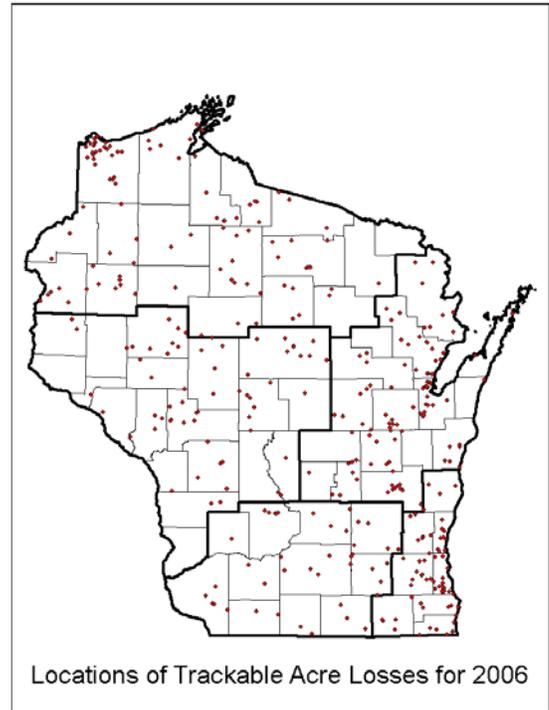


Map 2

Trackable Wetland Losses

Permitted Fills

Fill is put in wetland to convert it to buildable or developable upland. Permits authorize fill for projects including road fill and residential development. Restoration projects also sometimes require small amounts of fill for berms, dikes, ditch plugs and ditch fills; and therefore require a permit. Data sources for wetland fill are: the Wetland and Waterway Permit Database and the Dept of Transportation database. Enforcement Actions on illegal wetland fill may also record the amount of wetland that was filled.



Map 3

Trackable Acre-Neutral Disturbances

Disturbance authorized by permit

These projects are generally expected to have a neutral or negative impact on wetland quality.

Wetland impacts for pipeline and electrical transmission line projects are authorized by the WDNR Office of Energy, and are also tracked through the Wetland and Waterway Permit Database. For example the Enbridge petroleum pipeline project, from Superior to near Whitewater, was permitted in 2006 and could disturb 1,254 acres during construction activities in 2007 and 2008, with 525 acres of forested wetland to be cleared.



Map 4



Regional Results

These pie charts show activities affecting wetlands in each region for 2006.

The majority of the tracked gains for 2006 were in the South Central WDNR Region. This can be attributed to a multi-partnered project that restored 1,195 acres of wetland on a muck farm, now called the Zeloski Marsh in Jefferson County. The same project also was responsible for 146.7 acres in the acre-neutral restoration category for this region.

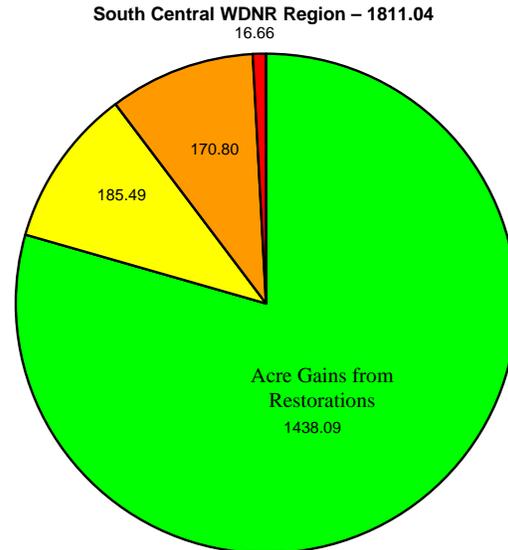


Figure 2

The majority of the acres permitted to be disturbed in 2006 were from an Enbridge Energy project laying new pipeline across Wisconsin. Nearly 92% of the acre-neutral disturbed category for the West Central WDNR Region were from this project. Permits for this project were granted in 2006, but much of the construction will take place in 2007 and some in 2008.

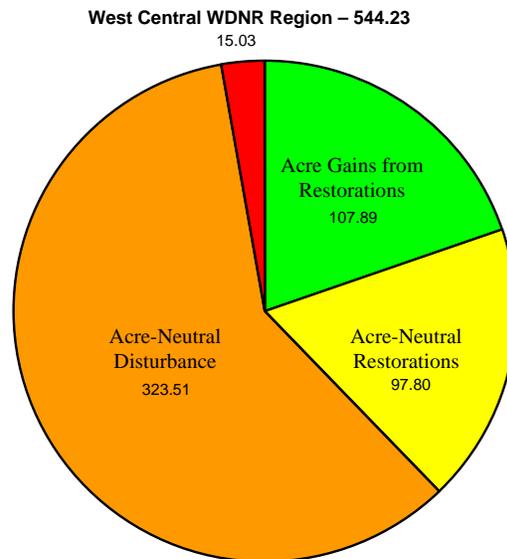


Figure 3

The Northern WDNR Region incurred an even larger sum of acres disturbed from the permits for the Enbridge Energy project. This specific project is responsible for 96% of the acres disturbed category for the state. We anticipate that the acre disturbed category will be significantly smaller in the future.

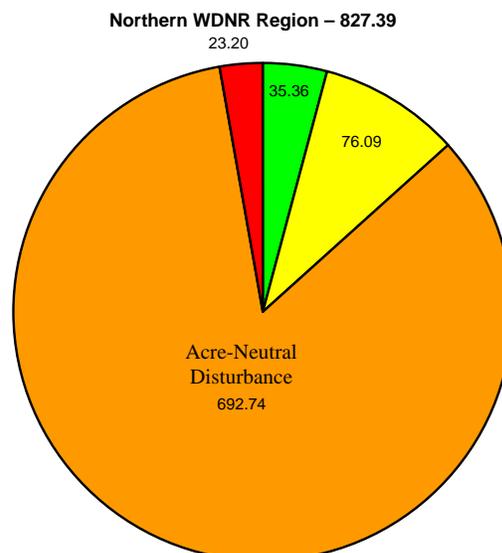


Figure 4

In the Northeast WDNR Region, there was a high percentage of acre gains due to a WisDOT mitigation bank of 126 acres. There were also two NRCS-WRP restoration projects of more than 60 acres each.

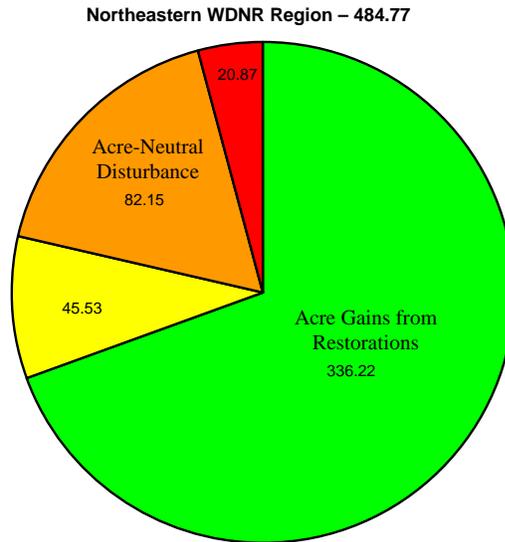


Figure 5

The Southeastern WDNR Region, being the smallest of the five, also had the smallest number of total project acres. However, of all of the regions, it had the highest proportion of acre losses.

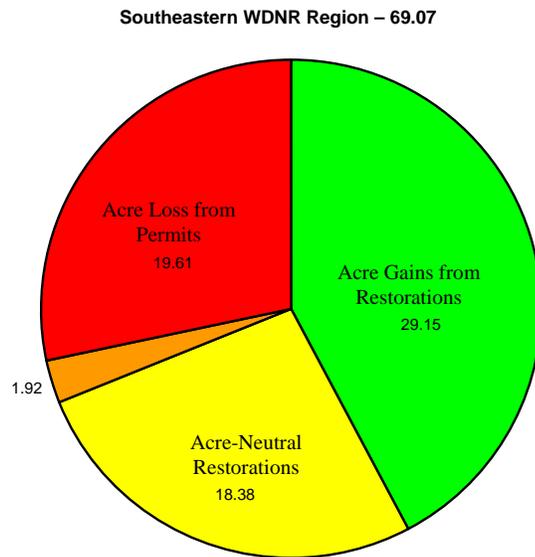


Figure 6

Statewide Summary

Statewide, we lost 55 acres of wetlands in 2006 from WDNR permits and 40 acres from WisDOT projects. We gained a much larger amount through restoration, but the amount of disturbance was also considerable.

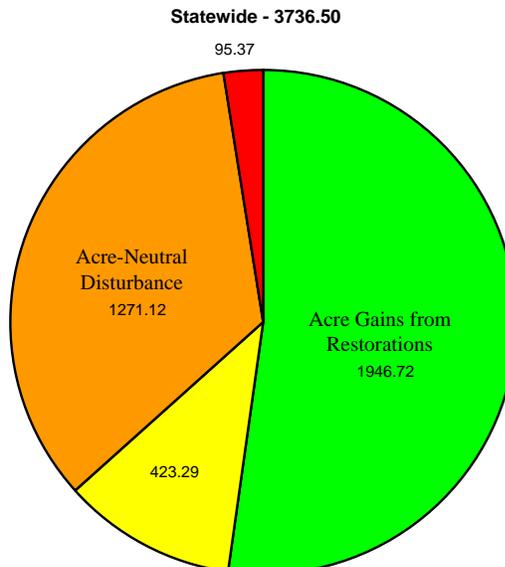


Figure 7

Unfortunately, on the gain side, federal property assessment practices that are currently in effect for the Wetland Reserve Program have resulted in a large decrease in the number of landowners participating in the program. If this is not rectified, the number of acres gained through restoration is likely to decrease drastically. The permitted loss and permitted disturbance numbers for 2007 may also be quite different than 2006, depending on the timing and status of projects.

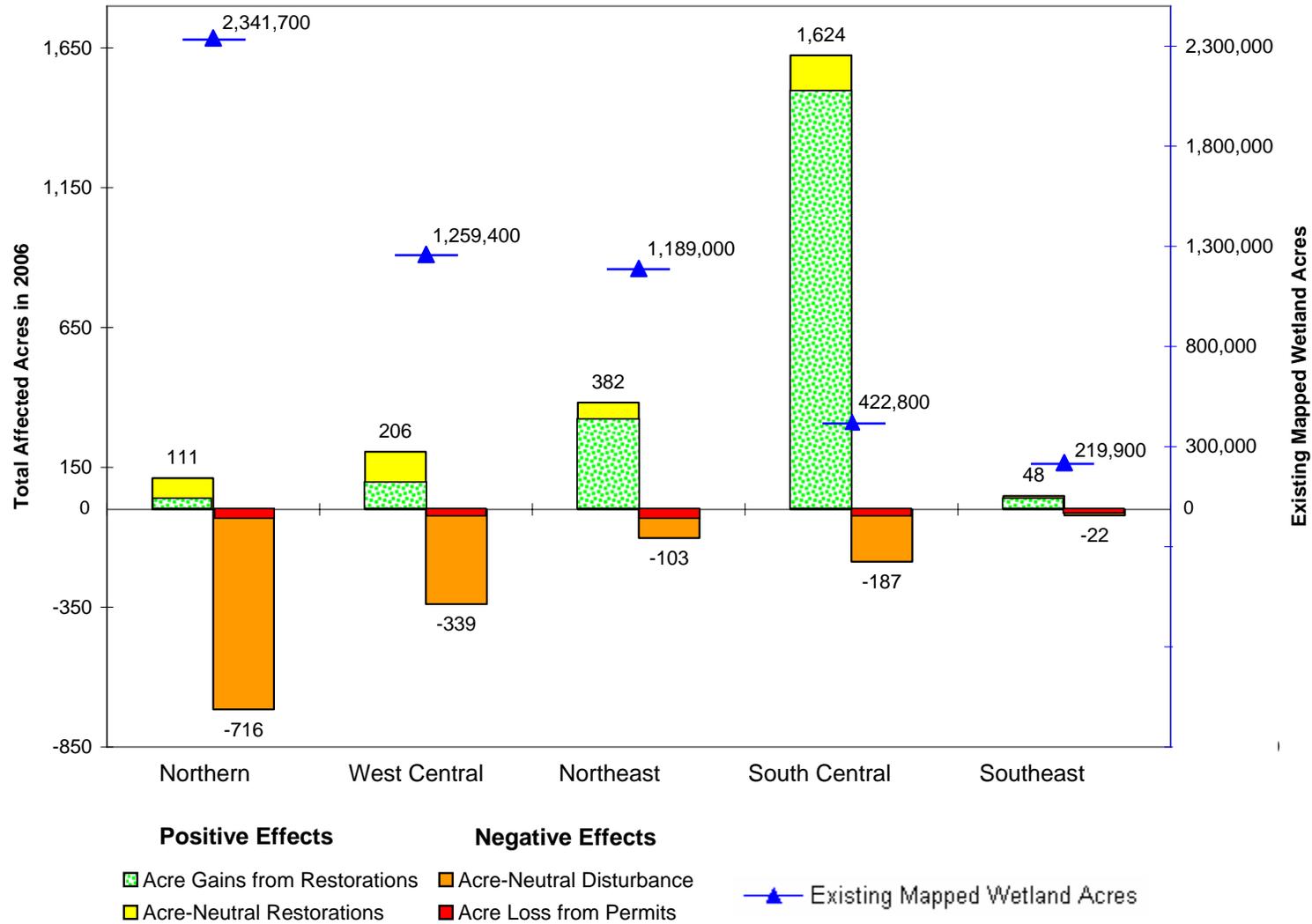
Other factors that could influence the status figures for 2007 and future years:

- increase in the number of agencies and conservation organizations reporting
- increase in the number of activities reported by field staff of current participants
- an increase in the types of activities that are routinely tracked,
- an increase in the detection of illegal fill activities.

Figure 8 shows, by region, a comparison of the positive and negative effects of the activities we were able to track for calendar year 2006. It also shows the amount of existing mapped wetland acreage for each WDNR Region, represented by the triangles. The right-hand y-axis has been used to scale the existing acreage, while the bar graphs for affected acres are scaled to the left-hand y-axis. Note the relatively low amount of existing wetland acreage in the Southeast Region and South Central Region, compared to the rest of the state.

A comparison of existing mapped wetland acreage to estimated original wetland acreage would be even more useful as a measure of the need for restoration. We have produced estimates of original wetland in several watershed projects and will continue to do so for special project plans, as funding is available.

Figure 8: Existing Wetland Acreage and 2006 Activities Affecting Wetlands, by WDNR Region



Wetland Activities in Wisconsin: Status Report for 2006
Losses, Gains and Acre-Neutral Projects

Table 1: Activities Affecting Wetlands Conducted in 2006, by WDNR Region

		Northern	Northeast	West Central	South Central	Southeast	Statewide
Acre Loss from Permits	Permits Database Loss / DOT Loss	11.79 / 11.41	11.58 / 9.29	9.21 / 5.82	9.16 / 7.50	13.64 / 5.98	55.37 / 40.00
Acre-Neutral Disturbance	Permits Database Neutral - Disturbance	692.74	82.15	323.51	170.80	1.92	1271.12
Acre-Neutral Restorations	Permits Database Neutral - Restoration	2.92	16.03	84.07	38.18	2.38	143.58
	Mitigation Database Neutral	0.00	0.00	1.30	0.61	0.00	1.91
	Voluntary Database Neutral	73.17	29.50	12.43	146.70	16.00	277.81
Acre Gains from Restorations	Voluntary Database Gain / DOT Gain	35.36 / 0	210.22 / 126	85.49 / 22.4	1437.73 / 0.36	28.81 / 0.34	1797.62 / 149.1
Total Project Acres		827.39	484.77	544.23	1811.04	69.07	3736.50
Existing Mapped Wetland Acres		2,341,701	1,188,990	1,259,442	422,842	219,946	5,432,923

What is Not Tracked?

We are not able to track all the activities that affect the quantity and quality of Wisconsin's wetlands. It is important to understand the type of data that we are not yet able to track through the new system.

Un-trackable Quantity Loss

Illegal Fill.

Illegal fill activities occur without the Department's knowledge. There is concern that illegal fill is increasing, particularly in the Northern Region. Eighty-five percent of the violations that occurred in 2006 were the result of illegal wetland fills.

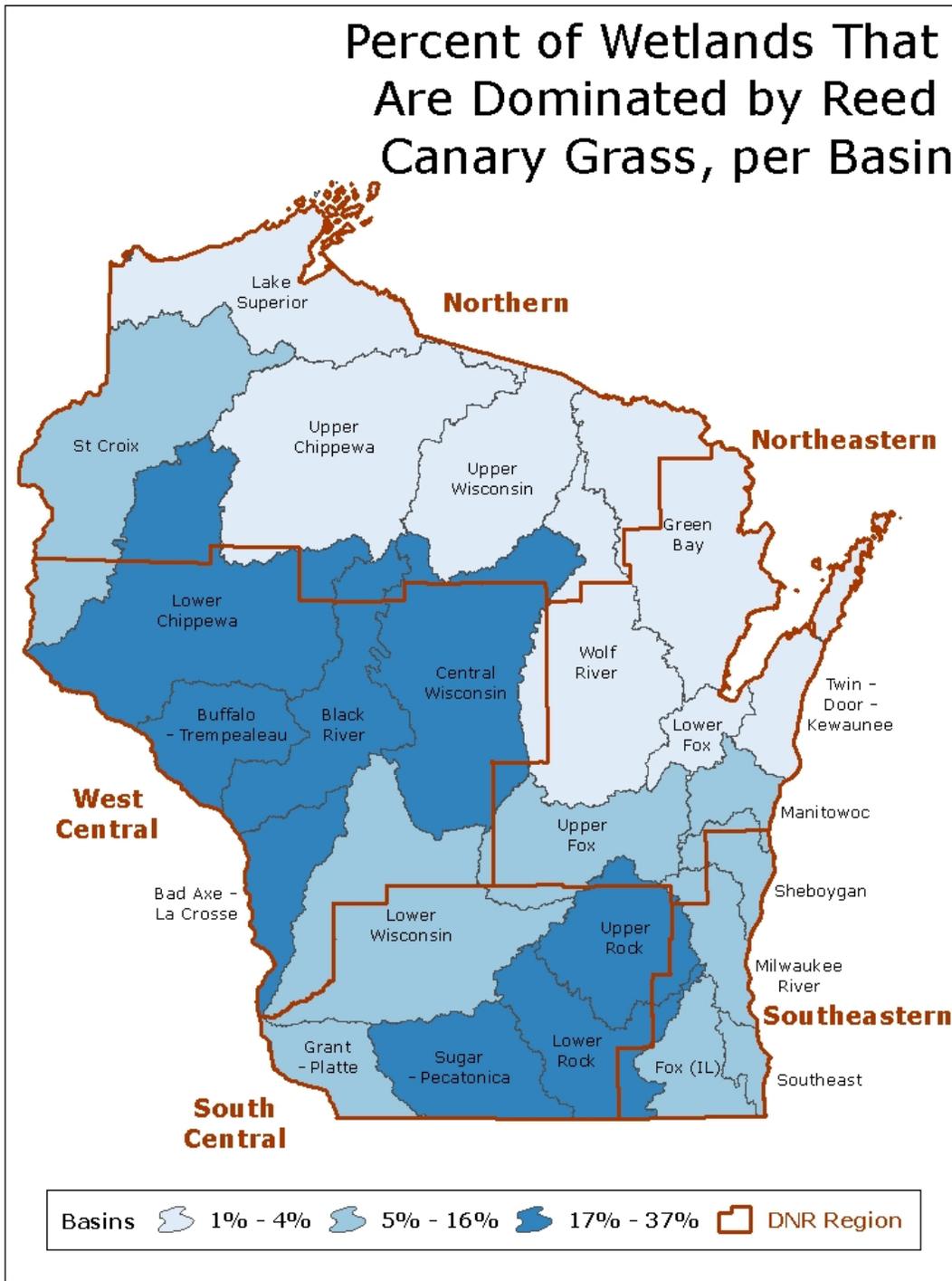
Drainage.

Drainage projects are done to convert wetland to dry land. While drainage for agriculture was a very large source of historical wetland loss, the practice is no longer promoted by the federal government and negative incentives are in place to discourage it, by loss of commodity supports. Drainage projects are not directly regulated and therefore are not reported to any state agency, unless participating farmers wish to retain federal commodity supports. NRCS administers a program for farmers that wish to convert wetland to productive farmland without losing their commodity support benefits. The program allows them to compensate by restoring other wetlands.

Impacts that Degrade Wetland Quality

In addition to gains or losses of wetland acres, there are many activities that affect the quality of Wisconsin's wetlands. Though they can protect downstream waters, wetlands are degraded when they receive polluted runoff. In agricultural watersheds, sediments and nutrients from eroded cropland and manure-spreading wind up in downstream wetlands. In urbanized areas, the amount of stormwater flowing over pavement and other impervious surfaces increases while the amount of water that can soak into the ground is greatly reduced. The increased flow brings too much water too quickly, stressing plants and dumping sediment and nutrients into wetlands. The result is often an increase in the spread of invasive species. In meadow and marsh wetlands the most problematic species are reed canary grass (*Phalaris arundinacea*), giant reed grass (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*). In meadows and wooded wetlands, there are invasions of buckthorn trees (*Rhamnus cathartica*) and honeysuckle shrubs (*Lonicera sp.*).

Monitoring the predominance of invasive species is one way to measure wetland quality. The Department has recently completed mapping wetland areas that are now dominated by the invasive grass species reed canary grass. By using Landsat satellite imagery and extensive ground-truthing to improve accuracy we were able to classify the entire state's non-forested wetlands into those dominated by reed canary grass. Map 5 shows where reed canary grass makes up the highest percentage of the wetlands in a water basin. For example in the Upper Rock Basin, 26% of wetlands are dominated by reed canary grass, putting it in the 17% - 37% range, the most severely impacted class. Over the entire state we mapped 509,989 acres of reed canary dominated wetlands. This is a major negative effect on wetland quality that needs to be considered. It is clear that to report a more complete picture on the status of wetlands we will need to develop more measures of wetland quality.



Map 5

Appendix A: Terms, Activity Categories and Expected Impacts

The terms used in the report include broad “umbrella” terms like “restoration” and “conservation” that in common usage cover many different activities. To produce uniform, consistent annual reports, terms must be more narrowly defined, yet not so technical as to be confusing to managers and decision-makers. Figure 1 outlines how wetland activities will be characterized as “gain”, “loss” or “acre-neutral” and the working assumptions about the impacts we expect from a given activity. The definitions we adopt here are based on those first developed by a federal interagency committee to use in reporting wetland conservation activities (Clean Water Action Plan, 2000). Later, these were slightly modified by the US Army Corps of Engineers in Regulatory Guidance Letter No.02-2, December 24, 2002. We use the 2002 guidance letter for the definition of restoration, enhancement and establishment (creation) and the Clean Water Action Plan for the definition of the two subcategories for restoration: reestablishment and rehabilitation. We adopt them here because these terms enable consistent tracking of wetland conservation activities.

Restoration: Re-establishment or rehabilitation of a wetland with the goal of returning natural or historic functions and characteristics to a former or degraded wetland. Restoration may result in a gain in wetland function and/or acres.

- **Re-establishment** - the manipulation of the physical, chemical or biological characteristics of a site with the goal of returning natural/historic functions to former wetland. Re-establishment results in rebuilding a former wetland and results in a gain in wetland acres.
- **Rehabilitation** - the manipulation of the physical, chemical or biological characteristics of a site with the goal of repairing natural/historic functions of a degraded wetland. Rehabilitation results in a gain in function but does not result in a gain of wetland acres.

Enhancement –activities conducted within existing wetlands that heighten, intensify, or improve one or more wetland functions. Enhancement is often undertaken for a specific purpose such as to improve water quality, floodwater retention, or wildlife habitat. Enhancement results in a change in wetland function(s), but does not result in a gain in wetland acres.

Establishment (Creation) – the manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site, where a wetland did not previously exist. Establishment results in a gain in wetland acres.

Assumptions About Wetland Activities and Their Expected Impacts

Figure 1 shows the assumptions we have made in order to sort project data into the general categories of acre gains, losses and acre-neutral projects. We have used straightforward definitions to assign projects into gains and losses of wetland acres. “Acre-Neutral” is a category that we had to create to handle the many projects that take place in existing wetlands and do not result in a loss or gain of acres. This is a catchall category that includes a wide variety of projects, with impacts that can be expected to be positive or negative, or it may not be possible to determine whether the impact will be positive or negative. In order to make the status report more meaningful within the “acre-neutral” category, we list below our general expectations for

Wetland Activities in Wisconsin: Status Report for 2006 Losses, Gains and Acre-Neutral Projects

whether the impact of types of activities will be positive, negative, or cannot be determined. These are only categorical expectations based on past experience. The impacts of any given project may differ upon investigation, but for tracking and reporting purposes these are the general expectations.

Expected Impact of Acre Gain type activities

(+) Re-establishment of wetland conditions on former wetland results in an acre gain and is expected to be a positive wetland impact.

(+/-) Creation of wetland on land that was not wetland in the past (based on lack of hydric soil) results in a gain of acres, if successful; but because the track record of creation projects is poor, we expect that we cannot categorize the impact as always positive. We list the expected impact as “+/-“ meaning the impact could be positive or negative.

Expected Impact of Acre Losses

(-) Permitted Fill. Though federal and state laws require avoidance and minimization of wetland impacts, permitted losses of wetland will have a negative wetland impact.

(-) Illegal Fill is expected to be a negative wetland impact. Some illegal fills are reported and enforcement action is taken. These are recorded in the wetland permit database. When resolution of the violation includes restoration, that is also documented. Illegal fills that are not reported cannot be accounted for in our reports. A tracking report will always under-report on the total amount of losses due to wetland fill.

(-) Drainage projects are also a cause of wetland loss. Where agricultural commodity supports are not involved, we do not have a mechanism to track the amount of wetland drained. NRCS administers a program for farmers that wish to compensate for converting existing wetlands to non-wetland agricultural land. This data may be available in the future.

Expected Impact of Acre-Neutral Activities

Activities Where Wetland Conservation is Not the Primary Goal

(-) Permitted Disturbance. Permits are issued for some temporary disturbances, such as pipeline or transmission line installation, which do not result in loss of wetland acres but likely result in negative impacts. Generally, there is at least a temporary impact and the possibility of a longer term negative impact due to altering soils and hydrology. Long-term impacts of forest fragmentation and loss of forested wetland can be expected where the project requires clearing and maintaining an open corridor through forested wetland. Though these impacts are minimized to the extent practicable, some negative impact can be expected.

(-) Stormwater Discharge to wetlands. Stormwater treatment facilities are generally not permitted in wetlands, and treatment of stormwater is required before discharging to wetlands. Nonetheless, it is well known that stormwater has detrimental effects on

Wetland Activities in Wisconsin: Status Report for 2006 Losses, Gains and Acre-Neutral Projects

wetlands and other waters, so in Figure 1 we list the expected impact to be negative. While the WDNR reviews stormwater plans for compliance with wetland water quality standards, the stormwater database does not record the locations of permitted discharges to wetlands.

Wetland Conservation Activities

(+) **Enhancement** projects alter wetlands to increase one or more specific wetland functions. However decreases in other functions may occur. For example a wetland could be impounded to increase the amount of open water to benefit waterfowl and anuran species, but this may reduce habitat for other wildlife, such as grassland species, or reduce floristic diversity. While enhancement projects are done for conservation purposes, trade-offs are often involved, making it important to evaluate individual projects outcomes. Further monitoring is needed to report on specific outcomes. For the purposes of this report, enhancements are considered to generally have an overall positive impact on the wetland.

(+) **Rehabilitation** projects can be distinguished from enhancement by their goals and design. Rehabilitation projects are directed toward reversing alterations that have caused degradation of existing wetlands. For example a reed canary grass dominated wetland degraded by partial drainage and sediment delivery from adjacent crop land could be rehabilitated by filling the drainage ditch and removing the sediment to uncover the original hydric soil and release the native seedbank. These projects can be expected to have a positive impact on the wetland.

(+) **Vegetation management** activities are carried out to favor more diverse, native vegetation, by removing or controlling invasive species. This could include prescribed burning or herbicide application. When successful, these activities have a positive impact on the wetland plant community. In contrast to restoration and enhancement, these activities usually are repeated on a long term cycle. Because they are repeated on the same acres periodically, it would be very problematic to track them in our system without double counting.

(+) **Wildlife structures** are artificial structures that provide specific lost habitat elements needed by wildlife. This could include nest boxes or snake boards. The federal HabITS database includes them, but NRCS does not. These are expected to have positive impacts, but they cannot be translated into our acreage-based tracking system so we do not include them.

(+/-) **Type Conversions** are not an activity type, but are an outcome that could be identified by comparing pre-restoration to post-restoration vegetation and hydrology. This requires more effort than we judged we could invest on an ongoing basis in a tracking system, and seems more appropriate as a basic element of future monitoring. The impacts can be positive or negative depending on the pre- and post- wetland type, and consensus on specific cases is elusive. For this reason we list the impacts as +/-.



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