

# Landowner Satisfaction with the Wetlands Reserve Program in Wisconsin

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**ABSTRACT** / We evaluated ecological monitoring data and landowner perceptions to the federally funded Wetlands Reserve Program (WRP) in a three-county region in Wis-

consin. We surveyed landowner satisfaction, involvement, participation, and use of the WRP restoration sites. We found that landowners are satisfied with the overall program (mean,  $3.6 \pm 0.2$  [SE], on a scale of 1–5, with 5 being completely satisfied). WRP restorations significantly increased the area of wetland within the sites surveyed, the increase was primarily of fresh meadow (736.32 ha after restoration). Satisfaction is related to landowner participation during restoration and to the economic incentives provided by the WRP. Landowner satisfaction and the number of plant communities after restoration are unrelated to each other or to restoration and easement costs per hectare. Survey participants recommended some changes to the WRP, including a reduction in the tax rate of land enrolled in the WRP, approval for permanent deer stands, and increased communication with WRP officials during the restoration. Monitoring information collected for WRP restoration sites does not allow assessment of whether WRP sites are functionally equivalent to natural sites. We suggest that the WRP require a more rigorous monitoring program, including guidelines for invasive species control. Managers should also encourage collaborations with external researchers and consider restorations within an experimental framework.

Conversion to agriculture has been one of the leading causes of loss of freshwater wetlands, between 1986 and 1997, 80,000 ha was converted (Dahl 2000). Reduction in wetland area and current agricultural practices in the U.S. states of Illinois, Iowa, Indiana, Missouri, and Wisconsin have caused widespread loss of aquatic habitat and decline in the quality of surface groundwater due to excessive sedimentation, runoff,

and infiltration of fertilizers and pesticides (Nielsen and Lee 1987, Lant and Kraft 1993).

Social and political support for wetland protection has increased with recognition of the importance of wetlands for the ecological services they provide, i.e., flood control, water quality improvement, and refuges for biodiversity (Lant and Kraft 1993, Mitsch and Gosselink 2000). Currently, most wetland types are protected through a variety of federal and state programs (Whigham 1999). Protection policies have been designed both to slow conversion to agricultural uses, e.g., the Wetland Conservation provision or Swampbuster, and to restore converted wetlands, i.e., the Wetlands Reserve Program (Parks and Kramer 1995, Whigham 1999).

The Wetlands Reserve Program (WRP) is a federal easement program where farmers retire marginal land from agriculture by establishing conservation easements on their property in exchange for financial incentives. The WRP is administered by the Natural Resources Conservation Service (NRCS), an agency of

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the US Department of Agriculture (USDA). Direct benefits of the WRP include an increase in wetland acreage (NRCS 2002), reduction of groundwater contamination from agricultural sources (Lant and Kraft 1993), flood prevention, and increases in groundwater recharge and wildlife habitat (Heimlich and others 1989). The WRP can also help achieve the policy goal of “no net loss,” no further loss of wetlands from the remaining area total (Carey and others 1990). An indirect benefit is the commodity supply control from taking existing cropland out of production (Heimlich and others 1989). The 1990 Farm Bill established the WRP. Initially, the WRP began as a 9-state pilot program in 1992 and expanded to all 50 states in 1995. At the end of fiscal year 2002, 516,629 ha was enrolled in the program (Poe 1998, NRCS 2002). The 2002 Farm Bill reauthorized the WRP and set a goal to enroll 101,171 ha each calendar year through 2007, up to 920,680 ha (WRP 2002).

The WRP offers three easement options: (1) permanent, where USDA pays 100% of the agricultural value of the land and the full cost of restoring the wetlands and uplands, (2) 30-year, 75% of easement and restoration costs, and (3) cost-share agreement, where the landowner maintains the restoration for a 10-year period in exchange for 75% of the restoration cost. In every type of easement, the holder retains private ownership of the property but must conform to easement restrictions, such as ending agricultural practices and removing permanent structures. The NRCS provides technical support during the restoration, and other agencies and private conservation organizations are encouraged to defray restoration costs as a way to reduce the landowner's share. To enroll in the WRP, landowners must file with the NRCS to have their property evaluated. The evaluation criteria include type of wetland, ease of restoration, location, proximity to other wetlands, and factors that may impede restoration efforts (NRCS 2002, WRP 2002).

Enrollment in the WRP is influenced by perceived opportunity costs, program payments, and land quality. An increase in agricultural benefits tends to decrease participation and an increase in the net benefits of wetland restoration increases participation (Parks and Kramer 1995). Landowners' opinions and satisfaction with the program can also affect enrollment (Kitchen 2002). We evaluated satisfaction of landowners enrolled in the WRP in a four county region of Wisconsin. This state has a high density of least-cost hydric cropland (Carey and others 1990) and over 12,140 ha is already enrolled in the WRP (NRCS 2003). We hypothesized that economic and ecological factors were related to satisfaction. Specifically, we asked: (1)

Are economic incentives related to the outcome of restoration? (2) Are economic factors and the ecological characteristics of the restored sites related to landowner satisfaction? and (3) Are landowners satisfied with the economic incentives received and the restoration program? We use this information to provide management recommendations that might increase landowner participation.

## Methods

We selected WRP projects in a four-county area in south-central Wisconsin including Dane, Columbia, Jefferson, and Marquette counties. These counties are located in the geographical provinces of the central plains and eastern ridges and lowlands of Wisconsin (Martin 1965). We identified 110 projects in this area, which constitute 25% of all WRP sites in Wisconsin. We excluded 41 sites, 23 that had not yet been restored, and 18 sites that are currently owned by nonprofit, state, and federal agencies such as the Audubon Society and the US Fish and Wildlife Service.

The analysis had four stages. First, we obtained restoration and easement costs for each WRP site. Second, we analyzed NRCS monitoring records to summarize available ecological information for each site, collected before and after restoration. Third, we sent surveys to former and current landowners to assess their satisfaction with the WRP. Finally, we related ecological characteristics of each site to costs and to landowner satisfaction. The study was carried out between February and June 2003.

Restoration and easement cost per hectare were derived using both the total project area and the wetland area after restoration. NRCS personnel collect monitoring data before and after restoration at each site (Table 1). Current policy mandates monitoring every 3 years; in some cases the data included a predicted outcome of restoration, Monitoring, tracking, and easement records were provided by the NRCS. These data included coarse physical and ecological descriptions of each site, easement payment, and restoration costs. For the 69 sites selected, 47 sites had postrestoration monitoring data available, 34 sites were monitored before restoration, but data from only 29 sites were appropriate for post- and preres-toration pairwise comparisons. Twenty sites also included predictions of expected community types. The site evaluations occurred at various times after restoration (1 to 5 years), so we included time since restoration as a variable in preliminary analyses, to determine if time was a significant factor on restoration outcome.

Table 1. Environmental variables surveyed by the Natural Resources Conservation Service from Wetland Reserve Program sites before and after restoration

Variable	Description
Area	Wetland, drained wetland, upland, and total area, pre- and postrestoration and predicted
Cover types	Type (see Appendix 1), area, and percentage of total project, pre- and postrestoration and predicted
Functions and values (presence)	1. Wildlife and fishery habitat: waterfowl habitat (standing water, 50:50-open cover: plant cover), upland nesting habitat (dense cover), amphibians and reptiles (shallow water areas, <1 ft), shorebirds (flats or exposed shorelines), or fish habitat (supports fish at some point during the year) 2. Value to society: areas that provide educational, recreational, or aesthetic values 3. Water quality: flood control, traps sediment, groundwater recharge, and groundwater discharge.
Vegetation and soils	1. Vegetation types: emergent, submergent, floating leaf, nonnative/invasive, and endangered/threatened species habitat 2. Soil: topsoil replaced within scrapes, mineral topsoil, organic topsoil, or compact substrate within scrapes
Hydroperiod	Categorized as 1–25%, 26–50%, 51–75%, and 76–100% according to the duration of inundation (permanent, intermittent, semipermanent, artificial, seasonal, and temporary) and soil saturation (permanent, extended periods)

Table 2. Variables used in the analysis of Wetland Reserve Program sites in Wisconsin

Factor	Variable
Economic	Easement cost Restoration cost
Ecological	Number and area of each community type after restoration Presence of <i>Phalaris arundinacea</i> Presence of <i>Urtica dioica</i> Anticipated wetland area Initial wetland area
Environmental	Time since restoration Buffer type Presence of open water
Social	Landowner satisfaction Landowner participation Use of wetland

We selected a subset of factors from the available data, to provide a surrogate for wetland function and improvement (Table 2). NRCS classifies communities into 28 types. We condensed these categories into eight for ease of analysis: agricultural, bog, fresh meadow, marsh, open water, shrub swamp, upland, and wooded swamp (Appendix 1). We compared number of communities prior to restoration to the most recent site evaluations using paired *t*-tests (Sokal and Rohlf 1995). We explored the relationship between economic and ecological factors. Costs per unit area (easement and restoration) were compared to the number of plant communities, percentage wetland converted, and area of each wetland community, using linear regression. In some cases, NRCS combined sites from several adjacent

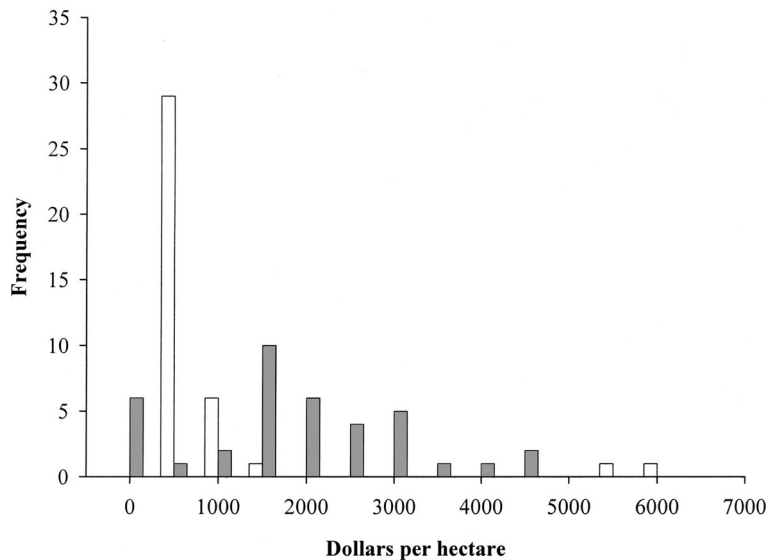
landowners into one larger restoration project. In these cases, landowners received individual easement payments, but one restoration payment was recorded for the whole project. We eliminated sites for which no individual restoration payments could be obtained to avoid pseudoreplication. Thus, final sample sizes for analysis varied from the original number of sites.

Eighteen of the 69 sites surveyed were sold and purchased by new owners after the WRP easement was established, and some sites changed owner more than once. Thus, we developed two semistructured questionnaires (Appendix 2). One questionnaire was designed for individuals who enrolled their property into the WRP directly (initial owners). The second survey was aimed at individuals who bought land that already had a WRP easement (new owners). The surveys assessed landowner satisfaction with the restoration process, including participation in planning and implementation, reasons to enroll in the WRP, and activities within the restoration site. An open comments section was also included. The survey was approved by the University of Wisconsin's Health Sciences Human Subjects Committee. We employed a modified version of the Total Design Method (Dillman 1978); this is a standard method for mail surveys. In March 2003, we sent a letter to 93 former and current owners describing the survey and asking their assistance. Five days later, we sent the surveys, with a cover letter asking for their return within 2 weeks. After this period, we sent a reminder postcard to landowners who had not replied. Survey results were compiled and open comments were recorded and categorized, all responses remained anonymous.

Table 3. Mean area of plant communities in Wetland Reserve Program sites in Wisconsin<sup>a</sup>

Cover type	Prerestoration ( $n = 34$ )	Projected ( $n = 20$ )	Postrestoration ( $n = 47$ )
Open water	$0.16 \pm 0.09$	$0.27 \pm 0.14$	$1.67 \pm 0.61$
Marsh	$0.86 \pm 0.36$	$10.11 \pm 4.20$	$12.39 \pm 4.90$
Fresh meadow	$5.59 \pm 2.32$	$28.73 \pm 12.02$	$23.26 \pm 6.89$
Shrub swamp	$1.70 \pm 1.61$	$0.50 \pm 0.29$	$3.90 \pm 1.93$
Wooded swamp	$1.35 \pm 0.87$	$0.84 \pm 0.52$	$4.24 \pm 3.03$
Agricultural	$30.08 \pm 9.80$	$0.17 \pm 0.12$	$0.41 \pm 0.37$
Upland	$3.05 \pm 0.98$	$3.28 \pm 1.44$	$2.39 \pm 0.74$
Number of communities	$2.46 \pm 0.27$	$2.59 \pm 0.24$	$4.98 \pm 0.22$

<sup>a</sup>Area in hectares (mean  $\pm$  SE) indicated for sites with available pre, post, and projected coverage.



**Figure 1.** Distribution of cost per hectare of restoration of wetland areas enrolled in the Wetlands Reserve Program in Columbia, Dane, Jefferson, and Marquette counties, Wisconsin. Filled bars indicate the easement payments made to landowners. Open bars indicate the cost of restoration per hectare in enrolled property.

We explored the correlations between environmental and ecological factors, cost per unit area, and survey data using logistic and ordinal logistic regression. Then we used proportional odds (Jaccard 2001) to build a model based on the correlations to predict landowner satisfaction. Area and survey responses are reported as Mean  $\pm$  SE.

## Results

The average size of the restored sites we surveyed was  $52 \pm 9.2$  ha. Time since restoration was not a significant predictor of any ecological or social variables. Therefore, we used the most recent monitoring event for analyses. Comparing sites with pre- and postrestoration data ( $n = 29$ ), we found a significant decrease in agricultural land ( $52 \pm 13.9$  to  $1.02 \pm 0.08$  ha;  $P < 0.01$ , paired  $t$ ) following restoration (Table 3). The most common community after restoration was fresh meadow, which comprised 52% of the 1416 ha surveyed. In

74% of sites monitored after restoration, *Phalaris arundinacea* (reed canary grass) was present, while *Urtica dioica* (stinging nettle) occurred in 35% of sites. In the 20 sites that had both predicted and observed wetland area, there was more open water ( $1.86 \pm 0.57$  vs.  $0.2 \pm 0.1$  ha;  $P = 0.04$ ) and swamp ( $5.1 \pm 3.0$  vs.  $0.85 \pm 0.45$  ha;  $P = 0.002$ ) than predicted. Comparing sites with prerestoration information ( $n = 34$ ) to sites with postrestoration monitoring ( $n = 47$ ), we found a significant increase in the area of all plant communities following restoration ( $P < 0.05$ , two-sample  $t$ ; Table 3).

The money allocated to WRP projects is used primarily for landowner easement payments. The cost of restoration in the four-county area was  $\$407 \pm 136$  per ha and was log-normally distributed, while the average easement payment was  $\$651 \pm 61$  per ha and showed a normal distribution (Figure 1). There was no relationship between the total cost, easement payment, or restoration costs per unit area and the number of plant

Table 4. Survey responses for landowners enrolled in the Wetlands Reserve Program (WRP), including those who enrolled in the program directly and those who bought land after the easement<sup>a</sup>

Survey response	Count	Proportion
<i>Motivation for original landowners (n = 52)</i>		
Economic	37	0.71
Recreation	31	0.60
Environment	42	0.81
Other	11	0.2
<i>Motivation for new landowners (n = 14)</i>		
Economics	1	0.07
Recreation	8	0.57
Environment	6	0.43
Other	3	0.21
Survey measure	Mean	SE
<i>Involvement (n = 53)</i>		
Planning	2.6	0.2
Implementation	2.7	0.2
Monitoring	2.8	0.2
<i>Satisfaction (n = 53)</i>		
Economics	3.9	0.2
Recreation	3.5	0.2
Participation	3.2	0.2
Overall	3.6	0.2

<sup>a</sup>Counts are number of respondents who checked the factor as significant for their decision to join the program or as significant for their decision to purchase land with a WRP easement. Survey measures are for the original owners, reported as averages that represent the importance score of each factor. Importance scores ranged from 1 to 5, with 1 representing never and 5 representing frequently.

communities after restoration, percentage increase in wetland habitat at a site, or percentage increase in any of the individual plant communities.

We obtained an 80% response rate in the survey. Mean satisfaction of landowners with the overall program was  $3.6 \pm 0.2$  (on a scale of 1–5, with 5 being completely satisfied). For specific aspects of the program, landowner satisfaction values varied from  $3.9 \pm 0.2$  (scale of 1 to 5) with landowner satisfaction with monetary incentives received, to  $3.5 \pm 0.2$  with recreational opportunities, to  $3.2 \pm 0.2$  with the amount of participation in planning. Landowners indicated that they were involved in planning, implementation, and monitoring of the restoration (initial owner  $2.6 \pm 0.2$ ; new owner,  $2.8 \pm 0.2$ ) (Table 4).

Eighty-one percent of initial landowners reported that protection of the environment was a primary reason to enroll in the WRP, 71% identified economic incentives, and 60% indicated recreational opportunities on the restored wetland (Table 4). Fifty-seven percent of new landowners indicated that recreational opportunities influenced their decision to purchase and 43% cited protection of the environment. Only 7% mentioned economic incentives as a reason to pur-

chase (Table 4). Both initial and new owners said they sometimes or frequently bird-watch and nature-walk in the restored wetland ( $3.2 \pm 0.27$  and  $3.3 \pm 0.2$ , respectively) (Figure 2). However, they responded that they rarely ( $1.2 \pm 0.37$ ) fish or canoe. New landowners were more likely to participate in recreational activities in their wetland compared to original owners ( $3.0 \pm 0.2$  compared to  $2.4 \pm 0.1$ ,  $P = 0.005$ ,  $df = 101$ , two-sample  $t$ -test).

We found that overall satisfaction of initial landowners correlated well with economic satisfaction ( $P = 0.01$ , odds ratio [OR] per unit increase in survey scale = 2.1) and owner satisfaction with participation in the restoration process ( $P = 0.02$ , OR = 1.8) using logistic and ordinal logistic regression analysis with all of the available environmental, economic, and survey data. The general model of landowner satisfaction is:

$$\text{Overall satisfaction} = \text{Economic satisfaction} \\ + \text{Participation satisfaction}$$

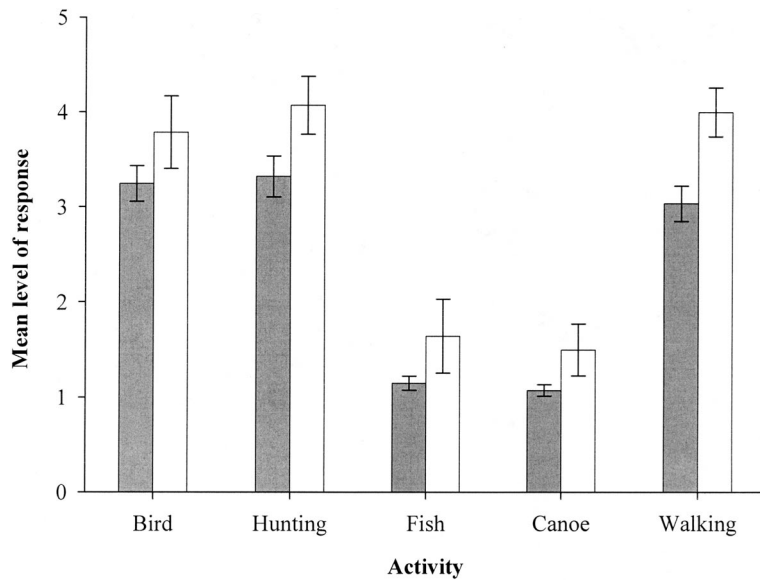
Assumptions of the proportional odds model hold ( $G = 25.6$ ,  $df = 3$ ,  $P < 0.001$ ). The likelihood ratio test statistic is equal to 62.803, indicating that the model is appropriate. No other variables predicted overall landowner satisfaction. Recreational satisfaction was negatively related to the presence of *Urtica dioica* ( $P = 0.08$ , OR = 0.35) and positively related to hunting ( $P = 0.004$ , OR = 1.90).

We found no other significant correlations. Cost per unit area as easement, restoration, and total cost did not significantly correlate with landowner economic satisfaction or with any recreational activities in the restored wetland. Notably, presence of open water, wetland cover type, and number of plant communities were not significantly related to social or economic variables.

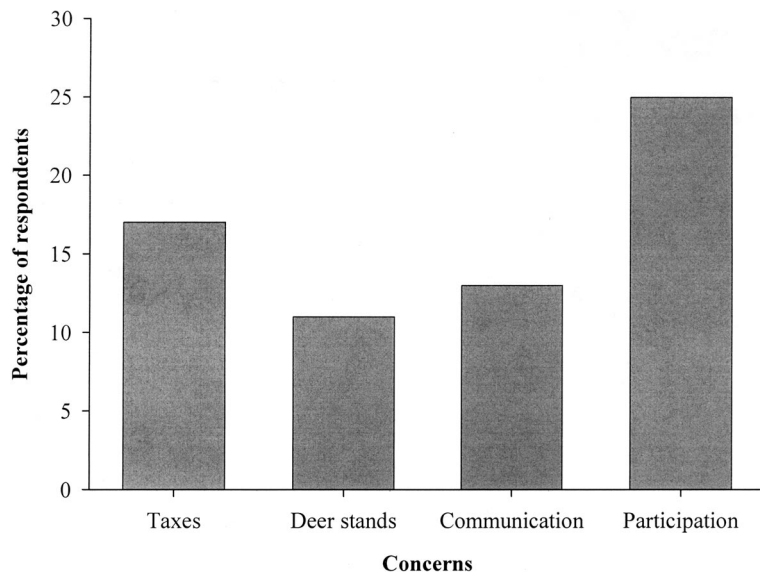
Within the open comment section of the survey, landowners described several common concerns. We categorized any mention of a concern and found that there were four common categories: the restriction on WRP land of permanent deer stands used for hunting, the increase in tax rate following restoration, limited communication with the WRP, and lack of participation in the restoration process were stated by 11 to 22% of all respondents to the survey (Figure 3).

## Discussion

The WRP has increased wetland area (Table 3) while maintaining landowner satisfaction. Our results indicate that overall landowner satisfaction is a result



**Figure 2.** Landowner activities in wetlands enrolled in the Wetlands Reserve Program in Columbia, Dane, Jefferson, and Marquette counties, Wisconsin. Filled bars indicate landowners that enrolled their property and open bars show landowners that purchased the land after enrollment.



**Figure 3.** Concerns indicated by landowners enrolled in the Wetlands Reserve Program in Columbia, Dane, Jefferson, and Marquette counties, Wisconsin. These concerns include the use of deer stands for hunting, the increase in tax rate following restoration, communication with the WRP, and lack of participation in the restoration process.

of economic incentives and participation during the restoration process. However, we did not find a relationship among economic incentives, satisfaction, and wetland characteristics, area and number of plant communities, following restoration. The open commentary responses of landowners indicate that several of concern may be important to the maintenance of landowner satisfaction and success of the WRP (Figure 3). We discuss these findings and present management suggestions to improve the WRP.

The WRP is effectively increasing area of all the categories of plant communities surveyed by decreasing marginal agricultural land. We found no relationship between the cost of restoration and the increase in wetland area or number of plant communities following restoration. Nonetheless, our analysis is not appropriate to draw conclusions on the results of investment in restoration. The data as collected by the NRCS are very coarse and are not collected with enough temporal consistency to quantify changes in biodiversity or wetland function, but only

effective for tallying the overall changes from agriculture to wetland. For example, data available from NRCS indicate that in 74% of all sites the invasive *P. arundinacea* was present following restoration, but there is no indication of the density or amount of cover or any way to describe change (if any) in populations of this species. The information currently gathered during monitoring of WRP sites focuses primarily on plant cover in restored sites, but there is little evidence that vegetative cover correlates with other wetland functions (Mitsch and Wilson 1996, Kentula 2000, Cole 2002). A more comprehensive program should consider both restoration of community structure (e.g., plant cover and composition) and restoration of wetland functions in setting goals and assessing outcomes (Simenstad 1996, NRC Committee on Mitigating Wetland Losses 2001). Restored wetlands need to be ecologically self-sustaining, with the processes that define a wetland present and expected to persist (NRC Committee on Mitigating Wetland Losses 2001).

The WRP would benefit from structured management approach, for example, adaptive management (Walters 2001). Within this framework, monitoring data are used for management decisions, learning optimization, and experimentation. Adaptive management has been recommended for wetland restoration projects (Kentula 2000, Thorn 2000, Zedler and Callaway 2000). Already certain aspects of the program reflect adaptive management principles, i.e., the sites are monitored periodically, the management goals for individual projects are flexible, and involvement with the project is maintained after a set number of years.

WRP participants are predominantly satisfied with the program (Table 4). The level of satisfaction with the WRP we found is similar to that reported by Kitchen (2002), who surveyed landowners enrolled in the US Fish and Wildlife Service's "Partners in Wildlife" program, which includes a large number of wetland restorations. This study found that almost 70% of program participants were satisfied and 89% planned to maintain their projects. Our satisfaction model indicates that landowner satisfaction is driven by participation in the restoration process and by the financial incentive received. In some instances, landowners are involved in the restoration and help shape management plans. However, the inclusion of stakeholders, including landowners, conservation groups, and researchers, is not systematic. Landowners are satisfied with the easement payments received. NRCS has the policy to pay the fair market value of land in each county. This policy likely discourages potential

participants that would not be satisfied with the current price. Therefore, caution should be made when asserting that the fair market values is universally appropriate because these results are biased and do not reflect the actual pool of potential participants. Since enrollment in the WRP is voluntary, these findings could be the result of effective short-term market responses; future studies on the level of satisfaction with easement programs should consider changes in market prices over the period of easement.

Our results indicate that several factors motivate landowner enrollment in the WRP. Initial landowners stated that their primary reasons for enrollment were protection of the environment, economic incentives, and recreational opportunities. New landowners were more influenced by the quality of recreational opportunities and environmental concerns relative to initial owners (Table 4). This group of landowners engages in more recreational activities within their wetlands compared to initial owners. These results reflect the fact that landowners derive nonmonetary benefits from their wetlands, such as recreation. Thirty-three percent of sites in the four-county area we surveyed have changed ownership since placed in the WRP. Eighteen sites are now part of larger conservation or restoration projects. The remaining sites have been bought by landowners for whom the WRP easement and the protection of the environment were incentives.

At a regional scale, economic drivers of enrollment are likely more complex than satisfaction with the easement payment. In general, an increase in agricultural benefits predicts a decrease in participation in conservation programs and an increase in the net benefits of wetland restoration increases participation (Parks and Kramer 1995, Heimlich and Claassen 1998). Enrollment in the WRP is believed to be determined by opportunity costs, program payments, and land quality (Lant and Kraft 1993). Similar reasons were reported for a survey of the USDA's Conservation Reserve Program where managers reported three reasons for farmer participation: (1) guaranteed income, (2) increase in financial returns from land that was not profitable, and (3) assistance in meeting current loan payments (Nowak and Schnepf 1987). None of these studies mentions conservation of the environment as a reason for enrollment. We found that individual landowners indicated that maintaining environmental quality influenced their decision. There is a growing environmental concern among the US population (Kanagy and others 1994), and education has improved the public's perception regard-

ing wetlands and wetland restoration (Rispoli and Hambler 1999).

We did not find a relationship among costs, landowner satisfaction, and outcome of restoration. The cost of restoration per unit area has a much wider distribution than easement payments (Figure 1), because the amount spent on restoration is driven by specific site conditions and requirements, e.g., plantings, seeding, tile removal, etc., while easement payments are determined a regional land value. The only ecological variable that predicted satisfaction was the presence of *U. dioica*, which was negatively related to recreational satisfaction. Although the presence of *P. arundinacea* is a threat to the persistence and development of wetland communities because it forms monotypic stands and replaces native species (Maurer and others 2003), it was not a significant variable in our analysis. This is likely because *P. arundinacea* was reported in 74% of the sites. The presence of invasive and highly competitive native plants is expected in WRP sites as conditions in altered wetlands favor the spread of these species (Srutek 1997, Maurer and others 2003). The prevalence of *P. arundinacea* and *U. dioica* in WRP sites indicates that these areas might be well suited to study and testing of hypotheses related to invasive species.

We conclude that the WRP is effectively converting marginal agricultural lands into wetlands while maintaining a generally satisfied population of private landowners. Nevertheless, we found that over 20% of participants described problems that should be addressed (Figure 2) in the WRP, as they are potential obstacles in encouraging widespread participation in this type of voluntary easement program. These concerns, although in some cases specific to Wisconsin, emphasize the need for changes that both increase the level of participation in the WRP and allow assessment of whether WRP sites are functionally equivalent to natural sites.

#### Management Recommendations

The recommendations aimed to improve the WRP are directed at specific levels of governance: federal, state, and local.

*Federal level.* (1) Establish assessment, control, and management of invasive species as an objective within the restored wetlands. This action would allow testing of hypotheses and practices that limit invasive species, particularly since several species known to be invasive were reported in WRP sites during monitoring, including *U. dioica*, *P. arundinacea* and *Typha x glauca*. Application of current research (Maurer and others 2003) could help restoration professionals

and managers anticipate invasion, act to control existing populations, and reduce invasibility. (2) Provide the framework and resources so that monitoring of restored wetlands is more rigorous is more systematic, and occurs for several years after restoration. Observing wetlands on a longer time scale is a policy widely supported in the literature, where most studies recommend at least 10–20 years of monitoring (Zedler and Callaway 1999, Kentula 2000, Thorn 2000).

*State level.* Sections of property enrolled in the WRP should receive significant tax relief such as full tax exemption following the easement. Under Act 27, published in 1995, tax rates for agricultural land changed from a standard based on fair market value of the land to a use value standard (based on the potential income from the land's rental for agricultural use [Boldt 2002]), to provide tax relief for farmers. After land was placed in the WRP, the tax rate changed to recreational valuation generating a tax penalty. The Wisconsin budget bill for 2003–2005 reclassifies lands adjacent to working farms, such as WRP easements, as "agricultural forest" to be assessed at 50% of fair market value (Office of the Governor 2003). Although this change in the tax law reduces property taxes for farmers, tax levies on conservation easements are a disincentive for restoration. Enrollment in the WRP by state from 1992 to 1995 was negatively correlated with relative tax rates (Poe 1998), Tax incentives to property within wetland mitigation banks in Georgia (Cammack and Van De Genachte 2002), and for landowners who enter into conservation easements in Canada (Department of Justice Canada 1985), have proven effective in encouraging wetland restoration and conservation.

*Local level.* Increase communication with WRP officials and farmers by implementing regular meetings or contacts. This type of action could limit the development of conflict regarding simple issues. For example, assess the impact of temporary deer stand removal. The prohibition of permanent deer stands by Wisconsin's WRP was the most widespread concern for landowners. Currently deer stands need to be removed each season, but there has been no assessment of the damage caused by movement onto and off the site. Permanent deer stands, built under strict size and construction guidelines, might have lower environmental impacts. A change in policy would most likely increase satisfaction of landowners, due to the popularity of hunting in this region. Managers should also encourage collaborations with external researchers and consider restorations within an experimental framework.



## Appendix 1. Wetland Community Classification Used to Monitor Wetland Reserve Program Sites in Wisconsin

Appendix 1. A1. The 28 categories used by the Natural Resources Conservation Service during monitoring grouped into 8 for ease of analysis

Category	Community
Open water	
Marsh	Deep marsh Shallow marsh
Fresh meadow	Sedge Wet meadow Wet to wet-mesic prairies Calcareous fens
Agricultural	Hayland Cultivated crop Herb pasture Drainage ditch
Shrub swamp	Shrub-carrs Alder thicket
Bog	Open Coniferous
Wooded swamp	Hardwood Coniferous Floodplain forest Seasonal flooded basin
Upland	Herb native Herb introduced Grass/shrub Shrub/deciduous Shrub/conifer Tree/deciduous Tree/conifer Tree/conifer/deciduous/mix

## Appendix 2. Summary of Survey Questions to Landowners Who Currently Own and Former Landowners Under the Wetlands Reserve Program

### Current Landowners

1. The restored wetland in your property was, before restoration (check all that apply): wetland, feedlot, cropland, ditch, pasture, forested, hayfield, or other.
2. Is the land surrounding the wetland still farmed? If yes, please indicate the type of farm (dairy, beef, or crop farm), and if crop farm, indicate the main crop.
3. Please tell us how important each of the following reasons were for your decision to participate in the WRP (from most to least important): WRP monetary incentives, recreational (opportunities, protecting the environment, other (please specify).

4. How involved were you in each of the following stages of your WRP project (as not involved, somewhat involved, or very involved) planning and design, putting plan into action, monitoring changes.
5. How satisfied are you with each of the following aspects of your WRP project? Monetary incentives, recreation opportunities, opportunity to participate, overall project outcome.
6. Please describe how often you engage in the following activities in your wetland (as never, sometimes, or very frequently): bird-watching, hunting, fishing, canoeing, and nature-walking.

### Former Landowners

1. Were you aware that your land was enrolled in the WRP at the time of purchase?
2. What influenced your decision to buy (please rank in order of importance): monetary incentives, recreation opportunities, interest in wetlands, or other.
3. Would you have participated in the WRP?
4. As the land surrounding the wetland still farmed? If it is, please indicate the type of farm—dairy, beef, or crop farm—and if it is a crop farm, indicate the main crop.
5. Please describe how often you engage in the following activities in your wetland (as never, sometimes, or very frequently): bird-watching, hunting, fishing, canoeing, and nature-walking.

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