

Evaluating the Acceptance of Wetland Easement Conservation Offers

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U.S. Fish and Wildlife Service wetland easement offers to North Dakota landowners from 1989 to 1998 had a 56% acceptance rate. Logit regression indicates that payment values, farm program certainty, participation history, and the quantity of deep wetlands all positively influenced acceptance. Payments were not sensitive to the use of published county land value data in lieu of appraisals. To increase acceptances, more transparency regarding easement offers and the updating of chart values accounting for the impact of easements on land values are suggested. These case study lessons have implications for other conservation easement programs that rely on private landowner participation.

Acceptance rates associated with easement payment offers made to landowners by various U.S. conservation programs have not been regularly reported and evaluated, which makes it difficult to identify potential institutional and/or economic factors influencing participation in these programs. For example, from the early 1960s to 1998, the U.S. Fish and Wildlife Service (FWS) Small Wetland Acquisition Program (SWAP) purchased 1.2 million acres of wetland easements in the Prairie Pothole states of Montana, Nebraska, North Dakota, South Dakota, and Minnesota at a cost of \$46.7 million (Heimlich et al.). Little is known, however, about such factors as how the FWS calculates easement payment offers, rates of landowner acceptance of easement offers, and other indicators of how efficiently the program is administered.

This research focuses on how levels of compensation, characteristics of wetlands and surrounding land uses, landowner experience with the program, and spatial and temporal factors have influenced landowner participation in the FWS program. This is accomplished through an analysis of accepted and rejected wetland easement payment offers made by the FWS to landowners in North Dakota between 1989 and 1998.

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The study: (a) calculates acceptance rates for wetland easement payment offers made from 1989 to 1998 and across counties; (b) evaluates differences in the characteristics of wetland easement offers among accepted and rejected offers; (c) quantifies the factors influencing the acceptance of easement payment offers using a discrete-choice logit model in order to obtain a better understanding of landowner decision making with respect to easement offers; (d) evaluates the potential impact of using alternative sources of land value data for calculating easement payments; and (e) identifies potential strategies to improve acceptance rates.

There are immediate policy implications of this research on quantifying acceptance rates and the factors influencing participation. First, not all of the current FWS funds available for wetland easements in the Prairie Pothole region are being spent (U.S. Department of Interior, 1998). Second, since it costs the FWS between \$500 and \$1,000 to prepare each easement payment offer in North Dakota (Wacker), the widespread rejection of easement offers is a potentially inefficient use of public funds. Finally, the FWS is concerned whether it under- or overpays for wetland easements because the agency is currently evaluating the adoption of alternative easement appraisal procedures (USDOL, 2003).

This empirical research is also relevant to the more general conservation easement literature. Due to a lack of data on acceptance rates associated with conservation easement offers, previous studies focused mostly on either the theoretical framework of landowner's conservation enrollment decision making or on quantitative analyses only of accepted conservation contracts, which lack the information value embodied in comparing rejected and accepted offers. A better understanding of the factors influencing landowner participation in conservation easement programs is important because of the rapid expansion of incentive-based conservation programs associated with the 2002 Farm Security and Rural Investment Act.

The ability to calculate and monitor acceptance rates and to identify characteristics influencing participation could help guide potential changes in the procedures used to calculate easement payments as well as the design of easement rules and regulations. This information could also be used to develop models that identify particular landowners with the highest probability of accepting conservation easement offers in order to improve the efficiency of promoting and administering conservation programs.

Previous Literature

Claassen et al. found that the conversion of wetlands was sensitive to the profit-maximizing behavior of landowners and changes in expected commodity prices. Heimlich hypothesized that landowners would enroll in the Wetland Reserve Program (WRP) if offered one-time easement payments equal to the capitalized net returns from agricultural production in perpetuity, plus additional compensation for administrative costs, and disruptions to normal farming operations. Parks and Kramer simulated participation in the WRP program based on conservation reserve program (CRP) enrollments. From this data, it was concluded that landowner participation occurs when compensatory payments exceed the discounted present value of a stream of net returns to agricultural production on

easement wetlands (Parks, Kramer, and Heimlich). Cooper and Osborn used an ordered response discrete-choice model to predict the range in rental rates over which landowners would renew their CRP easement contracts. Payment values, the right to hay and graze CRP land, and the pending retirement of farmers positively influenced renewals, while farm income and land value each had a negative influence. Differences were also noted between farmers with and without livestock, regarding their willingness to re-enroll in the CRP program.

Surveys have indicated that WRP participants are concerned about whether easement offers have adequately compensated them for foregone agricultural income, as well as the transparency of the bidding decision process, the permitted uses of easement wetlands, and taxation issues (Despain). Similarly, surveys of conservation easement participants found that personal attachments to land and potential reductions in property taxes and easement payment offer amounts were important factors influencing participation (Elconin and Luzadis; Marshall, Hoag, and Seidl).

Tegene, Weibe, and Kuhn applied Capozza and Sick's framework for modeling land prices as a function of spatial characteristics, asset pricing, and risk to the theoretical valuation of wetland conservation easements. Tegene, Weibe, and Kuhn concluded that both future returns from agriculture and the potential (uncertain) revenue from agricultural to urban land conversions (represented by option values) are critical in evaluating whether landowners accept wetland easements. In contrast, an empirical evaluation of the impact of farmland preservation programs on land values near Baltimore, Maryland, found that landowners embrace such programs and that easement prices paid by conservation agencies could potentially be lowered (Nickerson and Lynch). Finally, an analysis of the early phases of the CRP program found that program costs and nearby land values resulted from landowners being compensated at above market rates due to the existence of fixed upper bid values (Shoemaker).

No known studies have reported acceptance rates associated with the FWS wetland easement program nor have any quantified factors influencing acceptance. This makes it difficult to assess whether this large-scale wetland conservation program has offered landowners both adequate and transparent payments in order to encourage a maximum level of participation subject to available funds.

The FWS Wetland Easement Program

The FWS Small Wetland Acquisition Program began in 1958 and is financed through the sale of Migratory Bird Hunting and Conservation Act Stamps. A FWS wetland easement is a formal and perpetual conveyance of certain property rights from the landowner to the federal government. In exchange for a one-time lump-sum payment, the landowner agrees not to drain, fill, burn, or level existing wetlands. However, grazing, harvesting hay, and growing crops when easement wetlands dry of natural causes, are permitted.

Easement payment offers are calculated and presented to landowners only after both the FWS and landowners agree on the desirability of particular wetlands to be placed under easement. Payment offer calculations involve identifying an easement tract encompassing all wetlands to be placed under easement, appraising land values within the tract, classifying wetland types and acreage, and utilizing

chart values to measure the implicit price of easements. The underlying justification for the payment is that as a potential encumbrance on agricultural land uses, a wetland easement will reduce future income streams of agricultural income that could potentially be obtained by draining and farming wetlands. Alternatively, the easement payments are intended to compensate landowners for the expected price difference associated with future sales of land with and without an easement.

The appraisal of tract land values is based on analyses of nearby (comparable) land sales by FWS realty specialists. Payments for easements on shallow (and potentially drainable) wetlands are calculated by multiplying easement acreage by appraised tract values and a pre-established chart value obtained from a previous FWS study (Brown) and which are intended to measure the implicit impact of wetland easements on land values. Chart values in North Dakota range from 0.3 to 0.75 depending on locations and local land values (proportions increase with land values). Payments for easements on deep (and difficult to drain) wetlands are calculated by multiplying easement acreage by the average value of marshland and chart values. The lower values assigned to these deep wetland easement offers reflect their lower opportunity costs or, alternatively, the low probability of it being technically or economically feasible to drain and farm these wetlands.

Final easement payment values combine both deep and shallow wetland payments and are offered to landowners as a non-negotiable single payment. Transaction costs associated with registering easements are the responsibility of the FWS. Because the easement payment offer process is not entirely transparent, it may impact acceptance rates. While the FWS is likely to explain to landowners the general concepts underlying the FWS easement appraisal processes, specific details and information associated with the valuation of particular easements are not usually provided to landowners.

Conceptual Issues in Evaluating the Acceptance of Wetland Easement Offers

Before the FWS begins formally calculating and presenting an easement offer, there has usually been a fair amount of discussion with the landowner concerning details of the potential easements. Therefore, landowner willingness to accept (WTA) a specific offer should occur when the easement payment exceeds the expected net returns from agriculture on potentially drained wetland(s) in perpetuity minus drainage costs or, alternatively, the expected price differential associated with future sales of land with and without an easement. Option values associated with converting land from agricultural to urban land uses are not assumed to enter into the acceptance decision since wetland easements in North Dakota are not in close proximity to expanding urban and residential areas.

Landowner rejection of an easement offer is therefore hypothesized due to one or more of the following factors: the FWS having underestimated that the true value of the land tract; chart values used to measure the impact of easements on land values being out of date or inappropriate to the land uses surrounding particular wetland easements; or landowners having insufficient information concerning surrounding land values, chart values, or even the exact acreage and drainage classification of the easement wetlands.

Wetland types (shallow versus deep) influence both the potential for draining and utilizing wetlands for agricultural production and FWS payment calculations. Similarly, alternative land uses surrounding wetlands influence both payment calculations and how easement wetlands may be utilized. Cropland is the most valuable land use and hence generates larger easement payment offers on a per-acre basis but it is doubtful if easement wetlands can be regularly cropped except in very dry years. In contrast, pasture and hay land are valued less, but have the potential to generate agricultural income even with the imposition of an easement.

Procedures

To empirically evaluate the factors influencing the acceptance of FWS wetland easement offers in North Dakota, this study had three specific procedural components: (1) calculate and evaluate acceptance rates of the FWS wetland easement program in North Dakota over time and space; (2) quantify factors influencing acceptance using a discrete-choice logit model of landowners' willingness to accept easement payment offers; and (3) evaluate whether an underestimation of the market value of land surrounding wetland easements is one of the potential factors influencing the acceptance of easement offers.

Quantifying Acceptance Rates

The wetland easement offer data from 1989 to 1998 included: county location, payment offers, easement and tract acreage, wetland classifications (shallow or deep), and the acreage and value of land uses within tracts. Easement offers were cross-listed with a database of existing FWS easement contracts to determine whether offers were accepted and whether landowners had a prior FWS easement. Acceptance rates were calculated and evaluated across counties and by year. Characteristics of accepted and rejected offers were compared and qualitatively evaluated. Of particular interest was how acceptance rates varied by types of wetlands (shallow versus deep) and surrounding land uses.

The Discrete-Choice Logit Model

A discrete-choice logit model was estimated to evaluate how particular characteristics of easement offers influence the probability of landowner acceptance. The generalized form of the model is:

$$(1) \quad \text{Prob}(Y=1) = \frac{e^{\beta'x}}{(1 + e^{\beta'x})} = \Lambda(\beta'x)$$

where e is the base number for natural logarithms, and β represents a set of parameters reflecting the impact of changes in a set of explanatory variables (x_i) describing easement wetlands and their surrounding land uses. The premise of the model is that landowners seek to maximize net returns from agriculture by accepting wetland easement offers under one of two possible scenarios: that the easement payment offer exceeds the expected net returns from agriculture on a potentially drained wetland(s) in perpetuity minus drainage costs or that the offer will exceed a future reduction in the sale price of easement encumbered land parcels.

Reported coefficients for the logit-based explanatory variables (β_i) do not represent per-unit increases associated with the predicted probability of acceptance (Greene). Marginal effects of the explanatory variables, representing the change in the probability of a landowner accepting an easement offer associated with a one-unit increase in the explanatory variable holding all other explanatory variables constant at their average values were calculated by:

(2)
$$\frac{\partial E[y|x]}{\partial x} = \Lambda(\beta'x)[1 - \Lambda(\beta'x)]\beta.$$

Two separate versions of the discrete model were estimated. The first represents easement payments as an explanatory variable on a per-acre basis in order to evaluate the profit-maximizing behavior of landowners when making acceptance decisions and to evaluate the amount by which easement payments would need to be increased in order to raise acceptance rates. The second model substitutes easement payment values for a set of explanatory variables representing alternative land uses surrounding easement wetlands. This model evaluates how particular land uses increase the probability of offer acceptance and the extent to which landowners consider forgone agricultural income, which is likely to vary by alternative land uses. Model separation was necessary due to the strong correlation between easement payment values on a per-acre basis and surrounding land uses. Each model, however, contains four common variables (table 1): the percentage of the easement tract associated with shallow, easily drained wetlands (*Shallow Ease%*) versus deep, difficult to drain wetlands

Table 1. Explanatory variables in the logit model of easement acceptance

Variables		Average Values:		
		All	Accepted	Rejected
<i>Variables Common to Both Models:</i>				
Previous	Landowner with a previous easement	21%	25%	14%
Year 9596	If offer was made in 1995 or 1996	23%	32%	68%
Shallow Ease%	Percentage of shallow, easily drained wetland easements in tracts	12.1%	12.4%	11.7%
		(50 acres)	(53 acres)	(48 acres)
Deep Ease%	Percentage of deep, difficult to drain wetland easements in tracts	3%	3.5%	2.4%
		(12 acres)	(14 acres)	(10 acres)
<i>Unique Variables in Specification 1:</i>				
Offer / Ac	Easement payment offer (\$/acre)	\$147	\$157	\$134
<i>Unique Variables in Specification 2:</i>				
Pasture%	Percentage of tract in pasture ^a	24%	21.7%	27%
Hay%	Percentage of tract in hay ^a	5.3%	6.2%	4.2%
CRP%	Percentage of tract in CRP ^a	5.2%	5.9%	5.8%

^aFor this calculation, tracts do not include wetlands.

(*Deep Ease%*); whether the landowner had a previous FWS easement (*Previous*); and if the payment offer was made during the 1995–96 time period (*Year 9596*). The percentages of both shallow and deep wetland easements within a tract were each expected to have a positive impact on the probability of acceptance because increasing quantities of wetlands make drainage and access to land more difficult and because it may be difficult to farm around ubiquitous wetlands using mechanized equipment. The marginal effects of these and other percentage-based variables need to be interpreted with caution because a one-unit increase in such an explanatory variable represents a 100% increase in its absolute value. Therefore, to represent a single percentage change in the variables, marginal effects are divided by 100.

Whether landowners had previously entered into an easement contract with the FWS (*Previous*) was expected to positively influence acceptance because these landowners are considered to be satisfied repeat clientele and to possess greater knowledge of the impacts of easements on farming operations than landowners without such experience.

A dummy variable accounting for easement offers made between 1995 and 1996 (*Year 9596*) was intended to account for the very low acceptance rates during this two-year period. Since there were no noticeable differences in net agricultural income in the study area over this period (county net cash receipts and government crop assistance remained relatively unchanged), these sharp variations in acceptance might be explained by landowner perceptions of future agricultural income and land values perhaps in conjunction with the re-establishment and modification of the 1996 Federal Agriculture Improvement and Reform (FAIR) Act and “swampbuster” legislation.¹ As noted by Johnson, Johnson, and Buse, time-trend dummy variables should be interpreted descriptively rather than as explaining broad movements in the dependent variable over time.

In addition to the common explanatory variables, the first version of the model includes the per-acre dollar value of FWS easement payment offers (*Offer/Ac*). This variable, which is equivalent to the bid payment in a WTA framework, was not expected to have a statistically significant impact on acceptance under the assumption that FWS appraisals of tract land values (and the opportunity costs of wetland easements) were accurately calculated. However, if this variable is statistically significant, its marginal effect would measure the cost of increasing acceptance rates while holding all other variables constant at their average values.

The second model substituted the easement payment offer variable (*Offer/Ac*) for a set of explanatory variables representing the proportion of land within tracts associated with pasture (*Pasture%*), hay (*Hay%*), and CRP (*CRP%*) land uses. Pasture and hay land were expected to have a positive impact on acceptance because the FWS permits easement wetlands (most likely shallow wetlands) to be grazed or hayed when they dry under natural conditions. As well, it is expected that some deeper wetlands could be used as a water source for livestock production. The CRP land was expected to have a positive impact on acceptance because wetlands surrounded by CRP land have little chance of being drained and farmed at least for the life of the CRP contract.

The Impact of Alternative Land Valuation Procedures on Easement Values

Land values surrounding wetland easement tracts were compared to average county land values published by the North Dakota State Office of the National Agricultural Statistics Service (NASS) to determine how FWS appraisals differ from average land values at the county level. This was intended to provide insight into whether landowners may have rejected easement offers based on their perception of inaccurate and unacceptably low appraisal-based land values versus other possible reasons such as inaccurate (or out of date) chart values or landowners receiving insufficient information regarding easement details.

Results

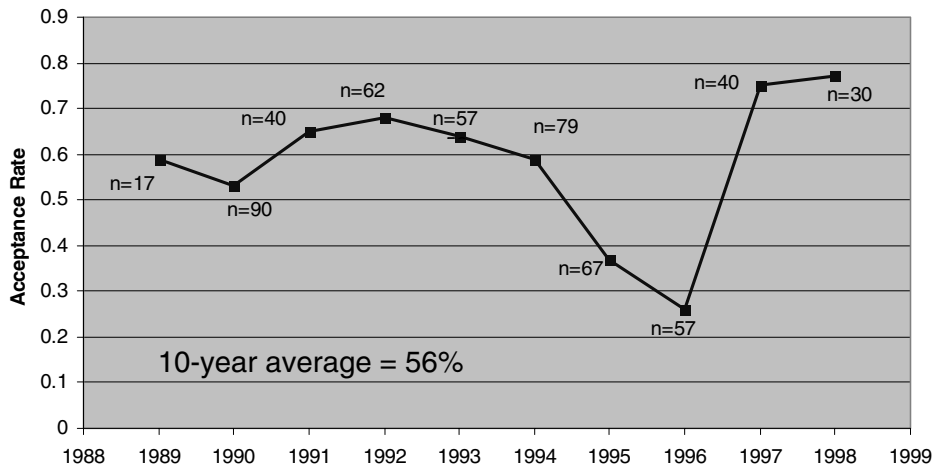
Acceptance Rates

A total of 539 easement offers made to North Dakota landowners between October 1989 and November 1998 contained sufficient data for analysis (10% of offers were missing required data and not used in this study). Of the 539 usable offers, 309 were accepted, resulting in a ten-year average acceptance rate of 56%, which is considered unexpectedly low because offers were made only to landowners who had already expressed a strong interest in placing their wetlands under easement (table 2). Acceptance rates increased slightly over the ten-year period yet saw a steep temporary drop in 1995 and 1996 (figure 1). The decline is hypothesized to be a direct result of the re-establishment of the FAIR Act of 1996 and swampbuster legislation, both of which created uncertainty concerning the legality and profitability of draining and farming Prairie Pothole wetlands. The distribution of easement acceptance rates across counties (figure 2) does not indicate that acceptance varied in any recognizable geo-spatial pattern across the state, even though land uses and values and easement payment offers varied spatially. Easement payment offers (*Offer/Ac*) ranged from \$22 to \$500/acre with an average value of \$147/acre. Accepted offers averaged \$158/acre and were 18% higher than the rejected offers (\$134/acre). The average value of land surrounding wetlands within easement tracts was \$274/acre meaning that overall, the FWS valued easements at 54% of local land values. Almost 21% of all easement offers were made to landowners with previous FWS wetland easement contracts. The

Table 2. Acceptance rates: By characteristics of easement offers

Condition or Characteristic of Offers	Offers Made	Acceptance Rate (%)
All offers (1989–98)	539	56
1995–96 offers	134	32
Tracts dominated by cropland	269	57
Tracts dominated by pasture and hay land	76	52
Tracts with mixed land uses	194	56
Only shallow, easily drained wetland easements	392	55
Only deep, difficult to drain wetland easements	9	77
Mix of deep and shallow wetland easements	138	58

Figure 1. Acceptance rates for wetland easement offers in North Dakota: 1989–98



*n = number of easement offers made in a given year

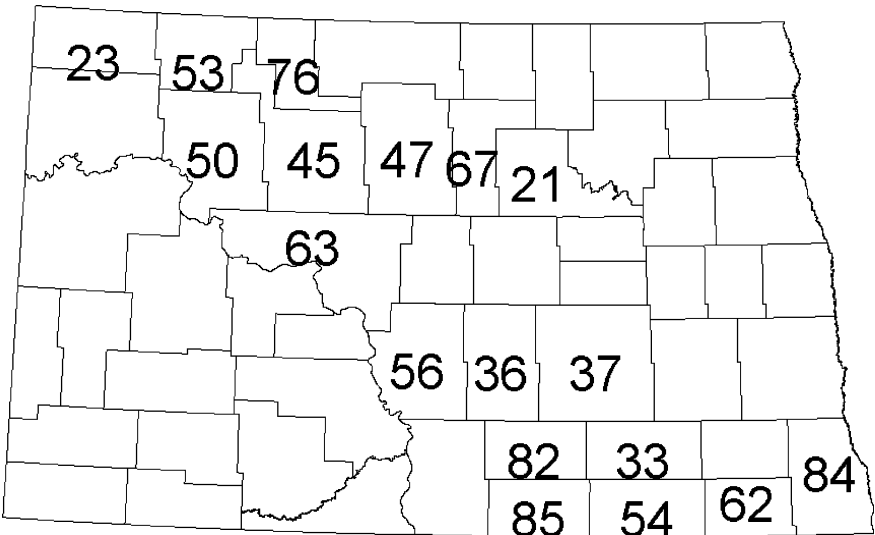
percentage of landowners accepting the easement offers with previous contracts was almost twice as large as the percentage of landowners rejecting the offers.

Crops were the dominant land use within tracts for which easement offers were made (56%), followed by pasture (20%), wetlands (15%), and hay and CRP (4.5% each). The percentage of pasture land within easement tracts was lower among accepted offers than rejected ones (21.7% versus 27%). In contrast, the percentage of hay land within easement tracts was higher among the accepted versus rejected offers (6.2% versus 4.2%), while the percentage of CRP land within easement tracts was virtually identical among accepted and rejected offers (5.9 and 5.8%, respectively). Finally, land uses were identical within tracts and adjacent counties except for the quantity of wetlands that were twice as common within easement tracts. Acceptance rates for tracts dominated by cropland ($n = 269$) were 57%, compared to 52% for pasture and hay land ($n = 76$), and 56% for tracts with a mix of crop, pasture, and hay land ($n = 194$).

Wetland density (the percentage of wetlands within easement tracts) was higher among accepted easement offers versus rejected offers and considerably higher among all tracts where easement offers were made versus the entire counties where offers were made (wetlands make up 18% of tract acreage yet only 10% of county land acreage). This provides a preliminary indication that wetland density is correlated with landowner interest in participating in wetland easement programs, which is likely due to the difficulty of farming around ubiquitous wetlands.

Acceptance rates associated with easements containing shallow and easily drained wetlands ($n = 392$) were 55% compared to 77% for those with deep and difficult to drain wetlands ($n = 9$) and 58% for those containing a mix of wetland types ($n = 138$). The relatively high acceptance rates associated with deep and

Figure 2. Wetland acceptance rates (%) across North Dakota counties, 1989–98



Note: Counties with fewer than 4 payment offers are excluded

difficult to drain wetland easements in spite of their relatively low payment values indicates that landowners perceive little, if any, opportunity costs associated with placing such wetlands under easement.

The Discrete-Choice Logit Models

Specification 1: Offer Values

The first specification of the discrete-choice logit model, which included easement payments on a per-acre basis as an explanatory variable, generated a chi-square statistic of 67.7, which is statistically significant at the 99% confidence level, and the model correctly predicts acceptance/rejection 66% of the time (table 3).

Per-acre payment offers (*Offer/Ac*) had a positive and statistically significant influence on the probability of acceptance, indicating that the FWS has not accurately convinced landowners that their easement valuations have accounted for the opportunity costs of easements. In other words, if the opportunity costs were fully accounted for by easement payments, this variable would have an insignificant impact on acceptances. This result also implies that increasing easement payment values would increase acceptance rates. However, the marginal effect of the payment offers is not very large; a \$1 increase in the average easement offer value of \$147/acre only increases the average predicted probability of acceptance (0.56) by 0.0011, holding all other variables constant.

As expected, the percentage of deep and difficult to drain wetland easement acres within easement tracts (*Deep Ease%*) had a statistically significant

Table 3. Results of the discrete-choice logit models

	Coefficient	Standard Error	Z-Statistic	Marginal Effect
Specification 1 (Offer Values)				
Offer / Ac	0.00446	0.001228	3.632 ^a	0.0011
Shallow Ease%	1.969855	1.300918	1.514	
Deep Ease%	4.540503	1.59384	2.849 ^b	1.1142
Previous	0.842027	0.241974	3.48 ^a	0.1946
Year 9596	-1.31984	0.22722	-5.809 ^a	-0.3180
Constant	-0.62999	0.294837	-2.137 ^b	
Specification 2 (Land Uses within Easement Tracts)				
Pasture%	-0.28635	0.310588	-0.922	
Hay%	1.553233	1.014062	1.532	
CRP%	0.101703	0.517191	0.197	
Shallow Ease%	1.313611	1.301865	1.009	
Deep Ease%	1.890996	1.47187	1.285	
Previous	0.838386	0.241511	3.471 ^a	0.1934
Year 9596	-1.34101	0.226167	-5.929 ^a	-0.3210
Constant	0.163621	0.21336	0.767	

^aSignificant at the 99% confidence level.^bSignificant at the 95% confidence level.

positive impact on acceptance. Increasing the percentage of deep wetland easements within tracts by 1% (from on average 3 to 4%) increases the probability of acceptance by 1.1% which confirms the notion that landowners perceive that these deep wetlands have little actual or potential production value and are willing to place them under easement even when their payment values are relatively low (on average \$35/acre versus \$153/acre for shallow wetland easements). In contrast, unexpectedly, the percentage of shallow and easily drained wetlands within tracts (*Shallow Ease%*) did not have a statistically significant impact on acceptance. This may be due to the trade-off between the high payment values associated with these types of wetlands when placed under easement and landowners' perceptions of the high agricultural production potential of these wetlands.

Finally, as expected, landowners with previous FWS wetland easement contracts had statistically significant higher acceptance rates than those without previous easements, while easement offers made from 1995 to 1996 had a statistically significant negative impact on acceptance.

Specification 2: Land Uses within Easement Tracts

The second version of the model, which focused on how non-cropland uses (pasture, hay, and CRP) surrounding wetland easements influenced acceptance, generated a chi-square statistic of 57.4, which is statistically significant at the 99% confidence level, and correctly predicted acceptance 64% of the time (table 3). Unexpectedly, none of the three land use variables had a statistically

significant impact on the probability of acceptance. It was hypothesized that because each of these land uses would likely be unaffected by the imposition of wetland easements, landowners would be more willing to accept such easement offers in contrast to easements surrounded by cropland.

An additional (third) specification of the model was also run using interaction variables between the three non-cropland uses and the easement types (deep versus shallow wetlands) in an effort to account for the possibility that utilization of wetlands surrounded by such land uses would be more likely with shallow versus deep wetlands. Again, however, none of the interaction land use/wetland type variables were statistically significant and the model results are therefore not reported.

There are three possible explanations for the insignificant relationship between the non-cropland land use variables and acceptance. First, it may be that landowners are not actively using wetlands for livestock and haying operations (either with or without the existence of an easement). Second, at least some landowners may be growing crops on shallow wetlands under easement when they dry of natural causes in addition to receiving generous payments for such easements. Finally, it may be that land use classifications across entire tracts (used to measure the quantity of the three non-cropland values) do not accurately represent the land uses immediately surrounding easement wetlands. For example, an entire tract may contain an equal mix of pasture, hay, and cropland, but these land uses immediately surrounding wetland easements might be entirely associated with only one of the land uses. A more accurate description of the land uses immediately surrounding wetlands would require knowledge of the specific location of easement tracts, which unfortunately is known only for accepted easement offers due to FWS data collection procedures.

In addition to a lack of specificity regarding land uses surrounding wetlands and how landowners utilize wetland easements, it is likely that there are additional explanatory variables missing from both specifications of the discrete-choice logit model. These could include: participation in federal farm support programs that are linked to 'swampbuster' legislation that greatly reduces the incentive for landowners to drain wetlands; landowner plans regarding retirement and their attitudes toward wetland conservation, which may over-ride their profit-maximizing behavior; and a measure of the degree to which landowners understand details of easement payment calculations.

The Impact of Alternative Land Valuation Procedures on Easement Values

If tract values were estimated using average county-level crop, pasture, and hay land values obtained from surveys of landowners and published by the NASS, rather than comparable sale values compiled by the FWS, they would on average, be virtually identical at \$273/acre. Using county land values instead of comparable sale values would have resulted in slightly higher easement offer values 54% of the time. By comparing easement offers based on alternative land value data it was determined that 53% of accepted appraisals and 62% of rejected appraisals had FWS appraisal-based easement offers that were lower than county average-based valuations and easement offers. This provides a preliminary indication that

the use of county land value data would likely increase easement payment offers only slightly and, therefore, levels of acceptance by a minimal amount. It also provides some general evidence that the use of appraisals has not resulted in unfairly low estimates of land values within tracts. In fact, because tracts contain almost twice as many wetlands as county-wide land, the appraisal process probably errs on the side of landowners by over-estimating tract land values.

Conclusions

In the case of FWS wetland easement offers in North Dakota, a ten-year average acceptance rate of 56% appears to be unnecessarily low considering that easement offers were made only to landowners who had already expressed a strong interest in entering into a wetland easement contract. Having a 44% rejection rate is particularly troublesome because the FWS has gone to great lengths (and expense) to calculate the fair market prices of agricultural land surrounding easements through comparable sales analyses.

Since landowners for the most part appear to recognize the opportunity costs of wetland easements, and because FWS appraisals appear to be accurately measuring tract land values, the agency may want to consider revising other aspects of their easement valuation procedures in order to increase acceptance rates. The use of alternative or updated chart values to account for the implicit price of easements should be investigated and, in the shorter term, the agency should consider supplying landowners with more information regarding the details of wetland easement offers including land appraisal data, utilized chart values, and the acreage and classification of wetlands being considered for easements.

As demonstrated by this study, discrete logit regression models used to quantify the factors influencing landowner willingness to accept wetland easement offers can be used to identify landowners with the highest probability of accepting offers. In North Dakota between 1989 and 1998, this would be landowners with prior wetland easements whose land is dominated by cropland and deep (difficult to drain) wetlands. Such predictive models also offer researchers the opportunity to evaluate proposed policy changes associated with either easement payment calculations or easement regulations. However, such modeling efforts likely could be improved by including additional explanatory variables such as: more accurate land use classifications immediately surrounding wetland easements; relative indicators of soil productivity surrounding easements; landowner characteristics such as their age and plans to continue farming operations; measures of how well landowners understand wetland easement details; and an indication of landowner participation in federal farm programs.

It is recommended that the FWS and other conservation programs throughout the country expand collection and monitoring of easement offer acceptances. Acceptance data are needed to model landowner perceptions and decision making, which, in turn, is required to ensure high levels of participation in conservation programs. The ability to identify whether easement valuation procedures, institutional behavior, and various landowner and land use characteristics may be hindering landowner participation in easement conservation programs is considered necessary to ensure the efficient use of finite conservation funds.

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Endnote

¹Under swampbuster, producers must refrain from converting wetlands for producing agricultural commodities to remain eligible for U.S. Department of Agriculture program benefits.

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