EFFECT OF CONTRACT ATTRIBUTE LEVELS ON WILLINGNESS TO PARTICIPATE IN A WORKING WETLANDS PROGRAM

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Effect of Contact Attribute Levels on Willingness to Participate in a Working Wetlands Program

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ABSTRACT

Wetlands are an integral part of duck habitat in the Prairie Pothole Region, which covers three Canadian provinces and five U.S. states. They often overlap with cropland, creating issues for farmers. A program that provided funding to farmers who agree to not alter wetlands and continue to farm the land was introduced in North Dakota called the Working Wetlands Program. After four years, participating farmers were surveyed. A choice experiment was used to investigate the effect of program contract attributes including payment, length, and whether the contract is binding, on willingness to enroll. A random parameters logit model was estimated. Nonbinding contracts are preferred to binding regardless of other attributes. If it is important that the contract be binding, notable for policymakers is that shorter lengths have a higher participation rate than longer lengths. This information is valuable to policymakers as they continue to build a national program.

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DEDICATION

This thesis is dedicated to Bree Diffely and Katelyn Long for being great friends and companions during this long process.

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LIST OF ABBREVIATIONS

CRP.....Conservation Reserve Program

PPR .....Prairie Pothole Region

WWP.....Working Wetlands Program

INTRODUCTION

Wetlands are an important part of the ecological system, providing habitat for a variety of plants and animals. Small microbes found in wetlands provide the base of the food chain for many different species (US EPA 2015). In addition to hosting important food sources, wetlands play an important role for nesting hens and ducklings (Waterfowl 2018) and they support the migration habitat for ducks and geese (Azevedo, Herriges and Kling 2000). Wetlands are defined by the United States Environmental Protection Agency as "areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season" (US EPA 2015, page 1). As the definition implies, wetlands do not have to hold water all year round to be considered a wetland. They can change sizes or dry up and still meet the definition.

Wetlands also play an important role in an area's hydrology. A study by the US Geological Survey found that draining smaller wetlands contributed to flooding. Using aerial pictures, the survey tracked wetlands over an eighty-year period and found that wetlands in North Dakota had been increasing in size. "This drainage moves surface water into fewer wetlands, making them larger and degrading their abilities to reduce regional flooding and provide productive habitat for animals" (USGS 2015, page 1). The study noted that larger wetlands do not provide the same benefits to the ecosystem that smaller wetlands do, and that the increase in larger wetlands should be a cause for concern.

In 2015, Delta Waterfowl, a nonprofit advocacy organization headquartered in Bismarck, North Dakota, launched a five-year conservation pilot program focused on working wetlands in North Dakota. The pilot Working Wetlands Program (WWP) provides financial incentives to farmers who agree to conserve their wetlands. WWP has since conserved an estimated 9,500

seasonal wetlands throughout the state (John Devney, personal communication, March 25, 2021) and falls in line with Delta Waterfowl's overall mission towards conservation.

North Dakota farmers were solicited to enroll in the WWP. As a condition of their enrollment, farmers were not allowed to drain or fill wetlands for five years, although the contract was not binding such that farmers could exit the program at any time without penalty. In addition to the benefits discussed, an important objective of the program was to conserve waterfowl habitat. Because many wetlands fall on actively farmed land, the program worked with farmers to protect their wetlands without restricting their use for farming while also providing compensation.

Perceptions of the WWP participants were gathered through two surveys, one at the beginning of the program and one in the final year. A third survey was sent to non-participating owners of land in the five-state Prairie Pothole Region (PPR), which includes parts of Minnesota, North Dakota, South Dakota, Montana, and Iowa (figure 1). This thesis reports on findings of the second survey of the pilot WWPs participants.

(US Geological Survey)

Figure 1. The Prairie Pothole Region of the United States and Canada

Forward, the Environmental Quality Incentive Program will provide funding for farmers to enroll wetlands into a working wetlands program. Farmers will receive the land rental rate for the acres that they do not drain, and they will in turn allow wetlands to remain intact. When wetlands are dry, farmers are allowed to farm them[1].

[1] The Prairie Pothole Region (PPR) extends up into Canada through part of Manitoba, and then a large portion of Alberta and Saskatchewan. Delta Waterfowl has worked with Canadian officials towards developing a provincial program for Canada. Manitoba designated funds to begin a like program (Arnason 2019).

LITERATURE

To understand why this program is necessary, we must first examine the effects of agricultural land on wetlands. From 1961 through 2006, the amount of land in the PPR used for agricultural purposes is estimated to have increased by 56% (Wong, Kooten and Clarke 2012). Farmers in the region will often use areas that normally contain wetlands for both cropland and pastured area. Pastured area increased 5% during the same period (Wong, Kooten and Clarke 2012).

The limited number of wetlands greatly effects the duck population. The PPR region contains 10% of duck habitat but produces 50% of the ducks on the continent (Baldassarre, Bolden and Saunders 1994). The duck population is estimated to decrease by 6-7% per square kilometer in an area when the agricultural land increases by just 1% (Wong, Kooten and Clarke 2012). This has an additional impact on the population, as ducks may not go to another location and breed, and if they do, it is likely to result in fewer offspring (Wong, Kooten and Clarke 2012).

While wetlands conservation and agriculture are often at odds, the federal government has created programs in attempts to create balance between the two. The North American Waterfowl Management Plan (NAWMP) was established in 1986 as a branch of the US Fish and Wildlife Service to help conserve America's waterfowl, mainly by working to restore wetlands that had been lost in previous decades (USFW 2015). The NAWMP estimates 91% of wetlands in the PPR overlap with agricultural land, agreements with farmers have often fallen through (Bethke and Nudds 1995).

Historically, the federal government has protected wetlands, which became vitally important as almost 14 million acres of wetlands were converted from the 1950's through the

1970's to agricultural land (U.S. Congress, Office of Technology Assessment, 1984). Because of this loss, the USDA stepped in to mitigate future wetland loss. As part of the 1985 Farm Bill, protections were put in place for wetlands. Farmers who were found draining protected wetlands were denied access to government programs including price and income support, followed by a tax reform act that eliminated preferential tax treatment for land that had appreciated in value after having been drained. The Bush Administration also included extensive wetland preservation in the 1990 Farm Bill (Heimlich 1994).

Wetland preservation efforts can use the penalty approach such as noted above but can also include those based on incentives. Wachenheim et al. (2018) reported that farmers enrolled in the WWP support the latter. Participating farmers reported that they are supportive of conservation efforts, but also believe that they have the right to do as they choose with their private property. They largely believe that any conservation program should come with compensation. According to Azevedo, Herriges and Kling (2000), willingness to participate in conservation programs among Iowan farmers is influenced by capital, farm size, income, education, access to information, positive environmental attitudes and awareness, and social media presence.

In general, the forementioned studies support the notion that there is support for conservation programs not just within the general public, but also within the agricultural community, especially from younger farmers. However, actionable support for conservation programs from farmers is dependent on their economic viability for the operation. Even with support for conservation programs, farmers still incur costs when participating in the programs. A study in France estimated that the production value lost via land enrolled in a wetland conservation program is approximately $130 USD/acre (Bostian, Dupraz and Minviel 2015). The

program, which encourages farmers to continue working the land while still being cautious of the environmental impacts, has a low payment rate for those who join. As a result, fewer than 10% of the region's producers participate.

In the US, the presence of permanent wetlands that are not enrolled in some form of easement program decrease land values by an estimated 40% and those with permanent wetlands enrolled in easement programs decrease value by 79%. Temporary wetlands were not found to have the same effect on land price (Bostian, Dupraz and Minviel 2015).

One strategy taken to encourage enthusiastic participation by producers is to provide incentives in addition to the strict penalties for draining wetlands. Palm-Forster, et al. (2019) discuss the concept that individuals behave in their own self-interest needs to be included when considering environmental policy and environmental economics. They note that there is a lack of agricultural economics, specifically behavioral economics, studies but hypothesize how people can be influenced when it comes to creating environmental policy. If policy is written in a way that takes advantage of social norms, then people are more likely to be supportive of programs, even if they aren't in their own self-interest, but instead are in the interest of the population as a whole. When offered as such, these programs are less expensive to implement. Some of the strategies recommended include taking advantage of the status-quo, incentives, and carefully considering how messages are relayed. Because of the potential for prices to change, the program has to be structured in a way that farmers will be willing to reenroll even if they risk loss of profit by participating.

Wachenheim (2019) considered enrollment in the Conservation Reserve Program (CRP), finding that a large majority of farmers in the PPR believed that they should be allowed to choose what they do or do not do with their land and that they should be paid when their land use

practices offer environmental protection. Specifically regarding CRP, farmers both agreed with the program's conservation goals and felt that the program was important and should be maintained as is. Most farmer suggestions were focused on administrative aspects of the program. This study found that 84% of farmers surveyed were pleased with how the CRP program is implemented and 80% of farmers surveyed were satisfied with both how the rules were enforced and with the length of contracts. Wachenheim, et al. also found that contract attributes matter. When enrolling in conservation programs, farmers were most concerned with contract length, restrictions on land use, and payment amounts. In addition, higher payments made farmers more willing to offer concessions in other areas in the contract.

Overall, the literature solidly establishes that there is support for wetlands and conservation in general, but that it comes at a cost to farmers. Farmers believe they should be compensated for any conservation efforts that limit what they are able to do with private property. The literature also discusses strategies employed to encourage conservation practices. Another strategy involves limiting access to private land by designating it as protected (Kamal, Grodzińska-Jurczak and Brown 2014). Usually when this is used, the landowner receives some sort of compensation.

Voluntary programs include conservation easements, and other programs that provide incentives to the landowner to make conservation a priority. Governments work with landowners to share in the cost of conservation and/or compensate them for the land they cannot use due to conservation (Kamal, Grodzińska-Jurczak and Brown 2014).

Calas et al (2016) also supports this research in which models were employed with and without consideration of farmer perceptions and attitudes to determine whether landowners could

be segmented by such. They attributed an increased willingness to enroll in CRP if they found environmental policy inflexible to the fact that participation in CRP is voluntary.

Although farmers may willingly become involved in conservation programs, keeping them active is another issue. Dayer *et al*. (2017 Page 1) defines persistence as "whether and why landowners continue their conservation behaviors after short-term financial incentive payments end". Persistence should be the goal of conservation programs, as it would signify a change in landowners' attitudes towards conservation. Dayer *et al*. (2017) found factors such as habit forming, resources, increased hunting opportunity, and social influence increased the persistence of conservation practices after the financial incentive associated with a program ended. Steps to facilitate this include programs with spillover benefits, encouraging conservation habits, requiring little effort as time goes on, and a program well matched with landowner goals that also falls in line with societal norms (Kamal, Grodzińska-Jurczak and Brown 2014).

METHODOLOGY

The WWP was designed to encourage simultaneous use of agricultural land and maintenance of wetlands. Farmers enrolled in the program received a payment for the land area of their wetlands based on local rental rates for agricultural land as reported by the National Agricultural Statistics Service. In return, they agreed not to alter their wetlands. The program is referred to as a WWP because, under the contract, farmers are still able to farm when they can do so without altering the wetlands. During the fourth year of the program, surveys were mailed out to farmers. In addition to eliciting perceptions about conservation practices and programs and the WWP, a discrete choice experiment was used to identify preferences for program design with options including contract payment and length as well as whether the contract was binding. Discrete choice experiments are useful in that they allow one to gauge what respondents would select when given a variety of different options in a hypothetical situation. Demographic information such as age, level of education, gender, and where the farmer lives and information about farms including crop and livestock production details was collected.

Theory

The theory of random utility underpins the basis of the discrete choice model which explains how consumers, when given options, are going to choose the one that provides them with the most utility. Let utility for *i* individual in *j* choice situation for *k* choice be denoted by U_{ijk}, and

$$U_{ijk} = V_{ijk} + \varepsilon_{ijk}, \tag{1}$$

where V_{ijk} is the observed component, and ε_{ijk} is the error term which captures the unobserved attributes or factors. The observed component in the function can be shown:

$$V_{ijk} = \sum_{h=1}^{H} \beta_h x_{hijk}, \quad (2)$$

where x_{hijk} is a set of *H* explanatory variables which include contract *k*'s attributes as well as individual *i's* characteristics, and β_h is the set of *H* parameters associated with the explanatory variables. In other words, β_h are the marginal utilities. In a mixed logit model, at least some of the parameters in β_h are random, such that

$$\beta_{hi} = \bar{\beta}_h + \sigma_h \upsilon_{hi}, \quad (3)$$

where the random parameter β_{hi} varies around its fixed mean marginal utility $\bar{\beta}_h$ parameter, is the standard deviation or the spread of preferences among the individuals sampled, and represents random draws from a standard normal distribution for individual *i* and factor *h*.

The probability of choosing contract *k* can be modeled as:

$$P = \frac{\exp(V_{ijk})}{\sum_{k=1}^{K} \exp(V_{ijk})} \quad (4)$$

Respondents

There were 40 respondents. Out of those surveyed, 72.5% live on their farm, while 10% live in a rural area less than 100 miles from their farm, and 17.5% live in a town less than 100 miles from their farm. Thirty-seven percent of respondents reported raising livestock. Slightly under half, at 47.5%, of those surveyed, reported a history with the CRP. Corn and sunflowers are grown by 80% and 75% of respondents, respectively. No farmers reported growing sugar beets and all reported growing soybeans. The respondents were surveyed during the first and fourth year to help gauge the success of the program. In that time period, respondents started to view wetlands more positively in regard to their operation.

Model

Contract attributes considered in the choice experiment are payment, length, and binding (table 1). Payment can either be 60, 75, 85, or 100. These signify what percentage of the local

land rental rate farmers will receive as payment if they enroll in the program. Length of contract can be 5, 10, or 15. These are number of years of the contract. Binding is a binary variable with 1 indicating a binding contract and 0 a contract that is not binding.

The model included two farm characteristic variables (table 1). Farmers were asked if they own cows and whether they own all the land their farm or if they rent some or all of it. Farmer characteristics were age and either or not they had a history with the CRP. Both were binary variables. Farmers' intended behavior regarding their wetlands if there were no penalty is represented by 1 if they would drain 100% of their wetlands and 0 otherwise. Attitudes and perceptions were measured using both binary and Likert scale variables. Using a Likert scale, farmers were asked how strongly they agreed with the statement, "The decision of how to use my land is my right as a landowner or farmer / rancher". Using a binary variable, they were asked to indicate if they found the payment (100%) and length (5 years) of the WWP within which they were enrolled acceptable.

Table 1. Variables in the model

Variable	Variable Definition	Coding
PAYMENT	Payment level contract	60, 75, 85, or 100
LENGTH	Length	5, 10, or 15
BINDING	Contract is binding	0=no, 1=yes
COWS	Have livestock	0=no; 1=yes
OWNALL	Own all land	0=no; 1=yes
YOUNG	Farmer is 41 years or younger	0=no; 1=yes
CRPHIS	Has or had CRP contract	0=no; 1=yes
DRAINALL	Would drain all wetlands if no loss of eligibility	0=no; 1=yes
MYRIGHT	The decision of how to use my land is my right as a landowner or farmer / rancher.	1=strongly disagree to 5=strongly agree
WWPPAY	WWP payment is okay	0=no; 1=yes
WWPLNG	WWP contract length is okay	0=no; 1=yes

A choice experiment was employed to measure the impact of payment, length of contract and whether contract was binding on willingness to participate. Choice sets offered landowners two contract options (OPT A and OPT B) and a no-enroll option (figure 2). The only non-contract attribute differences between the choices was their placement in the choice set with OPT A on the left and OPT B in the center. Participants were asked to rank options 1 to 3. Each faced sixteen choice sets with each following the pattern of two different contracts defined by contract payment and length and whether the contract was binding. Options for the payment ranged from 60% of local land rental rates to 100%. Options for contract length ranged from five years to fifteen years.

ATTRIBUTE	OPTION A	OPTION B	OPTION C
Length Payment Binding contract	15 years 100% No	10 years 60% Yes	Do not enroll
RANK			

Figure 2. Choice set example

Utility for Option A was estimated using:

$$U(A)= opta + \beta_{payment} * PAYMENT + \beta_{length}*length + \beta_{BINDING}*BINDING + \beta_{COW}*COW + \beta_{COW\_LENG}*COW\_LENG + \beta_{DRNall\_BINDING}*DRNall\_BINDING + \beta_{OWNALL\_BINDING}*OWNALL\_BINDING + \beta_{MYRIGHT}*MYRIGHT + \beta_{WWPPAY\_PAYMENT}*WWPPAY\_PAYMENT + \beta_{YOUNG\_LENGTH}*YOUNG\_LENGTH + \beta_{WWPLNG\_LENGHT} * WWPLNG\_LENGTH + \beta_{CRPH\_B} * CRPH\_B$$

Utility for Option B was estimated using:

$$U(B)= optb + \beta_{payment} * PAYMENT + \beta_{length}*length + \beta_{BINDING}*BINDING + \beta_{COW}*COW + \beta_{COW\_LENG}*COW\_LENG + \beta_{DRNall\_BINDING}*DRNall\_BINDING + \beta_{OWNALL\_BINDING}*OWNALL\_BINDING + \beta_{MYRIGHT}*MYRIGHT + \beta_{WWPPAY\_PAYMENT}*WWPPAY\_PAYMENT + \beta_{YOUNG\_LENGTH}*YOUNG\_LENGTH + \beta_{WWPLNG\_LENGHT} * WWPLNG\_LENGTH + \beta_{CRPH\_B} * CRPH\_B/$$

A random parameters model estimation that relies on random draws from a distribution imposed by the researcher requires a large number of replications due to the number of alternatives and parameters.. Here Halton draws were used to reduce the number of draws in the estimation. Bhat (2001) reports that use of Halton draws can reduce the number of draws needed by 90% of those required using random draws.

RESULTS

Results are consistent with the literature in finding a higher payment is more attractive to producers and longer contracts less attractive (table 2). Willingness to accept a contract with a greater length is lower among those satisfied with the five-year length of the contract within which they are currently enrolled. Those satisfied with the current payment rate (100%) were more responsive to payment. The current rate was the highest among payment levels in the hypothetical choice set. As such, all other payment attribute levels represented a reduction in their expected payment rate.

Table 2. Random parameters multinominal logit estimation

Variable	Coefficient	Prob [z]>z*
	Random parameters	
OPTA	-13.6471	.0000
OPTB	-14.5640	.0000
	Non-Random parameters: Contract attributes	
PAYMENT	0.10056	.0000
LENGTH	-0.13942	.0225
BINDING	-2.91023	.0000
COWS	2.02994	.0047
COWS*LENGTH	0.10295	.0084
DRAINALL*BINDING	-1.69742	.0000
OWNALL*BINDING	2.39761	.0000
MYRIGHT	1.99249	.0002
WWPPAY*PAYMENT	0.01500	.0496
YOUNG*LENGTH	0.06925	.0049
WWPLNG*LENGTH	-0.03330	.0254
CRPHIS*BINDING	0.44719	.0157
	Distributions of Random Parameters	
NsOPTA	2.7766	.0001
NsOPTB	1.9774	.0000
McFadden Pseudo R-squared	.0786878	

The standard deviations are significant and show that the parameters are both heterogeneous and random. While with some models, heterogeneity of the sample is an issue, with mixed logit models, the heterogeneity of the sample is accounted for.

Landowners under the age of 41 were less responsive to the length of contract, as were ranchers, who were also more likely to enroll than crop producers. Those who more strongly agree that the decision of how to use their land is their right as a landowner or farmer / rancher were also more likely to enroll. This is consistent with the program being voluntary.

Farmers were less likely to enroll in a contract that is binding. The negative effect of the binding attribute was stronger for those that would drain all the wetlands if they could and those that rent at least a portion of the land they farm. The former is consistent the binding attribute devaluing the contract more for landowners who would exit the program completely if allowed under rule changes. The latter may in part be because farmers who rent some of their land would need to consider whether a binding contract would extend past the length of their lease. Farmers who previously participated with the CRP program were less sensitive to a binding contract. This is expected as they were at one time willing to engage in a long-term binding contact with harsh penalties for breaking the contract.

A sensitivity analysis was conducted to investigate how changes in contract attributes affected willingness to accept the contract. The changes are calculated as movement from how likely a base case farmer was to enroll in the program. Results consider changes in contract length, payment rate, and whether it was binding or nonbinding. The base case farmer is 41 years old or younger and has a history with the CRP program. They do not own any cattle and agree (4.0 on 5-point Likert scale) that they have the right to do what they like with their land. They

rent some land and would not drain all the wetlands on their own land if given the option. They are also satisfied with the current rate of payment provided by the program and its length.

Tables 3 through 7 show how willingness to accept a contract differs based on attribute levels for the base case farmer. Table 3 shows how farmers respond to binding contracts of different lengths and payment levels. As contract length increases, willingness to enroll decreases. For a fifteen-year binding contract, the willingness to accept at a 60% payment rate is 7.42%, but it increases substantially with payment. Willingness to accept the contract increases to 89.08% at 100% payment rate. The fifteen-year contract length has the lowest participation rate of the three options, though it has the highest responsiveness to changes in payment rate, with a 30-point jump in likelihood to enroll at the 85% payment rate to 100% payment rate. Responsiveness to increased payment decreases as payment increases, regardless of contract length.

Table 3. Willingness to accept binding contracts with different payment levels

Payment as % of NASS-reported rental rate	**Length = 5 years**	**Length = 10 years**	**Length = 15 years**
60	18.40%	11.85%	7.42%
75	56.07%	43.21%	31.21%
85	80.21%	70.73%	59.03%
100	95.82%	93.19%	89.08%

Table 4 provides the same information for non-binding contracts. Willingness to participate in the program when the contract is nonbinding is higher across the board for all payment rates and contract lengths for the base case producer than when it is binding. And the only time they are more likely to not enroll than to enroll in a non-binding contract is at the 60% NASS payment rate and fifteen-year contract. With all contract lengths (and like the binding

contracts), producers are less responsive to an increase payment as the payment percentage increases, especially after a payment rate of 75%.

Table 4. Willingness to accept nonbinding contracts with different payment levels

Payment as % of NASS-reported rental rate	Length = 5 years	Length = 10 years	Length = 15 years
60	72.59%	61.22%	48.48%
75	93.75%	89.93%	84.19%
85	97.94%	96.60%	94.42%
100	99.63%	99.38%	98.97%

Table 5. shows how willingness to enroll changes in a binding contract compared to nonbinding contract with a length of five years. Even at a payment rate of just 60%, there is a 73% likelihood that the base-case producer will enroll in a non-binding contract, compared to only 18% when the contract is binding. As payment rate increases to 75%, in the non-binding contract, likelihood of enrollment increases to over 90%. After this point, increases in payment rate would not have a substantial effect on enrollment and should be reconsidered for budgetary reasons. Under the binding contract, willingness to enroll continues to increase in a meaningful way until the 100% payment level.

Table 5. Comparing willingness to enroll in a binding vs nonbinding contract at the five-year length

Payment as % of NASS-reported rental rate	Binding	Nonbinding
60	18.40%	72.59%
75	56.07%	93.75%
85	80.21%	97.94%
100	95.82%	99.63%

Table 6 compares likeliness to enroll with binding and nonbinding contracts with ten-year lengths. A similar pattern emerges as with Table 5. When the contract is set for a ten-year period, likelihood to enroll in a nonbinding contract is just over 60% at the 60% payment rate, compared to about 12% in the binding contract. Large increases in willingness to enroll continue as the payment rate of the binding contracts increase. At the same time, willingness to enroll in the nonbinding contract is close to 90% when the payment rate is at 75%.

Table 6. Comparing willingness to enroll in a binding vs nonbinding contract at the ten-year length

Payment as % of NASS-reported rental rate	Binding	Nonbinding
60	11.85%	61.22%
75	43.21%	89.93%
85	70.73%	96.60%
100	93.19%	99.38%

Table 7 compares binding and nonbinding contracts at different payment rates with a fifteen-year contract. At all levels, the likelihood to enroll is lower at every payment percentage in both binding and nonbinding contracts than at all points in the other contract lengths, with likelihood to enroll never breaking 90% with a binding contract. This is consistent with the

literature in that producers prefer shorter contract lengths. It is interesting to note that farmers are more likely to enroll at an 85% payment rate with a nonbinding fifteen-year contract than a 100% payment and binding contract.

Table 7. Comparing willingness to enroll in a binding vs nonbinding contract at the fifteen-year length

Payment as % of NASS-reported rental rate	**Binding**	**Nonbinding**
60	7.42%	48.48%
75	31.21%	84.19%
85	59.03%	94.42%
100	89.08%	98.97%

DISCUSSION

Based on the results of the model, a few recommendations are extended with the caveat that they hold for the base case producer. Consideration of other base case producers would provide additional information but is beyond the scope of this thesis. A non-binding attribute is important to entice enrollment under less attractive payment and length scenarios. Nonbinding contracts are strongly preferred to binding regardless of payment or contract length. If it is important the contract be binding, notable for policymakers is that shorter lengths have a higher participation rate than longer lengths. As the payment rate increases, the increase in likelihood of enrollment begins to decrease, particularly beyond a payment rate of 75% for a non-binding contract. There is little change in willingness to enroll with additional payment once the payment reaches this level.

These results are important as policymakers consider attributes and particularly attribute levels when the national program is designed. It would not be budget efficient to offer contracts paying 100% of land rental when the effect on enrollment as a measure of program attractiveness to landowners is small. Again, this is especially true for nonbinding contracts. If it is important the contract be binding, an increase in payment rate will have an effect on enrollment at higher payment levels. That trade off should be considered when contracts are specified with careful consideration to the objectives of the program and the budget available. If the participation goal can be met by offering a lower payment rate and a non-binding contract and/or a shorter length contract, it may be more financially responsible to go with those terms.

While the results in general agree with the literature and add the decreasing responsiveness of willingness to enroll at higher payment levels, there are some limitations that are important to keep in mind. It is suggested that further research be conducted, designed so as

to overcome the most important of these limitations. Limitations of this study include the small sample size, limited geographic area, and the use of one base case farmer. Thus, additional research may use an increased sample size and a wider geographic area and consider the effect of willingness to enroll on landowners other than the base case farmer. For example, results show that younger farmers are less responsive to program length. As many landowners are not in the younger-farmer category, considering a base case for an older landowner would provide additional insight. Another area of study would be the impact on the USDA budget if this were to become an extremely popular program, or the impact on the state budget if USDA decided to discontinue the program, but individual states wanted to continue on. Finally, this program and thus study only focuses on wetlands. The model can be applied to other conservation contracts as Wachenheim et al. (2018) demonstrate for the CRP.

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