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Feasibility of Public-Private Partnerships for Swamp Rabbit Conservation

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ABSTRACT

The distribution and abundance of swamp rabbits in southern Illinois have decreased due to loss and fragmentation of bottomland hardwood forests. Remaining populations are likely isolated because of limited dispersal across open areas. Private citizens own 69% of highly suitable swamp rabbit habitat in southern Illinois, so public-private partnership is key to any conservation efforts. Owners of highly suitable habitat were sent mail surveys to determine current and acceptable forms of land management, participation in government incentive programs, and interest in swamp rabbit conservation. The response rate was 41%, and 69% of surveyed landowners indicated interest in learning about or participating in swamp rabbit conservation efforts, implying that creation of public-private partnerships could be feasible. Nearly half of the respondents were already enrolled in government incentive programs. Our results suggest that there could be substantial support for swamp rabbit conservation, and that outreach efforts may increase enrollment in incentive programs.

Keywords: Government incentive programs, private land management, public opinion, public-private partnership, swamp rabbit, *Sylvilagus aquaticus*

INTRODUCTION

Conservation on private lands is one of the most pressing challenges in conservation (Knight, 1999; Freyfogle, 2003). Approaches to land conservation in the United States since the late 1880s have typically consisted of government reservation or acquisition of land (Jensen et al., 1993; Press et al. 1996; Raymond and Fairfax, 1999). However, funds are often not available to purchase lands and governments are often constrained in their ability to act quickly and efficiently (Endicott, 1993). Sustained and flexible outside support (financial and consultative) is required for most conservation projects on privately owned lands to be successful (Sinclair et al., 2000).

Conservation easements are voluntary, incentive-based approaches that depend upon continued private ownership and management of land used in conservation, which avoids the financial costs and political difficulties associated with public land acquisition and management (Merenlender et al., 2004). The increasing appeal of conservation easements

has been attributed to rising land values, high cost of government land management, frustration with gridlocked public land-management and resource agencies, and real or perceived insensitivity of federal and state regulatory authorities toward local communities (Turner and Rhylander, 1998). Conservation easements usually cost less than land acquisition (Main et al., 1998), and they may also facilitate various landowner goals (Wright, 1994). Unlike public acquisition, the property stays on the local property tax rolls (although generally at a reduced rate) and in some cases this can improve community support (Merenlender et al., 2004).

The swamp rabbit (*Sylvilagus aquaticus*) is a species that could benefit from cooperative habitat management by public agencies and private landowners. Woolf and Barbour (2002) estimated that 32% of sites occupied by swamp rabbits in southern Illinois were in private ownership and Rubert (2007) found that 79% of highly suitable swamp rabbit habitat in southern Illinois was privately owned. Swamp rabbits are closely associated with bottomland hardwood forests in the southeastern U.S. and along the Mississippi River and its tributaries (Lowe, 1958; Chapman and Feldhamer, 1981; McCollum and Holler, 1994). Large-scale swamp rabbit population decline has been linked to habitat destruction (Terrel, 1972; Korte and Fredrickson, 1977; Whitaker and Abrell, 1986; Kjolhaug and Woolf, 1988; Sole, 1994). Most of the swamp rabbit's historic habitat has been negatively impacted by flood control structures and conversion of forest to agriculture, and bottomland hardwood forests have been designated as a habitat of regional concern (Hunter et al., 1993).

Various government incentive programs can be used by private landowners to improve or create swamp rabbit habitat in southern Illinois. The U.S. Department of Agriculture has several programs directed toward private landowners to encourage wildlife conservation, including the Wetlands Reserve Enhancement Program (WREP) in their Wildlife Habitat Incentives Program (WHIP), Conservation Reserve Program (CRP), and Wetland Reserve Program (WRP). These programs offer easements and incentives for those interested in managing their private lands for the benefit of wildlife. The Illinois Forestry Development Cost Share Program, which reimburses eligible landowners for a portion of their costs for the preparation of forest management plans and practices, is also available.

Although private lands can allow for more flexibility in management options, publicly-owned areas contain most of the largest remaining habitat patches (Woolf and Barbour, 2002) and sites where swamp rabbits are highly abundant (Rubert, 2007). However, the public is generally opposed to burning and logging (Dessecker and McAuley, 2001), and this opposition limits the options for managing swamp rabbit habitat on public lands. The willingness of agencies, such as the IDNR, U.S. Fish and Wildlife Service (USFWS), and the U.S. Forest Service (USFS), to manage for swamp rabbit habitat can vary. Woolf and Barbour (2002) recommended that public and private lands be integrated into a partnership-based swamp rabbit management plan.

Our objective was to assess the feasibility of creating public-private partnerships to benefit swamp rabbit conservation. We sought to identify factors that would predict a landowners' willingness to participate in or learn more about swamp rabbit conservation. We also assessed current private land management practices in areas of highly suitable swamp rabbit habitat.

METHODS

Owners of lands identified as suitable swamp rabbit habitat were asked in 2007 to participate in a written survey to determine current and acceptable forms of land management, participation in government incentive programs, and interest in participating in swamp rabbit conservation efforts (Appendix A). Landowners were also asked whether they reside or hunt on the property and whether they practice agriculture on their property.

To identify owners of swamp rabbit habitat for our survey, a map of suitable habitat (Rubert, 2007; Figure 1) was overlaid onto 1998 1 m^2 ground resolution Digital Orthophoto Quarter Quadrangles for Alexander, Johnson, Massac, Pope, Pulaski, and Union counties using ArcMap (Environmental Systems Research Institute, Redlands, California). Landowners were identified using county plat maps. We visited several counties to collect landowner mailing addresses from county tax assessor offices. Landowners received four mailings based on the Total Design Method (Dillman, 1978). They were initially mailed an introductory letter, questionnaire, and a postage-paid envelope. A second mailing consisted of a postcard reminder thanking them for their cooperation. The third mailing to those that had not yet responded contained a cover letter, replacement questionnaire, and a postage-paid envelope. The final mailing was another postcard reminder, emphasizing the importance of the survey. Some survey respondents were contacted by telephone to clarify unclear responses.

We used single-factor logistic regression (McCullagh and Nelder 1989) in SAS (SAS Institute, Cary, North Carolina) to identify which factors were associated with willingness to participate in swamp rabbit conservation efforts, because willingness was recorded as a binary variable (yes or no). The independent variables we considered were length of ownership, presence of agriculture, presence of pasture, if the respondent had seen a swamp rabbit, if the respondent was currently engaged in any land management practices to benefit wildlife, if hunting or trapping took place on the respondent's land, and if the respondent found any land management practices to be unacceptable. To further clarify and reinforce the logistic regression results, we also conducted a forward stepwise selection procedure ($\alpha = 0.05$) to identify predictors of willingness to participate in conservation efforts

RESULTS

Surveys were sent to 372 landowners, of which 151 responded for a total response rate of 41%. The average (± SD) length of land ownership was 33 ± 26 years. Just over half of landowners reportedly did not reside on their properties, but few resided on their property for only part of the year (Table 1). Most respondents practiced agriculture, with similar numbers growing crops and with pasture (Table 1). The majority of respondents reported managing wildlife and their habitat in some way (Table 1), and the most frequently used technique was planting food plots. Nearly half of respondents were already enrolled in a government incentive program (Table 1). Among these, the CRP was the most popular incentive program, followed by WRP, the Illinois Forestry Development Cost Share Program, WHIP, and “other” (Figure 2). Thirty-eight percent of the enrolled respondents were enrolled in ≥1 program. Few respondents objected to any management techniques (Table 1), but burning and grazing management received some objections. Over two-

thirds of landowners indicated interest in learning more about swamp rabbit conservation (Table 1). A large majority of landowners reported hunting or trapping on their property (Table 1). The species hunted most were deer (*Odocoileus virginianus*), waterfowl, and turkey (*Meleagris gallopavo*); swamp rabbits or eastern cottontails (*Sylvilagus floridanus*) were hunted by 26% of the respondents. Few landowners reported seeing swamp rabbits on their property, but approximately one-third were unsure (Table 1).

In the simple logistic regression model, the only variable that significantly predicted willingness to learn about or participate in swamp rabbit conservation was whether the landowner had seen a swamp rabbit ($\chi^2 = 5.8$, df = 1, $P = 0.02$); not having seen a swamp rabbit had a negative effect on willingness to participate (odds ratio= 0.44). The logistic regression was a good fit according to the Hosmer and Lemeshow Goodness-of-Fit test ($\chi^2 = 10.13$, df = 8, $P = 0.25$). Stepwise variable selection indicated that engaging in wildlife management practices had a positive effect (odds ratio = 1.50) on the respondents' interest in swamp rabbit conservation practices ($\chi^2 = 3.88$, df = 1, $P = 0.05$).

DISCUSSION

None of the variables we examined was a strong predictor of landowner interest in participating in swamp rabbit conservation. We had expected that landowners that already practiced management techniques or that were enrolled in an incentive program would be more amenable to conservation efforts. Whether a respondent reported having seen a swamp rabbit on their property was significant in the logistic regression analysis, and an interesting result because this was probably the least reliable response. Swamp rabbits are cryptic and observations can be rare, even where they are abundant (Chapman and Feldhamer, 1981). Also, swamp rabbits and cottontails can be difficult for an observer to distinguish at a distance.

Our survey results are likely to be affected by nonresponse bias (Groves, 1989; Groves et al., 2002; Lynn, 2003). Characteristics of interviewers and potential respondents (Groves and Couper, 1998), attributes of survey design (Lynn et al., 1998; Edwards et al., 2002), and survey environment (Couper and Groves, 1996) can all affect survey participation. Interviewees that feel a survey is an invasion of privacy (Singer et al., 1993) or that lack interest in a survey (Martin, 1994; Groves et al., 2004) are less likely to return the survey. We received three hostile responses to our survey. Mail surveys typically have a lower response rate than more personal forms of communication, however they are more cost-efficient, give respondents privacy, and do not limit participants' time to think (Mannesto and Loomis, 1991).

Some respondents seemed to have been confused and had to be contacted for further clarification. For example, several respondents appear to have entered acceptable management practices in response to the question about unacceptable practices. Some of the responses might have been different if questions were clearer or better explained. Respondent participation is negatively affected by survey length (Burchell and Marsh, 1992; Bogen, 1996) and the amount of time and effort required to complete the questionnaire (Sharp and Frankel, 1983), which placed restrictions on the quantity of materials that could be sent.

Maintaining viable and well-distributed swamp rabbit populations requires active management to create early-successional areas within established bottomland hardwood forests (Woolf and Barbour, 2002). Active management efforts are expensive and labor intensive, limiting their use. Additionally, managers can face opposition when they attempt to manage for early-successional habitats through logging and burning on public lands, and timber harvest is very limited on public lands in southern Illinois. Therefore, more management options are available on private land than on public land in this region. Through conservation easements, managers can lower land-protection and management costs. Most of the easement contracts include reforestation plans that would create suitable swamp rabbit habitat. Swamp rabbits have been found in reforested areas within five years of planting, because reforested agricultural fields create early-successional forests with thick understory cover preferred by swamp rabbits (Scharine et al., 2011).

Conservation easement funding is limited and expecting immediate enrollment of all landowners whose lands are important to swamp rabbit conservation would be unreasonable. Many landowners that are not enrolled in conservation programs in southern Illinois are already engaged in wildlife management. Through outreach and education programs directed toward non-enrolled landowners, managers can encourage management techniques such as timber harvest, creation of brush piles, and reforestation that would benefit swamp rabbits. We found that a large majority of landowners wanted to learn more about or participate in swamp rabbit conservation efforts, providing reason for optimism that such outreach efforts would be successful.

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APPENDIX A

Please answer the following questions regarding your property in _____ county. The following information is being used for my study regarding habitat connectivity for the swamp rabbit in Southern Illinois. Thank you for your cooperation.

Lyann Rubert, Graduate Research Assistant
Cooperative Wildlife Research Laboratory, Southern Illinois University Carbondale

1) How long have you owned this property?

2) Do you reside on this property?
___Yes ___No
If yes, do you reside there year-round?
___Yes ___No

3) Have you seen swamp rabbits on your property?
___Yes ___No ___Not sure

4) Do you grow agricultural crops on this property?
___Yes ___No
If yes, what do you plant?
___ Soybeans ___Corn ___Milo/Sorghum ___Millet ___Rice___
Other_____

5) Do you have any pasture on this property?
___Yes ___No

6) Do you use any of the following techniques specifically to manage wildlife and its habitat?
___Yes ___No
If yes, check which ones you practice
___Predator control ___ Food plots ___Grazing management
___Prescribed burning ___Plantings ___Reforestation
___Removing exotic species ___Creating brush piles
___Timber harvest ___Managing water levels ___Other_____

7) Do you participate in any of the government incentive programs for conservation listed below?
___Yes ___No
If yes, please check which one(s) you participate in
____Wildlife Habitat Incentives Program (WHIP)
____Conservation Reserve Program (CRP)
____Illinois Forestry Development Cost Share Program
____Wetland Reserve Program (WRP)
____other_____

8) Would you consider any of the management techniques below to be unacceptable for use on this property?
___Yes ___No
If yes, check any unacceptable practices
___Predator control ___ Food plots ___Grazing management
___Prescribed burning ___Plantings ___Reforestation
___Removing exotic species ___Creating brush piles ___Timber harvest ___Managing water levels ___Other_____

9) Would you be willing to find out more about participating in swamp rabbit conservation?
___Yes ___No ___Not sure

10) Do you or others hunt or trap on your property?
___Yes ___No
If yes, which animals are hunted/trapped on your property?
___Waterfowl ___Quail ___Dove ___Turkey ___Deer ___Beaver
___Raccoon ___Mink ___Coyote ___Fox ___Muskrat ___Skunk ___Squirrel ___Rabbit ___Other_____

THANK YOU!

May we contact you about conservation efforts?
___Yes ___No

Please update your contact information.
Name:_____
Address: _____
_____
Phone: _____
E-mail address: _____
Which is the best way to contact you?_____

COMMENTS

Table 1. Responses by southern Illinois landowners to a 2007 survey regarding their land management practices and willingness to participate in swamp rabbit conservation efforts.

Question	Yes	No	Not Sure	% Yes
Do you reside on this property	64	74		47
Have you seen swamp rabbits on your property?	21	70	45	15
Do you grow agricultural crops on this property?	89	47		65
Do you have any pasture on this property?	90	47		66
Do you use any of the following techniques specifically to manage wildlife and its habitat?	86	50		63
Do you participate in any of the government incentive programs for conservation listed below?	64	72		47
Would you consider any of the management techniques below to be unacceptable for use on this property?	47	88		35
Would you be willing to find out more about participating in swamp rabbit conservation?	95	43		69
Do you or others hunt or trap on your property?	110	23		83

Figure 1. Map of highly suitable habitat for swamp rabbits (dark gray areas) in southern Illinois, based on Rubert (2007).

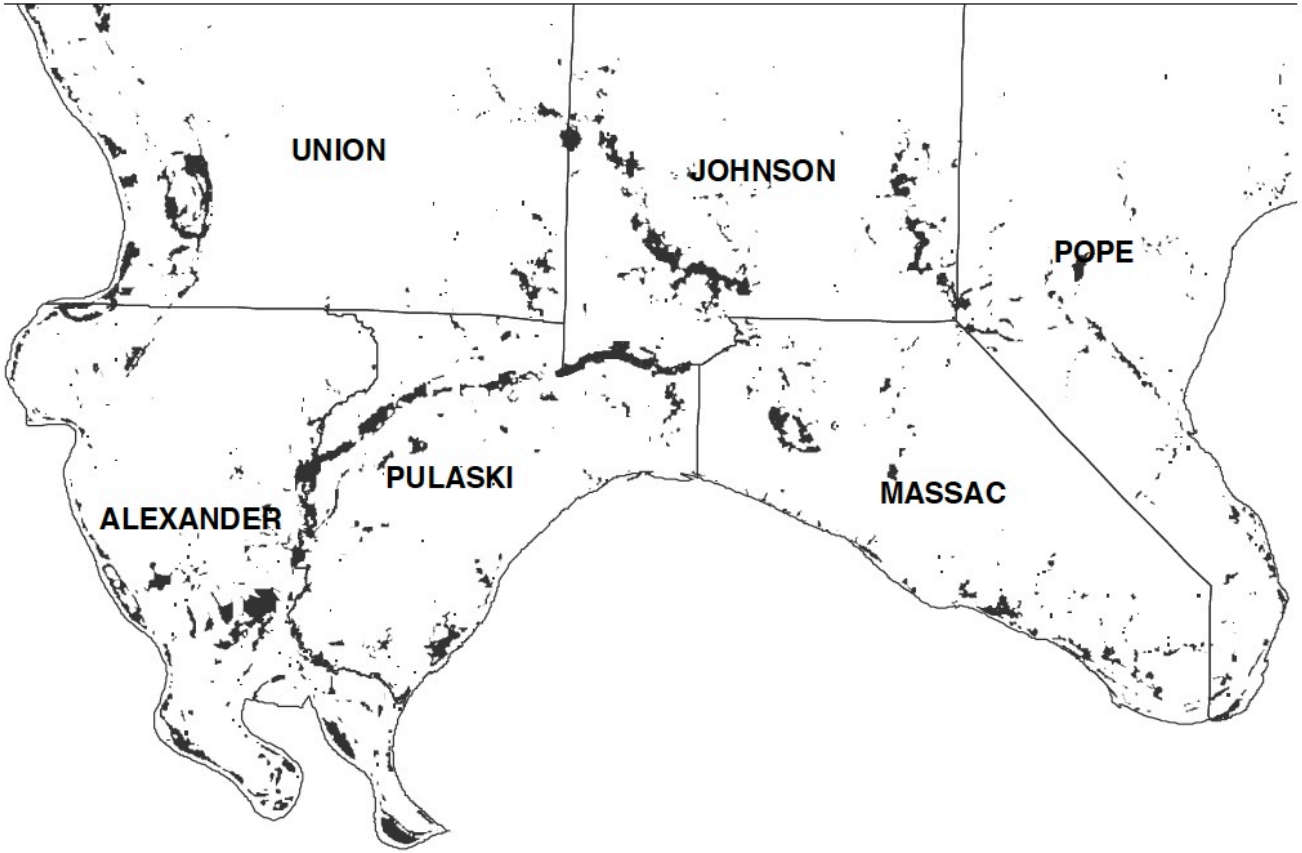

Figure 2. Reported participation in government incentive programs aimed at conserving wildlife habitat, among southern Illinois landowners surveyed in 2007. Programs include: Conservation Reserve Program (CRP), Wetland Reserve Program (WRP), Illinois Forestry Development Cost Share Program (IFDCSP), Wildlife Habitat Improvement Program (WHIP), or "other."