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What Influences Whether Family Forest Owners Participate in Outreach Campaigns?

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What Influences Whether Family Forest Owners Participate in Outreach Campaigns?

Abstract

We used an experimental design to analyze factors affecting participation rates for family forest owner outreach campaigns. Through logistic regression, we assessed the participation rates as a function of campaign and landowner attributes. Participation rates ranged from 3% to 14%. Owners offered a publication were on average 4.3 times more likely to participate than those offered a forester visit. Owners with a college degree were on average 1.5 times more likely to participate than those with lower levels of formal education. Extension and other outreach professionals can use knowledge of these factors to design more effective outreach campaigns.

Keywords: family forest owners, outreach, social marketing, logistic regression, United States

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Introduction

Across the United States, 290 million ac of forestland are owned by an estimated 10.7 million families, individuals, trusts, and estates, collectively referred to as family forest owners (Butler et al., 2016a). This represents 36% of the forestland in the United States. The fate of these family forests lies in the hands of the owners, but most of them are not engaged with the forest conservation community, at least not according to traditional engagement metrics. Of family forest owners with 10+ ac of forestland, only 13% have a written forest management plan and only 20% have received forest management advice (Butler et al., 2016a).

To engage more owners, many conservation-related groups, including Extension professionals, other governmental agencies, and nongovernmental organizations, are reaching out to family forest owners (Downing & Finley, 2005; Kaetzel, Fly, & Hodges, 2010; Magill, McGill, & Fraser, 2004). The outreach methods vary substantially, but the overall goal of "increasing engagement" is very common.

Traditional timber management is a common objective of much of this outreach, but the objectives have evolved to address other topics, such as invasive species (Ma, Clarke, & Church, 2018; Steele, McGill, Chandran, Grafton, & Huebner, 2008), nontimber forest products (McLain, 2013), estate planning (Catanzaro, Markowski-Lindsay, Milman, & Kittredge, 2014), and woody biomass harvesting (Joshi, Grebner, Henderson, & Gruchy, 2015). A number of articles attend to the concepts of improving outreach efforts through segmenting (Davis, Asah, & Fly, 2015; Kittredge, 2004; Metcalf, Gruver, Finley, & Luloff, 2016; Starr, McConnell, Bruskotter, & Williams, 2015) and honing messages (Ma, Kittredge, & Catanzaro, 2012; Morris, Megalos, Hubbard, & Boby, 2016; Starr & McConnell, 2014), but most do not explicitly address the mechanisms for communicating the information. Two exceptions are Butler et al. (2016b) and Magill et al. (2004). Butler et al. (2016b) found written materials to be the preferred method. Magill et al. (2004) found that preferred methods varied somewhat by topic, but of the three methods tested—technical aid, workshops, and financial assistance—technical aid was consistently preferred.

Social marketing, sometimes called targeted marketing, techniques are increasingly being used to improve the effectiveness of outreach activities. This type of marketing combines the traditional commercial marketing concepts of product, price, place, and promotion with the additional considerations of publics, partnerships, policies, and purse strings, with the aim of inducing a voluntary change in behavior (Weinreich, 2011). This technique is common in public health fields and has been adapted for forestry (Butler et al., 2007; Snyder & Broderick, 1992).

Building and expanding on the work of Rickenbach et al. (2017), we carried out a study in which we quantified factors affecting participation rates for 10 landowner outreach campaigns conducted by the American Forest Foundation and its partners. We used an experimental design to test campaign attributes combined with landowner attribute data to model participation.

Methods

Data

The data we used were from 10 campaigns conducted across six geographies (Figure 1). (For a list of the American Forest Foundation partners who assisted with implementing the campaigns, see Appendix A.) Although the specifics varied (Table 1), the overall purpose of the campaigns was to increase landowner engagement. For each campaign, landowners were randomly assigned to campaign treatments and contacted via mail. The primary outcome monitored was whether the owner indicated he or she would accept the offer (i.e., participate in the campaign).

Figure 1.

Geographies Targeted by the Outreach Campaigns Analyzed

Note: Abbreviations correspond to those used to identify the campaigns in this article.

Table 1.

Target Populations and Objectives of the Outreach Campaigns Analyzed

Identifier	Geography	Target population	Objective
AL	Alabama Cumberland	Family forest owners with 40+ ac of forestland	Increase sustainable forest management with an emphasis on riparian forest improvements, prescribed fire, and shortleaf pine management
LS	Wisconsin Lake Superior Basin	Family forest owners with 10+ ac of forestland	Improve water quality and supply, mitigate wildfire risks, and restore wildlife habitat for at-risk species
MA	Massachusetts and Connecticut	Family forest owners with 10+ ac of forestland	Increase conservation and sustainable management for the support of a wildlife corridor
MS	Mississippi Piney Woods	Family forest owners with 40+ ac of forestland	Conduct sustainable forest management with an emphasis on, but not exclusive to, longleaf pine management
NC	North Carolina	Participants in the North Carolina Forest Stewardship Program	Increase membership in the Tree Farm program

WI	Wisconsin Driftless Area	Family forest owners with 10+ ac of forestland	Improve landscape health and increase sustainable forest management, including through reestablishing native oak trees

The information used to model participation is summarized in Table 2, and a full list of variables is available in Appendix B. The offers in the mailings typically included a visit from an expert, a publication, or "multiple" (i.e., recipients were offered a site visit, a publication, or both). Message refers to the feel and tone of the mailings. Appended data varied by campaign but included variables such as size of holdings, participation in forestry programs, demographics, and outdoor/conservation-oriented interests and activities. The appended data came from local partners and commercial marketing data clearinghouses.

Table 2.

Key Attributes of the Family Forest Owner Outreach Campaigns Analyzed

Geography	Campaign	Season and year	Offer(s)	Message(s)	Sources and number of appends
Alabama Cumberland	AL.F15	Fall 2015	• Multiple	• Hunter, game, and wildlife • Hunter, nongame, and wildlife • Hunter, recreation, game, and wildlife • Hunter, recreation, nongame, and wildlife • Recreation, game, and wildlife • Recreation, nongame, and wildlife	• Partners (2) • Purchased (75)
Lake Superior Basin (Wisconsin)	LS.S15	Spring 2015	• Multiple	• General • Sharp-tailed grouse	• Partners (2)

					• Purchased (40)
Massachusetts and Connecticut	MA.F14	Fall 2014	• Handbook	• Conservation/legacy • Wildlife	• Partners (1) • Purchased (87)
	MA.S15	Spring 2015	• Handbook • Land trust – forester visit	• Conservation/legacy • Wildlife	• Partners (1) • Purchased (86)
Mississippi Piney Woods	MS.S13	Spring 2013	• Biologist visit • Forester visit • Handbook	• Financial • General • Wildlife	• Partners (3) • Purchased (84)
	MS.F13	Fall 2013	• Biologist visit • Forester visit • Handbook • Multiple	• Financial • General • Wildlife	• Partners (3) • Purchased (84)
North Carolina	NC.F14	Fall 2014	• Fact sheets • Forester visit	• General	• Partners (4)
Wisconsin Driftless Area	WI.S12	Spring 2012	• Handbook	• General • Wildlife	• Partners (2)

		• Forester visit		• Purchased (18)
WI.F12	Fall 2012	• Handbook • Forester visit	• Financial • General • Wildlife	• Partners (3) • Purchased (19)
WI.F13	Fall 2013	• Handbook • Forester visit	• Hunting	• Partners (3) • Purchased (33)

Analyses

Through logistic regression models (Hosmer, Lemeshow, & Sturdivant, 2013), we tested the relationships between participation and the campaign attributes and appended data. The participation variables were defined as 1 if the landowner replied that he or she would like to receive the specified offer and 0 otherwise. We used lasso variable selection to avoid model overfitting (Tibshirani, 1996). To avoid multicollinearity, we dropped variables in the reduced models with variance inflation factors over 2.5 (Allison, 1999). We assessed goodness of fit using the le Cessie-van Houwelingen-Copas-Hosmer sum of squares test (Hosmer, Hosmer, le Cessie, & Lemeshow, 1997). All analyses were conducted through use of the R statistical software computing environment (R Development Core Team, 2016).

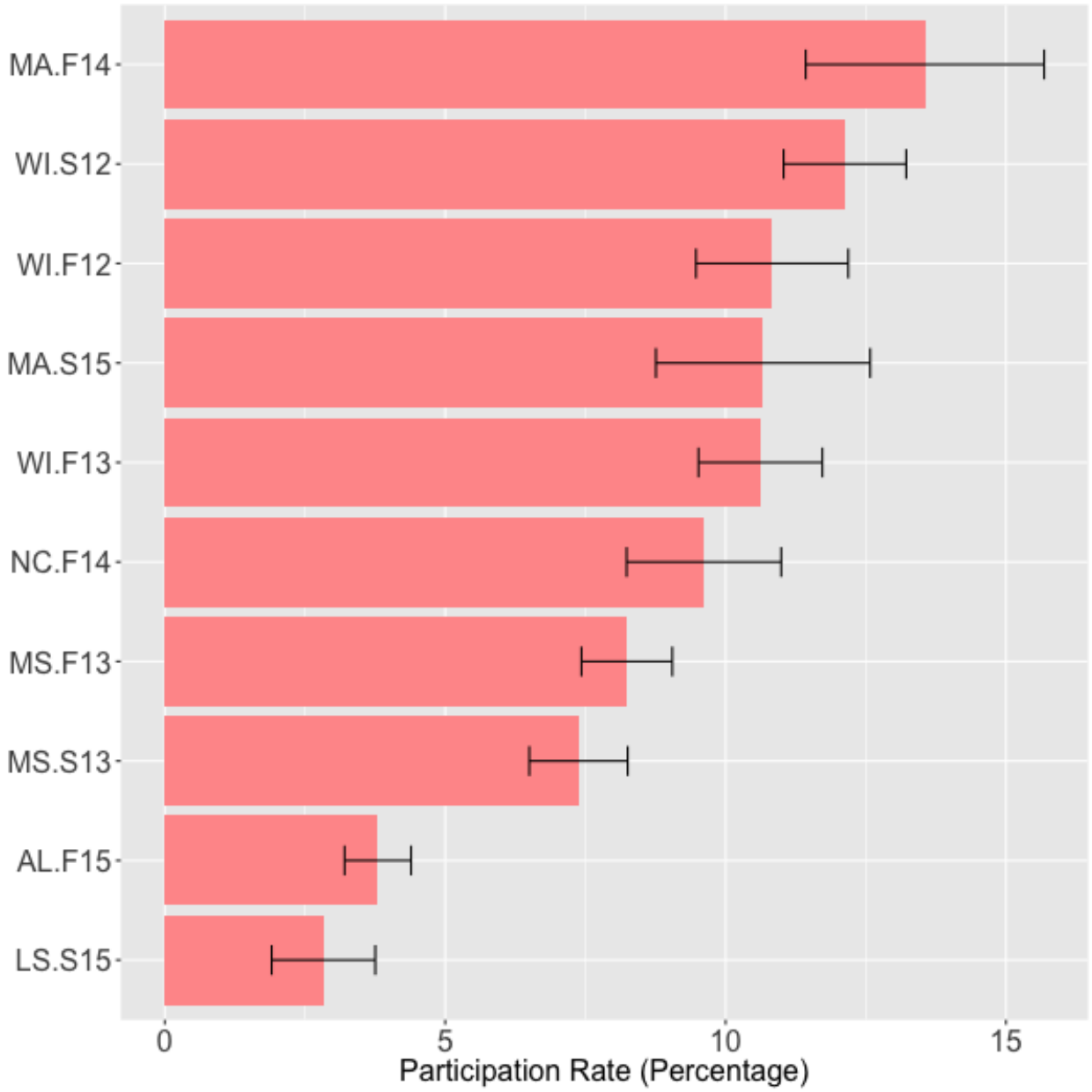
Results

Participation Rates

The percentages of landowners contacted who indicated they wanted to participate varied from 3% to 14% (Figure 2). Within a geographic region, the participation rates across campaigns did not vary substantially. For example, the Wisconsin Driftless Area participation rates ranged from 11% to 12%, and the Mississippi rates were 7% and 8%.

Figure 2.

Participation Rates, with 95% Confidence Intervals, by Outreach Campaign



Participation Models

All of the campaigns produced significant models. The lasso technique reduced the number of variables to two to 12 variables per model.

Offer and education level were the most consistently significant variables (p-value < .05) across models (Table 3). Offer was significant in all the models in which it was available; landowners receiving the offer of a publication were 2.5 to 7.9 times more likely to participate. Education was significant in six of the seven models in which it was available; landowners with a college education were 1.5 to 3.4 times more likely to participate. Other variables were less consistent in terms of significance.

Table 3.

Odds Ratios from Logistic Regression Models of Participation in Outreach

Campaign	Shooting	Size	ATV	Donor to	Donor	Education:	Inco

	license	(log of ac)	owner	environmental groups	to wildlife groups	College	$10
AL.F15	1.54*	—			—	1.58*	–
LS.S15		-		—		3.37**	–
MA.F14	—	1.46***		—	1.78*		–
MA.S15		—		—			–
MS.S13		1.20**	—		—	—	–
MS.F13		—	—		1.60**	1.59***	1.0
NC.F14		—	4.31***				
WI.S12		—		—		1.45***	
WI.F12		—		1.82**		1.55*	
WI.F13		—		1.44*		1.50**	

Note. Only values for significant variables are reported. Dashes indicate variables that were availabl indicate variables that were not available for a specific model. Full results for models are available i *$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

As one might expect, the type of service or product offered had the greatest impact on participation rates, but the preferred offer was less intuitive. The offers tested were two commonly used in forestry outreach: publications and site visits. Offering a handbook versus offering a forester or wildlife biologist visit increased the participation rate by an average of 10 percentage points (Figure 3). This circumstance is in spite of the commonly held sentiment that owners want more site visits. The higher participation rates associated with the publications may be related to the lower time commitments required from the owners as compared to the subsequent steps that occur with a site visit. The preference for publications is reinforced by results from the National Woodland Owner Survey (Butler et al., 2016b) (Figure 4).

Figure 3.

Participation Rates, with 95% Confidence Intervals, by Outreach Campaign and Offer

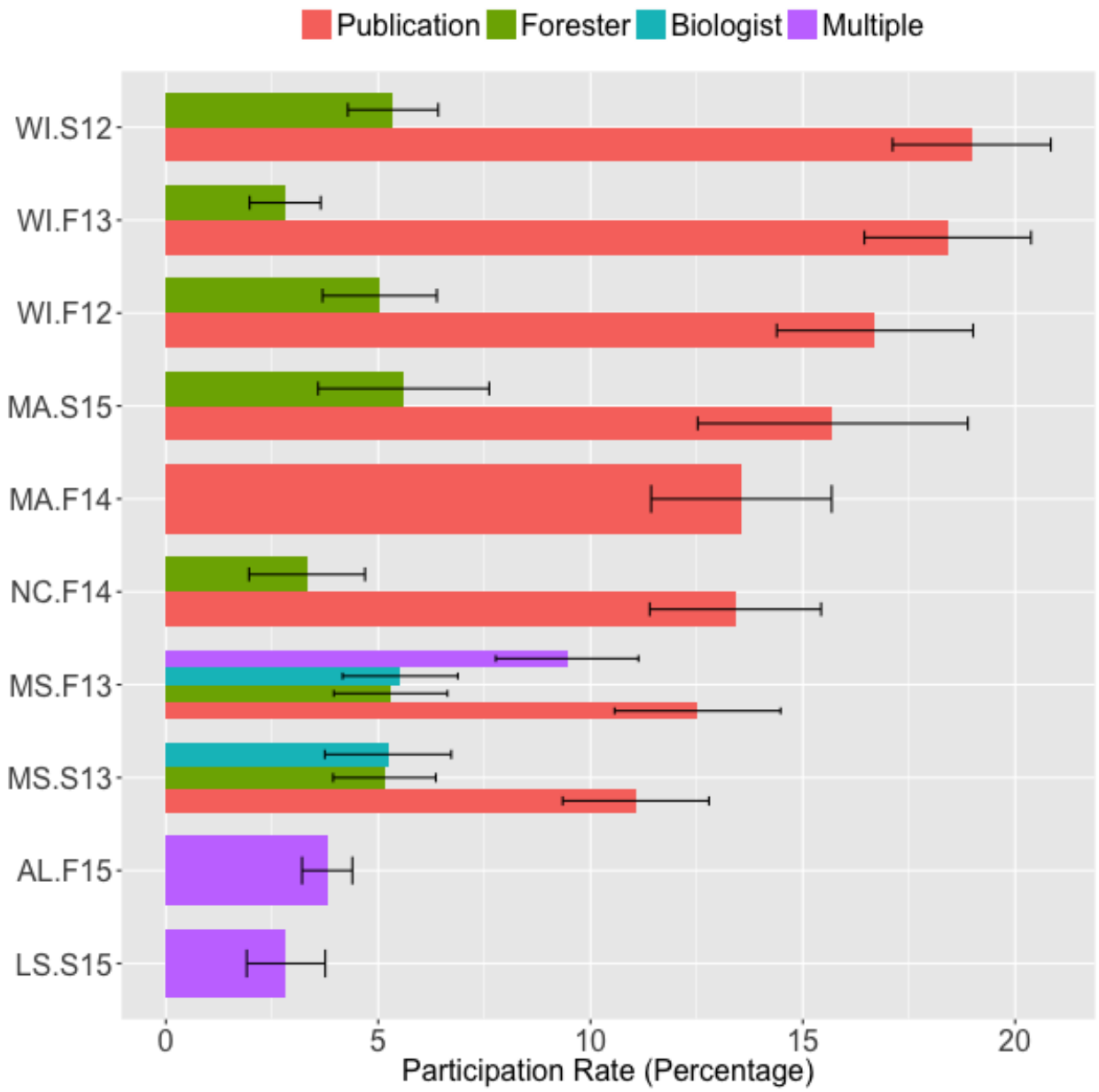
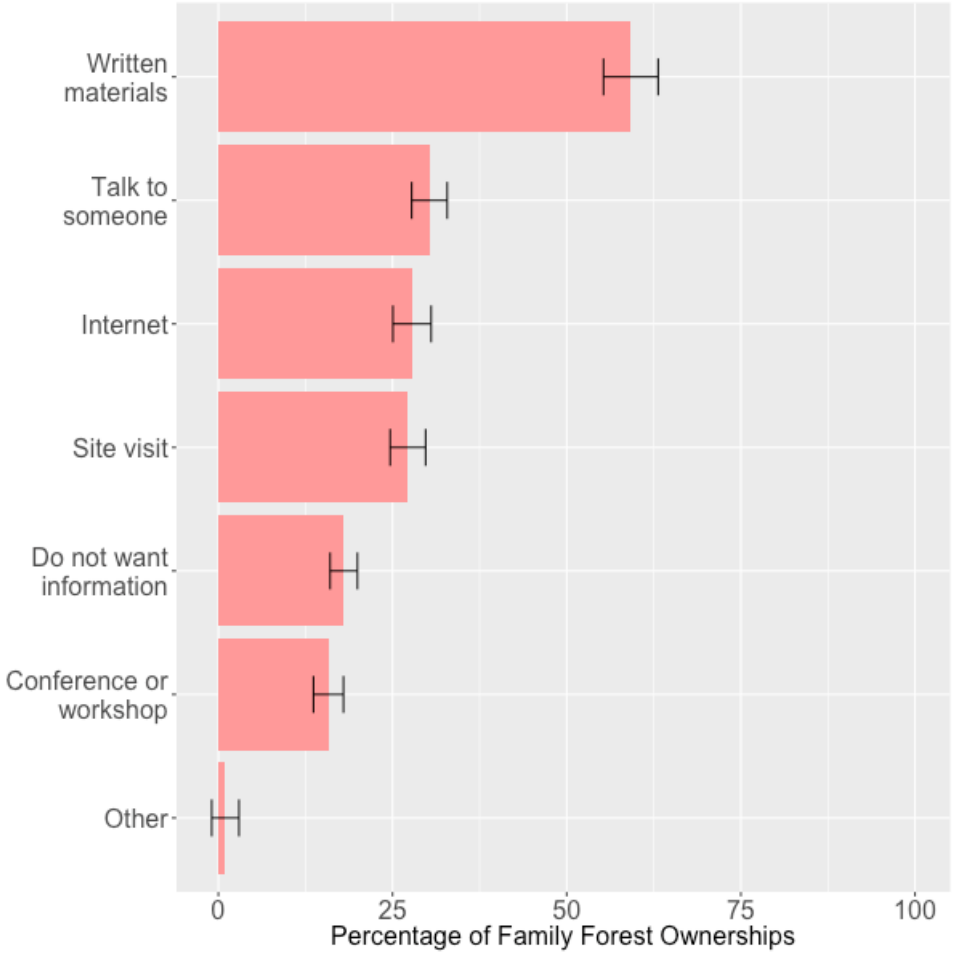


Figure 4.

Percentages of Family Forest Owners (10+ ac) Across the United States by Preferred Methods for Receiving Forest Management Information



Note: Numbers refer to owners rating a method as very useful or useful on a 5-point Likert scale. Source: Butler et al., 2016b.

The scope of our study was limited to testing campaigns offering publications and site visits, but other options, including social media and other electronic communications, are tools commonly used by many Extension professionals. The efficacies of these additional options, to our knowledge, have not been empirically tested for family forest owners. This circumstance is especially relevant given that resources for Extension programs are diminishing (Sagor, Kueper, Blinn, & Becker, 2014) and many professionals increasingly rely on these other tools. According to results from the National Woodland Owner Survey (Butler et al., 2016b) (Figure 4), traditional written materials are preferred over other resources, including the Internet, but these trends need to be monitored over time as newer generations, who are increasingly comfortable and reliant on electronic communications, become larger proportions of the family forest owner population.

One factor we did not consider in our analysis is the likelihood of the given offer leading to behavioral change, the ultimate goal of most outreach campaigns. Although participation rates for the forester offers were lower, the return on investment could be higher, but this possibility needs to be further investigated. However, in contrast to widely held beliefs, Kilgore et al. (2015) found that participation in educational campaigns may have larger impacts on landowner behaviors than having a management plan or having received cost-share assistance. In addition, publication offers can be seen as a "foot-in-the-door" technique where a modest, low-threshold offer helps build trust and increases the likelihood of later participation in higher threshold, larger offers (Burger, 1999).

Besides type of service or product offered, level of education was the only other variable that was consistently significant across models. Owners with a college degree were on average 1.5 times more likely to participate than owners with lower educational attainment levels. Organizations that are interested in interacting with a broad range of owners may want to consider that educational level may be a barrier for reaching some owners.

There was some evidence that owners who contribute to environmental or wildlife causes were more likely to participate, but the influence of these variables was less consistent, and additional research is needed to confirm or refute this association. It is plausible that owners who are inclined to donate to conservation organizations also are inclined to accept information from them.

The message variable did not have a significant impact on participation rates across the multiple campaigns we studied. In theory, distinct messages should resonate differently with different people (Weinreich, 2011). One reason for message not being significant could be related to how distinct the messages are. For the campaigns addressed here, the primary difference among messages was the pictures used on the materials being delivered.

Although size of holdings is correlated with many landowner behaviors and attitudes, such as timber harvesting (Beach, Pattanayak, Yang, Murray, & Abt, 2005; Silver, Leahy, Weiskittel, Noblet, & Kittredge, 2015), owning for timber or land investment purposes (Butler et al., 2016a), and participation in management activities and programs (Butler et al., 2016a), it was not a consistent indicator of participation in outreach campaigns in our study. This attribute may be of use for targeting owners with larger (or smaller) holdings depending on the goals of the campaign, but it does not appear to be of great help in identifying who will participate.

The participation models presented here do not explain all the differences across the campaigns. The quality of the outreach materials, the timing of the outreach efforts, the number of contacts, and the trustworthiness of the partners are a few of the untested variables that may help further explain differences.

Conclusions

Participation rates for the outreach campaigns we studied ranged from 3% to 14%. Through an experimental design, we showed that offer had the greatest influence on participation rates, followed by education level. More specifically, offering a family forest owner a publication is much more likely to solicit a positive response than offering a site visit from a professional. Publications offer owners opportunities to learn new information at their own rate. The potential that acceptance of publications will lead to future interactions with professional foresters is an important topic for future research.

Education is the only variable other than offer that consistently affected participation rates. The implications for Extension foresters and others for more readily reaching less educated owners should be factored into outreach efforts.

Most of the other appended data were not significantly correlated with participation rates. This result may be because the appended data were not specifically collected for understanding family forest owners or because these broad indicators simply are not great predictors of actual conservation-related behavior.

Our study was made possible by the foresight and commitment of those implementing the campaigns and a willingness to evaluate their efforts and test different approaches. This desire for evidence-based results and continual learning should be encouraged in all outreach projects and could be facilitated by the development of simple tools for participation tracking and automated analyses.

We hope that professionals use the information provided here with insights from other studies and their own experiences to design more efficient and more effective outreach programs.

Acknowledgments

Our research would not have been possible without the commitment of the American Forest Foundation to engage with us to set up our experiments and allow us to analyze and share the results. The American Forest Foundation provided funding for the research, but full editorial rights remained with us. We also are thankful to the partners who implemented the campaigns and the reviewers who provided constructive comments.

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Appendix A

Outreach Campaign Partners

- Alabama A&M and Auburn University Extension
- Alabama Department of Conservation and Natural Resources
- Alabama Forestry Association
- Alabama Forestry Commission
- Alabama Invasive Plant Council
- Alabama Treasured Forests Association
- Aldo Leopold Foundation
- American Forest Foundation
- Auburn University School of Forestry and Wildlife Sciences
- International Paper
- Kickapoo Woods Cooperative
- `Kü-lē Region Forestry Inc.
- MassConn Sustainable Forest Partnership
- Mississippi Forestry Association
- Mississippi Forestry Commission
- My Lake Superior Northwoods
- National Fish and Wildlife Foundation
- National Wild Turkey Federation
- Nature Conservancy
- New England Forestry Foundation
- North Carolina Tree Farm Program

- Oregon Department of Forestry
- Oregon Forest Resources Institute
- Oregon State University Extension Service
- Pheasants Forever
- Ruffed Grouse Society
- Southwest Badger Resource Conservation and Development District
- Trout Unlimited
- University of Wisconsin Extension
- University of Wisconsin Madison
- U.S. Department of Agriculture Forest Service
- U.S. Department of Agriculture Natural Resources Conservation Service
- U.S. Fish and Wildlife Service
- Wallowa Resources
- Walnut Council
- Wisconsin Bird Conservation Initiative
- Wisconsin Department of Natural Resources

Appendix B

Variables Appended to One or More Campaigns Analyzed

Category	Variable	AL.F15	LS.S15	MA.F14	MA.S15	MS.S13	MS.F13	NC.F14	WI.S12
Activity	ATV owner					X	X		
Activity	Big game hunting					X	X		
Activity	Boat owner		X			X	X		
Activity	Boating	X		X		X	X		
Activity	Camping	X		X	X	X	X		
Activity	Fishing	X		X	X	X	X		
Activity	Hunting	X		X	X	X	X		
Activity	Shooting	X		X	X				
Activity	Skiing	X		X	X	X	X		
Campaign	Message	X	X	X	X	X	X		X
Campaign	Offer					X	X	X	X
Demographics	Age								X
Demographics	Education	X	X			X	X		X
Demographics	Gender		X						
Demographics	Income	X	X	X	X	X	X		
Demographics	Married	X	X	X	X	X	X		
Donor	Environmental		X	X	X				X
Donor	Wildlife	X		X	X	X	X		
Forestry	Program participation		X			X	X		X
General	County								
Information	Birds			X	X				
Information	Fishing			X	X				
Information	Hunting			X	X				
Information	State conservation magazine					X	X		
Information	Wildlife			X	X				

Interest	Birds	X	X	X	X	X	X		
Interest	Boating		X						
Interest	Camping		X	X	X				
Interest	Fishing	X	X	X	X				
Interest	Hunting		X			X	X		
Interest	Outdoors								
Interest	Photography	X	X	X	X	X	X		
Interest	Wildlife		X						
Land	All land	X	X		X	X	X		
Land	ear=all style='page-break-before:always'> orestland	X		X		X	X	X	X
License	Deer	X		X	X	X	X		
License	Deer (archery)								X
License	Deer (gun)								X
License	Doe								
License	Fishing	X		X	X	X	X		X
License	Fishing (nonresident)								X
License	Fishing (other)	X		X	X				
License	Hunting					X	X		
License	Other hunting	X				X	X		
License	Patrons								X
License	Shooting	X		X	X				
License	Small game								X
License	Sportsman								X
License	Turkey								X
Registration	ATV								X
Registration	Snowmobile								X

Appendix C

Outreach Campaign Logistic Regression Model Summaries

Alabama – Fall 2015 (AL.F15)

Call:
glm(formula = RESPONSE ~ EDU + LICENSE_SHOOTING, family = "binomial", data = AL.F15)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.3810	-0.3056	-0.2470	-0.2470	2.6477

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.4746	0.1146	-30.327	<2e-16	***
EDU1	0.4545	0.1769	2.569	0.0102	*
LICENSE_SHOOTING1	0.4337	0.1799	2.411	0.0159	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1292.4 on 4000 degrees of freedom
Residual deviance: 1280.5 on 3998 degrees of freedom
AIC: 1286.5

Number of Fisher Scoring iterations: 6

Goodness-of-fit:
Sum of squares: 145.796 p-value: 0.291

Lake Superior Basin – Spring 2015 (LS.S15)

Call:
glm(formula = RESPONSE ~ ACRES_LOG + INCOME + EDUCATION_HIGHER + INTEREST_BIRDS + INTEREST_CAMPING, family = "binomial", data = LS.S15)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.5916	-0.2638	-0.1804	-0.1369	3.1838

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)

(Intercept)	-6.511712	1.112741	-5.852	4.86e-09	***
ACRES_LOG	0.341513	0.226218	1.510	0.13113	
INCOME	0.006906	0.005410	1.277	0.20177	
EDUCATION_HIGHER1	1.215152	0.465109	2.613	0.00899	**
INTEREST_BIRDS1	0.617252	0.719183	0.858	0.39074	
INTEREST_CAMPING1	0.282568	0.634817	0.445	0.65623	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 233.81 on 999 degrees of freedom
Residual deviance: 219.06 on 994 degrees of freedom
AIC: 231.06

Number of Fisher Scoring iterations: 7

Goodness-of-fit:
Sum of squares: 23.899 p-value: 0.669

Massachusetts – Fall 2014 (MA.F14)

Call:
glm(formula = RESPONSE ~ ACRES_LOG + MESSAGE + DONOR_WILDLIFE + INFO_WILDLIFE + INFO_BIRDS + INTEREST_CAMPING + SPORT_CAMPING + SPORT_SKIING, family = "binomial", data = MA.F14)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.1726	-0.5887	-0.4806	-0.3921	2.3478

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.6056	0.4537	-7.948	1.9e-15	***
ACRES_LOG	0.3816	0.1146	3.329	0.000871	***
MESSAGEWP	0.3545	0.2104	1.685	0.091933	.
DONOR_WILDLIFE1	0.5752	0.2652	2.169	0.030103	*
INFO_WILDLIFE1	0.5032	0.3126	1.610	0.107486	
INFO_BIRDS1	0.1444	0.3629	0.398	0.690709	
INTEREST_CAMPING1	0.3137	0.3890	0.806	0.420033	
SPORT_CAMPING1	0.1474	0.3209	0.459	0.646121	
SPORT_SKIING1	0.2348	0.3503	0.670	0.502636	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 645.32 on 757 degrees of freedom
Residual deviance: 609.10 on 749 degrees of freedom

AIC: 627.1

Number of Fisher Scoring iterations: 4

Goodness-of-fit:
Sum of squares: 92.551 p-value: 0.424

Massachusetts – Spring 2015 (MA.S15)

Call:
glm(formula = RESPONSE ~ ACRES_LOG + INFO_FISHING + HOBBY_BIRDS, family = "binomial", data = MA.S15)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8822	-0.4936	-0.4423	-0.4126	2.2569

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-2.9325	0.4566	-6.422	1.34e-10	***
ACRES_LOG	0.2022	0.1241	1.630	0.1032	
INFO_FISHING1	0.6997	0.3453	2.026	0.0427	*
HOBBY_BIRDS1	0.3685	0.3079	1.197	0.2313	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 535.12 on 770 degrees of freedom
Residual deviance: 525.28 on 767 degrees of freedom

AIC: 533.28

Number of Fisher Scoring iterations: 5

Goodness-of-fit:
Sum of squares: 74.547 p-value: 0.737

Mississippi – Spring 2013 (MS.S13)

Call:
glm(formula = RESPONSE ~ TIMBER_ACRES_LOG + INCOME + OFFER + EDU + SPORTS_CAMPING + SPORTS_FISHING + DONOR_WILDLIFE + HUNT_LICENSE_DEER + HUNT_LICENSE, family = "binomial", data = MS.S13)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0090	-0.4198	-0.3295	-0.2697	2.6799

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-4.12672	0.32779	-12.590	< 2e-16	***
TIMBER_ACRES_LOG	0.17981	0.06799	2.645	0.00818	**
INCOME	0.02553	0.01420	1.798	0.07222	.
OFFERForester	0.01887	0.20939	0.090	0.92819	
OFFERPublication	0.91941	0.18655	4.929	8.28e-07	***
EDU1	0.30398	0.15864	1.916	0.05535	.
SPORTS_CAMPING1	0.26827	0.19594	1.369	0.17096	
SPORTS_FISHING1	0.06049	0.15488	0.391	0.69614	
DONOR_WILDLIFE1	0.21225	0.19192	1.106	0.26876	
HUNT_LICENSE_DEER1	0.23881	0.38864	0.614	0.53889	
HUNT_LICENSE1	0.28337	0.19487	1.454	0.14590	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1722.4 on 3383 degrees of freedom
Residual deviance: 1644.6 on 3373 degrees of freedom
AIC: 1666.6

Number of Fisher Scoring iterations: 5

Goodness-of-fit:
Sum of squares: 215.687 p-value: 0.544

Mississippi – Fall 2013 (MS.F13)

Call:
glm(formula = RESPONSE ~ TIMBER_ACRES_LOG + INCOME + MESSAGE + OFFER + ATV + SPORTS_CAMPING + SPORTS_SKIING + EDU + DONOR_WILDLIFE + STATE_CONS_MAG + HOBBY_BIRDS + HUNT_LICENSE_DEER, family = "binomial", data = MS.F13)

Deviance Residuals:
Min 1Q Median 3Q Max -1.5719 -0.4406 -0.3598 -0.2747 2.7247

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-4.01421	0.34844	-11.520	< 2e-16	***
TIMBER_ACRES_LOG	0.12410	0.06366	1.949	0.051237	.
INCOME	0.03004	0.01115	2.695	0.007047	**
MESSAGEG	0.18338	0.13663	1.342	0.179535	
MESSAGEW	0.04639	0.14058	0.330	0.741428	
OFFERForester	-0.16638	0.19487	-0.854	0.393216	
OFFERMultiple	0.54489	0.16912	3.222	0.001274	**
OFFERPublication	0.90566	0.16343	5.542	2.99e-08	***
ATV1	1.45999	0.34381	4.246	2.17e-05	***
SPORTS_CAMPING1	0.24769	0.16496	1.502	0.133210	
SPORTS_SKIING1	0.51938	0.28473	1.824	0.068132	.
EDU1	0.46138	0.12651	3.647	0.000265	***
DONOR_WILDLIFE1	0.46837	0.15490	3.024	0.002498	**
STATE_CONS_MAG1	0.11431	0.22077	0.518	0.604610	
HOBBY_BIRDS1	0.22773	0.16881	1.349	0.177319	
HUNT_LICENSE_DEER1	0.31683	0.36882	0.859	0.390320	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 2507.0 on 4402 degrees of freedom
Residual
deviance: 2354.8 on 4387 degrees of freedom
AIC: 2386.8

Number of Fisher Scoring iterations: 5

Goodness-of-fit:
Sum of squares: 317.706 p-value: 0.117

North Carolina – Fall 2014 (NC.F14)

Call:
glm(formula = MODEL, family = "binomial", data = NC.F14)

Deviance Residuals:
Min 1Q Median 3Q Max

-0.6033 -0.5393 -0.4879 -0.2567 2.6491

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-2.86003	0.39529	-7.235	4.65e-13	***
OFFERPublication	1.52116	0.23460	6.484	8.92e-11	***
TOTAL_ACRES_LOG	-0.11835	0.07772	-1.523	0.128	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1112.8 on 1757 degrees of freedom
Residual deviance: 1054.7 on 1755 degrees of freedom
AIC: 1060.7

Number of Fisher Scoring iterations: 6

Goodness-of-fit:
Sum of squares: 148.354 p-value: 0.617

Wisconsin – Spring 2012 (WI.S12)

Call:
glm(formula = RESPONSE ~ OFFER + EDU + CONTRIB_ENV, family = "binomial", data = WI.S12)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7764	-0.5992	-0.3625	-0.3022	2.4937

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.0636	0.1199	-25.558	< 2e-16	***
OFFERPublication	1.4372	0.1244	11.550	< 2e-16	***
EDU1	0.3742	0.1103	3.392	0.000693	***
CONTRIB_ENV1	0.2075	0.1309	1.585	0.112871	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 2523.3 on 3416 degrees of freedom
Residual deviance: 2350.7 on 3413 degrees of freedom
AIC: 2358.7

Number of Fisher Scoring iterations: 5

Goodness-of-fit:
Sum of squares: 346.333 p-value: 0.246

Wisconsin – Fall 2012 (WI.F12)

Call:
glm(formula = RESPONSE ~ MESSAGE + OFFER + EDU + CONTRIB_ENV + LICENSE_SPORTSMAN + LICENSE_FISHING_RESIDENT, family = "binomial", data = WI.F12)

Deviance Residuals:
Min 1Q Median 3Q Max-0.9722 -0.5403 -0.3705 -0.2801 2.5613

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.21865	0.19153	-16.805	< 2e-16	***
MESSAGEGENE	0.20155	0.17929	1.124	0.26094	
MESSAGEWILD	-0.02308	0.18637	-0.124	0.90145	
OFFERPublication	1.36832	0.16989	8.054	8.01e-16	***
EDU1	0.44129	0.17264	2.556	0.01058	*
CONTRIB_ENV1	0.59720	0.18869	3.165	0.00155	**
LICENSE_SPORTSMAN1	1.34639	0.70247	1.917	0.05528	.
LICENSE_FISHING_RESIDENT1	0.44033	0.37945	1.160	0.24587	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1343.5 on 1924 degrees of freedom
Residual
deviance: 1247.6 on 1917 degrees of freedom
AIC: 1263.6

Number of Fisher Scoring iterations: 5

Goodness-of-fit:
Sum of squares: 180.376 p-value: 0.901

Wisconsin – Fall 2013 (WI.F13)

Call:
glm(formula = RESPONSE ~ OFFER + EDU + CONTRIB_ENV + LICENSE_SMALLGAME + LICENSE_FISHING_RESIDENT + CE_LHI_BIRDS, family = "binomial", data = WI.F13)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.1117	-0.5860	-0.2648	-0.2172	2.7419

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.7354	0.1673	-22.331	< 2e-16	***
OFFERPublication	2.0606	0.1726	11.939	< 2e-16	***
EDU1	0.4024	0.1435	2.803	0.00506	**
CONTRIB_ENV1	0.3628	0.1644	2.207	0.02735	*
LICENSE_SMALLGAME1	0.4032	0.7406	0.544	0.58614	
LICENSE_FISHING_RESIDENT1	0.3500	0.3322	1.054	0.29204	
CE_LHI_BIRDS1	0.2649	0.2173	1.219	0.22293	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1974.1 on 2890 degrees of freedom
Residual deviance: 1745.7 on 2884 degrees of freedom

AIC: 1759.7

Number of Fisher Scoring iterations: 6

Goodness-of-fit:
Sum of squares: 256.355 p-value: 0.535
