

Perspectives on Prescribed Fire in the South: Does Ethnicity Matter?

Siew Hoon Lim, J.M. Bowker, Cassandra Y. Johnson, and H. Ken Cordell

ABSTRACT

Using a household survey and regression methods, we assessed preferences for prescribed fire in the southern United States. We found that the majority of the respondents favored the use of prescribed fire. However, we observed pronounced racial variation in opinions on prescribed fire and its side effects. African Americans and Hispanics were less supportive and were more concerned about the side effects of prescribed fire than whites. We also observed that females tended to be more concerned about the side effects of prescribed fire than males. In addition, education had no effect on preference for prescribed fire in general, but education was found to be negatively associated with concern levels in all three models pertaining to concerns over the side effects of prescribed fire. Concern over the side effects diminished as education increased.

Keywords: prescribed fire, ethnicity, general

Race and ethnicity play a central role in society's diverse viewpoints on environmental issues. Johnson (1998), Raish and González-Cabán (2003), and Johnson et al. (2004b) found that ethnicity accounts for variations in wildland and environmental perceptions. Using a 1995 survey of residents in mostly rural, north Florida counties, Johnson (1998) found that racial variation was significant, with African Americans having "... less aesthetic appreciation of wildlands, compared to Whites." Johnson (1998) and Johnson and Bowker (2004) proposed that "collective memory" of wildlands (i.e., cultural references to slavery, lynching, sharecropping, and turpentine and the association with agricultural and forestland) could be a reason for African Americans' wildland perception and lack of engagement in wildland activities and outdoor recreation, except fishing and hunting. In a survey study of 247 residents in and around the Red River Community of Clarksville, Tennessee, Jones and Rainey (2006) found that African Americans "are more likely than whites to believe they are being exposed to poorer environmental conditions, suffer more related health problems, and think that local public agencies and officials have not dealt with environmental problems in their neighborhood in a just, equitable, and effective manner."

Although some researchers assert that African Americans are more averse to the environment than whites and that they tend to have different preferences and report lower values on environmental attitude scales, others contend that African Americans show more or at least equal environmental concern (Mohai 1990, Jones and Carter 1994, Johnson et al. 2004a). Cultural differences and population diversity may give rise to differing environmental beliefs and preferences, but studies relating sociodemographic factors to forest fire management are limited in number. Raish and González-Cabán (2003) highlighted the need to understand different cultures and

perceptions related to fire use and fire management practices. Loomis et al. (2001) revealed that Florida residents from various social strata differed significantly in their attitudes and understanding about fire treatment programs. Raish et al. (2005) pointed out that in some regions (e.g., the American Southwest), indigenous and traditional subpopulations may have very different knowledge, views, and practices toward fire and their surrounding environment. Thus, they emphasized the importance of examining and understanding historic and current attitudes and practices pertaining to fire among various cultural and ethnic groups.

Bowker et al. (2008) observed in a nationwide survey that African Americans appeared to be more concerned about wild-fire management than either whites or Hispanics. In addition, both African Americans and Hispanics tended to have less confidence in public forestland management. Bowker et al. (2008), however, did not control for other sociodemographic characteristics that would likely affect individuals' environmental preferences and viewpoints. Hence, their study did not incorporate socioeconomic factors such as age, gender, education, and income, nor were potential risk factors associated with residential location considered.

In this study, we used survey data to assess and compare public preferences for fuel control in the southern United States [1]. This study is intended to provide policymakers with a broad picture of public opinions on prescribed fire among major ethnic/racial groups in the southern United States so as to enhance agency-community communications and to improve fuel control program acceptance and effectiveness. First, we present cross-tabulations of responses with regard to prescribed fire use. Then, we conduct regression analyses to examine factors that account for variation in individual's responses to statements about prescribed fire.

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Siew Hoon Lim (siew.lim@ndsu.edu), Morrill 203B, Agribusiness & Applied Economics, North Dakota State University, Fargo, ND 58108. J.M. Bowker, Cassandra Y. Johnson, and H. Ken Cordell, US Forest Service, Southern Research Station, Athens, GA 30602. We are grateful to the associate editor and two anonymous reviewers for comments and suggestions. We also thank S. Hanzak-Rideout, G. Green, and S.H. Cho for helpful insights. Funding for this research was provided by the Joint Fire Science Program (JSFP Grant 01-1-3-30) and the US Forest Service (SRS 07-CA-11330144-057).

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Table 1. Prescribed fire in one's own state or region (sample size = 2,032).

Statement	Agree	Disagree	Uncertain
(%)		
Public land managers should use prescribed fire as part of a wildfire management program in my state/region			
White	92	4	4
African American	83	14	3
Hispanic	86	9	5
Pearson $\chi^2(4) = 30.56^a$			

^a Significant at the 1% level.

Survey Methods

The data for this study are from a broad-based national fire module within the ongoing National Survey on Recreation and the Environment (NSRE) [2]. The NSRE is the latest of eight national surveys focusing on public outdoor recreation behavior and environmental attitudes (Cordell et al. 2004). The most recently completed phase of NSRE surveying began in July 1999 and continued through November 2004. Eighteen separate versions, with more than 80,000 interviews, were conducted during that time. The survey procedure used random-digit dialing within a stratified random sampling framework [3]. Surveying proceeded during two time periods in two versions of the survey, first pretested and then administered between July 2002 and February 2004.

Responses to Prescribed Fire Use and Its Side Effects

To examine opinion differences, by ethnicity, about the use of prescribed fire in a respondent's own state or region, we present cross-tabulations in Table 1. Ninety-two percent of whites supported the use of prescribed fire, whereas only 4% disagreed. On the other hand, 83% of African Americans agreed that prescribed fire should be used, and 14% (highest among the three groups) disagreed. Eighty-six percent of Hispanics agreed, whereas 9% disagreed. Although preferences across the three groups are significantly different ($0 < P < 0.01$), the chi-square statistic should be viewed cautiously because of the large sample size.

In Table 2, we present cross-tabulations of responses to three side effects of prescribed fire: smoke, harm to wildlife, and reduced scenic beauty. We observe that concern levels of each group are significantly different over the side effects of prescribed fire. For example, more than 60% of African Americans and Hispanics, compared with just 32% of whites, were concerned about smoke from prescribed fire. Nearly 50% of whites were not concerned about smoke, whereas 24% of African Americans and 30% of Hispanics were not concerned.

The results in Table 2 also show that 44% of whites were concerned about harm from prescribed fire to fish and wildlife, compared with 68% of African Americans and 75% of Hispanics. In addition, more than 50% of African Americans and Hispanics were concerned about reduced scenic quality and recreation opportunities from prescribed fire, compared with 36% of whites, with more than 40% of whites being not concerned.

Others have shown that differences in race can be masked by spatial factors, and thus race appears more important as an explanatory factor in environmental attitudes/behavior than it should be (Bowker et al. 2006). Hence, examination beyond the chi-square statistics was warranted before reaching any conclusions about the association between ethnic grouping and prescribed fire. In this case,

we incorporated a number of individual and location characteristics into a regression context to see whether (and how) these factors affect preferences for prescribed fire.

Regression Analyses

We first applied a binomial regression model to help examine factors that could affect individual preferences for prescribed fire. Then we used three ordered logit regression models to examine factors that might affect concern levels over the three side effects of prescribed fire.

The binomial regression model is parameterized as follows: $y^* = \mathbf{x}\beta + u$, where y^* is a latent variable. We observe the sign of y^* when $y = 0$ if an individual agrees with the presented statement, $y = 1$ if an individual disagrees; \mathbf{x} is a vector sociodemographic and location characteristics affecting individual's response; and β is a vector of parameters to be estimated; u is a random error term assumed to be independent of \mathbf{x} and with a logistic distribution symmetrically distributed about zero. The probabilities of the response category are as follows.

$$P(y = 1|\mathbf{x}) = \frac{\exp(\mathbf{x}\beta)}{1 + \exp(\mathbf{x}\beta)} \quad (1)$$

$$P(y = 0|\mathbf{x}) = 1 - P(y = 1|\mathbf{x}). \quad (2)$$

The explanatory variables \mathbf{x} and the descriptive statistics are displayed in Table 3. Forest cover variables were obtained from the National Outdoor Recreation Supply Information System (Cordell 1999). Data were weighted according to a postsample stratification procedure according to a combination of five strata: age, race, gender, education, and origin setting (rural versus nonrural). Poststratification has been successfully applied in similar national surveys in the United States and in other countries (Holt and Smith 1979, Thomsen and Halmoy 1998) [4].

The average age of respondent's in our sample is 43. Roughly half of the observations are female. Twenty-two percent of our sample consists of African Americans, and 7% Hispanic. The maximum years of education is 20, and the minimum is 8. The average family income is \$35,882. Nonpublic forest coverage in a respondent's county (forcovpri) averages 33%, with a maximum of 92%. On average, nonfederal public forestland coverage (forcovpub) is 1%, with a high of 21%, whereas National Forest coverage (usdafscov) averages 2% with a maximum of 63%.

Previous research has shown that age, gender, ethnicity, and residence may affect environmental opinions (McMillan et al. 1997, Johnson et al. 1997, Johnson et al. 2001, Olli et al. 2001, Johnson et al. 2004b). The variables *African Americans* and *Hispanic* are used to compare against whites (the base group). It is assumed that, relative to whites, African Americans and Hispanics are less supportive of the use of prescribed fire as a management tool. Following Sun (2006), those with higher levels of education and incomes are hypothesized to be more supportive of prescribed fire.

Besides individual characteristics, we also included residence characteristics of our respondents. For example, forestland coverage is used as a proxy for rurality and fire risk around respondents' residences. Forestland coverage is further divided into three categories based on ownership and control: private, public (nonfederal), and federal. Private forestland coverage (forcovpri) might decrease or increase the support for prescribed fire. In addition, the support for prescribed fire could be higher or lower as the percentage of

Table 2. Side effects of prescribed fire: please state whether you are concerned, slightly concerned, or not concerned at all about the following (sample size = 2,032).

Statement	Concerned	Slightly concerned	Not concerned	Uncertain
.....(%).....				
Smoke from prescribed fire				
White	32	18	48	2
African American	62	11	24	3
Hispanic	64	5	30	2
Pearson $\chi^2(6) = 94.06^a$				
Harm to fish and wildlife from prescribed fire				
White	44	20	32	4
African American	68	12	15	5
Hispanic	75	5	16	5
Pearson $\chi^2(6) = 62.47^a$				
Reduced scenic quality and recreation opportunities from prescribed fire				
White	36	18	41	5
African American	56	17	19	8
Hispanic	52	23	11	14
Pearson $\chi^2(6) = 62.39^a$				

^a Significant at the 1% level.

Table 3. Variable definitions and descriptive statistics of explanatory variables (census weighted, n = 1,895).^a

Variable	Description	Mean	SD	Minimum	Maximum
Age	Respondent's age	42.924	18.838	16	91
Female	Female = 1, 0 otherwise	0.519	0.500	0	1
African American	African American = 1, 0 otherwise	0.222	0.416	0	1
Hispanic	Hispanic = 1, 0 otherwise	0.068	0.252	0	1
Education	Years of education	13.094	2.480	8	20
lnincome	Natural logarithm of income	10.488	0.795	7.824	12.206
forcovpri	Percentage of nonpublic forestland coverage ^b	0.326	0.243	0	0.920
forcovpub	Percentage of nonfederal public forestland coverage ^c	0.011	0.021	0	0.212
usfscov	Percentage of US Forest Service National Forest coverage in respondent's county	0.017	0.059	0	0.630

^a Census weighted.

^b forcovpri = Acres of nonpublic forestland/Total acres in the county.

^c forcovpub = (Acres of municipal forestland + Acres of county forestland + Acres state forestland)/Total acres in the county.

nonfederal public forest coverage (forcovpub) or the percentage of National Forest coverage (usdafscov) in a county increased.

Because the responses for the statements in Table 2 are qualitative but directional, we apply an ordered logit model. The ordered logit model can be derived from a latent variable model $y^* = \mathbf{x}\boldsymbol{\beta} + u$, where \mathbf{x} does not contain a constant term and y denotes an ordered response taking on the values {0, 1, 2}. Let $\alpha_1 < \alpha_2$ be the unknown threshold parameters to be estimated. We define y as

$$y = \begin{cases} 0 & \text{if } y^* \leq \alpha_1 \\ 1 & \text{if } \alpha_1 < y^* \leq \alpha_2 \\ 2 & \text{if } y^* > \alpha_2. \end{cases} \quad (3)$$

For each model, the response variable y takes on values 0 for "concerned," 1 for "slightly concerned," and 2 for "not Concerned." Like the binary model above, \mathbf{x} includes the variables age, gender, African American, Hispanic, education, and income; along with private, nonfederal public, and National Forest coverage. Data were weighted as described above.

Results and Discussion

The regression results give us some insights into the association between ethnicity and individual preferences after controlling for several other factors. Hence the results are more in-depth than the chi-square statistics. The coefficient estimates and marginal effects of the binomial regression are reported in Table 4. When interpreting the results of a binomial logit model, one should be aware that

the coefficients alone do not provide a true measure of the change in the dependent variable given a change in the explanatory variable. Hence the marginal effect is used. Here, marginal effects are defined as the change in the probability of disagreeing for a unit change in an explanatory variable, holding all other explanatory variables constant. In this analysis, the marginal effects are evaluated at the sample means for continuous independent variables, and at a discrete change from 0 to 1 for binary independent variables.

The results in Table 4 indicate that *female*, *African American*, *Hispanic*, and private forestland coverage affect individuals' responses. The marginal effects of these variables are also significant. The model correctly predicts 94% of the responses and has a likelihood ratio chi-square of 66.932, which is significant at the 1% level.

The parameter estimate for the variable *female* is positive and significant, implying that the probability of disagreeing is higher for females. The gender variable has the largest significant marginal effect. The predicted probability of disagreeing is more than 6% higher for females than males, other things being equal. The impact of gender is interesting. Mohai (1992) found that women are "somewhat more concerned about the environment than men," but they are "substantially less likely to be environmentally active." A more recent study by Torgler et al. (2008) asserted that women tend to have stronger environmental preferences. Riechard and Peterson (1998) and Marshall (2004) found that females tended to perceive environmental risk more highly than males did.

Table 4. Estimated coefficient and marginal effects of factors affecting individual responses to prescribed fire.^a

Variables	Coefficient	t Statistic	Marginal effect
Disagree			
Age	-0.008	-1.43	-0.0004
Female	1.281	5.66 ^b	0.0647 ^b
African American	0.902	4.08 ^b	0.0566 ^b
Hispanic	0.759	2.18 ^c	0.0506 ^d
Education	0.039	0.83	0.0019
lnincome	0.098	0.67	0.0048
forcovpri	0.758	1.86 ^d	0.0373 ^d
forcovpub	5.862	1.51	0.2887
usfsco	1.361	0.91	0.0670
Intercept	-5.367	-3.59 ^c	

^a Census weighted. Number of observations = 1,895. Log-likelihood = -429.889. Likelihood ratio $\chi^2(9) = 66.932$, P value = 0.000. Correct prediction = 94.2%. lnincome, natural logarithm of income; forcovpri, percentage of nonpublic forestland coverage; forcovpub, percentage of nonfederal public forestland coverage; usfsco, percentage of US Forest Service National Forest coverage in respondent's county.

^b Significance at the 1% level.
^c Significance at the 5% level.
^d Significance at the 10% level.

Each of the variables *African American* and *Hispanic* has a statistically significant marginal effect. Hence, the probability of disagreeing with using prescribed fire is higher for African Americans and Hispanics than whites, holding other factors constant. Relative to whites, the predicted probability of disagreeing is 5.7% higher for African Americans and 5% higher for Hispanics. Our ethnicity results are in line with the findings of Bowker et al. (2008) that African Americans and Hispanics were relatively less likely than whites to support the use of prescribed fire. A possible explanation for such a difference may be ethnic environmental beliefs and backgrounds (Johnson 1998, Raish and González-Cabán 2003, Johnson and Bowker 2004).

Private forestland coverage has a positive and significant marginal effect, implying that the probability of disagreeing with the use of prescribed fire increases as the percentage of private forestland coverage increases. As private forestland coverage increases by 1%, the predicted probability of disagreeing with the use of prescribed fire rises by 3.7%. This result may indirectly mirror the perceived risks of prescribed fire and the lack of confidence in private forestland management. In addition, the negative relationship between support for prescribed fire and private land coverage may be associated with state laws in the South. Prescribed fires are widely used on private forestland in the South, but the potential risk and liability of prescribed fires have limited their use. According to Sun (2006), because of an increased number of wildfires, all Southern states but Tennessee changed state liability laws related to prescribed fire to reduce the potential liability on private landowners, forest professionals, and agents administering prescribed fires. In fact, private forestland coverage affects the types of liability rules adopted by individual states. Larger private forestland ownership, such as industrial ownership, tended to lead to lighter liability rules adoption by states (Sun 2006).

Figure 1 displays the “gaps” of opinions among whites, African Americans, and Hispanics after controlling for gender, education, income, and age. In Panels A and B of Figure 1, the vertical axis represents the probability of agreeing with the use of prescribed fire in the respondent's state/region. The horizontal axis in each diagram represents the percentage of nonpublic (or private) forestland coverage in the respondent's county of residence. Stratified predicted probability curves for African Americans, Hispanics, and whites (non-Hispanic) are shown in each panel.

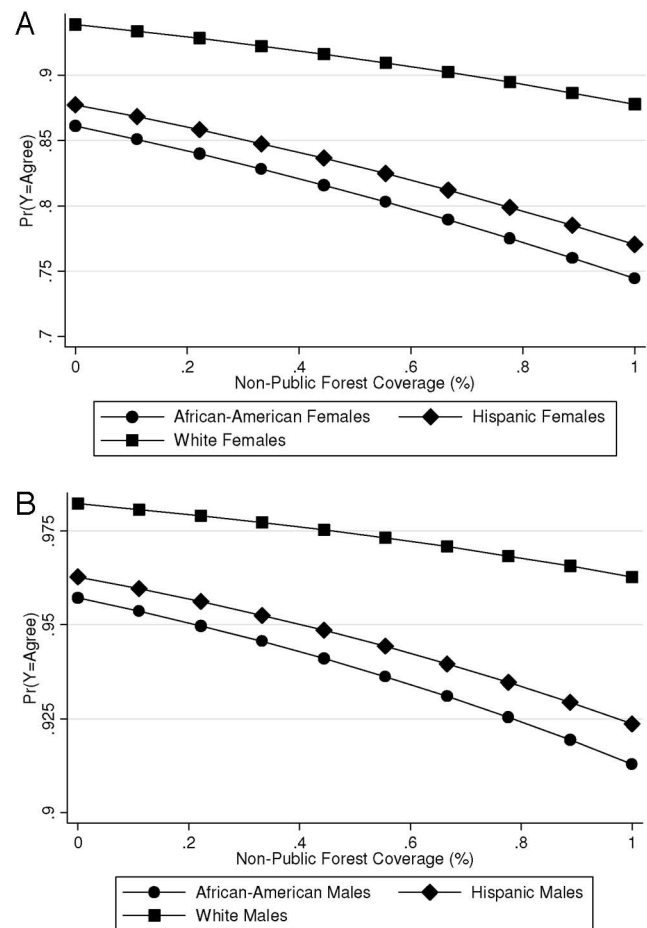


Figure 1. Private forestland coverage and the predicted probabilities of agreeing and disagreeing with the use of prescribed fire among males and females of three ethnic groups. (A): Probability of agreement among females. (B): Probability of agreement among males.

In Figure 1A, as the coverage of private forestland coverage increases, the predicted probability of agreeing decreases steadily in the three female racial groups, holding other variables constant at their means. However, the predicted probability is higher for white females than either African American or Hispanic females. In addition, the predicted probability gap between African American and Hispanic females is smaller relative to the gap between white females and either of the two groups. The probability of agreeing for African American females is lowest. The probability gap between African American and Hispanic females widens as private forestland coverage increases. Figure 1B displays a fairly similar pattern as well, with white males having the highest probability of agreeing and African American males having the lowest probability of agreeing.

Figure 1 suggests that there are large variations in opinions among the three ethnic groups on the use of prescribed fire, with whites and African Americans showing the most difference. The effects of gender and ethnicity on support for prescribed fire may be an indication of variations in behavior toward perceived environmental risks related to prescribed fire. In a survey of residents living in Cancer Alley, Louisiana, Marshall (2004) observed that “women more than men and Blacks more than Whites perceive environmental risk as serious. Further, evidence suggests that differences are mostly due to the relatively extreme perceptions of risk accepting White males and risk adverse Black females.”

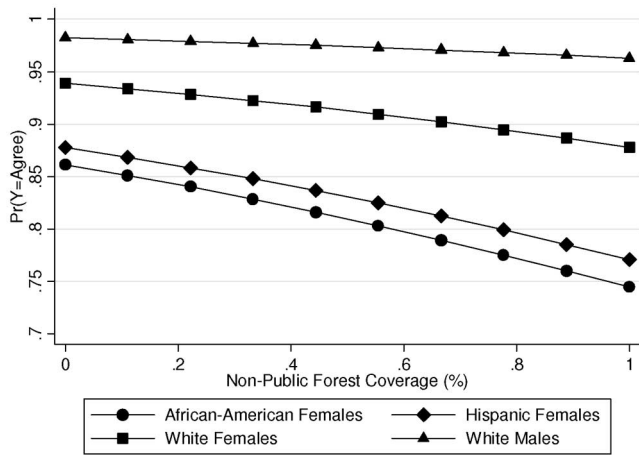


Figure 2. White males versus females of each ethnic group.

In Figure 2, we present the stratified probability curves for white males and the three female ethnic groups. The probability curve for white males is the highest and relatively flat over the entire range of private forestland coverage. White females' probability curve lies below that of white males, indicating that there is a gap between white females and white males in terms of support for prescribed fire. The probability curves for Hispanic and African American females lie below that of white females, and the largest gap is observed between African American females and white males. This extreme difference in preferences is consistent with Marshall's finding (2004).

Despite strong support for prescribed fire, the multinomial regression results show that gender, race/ethnicity, and types of forestland coverage strongly influence the public's attitude about the use of prescribed fire. This "gap" is statistically significant. Hence, we used three ordered logit regression models to further examine the relationship of race (among other sociodemographic factors) and levels of concern over prescribed fire smoke, harm to wildlife, and reduced scenic beauty.

The estimated results of all three ordered logit models show that the variables *female*, *African American*, *Hispanic*, and *education* consistently stand out [5]. Females, African Americans, and Hispanics tended to be more concerned about the side effects. Moreover, education was found to be positive and statistically significant, indicating that concern level falls as years of education rises.

Figure 3 displays a snapshot of the ordered logistic regression results: the predicted probability of concern for the males of each ethnic group given years of education. Figure 3A presents the stratified curves of predicted probability of concern over smoke from prescribed fire, Figure 3B presents the stratified curves of predicted probability of concern over prescribed fire's harm to fish and wildlife, and Figure 3C presents the stratified curves of predicted probability of concern over reduced scenic beauty.

In Figure 3A, for both African Americans and Hispanics, concern levels appeared to be identical over smoke from prescribed fire, given that the predicted probabilities of concern for both were equal along all levels of education. Thus, the two probability curves overlap one another in Figure 3A. On the other hand, whites' predicted probability of concern was much lower than that for African Americans or Hispanics. For example, with 14 years of education, the probability of concern for a white male is less than 0.3, whereas the

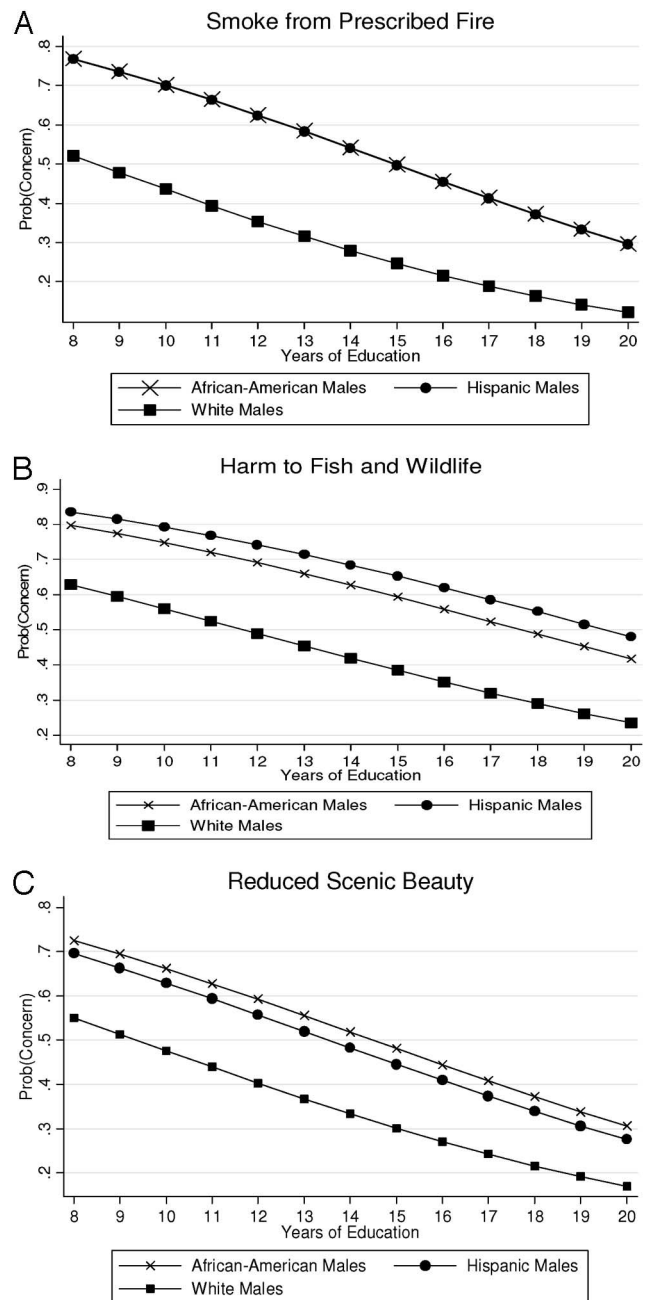


Figure 3. Predicted probability of concern for males over the side effects of prescribed fire. All continuous variables evaluated at the sample mean. (A): Predicted probability of concern over smoke from prescribed fire among males. (B): Predicted probability of concern over harm to fish and wildlife among males. (C): Predicted probability of concern over reduced scenic beauty among males.

probability for an African American or a Hispanic male is about 0.55, holding other factors constant.

Concern about harm to fish and wildlife (Figure 3B) for Hispanic males was higher than that of either whites or African Americans. However, the concern gap between Hispanics and African Americans is smaller than that between Hispanics and whites. The predicted probability curve for white males is the lowest among the three ethnic groups.

In Figure 3C, we observe that the predicted probability curve for African American males is the highest among the three groups,

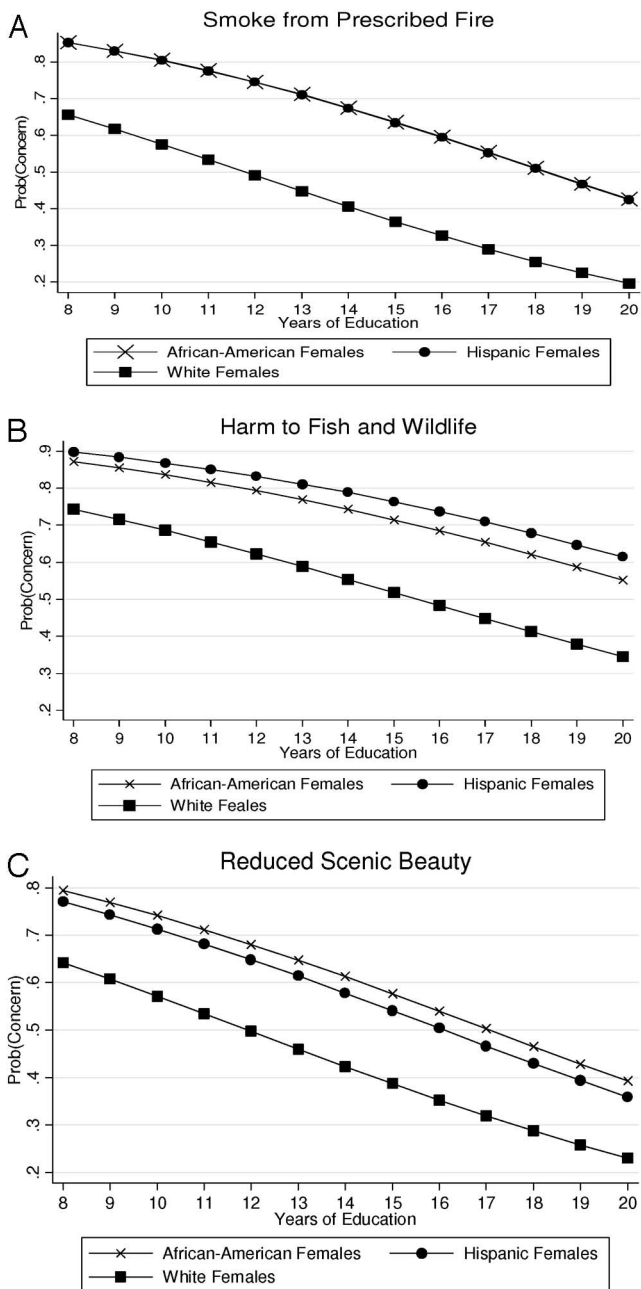


Figure 4. Predicted probability of concern for females over the side effects of prescribed fire. All continuous variables evaluated at the sample mean. (A): Predicted probability of concern over smoke from prescribed fire among females. (B): Predicted probability of concern over harm to fish and wildlife among females. (C): Predicted probability of concern over reduced scenic beauty among females.

implying that among males African Americans' concern over reduced scenic beauty is the highest. The concern gap between African American and Hispanic males is also smaller than that between African American and white males.

The predicted probabilities for females of the three ethnic groups over the side effects from prescribed fire are presented in a similar fashion in Figure 4. In Figure 4A, the predicted probabilities for African American and Hispanic females are very close, with the two curves overlapping one another, whereas white females have the lowest probability of concern at all education levels. Panels B and C

of Figure 4 are also comparable to the second and third panels of Figure 3. Thus, regardless of gender, there is clearly a gap between whites and the two other ethnic groups. However, the concern levels for females are relatively higher, suggesting that females across the three ethnic groups appear more concerned about the side effects of prescribed fire than males.

The ordered logit regression results offer some possible explanations for the varied ethnic opinions about prescribed fire. Relative to their counterparts, females, African Americans, and Hispanics tend to be more apprehensive about prescribed fire, in part because of the side effects like smoke, harm to wildlife, and reduced scenic beauty. Reasons for such higher levels of concern are unclear. One possible explanation could be that Hispanics and African Americans are more concerned than whites about the manipulation of the environment (Mohai 1990, Jones and Carter 1994). Another reason may be the question of "trust." Relative to whites, African Americans and Hispanics showed higher levels of concern over forest professionals' ability and exhibited less trust in forest (prescribed fire) management (Bowker et al. 2008), and thus were more concerned about the side effects of prescribed fire and were less supportive of prescribed fire use.

Conclusions

Despite seemingly popular support for the use of prescribed fire as a management tool, we found significant variation across ethnicities in opinions related to the same. African Americans and Hispanics were less supportive of prescribed fire than whites. The relatively low support from African Americans and Hispanics may be associated with their higher level of concern over the side effects of prescribed fire. To gain wide public support and trust, land managers and owners should be aware of these differences, and fuel control programs should be tailored accordingly given the concerns and preferences of the local community. Statistical evidence suggests that ethnicity does matter when it comes to prescribed fire.

Gender appears to be an even more important single factor than ethnicity in explaining differences of opinion about prescribed fire. Gender was a significant and negative predictor in all our regression models, indicating that women were less supportive of the use of prescribed fire. Reasons for this relatively lower support from women may be that women are more concerned about the side effects of prescribed fire than males. White females tend to perceive environmental health risks to be higher than did white males, but Flynn et al. (1994) found that this gender difference does not apply to nonwhite females and males. In addition, white males tend to perceive risks as much smaller and acceptable (Flynn et al. 1994). Davidson and Freudenburg (1996) and Mohai (1992), however, found that evidence of the relationship between gender and environmental concerns is not consistent. Moreover, recent studies found no conclusive evidence of linkages between motherhood and environmentalism among women (Caiazza and Barrett 2003, Torgler et al. 2008). Despite inconsistent evidence on the relationship between gender and environmental concerns, this study uncovered a statistically significant relationship between gender and the side effects of prescribed fire.

We also found that the respondents were less likely to support the use of prescribed fire as the percentage of private forest coverage increases. This result may indicate a lack of confidence in private land management/owners and a lack of management-resident communication on the subject. Hence, increased personal interaction

between land managers and residents may be necessary to build trust and increase acceptance of prescribed fire as a fuel management tool.

Finally, education and income were insignificant in the binomial model regarding the use of prescribed fire in general, but education was significant in all three ordered logit models pertaining to concerns over the side effects of prescribed fire. Education was negatively associated with concern levels. Concern over the side effects diminishes as education increases. Education is by no means a proper proxy for environmental knowledge. If it is used as a measure for environmental knowledge, then one needs to carefully examine the correlation between education and concern. Davidson and Freudenburg (1996) point out that earlier studies found no clear linkages between knowledge and concerns. In fact, in some instances, increased knowledge is associated with higher environmental concerns.

Endnotes

- [1] Virginia, North Carolina, South Carolina, Florida, Georgia, Mississippi, Alabama, Louisiana, Texas, Oklahoma, Arkansas, Kentucky, and Tennessee.
- [2] A fire module was developed for NSRE 2000 containing a battery of questions pertaining to knowledge, attitudes, and preferences toward fire and fire management in wildland and wildland/urban interface areas. Questions were developed via consultation with fire scientists, social scientists, managers, and local focus groups.
- [3] All respondents were asked whether they knew the difference between wildfire and prescribed fire. If a respondent could not distinguish the two, the definitions of wildfire and prescribed fire would be read to them. About 83% of the respondents claimed to know the difference between the two types of fire.
- [4] More details of the weighting procedure can be found in Cordell et al. (2002).
- [5] The sex, race, and education variables are significant at the 1% level in all models. Regression results of all three models are available in the Appendix.

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APPENDIX

Model A: Ordered logit regression: concern over smoke from prescribed fire. Model B: Ordered logit regression: harm to fish. Model C: Ordered logit regression: reduced scenic beauty.^a

Variables	Model A		Model B		Model C	
	Coefficient	<i>t</i> Statistic	Coefficient	<i>t</i> Statistic	Coefficient	<i>t</i> Statistic
Age	-0.015	-6.00 ^b	-0.000	-0.11	0.003	1.12
Female	-0.563	-6.00 ^b	-0.543	-5.63 ^b	-0.383	-4.11 ^b
African American	-1.112	-8.86 ^b	-0.847	-6.27 ^b	-0.767	-6.16 ^b
Hispanic	-1.107	-5.51 ^b	-1.102	-4.77 ^b	-0.624	-3.23 ^b
Education	0.172	7.59 ^b	0.142	6.21 ^b	0.149	6.58 ^b
lnincome	0.083	1.12	0.236	2.98 ^b	0.163	2.23 ^c
forcovpri	-0.492	-2.50 ^c	-0.030	-0.15	0.301	1.53
forcovpub	0.857	0.39	-0.299	-0.14	-1.293	-0.58
usfscov	0.060	0.08	-0.358	-0.45	-0.522	-0.68
Cut 1	1.498		4.148		3.348	
Cut 2	2.214		4.971		4.183	
<i>n</i>	1,924		1,892		1,851	
LR χ^2	328.05		241.34		194.87	

^a Census weighted. Because of missing values and exclusion of the “refused/uncertain” category, the number of observations is different for each model. lnincome, natural logarithm of income; forcovpri, percentage of nonpublic forestland coverage; forcovpub, percentage of nonfederal public forestland coverage; usfscov, percentage of US Forest Service National Forest coverage in respondent’s county.

^b Significance at the 1% level.

^c Significance at the 5% level.