

RESIDENTS' VALUES AND FUELS MANAGEMENT APPROACHES

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Abstract.—The research utilizes the Forest Value and Salient Value Similarity Scales to examine homeowners' value orientations and relate them to attitudes toward and support for fuels management approaches. Data were collected from homeowners living in the wildland-urban interface of the Huron-Manistee National Forest at two time periods, in 2002 and 2006. The panel data allowed for testing of whether residents' attitudes toward and support for fuel treatments changed within different value orientation and value similarity groupings over the 4-year period. Results show the Salient Value Similarity Scale provided strong predictive power in explaining attitudes toward and support for fuel treatments with the high value similarity group being more positive and supportive of the fuel management approaches over a 4-year period.

1.0 INTRODUCTION AND RELATED LITERATURE

Fire in the forested northern area of Michigan is an ever-present and natural part of the landscape. The Healthy Forests Initiative calls for agency management

and industry and community improvements that “ensure more timely decisions, greater efficiency, and better results in projects that reduce the risk of catastrophic wildfires and restore forest and rangeland health” (USDA Forest Service, 2007). Investigating people's value orientations and attitudes toward fuels management approaches between different periods of time could reveal any change in people's preferences for these approaches and assess the role of different values in shaping those preferences. This research examined the relationship between two different value scales—value orientation and salient value similarity—and individual preferences of different fuels management approaches.

One value orientation scale places individual's values on a spectrum ranging from anthropocentric to biocentric. Individuals with an anthropocentric orientation view environmental resources as “materials to be provided to humans rather than other species and to be used by human” (Scherer & Attig, 1983). At the other end of the spectrum, people with a biocentric orientation tend to see environmental resources as objects to be protected, not consumed or ruined by humans, and believe that “human economic uses and benefits are not necessarily the most important” (Steel et al., 1994). These value orientations may influence attitudes toward fuel management approaches (i.e., prescribed burning, mechanical fuel reduction, defensible space ordinance). In this paper, this scale is referred to as the Forest Value Scale. The Salient Value Similarity Scale is defined by Vaske and his colleagues (2007) as measuring “people's beliefs regarding important goals and processes that people and agencies should follow in specific situations. Value similarity reflects the extent to which a person's values are similar to those of the meaning agency.” Their research found that higher salient value similarities were related to higher levels of social trust in an agency and as trust increased so did approval for fuels management approaches.

Our research incorporated both of these value scales – the Forest Value Scale (Steel et al., 1994) and the newer Salient Value Similarity Scale (Siegest et al., 2000; Winter, 2003; Winter and Cvetkovish, 2004) – into a panel study to examine the extent to which homeowners' values relate to attitudes toward and support for specific fuels management approaches. We hypothesize that anthropocentric values and high similarity values would be positively related to positive attitudes toward and support for fuels management (Winter et al., 2004). This means that anthropocentric individuals would be more likely to support human-driven behaviors such as prescribed burning, mechanical thinning, and defensible space compared to biocentric individuals. We also hypothesize that those individuals with high shared values with respect to an agency's values would be more supportive of its management and of human-driven actions than individuals with low shared values.

2.0 METHODS

In 2002, a mail survey was sent to homeowners in three counties living in the wildland-urban interface of the Huron-Manistee National Forest (HMNF) where fuels management activities had been increasing on forest lands. Using Dillman's (2000) mail survey procedures with three mailings, we received 1,253 completed questionnaires for a 53 percent response rate. In 2006, we resurveyed the same sample of homeowners (n=1,292, response rate of 46 percent). Both a longitudinal data set (homeowners in 2002 and 2006) and a panel data set (homeowners who lived in the area and responded in both years) resulted.

The Forest Value Scale (FVS) with eight items yielded a summated scale with internal consistency of 0.75 Cronbach's alpha (Steel et al. reported .82 and .81). Values of 8 to 23 were classified as anthropocentric, 24 to 39 were classified as intermediate, and 40 to 56 were classified as biocentric using the tri-segments of the scale ranging from 7 to 56. The Salient Value Similarity Scale (SVS) with five items yielded a summated scale with internal consistency from 0.91 to 0.93 Cronbach's alpha (Vaske et al. reported 0.96). Values of the mean and lower were classified as low value similarity and values higher than the mean were

classified as high value similarity. Both the FVS and the SVS scales were used to examine the extent to which values relate to attitudes toward and support for fuels management approaches (FVS only measured in 2002, SVS only measured in 2006). In addition, we examined changes in attitudes and support by comparing the 2002 and 2006 panel data set. Attitudes toward and support for each the three fuel treatments were assessed with seven-point Likert scales. The questions of the FVS asked respondents to rate the extent to which they agreed with value-oriented items. The questions of SVS scales asked respondents to rate the extent to which they shared their goals and values with agencies that manage fuels (the data reported here are for Forest Service ratings).

3.0 RESULTS

This section presents the results of the research by: geographical location comparison, value orientation comparison, value similarity indicator comparison, value similarity comparison, and panel data comparison.

3.1 Geographical location comparison

Michigan results for the Forest Value Scale are presented along with national and Oregon statistics (Table 1), based on research by Steel and colleagues (1994). The national and Oregon data were measured with a five-point scale, whereas the Michigan data were measured with a seven-point scale but were also translated into a five-point scale for comparison. On the anthropocentric items, Michigan respondents scored slightly lower than national respondents on three items and similarly on the other two items in the scale. On the biocentric items, Michigan respondents were found to be very similar to the national respondents. In sum, the sample of Michigan homeowners were more like the national average than Oregon residents, revealing that geographic location or situational factors may be an influence on value orientations.

3.2 Value orientation comparison

After classifying the Michigan respondents as anthropocentric, intermediate or biocentric, a

Table 1.—Forest Value Scales: Comparing national and Oregon publics (Steel et al., 1994) to Michigan (Vogt et al., 2002)

	National mean*	Oregon mean*	Michigan mean**	Translated Michigan mean***
Anthropocentric items (reverse coded in additive scale)				
The primary use of forests should be for products that are useful to humans.	2.3	2.5	3.2	2.3
Forest resources can be improved through human management.	4.2	4.2	5.2	3.7
Forests should be used primarily for timber and wood products.	2.0	2.2	2.9	2.1
We should actively harvest more trees to meet the needs of a much larger human population.	2.2	2.1	2.5	1.8
Plants and animals exist primarily for human use.	2.6	3.4	2.8	2.0
Biocentric items				
Humans should have more love, respect, and admiration for forests.	4.4	4.0	6.2	4.4
Forests have a right to exist for their own sake, regardless of human concerns and uses.	3.6	3.3	5.0	3.6
Wildlife, plants and humans have equal rights to live and develop.	3.9	3.7	5.0	3.6
Additive scale mean	28.8	25.2	38.1	27.6
Cronbach's alpha	.82	.81	.76	---

*5-point scale where 1 = strongly disagree and 5 = strongly agree.

**7-point scale where 1= strongly disagree and 7 = strongly agree.

***translated 7-point scale to 5-point scale.

frequency distribution shows that most respondents are in the biocentric (52 percent of respondents) or intermediate group (44 percent of respondents) with only 4 percent of respondents in the anthropocentric group (Figure 1). ANOVA tests show that attitudes toward prescribed burning ($F=3.8$, $p<.05$) and mechanical thinning ($F=4.3$, $p<.05$) were significantly different between people with different value orientations; anthropocentric people had more positive attitudes toward these two fuel treatments (Table 2). Defensible space ordinances were rated similarly by the three forest value groups. Similar results were also found for support levels for the implementation of each of the fuel treatments. Support for the implementation of prescribed burning ($F=4.1$, $p<.05$) and mechanical thinning ($F=15.0$, $p<.001$) were significantly different. Scheffe's post-hoc comparisons revealed that those with biocentric values held significantly less positive attitudes toward mechanical fuel reduction ($p<.05$) than those with intermediate values. People with biocentric values also showed significantly lower support for mechanical thinning than those with anthropocentric ($p<.05$) and intermediate values ($p<.001$).

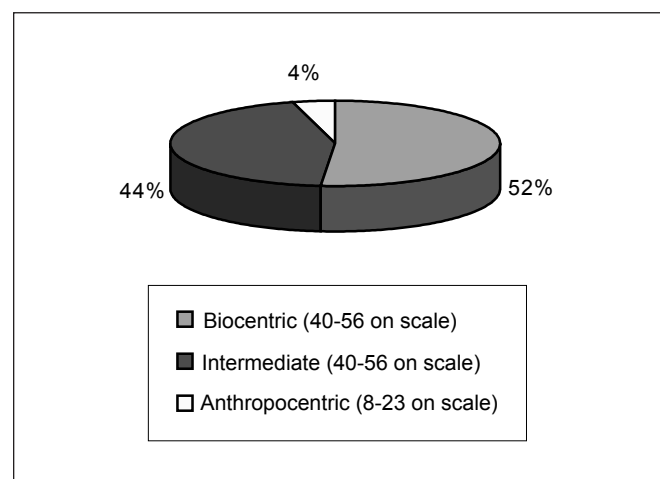


Figure 1.—Distribution on Forest Values Scale.

3.3 Value similarity indicator comparison

On the SVS scale Michigan results are compared to Colorado respondents (Vaske et al., 2007). Two of the scale items were replicated across the two studies, but the subject matter varied from a more global subject (i.e., forest fire management) in the Colorado study to specific measures of three fuel treatments in the

Table 2.—Forest Value groups and fuel management – 2002 data

	Anthro*	Intermediate	Biocentric	F-test, p-level
Group size	n=25	n=271	n=314	
Attitudes toward**				
Prescribed burning	4.6	4.1	3.8	3.8, p<.05
Mechanical fuel reduction	5.2	5.1 ^{B****}	4.7 ^I	4.3, p<.05
Defensible space ordinances	3.2	4.2	4.0	2.4, ns
Support for the Implementation***				
Prescribed burning	4.2	3.8	3.4	4.1, p<.05
Mechanical fuel reduction	5.3 ^B	4.9 ^B	4.3 ^{A,I}	15.0, p<.001
Defensible space ordinances	3.0	3.9	3.8	2.5, ns

*groups formed on tri-segments of the scale ranging from 8 to 56.

**7 point scale where 1 = strongly disagree and 7 = strongly agree.

***7 point scale where 1 = strongly disapprove and 7 = strongly approve.

****Different letter superscripts indicate significant post-hoc group mean differences (^A significantly different from Anthro; ^B significantly different from Biocentric; ^I significantly different from Intermediate).

Michigan study (Table 3). The scale items show high reliability across the fuel treatments (Cronbach alphas over .90). Overall, Michigan respondents were lower in shared value for all three of the fuel treatments compared to the Colorado respondents.

3.4 Value similarity comparison

Next, Michigan respondents were classified into a low value similarity or high value similarity group. The frequency distributions show that for all three fuel management approaches there were more respondents in the high value similarity group (Figure 2). For the SVS testing, high value similarity individuals were

significantly more positive toward prescribed burning ($t=16.981$, $p<.001$), mechanical thinning ($t=10.359$, $p<.001$) and defensible space ordinances ($t=12.863$, $p<.001$) than low value similarity individuals (Table 4). Similar results were found for homeowners' support levels for the implementation of each of the fuel treatments. High value similarity individuals were significantly more supportive of the implementation of prescribed burning ($t=21.406$, $p<.001$), mechanical thinning ($t=15.822$, $p<.001$) and defensible space ordinances ($t=17.317$, $p<.001$) than low value similarity individuals.

Table 3.—Salient Value Similarity indicators: Comparing Vaske, Absher, and Bright (2006) to Michigan (Vogt, Winter, and McCaffrey, 2006)

	Colorado residents of Front Range WUI (from Vaske et al.)	Michigan residents of Huron Manistee NF WUI		
	Forest fire mgmt.	Prescribed burning	Mechanical fuel reduction	Defensible space ordinance
I feel that the USDA Forest Service*:				
Shares similar values as me	4.9	3.7	3.8	3.6
Share similar goals as me	4.6	3.8	3.9	3.7
Shares similar opinions as me	4.5	n/a	n/a	n/a
Thinks in a similar way as me	4.5	n/a	n/a	n/a
Takes similar actions as I would	4.5	n/a	n/a	n/a
Trusts the USFS to manage forest fuels and wildland fire	n/a	3.7	3.8	3.6
Cronbach's alpha	.96	.93	.92	.91

*Scale: 1 = agency does not share my values/different goals than me/do not trust the agency at all; to 7 = agency shares my values/same goals as me/trust the agency completely.

Scales originate from: Siegest, Cvetkovich & Roth (2000) and Winter & Cvetkovish (2004).

n/a= not asked.

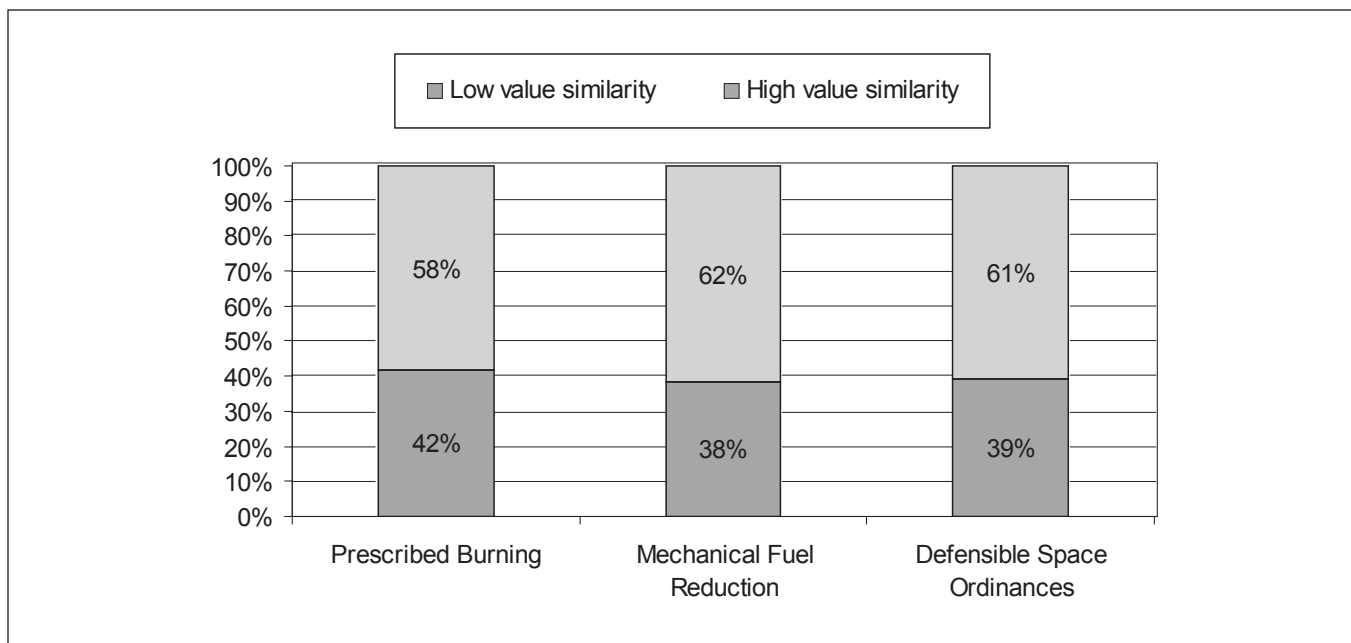


Figure 2.—Frequency distribution on Value Similarity Scale.

Table 4.—Salient Value Similarity groups and fuel management – 2006 data

	Low value* similarity	High value similarity	t-test, p-level
Attitudes Toward**			
Prescribed burning	3.0	4.7	16.98, p<.001
Mechanical fuel reduction	4.3	5.3	10.36, p<.001
Defensible space ordinances	3.5	4.9	12.86, p<.001
Support for the Implementation***			
Prescribed burning	2.6	4.6	21.41, p<.001
Mechanical fuel reduction	3.4	4.9	15.82, p<.001
Defensible space ordinances	2.8	4.5	17.32, p<.001

*groups formed on each scales mean value – low group was the mean and lower values.

**7 point scale where 1 = strongly disagree and 7 = strongly agree.

***7 point scale where 1 = strongly disapprove and 7 = strongly approve.

3.5 Panel data comparison

A final analysis tested whether attitudes toward and support for implementing specific fuels treatments changed within these value groupings over the 4-year period (from 2002 to 2006). Paired t-tests were applied to the panel data. The FVS orientation groups showed little change over time for attitudes or support (Table 5). Only the intermediate group showed significant differences: in 2006, they were more positive in their attitudes toward defensible space ordinances ($p<.05$) and less supportive of mechanical thinning ($p<.01$).

The SVS scale produced significant results in the low and high value groups. Over the 4- year period, homeowners with low value similarity with the Forest Service had become less positive toward – and were also less supportive of implementation of – prescribed burning and mechanical thinning (Table 5). Conversely, homeowners with high value similarity with the Forest Service had more positive attitudes toward and become more supportive of implementation for all three treatments over the 4-year study period.

Table 5.—Changes in attitude toward and support of fuel management approaches by Forest Value and Salient Value similarity groups – comparison of 2002 and 2006 panel data

	Global measure*		For each fuel management*	
	Intermediate** Forest Value	Biocentric Forest Value	Low Value Similarity	High Value Similarity
Attitudes Toward				
Prescribed burning	No change	No change	Less positive, $p < .001$	More positive, $p < .01$
Mechanical fuel reduction	No change	No change	Less positive, $p < .05$	More positive, $p < .01$
Defensible space ordinances	More positive, $p < .05$	No change	No change	More positive, $p < .001$
Support for the Implementation				
Prescribed burning	No change	No change	Less support, $p < .001$	More support, $p < .001$
Mechanical fuel reduction	Less support, $p < .01$	No change	Less support, $p < .001$	More support, $p < .01$
Defensible space ordinances	No change	No change	No change	More support, $p < .001$

*The Forest Value Scale measured a global value; whereas the Value Similarity Scale was measured for each of the three fuel treatments.

**Anthropocentric group was not tested because of too few cases.

4.0 DISCUSSION

This research demonstrates the importance of understanding values held by different members of the public and how values are related to attitudes toward and support for fuels management methods in high risk wildfire areas. With the two value scales, FVS and SVS, we found similar results: homeowners with different value orientations held different attitudes toward and expressed different levels of support for prescribed burning and mechanical thinning. As hypothesized, anthropocentric individuals showed more positive attitudes and higher levels of support for mechanical fuel reduction (but not prescribed burning or defensible space ordinances). It should be noted that 4 percent of the sample was “true” anthropocentric. However, 44 percent were considered intermediate (a mix of anthropocentric and biocentric) and their attitude and support levels to were similar to those of anthropocentrics. We also hypothesized that high shared values with agencies would be associated with more supportive attitudes toward human-driven actions, a statement upheld by our data for both attitudes and support across all three fuel treatment approaches. Only with the SVS did we find that value orientations differed on attitudes toward and support for defensible space ordinances. Further, the panel research shows that respondents’ attitudes toward and

support for different fuel management approaches over time can change in a positive direction thus revealing an “up-beat” outlook for public support for these fuels management approaches in wildfire policy.

As researchers, we also learned about the different performance or predictive validity of the two different value scales. At the time of our first study, the Forest Value Scale was published and appeared to be a reliable and valid measure of homeowners’ values, particularly for forest management plans. Four years later, a different value scale (i.e., the Value Similarity Scale) was available. We didn’t implement both value scales in each of our data collection efforts because of space and possible respondent fatigue. Both scales advocate measuring “values” but may tap different types of values, particularly global or holistic values versus more specific subject matter (like a fuel treatment). Future researchers can benefit from this research by continuing to test these value scales in different geographic, management, and policy contexts, as well as across different environmental or resource issues. The Value Similarity Scale appears to reveal more about agency or management of resources, whereas the Forest Value Scale appears to reveal more about core values that humans hold about the Earth and its resources.

5.0 CITATIONS

- Dillman, D.A. (2000). **Mail and internet surveys: The tailored design method** (2nd edition). New York: John Wiley and Sons.
- Scherer, D., & Attig, T. (Eds.) (1983). **Ethics and the Environment**. Englewood Cliffs, NJ: Prentice Hall.
- Siegrist, M., Cvetkovish, G., & Roth, C. (2000.) **Salient value similarity, social trust, and risk/benefit perception**. *Risk Analysis*, 20(3), 353-362.
- Steel, B., List, P., & Shindler, B. (1994.) **Conflicting values about federal forests: A comparison of national and Oregon publics**. *Society and Natural Resources*, 7, 137-153.
- USDA Forest Service. 2007. <http://www.fs.fed.us/r3/resources/index.shtml>
- Vaske, J. Absher, J. & Bright, A. 2007. **Salient value similarity, social trust and attitudes toward wildland fire management strategies**. *Human Ecology Review*, 14(2), forthcoming.
- Winter, G., Vogt, C., & McCaffrey, S. 2004. **Examining social trust in fuels management strategies**. *Journal of Forestry* 102(6), 8-15.
- Winter, P. 2003. **Californians' opinions on wildland and wilderness fire management**. In Jakes, P. (Ed.). *Homeowners, communities and wildfire: Science findings from the national fire plan*. Proceedings of the 9th ISSRM, Bloomington IN. GTR NC-231. St. Paul, MN: USDA Forest Service, North Central Research Station, 84-92.
- Winter, P.L. & Cvetkovish, G.T. 2004. **The voices of trust, distrust and neutrality: An examination of fire management opinions in three states**. Paper presented at the 10th International Symposium on Society and Resource Management. Keystone, Colorado. June.