

## CONSIDERATION OF PROPERTY RISK REDUCTION AT THE TIME OF HOME PURCHASE BY WILDLAND-URBAN INTERFACE (WUI) HOMEOWNERS

Christine A. Vogt, Ph.D.  
Assistant Professor of Park,  
Recreation and Tourism Resources,  
Michigan State University,  
131 Natural Resources Bldg.,  
E. Lansing, MI 48824-1222

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**Abstract:** The purpose of this paper is to understand home purchase decision making in wildland-urban interface areas. The research examined the level of consideration homeowners place on structure and property features, as well as the location of past wildland fires. ANOVA testing with eleven home or property features on state location (CA, CO, FL), residency type, and purchase methods revealed significant patterns. Implications for community and resource fire managers are discussed.

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### Introduction

The wildland fires of the late 20th century and early 21st century encountered homes of many types across the landscape. Some wildland fires destroyed homes that were in vulnerable areas, while other homes didn't have the "right stuff" to survive the nearby sparks and ravaging flames. Recent efforts by local, state and federal fire departments, planning departments of governments, and resource managers are initiating FireWise programs and other types of efforts to educate existing and future homeowners about the risks and preventative measures for living in the wildland-urban interface. Monroe (2002) states that wildland fire is perhaps the greatest challenge of the wildland-urban interface. Both loss of life and the tremendous resources needed to prevent or manage wildland fires in the WUI are critical issues that these growing areas face.

A key stakeholder in the wildland-urban interface is the land or home-owner. These households have made a financial investment and may live in

the area because of job opportunities or quality of life. Households moving into the wildland-urban interface may include young families looking for affordable housing, retirees, or households desiring a county or vacation home. These households may come to the wildland-urban interface with different levels of experience and understanding of wildland fire and subsequently view house buying differently. Studies by urban planners have documented why households move into suburban areas and the type of home or neighborhood they desire (Varady, 1990) with top considerations being schools and large lots or yards for those seeking suburban areas. Studies have also been done examining purchase behaviors of households searching for a seasonal or vacation home to purchase (Stewart and Stynes, 1994). Studies on wildland fire and homeowners have documented that urban residents (San Bernardino County, CA) had low initial awareness of fire severity, rated the likelihood of wildland fire occurring to be low, and preferred policies that required intervention from resource agencies that altered the wildland landscape to make it more suitable and risk-free for homeowners (Gardner, Cortner, and Widaman, 1987). Winter and Fried (2000) found homeowners believed wildland fires could occur, however that they were inherently uncontrollable and the resulting damage essentially random. They also reported that homeowners held low levels of support for investing in firefighting infrastructure or house or property features to safeguard their own properties. Few research studies have examined the home buying process in relation to wildland fire risks and the availability of fire protection available to residents in interface areas.

The purpose of this study is to further examine the views of homeowners living in the wildland-urban interface using decision making criterion to evaluate the level of best practices employed in the search to buy a home in the WUI. Specifically, a set of home and property features often used as the best practices for safeguarding a home from a wildland fire were administered to permanent and seasonal homeowners in three states in selected WUI areas. This research is intended to help communities and resource managers develop and maintain safer residential living.

**Table 1 . — Response rates**

State and National Forest	Type of residency	Sample Size	Bad Addresses	Net Sample Size	Returned	Returned, Reclassified into homeowner types	Response Rate
California study area							
-San Bernardino NF	Permanent	362	74	288	97	119	41%
	Seasonal	638	117	521	206	176	34%
Colorado study area							
-GMUG NF	Permanent	566	20	546	271	254	47%
	Seasonal	215	14	201	72	66	33%
Florida study area							
-Apalachicola NF	Permanent	711	33	678	244	268	40%
	Seasonal	289	23	266	92	56	21%
Total		2,781	281	2,500	982	939	38%

Note: 43 surveys were not classified as permanent or seasonal homeowners and omitted from the analysis.

## Methods

The study began by identifying the National Forests or wildland-urban interface areas at risk for wildland fires and active at reducing fuels near residential areas. Three study sites were selected -- San Bernardino National Forest, CA; Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests/Bureau of Land Management, CO; and Apalachicola National Forests, FL. Specifically, the California study site was located near Los Angeles and included the communities of Arrowhead and Big Bear Lake, located in San Bernardino county. The Colorado study site was located between Durango and Grand Junction in southwest Colorado, specifically Ouray, Montrose and Delta counties. The Florida study site was located west of Tallahassee in the panhandle area of the state and included Leon, Liberty and Wakulla counties.

Trips to the area allowed the researchers (Vogt and Charles Nelson) to meet with local fire managers from the USDA Forest Service and state and local fire departments. During these visits, specific study areas were identified so that homeowner lists could be obtained through local tax assessment offices. In California, two communities/neighborhoods --Running Springs (a community west of Big Bear Lake), and Sugarloaf (a large neighborhood east of Big Bear Lake) were selected.

In Colorado and Florida, numerous residential areas were selected in the three counties and did not encompass any one entire community. In most cases a proportion sample of permanent and seasonal homeowners were drawn from a larger population list. In Florida, all seasonal homes on the provided lists were included to ensure that largest possible group of these homeowners.

Data on homeowners were collected with a mail questionnaire sent to both permanent and seasonal homeowners in the selected WUI areas. A total of 2,781 households were sampled and mailed an eight-page questionnaire using a modified Dillman (1978) procedure where each household received a personalized letter, a prepaid business reply envelope, and a pre-numbered questionnaire. A reminder or thank you postcard was mailed approximately one week after the first mailing. After three weeks those households who had not responded were mailed another questionnaire. For first and second questionnaire mailings, press releases to local newspapers were mailed with follow-up phone calls to the editor to try to increase awareness of the study, particularly with permanent home owners. Data collection occurred in fall 2001 overlapping the events of September 11th, 2001 and the anthrax scare. Questionnaires were mailed to the address a tax bill would be

**Table 2. — Means of acquiring home in wildland-urban interface settings**

How did you acquire your home in this area?	California study area - San Bernardino NF		Colorado study area - GMUG NF		Florida study area - Apalachicola NF	
	Permanent Home- owners	Seasonal Home- owners	Permanent Home- owners	Seasonal Home- owners	Permanent Home- owners	Seasonal Home- owners
Property was purchased with the help of a realtor or sales office	74%	70%	60%	63%	34%	18%
Property was purchased directly from previous owner	18	17	26	26	40	56
Another way (mostly buying land and then building)	6	6	6	3	4	0
Property was handed down or purchased from within the family	2	7	8	8	22	26
Total	100	100	100	100	100	100

mailed to which meant that seasonal home owners most likely received their questionnaire at their permanent home. The letter included an incentive offer whereby one out of 250 households could be selected for a \$25 gift certificate to either Walmart or Lowe’s.

Response rates ranged from 21 to 47 percent (table 1) with a composite response rate of 38 percent. In total, 2,781 home owners were sampled and 281 bad addresses were identified, for an effective sample size of 2,500. Across the three study sites, 939 surveys were returned, completed, and correctly classified as either a permanent or seasonal homeowner. In all three study sites, permanent home owners responded at a higher rate than seasonal home owners, which could be explained by the press releases in local papers or possibly greater interest in fire by permanent residents. Bad addresses were the highest in California even though the tax records had just been updated (note: San Bernardino is a large urban-rural county with a population of 1.7 million and a half of a million households). Nonresponse bias was checked by comparing demographic characteristics of permanent home owners to the available census data (1990). In all three study areas, the respondents tended to be better educated, reported higher levels of income, and were more likely to be male in comparison to the general population.

Measurement for the variables of interest occurred in a series of questions. To measure home and property features that home buyers might consider, particularly those seeking a house in the wildland-urban interface, a list of eleven items were developed in consultation with fire managers and by referencing checklists that the Forest Service often uses with special use cabins. A seven-point scale ranging from “0” labeled as not at all a consideration to “6” labeled as a very strong consideration was employed. The question was asked with the following framing “what level of consideration was given to the following when you purchased your house in the (insert area name)?” The explanatory variables of state and residency type were established with the tax assessor information and then validated in a question in the survey. Purchase method was measured with three categories (i.e., realtor, directly from previous owner, family) and an open-ended option with respondents selecting one response.

**Results**

Demographic profile. In California, the respondents were more often men than women with 53% of permanent homeowners and 61% of seasonal homeowners being men. For permanent homeowners, the largest income group was \$40,000 to \$79,999 annual household income before taxes. For seasonal homeowners, the largest income groups was \$80,000 or more. The highest

**Table 3.— Length of home ownership**

Owned for:	California study area - San Bernardino NF		Colorado study area - GMUG NF		Florida study area - Apalachicola NF	
	Permanent Home- owners	Seasonal Home- owners	Permanent Home- owners	Seasonal Home- owners	Permanent Home- owners	Seasonal Home- owners
Up to last 5 years (1997-2002)	19%	30%	35%	36%	23%	24%
6 to 10 years (1992-1996)	22	12	28	18	16	24
11 to 20 years (1982- 1991)	32	24	20	27	22	24
21 to 50 years (1952-1981)	27	34	15	16	37	24
51 years or longer (before 1952)	0	0	2	3	2	4
Total	100	100	100	100	100	100

level of education was college for most permanent homeowners (61%) and seasonal homeowners (52%). Most of the respondents claimed California as their primary state of residency with 98% of permanent homeowners and 97% of seasonal homeowners. Most respondents were either employed full or part time or were retired. The greatest percentage (23%) of permanent homeowners lived most of their lives in a medium sized city, in comparison to the greatest percentage of seasonal homeowners (45%) lived most of their lives in a major city. The majority of California respondents hold the perception that their home is serviced by a fire department and that there are fire hydrant located near their homes. For example, 93% of permanent homeowners and 96% of seasonal homeowners believe there are hydrant in their neighborhoods. Approximately one out of every four households includes an individual that suffers from respiratory or breathing problems.

In Colorado, the permanent (76%) and seasonal (68%) homeowner respondents were more often men than women. For permanent homeowners, the largest income group was \$40,000 to \$79,999 annual household income before taxes. For seasonal homeowners, the largest income group was \$80,000 or more. College was the highest level of educational experience for most permanent homeowners (44%) and seasonal homeowners (47%). Colorado was claimed as the primary state of residence by 98% of permanent homeowners and 49% of seasonal homeowners (residencies also

included California, Texas, and Florida). Slightly more respondents were retired in comparison to employed full or part time. The greatest percentage (37%) of permanent homeowners lived most of their lives in the country or a very small town, in comparison to the greatest percentage (30%) of seasonal homeowners lived most of their lives in a major city. The majority of Colorado respondents' perceive that there are fire hydrant located near their homes with 63% of permanent homeowners and 87% of seasonal homeowners holding this perception. Approximately one out of every five households includes an individual that suffers from respiratory or breathing problems.

In Florida, the respondents were more often men than women with 70% of permanent homeowners and 79% of seasonal homeowners being men. The largest income bracket was from \$40,000 to \$79,999 for permanent homeowners in comparison to \$80,000 or more for seasonal homeowners. Junior high school or high school was the highest level of educational experience for most permanent homeowners (44%) in comparison to graduate school (38%) for most seasonal homeowners. Florida was claimed as the primary state of residence by 98% of permanent homeowners and 59% of seasonal homeowners (residencies also included Georgia and Alabama). Approximately half (52%) of permanent homeowners were employed full or part time and only 33% were retired, in comparison to 46% of seasonal homeowners were retired and 45% were

**Table 4. — Consideration of structure and property features when house was purchased by wildland urban interface residents**

Features.....	California study area - San Bernardino NF		Colorado study area - GMUG NF		Florida study area - Apalachicola NF	
	Permanent Home- owners	Seasonal Home- owners	Permanent Home- owners	Seasonal Home- owners	Permanent Home- owners	Seasonal Home- owners
Fire protection service (firefighters, fire trucks)	4.5 <sup>a</sup>	4.3	4.0	4.0	3.7	3.2
Fire hydrant in the neighborhood	4.5	3.9	3.3	3.2	2.7	2.1
Heated by source other than a wood burning stove	4.3	4.3	3.7	3.6	3.1	2.7
Nonflammable roofing materials	4.3	4.0	4.1	4.2	1.9	1.9
Trees/vegetation cleared 30 ft around home	3.7	3.3	3.8	3.3	2.6	2.2
Adequate street signs and address labeling for locating home in a fire	3.7	3.5	3.6	3.0	3.1	2.7
Wide roads and driveways to facilitate easy access for emergency vehicles	3.6	3.3	3.8	3.1	2.5	2.7
Location of home in relation to past fires	2.6	2.3	2.1	2.0	1.3	1.2
Lot had relatively few highly flammable trees	2.6	2.5	2.6	2.0	1.6	1.6
Exterior propane tank at least 10 ft from home	1.7	2.3	3.9	3.7	1.8	2.0
Pipe system that can draw water from lake	1.2	1.6	1.5	1.3	1.3	1.3

<sup>a</sup>Means with a scale where “0” labeled as not at all a consideration to “6” labeled as a very strong consideration.

employed full or part time. The greatest percentage (36%) of permanent homeowners have lived most of their lives in the country or a very small town in comparison to the greatest percentage (21%) of seasonal homeowners lived most of their lives in a medium sized city. Nine of out ten households believe their home is serviced by a fire department; and half of the households indicated hydrant are present in their neighborhood. Three out of ten households include an individual that suffers from respiratory or breathing problems.

Purchase method and home tenure. Respondents were asked how they purchased their home near the forest. Homeowners in California were most likely to purchase their home with the help of a realtor or sales office (table 2). Less than twenty percent purchased directly from the previous owner and few households had the property handed down through the family or purchased it from a family member. Homeowners in Colorado had similar results with realtor assistance being the most

common. Florida home transactions were quite different than California or Colorado. Seasonal homes in the Florida study area were most likely purchased directly from previous owners, followed by property being handed down in the family. Permanent homes in the Florida study area were also most likely to be purchased from previous owners, followed by assistance from a realtor.

Respondents in all three study areas had fairly long home tenure (table 3). Over 50 percent of California permanent and seasonal homeowners lived in the WUI for 11 or more years. Colorado homeowners were most likely to live in the area for five years or less. Permanent Florida homeowners held the highest tenure with 39 percent living in the WUI for 21 years or longer.

Home and property features. Across all three study areas, fire protection service in the form of firefighters and fire trucks was the most highly rated consideration when the WUI home was

purchased (table 4). Mean scores ranged from a high of 4.5 (with 6.0 being the highest level of consideration) with permanent homeowners in the California study area to a low of 3.2 with seasonal homeowners in the Florida study area. Fire hydrant in the neighborhood and a home heating system other than a wood burning stove were additional top considerations by California homeowners. Respondents in California and Colorado also showed strong consideration for nonflammable roofing materials, however homeowners in Florida did not. The existence of a pipe system that could draw water from a nearby lake or river was the lowest rated consideration possibly because only a few homes were near these types of water resources. Location of the home in relation to any past fires was not a strong consideration by many homeowners.

In separate analysis of variance tests, state and residency type were examined as explanatory variables to the home and property features. Given that these samples were not drawn in the same ways, these statistical difference tests should be used with some caution. In a series of ANOVAs where state was considered as an explanatory variable, ten of the eleven features were rated significantly different by respondents from the three states. The only feature that was rated similarly was the lowest rated feature - a pipe system that could draw water. On several items such as nonflammable roofing materials, trees cleared 30 ft. away from the house, wide roads and driveways to facilitate easy access for emergency vehicles, adequate street signs and address labeling for locating home in a fire, and lot with few highly flammable trees, California and Colorado respondents had similar answers and Florida respondents rated the consideration significantly lower. Colorado respondents were significantly more concerned about propane tanks being distant from the home than homeowners of the other states. California respondents were significantly more concerned about heating systems other than wood burning stoves than the other homeowners studied. In a similar analysis where residency type was tested as the only explanatory variable, two features were considered at a higher level by seasonal homeowners than permanent homeowners. These features were nonflammable roofing materials and the home heating system being something other than wood burning.

A final analysis examined whether the method of finding and purchasing a home influenced the consideration of home and property features. For 7 of the 11 features, homeowners that were studied in the three states who had purchased their home with the assistance of a realtor were more concerned than homeowners who purchased directly from the previous owner or acquired the home from a family member. These features included: nonflammable roofing materials, heating system, road and driveway access, street signs and address labeling, fire protection services, fire hydrant, and location of past wildland fires.

### **Discussion**

This study examined the type and level of home and property features wildland-urban interface homeowners consider when they purchase a home. The results are based on a wide range of home tenure lengths. Respondents were asked to recall what they were considering when they were searching for a home to purchase. The researcher recognizes that recent homebuyer are more likely to have lower recall stress and inaccuracy than less recent homebuyer so some caution is needed in interpreting these results.

The geographic location of the wildland urban interface areas appears to be the most significant predictor of home and property features. Using the midpoint of the scale to interpret the results, the California homeowners studied considered the most features when purchasing a home in the WUI, whereas the Florida homeowners studied considered the fewest features. Colorado homeowners were most like California respondents than they were Florida respondents. The top concerned features were public services in the form of firefighters, fire trucks, and fire hydrant. These results suggest that many who move in the wildland-urban interface believe that "city-level" public services will be available to them in their "rural" home. Almost all of the respondents perceived that a fire department would service their home if a fire (house or wildfire) were to occur.

The findings on purchase method are fairly compelling that home buyers who held higher consideration of certain features were more likely to be working with a real estate agent. Further examination is needed to determine whether these strong considerations lead a buyer to use a realtor

or a realtor points these features out as considerations for home buying in the WUI. Interesting, the two features involving vegetation (trees cleared near home, nonflammable trees/vegetation on lot) did not differ across purchase methods.

Few differences on feature consideration were found in the analysis of residency type. A closer examination of residency type, controlling for state, shows one instance (trees/vegetation cleared 30 ft. from home) where permanent homeowners showed more consideration for property features than seasonal homeowners.

These findings can be applied in four areas. The first area is insurance. This study didn't ask directly about insurance policies or homeowner's views of holding insurance protection to reduce or eliminate risks, however, the data suggests that selected home buyers are knowledgeable and show consideration for ways of reducing risks associated with wildland fires. Some homeowners indicated that insurance companies should reward reduced risks with lower premiums. The second and related area is housing development. New or remodeled homes could provide additional FireWise features if homeowners demanded or builders provided these features. The third application of these findings is defensible space ordinances or practices. The eleven items studied are generally accepted design features that homeowners should be encouraged (if not mandated) to follow to reduce risks. The final application is for education materials that explain the importance of these home and property features in reducing risks. Particularly in the areas studied in California and Colorado, real estate agents appear to have a strong market with new homebuyer and would be an efficient distribution channel. Materials can also be distributed in demonstration homes and in local newspapers to make homebuyer and owners more aware of best practices for living in the wildland-urban interface.

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