

# Predicting Public Acceptance of Fuel Management at the Lake States Forest Interface

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## Themes to Today's Presentation

- Human Dimensions
  - Who owns homes in WUI areas?
  - What are their experiences with wildland fire and fuels mitigation?
  - What are their perceptions?
  - What are they willing to accept as fuels mitigation in their “local” area?
- Modeling
  - What are some of the predictors of acceptance?

### Marin, CA

- Grass, chaparral, oak,
- Conifer
- High valued homes
- Federal, state lands
- Rare wildfire, non-existent Rx fire, intense suppression

### Tuolumne, Placer, El Dorado, CA

- Oak woodland, pine, mixed conifer
- Federal forest
- Frequent wildfire, rare Rx fire

Yellow = Focus Group  
Red = Survey  
Orange = Both

### Oscoda, Crawford, Ogemaw, MI

- Jack pine
- Many seasonal homes
- Federal, state forest
- Moderately frequent Rx and wildfire

### Clay, FL

- Pine
- Some seasonal homes
- Private forest ownership
- Frequent wild and Rx fire

## Survey Effort

- Representative sample methods *(presented later)*
- Clay County, FL, El Dorado/Placer Counties, CA, and Oscoda/Ogemaw/Crawford, MI
- 1,200 surveys sent per site in FL and CA; 2,400 surveys sent in MI
- Treatments: Rx fire, mechanical, defensible space
- Standard Dillman mail survey methods used
- Timing of mailing and 9/11 and anthrax may have influenced response rate for FL and CA
- Response rates were 32% FL, 48% CA, and 53% MI.

## Demographic Profile of Respondents

		Florida (n = 357)	California (n = 544)	Michigan (n = 1,244)
Type of residency:	Permanent	97%	89%	60%
	Seasonal	1	7	38
	Other	2	4	2
Residency length:	1-10 years	33%	40%	32%
	11 year or more	67	60	68
Breathing problems	Someone in hh	35%	30%	28%
Gender:	Male	60%	70%	71%
	Female	40	30	29
Household income levels:	Less than \$40,000	33%	23%	34%
	\$40,000 to \$79,999	49	45	37
	\$80,000 or more	18	32	29
Highest education attainment:	High school	45%	26%	35%
	Some college	39	38	33
	College graduate	16	36	32

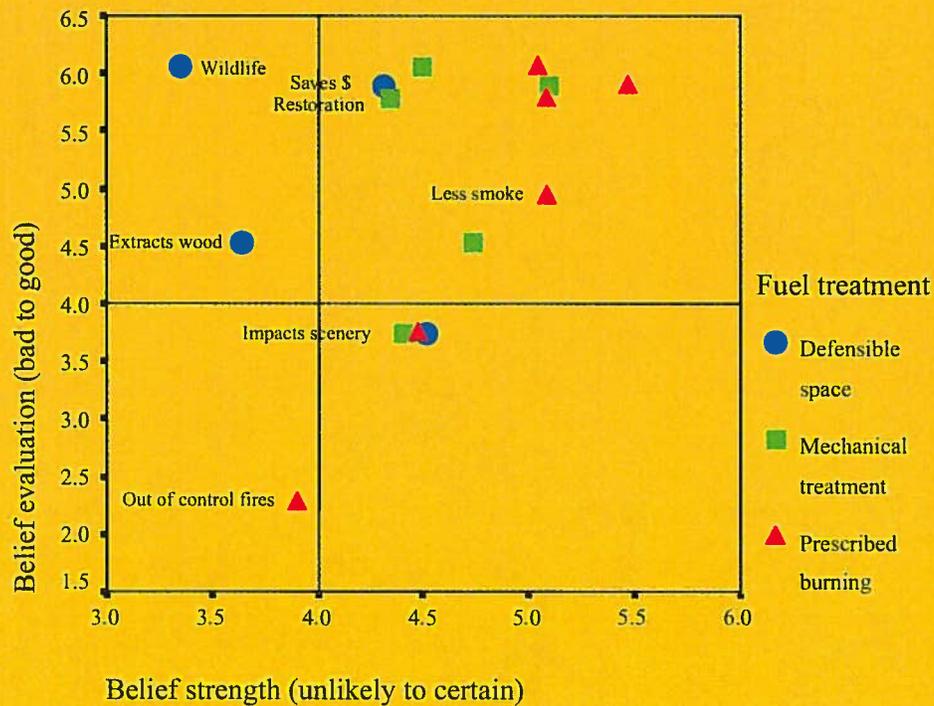
## Respondents' "Landscape" History

Lived most of life:	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/Crawford, MI
Major city	8%	13%	18%
Large city	18	15	10
Medium city	12	18	18
Smaller city	15	13	12
Town/village	9	14	11
Country	25	16	24
Rural farm	6	5	5
Moved often	8	8	3

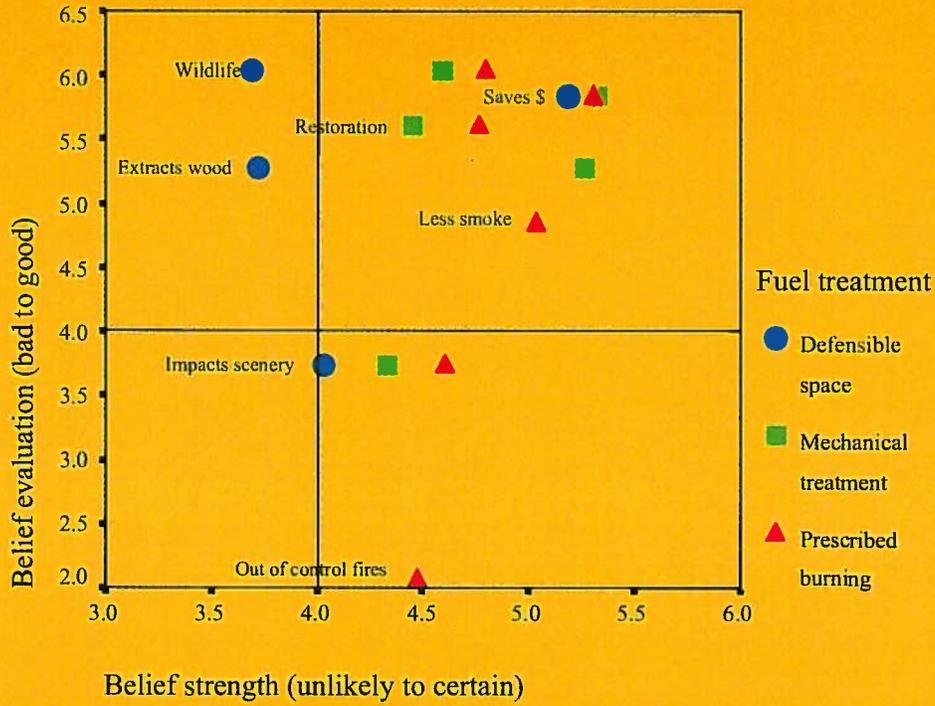
# Respondents' Experiences with Fuel Treatments

Over lifetime	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/Crawford, MI
Prescribed burning near my home	31%	25%	21%
Smoke discomfort from wildfires	61	68	17
Mechanical fuel reduction near home	5	21	9
Required to remove flammable vegetation on property	2	32	2
Actually removed flammable vegetation on property	44	91	42

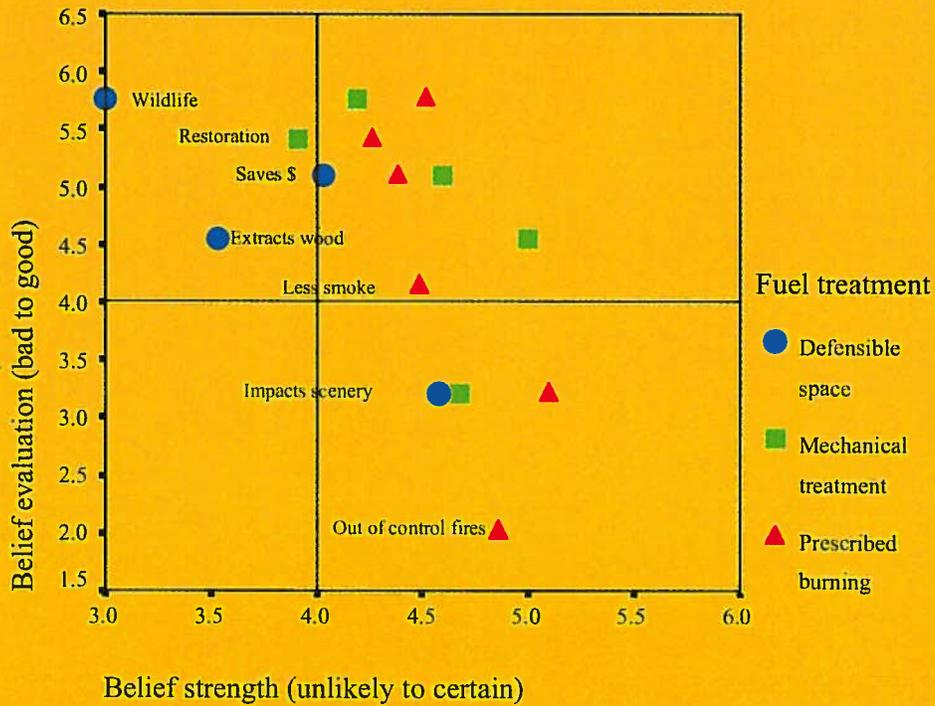
## Florida sample



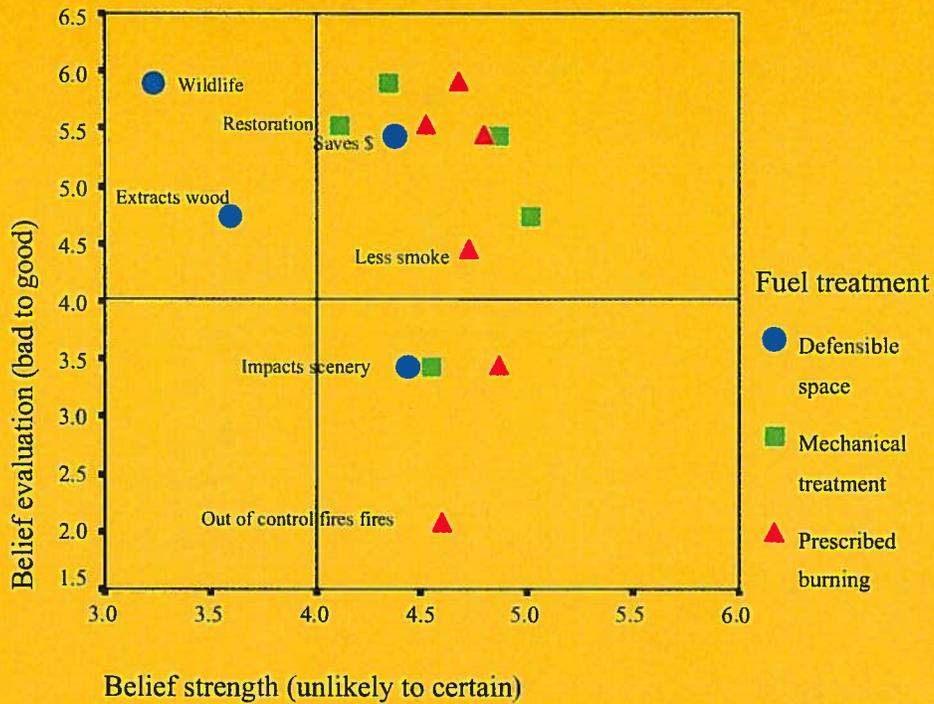
### California sample



### Michigan sample



### Combined sample



## Attitudes Toward Fuel Reduction Techniques

Fuel management approach:	Florida			California			Michigan		
	Pos.	Neut.	Neg.	Pos. <sup>1</sup>	Neut.	Neg.	Pos.	Neut.	Neg.
Prescribed burning	78%	17	5	66%	18	16	42%	23	36
Mechanical fuel reduction	64%	28	8	79%	17	4	57%	29	14
Defensible space	42%	30	28	79%	13	8	42%	27	32

<sup>1</sup> Attitude scale was categorized into three groups: positive attitude (points 5, 6, and 7 on the scale); neutral (4 or midpoint), or negative attitude (points 1, 2, and 3).

## Attitudes Toward Fuel Reduction Techniques

	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/ Crawford, MI
Rx Burning	Mean =5.7 (sd=1.4)	5.1 (1.7)	4.0 (1.9)
Mechanical Treatment	5.3 (1.5)	5.8 (1.3)	5.0 (1.6)
Defensible Space	4.3 (1.9)	5.8 (1.6)	4.2 (2.0)

*Scale of "1" equaled extremely negative  
and "7" equaled extremely positive*

## Intentions to Support Fuel Reduction Techniques

Percent who report they'd **vote No**

	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/ Crawford, MI
Rx Burning	13%	29%	53%
Mechanical Treatment	21	12	27
Defensible Space	58	25	57

## Intentions to Support Single or Combinations of Fuel Reduction Techniques

(Columns equal 100%)	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/Crawford, MI
All fuel trmts.	32%	49%	18%
PB/MT	40	15	20
PB/DS	6	4	4
MT/DS	2	18	15
PB only	9	2	5
MT only	5	6	18
DS only	2	4	6
None	4	1	14

## Predictors of Attitudes and Approval Ratings

- Demographic
- Spatial
- Theory of Reasoned Action
  - Beliefs predicting attitude
  - Attitude predicting approval
- What other factors?
  - Experience
  - Trust
  - Importance of fuel treatments
  - Concern that wildfire could change life

## Trust

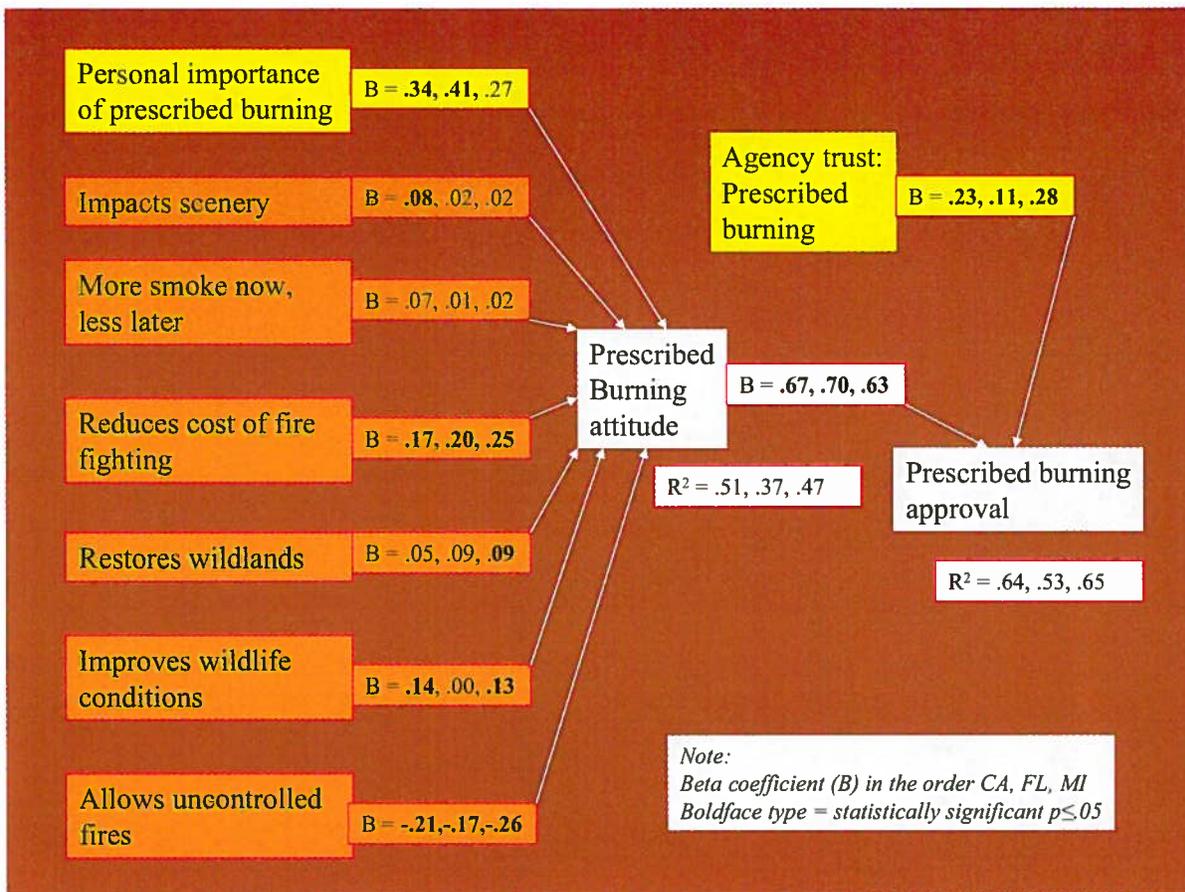
"I trust the gov't,....."	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/Crawford, MI
Use of prescribed burning	Mean=4.5	4.1	3.3
Notifying about prescribed burning	3.6	4.0	3.4
Use of mechanical fuel reduction	4.1	4.2	3.5
Enacting and enforcing defensible space	3.6	3.9	3.0
Gov't does a good job managing public land	4.1	3.9	3.5
Good job communicating about forest issues	3.7	3.6	3.0
Good job protecting private property from wildland fires	4.9	5.2	3.9

*Scale where "1" strongly disagree to "7" strongly agree.*

## Agency Trust Referent

	Clay, FL	El Dorado/Placer, CA	Oscoda/Ogemaw/Crawford, MI
Local	71%	50%	39%
State	62%	73%	86%
Federal	29%	66%	54%
DK	4%	3%	3%

*Multiple answers allowed.*



Objective: Investigate spatial relationships between and within survey variables

- Do survey variables exhibit spatial autocorrelation?
- Do survey variables exhibit association with spatially distributed phenomena (fuel types, past fire history, demographic characteristics, topography)?

## Sample Distribution and Structure

	Sampling Rate	Sampling Scheme
<u>Clay County, Florida</u>	32%	Clustered sampling, based on stochastic point pattern analysis
<u>El Dorado and Placer Counties, California</u>	Site 1: 74%, Site 4: 49% Site 2: 46%, Site 5: 43% Site 3: 29%, Site 6: 19% Overall: 36%	Random sampling of natural clusters
<u>Crawford, Oscoda, and Ogemaw Counties, Michigan</u>	100%	Sampling of all eligible parcels

## GIS Database Development

### House/Parcel Locations

#### Local Government Offices

Assessor's Office (FL, CA, MI)

Emergency Dispatcher's Office (MI)

Aerial Photographs (FL, CA)

Field Observations and GPS (MI)

### Ancillary layers

Fuels

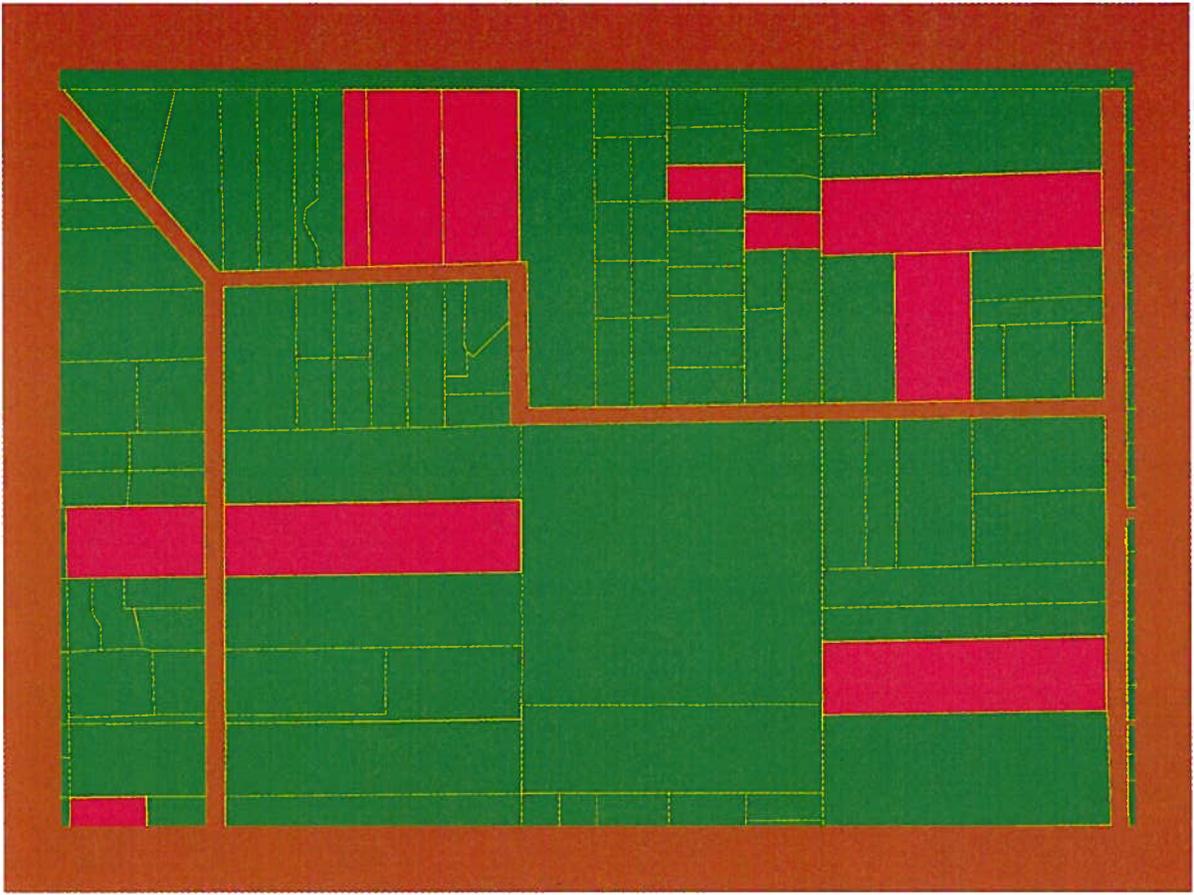
Roads

Recent fires

Topography (CA)

Housing density

Ownership class



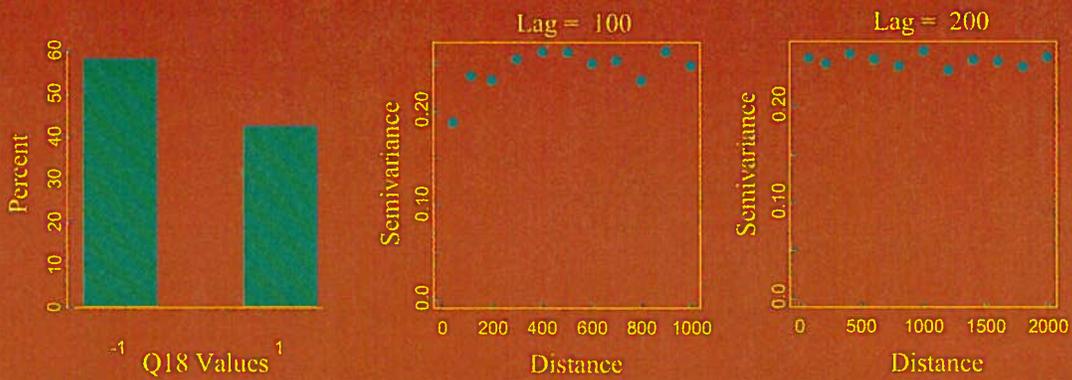


## Spatial Autocorrelation of Survey Variable

### Indicator Variograms

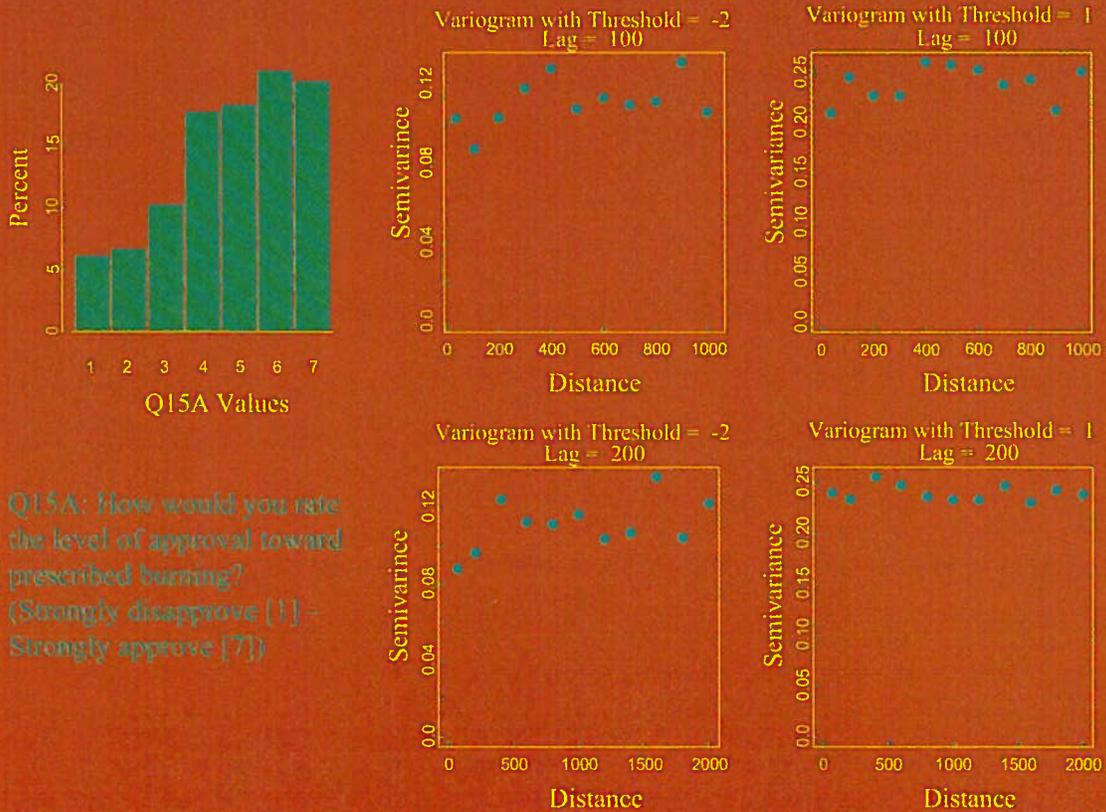
- Dichotomous Variables
- 3-class Ordinal Variables

### Q18, Clay County, FL



Q18: If you were given the opportunity to vote for or against allowing stronger enforcement of a defensible space ordinance in Clay County, how would you vote (For [1] / Against [-1])?

### Q15A, El Dorado County, CA



Q15A: How would you rate the level of approval toward prescribed burning? (Strongly disapprove [1] - Strongly approve [7])

## Association between Survey and GIS-derived Variables

### GIS-derived Variables

- Distance to nearest road
- Road Density (within an 1/6<sup>th</sup>, 1/3<sup>rd</sup>, 1/2, and 1 mile radius)
- House Density (within an 1/8<sup>th</sup>, 1/4<sup>th</sup>, 1/2, and 1 mile radius)
- Distance to Low, Medium, and High Risk Fuel Classes
- Percent of Low, Medium, and High Risk Fuel Class (within 1/8<sup>th</sup>, 1/4<sup>th</sup>, 1/2, and 1 mile radius)
- Number of fires, occurred after owner acquired property (within 1/8<sup>th</sup>, 1/4<sup>th</sup>, 1/2, 1, and 2 mile radius)
- Number of large (>40 ac) fires within radii-classes
- Distance to the perimeter of the closest large fire

