

# Cottage Owners' Views on Wildfire Protection in Cypress Hills Inter-Provincial Park Alberta



Canadian Wildland Fire Conference

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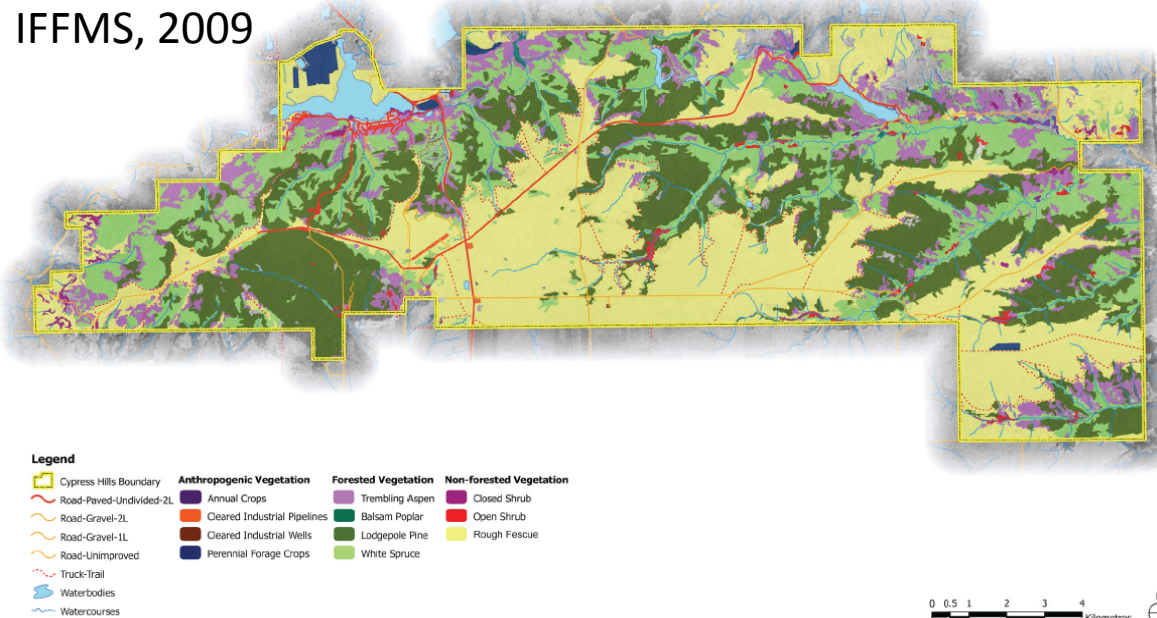


# Study Area (Elkwater)



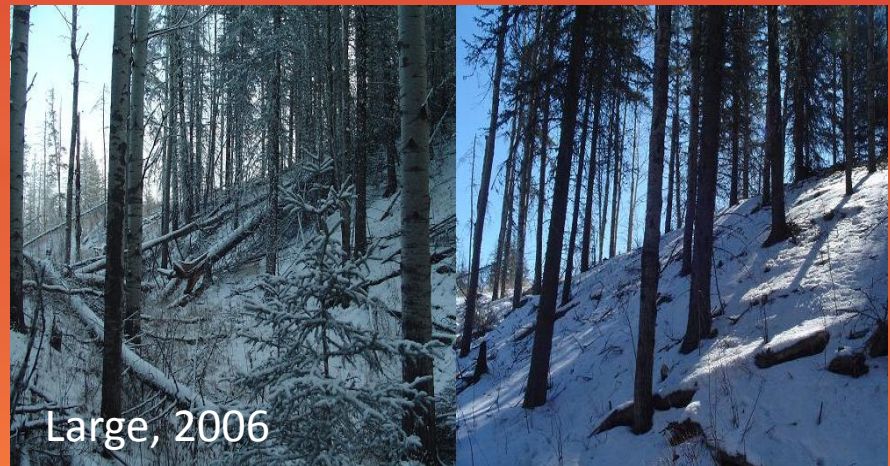
- Cypress Hills Inter-Provincial Park Alberta (205km<sup>2</sup>)
- Values at risk:
  - Human life (5,000 at peak season)
  - Infrastructure (276 cottages)
  - Biodiversity/Ecology
  - Tourism (250,000 annual visitors)

IFFMS, 2009



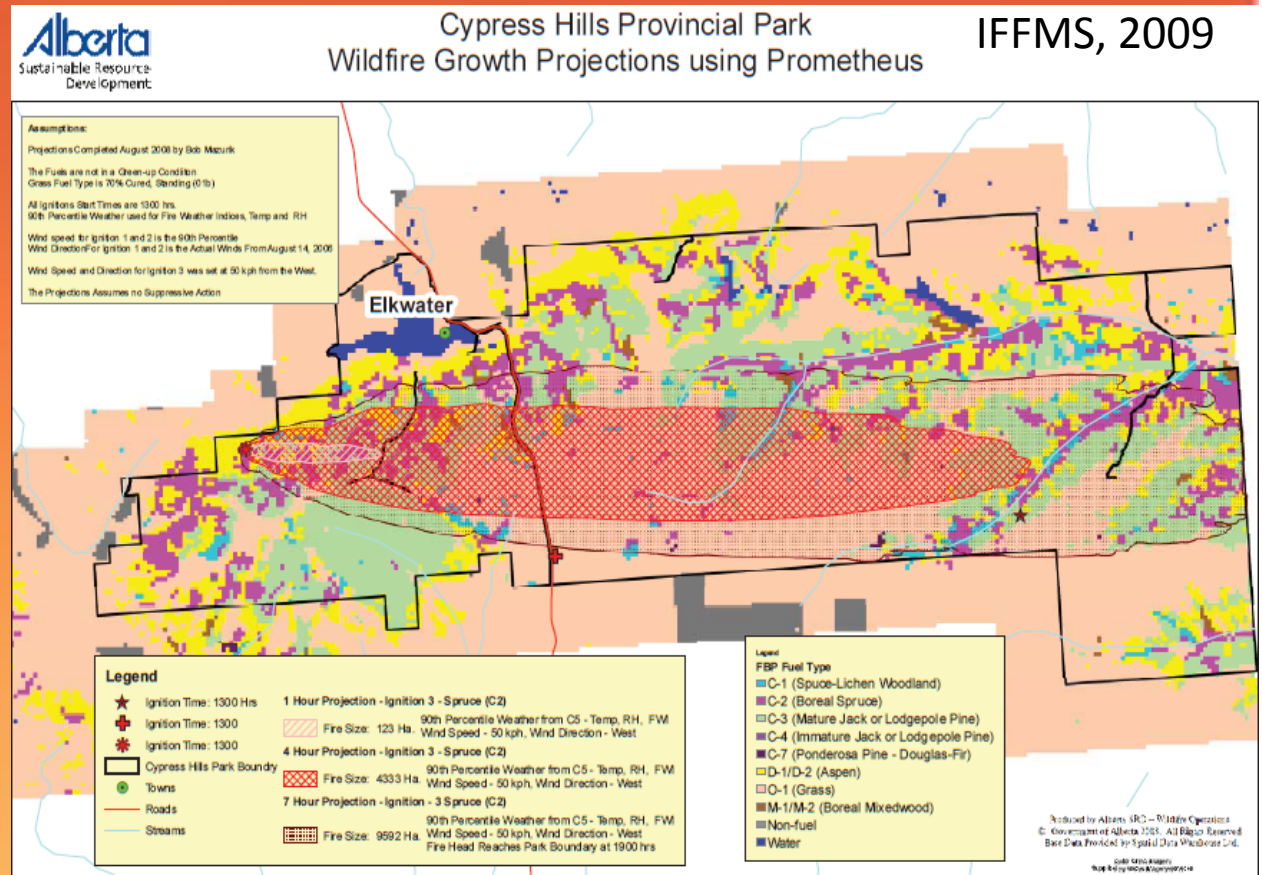
# Mitigation Efforts

- >100 ha fuel reduction/fire guard construction since 2004
- 60 ha priority zones in 2011
- Community protection sprinkler system developed in 2012
- Pre-attack plan
- Education:
  - Distribution of FireSmart pamphlets
  - Advertised fuel reduction spring clean-up days
  - FireSmart stakeholder consultation meeting
  - Distribution of a survey involved with this study
  - Promotion of CPSS



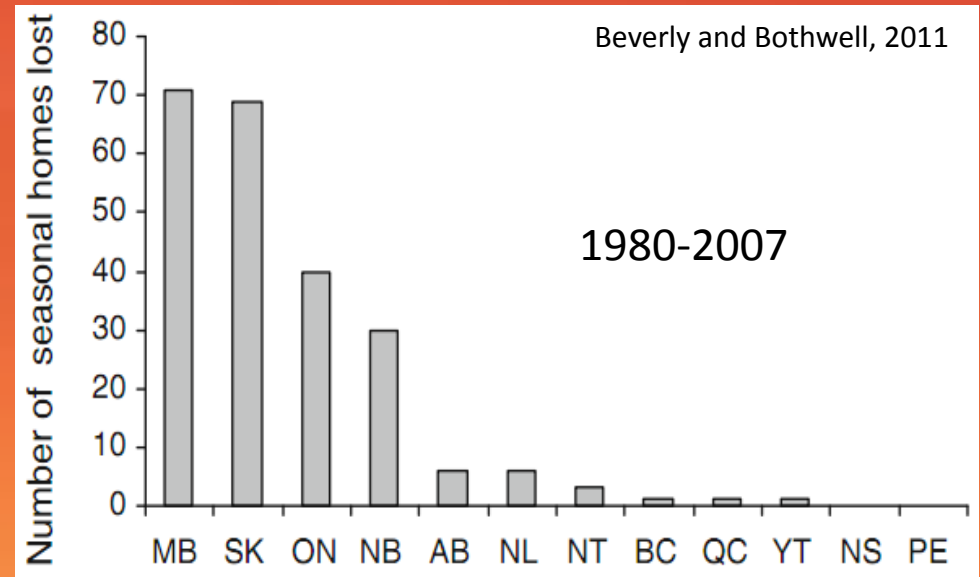
# Problem

- Historic moderate severity fire regime (50-75yr)
- Effective suppression since early 1900's
- 200% burn debt
  - 2 fire cycles skipped
- High fuel load
- High wildfire risk
- Simulation
  - August, 1:00PM
  - Wind 50km/hr
  - 20% humidity
  - 27°C



# Purpose

- Little research on cottage community mitigation efforts
- This study examined:
  - Wildfire knowledge
  - Wildfire risk perception
  - Existing mitigation efforts
  - Mitigation constraints
  - Willingness for involvement
  - Attitudes about the government's roles and responsibilities
- Provide recommendations:
  - Increase awareness
  - Increase participation
  - Increase public safety



# Objectives

- Understanding the population

- ✓ Design a survey
- ✓ Promote survey

- Understand results

- ✓ Interpretation
- ✓ Detailed analysis

- Other research

- ✓ Literature review
- ✓ Case studies
- ✓ Compare/contrast

- Recommendations

## BEFORE YOU START

**NOTE:** A wildfire is a non-prescribed fire which occurs in a forested or grassland area.

### Section 1: Wildfire Risk Perception

I would like to begin by asking you some questions about your views on wildfire risk. Please select only one answer you feel is most appropriate.

1. How would you rate the level of wildfire risk to your cottage?

High Risk  Moderate Risk  Low Risk  No Risk  No Opinion

2. A wildfire in Cypress Hills Provincial Park is likely within:

1 year  5 years  10 years  20 years  50 years  100+ years  No Opinion

3. Firefighters are able to protect my cottage during a wildfire situation:

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree  No Opinion

4. Wildfire risk in Cypress Hills Interprovincial Park is worse today than it was 20 years ago:

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree  No Opinion

5. Wildfires are an effective way of controlling forest insects and disease:

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree  No Opinion

# Survey

- Dillman - open ended, closed ended Likert scale and demographic questions:
  - (1) Wildfire risk perception
  - (2) Wildfire mitigation efforts
  - (3) Constraints to wildfire mitigation
  - (4) Wildfire management in CHIPP
  - (5) Demographic information
  - (6) Respondent Comments
- Mailed to the entire community of Elkwater (276 owners)
  - Pilot survey
  - Initial survey
  - Follow-up
- Returned 165 surveys = 60% response rate



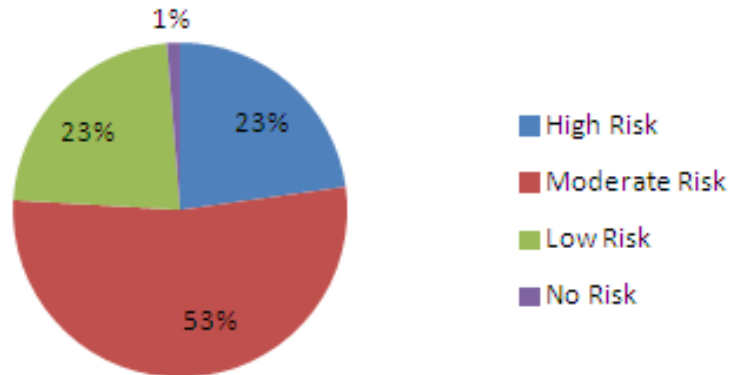


# Data Analysis

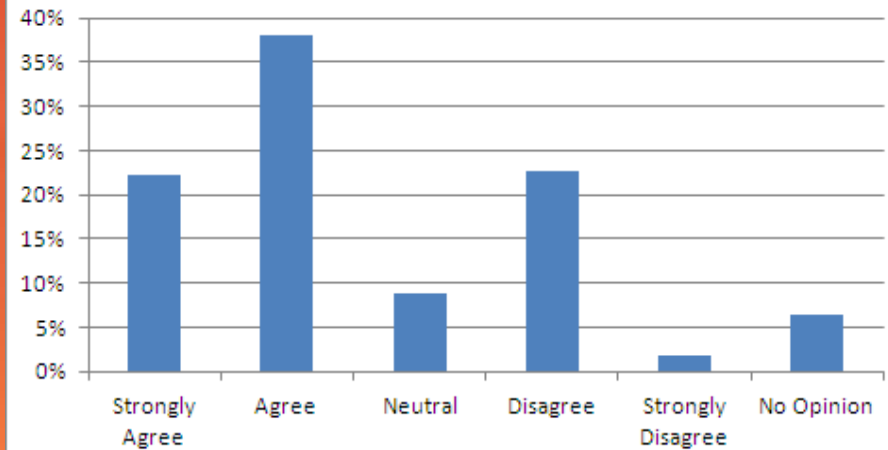
- Review of Comments
  - “scared for Elkwater wildland firefighters, so much deadfall”
  - “would like to see the FireSmart checklist and have one on one instruction”
- Assessment of individual questions
- Ordinal and binary logistic regression analysis
  - Socio-demographic impacts on key risk variables
  - Mitigation at the homeowner level
  - Constraints to mitigation
  - Park management

# Data Analysis (Risk)

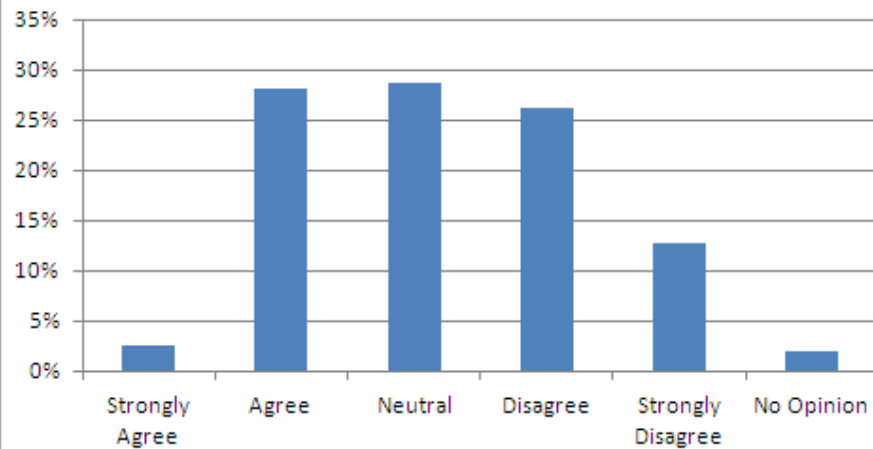
## Perceived Wildfire Risk



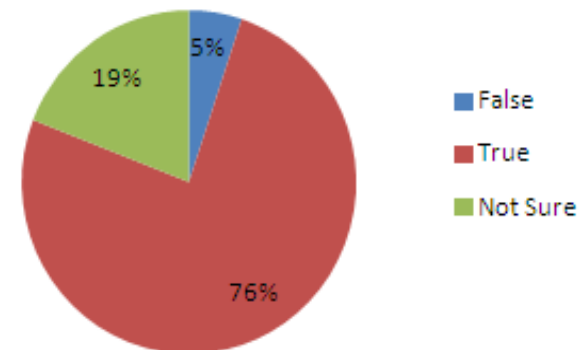
## Risk Worse Today vs. 20yrs



## Adequate Firefighter Protection



## Fire is Worse in Old Growth



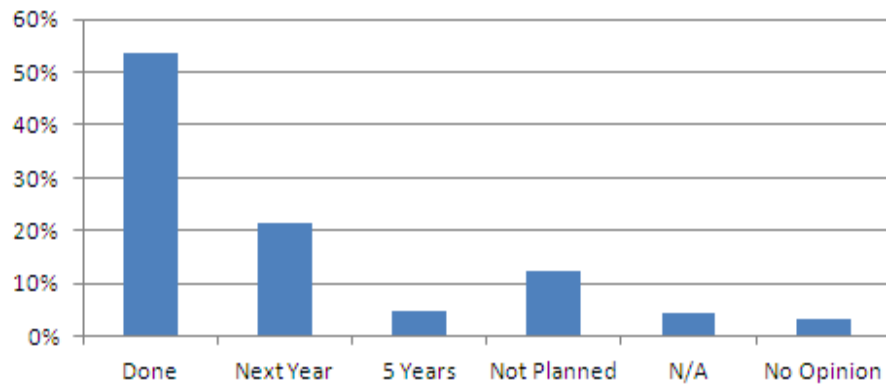
# Data Analysis (Key Variables)

Independent Variables	Ordinal Regression (Key Variables)			Binary Regression (Key Variables)		
	Perceived Cottage Risk	20-Year Risk	More Information	Co-op Participation	By-Law	Heard of FireSmart
Gender	-0.111 (0.460)	0.716 (0.458)	-1.361** (0.570)	-0.513 (0.599)	-0.150 (0.499)	0.528 (0.506)
Age	-0.643* (0.339)	-0.612** (0.370)	0.380 (0.393)	0.443 (0.389)	0.234 (0.375)	-0.296 (0.335)
Annual Income	0.012 (0.241)	-0.409* (0.243)	0.324 (0.254)	0.145 (0.290)	-0.083 (0.261)	-0.295 (0.257)
Education	0.108 (0.198)	-0.074 (0.200)	-0.047 (0.209)	-0.154 (0.252)	-0.197 (0.220)	-0.175 (0.210)
Years cottage has been in family	0.495** (0.223)	-0.001 (0.232)	0.129 (0.239)	-0.150 (0.269)	-0.145 (0.239)	-0.225 (0.237)
Days spent at cottage per year	0.621** (0.242)	0.799*** (0.259)	-0.886*** (0.262)	0.328 (0.322)	0.347 (0.240)	0.597** (0.250)
Perceived Cottage Risk		1.130*** (0.331)		0.546 (-0.374)	0.400 (-0.351)	
n	105	98	85	103	104	107
$\chi^2$	8.892	12.763	13.291			
Nagelkerke R <sup>2</sup>	0.137	0.317	0.194	0.089	0.061	0.129

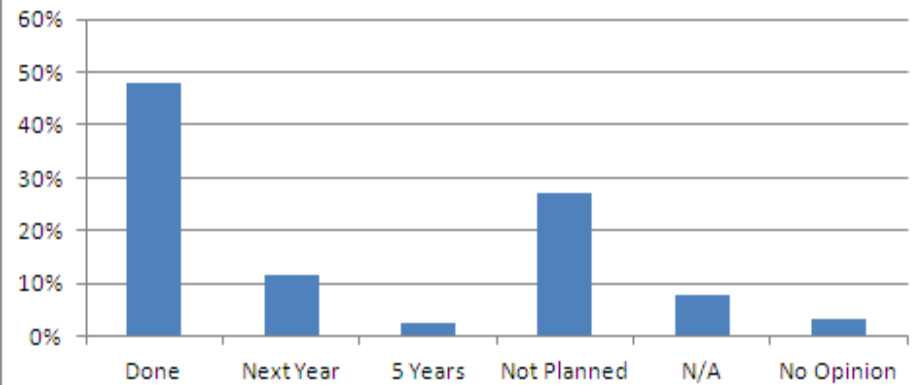
a\*= 90% Significant; \*\*= 95% Significant; \*\*\*= 99% Significant; <sup>b</sup>value in parenthesis represents standard error

# Data Analysis (Mitigation)

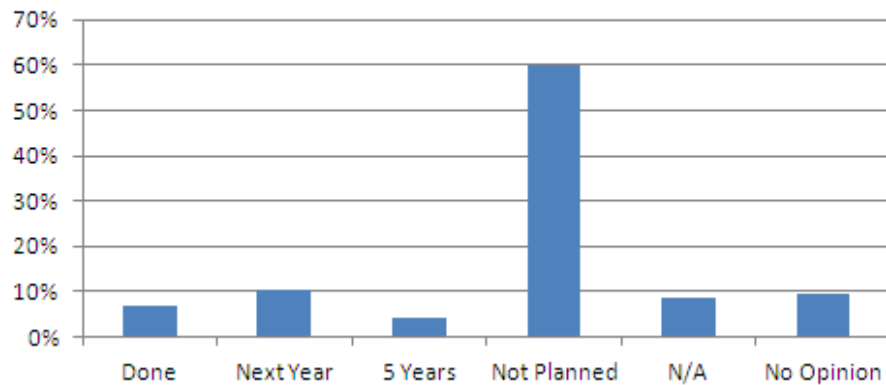
## Twigs/Sticks Removed - 10m



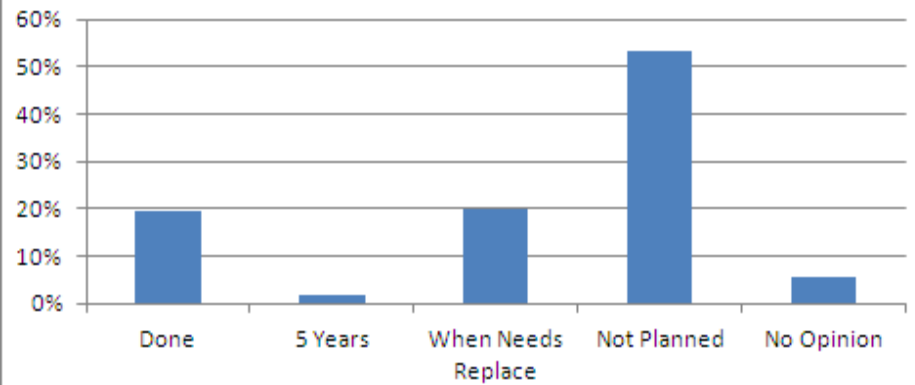
## Firewood Stored 10m Away



## Trees Touching Trees Pruned



## Fire Resistant Materials for Walls



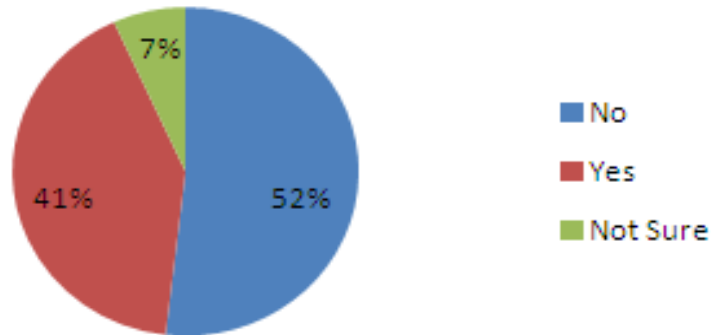
# Data Analysis (Mitigation)

Independent Variables	Ordinal Regression (Mitigation)		
	Litter Cleaning Non-Compliance Index	Tree Pruning Non-Compliance Index	FR Construction Non-Compliance Index
Gender	2.814*** (1.021)	-0.156 (0.586)	0.607 (0.551)
Age	-0.894** (0.444)	-0.310 (0.417)	-0.100 (0.395)
Annual Income	-0.804** (0.388)	0.132 (0.296)	0.064 (0.285)
Education	0.577* (0.347)	-0.040 (0.255)	0.396* (0.235)
Years cottage has been in family	0.632* (0.323)	-0.145 (0.265)	0.133 (0.259)
Days spent at cottage per year	0.083 (0.352)	-0.320 (0.325)	-0.806*** (0.273)
Heard of FireSmart	-1.642*** (0.611)	-0.060 (0.493)	-0.293 (0.457)
FB <sup>d</sup> in-effectiveness	-0.174 (0.246)	0.425* (0.229)	
FRC <sup>c</sup> In-effectiveness			-0.021 (0.198)
Tree Removal Cost		0.295 (0.285)	
FRC <sup>c</sup> Cost			0.463* (0.280)
n	75	72	82
$\chi^2$	11.305	4.073	5.041
Nagelkerke R <sup>2</sup>	0.419	0.102	0.245

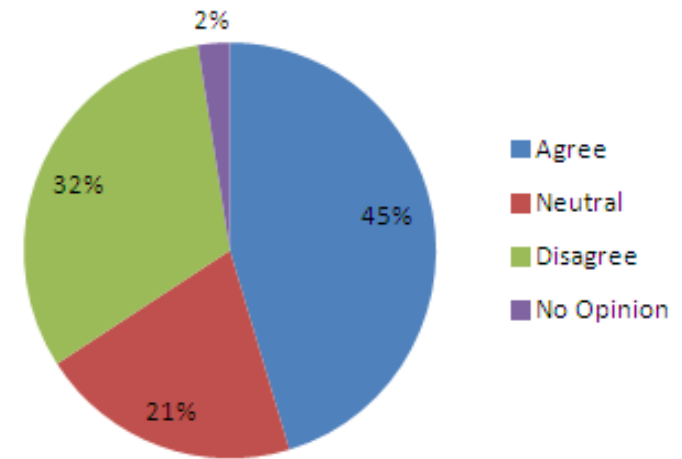
\*= 90% Significant; \*\*= 95% Significant; \*\*\*= 99% Significant; <sup>b</sup>value in parenthesis represents standard error  
<sup>c</sup>FRC = fire resistant construction <sup>d</sup>FB = 10 metre fuel buffer

# Data Analysis (Constraints)

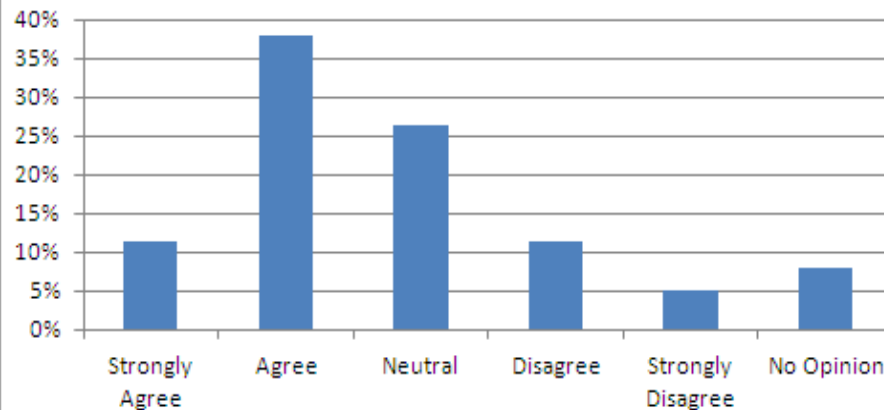
## Heard of FireSmart



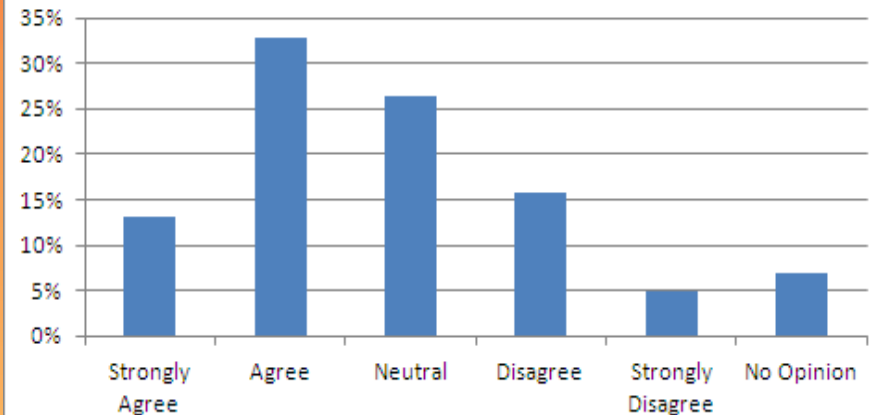
## I Do Not Want to Remove Trees



## Need More Information



## FR Material Too Expensive



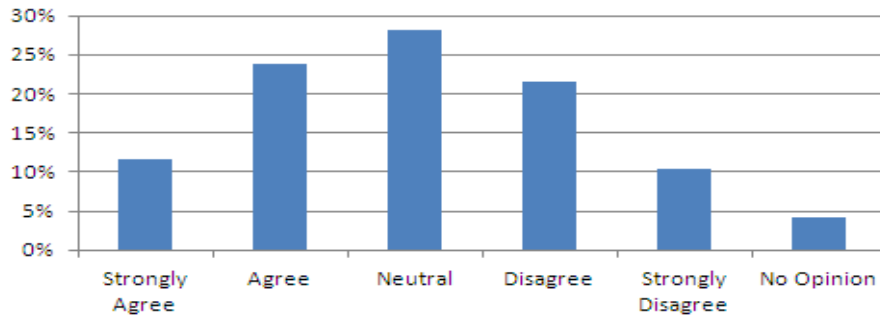
# Data Analysis (Constraints)

Independent Variables	Ordinal Regression (Constraints)				
	Tree Removal Cost	FRC <sup>c</sup> Cost	Aesthetics	Efforts Useless Without Neighbor	Mitigation Ineffectiveness Index
Gender	-0.173 (0.480)	-0.335 (0.474)	-0.165 (0.439)	-0.392 (0.446)	<b>-1.258**</b> (0.602)
Age	0.052 (0.356)	-0.287 (0.348)	-0.113 (0.321)	-0.023 (0.321)	0.804 (0.546)
Annual Income	-0.128 (0.254)	-0.284 (0.249)	0.054 (0.230)	-0.028 (0.228)	0.281 (0.359)
Education	-0.163 (0.208)	0.031 (0.206)	-0.254 (0.190)	-0.202 (0.191)	-0.347 (0.270)
Years cottage has been in family	0.032 (0.237)	0.105 (0.232)	-0.175 (0.213)	0.171 (0.213)	<b>0.546*</b> (0.325)
Days spent at cottage per year	<b>-0.582**</b> 0.261	-0.268 (0.246)	<b>0.485**</b> (0.227)	<b>-0.376*</b> (0.226)	-0.271 (0.331)
Perceived Cottage Risk	-0.029 (0.325)	0.055 (0.325)	<b>0.554*</b> (0.304)	0.342 (0.299)	<b>0.871*</b> (0.476)
n	94	94	99	100	95
$\chi^2$	2.889	5.962	17.849	26.060	9.883
Nagelkerke R <sup>2</sup>	0.095	0.063	0.133	0.078	0.241

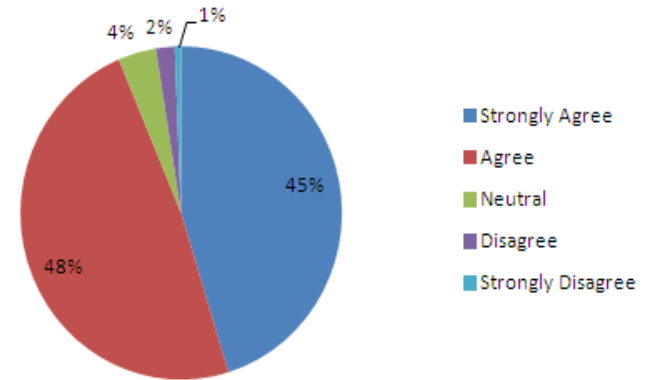
a\*= 90% Significant; \*\*= 95% Significant; \*\*\*= 99% Significant; <sup>b</sup>value in parenthesis represents standard error  
<sup>c</sup>FRC = fire resistant construction

# Data Analysis (Management)

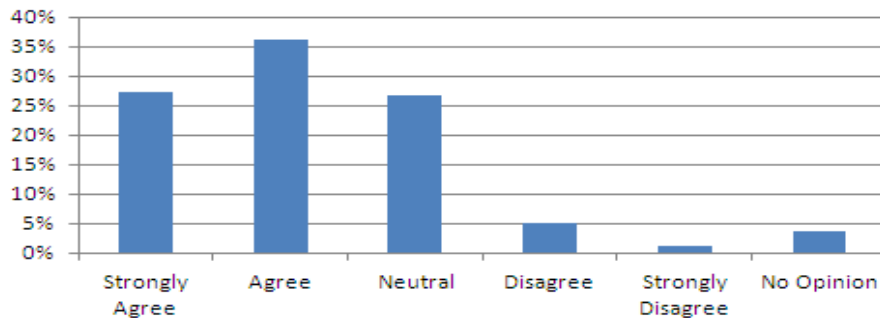
**Management Should Develop Bylaw**



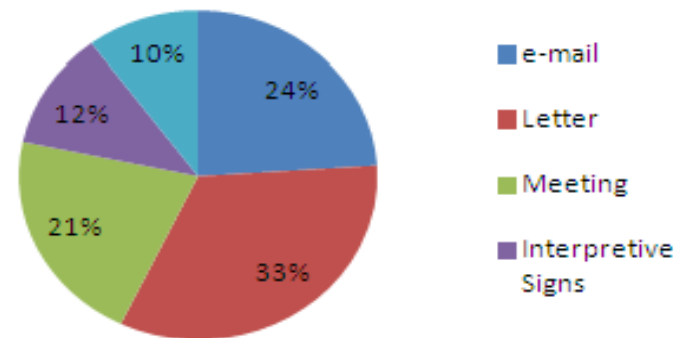
**Management Should Promote Mitigation**



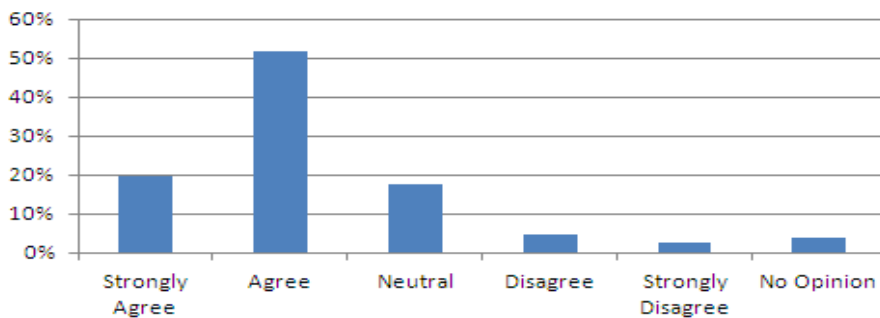
**More Willing if Park Did More Work**



**Best Contact Methods**



**Would Participate in Co-op FireSmart**





# Recommendations

- Education
  - Social marketing
    - Education programs
    - Involve Volunteer FD
    - Interpretive signage
    - Newsletters
    - Educational Video
  - Promote Park efforts
- Cost
  - Rebate program for FR materials
  - Assistance program for tree removal
- Combustible Materials
  - Phase-out program



# Recommendations

- Aesthetics
  - Encourage minor modifications
  - Encourage fuel conversion
- Collaboration
  - Community association meetings
  - Community leader influence
  - Clean-up days
  - FireSmart community recognition program
- Time
  - Patience is key
  - Take home message



# References

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# Questions?

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