

FIRE MANAGEMENT PLANNING

For

Sequoia and Kings Canyon National Park

A PUBLIC OPINION SURVEY OF THE RESIDENTS OF  
THREE RIVERS, CALIFORNIA

Submitted to  
Sequoia National Park, Three Rivers, California

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Paul Schissler Associates, Incorporated  
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## **ABSTRACT**

Sequoia National Park mailed self-administered questionnaires to residents of Three Rivers, California, an adjacent gateway community. The survey assessed residents' beliefs and attitudes about the Park's fire management program and their perceptions of community impacts.

Most respondents disagree that the park should suppress all fires and a minority believes that park fires cause large negative impacts. Still, subgroup differences with respect to smoke experience, smoke sensitivity, residence time and other demographic characteristics make certain populations more or less likely to support specific objectives, recall fire related events differently, and express divergent opinions on specific fire management issues.

Reducing the risk of a catastrophic fire was ranked as the fire management objective most important to respondents who also gave the Park high performance ratings in achieving this objective. Managing fires for minimum smoke was also important to respondents. For this objective, the Park received low performance ratings.

The intended effect of this information is (1) better inform park managers about issues important to park neighbors, (2) assist them in developing citizen education and involvement programs, (3) discover the most commonly used and preferred communication channels for fire information, and (4) help formulate fire management decision making criteria for fires in the Park.

## **ACKNOWLEDGMENTS**

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## EXECUTIVE SUMMARY

The community survey described in this report collected information about Park neighbors and their views of fire management goals and activities. Survey questions were designed to investigate residents': (1) beliefs about the current fire management program; (2) commonly held perceptions about fire and fire management; (3) knowledge about regional fire management history; (4) understanding of fire adapted ecosystems and the link between ecosystem health and fire management; (5) fire management policy preferences; and (6) relationships with Park.

Results of this survey of 530 Three Rivers residents will assist NPS fire managers in making decisions by providing information about the knowledge, needs and desires of the affected publics living near Park Service lands. The intended effect of this information is to better inform park managers about issues important to park neighbors, to assist them in developing citizen education and involvement programs, and to help formulate fire management decision making criteria for fires in the Park.

### Relationship Between Three Rivers Residents And The Park

The park is an important local employer. Three Rivers residents are frequent park visitors. The Park and the surrounding landscape are powerful attractions that influenced respondents' decisions to locate a residence in Three Rivers.

- **22% of Three Rivers households include at least one member that is a current or former Park employee**
- **80% visited the Park at least once in the 12-month period preceding the survey**
- **Sight-seeing, day hiking and visiting the visitor center topped the list of activities respondents participated in during park visits**
- **Proximity to the Park, recreational opportunities, to get away from the unpleasantness of urban life and the beautiful natural setting were the most frequently cited reasons why respondents chose to live in Three Rivers**

Three Rivers residents do not feel well informed about fire events and fire management activities in the Park. Residents learn about fires and fire management mostly from the local weekly newspaper (72%) and personal communication with Park staff (13%).

- **21% feel well or very well informed about upcoming controlled burn activities in the Park**
- **26% feel well or very well informed about ongoing fires in the Park**
- **23% feel well or very well informed about opportunities for public comment on Park management**
- **72% learned the most about the Park's fire management activities and events from the Kaweah Commonwealth newspaper**
- **13% learned the most about the Park's fire management activities and events from personal communication with Park staff**

Respondents who learned the most about the Park's fire management activities and events from the local newspaper feel, on average, significantly less informed than respondents who report learning the most from communication with Park staff or the Park's newsletter, the Sequoia Bark.

## **Experiences with, and Beliefs About The Current Fire Management Program**

Three Rivers residents are personally affected by smoke from Park fires. Most respondents have, at some time in the past, experienced discomfort related to smoke from Park fires. The smoke effects experienced most frequently by respondents at their homes included reduced visibility, breathing problems, unpleasant odor and other effects including nose, throat and eye irritation, allergic reactions, coughing, headaches, ash fallout, health effects on pets, and reluctance to exercise during periods of impaired air quality.

- **64% said they had experienced smoke-related discomfort at some time in the past**
- **25% responded that smoke bothered them at home during all or almost all Park fires that occurred in the past twelve months**
- **24% did not experience smoke effects at their homes during this period**
- **39% of respondents experienced reduced visibility**
- **33% suffered from breathing problems**
- **31% reported an unpleasant odor**

A minority of respondents believe that Park fires have large impacts on their neighbors and the community of Three Rivers.

- **36% believe that Park fires have a large effect on reducing the risk of local wildfires**
- **35% think the fires cause respiratory problems for local residents**
- **14% responded that the fires have a large effect on inconvenience due to road closures**
- **13% said fires cause Park access problems**

In response to open-ended questions, residents reported their opinions about the "best" and "worst thing" about fire management at the Park.

### **Best thing about fire management:**

- **reduced risk of catastrophic fires**
- **improved forest health**
- **wildlife benefits**
- **dedication of firefighters and managers**

### **Worst thing about fire management:**

- **Smoke from fires**
- **out of control fires**
- **poor air quality**
- **lack of information about fires**



## Knowledge Of Regional Fire Management History

Large proportions of Three Rivers residents give the Park's fire management program high marks for its forest health objectives, but many respondents said they did not know how successful the Park's programs are in this area.

- **52% rated accomplishments good or very good for improving conditions for giant sequoia trees**
- **44% think the Park is doing a good job of reducing the risk of catastrophic fires**
- **44% said that the Park is accomplishing its objective of improving the health of the Park's forests**

Residents were more critical and surer of the Park's performance of community objectives.

- **Only 18% believe the Park is doing a good job of managing fires for minimum smoke**
- **24% think the Park is accomplishing its objective to educate local residents**
- **24% gave the Park a good rating for notifying residents of fire management actions**

Residents are unsure how the Park Service manages fires.

- **57% did not know how often management decisions are made locally**
- **40% did not know how often fires were purposely ignited**
- **30% did not know how often the smoke from recent fires violated air quality standards**

## Understanding Of Fire-Adapted Ecosystems And Fire Management

Respondents possess a high degree of knowledge about the role of fires and fire management in the Park ecosystem. About half of Three Rivers residents think that restoring the Park's ecosystem is a high priority, and that fire management activities including prescribed burns and management-ignited controlled burns are necessary strategies.

- **48% agree or strongly agree that restoring natural ecosystem processes should be the Park's highest priority**
- **52% agree that, to restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions**
- **54% agree that managing lightning fires and lighting prescribed fires are the best ways to meet the Park's fire management objectives**
- **67% disagree or strongly disagree that the Park should suppress all fires because smoke is bad for the community**

## Respondent preferences

Three Rivers residents are concerned most with protection of human health and private property over other objectives of Park management. More than three-quarters of respondents said that the following fire management objectives are important or very important to them:

- **Notify local residents of fire management actions (85%)**
- **Manage fires for minimum smoke in nearby communities (80%)**
- **Improve conditions for giant sequoia trees (79%)**
- **Reduce the risk of a catastrophic fire (77%)**
- **Educate local residents about fire management in the Park (77%)**

Residents think the Park could improve its performance of notifying residents of fire management actions and managing fires for smoke in nearby communities. These two objectives received the highest importance ratings and the lowest performance ratings.

*Risk reduction and smoke management* emerge as the highest priority fire management objectives when residents are asked to choose the *most important objective*.

- **51% said reducing the risk of a catastrophic fire is most important**
- **27% think that managing for minimum smoke in nearby communities is the most important objective of fire management**

## Survey Response Differences by Demographic Subgroups

With some variation, Three Rivers residents are concerned most with protection of human health and private property over other objectives of Park management. This applies to men and women, those who live with someone with respiratory ailments, those who have experienced discomfort from smoke related to Park fires; to adult respondents of all ages groups, geographical location, number of visits to the Park, and all levels of education. Still, subgroup differences are evident that make certain populations more or less likely to support specific objectives, recall fire-related events differently, and express divergent opinions on specific fire management issues.

- ***Smoke sensitivity.*** Whether or not respondents have ever experienced smoke discomfort from Park fires has a strong effect on their preferences for management objectives, their recall of fire-related events and understanding of fire-adapted ecosystem management. Smoke sufferers are less likely to view ecosystem management objectives as important, give Park managers poor performance ratings and are more likely to think that Park fires have had large or severe impacts on the community.
- ***Residence time.*** Compared to long-term residents, newcomers to Three Rivers believe that the negative effects of Park fires on the community are relatively small and that the positive effects are relatively large. Newcomers are less likely to say that smoke bothered them or that it violated air quality standards in the 12-month period prior to answering the survey.

Long-term residents are more critical of the Park's fire management program. Newcomers are more likely to rate the Park's accomplishments as good or very good for all listed objectives. Compared to newcomers, long-term residents downplay the importance of fire management objectives tied to ecosystem health goals.

- **Park employment.** Respondents from households with at least one current or former Park employee are more likely to believe that Park fires have large positive effects and small negative effects on Three Rivers. These residents are also less likely to claim that smoke from fires frequently bothered them or violated air quality standards in the previous one-year period. Respondents from these households are more likely to emphasize the importance of ecosystem health objectives.
- **Gender.** Women are more likely to believe that Park fires have large or severe effects on the Three Rivers community.
- **Age.** Older respondents believe that the effect of Park fires on the community is relatively small compared to younger respondents.
- **Education.** Respondents who report fewer years of formal education give the Park the highest marks for accomplishing certain fire management objectives. The lowest ratings came from residents with a graduate college education.
- **Location.** Location has little bearing on response differences to this survey. However, a few differences across location groups were noted. For example, Middle Fork area residents are the most likely (among Middle Fork, South Fork and North Fork respondents) to believe that Park fires have a large impact on decreased tourism and keeping friends and relatives from visiting.

## INTRODUCTION

Sequoia and Kings Canyon National Park is developing its *General Management Plan*. In support of this plan, park managers are preparing more detailed interrelated *implementation plans* to guide specific activities. One of these implementation plans currently in development is the *Fire Management Plan*. Management policies that allow various forms of fire reduce wildfire risk and restore ecosystem functions, but they can also create unwelcome smoke and other impacts in adjacent residential areas. The National Park Service's use of fire is controversial in communities adjacent to the Park. The new *Fire Management Plan* will examine this issue and seek ways to preserve the health of the Park's forests with as little adverse impact on neighbors as possible.

The National Parks are required to conduct comprehensive planning to guide specific projects, to base decisions on adequate information and analysis, and to track progress made toward those goals. Analyzing the Park in relation to its surrounding ecosystem, historic setting, and community helps Park managers and staff understand how the Park can best interrelate with neighbors and others to maintain systems that are ecologically, socially, and economically sustainable.

Decisions based on these goals are more likely to be successful. Progressively more site-specific and detailed analysis helps minimize adverse natural, cultural, and socioeconomic impacts and the costs of particular actions. These goals and other rationale for National Park Service (NPS) planning policies are set forth in *Director's Order 2: Park Planning, January 1998* (National Park Service, 1998). The Director's Order recognizes, "Developing a plan of action dealing with a complex and sometimes controversial issue often requires a level of detail and thorough analysis that goes well beyond that which is appropriate at the general management planning or strategic planning levels."

To identify and understand those issues related to fire management that are most important to people who live in the nearest smoke-sensitive community is a necessary first step in making successful fire management decisions. Fire management at Sequoia and Kings Canyon National Parks needs to determine those issues related to its activities that are important to, and impact residents in the nearest smoke-sensitive community, Three Rivers, California. In addition, information collected on park neighbors' perceptions of fire ecology and fire management

activities will reveal perceptions and opportunities to improve and enhance communication between the Parks and local residents.

The National Park Service's goal in conducting this survey is to obtain Park neighbors' perceptions of the fire management program and its effect on residents, the community, and the ecosystem.

The community survey described in this report collected information about Park neighbors and their views of fire management goals and activities. Survey questions were designed to investigate residents': (1) beliefs about the current fire management program; (2) commonly held perceptions about fire and fire management; (3) knowledge about regional fire management history; (4) understanding of fire adapted ecosystems and the link between ecosystem health and fire management; (5) fire management policy preferences; and (6) relationships with the Park (see Methodology section and Appendix A).

Results of the survey will help NPS fire managers make decisions by providing information about the knowledge, needs and desires of the affected publics living near the Park. The intended effect of this information is to better inform Park managers about issues important to Park neighbors, to assist them in developing citizen education and involvement programs, and to help formulate fire management decision making criteria for fires in the Park.

## **METHODOLOGY**

### **Questionnaire Design**

Research investigators consulted with NPS officials and Three Rivers residents during questionnaire design to ensure the survey instrument would (1) collect information from residents that facilitates informed decision-making about fire management, (2) query residents about fire management issues that they consider to be important.

Consultations with the NPS officials occurred throughout the planning period from October 1997 through September 1998 in meetings at the Park, telephone conferences and e-mail messages. Consultation with Three Rivers residents included key informant interviews and focus groups in January 1998.

The draft questionnaire was pre-tested in Three Rivers and then it was reviewed by the National Park Service's chief social scientist and submitted to the Office of Management and Budget (OMB) for review as required by the federal Paper Work Reduction Act.

### **Census Frame**

This survey was designed to census the entire population of households in Three Rivers. Because the census frame combined the 1997 telephone directory and a list of local property owners as of October 1997, the survey population was smaller than the actual population. Those with unlisted telephone numbers that are renters were excluded from the survey population as were households that have relocated to Three Rivers since the publication of either of the census frame source lists. Also excluded were those households with a telephone number listing, but no published address, which are not represented on the property owner list.

The census frame is the product of combining two databases and several screening steps. The first database is the list of all residential property owners in Three Rivers Postal Zip Code area. The database was provided to the Contractor by the Tulare County Assessor's Office. The data from the Assessor's Office was made available via a data sharing agreement between the NPS and Tulare County because of NPS's need for the data for this project as stated in a letter from the Park Superintendent to the Tulare County Assessor. The second database lists all residences in the Three Rivers local calling zone as listed in the PhoneDisc database, a

commercially available computer database updated quarterly. The decision to combine the databases was prompted by the desire to include as many households as possible in the census frame including owner and renter households. The combined frame was screened for duplicate listings and any listings for which mailing addresses were not available.

## **Survey Administration**

Adherence to Dillman's Total Design method for self-administered questionnaire surveys guided the survey administration (Dillman, 1971). This method has been shown to maximize response rates. The initial mailing was followed by two follow-up mailings to non-respondents. The questions and response formats were designed to minimize the amount of writing required by respondents. Response rate objectives included completed questionnaires from 500 adults representing one household each.

## **Data Processing and Analysis**

Survey data were entered manually into a computer database. Data cleaning to detect and correct data entry errors included data summary reports and random selection designed to detect systematic errors. Cleaned quantitative data were analyzed using a statistical computer software program (SPSS™). Crosstabulations of survey responses by demographic characteristics (tables 11-28) include symbols indicating the results of tests for statistical significance. Somers *d* was used as a directional non-parametric measure of association between the independent demographic variables (nominal and ordinal) and the ordered dependent response variables (e.g., agreement scale). These statistics assume that the sample being tested is a simple random sample. Because one of the main purposes of this study is public scoping and because the population of Three Rivers is very small, the researchers employed a census data collection to give each household in the community an opportunity to express its views. Therefore, strictly speaking, this study is not a random sample of Three Rivers residents; however, we believe that the data presented here are a reasonable representation of the attitudes and opinions of the Three Rivers community.

Independent analysts coded qualitative data. The analysts resolved any discrepancies and developed a final code list. Each code was converted into independent variables, which were summarized using the statistical software package.



## FINDINGS

### Survey Response

Self-administered questionnaires were mailed to 867 Three Rivers households and 135 were returned by the Post Office as undeliverable due to the lack of mail receptacle or because the residents had moved. This left a total of 732 contacted households; 527 of them completed and returned a questionnaire yielding an overall response rate of 72%.

### Respondent Demographics

The descriptive statistics in this section can be found in Appendix A: Survey Instrument. Appendix A summarizes the survey results for all 527 respondents. To conserve space and make the tables more readable, only percentages are reported in the tables in the *Respondent Demographics* and *Fire Management and Park Variables: All Respondents* sections of this report, and Appendix A. Applying the percentages found in these sections' tables to the total number of respondents (527) yields the frequency (or count) of responses. Readers may refer to the Appendix to review the survey questions referenced in parentheses at the beginning of each section below.

#### *Age, Gender (questions 32, 21)*

Half of the survey respondents are 60 years of age or older. Respondents range in age from 20 to 93. While the average age seems rather high, 1990 census data shows that the Three Rivers population had a higher percentage of residents over 60 years old (32%) than the Tulare County Population (21%). Unless this older cohort of the Three Rivers population has expanded significantly since 1990— a likely possibility — older residents are over-represented in this survey. Respondent gender is almost evenly divided between males (53%) and females (47%).

#### *Education and Employment (questions 29, 27)*

Respondents are well educated. Almost half (47%) went to college and 39% completed college or attended graduate school. Only 3% lack a high school diploma. As expected from the age distribution, a high percentage of respondents are retired (40%). Those not retired included full-time employees (44%), part-time employees (8%) and full-time homemakers (3%).

*Tenure and place lived prior to Three Rivers (questions 22, 26)*

Almost all residents that responded to this question (98%) are permanent residents of Three Rivers; however, nonresponse to this question was very high (35%), possibly because respondents are not familiar with the terms *permanent* and *seasonal* with respect to residency. Such a high nonresponse calls into question the reliability of this question as a measure of tenure; therefore, it was not used in further analysis of the data. Most (92%) are homeowners. A few seasonal residents (1%) and nonresidents (1%) responded to the survey. The median residence time in Three Rivers is 13 years and the range is one to 80 years. Prior to moving to Three Rivers, 65% of respondents had lived in a city with a population of 50,000 or greater or in a suburb of a large city. Only 3% said they had always lived in Three Rivers. Thirty-five percent of the survey respondents did not answer this question.

*Location (question 25)*

Most of the respondents live in the South Fork (39%) or Middle Fork (41%) areas. The remaining households reside in the North Fork (12%), East Fork (7%) or other area (2%). A large proportion of survey respondents (27%) did not respond to this question. Perhaps this was due to some confusion over how the NPS delineates each region. Before coding responses into one of the five response categories, 30% of the respondents chose "other area" and identified a more specific location. All but five of these responses were later categorized into one of the first four response categories to this question.

*Smoke sensitivity (questions 6, 7, 8, 9)*

The smoke-sensitive population of Three Rivers ranges from about one-third to two-thirds of the residents depending on the measurement. About one-third of respondents (31%) *experienced breathing problems from smoke at their homes* in the period 12 months prior to filling out the survey. Almost two-thirds of respondents (63%) *have ever personally experienced discomfort related to smoke from Park fires* at their homes. More than one-third (36%) of households surveyed include a resident who *suffers from a respiratory ailment*; 27% of the respondents suffer such ailments and 26% of respondents said that someone else in their household has a respiratory ailment.

## Fire Management and Park Variables: All Respondents

### Relationship between residents and the Park

#### *Economic Impact (question 17)*

The Park provides direct and indirect economic benefits to the Three Rivers community by direct employment, concessions for companies that provide visitor services, purchasing goods from local businesses and attracting tourists who purchase local goods and services.

The Park is an important local employer. Nearly one-quarter (22%) of the respondent households include at least one member that is a current or former Park employee<sup>1</sup>; 10% of respondents were Park employees at the time of the survey, 10% were former Park employees and 7% said that someone else in their household is a Park employee.

Only about one in eight (13%) respondents reported economic ties to the Park in employment with or ownership of businesses that rely on transactions with the Park, its concessions or tourists.<sup>2</sup>

#### *Park Use (questions 14, 15, 16)*

Three Rivers residents are frequent park visitors. The vast majority of respondents (80%) visited the Park at least once for recreation or leisure trips in the 12 months prior to filling out the survey. The number of visits ranged from 1 to 75 during that period (not counting a Park employee who said he visited the Park 365 times) and the median number of visits was three. Sightseeing (66% of park visitors), day hiking (50%) and visiting the visitor center (44%) topped the list of activities respondents participated in during Park visits.

#### *Location Decision (question 18)*

The Park and the surrounding landscape are powerful attractions that influenced respondents' decisions to locate a residence in Three Rivers. The *beautiful natural setting* (77%), *to get away from the unpleasantness of urban life* (63%), *proximity to the national parks*

<sup>1</sup> Computed by the number of households that answered "yes" to one or more of the last three items in question 17.

<sup>2</sup> Computed by the number of households that answered "yes" to one or more of the first six items in question 17.

(43%) and *recreational opportunities* (40%) were the most frequently cited reasons why respondents chose to live in Three Rivers.

*Reasons why the Park is Important to the Community (question 19)*

*Recreational opportunities* (88%) and *scenic beauty* (88%) tied for the most frequently chosen reasons why respondents think the Park is important to their community (table 1). *Preserving critical natural resources* (84%) and *attracting interesting visitors* (71%) also received high agreement scores. All of the listed importance factors received higher agreement scores than disagreement scores. The *economic impact of the Park*, and the *Park linking the community to the past* each received remarkably high “don’t know” responses (39% and 46% respectively), although agreement was 54% and 30% respectively, and 3% and 10% disagreed respectively.

**Table 1. Reasons why the Park is important to the community** (% of 527 respondents)

Reason	Strongly agree or Agree	Neither agree nor disagree	Strongly disagree or Disagree	Don't know*
The Park offers recreational activities that I and/or my family enjoy.	88	4	3	6
The Park enhances the scenic beauty of the area.	88	3	4	5
The Park preserves critical natural resources.	84	4	5	8
The Park attracts interesting visitors.	71	16	4	9
The Park provides a buffer for Three Rivers against development and population growth	56	14	18	11
The Park brings people in the community together because they take pride in it.	54	25	10	11
The economic impact of the Park is vital to the community.	54	5	3	39
The Park staff are active community members.	50	19	12	18
The Park brings the federal government closer to our community in a helpful way	33	29	24	15
I see my family and/or friends more frequently because they enjoy the Park.	30	39	24	8
The Park links us to the past by representing the landscape before European settlement.	30	15	10	46

\* includes “don’t know” and missing responses

Communication (questions 11, 12, 13)

Three Rivers residents do not feel well informed about fire events and fire management activities in the Park (figure 1). Only one quarter or less feel well or very well informed about upcoming controlled burn activities in the Park (21%), ongoing fires in the Park (26%) and opportunities for public comment on Park management (23%).

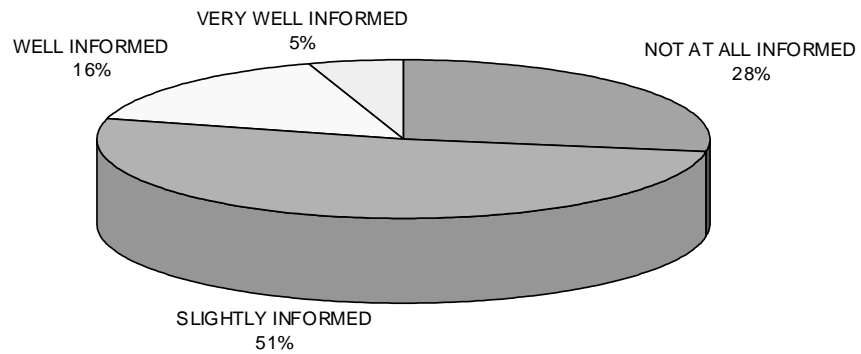
Residents learn about fires and fire management mostly from the local weekly newspaper (72%) and personal communication with Park staff (13%). Table 2 shows that these two sources are also the most preferred for receiving information about fire events and activities (60% and 11% respectively).

Although the local newspaper is the primary communication vehicle for fire information, it may not be the most effective. Figure 2 compares the average scores for *how well informed respondents feel about three fire events and management activities* between groups, based on which information source each *learned the most* from. Respondents who learned the most about the Park’s fire management activities and events from the local newspaper feel, on average, significantly less informed than respondents who report learning the most from communication with Park staff.

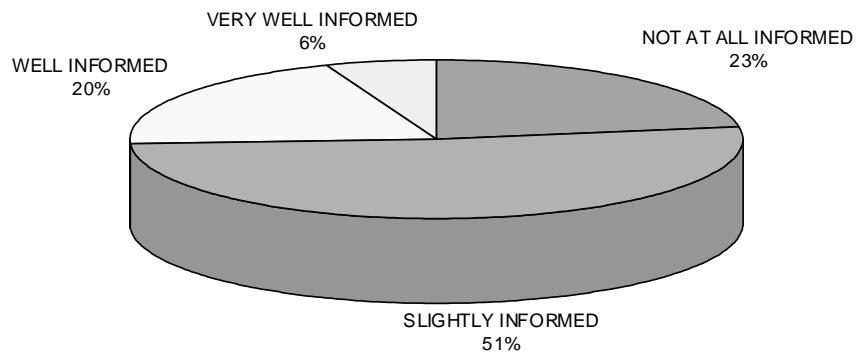
**Table 2. Most Effective and Preferred Park Fire Information Sources**

	LEARNED MOST		MOST PREFERRED	
	Frequency	Percent	Frequency	Percent
LOCAL NEWSPAPER (Kaweah Commonwealth)	343.0	71.6	287.0	59.9
PERSONAL COMM. WITH PARK STAFF	61.0	12.7	51.0	10.6
OTHER INFORMATION SOURCE	22.0	4.6	36.0	7.5
"SEQUOIA BARK" NEWSPAPER	10.0	2.1	9.0	1.9
OTHER NEWSPAPER	10.0	2.1	19.0	4.0
LOCAL BULLETIN BOARD	9.0	1.9	12.0	2.5
PUBLIC MEETINGS	7.0	1.5	22.0	4.6
PARK INTERPRETIVE PROGRAMS	7.0	1.5	5.0	1.0
TELEVISION	6.0	1.3	22.0	4.6
RADIO	2.0	0.4	13.0	2.7
FAX NOTICES	2.0	0.4	3.0	0.6

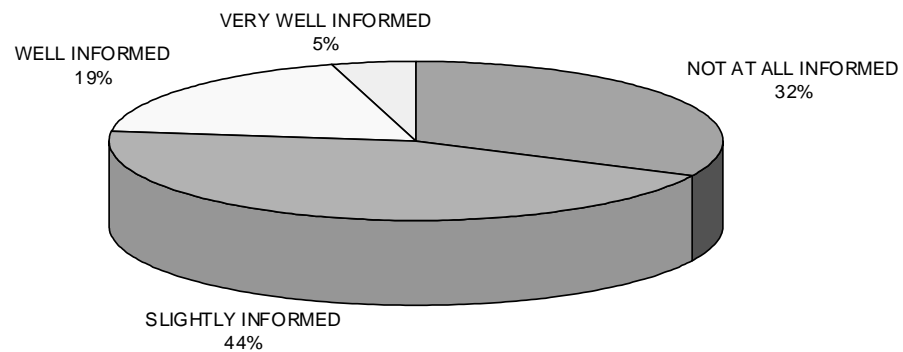
**Upcoming controlled burn activities in the Park Percent**



**Ongoing fires in the Park Percent**

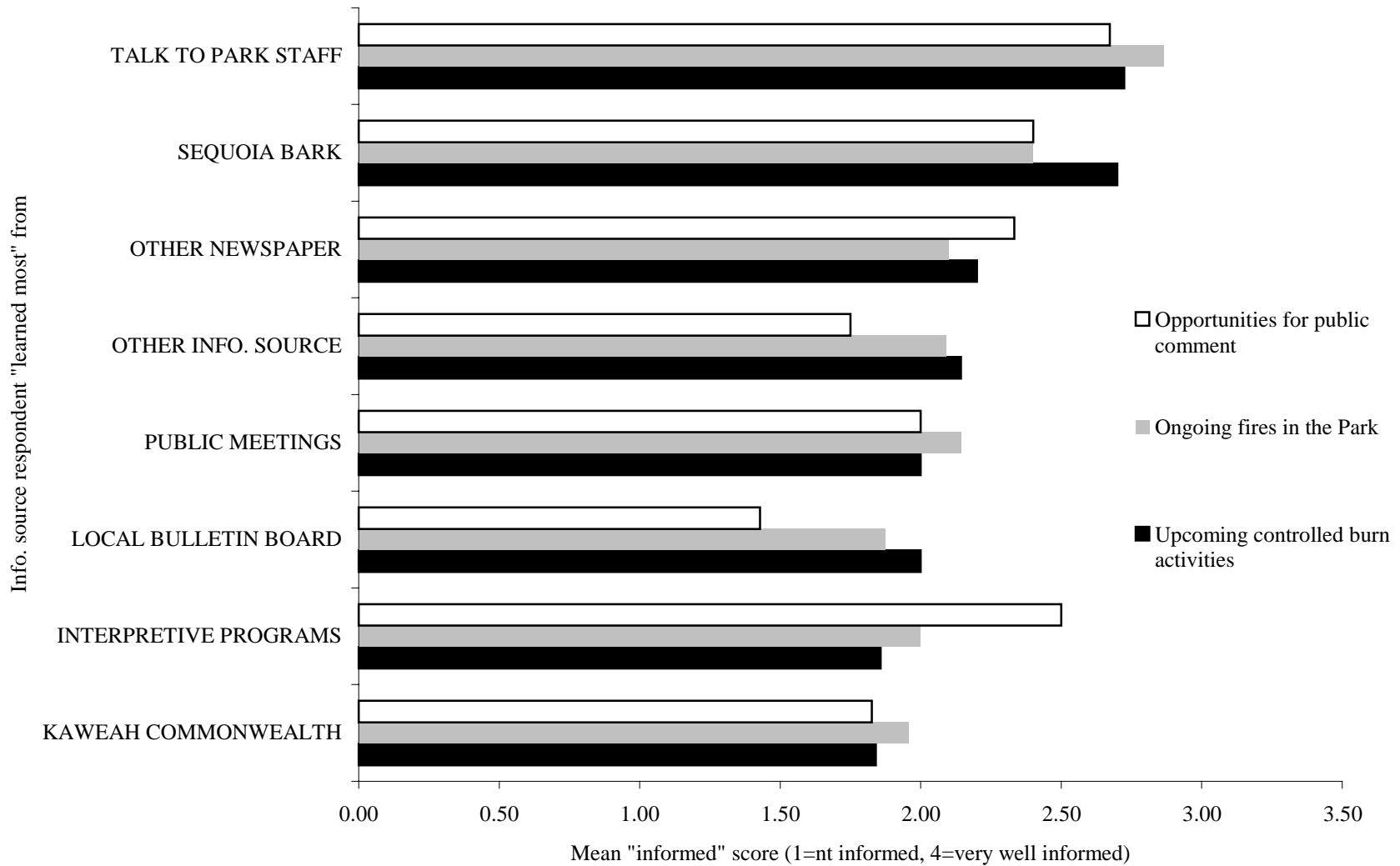


**Opportunities for public comment on management of the Park**



**Figure 1. How Informed Respondents Feel About Fire Management Events and activities**

**Figure 2. How Informed Respondents Feel by Information Source**





## Beliefs about the current fire management program

### *Perceived Benefits and Costs: Smoke Effects at Home (questions 6, 7)*

More than half of the respondents were not bothered by smoke at their homes (25%) or bothered during only some (30%) (of the Park fires that occurred 12 months prior to the survey). The remaining respondents were bothered by smoke at their homes during *all* (12%), *almost all* (15%) or *about half* (13%) of the Park fires during that period. One respondent noted that this seemed to be a biased question because during the 12-month period specified in question there were relatively few fires. Most of the survey questions that rely on respondent recall of specific experiences limit the time period to twelve months to reduce respondent recall error. However question #7 (Appendix A) provided respondents with an opportunity to report whether or not they had *ever personally experienced discomfort related to smoke from Park fires at their home*. Almost two-thirds (64%) said they had experienced discomfort at some time in the past.

The smoke effects experienced most frequently in the 12-month period preceding the survey included *reduced visibility* (39% of respondents), *breathing problems* (33%), *unpleasant odor* (31%) and *other effects* (9%) including nose, throat and eye irritation, allergic reactions, coughing, headaches, ash fallout, health effects on pets, and reluctance to exercise during periods of reduced air quality. Only one-quarter of respondents (24%) *did not experience smoke effects at their homes* during this 12-month period.

### *Perceived Benefits and Costs: Community Effect (question 10)*

Over one-third of respondents (36%) believe that Park fires have a large effect on *reducing the risk of local wildfires* and a similar proportion (35%) believe the fires *cause respiratory problems for local residents* (table 2). Some respondents think that fires *cause stress among local residents* (26%), *cause a decrease in tourism* (22%) and *allow visitors to see natural ecosystem processes* (18%). Few believe that the fires have a large effect on *inconvenience due to road closures* (14%), *Park access* (13%) or keeping friends and relatives from visiting (9%).

**Table 2. Perceived magnitude of local effects of Park fires** (% of 527 respondents)

Local Fire Effect	Large or severe effect	Some effect	Small or no effect	Don't know
Reduce local wildfire risks	36	27	19	18
Cause respiratory problems among local residents	35	36	18	11
Causes stress among local residents	26	21	12	41
Cause a decrease in tourism	22	26	35	17
Allows visitors to see natural ecosystem process	18	27	30	26
Create inconvenience due to road closures	14	34	39	13
Reduce access to Park	13	32	40	14
Keeps friends and relatives from visiting	9	13	38	40

*Perceived Benefits and Costs: Qualitative Analysis of Open-ended Questions (question 20)*

Responding to open-ended questions designed to elicit opinions about fire management (tables 3 and 4), residents believe the *worst things about fire management at the Park* are the smoke from fires (31%), out of control fires (16%), poor air quality (9%) and lack of information about fires (8%). They believe the best things about fire management are the reduced risk of catastrophic fires (26%), forest health (17%) and wildlife (12%) benefits, and the dedication of firefighters and managers (7%).

**Table 3. The Worst Thing About Fire Management at the Park**  
(Coded responses to open-ended question)

Response Category	Count	Percent of Responses*	Percent of Cases**
The smoke	163	27.8	31.4
Out of control fires	82	14.0	15.8
Poor air quality/pollution	48	8.2	9.2
Lack of information about fires	42	7.2	8.1
Financial concerns, spending, inefficiency	26	4.4	5.0
Creates stress/tension in the community, home, among visitors	20	3.4	3.9
Way decisions are made about how, when, where to burn	19	3.2	3.7
Way the Park manages controlled or prescribed fires	16	2.7	3.1
Detrimental effects on trees, the forest, wildlife	15	2.6	2.9
Personal or community health concerns	13	2.2	2.5
Political interference	9	1.5	1.7
No "worst" thing	8	1.4	1.5
Park's lack of concern for the community	5	0.9	1.0
Other comment	14	2.3	2.7
No response or "don't know"	107	18.2	20.6
Total	587	100.0	113.1

\* Percent of the total number of items in response category mentioned by all respondents

\*\* Percent of respondents that mentioned item in response category

**Table 4. The Best Thing About Fire Management at the Park**  
(Coded responses to open-ended question)

Response Category	Count	Percent of Responses*	Percent of Cases**
Risk reduction, less chance of catastrophic fire	138	24.2	26.2
Restores ecosystem functions, forest health	87	15.2	16.5
Protects/preserves wildlife, ecosystem, trees	65	11.4	12.3
Dedication of firefighters/managers	35	6.1	6.6
Protects people, property from fire	23	4.0	4.4
No "best" thing	17	3.0	3.2
Creates jobs	13	2.3	2.5
Negative effects don't last long/short fire season	8	1.4	1.5
It's necessary	5	0.9	0.9
Economic benefits	3	0.5	0.6
Good or better smoke management	1	0.2	0.2
Other comment	16	2.8	3.0
No response or "don't know"	160	28.0	30.4
Total	571	100.0	108.3

\* Percent of the total number of items in response category mentioned by all respondents

\*\* Percent of respondents that mentioned item in response category

**Knowledge of regional fire management history** (questions 3, 4)

Three Rivers residents give the Park Service's fire management program high marks for its forest health objectives. Respondents rated accomplishments *good* or *very good* for *improving conditions for giant sequoia trees* (52%), *reducing the risk of catastrophic fires* (44%) and *improving the health of the Park's forests* (44%); however, it should be noted that these same objectives also received the highest proportion of don't know responses (Table 5). Residents were more critical and surer of the Park's performance of community objectives.

Educating local residents, notifying residents of fire management actions and managing fires for minimum smoke received good or very good scores of only 24%, 24% and 18% respectively and poor or very poor scores of 31%, 37% and 41%.

**Table 5. Accomplishment of fire management objective** (% of 527 respondents)

Objective	Good or very good	Average	Poor or very poor	Don't know
Improve conditions for giant sequoia trees	52	14	7	26
Reduce the risk of a catastrophic fire	44	19	13	25
Improve the health of the Park's forests	44	18	11	27
Educate local residents about fire management in the Parks	24	29	31	17
Notify local residents of fire management actions.	24	24	37	16
Manage fires for minimum smoke in nearby communities.	18	24	41	16

Residents are unsure how the Park Service manages fires. More than half of the respondents (57%) do not know how often *management decisions are made locally* and 40% did not know how many recent fires were *purposely ignited* (table 6). Similarly, a large proportion do not know how often the *smoke from recent fires violated air quality standards* (30%). On the other hand, 91% have a definitive answer about whether *smoke bothered them at their homes*; 55% were not bothered or were only bothered during *some* fires; 25% say that they were bothered during *all* or *almost all* recent fires.

**Table 6. Perceived frequency of fire-related events** (% of 527 respondents)

Fire Events	All or almost all	About half	Only some or none	Don't know
The decisions on how to manage fire were made by local Park officials.	39	2	2	57
Fire was ignited purposely by Park staff.	32	13	15	40
Smoke from fire violated air quality standards in Three Rivers.	29	15	25	30
Smoke bothered me at my home.	25	12	55	9
The Park provided adequate notification about fire to local residents.	23	10	40	26

**Understanding of fire-adapted ecosystems (question 5)**

A majority of respondents seem to have a good understanding of the Park’s fire management objectives for maintaining a fire-adapted ecosystem. Less than one-quarter of respondents disagree with those statements (table 7). One possible exception to this is the response to the statement, *Giant Sequoia trees can survive severe fires*. More than half (58%) agree with this statement, but one-in-five responded *don’t know* (21%). Although Giant Sequoia trees can survive and have adapted to recurrent fires as a species, their seedlings, young and mature trees can succumb to severe fires.

**Table 7. Respondent beliefs about fire adapted ecosystems and fire management**  
(% of 527 respondents)

Fire management statement	Strongly agree or agree	Neither agree nor disagree	Disagree or strongly disagree	Don’t know
One way to prevent big fires is to ignite small fires.	63	10	12	15
Giant Sequoia trees can survive severe fires.	58	7	15	21
The Park should let all lightning caused fires burn unless they threaten lives and private property.	56	11	22	11
Managing lightning fires and lighting prescribed fires are the best ways to meet the Park’s fire management objectives.	54	10	17	20
To restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions.	52	11	22	16
Restoring natural ecosystem processes should be the Park’s highest priority.	48	17	22	13
If the Park would time fires later in the year (autumn), there would be more smoke in Three Rivers.	22	13	15	51
The Park should suppress all fires because smoke is bad for the community.	12	11	67	10

Two-thirds (67%) of residents disagree that *the Park should suppress all fires because smoke is bad for the community*. Just over half (51%) of respondents *do not know* whether there would be *more smoke in Three Rivers if the Park timed fires later in the year (autumn)*. The authors discovered during focus group and key informant interviews that some residents believe

that timing management-ignited burns in the fall would reduce the amount of smoke in Three Rivers; however, these results show that such opinions are not prevalent and highlight a need for further community education.

**Respondent preferences (questions 1, 2)**

One measure of resident preferences for fire management is the relative importance respondents assign to the listed fire management objectives (table 8). All but one objective received large majorities of *important* or *very important* responses. Less than half (47%) consider *restore the Park ecosystem to the way it functioned before European settlement* an important fire management objective. Considering this result, it is interesting that more than three-quarters (79%) think that improving conditions for giant sequoia trees is an important objective. There appears to be only a moderate understanding of the relationship between ecosystem restoration and the conditions for Giant Sequoia trees.

**Table 8. Importance of fire management objectives** (% of 527 respondents)

Objective	Important or very important	Undecided	Unimportant or of little importance	Don't know
Notify local residents of fire management actions.	85	2	6	7
Manage fires for minimum smoke in nearby communities	80	3	10	7
Improve conditions for giant sequoia trees	79	5	6	10
Reduce the risk of a catastrophic fire	77	5	10	9
Educate local residents about fire management in the Park	77	4	11	10
Restore the Park ecosystem to the way it functioned before European settlement	47	14	23	17

When asked to choose which fire management objective they consider the most important to them personally, 50% choose *reduce the risk of a catastrophic fire*, and 27% choose *manage fires for minimum smoke in nearby communities* (Figure 3). Only 9% of respondents choose ecosystem restoration as the most important objective.

**Figure 3. Most Important Fire Management Objective**

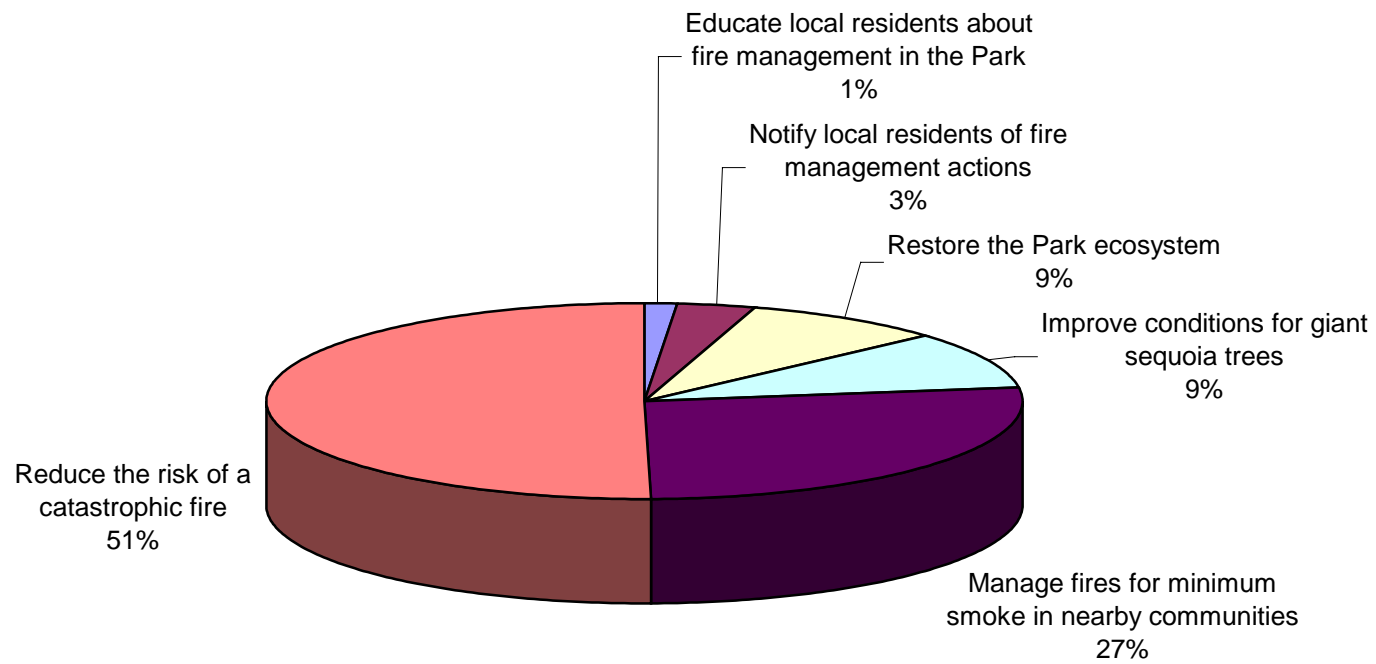
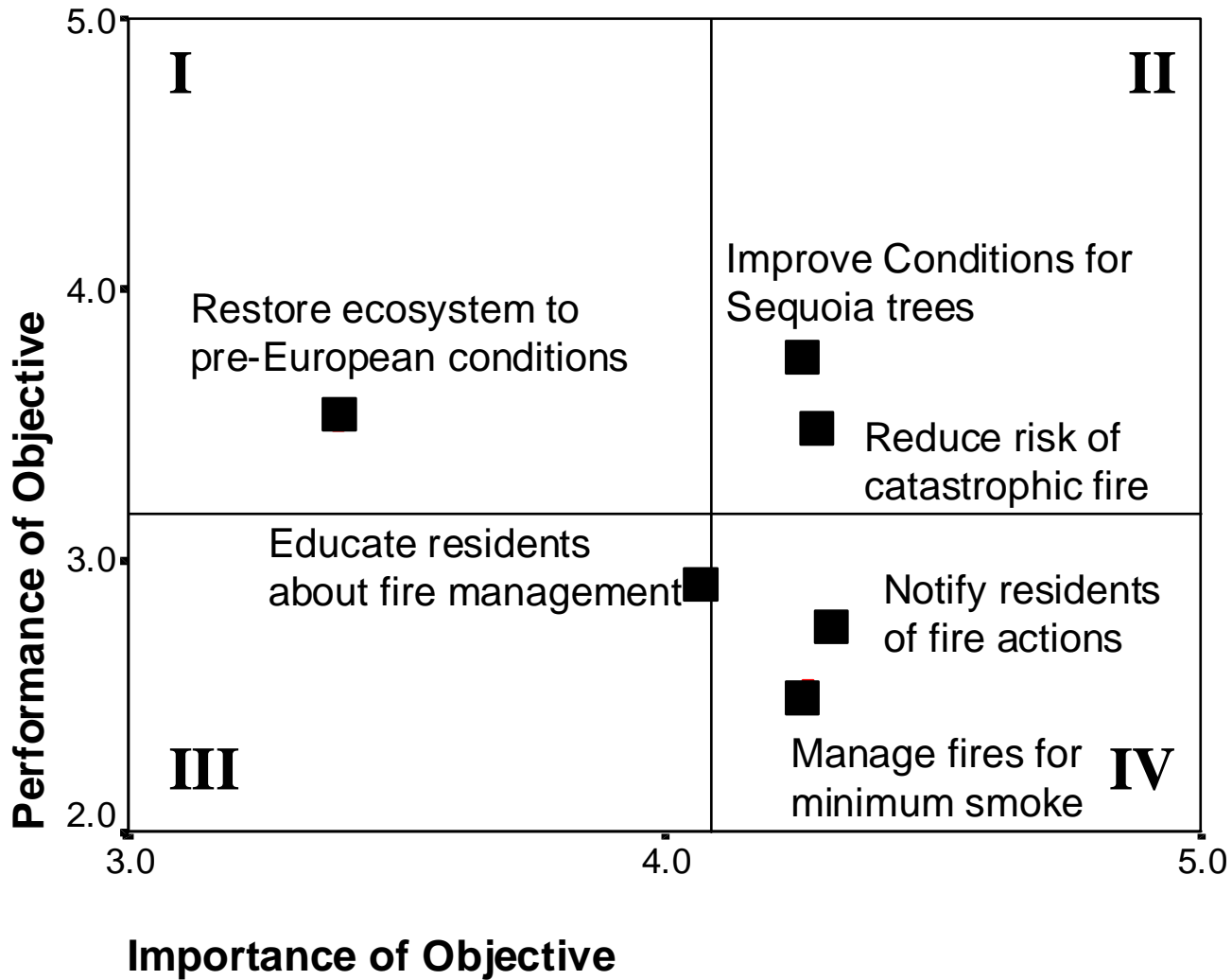




Figure 4. Importance and Performance of Park Service Fire Management Objectives



*Importance – performance analysis of fire management objectives (questions 1,3)*

Respondents were asked to rate, on a five-point scale, the importance of various fire management objectives (Table 8) and to choose the most important items from that list. Next the survey asked participants to rate the Park's accomplishment of those same objectives (on a five-point scale). These data form the basis of an importance-performance coordinate rating system displayed in Figure 4. The average (mean) importance and accomplishment ratings were calculated and plotted on the graph. The lines making up the "crosshairs" represent the average importance of all items (4.09) and the average satisfaction with all items (3.17). Overall, *notify local residents of fire management actions* (4.31) and *manage fires for minimum smoke in nearby communities* (4.27) received the highest importance ratings. *Improve conditions for giant sequoia trees* (3.74) and *reduce the risk of a catastrophic fire* (3.55) received the highest accomplishment ratings.

The importance-performance chart (Figure 4) displays graphically, by quadrant (I – IV), those objectives that respondents rank above average performance, but below average importance (I), above average performance and importance (II), below average performance and importance (III), and below average performance, but above average importance (IV). It is this last quadrant that contains those fire management objectives that planners would consider a priority for action based on public opinion. Among respondents and for this list of items, *notify residents of fire management actions* and *manage fire for smoke in nearby communities* are high priority objectives needing attention. *Educate residents about fire management* falls just outside this quadrant.

### Respondents' final comments (question 33)

Not surprisingly, opinions and suggestions about fire and fire management comprised the vast majority of respondents' final comments. Thirty percent of respondents (n=156) took advantage of the space left at the end of the questionnaire to add their comments in response to this question, "Would you like to tell us anything else?" Almost one-quarter of the respondents (24%) said very little or nothing about fire or fire management (figure 7). These comments included many references to the Park's visitor policies (e.g., entrance fees), and recollections of previous Park experiences.

Comments related to fire are generally categorized as *fire management*, *air quality*, *survey*, *ecosystem*, and *community*. The remainder of this section includes verbatim transcripts of representative comments from each major comment category. Percentages refer to percent of the 156 respondents who included comments in their completed questionnaire.<sup>3</sup> Of those that commented about fire management, and for which it was possible to discern an attitude toward current management practices, 17% expressed a positive attitude and 14% expressed a negative attitude. Examples of positive attitudes:

I think you are doing a fine job w/fire management. I also think three rivers residents complain too much and don't look at the big picture. Keep up the good work.

Any present unpleasantness resulting from prescribed burning would be inconsequential in the face of a catastrophic fire.

Keep up the great work, there will always be a small number of people complaining about control burns.

#### Examples of negative attitudes:

I believe the fire management is totally out of control as are most of the fires they start! Changing names i.e. From "controlled burn" to "prescribed fire" or "out of control" to "pre-suppression" is the kind of politically correct hogwash that is very wrong with America today and finally; as a taxpayer - we can't afford it! Thank you. [*signed – name suppressed*]

If I were in charge there would be no intentional fires. Who is the person that orders fires? He or she should be fired! We pay taxes for firefighters not fire starters. Stop burning intentionally!

Too many "control" burns become "out of control" it makes one skeptical of the whole concept - had to buy air purifiers so we could breathe!

<sup>3</sup> A small number of respondents included lengthy comments on attached pages, or attached articles that represented their views. Due to their length, these were not included in the analysis.

Air quality was a popular comment topic. These comments were dominated by general comments about the health impacts (6%) and nuisance (9%) of smoke, with some comments about visibility impacts (3%) and compliance with air quality standards (2%).

Please let the park know that they need to be honest about the pollution created by prescribed fires. They shouldn't say that smoke from slow-burning fires is more harmful than smoke from natural fires. They shouldn't hide behind the 24 hour average for measure pollution.

Unfortunately we have to leave three rivers due to health problems from the year round air quality. This is not just burns, but pollution backing up against the mountains. I believe this to be more of a problem than smoke from fires in the park. I do not know how to deal with it. I do know we have to leave.

The smoke from the fires aggravates a lung problem I have. Fire in the park should be restricted to days when the smoke will not drift into 3 rivers or any inhabited area.

The largest category of comments about the survey were expressions of positive attitudes and gratitude for being asked about the survey topics (8%), some commented on specific survey design features (6%), a few negative attitudes were expressed (2%) and some respondents asked to receive the survey results (1%).

Appreciate being included in this survey. We've been traveling - sorry this is late!

This is a very well constructed survey - I'd be very interested to learn the results after the data has been compiled. Perhaps in the local paper?

You should have a proofreader check your questionnaire this would eliminate errors such as on pg. 7 referring to question 15 when you obviously meant question 14.

I think this survey is wasted money - it will be like the lake - your group will do what they won't!

Some residents responded strongly to the notion of ecosystem restoration as means to achieve pre-European settlement conditions (5%).

The park can never be "restored to pre-European" - just explain again why we spent 60 years putting out fires (thanks, Smokey) - now we get to spend another 60 years starting them?

Do we feel, or have we assessed the feasibility of restoring the ecosystem to pre-European conditions? This seems to be a truly grand notion, especially below 5000'. And, do we really know what those conditions were in alpine environments that have been browsed?

Within the category of community comments we included those comments that expressed frustration that other residents in the community tend to exaggerate the problems caused by fires (3%), mentioned the need for residents to relocate because of fires (3%), blamed other residents for contributing to smoke problems by open burning on their own properties (2%), and suggested that realtors should inform prospective home buyers of the local fire impacts (1%).

I think you are doing a fine job w/fire management. I also think three rivers residents complain too much and don't look at the big picture. Keep up the good work.

A few extremely vocal residents make a mountain of a molehill.

Burning in three rivers by locals is much worse than most park burns - the burning here should stop first to really see the impact of the park burns.

### Respondents' final comments

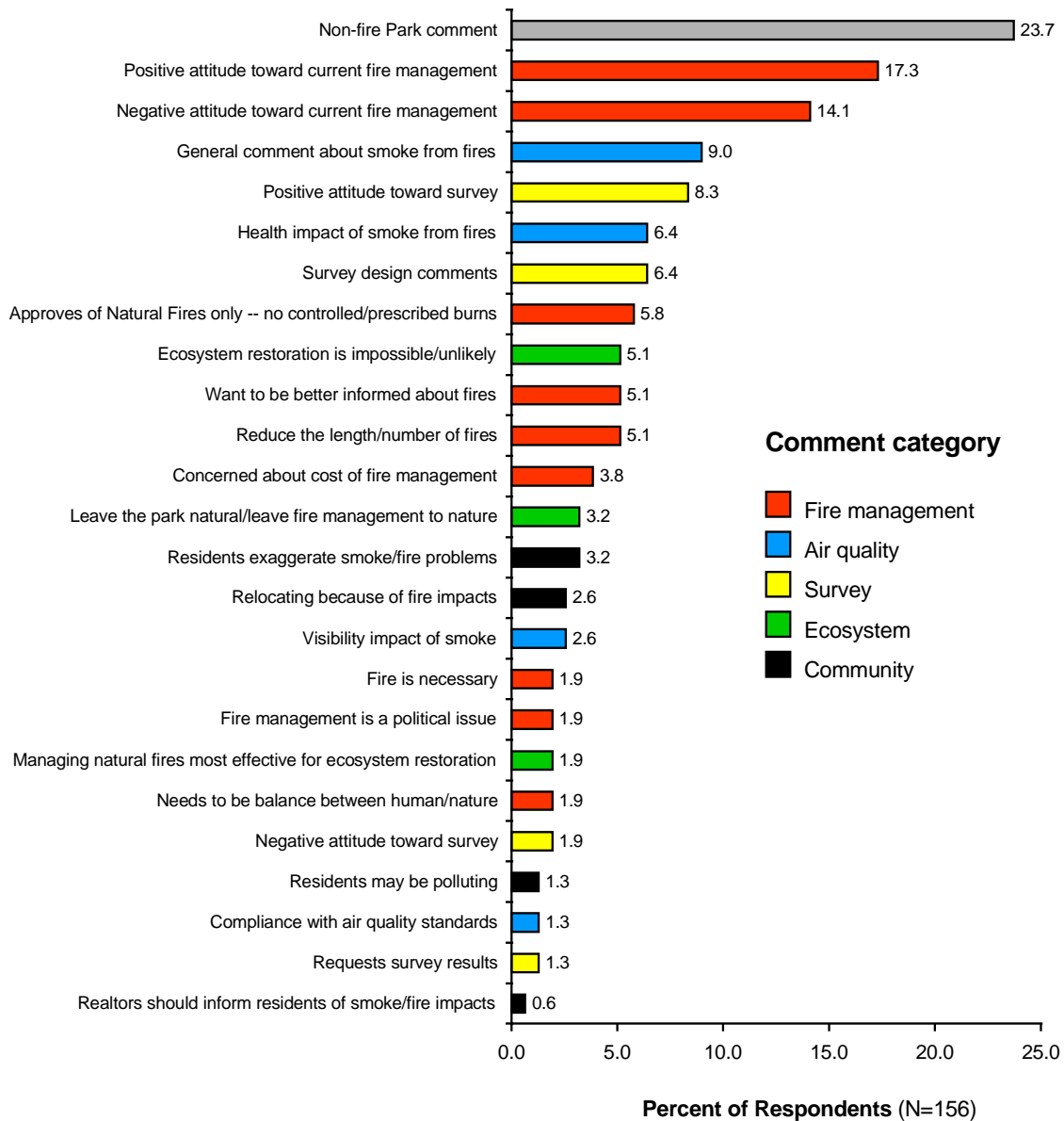


Figure 5. Final fire-related comments (Question 33)

## Fire Management and Park Variables by Demographics

The data presented in this section compare the responses to survey questions between respondent subgroups (demographic characteristics such as gender or smoke sensitivity). The total number of responses shown in the tables of this section are always less than the total number of survey respondents (527) because of non-response (“don’t know” or missing responses) to the survey questions the comparisons are based on.

### Relationship between residents and the Park

#### *Age, education and gender*

Respondents from Park employee households tend to be younger with more formal education than respondents from other households. The mean age of Park employee and non-employee respondents was 52 and 61 years respectively. A higher percentage of respondents from Park employee households completed formal education beyond high school (90%) than those from households not dependent on Park-related business or employment (80%). Males and females from each type of household responded at equal rates. Park employee households tend to be distributed geographically the same as non-employee households (Table 10).

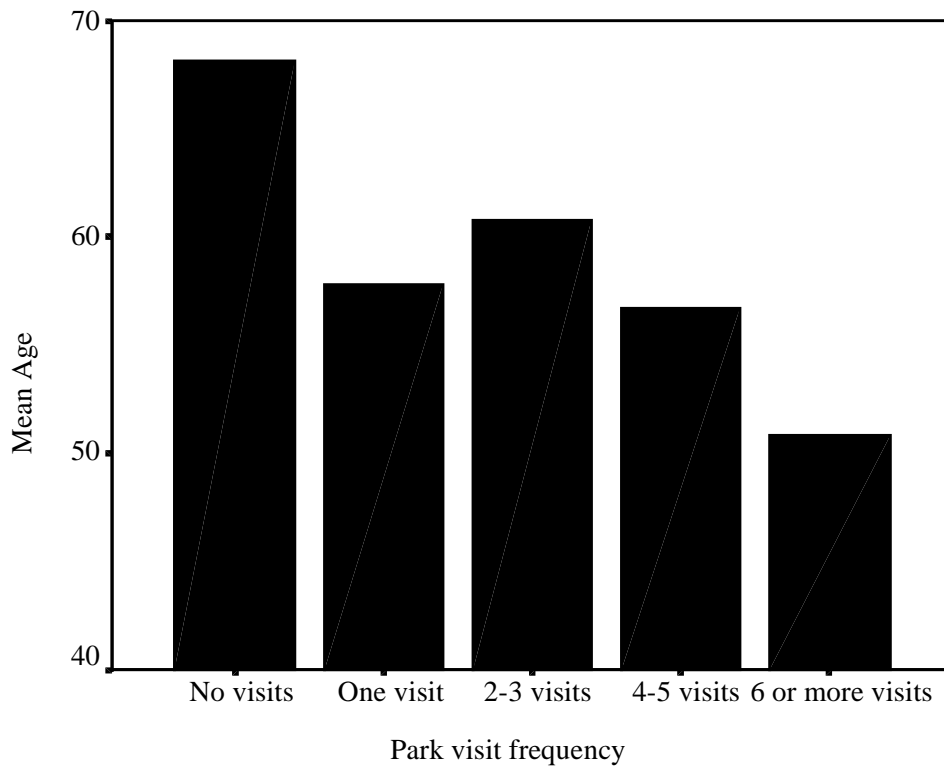
**Table 10. Park Employee Household by Location**

Location	Park employee household (% of Location)			
	NO		YES	
	Percent	Count	Percent	Count
North Fork	<b>79.6</b>	39	<b>20.4</b>	10
South Fork	<b>82.2</b>	111	<b>17.8</b>	24
Middle Fork	<b>76.2</b>	109	<b>23.8</b>	34
East Fork	<b>75.0</b>	18	<b>25.0</b>	6
Other area	<b>75.0</b>	3	<b>25.0</b>	1

*Park Use*

Park use, as measured by number of visits, is primarily related to age (Figure 5). The average age of the most frequent Park visitors (51) is significantly lower than that of non-visitors (68) or less frequent visitors (57 – 60). Park use also appears to be related to education. Frequent visitors tend to have completed more formal education; however, when controlling for age, education has no significant effect on Park use. Residence location and gender have no apparent effect on Park use.

**Figure 5. Park Use by Age**





**Beliefs about the current fire management program**

*Age, education and gender*

Women are more likely to believe that Park fires have large or severe effects on the Three Rivers community. Respiratory problems and stress are the effects that demonstrate this difference most dramatically (Table 11). About half of the female respondents believe that Park fires have a large or severe effect on these problems compared to about a third of the male respondents.

**Table 11. Magnitude of Community Effects by Gender**

Local Community Effect	Large or severe Effect (% of gender)			
	Males		Females	
	Percent	Count	Percent	Count
Reduce local wildfire risks	<b>43.6</b>	105	<b>47.8</b>	85
Cause respiratory problems among local residents *	<b>31.9</b>	79	<b>46.2</b>	96
Causes stress among local residents *	<b>35.8</b>	63	<b>51.8</b>	73
Cause a decrease in tourism *	<b>23.0</b>	55	<b>31.0</b>	58
Allows visitors to see natural ecosystem process	<b>25.2</b>	54	<b>28.0</b>	45
Create inconvenience due to road closures *	<b>14.0</b>	34	<b>18.1</b>	36
Reduce access to Park	<b>13.4</b>	32	<b>18.5</b>	37
Keeps friends and relatives from visiting	<b>13.7</b>	24	<b>15.8</b>	23

\* Statistically significant (p<.1)

Age is also related to residents' perception of the how much Park fires affect the community. Older respondents tend to believe the effect of Park fires is relatively small. This relationship is most evident in the highest age group (71 years and greater). For example, 26% of this age group believe that Park fires have a large or severe effect on *causing respiratory problems in the community*; significantly higher percentages of those in the lower age groups believe the effects to be large or severe (36% - 42%). A similar pattern of response was seen for all of the local effects except *causing a decrease in tourism*.

### *Residence Time*

Compared to shorter-term residents, long-time residents tend to believe that the negative effects of Park fires are relatively large and the positive effects are relatively small. This is surprising given the strong correlation between residence time and age, and the nearly opposite response pattern observed when analyzing responses by age. For example, 44-54% of respondents in the two highest age groups believed that Park fires have a large or severe effect on causing stress in the Community. This is substantially higher than the 36-39% of respondents in the lowest age groups that responded similarly. Only 35-37% of the older respondents believed that Park fires have a large effect on reducing local wildfire risks compared to 47-63% of younger respondents that believed the same thing.

### *Smoke Sensitivity*

Smoke sensitivity as measured by long-term personal experience starkly separates residents' perceptions of fire effects on the community. Respondents who had *ever experienced discomfort related to smoke from Park fires at their homes* also emphasized the negative effects of Park fires compared to all other respondents (table 12). More than half (55%) of these smoke sufferers believe that fires have large or severe effects on causing respiratory problems among local residents compared to only 8% of respondents with no such experience. The proportions are similar for *causing stress among local residents*. A relatively large proportion of this group also believe that Park fires have a large or severe effect on those items that were apparently of little concern to the rest of the respondents: *inconvenience due to road closures, reduced access to the Park* and *keeps friends and relatives from visiting*.

The relationship between smoke sensitivity and perceived magnitude of fire effects can be seen when comparing respondents from households with respiratory ailments to respondents from households without such ailments. This relationship is consistent but not pronounced except for *causing respiratory problems among local residents*. Almost half of respiratory ailment households (46%) responded that Park fires have a large or severe effect on *causing respiratory ailments among local residents*, but only 29% of the other households believe that this effect of Park fires is so strong.

**Table 12. Magnitude of Community Effects by Smoke Sensitivity**

Local Community Effect	Large or severe Effect (% of respondent type)			
	Experienced discomfort		Did not experience discomfort	
	Percent	Count	Percent	Count
Reduce local wildfire risks*	<b>33.5</b>	82	<b>62.9</b>	100
Cause respiratory problems among local residents *	<b>54.9</b>	158	<b>7.7</b>	12
Causes stress among local residents *	<b>58.3</b>	116	<b>15.1</b>	16
Cause a decrease in tourism *	<b>36.7</b>	94	<b>10.5</b>	16
Allows visitors to see natural ecosystem process	<b>22.1</b>	50	<b>29.3</b>	41
Create inconvenience due to road closures *	<b>22.1</b>	58	<b>5.5</b>	9
Reduce access to Park*	<b>23.1</b>	60	<b>3.6</b>	6
Keeps friends and relatives from visiting*	<b>24.2</b>	47	<b>0.9</b>	1

\* Statistically significant (p<.1)

*Park Employment*

Respondents from *current or former Park employee households* are more likely to believe that Park fires have larger positive effects and smaller negative effects on Three Rivers (table 13). Only 20% of households without current or former park employees believe that Park fires have a large effect on allowing visitors to see a natural ecosystem process compared to 43% of current or former Park employee households. However, the Park employee households are less likely to believe that Park fires have a large or severe effect on causing respiratory problems (27%) than the non-park employee households (41%). This pattern holds for all of the Park fire effects except causing stress among local residents. Both household groups agree on the magnitude of this Park fire effect.

*Park Use*

*Frequent Park visitors* are also more likely to believe that Park fires have a large effect on allowing visitors to see natural ecosystem processes and tend to believe some of the negative effects of Park fires are relatively small. This response pattern was observed for the following effects: *decrease tourism, road closure inconvenience, and reduced Park access*

**Table 13. Magnitude of Community Effects by Current or Former Park Employee Household**

Local Community Effect	Large or severe Effect (% of household category)			
	Park Employee Household		All Other Households	
	Percent	Count	Percent	Count
Reduce local wildfire risks *	<b>56.6</b>	60	<b>41.5</b>	127
Cause respiratory problems among local residents *	<b>26.9</b>	29	<b>41.3</b>	140
Causes stress among local residents	<b>41.6</b>	32	<b>44.0</b>	102
Cause a decrease in tourism *	<b>15.4</b>	26	<b>28.2</b>	87
Allows visitors to see natural ecosystem process *	<b>43.3</b>	45	<b>20.3</b>	54
Create inconvenience due to road closures *	<b>8.3</b>	9	<b>17.2</b>	56
Reduce access to Park *	<b>5.5</b>	6	<b>17.7</b>	57
Keeps friends and relatives from visiting *	<b>9.1</b>	7	<b>16.6</b>	40

\* Statistically significant (p<.1)

*Location*

Where respondents live is related to residents’ perceived magnitude of three Park fire effects on the community (table 14). *Middle Fork* households are the most likely to believe that Park fires have large or severe effects on *tourism* (34%) and *keeping friends and relatives from visiting* (19%). *North Fork* respondents are the most likely to believe that Park fires result in *inconvenience due to road closures* (28%).

**Table 14. Magnitude of Community Effects by Household Location**

Local Community Effect	Large or severe Effect (% of location)					
	North Fork		South Fork		Middle Fork	
	Percent	Count	Percent	Count	Percent	Count
Reduce local wildfire risks	<b>47.8</b>	22	<b>46.4</b>	52	<b>38.9</b>	49
Cause respiratory problems among local residents	<b>42.9</b>	21	<b>37.3</b>	47	<b>39.3</b>	55
Causes stress among local residents	<b>44.4</b>	20	<b>40.8</b>	40	<b>42.7</b>	56
Cause a decrease in tourism *	<b>28.9</b>	13	<b>20.0</b>	23	<b>33.6</b>	45
Allows visitors to see natural ecosystem process	<b>16.7</b>	7	<b>21.8</b>	22	<b>27.6</b>	32
Create inconvenience due to road closures *	<b>27.7</b>	13	<b>12.0</b>	14	<b>15.7</b>	22
Reduce access to Park	<b>20.5</b>	9	<b>11.9</b>	14	<b>20.4</b>	28
Keeps friends and relatives from visiting *	<b>8.7</b>	4	<b>9.9</b>	10	<b>19.0</b>	24

\* Statistically significant (p<.1)

<sup>a</sup> East Fork and Other area are not included due to the small number of responses for those areas

Education affects only two beliefs about Park fire effects on the community: *causing stress* and *keeping friends and relatives from visiting*. The likelihood that residents believe these two effects of Park fires are large or severe increases with level of formal education (table 15).

**Table 15. Magnitude of Community Effects by Education**

Local Community Effect	Large or severe Effect (% of education level)					
	High School or less		Undergraduate College (some or completed)		Graduate College (some or completed)	
	Percent	Count	Percent	Count	Percent	Count
Reduce local wildfire risks	<b>50.0</b>	31	<b>46.7</b>	100	<b>45.7</b>	53
Cause respiratory problems among local residents	<b>32.4</b>	22	<b>35.3</b>	82	<b>43.8</b>	56
Causes stress among local residents *	<b>25.0</b>	12	<b>43.6</b>	71	<b>51.7</b>	46
Cause a decrease in tourism	<b>14.8</b>	9	<b>27.5</b>	60	<b>26.5</b>	31
Allows visitors to see natural ecosystem process	<b>26.1</b>	12	<b>28.0</b>	56	<b>25.7</b>	28
Create inconvenience due to road closures	<b>11.4</b>	8	<b>16.7</b>	37	<b>12.7</b>	16
Reduce access to Park	<b>10.9</b>	7	<b>16.7</b>	38	<b>15.2</b>	19
Keeps friends and relatives from visiting *	<b>6.0</b>	3	<b>12.7</b>	21	<b>24.7</b>	22

\* Statistically significant (p<.1)

## Knowledge of regional fire management history

### *Age, education and gender*

Age, education and gender are not related to respondents' knowledge of fire history as measured by their recall of specific fire-related events. The only exception to these observations is that female respondents are more likely (62%) than males (47%) to believe that *all or almost all* fires over the last 12 months were *ignited by Park staff*.

### *Residence Time*

How long a respondent has lived in Three Rivers is related to his or her recollections of recent fire history for two of the events investigated in the survey. Longer-term residents are more likely to say, *smoke bothered me at my home* and *smoke violated air quality standards*

during *all or almost all* recent fires. This response pattern for these two events ranged from 20% for *1-6 year* residents to 32% for *25 year and greater* residents for the former event, and from 33% among *1-6 year* residents to 49% for *25 year and greater* residents for the latter.

#### *Park Use*

Park use does not affect respondents responses to questions about recent fire management history.

#### *Location*

Respondent household location has no significant effect on knowledge of recent fire management history.

#### *Smoke Sensitivity*

Smoke discomfort experience is strongly related to respondents' recall of fire-related events (table 16). Residents who had *ever experienced discomfort from smoke* are 10 times more likely to report that *smoke bothered them at their homes* during *all or almost all* fires that occurred over the last 12 months (41%) compared to other residents (4%). They are also far more likely to believe that smoke from Park fires violated air quality standards during *all or almost all* fires for the same 12-month period (55%) compared to other respondents (8%). Only about one quarter (24%) of smoke sufferers report that *the Park provided adequate notification about fires to local residents* for all or almost all fires compared to 44% for other respondents. These residents are also more likely to believe that recent fires were all or almost all ignited by Park staff (57% versus 46% for other residents). This measure of smoke sensitivity was unrelated to respondents' beliefs about local decisionmaking; over 85% of both groups believe that *decisions on how to manage fire were made by local Park officials*.

**Table 16. Frequency of fire related events by discomfort experience**

Fire event	Ever experienced discomfort from Park fires (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
Fire was ignited by Park staff *				
All or almost all	<b>45.6</b>	52	<b>57.1</b>	108
About half	<b>22.8</b>	26	<b>23.3</b>	44
Only some or none	<b>31.6</b>	36	<b>19.6</b>	37
Smoke bothered me at my home (last 12 months) *				
All or almost all	<b>4.0</b>	7	<b>41.1</b>	120
About half	<b>6.9</b>	12	<b>15.8</b>	46
Only some or none	<b>89.0</b>	154	<b>43.2</b>	126
The Park provided adequate notification *				
All or almost all	<b>43.6</b>	61	<b>24.2</b>	57
About half	<b>17.9</b>	25	<b>12.3</b>	29
Only some or none	<b>38.6</b>	54	<b>63.6</b>	150
Smoke violated air quality standards *				
All or almost all	<b>7.9</b>	9	<b>55.3</b>	131
About half	<b>19.3</b>	22	<b>24.1</b>	57
Only some or none	<b>72.8</b>	83	<b>20.7</b>	49
The decisions were made by local Park officials				
All or almost all	<b>89.5</b>	77	<b>86.8</b>	112
About half	<b>5.8</b>	5	<b>7.0</b>	9
Only some or none	<b>4.7</b>	4	<b>6.2</b>	8

\* Statistically significant (p<.1)

Measured another way, smoke sensitivity affects knowledge of fire management history similarly but less profoundly. Respondents from households, which include at least one member with a respiratory ailment, reported that smoke bothered them at home and that it violated air quality standards during *all or almost all* recent fires in greater proportions than did all other respondents (table 17). These residents were slightly less likely to report that Local Park officials made fire management decisions.

**Table 17. Frequency of fire related events by respiratory ailment household**

Fire event	Respiratory ailment in household (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
<b>Fire was ignited by Park staff</b>				
All or almost all	<b>50.3</b>	83	<b>55.7</b>	68
About half	<b>23.6</b>	39	<b>22.1</b>	27
Only some or none	<b>26.1</b>	43	<b>22.1</b>	27
<b>Smoke bothered me at my home *</b>				
All or almost all	<b>18.7</b>	45	<b>32.5</b>	63
About half	<b>12.0</b>	29	<b>13.9</b>	27
Only some or none	<b>69.3</b>	167	<b>53.6</b>	104
<b>The Park provided adequate notification</b>				
All or almost all	<b>34.4</b>	66	<b>30.2</b>	48
About half	<b>17.2</b>	33	<b>13.8</b>	22
Only some or none	<b>48.4</b>	93	<b>56.0</b>	89
<b>Smoke violated air quality standards *</b>				
All or almost all	<b>31.0</b>	57	<b>45.8</b>	70
About half	<b>23.4</b>	43	<b>20.9</b>	32
Only some or none	<b>45.7</b>	84	<b>33.3</b>	51
<b>The decisions were made by local Park officials *</b>				
All or almost all	<b>93.3</b>	112	<b>83.1</b>	69
About half	<b>4.2</b>	5	<b>8.4</b>	7
Only some or none	<b>2.5</b>	3	<b>8.4</b>	7

\* Statistically significant (p<.1)

*Park Employment*

Respondents report the frequency of recent fire-related events very differently from Park employee households than all other households. Park employee household residents are only half as likely as other households to report, *smoke bothered me at my home* during *all or almost all* recent fires, and twice as likely to report that *smoke from Park fires violated air quality standards* during *only some or none* of the recent fires (table 18). This group of residents is also twice as likely to believe that the Park provided adequate notification about fires to local



residents. However, it should be pointed out that only slightly more than half of this group – which appears to be the subgroup with the most favorable opinions of the Park’s fire management program – responded in this way.

**Table 18. Frequency of fire related events by Park employee household**

Fire event	Current or former Park employee in household (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
Fire was ignited by Park staff *				
All or almost all	<b>57</b>	122	<b>45.1</b>	37
About half	<b>22</b>	47	<b>22</b>	18
Only some or none	<b>21</b>	45	<b>32.9</b>	27
Smoke bothered me at my home *				
All or almost all	<b>29.5</b>	104	<b>14.8</b>	16
About half	<b>13.6</b>	48	<b>6.5</b>	7
Only some or none	<b>56.8</b>	200	<b>78.7</b>	85
The Park provided adequate notification *				
All or almost all	<b>23.1</b>	64	<b>55.9</b>	52
About half	<b>16.2</b>	45	<b>10.8</b>	10
Only some or none	<b>60.6</b>	168	<b>33.3</b>	31
Smoke violated air quality standards *				
All or almost all	<b>42.9</b>	118	<b>26.0</b>	19
About half	<b>24.7</b>	68	<b>12.3</b>	9
Only some or none	<b>32.4</b>	89	<b>61.6</b>	45
The decisions were made by local Park officials				
All or almost all	<b>85.1</b>	114	<b>94.7</b>	71
About half	<b>8.2</b>	11	<b>2.7</b>	2
Only some or none	<b>6.7</b>	9	<b>2.7</b>	2

\* Statistically significant (p<.1)

## Accomplishments of Fire Management Objectives

### *Age, education and gender*

Education exhibits a modest effect on respondents' ratings of fire management accomplishments. Residents with less formal education give the Park the highest marks for *reducing the risk of a catastrophic fire, managing fires for minimum smoke and educating local residents about fire management in the Park* (table 19). The Park received poor-to-average ratings for education of local residents about fire management actions. The lowest rating came from those who had graduate college education. Over 50% of those with undergraduate college education rated the *management of fires for minimum smoke in nearby communities poor or very poor*.

Age and gender do not affect residents' ratings of the Park's fire management accomplishments.

### *Residence Time*

Long-term residents are more critical of the Park's fire management program. Newcomers are more likely to rate the Park's accomplishments *good or very good* for all of the listed fire management objectives (table 20). This is most evident for responses to *manage fires for minimum smoke in nearby communities*. Newcomers (1-6 years) are twice as likely to rate the Park's accomplishment good or very good for this objective (31%) compared to those who have lived in Three Rivers for 25 years or more (16%).

### *Location*

Location of respondent households does not affect ratings of the Park's fire management accomplishments.

**Table 19. Accomplishment of fire management objective by education**

Fire Management Objective	Level of education (% of education group)					
	High school or less		Undergraduate college		Graduate college	
	Percent	Count	Percent	Count	Percent	Count
Improve conditions for giant sequoia trees *						
Poor or very poor	<b>3.5</b>	2	<b>12.2</b>	23	<b>6.7</b>	7
Average	<b>15.8</b>	9	<b>18.5</b>	35	<b>18.1</b>	19
Good or very good	<b>80.7</b>	46	<b>69.3</b>	131	<b>75.2</b>	79
Reduce the risk of a catastrophic fire *						
Poor or very poor	<b>8.1</b>	5	<b>17.5</b>	35	<b>16.7</b>	17
Average	<b>22.6</b>	14	<b>20.0</b>	40	<b>28.4</b>	29
Good or very good	<b>69.4</b>	43	<b>62.5</b>	125	<b>54.9</b>	56
Improve the health of the Park's forests						
Poor or very poor	<b>7.3</b>	4	<b>18.3</b>	34	<b>15.1</b>	16
Average	<b>20.0</b>	11	<b>23.1</b>	43	<b>28.3</b>	30
Good or very good	<b>72.7</b>	40	<b>58.6</b>	109	<b>56.6</b>	60
Educate local residents about fire management in the Parks *						
Poor or very poor	<b>25.0</b>	15	<b>35.6</b>	77	<b>34.2</b>	41
Average	<b>35.0</b>	21	<b>33.8</b>	73	<b>40.8</b>	49
Good or very good	<b>40.0</b>	24	<b>30.6</b>	66	<b>25.0</b>	30
Notify local residents of fire management actions *						
Poor or very poor	<b>29.3</b>	17	<b>42.1</b>	90	<b>38.1</b>	48
Average	<b>32.8</b>	19	<b>28.0</b>	60	<b>33.3</b>	42
Good or very good	<b>37.9</b>	22	<b>29.9</b>	64	<b>28.6</b>	36
Manage fires for minimum smoke in nearby communities *						
Poor or very poor	<b>25.8</b>	16	<b>50.9</b>	113	<b>47.5</b>	56
Average	<b>33.9</b>	21	<b>28.8</b>	64	<b>29.7</b>	35
Good or very good	<b>40.3</b>	25	<b>20.3</b>	45	<b>22.6</b>	27

\* Statistically significant (p<.1)

**Table 20. Accomplishment of fire management objective by residence time**

Fire Management Objective	Length of time in Three Rivers (% of residence time group)							
	1-6 years		7-13 years		14-24 years		25 years or more	
	Percent	Count	Percent	Count	Percent	Count	Percent	Count
Improve conditions for giant sequoia trees *								
Poor or very poor	<b>6.0</b>	5	<b>8.7</b>	9	<b>9.2</b>	8	<b>16.3</b>	15
Average	<b>18.1</b>	15	<b>20.2</b>	21	<b>14.9</b>	13	<b>18.5</b>	17
Good or very good	<b>75.9</b>	63	<b>71.2</b>	74	<b>75.9</b>	66	<b>65.2</b>	60
Reduce the risk of a catastrophic fire *								
Poor or very poor	<b>11.1</b>	9	<b>13.8</b>	15	<b>15.8</b>	15	<b>25.8</b>	24
Average	<b>22.2</b>	18	<b>22.9</b>	25	<b>28.4</b>	27	<b>21.5</b>	20
Good or very good	<b>66.7</b>	54	<b>63.3</b>	69	<b>55.8</b>	53	<b>52.7</b>	49
Improve the health of the Park's forests								
Poor or very poor	<b>8.9</b>	7	<b>17.0</b>	18	<b>13.8</b>	12	<b>22.5</b>	20
Average	<b>25.3</b>	20	<b>28.3</b>	30	<b>25.3</b>	22	<b>19.1</b>	17
Good or very good	<b>65.8</b>	52	<b>54.7</b>	58	<b>60.9</b>	53	<b>58.4</b>	52
Educate local residents about fire management in the Parks *								
Poor or very poor	<b>30.1</b>	28	<b>34.1</b>	42	<b>34.3</b>	35	<b>47.5</b>	47
Average	<b>35.5</b>	33	<b>34.1</b>	42	<b>36.3</b>	37	<b>34.3</b>	34
Good or very good	<b>34.4</b>	32	<b>31.7</b>	39	<b>29.4</b>	30	<b>18.2</b>	18
Notify local residents of fire management actions *								
Poor or very poor	<b>37.6</b>	35	<b>41.3</b>	52	<b>35.9</b>	37	<b>53.0</b>	53
Average	<b>26.9</b>	25	<b>28.6</b>	36	<b>35.9</b>	37	<b>25.0</b>	25
Good or very good	<b>35.5</b>	33	<b>30.2</b>	38	<b>28.2</b>	29	<b>22.0</b>	22
Manage fires for minimum smoke in nearby communities *								
Poor or very poor	<b>33.7</b>	29	<b>48.0</b>	61	<b>48.6</b>	54	<b>57.7</b>	56
Average	<b>34.9</b>	30	<b>29.1</b>	37	<b>31.5</b>	35	<b>25.8</b>	25
Good or very good	<b>31.4</b>	27	<b>22.8</b>	29	<b>19.8</b>	22	<b>16.5</b>	16

\* Statistically significant (p<.1)

*Smoke Sensitivity*

Smoke sensitivity has a pronounced effect on respondents' ratings of the Park's fire management accomplishments. Those who have ever experienced discomfort from smoke are much more likely to give lower ratings for all fire management objectives except, *improve the health of the Park's forests* (table 21). Compared to those who have not experienced discomfort,

smoke sufferers are four times more likely to believe that the Park has performed *poor or very poor* at *reducing the risk of a catastrophic fire and managing fires for minimum smoke in nearby communities*; and they are twice as likely to believe that the Park has performed *poor or very poor* at *notifying local residents of fire management actions*. To a lesser extent, smoke sufferers are also critical of the Park’s performance in the areas of *educating local residents about fire management and improving conditions for giant sequoia trees*.

**Table 21. Accomplishment of fire management objective by discomfort experience**

Fire Management Objective	Ever experienced discomfort from Park fires (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
Improve conditions for giant sequoia trees *				
Poor or very poor	<b>3.4</b>	5	<b>14.7</b>	33
Average	<b>13.8</b>	20	<b>22.3</b>	50
Good or very good	<b>82.8</b>	120	<b>62.9</b>	141
Reduce the risk of a catastrophic fire *				
Poor or very poor	<b>6.6</b>	10	<b>23.8</b>	54
Average	<b>20.4</b>	31	<b>26.4</b>	60
Good or very good	<b>73.0</b>	111	<b>49.8</b>	113
Improve the health of the Park’s forests				
Poor or very poor	<b>8.1</b>	12	<b>20.8</b>	46
Average	<b>23.0</b>	34	<b>27.6</b>	61
Good or very good	<b>68.9</b>	102	<b>51.6</b>	114
Educate local residents about fire management in the Parks *				
Poor or very poor	<b>26.1</b>	41	<b>42.5</b>	113
Average	<b>36.9</b>	58	<b>33.5</b>	89
Good or very good	<b>36.9</b>	58	<b>24.1</b>	64
Notify local residents of fire management actions *				
Poor or very poor	<b>26.0</b>	40	<b>51.6</b>	141
Average	<b>31.8</b>	49	<b>27.1</b>	74
Good or very good	<b>42.2</b>	65	<b>21.2</b>	58
Manage fires for minimum smoke in nearby communities *				
Poor or very poor	<b>16.7</b>	25	<b>65.7</b>	182
Average	<b>38.0</b>	57	<b>24.5</b>	68
Good or very good	<b>45.3</b>	68	<b>9.7</b>	27

\* Statistically significant (p<.1)

The effect of living in a household with respiratory ailments had a similar, but attenuated effect on respondents' ratings of the Park's fire management accomplishments (table 22). The effects are significant for ratings of the following objectives: *improve conditions for giant sequoia trees, reduce the risk of a catastrophic fire and manage fires for minimum smoke in nearby communities.*

**Table 22. Accomplishment of fire management objective by respiratory ailment household**

Fire Management Objective	Respiratory ailment in household (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
<b>Improve conditions for giant sequoia trees *</b>				
Poor or very poor	<b>6.3</b>	13	<b>14.1</b>	21
Average	<b>18.8</b>	39	<b>16.8</b>	25
Good or very good	<b>74.9</b>	155	<b>69.1</b>	103
<b>Reduce the risk of a catastrophic fire *</b>				
Poor or very poor	<b>14.4</b>	30	<b>17.5</b>	27
Average	<b>23.9</b>	50	<b>24.7</b>	38
Good or very good	<b>61.7</b>	129	<b>57.8</b>	89
<b>Improve the health of the Park's forests</b>				
Poor or very poor	<b>14.5</b>	24	<b>16.4</b>	24
Average	<b>22.2</b>	43	<b>29.5</b>	43
Good or very good	<b>63.3</b>	79	<b>54.1</b>	79
<b>Educate local residents about fire management in the Parks</b>				
Poor or very poor	<b>33.0</b>	74	<b>36.2</b>	64
Average	<b>37.1</b>	83	<b>35.6</b>	63
Good or very good	<b>29.9</b>	67	<b>28.2</b>	50
<b>Notify local residents of fire management actions</b>				
Poor or very poor	<b>36.8</b>	84	<b>45.7</b>	80
Average	<b>29.8</b>	68	<b>29.1</b>	51
Good or very good	<b>33.3</b>	76	<b>25.1</b>	44
<b>Manage fires for minimum smoke in nearby communities *</b>				
Poor or very poor	<b>40.7</b>	92	<b>57.1</b>	101
Average	<b>32.7</b>	74	<b>24.3</b>	43
Good or very good	<b>26.5</b>	60	<b>18.6</b>	33

\* Statistically significant (p<.1)

### *Park Use*

Park use does not affect ratings of the Park's fire management accomplishments.

### *Park Employment*

Park employee households gave the Park relatively high ratings for its effort to *educate local residents about fire management* and for *notifying local residents of fire management actions*. For all other fire management objectives, these respondents rated the Park's accomplishments approximately equal to all other households.

## **Understanding of fire-adapted ecosystems**

### *Age, education and gender*

Age has only a modest differentiating effect on understanding of fire-adapted ecosystems. Older respondents are more likely to agree that *the Park should suppress all fires because smoke is bad for the community*. Only 8% of the youngest half of respondents (less than 61 years old) expressed this opinion compared to 17-18% for older respondents (61 years old and greater).

Males and females share opinions and knowledge closely and both sexes possess a high degree of understanding of the role of fire in the Park's ecosystem.

Education does not have a strong bearing on knowledge of fire-adapted ecosystems; however, respondents with less formal education are more likely to agree that *the Park should suppress all fires because smoke is bad for the community*.

### *Residence Time*

Newcomers to Three Rivers agree in greater proportions that *restoring natural ecosystem processes should be the Park's highest priority* and that *to restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions* (table 23).

They are slightly less likely to agree that *giant sequoia trees can survive severe fires*, and slightly more likely to agree that *one way to prevent big fires is to ignite small fires*.

**Table 23. Understanding of fire by residence time**

Fire Management Concept	Length of time in Three Rivers (% of residence time group)							
	1-6 years		7-13 years		14-24 years		25 years or more	
	Percent	Count	Percent	Count	Percent	Count	Percent	Count
One way to prevent big fires is to ignite small fires.*								
Agree	<b>85.3</b>	81	<b>72.4</b>	92	<b>70.8</b>	75	<b>72.4</b>	71
Neither agree nor disagree	<b>10.5</b>	10	<b>13.4</b>	17	<b>12.3</b>	13	<b>10.2</b>	10
Disagree	<b>4.2</b>	4	<b>14.2</b>	18	<b>17.0</b>	18	<b>17.3</b>	17
Giant Sequoia trees can survive severe fires.*								
Agree	<b>67.8</b>	61	<b>67.5</b>	79	<b>74.7</b>	74	<b>78.9</b>	75
Neither agree nor disagree	<b>11.1</b>	10	<b>10.3</b>	12	<b>7.1</b>	7	<b>6.3</b>	6
Disagree	<b>21.1</b>	19	<b>22.2</b>	26	<b>18.2</b>	18	<b>14.7</b>	14
The Park should let all lightning caused fires burn unless they threaten lives and private property.								
Agree	<b>67.7</b>	67	<b>59.2</b>	77	<b>61.7</b>	66	<b>67.6</b>	71
Neither agree nor disagree	<b>9.1</b>	9	<b>13.8</b>	18	<b>13.1</b>	14	<b>12.4</b>	13
Disagree	<b>23.2</b>	23	<b>26.9</b>	35	<b>25.2</b>	27	<b>20.0</b>	21
Managing lightning fires and lighting prescribed fires are the best ways to meet the Park's fire management objectives.								
Agree	<b>73.5</b>	61	<b>63.2</b>	72	<b>64.9</b>	63	<b>69.5</b>	73
Neither agree nor disagree	<b>15.7</b>	13	<b>14.0</b>	16	<b>12.4</b>	12	<b>8.6</b>	9
Disagree	<b>10.8</b>	9	<b>22.8</b>	26	<b>22.7</b>	22	<b>21.9</b>	23
To restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions.*								
Agree	<b>75.3</b>	70	<b>59.7</b>	74	<b>51.4</b>	54	<b>61.0</b>	61
Neither agree nor disagree	<b>10.8</b>	10	<b>14.5</b>	18	<b>19.0</b>	20	<b>9.0</b>	9
Disagree	<b>14.0</b>	13	<b>25.8</b>	32	<b>29.5</b>	31	<b>30.0</b>	30
Restoring natural ecosystem processes should be the Park's highest priority.*								
Agree	<b>71.3</b>	72	<b>52.3</b>	67	<b>50.5</b>	53	<b>51.0</b>	52
Neither agree nor disagree	<b>12.9</b>	13	<b>22.7</b>	29	<b>21.0</b>	22	<b>21.6</b>	22
Disagree	<b>15.8</b>	16	<b>25.0</b>	32	<b>28.6</b>	30	<b>27.5</b>	28



**Table 23. Understanding of fire by residence time** (continued)

Fire Management Concept	Length of time in Three Rivers (% of residence time group)							
	1-6 years		7-13 years		14-24 years		25 years or more	
	Percent	Count	Percent	Count	Percent	Count	Percent	Count
If the Park would time fires later in the year, there would be more smoke in Three Rivers.								
Agree	<b>45.3</b>	24	<b>40.7</b>	24	<b>43.1</b>	28	<b>46.3</b>	31
Neither agree nor disagree	<b>28.3</b>	15	<b>23.7</b>	14	<b>30.8</b>	20	<b>17.9</b>	12
Disagree	<b>26.4</b>	14	<b>35.6</b>	21	<b>26.2</b>	17	<b>35.8</b>	24
The Park should suppress all fires because smoke is bad for the community.								
Agree	<b>7.7</b>	8	<b>14.1</b>	19	<b>16.5</b>	18	<b>11.5</b>	12
Neither agree nor disagree	<b>10.6</b>	11	<b>13.3</b>	18	<b>11.0</b>	12	<b>13.5</b>	14
Disagree	<b>81.7</b>	85	<b>72.6</b>	98	<b>72.5</b>	79	<b>75.0</b>	78

\* Statistically significant (p<.1)

*Location*

Location of residence does not have a strong differential influence on people’s understanding of fire-adapted ecosystems.

*Smoke Sensitivity*

Respondents who have *ever experienced discomfort from Park fires* have very different views of the Park’s management of the fire-adapted ecosystem (table 24). These residents are more likely to disagree *that restoring natural ecosystem processes should be the Park’s highest priority*, and they are three times more likely to disagree *that to restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions*.

Most of the respondents, regardless of their experiences with Park fires disagree that the Park should suppress all fires because of the smoke they cause. However, those who have experienced smoke discomfort are five time more likely to agree that *the Park should suppress all fires because smoke is bad for the community*. Only 66% of respondents who experienced

discomfort related to smoke from Park fires at their homes agree with the practice of *igniting small fires to prevent large fires* while 87% of respondents who reported not having experienced smoke discomfort agree with this management strategy.

This systematic influence is also reflected in responses to the statement, *if the Park would time fires later in the year (autumn), there would be more smoke in Three Rivers*, with 33% of those not experiencing discomfort and 50% of those experiencing discomfort agreeing. Thirty-eight percent of the former respondents and 27% of the latter disagree with the statement.

Despite a 16 percentage-point difference, the degree of agreement among those who have and those who have not experienced discomfort from Park fires supports the Park's prescribed burn policy in cases of lightning ignitions. Those who had experienced discomfort from smoke agree in 58% of their responses compared with 74% of those who had not had such experiences that the Park should let all lightning caused fires burn unless they threaten lives and private property. Disagreement is 29% to 17% respectively.

There is a modest relationship between the occurrence of someone with respiratory ailment in the households of respondents and understanding of fire-adapted ecosystems. Households with an afflicted member are less likely to disagree that *the Park should suppress all fires because smoke is bad for the community* (70%) than are non-afflicted households (81%). Respondents from households with a respiratory ailment sufferer are more likely to disagree with the statement, *to restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions* (31%), than are households without respiratory ailments (19%).

### *Park Use*

Park visit frequency had no significant effect on respondents' understanding of fire-adapted ecosystem management.

### *Park Employment*

Whether or not respondents' households include a current or former Park employee has a pronounced effect on the way they responded to questions about fire-adapted ecosystem management (table 25). Park employee households are far more likely to agree that *restoring*

*natural ecosystem processes should be the Park's highest priority and to restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions* (80% and 81% respectively) compared to all other households (49% and 56% respectively).

Significant majorities of both groups agree that *the Park should let all lightning fires burn unless they threaten lives and property* and that *managing lightning fires and lighting prescribed fires are the best ways to meet the Park's fire management objectives*; however, Park employee households are more likely to agree with these two statements.

**Table 24. Understanding of fire by smoke discomfort**

Fire Management Concept	Experienced discomfort from smoke at home (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
<b>One way to prevent big fires is to ignite small fires.*</b>				
Agree	<b>87.3</b>	145	<b>66.4</b>	174
Neither agree nor disagree	<b>7.8</b>	13	<b>14.5</b>	38
Disagree	<b>4.8</b>	8	<b>19.1</b>	50
<b>Giant Sequoia trees can survive severe fires.</b>				
Agree	<b>73.7</b>	112	<b>70.9</b>	178
Neither agree nor disagree	<b>7.2</b>	11	<b>9.6</b>	24
Disagree	<b>19.1</b>	29	<b>19.5</b>	49
<b>The Park should let all lightning caused fires burn unless they threaten lives and private property.*</b>				
Agree	<b>74.1</b>	129	<b>57.7</b>	157
Neither agree nor disagree	<b>9.2</b>	16	<b>13.6</b>	37
Disagree	<b>16.7</b>	29	<b>28.7</b>	78
<b>Managing lightning fires and lighting prescribed fires are the best ways to meet the Park's fire management objectives.*</b>				
Agree	<b>81.5</b>	128	<b>59.3</b>	147
Neither agree nor disagree	<b>8.9</b>	14	<b>14.1</b>	35
Disagree	<b>9.6</b>	15	<b>26.6</b>	66
<b>To restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions.*</b>				
Agree	<b>80.7</b>	134	<b>49.6</b>	129
Neither agree nor disagree	<b>9.0</b>	15	<b>15.8</b>	41
Disagree	<b>10.2</b>	17	<b>34.6</b>	90
<b>Restoring natural ecosystem processes should be the Park's highest priority.*</b>				
Agree	<b>70.1</b>	117	<b>48.7</b>	133
Neither agree nor disagree	<b>11.4</b>	19	<b>23.4</b>	64
Disagree	<b>18.6</b>	31	<b>27.8</b>	76
<b>If the Park would time fires later, there would be more smoke in Three Rivers. *</b>				
Agree	<b>32.6</b>	31	<b>50.3</b>	78
Neither agree nor disagree	<b>29.5</b>	28	<b>23.2</b>	36
Disagree	<b>37.9</b>	36	<b>26.5</b>	41
<b>The Park should suppress all fires because smoke is bad for the community.*</b>				
Agree	<b>3.4</b>	6	<b>17.7</b>	50
Neither agree nor disagree	<b>5.1</b>	9	<b>15.6</b>	44
Disagree	<b>91.4</b>	160	<b>66.7</b>	188

\* Statistically significant (p<.1)

**Table 25. Understanding of fire by Park employee household**

Fire Management Concept	Current or former Park employee in household (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
<b>One way to prevent big fires is to ignite small fires.</b>				
Agree	<b>73.6</b>	231	<b>78</b>	85
Neither agree nor disagree	<b>13.1</b>	41	<b>8.3</b>	9
Disagree	<b>13.4</b>	42	<b>13.8</b>	15
<b>Giant Sequoia trees can survive severe fires.</b>				
Agree	<b>69.8</b>	208	<b>76.8</b>	76
Neither agree nor disagree	<b>10.4</b>	31	<b>4.0</b>	4
Disagree	<b>19.8</b>	59	<b>19.2</b>	19
<b>The Park should let all lightning caused fires burn unless they threaten lives and private property.*</b>				
Agree	<b>61.0</b>	203	<b>72.2</b>	78
Neither agree nor disagree	<b>13.5</b>	45	<b>6.5</b>	7
Disagree	<b>25.5</b>	85	<b>21.3</b>	23
<b>Managing lightning fires and lighting prescribed fires are the best ways to meet the Park's fire management objectives.*</b>				
Agree	<b>64.2</b>	188	<b>77.9</b>	81
Neither agree nor disagree	<b>13.3</b>	39	<b>9.6</b>	10
Disagree	<b>22.5</b>	66	<b>12.5</b>	13
<b>To restore natural ecosystems, the Park must allow natural fires to burn and even ignite fires under controlled conditions.*</b>				
Agree	<b>55.8</b>	173	<b>80.6</b>	87
Neither agree nor disagree	<b>14.8</b>	46	<b>5.6</b>	6
Disagree	<b>29.4</b>	91	<b>13.9</b>	15
<b>Restoring natural ecosystem processes should be the Park's highest priority.*</b>				
Agree	<b>48.9</b>	161	<b>80</b>	84
Neither agree nor disagree	<b>24</b>	79	<b>7.6</b>	8
Disagree	<b>27.1</b>	89	<b>12.4</b>	13
<b>If the Park would time fires later, there would be more smoke in Three Rivers.</b>				
Agree	<b>44.7</b>	76	<b>44.3</b>	31
Neither agree nor disagree	<b>27.1</b>	46	<b>18.6</b>	13
Disagree	<b>28.2</b>	48	<b>37.1</b>	26
<b>The Park should suppress all fires because smoke is bad for the community.*</b>				
Agree	<b>13.8</b>	47	<b>4.5</b>	5
Neither agree nor disagree	<b>14.4</b>	49	<b>6.4</b>	7
Disagree	<b>71.8</b>	244	<b>89.1</b>	98

\* Statistically significant (p<.1)

## Respondent Preferences

### *Age, Education and Gender*

Respondents' gender, age group or educational level does not differentiate the importance residents assign to each fire management objective. The response patterns described earlier for all respondents are also observed across members of these demographic subgroups.

### *Residence Time*

Compared to newcomers, long-term residents downplay the importance of fire management objectives tied to ecosystem health goals (table 26). Only about half of respondents who have lived in Three Rivers for more than seven years consider *restoring the Park ecosystem to the way it functioned before European settlement* to be an important objective; whereas, three-fourths (77%) of newcomers (1-6 years residence) thought this was an important objective. This response pattern is similar, if somewhat attenuated, for *improving conditions for Giant Sequoia trees*. The proportion of those who consider this to be an important fire management objective decreases monotonically from 95% of newcomers to 82% for the long-term residents (25 years or more). Reducing the risk of a catastrophic fire elicited the same response pattern; 93% of newcomers consider this an important objective compared to only 78% of those who have lived in Three Rivers for at least 25 years.

Newcomers and long-term residents agree that *notifying local residents of fire management actions* is important. This objective received the highest proportion of *important* or *very important* responses for newcomers and long-term residents.

**Table 26. Fire management objective by residence time**

Fire Management Objective	Length of time in Three Rivers (% of residence time group)							
	1-6 years		7-13 years		14-24 years		25 years or more	
	Percent	Count	Percent	Count	Percent	Count	Percent	Count
Notify local residents of fire management actions.								
Little or no importance	<b>2.9</b>	3	<b>2.9</b>	4	<b>8.5</b>	10	<b>6.6</b>	7
Undecided	<b>1.0</b>	1	<b>2.9</b>	4	<b>3.4</b>	4	<b>2.8</b>	3
Important or very important	<b>96.1</b>	98	<b>94.3</b>	132	<b>88.1</b>	104	<b>90.6</b>	96
Manage fires for minimum smoke in nearby Communities								
Little or no importance	<b>11.8</b>	12	<b>8.6</b>	12	<b>8.3</b>	10	<b>17.8</b>	19
Undecided	<b>3.9</b>	4	<b>3.6</b>	5	<b>3.3</b>	4	<b>3.7</b>	4
Important or very important	<b>84.3</b>	86	<b>87.8</b>	122	<b>88.3</b>	106	<b>78.5</b>	84
Improve conditions for giant sequoia trees								
Little or no importance	<b>2.0</b>	2	<b>5.2</b>	7	<b>6.0</b>	7	<b>12.2</b>	12
Undecided	<b>3.0</b>	3	<b>6.7</b>	9	<b>7.7</b>	9	<b>6.1</b>	6
Important or very important	<b>94.9</b>	94	<b>88.1</b>	119	<b>86.3</b>	101	<b>81.6</b>	80
Reduce the risk of a catastrophic fire								
Little or no importance	<b>4.9</b>	5	<b>9.5</b>	13	<b>9.2</b>	11	<b>19.0</b>	19
Undecided	<b>2.9</b>	3	<b>5.1</b>	7	<b>9.2</b>	11	<b>3.0</b>	3
Important or very important	<b>92.2</b>	94	<b>85.4</b>	117	<b>81.5</b>	97	<b>78.0</b>	78
Educate local residents about fire management in the Park								
Little or no importance	<b>7.0</b>	7	<b>11.8</b>	16	<b>10.5</b>	12	<b>13.6</b>	14
Undecided	<b>6.0</b>	6	<b>2.9</b>	4	<b>5.3</b>	6	<b>2.9</b>	3
Important or very important	<b>87.0</b>	87	<b>85.3</b>	116	<b>84.2</b>	96	<b>83.5</b>	86
Restore the Park ecosystem to the way it functioned before European settlement								
Little or no importance	<b>10.6</b>	10	<b>27.9</b>	34	<b>29.9</b>	32	<b>38.7</b>	36
Undecided	<b>12.8</b>	12	<b>21.3</b>	26	<b>23.4</b>	25	<b>9.7</b>	9
Important or very important	<b>76.6</b>	72	<b>50.8</b>	62	<b>46.7</b>	50	<b>51.6</b>	48

\* Statistically significant (p<.1)

### *Location*

Location of residence is not related to respondents' preferences for fire management objectives.

### *Park Use*

Frequent and infrequent Park visitors responded similarly for all of the listed fire management objectives.

### *Smoke Sensitivity*

Residents who have experienced discomfort from Park fires at some time in the past are more likely to de-emphasize ecosystem health objectives and emphasize smoke management (table 27). Only 68% of those not experienced in smoke discomfort think that *managing fires for minimum smoke* is important and 25% of these respondents think that this objective is *of little or no importance*; however, 94% of those residents who have experienced smoke discomfort think this objective is *important or very important* and only 4% think it is *of little or no importance*.

### *Park Employment*

Respondents from households with current or former Park employees are more likely to emphasize ecosystem health objectives such as restoring the Park ecosystem to the way it functioned before European settlement and improving conditions for Giant Sequoia trees (table 28). Three-quarters (75%) of respondents from Park employee households think ecosystem restoration is important or very important compared to only half (51%) of respondents from households without current or former Park employees.



**Table 27. Fire management objective by discomfort experience**

Fire Management Objective	Experienced discomfort from smoke (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
Notify local residents of fire management actions.				
Little or no importance	<b>7.5</b>	13	<b>3.5</b>	10
Undecided	<b>1.7</b>	3	<b>3.5</b>	10
Important or very important	<b>90.8</b>	158	<b>93.0</b>	265
Manage fires for minimum smoke in nearby communities *				
Little or no importance	<b>25.4</b>	44	<b>3.5</b>	10
Undecided	<b>6.4</b>	11	<b>2.4</b>	7
Important or very important	<b>68.2</b>	118	<b>94.1</b>	270
Improve conditions for giant sequoia trees *				
Little or no importance	<b>2.3</b>	4	<b>9.7</b>	26
Undecided	<b>5.2</b>	9	<b>6.3</b>	17
Important or very important	<b>92.5</b>	160	<b>84.0</b>	226
Reduce the risk of a catastrophic fire *				
Little or no importance	<b>5.2</b>	9	<b>13.3</b>	37
Undecided	<b>0.6</b>	1	<b>9.0</b>	25
Important or very important	<b>94.2</b>	162	<b>77.7</b>	216
Educate local residents about fire management in the Park *				
Little or no importance	<b>6.4</b>	11	<b>14.1</b>	39
Undecided	<b>2.9</b>	5	<b>5.1</b>	14
Important or very important	<b>90.7</b>	156	<b>80.8</b>	223
Restore the Park ecosystem to the way it functioned before European settlement *				
Little or no importance	<b>19.4</b>	31	<b>31.9</b>	81
Undecided	<b>12.5</b>	20	<b>18.3</b>	46
Important or very important	<b>68.1</b>	109	<b>49.8</b>	125

\* Statistically significant (p<.1)

**Table 28. Fire management objective by Park employee household**

Fire Management Objective	Current or former Park employee in household (% of household type)			
	No		Yes	
	Percent	Count	Percent	Count
Notify local residents of fire management actions.				
Little or no importance	<b>5.6</b>	20	<b>4.6</b>	10
Undecided	<b>2.8</b>	10	<b>2.8</b>	3
Important or very important	<b>91.6</b>	329	<b>92.7</b>	101
Manage fires for minimum smoke in nearby communities				
Little or no importance	<b>11.4</b>	41	<b>12.8</b>	14
Undecided	<b>2.5</b>	9	<b>6.4</b>	7
Important or very important	<b>86.1</b>	309	<b>80.7</b>	88
Improve conditions for giant sequoia trees				
Little or no importance	<b>6.7</b>	23	<b>3.7</b>	4
Undecided	<b>7.3</b>	25	<b>0.9</b>	1
Important or very important	<b>86.0</b>	295	<b>95.3</b>	102
Reduce the risk of a catastrophic fire				
Little or no importance	<b>10.3</b>	36	<b>9.2</b>	10
Undecided	<b>6.9</b>	24	<b>2.8</b>	3
Important or very important	<b>82.8</b>	289	<b>88.1</b>	96
Educate local residents about fire management in the Park				
Little or no importance	<b>12.1</b>	42	<b>6.5</b>	7
Undecided	<b>4.9</b>	17	<b>1.9</b>	2
Important or very important	<b>83.0</b>	288	<b>91.7</b>	99
Restore the Park ecosystem to the way it functioned before European settlement				
Little or no importance	<b>29.0</b>	91	<b>16.3</b>	17
Undecided	<b>20.1</b>	63	<b>8.7</b>	9
Important or very important	<b>51.0</b>	160	<b>75.0</b>	78

\* Statistically significant (p<.1)

The same demographic variables that differentiate respondents by their importance ratings for individual fire management objectives also distinguish respondents for their choice of the *most important* fire management objective (table 29). *Smoke sensitivity*, measured by one's ever having experienced discomfort from smoke from a Park fire, starkly differentiates respondents' preferences for fire management objectives (figure 6). There is an apparent trade-off between two objectives: *reduce the risk of a catastrophic fire*, and *manage for minimum smoke in nearby communities*. Only 8% of respondents who have not experienced discomfort from smoke think this is the most important objective compared to 38% for those who have suffered discomfort. Only 41% of the sufferers think that reducing the risk of a catastrophic fire is most important (the number one choice in the survey, overall) compared to 66% of all other respondents.

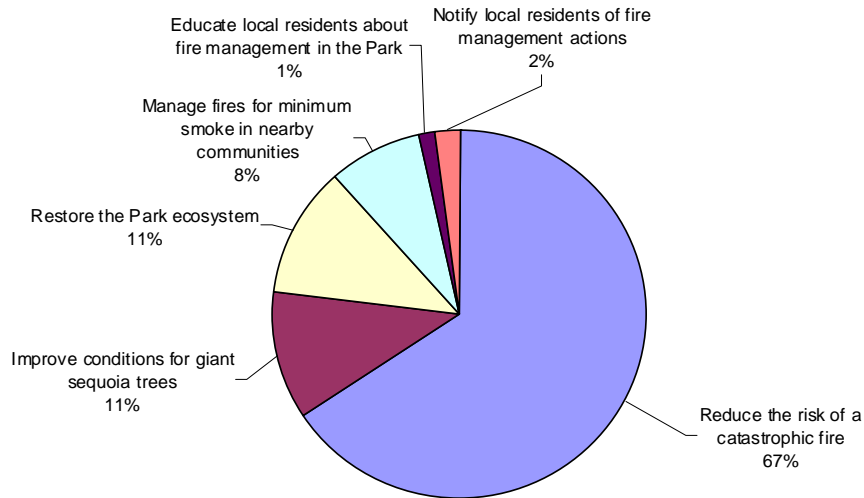
Based on their responses to this question, newcomers are more tolerant of the smoke problem. Only 14% of those who have lived in Three Rivers for only 1-6 years chose manage fires for minimum smoke as the most important objective. The proportions of longer term residents who chose this objective as most important increases with residence time. This pattern of response is reversed for the *risk reduction* objective. The proportion of residents who consider this to be the most important objective decreases with residence time, from 59% for newcomers to 44% for residents who have lived in Three Rivers for at least 25 years.

Risk reduction is the most common preference for fire management objective among respondents from Park employee households (47%) and those from all other households (51%); however, for the remaining residents, Park employee household respondents are more likely to choose ecosystem health objectives as the most important. Respondents from households with no Park employees are more likely to choose smoke management as the most important objective.

**Table 29. Most Important Fire Management Objectives by Significant Demographic Characteristics**

Demographics	Most Important Fire Management Objective											
	Reduce the risk of a catastrophic fire		Improve conditions for giant sequoia trees		Restore the Park ecosystem		Manage fires for minimum smoke in nearby communities		Educate local residents about fire management in the Park		Notify local residents of fire management actions	
	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count
Have you ever personally experienced discomfort related to smoke from Park fires at your home?												
YES	40.6	113	8.3	23	7.6	21	38.1	106	1.1	3	4.3	12
NO	65.9	112	11.2	19	11.2	19	8.2	14	1.2	2	2.4	4
Length of time in Three Rivers												
1-6 years	59.4	60	8.9	9	14.9	15	13.9	14			3.0	3
7-13 years	54.0	74	7.3	10	5.8	8	26.3	36	2.9	4	3.6	5
14-24 years	44.8	52	11.2	13	7.8	9	32.8	38			3.4	4
25 years or more	43.6	44	8.9	9	5.0	5	35.6	36	3.0	3	4.0	4
Current or Former Park Employee Household												
NO	50.6	174	7.8	27	5.5	19	30.8	106	1.5	5	3.8	13
YES	46.8	51	13.8	15	20.2	22	16.5	18	0.9	1	1.8	2

### Did not experience smoke discomfort



### Experienced smoke discomfort

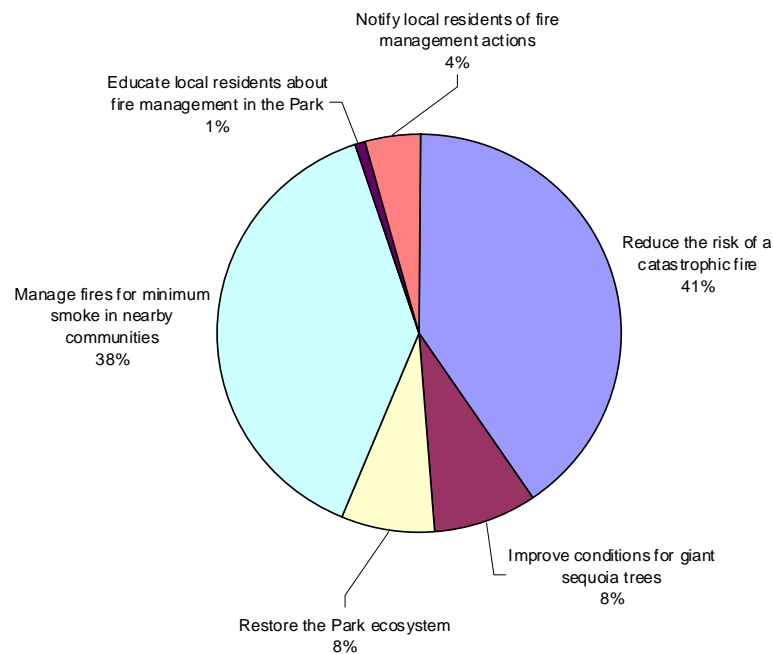


Figure 6. Most Important Fire Management Objective by Smoke Discomfort Experience

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**APPENDIX: MAIL SURVEY QUESTIONNAIRE**

