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California

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Visitors' Perspectives toward Transportation Issues in Yosemite National Park



Final Technical Report
June 2008

ASU College of
Public Programs

ARIZONA STATE UNIVERSITY

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Introduction

This Final Report presents findings from a cooperative social science research study conducted to inform visitor experience and resource protection and transportation planning and management for Yosemite National Park, California (Yosemite). The goal of this study was to examine visitors' perspectives toward a variety of transportation issues in Yosemite, with a specific focus on alternative transportation. Yosemite staffers cooperated with researchers from Arizona State University (ASU), School of Community Resources and Development (SCRD).

This study builds upon the findings of a qualitative interview study conducted in Yosemite National Park in 2005 and described in *Visitor Experiences and Transportation Systems in Yosemite National Park Final Technical Report* (March 2006). The earlier study results are also presented in: White, D. D. (2007). An interpretive study of Yosemite National Park visitors' perspectives toward alternative transportation in Yosemite Valley. *Environmental Management*, 39(1), 50-62; and Youngs, Y. L., White, D. D., and Wodrich, J. A. (in press). Transportation systems as cultural landscapes in national parks: The case of Yosemite. *Society & Natural Resources*.

Summary of Cooperative Agreement

This research is made possible by a cooperative agreement between NPS and ASU facilitated by the Colorado Plateau Cooperative Ecosystems Studies Unit (Cooperative Agreement #H1200040002, Task Agreement #J8813051510, Project # ASU-25). The research protocol was approved by the ASU Office of Research Compliance, Institutional Review Board (IRB Protocol #0705001886, Expiration Date: 06/01/2008). The research methods and instruments were reviewed and approved by the NPS Social Science Program and the federal Office of Management and Budget (OMB Approval #1024-0224 [NPS #07-048], Expiration Date: 06/01/2008). A Scientific Research and Collecting Permit was approved by Yosemite National Park (Study YOSE # 00204; Permit #YOSE-2007-SCI-0081; Expiration Date: 12/31/2007).

Summary of Project Schedule

- ☑ Project initiation – January 1, 2007
- ☑ Data Collection – July 17 – 28, 2007
- ☑ NPS Investigators Annual Report – November 11, 2007
- ☑ Progress Report – December 15, 2007
- ☑ Draft Final Report – February 15, 2008
- ☑ Final Technical Report – June 15, 2008
- ☑ Databases and Original Surveys Provided to Park Management – June 15, 2008

Study Background

Transportation networks are an essential but often overlooked component of the cultural landscape in national parks. Indeed, the very preservation of parks and wilderness areas in America is linked historically to tourist travel by trail, rail, and road (Dilsaver and Wyckoff 1999; Louter 2006; Shaffer 2001). Public support for park preservation in the nineteenth and early twentieth centuries was bolstered by transportation infrastructure that provided tourists access to parks. Train and stagecoach travel, uncomfortable and expensive, dominated the transportation scene in early American national park history. Visitors endured long hours on trains followed by half and full day excursions along bumpy, dusty roads by stagecoach (Schwantes 2001). As auto tourism replaced train tourism, the emerging middle class explored park landscapes in their personal vehicles, experiencing parks in a more direct way than train travel had allowed (Barnett 2004; Louter 2006). Direct, popular access to national parks via automobiles, however, presented new challenges. As early as 1920, National Park Service Director Stephen Mather struggled between improved road access for the public and preservation of the parks (Havlick 2002). Today, park infrastructure, management mindset, and visitor expectations about automobile access are persistent issues for the park service (Dilsaver and Wyckoff 1999).

The attempt to reconcile the values of visitor access and wilderness preservation is a defining theme of the American national park experience. Consider Yosemite National Park, one of the great parks of the world, renowned for glacially carved valleys, groves of giant sequoia trees, and spectacular vistas. Yosemite is also notorious for its densely developed visitor

service areas and concentration of visitors in Yosemite Valley. One approach to providing visitor services while maintaining a wilderness mystique has been to try and blend roads and infrastructure into the park scene through landscaping and maintenance programs (Colten and Dilsaver 2005). For instance, safety and sanitation facilities such as sewage, garbage, and water transfer stations are camouflaged in the national park scene so that visitors do not view these areas. What role, however, does transportation infrastructure – expected, visible, and essential to visitors – play in visitor behavior and experience?

Scholars are paying more attention to the role of transportation in national parks. This line of scholarship is instructive for our understanding of visitor experience and behavior as well as cultural meanings of national parks in contemporary American society. Studies have focused on: Acadia National Park (Daigle and Zimmerman 2004); Colonial National Historical Park (Shiftan, Vary, and Geyer 2006); Glacier National Park (Dilsaver and Wyckoff 1999); Glacier, Mount Rainier, and Olympic National Parks (Louter 2006); Grand Canyon National Park (Laube and Stout 2000; Morgan 1985); Great Smoky Mountains National Park (Sims et al. 2005); Sequoia-Kings Canyon National Park (Dilworth 2003); and Yellowstone National Park (O'Brien 1966). Louter (2006) summarized the basic thesis of this scholarship: “We cannot understand parks without recognizing that cars have been central to shaping how people experience and interpret the meaning of national parks, especially how they perceive them as wild places” (p. 164). We concur with this assessment but would add that we cannot understand national parks without understanding transportation systems more broadly.

Tension between automobiles, roads, and park preservation existed since the early days of auto tourism (Shaffer 2001). For example, preservationists initially supported automobile touring in California’s north coast redwood region as a way to help educate and preserve natural areas; however, advocates later criticized automobiles and roads as having a negative effect on preserving these lands (Barnett 2004). In Yosemite, these concerns grew as visitation increased from 1915 to 1930 in concert with improvement projects that widened and paved roads (Runte 1990). By 1954, visitation to Yosemite National Park reached one million. This figure continued to rise, by 1976 there were over two million visitors, and by the mid 1990s there were more than four million visitors to the park (NPS 2007).

Throughout the years, Yosemite National Park has implemented several efforts to control and improve the transportation systems while reducing traffic congestion including adjusting traffic patterns, removing private automobile travel along the eastern section of Yosemite Valley, and initiating a free public bus service in the valley (Greene 1987). This bus system was expanded after the extensive flooding of the valley during the winter of 1996-1997. The Yosemite Valley Plan (NPS 2000) included plans to change traffic patterns, reduce congestion, and add a fleet of diesel and electric hybrid shuttles to reduce private car use in the park.

As of today, about 90 percent of visitors arrive to the park in their private automobiles (NPS 2006). The single most popular activity when visiting Yosemite, cited by 87 percent of respondents, was “taking a scenic drive” and 60% of all visitors cited taking a scenic drive as the “primary activity” when visiting Yosemite. This is worth repeating – the majority of visitors to Yosemite say that scenic driving is their primary activity in the park. Following scenic driving, the next most popular activities were going to the visitor center in Yosemite Valley (55%) and eating in a park restaurant (49%). Less than half the respondents took a day hike, and only three percent took an overnight backpack trip. Once in Yosemite Valley, most visitors drive from one attraction site (e.g., Lower Yosemite Falls) to another (e.g., Bridal Veil Falls) in their private vehicles or take the free park shuttle bus while only relative few walk or bicycle.

Thus, to understand how visitors experience the natural and cultural elements of the park it is necessary to consider how visitors move through, interact with, and negotiate the transportation system because it is this behavior, along with park management response, that co-produces the landscape. Such information is vital to managing visitor experience and protecting park resources.

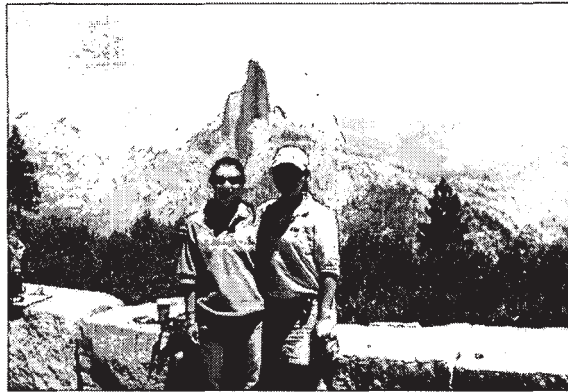
Sampling and Survey Administration

The survey research method and questionnaire instrument were developed by ASU researchers and staff from Yosemite National Park, Resource Management and Sciences and Planning Divisions. Following scientific peer review, the questionnaire was pre-tested with less than nine visitors in Yosemite National Park May 2007. The pre-test demonstrated that the questionnaire was interesting and understandable to visitors and confirmed the accuracy of the estimated time to complete the instrument. The instrument was revised based upon the pretest.

The respondent universe for the study included all adult visitors to Yosemite during the study period. The on-site sampling occurred July 17 to July 28, 2007. Six sampling locations were identified as being most relevant to the park's transportation planning needs: 1) Visitor Center in Yosemite Valley; 2) Lower Yosemite Falls; 3) Happy Isles; 4) Tunnel View Overlook; 5) Glacier Point; and 6) Tuolumne Meadows.

ASU researchers Chelsea McKinney and Jessica Aquino

Surveyors included ASU graduate and undergraduate students working in cooperation with Yosemite staff. During each sampling block, surveyors intercepted a visitor group every 25 minutes. If no groups were encountered within 25 minutes, surveyors intercepted the next available group and then resumed the normal schedule. Visitor groups were greeted and



introduced to the purpose of the study. If visitors agreed to participate in the survey, an individual respondent was selected to complete the questionnaire. Individuals were randomly selected by asking for the member of the group at least 16 years of age who had had the most recent birthday. Visitors who accepted were provided a self-administered questionnaire. The survey administrator assured the respondent that the information provided was anonymous and offered any necessary assistance. A total of 533 completed and usable questionnaires were obtained.

To track response rates and to check for potential non-response bias, interviewers completed an on-site log for every visitor contact, taking note of date, sampling location, weather, time, acceptance or refusal, questionnaire ID for respondents, number of children present, personal group size, and reason for refusal if offered.

The final questionnaire instrument, introductory script, and on-site log, are presented in Appendix A.

Across all locations, the study acceptance rate was 73%. Acceptance rates ranged from a high of 86.2% at Happy Isles to a low of 61.9% at Lower Yosemite Falls. The survey has a margin of sampling error of +/- 4.24% at the 95% confidence interval.

Non-response bias analyses were conducted for each sampling location. These analyses revealed that there were no significant differences between respondents and non-respondents at any location based upon gender or group size. There were no differences between respondents and non-respondents based upon number of children present at five of the six locations. Those who agreed to take the survey, however, at Lower Yosemite Falls had on average more children present than those who refused (mean=3.44 vs. 2.89; $F=4.43$, $p=.037$). These results, coupled with the high response rates, enhance confidence that there are likely no systematic differences between groups who did participate in the survey and those that refused.

Table 1. Sampling locations and acceptance rates

Location	Frequency	Valid Percent	Acceptance	
			Rate	Refusal Rate
Valley Visitor Center	145	27.2	73.4	26.6
Lower Yosemite Falls	114	21.4	61.9	38.1
Happy Isles	102	19.1	86.2	13.8
Tunnel View	54	10.1	68.8	31.3
Glacier Point	64	12.0	77.4	22.6
Tuolumne	54	10.1	77.3	22.7
Total	533	100.0	73.0	27.0

Figure 1. Percent of surveys collected at each sampling location

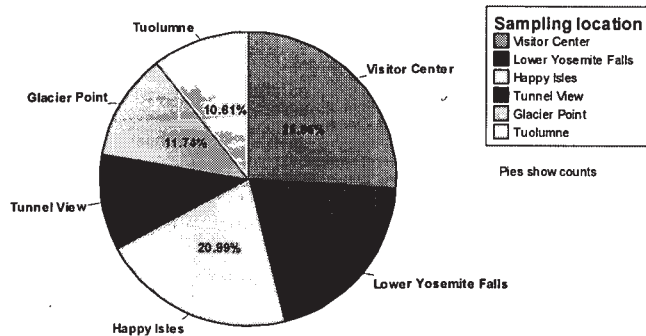


Table 2. Number of surveys completed by surveyor

Surveyor	Frequency	Valid Percent	Cumulative
			Percent
Jessica Aquino	289	54.2	54.2
Chelsea McKinney	244	45.8	100.0
Total	533	100.0	

Table 3. Weekday or weekend user

	Frequency	Valid Percent	Cumulative Percent
Use Type Weekday	288	54.0	54.0
Weekend	245	46.0	100.0
Total	533	100.0	

Study Limitations

Although the use of standardized questionnaires and probability sampling makes survey research especially well suited to describing the characteristics of a large population, survey research also has several limitations that should be noted and taken into account when interpreting the findings. First, this study utilized a self-administered questionnaire and thus it is not possible to know if visitors interpreted the questions in the manner intended or if responses reflect actual behavior. By administering the survey on-site during the actual park visit and by having trained interviewers present to answer questions, however, these limitations are reduced. Second, although the sampling plan was designed to provide a reliable estimate, the study results are representative only of the visitors during the sample period and do not necessarily apply to visitors during other times of the year or at other locations. Thus, the findings should be considered a “snapshot” in time.

Detailed Survey Findings

Questionnaire data were coded and entered into Statistical Package for the Social Sciences (SPSS) Version 15 for analysis. This report presents frequency distributions and descriptive statistics for survey variables as well as selected cross-tabulations. The data were tested for differences between respondents contacted at the Yosemite Valley sampling locations (Yosemite Falls, Yosemite Valley Visitor Center, and Happy Isles) versus respondents contacted outside Yosemite Valley (Tunnel View, Glacier Point, Tuolumne Meadows); weekday versus weekend respondents; and first time versus return visitors. Depending on the variable, tests included Chi-square, One-way Analysis of Variance (ANOVA) with Tukey Post-Hoc Multiple Comparisons, and means test. In each test, statistical significance was accepted when the *p*-value was less than or equal to .05 at the 95% confidence interval. Differences between

subgroups are reported only when statistically significant differences were found, in which case, the test statistics are reported.

Respondent Characteristics

Overall, respondents included more men than women and the average age was 43 years. Overall, respondents were very well educated - 71.3% had attained a Bachelor's degree or higher level of education. This is in stark contrast to the 26.6% of Californians and 24.4% of U.S. residents who have attained a Bachelor's degree or higher according to the 2000 U.S. Census.

Table 4. Gender

	Frequency	Valid Percent	Cumulative Percent
Gender Male	303	58.2	58.2
Female	218	41.8	100.0
Total	521	100.0	

Table 5. Age

	N	Min	Max	Mean	Std. Deviation
Age	515	17	80	43.47	13.078

Table 6. Please indicate the highest level of education that you have attained.

	Frequency	Valid Percent	Cumulative Percent
Education Less than high School	7	1.4	1.4
High school graduate	67	13.2	14.5
Technical school or Associates Degree	72	14.1	28.7
Bachelors Degree	173	34.0	62.7
Masters Degree	135	26.5	89.2
Ph.D., M.D., J.D., or equivalent	55	10.8	100.0
Total	509	100.0	

Regarding ethnic identification, 89.7% of visitors identified themselves as White; 2.2% as American Indian or Alaska Native; 11.7% as of Hispanic descent; 1.1% as Black or African American; and 0.4% as Native Hawaiian or other Pacific Islander. For comparison purposes, the ethnic breakdown for the State of California as of the 2000 census was as follows: White (76.9%), American Indian or Alaska Native (1.2%); Hispanic (35.9%); Black or African American (6.7%); and Native Hawaiian or other Pacific Islander (0.04%).

Table 7. For you only, are you Hispanic or Latino/a?

	Frequency	Valid Percent	Cumulative Percent
Hispanic Yes	59	11.7	11.7
No	444	88.3	100.0
Total	503	100.0	

Table 8. For you only, which of these categories best describes your race?

	Frequency	Valid Percent	Cumulative Percent
Race American Indian or Alaska Native	10	2.2	2.2
Asian	31	6.7	8.8
Black or African American	5	1.1	9.9
Native American or other Pacific Islander	2	.4	10.3
White	416	89.7	100.0
Total	464	100.0	

Table 9. What language if any other than English is frequently spoken at home?

	Frequency	Valid Percent
Language Spanish	54	10.1
French	33	6.2
German	32	6.0
Dutch	11	2.1
Danish	6	1.1

Note. Only those languages with greater than 1% response are listed

More than half of domestic respondents (53.2%) hailed from California. The most common cities of residence for these Californians were Los Angeles, Sacramento, San Diego, San Jose, Fresno, and San Francisco.

Table 10. State of residence for domestic respondents

State	N	%	State	N	%	State	N	%
CA	207	53.2	MN	5	1.3	HI	1	.3
WA	16	4.1	MO	5	1.3	ID	1	.3
NY	14	3.6	OR	5	1.3	KY	1	.3
PA	11	2.8	UT	5	1.3	LA	1	.3
TX	11	2.8	NC	3	.8	NJ	1	.3
VA	11	2.8	OH	3	.8	NM	1	.3
NV	10	2.6	WI	3	.8	PR	1	.3
IL	9	2.3	CT	2	.5	RI	1	.3
MI	9	2.3	DC	2	.5	SC	1	.3
AZ	8	2.1	IA	2	.5	VT	1	.3
MA	7	1.8	MD	2	.5			
CO	6	1.5	OK	2	.5			
FL	6	1.5	TN	2	.5			
IN	6	1.5	AK	1	.3			
GA	5	1.3	AR	1	.3			

For international respondents, the most common countries of origin included the United Kingdom / England, German, France, Canada, Denmark, Australia, and Switzerland.

Table 11. Country of origin for international respondents

Country	N	%	Country	N	%
U.K.	13	12.3	Poland	2	1.9
England	10	9.4	Scotland	2	1.9
Germany	9	8.5	Sweden	2	1.9
France	7	6.6	Amsterdam	1	.9
Holland	7	6.6	Argentina	1	.9
Canada	6	5.7	Brazil	1	.9
Denmark	6	5.7	Colombia	1	.9
Australia	5	4.7	Estonia	1	.9
Switzerland	5	4.7	Finland	1	.9
Ireland	4	3.8	India	1	.9
Austria	3	2.8	Israel	1	.9
Belgium	3	2.8	London	1	.9
Italy	3	2.8	New Zealand	1	.9
Spain	3	2.8	Saudi Arabia	1	.9
Mexico	2	1.9	Switzerland	1	.9
Netherlands	2	1.9	Total	106	100.0

Trip / Visit Characteristics

For personal groups, the most common group size (i.e., the mode) was 2 people, the median group size was 4 people, the mean was 4.46, and 75% of all personal groups were 5 people or less. Personal groups included an average of 1.29 visitors under the age of 16 and 50.5% of respondents were traveling with no members under 16.

Table 12. Group size

	Mean	Std. Deviation
Including yourself, how many people are in your personal group during this visit?	4.46	4.396
How many people in your personal group are under the age of 16?	1.29	2.064

Respondents staying than less than 24 hours inside the park (i.e., day visitors) planned to spend an average of 12.5 hours inside Yosemite. Respondents staying more than 24 hours inside the park (i.e., overnight visitors) planned to spend an average of 3.80 days. Just more than half (51.2%) of respondents had visited Yosemite previously. Those respondents who had been to the park before had visited an average of 5.65 times in the previous five years.

Table 13. Length of Stay

	N	Min	Max	Mean	Std. Deviation
How long are you staying, or do you plan to stay inside Yosemite NP? Number of hours if less than 24 hours	97	1.00	18.00	12.49	5.697
How long are you staying, or do you plan to stay inside Yosemite NP? Number of days if more than 24 hours	433	1.00	90.00	3.80	5.972

Table 14. Before this visit, have you ever been to Yosemite NP?

		Frequency	Valid Percent	Cumulative Percent
Prior Visit	No	267	51.2	51.2
	Yes	254	48.8	100.0

Table 15. Prior Visits

	Mean	Std. Deviation
How many times have you visited Yosemite NP in the past five years, including this visit?	5.65	22.405

Transportation Use in Yosemite and Other National Parks

Overall, more than eight in ten respondents (84.4%) entered the park in a private vehicle. Other transportation modes used to enter the park included commercial tour bus (4.8%), recreational vehicle (3.2%), YARTS bus (1.3%), motorcycle (1.1%), walking (0.6%), bicycle (0.2%), and “other” (4.4%). Notably, 77% of first time visitors entered the park in a private vehicle compared to 91.7% of repeat visitors. First time visitors were more likely to arrive via commercial tour bus (8.3%) than repeat visitors (1.2%). Also, weekday visitors were somewhat more likely to enter via commercial tour bus (6.3%) compared to weekend visitors (2.9%).

Most respondents entered the park in 1 vehicle (mode); the median number of vehicles was 1 (83.8% respondents entered in 1 vehicle and 11.0% entered the park in 2 vehicles). Prior to the current visit, 42.1% of respondents reported having used alternative transportation once inside a national park. Alternative transportation included modes of travel other than private automobiles such as bicycle, shuttle bus, boat, carriage, ferry, train, tram, or trolley. For those respondents who had used alternative transportation inside other national parks, the most commonly mentioned parks were Grand Canyon (30.9%) Zion (17.3%), Acadia (9.1%), Denali (9.1%), Golden Gate Nat’l Recreation Area (including Muir Woods) (5.0%), and Glacier (5.0%).

Table 16. On this visit, what form of transportation did you and your personal group use to enter Yosemite NP?

		Frequency	Valid Percent	Cumulative Percent
Mode	Private vehicle	443	84.4	84.4
	Recreational Vehicle	17	3.2	87.6
	Motorcycle	6	1.1	88.8
	Commercial Tour Bus	25	4.8	93.5
	YARTS Bus	7	1.3	94.9
	Bicycle	1	.2	95.0
	Walk	3	.6	95.6
	Other	23	4.4	100.0

Table 17. Number of vehicles used to enter park.

	Mean	Std. Deviation
On this visit, how many total vehicles did you and your personal group use to enter the park?	1.31	1.133

Table 18. Prior to this visit, have you ever used alternative transportation once inside a national park?

		Frequency	Valid Percent	Cumulative Percent
Used ATS	No	292	57.9	57.9
	Yes	212	42.1	100.0
	Total	504	100.0	

Table 19. If yes, in which national park(s) have you used alternative transportation once inside the park?

		Frequency	Valid Percent	Cumulative Percent
National Park Site	Acadia National Park, Maine	20	9.1	9.1
	Denali National Park, Alaska	20	9.1	18.2
	Devils Postpile National Monument, California	9	4.1	22.3
	Glacier National Park, Montana	11	5.0	27.3
	Golden Gate National Recreation Area (including Muir Woods), California	11	5.0	32.3
	Grand Canyon National Park, Arizona	68	30.9	63.2
	Great Smoky Mountains National Park, Tennessee/North Carolina	5	2.3	65.5
	Sequoia National Park, California	14	6.4	71.8
	Zion National Park, Utah	38	17.3	89.1
	Other	24	10.9	100.0
	Total	220	100.0	

Once inside Yosemite, more than eight in ten respondents (86.6%) traveled though the park in their private vehicle, more than six in ten (62.1%) traveled via the Yosemite Park Shuttle, and more than half (55.3%) walked as a form of travel (other than hiking).

- More weekday visitors reported using the Yosemite Park Shuttle than weekend visitors (68.7% vs. 54.4%; $\chi^2=11.23, p=.001$). Also, more weekday visitors reported walking (other than hiking) as a form of travel than weekend visitors (63.4% vs. 45.6%; $\chi^2=11.23, p=.001$).
- Respondents contacted in Yosemite Valley were significantly more likely than respondents contacted at Glacier, Tuolumne, and Tunnel View to have utilized the Yosemite Park Shuttle (68.6% vs. 48.2%; $\chi^2=20.11, p=.001$), (bicycling (17.6% vs. 9.6%; $\chi^2=5.67, p=.001$) and walking (other than hiking) (60.8% vs. 43.4%; $\chi^2=13.89, p=.001$) as forms of travel.

Table 20. Transportation Modes Used once Inside Yosemite.

Mode	Frequency	Valid Percent
Used Private Vehicle (Car, SUV, Pickup)	452	86.6
Used Recreational Vehicle (RV)	22	4.2
Used Yosemite Park Shuttle (shuttle)	325	62.1
Used Commercial Tour Bus	31	5.9
Used Yosemite Area Regional Transportation System (YARTS)	17	3.3
Used Motorcycle	12	2.3
Used Bicycling	79	15.1
Used Walking (other than hiking)	289	55.3
Used other mode	19	3.6

Importance – Satisfaction Analysis of Transportation Modes

Respondents rated the importance of using different types of transportation modes once inside Yosemite, considering only those modes that they had used. Based upon mean scores on a five-point scale ranging from 1=Not at all important to 5=Extremely important, the modes were rated as: YARTS (4.52), Walking (other than hiking) (4.49), bicycling (4.21), Yosemite Park Shuttle (4.14), motorcycle (3.75), private vehicle (3.38), and recreational vehicle (3.24).

- Weekend visitors rated the importance of private vehicles significantly higher than did weekday visitors (3.59 vs. 3.20, $F=7.72$, $p=.006$).
- Respondents contacted at Glacier, Tuolumne, and Tunnel View rated the importance of private vehicles significantly higher than did respondents contacted in Yosemite Valley (3.85 vs. 3.15, $F=22.65$, $p<001$).
- Weekend visitors rated the importance of bicycling significantly higher than weekday visitors (4.51 vs. 4.00, $F=6.05$, $p=.016$).
- Repeat visitors rated the importance of walking (other than hiking) significantly higher than first-time visitors (4.57 vs. 4.40, $F=9.86$, $p=.002$).
- Repeat visitors rated the importance of bicycling significantly higher than first-time visitors (4.42 vs. 3.71, $F=4.45$, $p=.036$).

Respondents also rated their satisfaction with different types of transportation modes once inside Yosemite, considering only those modes that they had used. Based upon mean scores on a five-point scale ranging from 1=Not at all satisfied to 5=Extremely satisfied, the modes were rated as: motorcycle (4.54), walking (other than hiking) (4.53), bicycling (4.44), Yosemite Park Shuttle (4.39), recreational vehicle (4.38), private vehicle (4.32), YARTS (4.32), and commercial tour bus (4.15).

- Weekend visitors rated their satisfaction with private vehicles significantly higher than did weekday visitors (4.43 vs. 4.22, $F=7.53$, $p=.006$).
- Respondents contacted at Glacier, Tuolumne, and Tunnel View rated their satisfaction with private vehicles significantly higher than did respondents contacted in Yosemite Valley (4.54 vs. 4.21, $F=15.53$, $p<.001$).

Table 21. Importance and Satisfaction of Transportation Modes.

Mode	Importance			Satisfaction		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
Private Vehicle (Car, SUV, Pickup)	456	3.38	1.495	433	4.32	.820
Recreational Vehicle (RV)	29	3.24	1.480	26	4.38	.804
Yosemite Park Shuttle (shuttle)	320	4.14	.920	310	4.39	.816
Commercial Tour Bus	32	4.00	1.136	27	4.15	.818
Yosemite Area Regional Transportation System (YARTS)	21	4.52	.680	19	4.32	.820
Motorcycle	16	3.75	1.483	13	4.54	.776
Bicycling	85	4.21	.977	82	4.44	.787
Walking (other than hiking)	283	4.49	.670	271	4.53	.687
Other mode	25	4.52	.714	26	4.38	.804

To complete an importance-satisfaction analysis, the mean ratings for importance and satisfaction for each transportation mode were matched, and the resulting points were plotted on a matrix. As importance and performance ratings tend to be high for most items in park and recreation settings, reference lines were placed at the overall mean for *attributes in the list*. The resulting graph produces four quadrants. The upper right quadrant includes items that are relatively high in both importance and performance and this quadrant is labeled “**Keep up the**

good work.” This quadrant includes **walking, bicycling, and Yosemite Park Shuttle.** The upper left quadrant includes items that are relatively high in importance but lower in satisfaction and quadrant is labeled **“Concentrate here.”** This quadrant includes **YARTS.** The lower right quadrant includes items that are relatively low in importance and high in satisfaction and is labeled **“Possible overkill.”** This quadrant includes **private vehicle and motorcycle.** The lower left quadrant contains items that are relatively low in importance and satisfaction and is labeled **“Low priority.”** This quadrant includes **commercial tour bus.**

Figure 2. Importance-Satisfaction analysis of transportation modes

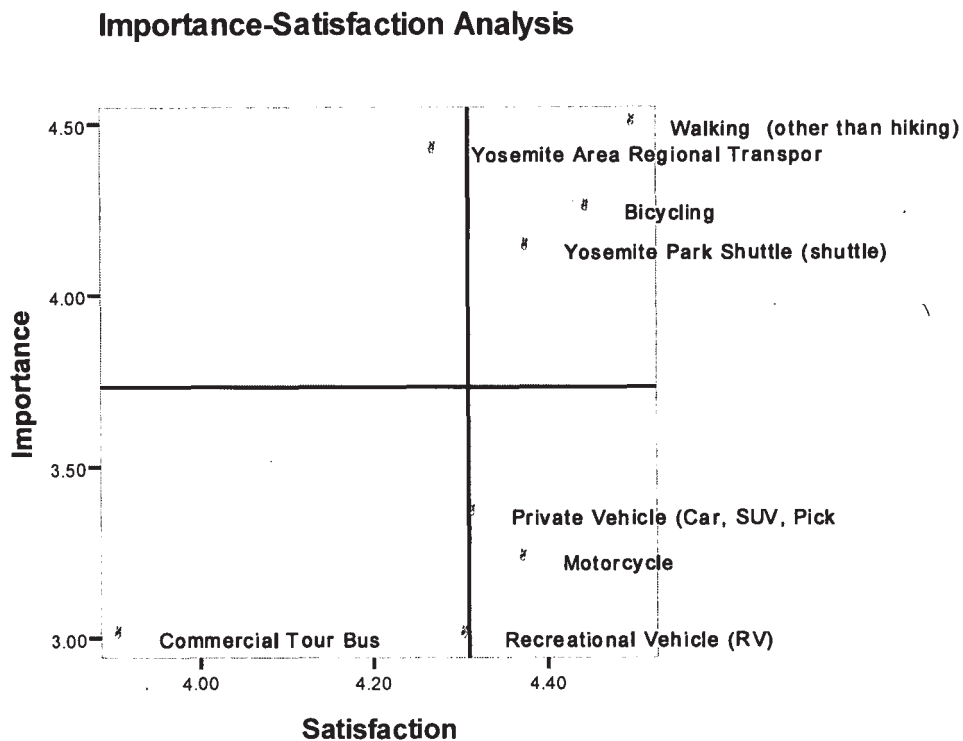
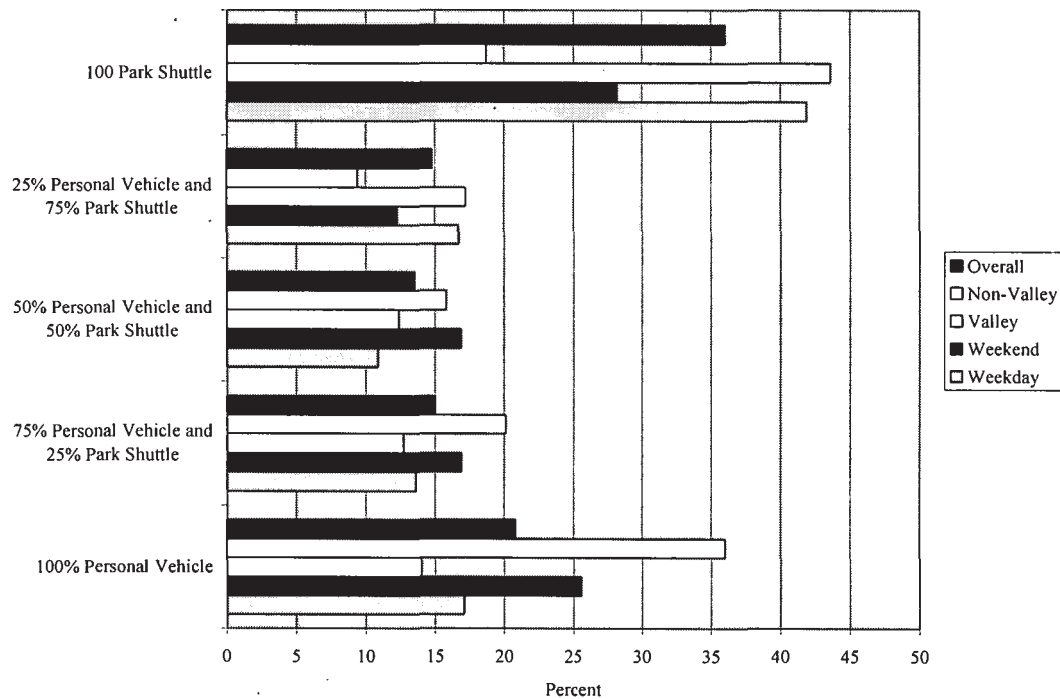


Table 22. Since entering the park for this visit, about what percentage of the time you have spent traveling in the park has been in your personal vehicle versus the park shuttle bus?

		Frequency	Valid Percent	Cumulative Percent
Vehicle vs. Park Shuttle	100% Personal Vehicle	94	20.8	20.8
	75% Personal Vehicle and 25% Park Shuttle	68	15.0	35.8
	50% Personal Vehicle and 50% Park Shuttle	61	13.5	49.2
	25% Personal Vehicle and 75% Park Shuttle	67	14.8	64.0
	100 Park Shuttle	163	36.0	100.0
	Total	453	100.0	

Figure 3. Comparison of transportation mode use by subgroups



Perceptions of Attributes of Transportation Modes in Yosemite

To examine visitors' perceptions of transportation modes, they rated the extent to which they agreed or disagreed with a series of statements. First, they rated how much each statement described the mode they used to enter the park and second they rated the degree to which each statement described the Yosemite Park Shuttle. The statements were derived based upon the findings from the 2005 qualitative interview study.

Table 23. Characteristics of Transportation Modes

Attributes	Vehicle Used to Enter Park			Yosemite Park Shuttle		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
You have easy access to your personal belongings (such as recreation equipment)	503	1.67	.604	438	2.44	.741
You learn about the park	493	2.36	.686	429	1.94	.649
Travel is affordable or low cost	487	2.23	.647	428	1.49	.618
You have opportunities to see wildlife	488	2.12	.643	413	2.18	.639
It is easy to find your way around the park	483	2.05	.615	422	1.76	.601
You have pleasant interactions with other visitors	476	2.46	.760	420	1.94	.593
It takes too long to get where you want to go	474	2.78	.667	414	2.55	.707
You feel safe	492	1.78	.538	434	1.77	.520
You have little impact on park's natural environment	471	2.62	.779	423	1.90	.669
You connect with the natural environment	483	2.35	.755	424	2.31	.707
You hear natural sounds	483	2.45	.783	420	2.65	.753
You have easy access to different areas of the park	479	2.02	.637	420	2.10	.710
You hear the sounds of traffic	479	2.21	.659	415	2.31	.642
It is easy to get to scenic overlooks/vistas	460	1.91	.606	377	2.23	.658
You experience a sense of freedom	484	1.80	.671	418	2.45	.725
You feel stressed while traveling through the park	475	2.80	.713	407	2.96	.655
You have trouble finding parking	460	2.43	.815	167	3.16	.806
You can go "where you want, when you want"	481	1.84	.636	410	2.42	.692
You experience conflict with visitors using other kinds of transportation	470	2.84	.606	407	2.97	.603
You avoid traffic congestion	466	2.59	.698	401	2.14	.697
You feel crowded by other visitors	473	2.72	.691	406	2.50	.723

Exploratory factor analysis (EFA) was used to reduce the number of items and examine the structure of the correlation matrix for the items as respondents ranked them in reference to the Yosemite Park Shuttle Bus versus private vehicles. Through this analysis, six factors or dimensions were identified: Freedom and Access, Stress and Conflict, Education/Learning, Environment, and Transportation System Qualities. Paired-sample T-tests were then used to compare mean differences in the way the respondents rated the six dimensions for the Yosemite Park Shuttle versus private vehicles. The tests revealed that respondents more strongly agreed that vehicles provide: Freedom and Access, Stress and Conflict, and Education/Learning opportunities. On the other hand, respondents more strongly agreed that the Yosemite Park Shuttle Bus provides: desirable Transportation System Qualities such as ease of route finding, safety, affordability, and socializing.

Table 24. Descriptive statistics for items and scales for factor analysis

Scale Items	Yosemite Park Shuttle			Private Vehicle				
	α	Mean	SD	α	Mean	SD	<i>t</i>	<i>p</i>
Freedom and Access	.747	2.30	.533	.701	1.88	.505	9.95	<.001
You have easy access to different areas of the park		2.46	.738		2.01	.660		
You experience a sense of freedom		2.42	.699		1.82	.691		
You can go "where you want, when you want"		2.23	.662		2.43	.679		
It is easy to get to scenic overlooks/vistas		2.10	.728		1.86	.614		
Stress and Conflict	.711	2.87	.589	.620	2.69	.481	3.23	.003
You have trouble finding parking		3.16	.810		2.40	.809		
You experience conflict with visitors using other kinds of transportation		2.93	.797		2.84	.610		
You feel stressed while traveling through the park		2.95	.810		2.81	.709		
You feel crowded by other visitors		2.45	.809		2.71	.691		
Education/Learning	.490	3.04	.673	.359	2.62	.567	6.04	<.001
You learn about the park		1.92	.634		2.37	2.37		
You have opportunities to see wildlife		2.17	.639		2.37	2.37		
Environment	.665	2.47	.632	.741	2.40	.687	.77	.444
You hear natural sounds		2.65	.753		2.44	.786		
You connect with the natural environment		2.30	.709		2.37	.756		
Transportation System Qualities	.650	1.80	.409	.520	2.13	.413	11.16	<.001
It is easy to find your way around the park		1.74	.597		2.07	.623		
You feel safe		1.76	.526		1.79	.550		
Travel is affordable or low cost		1.47	.612		2.22	.646		
You have pleasant interactions with other visitors		1.93	.594		2.49	.752		

Note. Coefficient alpha (reliability) for the Education/Learning factor is below desired level (.60 or greater), illustrating a low reliability for that factor.

Perceptions of Traffic Conditions in Yosemite

Respondents were asked to report the amount of time they spent waiting in traffic congestion to enter Yosemite. Traffic congestion was defined as traffic speeds that are slower than normal or “stop-and-go” traffic. To remove numerically distant cases, which can exert inordinate influence on averages and standard deviations, an outlier analysis was conducted for the variables measuring time spent waiting in traffic congestion to enter the park and time spent waiting in traffic congestion to find parking. A standard decision rule for classifying cases as outliers was used. Values that were three times the interquartile range were deleted from the analysis. On average, respondents reported spending less than three minutes (2.68 minutes) waiting to enter the park. More than half (57.4%) reported waiting in no traffic at all (i.e., 0 minutes) to enter the park and 75% reported waiting in less than 5 minutes. When asked how acceptable it was to wait this amount of time to enter Yosemite, the mean value was 1.55 on a five-point scale ranging from 1=Very acceptable to 5=Not at all acceptable.

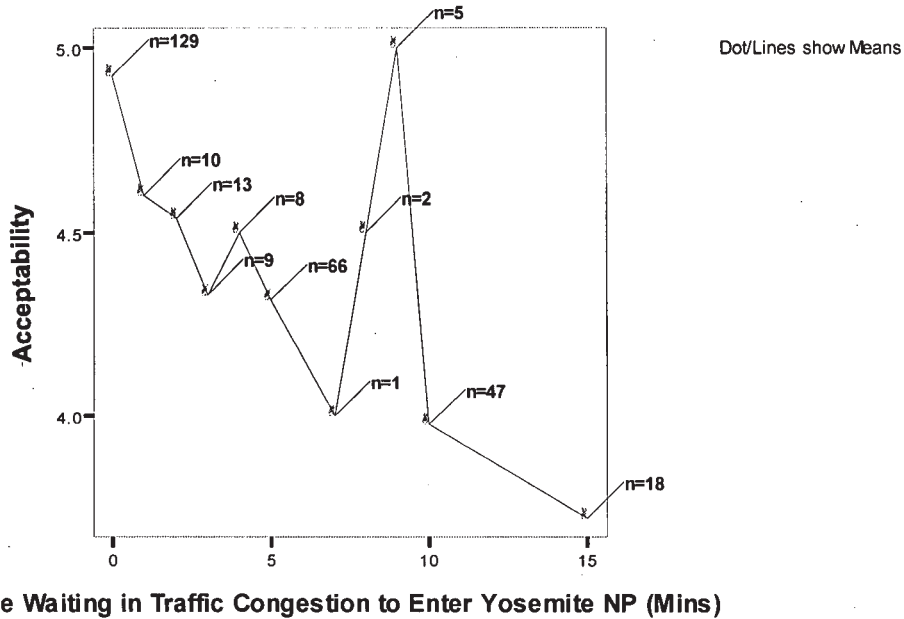
Table 25. Time spent waiting in traffic congestion to enter park

	N	Mean	Std. Deviation
Approximately how much time did you wait in traffic congestion to enter Yosemite NP on this trip?	491	2.68	4.15

Table 26. How acceptable was it to wait this amount of time to enter Yosemite NP?

	Frequency	Valid Percent	Cumulative Percent
Acceptability Very Acceptable	205	56.9	56.9
Acceptable	124	34.4	91.4
Neither Acceptable nor Unacceptable	21	5.8	97.2
Unacceptable	8	2.2	99.4
Very Unacceptable	2	.6	100.0
Total	360	100.0	

Figure 4. Acceptability of time spent waiting in congestion to enter Yosemite



Respondents were also asked to report the amount of time they spent waiting in traffic congestion looking for parking inside Yosemite. Traffic congestion was defined as traffic speeds that are slower than normal or “stop-and-go” traffic. On average, respondents reported spending 2.10 minutes in traffic looking for parking and 64.5% reported waiting in no traffic (i.e., 0 minutes). When asked how acceptable it was to wait this amount of time to enter Yosemite, the mean value was 1.69 on a five-point scale ranging from 1=Very acceptable to 5=Not at all acceptable.

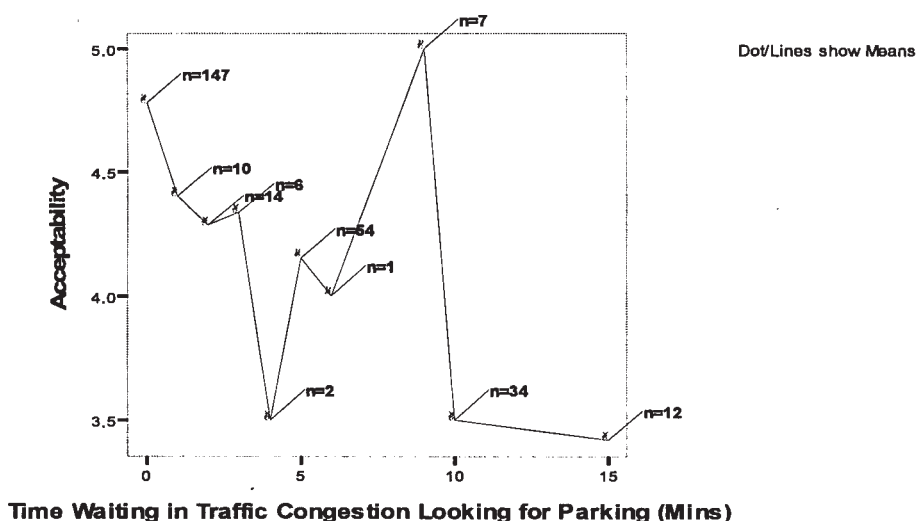
Table 27. Time Spent waiting in traffic congestion looking for parking in park

	N	Mean	Std. Deviation
Overall, approximately how much time did you spend in traffic congestion looking for parking in Yosemite NP on this trip?	465	2.10	3.77

Table 28. How acceptable was it to spend this amount of time looking for parking in Yosemite NP?

		Frequency	Valid Percent	Cumulative Percent
Acceptability	Very Acceptable	180	53.3	53.3
	Acceptable	108	32.0	85.2
	Neither Acceptable nor Unacceptable	28	8.3	93.5
	Unacceptable	19	5.6	99.1
	Very Unacceptable	3	.9	100.0
Total		338	100.0	

Figure 5. Acceptability of time spent waiting in congestion looking for parking



Regarding traffic congestion in the park, 72.7% said it was “not a problem” at park entrances/exits; 71.8% said it was “not a problem” driving on park roadways; 83.7% said it was “not a problem” on paths or roadways; and 60.6% said it was “not a problem” in parking areas. Nearly half of respondents (48.1%) said they experienced less traffic congestion than they expected, 29.8% said about as much as they expected, 7.6% said more than they expected, and 14.4% said they didn’t know what to expect. Respondents who had visited Yosemite at least once previously were more likely to say that they experienced about as much traffic congestion as they expected than first time visitors. On the other hand, first time visitors were more likely to say that they didn’t know what to expect regarding traffic congestion.

Table 29. How much of a problem is traffic congestion at park entrances/exits, park roadways, bicycling paths or roadways, and parking areas?

	N	Not a Problem		A Small Problem		A Big Problem	
		N	%	N	%	N	%
Park Entrance/Exits	516	375	72.7	123	23.8	18	3.5
Park Roadways	514	369	71.8	125	24.3	20	3.9
Bicycling Paths or Roadways	411	344	83.7	52	12.7	15	3.6
Parking Areas	502	304	60.6	141	28.1	57	11.4

Table 30. Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?

		Frequency	Valid Percent	Cumulative Percent
Expectation	I didn't know what to expect	74	14.4	14.4
	Less than I expected	247	48.1	62.6
	About as much as I expected	153	29.8	92.4
	More than I expected	39	7.6	100.0
	Total	513	100.0	

Table 31. Perceptions of traffic congestion at park entrance/exit by expectations

		Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?				Total
		I didn't know what to expect	Less than I expected	About as much as I expected	More than I expected	I didn't know what to expect
Traffic congestion at the park entrance/exit?	Not a Problem	85.1%	76.0%	64.9%	56.4%	72.5%
	A Small Problem	13.5%	22.8%	28.5%	35.9%	24.1%
	A Big Problem	1.4%	1.2%	6.6%	7.7%	3.3%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%

Note. $\phi = .212, p < .001$

Table 32. Perceptions of traffic congestion at on park roadways by expectations

		Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?				Total
		I didn't know what to expect	Less than I expected	About as much as I expected	More than I expected	I didn't know what to expect
Traffic congestion driving on park roadways?	Not a Problem	100.0%	70.4%	62.7%	57.1%	68.8%
	A Small Problem		27.6%	25.3%	35.7%	25.2%
	A Big Problem		2.0%	12.0%	7.1%	5.9%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%

Note. $\phi = .243, p < .001$

Table 33. Perceptions of traffic congestion on bicycling paths or roadways by expectations

		Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?				Total
		I didn't know what to expect	Less than I expected	About as much as I expected	More than I expected	I didn't know what to expect
Congestion bicycling on paths or roadways	Not a Problem	91.7%	80.2%	74.2%	75.0%	78.4%
	A Small Problem	8.3%	16.0%	21.0%	25.0%	18.0%
	A Big Problem		3.7%	4.8%		3.6%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

$\phi = .183, p < .182$

Table 34. Perceptions of traffic congestion in parking areas by expectations

		Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?				Total
		I didn't know what to expect	Less than I expected	About as much as I expected	More than I expected	I didn't know what to expect
Congestion in the parking areas?	Not a Problem	66.7%	63.2%	45.1%	35.7%	54.9%
	A Small Problem	26.7%	28.4%	33.8%	35.7%	30.8%
	A Big Problem	6.7%	8.4%	21.1%	28.6%	14.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

$\phi = .284, p < .001$

Table 35. Perceptions of traffic congestion at scenic overlooks by expectations

		Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?				Total
		I didn't know what to expect	Less than I expected	About as much as I expected	More than I expected	I didn't know what to expect
Traffic congestion at scenic overlooks?	Not a Problem	92.3%	64.9%	59.2%	58.3%	64.2%
	A Small Problem	7.7%	28.7%	33.8%	25.0%	28.9%
	A Big Problem		6.4%	7.0%	16.7%	6.8%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

$\phi = .215, p = .001$

Attitudes toward Transportation Management

The overwhelming majority of respondents (95.7%) had a very favorable or favorable attitude toward the use of alternative transportation for visitor travel once inside U.S. national parks (in general). Visitors who had previously used alternative transportation once inside a national park expressed a significantly more favorable overall attitude toward the use to ATS inside national parks than those who had never used ATS inside a national park (mean=1.49 vs. 1.63, $F=6.93$, $p=.028$).

Table 36. What is your overall attitude toward the use of alternative transportation for visitor travel once inside U.S. National Parks (in general)?

	Frequency	Valid Percent	Cumulative Percent
Attitude Very Favorable	246	48.0	48.0
Favorable	244	47.7	95.7
Unfavorable	19	3.7	99.4
Very Unfavorable	3	.6	100.0
Total	512	100.0	

Respondents were asked to rate their level of support or opposition for a series of transportation management options for Yosemite. Overall, the results show the following levels of support for each option:

- Use of hybrid or alternative fuel shuttle buses (97.6% support)
- Bicycle racks on park shuttle buses (89.6% support)
- Adding shuttle bus service to more areas of the park (87.2% support)
- Optional park-and-ride system with automobile parking inside Yosemite NP (88.1% support)
- Additional bicycle paths (86.8% support)
- More frequent Yosemite Park shuttle bus service (79.9% support)
- Additional bike lanes on roadways (78.8% support)
- Optional park-and-ride system with automobile parking only outside of Yosemite NP (56.9% support)

Table 37. Support for transportation management options.

Option	N	Strongly Support		Support		Oppose		Strongly Oppose		Mean	Std. Deviation
		N	%	N	%	N	%	N	%		
More frequent Yosemite Park shuttle bus service	492	158	32.1	235	47.8	97	19.7	2	.4	1.88	.723
Use of hybrid or alternative fuel shuttle buses	506	305	60.3	190	37.5	8	1.6	3	.6	1.46	1.072
Optional park-and-ride system with automobile parking inside Yosemite NP	506	141	27.9	305	60.3	49	9.7	11	2.2	1.86	.666
Optional park-and-ride system with automobile parking only outside of Yosemite NP	501	96	19.2	189	37.7	167	33.3	49	9.8	2.34	.897
Additional bicycle paths	447	131	29.3	257	57.5	54	12.1	5	1.1	1.85	.661
Additional bike lanes on roadways	477	138	28.9	238	49.9	88	18.4	13	2.7	1.95	.763
Bicycle racks on park shuttle buses	479	166	34.7	263	54.9	46	9.6	4	.8	1.77	.650
Adding shuttle bus service to more areas of the park	483	174	36.0	247	51.2	58	12.8	4	.8	1.78	.681

- Glacier, Tunnel View and Tuolumne respondents rated use of hybrid or alternative fuel shuttle buses significantly higher than Valley respondents (1.65 vs. 1.38, $F=7.09$, $p=.008$).
- Glacier, Tunnel View and Tuolumne respondents rated additional bike lanes or roadways significantly higher than Valley respondents (2.06 vs. 1.90, $F=4.64$, $p=.032$).
- Weekend visitors rated the following items significantly higher than weekday visitors: Use of hybrid or alternative fuel shuttle buses (1.57 vs. 1.37, $F=4.23$, $p=.039$), Additional bike lanes on roadways (2.04 vs. 1.88, $F=5.703$, $p=.017$).
- First time visitors expressed greater support for bicycle racks on shuttle busses than repeat visitors (1.84 vs. 1.69, $F=6.38$, $p=.012$).

Table 38. About how many local trips a month do you make using public transportation at home?

	N	Mean	Std. Deviation
About how many local trips a month do you make using public transportation at home?	471	5.66	14.054

Respondents' Final Comments

Visitor's final comments are listed here as provided by the respondents (unedited except to protect confidentiality and to remove inappropriate language).

Visitor Comments
2/3 RESTROOMS BAD, WANT CARS IN PARK
Awesome! Yosemite is the best!
better parking, bike lanes @ Tuolumne
cables @ vernal falls, more crosswalk signs
cheaper rental bikes/long term rental option for bikes
cheaper rental bikes; longer bike rentals
dry humor/bus drivers
enjoy shuttle service/want sky lights
Escalator
express buses
fast pass for golden age holders
Inconvenient information don't know where there going. stops don't tell you info
information about shuttles/trails
like shuttle
MONORAIL SYSTEM
Muy buien protegido! Muy buien quidado!
my wifes favorite spot in the world
NEED INFO THATS CONSISTANT FOR SHUTTLES
nice job
nice to get rid of the cars. likes shuttle buses
permit vehicles only, park and ride
please watch our bikes
private vehicles needed sometimes b/c buses don't go everywhere cars can
segways/scooters for rent
stroller made it difficult to use shuttle
Tener transporte para subir alas montanas mas altas sin descuidar la seguridad de la gente.
transportation hub
we like bikes
we like our cars!
yes- great shuttle
yes- limit larger vehicles
yes- more shuttles from wawona
yes-good job
Yosemite fund has been great! Good idea. Please raise the seats up for small people.

Conclusions and Implications

The goal of this study was to examine visitors' attitudes toward transportation issues in Yosemite National Park to inform planning and management. Data were collected from adult visitors to Yosemite July 17 to July 28, 2007 at six locations: 1) Visitor Center in Yosemite Valley; 2) Lower Yosemite Falls; 3) Happy Isles; 4) Tunnel View Overlook; 5) Glacier Point; and 6) Tuolumne Meadows. Data were collected from a random sample of 533 visitors through on-site, self-administered survey questionnaire. The survey achieved an overall acceptance rate of 73% and the margin of sampling error is estimated to be +/- 4.24% at the 95% confidence interval. The results of this study are intended to assist Yosemite in transportation planning and management, specific informing the development of indicators and standards of quality for the visitor experience of the transportation system. The findings of this study have several implications:

- Consistent with prior estimates, the vast majority of respondents in this study arrive to Yosemite in a private vehicle (84.4%), whereas relatively few enter the park via commercial tour bus (4.8%) or YARTS bus (1.3%). Given persistent concerns over the potential negative effects on visitor experience and park resources of the reliance on personal vehicles as the primary means of visitor access to the park, this finding, while expected, is disappointing. Clearly the visiting public currently does not utilize mass / alternative transportation to enter the park in any significant numbers.
- Once inside Yosemite, more than eight in ten respondents (86.6%) traveled through the park in their private vehicle at least part of the time. More than six in ten (62.1%), however, also traveled via the Yosemite Park Shuttle. Yosemite Park Shuttle ridership was highest among weekday visitors and those contacted in Yosemite Valley. Coupled with the generally high level of satisfaction with the shuttle, described below, this finding is encouraging. Although visitors do not seem to be using alternative / mass transit to arrive at the park, they are utilizing the shuttle bus in large numbers once inside the park. It is also encouraging to note that 42.1% of respondents had utilized alternative transportation systems inside other national parks, including Grand Canyon National Park and Zion

National Park, and that those who had used ATS in national parks expressed significantly higher support for ATS use in general. This implies that as visitors gain experience with ATS in parks, they are likely to be increasingly supportive.

- An importance-satisfaction analysis revealed that, although it was utilized by a very few number of respondents (1.3%), the YARTS bus service is very important to those who do use it and satisfaction is lower relative to other forms of transportation. It is possible that this finding reflects the very high importance of YARTS service to those immediately local visitors and/or park or concessionaire staff who may have responded to the survey. It is very encouraging to note that walking (other than hiking), bicycling, and Yosemite Park Shuttle, all forms of alternative transportation, emerged in the “Keep up the good work” quadrant of the importance-satisfaction analysis, reflecting both high levels of importance and satisfaction. On the contrary, and somewhat surprisingly private vehicles emerged in the “Possible overkill” quadrant, reflecting relatively high levels of satisfaction compared to the importance of these modes, relative to the other modes.
- To evaluate the effects of the transportation modes on visitor experiences and the factors that influence visitors’ transportation mode choices, respondents expressed their agreement or disagreement with a series of statements. The statements were derived from the qualitative interview study conducted in 2005 (see White 2007). Using exploratory factor analysis, six factors were identified, including: Freedom and Access, Stress and Conflict, Education/Learning, Environment, and Transportation System Qualities. Paired-sample T-tests were used to compare mean differences in the way the respondents rated the six dimensions for private vehicles versus Yosemite Park Shuttle. The tests revealed that respondents more strongly agreed that private vehicles provide Freedom and Access, Stress and Conflict, and Education/Learning opportunities. On the other hand, respondents more strongly agreed that the Park Shuttle Bus provides desirable Transportation System Qualities such as ease of route finding, safety, affordability, and socializing. This finding demonstrates that visitors appear to value their private vehicles for freedom but recognize that parking difficulty, stress, conflict, and

crowding are trade-offs. Interestingly, there was no significant difference in respondents' ratings between private vehicles and park shuttle bus for the Environment factor, which included hearing natural sounds and connecting with the natural environment.

- Respondents in this study reported waiting, on average, less than three minutes in traffic congestion to enter Yosemite. Traffic congestion was defined as traffic speeds that are slower than normal or “stop-and-go” traffic. This finding must be interpreted in light of the sample period, which did not include any major holidays, but did include several weekends. Respondents also rated the level of acceptability for the amount of time they spent waiting in traffic congestion to enter the park and the overall mean value was 1.55 on a five-point scale ranging from 1=Very acceptable to 5=Not at all acceptable. This indicates that these respondents experienced (or at least recalled) very little traffic congestion and found the amount of congestion they did experience very acceptable. Plotting the reported wait times against the acceptability ratings using a line graph provides guidance for potential standard in a VERP framework (see Figure 4). Based upon the data collected in this study, one potential standard would be that a certain percentage of respondents (e.g., 80%) on a certain percentage of days (e.g., 90% of non-Holiday days) wait no more than 15 minutes in traffic congestion to enter Yosemite.
- Respondents were also asked to report the amount of time they spent waiting in traffic congestion looking for parking inside Yosemite. Traffic congestion was again defined as traffic speeds that are slower than normal or “stop-and-go” traffic. On average, respondents reported spending just a few minutes in traffic looking for parking and 64.5% reported waiting in no traffic (i.e., 0 minutes). When asked how acceptable it was to wait this amount of time to enter Yosemite, the mean value was 1.69 on a five-point scale ranging from 1=Very acceptable to 5=Not at all acceptable. Again, plotting the reported wait times against the acceptability ratings using a line graph provides guidance for potential standard in a VERP framework (see Figure 5). Based upon the data collected in this study, one potential standard would be that a certain percentage of respondents (e.g.,

80%) on a certain percentage of days (e.g., 90% of non-Holiday days) wait no more than 15 minutes in traffic congestion looking for parking inside Yosemite.

- In general, respondents in this study *did not* perceive traffic congestion to be a problem at park entrances/exits, on park roadways, on bicycling paths or roadways, or in parking areas. Less than 4% of respondents rated traffic congestion to be “A Big Problem” in any of these areas. Once again, this finding must be interpreted in light of the sample period, but even with that caveat, it is revealing to find that respondents do not find traffic congestion to be problematic.
- It is notable, however, that, in general, respondents who experienced more traffic congestion than they expected rated it as a bigger problem. On the other hand, those who experienced less than they expected, in general, rated traffic congestion to be a lesser problem. (See Tables 32-36.) Thus, it is possible that visitors have an image of Yosemite as gridlocked with traffic congestion and if they do not have that experience, they are pleasantly surprised.
- The overwhelming majority of respondents (95.7%) had a very favorable or favorable attitude toward the use of alternative transportation for visitor travel once inside U.S. national parks (in general). Visitors who had previously used alternative transportation once inside a national park expressed a significantly more favorable overall attitude toward the use to ATS inside national parks than those who had never used ATS inside a national park. This finding is encouraging for future adoption of ATS inside parks.
- Nearly all alternative transportation management options received significant public support, especially the use of hybrid or alternative fuel busses, bicycle racks on shuttle busses, adding shuttle bus services to more areas of the park, optional park-and-ride system with automobile parking inside Yosemite NP, additional bicycle paths, more frequent Yosemite Park shuttle bus service, additional bike lanes on roadways. On the contrary, an optional park-and-ride system with automobile parking *only outside* of Yosemite NP received the least support, fully 20% less than any other option. This finding indicates that, even though more than half of all respondents strongly supported or supported this option, there remains significant resistance to the idea.

Appendix A: Survey Materials

Transportation and Visitor Experience at Yosemite National Park

On-site Visitor Contact Log

Date: _____ Site: _____ Weather: _____

Time	Refuse/ Accept (R/A)	Q. ID	Gender (M/F)	# Children Present	Personal group size (#)	Comments (explain reason for refusal)	Age 18+

Introductory Statement to invite visitors to participate in on-site questionnaire:

“Hello! Welcome to Yosemite National Park. My name is []. I am a student from Arizona State University under the direction of Dr. Dave White in the School of Community Resources and Development. I am conducting a survey about Yosemite National Park and the transportation system. This survey is a joint research project between Arizona State University and the National Park Service; the purpose is to learn visitors’ opinions about transportation management. We are only talking with a small number of visitors, so your participation would be greatly appreciated. As a small token of our appreciation for your time, we would like to offer you this large color postcard of Yosemite National Park. The questions I would like to ask will take about 15 minutes. All of your answers are voluntary and anonymous.

Would you be willing to complete a questionnaire?

If no, thank the visitor; stop the contact, and record observational information on log sheet. (Visitor still receives postcard)

If yes, select random respondent by asking which member of the group who has had the most recent birthday, confirm that respondent is at least 16 years old, record observational information on log sheet, and continue with the interview.

The Paperwork Reduction Act requires approval of all federal government surveys by the Office of Management and Budget. This survey has been approved under this Act. The Office of Management and Budget control number and expiration date is available at your request. Additional information about this survey and its approval is available at your request.*

***Additional Information Provided upon Request.**

OMB Approval number: *(Not yet assigned)*
Expiration Date: *(Not yet assigned)*
Person Collecting and Analyzing Information: Dave D. White
411 N. Central Ave., Ste. 550
Phoenix, AZ 85004
(602) 496-0154
Email: YOSE@asu.edu

PRIVACY ACT and PAPERWORK REDUCTION ACT statement:
16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. Permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Burden estimate statement: Public reporting for this form is estimated to average **15** minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to:

Bret Meldrum
Yosemite National Park
9039 Village Dr., Admin Bldg.
P.O. Box 577
Yosemite National Park, CA 95389
Bret_Meldrum@nps.gov

National Park Service
Yosemite National Park
California

National Park Service
U.S. Department of the
Interior



Yosemite National Park



Visitor Survey of Transportation Issues
Summer 2007

Dear Yosemite National Park Visitor:

We are conducting this survey to learn more about visitors to Yosemite National Park (NP) so that we can improve our service to you. You are one of a select number of people randomly chosen for this survey, so your opinions are important to us. All of the information collected will be anonymous. Please read each question carefully and save any additional comments for the final page.

Section 1: This first section includes questions about you and your personal group. In this questionnaire, your personal group is defined as anyone that you are traveling with, such as a spouse, a partner, family, or friends. This does not include the larger group that you might be traveling with, such as school, church, scouts, or tour groups.

1. Including yourself, how many people are in your personal group during this visit?

_____ Number of people

2. How many people in your personal group are under the age of 16?

_____ Number of people under age of 16

3. How long are you staying, or do you plan to stay, inside Yosemite NP during this visit?
Please list partial hours and days as $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$.

_____ Number of hours if less than 24 hours

_____ Number of days if more than 24 hours

4. a) Before this visit, have you ever been to Yosemite NP?

No, this is my first visit to Yosemite NP → Go on to question 5

Yes



b) If yes, how many times have you visited Yosemite NP in the past five years, including this visit?

_____ Visits in past five years, including this visit

Section 2: This second section includes questions about your use of different types of transportation in Yosemite and other National Parks.

5. On this visit, what form of transportation did you and your personal group use to enter Yosemite NP?

- Private vehicle such as a car, SUV, or pickup
- Recreational Vehicle (RV)
- Motorcycle
- Commercial tour bus
- Yosemite Area Regional Transportation System (YARTS Bus)
- Bicycle
- Walk
- Other (Please specify _____)

6. On this visit, how many total vehicles did you and your personal group use to enter the park?

_____ Vehicles

7. a) Prior to this visit, have you ever used alternative transportation once inside a national park? Alternative transportation include modes of travel other than private automobiles, such as bicycle, shuttle bus, boat, carriage, ferry, train, tram, trolley, or van.

- No → Go on to question 8
 - Yes
- ↓

b) If yes, in which national park(s) have you used alternative transportation once inside the park? (Please check all that apply)

- Acadia National Park, Maine
- Denali National Park, Alaska
- Devils Postpile National Monument, California
- Eugene O'Neill National Historic Site, California
- Glacier National Park, Montana
- Golden Gate National Recreation Area (including Muir Woods), California
- Grand Canyon National Park, Arizona
- Great Smoky Mountains National Park, Tennessee/North Carolina
- Sequoia National Park, California
- Zion National Park, Utah
- Other(s) (Please specify _____)

8. This question asks about your use of transportation modes inside Yosemite NP and has three parts.

a) First, please check (✓) **all** transportation modes that you and your group used during this visit to Yosemite NP.

b) Next, for **only** transportation modes that you and your group used, please use the 1-5 scale to rate how important it is for you to be able to use this mode inside Yosemite NP.

c) Finally, for **only** those transportation modes that you and your group used, please use the 1-5 scale to rate your satisfaction with the convenience of using that mode in Yosemite NP.

a) Used mode? Check (✓)		b) If used, how important to be able to use? 1=Not important 2=Somewhat important 3= Moderately important 4=Very important 5= Extremely important					c) If used, how satisfied with convenience? 1=Very unsatisfied 2=Unsatisfied 3= Neutral 4=Satisfied 5=Very Satisfied				
		1	2	3	4	5	1	2	3	4	5
Private Vehicle (Car, SUV, Pickup)	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Recreational Vehicle (RV)	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Yosemite Park Shuttle (shuttle)	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Commercial Tour Bus	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Yosemite Area Regional Transportation System (YARTS)	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Motorcycle	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Bicycling	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Walking (other than hiking)	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5
Other (specify _____)	<input type="checkbox"/> →	1	2	3	4	5	1	2	3	4	5

9. Since entering the park for this visit, about what percentage of the time you have spent traveling in the park has been in your personal vehicle versus the park shuttle bus?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100%	75%	50%	25%	0%
Personal Vehicle	Personal Vehicle	Personal Vehicle	Personal Vehicle	Personal Vehicle
0%	25%	50%	75%	100%
Park Shuttle	Park Shuttle	Park Shuttle	Park Shuttle	Park Shuttle

10. We would like to know how you feel about using different kinds of transportation in Yosemite NP. For each item below, FIRST rate how much you think it describes the form of transportation you used to enter the park. THEN rate how much you think it describes the Yosemite shuttle bus. Please answer this last part even if you have not yet used the shuttle bus system.

Statements	Vehicle you used to enter the park				Yosemite Park Shuttle			
	1= Strongly Agree 2= Agree 3= Disagree 4= Strongly Disagree				1= Strongly Agree 2= Agree 3= Disagree 4= Strongly Disagree			
You have easy access to your personal belongings (such as recreation equipment)	1	2	3	4	1	2	3	4
You learn about the park	1	2	3	4	1	2	3	4
Travel is affordable or low cost	1	2	3	4	1	2	3	4
You have opportunities to see wildlife	1	2	3	4	1	2	3	4
It is easy to find your way around the park	1	2	3	4	1	2	3	4
You have pleasant interactions with other visitors	1	2	3	4	1	2	3	4
It takes too long to get where you want to go	1	2	3	4	1	2	3	4
You feel safe	1	2	3	4	1	2	3	4
You have little impact on park's natural environment	1	2	3	4	1	2	3	4
You connect with the natural environment	1	2	3	4	1	2	3	4
You hear natural sounds	1	2	3	4	1	2	3	4
You have easy access to different areas of the park	1	2	3	4	1	2	3	4
You hear the sounds of traffic	1	2	3	4	1	2	3	4
It is easy to get to scenic overlooks/vistas	1	2	3	4	1	2	3	4
You experience a sense of freedom	1	2	3	4	1	2	3	4
You feel stressed while traveling through the park	1	2	3	4	1	2	3	4
You have trouble finding parking	1	2	3	4	1	2	3	4
You can go "where you want, when you want"	1	2	3	4	1	2	3	4
You experience conflict with visitors using other kinds of transportation	1	2	3	4	1	2	3	4
You avoid traffic congestion	1	2	3	4	1	2	3	4
You feel crowded by other visitors	1	2	3	4	1	2	3	4

The following questions ask about your experience with traffic congestion in Yosemite NP. Traffic congestion means traffic speeds that are slower than normal or “stop-and-go” traffic.

11. a) Approximately how much time did you wait in traffic congestion to enter Yosemite NP on this trip?

_____ Time in minutes (enter 0 if you did not experience any congestion and go on to question 12)

b) How acceptable was it to wait this amount of time to enter Yosemite NP?

Very Acceptable	Acceptable	Neither Acceptable nor Unacceptable	Unacceptable	Very Unacceptable
1	2	3	4	5

12. a) Overall, approximately how much time did you spend in traffic congestion looking for parking in Yosemite NP on this trip?

_____ Time in minutes (enter 0 if you did not experience any congestion and go on to question 13)

b) How acceptable was it to spend this amount of time looking for parking in Yosemite NP?

Very Acceptable	Acceptable	Neither Acceptable nor Unacceptable	Unacceptable	Very Unacceptable
1	2	3	4	5

13. Please rate from 1 to 3 how much of a problem you feel traffic congestion is at different locations in Yosemite NP.

Location	Not a Problem	A Small Problem	A Big Problem
At the park entrance/exit	1	2	3
Driving on park roadways	1	2	3
Bicycling on paths or roadways	1	2	3
In the parking areas	1	2	3
At scenic overlooks	1	2	3

14. Overall, how much traffic congestion did you experience during your visit to Yosemite NP compared to what you expected?

I didn't know what to expect

OR

Less than I expected

About as much as I expected

More than I expected

Section 3: This third section asks you your opinions about transportation management in national parks.

15. What is your overall attitude toward the use of alternative transportation for visitor travel once inside U.S. National Parks (in general)? Alternative transportation includes modes of travel other than private automobiles, such as bicycle, bus, boat, carriage, ferry, train, tram, trolley, or van?

Very Favorable	Favorable	Unfavorable	Very Unfavorable
1	2	3	4

16. Please rate your level of support or opposition for the following alternative transportation management options for Yosemite NP.

Alternative Transportation Management Option	Strongly Support	Support	Oppose	Strongly Oppose
More frequent Yosemite Park shuttle bus service	1	2	3	4
Use of hybrid or alternative fuel shuttle buses	1	2	3	4
Optional park-and-ride system with automobile parking inside Yosemite NP	1	2	3	4
Optional park-and-ride system with automobile parking only outside of Yosemite NP	1	2	3	4
Additional bicycle paths	1	2	3	4
Additional bike lanes on roadways	1	2	3	4
Bicycle racks on park shuttle buses	1	2	3	4
Adding shuttle bus service to more areas of the park	1	2	3	4

Section 4: Your response to the following background questions is greatly appreciated. Your response is voluntary and anonymous. The information is used to make sure we accurately represent visitors to Yosemite NP.

17. About how many local trips a month do you make using public transportation at home?

_____ Number of local trips a month

18. Are you ...?

- Male
 Female

19. What is your age? _____

20. What is your home zip code (or country of residence if outside the U.S.)? _____

21. Please indicate the highest level of education that you have attained.

- Less than high school
- High school graduate
- Technical school or Associates Degree
- Bachelor's Degree
- Master's Degree
- Ph.D., M.D., J.D., or equivalent

22. For you only, are you Hispanic or Latino/a? *(please ✓ one)*

- Yes
- No

23. For you only, which of these categories best describes your race? *(please ✓ one or more)*

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White

24. What language *(if any other than English)* is frequently spoken in your home?

If you have any additional comments, please write them in this space.

OMB Approval number:

#1024-0224 (NPS #07-048)

Expiration Date:

06/01/2008

Person Collecting and Analyzing Information:

Dave D. White

411 N. Central Ave, Ste. 550

Phoenix, AZ 85004-4020

Tel: (602) 496-0154

Email: YOSE@asu.edu

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Burden estimate statement: Public reporting for this form is estimated to average **15** minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to: Bret Meldrum, Yosemite National Park, 5083 Foresta Rd., P.O. Box 700-W, El Portal CA 95318