



## Expedited Approval for NPS- Sponsored Public Surveys

1. Project Title | Yosemite Wilderness Visitor Travel Patterns | May 6, 2009  
Submission Date:

2. Abstract: The purpose of this study is to collect travel route information and campsite locations from wilderness visitors in Yosemite National Park in order to: 1) understand changes in travel patterns in the park's wilderness, and 2) create a computer travel simulation model to inform park managers about wilderness zone capacity issues and decisions about trailhead quotas.  
(not to exceed 150 words)

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Park: YOSE

Park Office/Division: Resources Management & Science

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**Project Information**

5.	<b>Park(s) For Which Research is to be Conducted:</b>	Yosemite National Park				
6.	<b>Survey Dates:</b>	5/1/2010	(mm/dd/yyyy)	to	9/30/2010	(mm/dd/yyyy)
7.	<b>Type of Information Collection Instrument (Check ALL that Apply)</b>					
	<input type="checkbox"/> Mail- Back Questionnaire	<input checked="" type="checkbox"/> On- Site Questionnaire	<input checked="" type="checkbox"/> Face- to- Face Interview	<input type="checkbox"/> Telephone Survey	<input type="checkbox"/> Focus Groups	
	<input type="checkbox"/> Other (explain)					
8.	<p><b>Survey Justification:</b> (Use as much space as needed; if necessary include additional explanation on a separate page.)</p>	<p>Social science research in support of park planning and management is mandated in the <i>NPS Management Policies 2006</i> (Section 8.11.1, "Social Science Studies"). The NPS pursues a policy that facilitates social science studies in support of the NPS mission to protect resources and enhance the enjoyment of present and future generations (National Park Service Act of 1916, 38 Stat 535, 16 USC 1, et seq.). NPS policy mandates that social science research will be used to provide an understanding of park visitors, the non-visiting public, gateway communities and regions, and human interactions with park resources. Such studies are needed to provide a scientific basis for park planning, development, operations, management, education, and interpretive activities.</p> <p>The last time information on wilderness use in Yosemite was collected systematically was in the 1970s, when the original wilderness travel use simulator was created and trailhead quotas determined. Park managers suspect travel patterns have changed, and that some wilderness travel zones could be experiencing levels of overnight use that exceed their capacity. If true, trailhead quotas would need to be adjusted accordingly. This study will provide the information to allow managers to make informed decisions about adjusting trailhead quotas.</p> <p><u>Literature Review:</u> The Yosemite Wilderness experienced heavy use in the late 1960s and early 1970s with visitor nights peaking in 1975 at 218,890 and averaging 172,310 visitor nights from 1972 to 1979 (Van Wagtendonk 1981). During that time, the park determined an overnight user capacity for each of the wilderness travel zones, loosely corresponding geographically to watershed drainages and based on zone acreage, trail mileage, and ecological fragility. A Wilderness Use Simulation Model was created and used to derive trailhead quotas based on data that related overnight zone use to trailhead entries (Van Wagtendonk 1986).</p> <p>Using the trailhead quota system and limiting the number of visitors who start at a given trailhead each day presumably maintains overnight use in each of the travel zones at or below capacity. This is valid as long as: 1) patterns of visitor use remain roughly the same as when the trailhead quotas were established, and 2) visitors adhere to the planned itinerary recorded on their permits. Current permit data suggest strongly that patterns of visitor use have changed since the original Wilderness Use Simulation Model was created and the trailhead quotas were derived. In addition, previous research on Yosemite National Park permit validity revealed that 62 percent of all parties with permits made changes to their trips (Van Wagtendonk and Benedict 1980). For all of these reasons, trip duration, the zones in which nights are spent, and exit trailheads may differ between permitted and actual itineraries.</p> <p>The data on which the original trailhead quotas were based, and the data relating intended and actual routes, are now over 30 years old. The supposition is that</p>				

		<p>visitor travel patterns have become shorter in distance and duration. As a result, the overnight capacities of the travel zones nearest to trailheads may be being exceeded. An accurate account of Yosemite wilderness zone use and itinerary modification will recalibrate the current trailhead quotas to better manage the travel zones for optimal biophysical and social conditions. The NPS will use <i>Extend</i> modeling software to model overnight visitor use. This modeling software has been employed previously and successfully in both Yosemite National Park and other wilderness settings (Lawson et al., 2008; Lawson et al., 2006).</p> <p>We propose to survey a random sample of permitted wilderness groups to obtain their actual trip characteristics, which we will then compare with their intended characteristics. This comparison will allow us to calibrate the permit data to reflect actual behavior, thereby allowing more accurate modeling of important wilderness use parameters (e.g., van Wagtenonk and Benedict, 1980).</p>
<p>9.</p>	<p><b>Survey Methodology:</b> (Use as much space as needed; if necessary include additional explanation on a separate page.)</p>	<p>(a) <b>Respondent universe:</b> One person 18 years of age or older from each party that spends at least one night in a wilderness zone in Yosemite National Park between May 1 and September 30, 2010, except those staying overnight in High Sierra Camp lodging. (The High Sierra Camps are backcountry tent cabins managed by the park’s concessioner, Delaware North Parks and Resorts. Their capacity is determined by the number of available beds in each cabin.)</p> <p>(b) <b>Sampling plan/procedures:</b> Each overnight wilderness party must obtain a permit by physically visiting one of the Wilderness Centers in Yosemite or a cooperative Forest Service permit issuing station (if their trip originates on adjacent Forest Service land). These permits record attributes of wilderness use, such as party size, trip dates, entrance trailhead, wilderness zones in which nights are spent, and exit trailhead. Assuming that all groups entering the wilderness obtain a permit as required, the permit data provide an accurate estimate of the total number of groups using the wilderness.</p> <p>Selecting an appropriate sample size requires balancing resources available to conduct sampling and data analysis against meeting the objectives of the study (Manly, 2001). In addition, because the data collection requires time on the part of Yosemite National Park personnel and visitors, we sought to minimize the sample size, both to limit the amount of time required to administer and complete the survey and to minimize deviation from sampling protocols that could occur due to extra workload required of Park personnel on selected sampling days. Based on itineraries from wilderness permits issued in 2009, on deviations from intended itineraries observed by van Wagtenonk and Benedict (1980), and on properties of standard statistical estimators and tests (Manly 2001), we determined that sampling 10% of all wilderness parties will meet the objectives for sample size (see section d below for more detail on sample sizes).</p> <p>In 2009, 12,276 wilderness permits were issued in Yosemite. Allowing for a potential 5% increase in use, we estimate that 13,000 visitors will obtain wilderness permits in 2010. Assuming a 60% response rate (see Section (d)), a desired 10% sample size (n = 1,300) will require distributing 2,167 survey instruments.</p> <p>Previous studies (van Wagtenonk, 1981) and the 2009 permit data show that wilderness use in Yosemite is not distributed uniformly through the season. Use is much higher on weekends/holidays than on weekdays and increases gradually from the beginning of the season to reach a peak around early August, after which there is a rapid decline to essentially zero use by the end of September. The most efficient sampling scheme will allocate sampling probabilities according to temporal distribution of use. The sampling frame</p>

will consist of all weekends (Friday and Saturday nights for regular weekends, Friday through Sunday nights for three-day holiday weekends) and all weekdays in the study period. The sample will first be divided into two strata: 1) all weekends, and 2) the remaining weekdays. Each stratum will be sampled in proportion to the proportion of total visitor-nights in that stratum, according to the 2009 permit data. Within each stratum, the probability of a given wilderness zone unit being selected for sampling will be equal to the proportion of total visitor-nights in that stratum accounted for by trips that began in that unit. These proportions will again be taken from the 2009 permit data. The number of units selected for sampling will be equal to that necessary to distribute the desired 2,167 survey instruments.

To account for the possibility that temporal distribution of use is not uniform across wilderness zones, we will use Monte Carlo simulation to assess whether the sampling scheme will result in samples that are unbiased with respect to use of wilderness zones. We will generate 2,000 possible samples under the above sampling scheme and assess whether the probability of sampling parties using each zone is approximately proportional to the distribution of use across zones. If not, the sampling scheme will be further refined to result in a sampling scheme that allocates sampling effort in proportion to both temporal and spatial distribution of visitor-nights.

- (c) Instrument administration: If a given weekend is selected for sampling, we will distribute survey instruments to all parties that obtain their permit between Thursday afternoon and Saturday morning. On sampled weekdays, we will distribute survey instruments to all parties that obtain their permit during the afternoon of the previous day and the morning of the selected day. At the time the permit is issued, the issuing ranger will request intended campsite locations from the party and an e-mail address. This will be recorded as part of the permit procedure. Each party will then be given a map of the wilderness (just the portion appropriate to their route) showing trails and dominant landscape features and be asked to trace their route and mark their campsites. The map includes two questions about trip behavior on the back. Because the information requested is for the entire party, rather than a single individual, sampled groups will be told that the route map and questions can be completed by any individual over the age of 18 in the party. The issuing ranger will record a unique identifying number on this map so that it can be connected back to the permit data. Once the trip is completed, the party will return the map to the park, either by putting it inside their rental food canister, dropping it off in person at a Wilderness Center, or handing it back to the entrance station ranger as they exit the park (all vehicles exiting the park must stop at the entrance station).

A reminder e-mail will be sent to all survey participants who do not return a map within a week of the scheduled end of their trip. A second e-mail will be sent one week following the first one to all persons who have not yet returned a map.

NPS employees and volunteers who staff the Wilderness Centers will distribute the maps and instructions to visitors. To assure quality control over the sampling protocol, the PI will meet with staff before the study begins to train them in the survey methods. An instruction sheet will be developed that can be referred to if any questions arise. In addition, the PI will meet again with staff after the first week or two of sampling to review procedures and discuss any unanticipated issues. A graduate research assistant will be present in the park for the duration of the study and also will be able to answer questions. Finally, the PI will visit the park periodically and during these visits, he will check with the staff to monitor progress. Social science staff in the park also will be available to answer questions about the survey protocol.

(d) Expected response rate/confidence levels: The response rate is expected to be approximately 60%. The questionnaire is very short and simple, with only two questions to answer, along with a route to be traced on a map. The study conducted by van Wagtenonk and Benedict (1980) in Yosemite in the 1970s obtained a response rate of over 90%. However, more recent research indicates that the propensity to respond may be declining. Newman and Manning (2002) collected route data from overnight wilderness visitors in 2001 and obtained a response rate of 45%. We expect our response rate to be higher, because their study included a lengthy and detailed questionnaire, in addition to the map. Also, because 60% of Yosemite overnight wilderness visitors whose trips originate in the park now rent food canisters as a protection against bears, it will be very easy for them to place their completed map in their empty food canisters when they are returned. The e-mail reminders will encourage additional responses. For all of these reasons, we expect a higher return rate than reported by Newman and Manning, but lower than the early study by van Wagtenonk and Benedict.

Using the standard deviation in mean trip duration calculated from the 2009 permits, a sample size of 1,300 yields a standard error on the estimate of mean trip duration of 0.157 nights. Thus, at 95% confidence, the sampling error is 0.308 nights. The mean trip duration calculated from the 2009 permit data was 4.40. Van Wagtenonk and Benedict (1980) reported that actual trip duration was 0.5 nights less than intended trip duration. If that deviation holds in our population, the expected trip duration will be 3.90 (4.40 – 0.5), so the relative sampling error, at 95% confidence, is  $0.308/3.90 = 7.9\%$ . Looked at another way, we will be able to detect, at the 95% confidence level, deviations in mean trip duration of 0.308 nights.

Van Wagtenonk and Benedict (1980) also reported that about 60% of parties altered their trip in either duration or location relative to the trip itinerary they entered on their wilderness permit. With a sample size of 1,300, the standard error in estimating a proportion of 0.6 is 0.0129, so at 95% confidence, the sampling error is 0.0253. Thus, the relative sampling error, at 95% confidence, is  $0.0253/0.6 = 4.2\%$ .

Based on the 2009 permit data (intended itineraries), the highest frequency with which a wilderness zone exceeded capacity was 38 nights out of the year. Some 953 parties intended to spend at least one night in this particular zone, accounting for 5.7% of total visitor-nights in 2009. With a sample of 1,300, and with selection probability proportional to use, we expect a sample size of 74 parties spending at least one night in this specific zone. Based on the standard deviation of trip length for parties intending to use this zone in 2009, the resulting standard error for the estimate of mean trip duration is 0.077. Thus, at 95% confidence, the sampling error is 0.15, indicating that we will be able to detect a deviation in mean trip length to this zone of 0.15 nights. The mean intended duration of visits to this zone in 2009 was 1.43, so we will be able to detect a deviation of about  $0.15/1.43 = 10.5\%$ .

(e) Strategies for dealing with potential non-response bias: Respondents will be compared to non-respondents on several available characteristics recorded on the permits completed by all parties sampled. These include intended campsite, state or country of residence, day of week, month, party size, and trip length. The implications of any non-response bias for interpretation of the findings will be discussed in the final technical report.

(f) Description of any pre-testing and peer review of the methods and/or instrument (recommended): The instrument is similar to those used in previous studies of wilderness campers and day hikers. In addition, the

		questions have been reviewed by the Social Science Branch in Yosemite NP.								
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10.	<b>Total Number of Initial Contacts   Expected Respondents:</b>	2167	1300	ii.	<b>Estimated Time to Complete Initial Contact   Instrument (mins.):</b>	2	5	12.	<b>Total Burden Hours:</b>	181
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13.	<b>Reporting Plan:</b>	<p>Survey results will be compiled, analyzed and presented in a technical report that will be submitted to NPS officials in Yosemite National Park. Analysis will include A copy of the report will be sent to the NPS Social Science Division to be archived in the Social Science Studies Collection.</p> <p>References</p> <p>Manly. 2001. Statistics for Environmental Science and Management. Chapman and Hall/CRC, Boca Raton, FL.</p> <p>Lawson, Itami, Gimblett and Manning. 2006. Benefits and challenges of computer simulation modeling of backcountry recreation use in the Desolation Lake area of the John Muir wilderness. Journal of Leisure Research 38(2):187-207.</p> <p>Lawson, Kiser, Hockett, Reigner, Chamberlin and Choi. 2008. Visitor use computer simulation modeling to address transportation planning and user capacity management in Yosemite Valley, Yosemite National Park. Final Research Report submitted to the National Park Service.</p> <p>Newman and Manning. 2002. Integrating social, ecological and managerial indicators of quality into carrying capacity decision-making in Yosemite National Park Wilderness. Final research report submitted to NPS.</p> <p>Van Wagtenonk, J. 1981. The effect of use limits on backcountry visitation trends in Yosemite National Park. Leisure Sciences 4:311-323.</p> <p>Van Wagtenonk, J. 1986. The determination of carrying capacities for the Yosemite Wilderness. USDA Forest Service general technical report INT-</p> <p>Van Wagtenonk, J. and J. M. Benedict. 1980. Wilderness permit compliance and validity. Journal of Forestry 78:399-401.</p> <p><b>Quality Assurance for Yosemite National Park Visitor Survey</b>  Steven Martin, Principal Investigator, Humboldt State University  Bret Meldrum, Branch Chief, Visitor Use and Social Sciences, Yosemite National Park.</p> <p>The staff of Yosemite National Park is committed to the success of a visitor survey which will provide valid scientific results for future park planning. Quality assurance in the field will be provided by the onsite park coordinator and/or his designee, who will oversee the survey and assist the P.I. in training the staff of permanent and seasonal park employees and volunteers. This staff will carry out the distribution of the overnight surveys. Additional oversight will be provided by Yosemite’s management staff (Mark Fincher, Ken Watson, Paul Gallez).</p> <p><b>Responsibilities of Park Coordinator</b></p> <ul style="list-style-type: none"> <li>• Oversees the survey onsite to ensure a valid, non-biased sampling.</li> <li>• Assists the P.I. in training all employees who will be distributing surveys on the survey process before the survey begins, and train all new employees who will be</li> </ul>								
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		<p>distributing surveys as the survey continues through the season.</p> <ul style="list-style-type: none"><li>• Ensures ample visitor center staffing on the pre-determined survey days so that those employees responsible for distributing surveys will not be diverted away from this priority to fulfill other duties.</li><li>• Makes all other staff members aware of the survey so that they may answer survey-related questions upon encountering participants in the park.</li><li>• Positions survey drop boxes so that they are highly visible and easily accessible.</li><li>• Discuss collection protocols with visitor center staff.</li></ul> <p><b>Responsibilities of Surveyors</b> (<i>Permanent and seasonal employees/volunteers</i>)</p> <ul style="list-style-type: none"><li>• Will be trained according to the pre-determined survey distribution instructions and guidelines prior to distributing surveys.</li><li>• Will be dedicated to that duty for the survey day.</li><li>• Will adhere to survey distribution instructions to ensure valid, accurate results.</li><li>• Will maintain survey logs recording any refusals and the observable characteristics of those refusers for use in a non-response bias analysis.</li></ul> <p><b>Responsibilities of Principal Investigator</b></p> <ul style="list-style-type: none"><li>• Prepares a detailed sampling protocol document to use in training park staff and to guide and remind interviewers of the protocol.</li><li>• Conducts at least one training session in collaboration with the Park Survey Coordinator at the beginning of the survey season (the beginning of the survey season will generally coincide with the start date of summer seasonal employees).</li><li>• Ensures a graduate student will be onsite for the duration of the study to collect surveys and be in contact with park staff.</li><li>• Is in continuous contact with graduate student and park staff conducting the survey.</li><li>• Makes park visits as needed to ensure continued commitment.</li><li>• Provide reports as specified in the agreement.</li></ul>
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*Verbal script for initial contact (this will be embedded into the larger wilderness permit process as carried out by the NPS permit-issuing ranger):*

You've told us where you intend to camp, but we know that sometimes people's plans change once they get out there, and that's okay. So we'd like to give you a map that covers the area where you'll be hiking and camping, and ask you to trace your actual hiking route with a solid line, and mark the location of each of your campsites with a circled number corresponding to the night of your trip. If you're carrying a GPS you can even provide the coordinates of your campsites if you wish, but that's up to you. There are also two simple questions on the back of the map we'd ask you to answer. You are not required to complete the map or answer these questions, but the information you provide will help us in managing Yosemite..

When you exit the wilderness, you can return the map by leaving it inside your rental food storage canister, or by dropping it in the marked box outside the Wilderness Center closest to where you exit, or by handing it to an Entrance Station ranger when you leave the park. Please be sure to trace your route and number your campsites and return the map to us. This type of data hasn't been collected from Yosemite visitors for 30 years, and the park desperately needs to update its information on people's hiking routes and campsite locations.

**Additional Information Provided upon Request.**

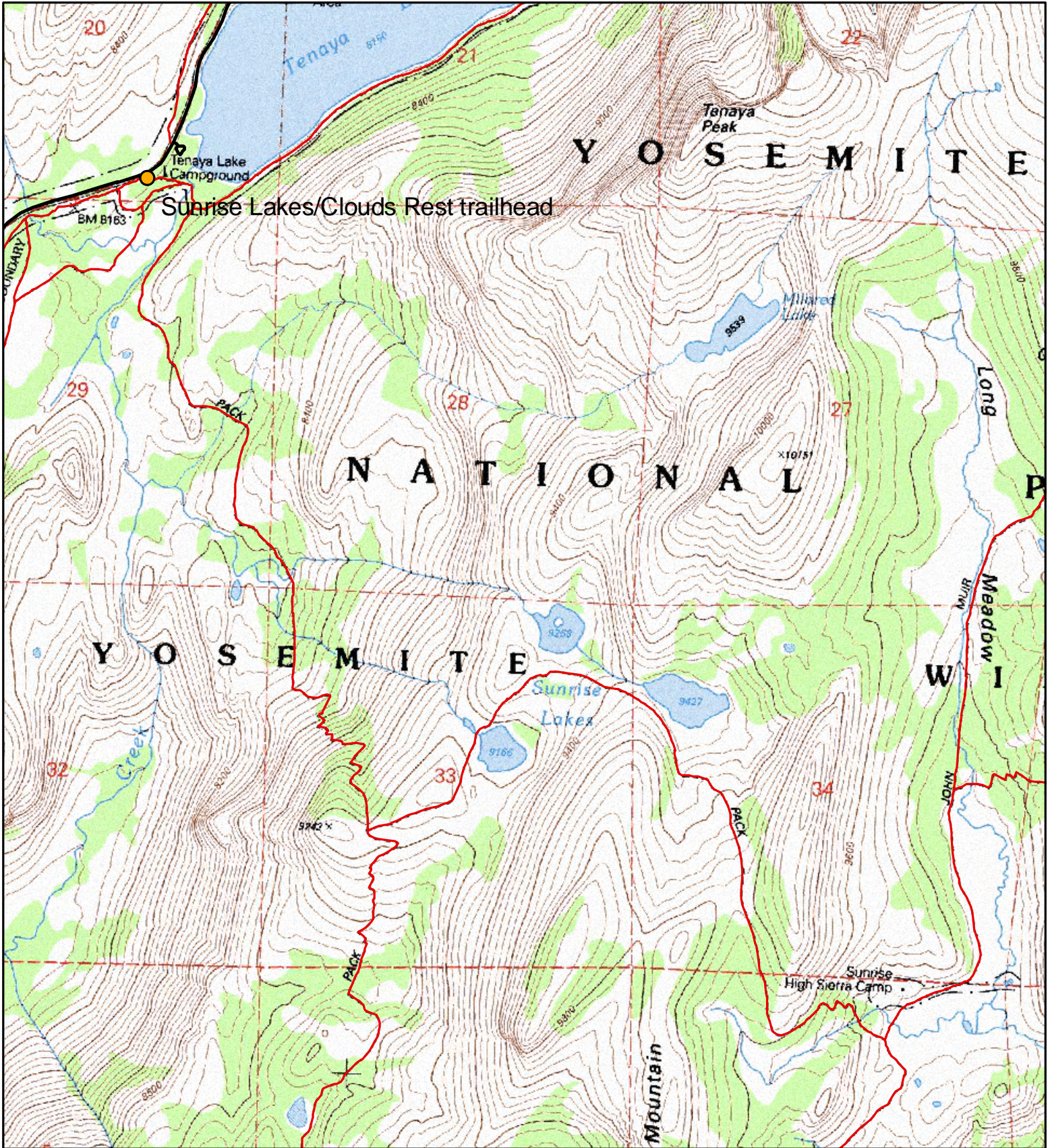
16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. An agency may not conduct or sponsor, and a 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 burden for this form is estimated to average **5 minutes** per response. Direct comments regarding the burden estimate or any other aspect of this form to:

Bret Meldrum, Branch Chief  
Visitor Use/Social Science  
Yosemite National Park  
5083 Foresta Rd, RMS Bldg.  
El Portal, CA 95318  
(209) 379-1216  
Bret\_Meldrum@nps.gov

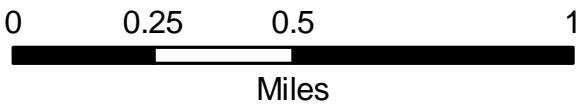


# Visitor Use Map



**Legend**

- Trails
- Trailheads
- Roads



Visitor ID \_\_\_\_\_  
Trip ID \_\_\_\_\_

We know that sometimes people's plans change once they get out into the wilderness. That's okay. But park managers need accurate information on people's camping locations. This type of data hasn't been collected from Yosemite visitors for 30 years. The park needs to update its data on people's hiking routes and campsite locations in order to know where crowding or camping impacts might occur.

On the map on the reverse side, we'd like you to please trace your hiking route with a solid line, and mark the location of each of your campsites with a circled number corresponding to the night of your trip. If you're carrying a GPS you can even provide the coordinates of your campsites if you wish, but that's up to you.

We only need you to trace your camp-to-camp route. You don't need to mark the route of any day hikes or side trips you may take. Please remember to mark each of your campsites with a circled number corresponding to the night of your trip.

When you exit the wilderness, you can return the map by leaving it in your rental food storage canister (if you have one), or by dropping it in the marked box outside the Wilderness Center closest to where you exit, or by handing it to an Entrance Station ranger when you leave the park. **Please be sure to trace your route and number each of your campsites and return the map to us.** This information will help park managers protect the Yosemite Wilderness. Please also answer the two questions below, and **thank you** for your assistance and cooperation!

On this trip in the Yosemite wilderness, which of the following activities did you or your group participate in? Please check (✓) **all** that apply. **[3. ACT18]**

- Climbing
- Fishing
- Other (Please specify) \_\_\_\_\_

**While in Yosemite National Park** before and after the backpacking portion of your visit, which of the following activities did you or your group participate in? Please check (✓) **all** that apply. **[3. variation ACT18]**

- Take a scenic drive
- View roadside exhibits
- Day hike
- Visit visitor center
- Eat in park restaurant
- Stay in park lodging
- Camp in developed campground
- Other (please specify) \_\_\_\_\_

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. 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 burden for this form is estimated to average 5 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, RMS Bldg., El Portal, CA 95318, (209) 379-1216, Bret\_Meldrum@nps.gov

## YOSEMITE WILDERNESS VISITOR STUDY, E-MAIL FOLLOW-UPS

*Script for e-mail reminder:*

[date and trailhead of trip included in subject line]

Hello overnight Yosemite wilderness visitor. Earlier this summer you took a camping trip into the Yosemite Park wilderness. When you picked up your permit at the park's Wilderness Center, you were given a map and asked to trace your route and mark/number your campsites. If you have already returned this map to us, thank you. If you have not, please mail it today with your hiking route and numbered campsite locations to Dr. Steven R. Martin, ENRS Dept., Humboldt State University, 1 Harpst Street, Arcata, CA 95521. This information will help park managers better manage the park's wilderness.

If you no longer have the map, we'd be happy to send you a replacement. To request a replacement map, please e-mail us at [xxx.xxx@humboldt.edu](mailto:xxx.xxx@humboldt.edu) and tell us which trail or trailhead you used, and we'll send the correct map to you. (You can also make it a lot easier for us by providing your mailing address, so we don't have to look it up from your permit!) You can return the map by mailing it to Dr. Steven R. Martin, ENRS Dept., Humboldt State University, 1 Harpst Street, Arcata, CA 95521.

*Second e-mail follow-up:*

Hello, I'm e-mailing you about the survey of Yosemite wilderness users that you agreed to participate in this summer. The waiting period for incoming maps is almost over, and we have not yet received yours. I would appreciate you completing another one unless you mailed it within the past few days.

The staff of Yosemite National Park is anxiously awaiting the survey results. They want to use the information you provide to better manage the park's wilderness and provide enjoyable visitor experiences. I urge you to complete the map and questionnaire and return it by (month day). Your contribution to the success of this study is greatly appreciated.

Please mail your map with your hiking route and numbered campsite locations to Dr. Steven R. Martin, ENRS Dept., Humboldt State University, 1 Harpst Street, Arcata, CA 95521.

Should you have questions, or if you need a replacement map, please contact me at [xxx.xxx@humboldt.edu](mailto:xxx.xxx@humboldt.edu).

Thank you!