The Role of Crowding in Visitor Displacement at Mount Rainier and Olympic National Parks

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Executive Summary

One thousand telephone interviews were conducted in the six western Washington counties of Clallam, King, Kitsap, Pierce, Snohomish, and Thurston. Two research questions addressed in the telephone survey included: 1) the amount of spatial and temporal displacement due to crowding at Mount Rainier and Olympic national parks; and 2) the differences between displaced and non-displaced visitors in terms of demographic characteristics, crowding perceptions, and recreation motives. The survey found that 20.4% of Mount Rainier visitors and 20.6% of Olympic visitors reported inter-site displacement, i.e., they were previous visitors who were either somewhat unlikely or very unlikely to return to the parks in the foreseeable future. The most important reasons for this were time and distance constraints and lack of travel companions. Crowding-related causes also were reasons for not planning to return, although more so at Mount Rainier than at Olympic. Among the crowding-associated reasons for displacement were traffic congestion in the parks, too many visitors, and difficulty getting campsites or lodging. Of the 1,000 persons interviewed, 5.6% said they would not return to Mount Rainier National Park solely because of crowding-related conditions. The figure for Olympic National Park was 4.1%. On average, more than ten years had passed since these displaced respondents had visited either park. In addition, substantial amounts of temporal and intra-site displacement were reported. At Mount Rainier, 65.7% of previous visitors had visited the park during a low-use period (primarily the fall and spring seasons), while 20.3% had gone to lesser-used locations to avoid crowds, including the backcountry, Ipsut Creek, and Lake Mowich. For Olympic, the corresponding figures were 60.6% and 24.7%. As at Mount Rainier, the most-commonly visited low-use periods at Olympic were also fall and spring, and the most-reported lesser-used locations were the wilderness coast, backcountry, and the Staircase area. Convenience was the most frequently cited reason for visiting during low-use periods at both parks. However, experiencing a more natural park and an uncrowded park ranked second and third as reasons for this.

Respondents who had visited the parks were compared with those who had not. Non-visitors were younger, tended to have less schooling, and were less affluent than visitors. Non-visitors also were more likely to be Hispanic and less likely to be white.

Former visitors displaced by crowding were compared with those displaced for other reasons. Crowding-displaced visitors were more likely to believe Mount Rainier and Olympic national parks were too crowded for enjoyable recreation and also were more likely to participate in outdoor recreation to avoid crowds and enjoy natural surroundings.

Analysis suggested that, among the most crowd-averse visitors, intra-site displacement may be a robust predictor of subsequent displacement away from a park. Intra-site displacement could be monitored as an indicator of experience quality, and lesser-used locations receiving these visitors might be considered for designation as areas of critical capacity concern in general management plans.

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Introduction

Change is endemic to recreation settings. At times, change can be sudden and large-scale, as when a catastrophic fire denudes an entire forest. More often, change occurs gradually. When recreation planners respond to increasing visitation with piecemeal development–paving a road one year, expanding a parking lot the next–the impact of individual actions may seem minor, but over time the cumulative effects can be significant. Among these effects can be a change in the visitor population itself as people react to altered conditions. Kuentzel and Heberlein (1992) describe a hierarchy of visitors' coping responses that range from no coping (i.e., maintaining the same attitudes and behavior in response to change) to cognitive coping (modifying attitudes, but not behavior), to displacement (modifying attitudes and behavior). This report describes research on the last and most extreme of these coping responses. The settings examined are Mount Rainier and Olympic national parks in the state of Washington.

Theoretical Background

Displacement describes visitors' avoidance of unwanted conditions caused by sustained changes in the character of a recreation setting (Becker, Niemann, & Gates, 1981; Hall & Shelby, 2000; Manning & Valliere, 2001). At least three types of displacement have been recognized: spatial, temporal, and activity. Spatial displacement occurs when visitors to an area shift their use to other locations to escape undesirable conditions at the original site. This type of response can be subdivided into intra-site and inter-site displacement (Hall & Shelby, 2000; Kuentzel & Heberlein, 1992). Intra-site displacement occurs when visitors move to other locations within the same general area or unit. For example, Kuentzel and Heberlein (1992) found that many boaters at Apostle Islands National Lakeshore who felt that the area had become too crowded shifted their boating to lesser used islands, although they remained within the park. In contrast, inter-site displacement involves people moving away from a park. Hall and Shelby (2000) documented inter-site displacement away from a popular reservoir in Oregon to other lakes in the surrounding region. Similarly, Becker, Niemann and Gates (1981) reported that some recreational boaters on the Lower St. Croix National Scenic River were displaced to the Mississippi River because of crowding on the St. Croix.

Temporal displacement occurs when people change the time of visits to avoid unwanted conditions. Examples include shifts from weekends to weekdays and from peak seasons to shoulder seasons. Gramann (1992a) found temporal displacement to be a common coping strategy used by visitors to Yosemite National Park.

A third type of displacement is activity displacement (Brunson & Shelby, 1993). This may occur when visitors continue to use a park, but change their primary activity as a means of coping with change. For example, Manning & Valliere (2001) reported that some local residents had stopped

walking the carriage roads in Acadia National Park because of changes in the amount and type of use on the roads. In this report, both temporal and spatial displacement are examined, but not activity displacement.

Displacement and Social Succession

Social scientists frequently assume that an important change triggering displacement is increased use.[1] Supporting this, Hall and Shelby (2000) found that visitors displaced from Lake Billy Chinook in Oregon most commonly cited crowding and related factors, including noise and difficulty in getting a campsite, as the reasons they shifted their recreation to other lakes. Gramann (1992a), in a telephone survey of households in central and southern California, found that 1.5 million people–representing 5.9% of the households in the region–had ceased visiting Yosemite National Park for reasons that included crowding in the park. These results are consistent with the process of "social succession" described by Schreyer and Knopf (1984:10):

> The prototypical scenario involves swelling numbers of visitors to a recreation environment, the construction of new facilities and other support services to accommodate them, and the subsequent arrival of a whole new clientele who are attracted by the support services rather than the original character of the setting. In effect, there is a progressive shift from more primitive-focus values to more socially-oriented, urban-centered, facility dependent values.

Similar to classic ecological succession theory (Connell & Slayter, 1977), social succession is thought to be rooted in a process of "facilitation." The arrival of one visitor population spawns sustained changes in physical and social settings (e.g., access improvements, amenity development, crowds) that facilitate that population's replacement by succeeding ones better adapted to the new conditions.

Schreyer and Knopf (1984) argued that unless successional change was managed, it would drive recreation settings to the developed end of the opportunity scale, reducing the diversity of settings available. Planning systems such as the Recreation Opportunity Spectrum (Clark & Stankey, 1979), Limits of Acceptable Change (Stankey et al., 1985), and Visitor Experience and Resource Protection (National Park Service, 1997) control unmanaged change by identifying and preserving a range of setting conditions and recreation opportunities in an area.

Recent research suggests that Schreyer and Knopf's original theoretical statement on social succession requires modification. In particular, the outcome of increased use need not be total displacement of one visitor population by another. A panel study of river floaters in Oregon (Shindler & Shelby, 1995) found that, after a 14-year period in which river use almost doubled, original visitors were more likely to change their definition of the setting from wilderness to semi-wilderness than to stop using the river altogether. This is a cognitive adjustment to change, such as that described by Kuentzel and Heberlein (1992). In addition, Hall and Shelby (2000)

[1]Other displacement causes reported in the literature include natural resource degradation (Roberston & Regula, 1994) and racial prejudice (Gramann et al., 2001).

found that reservoir users who reported inter-site displacement to other lakes did not stop using the original site altogether; they simply used it less often.

Whether or not inter-site displacement occurs appears to depend on several factors, including the availability of substitute sites, visitors' personal attachment to an area, and the degree of certainty (or "norm crystallization") about appropriate conditions at an area (Manning et al., 1999). But even strongly crystallized setting norms may change over long periods of time. For example, as visitor cohorts age it is possible that they may evolve very different setting preferences. Those who once spurned amenities in national parks may seek them out more often at a later stage in their lives.

Coping and Experience Quality

Coping behaviors have significant implications for recreation managers who gauge their success by visitors' reports of "experience quality." Quality is sometimes measured by asking users to rate their satisfaction with a visit. Although this seems intuitively sound, satisfaction measures are often insensitive indicators of change in visitor experiences due to changes in setting conditions (Shelby & Heberlein, 1986). In particular, a "floating baseline of satisfaction" often exists in recreation areas. Even though setting conditions alter significantly, the majority of users continue to be very satisfied (Gramann, 1992a; Shindler & Shelby, 1995). The explanation for this appears to lie in the various coping behaviors employed by visitors. In some cases, people are able to shift their use within a site, either spatially or temporally, so conditions more closely match their preferred experiences. In other cases, people might continue their normal use patterns, but make cognitive adjustments to change, e.g., by redefining the nature of the setting or of their visit. Additionally, others may tolerate a range of conditions so broad that change does not approach the threshold needed for either cognitive or behavioral coping. The consequence of all of these responses is the floating baseline of satisfaction.

Nevertheless, when temporal or intra-site displacement are impractical and when visitors' norms crystallize around a low-tolerance point for such setting conditions as high use density, those with strong attachments to uncrowded or undeveloped settings may be displaced completely. Displaced visitors also contribute to the floating baseline of satisfaction *because they are no longer in an area to express their dissatisfaction in onsite surveys*. Yet, these are the people most disadvantaged by policies that favor socially oriented, facility-dependent user groups.

Policy and Management Implications

Displacement has significant implications for managing visitor numbers (Gramann, 1992b). The 1978 National Parks and Recreation Act requires the National Park Service to set carrying capacities for all of its units (Haas, 2001). Various types of carrying capacity plans are possible. Parks might restrict visitation through private vehicle prohibitions, day-use reservations, reduced overnight capacity, or more stringent length-of-stay limits at campgrounds. Controversy over such actions is often intense. Advocates of capacity limits have argued that the primitive experiences they seek are increasingly rare in urban society and that persons most dependent on such experiences are disproportionately harmed when primitive values erode (Schreyer & Knopf,

1984). The underlying assumption is that people who prefer socially oriented settings can more easily find substitutes if they are excluded from national parks by use restrictions. Therefore, they are less dependent on a scarce resource than those who have fewer options.

In rebuttal, advocates of unrestricted use can point to the greater number of people (taxpayers and voters) served by recreation areas that have shifted toward the urban end of the opportunity spectrum and to greater accessibility for special populations, including the aged and the disabled. The economic benefits to surrounding communities buttress this argument, especially if economic conditions in an area are intractably poor.

For all these reasons, it is essential to understand coping processes. In parks where there has been substantial inter-site displacement, visitor studies will not accurately reflect all the impacts of setting changes because the people most affected are no longer in the parks to be surveyed. And if onsite surveys are limited to peak seasons, the full extent of intra-site displacement will not be detected because those visiting only during low-use seasons are excluded from the sample. Yet the reasons for temporal displacement should be of great interest to managers. Avoidance of peak-use periods may be symptomatic of an underlying problem, i.e., unenjoyable experiences during heavily used periods. Moreover, it is possible that temporal displacement may be an intermediate step to inter-site displacement, signifying again that, for those displaced, conditions have exceeded the threshold of tolerance for change.

In summary, inter-site displacement contributes to the floating baseline of satisfaction and may be one reason for the high level of experience quality often reported by national park visitors (Hoger, 2000). Managers must be alert to the possibility that satisfaction measures take an incomplete snapshot of social conditions in areas where there have been significant changes in setting characteristics. Those faced with the difficult decision of establishing and maintaining visitor capacities in the National Park System are best served by knowing not only how many satisfied users they currently serve, but how many displaced visitors they no longer serve.

Study Region

This study was conducted as a telephone survey of households in six counties of western Washington state. The counties (with their principal cities) were: Clallam (Port Angeles), King (Seattle), Kitsap (Bremerton), Pierce (Tacoma), Snohomish (Everett), and Thurston (Olympia). According to visitor surveys conducted at Mount Rainier (MORA) and Olympic (OLYM) national parks in 2000 (Van Ormer et al., 2001; Simmons et al., 2001), these six counties were the points of origin for 40% of summer visitors to the two parks. Points of origin for the remaining 60% of visitors were widely dispersed across other states and countries.

MORA is a volcanic peak straddling the crest of the Cascade Range 95 miles southeast of Seattle. In recent decades the region around the park has progressively urbanized. Good highways make it easily accessible from Tacoma and Seattle. In contrast, OLYM lies across Puget Sound on the relatively rural Olympic Peninsula. Within its boundaries are mountains, an extensive wilderness coastline, and temperate rainforests. It is reached by ferry, either from

Seattle or Victoria, British Columbia, or by highway from Tacoma or Olympia. According to the NPS (National Park Service, 2001), in the decade between 1991 and 2000 visitation to OLYM increased 21%, from 2.76 million to 3.33 million. However, since 1995 visitation has declined each year from a peak of 3.85 million. In contrast, recreational visits to MORA have remained relatively stable over the last decade, hovering between 1.29 million (1999) and 1.55 million (1991). In addition, MORA and OLYM differ in the nature of their visitation. MORA is oriented more toward day-use, recording less than half as many overnight stays as OLYM in 2000 (196,000 vs. 406,000) (National Park Service, 2001).

Research Questions

Two major research questions guided this study:

- How much spatial and temporal displacement attributed to crowding is occurring at Mount Rainier and Olympic national parks?

- How do displaced and non-displaced visitors differ in their characteristics?

Amount of Displacement

The first objective was to measure the amount of displacement occurring at MORA and OLYM due to crowding-related conditions. Both spatial and temporal displacement were investigated. This required determining how many respondents had visited one or both parks in the past, and how many had stopped visiting or had shifted their use to other times and locations within the parks. In addition, the amount and extent of crowding at each park–as perceived by respondents–was examined to provide an indication of perceived setting characteristics that might lead to displacement. Further, because displacement can occur for reasons other than crowding, additional motives for displacement were examined. Finally, the total number of households in the six-county region with members displaced by crowding was estimated. To accomplish this, sample data were extrapolated to the population of the region, as enumerated in the 2000 census. A 95% confidence interval established upper and lower bounds on this estimate of displaced households.

Description of Displaced and Non-displaced Visitors

A series of analyses compares displaced visitors with non-displaced visitors, as well as visitors displaced by crowding with those displaced for other reasons. Key descriptive variables in this investigation included use history, demographic characteristics, perceptions of crowding, recreation motives, and coping behaviors, i.e., temporal and intra-site displacement. This analysis also profiles the characteristics of two types of non-visitors: "intenders" and "non-intenders."

What Does It Mean?

The concluding section of the report revisits the theoretical discussion of crowding and displacement and discusses three important issues: 1) considerations applicable to visitor-

capacity management; 2) the significance for the theoretical understanding of displacement; and 3) considerations for how social science is conducted in the National Park Service.

Methods

Data Collection

Telephone interviews were completed with 1,000 households in western Washington state. Staff at both MORA and OLYM were given the opportunity to review the questionnaire and suggest changes. The survey was conducted using the computer-assisted telephone interviewing facilities at the Public Policy Research Institute at Texas A&M University. Interviewing began on June 8, 2001 and ended on July 24, 2001. The telephone sample was designed to be proportional to the population of the region as measured in the 2000 census. Table 1 shows the final distribution of completed interviews by county.

Telephone numbers were generated by random-digit dialing to avoid bias caused by unlisted numbers. The interview took about 20 minutes to complete. Telephoning occurred Monday through Friday from 5:30 p.m. to 8:30 p.m. (Pacific Daylight Time), on Saturday from 9:00 a.m. to 1:00 p.m. and from 1:30 p.m. to 5:30 p.m., and Sunday from 11:00 a.m. to 3:00 p.m. and from 3:30 p.m. to 7:30 p.m. A total of 6,290 telephone numbers were called to complete 1,000 interviews. Respondents were selected by asking which household member 18 years of age or older had had the most recent birthday. That person was then interviewed. If the selected person was not at home, a call-back time was arranged. In addition, attempts were made to convert initial refusals to completed interviews using call backs by the most experienced interviewers.

Table 1: Distribution of telephone sample by county

County (principal city)	2000 population (%)	Sample size (%)
Clallam (Port Angeles)	64525 (1.8)	17 (1.7)
King (Seattle)	1737034 (49.0)	482 (48.2)
Kitsap (Bremerton)	231969 (6.5)	64 (6.4)
Pierce (Tacoma)	700820 (19.8)	186 (18.6)
Snohomish (Everett)	606024 (17.1)	177 (17.7)
Thurston (Olympia)	207355 (5.8)	55 (5.5)
Not identified	—	19 (1.9)
TOTAL	3547727 (100.0)	1000 (100.0)

Response Rates

Response rates for telephone surveys can be calculated in several ways. Two of the rates described by Groves and Lyberg (1988) are reported here. The first is the “contact rate.” This

assesses how well the survey performed in contacting all eligible respondents, regardless of whether they completed an interview. The second is the "cooperation rate," which evaluates how well the interviewers persuaded eligible respondents who were contacted to participate in the survey.

The figures shown in Table 2 were used in computing response rates. The contact rate, i.e., (CI+TI+R+NI) ÷ (CI+TI+R+NI+NA), was 53.7%. The cooperation rate, i.e., CI ÷ (CI+TI+R), was 38.0%.

Table 2: Final disposition of telephone sample

Disposition	Number	Percent
Completed interviews (CI)	1000	16
No answer (NA)	647	10.3
No answer on call backs (NA)	488	7.8
No answer, busy (NA)	61	1.0
No answer, answering machine (NA)	183	2.9
No answer, disconnected (NA)	928	14.7
Not eligible (fax, etc.) (NE)	755	12.0
Not eligible (business/government) (NE)	554	8.8
Other non-interviewed–deaf/language (NI)	45	0.7
Refused (R)	1561	24.8
Terminated interviews (TI)	68	1.1
TOTALS	6290	100.0

The relatively low cooperation from eligible households (38.0%) is due almost entirely to a refusal rate of 24.8%. Refusals may have been high because of the narrow focus of the survey on visitation to Mount Rainier and Olympic national parks.

To determine if serious bias in the sample resulted from the refusal rate, characteristics of those interviewed were compared with the same characteristics in the six counties' overall population, as described in the 2000 census. This was done for all variables for which comparable 2000 census data were available at the time of the analysis.

The sample included a higher proportion of females (56.9%) than the population (50.7%). It also had fewer persons 20-34 years of age (24.2%) than were counted in the 2000 census (30.2%). In terms of ethnicity, the percentage of non-Hispanic respondents 18 years of age and older (97.9%) closely matched the population profile (95.6%). The largest discrepancy occurred for race.

Among those listing only one race, the telephone sample over-represented whites in the population (94.4% vs. 85.3%) and under-represented Asians (2.5% vs. 8.5%). Proportions of African Americans, Native Americans, and Pacific Islanders were similar in the sample and the population.

In summary, the respondents as a whole were somewhat older, more likely to be female, and more likely to be white than the population of the six-county region. Some of this difference may be attributed to the survey's refusal rate, although some may also be due to the exclusion from the sample of households without telephones.

Measurement of Key Variables

Inter-site displacement was measured by asking respondents how likely it was they would visit each park in the foreseeable future. Responses categories were "very likely," "somewhat likely," "somewhat unlikely," "very unlikely," and "don't know." Those who answered either somewhat or very unlikely *and* who were previous visitors to the parks were considered displaced. These persons then indicated whether or not each of 17 reasons for not planning a future visit applied to them. The reasons included crowding-related items (e.g., "too many visitors in the park") and non-crowding items (e.g., "my health won't permit it"). Respondents also had the opportunity to specify up to two additional reasons for not returning to either park in the future.

The measure of intra-site displacement asked respondents if they had visited a place in OLYM or MORA specifically to avoid crowds. A follow-up question asked which areas these were.

Temporal displacement was measured by asking previous users if they had visited MORA or OLYM during a low-use period, such as spring or fall or a non-weekend day. Those who had were asked to specify the time period and if any of nine reasons for such a visit applied to them. As before, these reasons included crowding items (e.g., to experience an uncrowded park) and non-crowding items (e.g., to take advantage of lower prices).

Both the amount and extent of perceived crowding at MORA and OLYM were measured. The "crowding-amount" question read, "On your most recent visit, how crowded did you feel Mount Rainier (or Olympic) National Park was–not at all crowded, a little crowded, moderately crowded, very crowded, or extremely crowded?" The "crowding-extent" question asked, "Do you feel Mount Rainier (or Olympic) National Park is ever *too crowded* for an enjoyable visit–never too crowded, too crowded some of the time, too crowded most of the time, too crowded all of the time?" Persons who had not visited a park were asked similar questions, but introduced with the phrase, "Based on what you have heard . . ." Response categories matched those used for visitors.

Statistical Analysis

The MORA and OLYM visitors are not separate samples, but a single sample of households responding to questions about both parks. For comparisons in which the *same respondents* answered questions about each park (e.g., year of last visit), paired-sample t-tests are used to evaluate mean differences. However, fewer persons visited OLYM (N = 677) than MORA (N =

800). This means that paired-sample analyses sometimes excluded substantial numbers of MORA visitors, since only those visiting both parks could be compared. Because of this, paired-sample t-tests are not reported if they misrepresent the full sample of respondents visiting either park. For comparisons involving mutually exclusive sub-samples, e.g., displaced and non-displaced visitors, independent t-tests are employed.

Amount of Displacement

Previous Visits

Respondents were significantly more likely to have visited MORA than OLYM (paired-sample $t = -7.3$, $df = 986$, $p < .001$).[2] One reason for this may be the proximity of MORA to the large population centers on the eastern shore of Puget Sound. Even so, a majority had traveled to both parks (Table 3). Eighty percent reported a trip to MORA, while 67.7% had visited OLYM. A very small number of respondents did not know if they had been to either park.

Table 3: Previous visits to MORA and OLYM (N = 1000)

Previous visit	Number	Percent
MORA	800	80
MORA, but not OLYM	185	18.5
MORA (don't know)	3	0.3
OLYM	677	67.7
OLYM, but not MORA	71	7.1
OLYM (don't know)	10	1.0
Both MORA and OLYM	606	60.6
Neither MORA nor OLYM	125	12.5

Past visitors were asked the year of their most recent trip to each park. Almost half of those who had been to MORA (49.3%) had visited within the past three years (i.e., 1999-2001). The modal year was 2000, reported by 25.0%. Similarly, almost as many respondents who had visited OLYM had done so within the past three years (46.8%). The modal year for this park was also 2000, reported by 22.2%. There were no statistically significant differences in this comparison.

[2] A "p" value of less than .001 means that the probability of the relationship found in the sample *not* existing in the population the sample represents is less than one in 1,000. By convention, p values of .05 or less are considered statistically "significant," meaning there is a high likelihood (95 chances in 100) that the observed result in the sample *does* exist in the population. The p value is a function of the "t" statistic and df (degrees of freedom). The "independent" t-statistic reflects how much two sub-samples (e.g., visitors and non-visitors) differ in their response to a *single* item, such as a question about crowding. The "paired-sample" t-statistic reflects how much the same sample differs in its response to *two* items, such as questions about crowding at MORA and at OLYM.

Crowding Perceptions

Despite the fact that MORA receives less visitation than OLYM, Figure 1 shows that respondents felt MORA was more crowded during their last visit (paired-sample $t = 13.5$, $df = 575$, $p < .001$). A majority (58.1%) reported feeling not all crowded during their last trip to OLYM, compared to 32.9% for MORA. In contrast, 30.5% of those visiting both parks said that MORA had been moderately crowded, compared to only 15.1% for OLYM. One explanation for this is that OLYM is a much larger park than MORA, and visitation is more dispersed across widely separated points of visitor concentration. Thus, use density may be lower at OLYM, even though visitation is higher.

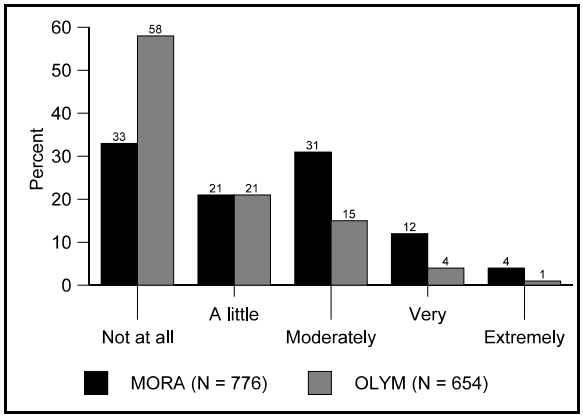

Figure 1 Crowding amount at both parks (visitors only).

Among non-visitors, crowding perceptions tended to mirror those of visitors: OLYM was viewed as less crowded than MORA. However, most non-visitors reported no opinions about crowding at either park (Figure 2).

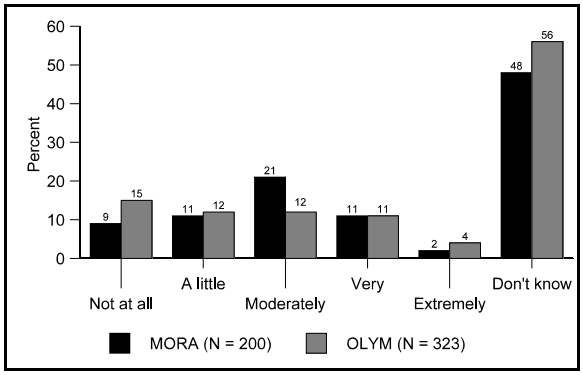

Figure 2 Crowding amount at both parks (non-visitors only).

Respondents visiting the parks were also asked if they felt that MORA or OLYM were ever *too* crowded for enjoyable recreation. Results are shown in Figure 3. As in the previous comparison, OLYM was reported to have less crowding than MORA. Almost three-fourths of

OLYM visitors (73.1%) said the park was never too crowded for enjoyable recreation, compared to 48.6% of MORA visitors. In contrast, 40.3% of those who had been to MORA felt that it was too crowded some of the time. The corresponding figure for OLYM was only 23.1% (paired-sample $t = 10.3$, $df = 485$, $p < .001$). Non-visitors also tended to believe that MORA was too crowded for enjoyable recreation more often than OLYM, but, again, the largest number of non-visitors had no opinion about the extent of crowding at either park.

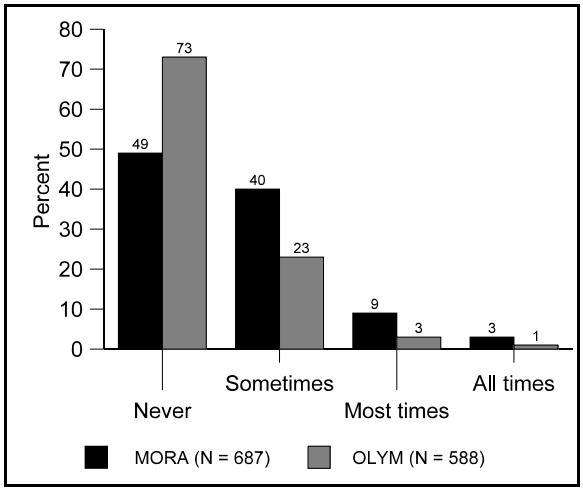

Figure 3 Crowding extent at both parks (visitors only).

Inter-site Displacement

By cross-tabulating questions about past visits with future plans, four categories of respondents were identified for each park (Figure 4). Those who made previous visits, but did not plan to return in the future, were labeled "displaced visitors."[3] In contrast, past visitors intending to return were "non-displaced." "Non-intenders" were those with no previous trips and no plans to visit, while "intenders" had not yet visited, but did plan on going in the foreseeable future. For both parks, the most common respondent type was the non-displaced visitor (63.9% at MORA and 54.9% at OLYM). For MORA, displaced visitors made up 16.4% of all those interviewed (including non-visitors) and 20.4% of previous visitors. At OLYM displaced visitors represented 14.3% of the entire sample and 20.6% of previous visitors.

[3]This typology departs from the standard definition of displaced visitors, i.e., those who stopped visiting because of perceived changes in the setting they were displaced from. The former visitors in this study may not be planning return trips for reasons unrelated to crowding or other setting changes. These could be time constraints, health concerns, and so on. The advantage of the typology used here is that it allows the relationship between perceived setting conditions and displacement to be tested empirically, rather than made true by definition.

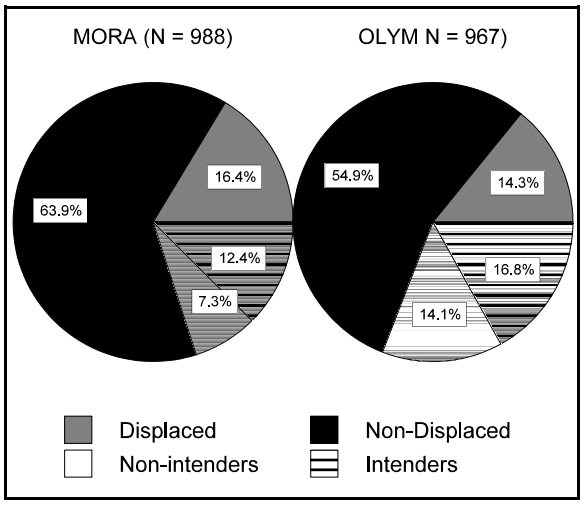

Figure 4 Respondent types (Ns do not equal 1000 because some respondents did not answer one or both questions about past or future visits).

Reasons for Inter-site Displacement

A park's visitors may be displaced for many reasons. The research question central to this study was whether or not crowding and associated factors played an important role in that behavior. Displaced visitors were given a list of reasons for not returning and asked which ones applied to them. Responses are tabulated in Table 4 for MORA and Table 5 for OLYM. Because respondents could choose more than one item, totals sum to more than 100%.

The top three reasons for not returning were similar for both MORA and OLYM. Lack of time, feeling the park was too far away, and not having family or friends who wanted to go figured prominently at both parks. However, other frequently chosen reasons were crowding-related. These included too many visitors, difficulty getting campsites or lodging, and traffic congestion in the parks. Table 4 shows that at MORA traffic congestion (24.8%) and too many visitors (24.1%) ranked fourth and fifth out of 17 reasons visitors thought it unlikely they would return. Difficulty getting lodging or campsites ranked sixth (22.4%). However, only 8.7% of displaced visitors felt that MORA was too developed.

Table 4: Reasons unlikely to visit MORA in future (previous visitors only)

Reason (item N)	Number	Percent
Not enough time to visit (159)	63	39.6
Park is too far away (162)	57	35.2
Family/friends won't go (157)	43	27.4
Traffic congestion in park (149)	37	24.8
Too many visitors in park (158)	38	24.1
Hard to get campsites/lodging (125)	28	22.4
Health won't permit it (162)	36	22.2
Not interested in national parks (160)	30	18.8
Park entrance fee too high (145)	18	12.4
Costs too much to get there (158)	18	11.4
Park is too developed (150)	13	8.7
Unreasonable regulations (151)	12	7.9
Would not feel welcome (161)	7	4.3
Would not feel safe (156)	6	3.8
Never heard of MORA (162)	5	3.1
Park is too primitive (151)	4	2.6
Poor condition of natural resources (152)	3	2.0

Crowding-related reasons also ranked relatively high as explanations for displacement from OLYM. Nevertheless, a smaller percentage of those who had been to OLYM offered these as reasons for not planning to return.

Table 5: Reasons unlikely to visit OLYM in future (previous visitors only)

Reason (item N)	Number	Percent
Not enough time to visit (136)	63	46.3
Park is too far away (134)	63	47.0
Family/friends won't go (131)	35	26.7
Traffic congestion in park (131)	19	14.5
Too many visitors in park (130)	19	14.6
Hard to get campsites/lodging (115)	24	20.9
Health won't permit it (136)	30	22.1
Not interested in national parks (136)	11	8.1
Park entrance fee too high (125)	10	8.0
Costs too much to get there (136)	13	9.6
Park is too developed (128)	6	4.7
Unreasonable regulations (131)	4	3.1
Would not feel welcome (136)	4	2.9
Would not feel safe (134)	7	5.2
Never heard of OLYM (135)	2	1.5
Park is too primitive (129)	5	3.9
Poor condition of natural resources (133)	4	3.0

A sub-sample of 62 respondents were displaced from both MORA and OLYM. Their reasons for not returning to each park were compared. In most cases, the responses did not differ significantly. However, Figure 5 shows two exceptions to this: respondents were more likely to say that too many visitors and too much traffic congestion were reasons for displacement from MORA (paired-sample t, too many visitors = -2.3, df = 55, p = .02; paired-sample t, traffic congestion = -2.8, df = 56, p = .007). Again, this is consistent with the earlier finding that respondents thought MORA was more crowded than OLYM.

Respondents were asked in an open-ended question if there were any other reasons they did not intend to visit the parks in the future. Except for a few persons who said they were moving from the area, answers to this question mirrored those shown in tables 4 and 5.

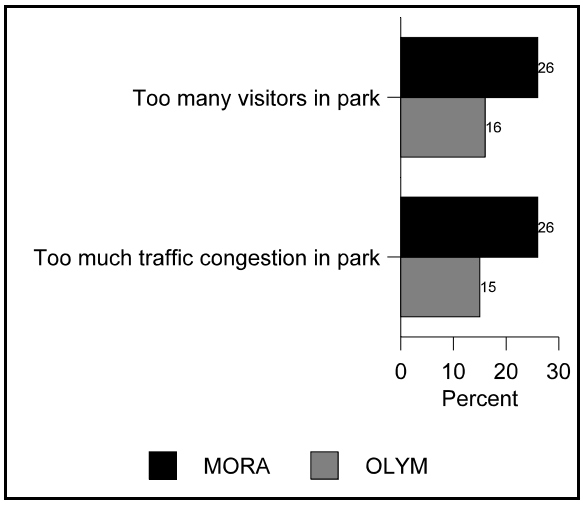

Figure 5 Percent of respondents displaced from both parks because of traffic congestion and too many visitors (N = 62).

Finally, respondents were given an opportunity to identify the most important reason they were unlikely to visit either park in the foreseeable future (tables 6 and 7). A large percentage of displaced respondents did not reply to this question, possibly because they believed they had already answered it in the close-ended format or because they could not think of a single "most important" reason. Among those who did answer, crowding-related factors were mentioned by only 4.3% of those displaced from MORA. Other reasons reported as "most important" were time pressures, health concerns, and different preferences or interests. Crowding-related factors were not mentioned as most important reasons for displacement from OLYM. Nevertheless, the high non-response to this item limits its usefulness as a measure of displacement causes.

Table 6: Most important reason unlikely to visit MORA in future (previous visitors unlikely to return)

Reason	Number	Percent
No response	63	38.9
Demanding job/time constraints	19	11.7
No interest	18	11.1
Limited health/abilities	18	11.1
Different preference	9	5.6
Too many people/traffic	7	4.3
No one to go with	7	4.3
Too great a distance	6	3.7
Too much money	4	2.5
Moving to another area	3	1.9
Miscellaneous other reasons	8	4.9
TOTAL	162	100.0

Table 7: Most important reason unlikely to visit OLYM in future (previous visitors unlikely to return)

Reason	Number	Percent
No response	60	43.5
Too old/health	18	13.0
Trip too long	17	12.3
No interest	11	8.0
Demanding job/time constraints	10	7.2
Personal transportation problems	6	4.3
Other preferences	4	2.9
Miscellaneous other reasons	12	8.7
TOTAL	138	100.0

Persons reporting displacement from MORA and OLYM were divided into two categories: those displaced because of crowding and those displaced for other reasons. The four crowding-associated items used in this classification were:1) too many visitors in the park, 2) difficulty

getting campsites and lodging, 3) too much development, and 4) traffic congestion in the park. Respondents displaced for one or more of these reasons made up 34.6% of MORA's displaced visitors (Figure 6) and 7.0% of all the park's previous visitors (displaced plus non-displaced). For OLYM, the figures were 29.7% (Figure 7) and 6.1%.

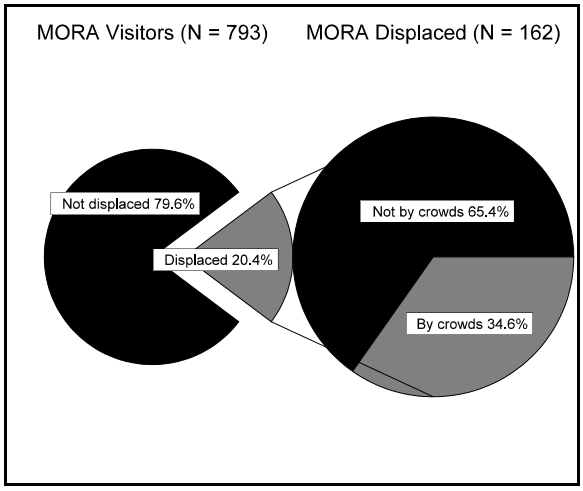

Figure 6 MORA visitors displaced by crowding and non-crowding factors

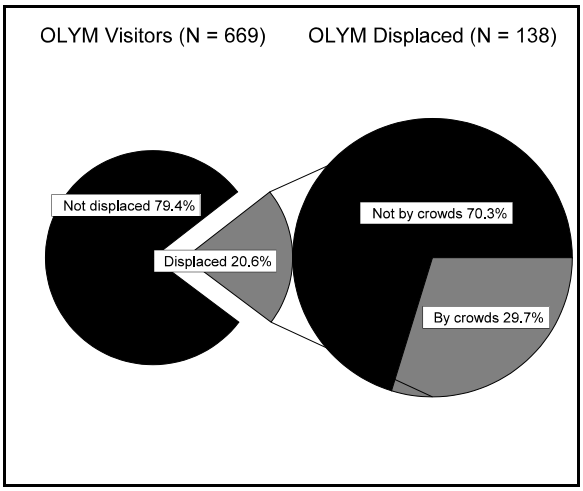

Figure 7 OLYM visitors displaced by crowding and non-crowding factors.

Population Estimates of Displacement Due to Crowding

Estimates of displacement in the region can be computed by applying relevant sample proportions to the six counties' total population. The result is the total number of households (with telephones) in the region with past visitors displaced from either park solely because of crowding-related conditions, i.e., too many visitors, too much development, difficulty getting

campsites or lodging, and traffic congestion. (Table 8). The survey revealed that 5.6%[4] of the 1,000 respondents were previous visitors to MORA who did not plan to return because of one or more of the crowding-related reasons. The figure for OLYM was 4.1% of the1,000 respondents.

Table 8: Number of households in six Washington counties displaced by crowding

Park	Percent of sample (95% confidence interval)	Population estimate	Lower bound of estimate	Upper bound of estimate
MORA	5.6 (4.2 - 7.0)	199,000	149,000	248,000
OLYM	4.1 (2.9 - 5.3)	145,000	103,000	188,000

Note: Percents include past visitors who reported traffic congestion, too much development, too many visitors, and/or difficulty getting camping or lodging as reasons for not visiting in the foreseeable future.

Note: Total crowding-related displacement from the two parks cannot be summed from these two estimates, since some respondents were displaced from both units and would be double-counted.

According to the 2000 census, the six counties surveyed had a combined population of 3,547,727. Applying sample proportions to this figure translates into an estimate of 199,000 households in the region with an adult displaced from MORA due to crowding and 145,000 households with an adult displaced from OLYM. However, because survey estimates fluctuate predictably from sample to sample, the 95% confidence interval for these estimates is also reported.[5] This confidence interval provides conservative and liberal bounds on the sample estimate. We are 95% confident that the number of households displaced from MORA by crowding is between 149,000 and 248,000. The 95% confidence interval for OLYM is 103,000 to 188,000. Of course, these population estimates do not include displaced persons who live in other Washington counties, other states (e.g., Oregon), or other countries (e.g., British Columbia, Canada).

Intra-site and Temporal Displacement

One explanation for the modest amount of inter-site displacement from MORA and OLYM may be the high incidence of intra-site and temporal displacement. The importance of these forms of coping lies in their ability to provide visitors with satisfying experiences, even though popular locations or peak periods are avoided. The amounts of intra-site and temporal displacement occurring at MORA and OLYM are displayed in Figure 8.

[4] A1991 telephone survey in central and southern California (Gramann, 1992a) found that 5.9% of households in that region included an adult displaced from Yosemite National Park, at least in part due to crowding.

[5] A single sample of a population can overestimate or underestimate the true number of displaced households in the population. This "sampling error" is magnified during the multiplication process extrapolating to the total number of displaced households. However, for large representative samples (such as the 1,000 in this survey), it is virtually certain that the true number of displaced households falls within the 95% confidence interval.

Past visitors were asked if they had ever gone to locations in either park specifically to avoid crowds. In an open-ended follow-up they were asked to name these areas. Visitors were also queried about visiting the parks during low-use periods, such as spring, fall, or a midweek day and the reasons for this.

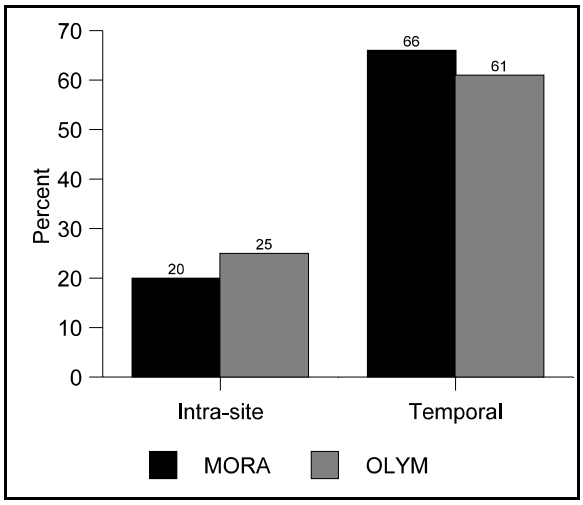

Figure 8 Intra-site and temporal displacement at the two parks (as percent of previous visitors).

Slightly more visitors reported going to a lesser-used area of OLYM (24.7%) than MORA (20.3%), although this difference was not statistically significant. At OLYM, the most commonly visited low-use area was the wilderness coast, followed by the backcountry and the Staircase area in the southeastern corner of the park. At MORA, the backcountry topped the list of low-use locations visited to avoid crowds. This was followed by Lake Mowich and Ipsut Creek, both located in the relatively remote northwest section of the park.

Temporal displacement was much more common at MORA and OLYM than was intra-site displacement. Among those visiting both parks, somewhat more respondents (65.7%) reported using this strategy at MORA than at OLYM (60.6%) (paired-sample $t = -4.6$, $df = 577$, $p < .001$). One explanation for the popularity of temporal displacement is that it lets people experience approximately the same resource conditions, but under more preferred social conditions. Another likely reason is that there are simply more low-use periods available to visitors (e.g., weekdays) than there are accessible low-use sites. At both parks, fall and spring were the most frequently reported lesser-use periods for visits.

Reasons for Temporal Displacement

Respondents indicated similar reasons for temporal displacement at both MORA and OLYM, the major distinction being that avoiding ferry traffic was mentioned almost twice as often for OLYM (Figure 9). At both parks, the most frequent explanation for visiting during low-use periods was convenience (63.1% at MORA and 71.3% at OLYM). Following this came the

desire to experience a natural park and an uncrowded park. Other important motives for temporal displacement included participating in seasonal recreation activities and greater ease in finding lodging or camping. Taking advantage of off-peak prices and avoiding entrance fees were unimportant reasons at both parks.

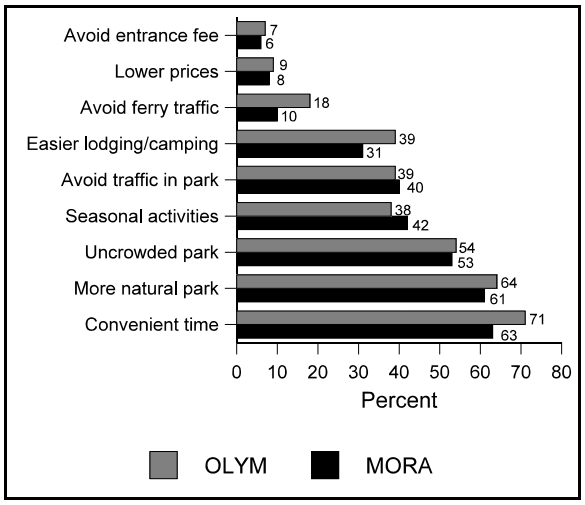

Figure 9 Reasons for visiting during low-use periods as percent of previous visitors (Ns vary).

A series of paired-sample t-tests using the sub-group of 285 respondents temporally displaced from both parks showed that convenience and avoiding ferry traffic were reported significantly more often as reasons for temporal displacement at OLYM than at MORA. Conversely, avoiding park traffic and participating in seasonal recreation activities were mentioned more frequently as reasons for visiting MORA during lesser-used times.

Description of Displaced and Non-displaced Visitors

In this section, displaced and non-displaced visitors, as well as intenders and non-intenders, are described in terms of their recency of visits, demographic characteristics, crowding perceptions, recreation motives, and coping behaviors. Recall that non-intenders are those who have not visited a park and have no plans to visit, while intenders are non-visitors who are somewhat or very likely to visit either MORA or OLYM in the foreseeable future. In some comparisons that follow, intenders and non-intenders are excluded because the analysis by its nature is limited to past users.

Year of Most Recent Visit

The mean year of most recent visit by those displaced from MORA was 1987, compared to 1996 for non-displaced visitors (independent-sample $t = -8.22$, $df = 765$, $p < .001$). For OLYM, the corresponding means were 1988 and 1996 ($t = -7.07$, $df = 634$, $p < .001$). In the year of the survey (2001), an average of more than a decade had passed since persons displaced from MORA and OLYM had visited those parks.

This finding has important implications for the validity of displacement estimates based on self-reports of intended behavior. In the case of MORA and OLYM, future intentions to not return would appear to be valid measures of displacement since those saying they would not visit the parks in the foreseeable future had, on average, not been to either park for more than ten years. This increases confidence that present intentions to not visit will be accurately predict future behavior.

No statistically significant differences existed in year of most recent visit between those displaced because of crowding and those displaced for other reasons. For both groups and both parks, the most recent visit occurred between 1986 and 1990.

Age, Education, and Income

Displaced visitors, non-displaced visitors, intenders, and non-intenders differed significantly in their age, education, and household income (Table 9). At both MORA and OLYM, intenders were younger than either non-intenders or non-displaced visitors, who were in turn younger than displaced visitors. The same pattern held for OLYM.

MORA non-intenders had completed fewer years of schooling than either intenders or non-displaced visitors, although on average all four respondent types reported at least one year of post-secondary education. Displaced visitors did not differ significantly from the other types on education. The pattern was slightly different for OLYM: non-intenders had less education than the other three respondent types.

Table 9: Demographic characteristics of respondent types at both parks

Respondent type	Age (yrs.)	Education (yrs.)	Income (x1000)
MORA displaced	56.3	14.2	$40 - $49.9
MORA non-displaced	45.7	14.7	$50 - $59.9
MORA non-intender	45.0	13.7	$30 - $39.9
MORA intender	36.9	14.5	$40 - $49.9
OLYM displaced	56.1	14.5	$40 - $49.9
OLYM non-displaced	47.0	14.9	$50 - $59.9
OLYM non-intender	44.4	13.4	$40 - $49.9
OLYM intender	37.3	14.5	$40 - $49.9
MORA F (age) = 35.6, df = 3/961, p < .001		OLYM F (age) = 35.4, df = 3/941, p < .001	
MORA F (educ.) = 4.5, df = 3/ 984, p = .004		OLYM F (educ.) = 13.7, df = 3/963, p < .001	
MORA F (income) = 10.2, df = 3/842, p < .001		OLYM F (income) = 13.8, df = 3/828, p < .001	

Finally, MORA non-intenders reported significantly lower household incomes than either intenders, displaced visitors, or non-displaced visitors. Again, the pattern differed slightly for

OLYM. Non-intenders had less income than displaced visitors and intenders, who in turn reported lower incomes than non-displaced visitors.

To summarize, for both parks the intenders ranked lowest in age, while non-intenders ranked lowest in education and household income. Stated another way, the two types of non-visitors were younger, tended to have less schooling, and were less affluent than the two types of visitors. In contrast, respondents displaced from MORA and OLYM were the oldest groups (on average, 20 years older than intenders). In both cases, the highest income levels belonged to non-displaced visitors.

Ethnicity and Race

A significant association existed between Hispanic ethnicity and MORA respondent type (chi-square = 8.9, df = 3, p = .03).[6] MORA's intenders and non-intenders (i.e., non-visitors) were more likely to be Latino than were the park's displaced and non-displaced visitors. Nevertheless, this relationship was not strong, primarily because Hispanic respondents constituted such a small proportion of the overall sample. Hispanic ethnicity did not vary significantly across the four respondents types for OLYM.

Figure 10 shows that MORA non-visitors (i.e., non-intenders and intenders) were about three times as likely to be non-white than current and former visitors (i.e., non-displaced and displaced; chi-square = 20.8, df = 3, p < .001). A slightly stronger association existed between race and OLYM respondent type (Figure 11). In this case, non-intenders were almost four times as likely to be non-white than the park's visitors (chi-square = 32.9, df = 3, p < .001).

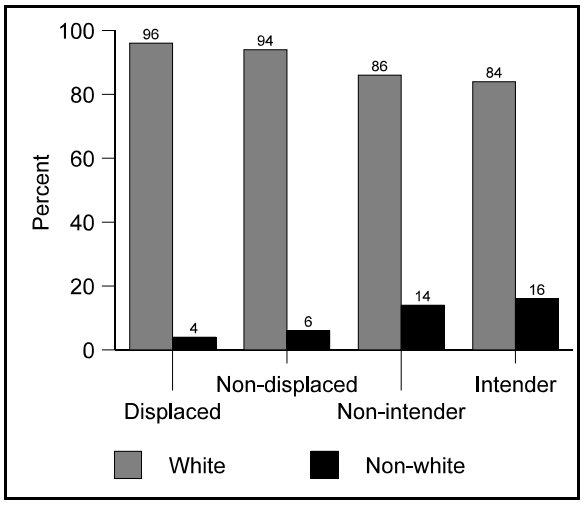

Figure 10 MORA respondent type by race (N = 961).

[6]Chi-square is a measure of association between "categorical" variables, such as race and visitor type.

The results for race and ethnicity are consistent with previous research on ethnic and racial patterns in outdoor recreation (Gramann, 1996). In general, Hispanic and non-white persons tend to participate less than non-Hispanic whites in many wildland recreation activities, and are less likely to travel to distant recreation areas for reasons that include cost, low awareness or interest, and lack of personal transportation (Gramann et al., 2001).

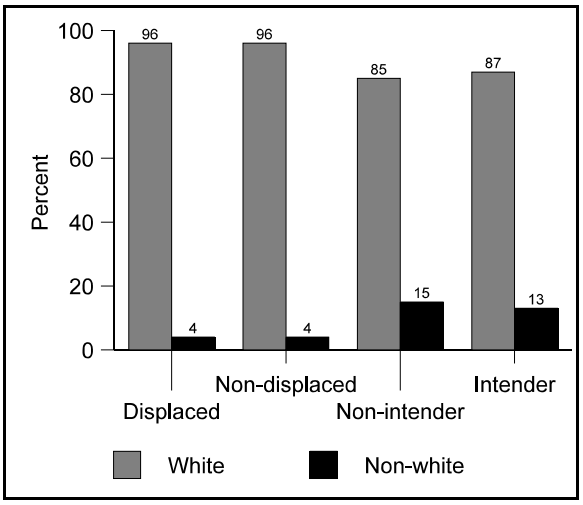

Figure 11 OLYM respondent type by race (N = 940).

Crowding Perceptions

Figure 12 indicates a strong relationship between the amount of crowding perceived on the most recent visit and the reasons for displacement among MORA visitors. Over 40% of those displaced for reasons other than crowding felt that MORA was not at all crowded on their last trip compared to 16.7% of crowding-displaced respondents (chi-square = 14.4, df = 4, p = .006).

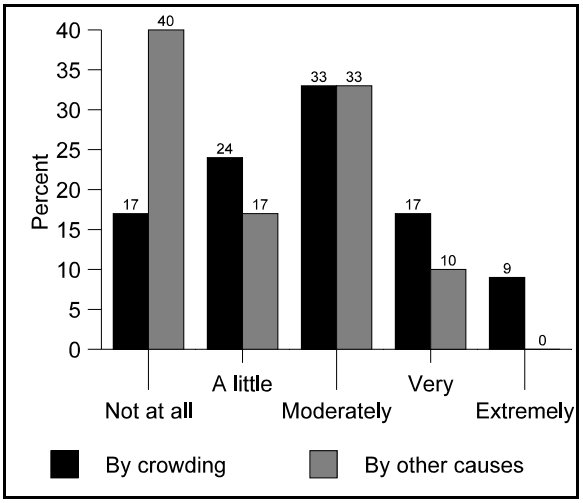

Figure 12 MORA crowding amount by reasons for displacement (N = 126).

In contrast, 26% of those displaced by crowding rated MORA as either very crowded or extremely crowded, compared to just 10% of visitors displaced for other reasons.

An even stronger association emerged when examining the extent of crowding (Figure 13). More than two-thirds of those displaced for reasons other than crowds (67.9%) said that MORA was never too crowded for enjoyable recreation, compared to less than one-fourth of crowding-displaced visitors (chi-square = 23.9, df = 3, $p < .001$). At the other extreme, 38% of the crowding-displaced respondents felt that MORA was too crowded most or all of the time. Only 7.1% of noncrowding-displaced visitors believed this.

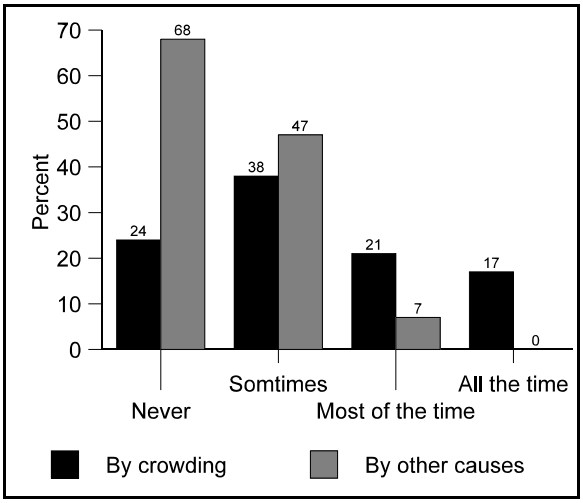

Figure 13 MORA crowding extent by reasons for displacement (N = 98).

Comparable patterns appeared when examining respondents displaced from OLYM. In Figure 14, 16.2% of crowding-displaced visitors said that OLYM was either very crowded or extremely crowded on their last visit, compared to just 1.4% of those displaced for non-crowding reasons (chi-square = 22.1, df = 4, $p < .001$). A similar pattern occurred for crowding extent (Figure 15). Respondents displaced by crowds were much more likely to feel that OLYM was too crowded some or most of the time than were other displaced visitors (chi-square = 13.2, df = 2, $p = .001$).

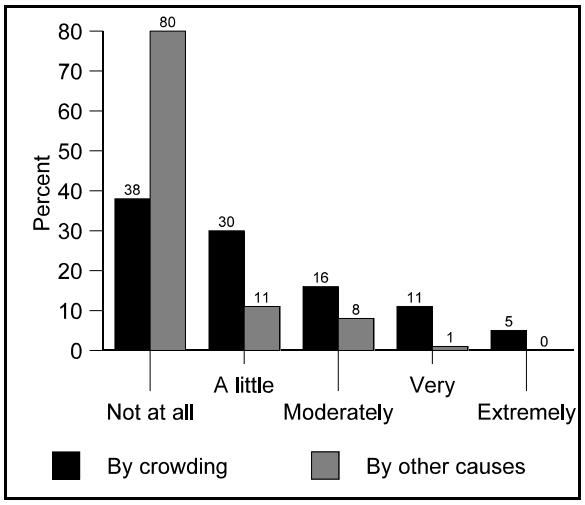

Figure 14 OLYM crowding amount by reasons for displacement (N = 111).

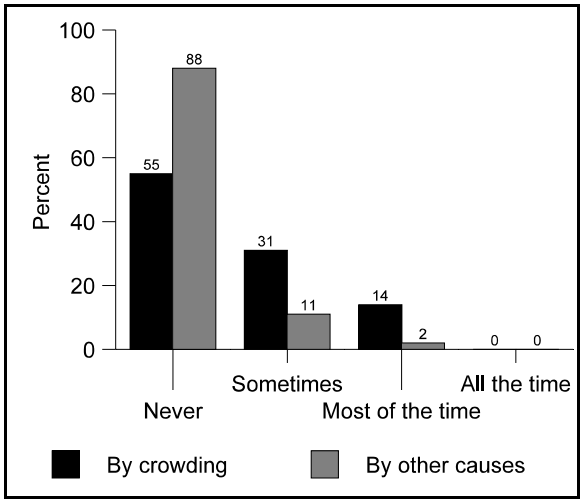

Figure 15 OLYM crowding extent by reasons for displacement (N = 94).

Recreation Motives

Respondents rated the importance of 22 motives for their favorite outdoor recreation activity using Driver's Recreation Experience Preference scales (Manfredo et al., 1996). The purpose was to determine if the important motives of crowding-displaced visitors were more sensitive to crowding than those of visitors displaced for other reasons. At MORA, six recreation motives were significantly more important to the group displaced by crowding (Table 10). Four of these involved being in nature: 1) gaining a better appreciation of nature, 2) enjoying the smells and sounds of nature, 3) being close to nature, and 4) learning more about nature. A fifth referred to crowds explicitly: getting away from crowded situations. The sixth, experiencing open space,

seems linked both to nature and escaping crowds. MORA visitors displaced by crowding were more likely to engage in recreation to avoid crowds and be in natural areas than those displaced for other reasons.

Table 10: Independent t-tests of motives for favorite outdoor recreation activity, (crowding-displaced and noncrowding-displaced MORA visitors)

Motive	t	df	Sig.	More important to:
Getting exercise	-.57	126	.57	No difference
Getting away from the demands of life	1.76	124	.08	No difference
Doing something with the family	1.2	122	.24	No difference
Gaining a better appreciation of nature	2.3	125	.02	Crowding-displaced
Releasing or reducing tension	.38	125	.71	No difference
Resting physically	.56	117	.58	No difference
Getting away from crowded situations	2.2	123	.03	Crowding-displaced
Experiencing excitement	1.1	125	.27	No difference
Meeting new people	1.1	123	.27	No difference
Enjoying the smells and sounds of nature	2.8	124	.007	Crowding-displaced
Keeping physically fit	-1.2	126	.22	No difference
Experiencing tranquility	1.6	124	.11	No difference
Being with respectful people	.30	122	.77	No difference
Being close to nature	2.5	125	.01	Crowding-displaced
Talking to new and varied people	.63	123	.53	No difference
Experiencing open space	2.9	124	.005	Crowding-displaced
Feeling exhilaration	.81	125	.42	No difference
Being near considerate people	.63	122	.53	No difference
Relaxing physically	1.1	122	.29	No difference
Being where it is quiet	1.8	125	.08	No difference
Bringing the family closer together	1.6	119	.12	No difference
Learning more about nature	3.5	125	.001	Crowding-displaced

A similar analysis compared the recreation motives of respondents displaced from OLYM. Only three motives distinguished those who were crowding-displaced from those displaced for other

reasons. These were getting away from crowded situations, learning more about nature, and bringing the family closer together. The first two are identical to motives in the MORA analysis. The reason for the association between the third motive and displacement due to crowding is unclear.

Intra-site and Temporal Displacement

An earlier analysis showed that temporal displacement was much more common among all MORA visitors than intra-site displacement. Figure 16 reveals the same pattern when comparing displaced and non-displaced MORA visitors. (Item nonresponse reduced the sample sizes for some comparisons.) Both types of displaced visitors were more likely to have used temporal displacement than intra-site displacement.

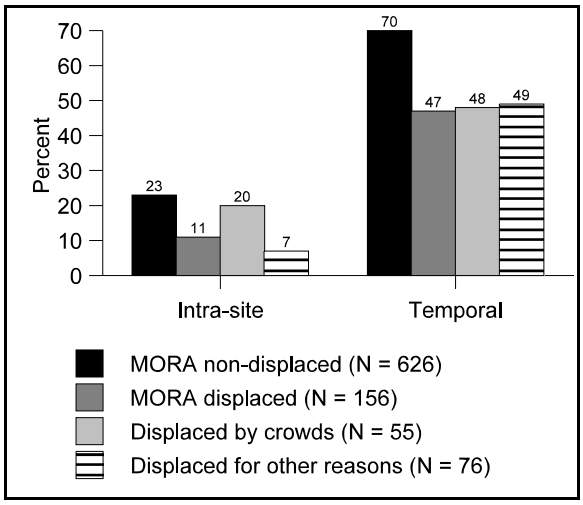

Figure 16 MORA visitor type by intra-site and temporal displacement behavior.

The first two columns in both clusters of Figure 16 compare non-displaced MORA visitors with those reporting inter-site displacement. The third and fourth columns compare visitors who were displaced by crowding with those displaced for other reasons.

Non-displaced visitors were twice as likely to use intra-site displacement during a previous trip than were displaced visitors (22.8% vs. 10.9%, chi-square = 11.0, df = 1, p = .001). They were also significantly more likely to employ temporal displacement during a prior trip (69.8% vs. 47.0%, chi-square = 27.7, df = 1, p < .001).

Comparing MORA visitors displaced for crowding-related reasons with those displaced by other causes produces somewhat different results. Although the crowding-displaced users were more likely to report intra-site displacement (20.0% vs. 6.6%, chi-square = 5.4, df = 1 p = .02), this was not true for temporal displacement. Almost half of both subgroups had visited the park during low-use periods. Thus, although temporal displacement was more common than visiting

a lesser-used site at MORA, it was unimportant in distinguishing past visitors displaced by crowds from those displaced for other reasons.

Figure 17 repeats the analysis for OLYM. As before, the first two columns in both clusters compare non-displaced OLYM visitors with visitors reporting inter-site displacement. The third and fourth columns compare those who were displaced by crowding with those displaced for other reasons. The pattern is very similar to that for MORA, although the associations are weaker. Non-displaced OLYM visitors were twice as likely to use an intra-site displacement strategy during a previous visit than were displaced visitors (27.7% vs. 13.7%, chi-square = 10.9, df = 1, p = .001), and they were significantly more likely to employ a temporal displacement strategy (63.9% vs. 48.8%, chi-square = 9.8, df = 1, p < .002).

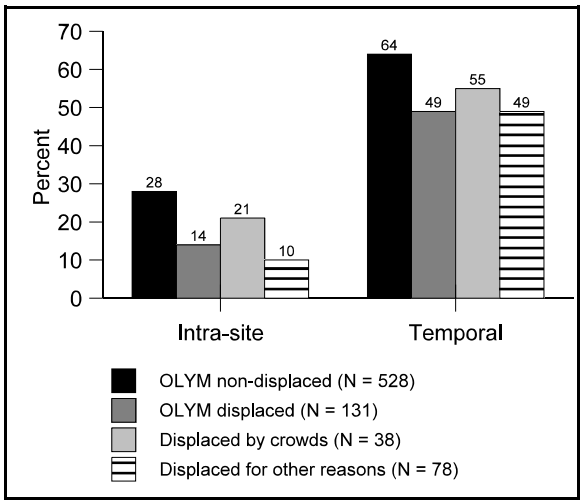

Figure 17 OLYM visitor type by intra-site and temporal displacement behavior.

Comparing OLYM visitors displaced for crowding-related reasons with those displaced by other causes yielded insignificant results. Neither group was statistically more likely to use intra-site or temporal displacement more than the other. In a familiar pattern, temporal displacement was more common than intra-site displacement at OLYM, but it cannot be concluded that one group of displaced visitors was more likely than the other to use a specific coping behavior.

Discussion

Considerations for Visitor Capacity Management

Haas (2001) argues that the term "carrying capacity" has outlived its usefulness. He suggests "visitor capacity" be used instead because "capacity" does not mislead the public about the need for capacities in parks, and because "visitor" reflects the privileged use of national parks for recreational, as well as nonrecreational, purposes. Haas also points out that the older term continues to be mired in the notion that a "magic number" exists that represents the social carrying capacity of a park for visitors.

In fact, parks have many possible visitor capacities based on their desirable resource and social conditions as defined by management, policy, political considerations, and the public. Deciding on a capacity is difficult because interest groups will articulate varying notions of the appropriate level based on the stakes they hold in the debate. It is remarkable how persistent these debates can be. Whatever the actual use level, it seems there have always been some who believe it is too high and others who think it is too low (Gramann, 1992b).

Managers and planners are understandably reluctant to exclude people from a park when they are highly satisfied with their visit. As Lon Garrison, an NPS notable, commented in his autobiography, "The supposed number of tolerable visitors always seemed to move higher in response to the actual numbers" (Garrison, 1983:101). Nevertheless, fairness issues arise when displacement excludes some persons from their desired experiences. From this perspective, visitor-capacity decisions might be usefully viewed as allocations that determine who "gets" a national park. Furthermore, displacement research demonstrates that failing to act by allowing unmanaged and incremental change to occur is as much an allocation decision as imposing stringent capacity limits.

This study documented approximately 199,000 households (5.6% of previous visitors) in six counties of western Washington that contained at least one member displaced from MORA because of crowds, and 145,000 (4.1% of previous visitors) with a member displaced from OLYM. Balanced against this are the 3.3 million visits to OLYM that occurred in 2000 and the 1.3 million to MORA, the vast majority of which were highly satisfying (Hoger, 2000). In this light, displacement at the two parks seems minor until one considers that many current visitors to both parks also purposefully visited lesser-used areas, or traveled during low-use periods, to avoid crowded situations. Among respondents visiting both areas, MORA was considered more crowded than OLYM, and its visitors were somewhat more likely to be displaced temporally. Intra-site displacement occurred at both parks, although it was less common as a coping behavior than visiting during the shoulder seasons of fall and spring.

The analysis of displacement at MORA and OLYM can be synthesized into four considerations relevant to visitor-capacity decisions:

- *Intra-site and temporal displacement appear to provide many current MORA and OLYM visitors with effective coping mechanisms against crowds.* Persuasive evidence for this comes from the finding that those planning future visits to the parks were significantly more likely to have employed intra-site and temporal displacement strategies during previous trips than those who were unlikely to return. In this sense, the non-displaced visitors seem to be more resilient and able to cope with crowded conditions than those who have been displaced.

- *Among the most crowd-averse visitors, intra-site displacement may be a predictor of subsequent inter-site displacement.* In particular, for visitors displaced from MORA by crowding, neither temporal nor intra-site strategies proved effective in avoiding eventual inter-site displacement. Recalling that MORA visitors who were displaced by crowds

also were more likely to be motivated by nature experiences and crowd avoidance, this makes sense. Visiting lesser-used locations is a means to deal with crowds for some visitors, but it may also foreshadow subsequent inter-site displacement among those least tolerant of crowding. Evidence for this comes from the finding that, at MORA, intra-site displacement occurred significantly more often among individuals eventually displaced by crowds than among those displaced for other reasons.

- *Management frameworks such as VERP could incorporate intra-site displacement as an indicator of experience quality.* Because it can be difficult to access lesser-used places, the fact that some visitors make this effort is significant. For this reason it could prove useful to monitor the extent of intra-site displacement. Apart from its potential value as a predictor of future displacement away from a park, such monitoring would also identify those areas that provide alternative experiences to more crowded areas of visitor concentration. This leads to the fourth management implication.

- *Lesser-used places receiving intra-site displacement could be designated as "areas of critical capacity concern" in NPS general management plans* (Haas, 2001). Because they may serve a unique function in maintaining enjoyable experiences for crowd-averse visitors, such locations as MORA's Ipsut Creek and Lake Mowich could be considered for special protection from the incremental development that marks unmanaged change. Managing lesser-used locations at current visitation levels might be considered in parks that are experiencing significant intra-site displacement to these areas due to crowd avoidance. The key to successful visitor-capacity planning is to preserve a diversity of settings and experience opportunities, including low-use and high-use areas. Incremental change can erode the values that people displaced to lesser-used places are seeking, so low-density opportunities should be preserved. At the same time, concentrating high use in small areas is generally viewed in the recreation-management literature as more preferred in terms of environmental impacts than dispersing this use over wide areas (Hammitt & Cole, 1987). For both environmental and social reasons, each strategy is needed.

Implications for Displacement Theory

Although elegant, the process of social succession described by Schreyer and Knopf in 1984 is an incomplete explanation of how unmanaged change affects visitors to outdoor recreation areas. Inter-site displacement is certainly one outcome, and this research reinforces the assumption that it occurs at least in part because of crowding and associated conditions. However, this study and others like it in national parks (Manning & Valliere, 2001) also show that coping behaviors are not limited to complete displacement away from an area. Visitors can make cognitive adjustments by redefining the normative experience a park provides (e.g., from wilderness to semi-wilderness), or adjust behaviorally by moving to lesser-used places within a park and visiting during lesser-used times. Indeed, although not investigated in this research, even inter-site displacement may not mean complete cessation of visits. Hall and Shelby (2000) found inter-site displacement to be a coping behavior used *in combination* with less extreme adjustments, such as temporal and intra-site displacement. This implies a high degree of

resiliency in many visitors, as long as sufficient opportunities for less-congested experiences are provided in other locations and outside of peak periods.

At the same time, as suggested by Kuentzel and Heberlein (1992), some coping responses may lie along a hierarchy that, under certain conditions, lead to displacement away from a park. As already discussed, for the most crowd-averse visitors, intra-site displacement may be one of these intermediate responses.

Displacement should not be *defined* as a reaction to crowding, since it can be caused by other setting attributes. Although they were not important sources of displacement at MORA and OLYM, user fees, prejudiced behavior by staff or visitors, regulations, and degradation of natural resources could result in displacement away from parks. Therefore, displacement should be viewed as a subset of a more general pattern of non-use, the defining attribute being that it is driven by setting characteristics within a park that "push" visitors away.

Even so, many people may stop visiting parks for reasons that have nothing to do with these "push factors." Most respondents in this study who had ceased visiting MORA and OLYM had done so for reasons unrelated not only to crowding, but to other setting conditions in the parks. These causes included time constraints, travel distance, and lack of family or friends to visit with. Perhaps some other term should be reserved for these persons, such as "former visitors."

Finally, a growing body of literature in environmental and social psychology has examined pre-disposing and situational variables that influence people's reactions to crowding. These include residential density (Evans et al., 2000), prior experience with a crowded setting (Baum et al., 1981; Webb & Worchel, 1993), behavior of others sharing a crowded area (Sinha & Mukherjee, 1996), and perceived control (Fleming et al., 1987). These variables have not been examined in recreation displacement research, but may improve understanding of why some visitors' reactions to crowds are more extreme than others.

Considerations for National Park Service Social Science

The dominant research paradigm in national parks continues to be the visitor survey. Certainly, visitor surveys are vital to management and planning in that they provide public-involvement opportunities for important, but typically unorganized, constituencies. They also are one means of gathering data on experience-quality indicators for management frameworks such as VERP. However, despite their many uses, onsite surveys do not contact displaced former visitors, nor (in their usual application during peak seasons) are they likely to adequately represent temporally displaced visitors. Even during peak seasons, they may be limited to locations where it is most efficient to contact large numbers of visitors in short periods of time, potentially under-representing the intra-site displaced segment of the visitor population. Besides visitor surveys, regional household surveys can provide a breadth of information on users, non-users, and former visitors that cannot be gained using other approaches.

There are other approaches to conducting displacement studies as well. Becker et al. (1981) and Hall and Shelby (2000) took advantage of local knowledge that allowed them to identify

locations that visitors had been displaced to so they could conduct surveys at these alternative sites, in addition to the original location. Although knowledge of such places may not always be available, this approach has advantages, not the least of which is to measure inter-site displacement as a behavior, rather than an intention, as was done in this study.

Conclusion

Although not the only key, the prevalence of temporal displacement and intra-site displacement at parks such as MORA and OLYM provides one explanation for the floating baseline of satisfaction. The effects of crowding and congestion in these areas is seen not so much in present visitors as it is in those who have been displaced. Although MORA and OLYM are heavily used, it seems doubtful they are close to approaching their "recreational carrying capacity" in the sense of use levels beyond which aggregate visitor satisfaction decreases significantly (Shelby & Heberlein, 1986). Indeed, the early focus of carrying capacity theory and research in the 1960s on users' satisfaction virtually assured that no visitor survey would ever indicate that a park was nearing its recreational limits. However, when viewed from the perspective of displacement, quite different conclusions emerge. There are social costs to crowding and congestion at parks such as OLYM and MORA in terms of displaced visitors. This is not to advocate that heroic efforts be made to "re-enfranchise" displaced visitors. However, displacement in all of its forms should be considered as a recognized consequence of increased visitation.

If visitor capacity is not managed in the National Park System, history indicates that the effect described by Lon Garrison may continue: the number of tolerable visitors will increase in response to actual use. In part, this is because coping behaviors that are less extreme than inter-site displacement are possible in many park units. As well, a lack of off-site studies will result in displaced visitors not being considered in visitor-capacity research and management. The combination of these produces the floating baseline of satisfaction that is a feel-good statistic in visitor surveys, but provides little support for capacity management beyond maintaining the status quo. To reiterate a point made in the introductory section of this report, managers and planners faced with the difficult decision of establishing and maintaining visitor capacities within the National Park System are best served by knowing not only how many satisfied users they currently serve, but how many displaced visitors they no longer serve.

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