The Spatial Configuration of Travel to Yellowstone National Park

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While vacation travel to Yellowstone National Park may be considered the epitome of American travel traditions, measurement and analysis of this important national phenomenon is surprisingly limited. This survey of 600 Yellowstone visitors focuses upon the spatial pattern of their travel movements to and from Yellowstone. Four types of trip configurations are discovered: Direct Route, Partial Orbit, Full Orbit, and Fly/Drive.

The legendary wonders of Yellowstone have been widely known among travelers for more than a century. Recent occurrences of spectacular earthquakes (1959) and fires (1988) and extensive publicity in popular literature, films, and scientific study have drawn attention to Yellowstone (Chase 1986; Foresta 1984; Haines 1977; Jakle 1981). Averaging nearly 7 million visitor days annually during the 1980s, this exceptional landmark has become the mythical symbol of the scenic American West to people everywhere (National Park Service 1988).

Despite the extensive publicity accorded Yellowstone and the park's importance as a destination for travelers, scholarly examination of travel to this oldest national park in the world is quite limited. While many factors account for this omission, probably the main one is the very limited visitor data collected by the National Park Service. While complete statistics do exist for the number of people visiting individual recreation sites administered by the National Park Service, basic demographic and socioeconomic information on visitors is not collected regularly (National Park Service 1988). Accordingly, most analyses of travel to Yellowstone (and other national parks) depend heavily on examination of occasional case studies, most of which are produced by the National Park Service for the primary purpose of providing adequate visitor services (Cooperative Park Studies Unit 1989). Two such focused surveys have been produced recently for Yellowstone National Park (Machlis and Dolsen 1988; Littlejohn, Dolsen, and Machlis 1989). Broader-based studies of park visitation, or regional and national studies of the myriad issues related to visiting our national parks, simply do not exist (National Park Service 1988).

Given the general lack of research available on travel to national parks, and to Yellowstone in particular, this study offers a rare glimpse of an important phenomenon: the spatial configuration of visitor routes traveled from home to Yellowstone National Park and then back home. In focusing on the spatial pattern of travel movements, we embrace a geographic perspective (Mitchell and Smith 1989).

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PROBLEM STATEMENT

This study addresses two questions: (1) What are the spatial configurations of journeys to Yellowstone; and (2) How do trip attributes and socioeconomic characteristics vary across spatial configurations? Answers to these questions are relevant for managers of western parklands, but also for a wide variety of social scientists concerned with multiple facets of leisure travel (Husbands 1985; Keogh 1984; Uysal and McDonald 1989).

It is expected that few visitors merely travel directly from home to Yellowstone and back home again. Most probably combine a trip to Yellowstone with stops at other scenic landmarks in the Rocky Mountain region and undertake what could be termed a "grand tour" of the American West. The mystique of Yellowstone may provide the primary motivation for travel, but, given the lengthy distances traveled by most visitors plus the availability of other very attractive landmarks relatively nearby, a high percentage of visitors to Yellowstone National Park may extend their journey to take advantage of other scenic opportunities. Indeed, touring the American West is a time-honored form of family vacation in the United States that has been widely stereotyped (Patmore 1974; Jakle 1985). We are interested in documenting the spatial configuration patterns of recreation travel.

METHODOLOGY

The principal means of acquiring information on Yellowstone visitors was through use of a questionnaire administered to 600 guests at Canyon Lodge during July and August 1989. In addition to making standard inquiries into demographic, social, economic and visitation topics, the questionnaire provided a map of the United States with state boundaries, interstate highways, and the location of Yellowstone National Park (Figure 1). Respondents were asked to sketch their trip directly onto the map, indicating the actual route (not necessarily using interstate highways) taken from home to Yellowstone and back home. This mapping component of the questionnaire was crucial for determining individual spatial patterns of travel. Fortunately, 570 of the 600 completed questionnaires included trip maps. While some maps appear to have been fashioned rather sketchily and hastily, the vast majority appear to have been thoroughly and carefully done.

The questionnaires were distributed from the front desk

as guests checked into Canyon Lodge, a large, moderately priced facility with 580 rooms. Low-density clusters of four to eight cabins are scattered thinly over a forested terrain. Prices range between $49 to $59 per night for a double room, and Canyon Lodge attracts mostly middle- and upper middle-income households. More affluent visitors are underrepresented; they are more likely to stay at Yellowstone Lake Lodge, where the least expensive accommodation is $95 per night. Old Faithful Inn is even more expensive. Less affluent (or extremely price-conscious) visitors can stay in older cabins, minus plumbing, for $20.00 at Mammoth and Roosevelt Lodges. Campers, of course, stay in the many campgrounds of Yellowstone. Some visitors are day-trippers who do not stay overnight in the national park. While our survey at Canyon Lodge is not representative of all types of Yellowstone visitors, it does offer insight into middle-income visitors, the largest and most important group (Foresta 1984).

RESULTS

Spatial Configuration of Trips

Initial analysis focused on examination of the 570 visitor route sketch maps in search of common spatial patterns of travel. This process revealed four distinct patterns of visitor travel from home to Yellowstone National Park and back home again (Figure 2). These four travel patterns are described briefly; then a comparative examination of selected characteristics of their respective participants is presented.

The smallest category, Direct Route (9.5%), consists of travelers who follow routes that are as nearly direct as highway availability will permit. Their routes use the shortest distance possible between home and Yellowstone. In addition, these people tend not to take side trips. They return home from Yellowstone over the exact route they embarked upon originally. Figure 3 illustrates the general dimensions of the Direct Route category through mapping actual routes of three households considered typical examples of this trip type. These routes are as straight as existing highways and the knowledge thereof permits.

The next largest category, Partial Orbit (11.2%), is composed of Yellowstone visitors who travel a portion of their trip over a direct route, but only until they reach the perimeter of the scenic mountainous west (Figure 4). Then they are close to many examples of spectacular scenery, and their route becomes circuitous. They "orbit" a portion of the Rocky Mountain region on a route that links them with Yellowstone National Park and an assortment of other scenic attractions. Typically, these attractions include a variety of national parks, national monuments, state parks, and historic sites. The importance of individual attractions will be discussed later. After completing a circular orbit of western

FIGURE 1
TRIP ROUTE SKETCH MAP

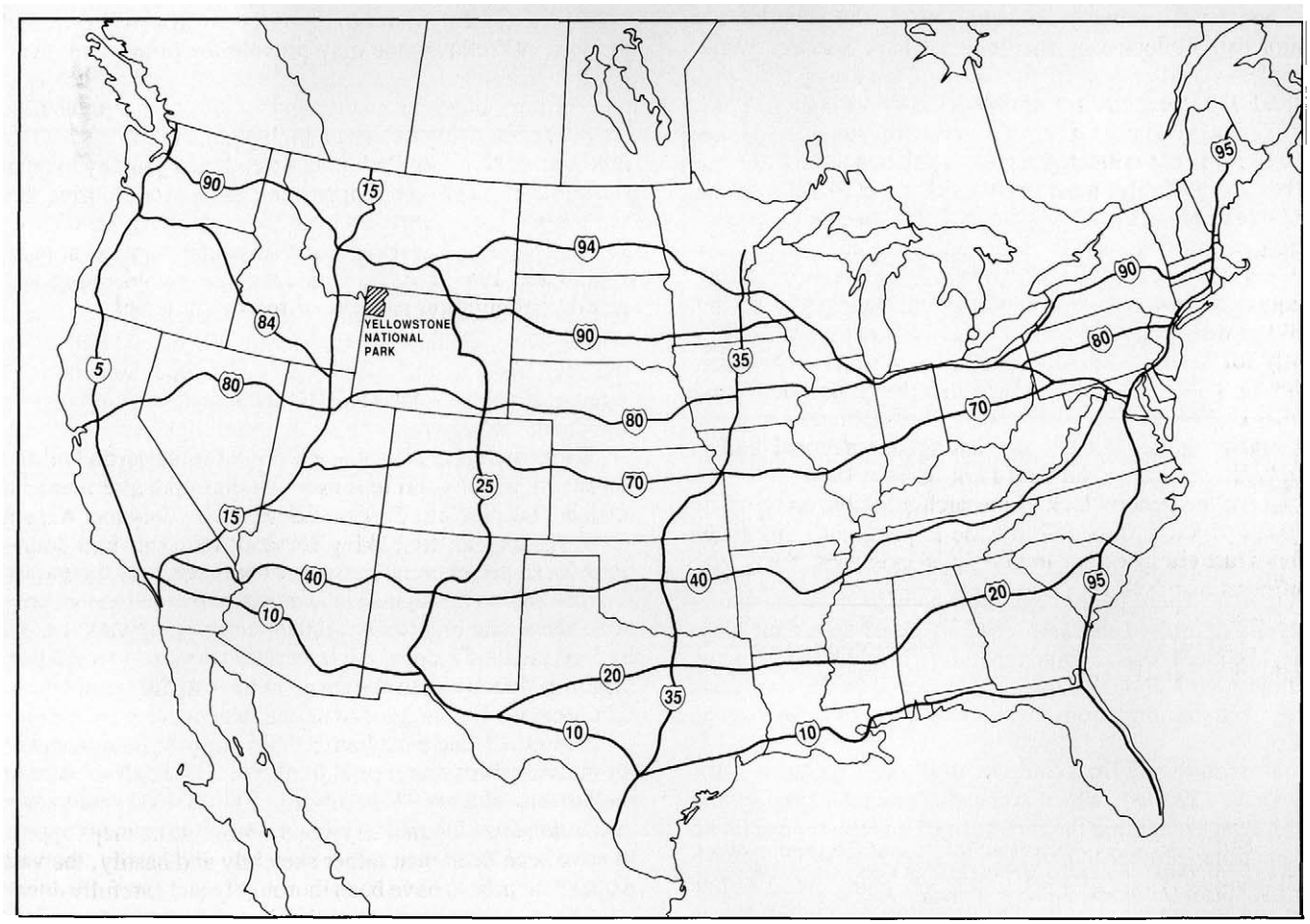


FIGURE 2
PRINCIPAL TRIP CONFIGURATION TYPES

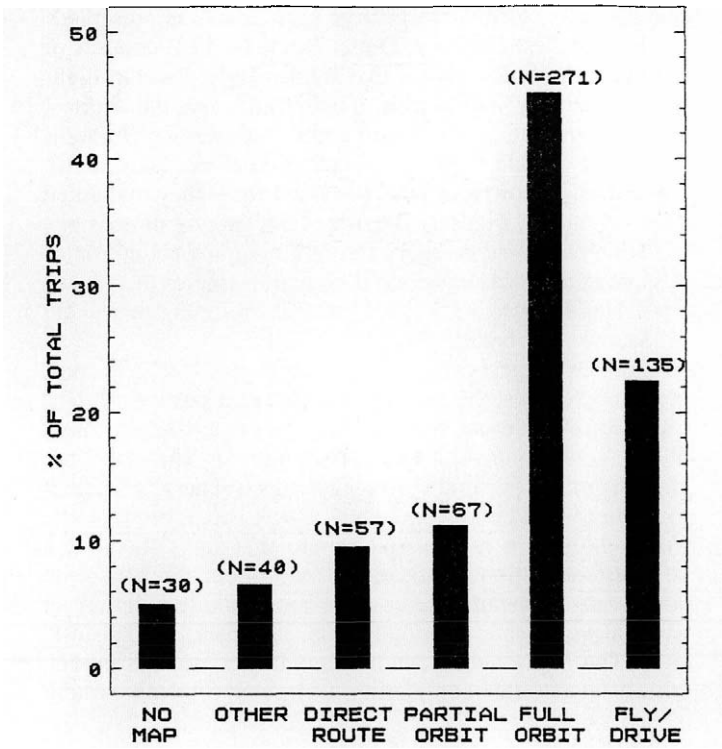


FIGURE 3
DIRECT ROUTE TRIPS

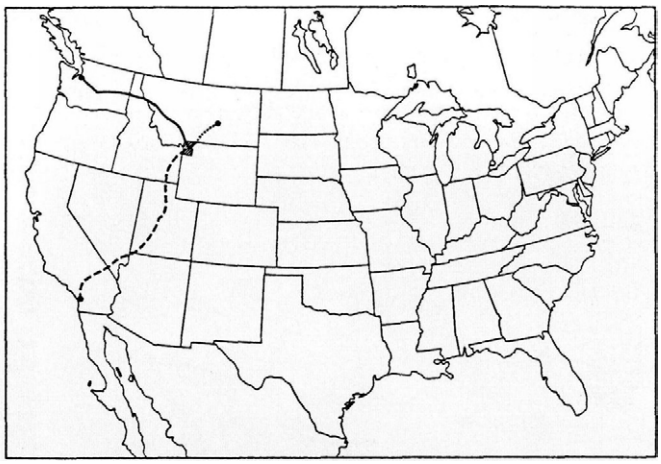


FIGURE 4
PARTIAL ORBIT TRIPS

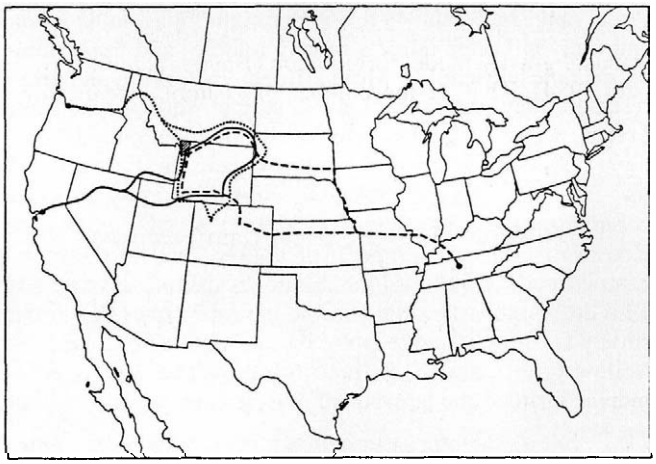
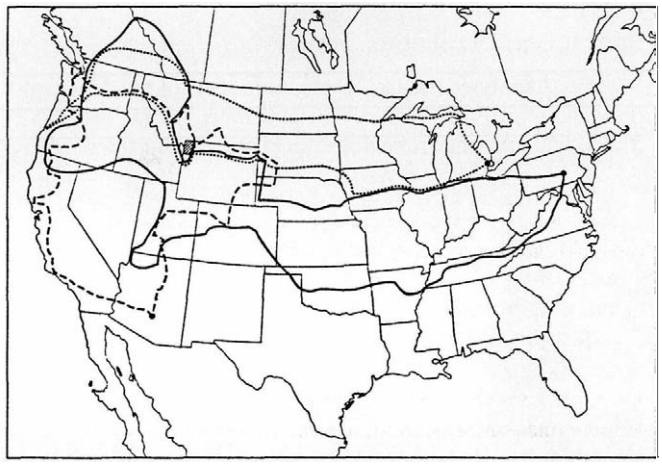


FIGURE 5
FULL ORBIT TRIPS



landmarks, Partial Orbiters then return to their original route path and proceed directly back home.

The type of trip configuration used by most households in the study sample (45.2%) is labeled Full Orbit (Figure 5). As the title implies, Full Orbiters travel a route that is completely circular. These people exit their hometown in one direction and return via another. Virtually never does their loop-shaped pattern require route repetition. In addition to visiting Yellowstone National Park, Full Orbiters visit a very wide array of scenic attractions in their grand tour of the American West.

The fourth and final category of trip configuration is the Fly/Drive (22.5%), which somewhat resembles the Partial Orbit type except that the direct leg of this trip type is flown in an airplane rather than driven over a highway (Figure 6). Yellowstone National Park offers no commercial airline services, so prospective Fly/Drive visitors are required to fly to one of the several cities in the general vicinity of Yellowstone National Park (e.g., Denver, Salt Lake City, Bozeman or Billings, Jackson or Idaho Falls), where a vehicle can be rented. Then, similar to both the Partial Orbit and Full Orbit, the Fly/Drive visitor undertakes a circuitous excursion of western landscapes. Eventually, the rented vehicle is driven back to the air terminal city and a return flight is taken home. By way of comparison, the 22.5% who use airplanes as a means of travel to Yellowstone is slightly higher than the national average of 19% for all American vacationers (U. S. Travel Data Center 1988). Because Yellowstone National Park lacks commercial services completely and the park is inaccessible to the nearest available commercial airline services, the figure of 22.5% is rather surprising. Finally, 6.8% (41) of the total sample are international visitors originating from outside North America, and virtually all of them are Fly/Drivers.

The small Other category (6.6%) reflects a wide variety of individual trip configuration types. The largest subgroup within this category is composed of Yellowstone visitors who are stopping at the park while en route from one permanent place of residence to another. Fully half of this miscellaneous category, or 3.3% of the total sample surveyed, are in the middle of a household move.

Geographical Origin of Visitors

American visitors to Yellowstone National Park originate from all parts of the United States (Figures 7 and 8). The geographic distribution of U. S. visitors appears to follow a standard gravity model formulation (Haynes and Fotheringham 1984). That is, the number of visitors appears to be positively related to population size of states and inversely related to distance from Yellowstone. These hypotheses are tested using the following equation:

$$\text{TRAVEL} = f(\text{POP}, \text{DIST}, \text{random errors})$$

Where:

TRAVEL = the number of persons visiting Yellowstone National Park from each state (based on the survey sample of 545 U. S. visitors)

POP = population of each state, 1989

DIST = distance from the most populous urban center in each state to Yellowstone National Park measured in road miles

N = 49 (Alaska and Hawaii excluded, Washington, D.C. included)

Parameters were estimated by means of ordinary least-squares regression analysis using a double logarithmic specification. Results showed that population size of states and distance to Yellowstone account for 73% of the observed interstate variation in visitation (Table 1). Both population size (+) and distance (−) are statistically significant predictors of travel to Yellowstone in the hypothesized direction. The standardized regression coefficients indicate that population size exerts a somewhat stronger influence on visitation than distance.

While some caution should be exercised in interpreting the results because they are based on a sample of 545 visitors, this analysis indicates that interstate variation in travel to Yellowstone can be accounted for largely in terms of a simple gravity model. In short, the geographical distribution of visitors to Yellowstone is not anomalous.

Differentiating Trip Configuration Types

Insights into the nature of the four principal trip configurations outlined above can be achieved through examining selected characteristics of their respective participants. In response to an open-ended question on the purpose(s) of taking this trip, park visitors gave widely varying responses. However, the purposes given for traveling to Yellowstone were remarkably similar among all four types (Figure 9). As might be expected, the most frequent purpose cited was family vacation. Two categories of response (special place and show kids wilderness) may be combined as they both reflect a perceived uniqueness of the Yellowstone area. Often

TABLE 1

REGRESSION RESULTS: PREDICTING TRAVEL TO YELLOWSTONE NATIONAL PARK USING POPULATION SIZE AND DISTANCE

Indep. Var.	Partial Pearson Correl.	Std. Regr. Coeff.	t-ratio	p-value
POP	.835	.859	10.28	<.001
DIST	−.750	−.643	−7.68	<.001
R^2 = .759				

FIGURE 6

FLY/DRIVE TRIPS

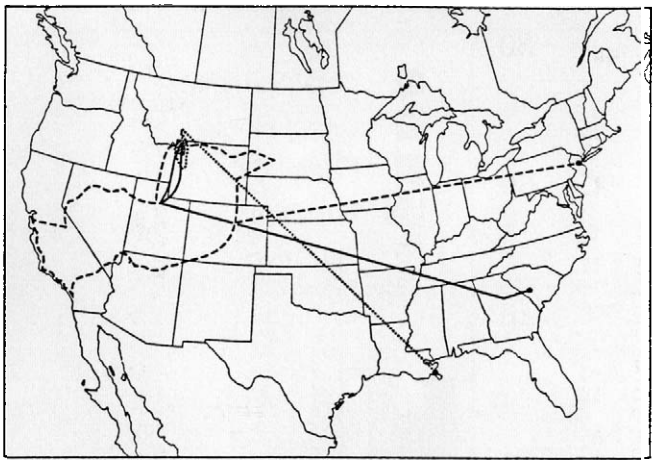


FIGURE 7

YELLOWSTONE VISITOR ORIGIN, BY STATE

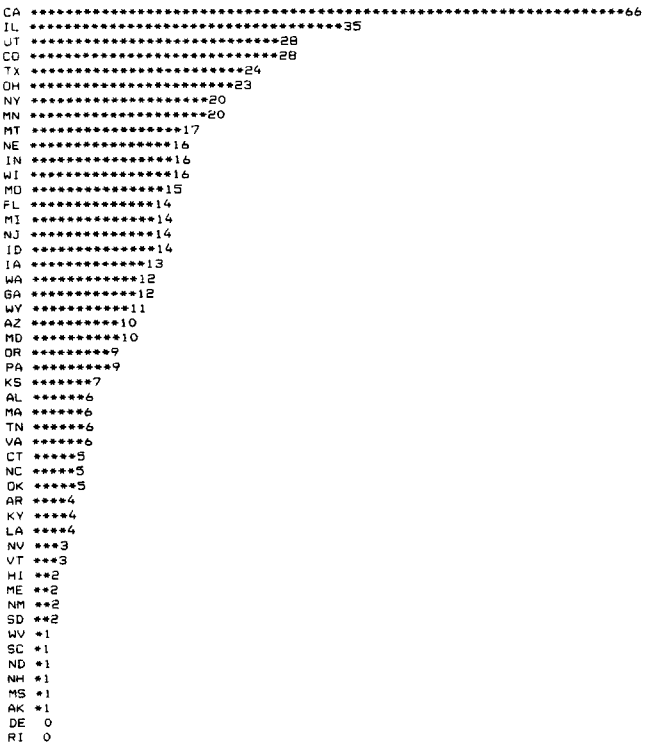


FIGURE 8

YELLOWSTONE VISITOR ORIGIN, BY HOMETOWN

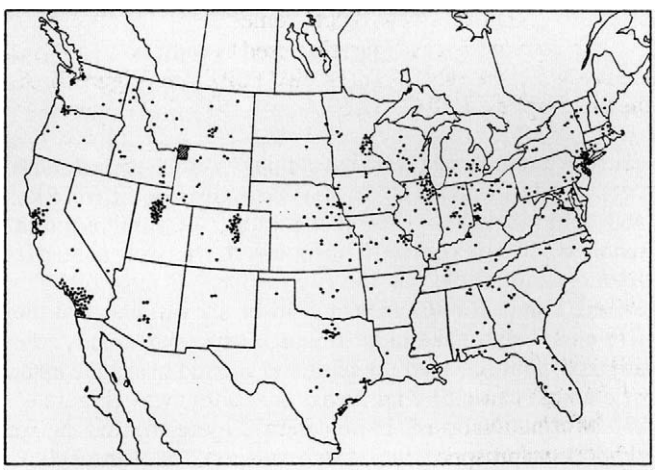


FIGURE 9
PURPOSES OF TRIP

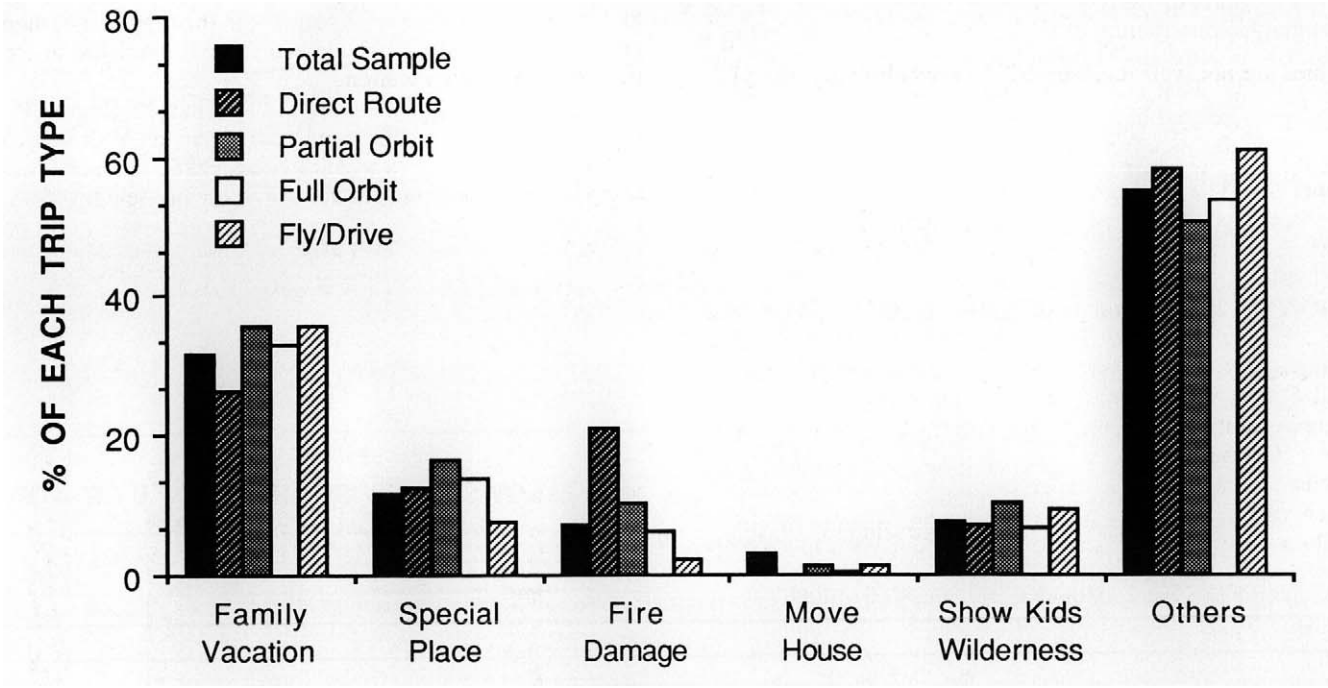
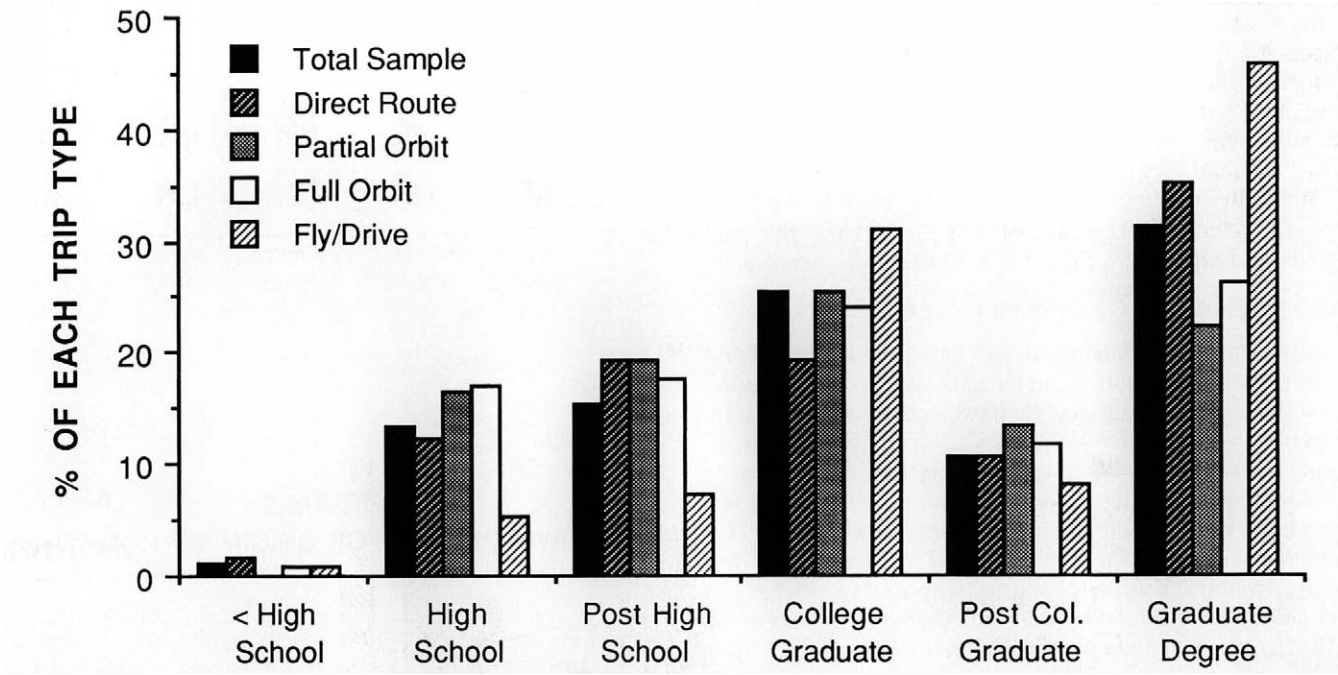


FIGURE 10
EDUCATION LEVEL



stated were sentiments such as "this is a truly special place" or "we want our kids to see it as we did when we were kids and before it is lost." Another reason, "to observe the fire damage," is, of course, a response to the well-publicized fires of 1988. Note that the fire response is most prevalent among Direct Route types. It will be shown later that they live closer and make more frequent trips. Apparently, they are more familiar with the park and wanted to see the extent of damage caused by the fires.

Information on education levels (Figure 10) reveals high proportions of well educated visitors: 69.2% of the Yellowstone sample possessed at least a baccalaureate degree. In comparison, the U. S. Travel Data Center reported in 1988 that only 28% of those Americans taking vacations had graduated from college (U. S. Travel Data Center 1988). Whereas 53% of the national sample of vacationers had a high school diploma (or less), only 14.9% of the Yellowstone sample possessed this level of education. The Fly/Drive group is the best educated of the four types of Yellowstone visitors: 31.1% had baccalaurete degrees, 8.1% had some postgraduate coursework, and 45.9% had postgraduate degrees (apparently mostly lawyers and medical doctors) —

yielding an astounding 85.1% with a minimum of one university degree.

The questionnaire requested respondents to select one of five generic income classes that most closely matched their household income. Not surprisingly, people with lower incomes are not well represented. Overwhelmingly, the visitors place themselves in the middle-middle and upper-middle income categories (Figure 11). The Fly/Drive group again appears distinctive, with proportionately higher numbers in upper-middle and upper-income levels.

Results from the question asking whether other national parks in addition to Yellowstone were visited are presented in Figure 12. With 81.3% of the total sample answering affirmatively, clearly not many people are making a single purpose trip from home to Yellowstone National Park. Even the category with the lowest positive response, Direct Route, had 61.4% visiting other parks. Respondents were asked only about their visits to other national parks. If all types of other federal and nonfederal scenic attractions had been included, undoubtedly the level of response would climb even higher. It appears that virtually all overnight visitors to Yellowstone are on vacation trips that include visits to multiple western landmarks.

Figure 13 illustrates the mean number of visits made to other national parks while on this trip. As might be expected, people of the Direct Route type visit fewer places, but even they have a mean of .88 national park visits (in addition to Yellowstone National Park).

National parks visited most often are presented in Figure 14. These other national parks cover a wide geographic area of the western United States. Grand Teton National Park attracts the highest percentage of all types of Yellowstone visitors. This is not surprising, given its proximity to Yellowstone. Figure 14 also shows that Fly/Drivers and Full Orbiters consistently visit more parks than Partial Orbiters and Direct Routers.

While the mean trip length for all respondents is 15.7 days, considerable variation exists among the four principal trip configuration types (Figure 15). There is a rather steady progression in trip length from 10.5 days for the Direct Routers to 13.1 days for Partial Orbiters to 16.0 days for Full Orbiters to a high of 19.6 days for the Fly/Drivers. One might suspect that time considerations would not allow Fly/Drivers to spend the most days on vacation. On the other hand, their greater affluence suggests more resources available to expend on a western vacation.

A comparison of figures on total trip lengths (Figure 15) with figures on the length of time spent at Yellowstone (Figure 16), suggests why Yellowstone National Park is not likely to be the only destination for many households. Sim-

FIGURE 12
VISITING OTHER NATIONAL PARKS

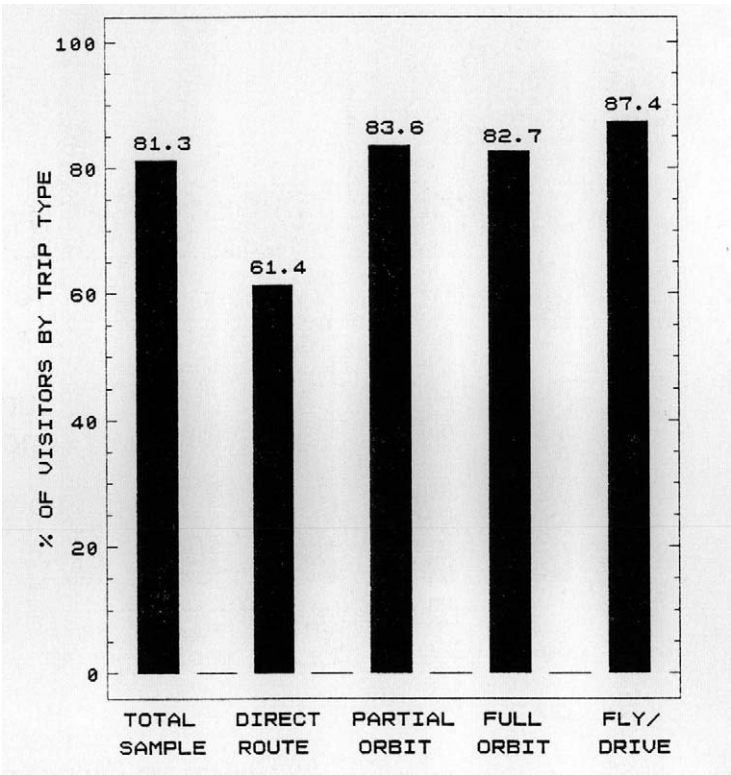
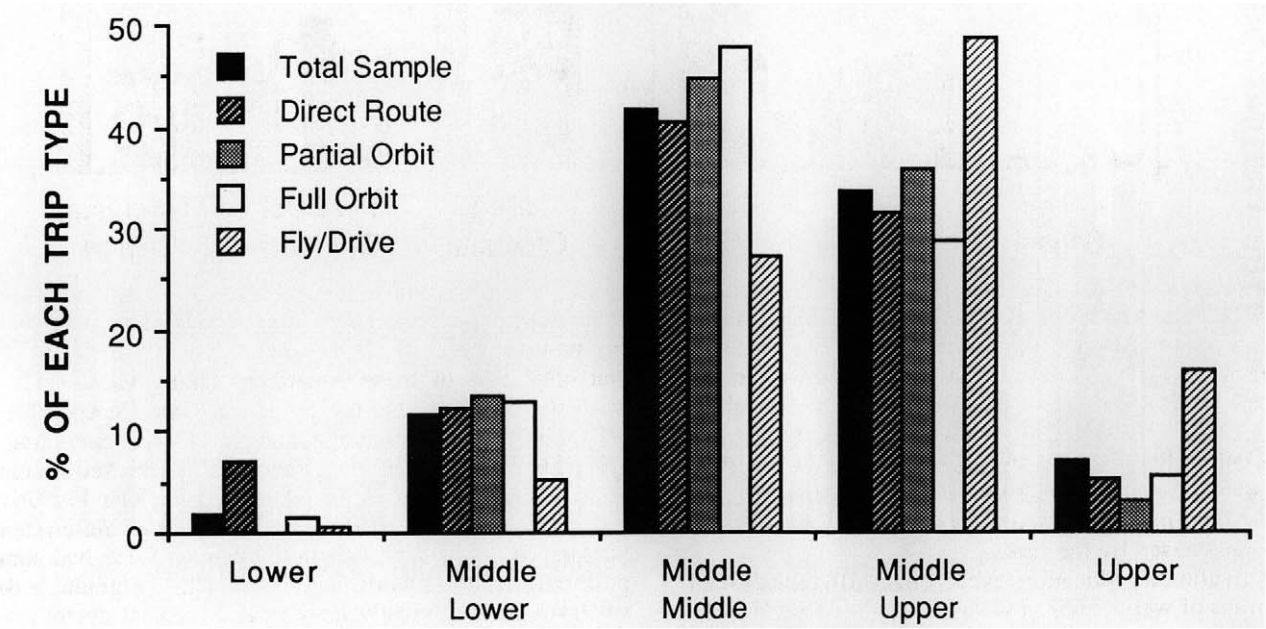


FIGURE 11
INCOME LEVELS



ply, the mean total trip length (15.7 days) is extremely long in relation to the brief time spent at Yellowstone (2.72 days). Time visiting other western landmarks is a feasible explanation for at least some of these extra days. Incidentally, the mean trip length among Yellowstone visitors (15.7 days) is nearly three times as along as the mean length of all vacations (5.4 days) taken in the United States (U. S. Travel Data Center 1988).

Figure 17 shows direct distance from home to Yellowstone in 500-mile intervals for each of the four trip configuration types. As expected, the Direct Route category has the highest proportion of shorter trips (30% under 500 miles),

FIGURE 13
MEAN NUMBER OF OTHER PARKS VISITED

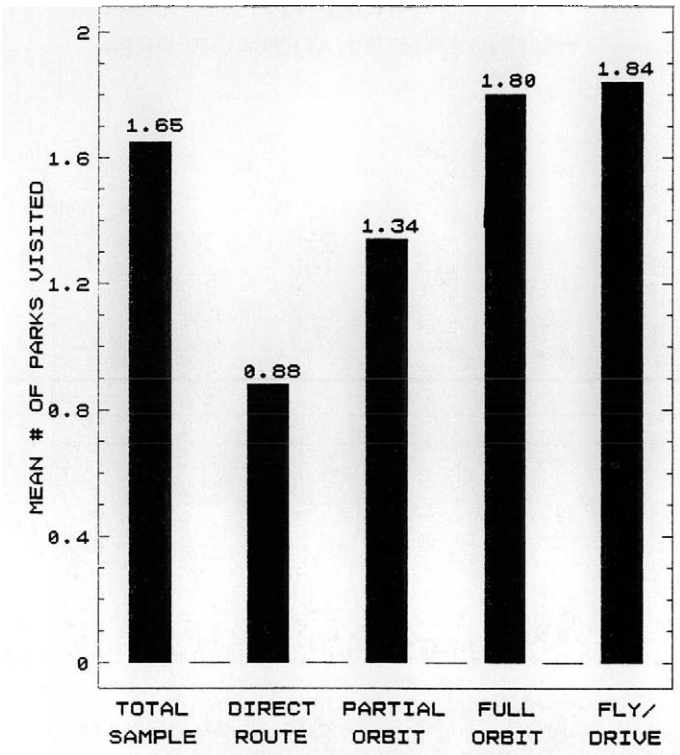


FIGURE 15
MEAN LENGTH OF TRIP

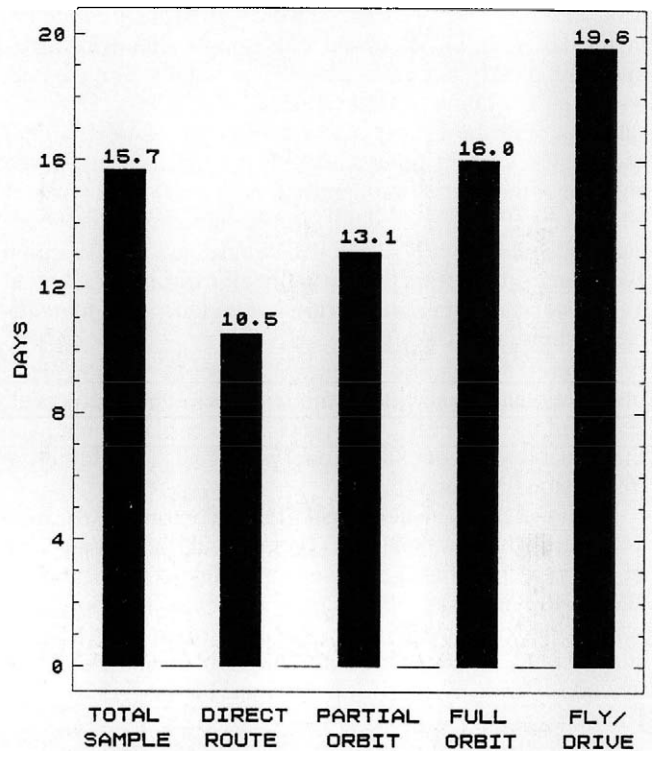
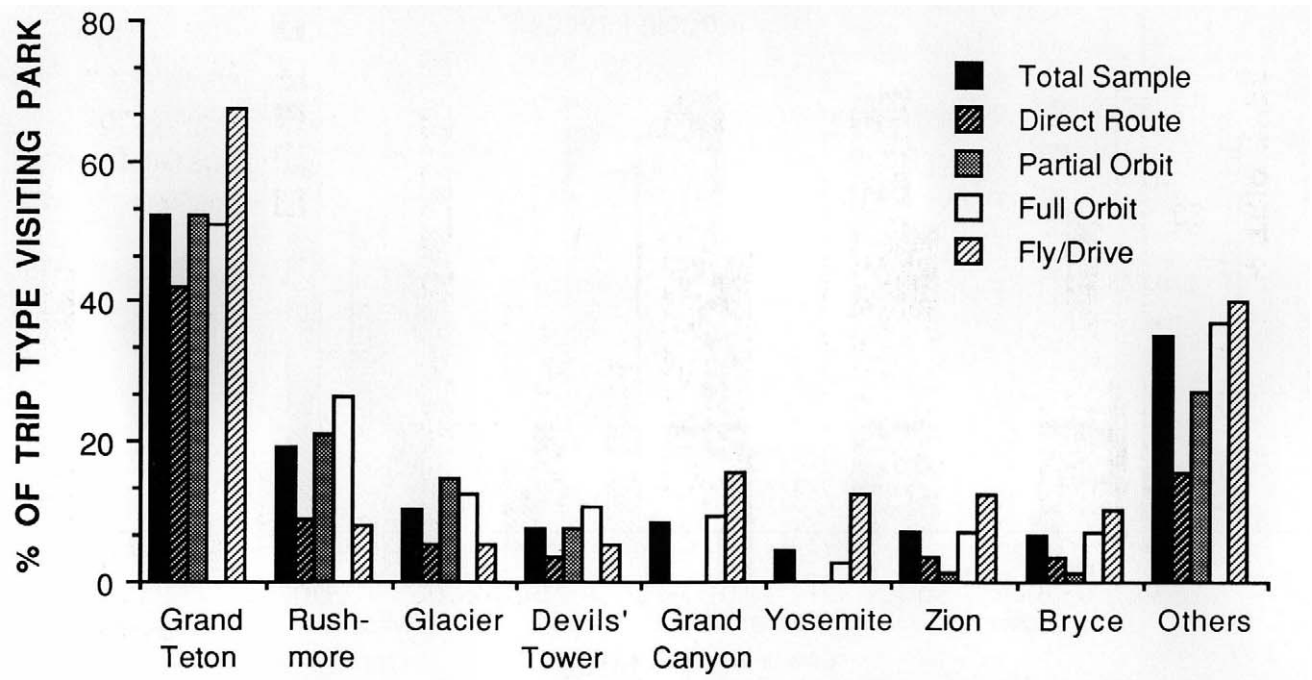


FIGURE 14
VISITS TO SELECTED NATIONAL PARKS



while the Fly/Drivers tend to travel the farthest (44% traveling between 1,500 and 2,000 miles). The sharp drop-off in people traveling more than 2,000 miles results, of course, from the scarcity of places in the United States located more than 2,000 air miles from Yellowstone National Park.

The downward progression in Figure 18, from a mean of 4.21 of prior Yellowstone visits by Direct Routers to only 1.93 for Fly/Drivers, suggests the influence of distance. The

FIGURE 16
MEAN LENGTH OF STAY AT YELLOWSTONE

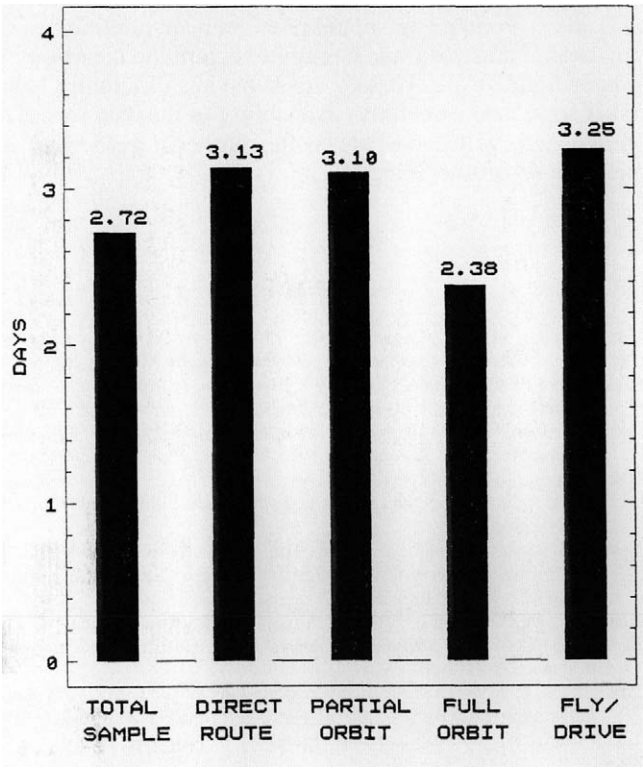


FIGURE 18
MEAN NUMBER OF PRIOR VISITS TO YELLOWSTONE

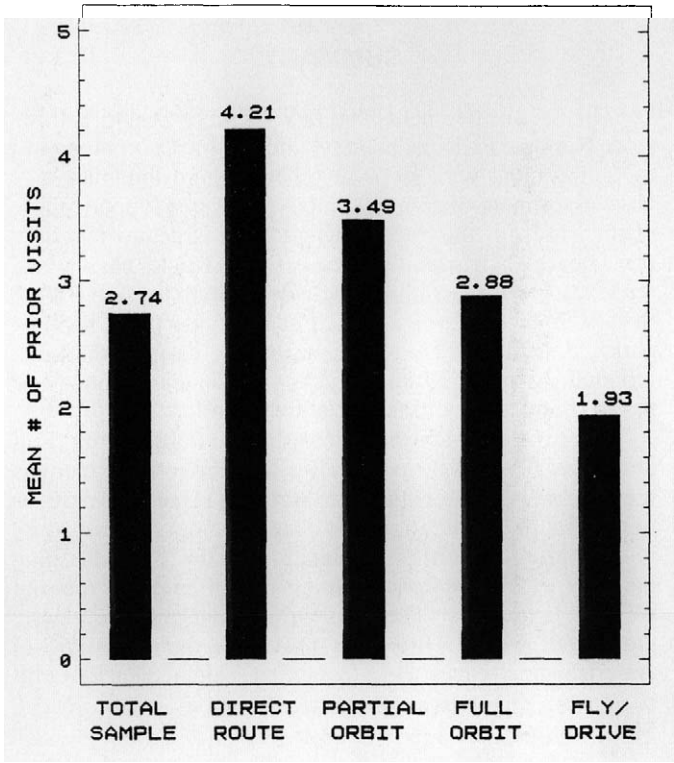
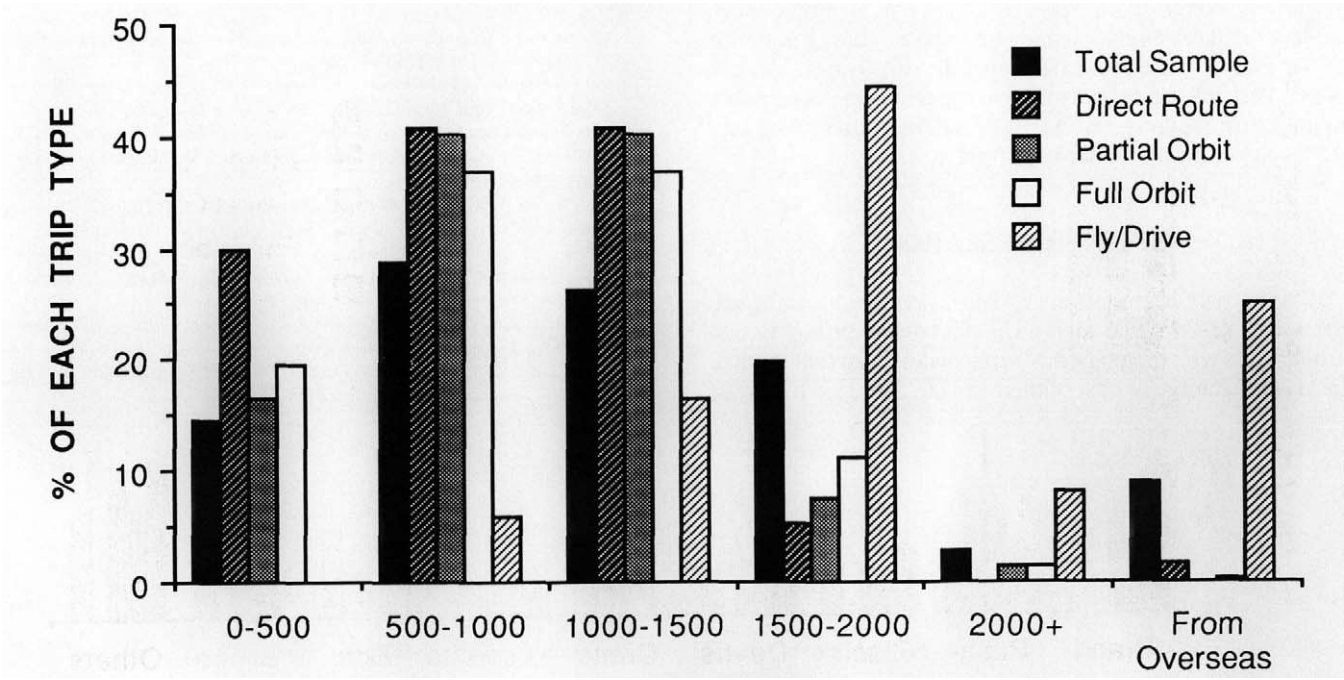


FIGURE 17
DISTANCE TRAVELED



much higher proportion of Direct Routers who live closer to Yellowstone (Figure 17) can travel to the park with less time and money and generally better knowledge of travel conditions. The inverse is true for those living farthest away. Hence, the friction of distance results in fewer visits to Yellowstone for people living farthest away. The combined information of Figures 17 and 18 indicates that the farther people live from Yellowstone National Park, the fewer, but lengthier, will be their trips to the park. The closer people live to Yellowstone, the more an opposite tendency is likely — more frequent but shorter trips.

SUMMARY

This study documents that few visitors travel to Yellowstone National Park exclusively, and that most combine a trip to Yellowstone with stops at other western landmarks. A large assortment of complementary measures supports these claims. Indeed, this record of evidence indicates that only one category of trip configuration, Direct Route, has any real tendency toward including single destination trips, and more than 60% of this group visited at least one other national park. More than 80% of the visitors in each of the three remaining trip configuration types visited a minimum of one national park in addition to Yellowstone.

The trip configuration patterns of the Partial Orbit, Full Orbit, and Fly/Drive trip types illustrate the sort of circuitous routing that is very conducive to stopping at multiple destinations. Figures on duration of trip and number of other parks visited provide further evidence that the overwhelming majority of Yellowstone visitors are, in essence, orbiting western landmarks. The Full Orbit represents the classic grand tour whereby travelers maximize their exposure to American landscapes. On a less grand scale, the Partial Orbit is a more direct link to scenic attractions of the Rocky Mountain West.

It was not anticipated that nearly one-fourth of all Yellowstone visitors would combine both air and automobile travel. Because air services available at closest gateway cities are rather distant and are not linked to Yellowstone by public transportation, air travelers must rent an automobile. In view of such inconvenience and expense, the importance of the Fly/Drive trip configuration is surprising (Thomas 1989). Perhaps this reflects increasing affluence, constraints on leisure time, and growing appreciation of dwindling scenic resources in the American West.

FURTHER RESEARCH

The body of information presented in this study indicates that most Yellowstone visitors are involved in highly circuitous trips which, apparently, are not designed to minimize the time, distance, or cost of their travel. There are limits, of course, but people tend to dedicate substantial time and money to western travel. Such behavior has obvious implications for the travel industry and warrants further research. Why and how are Yellowstone visitors successfully overcoming these time-honored obstacles to travel? Special attention should be given to the Fly/Driver traveler.

Another potential avenue of research is suggested by the highly circuitous travel route followed and the multiple tourist destinations visited by Yellowstone guests. While most travel data and origin/destination studies assume some circuitous travel movement, few assume the degree outlined in this study. Perhaps we should re-examine our definitions of trip destination and route circuity to determine the extent to which Yellowstone visitors are behaving differently from other travelers. Hopefully, availability of the data sets suggested here will contribute to the further development of pleasure travel modeling.

REFERENCES

Chase, Alston (1966). *Playing God in Yellowstone: The Destruction of America's First National Park*. Boston: Atlantic Monthly Press.

Cooperative Park Studies Unit (1989). *Introduction to the Visitor Services Project*. Moscow: University of Idaho.

Foresta, Ronald A. (1984). *America's National Parks and Their Keepers*. Washington, DC: Resources for the Future.

Haines, Aubrey (1977). *The Yellowstone Story: A History of Our National Park*. Yellowstone National Park: Yellowstone Library and Museum Association.

Haynes, Kingsley E., and A. Stewart Fotheringham (1984). *Gravity and Spatial Interaction Models*. Scientific Geography Series, vol. 2. Beverly Hills: Sage Publications.

Husbands, W. C. (1983). "Tourist Space and Touristic Attraction: An Analysis of the Destination Choices of European Travellers." *Leisure Sciences*, 5: 289-308.

Jakle, John A. (1981). "Touring by Automobile in 1932: The American West as Stereotype." *Annals of Tourism Research*, 20 (4): 534-39.

___ (1985). *The Tourist*. Lincoln: University of Nebraska Press.

Keogh, B. (1984). "The Measurement of Spatial Variations in Tourist Activity." *Annals of Tourism Research*, 11 (2): 267-82.

Littlejohn, Margaret, Dana E. Dolsen, and Gary E. Machlis (1989). *Visitor Services Project Report 25, Yellowstone National Park*. Moscow: Cooperative Park Studies Unit, University of Idaho.

Machlis, Gary E., and Dana E. Dolsen (1988). *Visitor Services Project Report 15, Yellowstone National Park*. Moscow: Cooperative Park Studies Unit, University of Idaho.

Mitchell, Lisle S., and Richard V. Smith (1989). "The Geography of Recreation, Tourism and Sports." In *Geography in America*, Gary L. Gaile and Cort J. Willmott, eds. Columbus: Merrill Publishing Co.

National Park Service (1988). *Statistical Abstract*, Washington, DC: Department of the Interior.

Patmore, J. A. (1974). "Routeways and Recreation Patterns." In *Recreational Geography*, Patrick Lavery, ed. New York: John Wiley & Sons.

Thomas, William (1989). Interview with General Manager of Canyon Lodge. Yellowstone National Park.

U. S. Travel Data Center (1988). *1988 Travel Market Close-up*. Washington, DC: U. S. Travel Data Center.

Uysal, M., and C. D. McDonald (1989). "Visitor Segmentation by Trip Index." *Journal of Travel Research* 27 (3): 38-42.