

**Foot and vehicle traffic patterns:
The Main Road,
Cumberland Island National Seashore**

CPSU Technical Report 28

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June 1986

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Bratton, Susan P. CPSU Technical Report 28. Univ. Georgia, Athens. 21 pp. June 1986.

Abstract

This study determined the number of vehicles and foot travelers a hiker was likely to encounter while walking wilderness and non-wilderness sections of the Main Road, Cumberland Island National Seashore. The Main Road is the primary north-south route for hikers in the park. A section of the road from Sea Camp to Stafford was sampled by walking routes, four hours in duration, in fall, winter, spring and summer, 1983-1984. A wilderness section from Plum Orchard Road intersection to Brickhill campsite was sampled by the same method in winter, spring and summer of 1984. Encounters with vehicles were much higher on the non-wilderness section, where records of five vehicles or more per four hour sample were common. Although vehicle encounters were less frequent in the wilderness, vehicles were encountered during 72% of the winter and spring samples and during 92% of the summer samples. Vehicle encounters frequently outnumbered encounters with hiking groups. A wilderness walker would be three times more likely to encounter a vehicle than a hiking group on a spring weekend and would be eight times more likely to encounter a vehicle than a hiking group on a summer weekend. Private vehicles outnumbered government vehicles on both wilderness and non-wilderness sections of the road, especially on weekends. Spring is the most important season, in terms of numbers, for backpacking and day hiking. The data indicate that removal of government vehicles alone will not significantly reduce hiker-vehicle encounters in wilderness. Temporal displacement of vehicle and hiker travel times is also unlikely. Until agreements allowing private vehicles expire, providing hikers with alternative north-south hiking trails is probably the most effective way of reducing vehicle encounters.

Introduction

The question of the appropriate visitor experience for Cumberland Island National Seashore has been a topic of much discussion and controversy. With the passage of wilderness legislation for the northern two-thirds of the island, the determination of visitor use patterns in backcountry areas has become more critical, as has the analysis of vehicle use on park roads and trails. The purpose of this report is to provide preliminary vehicle and visitor flow data for the Main Road from Sea Camp Visitor Center to Stafford House, a major route from the public boat docks to the north, and for the Main Road from the intersection with Plum Orchard Road to Brickhill (Bricklin) campsite, a wilderness route. The Main Road is the primary artery from north to south for vehicles and is also used by backpackers. Dayhikers from Sea Camp use the Main Road as a route to Greyfield, Stafford, Willow Pond, and for loops to the beach. Day hikers, bicyclists, and horseback riders from Greyfield Inn and from retained rights properities use the Main Road to reach points from Plum Orchard south. The road thus is one of the principal locations for contacts between park visitors and vehicles. This study compares vehicle and visitor flows on different days of the week, as well as different times of day during fall (Sept.-Nov.) 1983, winter (Feb.) 1984, spring (April) 1984, and summer (June-July) 1984.

At the time of this study, retained rights agreements allowed private vehicle use on many park roads and trails and on the beach. Almost all of these agreements specifically mention use of the Main Road or allow island residents a means of traveling to one or more of the boat docks. Despite the existence of these agreements, the Main Road was not excluded from wilderness legislation, although the legislation acknowledges the existence of retained rights and private property on the island. Many of the agreements are some form of life estate, so some will probably not expire for another 60 to 80 years. The presence of vehicle traffic on the Main Road is thus a long term managerial concern for the U.S. National Park Service.

Methods

The southern study area extended from the wooden fence around Sea Camp Visitor Center to the road junction near the gate at Stafford House, a distance of 5.6 kilometers (km) or 3.5 miles. The route was divided into six sections: 1) from Sea Camp Visitor Center fence to the Main Road (.2 km); 2) (turning north) to Greyfield Inn's southern entrance (1.6 km); 3) to the intersection to the Road to Davisville (1.3 km); 4) to Pratts Trail south end (.5 km); and 6) to Stafford House (1.1 km). The wilderness (northern) route began at the Y turn to Plum Orchard and extended to Brickhill Campsite, a distance of 6.7 km. There were seven sections from south to north: 1) Plum Orchard road intersection to Duck House trail (.8 km); 2) to Yankee Paradise trail (.9 km); 3) to King's Bottom trail (1.4 km); 4) to Oyster Pond trail (1.3 km); 5) to South Cut road (1.1 km); 6) to the trail to Brickhill campsite (.9 km); and 7) to the intersection of the trail from Brickhill to Bunkley trail (.3 km).

The first sampling period (fall) began Sept. 9, 1983 and continued until the Monday after Thanksgiving (Nov. 28, 1983). Sampling included holiday and non-holiday weekends, and weekdays with and without the ferry. Two samples were conducted when a deer hunt was in progress, thus the campgrounds were closed. During the first sampling interval only the Sea Camp to Stafford route was sampled.

Sampling began at four different times of day, 8:00 to 8:30 (a.m.), 10:15 to 10:55, 12:30 to 12:50 and 14:30 to 14:50. Sampling at 10:15 and 14:30 was coordinated with ferry landing times. The investigator would start, on foot, when the first backpackers, if any, had left or when about half the day users had left the Sea Camp Visitor Center area. During the first sampling period, only one sample walk was made a day, except for Nov. 26 and 27 when three sample walks were initiated at 8:00, 10:00 and 12:00.

During the second sampling period (winter), the wilderness route was walked five days a week (Wednesday - Sunday) from Feb. 1 to Feb. 26, and the Stafford route was sampled five days a week from Feb. 15 to Feb 26, 1984. Sampling was alternated to sample four times of day for each of the selected days of the week (8:00 and 12:30 or 10:15 and 14:30). In spring, April 4 to 29, the two routes were sampled five days a week at the same times. Once on Wednesday and Thursday and twice on Friday, Saturday and Sunday. In summer, June 20 to July 15, the same scheme was used, except two samples were run on Wednesday and Thursday.

The person collecting data would walk from the route in question from south to north over about two hours then return to the southern terminus, continuing to collect data. Since the two routes take less than two hours to complete, short stops were made at trail intersections and at Stafford and Brickhill to adjust the times (when visitor traffic was heavy the routes took slightly longer to complete.) Each time the investigator encountered visitors, island residents, park staff or park contractors, the investigator recorded the time the party was first seen or heard and the time last seen or heard, the direction of travel, and the number of people in the party. Parties were classified according to their conveyance: *I. Vehicles*, car, pick-up truck, suburban van, van, heavy truck, jeep, motorcycle, moped, motorized trike, tractor, road equipment or Cushman motor wagon; *II. Foot travelers*, walker (without pack), daypacker, backpacker, and jogger; *III. Other*, bicycle, horseback, and horse and wagon. Since wilderness legislation does not allow bicycles or wagons, these were considered vehicles in some analyses. Each group or vehicle was assigned a number in order of encounter. If it was seen more than once during the four hour sample it was recorded again by the same number. Vehicles were identified by owner: U.S. government, state government, park contractor, park staff private, or other private. Data on weather conditions were recorded but are not reported here.

Most of the sampling was completed by volunteer student assistants, thus there were occasionally problems, particularly at the beginning of sampling periods, with vehicle identification. Most of these could be corrected or adjusted with descriptive information included on the data sheets. No effort was made to inform park staff or island residents of the days of the survey and research vehicles were recorded when they traveled through the sample routes.

Results

Encounters Sea Camp to Stafford

The number of encounters with groups or vehicles per four hour sample from Sea Camp to Stafford was higher on weekends (Friday, Saturday, Sunday) than on weekdays, although the difference was insignificant in spring and summer (Table 1). Average weekday use was lowest in winter, and highest in the spring. Weekend use was also highest in spring but varied little between the seasons, except for a summer decline, due largely to the lower numbers of foot travelers. Private vehicle use was the same or slightly higher than government use (Park Service, state and government contractors) during the week, but is two to four times higher on week ends (Table 1). Foot traffic on weekdays is less than half that of weekends for fall and winter, but in spring and summer, foot use on weekends was only slightly greater than weekday use. Weekend foot use was similar for all four seasons, averaging 9 to 11 encounters per four hours, except during the summer when it averaged about 5 encounters per four hours. Total weekend encounters (hikers and vehicles) varied from a low of 18 per four hours in the summer to 26 per four hours in the spring. On the average, vehicle encounters were always greater than encounters with foot travelers.

The maximum number of vehicle encounters per four hour sample period was 22 in the fall, 19 in winter, 27 in spring and 22 in summer. Seven of 32 spring samples encountered 20 or more vehicles each. Of the 123 samples total, nine had no encounters with government vehicles although none of the samples lacked an encounter with a private vehicle. Twenty-two (18%) of the samples encountered five or fewer private vehicles. Even if government use of the road were to cease completely, a hiker would still almost certainly encounter a vehicle during almost any day time hike, and might encounter 8 to 12 on walk from Sea Camp to Stafford and back.

The maximum total encounters was 53, on Sunday of the Thanksgiving weekend. This included 29 encounters of groups on foot. Of the four holiday weekends sampled, Thanksgiving, Washington's Birthday, Easter and the Fourth of July, Thanksgiving had the heaviest traffic. Figures for Saturdays and Sundays of the holiday weekends indicate low government vehicle

Table 1: Encounter rates for vehicles and foot travelers, Sea Camp to Stafford by season. Figures are average encounters per four hour sample. Total encounters includes bicycle and horse parties.

		Weekday	Weekend
Government vehicles	Fall	7.1	2.6
	Winter	4.8	4.5
	Spring	6.3	4.3
	Summer	4.6	3.8
Private vehicles	Fall	7.1	10.9
	Winter	5.9	8.0
	Spring	9.1	11.9
	Summer	8.2	8.9
Hiker groups	Fall	3.4	10.8
	Winter	4.0	10.2
	Spring	8.5	9.0
	Summer	3.9	4.9
Total encounters	Fall	18.0	25.1
	Winter	14.6	23.7
	Spring	24.0	26.0
	Summer	17.3	18.0

encounters. During Thanksgiving, for example, private vehicles were ten times more frequent than government vehicles. Foot use was high, averaging 17.0 encounters per sample (and 1.0 for bicycles and horses). The average total encounters for a four hour trip during Thanksgiving was 43.7, or more than 10 per hour. The average for non-holiday weekends in the fall was 20.6 or about half the holiday rate. Fourth of July (Saturday and Sunday) had 1.0 government vehicles encounters and 10.8 private vehicle encounters per four hours. The average total encounters was 17.8 per four hours, which was not particularly high for a weekend.

Encounters in Wilderness

Use of the wilderness was greater in the spring and summer than in the winter. There were approximately twice as many vehicles and 60% more hiker encounters during the spring than in winter. During the summer, hiker encounters declined to a lower rate than during the winter, but vehicle encounters remained about the same on weekdays and slightly higher on weekends. Hikers favor weekends, although this difference was most marked in the summer. In the winter sample, there was little difference between government and private vehicles in terms of numbers. Government vehicles were less frequently encountered on weekends, and private vehicles on weekdays. During the spring, government use was greater than private use on weekdays, while private use was three times greater than government use on weekends. In summer, government use was slightly greater than private use on weekdays and about half private use on weekends (Table 2).

For winter and spring, nine (18%) of the four hour samples produced no encounters. These were largely weekday and Sunday afternoon samples. During winter and spring five of the samples (10%) produced only encounters with hikers. Therefore, during 28% of the winter and spring samples, no vehicles were encountered. During summer, however, three of 39 produced no encounters and all the others included encounters with vehicles. Thus during summer only 8% of the samples encountered no vehicles.

During the spring, 25 out of 32 samples included encounters with private vehicles and 13 out of 32 included encounters with government vehicles. In winter, nine and 11 of 28 encountered private and government vehicles respectively, and in summer, 27 and 24 of 39 samples encountered private and government vehicles. Thus, private vehicles were encountered on 76% of the samples and park vehicles on 48% during winter and spring. During summer, private vehicles were encountered on 68% of the samples and government vehicles on 62%. The increase in park

Table 2: Encounter rates for vehicles and foot travelers, the Main Road, Plum Orchard road intersection to Brickhill (the wilderness route). Figures are average encounters per four hour sample. Total encounters includes bicycles.

		Weekday	Weekend
Government vehicles	Winter	.6	.4
	Spring	1.4	.5
	Summer	1.2	1.0
Private vehicles	Winter	.6	.6
	Spring	1.1	1.5
	Summer	1.0	2.2
Hiker groups	Winter	.2	.6
	Spring	.6	.8
	Summer	.2	.4
Total	Winter	1.5	1.6
	Spring	3.1	2.8
	Summer	2.4	3.6

vehicles in summer may be partially due to the assignment of a ranger to quarters in the Settlement, which is north of the wilderness boundary, and it may also reflect a seasonal increase in research use. Private vehicle use was consistent from spring to summer.

A hiker walking this section of the Main Road could expect to encounter one other hiking group in a four hour walk, and would have a good chance of not seeing anyone else on foot. The maximum number of hiking parties encountered in four hours was three separate groups. Vehicle encounter rates were higher, and a hiker would be much more likely to see a vehicle than another hiking party even though this section was legislated wilderness. During spring, a hiker could expect to see two to three vehicles during a four hour walk (Table 2). Thus, during a spring weekend a hiker was three times more likely to see a vehicle than an another hiking group and during a summer weekend a hiker would be eight times more likely to see a vehicle than another hiking group (Table 2 and Figure 3).

The maximum number of vehicles encountered per sample was seven during the spring and six during the summer. Even if there were no government use of this section of road, a spring hiker could expect a vehicle encounter on 80% of weekend walks of four hours duration.

Group size

Both the backpacking and day hiking groups encountered in the wilderness (sum of three seasons) tended to be small. Of 124 backpackers encountered (in the process of carrying their packs between campsites) there were four groups of 10 or 12. These accounted for 44 hikers or 35% of the total hikers but only 10% of the total groups. All the other backpacking or day hiking groups encountered included five or fewer people, and only one of these groups had five (Fig. 1). The average group size for the backpackers was 3.1, and without the large groups was 2.2. The mode was two (Fig. 1). The average size of the day hiking groups was also 2.2. Many of the day hiking groups in this section were actually backpackers who had already set up camp and were touring the area on foot. A few of the day hikers had hiked or hitch hiked from the south end and a few were staying at retained right properties or had driven to the wilderness area and had ventured out on foot. The ratio of dayhikers to backpackers was .49, and of day hiking groups to backpacking groups was .70.

The average group size for backpackers, Sea Camp to Stafford, was 3.1, the same as on the wilderness route, and was 2.6 without the groups of ten or more. Most of the large groups encountered on the non-wilderness route were 10 to 13 people, although the largest group encountered consisted of 38 boy scouts and leaders. The mode was two (Fig. 2). The average group size for walkers without day packs was 2.4 and for walkers with daypacks was 2.8. A few large groups of day hikers were encountered, 15 to 25 people, but these were in the southern most section of the route (zone 1) and were probably just heading to the beach. The mode for day hikers was also two (Fig. 2). The average group size for joggers was 1.2, and the largest group encountered was three (of a small sample of 20 joggers). Groups of bicyclists also tended to be small, averaging 2.5 individuals per group. Of the 74 groups of bicyclists encountered, 95% were comprised of three or fewer people. Of the 474 groups of day hikers encountered, 82% were comprised of three or fewer people. Of the 350 groups of backpackers, 76% had three or fewer. The ratio of dayhikers (including joggers) to backpackers was 1.12, and the ratio of dayhiking groups to backpacking groups was 1.40. This ratio did vary seasonally, from a low of .82 in the spring when backpackers predominated, to .88 in the fall and .98 in the winter, to a high of 2.85 in the summer when dayhikers were far more common than backpackers.

Encounters by section and time

Since there were few encounters in the wilderness, encounters were summed by the three seasons to determine possible distribution by section (or zone) and time. For the wilderness route there was no strong concentration of either hikers or vehicles in terms of where they were likely to appear along the route. (Fig. 3) This may be due to the high proportion of through traffic, particularly vehicles traversing the entire route, and the multiple entrances and exits available.

For the Sea Camp to Stafford route, there are differences between sections. Foot traffic tends to decrease from south to north. This is partially due to very heavy visitor use in the immediate area of Sea Camp, including some people taking short walks, and others traveling between Sea Camp campground and the visitor center. The foot traffic in Section 1, was eight to ten times that in Section 2. Foot traffic declined north of the intersection of Pratts Trail and the Main Road. In summer, for example, there were 5 to 6 foot travelers encountered per km (sum of all sampling periods) in Sections 5 and 6, and 23 to 24 foot travelers per km in Sections 2 and 3. In spring, patterns were similar, except Section 6, terminating at Stafford House, had nearly as many backpackers as the more southerly sections. Private vehicles were relatively evenly distributed among the Sections, whereas government vehicles decreased in frequency north of the turn to Little

Greyfield Beach. The data indicate both day hikers and backpackers are leaving the Main Road at Pratts Trail.

In terms of time of day, encounters with wilderness hikers tended to be concentrated in the afternoon from 13:00 to 16:00 (Table 3). Very few wilderness hikers were encountered before 10:00 or after 17:00. Vehicle use was more evenly dispersed through the day, and was above .38 vehicles per hour from 9:00 until 17:00 hours. Although the variability in encounters was high, peak vehicle use was probably between 13:00 and 14:00.

The mid-day encounter pattern of the hikers is probably related to departure times from campsites such as Stafford and Hickory Hill. Assuming that hikers leave these areas about 9:00 or 10:00, it takes a hour or two to reach the section of road surveyed. A vehicle leaving Sea Camp, in contrast, can reach this stretch of road in a half an hour.

From Sea Camp to Stafford, foot travelers were most frequent between 10:00 and 12:00. Most hiking was between 10:00 and 17:00 (Table 4). Private vehicles were distributed throughout the day, but tended to peak about 11:00. Government vehicles were most frequently encountered in early afternoon, 13:00 to 15:00, and decreased after 16:00, the end of the government working day. Private vehicles continued to travel into the evening, especially in the summer (Table 4).

Private vehicles belonging to park staff

Private vehicles on Cumberland Island belong to park employees as well as to holders of retained rights and owners of private property. An attempt was made to differentiate between private vehicles belonging to park staff and those belonging to other island residents throughout the sampling, but this effort was most effective during the summer, when investigators made a descriptive list of all vehicles known to belong to park employees. During the summer, four vehicle encounters in wilderness, or 9% of the encounters with private vehicles, were with vehicles belonging to park employees. From Sea Camp to Stafford, there were 32 encounters with vehicles owned by park staff, or about 10% of the private vehicle encounters.

Figure 1: Group size on the wilderness route

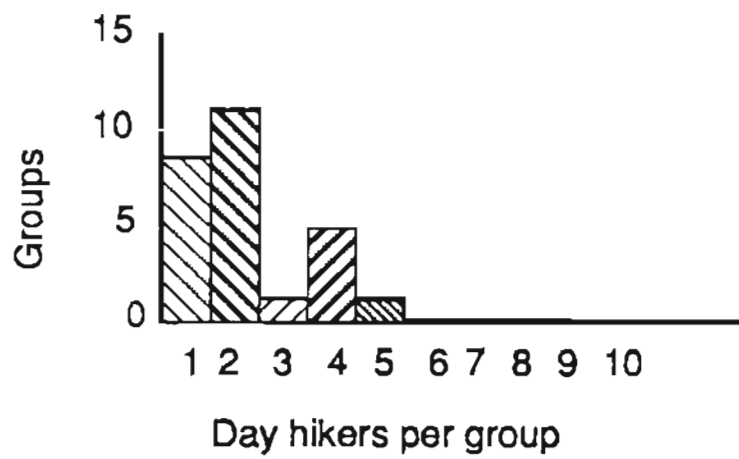
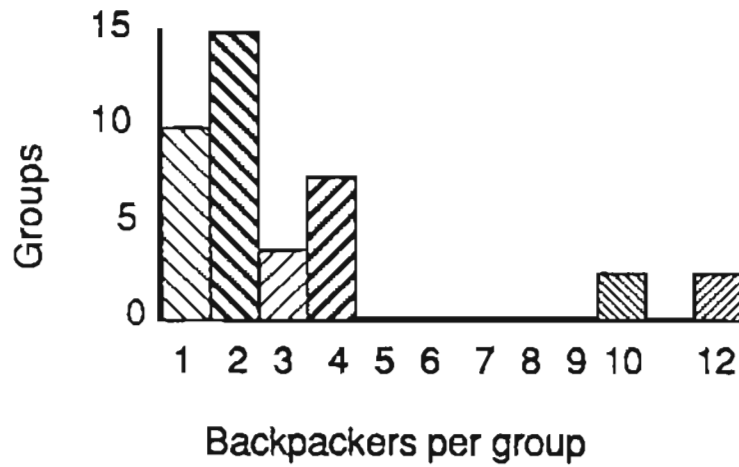
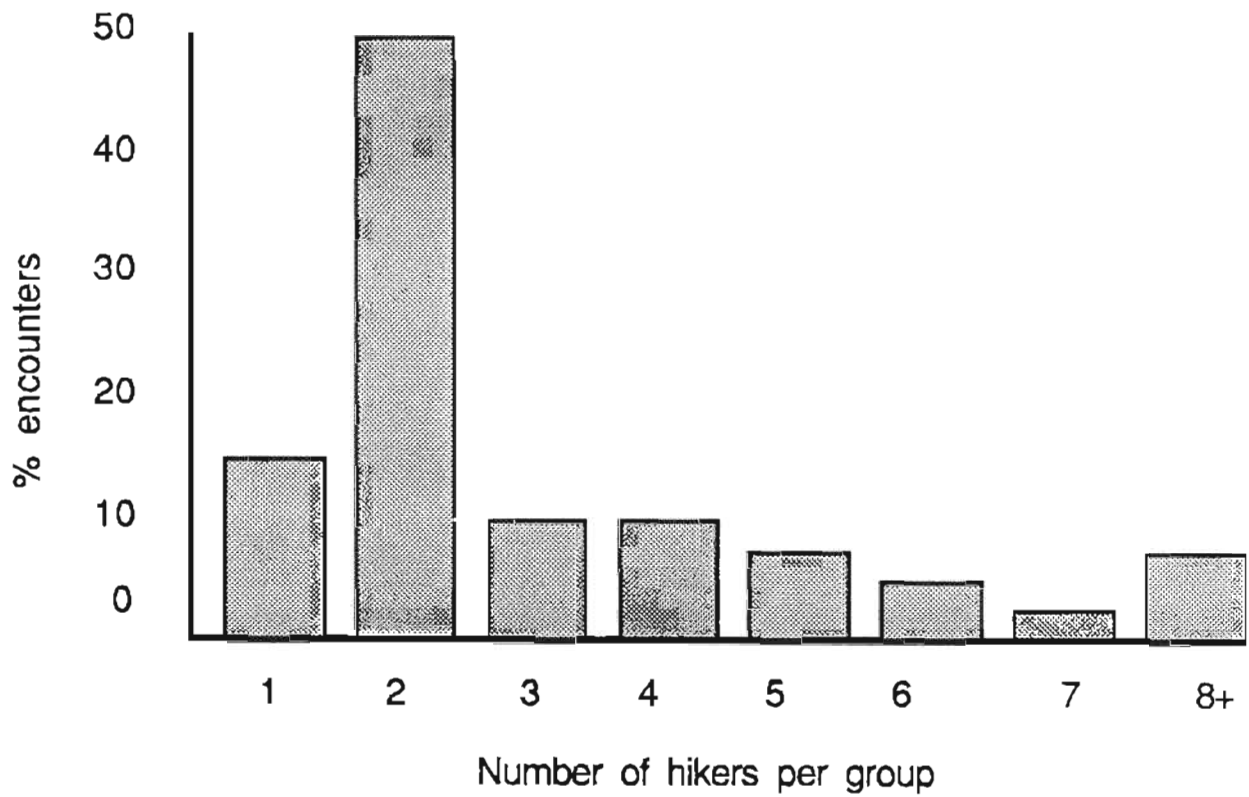


Figure 2: Group size - Sea Camp to Stafford

BACKPACKERS



DAYHIKERS

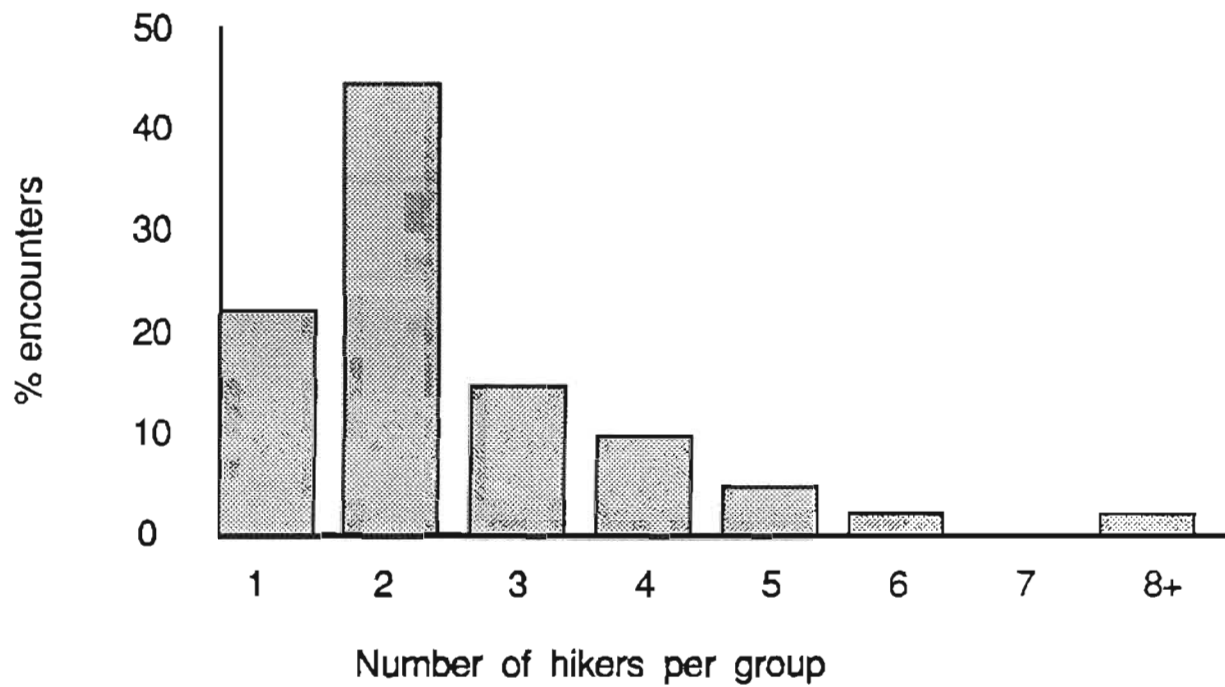


Figure 3: Total encounters by zone on the wilderness route

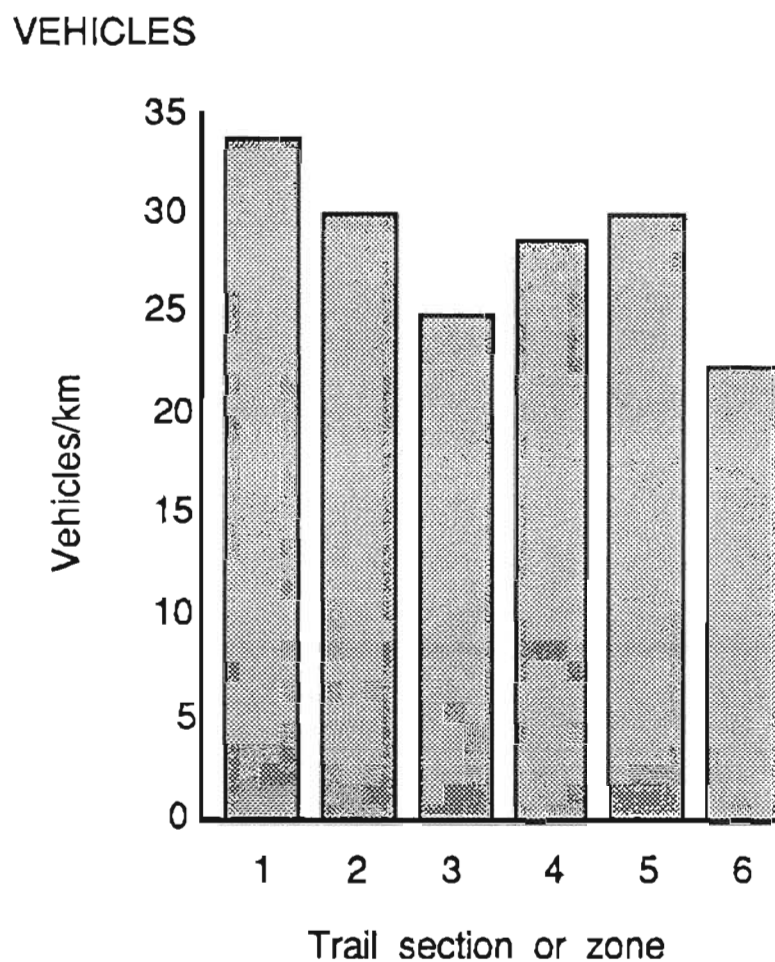
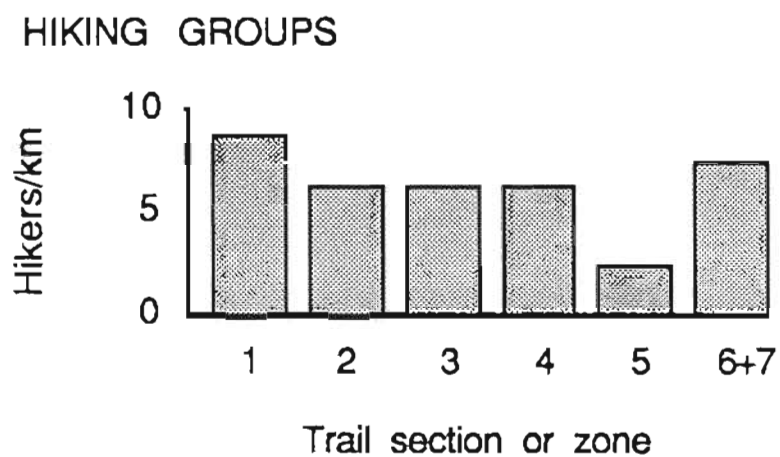


Table 3: Wilderness encounters per hour by time of day. Winter, spring and summer data are summed.

Time	Hiker group	Government vehicle	Private vehicle
8:00	.05	.10	.02
9:00	.04	.23	.23
10:00	.10	.14	.43
11:00	.12	.21	.23
12:00	.08	.19	.38
13:00	.15	.28	.41
14:00	.19	.17	.23
15:00	.17	.13	.25
16:00	.10	.19	.37
17:00	.04	.04	.15
18:00	.00	.00	.07

Table 4: Sea Camp to Stafford encounters per hour by time of day for two seasons, spring and summer.

Time	<i>SPRING</i>			<i>SUMMER</i>		
	Hiker group	Government vehicle	Private vehicle	Hiker group	Government vehicle	Private vehicle
8:00	.21	.36	.36	.52	.21	.38
9:00	.10	.12	.55	.31	.16	.44
10:00	.49	.24	.59	1.29	.20	.73
11:00	.33	.21	.84	.88	.19	.89
12:00	.32	.18	.38	.53	.26	.77
13:00	.14	.50	.63	.29	.21	.65
14:00	.29	.25	.59	.72	.42	.88
15:00	.26	.29	.45	.47	.41	.95
16:00	.39	.07	.33	.40	.21	.53
17:00	.13	.06	.50	.03	.31	.75
18:00	.08	.04	.40	.53	.13	.27

Discussion

This study found a high rate of encounter between hikers and vehicles on the Main Road. For both wilderness and non-wilderness sections, there were, on the average, more encounters with vehicles than with hikers. Particularly on the non-wilderness portion of the road, traffic is heavy, and every sample run encountered vehicles. A majority of the vehicles encounters were with private rather than government vehicles. On high use week-ends, private traffic far exceeded government traffic.

At present, the Main Road is one of two continuous north-south routes available to hikers traveling between Sea Camp and the wilderness area. Almost all hikers either use the Main Road for part of the trip, or use the beach, which is also open to vehicles. A back packer leaving Sea Camp on the section of the Main Road to Pratts Trail can expect several vehicle encounters, an unusual situation in a National Park Service area. A backpacker traveling the Main Road in the wilderness is less likely to see vehicles, but the probability of an encounter is still high.

The high frequency of encounters between hikers and vehicles is undesirable for several reasons. First, some hikers are seeking a backcountry or wilderness experience and do not wish to see vehicles. Second, high rates of encounter with either other hikers or vehicles, give the impression that the island is crowded, and detract from hiking experience. Third, vehicles are a hazard to people on foot or bicycles. Since wilderness users are more likely to see vehicles than to see other hikers, they are very likely to notice vehicles and find them an intrusion.

The data from this study indicate reduction or elimination of encounters with government vehicles will not solve the problem. During popular hiking times on weekends, a majority of the vehicle traffic is private. Travel early or late in the day (before 10:00 or after 17:00) will reduce wilderness hiker/vehicle encounters, but private vehicles tend to travel in the middle of the morning and the early afternoon, thus intercept large numbers of hikers. Even if there were no Park Service vehicle use in the wilderness, a spring hiker could expect a vehicle encounter on 80% of day time walks, four hours in duration. A summer hiker might encounter a vehicle on 90% of week-end walks. Displacement by road sections is also impractical. Traffic tends to be relatively evenly distributed in the wilderness. From Sea Camp to Stafford, the sections most heavily used by

hikers are also heavily used by private vehicle traffic.

One can not assume private traffic will decline over the next few years. It may, in fact, increase with further development of retained right properties (such as recent additions at High Point). The existing retained rights agreements are not likely to expire until well after the turn of the century. The figures in this report, therefore, may not predict future private use traffic patterns. Under present circumstances, the best way to reduce encounters between hikers and vehicles is to offer alternate hiking routes, on trails that are not open to motorized conveyances.

From Sea Camp to the wilderness boundary, an alternate foot trail leading first to Pratts Trail and thus to Stafford would provide a hiking option away from traffic. A route for this trail is already under evaluation. From Stafford to the wilderness boundary, foot traffic is forced back on the Main Road or onto the beach by private property. An alternate interior trail would also be desirable between Stafford and Hickory Hill or Willow Pond Trail, although a satisfactory route may be more difficult to find due to the presence of a commercial farming operation and cattle pastures in that section of the island. From the wilderness boundary to Long Point (the northern end of the island), a series of interior trails already exists. The only campsite north of Yankee Paradise, however, is Brickhill, which is on the Main Road. Backpackers traveling north therefore tend to either remain on the Main Road or return to it after camping at Yankee Paradise or Hickory Hill. A potential solution is to place new campsites along the existing interior trail system (ie. Lost Road or Roller Coaster Trail) that will give hikers wishing to go north places to camp away from the major north-south motorized vehicle route. With these adjustments, and adequate information to direct the park visitor to appropriate trails, backpackers would be able to travel from Sea Camp to Long Point area with few or no vehicle encounters.

The National Park Service can also reduce hiker-vehicle encounters by:

- 1) reducing vehicle use park wide,
- 2) doing road maintenance and other necessary mechanized activities during low hiker use periods, such as week days or non-ferry days, and during the winter and summer rather than the spring or fall,
- 3) by reducing vehicle use in mid to late morning and at ferry times on the south end of the Main Road,
- 4) by reducing mid-day vehicle use,

- 5) by allowing trails not specifically mentioned in retained rights agreements to close to hiker width,
- 6) by providing more information to hikers on road and trail conditions, including vehicle encounters,
- 7) by maintaining a north-south wilderness hiking route from Willow Pond trail, to Lost Road to Roller Coaster.

The National Park Service can improve the efficiency of patrols intended to encounter hikers by:

- 1) patrolling on weekends rather than weekdays (especially in fall and winter)
- 2) patrolling during late morning to mid-afternoon (unless one wishes to encounter hikers at their campsites)
- 3) increasing patrol activities in spring.

The structure of hiking groups on the Main Road is typical of many park and wilderness areas. Most of the groups tend to be small, one to three people. Large groups are less frequent, but accounted for 35% of the hikers encountered in the wilderness. Campsites need to accomodate primarily small groups. Large groups, usually ten people or more, represent a substantial percentage of the total campers, however, and under the present system will tend to share sites with groups containing from one to three people. More camping options may be needed to provide for both types of backpacking parties, the small group and the organized large group.

Acknowledgments

I would like to thank all the volunteers who helped gather these data. Special thanks go to Richard Grumbine who helped to set up the survey. Becky Jones, Rachel Aptekar, Leam Citka, Lisa Conrad, Dollene Davidson, Chuck Lowe, and Tom Reynolds all braved the weather, the dust, the exhaust fumes and the noxious insects to help gather the information presented here. Barb Zoodsma and Mark White helped tabulate the data. Hopefully they all can return to the island in the future to appreciate an even better trail and campsite system.