



Monitoring Visitor Capacity for Isle au Haut, Acadia National Park, 2015



Western Head, Isle au Haut

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Executive Summary

The visitor experience standard outlined in the Visitor Use Management Plan for the Isle au Haut District allows ten percent of the days in July and August (six days) to exceed a 6-groups per day encounter standard for hikers. Based on a simulation model of visitor use, this 6-group standard should be equivalent to about 128 visitors per day. If the group encounter standard is violated, NPS management actions will be needed to achieve the intent of P.L. 97-335 to manage visitor use under a “strictly limited” carrying capacity to protect park resources and the quality of the visitor experience.

In July and August 2015 surveys were administered to visitors at Duck Harbor to measure trail encounters. As usual, Isle au Haut rangers collected daily visitor use data using established methods.

Visitors to Isle au Haut encountered an average of 4 other groups out hiking, which is well below the daily group encounter standard of 6. When asked, they also reported overwhelmingly they do not feel crowded. However, there were 16 days with more than 128 visitors on Isle au Haut, which far exceeds the 6 days per season delineated by the visitor experience standard. These high counts can be attributed to visitors from Private Boats and from Town, and to a much lesser extent, from Commercial Boats. A likely reason for these conflicting results is that visitor’s temporal and spatial use of Isle au Haut trails sufficiently disperses use to reduce the number of encounters for most visitors. It is also possible there were duplicate counts, or the counting methodology overcounts visitors, but this seems less likely.

We believe the encounter metric should be given greater weight than the number of visitors counted. Coupled with the fact that the vast majority of visitors did not feel crowded, we conclude that intent of P.L. 97-335 and the goals of the Visitor Use Management Plan were met.

Based on these results we offer the following recommendations:

- Continue the admittedly difficult-to-obtain visitor count methods, tightening them up wherever possible;
- Conduct visitor surveys again in 2018, making a better effort to representatively sample visitors from Town and Private Boats;
- Set a group size limit for all groups (commercial, noncommercial, educational etc.) for trails at Isle au Haut.

Finally, we note here that we expect to repeat the resource assessment for trails (Marion 2006) in 2016 to see if conditions have changed after 14 years of visitation. If conditions have degraded, we should revisit the 128-person limit because previous research demonstrated a direct relationship between the level of use and trail width and depth.

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INTRODUCTION

Isle au Haut lies about 30 miles southwest of Bar Harbor, Maine and seven miles south of Stonington, Maine. The island is about seven miles long and two miles wide and the National Park Service (NPS) manages about half of it (2,900 acres) as part of Acadia National Park. The other half is privately owned. About forty-five year-round residents and two hundred summer residents live on the island. Annual park visitation to Isle au Haut is currently about 5,000 to 7,000 day use visitors and 500 to 600 individual campers. Both island residents and visitors access the island via a private, nonprofit passenger ferry service from Stonington, Maine that serves the town year-round and the park pier at Duck Harbor from June to September.

Public Law 97-335, passed in 1982, required the NPS to establish a visitor carrying capacity to manage for limited entry, low intensity recreational experiences. Part of the motivation for the legislation was increased conflict between the NPS and island residents concerned about the number of visitors and their behaviors (e.g. trespassing on private lands) and private lands being added to the park. The NPS has managed Isle au Haut for a 120-visitor daily capacity since the late 1980s based on research done by the Appalachian Mountain Club. However, violations of this capacity in the late 1990s prompted research to develop a revised, more informed visitor capacity in the early 2000s. This research included resource assessments of conditions of trails and campsites (Marion 2006) but these were not monitored and are not addressed in this report.

From 2001 to 2003 the University of Vermont (UVM) administered surveys to Isle au Haut visitors and residents to assess the quality of the visitor experience (Bacon et al 2004). The study found the mean and median hiking group size to be 2.8 and 2.0 persons respectively. The number of encounters visitors had with other groups of hikers along trails was established as the key indicator of the visitor experience. Residents *preferred* a much lower number of encounters per day on trails than visitors (1.9 versus 5.6 groups); they also had a lower level of *acceptability* for encountering other hiking groups than visitors (6.5 versus 10.8 groups). Park staff asked the UVM team to apply the visitor use simulation model they developed to determine the levels of overall visitor use that would apply for encounter levels of 5, 6, and 7 groups of hikers per day and the number of visitors who could disembark at Duck Harbor to achieve those encounter levels. These are shown in Table 1, and they offered a range of reasonable standards for managing the visitor hiking experience on Isle au Haut (William Valliere 2003 email communication).

TABLE 1: ESTIMATED OVERALL USE LEVELS AND THE NUMBER OF VISITORS WHO COULD DISEMBARK AT DUCK HARBOR FOR THREE HIKING GROUP DAILY ENCOUNTER RATES

# Groups	# Hikers*	Overall Use (# visitors)	# Visitors Disembarking at Duck Harbor
5	10 – 14	105	55
6	12 – 16.8	128	68
7	14 – 19.6	149	78

* This range is based on using the median (2.0) and the mean (2.8) number of hikers per group. These data are available in park files.

Park staff then considered the disparate *preference* and *acceptability* ratings of visitors and residents along with other study results, P.L. 97-335, and NPS policies to establish a standard for

trail encounters. In 2003, we selected an encounter level of six hiking groups per day as the standard, but it was not until 2014 that a Visitor Use Management Plan (NPS 2014) adopting those standards was completed. Specifically, the standard is expressed as follows:

“On 90% of the days in July and August visitors will experience a daily encounter rate of no more than 6 groups while hiking, which is equivalent to a daily visitor capacity of 128 persons, including day users and campers” (NPS 2014).

This standard allows ten percent of the days in July and August (six days) to violate the 6-groups or 128-persons per day standard before NPS takes action to meet the standard. On average, park staff expected the 128-visitor capacity would be comprised of the (up to) 50 passengers on the Duck Harbor Ferry, and about 18 campers from the Duck Harbor campground, 30 visitors from the town ferries and private boats, and 30 residents (NPS 2014).

This report describes the results of the first monitoring survey to assess the condition of the visitor experience by comparing visitor encounters with other hiking groups to the standard and to actual daily counts of visitors by Isle au Haut rangers.

METHODS

SURVEY ADMINISTRATION

We planned to administer 250 surveys, 200 (80%) at Duck Harbor and 50 (20%) at the Town Landing, an allocation roughly based on the visitor ferry departure patterns. Ten days in July and ten days in August were randomly selected for the surveys. Sixteen of these survey days would be at Duck Harbor and four at the Town Landing. Our protocol was one survey per visitor group. This meant we needed to collect 12-13 surveys/day. Surveys were planned for late afternoon ferry departures: Duck Harbor between 3:00 p.m. and 4:00 p.m.; and Town Landing between 3:30 p.m. and 4:30 p.m.

Because there were not enough daily visitor groups to obtain 12-13 surveys per day, Isle au Haut rangers adjusted the protocols and surveyed visitors at Duck Harbor between 3:00 p.m. and 4:00 p.m. almost every day in July and August. Rangers were also unable to survey at the Town Landing due to other obligations. As a result, no town residents and no private boat visitors completed surveys. The original protocols and contact script are in Appendix 1.

When a group agreed to participate, we asked the adult with the next birthday to serve as the respondent. If a visitor refused, we recorded their gender, group size, and asked if they had any prior visits to Isle au Haut, and recorded this data on a Non-response Bias data sheet. Isle au Haut rangers administered the surveys, having been trained and advised by the primary authors.

QUESTIONS

Question 1 asked approximately how much time visitors spent hiking on Isle au Haut. Question 2 asked what the approximate number of other groups of hikers the visitors saw while hiking on the trails on Isle au Haut. Question 3 asked how crowded the visitors felt along the trails on Isle

au Haut, giving them a range to choose from of: not at all crowded; somewhat crowded; moderately crowded; very crowded; or extremely crowded. Question 4 asked if the visitors had visited Isle au Haut before and if the answer was yes, how many times. Question 5 asked how many people were in their group. Question 6 asked what year the visitors were born. Question 7 asked what the visitors' gender was. The questionnaire is in Appendix 2.

MONITORING DAILY VISITATION

Isle au Haut rangers count or estimate visitors every day through a variety of means. They usually meet every ferry to greet and orient visitors and make a count. If they are unable to, they get the count from the captain. Visitors arriving by private boat are estimated by multiplying the number of private boats at anchored in Duck Harbor at midday times three persons per boat plus individual counts of kayaks/people. If rangers talk to visitors from private boats, they inquire about the number of people on the boat and use that number instead of the multiplier. Visitors from a commercial operator providing boat service to the Town Landing are counted when the rangers see them in the park, identified by the company's bicycles. Rangers recognize most visitors from town and count them when they see them in the park, and when and where a vehicle is observed, they use a four person per vehicle multiplier. All of these are added together to come up with the total number of daily visitors (NPS 2014). The data collection protocols are in Appendix 3.

DATA ANALYSIS

All data was entered into Excel for analysis. Standard descriptive statistics (e.g. mean, median, 95% confidence levels etc.) and frequency distributions were performed on survey variables and visitor counts. Several of our distributions are Poisson and skewed either left or right, including number of previous visits, age, and group size. Because of our large sample sizes, we treated these as normal distributions. We also ran a scatter plot with y as the number of groups encountered and x as the number of hours hiking to test if more hours spent hiking meant more groups encountered. Detailed statistical data can be found in Appendix 5.

RESULTS

The rangers on Isle au Haut administered 230 surveys over 25 days in July and 26 days in August (Appendix 4). Almost all were administered to visitors at Duck Harbor and there were no refusals. Visitors also answered nearly every question in the survey (n=229 or 230).

VISIT AND VISITOR CHARACTERISTICS AND COMPARISONS TO 2001 VISITORS

Fifty-four percent of survey respondents were female and the average age of respondents was 51. The average number of previous visits was 1.24 for all visitors and 3.64 if all first time visitors were removed from the sample. The average group size was 3.1 persons and visitors spent an average of four hours hiking on Isle au Haut.

Tables 2 – 6 show the distribution functions for age, group size, time spent hiking, number of other groups seen, and number of previous visits. From these tables we can glean the following:

- nearly half of all groups consisted of two people and 81% were of four people or less;
- nearly half of all groups spent four hours hiking;
- more than 85% of hikes lasted between two and five hours;
- almost 90% of visitors saw no more than six other hiking groups while hiking;
- about 2/3 of visitors were on their first visit;
- 12% of respondents were under 30 years of age.

Since we did not survey or count visitors under 18, this last figure does not reflect the age profile of all Isle au Haut visitors. On our several trips out there on the ferry on 2015, we saw many children, and rangers confirmed this observation.

The longest hike time of any respondent was 9 hours, the largest number of other groups seen was 12, the most previous visits was 25, the oldest respondent was 75, and the largest group size was 12.

TABLE 2: AGE DISTRIBUTION		
Age Range	Number of Visitors	Percent of Visitors
1 - 10	1	0.43%
11 - 20	6	2.61%
21 - 30	21	9.13%
31 - 40	26	11.30%
41 - 50	43	18.70%
51 - 60	58	25.22%
61 - 70	65	28.26%
70+	10	4.35%
Total	230	100.00%

TABLE 3: GROUP SIZE DISTRIBUTION		
Group Size	Number of Groups	Percent of Groups
1	19	8.26%
2	111	48.26%
3	19	8.26%
4	37	16.09%
5	22	9.57%
6	8	3.48%
7	7	3.04%
8	5	2.17%
9	0	0.00%
10+	2	0.87%
Total	230	100.00%

TABLE 4: TIME SPENT HIKING DISTRIBUTION		
Time Spent Hiking (hrs)	Number of Groups	Percent of Groups
1	3	1.30%
2	9	3.91%
3	40	17.39%
4	111	48.26%
5	48	20.87%
6	8	3.48%
7	4	1.74%
8	6	2.61%
9+	1	0.43%
Total	230	100.00%

TABLE 5: NUMBER OF OTHER GROUPS SEEN WHILE HIKING DISTRIBUTION		
Size of Groups Seen	Number of Groups	Percent of Groups
0	5*	2.17%
1	10	4.35%
2	37	16.09%
3	62	26.96%
4	37	16.09%
5	32	13.91%
6	22	9.57%
7	8	3.48%
8	8	3.48%
9	3	1.30%
10	1	0.43%
11	0	0.00%
12	5	2.17%
13+	0	0.00%
Total	230	100.00%

* For example, 5 groups saw no other groups while hiking.

TABLE 6: NUMBER OF PREVIOUS VISITS DISTRIBUTION		
Number of Previous Visits	Number of Visitors with Previous Visits	Percent of Visitors with Previous Visits
0	151	65.94%
1	30	13.10%
2	17	7.42%
3	6	2.62%
4	5	2.18%
5	6	2.62%
6+	14	6.11%
Total	229	100.00%

Table 7 shows descriptive survey results compared with research conducted in 2001 (Bacon et al 2004). More respondents in 2015 were female and they were also about five years older. Many more visitors in 2015 were first time visitors. Mean group size was slightly larger in 2015, the number of other hiking groups seen was slightly larger in 2001, and time spent hiking was much the same.

TABLE 7: 2001 – 2015 SURVEY COMPARISON						
	Female	Male	First Visit	Not First Visit	Mean Group Size	Median Group Size
2001	50%	50%	50%	50%	2.8	2.0
2015 ¹	54%	46%	65%	35%	3.11 +/- 0.24 ²	2.0
	Mean Age	Median Age	Mean Time Hiking (hrs)	Median Time Hiking (hrs)	Mean # Groups Seen	Median # Groups Seen
2001	46	48	4.17	4.0	4.7	4.0
2015	51 +/- 1	53	4.01 +/- 0.16	4.0	4.03 +/- 0.29	3.75
	Mean # Prev Visits		Mean # Prev Visits Without First Time Visitors			
2001			--			
2015	1.24 +/- 0.39		3.64 +/- 0.96			

1. n=229 or 230 for 2015.

2. Confidence intervals for the means in this table are all 95%.

Some of the differences above are not easily explained. The 2001 research included a few surveys conducted at the Town Landing and a handful of summer or year-round residents but probably not enough to have any substantial effects. The large increase in first time visits is unusual. Since the 2001 surveys did not use the next birthday protocol, perhaps those who volunteered to participate then were more likely to be repeat visitors and the 2015 protocol captured more first time visitors who arrived with friends or family who visited before.

VISITOR CAPACITY, SENSE OF CROWDING, AND VISITOR COUNTS

Table 8 shows the number of other hiking groups encountered while on the trails and how crowded respondents felt on a scale of 1-5. Visitors to Isle au Haut encountered an average of 4 other groups out hiking, which is below the daily group encounter standard of 6. They also overwhelmingly do not feel crowded. Comparing the sense of crowding between 2001 and 2015 is less easy because a nine point scale was used in 2001 and 2002 and a five point scale used in 2015. In 2001 and 2002, 89% and 92.6% of visitors respectively checked 1, 2, or 3 on the nine point scale where 1 was “Not at all Crowded” and 9 was “Extremely Crowded.” In 2015, 91% of visitors checked “Not at all Crowded.” Our assessment is that there was no substantial change in the sense of crowding.

TABLE 8: NUMBER OF OTHER HIKING GROUPS ENCOUNTERED AND HOW CROWDED VISITORS FEEL ON TRAILS			
Other Hiking Groups Encountered		How Crowded Visitors Feel	
Mean	4.03 ± 0.29	1 ¹	91% (209)
Median	3.75	2	7% (16)
Minimum	0	3	2% (4)
Maximum	12	4	0% (0)
		5	0% (0)
n=230		n=229	

1. 1=Not at all crowded, 2=Somewhat crowded, 3=Moderately crowded, 4=Very crowded, 5=Extremely crowded

We tested with a scatter plot (y = number of encounters, x = time spent hiking) whether more time spent hiking meant that visitors encountered more groups. Visually, the scatter plot, as shown in Figure 1, does not suggest a straight line relationship. However, it does suggest a slight curvilinear relationship as shown by the trend line. Visitors who spent less time spent hiking and more time hiking saw slightly fewer groups. We suspect this is a result of visitor behavior. Because of this curvilinear relationship we did not do a regression test.

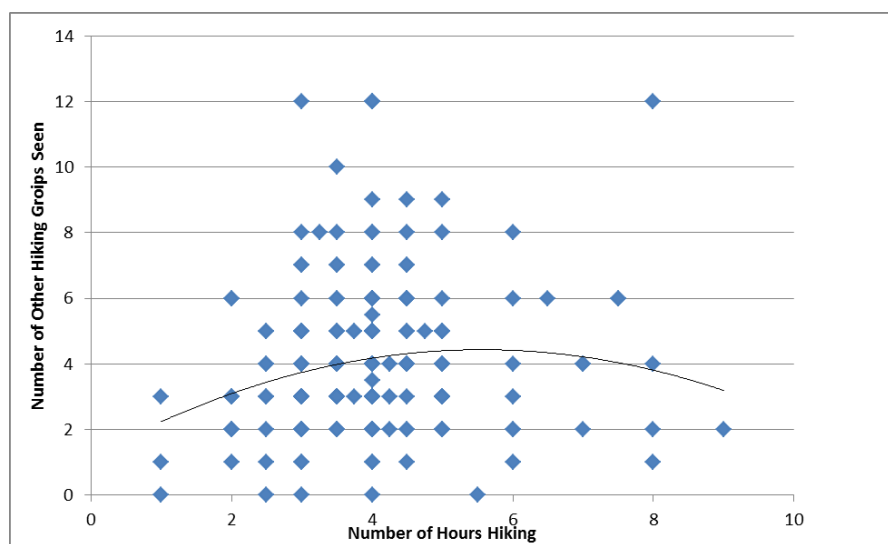


Figure 1: Scatter Plot of Number of Hours Hiking vs. Number of Hiking Groups Encountered.

Isle au Haut visitor counts from key sources and the total number of visitors for July and August 2015 are shown in Tables 9 and 10. Details are in Appendix 6. Results can be summarized as follows:

- For the Total Number of Visitors per day, there were four days in July and 12 days in August when the capacity of 128 persons was exceeded. The highest number of visitors counted was 218 on August 13;
- For the A.M. and Noon Ferries and Private Boats together, there were eight days in July and 18 days in August when visitation from these sources was greater than 30, the average number projected when standards were set in 2003. Visits from Private Boats was the primary reason;
- For the Duck Harbor Ferry, there were no days in July or August when visitation exceeded 50, the passenger limit since the late 1980s and set by the park under agreement with Isle au Haut Boat Services. The highest count was 47 on August 18;
- For visitors from Town, there were 17 days in July and 21 days in August when visitation was greater than 30, the average number projected. The highest count was 94 on July 26;
- For Commercial Boats, there were eight days in July and seven days in August when rangers observed visitors from this boat visiting the park. Three days in late July had more than 30 visitors due to large groups. No more than 12 visited on any other day. This type of use was not projected during the early development of the Visitor Use Management Plan;
- For Duck Harbor Campers, there were no days in July or August with greater than 18 campers, and 18 was the most campers on any night.

The 16 days with more than 128 visitors on Isle au Haut far exceeds the 6 days per season delineated by the visitor experience standard. The main contributors were visitors from Private Boats and from Town, and to a much lesser extent, from Commercial Boats. It is clear that earlier projections of average use from Town and Private Boats were inaccurate.

TABLE 9: NUMBER OF VISITORS TO ISLE AU HAUT FROM VARIOUS SOURCES, JULY 2015*.

July	A.M. + Noon Ferries + Private Boats	Duck Harbor Ferry	Town	Commercial Boats	Duck Harbor Campers	Total Visitors
1	16	0	1	0	11	28
2	26	14	6	0	12	58
3	29	21	35	0	12	97
4	19	7	45	0	10	81
5	15	14	32	0	12	73
6	34*	21	35	0	4	94
7	4	27	20	0	8	59
8	16	2	15	7	6	46
9	31	9	32	0	5	77
10	38	5	28	0	12	83
11	39	9	31	0	14	93
12	12	5	25	0	14	56
13	17	24	33	5	13	92
14	2	5	38	0	15	60
15	27	1	28	0	14	70
16	18	26	37	6	14	101
17	33	26	42	0	6	107
18	21	1	15	0	4	41
19	3	5	20	0	5	33
20	16	18	37	0	6	77
21	7	8	14	0	12	41
22	27	39	49	30	15	160
23	15	28	78	10	8	139
24	45	12	23	0	10	90
25	30	13	75	38	8	164
26	12	0	94	32	4	142
27	44	2	22	0	11	79
28	15	10	20	0	14	59
29	14	33	34	6	10	97
30	9	16	27	0	9	61
31	42	23	35	0	12	112

* Numbers in bold represent instances where actual visits are greater than average number of visits projected in the Visitor Use Management Plan or in the case of Total Visitors, greater than the daily visitor capacity of 128. The number of projected visits for A.M. and Noon Ferries and Private Boats was 30; for the Duck Harbor Ferry, 50; for Town, 30; for Commercial Boats, 0 (there was none at the time); and for Duck Harbor Campers, 18.

TABLE 10: NUMBER OF VISITORS TO ISLE AU HAUT FROM VARIOUS SOURCES, AUGUST 2015*.						
August	A.M. + Noon Ferries + Private Boats	Duck Harbor Ferry	Town	Commercial Boats	Duck Harbor Campers	Total Visitors
1	45*	12	29	0	13	99
2	31	8	46	0	7	92
3	29	31	53	0	10	123
4	25	4	23	2	8	62
5	47	43	54	0	8	152
6	62	32	61	12	7	174
7	46	30	55	0	13	144
8	87	23	61	0	15	186
9	27	17	70	0	11	125
10	49	38	53	4	11	155
11	7	7	20	0	7	41
12	24	8	51	0	7	90
13	82	32	81	11	12	218
14	43	37	36	0	18	134
15	65	5	40	0	18	128
16	45	15	32	0	8	100
17	71	33	41	5	14	164
18	38	47	73	0	12	170
19	55	28	36	0	12	131
20	23	26	47	0	6	102
21	16	15	28	0	13	72
22	30	6	15	0	11	62
23	24	8	25	5	5	67
24	23	18	39	6	15	101
25	21	8	24	0	15	68
26	15	0	17	0	10	42
27	60	30	37	0	13	140
28	57	35	31	0	2	125
29	63	32	35	0	4	134
30	39	25	22	0	13	99
31	19	9	25	0	14	67
* Numbers in bold represent instances where actual visits are greater than average number of visits projected in the Visitor Use Management Plan or in the case of Total Visitors, greater than the daily visitor capacity of 128. The number of projected visits for A.M. and Noon Ferries and Private Boats was 30; for the Duck Harbor Ferry, 50; for Town, 30; for Commercial Boats, 0 (there was none at the time); and for Duck Harbor Campers, 18.						

DISCUSSION

The number of groups seen per day standard and the daily visitation limit of 128 persons should be related through the simulation model as shown in Table 1. The discrepancy between them -- we met the groups per day standard but frequently violated the daily limit -- may be explained by one or more of the following factors:

- 2015 had exceptionally good weather, which encouraged more visitation;
- Visitors off the Duck Harbor ferry tend to stagger their departures and disperse naturally by using the toilet, talking or not talking to rangers, eating etc. and also, for many, by traveling the same hiking loop in the same direction, and thus minimizing encounters;
- Some visitor counts are obtained from self-registration sheets at the Ranger Station, and these visitors may be counted again by rangers if they are seen in the park;
- Visitors from Town may visit the park at different times and places and thus are seen less frequently by other visitors;
- There were several large groups that visited, such as a two-day geology field trip and summer camps;
- Visitors from Private Boats may use the park in the morning before the Duck Harbor Ferry arrives or in the evening after it leaves and thus are seen less frequently by other visitors. There were also more Private Boats in 2015 than in previous years, including a group from a yacht club;
- Rangers sometimes talk with Private Boat visitors and get a count of them. These visitors may sometimes be double counted with the boat multiplier of three persons per boat;
- The simulation model may not be valid anymore. It is 14 years old. One potential flaw in the model is the hiking route data. The hiking routes were taken from surveys conducted only at Duck Harbor and the Town Landing. The routes of local visitors entering and exiting on the road at either of two locations, or at Eastern Head, were not represented.

We graphed the Day User Private Boat and Day User Town counts for July and August 1990 – 2015 to look for trends. As shown in Figures 2 and 3, over that entire time period there is no discernable trend for either source of visitors. Since 2010, the number of Day User Private Boats visitors shows a slight increasing trend for July and a much stronger one for August. Day User Town visitation is also suggestive of an increasing trend since 2009 in each month.

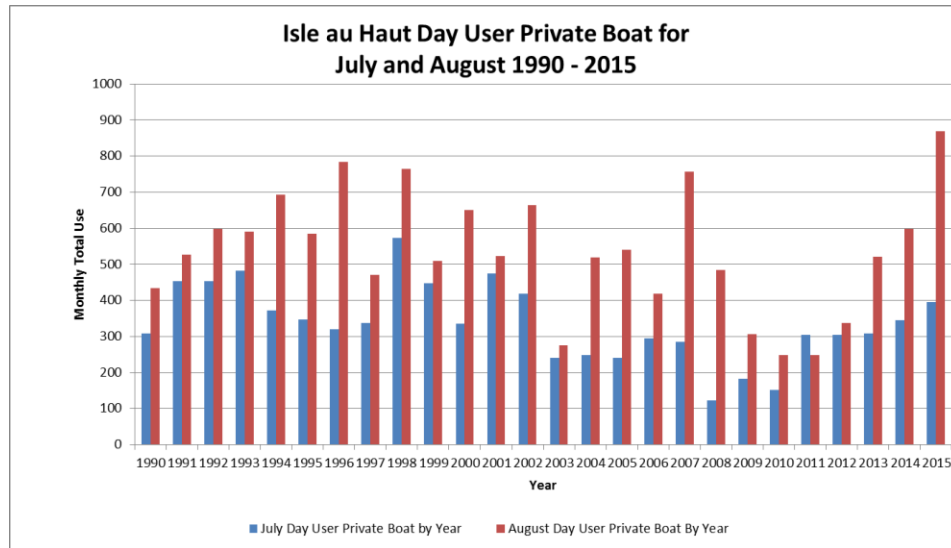


Figure 2: Isle au Haut Day User Private Boat Visits, July and August 1990 – 2015.

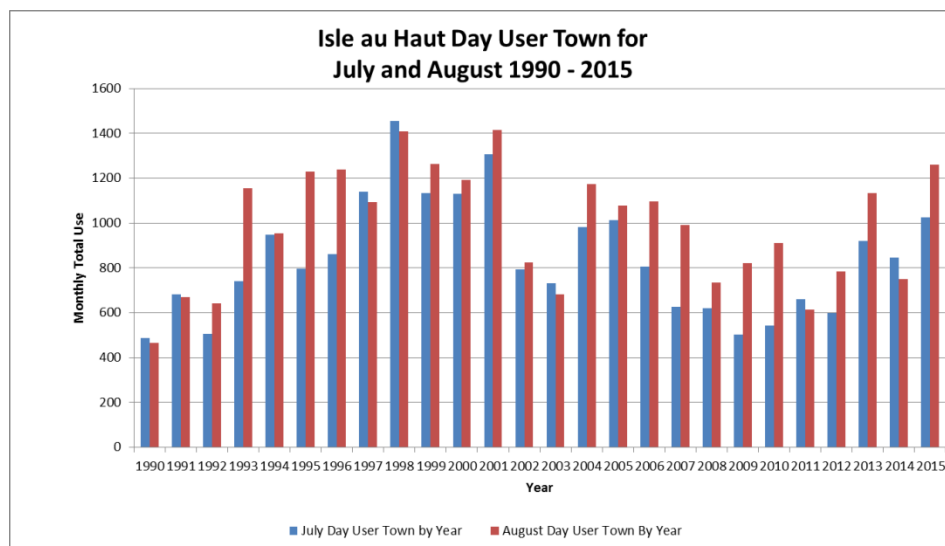


Figure 3: Isle au Haut Day User Town Visits, July and August 1990 – 2015.

Isle au Haut rangers confirmed that the multipliers for Private Boats seen in Duck Harbor (3 persons) and motor vehicles (4 persons) seen in the park are still valid. We can also note that A.M. and Noon Ferry visitors have minimal impact on encounter rates. There are few A.M. Boat visitors, and likely fewer still make their way to the hiking trails in the south. Noon Boat visitors generally do not have enough time to hike to the south and catch the Duck Harbor Ferry.

The effects of Commercial Boat use on visitation, with the exception of three days at the end of July (two of which were a special geology field trip), were minimal compared with visitation from Private Boats and Town. However, there is potential for growth in this use and this could have a significant impact on encounter rates and the sense of crowding.

Finally, the lack of surveys obtained from residents and visitors from private boats may not be a major concern. In 2001, UVM found that visitors getting off ferries encountered more visitors than those who did not get off ferries (residents and private boat visitors). Nonetheless, that was 14 years before, and it would have been better to have these visitors represented in the survey sample.

SUMMARY AND RECOMMENDATIONS

Despite the disparity between the number of groups encountered and the actual visitor counts, which were often much higher than 128 persons, we met the group encounter standard, which we believe should be given greater weight than the number of visitors. In addition, the vast majority of visitors did not feel crowded. The main reason for these results may be that visitor's temporal and spatial use of Isle au Haut trails sufficiently disperses use to reduce the number of encounters. From this, we conclude that visitors had a high quality, limited entry, low intensity visitor experience as defined in P.L. 97-335 and the Visitor Use Management Plan (NPS 2014).

Based on the results of this study, we offer the following recommendations:

- Continue the admittedly difficult-to-obtain visitor count methods, tightening them up wherever possible;
- Conduct visitor surveys again in 2018, making a better effort to representatively sample visitors from Town and Private Boats;
- Set a group size limit for all groups (commercial, noncommercial, educational etc.) for trails at Isle au Haut.

Finally, we note here that we expect to repeat the resource assessment for trails (Marion 2006) in 2016 to see if conditions have changed after 14 years of visitation. If conditions have degraded, we should revisit the 128-person limit because previous research has demonstrated a direct relationship between the level of use and trail width and depth for Isle au Haut trails.

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APPENDIX 1: SURVEY PROTOCOLS AND CONTACT SCRIPT

IAH Survey Administration

Goal: 200 from Duck Harbor, 50 from Town Landing.

Approach 13-14/ groups day at each site. Obtain 12-13 surveys/day, only one from each group 18 or older.

Follow Sample Script Protocol Consistently!!! Be friendly and enthusiastic.

Duck Harbor 3pm – 4pm before boat leaves

Town Landing 330pm – 430pm before boat leaves.

Approach everyone at Town Landing and ask if they have been hiking in park today, even if you know them and they are residents or a worker. Let them say no. If residents have been hiking in the park today they can and should answer the survey

10 days in July and 10 in August. See schedule below.

7/2	3 – 4 DH	8/4	3 - 4 DH
7/4	3 – 4 DH	8/5	330 - 430 TL
7/6	3 – 4 DH	8/7	3 - 4 DH
7/9	3 – 4 DH	8/10	330 - 430 TL
7/11	3 – 4 DH	8/11	3 - 4 DH
7/13	3 – 4 DH	8/15	3 - 4 DH
7/18	3 – 4 DH	8/18	3 - 4 DH
7/24	330 – 430 TL	8/19	3 - 4 DH
7/28	330 – 430 TL	8/25	3 - 4 DH
7/29	3 – 4 DH	8/27	3 - 4 DH

If you come up short, go back the next day or the earliest opportunity for the rest.

(a) Instrument Administration:

The initial contact with visitors will be used to explain the study and determine if visitors are interested in participating. This should take approximately 1 minute. If a group is interested, the survey interviewer will ask the adult individual within the group who has the next birthday to serve as the respondent. Visitors that refuse to participate will be asked if they would be willing to take one minute to respond to three non-response bias questions(see item 9e below). The number of refusals will be recorded and used to calculate the overall response rate for the collection.

If the answer is yes, they will state that the NPS is conducting a brief visitor survey about their experience on IAH, that it is voluntary and will take about three minutes, and that we would very much like to have their participation. If a visitor refuses to participate, the interviewer will ask for and/or record their gender, the number of persons in their group, and if they had any prior visits on nonresponse bias data sheet. ~~If they agree to participate, the interviewer will give them a clipboard and questionnaire, and contact the next visitor group for participation and so on, always remaining available to collect the completed surveys as they are finished.~~

We will ask the questions and record all answers ourselves on the clipboard. For Q3 we will guide them through it verbally or let them look at the questions. This is quicker, easier, and more reliable

Sample Script: *Hi. My name is Charlie Jacobi and I'm a ranger at the park. Have you folks been hiking in the park today?*

→ If YES then - The interviewer will say: *We're conducting a brief visitor survey about your hiking experience on Isle au Haut today. It's voluntary, takes about three minutes to complete. We would really appreciate your help today. Has any member of your group been asked to take this survey before?*

→ If "YES" (already asked to participate) then, the interviewer will say: *"Thank you for participating in this study. Have a great day"*

→ If "NO" (have not been previously asked to participate) then, the interviewer will ask: *"Who in your group is at least 18 years old, with the next birthday and is willing to complete the questionnaire?"* The interviewer will give them a clipboard and questionnaire. ~~After that the interviewer will proceed to contact the next visitor group for participation and so on, always remaining available to answer questions and collect the completed surveys as they are finished.~~

→ If **No one in the group agrees to participate**– (soft refusal) – the visitor (person 18 years or older) will be asked if they would be willing to answer the non-response bias questions (listed below) and then thank them for their time. [The surveyor will record responses on the tracking sheet].

→ If NO– (hard refusal) - *end the contact and thank them for their time.*

(e) Strategies for dealing with potential non-response bias:

After the initial contact, the interviewer will ask each visitor three questions taken from the survey. These questions will be used in a non-response bias analysis.

- 1) What is your gender (may be observed)?
- 2) How many people are in your group (may be observed)?
- 3) Is this your first visit to IAH (must be asked)?

Responses will be recorded on a log for every survey contact. Results of the non-response bias check will be reported and any implications for planning and management will be discussed.



APPENDIX 2: QUESTIONNAIRE

Acadia National Park 2015 Isle au Haut Visitor Experience Hiking Survey

OMB Number: 1024- 0224
Expires: 10/31/2015

1. Approximately how much time did you spend hiking on Isle au Haut today?

Length of hike (hours and/or minutes)_____

2. What is the approximate number of other groups of hikers you saw while hiking the trails on Isle au Haut today?

Approximate number of groups_____

3. How crowded did you feel along the trails on Isle au Haut today? (circle one number)?

Not at all crowded	Somewhat crowded	Moderately Crowded	Very Crowded	Extremely crowded
1	2	3	4	5

4. a. Have you visited Isle au Haut before? (check one)

Yes_____

No_____

b. If yes, approximately how many times have you visited Isle au Haut before today?

Number of previous visits_____

5. How many people were in your group?

Number of people_____

6. What year were you born?

Year born_____

7. What is your gender (check one)?

Female_____

Male_____

PAPERWORK REDUCTION ACT STATEMENT: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information will be used by park managers to manage for a high quality hiking experience at the Acadia National Park - Isle au Haut district. Your response to this request is completely voluntary and no action may be taken against you for refusing to supply the information requested. Your responses will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB Control Number.

Burden Estimate Statement: The estimated time to complete this collection is 3 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to: Charlie Jacobi, Acadia National Park, 20 McFarland Hill Dr., Bar Harbor, ME 04609, Charlie_jacobi@nps.gov (email).

Number_____ Date/Time_____ Site_____ Interviewer_____

(The above information will be entered by the interviewer.)

APPENDIX 3: DATA COLLECTION PROTOCOLS FOR ISLE AU HAUT VISITATION

Isle au Haut Visitor Use Data Collection Guidelines 2010

In 2007 we eliminated *3pm Campers* and *3pm Day Users* because according to IAH rangers, their numbers were essentially zero. As of 2008 there was no 3pm freight boat. That has been combined with the DH boat on a 2:30pm run out of Stonington. This boat is where the *PM Camper* count comes from, with perhaps and occasional stray from the 4:30pm boat (who would have to hike to the campground. We added a column for day users arriving by commercial boat (*Day Use Comm Boat*) to count operations like Old Quarry Adventures (Bill Baker) or others who now drop visitors off at the town dock. We also deleted the *Total Day Use* and *Arriving Campers* Columns to eliminate confusion over which columns to add and eliminate potential addition errors. The Excel spreadsheet will make these calculations.

1. Data collection was revised and standardized in May 2002, and again for 2008 and 2010.
2. In a perfect data collection scenario, a ranger meets every mailboat. The ranger counts day users and campers arriving on that boat and records them in the appropriate column. If a ranger is not able to meet the boat, they will get an estimate or count from the captain.
3. *PB Cmpr* refers to **campers** arriving by private boat—usually kayaks, but possibly other small boats. This should be a direct and complete count. It should also include campers arriving via commercial boat (see #6 below).
4. *PB Day* is the number of day users estimated arriving from private boats (motor and sail) **anchored in Duck Harbor at mid day** and the number of kayaks hauled ashore (generally in Duck Harbor only). This number should be calculated by multiplying the number of private boats **times three persons** per boat plus individual counts of kayaks/people. No attempt should be made to count visitors from each boat. Any **campers** from private boats should not be included here. If groups like Chewonki or others use the park for the day and arrive on their own boats and moor/anchor somewhere other than Duck Harbor, they should be added to the *PB Day* column.
5. *# Pvt Boats* is the number of private motor and sail boats anchored in Duck Harbor and does not include kayaks. It is not a count of persons.
6. *Day Use Comm Boat* are day users (only) arriving via Old Quarry Adventures or other commercial operators who provide transportation to the town dock or other private docks on IAH, **and are likely to enter the park!** So far, only day visitors are arriving from this source and only Old Quarry is providing it. Make a note about Old Quarry in the *Remarks* column with the number passengers in case other transportation providers begin providing service. We want to tally Old Quarry arrivals separately. If Old Quarry or other providers drop off **campers**, record them as *Camper Private Boat* for now.
7. *Day Use Town* is the number of day users counted coming from Town. These may be year-round or seasonal residents or renters. **Rangers will count only those they see and know are from town.** If vehicles are observed without the occupants, a multiplier of **four persons per vehicle** will be used. We will not estimate the amount of traffic coming from town as in previous years.
8. *Cmpr days* is the count of campers each evening in the campground. Campers are counted for each night they are in the campground. This count is also used for the monthly park visitation report.

9. *# Arriving Campers* (no column anymore) is the sum of campers arriving each day on the five boats from Stonington plus campers from private boats. This is the number of **individual** campers and is used for the monthly park visitation report. **Excel will calculate *Arriving Campers*.**

10. *Total Day Use* (no column anymore) is the sum of day users arriving on the five boats from Stonington, private boats (including kayaks), commercial boats, and from Town. No day users are expected on the PM boat or the 3pm freight boat, and even if they do they have no time to access the park. This count is also used for the monthly park visitation report. **Excel will calculate *Total Day Use*.**

11. *Weather* should be recorded as sunny (SUN), cloudy (CLD), foggy (FOG), or rainy (RNY).

12. *Remarks* should include the number of people in large groups for noncommercial groups like Chewonki or Outward Bound who use the park from time to time (**be sure to count them as day users somewhere!**) and the group identity; the number of people staying at Eli Creek Cabin (each night!); and counts for Old Quarry Adventures, because we want to track them separately.

13. Zero should be used whenever a count is made and zero people are observed. If a boat or a count is missed it should be recorded as a blank—no data. There is a difference!!!

Entries should be made to the file in Google Docs.

Month	IAH Mailboat Arrivals-DH and Town							Private Boat Arrivals-DH							
Day	AM Cmpr	AM Day	DH Cmpr	DH Day	Noon Cmpr	Noon Day	PM Cmpr	PB Cmpr	PB Day	# Pvt Boats	Day Use Comm Boat	Day Use Town (local)	Cmpr Days	Weather	Remarks (note large groups, Eli Crk visitors, Old Quarry, Outward Bound, Chewonki #s etc)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
Total															
Avg															

APPENDIX 4: DATES OF SURVEY ADMINISTRATION

Dates of Survey Administration July and August 2015		
Dates		
	July	August
	5	1
	6	2
	7	3
	8	4
	9	6
	10	7
	11	8
	12	9
	13	11
	14	12
	15	13
	16	14
	17	16
	18	17
	19	18
	21	19
	22	20
	23	21
	24	23
	25	24
	27	25
	28	27
	29	28
	30	29
	31	30
		31
Total days surveyed	25	26
Surveys were administered at Duck Harbor between 15:00 and 17:00 (except for a couple)		

APPENDIX 5: STATISTICAL ANALYSES FOR SURVEYS

Descriptive and Frequency Distribution Statistics Outputs for Q1 Time Spent Hiking, Q2 Other Groups Seen, Q3 How Crowded, Q4 a and b Times Previously Visited and Times Previously Visited for Previous Visitors Only, Q5 Group Size, Q6 Age, and Q7 Gender.

<i>Q1 Time Spent Hiking (hours)</i>		Freq	Q1 Time Spent Hiking	
		Bin	Number	Percent
Mean	4.01	0	0	0.00%
Standard Error	0.08	1	3	1.30%
Median	4.00	2	9	3.91%
Mode	4.00	3	40	17.39%
Standard Deviation	1.20	4	111	48.26%
Sample Variance	1.44	5	48	20.87%
Kurtosis	3.05	6	8	3.48%
Skewness	1.07	7	4	1.74%
Range	8.00	8	6	2.61%
Minimum	1.00	9+	1	0.43%
Maximum	9.00		230	100.00%
Sum	923.00			
Count	230.00			
Confidence Level(95.0%)	0.16			

<i>Q2 Number of Other Groups Seen</i>		Freq	Q2 Other Groups Seen	
		Bin	Number	Percent
Mean	4.03	0	5	2.17%
Standard Error	0.15	1	10	4.35%
Median	3.75	2	37	16.09%
Mode	3.00	3	62	26.96%
Standard Deviation	2.22	4	37	16.09%
Sample Variance	4.93	5	32	13.91%
Kurtosis	2.33	6	22	9.57%
Skewness	1.23	7	8	3.48%
Range	12.00	8	8	3.48%
Minimum	0.00	9	3	1.30%
Maximum	12.00	10	1	0.43%
Sum	926.00	11	0	0.00%
Count	230.00	12	5	2.17%
Confidence Level(95.0%)	0.29	13+	0	0.00%
			230	100.00%

<i>Q3 How Crowded (scale 1 - 5)</i>	
Mean	1.1048
Standard Error	0.02376
Median	1
Mode	1
Standard Deviation	0.35961
Sample Variance	0.12932
Kurtosis	13.6282
Skewness	3.65982
Range	2
Minimum	1
Maximum	3
Sum	253
Count	229
Confidence Level(95.0%)	0.04682

Scale	Q3 How Crowded	Percent
1	209	91%
2	16	7%
3	4	2%
4	0	0%
5	0	0%
Total	229	1

	Q4a Visited Before (1=Yes, 2=No)	Percent
1	80	35%
2	150	65%
	230	

<i>Q4b Times Previously Visited</i>	
Mean	1.24
Standard Error	0.20
Median	0.00
Mode	0.00
Standard Deviation	3.02
Sample Variance	9.10
Kurtosis	25.10
Skewness	4.41
Range	25.00
Minimum	0.00
Maximum	25.00
Sum	284.00
Count	229.00
Confidence Level(95.0%)	0.39

<i>Q4b Times Visited for Prev Visitors Only</i>	
Mean	3.6410256
Standard Error	0.48176
Median	2
Mode	1
Standard Deviation	4.2547891
Sample Variance	18.10323
Kurtosis	10.069344
Skewness	2.862627
Range	24
Minimum	1
Maximum	25
Sum	284
Count	78
Confidence Level(95.0%)	0.9593067

Q5 Group Size	
Mean	3.11
Standard Error	0.12
Median	2.00
Mode	2.00
Standard Deviation	1.83
Sample Variance	3.33
Kurtosis	3.41
Skewness	1.61
Range	11.00
Minimum	1.00
Maximum	12.00
Sum	716.00
Count	230.00
Confidence Level(95.0%)	0.24

Q5 Group Size			
Size	Number	Percent	
1	19	8.26%	
2	111	48.26%	
3	19	8.26%	1to 4
4	37	16.09%	80.87%
5	22	9.57%	
6	8	3.48%	
7	7	3.04%	5 to 8
8	5	2.17%	18.26%
9	0	0.00%	9+
	2	0.87%	0.87%
	230	100.00%	

Q6 Age	
Mean	50.89
Standard Error	0.96
Median	52.50
Mode	64.00
Standard Deviation	14.56
Sample Variance	211.89
Kurtosis	-0.38
Skewness	-0.63
Range	66.00
Minimum	9.00
Maximum	75.00
Sum	11704.00
Count	230.00
Confidence Level(95.0%)	1.89

Age	Q6 Age	
Range	Number	Percent
1 to 10	1	0.43%
11 to 20	6	2.61%
21 to 30	21	9.13%
31 to 40	26	11.30%
41 to 50	43	18.70%
51 to 60	58	25.22%
61 to 70	65	28.26%
71+	10	4.35%
	230	100.00%

Q7 Gender (1=Female, 2=Male)		
Number	Percent	
124	54%	
106	46%	

Regression Output

SUMMARY OUTPUT	Number of Groups=Y							
	Number of Hours Hiking=X							
<i>Regression Statistics</i>								
Multiple R	0.1043044							
R Square	0.0108794							
Adjusted R Square	0.0065412							
Standard Error	2.2134526							
Observations	230							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	12.28657922	12.28658	2.507786	0.11467103			
Residual	228	1117.056899	4.899372					
Total	229	1129.343478						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.2516998	0.510320522	6.371877	1.02E-09	2.24615241	4.2572472	2.246152413	4.2572472
X Variable 1	0.1929675	0.12185378	1.583599	0.114671	-0.04713597	0.4330711	-0.04713597	0.43307106

APPENDIX 6: DAILY VISITOR COUNTS BY TYPE OF VISITOR, JULY AND AUGUST 2015

IAH Mailboat Arrivals - DH and Town										Private Boat Arrivals - DH					Camper days +						
Month	Year	Day	AM Cmpr	AM DayUser	DH Cmpr	DH DayUser	Noon Cmpr	Noon DayUser	3PM Cmpr	3PM DayUser	PM Cmpr	Cmpr PvtBoat	DayUser PvtBoat	PVT Boat	DayUser CommBoat	DayUser Town	Camper Days	Arr Cmpr	Total DayUser	Total DayUser	AM+Noon+Comm
July	2015	1	0	0	7	0	0	16			4	0	0	1	0	6	12	11	17	28	16
July	2015	2	0	6	2	14	1	18			4	0	2	2	0	6	12	7	46	58	24
July	2015	3	0	2	8	21	0	10			2	0	17	4	0	35	12	10	85	97	12
July	2015	4	0	0	0	7	0	0			2	0	19	6	0	45	10	2	71	81	0
July	2015	5	0	0	2	14	0	0			4	0	15	5	0	32	12	6	61	73	0
July	2015	6	0	0	2	21	0	10			0	0	24	8	0	35	4	2	90	94	10
July	2015	7	0	0	4	27	0	2			2	0	2	2	0	20	8	6	51	59	2
July	2015	8	0	4	2	2	0	6			0	0	6	4	7	15	6	2	40	46	17
July	2015	9	0	2	3	9	0	0			0	0	29	19	0	32	5	3	72	77	2
July	2015	10	0	5	4	5	0	6			6	0	27	19	0	28	12	10	71	83	11
July	2015	11	0	3	2	9	0	12			0	0	24	8	0	31	14	2	79	93	15
July	2015	12	0	0	8	5	0	0			4	0	12	3	0	25	14	12	42	56	0
July	2015	13	0	2	7	24	0	7			0	0	8	3	5	33	13	7	79	92	14
July	2015	14	0	0	2	5	0	0			2	0	2	1	0	38	15	4	45	60	0
July	2015	15	0	6	2	1	0	6			1	0	15	5	0	28	14	3	56	70	12
July	2015	16	0	1	2	26	0	15			4	0	2	3	6	37	14	6	87	101	22
July	2015	17	0	0	6	26	0	12			0	0	21	7	0	42	6	6	101	107	12
July	2015	18	0	0	0	1	0	12			0	0	9	3	0	15	4	0	37	41	12
July	2015	19	0	0	2	5	0	0			3	0	3	2	0	20	5	5	28	33	0
July	2015	20	0	5	1	18	0	2			2	0	9	2	0	37	6	3	71	77	7
July	2015	21	0	0	8	7	0	2			0	0	5	2	0	14	12	7	29	41	2
July	2015	22	0	4	0	39	0	12			6	0	11	5	30	49	15	6	145	160	46
July	2015	23	0	0	4	28	0	10			2	0	5	5	10	78	8	6	131	139	20
July	2015	24	0	1	3	12	0	8			0	0	36	12	0	23	10	3	90	90	9
July	2015	25	0	0	1	13	0	12			0	0	18	6	38	75	8	1	156	164	50
July	2015	26	0	0	2	0	0	0			2	0	12	4	32	94	4	4	138	142	32
July	2015	27	0	15	1	2	0	13			6	0	16	9	0	22	11	7	68	79	28
July	2015	28	0	0	0	10	0	5			5	0	10	2	0	20	14	5	45	59	5
July	2015	29	0	2	9	33	0	5			0	0	7	2	6	34	10	9	87	97	13
July	2015	30	0	2	0	16	0	7			0	0	0	0	0	27	9	0	52	61	9
July	2015	31	0	0	0	23	0	12			2	0	30	10	0	35	12	2	100	112	12
		Total	0	60	93	424	1	220			63	0	396	164	134	1026	310	157	2260	2570	414
		Average	0.00	1.94	3.00	13.68	0.03	7.10			2.03	0.00	12.77	5.29	4.32	33.10	10.00	5.06	72.90	82.90	
		Max	0	15	9	39	1	18			6	0	36	19	38	94	15	12	156	164	
August	2015	1	0	5	2	12	0	12			5	0	28	8	0	29	13	7	86	99	17
August	2015	2	0	0	3	8	0	0			0	0	31	6	0	46	7	3	85	92	0
August	2015	3	0	5	2	31	0	14			2	0	10	2	0	53	10	4	113	123	19
August	2015	4	0	2	0	4	0	10			0	0	13	3	2	23	8	0	54	62	14
August	2015	5	0	0	2	43	0	22			4	0	25	6	0	54	8	6	144	152	22
August	2015	6	0	2	5	32	0	18			0	0	42	8	12	61	7	5	167	174	32
August	2015	7	0	2	6	30	0	14			0	0	30	8	0	55	13	6	131	144	16
August	2015	8	0	0	5	23	0	12			0	0	75	21	0	61	15	5	171	186	12
August	2015	9	0	0	6	17	0	0			0	0	27	6	0	70	11	6	114	125	0
August	2015	10	0	0	2	38	0	13			0	0	36	12	4	53	11	2	144	155	17
August	2015	11	0	0	2	7	0	7			5	0	0	0	0	20	7	7	34	41	7
August	2015	12	0	0	0	8	0	12			0	0	12	3	0	51	7	0	83	90	12
August	2015	13	0	0	5	32	0	30			0	0	52	12	11	81	12	5	206	218	41
August	2015	14	0	8	0	37	0	10			5	0	25	6	0	36	18	5	116	134	18
August	2015	15	0	0	0	5	0	13			0	0	52	9	0	40	18	0	110	128	13
August	2015	16	0	0	4	15	0	0			2	0	45	15	0	32	8	6	92	100	0
August	2015	17	0	2	4	33	4	23			0	0	46	12	5	41	14	8	150	164	30
August	2015	18	0	2	0	47	0	12			2	0	24	8	0	73	12	2	158	170	14
August	2015	19	0	4	4	28	0	13			3	0	38	20	0	36	12	7	119	131	17
August	2015	20	0	0	4	26	0	10			0	0	13	5	0	47	6	4	96	102	10
August	2015	21	0	0	5	15	0	4			4	0	12	4	0	28	13	9	59	72	4
August	2015	22	0	0	0	6	0	9			0	0	21	7	0	15	11	0	51	62	9
August	2015	23	0	0	2	8	0	0			0	0	24	8	5	25	5	2	62	67	5
August	2015	24	0	0	15	18	0	8			0	0	15	5	6	39	15	15	86	101	14
August	2015	25	0	2	0	8	0	15			0	0	4	2	0	24	15	0	53	68	17
August	2015	26	0	2	0	0	0	7			0	0	6	2	0	17	10	0	32	42	9
August	2015	27	0	1	2	30	0	23			11	0	36	12	0	37	13	13	127	140	24
August	2015	28	0	0	2	35	0	27			0	0	30	10	0	31	2	2	123	125	27
August	2015	29	0	2	2	32	0	16			0	0	45	15	0	35	4	2	130	134	18
August	2015	30	0	0	6	25	0	0			4	0	39	13	0	22	13	10	86	99	0
August	2015	31	0	0	3	9	0	7			0	0	12	4	0	25	14	3	53	67	7
		Total	0	39	93	662	4	361			47	0	868	252	45	1260	332	144	3235	3567	445
		Average	0.00	1.26	3.00	21.35	0.13	11.65			1.52	0.00	28.00	8.13	1.45	40.65	10.71	4.65	104.35	115.06	
		Max	0	8	15	47	4	30			11	0	75	21	12	81	18	15	206	218	