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**To:** [Sandra Hamilton](#)  
**Cc:** [Butch Street](#); [carolm@rti.org](mailto:carolm@rti.org); [lfox@louisberger.com](mailto:lfox@louisberger.com)  
**Subject:** Re: beach driving ramp counts - please review quickly  
**Date:** 10/12/2010 01:08 PM  
**Attachments:** [Beach Driving 20101001.mbm cm sh with suggestions from Butch 101210.mbm.docx](#)

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Looks fine to me. There were several places in or near Table 48-1 in which vehicle "accesses" had not been changed to "entrances or exits", so I edited those in the attached version.



Beach Driving 20101001.mbm cm sh with suggestions from Butch 101210.mbm.docx

Thanks,

Mike Murray  
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▼ [Sandra Hamilton/DENVER/NPS](#)

**Sandra  
Hamilton/DENVER/NPS**

To Mike Murray/CAHA/NPS@NPS, Butch  
Street/DENVER/NPS@NPS, carolm@rti.org

cc lfox@louisberger.com

10/12/2010 01:43 PM

Subject beach driving ramp counts - please review quickly

Hello All,

Butch had some suggestions for clarifying the ramp counting and its relation to Seashore visitation as officially counted at the Whalebone Junction counter, and for clarifying what the ramp counts are counting.

I've incorporated these in track changes in the first attached doc below. Please let me know if this works for you for use in CH 3 of the FEIS. For reference I've also attached the last draft before this one.

[attachment "Beach Driving 20101001.mbm cm sh with suggestions from Butch 101210.docx" deleted by Mike Murray/CAHA/NPS]  
[attachment "Beach Driving 20101001.mbm.docx" deleted by Mike

Murray/CAHA/NPS]

Thanks.

Sandy

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## Beach Driving

To support the required analyses and to collect information relevant to park management, NPS contracted with RTI International to conduct a count of vehicles using the ocean-side ORV beach access ramps over a 12-month period from April 2009 through March 2010. The primary goal of the vehicle counting survey was to estimate of the total number of times that vehicles entered or exited utilize accesses<sup>‡</sup> onto the beach using the 16 ocean-side ORV ramps during a 12-month period between 6 a.m. and 10 p.m. The details of the study are described in the final report (RTI 2010). These vehicle access entrance and exit counts provide an estimate of the total number of times vehicles enter and exit the beach. They are not directly comparable to the official number of recreational visitors to Cape Hatteras, because these numbers are determined by a traffic counter at Whalebone Junction. as a single recreational visit, as counted by the Whalebone Junction counter, can include multiple vehicle accesses entrances and exits over an ORV ramp to the beach. The official number of recreational visitors also does not include recreational visits by residents of the Seashore villages who access the beach.

Sixteen ocean-side ORV access ramps currently operate in the Seashore. Two of the ramps are located on Bodie Island, nine are on Hatteras Island, and the remaining five are on Ocracoke Island. Field staff took 19 three-day trips to the Seashore to count at beaches and ramps, for a total of 57 days of counting. Each selected day, field staff traveled to two randomly selected clusters of ramps and beaches and spent two hours counting the number of times that vehicles entered or exited crossed (or used) accesses at each of the two ORV ramps (vehicle "accesses") and two hours counting beach visitors at the four beach segments in the cluster. The 57 days of counting resulted in a total sample of 114 clusters covering 228 two-hour ramp-vehicle access counting opportunities and 456 beach counting opportunities.

<sup>‡</sup> These vehicle access counts provide an estimate of the total number of times vehicles enter and exit the beach. They are not directly comparable to the official number of recreational visitors to Cape Hatteras, as a single recreational visit can include multiple vehicle accesses to the beach. The official number of recreational visitors also does not include recreational visits by residents of the Seashore villages who access the beach.

**Comment [c1]:** Maybe leave this out since we don't discuss the beach visitor counts.

To ensure that we had at least two counting trips taken during the low winter season, we created two seasonal strata out of the 52 weeks. The two strata roughly correspond to low and medium/high visitation seasons at the Seashore. The lowest visitation stratum, which consists of the 17 weeks from the beginning of December 2009 through the end of March 2010, was assigned two 3-day trips. The remaining 17 trips ~~will take~~took place in the other 35 weeks from April 2009 through November 2009, which make up the medium and high visitation strata.

The data from the counting trips was weighted based on sampling design and the probability that a ramp was selected for counting at a certain time or a certain day. Based on the data from the ~~vehicle ramp~~ counts, the mean estimate is 499,802 vehicle ~~trips~~ “accesses” entrances or exits over an Oceanside ramp onto the Seashore beaches ~~accessed by the ocean-side ramps~~ between April 2009 and March 2010, with a 95% confidence interval of 276,946 to 722,659. An estimated mean of 994,604 passengers were involved with these vehicle ~~trips~~ accesses entrances and exits with a 95% confidence interval of 654,961 to 1,334,247 passengers (table 48-1). As with the number of vehicle ~~accesses~~ entrances or exits, the estimated number of passengers is not directly comparable to the official statistics on recreational visitors to the Seashore. A visitor using the ramps could enter or exit several ramps in a day and would result in counting the same visitor multiple times. A single recreational visit could include multiple entries and exits.

The increased sampling coverage between April and November (49% of the weeks as opposed to 12% of the weeks between December and March), resulted in narrower confidence intervals around the April and November estimates. Between April and November, the 95% confidence interval is +/-17% of our point estimate of 344,999 vehicle ~~trips~~ entrances or exits~~accesses~~. Between December and March, the 95% confidence interval is +/-151% (table 48-1). In addition, the geographic distribution of ORV use in the Seashore could not be determined between December and March due to the lack of sampling

coverage. April through November captures the majority of ~~trips beach~~ vehicle accesses-entrances or exits that would be affected by the proposed management alternatives, providing the best estimates.

**Table 48-1. Estimates and 95% Confidence Intervals for Number of**

**Vehicle ~~Vehicle~~ Beach Accesses ~~s~~ and Associated Passengers by Time Strata<sup>a</sup>**

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| Time Interval               | Vehicle <del>Entrances or Exits</del> <u>Trips</u> <del>Accesses</del> |             |             | Passengers |             |             |
|-----------------------------|--|-------------|-------------|------------|-------------|-------------|
|                             | Estimate   | Lower Bound | Upper Bound | Estimate   | Lower Bound | Upper Bound |
| April 2009 to November 2009 | 344,999  | 284,696     | 405,302     | 768,948    | 625,928     | 911,968     |
| December 2009 to March 2010 | 154,803  | 0           | 392,594     | 225,656    | 0           | 567,185     |
| 52 week total               | 499,802  | 276,946     | 722,659     | 994,604    | 654,961     | 1,334,247   |

<sup>a</sup>~~These vehicle access counts provide an estimate of the total number of times vehicles enter and exit the beach. They are not directly comparable to the official number of recreational visitors to Cape Hatteras, as a single recreational visit can include multiple vehicle accesses to the beach. The official number of recreational visitors also does not include recreational visits by residents of the Seashore villages who access the beach. Currently the NPS method for compiling visitation only uses the Whalebone Junction counts because a vehicle using the ramps could enter and exit several ramps in a day and would result in counting the same visitor multiple times.~~

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Table 48-2 reports the ~~estimates average daily vehicle~~ accesses-entrances or exits and associated passengers ~~broken down~~ by clusters of ramps for the period of April to November 2009. The most popular ORV ramp ~~cluster~~ between April and November ~~were Ramps 2 and~~ was Ramp 4 on Bodie Island, ~~however ramps 43, 49, 55, and 70 were all estimated to average over 100 vehicle~~ accesses-entrances or exits a day between April and November 2009. An estimated ~~fifty-nine~~ eight percent of ORV trips ~~vehicle~~ accesses-entrances or exits took place on the various ramps through Hatteras Island, ~~1926~~ 1926 percent on Ocracoke Island, and ~~2315~~ 2315 percent on Bodie Island (table 48-2). Confidence intervals for the ~~ramp~~ vehicle

accesses entrances or exits cluster estimates range from +/-55.18% for Ramps 2 and 4-70 to +/-79.132% for ramps 59 and 67. Ramp 44.

**Table 48-2. Estimates and 95% Confidence Intervals for for Number of Vehicles Daily Vehicle Accesses Entrances or Exits and Passengers Clusters Associated Passengers of Ramps by ORV Ramp (April to November 2009)<sup>a</sup>**

| Ramp | Vehicle <u>Accesses</u> <u>Entrances or Exits</u> |             |             | Associated Passengers |             |             |
|------|---|-------------|-------------|-----------------------|-------------|-------------|
|      | Estimate  | Lower Bound | Upper Bound | Estimate              | Lower Bound | Upper Bound |
| 2    | 40.4  | 26.8        | 54.1        | 66.2                  | 40.8        | 91.6        |
| 4    | 173.0   | 95.1        | 250.8       | 409.0                 | 195.8       | 622.3       |
| 23   | 55.0  | 0.0         | 110.5       | 105.0                 | 0.0         | 212.9       |
| 27   | 57.6  | 17.2        | 98.1        | 141.8                 | 21.2        | 262.5       |
| 30   | 53.7  | 15.9        | 91.5        | 138.3                 | 31.7        | 245.0       |
| 34   | 60.4  | 25.3        | 95.5        | 123.7                 | 49.2        | 198.3       |
| 38   | 82.2  | 45.3        | 119.1       | 177.8                 | 89.8        | 265.8       |
| 43   | 133.9   | 52.9        | 214.9       | 273.3                 | 78.1        | 468.4       |
| 44   | 86.5  | 0.0         | 200.3       | 229.7                 | 0.0         | 547.1       |
| 49   | 134.2   | 8.9         | 259.5       | 349.3                 | 10.8        | 687.8       |
| 55   | 152.1   | 57.9        | 246.2       | 325.6                 | 89.6        | 561.6       |
| 59   | 66.3  | 37.6        | 95.0        | 152.9                 | 74.8        | 231.1       |
| 67   | 48.1  | 19.8        | 76.4        | 99.6                  | 37.4        | 161.8       |
| 68   | 13.9  | 1.5         | 26.2        | 25.8                  | 0.3         | 51.3        |
| 70   | 155.5   | 127.5       | 183.4       | 318.1                 | 226.6       | 409.7       |
| 72   | 76.4  | 14.5        | 138.3       | 167.4                 | 28.6        | 306.3       |

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<sup>a</sup>These vehicle access counts provide an estimate of the average daily number of times vehicles enter and exit the beach. They are not directly comparable to the official number of recreational visitors to Cape Hatteras, as a single recreational visit can include multiple vehicle accesses to the beach. The official number of recreational visitors also does not include recreational visits by residents of the Seashore villages who access the beach. Currently the NPS method for compiling visitation only uses the Whalebone Junction counts because a vehicle using the ramps could enter and exit several ramps in a day and would result in counting the same visitor multiple times.