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Accuracy of Vogelsong Study Disputed

The National Park Service (NPS) published a report in 2003 titled Cape Hatteras National Seashore Visitor Use Study conducted for the NPS by Dr. Hans Vogelsong, Associate Professor in the Department of Recreation and Leisure Studies, East Carolina University.

The Outer Banks Preservation Association (OBPA) has been concerned that many of the findings and projections from this study are in disagreement with both the observations by knowledgeable residents and property owners on the Outer Banks and with other credible data and research addressing Visitor preferences, ORV use, and economic impacts on the Outer Banks.

To the best of OBPA's knowledge, this study had not previously been subjected to a formal critical review or been assessed for reliability and compliance with generally accepted standards of research. Yet, the Vogelsong study has been and is being used by other researchers and government agencies as underlying assumptions in their studies concerning beach usage and the economic impact of beach closures. Consequently, OBPA requested William Neal, a highly qualified survey research expert, perform a thorough review of the Vogelsong study and the underlying observational and survey research data upon which the study is based.

After a detailed review, Mr. Neal found many serious flaws in the research, any one of which would render the study not in compliance with established standards of validity, reliability and trustworthiness for observational and survey research findings that are used in commerce, the federal courts or the various departments of the federal government. The following are just a few points:

- There is overwhelming evidence the sampling procedure used by Dr. Vogelsong to collect both the observational data and the survey data is based on a highly biased convenience sample. Results from a convenience sample cannot be projected to the larger population from which it was drawn.
- Much of the data reported in Vogelsong's data file was not analyzed or reported correctly.
- The methodology used to calculate the number of ORVs that use the Cape Hatteras National Seashore (CHNS) annually is methodologically flawed and greatly underestimates ORV usage on the CHNS beaches.

- The majority of Dr. Vogel song's literature review of OV usage is not relevant to issues at CHNS and much of his literature review and citations in the study deal with ORV usage as a recreational pursuit. At the CHNS, the overwhelming motivation for ORV usage is for the pursuit of other recreational opportunities such as fishing, shell collecting, bird watching, surfing, etc.
- Dr. Vogel song's estimates of visitor spending are greatly understated.

Mr. Neal stated, "In my expert opinion, due to its many flaws, the (Vogel song) study cannot be relied upon to characterize the visitors to the CHNS and their activities during their visits. The National Park Service and U.S. Fish and Wildlife Service should not rely on the results of this survey to guide policy development or policy decisions for the CHNS, nor should anyone else."

Mr. Neal's detailed 65-page report is available at www.OBPA.org.

A Critical Review:

**Cape Hatteras National Seashore
Visitor Use Study**

**That was conducted by:
Hans Vogel song, Ph. D.
Associate Professor
East Carolina University
Department of Recreation and Leisure Studies**

For the National Park Service

Report Prepared by:

**William D. Neal
Senior Partner
SDR Consulting**

9 January 2008

Introduction and Overview

My name is William Neal. I am a qualified expert in survey research in the US Federal Judicial System and in several state court systems. I have testified in person and through reports and depositions in several administrative law hearings for departments of the federal executive branch of government. I have been designing, conducting and analyzing surveys for over 35 years. My qualifications and curriculum vita are at Enclosure 1.

The Outer Banks Preservation Association (OBPA) requested that I perform a thorough review of the report titled Cape Hatteras National Seashore Visitor Use Study and the underlying observational and survey research upon which that report is based. The research was conducted for the National Park Service (NPS) by Dr. Hans Vogel song, Associate Professor in the Department of Recreation and Leisure Studies, East Carolina University. Dr. Vogel song also wrote the report.

OBPA's concern is that many of the findings and projections from this study are in considerable disagreement with observations by knowledgeable residents and property owners on the Outer Banks. The research conducted by Dr. Vogel song is also in disagreement with other credible research addressing ORV use and economic impacts on the Outer Banks.

To the best of their knowledge the findings in this study have not been previous subjected to a formal critical review or been assessed for reliability and compliance with generally accepted standards of research. Yet, the findings from the Vogel song report have been and are being used by other researchers and government agencies as underlying assumptions in their studies and deliberations concerning beach usage and the economic impact of beach closures.

For example, in a report titled Economic Analysis of Critical Habitat Designation for the Wintering Piping Plover, conducted by Industrial Economics, Incorporated for the U.S. Fish and Wildlife Service, information in the Vogel song report was cited 15 times, and was used as the basis for determining the economic impact of closing large portions of the CHNS as critical habitat for the wintering piping plover. Based on the Vogel song report, Industrial Economics Inc. concluded that "ORVs represent approximately 2.7 to 4.0 percent of all visitors to the park." Yet other credible surveys have shown that ORV usage is as high as 52% of visitors. And simple observation would indicate that the 10% visitor ORV usage reported by Vogel song and the 2.7% to 4.0% ORV usage in suggested closure areas (Oregon Inlet, Cape Point, and Hatteras Channel area) reported by Industrial Economics are highly questionable. Dr. Vogel song's own data show a 73% ORV usage rate by visitors and some unknown percentage of residents (up to 15%.)

Consequently, I examined the full 55-page report produced by Dr. Vogel song, the survey questionnaire he relied upon, and the data file of the observational and survey research he collected. Information that should have been included in the report and subject to examination, but was not available at the time this report was written includes:

- . The sampling plan used to conduct the observational research.
- . Written instructions to the observers.
- . The sampling plan used to conduct the survey research.
- . Written instructions to the survey interviewers.

Summary of Findings

There are many very serious flaws in the research reported in the Cape Hatteras National Seashore Visitor Use Study, any one which would render the research not in compliance with established standards of validity, reliability, and trustworthiness for observational and survey research findings that are used in commerce, the federal courts, or the various departments of the federal executive.

The overriding flaw in the research is the sample and sampling process. Dr. Vogelsong did not use a probability sample, or any other sampling technique that would allow the data he collected to be projected to the larger population of visitors to the CHNS. That is, it is both logically and statistically inappropriate to make inferences about the population of visitors to the CHNS based on this research. There is overwhelming evidence that the sampling procedure used by Vogelsong to collect both the observational data and the survey data is based on a highly biased convenience sample. Results from a convenience sample cannot be projected to the larger population from which it was drawn. Evidence that a biased convenience sample was used includes the following:

- High use ORV locations on the beach were under sampled, or not sampled at all (Ramp 49, for example.)
- The sampling process itself was highly biased, favoring unrepresentative times of day and days of the week.
- The number of observations at each observation point by date follows no pattern, nor is it sufficiently random to imply probability sampling.
- The sampling by month of year is greatly out of alignment with the known NPS monthly visitor counts as well as other independent sources of visitor usage (Dare County usage tax receipts, for example.)
- There is overwhelming evidence that a significant portion of Dr. Vogelsong's sample were not visitors at all. They were either residents, non-resident property owners, or their status was indeterminate, but not likely a visitor.
- It should be noted that in other documents Vogelsong's sampling method was characterized as a systematic sampling procedure, which can be projectable under certain circumstances. Vogelsong's sampling procedure does not meet and of the criteria for being a systematic sample.

The result is that nothing in this research can be used to infer the characteristics, behaviors, or opinions of the population of visitors to the CHNS.

A convenience sample can be used as a rough "indicator" of the characteristics of the larger population from which it is drawn. Indeed, convenience samples, by necessity are often used in commerce and in some judicial proceedings. However, for research based on convenience samples to be acceptable, the use of a convenience sample must be justified in detail and the execution of the research must meet very high standards as referenced in this report.

Unfortunately, in this research there are so many other serious flaws that the results reported in the study are meaningless. Those flaws are briefly described below.

1. The entire research process is methodologically and procedurally flawed. The methods, processes, and procedures used by Vogelsong to conduct this research do not meet the standards of acceptability for observational or survey research conducted for commercial organizations, the federal courts, or departments of the federal executive.
2. Many of the calculations that Vogelsong makes and the summary statistics he presents in his report are erroneous, based on his own data file.
3. The methodology used to calculate the number of ORVs that use the CHNS beaches annually is not documented, appears to be methodologically flawed, and cannot be projected to the population of CHNS visitors. It is unclear how the estimate of an average of 251.8 ORVs on the beach each day was calculated. I cannot replicate that number from Vogelsong's own data file – nor can I even come close. In fact, using his own methodology,

as best I understand it, gives a daily figure of 382.2 ORVs on the CHNS beaches on the average day. But even that number is erroneous.

4. Vogel song's conclusion that on average approximately 10% of visitors to the CHNS use ORVs on the beach is not supported by any of the research he reports or by the data in his data file, and is greatly understated. Using other data in Vogel song's data file, namely claimed ownership or rental of an ORV by visitors and claimed usage of that ORV to drive on the beaches at CHNS, at least 73% of all those surveyed in this study use ORVs for beach access.
5. Vogel song's estimate of an average 2.26 persons per ORV on the beach is clearly erroneous. The number of persons per ORV on the beach was never measured. However, based on his initial survey data, an analysis of the question concerning the number of people in the respondent's party on the beach shows that the average number of persons per ORV on the beach would likely fall somewhere between 2.8 and 3.5 persons. Of course those numbers are not projectable either.
 6. Even if Vogel song had used a probability sample (which he clearly did not), the haphazard method for selecting and conducting the actual interviews in the study severely undermines the validity and reliability of the collected data and, on that count alone, the data is also not representative of the population of visitors at CHNS.
 - o Residents and non-resident property owners were not excluded from the observation counts or from the surveys, and were apparently included in most, if not all of the reported results. Yet the entire study was characterized as a study of visitors.
 - o The sample selection process was not controlled and most likely resulted in multiple interviews with the same or related parties, further biasing the sample and the results.
 - o Interviewers made numerous errors in recording their observations.
 7. The survey questionnaire is very poorly constructed and contains numerous major flaws.
 8. Based on established research criteria, my own personal observation, and the observations of others who were interviewed, it is obvious that the interviewers were not properly trained to administer the interview and that they violated the basic tenants of acceptable interviewing procedures. This introduced additional significant error to the results.
 9. Much of the data reported was not analyzed correctly or reported correctly based on the data that is in the Vogel song data file, or the analysis cannot be replicated because the data analysis procedures used by Vogel song were not documented.
 10. There are a very large number of errors and miscoding in the data file that Vogel song relied upon to do his analysis. In addition, the interviewers/observers made numerous, and obvious errors. For example, on 6/21/01 at Oregon Inlet, at 12:30 pm the observer recorded seeing 235 visitors and 70 ORVs. At 12:35 pm the same interviewer reported seeing 23 visitors and 14 ORVs.
 11. The report itself was written in an inappropriate manner and contains a considerable amount of speculation that is not supported by the data or even addressed by the research. The report also:
 - o omits critical procedural documentation.
 - o omits critical methodological information.
 - o omits documentation of critical calculations (e.g. the average number of ORVs on the beach daily.)
 - o omits the sampling plan.
 - o omits interviewer instructions.

- o uses citations that indicate a biased approach to the entire study.

12. Starting on page 30 of his report Vogel song begins a literature review of ORV usage that demonstrates an obvious personal misunderstanding or bias. At a minimum it indicates a lack of impartiality. The vast majority of his cited literature is not relevant to issues at CHNS. Much of his literature review and citations therein deal with ORV usage as a recreational pursuit. In the CHNS the overwhelming motivation for ORV usage is for the pursuit of other recreational opportunities, such as fishing, shell collecting, bird-watching, surfing, and so forth. Vogel song's own data support that premise – only 3.8% of respondents interviewed said that beach (ORV) driving was their primary activity that day, yet 73% of those in interviewed claimed to use an ORV to access the beaches.

Furthermore, there are no citations or references concerning the use of ORVs that allow the disabled or infirm to partake of recreational areas that would otherwise be out of their sphere of opportunities. This appears to be an important and obvious issue that was totally ignored.

13. Vogel song's entire analysis and discussion of ORV encounters and norms is flawed. He includes in his calculations people who were interviewed in areas where there is no ORV traffic and even in areas where there is no beach, but asks such questions as:

- **How many ORVs did you see on the beach today?**
- **What is the maximum number of ORVs per day you would find acceptable to see on the beach?**
- **What is the maximum number of ORVs per day you could tolerate seeing on the beach before you would no longer visit this park?**
- **What is the maximum number of ORVs per day you think you should see along this section of the beach before managers start to limit use?**

Then he folds answers from those non-ORV locations into his mean calculations and analyses.

Overall, in my expert opinion, due to its many flaws, the report cannot be relied upon to characterize the visitors to CHNS and their activities during their visits. The National Parks Service should not rely in the results of this survey to guide policy development or policy decisions for the CHNS, nor should anyone else.

The remainder of this report documents how and why I have reached these conclusions.