



Deer Management on Bald Head Island April 5th, 2010

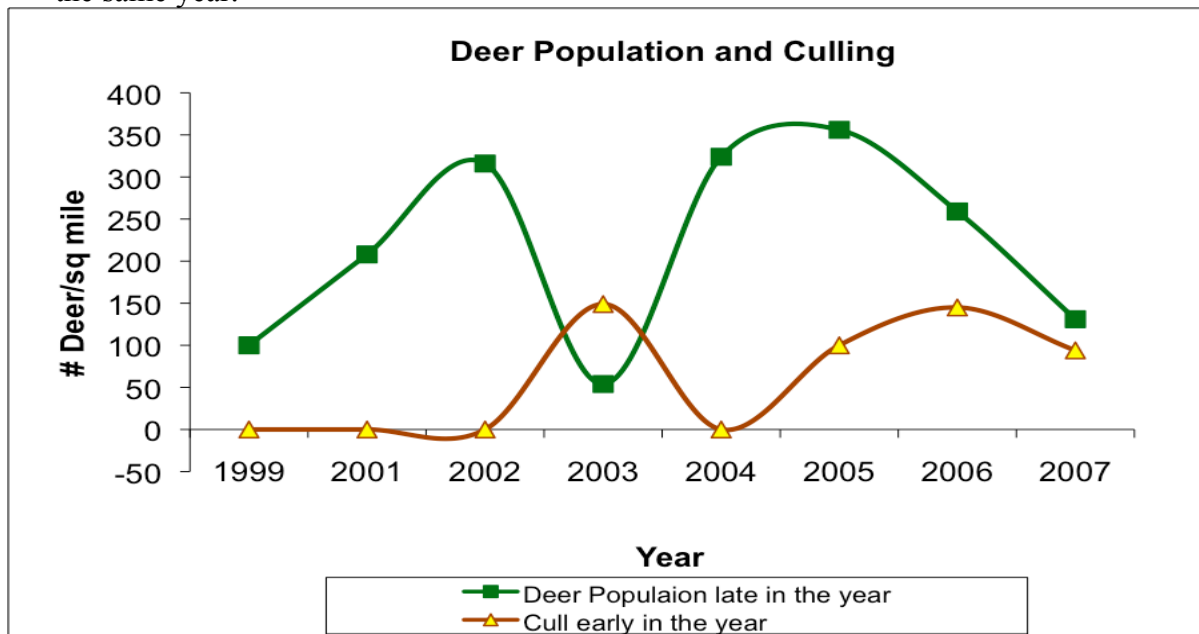
Objective: To manage the BHI deer population at a level that maintains the maritime forest's natural resilience to hurricane disturbance.

History:

The island has struggled in the past to determine a quantifiable “carrying capacity” for its deer population. There exist multiple carrying capacities that may or may not be related to one another. One is an ecological carrying capacity in which the number of deer is kept at or below a certain level so that impacts on the habitat (e.g. live oaks in the maritime forest) are minimal. The other is a social carrying capacity in which the number of deer is kept at or below a certain level so that impacts on humans (e.g. landscape plants, gardens, road obstructions) are minimal. The Conservancy has advocated for managing deer relative to the carrying capacity of our maritime forest environment to ensure the resilience of our barrier island.

Time Line:

- The original BHI deer study conducted by Ray and Bolen (1998-1999) estimated that the carrying capacity of the island was 88 to 186 deer.
- Below is graph depicting the BHI deer population and cull numbers from 1999 to 2009. Please note that count data for the 2000 does not exist and therefore an average of the 1999 and 2001 counts were used for continuity. Also note that culling typically occurs early in the year, January and February, whereas the population estimates are finalized in December of the same year.





- In 2002, deer damage to flora in the form of browsing was observed by NCSU scientists. The BHI Conservancy determined that a “hands-off” approach was not an acceptable response to the potential threat to maritime forest habitats.
- Also in 2002, the BHI Conservancy presented “White-tailed deer management report and recommendations” and held public forums including state wildlife biologist and scientists with the purpose of communicating the goals of deer management:
 - ensure the well being of white-tail deer and their habitat
 - maintain deer populations at levels that ensure compatibility with human land uses and ecological biodiversity
 - encourage and promote the educational and aesthetic enjoyment of the deer herd
 - inform stakeholders about deer biology, management options and the impacts, both positive and negative that deer have on people, landscapes and ecosystems
 - ensure that all recommendations and actions are fully consistent with the best available scientific principles and findings
 - ensure full compliance with federal, state, and local regulations and accepted safety and liability minimization practices
- Below is a table depicting culling events on Bald Head Island from 2003 to present. Please note that culling events occur in January-February of the year indicated while population counts occur in the fall of the year indicated. Therefore effects of a cull will be observable in the same year’s population count.

Year	Number of deer culled
2003	149
2005	100
2006	145
2007	94
2009	71

- A public forum held on March 11, 2003 resulted in questions about immunocontraception as an alternative, non-lethal deer management method. The BHI Conservancy indicated that they would evaluate this management option.
- In 2005, the Conservancy introduced the idea that the maritime forest was the most important conservation priority for the island. Deer have the potential to cause significant harm to forests if left unmanaged. The Conservancy urged citizens to manage deer based on their impact to the maritime forest.
- A Citizens Deer Committee was established in 2006
- In 2006, the Conservancy was asked to present all potential options for deer management
 - The Conservancy evaluated the benefits of the following options:
 - Culling – a cheap and effective management option with strong concerns from the community: some concerned about the violence to the deer other concerned about personal safety with hunters on the island
 - No Management – the BHI Conservancy did not think that this was a viable option given potential damage to the maritime forest

- Non-lethal management. Although data indicated that past efforts to use hormonally based drugs have been impractical, expensive, and have a mixed result a new drug that promotes a contraceptive immune response (immunocontraception) in deer had recently been tested on Fripp Island, South Carolina by the Humane Society. This drug, if effective had promise to become a more cost-effective and viable non-lethal management option.
- In 2006, the Citizens Deer Committee asked how many deer the maritime forest could sustain. Specifically what is the carrying capacity of the forest for deer?
 - 2006/2007 UNCW researchers in conjunction with the Conservancy initiated a forest study, funded by the Village of BHI. An initial vegetation sample found no live oaks seedlings within the forest. The study erected a total of twenty deer exclosures paired with control plots throughout the Bald Head Island Forest Reserve in order to assess possible deer effects on vegetation. A continuation of the study was requested from the Village by the BHI Conservancy.
 - A preliminary report released in July of 2008, found no live oak seedlings in either the exclosures or control plots. There were, however, differences in number of acorns between exclosure and control plots. It was concluded that “deer are likely suppressing live oak recruitment by consuming acorns directly and by lowering acorn density, thereby reducing the likelihood of acorn burial by squirrels”.
 - 2008/2009 research on the forest found no major negative impact at the current level of deer on BHI (that is other than reduction in acorn numbers). The lack of live oak seedlings continues to be a concern and therefore UNCW researchers have proposed a study for the 2010-2011 fiscal year in which seedlings are planted in exclosures and control plots then monitored for damage due to deer over time. Additional factors that might influence seedling recruitment will also be examined (e.g. light levels, logging history). One potential explanation is that no hurricane or other major disturbance factor has impacted the forest in over ten years. This lack of disturbance may be limiting the success of all seedlings but especially live oaks. This hypothesis is supported by Conservancy observations of live oak seedlings on the golf course and in disturbed areas of the island. John Taggart (UNCW) is suggesting that our forest is adapted for disturbance and live oaks may need the creation of gaps to stimulate seedling survival.
- The BHI Conservancy held a series of public forums to discuss deer management on BHI in 2007 and 2008.
- In 2007 Lauryn Cannon, a BHI Conservancy intern, conducted a survey of BHI stakeholders that determined the following:
 - 83% of respondents were aware that BHI manages its deer population
 - 73% had never attending a deer management public forum
 - preservation of the maritime forest was the chief concern of most respondents
 - 41% of respondents strongly agreed and 16% somewhat agreed with the statement “the BHI community supports the proposal for non-lethal deer management”
 - 64% of respondents expressed a willingness to pay for the non-lethal plan
 - 40% of respondents strongly agreed and 20% somewhat agreed with the statement “current public opinion (i.e. deer management public forum) is representative of the BHI community”
 - Lauryn’s presentation can be found at <http://www.bhic.org/deermgt.shtml>

- In 2007, the Citizens Deer Committee asked the Conservancy to pursue the non-lethal management option using immunocontraception with the Village of BHI. This decision was based on the efficacy of the drug, a survey of citizens on both sides of the issue which demonstrated broad support for the approach, and the consideration that although the cost of the approach would be initially higher, costs would come into line with the \$50,000 budgeted annually for culling.
 - 2007 data from Fripp Island continued to provide support for the efficacy of the immunocontraception drug.
 - 2007/2008 The Conservancy pursued a study in conjunction with Dr. Anthony Snider and Dr. Chris Deperno (NCSU) that would determine if the BHI deer population is “closed” (deer do not leave the island), effectiveness and efficiency of darting deer and continue the long-term BHI deer database (e.g. population estimates, numbers culled). This study was necessary to pursue immunocontraception or any other non-lethal methodology. The state Wildlife Resource Commission indicated that no permit for experimental drugs would be forthcoming without this study.
 - 2008/2009 Deer were tagged with a radio collar and followed for 12 months.
 - 2009 Deer were culled with a goal of moving toward immunocontraception.
 - The NCSU study, completed in spring 2010 with a final report to the Village of BHI due June 1, 2010 has determined that the BHI deer population is closed, deer can be darted effectively and efficiently, and provided a detailed summary of the deer population from 1999-2009. Therefore, BHI does meet the requirements for an immunocontraception program as outlined by regulatory agencies.
 - 2010/2011 The Conservancy has received clearance from the drug licensing organization to use immunocontraception on BHI. The Conservancy has received a proposal from Dr. Chris Deperno (NCSU) to pursue an immunocontraception study that could lead to long-term, non-lethal deer management on BHI (the study would take five years to complete). The BHI Conservancy sought and received a second proposal that monitors the health of the BHI deer population and seeks to establish the ecological carrying capacity of deer on island. The second proposal was received in response to the expense of the immunocontraception study.

Efficacy of immunocontraception:

As mentioned previously, deer populations must meet certain requirements for immunocontraception to be an appropriate means of management, namely:

- The site should be between 100 acres and three square mile
- The deer population should be isolated or semi-isolated
- Deer should be approachable and easily located at least some of the time
- There should be an extensive database on the deer population

Bald Head Island meets all of the above requirements.

The following communities/entities have utilized immunocontraception with success:

- National Institutes of Standards and Technology, Gaithersburg, Maryland
- Fripp Island, South Carolina
- Fire Island, New York
- Irondequoit, New York



Additionally, there are a variety of studies that focused on immunocontraception in animals other than deer. There are also several studies that used immunocontraception in deer but that took place in a controlled setting (research and/or farm facility). Below is a link to the Humane Society's website that provides details of these studies.

http://www.hsus.org/wildlife/issues_facing_wildlife/immunocontraception/

The proposal submitted by Dr. Chris Deperno (NCSU) for fiscal year 2010-2011 will incorporate the GonaCon™ immunocontraceptive drug. It is considered a 2nd generation immunocontraceptive that has less side effects, high efficacy and only requires a single administration to be effective for up to five years. These desirable attributes could potentially bring the cost of a long-term immunocontraception program in line (or even less) than annual culls. Following is a link to the United States Department of Agriculture that provides details:

http://www.aphis.usda.gov/wildlife_damage/nwrc/research/reproductive_control/gonacon.shtml

Options for deer management:

1. No action

The Village of BHI could decide to take no action concerning deer management, essentially allowing the population to reproduce naturally. Based on information reviewed by the BHI Conservancy, this is not a recommended course of action. Given the reproductive rate of deer on BHI, population numbers would likely be over 500 individuals within 3-4 years. This number of deer would most likely have a deleterious impact upon the maritime forest and other habitats as well as increase the risk of negative interactions with humans. If the Village decided to restart a deer management program after taking no action for several years, the start-up costs would be significant.

2. Culling

The Village of BHI could continue the annual cull as determined by deer population estimates provided by the Conservancy (in conjunction with NCSU and UNCW researchers) or Westervelt Services. Deer number to cull could be based upon the generally accepted 88 to 186 deer carrying capacity of the island. Advantages of this approach are its proven effectiveness and relatively inexpensive cost. Disadvantages of this approach are the inconsistent quality of contractors, logistic difficulties, safety issues, unsightliness of the operation and opposition of numerous BHI stakeholders. From a purely scientific point of view, culling will achieve the Conservancy's objective of protecting the maritime forest. The community's stated opposition to this method of deer management and the Conservancy's commitment to its constituents to pursue immunocontraception leads us to the final option.

2. Immunocontraception

The Village of BHI could take the next step in the immunocontraception deer management process. That is, it could fund the proposal submitted by Chris Deperno (NCSU). Advantages of this approach are justification of the substantial amount of time and money already invested in this process, assessment of deer health, assessment of deer use of maritime forest, better understanding of ecosystem function, wide ranging public support and edification (i.e. the



Village government listens and acts upon our concerns), and initiation/determination of a long-term immunocontraceptive deer management program that may be of benefit to other barrier island communities. Disadvantages of this approach are higher initial costs and unknown consequences on long-term deer population age structure. **The BHI Conservancy recommends that the Village of BHI fund the NCSU immunocontraception study for 2010-2011 with the understanding that it is a five-year commitment to complete the study.** It is anticipated that at the completion of the study a contractor can be hired (potentially one of the NCSU graduate students conducting the study) to continue an immunocontraception program only (no further studies required).

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