

Draft Summary of Jekyll Island White-tailed Deer Management Recommendations

July 2014

I. Introduction and background

The mission of the Jekyll Island Conservation Plan (JICP) is to “Preserve, maintain, manage, and restore Jekyll Island’s natural communities and species diversity while providing nature-based educational and recreational opportunities to the general public.” Specifically regarding white-tailed deer, the JICP recognizes that deer can “adversely affect long-term conservation goals by preferentially foraging on propagules and saplings of desirable native plant species”.

Furthermore, the Plan states that the primary goal for the management of deer is to “sustain a healthy population that is not fed by humans and thereby poses less risk in spreading disease and damaging the fragile ecosystem”. One of the habitat management strategies called for in the JICP for upland forest habitat is the “Manage(ment) of deer population size and/or access to oak hammock portions of this (Management) Unit to create conditions favorable for seedling/sapling recruitment and growth.

Based on the guidance from the JICP, the JIA Conservation Staff have been working with partners since 2011 to evaluate the need for deer-population management and to identify feasible management techniques. As stated in the JICP, this “requires an understanding of the population size that can be supported by the natural systems with sustained habitat quality, the population size that can coexist compatibly with the human population, and the health of the population.”

To this end, the following actions have been taken by the JIA Conservation Staff:

- Spotlight survey (2011) – led by DNR with JIA support
 - High population density indicated
 - Population management recommended by DNR Wildlife Biologist
- Browse survey (2011) – led by DNR with JIA support
 - High population density indicated
 - Population management recommended by DNR Wildlife Biologist
- Spotlight survey (2012) – led by JIA with DNR support
 - High population density indicated
- Health assessment (2012) – led by SCWDS with JIA support
 - High frequency of malnutrition and parasitism
 - High population density indicated
 - Population management recommended by Director of SCWDS
- Camera survey (2013) – led by JIA with DNR support
 - Survey failed as indicated by under-representation of does and fawns in camera sightings.

- Vegetation community monitoring (2013) – led by JIA with DNR support
 - First year of long-term monitoring program
 - High browse pressure and low recruitment in native oaks
 - Low browse pressure on non-native invasive camphor
- Spotlight survey (2013) – led by JIA with DNR support
 - High population density indicated
- Collection of Georgia State Patrol records documenting reported collisions between vehicles and deer (2008 – 2013) – GSP
- Deer ecological-impacts literature review (2012-2014) - JIA
 - 62 articles, including peer reviewed journals and technical reports
 - Indicated that deer-related losses of ecological diversity are common
- Rare plant species observations (2012-2014) - JIA
 - Populations of locally rare plant species, focusing on rare hardwood-tree species, are being identified and will be inventoried and mapped by the JI Conservation staff.
 - Native, locally-rare, tree species subject to risk of extirpation from Jekyll Island due to white-tailed deer herbivory include: Red Mulberry, Pignut Hickory, Chestnut Oak, Tupelo, and Loblolly Bay.
- Formation of Jekyll Island Deer Management Committee (2013-2014)

More details about the above actions and results are available in summary reports submitted by to JIA Board in March and November, 2013.

A solid majority of the results detailed above indicate that the density of deer on Jekyll Island is at or above the ecological carrying capacity of the habitat. None of them indicate otherwise. Individually, most of these results are cause for concern. Taken together, they lead to a clear conclusion:

Action to reduce the density of deer on Jekyll Island is consistent with the mission stated in the Jekyll Island Conservation Plan to maintain, manage and restore natural communities and species diversity.

While there may be other collateral benefits to a deer population reduction, such as reduced vehicle collisions, reduced residential and business expenses due to deer damage to landscaping plants, and reduced risk of tick-borne illness, the protection and restoration of ecological diversity is the sole objective of the call for deer population management by the Conservation staff.

II. Deer Management Committee

Following a recommendation to the JIA Board in November of 2013, a committee of subject-matter experts, the Jekyll Island Deer Management Committee, was convened. This group met in December 2013, January 2014, and June 2014.

The Committee was composed of the following members:

- Ben Carswell, JIA Director of Conservation
- Terry Norton, DVM, JIA Director of the Georgia Sea Turtle Center (GSTC)
- John Marr, Ph.D., JIA/GSTC General Manager
- Kimberly Andrews, Ph.D., JIA/GSTC Research Coordinator
- Cliff Gawron, JIA Director of Landscape and Planning
- Jim Broadwell, JIA Projects Manager
- Will Ricks, GADNR WRD, Game Management Section, Wildlife Biologist
- Jacob Thompson, GADNR WRD, Nongame Conservation Section, Wildlife Biologist
- Robert Warren, Ph.D., UGA, Warnell School of Forestry and Natural Resources, Professor of Wildlife Ecology and Management
- Judy Winieki, Retired, Minnesota Department of Natural Resources, Jekyll Island seasonal resident.

In addition, the following individuals participated in at least one committee meeting as an informational resource.

- Sid Painter, retired GADNR Wildlife Biologist
- Mike Cherry, Ph.D. candidate, UGA, Warnell School of Forestry and Natural Resources
- Bob Krueger, Vice Chair, Committee Chair – Historic Preservation and Conservation Committee, JIA Board

At the opening of the first meeting, the committee adopted the conclusion stated in bold on page two of this report as a starting point. The committee was then charged with evaluating an array of potential deer-population management methods with the goal of eliminating any that could not meet all of the following criteria.

- Can be accomplished legally with all necessary permits
- Measurably reduces the density of deer on Jekyll Island by an amount to be determined
- Is safe for residents, guests, and staff of Jekyll Island
- Is economically sustainable without compromising other conservation goals
- Is adaptable to changing conditions and information
- Maximizes the beneficial use of any animals to be sustainably harvested as part of a prospective program

All known reasonable methods for deer population management were initially considered “on the table” by the committee. The methods discussed, along with a brief summary of the committee’s discussions and conclusions regarding each method, follow.

III. Deer population management methods considered by the committee

Relocation – capture of live deer followed by relocation and release away from Jekyll Island

- This method was immediately dismissed by the committee for failing to meet multiple criteria
- Wildlife relocation, especially for deer, results in high levels of stress and low levels of post-release survival for relocated animals and is broadly disfavored by natural resource management professionals including those on this committee
- Disease transmission is a serious concern and the primary reason why this method would not be permitted by GADNR.

Contraception and sterilization – reduction in the reproductive rate of the deer population by eliminating reproductive capability in does through either administration of immuno-contraceptive drugs or surgical sterilization.

- This method was discussed by the committee and was dismissed for failing to meet multiple criteria.
- The GADNR Game Management Section representative expressed that the Chief of Game Management would be unwilling to allow a permit for this method.
- No committee members argued in favor of pursuing this method. Concerns were expressed that expense, both in time and dollars, was likely to be unsustainable. Committee members also had concerns about the experimental status of the contraceptive drugs and the resulting uncertainty that these experimental drugs would be reliably available into the future to support a long-term effort.

Native predator reintroduction – capture of native deer predators, in this case bobcats, from nearby populations followed by release and monitoring on Jekyll Island. Bobcats are known to commonly prey on young white-tailed deer and have been shown to be capable of limiting white-tailed deer populations on Cumberland Island in Georgia and Kiawah Island in South Carolina.

- This method was discussed by the committee and was dismissed for failing to meet multiple criteria.
- The JIA Director of Conservation favored this method due to the demonstrated success of the reintroduction program on Cumberland Island as well as the mutually beneficial coexistence of humans and bobcats on Kiawah Island, an island similar in size, but more developed than Jekyll Island.

- Concerns were expressed by the JIA/GSTC staff as well as the GADNR Nongame Conservation representative about predation by bobcats on priority species for conservation. Concerns were also expressed about disease transmission.
- The GADNR Game Management Section representative expressed that the Chief of Game Management would be unwilling to allow a permit for this method.
- A recommendation was agreed upon by the committee that the JIA Conservation staff should take steps to confirm that bobcats are indeed absent from Jekyll Island as they are currently believed to be. This work is in progress.

Controlled public hunting – a public hunting program with a limited number of participants and a carefully managed hunt plan that would specify approved hunting locations, hunting equipment, and deer harvest to maximize safety and effectiveness.

- This method was discussed by the committee and was not dismissed, but was also deemed not actionable immediately.
- It cannot be determined if a hunting program would satisfy all criteria until the details of such a program are specified. Higher level discussions between the leadership of the JIA and the DNR will be required to establish the terms of a mutually beneficial partnership between the two organizations that could lead to the development of an outline for the prospective hunting program and initial hunt plans.

Sharpshooting – a program of removing deer from the population by utilizing highly-trained marksmen operating under a protocol that maximizes safety and effectiveness

- This method was discussed by the committee and was not dismissed. See further explanation in Recommendations Section.
- The GADNR Game Management Section representative conveyed that the Chief of Game Management would allow a permit for this method only if the work was to be conducted by the USDA APHIS Wildlife Services program.
- USDA staff, upon the request of the JIA Director of Conservation, conducted surveys to inform an estimate of cost and recommended deer reduction numbers during an initial year of the prospective program.

IV. Recommendations

Primary method - Sustainable, professional harvest with 100% donation of meat

The committee recommends that at such time as the JIA decides to implement a deer population management program the primary method of population control should be sharpshooting to be conducted by the USDA APHIS Wildlife Services program. This is the only method currently

available that meets all of the criteria (p. 3) and is actionable, as early December 2014, should the JIA decide to approve the program.

The long term goal of this program would be to reduce Jekyll Island's white-tailed deer population and to maintain it at a level at which increased survival and growth is documented in selected at-risk native plant species. It is critical that JIA decision makers be aware that this management program must be instituted on a routine basis to be successful. It is recommended that management be conducted on an annual, or at minimum bi-annual, schedule based upon routinely updated recommendations by JIA Conservation and USDA staff. Critically, the meat from all deer harvested as part of such a prospective program would be donated. Donation recipients are expected to be the [White Oak wildlife](#) conservation facility in Yulee, Florida to support care of carnivore species of global conservation concern, and America's Second Harvest of Coastal Georgia through a partnership between the [Georgia Food Banks Association](#) and Georgia Hunters for the Hungry.

USDA Wildlife Services has recommended an initial reduction of 80 to 100 deer, with removal operations to be conducted during winter. The committee thinks this recommendation is conservative and recommends that the number of deer removed during the initial year of management should be on the conservative end of that range. Thus it is recommended that, if the JIA decides to implement these recommendations, a goal would be set of removing 80 deer in the winter of 2014/2015.

Secondary method – supplementary population management through controlled public hunting.

This method is not currently actionable. However, the Jekyll Island Deer Management Committee advises that hunting could reduce the sharpshooting effort needed to reach project goals thereby reducing the total cost of deer population management. It is possible for a hunting program on Jekyll Island to meet each criteria (p. 3) contingent upon the specifics of hunt plans. Before these specifics can be developed, a mutually beneficial partnership agreement between the JIA and the DNR must be developed such that the agencies share equally in the expenses and benefits of such an effort. In calling for "nature-based educational and recreational opportunities for the general public", the Jekyll Island Conservation Plan provides support for JIA investment in such an endeavor. However the substantial costs of organizing and managing the program would necessitate equal investment on the part of the DNR. The committee therefore recommends that the leadership of both agencies engage one another to explore the potential terms of a partnership agreement.

Expanded research and monitoring to support adaptive management

In concert with any management action, the JIA Conservation program should coordinate ongoing monitoring and research to document changes in the abundance of white-tailed deer on Jekyll Island as well as indicators of plant community response. The staff should be stay on top

of the science of deer management and should seek to identify population estimation techniques that could produce more accurate estimates of deer density across all habitat types on Jekyll Island. At risk plant populations should specifically be identified, inventoried, and monitored. In addition, regeneration of dominant canopy species, such as live oak, should continue to be monitored. Standardized vegetation monitoring should be expanded to include additional habitats currently not evaluated, such as forested wetlands. Management recommendations regarding the number of deer to be harvested and the frequency of harvest should be updated on a yearly basis. Health assessments should be conducted in cooperation with SCWDS every 5 years following initial management action. Biological information should be gathered from a sample deer collected by sharpshooting to provide additional deer health and population indicators over time such as age structure, reproductive rate, and parasite load. The prevalence of tick-borne diseases on Jekyll Island should also be evaluated.

The information gathered from harvested deer will lead to a steadily improving understanding of the characteristics of the population which will in turn lead to more effective management and refined goals. These actions should involve JIA, GADNR, SCWDS, UGA, and USDA staff to working together to ensure that conservation objectives are being met and that management continues to be sustainable. Researchers unaffiliated with the JIA or any existing partners often approach staff with interest in conducting ecological research on Jekyll Island. The JIA Conservation staff should encourage and seek to glean information from this external research wherever the possibility presents itself to further inform management of the deer population and protection of native plant communities. Long term monitoring of Jekyll Island's vegetation communities and rare plant species should continue regardless of whether or not deer management action is taken.

V. Acknowledgement and response to opposition

The JIA staff have received approximately 142 emails to date (7/7/14) from concerned citizens in opposition to lethal deer management methods. These emails arose from a campaign being led by a group of Jekyll Island residents, calling themselves "[Citizens for the Humane Treatment of Animals on Jekyll Island](#)". The Jekyll Island Conservation staff has developed the following responses to the main points of criticism put forth by the opposition.

On the accuracy of data and it's utility for supporting management decisions:

A few residents have criticized the JIA Conservation staff's and DNR's interpretation of spotlight count and browse survey results. In so doing, they demonstrate a profound misunderstanding of the role of data in decision making for conservation management. All data is subject to uncertainty. Any good manager knows this and his or her role is thus to understand that uncertainty, being mindful of the resources at stake, and to assess a problem from multiple

angles to be sure that all results are pointing towards the same conclusion before making a recommendation. That's exactly what we've done with this issue.

Natural Resource management professionals are well aware of the limitations of spotlight surveys in determining a specific number of deer or an exact density in an area such as Jekyll Island. Nonetheless, we do have a high degree of confidence in the number of individual deer counted in the surveyed area during the spotlight counts. Since the visible area surveyed is known, we likewise have a high degree of confidence in the density estimate for the surveyed area (# of deer / unit area). We take care not to count any individual deer twice. Uncertainty arises in the extrapolation of the density observed in the surveyed area to account for the unsurveyed areas of the island. In other words, there may be less deer out in the middle of the maritime forest, where we can't conduct spotlight surveys, than there are near the paved roads, dirt roads, and golf cart paths that we are able to survey from. We do of course know that deer use these more remote habitats because we have other projects that take us into those areas and we see deer, deer sign, and deer effects on plants in remote natural areas.

While the spotlight survey results under the leadership of different agencies have varied over the years, none have fallen below and estimated density 76 deer per square mile. Far from being contradictory, this indicates that no matter when you count, or whose doing the counting, there are very high densities of deer in surveyed areas.

Nonetheless, the uncertainty about the density of deer in unsurveyed areas is one important reason why the recommendations in this report are not based solely on spotlight survey results. After initial spotlight surveys in 2011, the decision was made to assess the health of the deer and to set up long term vegetation monitoring plots to help assess the effects of deer on vegetation communities. Additionally, a comprehensive literature review was undertaken.

The 2012 health assessment report from the Southeastern Cooperative Wildlife Disease Survey (SCWDS) produced results that were entirely consistent with a high-density deer population that is pushing the limits of the ecological carrying capacity of the habitat.

The Director of SCWDS, John Fisher, said the following in regards to the health assessment results:

“The presence of (Stomach worms) in all of the deer, (Lung worms) in 4/6, anemia in 3/6 (with low PCV in 2 more), total protein below 6.0 in 3/6, and the fair to poor overall condition of 4/6 deer tells me that the overall health of the herd is declining at the current density. This is why I recommended that the density not be allowed to increase and that reduction of the population density followed by regular population control is appropriate.”

Our comprehensive literature review showed us that this is not a unique situation to Jekyll Island. On the contrary, over-abundant deer populations are degrading native plant communities and the ecological relationships that rely on them throughout North America. Numerous peer-reviewed scientific articles demonstrate that there is good reason for natural resource managers to be concerned about evidence of deer overabundance and to take precautionary action in response. The following two quotes from published review articles encapsulate our interpretation of the scientific literature on the ecological impacts of deer over-abundance.

“We urge ecologists to promote a precautionary approach. Because overabundant deer can cause severe, long-term impacts that are difficult to reverse, ecologists should persuade managers to reduce deer numbers before and not after such impacts become evident.”

- Cote et al. 2004, Ecological Impacts of Deer Overabundance, *Annual Review of Ecology, Evolution, and Systematics*

“In the face of uncertainty the usual prescription is conservative management. Given the very large, and sometimes increasing, deer populations now common in some plant communities and the worrisome possibility that effects of deer overbrowsing may be irreversible, or reversible only with complicated and expensive intervention in the future, the most prudent management option would be to attempt to keep deer populations at more moderate densities.”

- Russell et al. 2001, Effects of White-tailed Deer (*Odocoileus virginianus*) on Plants, Plant Populations and Communities: A Review, *American Midland Naturalist*

Those residents who are challenging the JIA Conservation staff’s recommendations on this matter simply misunderstand the relationship between information, uncertainty, and risk as they relate to this decision. Most simply put, the situation is as follows:

1. We have documented many indicators of a high-density deer population. Some of these indicators are stronger than others, but they all point in the same direction. **We have observed no indicators of a low-density deer population.**
2. High-density deer populations have been scientifically demonstrated to have negative ecological effects, including local extirpation of plant and animal species in locations throughout North America and the Southeast.
3. We have reason to believe that negative ecological effects are occurring on Jekyll Island based on observations made by multiple professionals from multiple agencies.

4. The risk of inaction on this matter is plant species loss and potentially irreversible ecosystem alteration.

With the mission of the Jekyll Island Conservation Plan as a guiding principle, and considering the advice of both published experts and those consulted directly, no other recommendation besides those put forth in this report are logical and reasonable. Those advocating otherwise are placing a higher priority on their own personal interests, interests which are in this case contrary to the goals of the Conservation Plan.

On the professionalism and integrity of the JIA Conservation staff

The recommendations contained in this report are not a knee jerk reaction. They are backed by thousands of hours of staff time invested in thoughtful consideration of data, literature, consultation with a broad array of external professionals, and collaborative deliberation. The issue of deer overabundance compromising forest health is not unique to Jekyll Island and has been considered by many other Conservation managers throughout the United States and in Coastal Georgia. The critics have been forced to turn to outside special-interest groups to find anyone who is sympathetic to their position. They would be hard pressed to find any manager of conservation land in the Southeast who would join them in criticizing the JIA Conservation staff's recommendations on this issue. There's a reason why other organizations in coastal Georgia and South Carolina, such as Little Saint Simons Island and The Saint Simons Land Trust and the town of Kiawah Island, have all come to some of the same conclusions for the management of conservation lands under their stewardship. Like Jekyll, these places are managed by teams of professionals with strong backgrounds working with the benefit of advice from respected peers. On the national level, conservation land management organizations including the National Park Service and the Nature Conservancy recognize the importance of managing deer to protect ecosystems and have instituted policies and management plans accordingly.

On the value of deer for the Jekyll Island experience

Many residents have rightly pointed out that viewing deer is an attraction for visitors to Jekyll Island and contributes to the quality of life for residents. This is an important point, and the JIA should value wildlife viewing opportunities for visitors and residents.

The recommendations in this report, if implemented, will not result in deer becoming so rare that they will no longer be seen. Anyone who is familiar with Jekyll Island knows that even if they saw deer half as often as they do now, they would still see deer quite often. Everyone should be assured that deer will still be a part of the Jekyll Island experience and a part of the island's ecology if they are managed. The goal is simply to restore balance to the relationship between deer and other important elements of Jekyll's plant and animal communities.

On population rebound

Critics have pointed out that deer will reproduce more quickly after the population has been reduced thereby releasing the remaining deer from the nutritional impoverishment that currently reduces the ability of does to conceive multiple fawns and the ability of fawns to survive. They suggest that this population rebound would make the management actions suggested here counterproductive.

Once again, any good natural resource manager knows that the reproductive success of does will increase if the population is reduced below the ecological carrying capacity of the habitat. That's exactly the point! A deer population that is maintained below ecological carrying capacity will result in healthier deer and more diverse plant communities. However, the population rebound effect is an important reason why it will be necessary to continue management annually or bi-annually.

On ethics:

Ethical opinions are a personal and often emotional matter to which we are all entitled. The critics put forward both inaction and management with immuno-contraception as preferred alternatives to sustainable harvest. They assert that sustainable harvest with 100% donation of meat would be "unethical". Yet they neglect to explain how risking species loss and ecological degradation while allowing a deer population to persist in a chronic state of nutritional impoverishment is more ethical than using the meat from an animal that has been used as a source of protein for as long as humans have been in North America to support conservation and human welfare goals. On the matter of contraception for deer, putting aside the fact that it is not a legal option in Georgia, the critics do nothing to explain why injecting a wild animal with experimental drugs that cause its immune system to attack its reproductive system would be a more ethical alternative.

On precautionary, adaptive management

Taking informed, precautionary action in the face of uncertainty when natural resources are at risk has become a corps tenant of conservation practice. Likewise, managing in an adaptive way that accounts for evolving information and circumstances is now a best management practice in natural resource fields.

Critics of deer management on Jekyll Island have attempted to twist our adherence to these principles to suggest that we are recommending "experimental" management, as though we are simply intellectually curious about the result. This accusation ignores the time and thought that numerous professionals from multiple agencies have put into this issue over the course of three years and is indicative of ignorance about the current state of conservation practice.

On necessity and choice

Some have asked whether deer management on Jekyll is necessary. Asserting that something is necessary implies that one has no choice in the matter. In the case of deer management, we do have a choice. Management is not necessary *per se*. We could choose to gamble on Jekyll Island's ecosystem health. However, there is clearly a better choice that is supported by the Jekyll Island Conservation Plan and by responsible management principles, one that would benefit our community as well as our environment. That choice has been laid out here.

DRAFT

VI. Appendices

Appendix A. Previous summaries and reports

Department of Natural Resources – October, 2011

Dear Jekyll Island Authority,

Over many years the deer population has grown on Jekyll Island. 65% of Jekyll is undeveloped by law and this gives deer some suitable habitat. Unfortunately island habitats are limited because of the soil and forage quality. I have conducted a spotlight and browse survey on the island to find out exactly where the population stands.

Browse Survey

I conducted browse surveys at five locations (100 yard transects). Browse surveys involve identifying available browse species and estimating availability and utilization. Woody plants are the focus of these surveys because they generally persist as a food source year after year. However, herbaceous plants can be an important component of a deer's diet, especially in areas with varying water levels. These surveys indicated high availability and high utilization. This, in conjunction with the spotlight survey data we collected this year, will shed some light on the make-up of this deer herd and allow for more precise population management recommendations.

Spotlight Survey

I conducted a spotlight survey over a four-night period. One night conducted the distance-sampling portion and the next three we counted deer. Deer were placed into four categories: bucks, does, fawns, and unknowns. A formula was later used to determine the population parameters. A survey of this size and scale should reflect an accurate number of deer across the landscape. This, along with the browse survey will be used to construct a thorough management plan on the island.

Habitat

Habitat is a limiting factor in coastal habitats. Soil quality and forage quality is low along the coast. The quantity of forage is high, but many of the available species have very low digestibility and palatability. This makes it difficult for deer to make it through the hot summers, as well as making it tough for does to make it through lactation.

Browse Survey Results

The browse survey showed there is a very high number of deer on Jekyll Island. The counts indicated the following: 101 bites at the beach site, 61 bites at the field site, 97 bites at the golf course site, 58 bites at the marsh site, and 93 bites at the forest site. All preferred species were heavily browsed when present. Any number of bites over 50 indicates over population. All transects counted were over 50. These are the highest numbers I have seen in my career.

Spotlight Survey Results

The spotlight survey showed Jekyll Island has one deer per 8 acres, or 80 deer per square mile. There are 712 deer on the island; 121 of which are bucks, 463 are does, and 128 are fawns. 73% of the deer were counted in and along the golf course. 80 deer per square mile clearly indicates deer are overpopulated and should be reduced to somewhere in between 20-30 deer per square mile.

Overpopulation Risks

Disease: Tick diseases are more common in high populations, because deer are a host species. This can also increase the occurrence of these diseases in humans.

Deer-vehicle collisions: Deer-vehicle collisions can cause serious damage to a vehicle, human injury, and even death. This is increased in areas with high deer populations.

Threats to Natural Resources: Overbrowsing can hurt native wildflowers and other native threatened and endangered plants. Also, it can decrease nesting habitat for many birds and cover for small mammals.

Landscape Damage: Deer with high populations will use yards and public places, such as golf courses to live and forage when food is a limiting factor. This is seen everyday on Jekyll Island.

Lower Deer Herd Health: Malnutrition can increase disease and lower the health of the herd. Death by starvation has been seen on Jekyll Island.

Management Options

Hunting: Hunting has been proven to be the best way to lower a population. This would bring money to the island, is very safe, and all the meat would be used. State parks all over the state have benefited from managed hunts.

Sharpshooting: This is another good option. It would cost money, but would be a safe and effective way to reduce the population.

Immunocontraception: This is a very expensive and very ineffective means on a large-scale open environment. This is better suited for small fenced populations.

Release of predators: Can be effective, but would most likely cause more problems on the island.

Trap and relocation: This is illegal in Georgia.

Conclusion

The deer population on Jekyll Island is higher than what I would recommend. I have dedicated my life to deer and deer management over the past ten years and this is the highest population I have ever

seen. Reduction of the population will have major positive impacts on native wildflowers and native plants, while also helping migratory songbirds. Hunting or sharpshooting are the only available options to reduce the deer herd.

I have many ideas on how a managed hunt could work on Jekyll Island. We have many state parks in Georgia that this has been successful in reducing the deer population.

Please let me know if you have any further questions. Thank you for your time.

Sincerely,

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DRAFT

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March 5, 2013

Mr. Ben Carswell
Jekyll Island Authority
110 James Road
Jekyll Island, Georgia 31527

Dear Ben:

Enclosed is our report on the deer herd health check conducted on Jekyll Island, Glenn County, Georgia, on August 1, 2012. The health check involved examination of six deer. The data are arranged into a series of tables (parasitologic, serologic, and pathologic) and are accompanied by interpretive comments. The interpretive comments focus on the current and future status of herd health due to the two major disease problems of southeastern deer: 1) a syndrome of parasitism/malnutrition, which tends to be largely dependent on deer density, and 2) hemorrhagic disease which is less clearly linked to deer density. In addition, we have conducted tests for selected diseases that are either important concerns for deer health or major domestic livestock diseases.

Regarding the parasitism/malnutrition syndrome, the average adult stomach worm burden (1,137) indicates that the deer population likely is in excess of the nutritional carrying capacity of the habitat. Other indicators that this population is exceeding the carrying capacity include poor body condition and anemia. In addition, species of pathogenic parasites were present and could become bigger problems should herd density not be reduced. Large stomach worms were found in all six deer and lungworms were found in four of six: this population clearly has potential for haemonchosis and/or lungworm pneumonia problems. Herd increases should be avoided under all circumstances, and a moderate reduction in herd density is recommended before additional health problems develop in this herd.

This population has experienced little or no hemorrhagic disease activity within the recent past and currently has limited herd immunity to hemorrhagic disease. Future episodes of epizootic hemorrhagic disease virus or bluetongue virus activity could affect a large proportion of the population, but in this region, hemorrhagic disease activity usually produces limited mortality and mild clinical disease. There are no management actions that are known to be helpful in regard to hemorrhagic disease. There was no evidence of significant problems with other selected diseases important to livestock health.

Additional information on many of the parasites and diseases mentioned in the report can be obtained from our Field Manual of Wildlife Diseases or from our website at www.scwds.org. If you have any questions about the report, please do not hesitate to contact me.

Sincerely,


John R. Fischer

Enclosures

CC: Dr. Terry Norton
Mr. Mark Whitney
Mr. Charlie Killmaster

DRAFT

Jekyll Island Deer Population and Health Assessment Summary, 3/8/2013

Population Assessment

During the first week of October, 2012 a spotlight-survey assessment of Jekyll Island’s white-tailed deer population was conducted. This assessment was conducted cooperatively by DNR personnel, JIA staff, and Americorps members. The assessment followed the same methodology that was used in in the 2011 spotlight-count assessment which was also a cooperative JIA/DNR effort. The methodology described here should be viewed as a rapid assessment rather than a comprehensive scientific analysis and has known caveats. However, it is useful for evaluating populations and tracking trends in population density and structure through time. Spotlight surveys are routinely used by natural resource management professionals with recognition that some uncertainty is inherent to the analysis.

The methodology essentially involves an estimation of the number of visible acres along a standard route. This route is then driven three nights in a row with observers counting deer using spotlights and enumerating the number of bucks, does, and fawns observed. The total number of individual deer counted in the survey is then divided by the total number of visible acres observed to produce an estimate of deer density. This estimate is reasonably accurate for the observed area. Uncertainty increases with extrapolation to unobserved habitat. The 2012 survey route provided approximately 995 acres of observable habitat primarily in the Urban/Developed land use category as described in the Jekyll Island Conservation Plan. This habitat type amounts to approximately 1,450 acres. A conservative estimate of approximately 4000 acres of land area on Jekyll Island is usable by deer. The observed population density was extrapolated to produce estimates of the total population of deer on Jekyll within the Urban/Developed category (1,450 ac.) and within the total usable area of the island (4,000 ac.). These estimates are presented in Table 1 with 95% confidence intervals, meaning that we can be 95% confident that the actual mean density for deer during this survey was within the given range.

Table 1. Estimated density and population of deer on Jekyll Island, GA, October 2012. Urban acreage (1,450 ac.) includes developed areas, golf courses, parks, transportation corridors and open fields. Total acreage (4,000 ac.) includes all upland habitats, freshwater wetlands, and marsh edge; ponds and salt marsh are excluded.

	Mean	lower 95% CI	Upper 95% CI
Deer per square mile	146	95	196
Population (urban acres)	330	216	445
Population (total acres)	911	595	1227

The Georgia Department of Natural Resources, Wildlife Resources Division, recommends that managed white-tailed deer populations be maintained at a density between 20 and 30 deer per square mile. A population density in the range that we have estimated (95 – 196 per square mile) is very likely to be near or over biological carrying capacity, the maximum number of animals that can forage on a given area without becoming malnourished.

A population density within the estimated range is also higher than would occur in a population of white-tailed deer exposed to predation by natural predators such as bobcats. On Kiawah Island, South Carolina, for example, the deer population fluctuated between 38 and 90 deer per square mile between 1997 and 2012. Bobcats are estimated to prey upon 55% of the deer fawns on Kiawah Island, providing an important natural population control that has no correlate on Jekyll Island.

The 2011 spotlight survey reported an estimated mean of 80 deer per square mile. The 2012 analysis indicates that the deer population increased between 2011 and 2012. This is corroborated by an increase in the percentage of deer counted that were fawns, from a mean of 18% in 2011 to a mean of 26% in 2012.

In addition to the spotlight survey, a motion sensor camera survey was conducted in December 2012 and January 2013. This survey was conducted because the scientific literature suggests that camera surveys can be more accurate than spotlight surveys for estimating deer population size, particularly in areas with thick vegetation. Mindful of public concern that had been expressed regarding the spotlight methodology, we decided to assess the camera methodology to see if it would prove accurate and feasible on Jekyll Island. Unfortunately the camera survey was unsuccessful. This methodology relies on the attraction of deer to bait stations stocked with corn. When the data was analyzed, it became clear that a low percentage of deer visited the bait stations, resulting in an unrealistically low estimate of 160 deer on the island, a number below the lower bounds of the 95% confidence range from the spotlight survey for the Urban/Developed land-use areas alone and below the number of individual deer counted on 2 out of 3 nights during the spotlight survey.

Health Assessment

On August 1st, 2012, six deer were collected from Jekyll Island by staff of the Southeastern Cooperative Wildlife Disease Study (SCWDS) to conduct a herd health check that involved comprehensive parasitological, serological, and pathological examination. These results are summarized by Dr. John Fischer, Director of SCWDS, in the accompanying letter and report. The health assessment results provide evidence in support of our conclusion that the Jekyll white-tailed deer population is near or above biological carrying capacity. Notably, the health assessment was conducted during a period of relatively good environmental conditions for deer on Jekyll, with a wet spring and summer having stimulated new plant growth following a

previous fall season with a plentiful oak mast (acorn production). These conditions likely amplified the population growth that occurred between 2011 and 2012 by providing for increased biological carrying capacity. However, it is important to be aware that the onset of drought conditions or a failed oak mast in future years would result in biological carrying capacity being reduced again. When this happens, the deer, already exhibiting some indicators of malnutrition during good conditions, would be at risk of increased physiological stress and mortality.

Recommendations

These results are yet to be reviewed in their entirety by the JIA Conservation Committee. However, it is the opinion of the Director of Conservation that despite the evidence indicating that the deer population is near or exceeding biological carrying capacity and exhibiting some signs of malnutrition, a decision regarding whether or not to implement population control measures should be postponed pending further research and consideration of stakeholder values. While it is clear that the density of the deer population has consequences for the health of the animals, the broader ecological impacts of a deer population in excess of 95 deer per square mile remain un-assessed as does the prevalence of tick-borne diseases in the population. The latter gap is being addressed by a sample of Jekyll Island ticks that were recently sent to the University of Georgia for disease testing. The former, is critical to understanding the effects of the deer population on Jekyll Island's plant communities and the rich ecological systems they support. To address this, funding should be identified to support the development and implementation of a deer-exclusion study that would fence deer out of small natural areas throughout the island to determine the effects of deer browse on a variety of vegetative community types.

November 2013 - Jekyll Island deer-population update and recommendations

The 2013 white-tailed deer spotlight survey was conducted cooperatively by GADNR personnel and JIA staff following the same methodology that was used in the 2011 and 2012 spotlight-count assessments. This methodology is useful for tracking trends in population density and structure through time and is routinely used by natural resource management professionals with recognition that some uncertainty is inherent to the analysis.

Table 1. Estimated density and total population of deer on Jekyll Island, with 95% confidence intervals. The estimated population is based upon an approximate total habitat availability of 4,000 acres. This includes all upland habitats, freshwater wetlands, and marsh edge; ponds and salt marsh are excluded.

October 2012	mean	lower 95% CI	Upper 95% CI
Deer per square mile	146	95	196
Population (4000 ac.)	911	595	1227

October 2013	mean	lower 95% CI	Upper 95% CI
Deer per square mile	123	112	134
Population (4000 ac.)	769	699	839

The Georgia DNR Wildlife Resources Division recommends that managed white-tailed deer populations be maintained at a density between 20 and 30 deer per square mile. A population density in the estimated range (112 to 134 deer per square mile) is very likely to be near or above biological carrying capacity, defined as the maximum number of animals that can forage on a given area without becoming malnourished. The 2012 herd-health assessment, along with the browse survey conducted in 2011, and the preliminary results of the vegetation monitoring initiated in 2013, support this assessment. The 2013 spotlight survey results indicate no significant change in population density or size since the 2012 survey. The 2012 survey indicated a probable increase in the population from 2011 to 2012.

2013 Vegetation Monitoring

In October 2013, three long-term vegetation monitor transects were established in maritime oak forest on Jekyll Island. Data were collected to measure the diversity of plant species and the abundance, diversity, size, and deer-browse status of canopy-tree species. This data is still being analyzed, but preliminary results indicate heavy browse pressure on seedlings and saplings of canopy tree species at all three sites. Although the presence of a few saplings of dominant canopy species, such as oak, indicates that some successful regeneration is occurring. The rate of recruitment is likely reduced due to heavy browse pressure. Over long periods of time this could decrease the competitiveness of heavily browsed native trees, such as oaks and hickories, and

lead to increased dominance by browse tolerant native trees, such as conifers, or non-native invasive trees such as Chinese tallow tree and camphor tree.

Recommendations

Our research thus far includes literature review, three years of spotlight surveys, a herd health assessment, and preliminary findings from the first year of a long-term vegetation-monitoring effort. This research and informal consultation with wildlife biologists from a variety of agencies and backgrounds leads us to conclude that ecological benefits may be realized if a white-tailed deer population control program were to be instituted on Jekyll Island. These benefits could include:

- Increased regeneration of heavily browsed plant species including native hardwood trees
- Increased understory cover to improve habitat and forage for birds and small mammals.

These changes would have effects throughout the natural community on Jekyll Island, potentially benefiting species that are not directly connected to deer. A widely accepted principle in ecology is that evenness among many species promotes ecological diversity, whereas dominance by a few species reduces ecological diversity. This principle is embraced in the mission of the Jekyll Island Conservation Plan which explicitly identifies diversity as a focal point.

We suggest that a white-tail deer population control program could contribute to enhanced ecological diversity on Jekyll Island and are confident that such a program would not detract from conservation goals. Therefore, we recommend that an exploratory committee be formed and charged with evaluating the feasibility of an array of alternative population-control programs. The committee's goal should be to determine if there is a method or combination of methods that will meet all of the following criteria:

- Measurably reduces the density of deer on Jekyll Island by a desired percentage to be determined
- Is safe for residents, guests, and staff of Jekyll Island
- Is economically sustainable without compromising other conservation goals
- Is adaptable to changing conditions and information
- Maximizes the beneficial use of any animals to be culled as part of a prospective program

The committee should be composed of:

- JIA staff members serving on the Conservation Committee
- A representative of the Georgia DNR Wildlife Resource Division
- A representative of the Georgia DNR Nongame Conservation Section
- An academic researcher, extension agent, or consultant with relevant expertise
- A resident of Jekyll Island with relevant expertise

This committee would report its recommendations to the JIA Executive Director and Board.

15 May 2014

Ben Carswell
Jekyll Island

Dear Mr. Carswell,

First of all, I would like to express my sincere appreciation for the assistance you provided. Successful operations are dependant on team work and cooperation, both of which were exceeded with your assistance.

Spotlight surveys were conducted during March and April on Jekyll Island. Prior to conducting the spotlight surveys, a predetermined route was established to include an adequate representation of all available habitats within the study area. The visible area method was utilized to determine visible acreage along this survey route. This route was approximately 18.3 miles long with 1021 acres of visibility. The operation was a success and the results are provided below:

Spotlight survey 1 (3/24/14): 115 deer observed

Spotlight survey 2 (4/23/14): 128 deer observed

Average deer observed: 121.5

The average number of deer observed (121.5) was used in the visible area method formula to determine the density of deer per sq. mile. The density within the study area equated to 76 deer per sq. mile. The deer per sq. mile is based on useable habitat within the community. Considering surrounding landscapes (golf courses, buildings, residences, etc.), available habitat within the community is determined to be 6.5 square miles.

Glynn County is identified as Deer Management Unit (DMU) 9 by the Georgia Department of Natural Resources (GDNR). DMUs were developed by GDNR to determine deer data analysis, hunting regulations, and management decisions. They represent groups of counties that have similar habitat and population characteristics. GDNR classifies the optimum deer population to be between 30-40 deer per sq. mile of forested acreage in DMU 9. This average represents the ecological carrying capacity of forested habitats in this region. The ecological carrying capacity of a species is considered the species population size that the surrounding habitat can sustain. Negative impacts to the environment can occur when certain keystone species exceed their ecological carrying capacity.

A keystone species is a species whose presence contributes to the diversity of life within environment it inhabits. White-tailed deer are considered as a keystone species. An overabundance of this species could have a detrimental effect on native vegetation which, in

turn, causes less food and habitat for an array of other wildlife species. For example: degradation of habitat through deer overbrowsing has negative effects on nesting and foraging habitat for many native songbirds, neotropical migrants (orioles, warblers, flycatchers, etc.)

The spotlight surveys and native vegetation indicate that the deer density on Jekyll Island is high and is exceeding the ecological carrying capacity. Significant browsing pressure is apparent on deer preferred vegetation such as green briar, honeysuckle and muscadine vines. Very little to no hardwood regeneration was observed and browsing of non-preferred plants indicate a high deer density.

RECOMMENDATIONS

A reduction of the deer herd is recommended to meet the ecological and social carrying capacity of the Island. Approximately 80-100 deer should be removed from Jekyll Island to encourage natural vegetation regeneration and decrease browsing impacts to planted ornamentals. If management decisions are made to reduce deer numbers from Jekyll Island, removal methods would include reduction efforts from elevated stands over bait attractants (corn) and the use of vehicles with spotlights. Biological parameters will be taken from a percentage of deer collected to assess the deer herd health. It is recommended that all deer be donated to a charitable organization. WS will assist with finding appropriate donation sites but any processing fees will be the responsibility of Jekyll Island.

I would like to stress that spotlight surveys are not exact and when the numbers are used alone without considering all other parameters involved can be misleading. What they will do overtime is give you a really good evaluation of your relative deer abundance from year to year. My experience with deer removals in residential areas has shown that first time deer reductions raise a lot of concerns with everybody involved from the public side and the management side. The process seems to work best if you reduce your deer numbers to your desired level over a period of several years. There are several reasons for gradually reducing your herd but the public perception that we are going to come in and “kill” all of the deer seems to always be the main concern. Another reason is it allows us to compile more surveys and data which will give us a better handle on the actual deer numbers and the health of the herd.

We recommend a reduction to take place during the winter months. During late winter the majority of the hard mast has been consumed and visibility is better. Considering these parameters, a reduction during this time period would drastically increase the overall removal success and increase attractiveness of bait sites for safe removal opportunities.

Less visibility, bait acceptance, and pregnant females are a few problems that occur with a removal during the spring and summer months. Due to the onset of shrub and tree foliage, the deer will be less visible and safety determination would be less apparent. Additionally, bait attractants used to concentrate deer in safe removal areas would be less desirable because other natural and ornamental forage items are present within the environment. Pregnant females will also have large viable fetuses which could lead to a negative public image. Removing adult females before or during the early stages of pregnancy would be ideal to prevent the potential of negative media coverage.

If you have any questions regarding the results or the inquiry of potential collections, please feel free to contact me at any time.

Jonathan P Smith
Wildlife Biologist

DRAFT

Appendix C. Deer-Literature reviewed by the Jekyll Island Conservation staff

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