

Application for Funding of Natural Resource and Environmental Initiatives through the Town of Kiawah Island

The Town of Kiawah Island adopted a new Comprehensive Plan in 2015

(<http://www.kiawahisland.org/SharedFiles/Download.aspx?pageid=37&mid=141&fileid=992>).

The Plan lists four Goals related to Natural Resources, three of which the Town's standing Environmental Committee is charged with implementing. Applications for funding through the Environmental Committee should directly address one of the following Goals and Implementation Strategies:

1. *Develop and maintain an environmentally sustainable system of parks and open spaces which provide access to the beach and river; preserves, protects and enhances natural resources; and meets the diverse recreational needs of the Town's population.*
 - a. *Maintain existing programs to monitor and protect natural resources, wildlife species and habitat and expand these programs to include all groups of species on the island.*
 - b. *Support and encourage research on wildlife and natural resources by outside entities, such as colleges and universities, to expand our knowledge and understanding of the natural systems on the island.*
 - c. *Conduct aerial orthophotography of the island every 3 year to monitor changes to the beach and dunes, interior habitat areas, and ongoing development.*
 - d. *Improve access to the beach, Kiawah River and other open space areas by allowing for parking near key access points.*
2. *Maintain existing quality of the natural resources on Kiawah Island, as well as the waters and marine environment surrounding the Island.*
 - a. *Minimize disturbances to or impact on the Island's natural resources and unique natural setting.*
 - b. *Discourage land uses that are threatening to wildlife and wildlife habitats.*
 - c. *Protect natural habitats and corridors essential for the health and integrity of native plant and wildlife populations. Control invasive species.*
 - d. *Recognize that native vegetation should be protected and used to protect and stabilize lagoons and stream banks.*
3. *Maintain and expand public education and outreach programs.*
 - a. *Maintain and expand exiting wildlife website.*
 - b. *Continue to produce wildlife nature guide and other pertinent publications and distribute to residents and visitors.*
 - c. *Maintain wildlife interpretive signs and update as necessary.*
 - d. *Continue and expand public outreach programs, including presentations and school group field trips.*

A funding cycle is based upon the Town's fiscal year budgeting process. Requesting and receiving funding through the Environmental Committee involves the following steps:

1. Submission of a **Preproposal** by **February 15** preceding the fiscal year (July – June) for which funding is requested.
2. Submission of a **Proposal** by **April 1** preceding the fiscal year for which funding is requested.
3. Review of proposals by the Environmental Committee, which may seek advice from external reviewers if deemed necessary.
4. Notification of funding recommendation to Town Council by **June 1** preceding the fiscal year for which funding is requested.
5. Funding notification made after Town Council approval. Funds available by **July 15** of the fiscal year during which the project will be conducted.
6. **Final Report** submitted by **August 15** following completion of the fiscal year during which the project was funded.

Eligibility

Funding requests for specific projects may be requested by any Kiawah-associated individuals or organizations, including the Town Wildlife Department and the Environmental Committee. Requests may be submitted by individuals or organizations not directly associated with Kiawah Island, such as colleges, universities, nonprofits, and government agencies. All requests must address one or more Town of Kiawah Island Comprehensive Plan Goals and the proposed initiative must be performed on Kiawah Island or in the adjacent communities. The Town of Kiawah Island is not obligated to fund any projects during any specific fiscal year.

Preproposal

In order to assist the Environmental Committee and Town Council in budgeting for the next fiscal year, a preproposal should be submitted to the Environmental Committee by **February 15** prior to the fiscal year (July 1 – June 30) for which the funding is sought. The preproposal should not exceed **one page** (single spaced, 12 font, 1" margins) in length and should clearly address the following items in sequence:

1. Project title.
2. Names, affiliation, and contact information of applicants.
3. Brief description of proposed project.
4. Identification of which Comprehensive Plan Goal(s) the project addresses.
5. Expected outcome(s) and anticipated benefit(s).
6. Total funds requested for upcoming fiscal year.

Submission of a preproposal does not guarantee funding, and is solely to assist Town Council in budget planning for possible initiatives. Decisions to award funding will be based upon the complete Proposal submitted at a later date.

Proposal

Proposals for the upcoming fiscal year (July 1 – June 30) must be submitted to the Environmental Committee by **April 1**. The proposal should not exceed **four pages** (single spaced, 12 font, 1" margins) in length and should clearly address the following items in sequence:

1. Project title.
2. Names, affiliation, and contact information of applicants.
3. Introduction/Background/Rationale – Must reference at least one of the Town's Comprehensive Plan Goals and Implementation Strategies.
4. Problem Statement and Objectives.
5. Description of proposed project, including methods and expected timeline for completion.
6. Identify target audience. Describe engagement, outreach, and education efforts as appropriate.
7. Expected outcome(s) and information product(s).
8. Anticipated benefits. Describe these benefits in terms of the Comprehensive Plan Goals and Strategies that the project is designed to address.
9. Brief summary of qualifications of individuals who will conduct the project. If desired, detailed information may be attached as an appendix, not counted in the 4-page limit.
10. Budget with total funds requested, broken down by major categories.
11. Budget justification. Why are these funds necessary and what is the basis for each amount? **Note: the Town of Kiawah Island will not pay Indirect Costs.**
12. Collaborations and partnerships, including additional sources of funding that leverage the Town's funding.

Proposal Evaluation

The Environmental Committee will evaluate proposals based on the following criteria:

1. Degree of relevance to one or more Comprehensive Plan Goals and Strategies.
2. Justification that this is an important project for the Town to support.
3. Likelihood of successful project completion with expected outcomes and products.
4. Anticipated benefits for target audience.
5. Significance of benefits for the Town and Town residents.
6. Qualifications of individuals who will conduct project.
7. Appropriateness of requested budget for accomplishing project.
8. Collaborations and partnerships that leverage the Town's investment.

Final Report

Acceptance of funding from the Environmental Committee obligates the recipient to be accountable for expenditure of those funds in accordance with the plan outlined in the original

proposal. Should the recipient encounter unforeseen situations during the fiscal year that necessitate significant changes to the project or reallocation of funds within the project, the Environmental Committee should be notified immediately through a brief written statement with a request for approval.

A Final Report should be submitted to the Environmental Committee by **August 15** following the conclusion of the fiscal year for which it was funded. These reports may be brief, but should include the following:

1. Project title.
2. Names, affiliation, and contact information of responsible parties.
3. Brief description of project, activities undertaken, and accomplishments.
4. Identification of the specific Comprehensive Plan Goal(s) addressed and how the project successfully advanced the Goal(s).
5. Specific outcomes, quantified if possible (e.g. number of students served). Information products produced. Programs presented.
6. Identify specific benefits to the Town and its residents as a result of this project.

Failure to submit a Final Report may result in denial of future funding, or initiation of action to recover the provided funding.



NATURAL RESOURCES ELEMENT

Background

Kiawah Island, the largest barrier island in the state of South Carolina, is located just south of Charleston. The Island has a rich variety of maritime habitats and scenic natural resources that include over 10 miles of beach, a broad salt marsh with tidal creeks, freshwater wetlands, and extensive maritime forest and shrub thickets.

In 1975, the Kiawah Island Company introduced plans to develop Kiawah Island as a scenic residential and Resort community, which capitalized on its natural beauty. Residential areas are interlaced with recreational open space, a system of lagoons and ponds, wildlife corridors and nature trails that are functional and aesthetically pleasing. The intra-Island brackish and fresh water ponds serve multiple purposes including storm water retention and removal. Roadway and other pavement runoff are naturally filtered through the marshes, protecting river and ocean water quality.

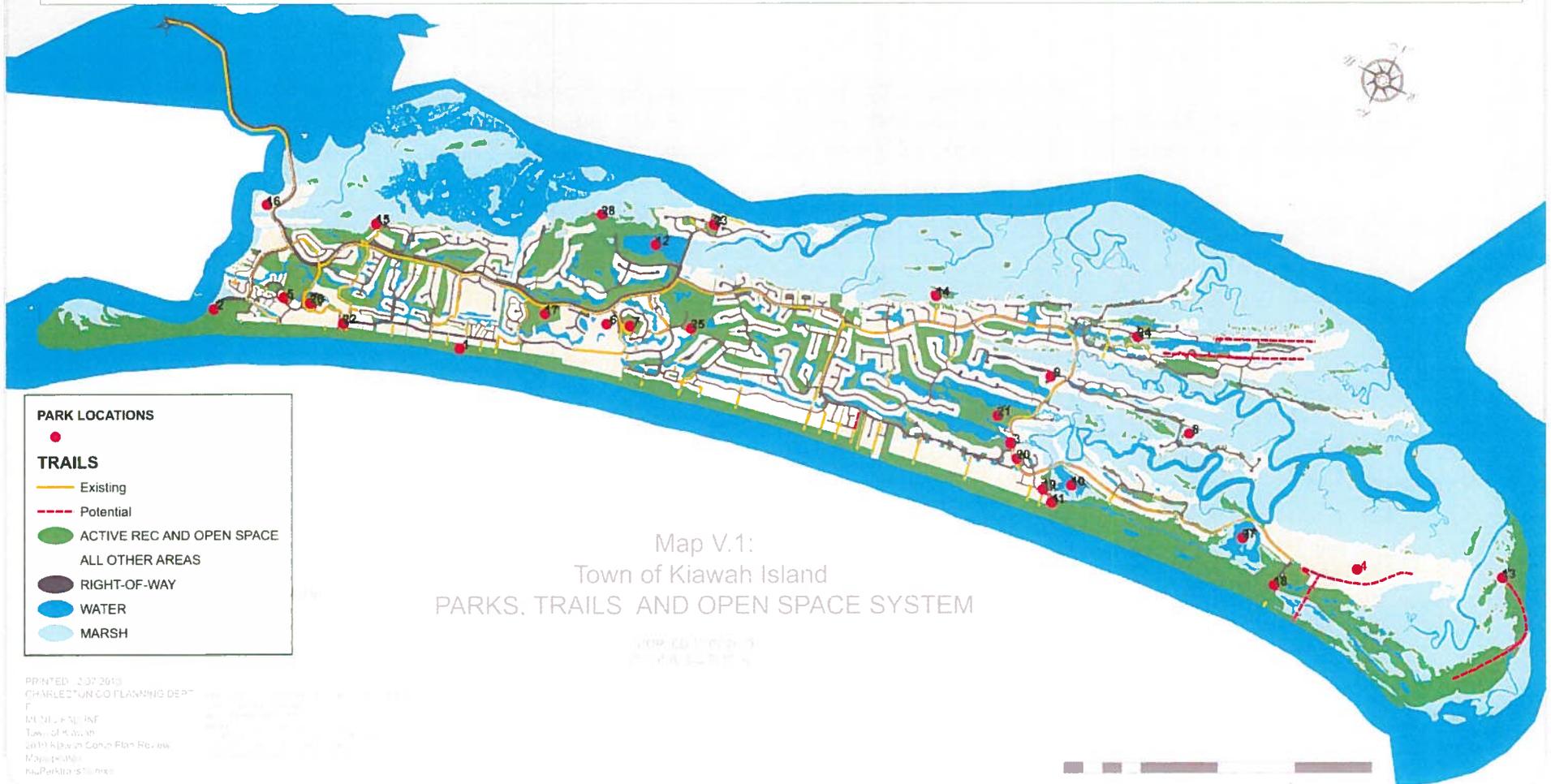
As a result of environmentally sensitive planning, Kiawah Island has been recognized nationally for its creative balance between natural and developed areas by the Urban Land Institute and the American Planning Association. Map V.1 below shows the parks, trails and open spaces that exist in the Town as of November 2





Natural Resources Element-V

- | | | | | |
|----------------------------------|-------------------------------|------------------------------|-----------------------------------|---------------------------|
| 1 BEACH | 7 EAST BEACH TENNIS | 13 LITTLE BEAR ISLAND | 19 OCEAN MARSH ROAD BEACH PARKING | 25 TURTLE POINT GOLF |
| 2 BEACHWALKER PARK | 8 FALCON POINT/SUMMER ISLANDS | 14 MARSH ISLAND PARK | 20 OCEAN OAKS | 26 WEST BEACH TENNIS |
| 3 CANVASBACK MINIPARK | 9 GLOSSY IBIS MINI PARK | 15 MARSH VIEW TOWER OVERLOOK | 21 OSPREY POINT GOLF | 27 WILLET POND |
| 4 COUGAR ISLAND | 10 IBIS POND | 16 MINGO POINT | 22 PROPERTY OWNERS REC CENTER | 28 RIVER COURSE CLUBHOUSE |
| 5 COUGAR POINT GOLF | 11 KIAWAH BEACH CLUB | 17 NIGHT HERON PARK | 23 RHETT'S BLUFF | |
| 6 EAST BEACH CONFERENCE/TOWN CTR | 12 BASS POND | 18 OCEAN COURSE GOLF | 24 THE PRESERVE | |



Map V.1:
Town of Kiawah Island
PARKS, TRAILS AND OPEN SPACE SYSTEM

PRINTED: 2/27/2018
CHARLESTON CO PLANNING DEPT
1410 JEFFERSON
Town of Kiawah
2019 Kiawah Comm Plan Review
Mapspc01801
KiawahParkto510.mxd



Existing Conditions

Beach and Dune Preservation

Oceanfront beach and dunes serve several important functions. These include storm protection for upland areas, habitat for a variety of plant and animal species (very important for daytime resting cover for bobcats), nesting habitat for sea turtles and recreation for Town residents, property owners and guests.

The beach and dune system is currently in very good shape and is monitored annually by Dr. Tim Kana of Coastal Science and Engineering (CSE). The beach is currently divided into 6 reaches or zones (Figure V.2) and annual erosion and accretion rates are calculated each year. This is done by conducting beach profile monitoring at 61 locations along the beachfront. Between 2012 and 2013, all reaches accreted sand with the exception of the Lagoon and Stono Inlet reaches. These 2 reaches are located on the eastern end of Kiawah and are very dynamic due to their location near the Stono River Inlet. Neither of these reaches is adjacent to any homes or structures.



Figure V.2. Map of Kiawah Island showing the location of the 6 beach reaches used for monitoring and reporting erosion and accretion rates.



2006 East End Beach Restoration Project

In 2006, the Town conducted a large scale Beach Restoration Project on the eastern end of Kiawah Island. This project successfully stopped intensive erosion on the eastern end of the island adjacent to the Ocean Course clubhouse. A total of 550,000 cubic yards of sand was moved onto the beach by land-based equipment. The total project cost was \$3.6 million, the majority of which was paid by the Town of Kiawah Island. Financial contributions to the project also came from the Kiawah Island Golf Resort, Kiawah Island Community Association, as well as the Kiawah Resort Association. The mitigation plan for the project required monitoring of habitat changes (including ground elevation surveys and aerial orthophotography) and periodic piping plover surveys of the project area through 2012.

2015 East End Beach Restoration Project

The eastern end of Kiawah Island experienced severe erosion during 2014-2015, mainly due the presence of a tidal inlet located parallel to the beach adjacent to the Ocean Course driving range. The Town applied for federal and state permits to close the tidal inlet, excavate a new inlet a half-mile to the east, and renourished portions of the eroded areas in May of 2014. The restoration took place in May of 2015 and moved 100,000 cubic yards of sand. Mitigation requirements for this project are similar to the 2006 project and involve macroinvertebrate monitoring, piping plover surveys, sea turtle nest monitoring, and aerial photography. The total cost of the project including follow up monitoring was \$1 million.

Baseline and Setback Lines

The South Carolina Office of Coastal Resource Management as required in the 1990 Beach Management Act establishes baseline and setback lines. No new development is allowed seaward of the setback line and existing structures located in these areas typically cannot be rebuilt if destroyed. The baseline is set at the "crest of the primary dune" for most areas. Setback lines are drawn 20 feet landward of the baseline for stable and accreting beaches. In erosional areas, the setback line is located landward of the baseline a distance equal to 40 times the annual long term erosion rate.

The baseline and setback lines for Kiawah Island were created in July 1991 and must be revised every 8-10 years. Kiawah's lines were revised in September 1999 and again in October 2009. At this time, there are no homes or structures seaward of the setback line.

Critical Habitat Areas

In October 2009, Town Council designated both ends of Kiawah's beach as critical habitat. The critical habitat designation prohibits pets from entering these areas at any time. Both areas provide vital habitat for a variety of shorebirds, including: piping plovers, Wilson's plovers, American oystercatchers, least terns, Black skimmers, and red



knots. An interactive map of these areas, including all beach pet restrictions, can be found on the following web page: <http://www.wildlifeatkiawah.com/dogleash.html>.

Maritime Forest Preservation

The extensive maritime forest and understory serve to enhance Kiawah's natural beauty and shelter a diversity of wildlife. As Island development progresses, careful attention and planning must be given to preserving and maintaining maritime forest, understory, and the quality of the Island's lakes and ponds. Data obtained from wildlife research and monitoring efforts should be used to help plan future developments to minimize impacts to native wildlife species.

Invasive Plant Control

Invasive exotic plants species can cause considerable damage to native ecosystems. On Kiawah Island, the Chinese Tallow Tree has emerged as a significant threat to freshwater wetland areas as well as other habitat types. The Town of Kiawah Island began a Tallow Tree Control Program in 2013. A contractor was hired to kill Tallow Trees in specific areas using herbicides. During 2013, 130 acres as well as all leisure trail and road right-of-ways were treated and an additional 240 acres were treated in 2014. Follow up treatments will be necessary in the future to prevent Tallow Trees from recolonizing these areas.



Wildlife Management on Kiawah Island

An extensive environmental inventory of Kiawah Island was conducted in 1975. This study examined all portions of Kiawah, "pre-development," and provides good baseline documentation for use in tracking changes as a result of development. Since 1990, there has been a committee of citizens and experts that has been at the forefront of managing and surveying the island's wildlife species. From 1990-1994, the Wildlife and Fisheries Committee had responsibility. In 1994, this responsibility was taken over by the Town's Wildlife Committee, renamed in 2003 to the Environmental Committee.

In September 2000, the Town hired a full-time wildlife biologist to oversee all wildlife management and research activities on the island. In addition, an assistant wildlife biologist position was created and filled in August 2008 to help with and expand existing wildlife research and monitoring efforts.



Surveys of wildlife abundance have been conducted since 1990, although most surveys were initiated in 1996. The Town, with support from the Kiawah Conservancy, has conducted five (5) major wildlife research projects to better understand the island's native wildlife species.

Wildlife Research on Kiawah

Deer Ecology Study (1996-1998)

This study was conducted as part of a Master of Science (MS) project at the University of Georgia (UGA). James D. Jordan working under Dr. Robert J. Warren at UGA conducted the project. The project was designed mainly to provide a baseline ecological assessment of deer and bobcat populations on the island.



Results and recommendations

- Deer are very abundant on Kiawah Island (100 deer per square mile)
- Deer-vehicle collision rates are high on Kiawah Island (50 or more per year)
- Bobcats serve as the primary natural predator on deer
- Bobcats are more abundant in undeveloped areas of Kiawah

Fertility Control Study (1999-2002)

This study was conducted by James D. Jordan working as a consultant for the Town of Kiawah Island, with support from Dr. Robert J. Warren at UGA. The project was designed to test the efficacy of a fertility control drug (prostaglandin) in controlling deer numbers within the central portion of Kiawah Island.

Results and recommendations

- Fertility control was effective initially and reduced fawn numbers by an average of 50% each year compared to the control area
- Fertility control is not feasible long term because deer quickly learn to avoid being treated
- Fertility control was not necessary based on increasing bobcat predation rates on deer fawns which provided a better, more natural control of rising deer numbers
- Future research should focus on bobcats and their role in controlling deer numbers



Bobcat Ecology Study (2000-2001)

This study was conducted as part of a Master of Science (MS) project at the University of Georgia (UGA). The project was conducted by John C. Griffin working under Dr. Robert J. Warren at UGA and James D. Jordan (Town of Kiawah Island biologist). The project was designed mainly to provide a more in depth look at the bobcat population on the island. Twelve bobcats were captured and fitted with very high frequency collars and tracked for 1 year to determine home range size and general habitat requirements.



Results and recommendations

- Bobcats in developed areas exhibited greater movements and higher mortality rates than bobcats in less developed areas
- Bobcats in developed areas had home ranges that were almost twice the size of bobcats in less developed areas
- Bobcats feed primarily on rodents but deer are an important component of their diet
- Future research should look at predation rates on deer fawns

Predator-Prey Ecology Study (2002-2005)

This study was conducted as part of a Doctorate project at the University of Georgia (UGA). The project was conducted by Shane B. Roberts working under Dr. Robert J. Warren at UGA and James D. Jordan (Town of Kiawah Island biologist). The project was designed to determine predation rates on deer fawns (2002-2005) and to replicate the 2000 Bobcat Ecology Study with the addition of gray foxes (2004-2005). A total of 124 fawns were fitted with very high frequency collars and monitored between 2002 and 2005. In addition, 16 bobcats and 5 gray foxes were fitted with very high frequency collars and monitored for 1 year.

Results and recommendations

- Bobcats are the most important predator of deer fawns on Kiawah, responsible for killing 70 of 124 fawns monitored during the study (56% predation rate)
- Bobcat population has low mortality rate
- Bobcat reproduction rate is high
- Gray fox population has a high mortality rate (40%)
- Future research should focus on maintaining bobcat numbers



Bobcat GPS Study (2007-2015)

Primarily the Town's wildlife staff conducted this study, with support from the Kiawah Conservancy. The project was designed primarily to determine fine-scale habitat use by bobcats on Kiawah using GPS collars. These collars provide much more accurate locations and allow Town biologists to collect many more locations than conventional very high frequency studies. A total of 64 bobcats (5 in 2007, 8 in 2008, 10 in 2009, 6 in 2010, 8 in 2011, 9 in 2012, 6 in 2013, 6 in 2014, and 6 in 2015) have been captured and fitted with GPS collars during this project. More than 75,000 individual locations have been obtained during this study. Data was also used to prepare a detailed Bobcat Management Plan for the island, which includes the designation of Important Bobcat Areas (IBA) and an action plan to protect and enhance these areas. This document was created in 2008 and updated in 2011 and 2014. The current version can be downloaded here: <http://www.wildlifeatkiawah.com/linked/2014bobcatmanagementplan.pdf>



Results and recommendations

- Bobcats spend the majority of daylight hours in patches of thick cover and do not move very often
- Daytime cover is critical for bobcats and this cover consists primarily of dense scrub-shrub habitat found primarily in the secondary dunes and along marsh edges
- Denning cover is very important for bobcats and bobcats typically seek larger, more secluded patches of undeveloped cover for denning
- Bobcats move throughout developed portions of the island during nighttime hours in search of food and often use road buffers and corridors for travel

Wildlife Population Monitoring

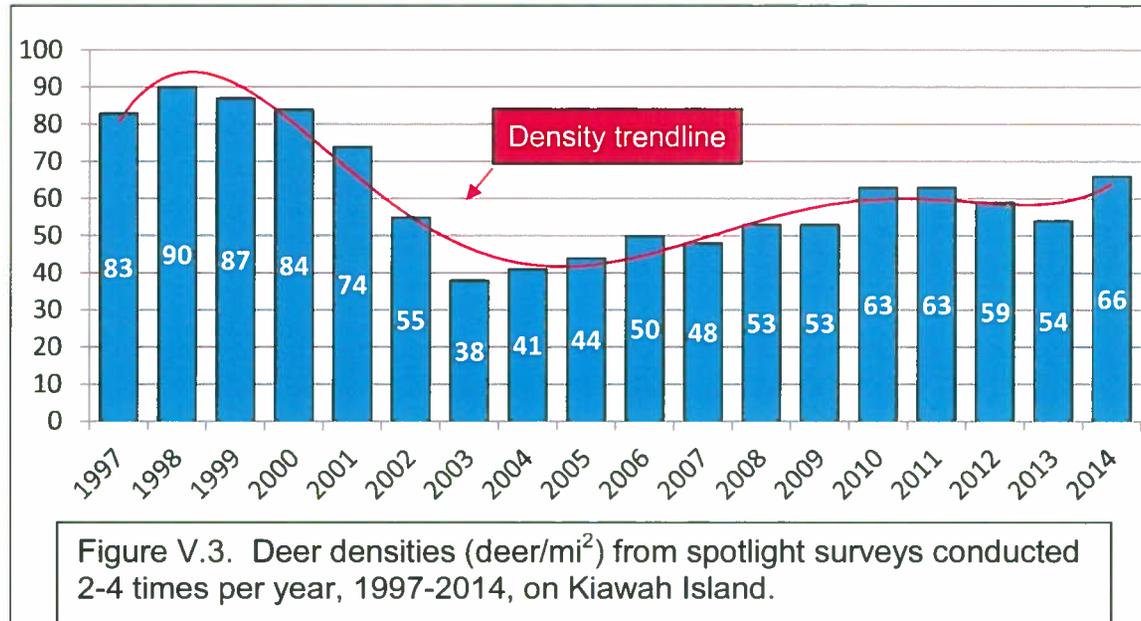
Town biologists conduct a variety of surveys to determine population size and health of many of the wildlife species that live on Kiawah Island. Many of these surveys are conducted in coordination with state and federal agencies as well as other island entities.

White-tailed Deer In 1975, deer were common on Kiawah Island although no detailed population estimates were obtained. Likely, deer were not as abundant pre-development since the habitat was not ideal. Activities associated with development, such as removal of trees and the creation of openings in the forest, allowed the growth of vegetation preferred by deer. This boosted the carrying capacity of the Island (i.e., the number of deer) that the Island could support.



In addition, fertilization and irrigation further increased the quality of the food sources available to deer. The current deer population estimate on Kiawah is 500.

Spotlight surveys were used beginning in 1990 to track changes in abundance of deer on Kiawah. Initial surveys estimated a deer population of 100/square mile. Island residents and volunteers conducted surveys until 1997, when the Town and UGA initiated their first wildlife project. Deer numbers were still stable at 100/square mile at this time, but research showed that deer-vehicle collisions were at very high levels (50 annually). In 1999, the Town initiated a 4-year study to investigate the efficacy of a fertility control drug in reducing deer numbers on the Island. The study was the first of its kind in the nation. It was discontinued in 2002 when the deer population and deer-vehicle incidents had been reduced to acceptable levels. It was concluded that the reduction in deer abundance (Figure V.3) occurred due to the combined effect of fertility control and natural predation by bobcats and alligators.





Bobcats

Bobcats were estimated to be “fairly common” in the 1975 study. The onset of development likely had a similar effect on bobcat numbers as it did on deer numbers, although in a delayed fashion. The creation of openings within the existing forest increased the amount of cover and food available for small mammals such as rabbits and rodents. As rabbit, rodent and deer populations increased, bobcat numbers likely increased as well to take advantage of these readily available food sources.

Bobcats play a vital role on Kiawah Island in helping to maintain the current deer population size. A Town/UGA study conducted during 2002-2005 determined that bobcats are capable of killing more than 50% of fawns produced in a given year. This reduces the number of deer that are added to the population each year and allows the island deer herd to remain stable. It is clear that bobcats are the primary reason why deer numbers continue to remain relatively low on Kiawah.

Bobcats typically do not respond well to development and are often pushed out of these types of areas. Kiawah’s bobcats are unique in that they have adapted quite well to development and are commonly seen throughout the island. This is due mainly to the large amount of cover that is still presently available on Kiawah, but is typically the limiting factor in other developed communities. Studies have shown that bobcats utilize all parts of Kiawah, but that they are more abundant on the less-developed eastern end of the island. Since bobcats in more developed areas have to travel further in order to find the food and cover that they need to survive, these areas cannot support as many bobcats. Since 2007, the Town, with support from the Kiawah Conservancy, has been conducting a Bobcat GPS study to provide more detailed data to aid in the preservation and protection of the island’s bobcat population. Town biologists have also developed a detailed Bobcat Management Plan for the island.

Gray Foxes

The 1975 study described gray foxes as “uncommon.” As with bobcats, the onset of development caused an increase in the number of prey species available to gray foxes, which likely led to an increase in fox numbers. Gray foxes play an important role in helping to control rodent populations. In recent years, the gray fox population has fluctuated dramatically. The fluctuation has primarily been caused by periodic outbreaks of canine distemper. Canine distemper is a common wildlife disease that is present in raccoon populations. It is nature’s way of controlling overabundant raccoon populations. In most areas, raccoon populations rarely achieve the high numbers required for a distemper outbreak to occur, but outbreaks have taken place on Kiawah. Although distemper is less





than 50% fatal to raccoons, it is almost 100% fatal to gray foxes. Gray fox numbers are currently very low on Kiawah.

Red Foxes

The 1975 study did not find any red foxes on Kiawah Island. The only confirmed red fox on Kiawah Island was captured during bobcat trapping efforts in January 2010. It is possible that red fox numbers may increase in the future and since they are not native to South Carolina it will be important to monitor any population increase and any resultant effects on our native wildlife.

Coyotes

The 1975 study did not find any coyotes on Kiawah Island. The first coyote confirmed in the vicinity of Kiawah Island was on January 9, 2008. This coyote was hit and killed by a car on the exterior Kiawah Island Parkway near Cassique. Coyote numbers have increased in recent years, peaking in 2013. Currently, numbers have stabilized and it is estimated there are 6-8 coyotes on the island. GPS collars have been placed on 2 coyotes (an adult female in 2013 and an adult male in 2014). Data from these 2 animals indicates that coyotes spend most their time in undeveloped portions of the island. There have been no negative encounters between coyotes and either humans or pets on Kiawah. It is important to continue to monitor coyote numbers, habitat use, and any effects on endemic wildlife species.



Raccoons

The 1975 study categorized raccoons as “abundant.” Raccoons are very adaptable animals and will live in very close proximity to people. They will readily consume trash, carrion, dog food, birdseed, and almost anything else they can find. Raccoon populations can quickly become overabundant in suburban areas since they do not have any natural predators. Overabundant raccoon populations can be a nuisance as they will readily enter homes, garages and attics in search of food or denning sites and, in doing so, can cause substantial damage to structures. They can also be very detrimental to loggerhead sea turtle nests and beachfront nesting birds. Nature’s way of controlling raccoons is canine distemper. The raccoon population on Kiawah has undergone fluctuations over the last few years, tied to distemper outbreaks, but is currently very high.

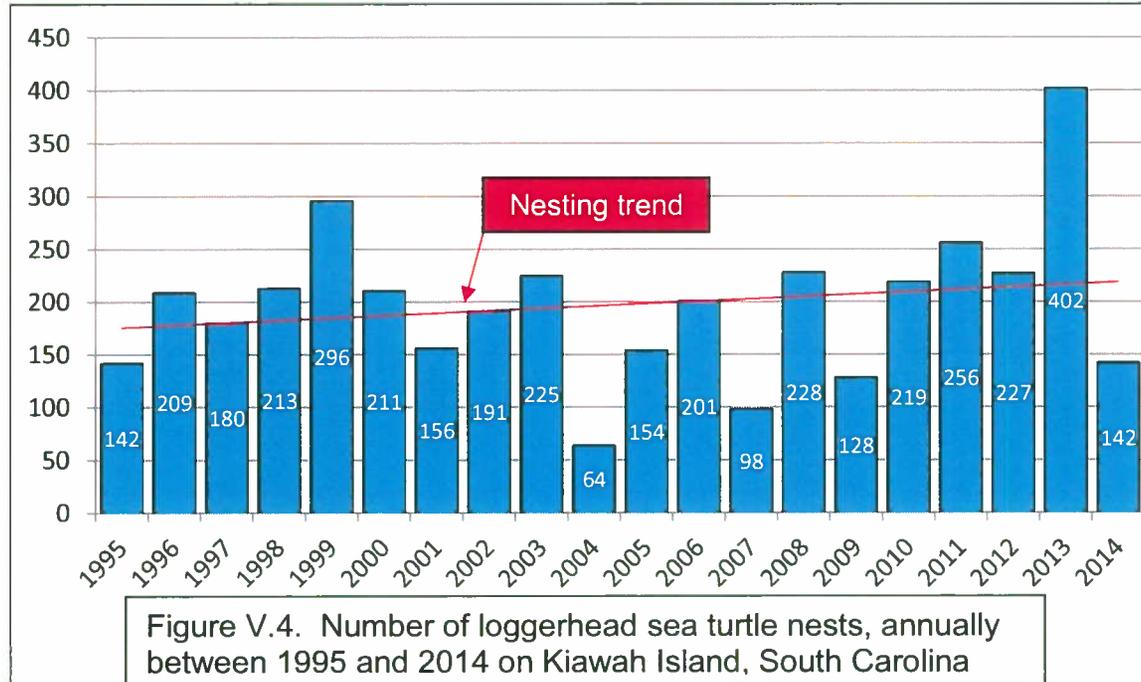
Loggerhead Sea Turtles

A program to protect the nests of loggerhead turtles on the beach of Kiawah Island has been in operation since 1973. In the early years, support came from the Kiawah Island Community Association and the Island’s developers, but since 1990



the Town of Kiawah Island has provided funding for the program. The program operates under a permit from the South Carolina Department of Natural Resources (SCDNR); all activities strictly conform to the guidelines set forth by that agency. The program is carried out entirely by volunteers from the community whose numbers have increased each year; approximately 150 property owners and regular visitors participated during 2014. The mission of the Turtle Patrol is fourfold: protection of the rookery, maintenance of records of activity, education of tourists and residents and the conduct of occasional research projects.

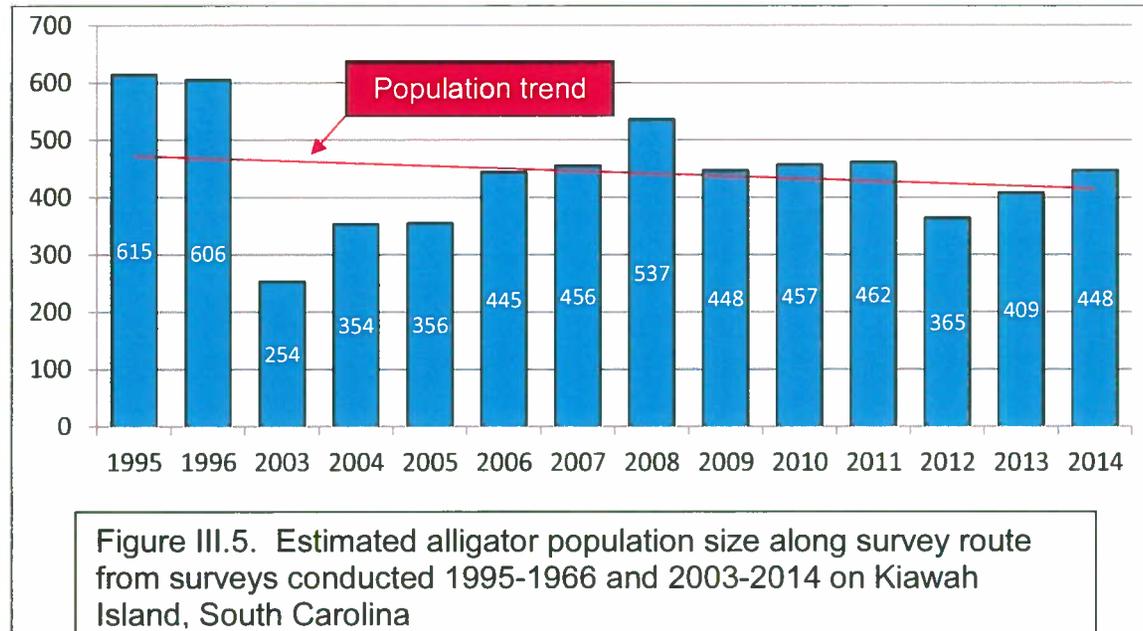
The activities related to protection of the rookery occur during the nesting phase (mid-May to mid-August) when the adult female turtles come ashore to lay nests along the edge of the dunes and the hatching phase when, after an incubation period of 55 to 60 days, the new hatchlings emerge from the nests and make their way to the surf. During both phases, the Patrol's objective is to protect the eggs and the hatchlings from harm by predators and loss due to beach erosion during storms and spring high tides. To this end, nests laid seaward of the expected high tide line are relocated landward on the first morning after being laid. A protective screen is used in some areas to protect nests from predation by raccoons and foxes. Nesting totals for the last 20 years can be found in Figure III.4





American alligators

Kiawah Island is home to a very healthy population of American alligators. Alligators can be seen in almost all of the 183 brackish and freshwater ponds which are interspersed throughout the island. Alligator numbers have been monitored annually since 2003 by Town biologists in conjunction with KICA Lakes Department staff. In addition, surveys were conducted in 1995 and 1996 by Lakes Department staff and SCDNR. (Figure V.5) In January of 2015, the Kiawah Conservancy announced the undertaking of an Alligator Study. This study will provide critical information on how these reptiles continue to adapt to rapidly changing environments along the southeastern coastal plain.





Town biologists are also responsible for responding to and removing aggressive alligators from the island under the state's Nuisance Alligator Program. These are alligators that have lost their fear of humans typically as a result of being fed by people. Biologists typically remove 2-4 alligators per year under this program.

Piping Plovers

Piping plovers are a federally endangered shorebird that uses Kiawah Island for feeding and resting during the fall, winter, and spring. Surveys have been conducted seasonally for plovers since 2006. These surveys were required as mitigation for the 2006 East End Beach Restoration Project and are also required as part the 2015 Beach Project. Piping plover numbers on Kiawah Island vary by season, peaking during the months of March and April as they migrate north to their breeding grounds.



Wilson's plovers



The Wilson's plover is listed as threatened in South Carolina and is declining in numbers because of coastal development, habitat destruction, and disturbance from beachgoers and their pets. Kiawah Island beaches are home to Wilson's plovers year-round but it is a particularly important area for nesting. For several years up to 2014, an independent researcher conducted research on Wilson's Plovers on the beaches around Charleston including Kiawah Island. He trapped plovers and placed a green flag (band) with a unique three-letter code on one leg. The coded flag allows the bird to be identified without it being captured again. The combination of banding and resighting data allows greater understanding of the habitat uses and needs, movements, and survivorship of Wilson's Plovers. In 2015, the Town continued this research and began flagging Wilson's Plovers at the west and east end of Kiawah Island. A priority should be placed on continued monitoring and banding efforts for Wilson's plovers in the future.



Red Knots

Red Knots were listed as a federally threatened species in 2014 based on a long-term population decline. Red knots have one of the longest migrations of any bird, traveling up to 9,300 miles from Tierra del Fuego in southern South America to its Arctic breeding grounds. Kiawah Island is an important stop-over site for large numbers of red knots during the spring so they can rest and refuel as they continue their journey north. Researchers have placed unique alpha-numeric flags on these birds to gather more information on migration patterns and survival. Town Biologists conduct periodic surveys for red knots on the island and report flag combinations to aid in this research. Because of the importance of Kiawah Island to migrating and wintering red knots, SCDNR and USFWS began a capture and banding program in 2010.



Bird Banding

Capturing birds and banding them with a unique identifier gives biologists insight into the health and demographics of Kiawah's bird population. Important information on the productivity, survivorship, and movements of many species can be attained through a banding program. The Town of Kiawah has initiated 4 major projects that use banding as the primary tool to study populations of different birds. These projects are discussed in detail below and additional banding information is available on the following web page: <http://www.wildlifeatkiawah.com/birdbanding.html>.

1. Fall Migration Banding

Banding is conducted each fall to monitor songbird populations during their migration. Kiawah Island provides important stop-over habitat that migrating birds rely on to rest and refuel before continuing their journey. During our pilot season in 2009, we banded at two sites - one on each end of the island (Captain Sam's Spit and Cougar Island). After evaluating our results, we decided that it would be more effective to concentrate our effort at Captain Sam's Spit, located on the west end of the island. Fall migration banding is currently conducted annually from August 15 to November 30. Between 20-25 mist nets are operated daily (weather permitting) beginning at sunrise and continuing for 5-6 hours. The table below provides detailed results from this effort.



	2009		2010	2011	2012	2013	2014	TOTAL
	Cougar	Captain Sam's						
# of Birds Banded	283	549	910	2263	4725	4529	5086	18345
# of Recaptures	27	85	157	289	885	1144	1312	3899
# of Species	39	41	54	66	89	82	78	115
Effort (net-hours)	258.0	537.0	1000.7	2409.8	7220.8	9566.6	11565.6	32558.5
Capture Rate (birds/100 net-hours)	120.2	118.1	106.6	105.9	77.7	59.3	55.3	68.3
# of Days	8	14	27	57	98	98	103	405

2. Winter Banding

Banding is conducted during the winter months to monitor wintering songbirds. A large population of Yellow-Rumped Warblers spends the winter on Kiawah Island which allows a unique opportunity to study many aspects of their wintering ecology. Winter banding is conducted annually at the west end of the island on Captain Sam's Spit. The nets are operated about twice a month from December to March. Data from this effort is presented in the table below.

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	TOTAL
# of Birds Banded	424	179	212	353	340	263	1771
# of Recaptures	32	68	65	195	141	83	584
# of Species	15	11	18	17	16	20	34
Effort (net-hours)	115.3	210.1	461.5	781.8	510.8	305.6	2385.1
Capture Rate (birds/100 net-hours)	395.7	117.6	60.0	70.1	91.4	113.2	98.7
# of Days	3	6	9	7	5	5	35



3. Marsh Sparrow Banding

Three species of coastal "marsh" sparrows winter in the salt marshes of Kiawah Island: Seaside Sparrow, Nelson's Sparrow, and Saltmarsh Sparrow. This group is considered species of high conservation concern due to their specialization of habitat that is considered spatially restricted. This group may be particularly vulnerable to sea-level rise and loss of saltmarsh habitat along their wintering grounds along the southeast United States. Sparrows are captured in mist nets at 10-12 sites around the saltmarshes of Kiawah Island. The nets are deployed to coincide with high tide which concentrates the sparrows into smaller patches of habitat. Each sparrow is identified to species, banded, and a series of morphological measurements are taken. The project began during the winter of 2011-2012 with the objectives of determining habitat requirements, site fidelity, relative abundance, and distribution of the species. The table below provides the number of birds banded each year by species (numbers in parenthesis indicate recaptures of previously banded birds).

	2011-2012	2012-2013	2013-2014	2014-2015	TOTAL
Seaside Sparrow	106	245 (107)	109 (118)	99 (111)	559 (336)
Nelson's Sparrow	115	39 (13)	10 (5)	50 (21)	214 (39)
Saltmarsh Sparrow	64 (1)	24 (28)	28 (10)	46 (30)	162 (69)
Other Species	23	15 (1)	9 (1)	24 (1)	71 (3)
TOTAL	308 (1)	323 (149)	156 (134)	219 (163)	1006 (447)
# of Sessions	21	23	16	24	84



4. Painted Bunting Banding

In 2011, we started intensely trapping and banding Painted Buntings for a long-term project studying their movements, distribution, and site fidelity. The eastern population of Painted Buntings has shown steady, long-term declines over the past several decades. Much of these declines can be attributed to the loss of coastal habitat for development. Painted Buntings readily come to feeders offering white millet and the birds are easily captured in a specially designed cage with a feeder placed inside. Banding occurs from May-August at Kiawah Island resident's homes. The table below provides the number of birds banded each year by species (numbers in parenthesis indicate recaptures of previously banded birds).

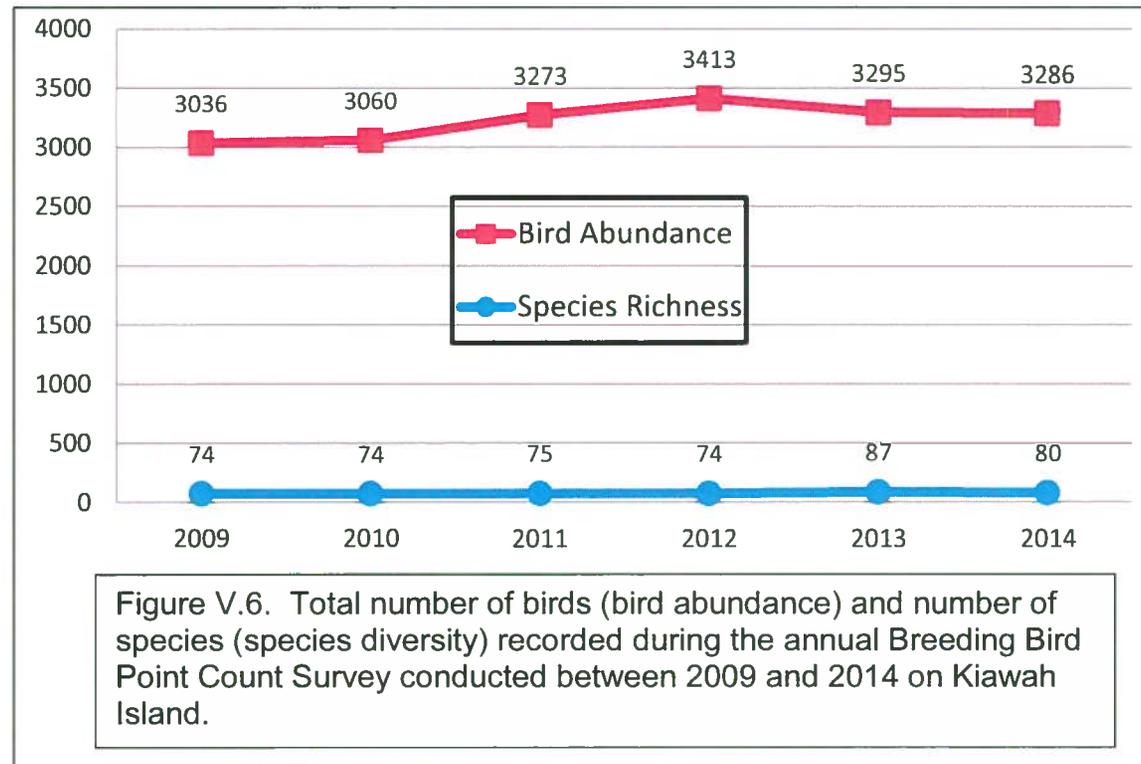


	2011	2012	2013	2014	TOTAL
Painted Bunting	122 (22)	156 (52)	20 (23)	110 (73)	408 (170)
Other Species	115 (1)	71 (1)	24 (1)	47 (1)	257 (4)
TOTAL	237 (23)	227 (53)	44 (24)	157 (74)	665 (174)
# of Sessions	19	32	8	20	79

Breeding Bird Point Counts

Point count surveys are conducted annually during late spring (end of May) to inventory and monitor breeding birds on Kiawah Island. The points are located across the island from Captain Sam's Spit to Little Bear Island in all major upland cover types. For logistical convenience, a majority of the points are located on secondary and tertiary roads and trails; however in areas where roads or trails are not present, points are located off-road. The minimum distance between point-count stations is 250 meters in order to reduce the possibility of recording the same bird twice. All individuals heard or

seen within a 5-minute period are recorded. Birds flying over the area are recorded separately from all other birds. The point count survey is divided into 9 separate routes with each route consisting of 15-34 points. One route is conducted per day during the count period with each route beginning at sunrise and ending no later than 11:00am. Each route is conducted in the same order and during the same time period each year. Figure V.6 provides the results of this survey.



North American Breeding Bird Survey

The annual North American Breeding Bird Survey headed up by the United States Geological Survey (USGS) has been conducted on Kiawah Island since 1998. The survey consists of 50 stops during which all birds seen or heard during a 3-minute period are recorded. Data from this survey is submitted to USGS and is used to monitor trends and changes in bird populations at a landscape level. Results are available in Figure III.7 on the next page

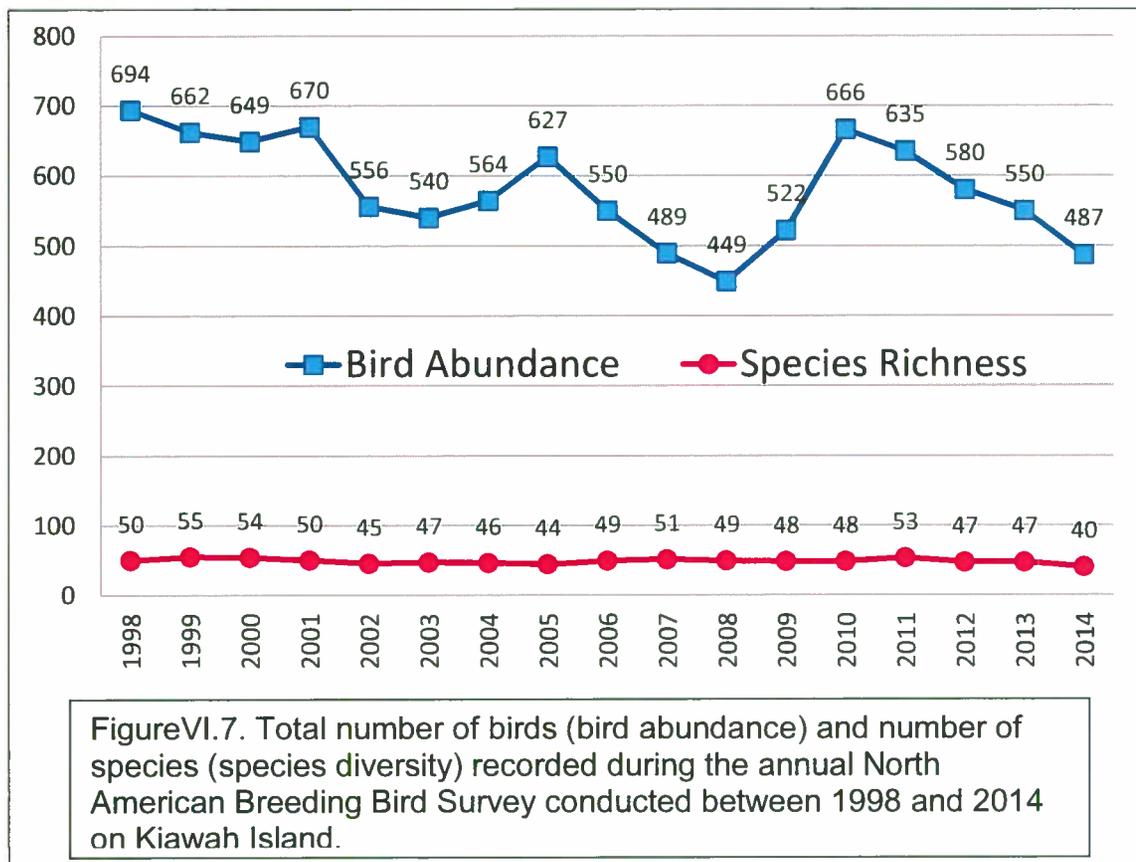
Nest Box Monitoring Program

In 2011, the Town took over managing the Kiawah Island Nest Box Monitoring Program from the Kiawah Island Naturalist Group who had been managing the program since its inception in 1997. A dedicated group of volunteers monitors a series of nest boxes on the grounds all five golf courses, Night Heron Park, the Sanctuary, and the Preserve. The boxes



provide an artificial nesting cavity for bluebirds and other cavity nesting birds. The boxes are primarily occupied by Eastern Bluebirds and Carolina Chickadees, although Tufted Titmice and Carolina Wrens will occasionally use them as

well. Approximately 216 boxes are monitored once per week from March through August by the volunteers. Data collected at the nest includes: species, date, number of eggs laid, number of young hatched, and number of young fledged. Data resulting from this program is used to track the status and trends in the reproductive biology of the birds using the nest boxes. During 2013, these nest boxes produced 459 Eastern Bluebird fledglings, 234 Carolina Chickadees, and 8 Carolina Wrens. Figure V.7 below depicts this information.





Beach bird nest monitoring

Least terns, Wilson's plovers, American oystercatchers, and Black skimmers typically nest along Kiawah's beachfront. Town Biologists monitoring nesting colonies of birds and initiate nest monitoring and protection efforts as necessary.

Least terns, a threatened species in South Carolina, nested regularly on Kiawah Island from the 1970's through the early 1990's but then disappeared. In 2006, least terns returned to Kiawah Island with a small nesting colony on the east end of the island. Unfortunately the colony failed when all nests were overwashed but they have continued to nest with varying degrees of success each year since 2006.

Nesting areas are closed to all traffic (people and dogs) during the nesting season (April-September). It is vitally important that these birds are given the best possible chance to successfully raise young.

Bald Eagle Nesting

An eagle nest was initiated on Kiawah Island in 2000 and successfully produced eaglets during 2002 and 2003. This was the first eagle nest recorded on Kiawah in over 20 years. This nest was destroyed during a hurricane in 2004 and subsequently relocated to a group of hammock islands located in the marsh near the Cassique golf course. The nest is no longer within the municipal limits of the Town of Kiawah Island. During 2014-2015, there were 2 active eagle nests on Kiawah Island. One nest was located adjacent to the Kiawah Island Parkway near the first Fire Station and the second nest was located on a hammock island north of Willet Pond.

Education and Public Outreach

TOKI Wildlife Website

A new standalone wildlife website was created by Town biologists in August 2009 (www.wildlifeatkiawah.com). The website contains a wealth of information on Kiawah's wildlife inhabitants, including videos and slideshows. There are also interactive maps showing all of the GPS locations for bobcats between 2009 and 2015, the best places to view wildlife, beach bird nesting areas, dog-leash restrictions, and much more. Use of the website has remained high since inception and averages approximately 2,500 visits per month. Visits to the site are highest during the summer months. The table below shows the top 10 pages visited during June and July 2014 and the number of visits during that same time period



Rank	Page Name	Visits
1	Home	2,990
2	American Alligator	1,428
3	Where to see wildlife	1,050
4	Fish	767
5	Meet our Wildlife	717
6	Fishing Location Map	577
7	2014 Bobcats	565
8	Loggerhead Turtles	561
9	Pet Restrictions Map	487
10	Bobcat GPS Research	442

Bird Banding Blog

A blog (<http://kiawahislandbanding.blogspot.com>) was created in 2012 to provide daily updates on bird banding activities on Kiawah Island. This is a popular site and, as of April 2015, has been visited 53,123 times.

Conservation on Kiawah Island

Kiawah Conservancy

The Kiawah Conservancy is a chartered non-profit, Section 501(c)(3), grassroots organization that was established by Island residents in 1997, to preserve the natural habitat of Kiawah Island. The Conservancy has the capability to be a holder of land and conservation easements, and as such, it acts as a land trust. In this regard, the Kiawah Conservancy is a member of the Land Trust Alliance and has adopted and subscribes to the Land Trust Standards and Practices as a guide for its organization and operations. Since its inception in 1997, the Kiawah Conservancy has preserved 28 properties that total over 345 acres of pristine barrier island habitat. The Kiawah Conservancy benefits the community by enhancing the quality of life of residents and wildlife alike; fostering a long-term vision for land and habitat protection; providing a credible voice for land conservation on Kiawah Island; encouraging the preservation of natural habitat for native and migrating wildlife species and finally by making a positive impact on the socio-economic aspects of life for everyone in the area.



Publications

Brochures

Up until 2012, The Town of Kiawah Island Environmental Committee produced 12 different wildlife brochures that were made available free of charge to the public at the Nature Center at Night Heron Park and at the Town Hall Visitors Center. The list of brochures is as follows: American alligator, Bird Life, Birds of Prey, Bobcat, Crabs, Lakes and Ponds, Loggerhead turtles, other mammals, Seashore and river, Shorebirds, Snakes, and White-tailed deer. The brochures are no longer printed for distribution but are available for download on the TOKI wildlife website. <http://www.wildlifeatkiawah.com/brochures.html>

The Nature of Kiawah Field Guide

This booklet was created in 2012 to provide a single publication provided all of the information contained in the brochures mentioned above, as well as a variety of additional information and details on island wildlife. This guide is available at Town Hall and at the Nature Center at Night Heron Park. It can also be downloaded from the TOKI wildlife website. <http://www.wildlifeatkiawah.com/linked/naturekiawah.pdf>

Parks and Recreation

Kiawah Island has more than ten miles of beach, a 20 mile leisure trail system maintained by KICA, two miles maintained by the Town, five championship golf courses, an extensive open space and trail system, and many parks. The beaches, parks, golf courses and open spaces are key attractions for this community. They meet important community needs for recreation and preserve natural areas.

Kiawah has an extensive pond system (owned and maintained by KICA) which is an important component of the Island's ecology. The pond system includes 117 ponds that encompass approximately 365 acres of water surface. These water bodies range from nearly fresh (>0.5 ppt) in the center of the Island to close to sea strength (30 ppt) on the edges of the Island. The system supports at least 30 species of fish, 3 species of bivalves, 6 species of crustaceans, 4 species of reptiles, and a host of smaller invertebrates. It also supports numerous avian species and is an important asset for migratory waterfowl.

Since 1994, there have been significant park and recreation facility additions. A private golf course and clubhouse (the Kiawah Island Club) was built at Bass Pond. In The Preserve at Cinder Creek, a park with trails, community pavilion, boat and crabbing docks, canoe storage and observation deck were added. In addition, a boat ramp with boat trailer parking was added at Eagle Point on the eastern end of The Preserve. Community piers were added at Egret Pond, Falcon Point



Road and Salt Cedar Lane. A park with amenities was recently added at Ocean Park (Cougar Island). Also, most of Little Bear Island (145 acres of the 193 acres) is accessible for passive recreation and is protected by a conservation easement.

The table below lists the existing park sites on Kiawah Island. Park sites are those which provide for a variety of passive recreational activities, from nature observation to field sports. The numbers coincide with the numbers shown on Map V.1 entitled, "Kiawah Island Parks, Trails, and Open Space System."

- Beach (1)
- Beachwalker Park (2)
- Canvasback Minipark (3)
- Ocean Park (4)
- Cougar Point Golf (5)
- East Beach Conference Center (6)
- East Beach Tennis (7)
- Falcon Point (8)
- Glossy Ibis Minipark (9)
- Ibis Pond (10)
- Beach Club (private) (11)
- Bass Pond (12)
- Little Bear Island (13)
- Marsh Island Park (14)
- Marsh View Tower Overlook (15)
- Mingo Point (16)
- Night Heron Park (17)
- Ocean Course Golf (18)
- Ocean Marsh Road Beach Parking (19)
- Ocean Oaks (Beach Parking Lot) (21)
- Osprey Point Golf (22)
- Property Owner's Recreation Center (23)
- Rhett's Bluff (24)
- The Preserve (25)



Turtle Point Golf (26)
West Beach Tennis (27)
Willet Pond (28)
River Course Golf – (Private) (29)

Amenities available at the recreational sites listed above include benches, bike rental, deck areas, boat docks, picnic areas, pools, river access, and fitness and leisure trails.

The management of dock placement is an important issue for the Town. The Town adopted the Dock Key Locations Ordinance 2003-5. The purpose of this ordinance is to control location and installation of all docks, floating and fixed so as to prevent their uncontrolled proliferation along the Island's river and stream frontage. The ordinance includes dock design criteria as well as tables and a map depicting where on the Island docks are permissible, by type.

Needs Assessments:

- As the Town is developed, an increasing amount of the Island's natural habitat is taken away; and
- Development also removes the connectivity between natural habitats, putting stress on the Island's wildlife to find alternate routes to move around the Island; and
- Continued monitoring and research of native wildlife species and their response to development will be vital to protecting these species; and
- Research and monitoring data should be taken into account when planning new developments or other projects; and
- Encourage property owners and island entities to eliminate existing invasive plant species and discourage future use of these plants; and
- As one of the Island's key natural resources, the beach and dunes must be maintained and protected.



Goals

The following goals related to the Island's natural resources shall be considered when evaluating proposals for change:

- 1. Complete the Island's development in a way that maintains the Island's environmental integrity and natural beauty and is consistent with the Vision of the Town.**
- 2. Develop and maintain an environmentally sustainable system of parks and open spaces which provide access to the beach and river; preserves, protects and enhances natural resources; and meets the diverse recreational needs of the Town's population.**
- 3. Maintain the existing quality of the natural resources on Kiawah Island, as well as the waters and marine environment surrounding the Island.**
- 4. Maintain and expand public education and outreach programs.**



Natural Resources Element

Goals:

To help the Town further realize its Vision, the following goals should be considered when evaluating proposals for change:

1. Complete the Island’s development in a way that maintains the Island’s environmental integrity and natural beauty and is consistent with the Vision of the Town.

	Implementation Strategy	Responsibility	Time Frame
a.	Utilize site design and construction standards, methods, and practices to minimize natural area disturbance resulting from building design, location and construction. Standards in the ARB Building and Landscaping Guidelines, “Designing with Nature” should be used as a guide.	Town Council, Planning Commission	Ongoing
b.	Provide for or create open spaces, including undisturbed spaces, natural habitat areas, and access thereto throughout the Town (open space is intended to protect the natural and visual character of the community, provide for appropriate active and passive recreational uses and preserve corridors for wildlife travel between larger open space areas).	Town Council, Planning Commission	Ongoing

2. Develop and maintain an environmentally sustainable system of parks and open spaces which provide access to the beach and river; preserves, protects and enhances natural resources; and meets the diverse recreational needs of the Town’s population.

	Implementation Strategy	Responsibility	Time Frame
a.	Maintain existing programs to monitor and protect natural resources, wildlife species and habitat and expand these programs to include all groups of species on the island.	Town Wildlife Department, Environmental Committee	Ongoing



b.	Support and encourage research on wildlife and natural resources by outside entities, such as colleges and universities, to expand our knowledge and understanding of the natural systems on the island.	Town Wildlife Department, Environmental Committee	Ongoing
c.	Conduct aerial orthophotography of the island every 3 years to monitor changes to the beach and dunes, interior habitat areas, and ongoing development.	Town Wildlife Department, Environmental Committee	Every 3 years
d.	Improve access to the beach, Kiawah River and other open space areas by allowing for parking near key access points.	Environmental Committee	Ongoing

3. Maintain the existing quality of the natural resources on Kiawah Island, as well as the waters and marine environment surrounding the Island.

	Implementation Strategy	Responsibility	Time Frame
a.	Minimize disturbances to or impact on the Island’s natural resources and unique natural setting.	Environmental Committee	Ongoing
b.	Discourage land uses that are threatening to wildlife and wildlife habitats.	Environmental Committee	Ongoing
c.	Protect natural habitats and corridors essential for the health and integrity of native plant and wildlife populations. Control invasive species.	Town Wildlife Department, Environmental Committee	Ongoing
d.	Recognize that native vegetation should be protected and used to protect and stabilize lagoons and stream banks.	Environmental Committee	Ongoing



4. Maintain and expand public education and outreach programs.

	Implementation Strategy	Responsibility	Time Frame
a.	Maintain and expand existing wildlife website	Town Wildlife Department, Environmental Committee	Ongoing
b.	Continue to produce wildlife nature guide and other pertinent publications and distribute to residents and visitors.	Town Wildlife Department, Environmental Committee	Ongoing
c.	Maintain wildlife interpretive signs and update as necessary.	Town Wildlife Department, Environmental Committee	Ongoing
d.	Continue and expand public outreach programs, including presentations and school group field trips.	Town Wildlife Department, Environmental Committee	Ongoing

Cultural Resource Element

Goals

To help the Town further realize its Vision, the following goals should be considered when evaluating proposals for change.

1. Encourage the development of programs and services that improve the delivery of cultural activities to all of Kiawah Island and its visitors.

	Implementation Strategy	Responsibility	Time Frame
a.	Support the Town Arts and Cultural Events Council which is chartered to	Town Council	Ongoing