# SANDHILL LAKES MITIGATION BANK
# (FITZHUGH CARTER TRACT)
# OF
# ECONFINA CREEK WILDLIFE MANAGEMENT AREA

# ANNUAL REPORT 2011-2012

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# INTRODUCTION

The Sand Hill Lakes Mitigation Bank property (referred to hereafter as the Carter Tract) is a 2,155-acre parcel located in south-central Washington County, approximately five miles north of State Road 20 and one mile west of State Road 77. The Carter Tract was purchased by the Northwest Florida Water Management District (NWFWMD) in October 2003, and established by the Florida Fish and Wildlife Conservation Commission (FWC) as a tract of the Econfina Creek Wildlife Management Area (WMA). A mitigation bank permit from the Florida Department of Environmental Protection (DEP) was issued to the NWFWMD in August 2005 to manage the property. Management objectives identified by the NWFWMD include wetlands restoration, preservation, and management; aquatic habitat preservation; erosion control; and uplands restoration and management. In June 2005, FWC entered into a cost-share agreement with the NWFWMD to develop and implement a comprehensive fisheries and wildlife management program for the Carter Tract. Following six years of successful partnership, in April 2011 this agreement was renewed for an additional three years through 2014.

# HABITAT

***Ecological and Land Cover Classification***

The Carter Tract harbors several distinct ecological communities. A significant portion of the property is upland sandhill habitat (approx. 1,150 acres), which was historically logged for longleaf pine (*Pinus palustris*) and re-planted in pine plantation or left to regenerate with pine (*Pinus* spp.), live oak (*Quercus virginiana*), and scrub oaks (*Quercus* spp.). Interspersed within the uplands are approximately 850 acres of mesic and hydric habitats comprised of Swamp Lakes, Basin Swamps and Marshes, Seepage Streams, isolated Depression Marshes, Mesic Flatwoods, Baygalls, Wet Prairie, and Seepage Slopes. The remaining 150 acres are natural Sinkholes and Sinkhole lakes (isolated, steep-sided karst ponds and shallow, gently-sloping lakes).

Historic communities have been degraded by timber operations and suppression of natural fire regimes. Restoration efforts by NWFWMD, including mechanical reduction/herbicide application of hardwoods and sand pines (*Pinus clausa*; Figure 1), native groundcover plantings,

and prescribed burning continued at the Carter Tract during 2011-12. These restoration activities transitioned land cover classifications closer to their targeted goals.

**Figure 1. Before (left) and after (right) photographs illustrating sand pine eradication results during April 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

***Water Levels***

Water levels on Carter Tract ponds and creeks have historically fluctuated in cycles lasting several years. Water gauges were installed on the Carter Tract by NWFWMD in 2005, and readings were recorded monthly by FWC field staff beginning in January 2006. Following large rain events that filled up once-dry area ponds during spring 2009, water levels on all area ponds remained constant or increased until drought conditions returned in mid-April 2011 (Figure 2). By June 2011, Green Pond 1 was closed to fishing due to low water levels, with Green Ponds 2 and 3 closed shortly thereafter. Accordingly, FWC staff were unable to conduct electrofishing surveys on Green Ponds in Fall 2011 and Spring 2012.

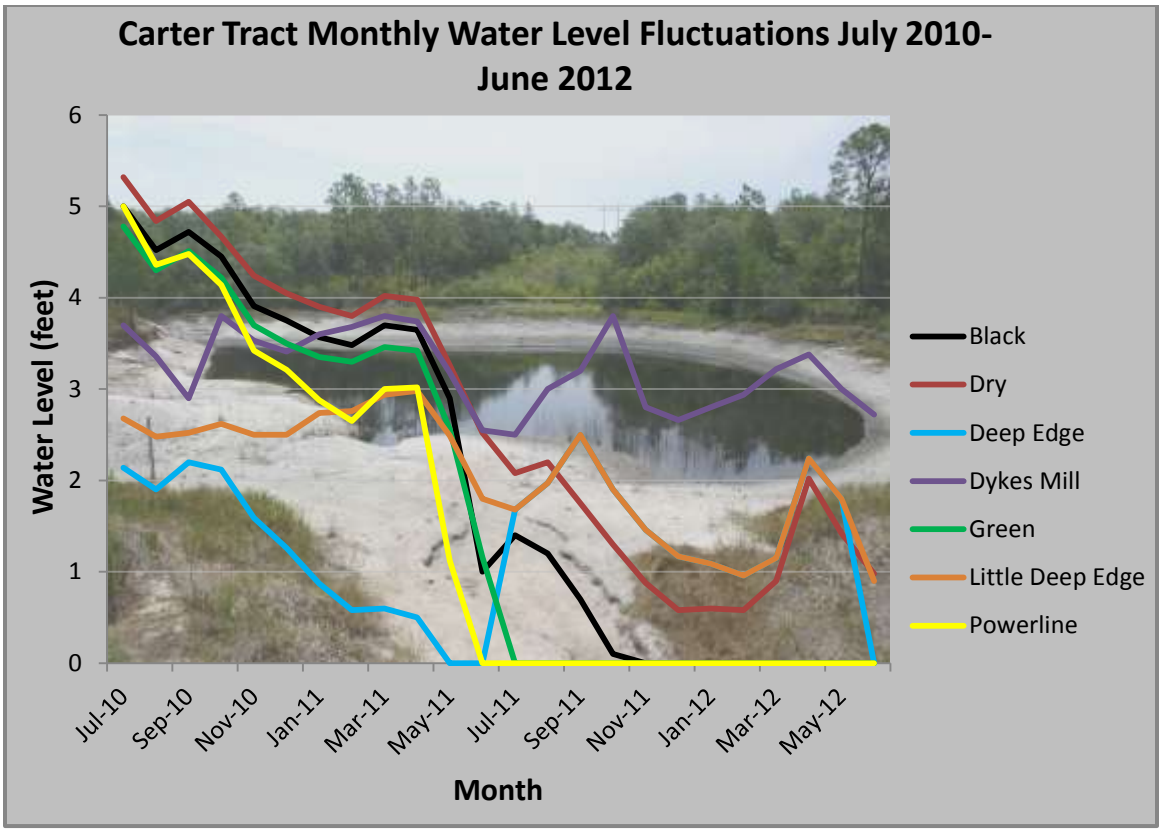


**Figure 2. Monthly fluctuations in water levels from July 2010-June 2012 on major water bodies located at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

***Photo Plots***

In an effort to visually document the progression of natural areas over time, annual photographs were taken at established locations (plots), facing predetermined azimuth bearings. Sixty-three photo plots on the Carter Tract document natural community responses to restoration efforts such as prescribed burning and tree removal, as well as natural events (i.e. drought conditions; Figure 3). Infrastructure maintenance and improvements such as road-grading, bridge construction, and facility enhancements are also documented. Photo plot photographs will continue to be taken annually, documenting all habitat types, water bodies, and infrastructure on the area.

**Figure 3. Photo plot pictures help to document natural water level fluctuations such as these between May 2011 (left) and April 2012 (right) at Powerline Pond.**

# FISH AND WILDLIFE POPULATIONS

Working in cooperation with the NWFWMD, the responsibilities of FWC-Division of Habitat and Species Conservation on the Carter Tract are to conduct fish and wildlife population surveys/assessments, collect/analyze biological data, evaluate results, administer public fishing and hunting programs, provide recommendations for adjustments in harvest designed to optimize fish and wildlife populations, and oversee other fish- and wildlife-based recreational opportunities. The following are monitoring and management programs developed to address targeted species and public opportunities. Appendix I presents the 2011-12 Fitzhugh Carter Tract Hunting and Fishing Regulations Summary and Area Map. Appendix II presents the FWC Annual Work Plan and Accomplishment Report for July 1, 2011 – June 30, 2012.

# FRESHWATER FISH

***Fish Population Assessment***

Given adequate water levels, fish population assessments are conducted twice a year during spring and fall. From fall 2005 – fall 2009 Wegener rings were used to conduct baitfish surveys for gauging recruitment and prey base status (Wegener et al., 1974). However, fyke nets (Hubert, 1996) were implemented in 2010 as the preferred method for surveying baitfish populations and young-of-year (YOY) sportfish recruitment after proving to be a more efficient and productive method of capturing target fish species. Therefore, fyke nets were again used

during fall 2011 and spring 2012. Electrofishing also continued during fall 2010 and spring 2011 on Black and Dry Ponds to assess mature sportfish populations, measuring catch-per-unit-effort (CPUE). As mentioned, low water levels as a result of drought conditions began in late summer 2011 and precluded electrofishing in Green Ponds during fall 2011 and spring 2012. Baitfish and sportfish surveys will continue to be coducted biannually on water bodies with adequate water levels.

***Fyke Nets***

Fyke nets were used in October 2011 and April 2012 to measure baitfish abundance and YOY sportfish recruitment. Fyke nets were 24-inches square, made of 1/8-inch mesh with two-inch wide throat plates and a two-inch diameter funnel ring. The lead line was 15-feet in length, with lead weights and floats spaced every three- and 12-inches on the bottom and top, respectively (Figure 4). When possible, fyke nets are set at the same locations during spring and fall each year. However, low water conditions often require adjustment of net locations (Figure 5).

**Figure 4. Fyke net used to sample percent species occurrence in Black, Dry, and Green Ponds on the Carter Tract of Econfina Creek WMA, Washington County, Florida, April 2012.**

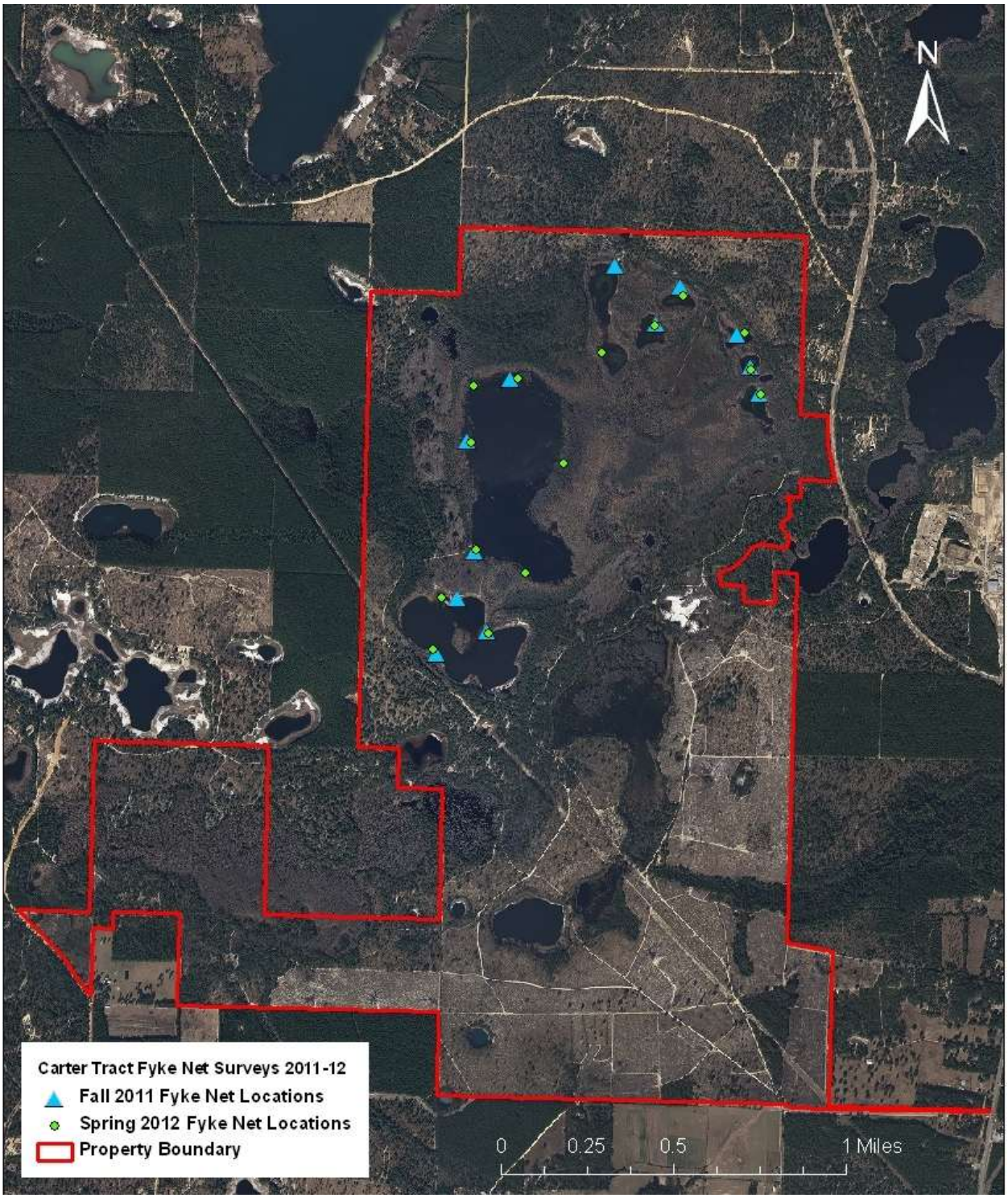


**Figure 5. Fyke net locations used during October 2011 and April 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Average percent occurrence of each species was calculated for each pond per season; these data are illustrated graphically in Figures 6 and 7 and tables with specific values can be found in Appendix III. On average across all ponds, during fall 2011 and spring 2012 the dollar sunfish (*Lepomis marginatus*), eastern starhead topminnow (*Fundulus escambiae*), and mosquitofish (*Gambusia affinis*) were the most abundant baitfish. For YOY sportfish, bluegill (*Lepomis macrochirus*) was the most sampled species during both fall 2011 and spring 2012 surveys. Warmouth (*Lepomis gulosus*) was the second most abundant sportfish during the fall 2011 sample while largemouth bass (*Micropterus salmoides*) was the second most abundant during spring 2012. It was again encouraging to see YOY largemouth bass captured from Black, Dry, and Green Pond 3 during spring 2012. The number of YOY largemouth bass recorded from all ponds during spring 2012 (n=43) was greater compared to spring 2011 (n=34). We hope to see this trend continue over the years as area-specific regulations designed to harvest larger (≥8 inches) predatory bluegill while prohibiting the take of largemouth bass bolsters the largemouth bass population and provides better fishing opportunities for this popular sportfish.

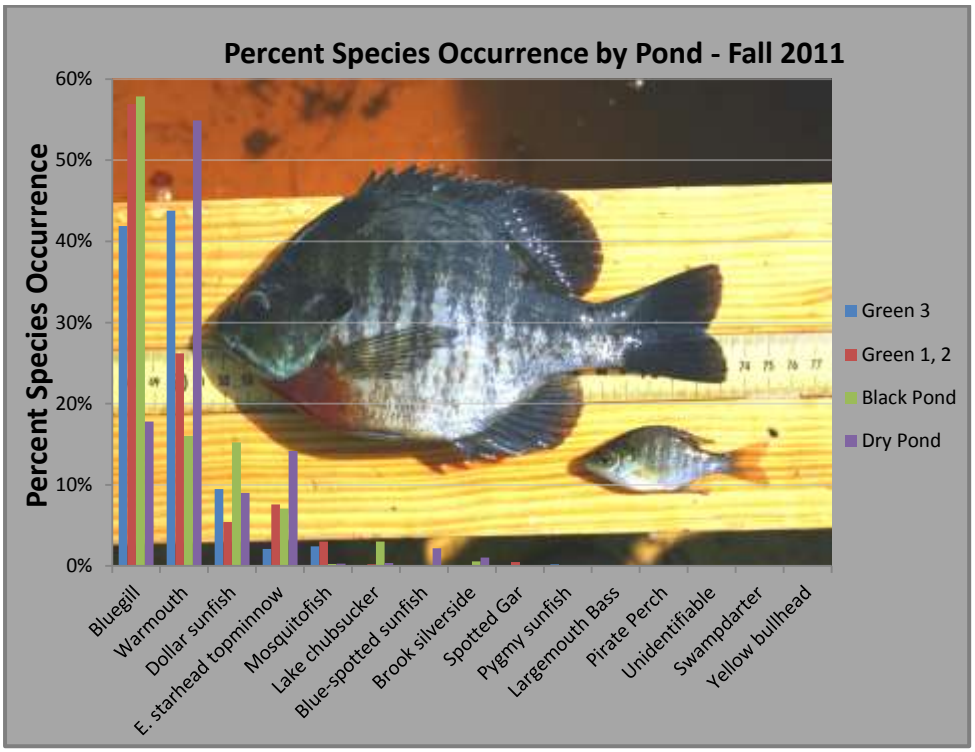


**Figure 6. Percent species occurrence measured during October 2011 using fyke nets on Black, Dry, and Green Ponds at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

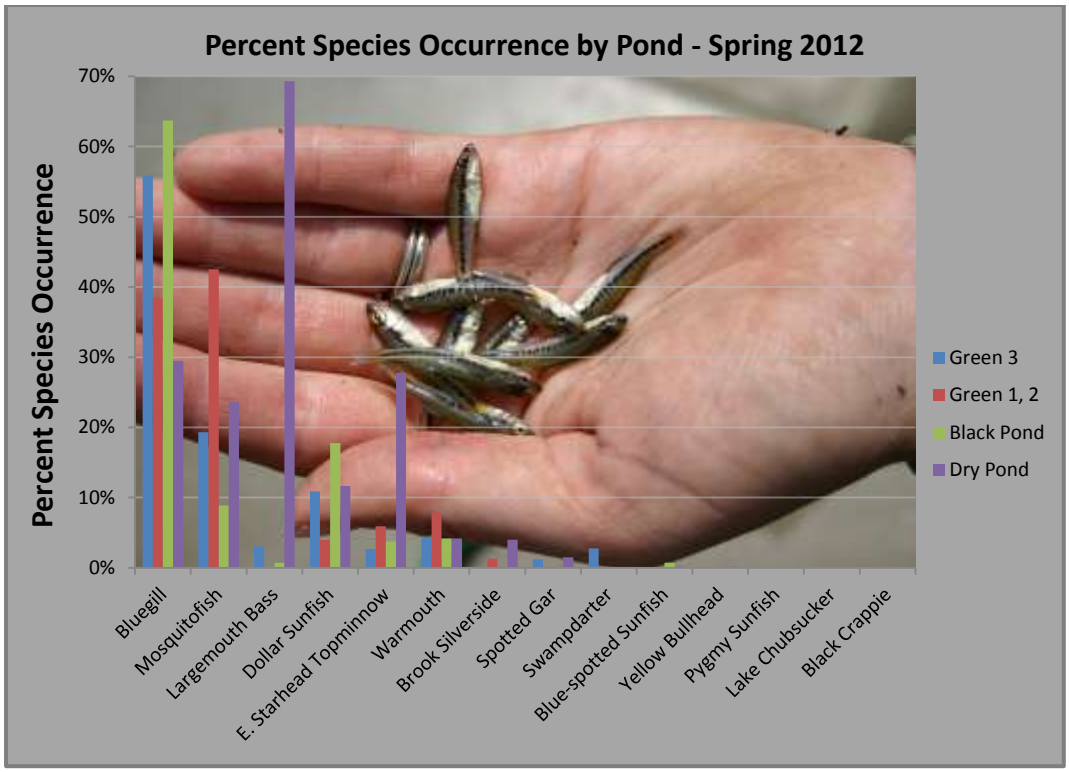


**Figure 7. Percent species occurrence measured during April 2012 using fyke nets on Black, Dry, and Green Ponds at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

It should be noted that during the spring 2012 sampling effort on Dry Pond one fyke net captured two large greater sirens (*Siren lacertina*) and one large two-toed aphiuma (*Amphiuma means*). Another fyke net set on Dry Pond was found with several large holes ripped in it. We determined that this fyke net was predated and damaged by an alligator. We believe a large portion of the captured fish in these fyke nets were either consumed or escaped. Given that these unforseeable trapping events and the resulting unrepresentative capture numbers might skew capture data, we set three additional nets on Dry Pond for a total of six sample points.

***Electrofishing***

Sportfish abundance on Black and Dry Ponds was measured during October 2011 and April 2012. Green Pond 3 was unable to be shocked during both the fall and spring sampling efforts due to extreme low water conditions which precluded access by shocking boat. An 18-foot aluminum vessel with Smith-Root® generator-powered pulsator electrofisher and two six-foot shocking booms was deployed. Direct current power settings were 120 pulses per second and 680 volts; average amperage generated was between 1-2 amps. Two dippers using ½-inch mesh dipping nets captured, measured, and weighed all affected fish (Figure 8). Sportfish abundance for each pond was calculated as catch-per-unit-effort (CPUE), or the number of fish sampled per minute. A breakdown of the CPUE for each species captured per pond during fall 2011 and spring 2012 is presented in Appendix IV. Graphs illustrating sportfish abundance trends from 2005 – 2012 for each pond sampled are presented in Figures 9 and 10 (note that not all seasons were sampled for each pond each year due to water level restrictions).

**Figure 8. Electrofishing was conducted on Black and Dry Ponds in October 2011 and April 2012 to sample sportfish populations at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Bluegill remained the most abundant sportfish in Black Pond during both the fall 2011 and spring 2012 samples, which is consistent with historical shocking data on this water body (Figure 9). For Dry Pond, warmouth was the most abundant sportfish captured during fall 2011 while bluegill was the most abundant during spring 2012 (Figure 10). The number of largemouth bass captured in both ponds during fall 2011 and spring 2012 was higher than the previous year during both seasons. This is encouraging to see and follows fyke net capture trends outlined earlier which have shown an increase in YOY largemouth bass capture rates over the last couple of years. These data preliminarily support the assumption that size/bag limits that encourage the harvest of large (≥8 inches) predatory bluegill and restrict the harvest of all largemouth bass may be helping to bolster largemouth bass recruitment and will ultimately help balance out the bluegill/largemouth bass population. While several subsequent years of additional sampling are needed to confirm this assumption, current trends suggest that largemouth bass numbers have increased. Electrofishing on Black, Dry, and Green Ponds will continue to take place biannually (spring and fall) given adequate water levels.

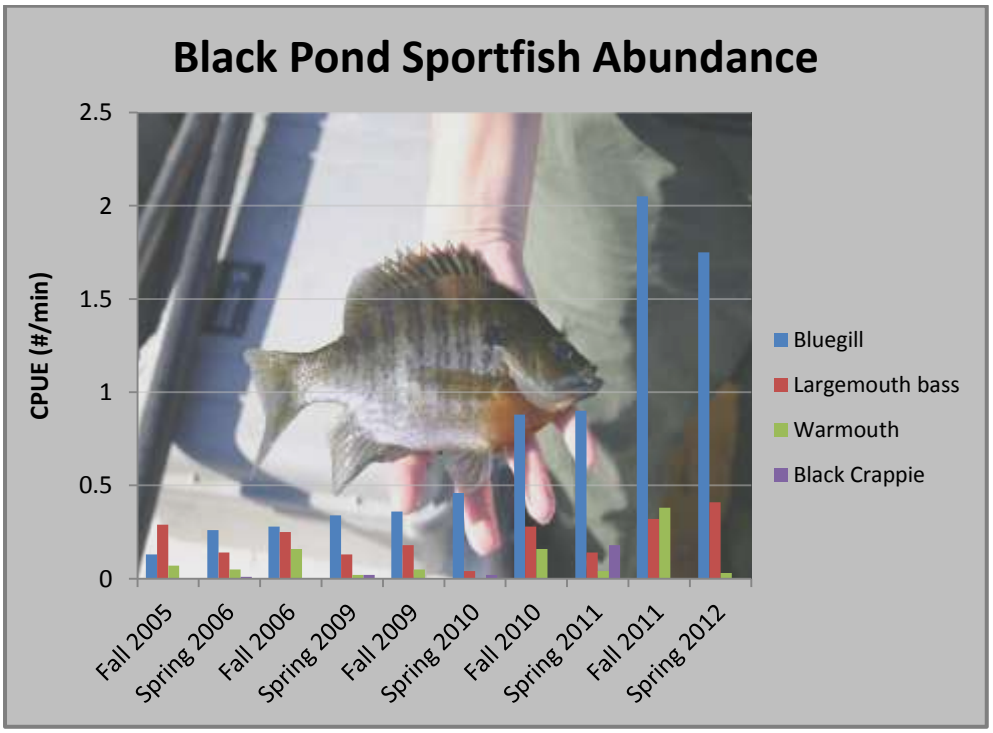


**Figure 9. CPUE results from Fall 2005 – Spring 2012 sampling efforts on Black Pond, Carter Tract of Econfina Creek WMA, Washington County, Florida.**

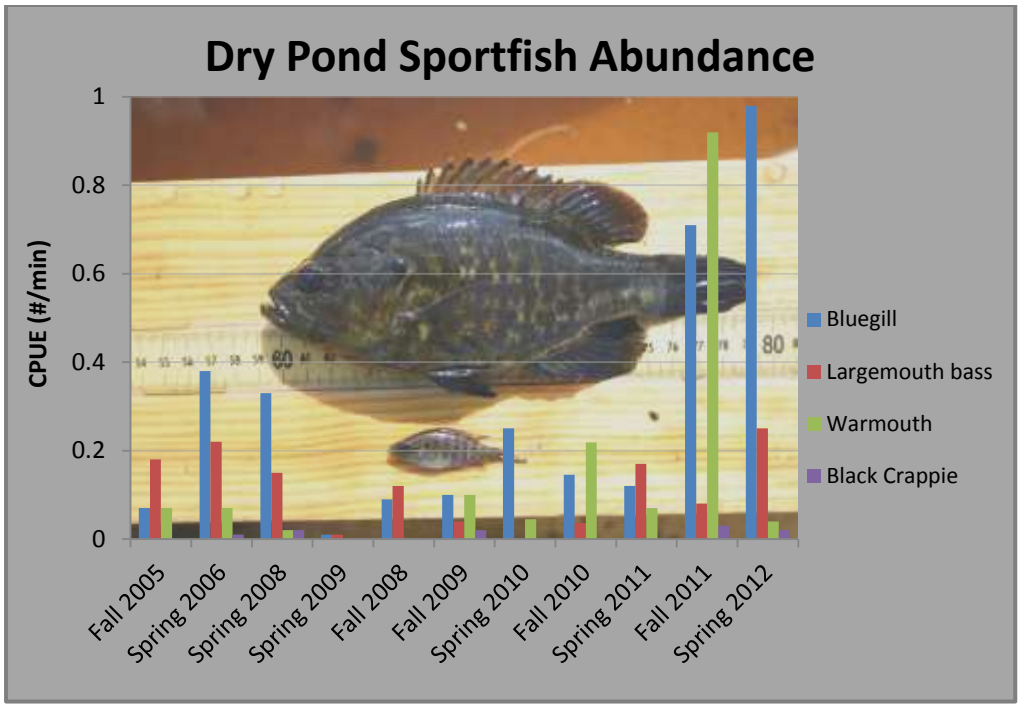


**Figure 10. CPUE results from Fall 2005 – Spring 2012 sampling efforts on Dry Pond, Carter Tract of Econfina Creek WMA, Washington County, Florida.**

***Age - Length Analysis***

To provide the most accurate and comprehensive assessment of fish populations on Carter Tract water bodies, it is necessary to determine the age of fish sampled through various survey techniques. Age determination is important for capturing age structure of fish populations and measuring sportfish recruitment levels (Devries and Frie, 1996). These data are imperative for making adjustments in size and bag limits as populations change over time as a result of the natural progression of aquatic ecosystems and angler harvests. Because fish exhibit indeterminate growth, total length does not provide a suitable basis of comparison for age. For example, fish that have access to more nutrient-rich food and less turbid water will grow faster than fish that do not. Therefore, a dependable method of aging is needed to compare total length measurements with age to develop a baseline of growth over time. One such method involves extraction and examination of one pair of otoliths. Otoliths are hard, calcium carbonate structures located behind the brain of bony fish and are used for balance and sound detection. When fish grow slowly in the winter, an opaque ring forms on the otolith, and when fish grow faster in the summer, a more transparent ring is formed on the otolith. By counting the annuli on the otolith, the age of the fish in years can be determined. Fish have three sets of otoliths: the

sagitta, asteriscus, and lapillus. The largest set of otoliths, the sagittae, is most commonly used to age fish (Devries and Frie, 1996).

Sagittae samples were collected from fish captured during the multiple survey types conducted on the Carter Tract (i.e.electrofishing, fyke nets, and minnow traps). Only a small sample of fish captured during the above surveys were kept and sacrificed for otolith extraction, and FWC staff focused on obtaining samples representing multiple size classes from the four most common sportfish species: bluegill, warmouth, black crappie (*Pomoxis nigromaculatus*), and largemouth bass. Otoliths were extracted (Porak et al., 1986) and sectioned using a slow-speed diamond wheel saw (Beamish, 1979; Casselman, 1983). Doing so created four crosswise sections (approximately 300-400µm wide) per otolith, which revealed the most complete set of annuli. Annuli were subsequently counted (independently by two different readers) using an AO Scientific Instruments Model 40 microscope with 30-watt light (Figure 11).

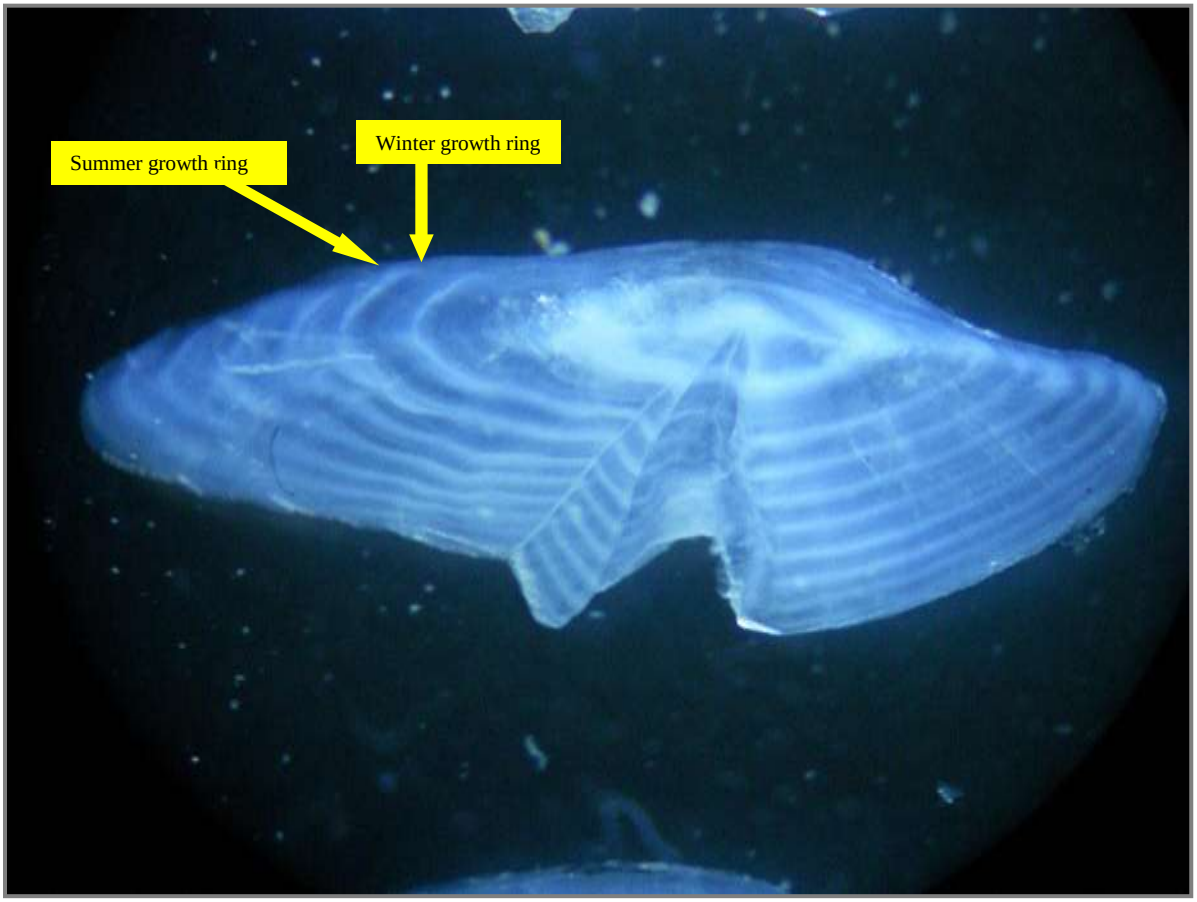


**Figure 11. Cross-section of otolith extracted from nine-year-old blugill showing opaque winter growth ring and transparent summer growth ring.**

Between October 2011 and April 2012, twenty otoliths were collected from largemouth bass (n=16), bluegill (n=3), and warmouth (n=1) captured from Dry and Black Ponds. The number of otoliths pulled for each species varies annually as FWC staff select fish of certain size classes to supplement lacking data to make existing datasets more robust. Additional samples will be taken in the future to further increase the robustness of the mean length-at-age estimates for Carter Tract water bodies. Figure 12 depicts the mean length-at-age for Bluegill, Largemouth Bass, Warmouth, and Black Crappie sampled from Black, Dry, and Green Ponds on the Carter Tract from 2010 – 2012. Colored points represent the mean total length for fish at each age while bars around those points represent the size range for each age (lack of size range bars around mean points is a result of very low sample size; often as few as one sample). The overlap in size range of fish at different ages demonstrates just how variable individual fish growth can be, and accentuates the need for additional sampling to further improve mean length estimates for each age. As mean length-at-age data for each species becomes more robust through additional sampling, these data can more confidently be used to estimate growth and mortality (both natural and angler-induced) rates. These data will ultimately be used in concert with YOY recruitment data from fyke net captures, mature sportfish measurements from electrofishing, and public fishing creel data to ensure that size and bag limits for sportfish are appropriate for current populations and adjusted when necessary as sportfish populations within fishable Carter Tract water bodies evolve over time.

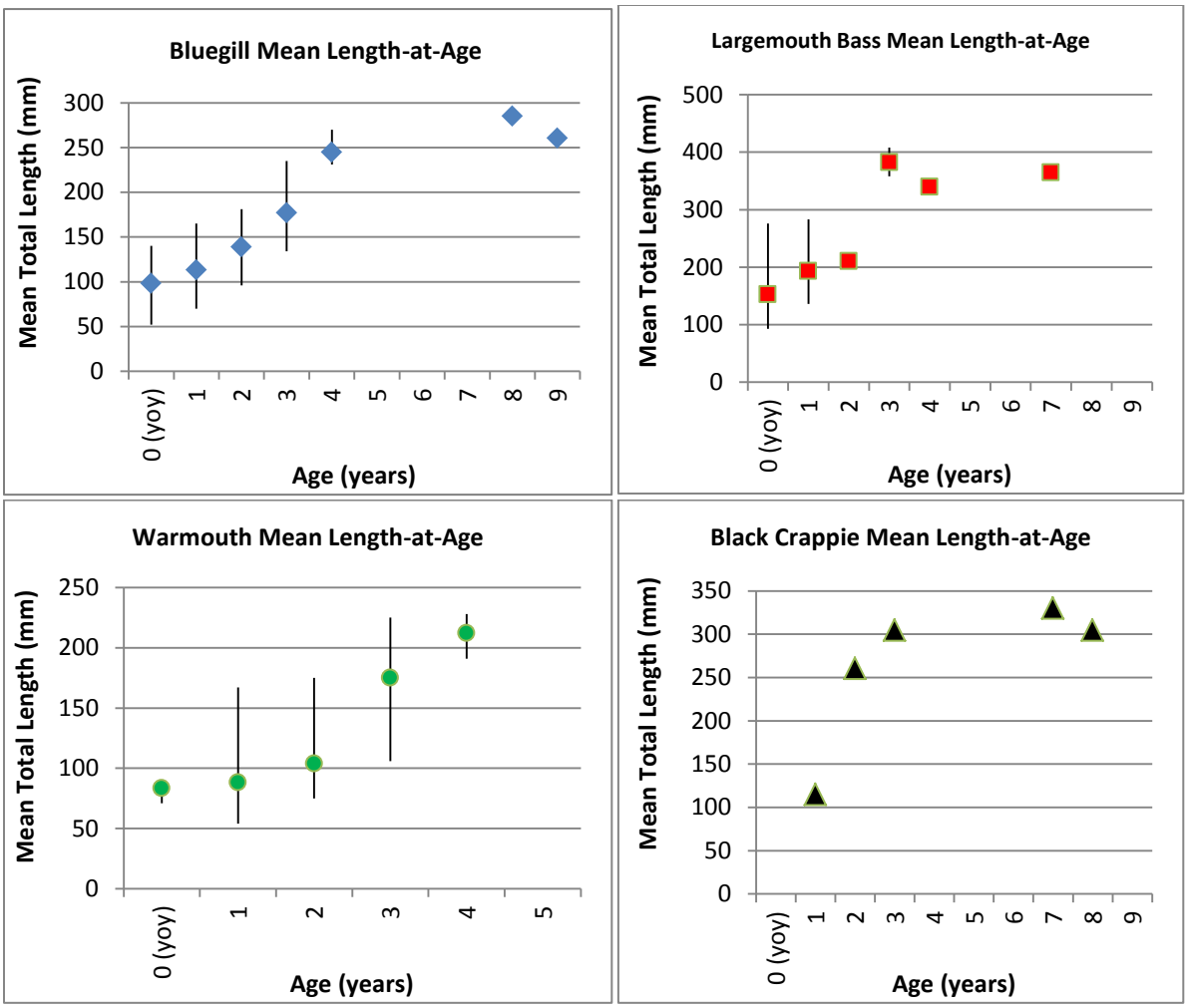


**Figure 12. Mean length-at-age of Bluegill, Largemouth Bass, Warmouth, and Black Crappie from Dry, Black, and Green Ponds of the Fitzhugh Carter Tract of Econfina Creek WMA, Washington County, Florida, 2010-2012 (colored points represent the mean total length for fish at each age while bars around those points represent the size range for each age).**

## ***Public Fishing***

The Public Fishing Program on the Carter Tract continues to provide anglers with the unique opportunity to fish smaller (farm pond style) bodies of water with comparatively low fishing pressure. Creel surveys from July 2011- June 2012 resulted in 1,165 anglers logging 4,496 fishing hours (Figure 13). While this is a decrease from the 2010-11 fishing season, these numbers still represent the second highest usage since the Carter Tract initiated its public fishing program. The drop in angler participation is likely due to severe drought conditions which forced the closing of Green Ponds 1, 2, and 3.

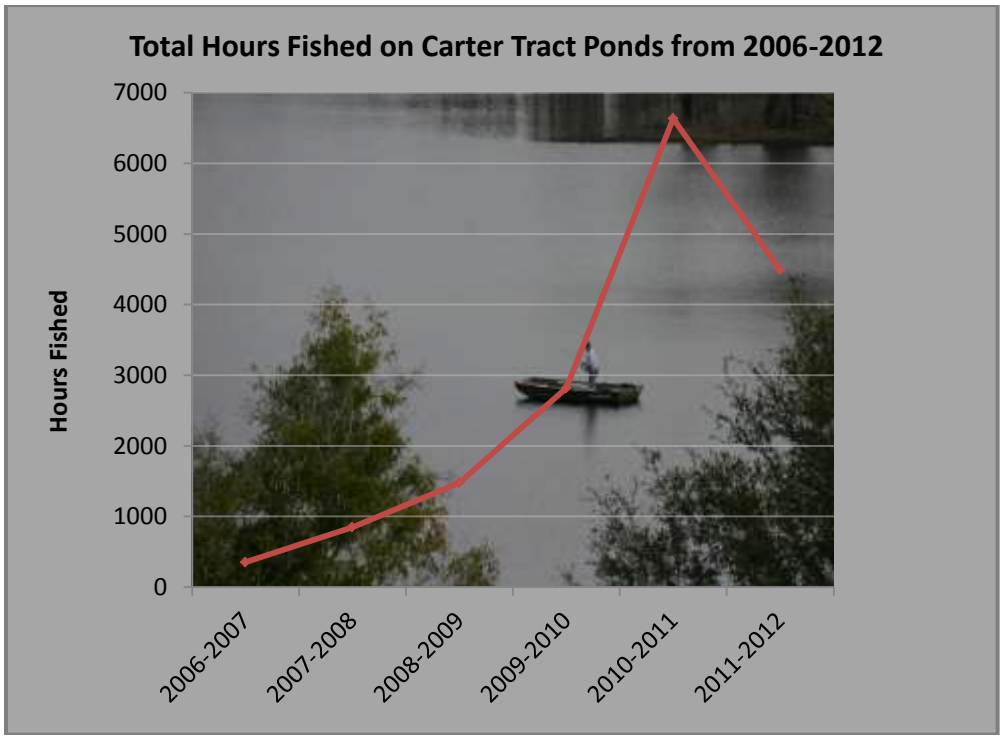


**Figure 13. Total number of hours fished from 2006-12 on all area ponds combined at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Fishing pressure on the Carter Tract was calculated based on the total number of possible fishing hours from July 1, 2011 through June 30, 2012. Out of a possible 41,320 fishing hours, anglers fished 4,496 hours yielding just over 9% usage, a 7% decrease from the previous fishing season. Again, the drop in angler participation can likely be at least somewhat attributed to the closing of Green Ponds 1, 2, and 3. Dry pond was the most fished pond during 2011 -2012 (Figure 14), which is consistent with trends from the previous fishing season. Angler participation per month was relatively consistent with past trends, with a lull in activity during the winter months due to cold weather and temporary closures for hunting seasons (Figure 15).

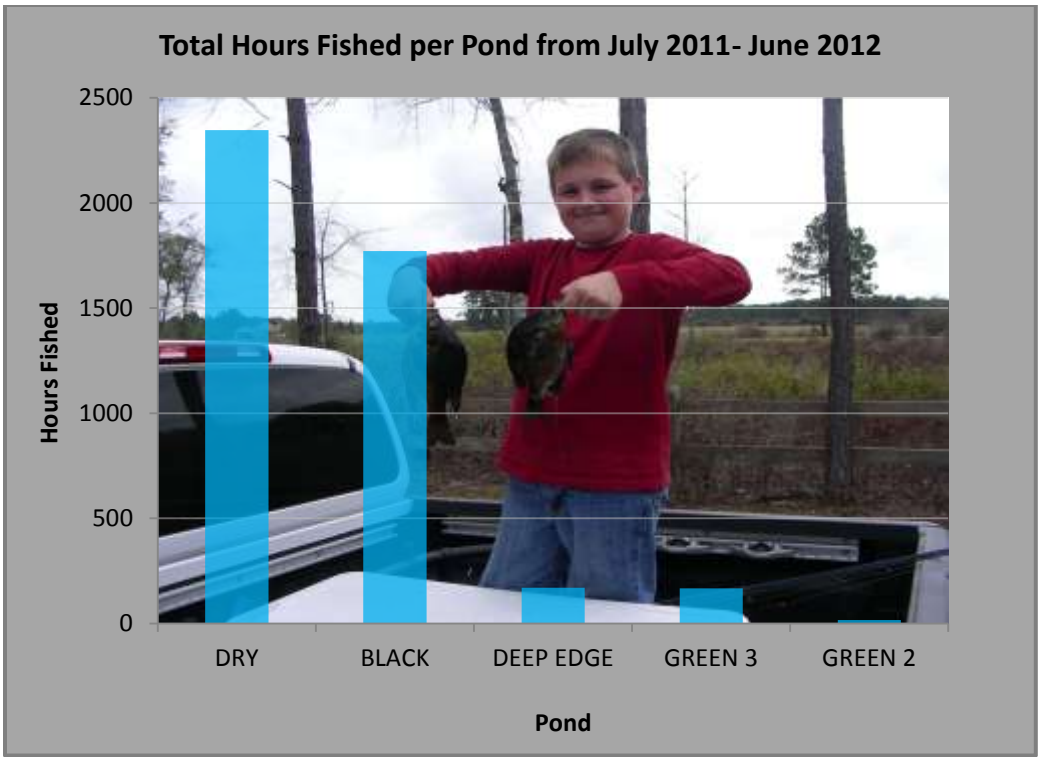


**Figure 14. Hours fished per pond from July 2011 – June 2012 at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

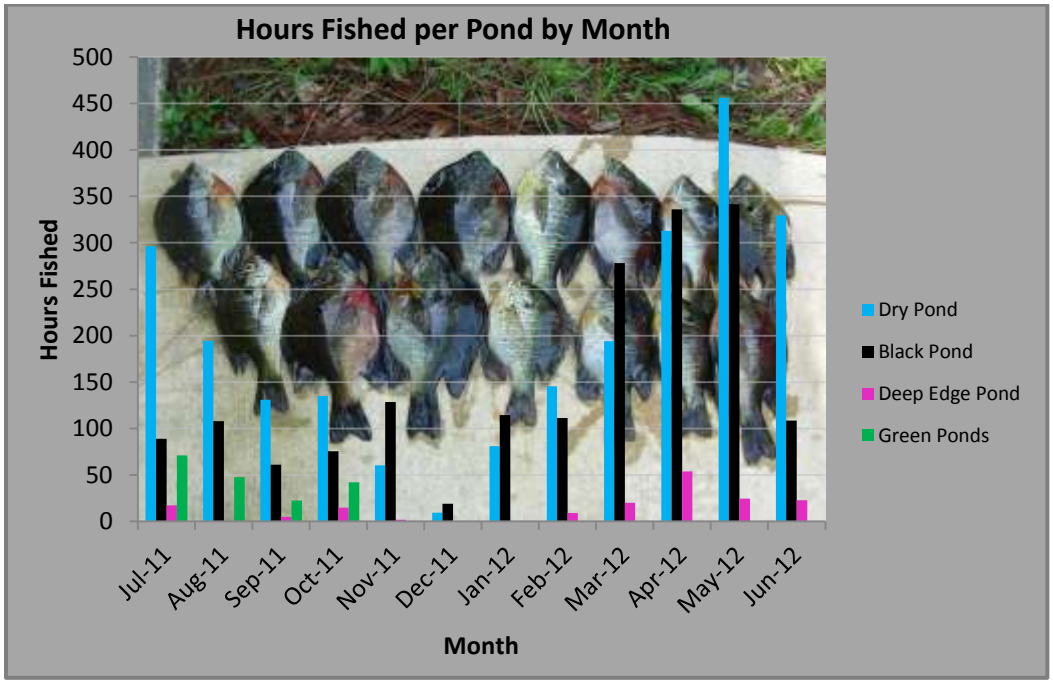


**Figure 15. Number of anglers per month utilizing the Fishing Program on the Carter Tract of Econfina Creek WMA, Washington County, Florida, July 2011 – June 2012.**

A total of 2,704 fish representing eight species were caught on Carter Tract ponds during 2011-12. This is a 57% decrease compared to 4,762 fish caught during 2010-11. Figure 16 illustrates the number of fish caught per species for each pond. Bluegill comprised 59% of fish caught, followed by largemouth bass, black crappie, warmouth, and bullhead catfish (*Ameirus nebulosus* and *Ameirus natalis*) with 21%, 10%, 2%, and 1% respectively. The remaining 7% of fish caught were comprised of bowfin (*Amia calva*), chain pickerel (*Esox niger*), and spotted gar (*Lepisosteus oculatus*).

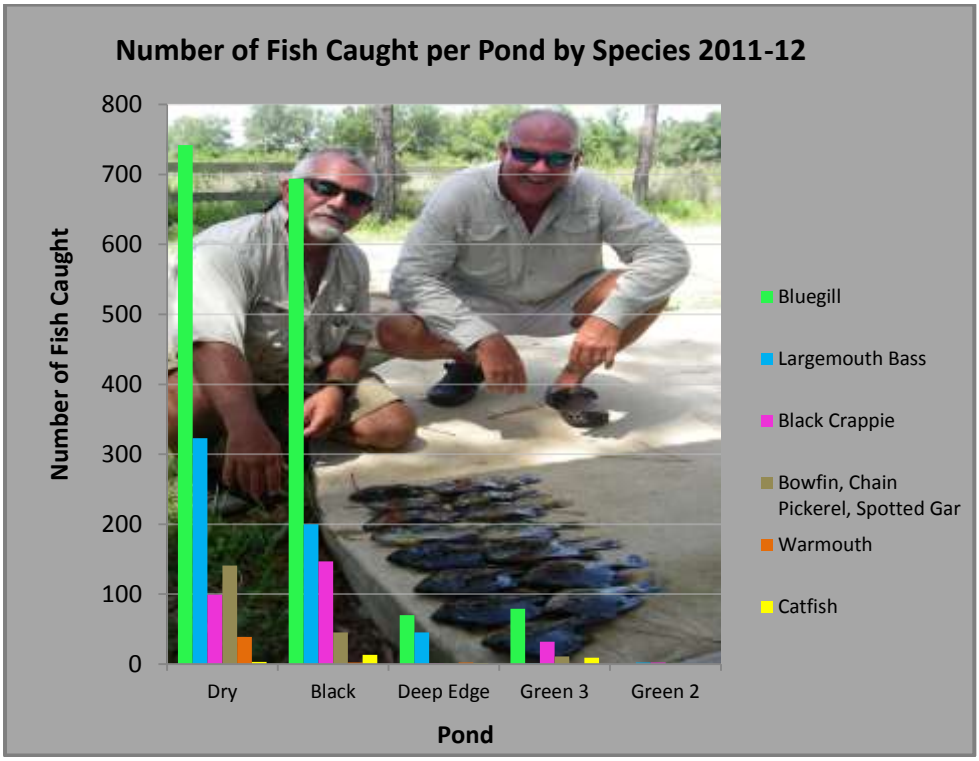


**Figure 16. Number of fish caught by species per pond at the Carter Tract of Econfina Creek WMA, Washington County, Florida, July 2011-June 2012.**

Figure 17 illustrates angler creel trends from 2007-12 per water body. The dramatic dip in bluegill catch during 2008-09 was likely due to the drought that closed all Green Ponds to fishing until heavy rains in May 2009 returned ponds to fishable water levels. Similarly, the drop in bluegill and black crappie during 2011-12 could be attributed to drought conditions which again forced the closure of Green Ponds to fishing. Alternatively, it is possible that the drop in bluegill catch during 2011-12 is a sign that bluegill populations are beginning to reach a more balanced number following strict size restrictions. Total number of fish caught and released per pond was calculated based on angler-reported creel data (Appendix V). Fishing success rate, defined as the

number of fish caught per hour of fishing effort, was calculated for each pond and all water bodies combined (Table 1).

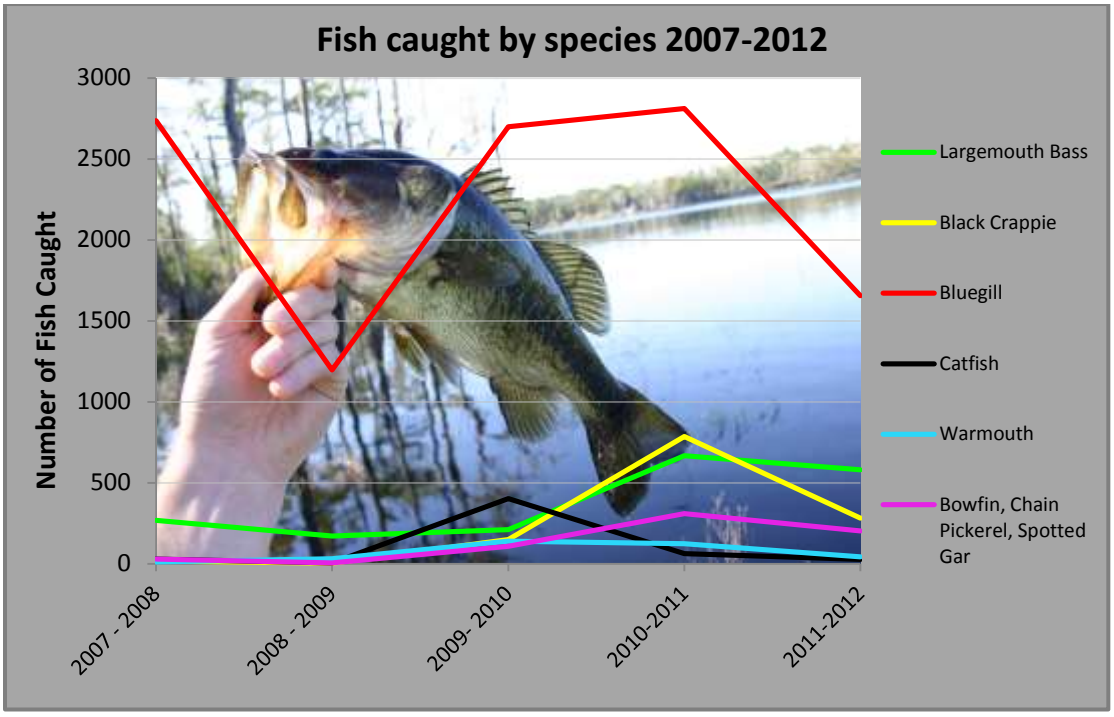


**Figure 17. Angler creel trends from 2007-12 on all area ponds of the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

**Table 1. Fishing success rate (fish caught/hours of fishing effort) on area ponds at the Carter Tract of Econfina Creek WMA, Washington County, Florida, July 2011 - June 2012.**

| Pond | Angler success rate (fish/hour) |
|---|---|
| **Dry** | 0.6 |
| **Black** | 0.6 |
| **Deep Edge** | 0.7 |
| **Green 3** | 0.8 |
| **Green 2** | 0.3 |
| **All Ponds** | 0.6 |

# WILDLIFE POPULATIONS

## White-tailed Deer

***Management Objectives***

The primary white-tailed deer (*Odocoileus virginianus*) management objective for the Carter Tract is to provide quality hunting opportunities while managing optimal herd health. Specific objectives are to attain a herd density of 16-26 deer/mi$^2$ (25-40 acres/deer). With limited hunting dates and a conservative hunt format, our goal is to attain a harvest consisting of antlered deer predominantly in the 3.5+ age classes. In addition to offering a quality buck harvest, we plan to bolster and maintain a high degree of hunter participation with the implementation of limited antlerless deer harvest, dependent upon herd expansion. Achieving these objectives requires active monitoring and management of the population, as well as habitat.

***Population Trends***

Reliable annual indices of population size are fundamental to successful deer herd management. Indices provide an estimate of relative abundance, rather than true population size. However, because the specific relationship between the index and population density is not known, the real value of population surveys is to evaluate trends over time. Deer density on the Carter Tract is estimated using data collected from line-transect distance sampling (LTDS) surveys, which utilizes modeling to account for deer detectability. Precision seems to be higher using the LTDS method compared to standard spotlight surveys.

LTDS on the Carter Tract was conducted along two routes, one 4.6-km long and the other 4.7-km long, and were replicated six times in September 2011. Surveys began approximately one hour following official sunset, and were driven along the pre-selected routes via pickup truck with two observers in the back, each equipped with a one-million candlepower Q-beam® spotlight. Routes were driven at a speed of roughly 5-7 mph. Deer were detected by eye shine and the following data were recorded: number of deer, distance to deer, direction/bearing from vehicle, age (adult versus fawn), and gender (if determinable). Distance and bearing data were calculated using a Leupold® RXB-IV digital rangefinder/binocular. Figure 18 depicts the line transect routes used on the Carter Tract, along with locations of deer observed during 2011 surveys.

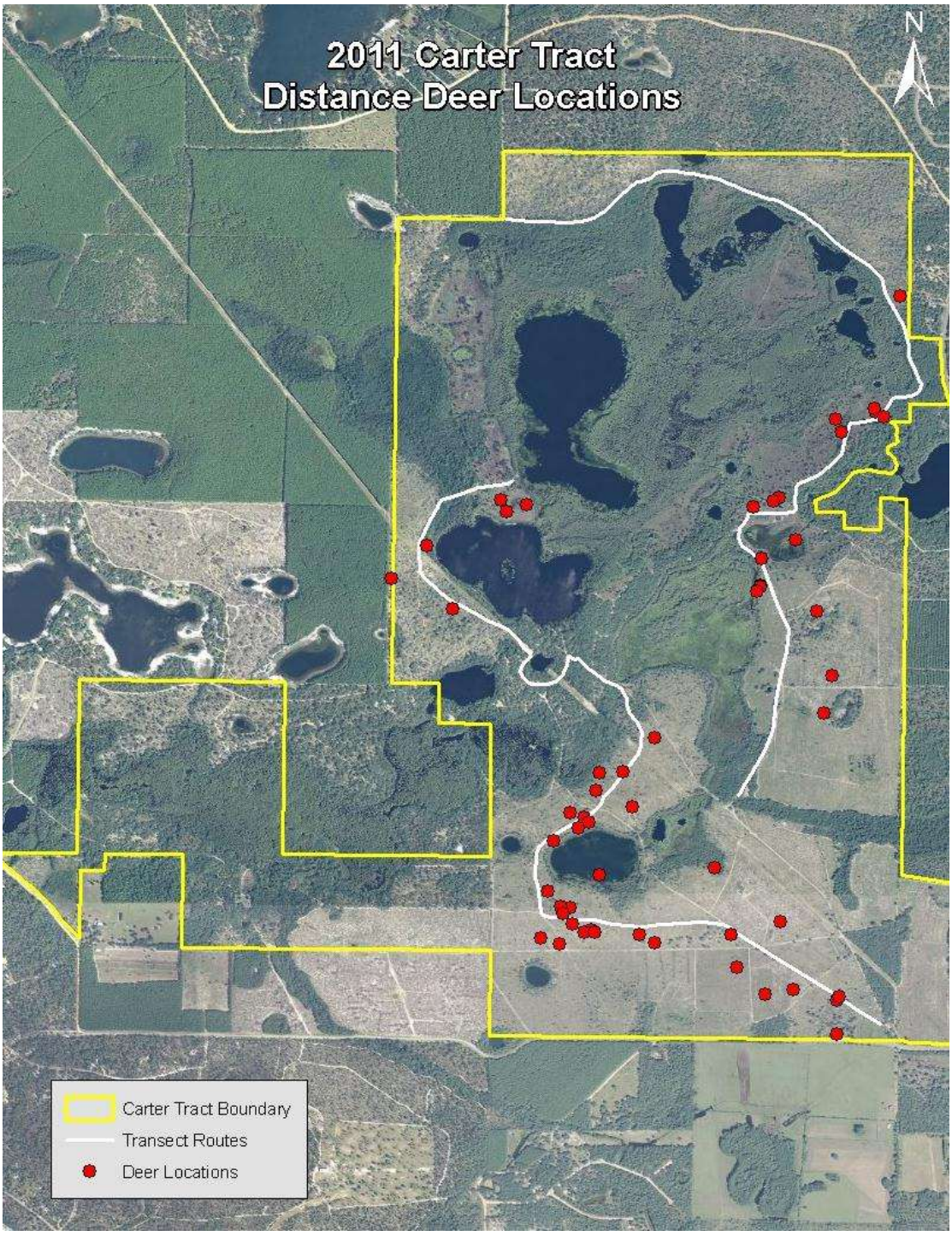


**Figure 18. Survey routes and location of deer observations during the September 2011 line-transect distance sampling conducted on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Preseason deer density for 2011 was estimated at 17 deer/mi$^2$ (95% CI: 11.6, 27.9), using the software DISTANCE 5.0 Release 2 (Thomas et al., 2006). This index was an increase from the 10.8 deer/mi$^2$ estimated during 2010, and rose back above the lower limit of our population goal since dropping below it in 2010 (Figure 19). While this increase is encouraging, it is important to remember that a number of factors can influence deer detectability during spotlight transect surveys, and thus create what appear to be contradictory or confusing population trends over time. Typically, variance estimate in DISTANCE has three components: variance due to observers' ability to detect animals along a transect (detection probability); variability between transect lines (encounter rate); and variance due to group size (cluster size). Further, vegetation composition and height, weather variables, recent burning activity, etc. can all influence deer activity. Therefore, several subsequent years of surveys will be required to produce a clearer relative abundance, from which stronger inferences of trends in population size can be drawn.

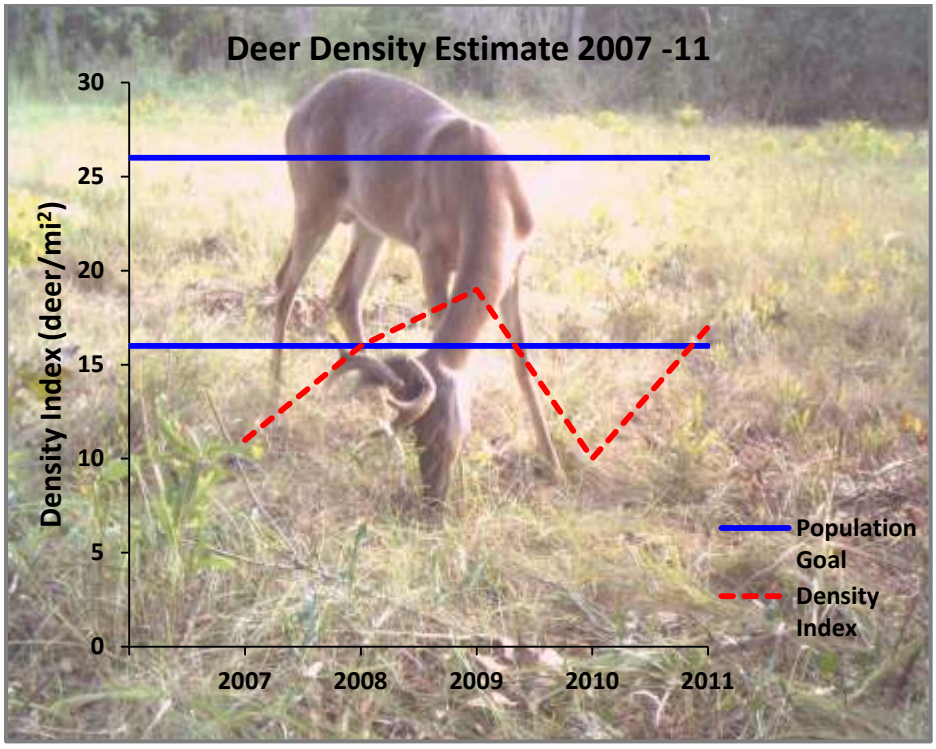


**Figure 19. Trend in White-tailed deer density as estimated using line-transect distance sampling at the Carter Tract of Econfina Creek WMA, Washington County, Florida, 2007-11.**

***Harvest and Hunting Pressure***

Deer hunters and their guests logged a total of 173 man-days of hunting during the 2011-12 season. This is an increase from the 159 man-days reported during the previous deer quota season. In 2011-12, the phase II archery and phase III general gun hunts yielded the highest participation with 46 and 40 hunters, respectively. Figure 20 illustrates that this is fairly consistent with use trends over the last few years. It would make sense to assume participation in each quota hunt is directly proportional to the harvest success rate realized during those hunts in previous years. However, this is not always the case; Figure 21 demonstrates that the phase II general gun hunt has consistently produced the highest harvest success rates from 2006 to present with the exception of just one deer season (2009-10). It is therefore likely that other factors play a large role in determining quota hunt preference and participation. Those factors might include anticipated weather/temperature patterns, increased perceived deer activity, weapon preference, length of hunt, and even tradition.

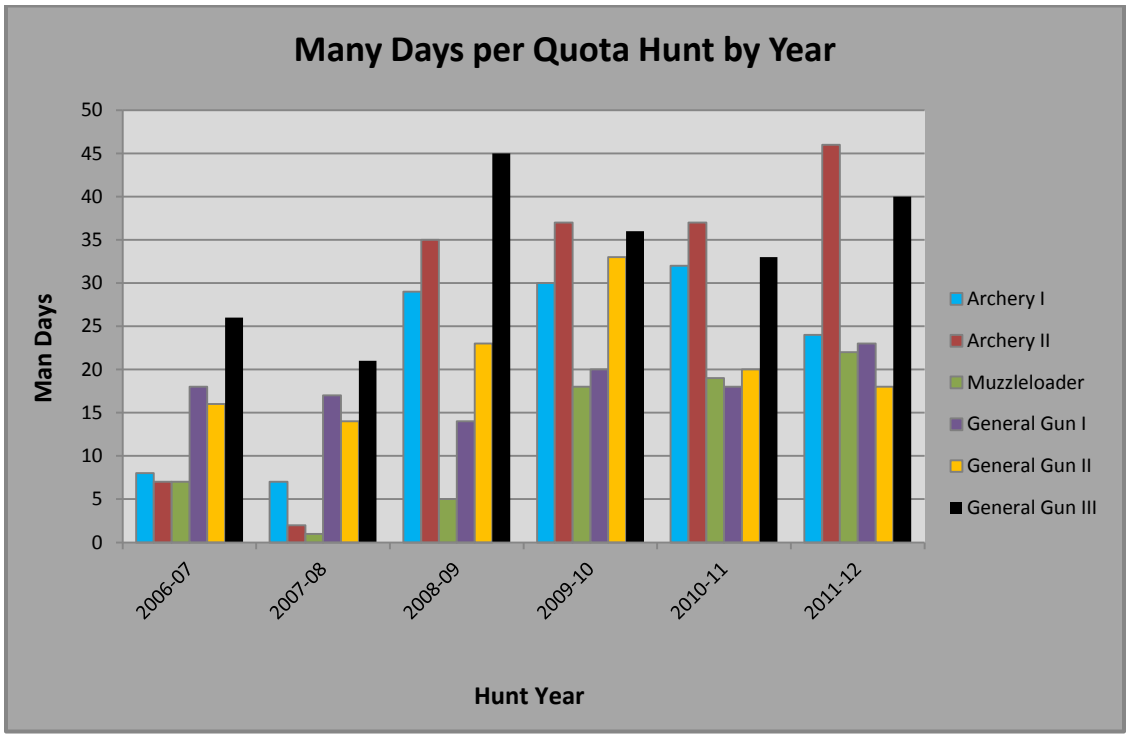


**Figure 20. Comparison of hunter participation by quota hunt from 2006-12 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

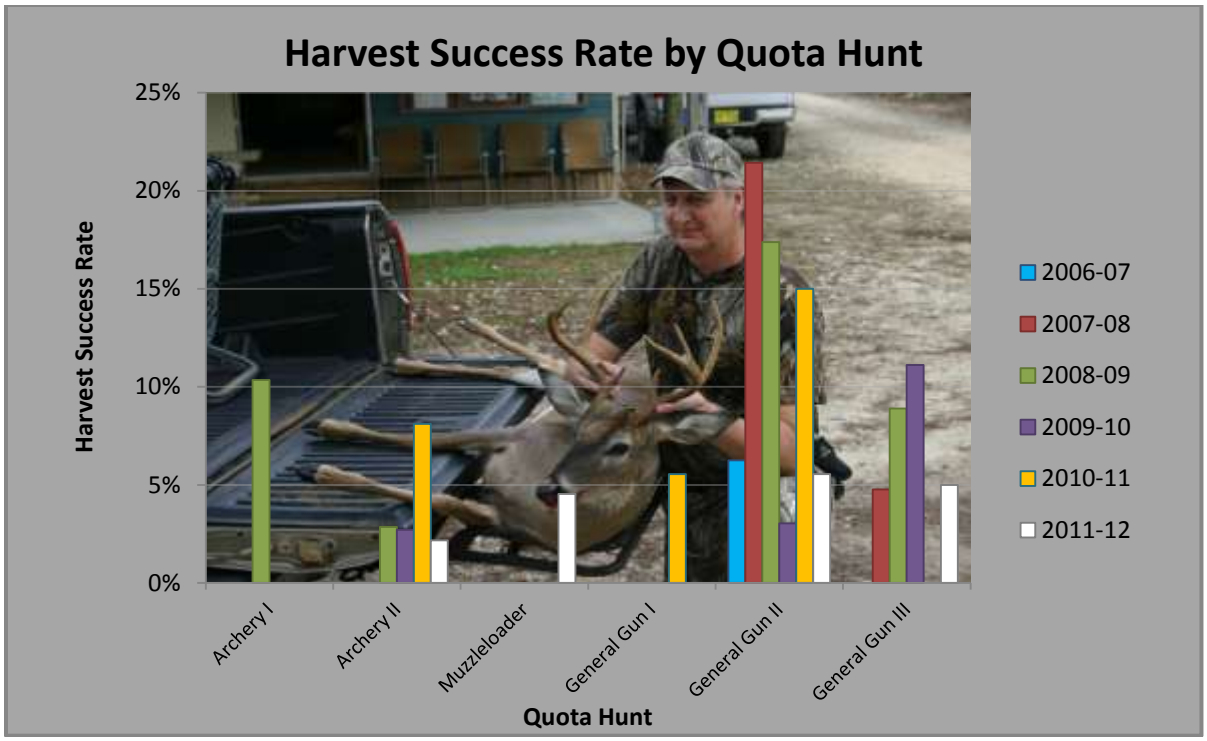


**Figure 21. Comparison of hunter success rate by quota hunt from 2006-12 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Overall hunter success rate (calculated as the number of deer harvested per man-days hunted) is depicted in Figure 22, and is compared over the last five deer seasons. Overall hunt success (compiling all quota hunts) for the 2011-12 season was estimated at approximately one deer/35 man-days (2.89%), compared to one deer/25 man-days (4.4%) realized in 2010-11. A combination factors affect harvest rates from year to year, including (but not limited to) hunter pressure, experience of hunters, weather patterns, hunting pressure on surrounding/adjacent properties, mast production, etc.

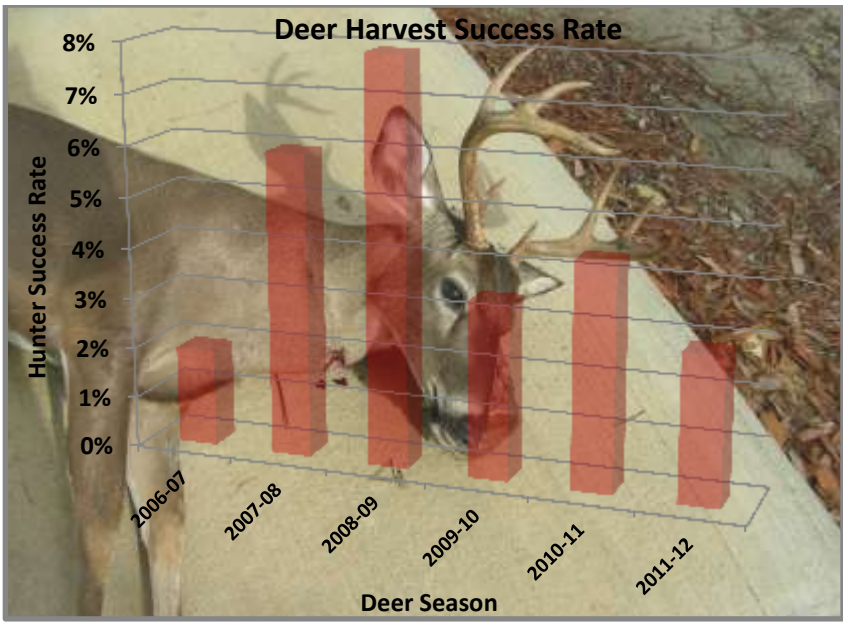


**Figure 22. Comparison of overall hunter success rate from 2006-12 at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

All quota permit hunters were required to check-in/out at the Carter Tract check station in order to monitor hunter pressure and collect biological data from harvested deer. Five deer (all bucks) were harvested on the Carter Tract during 2011-12 compared to seven deer harvested the previous season. Mean physical parameters of all deer harvested per quota hunt season are presented in Table 2.

**Table 2. Morphometric parameters of deer harvested during 2011-12 quota hunts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| Quota Hunt | Mean Physical Parameters 2011-12 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Gender | Age (yrs) | Weight (lbs) | Antler points | Avg beam length (cm) | Avg beam circum. (cm) | Inside spread (cm) |
| **Archery II** | Buck | 2.5 | 89* | 3 | 27.5 | 7 | n/a† |
| **Muzzleloader** | Buck | 2.5 | 92 | 6 | 22.25 | 5 | 25 |
| **General Gun II** | Buck | 2.5 | 122 | 8 | 35.25 | 7.25 | 30 |
| **General Gun III** | Buck | 1.5 | 95 | 2 | 18 | 5 | 16.5 |
| **General Gun III** | Buck | 2.5 | 130 | 8 | 37.85 | 8 | 31.5 |

*gutted weight
†right antler broken at main beam

The two smallest deer were taken during the Archery II and Muzzleloader quota hunts. The buck harvested via muzzleloader is the first deer harvested by this method since the Carter Tract opened to hunting in 2005. The remaining three bucks were harvested during the phases II and III General Gun quotas. A deer breeding chronology study was initiated in 2009 by FWC with preliminary results calculating mean conception dates for the southern Washington County area to be approximately January 26th (Garrison et al., 2009). It is therefore not surprising that the larger, more mature deer were harvested during quota hunts which took place later in the winter during primary rutting activity. The largest deer harvested was an 8-point, 2.5-year-old buck weighing 130 pounds (Figure 23).


**Figure 23. This 8-point, 130-pound buck was the largest deer harvested during the 2011-12 hunting season on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

We believe the full potential for deer hunting opportunities on the Carter Tract has yet to be realized, but is expected to continue to improve in conjunction with habitat quality. Considering herd management objectives, additional antlerless harvests are not presently needed to control population levels as a higher density is desirable to meet our population objectives and improve hunter success rates. The continued protection of does (outside archery season) is necessary to further bolster recruitment and expedite achievement of herd objectives. Limiting the harvest of does will facilitate increases in herd size and improvements in overall age structure, which should in turn affect improvements in hunter success. Further, physiologic and morphometric indices suggest the population can be maintained at still higher densities before eroding herd health.

***Disease and Monitoring***

Recently there has been a substantial increase in the attention being paid to Chronic Wasting Disease (CWD) by the media, state and federal natural resource agencies, and hunters and outdoor enthusiasts. CWD is a contagious neurological disease that has been found in captive and wild mule deer (*Odocoileus hemionus*), white-tailed deer, moose (*Alces alces*), and Rocky Mountain elk (*Cervus elaphus*) within several midwestern and western states. The disease causes degeneration of the brains of infected animals, resulting in emaciation, abnormal behavior, loss of bodily functions, and death. Thus far no southeastern state, including Florida, has been impacted by this disease.

Currently the only practical method for diagnosing CWD is through analysis of brain stem tissue or lymph nodes from dead animals. There is no practical live-animal test. The FWC has initiated a comprehensive active surveillance and monitoring program for CWD. In recent years, we have collected and tested tissue samples from hunter killed deer from the Carter Tract and surrounding counties. Even low numbers of CWD-positive deer would be cause for concern, so we plan to continue this disease surveillance for the foreseeable future.

# Wild Turkey

***Management Objectives***

1. Encourage and maintain a population of wild turkey (*Meleagris gallopavo*), providing a high quality hunting experience to the public.
2. Continue to provide and enhance high quality habitat for wild turkeys by maintaining an open understory and encouraging herbaceous groundcover via habitat improvement activities such as prescribed burning.

***Harvest***

Spring turkey season on the Carter Tract consists of three quota hunts, each three days in length. In addition, the spring 2012 turkey season marked the introduction of a two day youth-only turkey quota hunt at the Carter Tract. Permit holders for all turkey quota hunts were afforded one day prior to each hunt for scouting. Thirty hunters participated in the 2012 spring turkey hunts and while FWC staff and hunters observed substantial turkey activity on the property both during and between quota hunts, no gobblers were harvested. The turkey harvest success rate (defined as the number of gobblers harvested/man-days of effort) for the Carter Tract from 2007 – 2012 is illustrated in Figure 24.

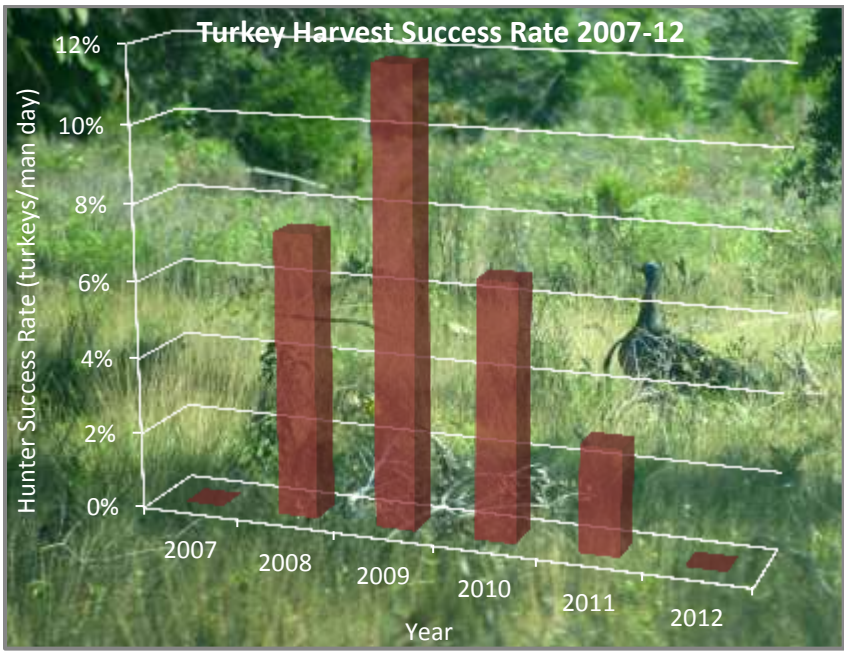


**Figure 24. Turkey harvest success rate from 2007-12 on the Carter Tract of Econfina Creek WMA in Washington County, Florida.**

FWC staff do not attribute the zero harvest of turkeys during the 2012 season to a decline in the turkey population on the Carter Tact. Rather, incidental observations of both adult turkeys and poults throughout the year suggest that the turkey population on and around the Carter Tract is likely increasing (Figure 25). Weather conditions, experience of quota permit holders, and hunting pressure on surrounding/adjacent properties can all affect harvest success rates. Turkey harvesting opportunities on the Carter Tract should continue to improve as a more frequent burn regime is maintained for controlling scrub oaks and producing open grassy/herbaceous areas for nesting. Further, more frequent mowing of powerline right-of-ways at strategic times of the year (just post nest-hatching) can provide better bugging conditions for poults. Turkey poults have a high protein demand during the first four weeks of life (Hurst, 1992), and are incapable of flight until approximately ten days old (Williams, Jr. and Austin, 1988). During this flightless period poults are extremely vulnerable to predation. Increasing the amount of protein available (in the form of insect abundance) should help achieve maximum poult growth and improve survival.

**Figure 25. A flock of 15-20 wild turkey hens was regularly observed on the Carter Tract in late winter 2011, just prior to the 2012 spring turkey season.**

## Small Game

The Carter Tract is open annually to small game hunting during a 16-day non-quota season each December. Small game can also be hunted by permit holders during deer quota hunts, provided there is season overlap between the game being hunted and deer quota hunt dates. Hunters are encouraged not only to hunt popular small game such as gray squirrel (*Sciurus carolinensis*), rabbit (*Sylvilagus* spp.), and northern bobwhite (*Colinus virginiana*), but also for taking wild hogs (*Sus scrofa*), which are occasionally encountered on the property. Check station operators record how many hunters pursue each type of game for the duration of the small game season. Thirty-one hunters took advantage of the 2011-12 small game season, devoting 27 days to squirrel hunting and four days to quail hunting. This is an increase from the previous year and the highest participation to date since small game hunting initiated on the property in 2005 (Figure 26). Hunters harvested 32 gray squirrels, which is a substantial increase from the five squirrels harvested during 2010-11. No bobwhites were harvested during the 2011-12 season.

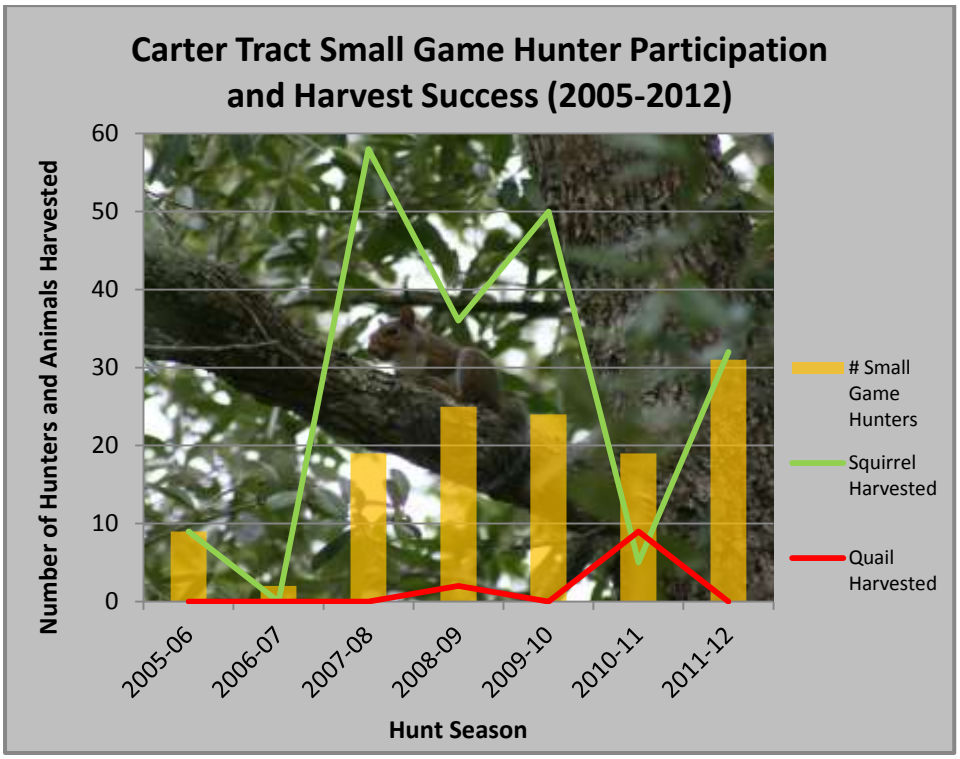


**Figure 26. Small game hunter participation on the Carter Tract of Econfina Creek WMA, Washington County, Florida, 2005-12.**

# Waterfowl

***Harvest***

The Carter Tract provides duck hunting opportunities during a special five-day early duck season each September. Portions of the general gun and small game seasons coinciding with the phase I and II waterfowl seasons as determined by the USFWS (U.S. Fish & Wildlife Service) are also open to duck hunting. For the 2011-12 season duck hunters spent 52 man-days hunting and harvested a total of 63 waterfowl, representing three species. Nineteen wood ducks (*Aix sponsa*) and five blue-winged teal (*Anas discors*) were harvested during the September early duck season, while 34 wood ducks, two blue-winged teal, and three American coots (*Fulica americana*) were harvested during the phase I general gun and small game seasons. Duck hunter participation and harvest trends from 2006-12 on the Carter Tract are represented in Figure 27. Figure 28 depicts harvest success (number of ducks harvested/man-day of hunting effort) on the Carter Tract from 2006-12. Duck hunter participation has increased annually since 2007. Duck harvests during 2011-12 yielded a hunting index of 1.2 ducks/man-day, which is an increase over that realized during the previous two duck seasons.

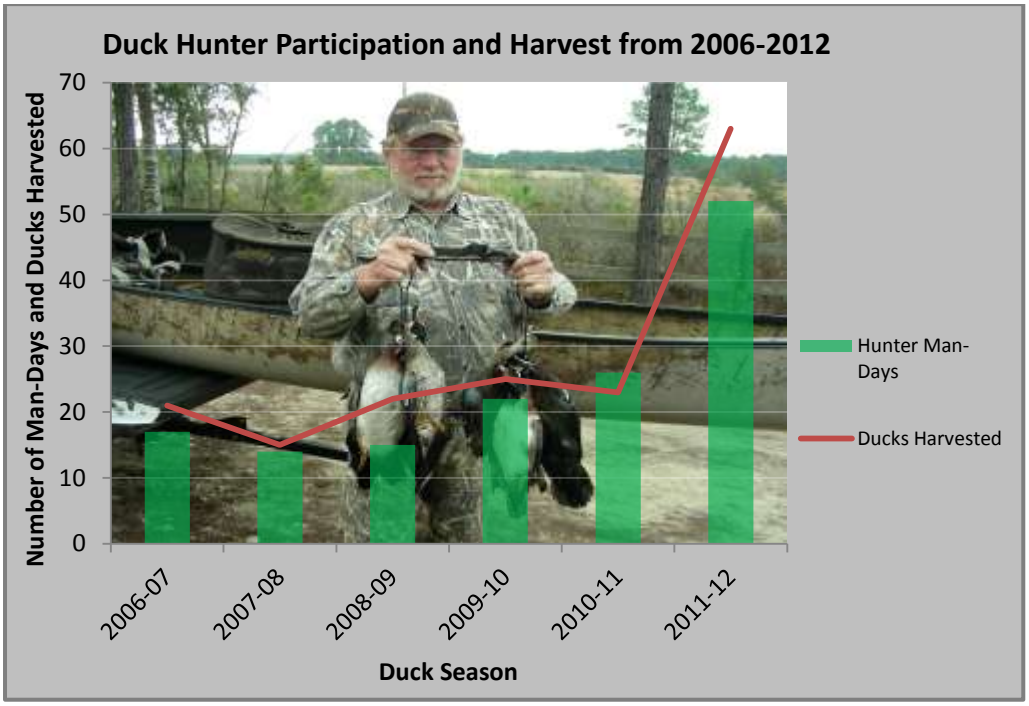


**Figure 27. Duck hunter participation and harvest from 2006-11 at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

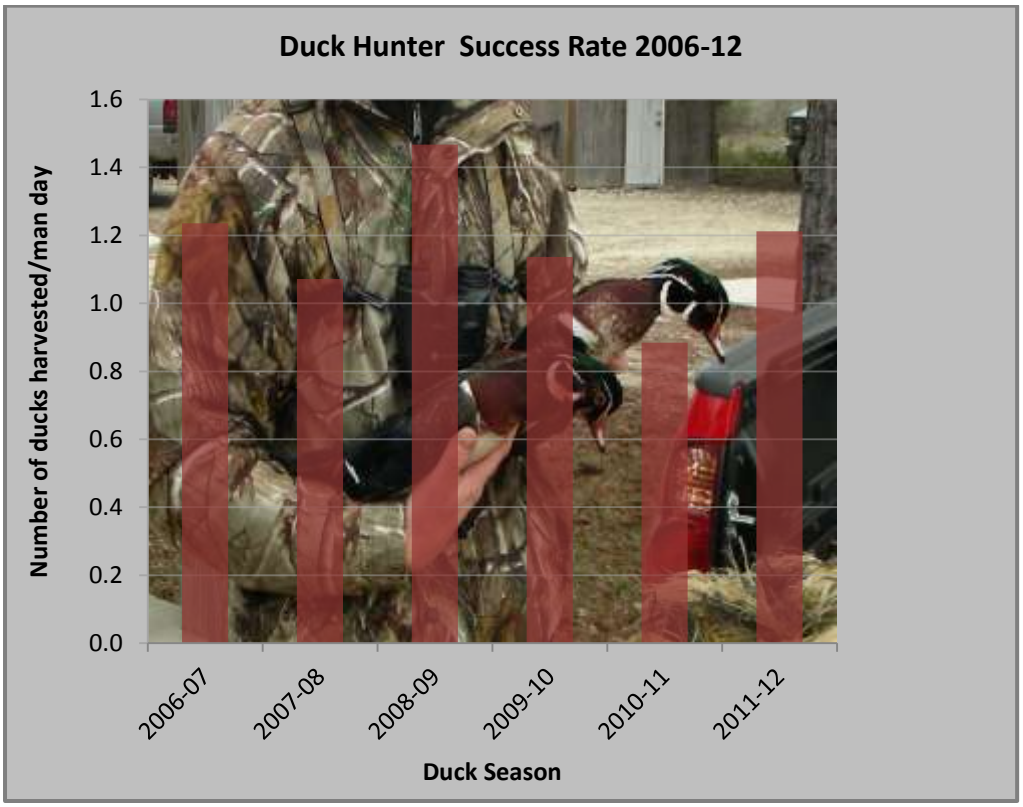


**Figure 28. Duck hunter success rate (ducks harvested/man-day) on the Carter Tract of Econfina Creek WMA, Washinton County, Florida, 2006-12.**

***Wood Duck Nest Boxes***

Efforts to monitor and facilitate local breeding populations of wood ducks continued on the Carter Tract, with quarterly monitoring efforts on 50 nest boxes that were erected in winter 2005. Boxes are checked three times throughout the breeding season (March – September) to determine occupancy and nest fate, and yearly winter checks allow boxes to be cleaned and repaired as needed. Following initial implementation, it takes several years for a wood duck nest box project to develop. Female wood ducks are philopatric, meaning that they typically return to the same areas from which they were hatched, and once they breed, often return to the same nesting site year after year (Hepp et al., 1987). Figure 29 shows the location of nest boxes and associated use by year from 2006-present.

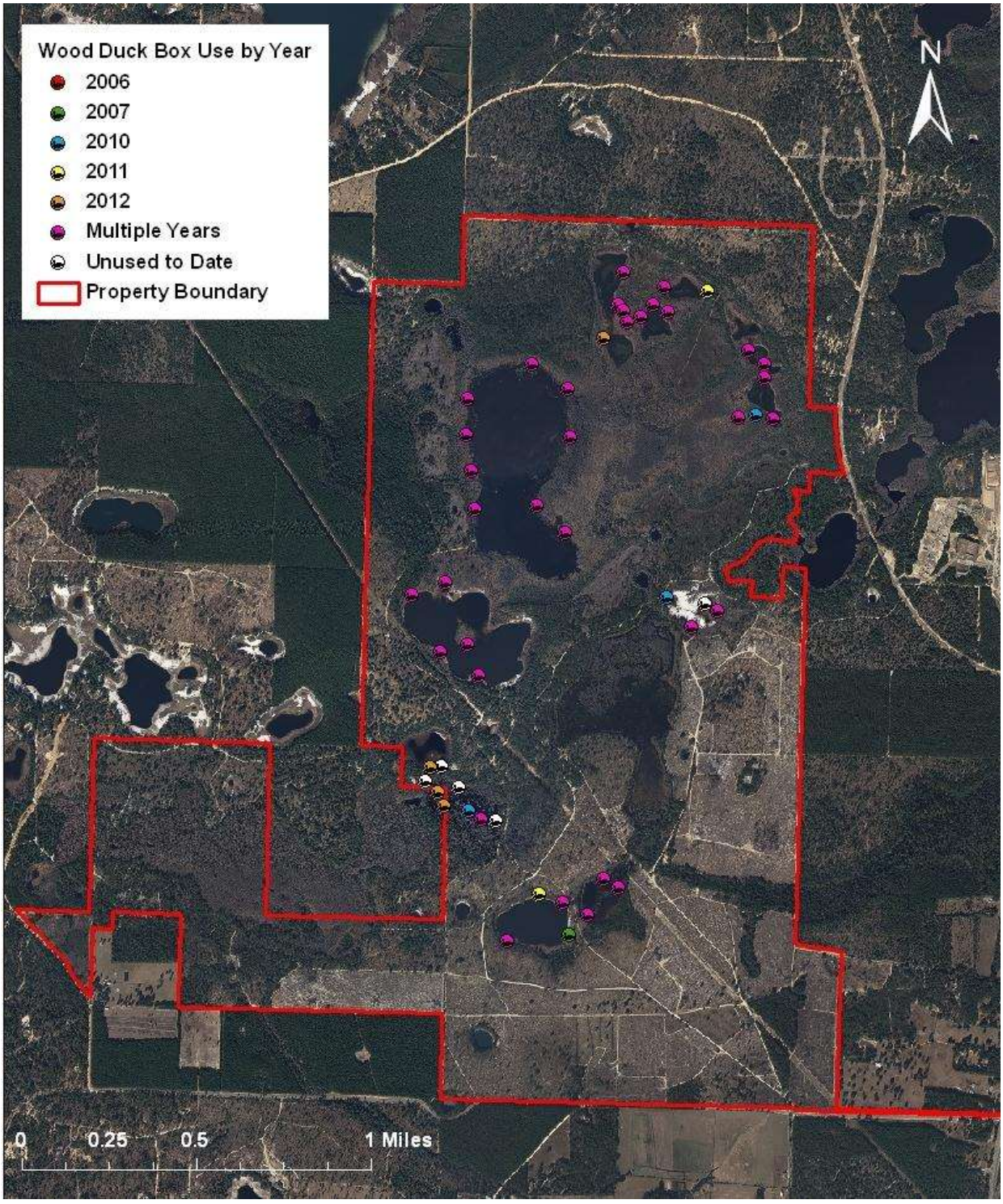


**Figure 29. Use of wood duck nest boxes across the Carter Tract of Econfina Creek WMA, Washington County, Florida, 2006-12.**

Wood duck box use (n=21) on Carter Tract water bodies decreased slightly during the 2012 nesting season (Table 3). The percent of boxes reused (81%) also dropped from the previous nesting season. The slight drop in usage during spring 2012 could be attributed to low water levels induced by drought conditions. While box use and percent reuse both dropped in 2012, measures of reproductive success including average number eggs/clutch, total number of productive nests, overall nesting success, total ducklings, and estimated ducklings/clutch all reached their highest values to date during spring 2012 (Table 4). These numbers suggest Carter Tract water bodies and the surrounding upland habitat are meeting the nesting and brood-rearing habitat requirements necessary for supporting local wood duck populations annually. More detailed data on number of nests, percent nest success, average clutch size, and estimated ducklings produced/clutch for each water body by year is available in Appendix VI.

**Table 3. Wood duck box occupancy and percentage of boxes reused per year (2006-2012) on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| Year | Total boxes used | New boxes used | Previously used boxes | Boxes never used | % boxes reused |
|---|---|---|---|---|---|
| **2006** | 6 | 6 | - | 44 | - |
| **2007** | 11 | 8 | 3 | 36 | 27% |
| **2008** | 5 | 4 | 1 | 32 | 20% |
| **2009** | 21 | 13 | 8 | 19 | 38% |
| **2010** | 29 | 7 | 22 | 12 | 76% |
| **2011** | 24 | 3 | 21 | 9 | 88% |
| **2012** | 21 | 4 | 17 | 5 | 81% |

**Table 4. Reproductive success measurements of wood ducks from 2006-12 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| Measurement | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| **Total number clutches:** | 6.0 | 11.0 | 5.0 | 21.0 | 29.0 | 26.0 | 22.0 |
| **Average number eggs/clutch:** | 8.2 | 3.1 | 7.8 | 8.1 | 7.8 | 7.4 | 8.4 |
| **Number productive nests*:** | 2.0 | 2.0 | 2.0 | 12.0 | 14.0 | 16.0 | 20.0 |
| **Nesting success†:** | 33% | 18% | 40% | 57% | 48% | 62% | 91% |
| **Total estimated ducklings:** | 6.0 | 5.0 | 25.0 | 64.0 | 79.0 | 88.0 | 109.0 |
| **Estimated ducklings/clutch:** | 1.0 | 0.5 | 4.2 | 2.7 | 2.7 | 3.4 | 5.0 |

*Nests considered productive if ≥ one membrane found following spring nesting season
†Nesting success measured as number of productive nests/total number of clutches

Evidence of nest box use by a variety of non-target wildlife species has also been documented. Great-crested flycatchers (*Myiarchus crinitus*) are a cavity-dwelling species known for incorporating shed snake skins into nest construction (Harrison, 1975). The presence of this type of nest in several wood duck boxes on the Carter Tract suggests this species takes advantage of vacant boxes annually. Other avian species that have been documented in next boxes on the Carter Tract include chimney swifts (*Chaetura pelagic*), eastern bluebirds (*Sialia sialis*), Carolina wrens (*Thryothorus ludovicianus*), and eastern screech owls (*Megascops asio*). Two species of mammal have also been documented inside wood duck boxes on the Carter Tract: the southern flying squirrel (*Glaucomys volans*) and southeastern myotis (*Myotis austroriparius*). From fall 2011 through summer 2012, we again documented use of wood duck nest boxes by southeastern myotis, eastern bluebirds, Carolina wrens, great-crested flycatchers, and chimney swifts. Figure 30 shows an eastern screech owl documented in wood duck box #26 on Deep Edge Pond. The exact same box was also used by an eastern screech owl during 2011.

**Figure 30. An eastern screech owl was found nesting in a wood duck box for the second year in a row on Deep Edge Pond, Carter Tract of Econfina Creek WMA, Washington County, Florida, April 2012.**

# Avifauna

Parcels, like the Carter Tract, that support a mosaic of unique habitat types often harbor large numbers of bird species. As such, multiple survey types designed to document different bird groups are performed annually at the Carter Tract. For example, rookery surveys document wading bird use of the Little Deep Edge Pond Rookery. Passerine point counts note species change over time in relation to habitat restoration and bluebird boxes provide an index of the success of secondary cavity-nesting songbirds. Kestrel boxes are used to determine possible residency status of the southeastern American kestrel (*Falco sparverius paulus*). Finally, gamebird populations are monitored using fall covey call counts and summer whistle counts for Northern bobwhite quail and mourning doves are banded each summer as part of a national banding program.

***Wading Birds***

Most wading birds nest semi-colonially in rookeries, often found along the edges of lakes or creeks, or in trees and shrubs growing out of water bodies. Little Deep Edge Pond on the Carter Tract is one such rookery that has been documented as supporting up to 117 individuals representing six species. Great egrets (*Ardea alba*), cattle egrets (*Bubulcus ibis*), and little blue herons (*Egretta caerulea*; SSC) have historically been the most common species documented using the Little Deep Edge Pond rookery, with tricolored herons (*Egretta tricolor;* SSC) occasionally documented. Egrets and herons belong to the family Ardeidae, members of which are locally affected by wetland drainage resulting from urbanization and agricultural expansion. In Florida specifically, changing water regimes have led to the relocation or decline of several species, inlcuding the little blue heron (Sibley et al., 2001). Alteration of habitat remains the greatest threat to most Ardeids today, highlighting the importance of the conservation of unspoiled wetland habitat such as that found on the Carter Tract.

Rookery surveys are done annually from April – July on the Carter Tract. Adult birds are observed first at a distance using binoculars and a spotting scope to get an accurate count of adult birds. A 10-foot jonboat is then used to approach nesting areas in order to count nests, number of eggs, and number of chicks. Nesting areas are disturbed as little as possible while performing nest, egg, and chick counts. Some nests are often situated in locations that are too difficult to get accurate egg counts. In these instances, average number of eggs/clutch for the species observed is used to calculate estimated fledgling success rates.

The spring 2012 wading bird nesting season on the Little Deep Edge rookery was subdued relative to the highly productive 2011 season. However, four little blue heron nests did produce six chicks with a fledgling success rate of 75%. Seven great egret nests also produced six chicks but realized just a 29% fledgling success. This fledgling success rate may be an underestimate as not all nests were located in positions which allowed confirmation of the exact number of eggs. In these cases we calculated fledgling success assuming three eggs were initially laid (based on average number of eggs observed in previous nesting seasons on the Carter Tract). No cattle egrets were observed at the rookery during the spring 2012 nesting season. Approximate location of nests by species is depicted in Figure 31.

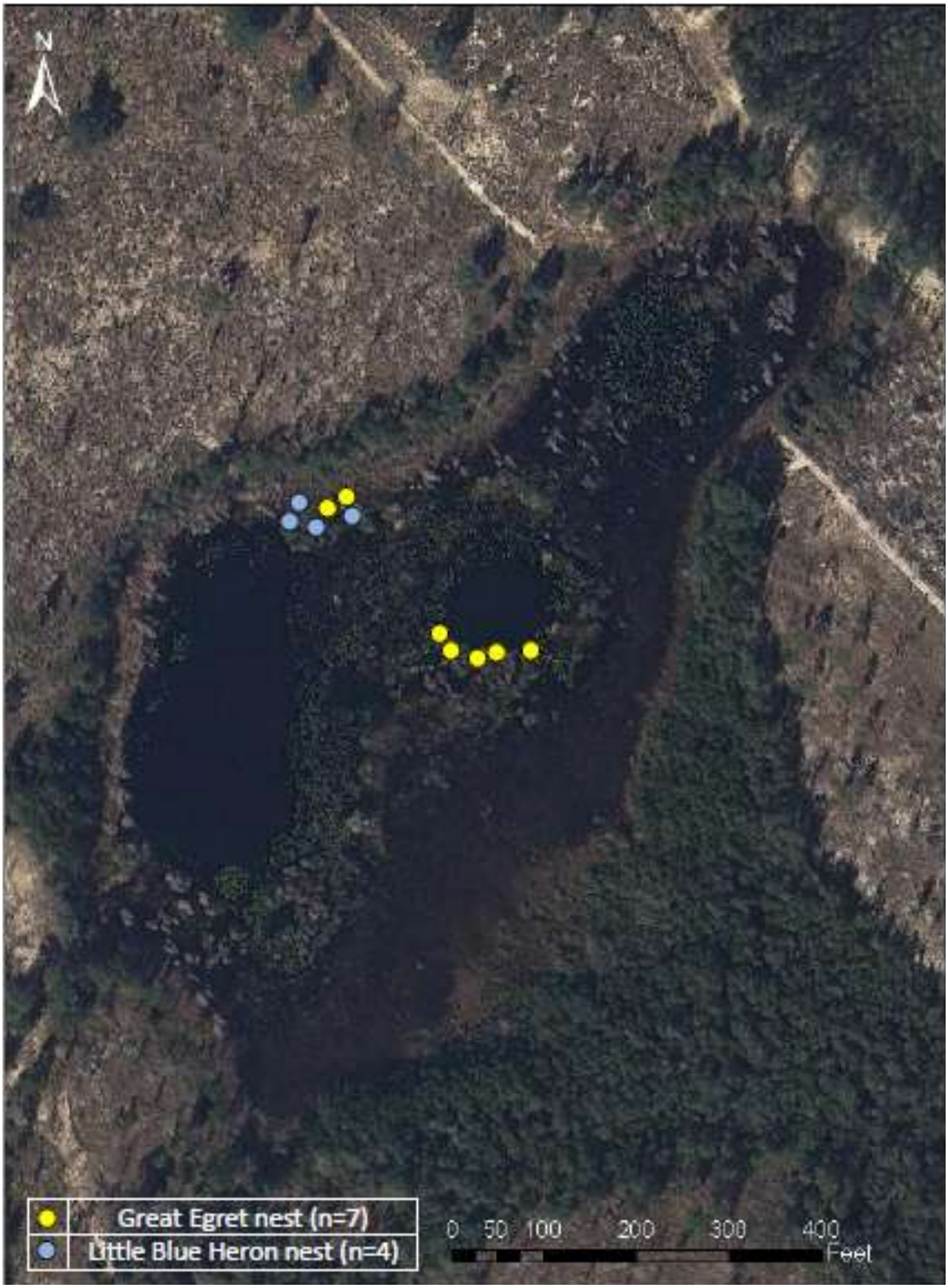


**Figure 31. Great egret (*Ardea alba*) and little blue heron (*Egretta caerulea*) nest locations at Little Deep Edge Pond rookery, Carter Tract of Econfina Creek WMA, Washington County, Florida, April-July 2012.**

The 2012 rookery nesting season produced fewer adult birds, nests, and chicks compared to the extrememely productive 2011 season. However, nesting and chick production by both great egrets and little blue herons still reached their third highest levels over five years of surveys (Figure 32).

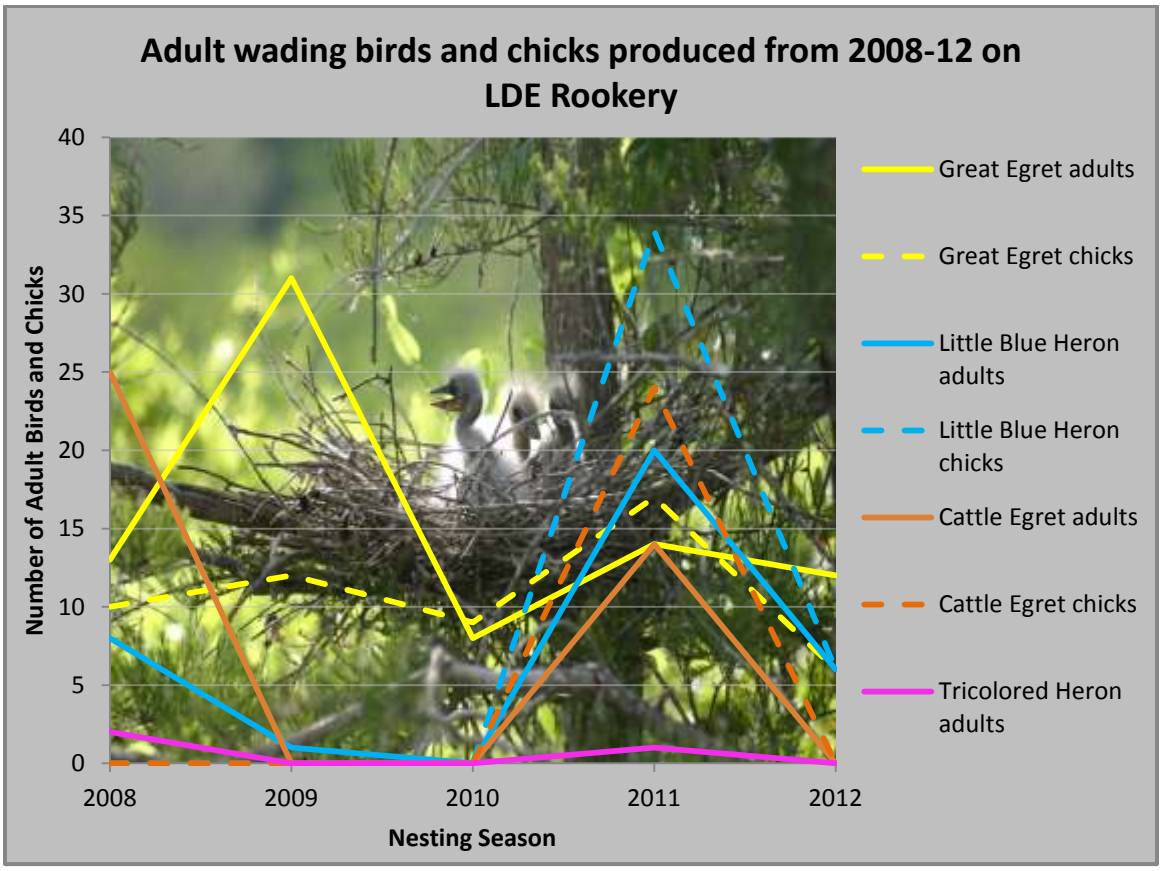


**Figure 32. Adult wading birds and chicks observed on Little Deep Edge rookery from 2008-12, Carter Tract of Econfina Creek WMA, Washington County, Florida.**

It is hard to know exactly why some nesting years are more or less productive than others. One theory suggests that long-lived bird species will adjust nesting efforts according to current conditions in order to balance the costs and benefits of current reproduction with their long-term needs for survival and future reproduction (Herring et al., 2010). "Conditions" could include factors such as rainfall, foraging water body levels, and prey base. These factors can become further intrinsically complicated depending on the time of year within which they fluctuate. To test whether there was a correlation between water levels on major foraging water bodies during

the nesting season and the number of chicks produced by great egrets, little blue herons, and cattle egrets from 2008-12, we preformed a linear regression analysis on the aforementioned data. Results can be found in Table 5 and suggest that water level fluctuation on foraging ponds is not significantly correlated to wading bird chick production at the Little Deep Edge rookery.

**Table 5. Linear regression analysis of the effect of water levels on wading bird reproduction rates from 2008-12 at Little Deep Edge Rookery on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| | LDE Pond | | Black Pond | | Dry Pond | | Green Ponds | |
|---|---|---|---|---|---|---|---|---|
| **Species** | $r^2$ | p-value | $r^2$ | p-value | $r^2$ | p-value | $r^2$ | p-value |
| **Great Egret (*Ardea alba*)** | 0.114 | 0.579 | 0.046 | 0.729 | 0.030 | 0.781 | 0.027 | 0.791 |
| **Little Blue Heron (*Egretta caerulea*)** | 0.015 | 0.847 | 0.030 | 0.780 | 0.087 | 0.631 | 0.060 | 0.691 |
| **Cattle Egret (*Bubulcus ibis*)** | 0.033 | 0.769 | 0.005 | 0.906 | 0.032 | 0.772 | 0.022 | 0.813 |

Additional species observed in/around Little Deep Edge Pond during 2012 rookery surveys included anhinga (*Anhinga anhinga),* osprey (*Pandion haliaetus),* and wood ducks (*Aix sponsa*). A detailed summary of wading birds observed from 2008-2012 at the Little Deep Edge Pond rookery can be found in Appendix VII.

***Passerines***

Annual point count breeding bird surveys are conducted on the Carter Tract. Point count surveys document bird species presence, and can be used to calculate relative abundance among habitat types (Bibby et al., 1992). Point count surveys are most effective during the breeding season, when calling activity is at its peak (Hamel et al., 1996). Survey locations are distributed among the different habitat types as follows: sandhill habitat (Points 2, 6 and 7), wetland/wading bird rookery (Point 1), lake edge (Point 8), wet prairie (Point 4), mixed-hardwood forest (Point 3), and early successional grassland habitat (Point 5) that was clearcut in 2007 (Figure 33).

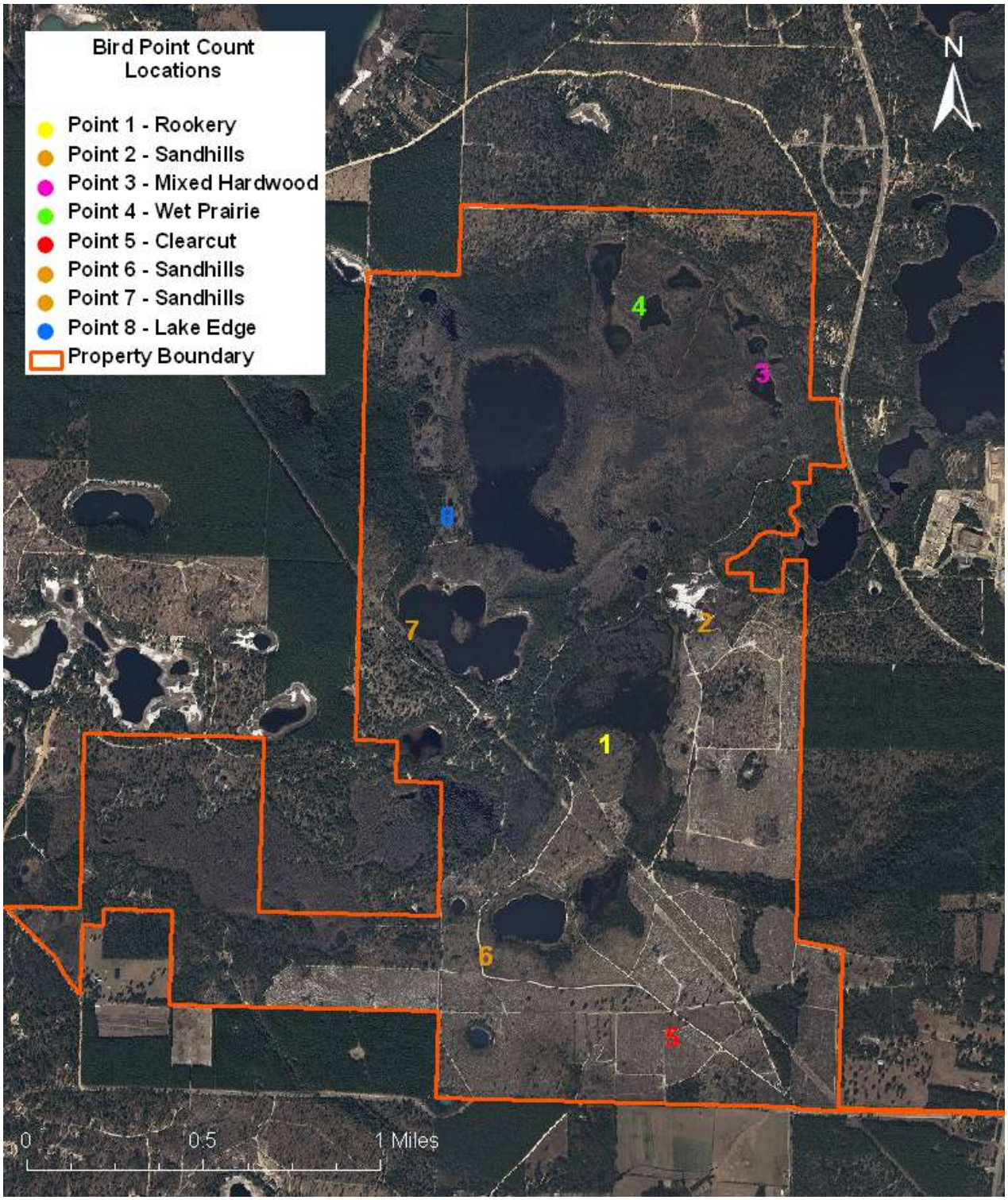


**Figure 33. Location of point count surveys conducted during May 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Except for Point 3, all locations have undergone significant habitat enhancement and restoration efforts. Point counts were conducted from May 1-4, 2012. Protocol followed was consistent with those used in previous years, and closely follow procedures outlined in Hamel et al. (1996). Surveys were conducted in the early morning, when bird activity is typically highest (Hostetler and Martin, 2001), with counts beginning at dawn and ending by 0830. The order in which each count location was visited was alternated among the four survey days. This was done to ensure that counts were conducted in early-, mid-, and late-morning periods for each location, thus accounting for any bias from birds potentially calling more frequently at certain hours during the count period (Hostetler and Martin, 2001). Following arrival at each count location, observers refrained from movement or sound for two minutes prior to the start of the count. Count duration was ten minutes, during which time all birds seen and/or heard within a 75-meter radius were recorded. Birds observed/heard outside of the 75-meter plot were also noted. Only birds positively identified were listed by species; other birds seen and/or heard were marked as "unknown", with distinct plumage characteristics or call patterns noted for later identification.

The three sandhill point count locations chosen were spatially distinct to represent the entire area of the Carter Tract and were similar in vegetative composition (tree stem density and plant species). The most common avian species identified were the cedar waxwing (*Bombycilla cedrorum*), mourning dove (*Zenaida macroura*), great-crested flycatcher (*Myiarchus crinitus*), and blue-gray gnatcatcher (*Polioptila caerulea*; Figure 34). Less common species of note that were observed during 2012 but absent during 2011 included the loggerhead shrike (*Lanius ludovicianus*), orchard oriole (*Icterus spurious*), and white-eyed vireo (*Vireo griseus*). Brown-headed nuthatches (*Sitta pusilla*) and downy woodpeckers (*Picoides pubescens*) were also documented in mature pines. Finally, more Northern bobwhites were documented during 2012 sandhill point counts than 2011. Species count trends within sandhill habitats suggest that management activities designed to control hardwoods and promote herbaceous groundcover (i.e. herbicide and prescribed burning) are beginning to attract habitat specialists to the property.

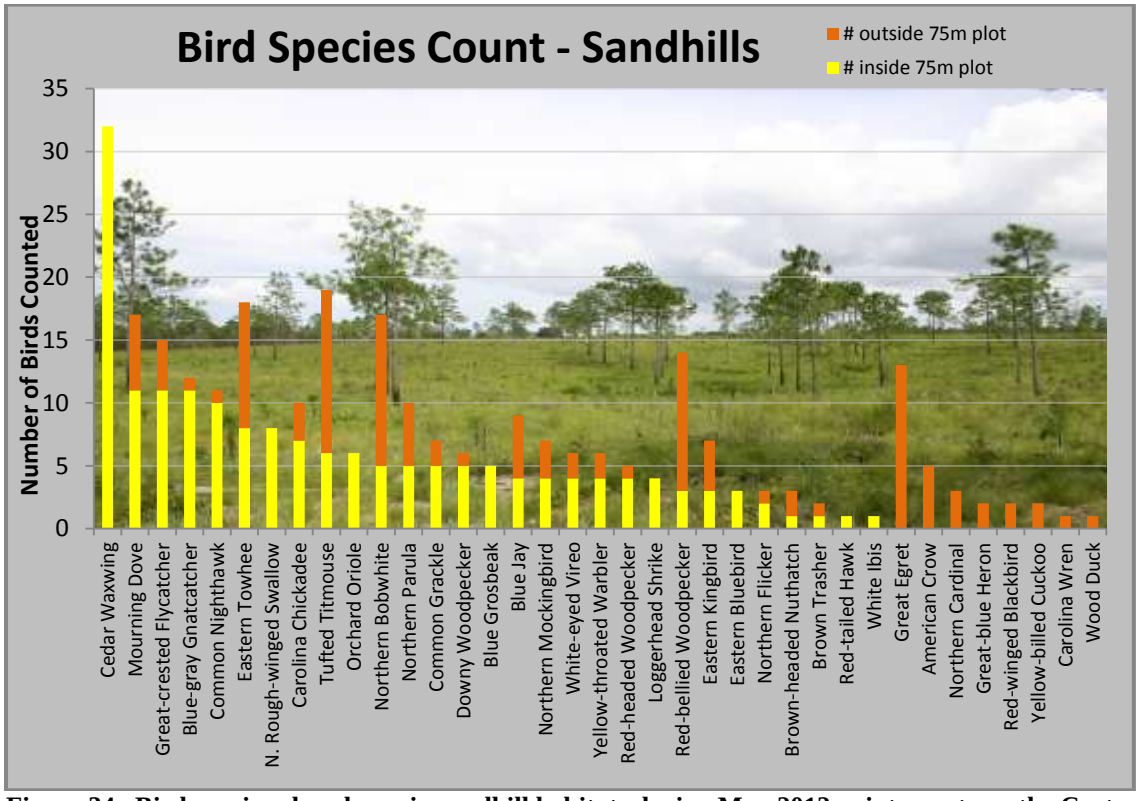


**Figure 34. Bird species abundance in sandhill habitats during May 2012 point counts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

The wetland point count location contains a mixture of open water and freshwater marsh, with a transition zone of emergent aquatic vegetation and shrubs merging with a steep-sloped hardwood hammock adjacent to sandhill uplands. The wading bird rookery on Little Deep Edge Pond is just outside this point count. Great egrets, red-winged blackbirds (*Agelaius phoeniceus*) and common grackles (*Quiscalus quiscula*) were the most common species observed (Figure 35). Northern parulas (*Parula americana*), blue-gray gnatcatchers (*Polioptila caerulea*), red-eyed vireos (*Vireo olivaceus*), tufted titmice (*Baeolophus bicolor*), Carolina wrens (*Thryothorus ludovicianus*), and Eastern bluebirds (*Sialia sialis*) were identified utilizing the hardwood hammock transition zone.

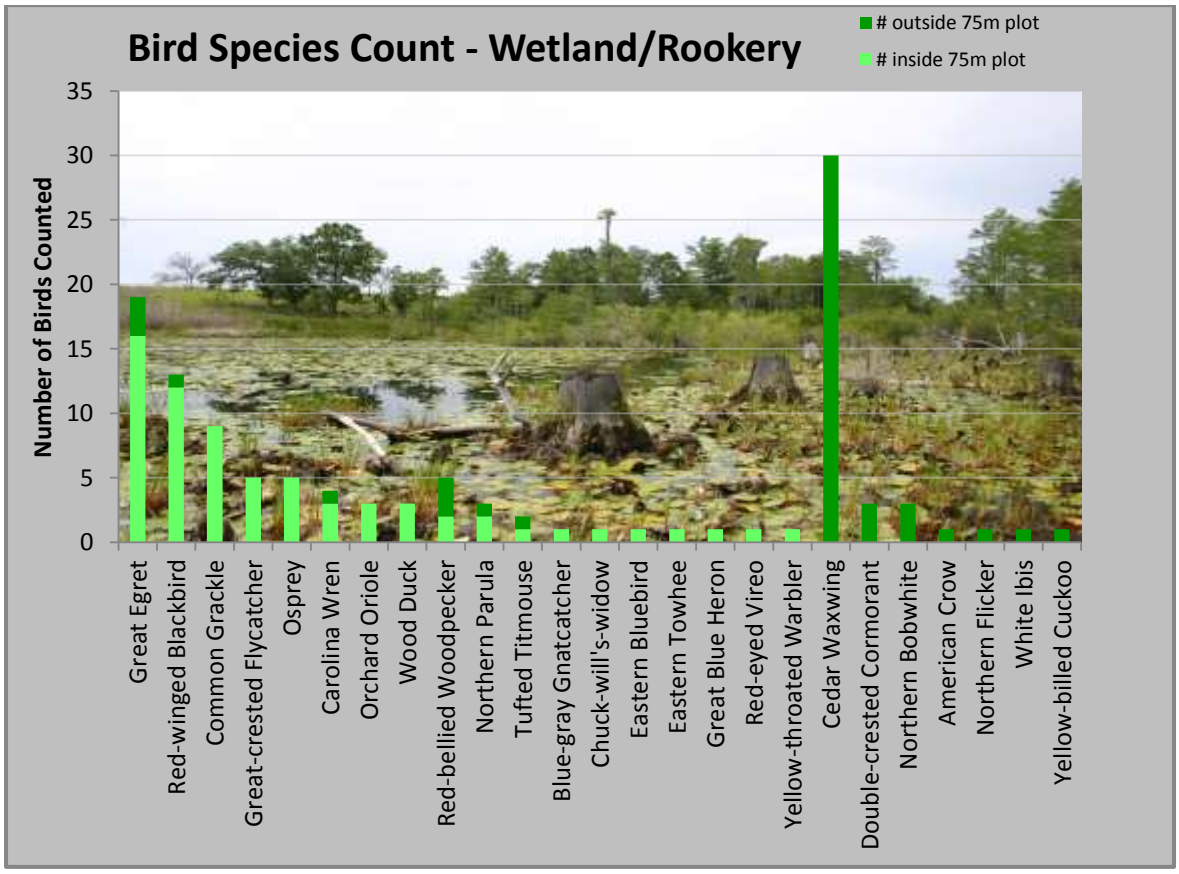


**Figure 35. Bird species abundance in wetland/rookery habitat during May 2012 point counts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

The lake edge point count location is made up of a large body of open water (Dry Pond), and shrubby transition zone leading to hydric pine on one side and mixed wetland hardwoods on the other. This count therefore yields species found in both aquatic and flatwoods habitat types. The most common species identified were the wood duck, blue-gray gnatcatcher (*Polioptila caerulea*), yellow-throated warbler (*Dendroica dominica*), and the great-crested flycatcher (Figure 36). Several standing dead pine trees within this point count make this location a hot-spot for primary (i.e. woodpeckers) and secondary cavity nesters. Woodpeckers documented included the red-bellied, red-headed (*Melanerpes erythrocephalus*), and pileated (*Dryocopus pileatus*) woodpeckers. Secondary cavity nesters observed utilizing woodpecker-created cavitites included Carolina chickadees (*Poecile carolinensis*) and brown-headed nuthatches. Because of its restricted range, dependence on mature pine-savannah habitats, and declining population trend in Florida since 1966 (Sauer et. al., 2008), the brown-headed nuthatch is a species of high conservation importance (U.S. Fish and Wildlife Service, 2008).

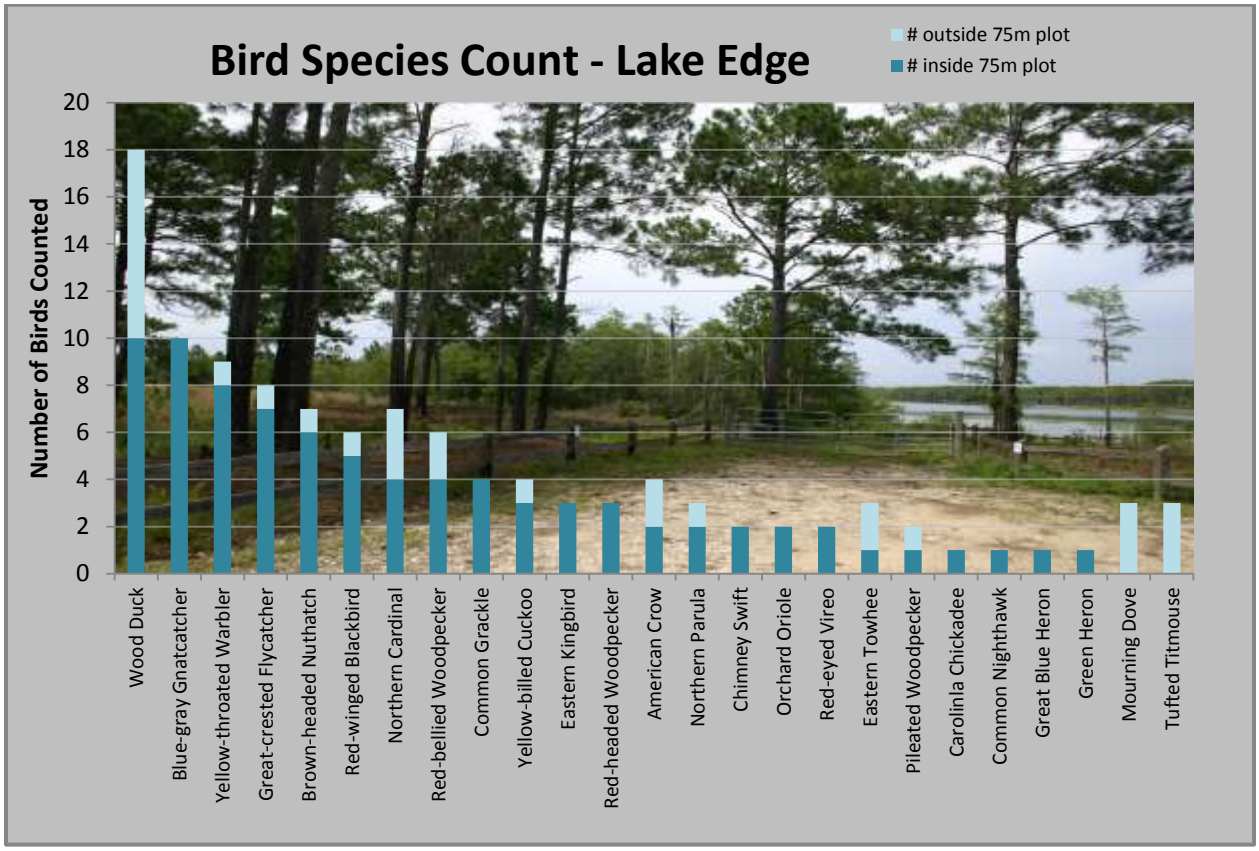


**Figure 36. Bird species abundance in lake edge habitat during May 2012 point counts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

The wet prairie point count location is positioned adjacent to the cypress swamp connecting Dry and Green Ponds. The most common species identified were the Carolina wren, Northern parula, Eastern Towhee, and Northern Cardinal (Figure 37). This is a significant change from the wood storks (*Mycteria americana*) and white ibises (*Eudocimus albus*) that were the most common species documented at this location during 2011 surveys. The shift to songbirds in 2012 might be attributted to the drought that began during late summer 2011. While wood storks and white ibises were observed utilizing receeding puddles throughout the property in late summer 2011, these puddles were virtually non-existent during Spring 2012 point counts, which may have potentially forced wading birds observed in the past to congregate elsewhere.

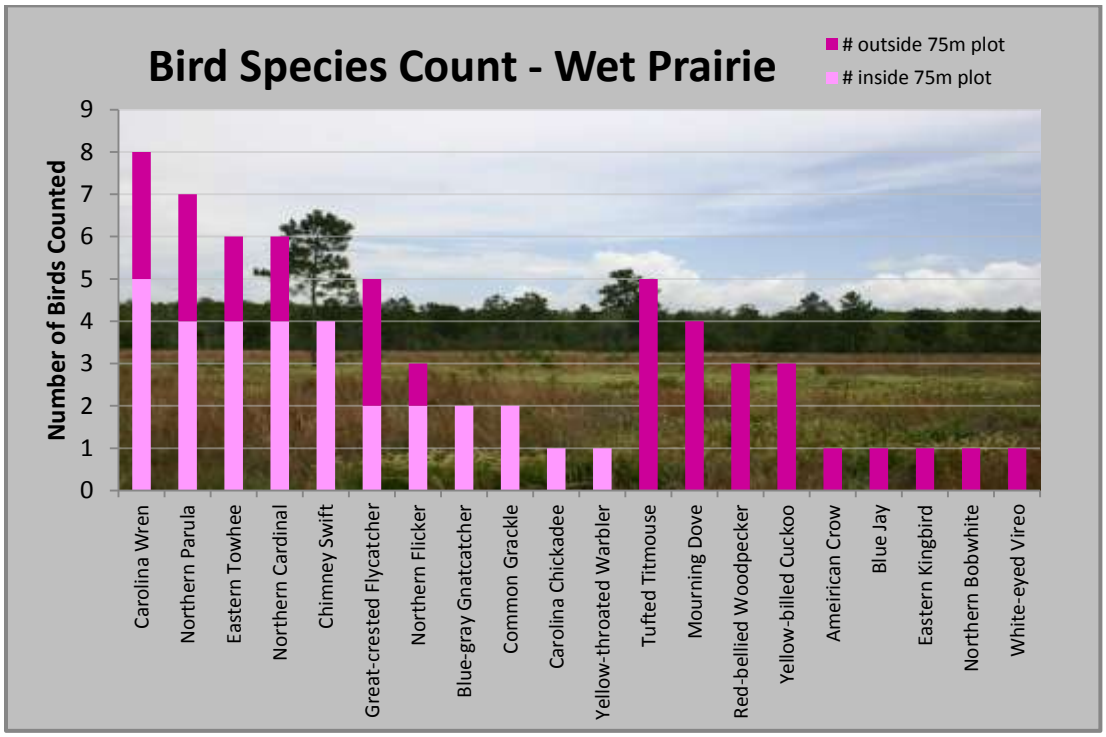


**Figure 37. Bird species abundance in wet prairie habitat during May 2012 point counts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

The mixed hardwood point count location is dominated by live oaks, bays, and holly trees that provide a mostly closed canopy. The Northern parula, blue-gray gnatcatcher, and Carolina wren were the most common species documented at this location (Figure 38). These three species have consistently made up the majority of observations at this location over the last few years. This is likely because the habitat has not been altered in the way that the other point count locations thoughout the property have. Another observation of note at this point count location was the presence of three raptor species: the Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), and barred owl (*Strix varia*; Figure 39). The presence of raptors within a habitat generally suggests good ecosystem health, as adequate small mammal and songbird populations are necessary to support these higher order predator species.

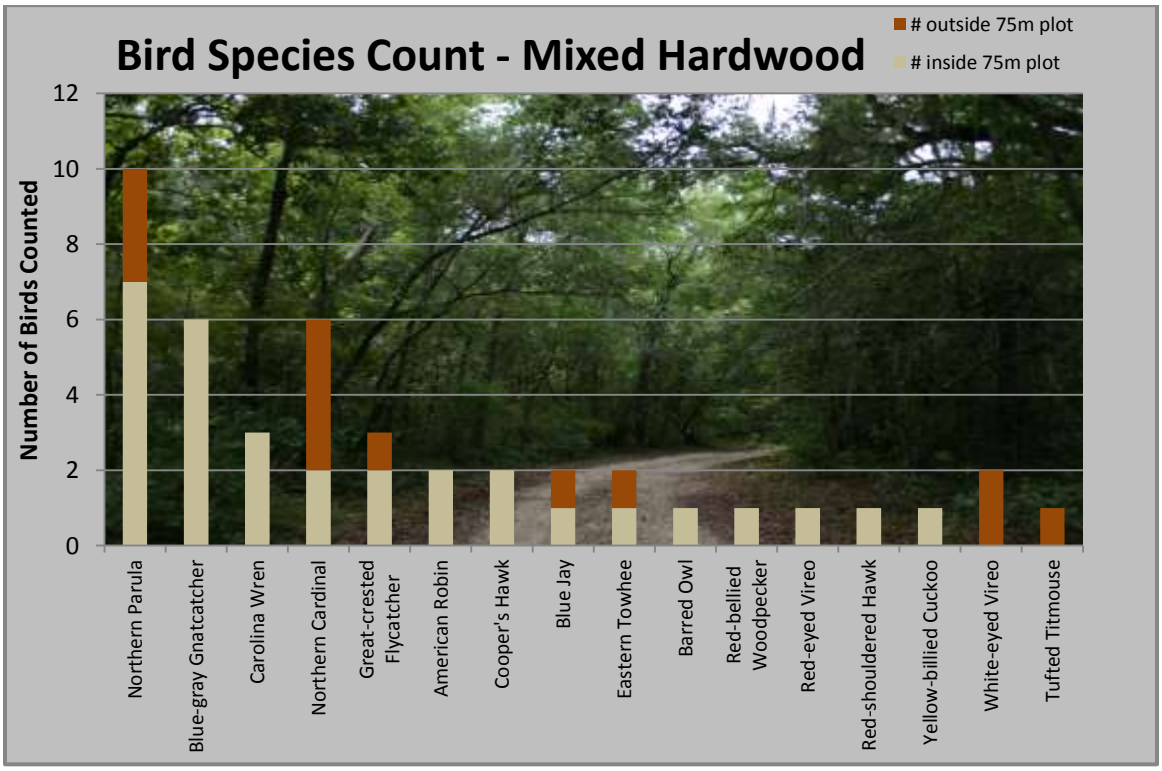


**Figure 38. Bird species abundance in mixed hardwood forest habitat during May 2012 point counts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

**Figure 39. The red-shouldered hawk (*Buteo lineatus*) and barred owl (*Strix varia*) were both documented at the mixed hardwood point count location during spring 2012 surveys on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

The grassland point count location is a former pine plantation that was clearcut in 2007. Current vegetative composition in this area is typical of early successional habitat types, consisting primarily of *Hypericum* sp., foxglove beardtongue (*Penstemon digitalis*), *Lespedeza* sp., wiregrass, broomsedge (*Andropogon virginicus*), and persimmon (*Diospyros virginiana*). The mourning dove and blue jay (*Cyanocitta cristata*) were the most common species counted at this location (Figure 40). Tufted titmice, red-bellied woodpecker, Eastern kingbird, Northern mockingbird (*Mimus polyglottos*), common nighthawk (*Chordeiles minor*), and Eastern meadowlark (*Sturnella magna*) were also documented but less abundant. It is likely that the bird community at this grassland site will continue to evolve in subsequent years as native groundcover becomes established with frequent prescribed fire and longleaf pine seedlings emerge from the grass stage and begin to mature.

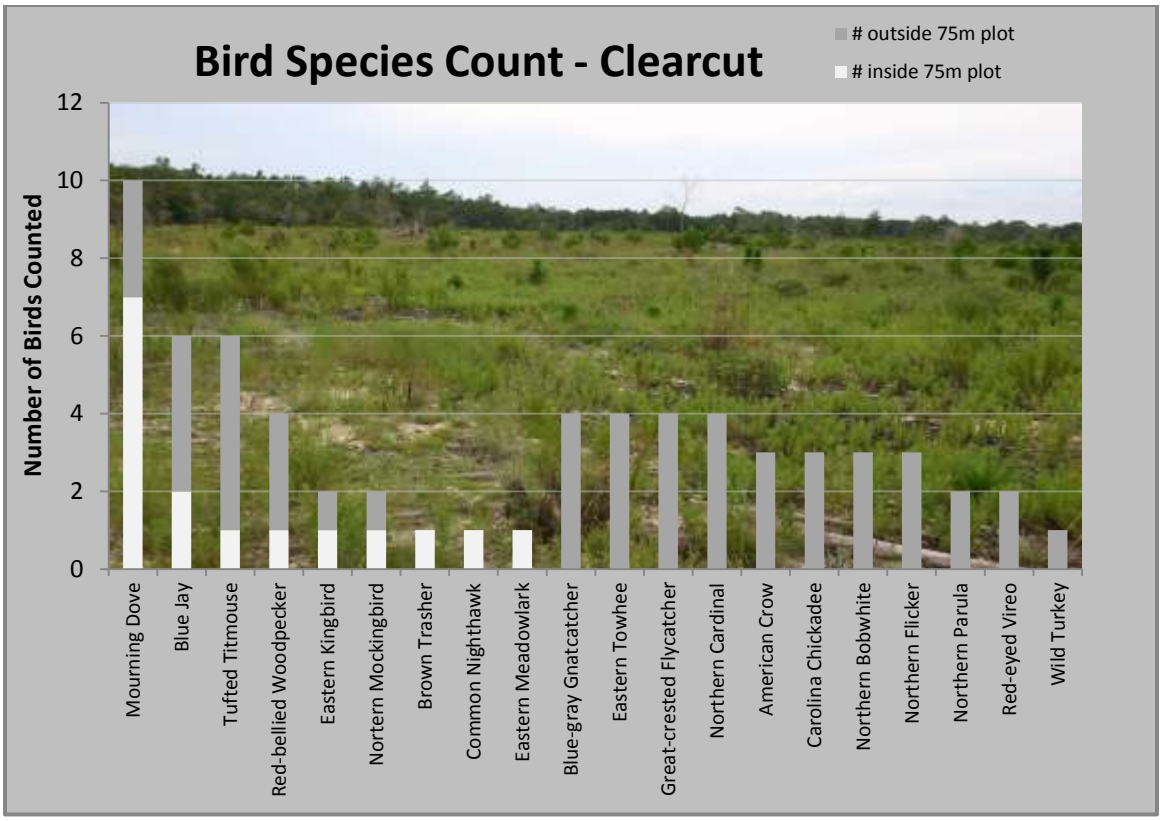


**Figure 40. Bird species abundance in clearcut/grassland habitat during May 2012 point counts on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

To date, 124 species of bird have been documented as occurring on the Carter Tract (Appendix VIII). New species that were documented during 2011-12 include the Vermillion flycatcher (*Pyrocephalus rubinus*; Figure 41), Forster's tern (*Sterna forsteri*), Solitary sandpiper (*Tringa solitaria*), and Least sandpiper (*Calidris minutilla*). With three of the four new species identified during 2011-12 being shorebirds, it is obvious that the unspoiled water bodies of the Carter Tract provide important foraging grounds for migrating shorebirds each year. Bird species count should further increase as the various habitat types on the area continue to be enhanced by restoration efforts and subsequent prescriptions. We would expect through continued habitat enhancement and active management, that recruitment of those bird species that rely on specific habitat characteristics should increase, while still providing for the more common generalist species. In addition to formal annual spring point counts, incidental observations are also made throughout the year to document bird species utilizing the Carter Tract. Spring 2012 point counts documented several species not previously observed during our

formalized surveys. It is encouraging to see the presence of new species utilizing different habitat types on the Carter Tract and is a testament to the success of habitat restoration efforts on the property to date. As restoration and scheduled management activities continue, further species diversification is expected as additional habitat specialists utilize preferred habitat types.

**Figure 41. A Vermillion flycatcher (*Pyrocephalus rubinus*) uses the edge of Dry Pond as a resting spot during the 2011 migration.**

***Bluebird Boxes***

Worldwide bird species diversity continues to decline each year due to habitat fragmentation, development, and degradation. For secondary cavity nesters like the eastern bluebird, this regression has typically been attributed to a decline in available nesting cavities. Further, changing agricultural and silvicultural practices have led to snag removal and replacement of wood fence posts by treated wood or steel posts (Conner, 1974). Since bluebirds are secondary cavity nesters, they rely on primary excavators (i.e. woodpeckers) and natural forces to create suitable cavities for nesting. Competition for cavities has also increased due to growing populations of introduced species such as the European starling (*Sturnus vulgaris*) and house sparrow (*Passer domesticus*). When natural cavities become scarce, nest boxes become important supplementary nesting sites.

During January 2011, efforts were launched to monitor local breeding populations of eastern bluebirds on the Carter Tract. Eighteen nest boxes were fastened to existing fence or sign posts roughly 3.5 – 5 feet off the ground and were oriented on a south/southeast bearing. Boxes were installed throughout the property in locations with open grassy habitat and were located a minimum of 100 yards from the next closest box (Figure 42). Bluebird nest boxes were checked every 7-10 days throughout the breeding season (April – July) to determine occupancy and nest fate. Box construction, installation, and monitoring followed protocol outlined by the U.S. Geologic Survey (USGS) online resources (2006).

Eastern bluebirds and Carolina chickadees utilized all but one established nest box during the 2012 spring nesting season. Bluebirds constructed 24 nests, layed an average of 4.4 eggs/clutch, and fledged 48 chicks (Table 6). Carolina chickadees built four nests, layed an average of 4.4 eggs/clutch, and fledged five chicks. Egg success rate (number of fledged chicks/total number of eggs produced) was 45.3% and 26.3% for bluebirds and chickadees, respectively. From 2011-2012 Carolina chickadees had greater nesting success but almost equivalent egg success rates. Hopefully in subsequent years the increase in nesting success will translate to an increased egg success rate. Eastern bluebird nesting and egg success rates from 2011-12 increased by 18.1% and 26.1%, respectively. Twelve nests appeared to have been predated during the 2012 nesting season, which is a slight increase from the ten nests predated in 2011. The culprit of predation in one case was fire ants; the 11 remaining predations were from unknown predators, but evidence suggested predation by both snakes and rodents. Predator guards were not used so boxes could be installed directly on existing fence/sign posts, which is a common method of mounting/installation. Brawn (1985, 1987) found similar predation rates between unprotected western bluebird (*Sialia mexicana*) boxes and natural cavities. Survey and monitoring of these nest boxes in subsequent years will determine whether predation rates reach levels warranting the installation of predator guards.

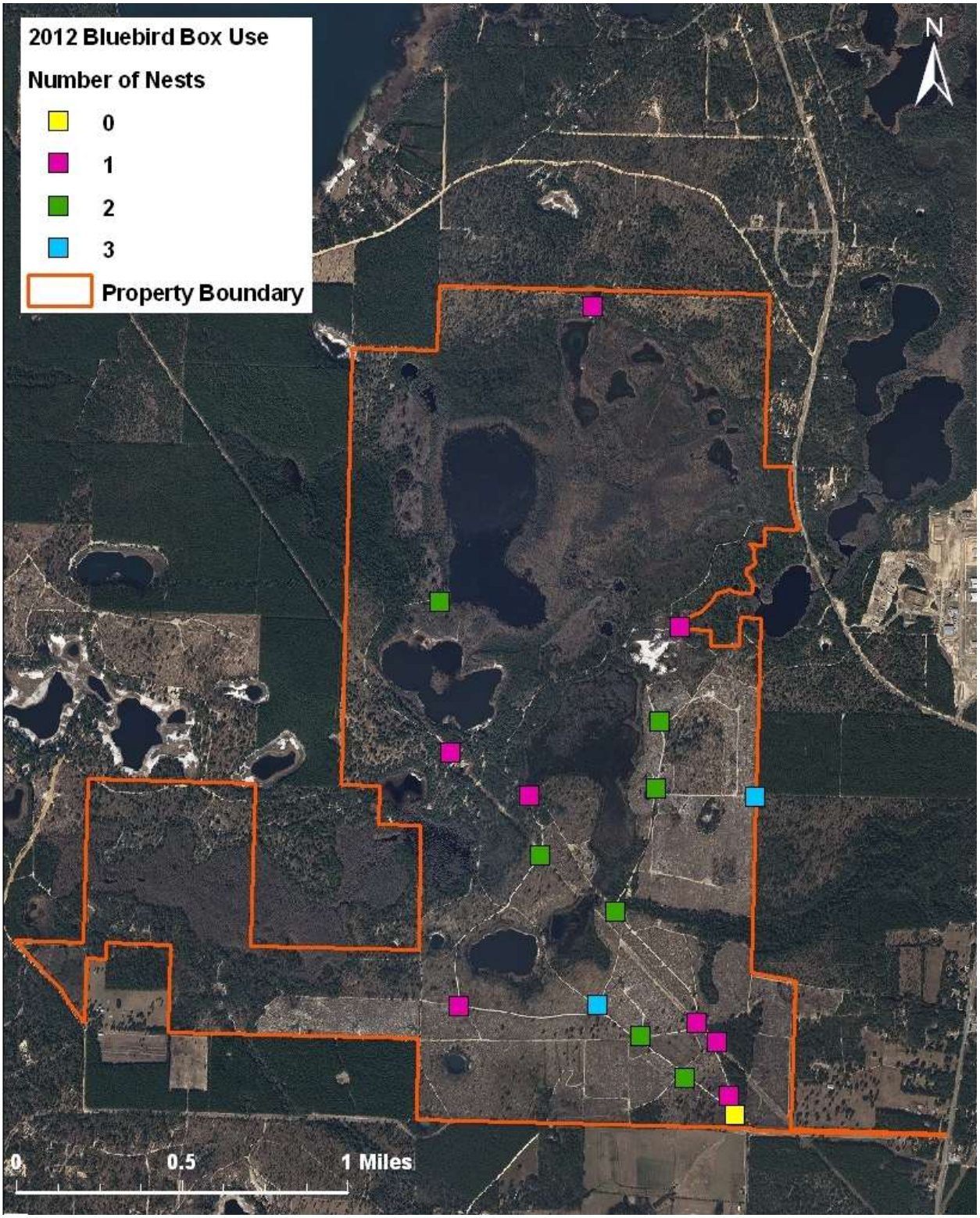


**Figure 42. Location and use of bluebird nest boxes from April – July 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

**Table 6. Bluebird box occupancy, egg success, and nest success on the Carter Tract of Econfina Creek WMA, Washington County, Florida, April – August 2011.**

| Year | Species | Total nests | Total eggs | Avg. clutch size | Nests with young | Total chicks | Fledged chicks | Egg success (fledged chicks/# eggs) | Nest success (nests with young/total nests) |
|---|---|---|---|---|---|---|---|---|---|
| **2011** | Carolina chickadee | 5 | 21 | 4.2 | 3 | 12 | 6 | 28.6% | 60.0% |
| | Eastern bluebird | 18 | 78 | 4.3 | 8 | 22 | 15 | 19.2% | 44.4% |
| **2012** | Carolina chickadee | 4 | 19 | 4.8 | 1 | 5 | 5 | 26.3% | 25.0% |
| | Eastern bluebird | 24 | 106 | 4.4 | 15 | 59 | 48 | 45.3% | 62.5% |

***Kestrel Boxes***

The southeastern American kestrel (*Falco sparverius paulus*) is a subspecies of the American kestrel (*Falco sparverius sparverius*) found in open pine habitats, woodland edges, prairies, and pastures, with a preference for sandhill habitats. The smallest falcon in the U.S., and a threatened species in the state of Florida, the southeastern American kestrel relies on suitable cavity trees as a key habitat feature necessary for breeding (Rodgers, Jr. et al., 1996). However, because kestrels are secondary cavity nesters, suitable nest sites is thought to be the most limiting factor and a major contributor to declining populations in Florida (Hoffman and Collopy, 1988). The decline of natural nesting and foraging habitats in recent years has prompted the use of nest-box programs to help augment populations. Kestrel boxes can also provide important winter cover for other avian species, such as the eastern screech owl (Hipes et al., 2001; U.S. Department of Agriculture, 1999).

FWC staff have observed kestrels at the Carter Tract during previous winters. However, it is unknown whether the birds are migratory/wintering American kestrels or resident southeastern American kestrels. Although southeastern American kestrels are slightly smaller than American kestrels, the two species cannot be reliably distinguished in the field. Because the southeastern American kestrel is the only subspecies of kestrel that breeds in Florida, erecting nest boxes is one method of determining which species is present on the Carter Tract. Therefore, in February 2011 eight nest boxes were installed throughout the Carter Tract following protocol outlined by the U.S. Department of Agriculture (USDA) (1999; Figure 43).

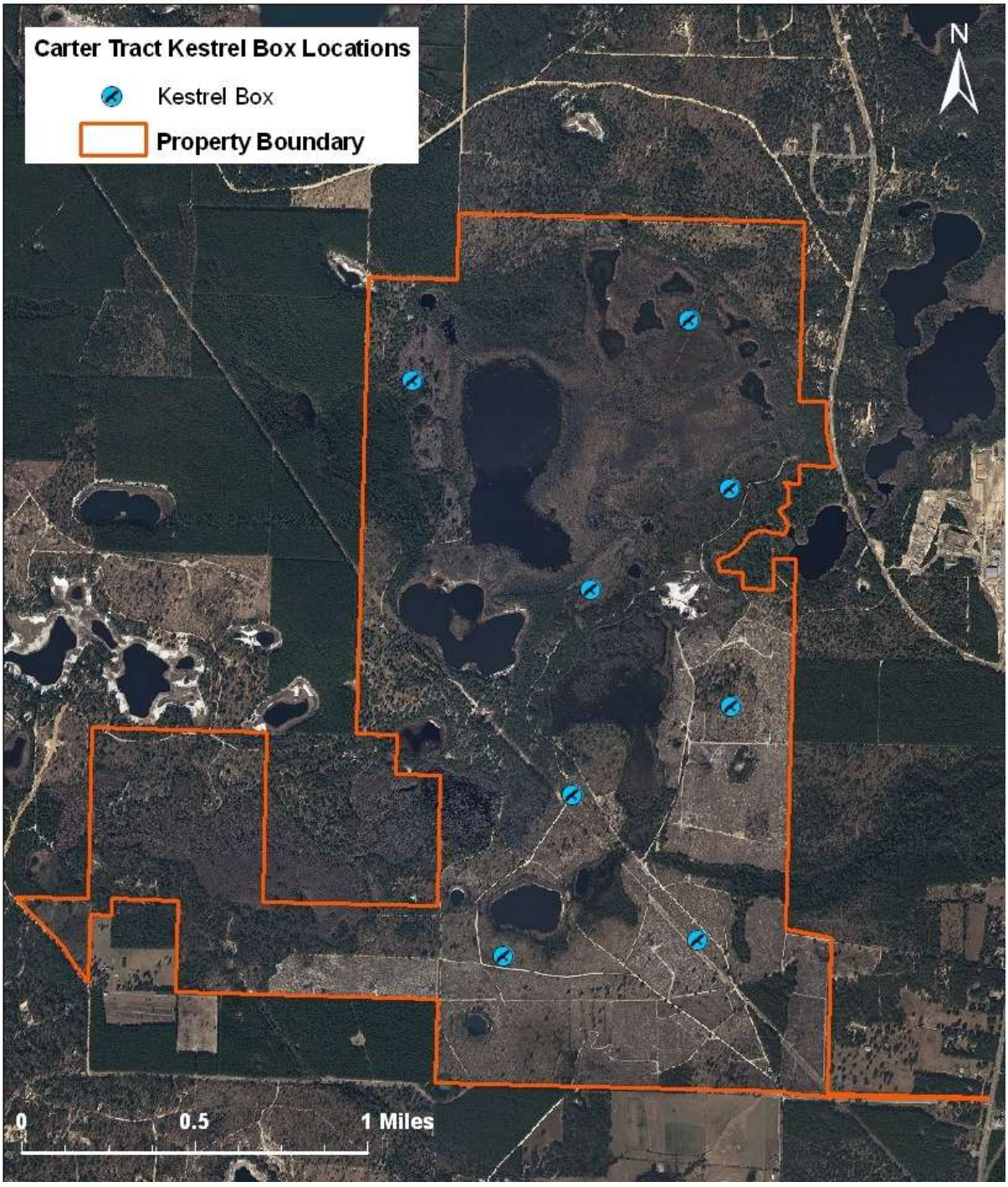


**Figure 43. Location of Kestrel nest boxes at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Nest boxes were installed on mature longleaf pine trees, approximately 15 feet from the ground facing a southeast orientation. Trees chosen were those in open areas, far enough away

from surrounding trees to discourage squirrels from accessing nest boxes. Boxes were located at least ½-milefrom the next nearest nest box. Boxes were filled with cedar shavings as nesting material. Aluminum flashing was wrapped around the base of trees to discourage rat snake predation (Figure 44). Nest box monitoring followed protocol outlined by FWC's Fish and Wildlife Research Institute.

**Figure 44. Kestrel nest box installed on a longleaf pine tree at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

No kestrel nests were recorded during spring 2012. Non-target species documented using kestrel boxes included eastern bluebirds, great-crested flycatchers, tufted titmice, and flying squirrels. Breeding kestrels do not always utilize nest boxes immediately following installation. A similar kestrel box project on Blackwater WMA (approximately 75 miles west of the Carter Tract) documented breeding kestrels one year following box installation (Barbara Almario, pers. comm.). Therefore, kestrel boxes will be monitored again during the 2013 nesting season (February – June).

***Quail Covey Call Counts***

Determining autumn density of Northern bobwhite populations can be important for estimating population responses to land management actvities. Upland habitat restoration activities on the Carter Tract (i.e. establishment of an herbaceous understory, hardwood control, establishment of a 2-3 year prescribed burn rotation) benefit bobwhite populations by providing the right combination of bare ground (for foraging) and herbaceous cover (for nesting and brooding). On areas with extremely low autumn densities (<1 bobwhite/25 acres or 1 covey/300 acres) early morning covey call counts may be the only realistic survey technique. Because a calling covey in the early morning will stimulate other coveys to call, a good technique when surveying low density areas is to stimulate calling by broadcasting taped recordings of covey calls (Wellendorf et al., 2004).

Covey call counts were performed at the Carter Tract from November 29 – December 14, 2011. Nine call count stations were established throughout the property, with survey locations chosen based on habitat, incidental observations of bobwhite activity on the property, and adherence to a 500-meter buffer zone beween count stations (Figure 45). Surveys began approximately 30 minutes prior to official sunrise and generally lasted one hour. A pre-recorded calling sequence was downloaded to an mp3 player and projected through portable speakers. The call was played for ten second loops with one minute breaks in between loops to listen for response calls. This iteration process was repeated until official sunrise, and the speaker was rotated 360 degrees to project the call in all directions. The relative locations of coveys within the 500-meter survey station (Appendix IX) were noted during the survey and attempts were made at the end of the survey to flush each covey to count the number of birds. Surveys were performed on mornings with the following weather conditions: wind speed less than eight miles/hour, cloud cover less than 75%, barometric pressure had not dropped >0.05 inches/Hg in the six hours prior to the survey, and no rain.

Covey call counts during November/December 2011 resulted in response of seven coveys to call stimulation recordings. Figure 45 illustrates the location of coveys heard during surveys. None of the coveys were successfully flushed, therefore the number of birds making up each covey could not be confirmed. It should be noted that of the seven coveys heard and noted in Figure 45, it cannot be confirmed whether or not multiple coveys in the same plot indicate different coveys or simply the same covey that was heard on multiple days. The primary

purpose of covey call counts on the Carter Tract is to monitor bobwhite population trends as restoration activities continue to improve habitat quality across the property. Covey call counts will continue to be performed each autumn to monitor covey density estimates and track population trends over time.

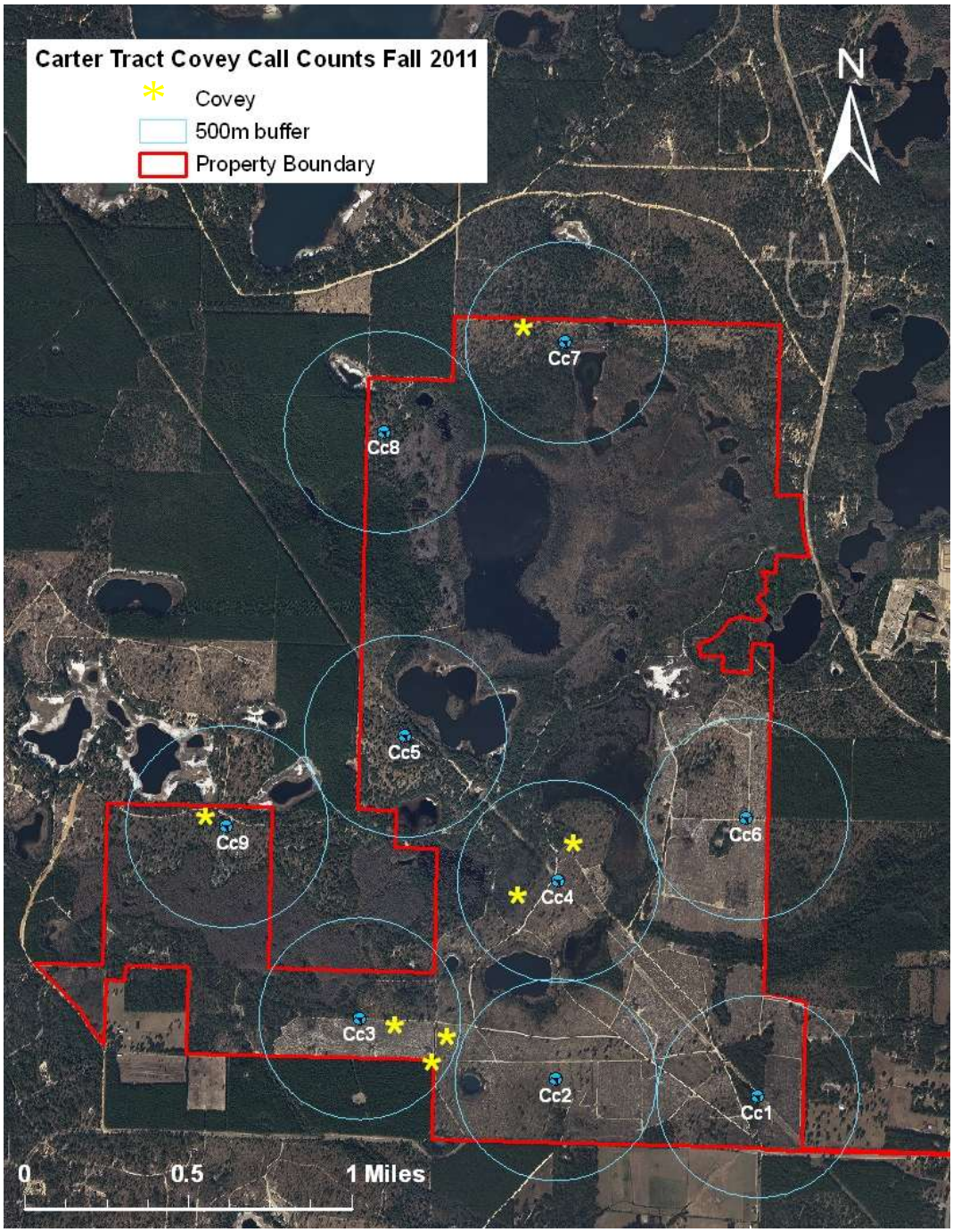


**Figure 45. Northern bobwhite covey call count stations (with 500-m buffers) conducted November/December 2011 at the Carter Tract of Econfina Creek WMA, Washington County, Florida; also shown are approximate covey locations.**

***Summer Whistle Counts***

Conducting summer whistle counts for the Northern bobwhite is a common method of obtaining a population index for this popular game species. It has been shown that there is a strong positive relationship between the number of bobwhites whistling in the summer and the number of coveys established the following fall (Rosene, 1984; Terhune et al., 2006). We therefore chose to conduct summer whistle counts for Northern bobwhites in order to analyze this data in concert with results from covey call counts and subsequent harvest success of bobwhites on the Carter Tract.

Whistle count surveys were conducted from June 14-28, 2012. Our surveys fell within the June 15-July 10 calling peak suggested by Rosene (1984) and the mid-June to late-July peak suggested by Terhune et al. (2006). It was important to conduct surveys during peak whistling dates as intensity of whistling is thought to correspond closely with nesting and hatching activity (Terhune et al., 2006), and thus should be a more robust indicator of overall population estimates. Rosene (1984) and Terhune et al. (2006) also suggested that the best time to conduct whistle counts is during the 'calling optimum' that takes place during the two hours following sunrise. We followed this protocol, beginning surveys exactly at sunrise and completing all surveys within the two hours following official sunrise. Surveys lasted for five minutes per station and 12 total stations were chosen that maintained adequate spatial coverage of the upland habitats of the Carter Tract (Figure 46). One-half mile buffers were maintained between stations to decrease the possibility of double-counting birds. Surveys were not conducted when cloud cover was >50%, windspeed exceeded 12 mph, or under rainy conditions.

Figure 47 illustrates the average number of bobwhites and whistles detected for each listening station. Bobwhites were detected at all but four listening stations. Not surprisingly, those stations (1, 2, 3, 4, 9, 10, 11, 12) which have received the greatest amount of site restoration efforts (including control of hardwoods, planting of wiregrass, burning, etc.) to date yielded the highest whistle/bobwhite counts. Conversely, those stations (5, 6, 7, 8) that still have a substantial mid-story/hardwood shrub component and/or are in need of a more intense prescribed fire regime yielded no whistle/bobwhite detections.

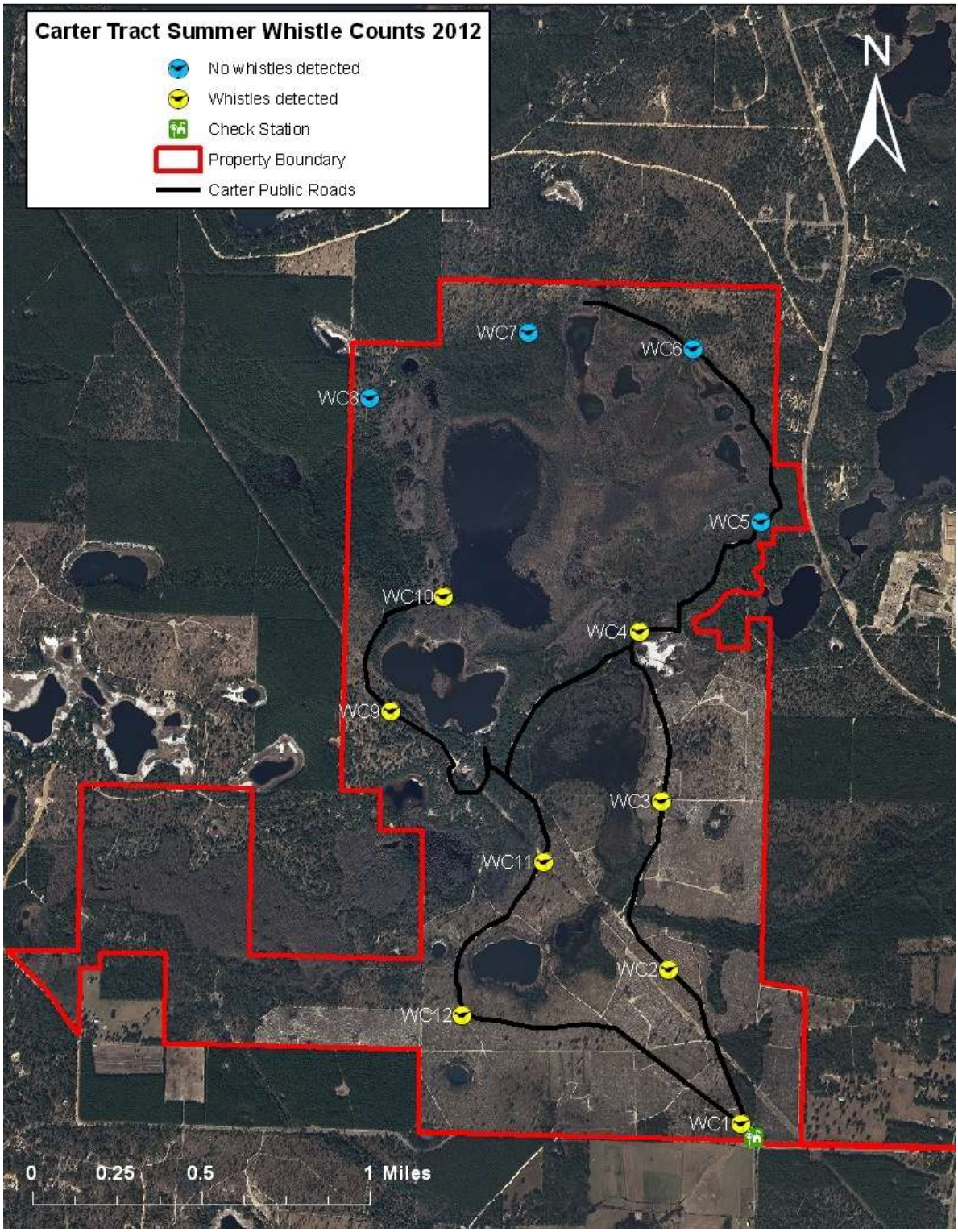


**Figure 46. Locations of Northern bobwhite summer whistle count survey stations conducted during June 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

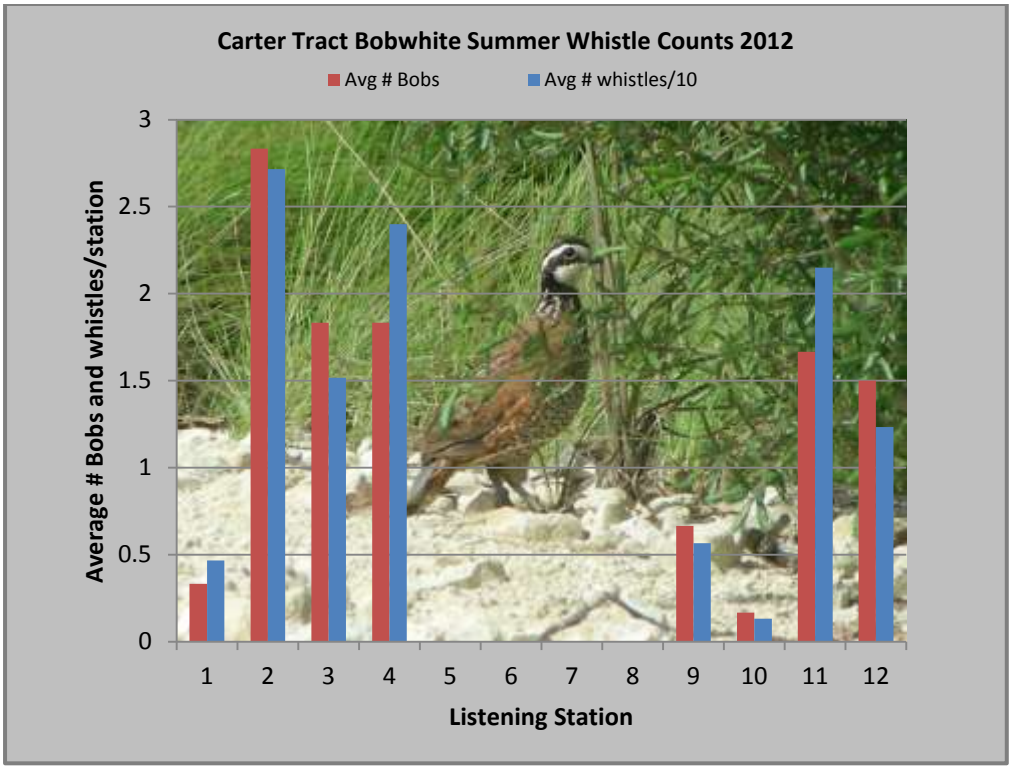


**Figure 47. Results of Northern bobwhite summer whistle counts conducted during June 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

FWC staff counted the total number of bobwhite calls heard per station as well as estimated the number of individual bobwhites calling. A simple linear regression was performed on these data. Results indicated a strong postive correlation ($r^2 = 0.9356$, $p < 0.001$) between total whistles heard per station and the number of individual bobwhites estimated per station (Figure 48). This anaylsis gives us confidence that a higher number of whistles heard per station equates to more individual bobwhites calling at that station. Moreover, by counting the total number of whistles per station we are able to avoid potential observer error in distinguishing the number of individual calling bobwhites. For future bobwhite trend indices, the total number of whistles heard can be used as a barometer for habitat quality, as we assume that better habitat will support more bobwhites. Accordingly, we can use whistle count surveys to make habitat management decisions that improve bobwhite habitat across the Carter Tract by comparing relative abundance trends between habitats. Based on this premise, the upland habitat north of Green and Dry Ponds (stations 5, 6, 7, 8) appears more in need of additional habitat restoration efforts. Specifically, we suggest that these areas be subject to a more aggressive prescribed burn regime, performing

prescribed burns no less than every other year until the residual scrub hardwood component has been adequately reduced.

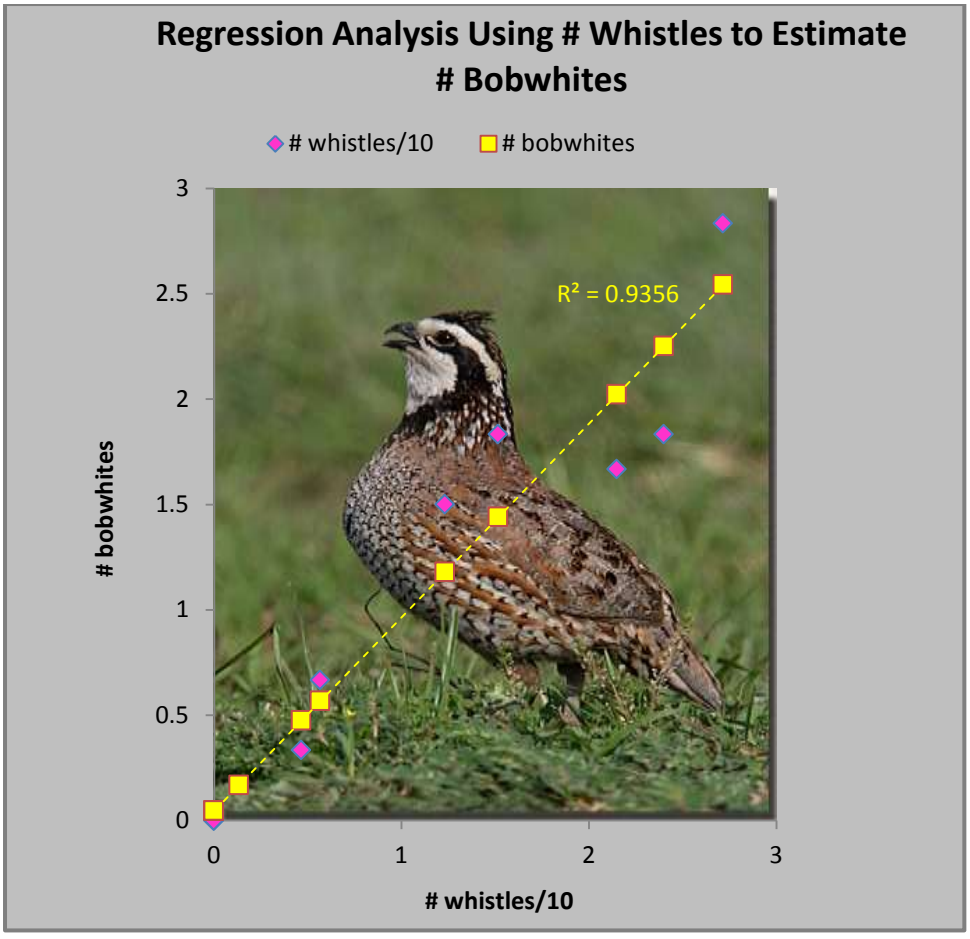


**Figure 48. Regression analysis of 2012 summer whistle count surveys conducted on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

***Mourning Dove Banding***

Contemporary and statistically reliable estimates of harvest rates, survival rates, and geographical distribution and derivation of harvest throughout the United States are necessary to improve science-based harvest management of mourning doves. A three year national pilot banding program was initiated in 2003 to produce data for estimation of these demographic parameters. This cooperative effort between state wildlife agencies, the U.S. Fish and Wildlife Service (USFWS), and the U.S. Geological Survey Bird Banding Laboratory (BBL) resulted in much needed information for improvement of dove harvest management. The pilot study

represented the only source of contemporary information available on a large-scale basis (26 states), as the last comprehensive banding program occurred from 1965-1975. Goals and objectives of this study included:

- Estimate age-specific harvest rates and band reporting rates in a representative set of sub-regions in each of the three national dove harvest management units
- Estimate band reporting rates with the same subregions
- Establish protocols, training, and cost estimates for a future coordinated nationwide banding program designed to monitor harvest and survival rates
- Provide information on geographical distribution and derivation of harvest
- Provide initial estimates of annual survival and breeding site fidelity of subregion breeding populations

The field protocols and sampling designs used and tested by the cooperating state agency field staffs, and the resultant parameter estimates generated from this pilot study, were critical in the design of a cooperative state and federal long-term operational banding program. As part of this national long-term banding program, FWC's Small Game Management Program solicited WMAs throughout the state to participate in this banding work. FWC on the Carter Tract has chosen to participate and contribute to Florida's statewide dove-banding project in cooperation with the USFWS and BBL (Figure 49). These efforts are integral components in the development and implementation of a long term national harvest management strategy for mourning doves. Hunters play an important role in the success of the program and are encouraged to report leg bands at 1-800-327-BAND, or online at www.pwrc.usgs.gov (select "Birds", then "Bird Banding Lab"). Interestingly, according to 2003-2010 mourning dove band returns (n=301), 85% of doves harvested in Florida originated in Florida (Kurt Hodges, FWC, pers. comm.).

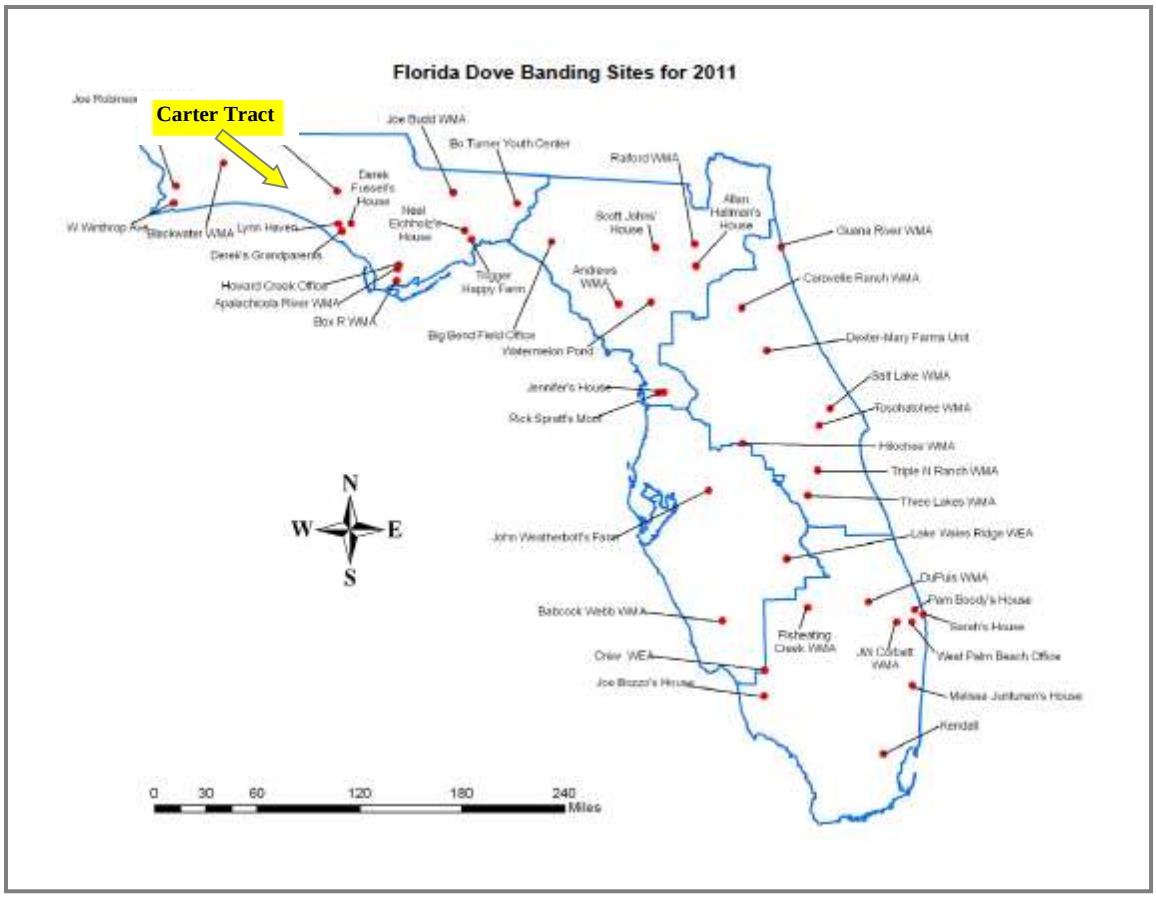


**Figure 49. In conjunction with national long-term banding efforts, the Carter Tract of Econfina Creek WMA in Washington County, Florida is one of the sites participating in Florida's statewide dove banding program.**

Two sites on the Carter Tract were prebaited with white millet seed in June 2011, prior to trapping. Trapping was conducted beginning July 1, 2011 with traps set in the early morning and late afternoon. Traps were checked after 1-2 hours, depending on weather conditions. Doves were banded using U.S. Fish and Wildlife Service metal identification bands, and age (HY = hatch year; AHY= after hatch year), sex, and molt sequence data were collected for each bird (Figure 50). Twenty mourning doves (11 HY; 9 AHY) were successfully banded during the 2011 capture/banding effort, and there were no recaptures of birds banded in previous years.

**Figure 50. Mourning doves were trapped (left), banded with U.S. Fish and Wildlife identification bands, and age, sex, and molt sequence (right) were recorded in July 2011 on the Carter Tract of Econfina Creek WMA, Washington County, Florida (arrow denotes the emergence of new primary feather #06 following molting on a hatch year mourning dove).**

## Herpetofauna

FWC staff employ a host of methods for surveying herpetofauna populations at the Carter Tract, including drift fences, minnow traps, frog tubes, box-style snake traps, pitfall traps, turtle hoop traps, and incidental observations. A comprehensive list of all herpetofauna species (n=61) identified on the Carter Tract from 2005 to present has been compiled (Appendix X). Since July 2011, seven previously unconfirmed herpetofauna species were identified as occurring on the Carter Tract, bringing the current species count to 38 reptiles and 23 amphibians. Sandhill and scrub habitats, as well as seasonal isolated wetlands and small ponds are among the most important and imperiled habitats for southeastern herpetofauna. Additionally, most amphibians that rely on seasonal wetlands or ponds for reproduction also require upland habitats (Bailey et al., 2006). The Carter Tract is an example of a good mix of both permanent (e.g. Dry Pond) and intermediate (e.g. Pine Log Creek and Garrett Pond) aquatic habitats interspersed with adjacent upland sandhills. The presence of the gopher tortoise (*Gopherus polyphemus*) in the sandhill areas of the tract is significant not only because it is a state Threatened species, but also because their burrows are beneficial to a host of commensalistic species that utilize them (both active and abandoned) for shelter and foraging (Jackson and Milstrey, 1989). Specifically, the federally and state Threatened eastern indigo snake (*Drymarchon courais couperi*), in addition to the gopher

frog (*Rana capito*) and Florida pine snake, both SSC, are known to use gopher tortoise burrows (Moler, 1992; Ashton and Ashton, 2008). As in previous years, a detailed report on the *Annual Survey and Monitoring of the Gopher Tortoise on the Carter Tract* will be submitted separate from this comprehensive annual report.

***Drift Fences***

Due to drought conditions which began in October 2011 and continued through June 2012, ephemeral water bodies on the Carter Tract that are usually targeted for amphibian trapping remained dry. Therefore drift fences were not set during that time period. Hopefully late summer rains will refill ephemeral water bodies so that amphibian trapping via drift fences can be reinstated starting in the late fall/early winter 2012.

***Minnow Traps***

Drought conditions previously described precluded the use of minnow traps in most water bodies during the majority of 2011-12. However, a few heavy rains in March 2012 filled three previously dry water bodies, providing good breeding spots for amphibians. To document species use of this brief wet period we set minnow traps in four locations (Figure 51) over 18 nights. Minnow traps were placed partially submerged in shallow water at the edges of ponds, and were pulled as dry conditions resumed and water bodies dried up. A total of 25 minnow traps were set during April 2012 and documented use of the four sampled ephemeral ponds by southern toads (*Bufo terrestris*), southern leopard frogs (*Rana sphenocephala*), barking treefrogs (*Hlya gratiosa*), pinewoods treefrogs (*Hyla femoralis*), and southern cricket frogs (*Acris gryllus*). Tadpoles of all species were documented using at least one of the four ponds sampled. Carter Tract staff will continue to use minnow traps in the future (as water levels allow) during strategic months to document use of area water bodies by frogs, toads, and salamanders.

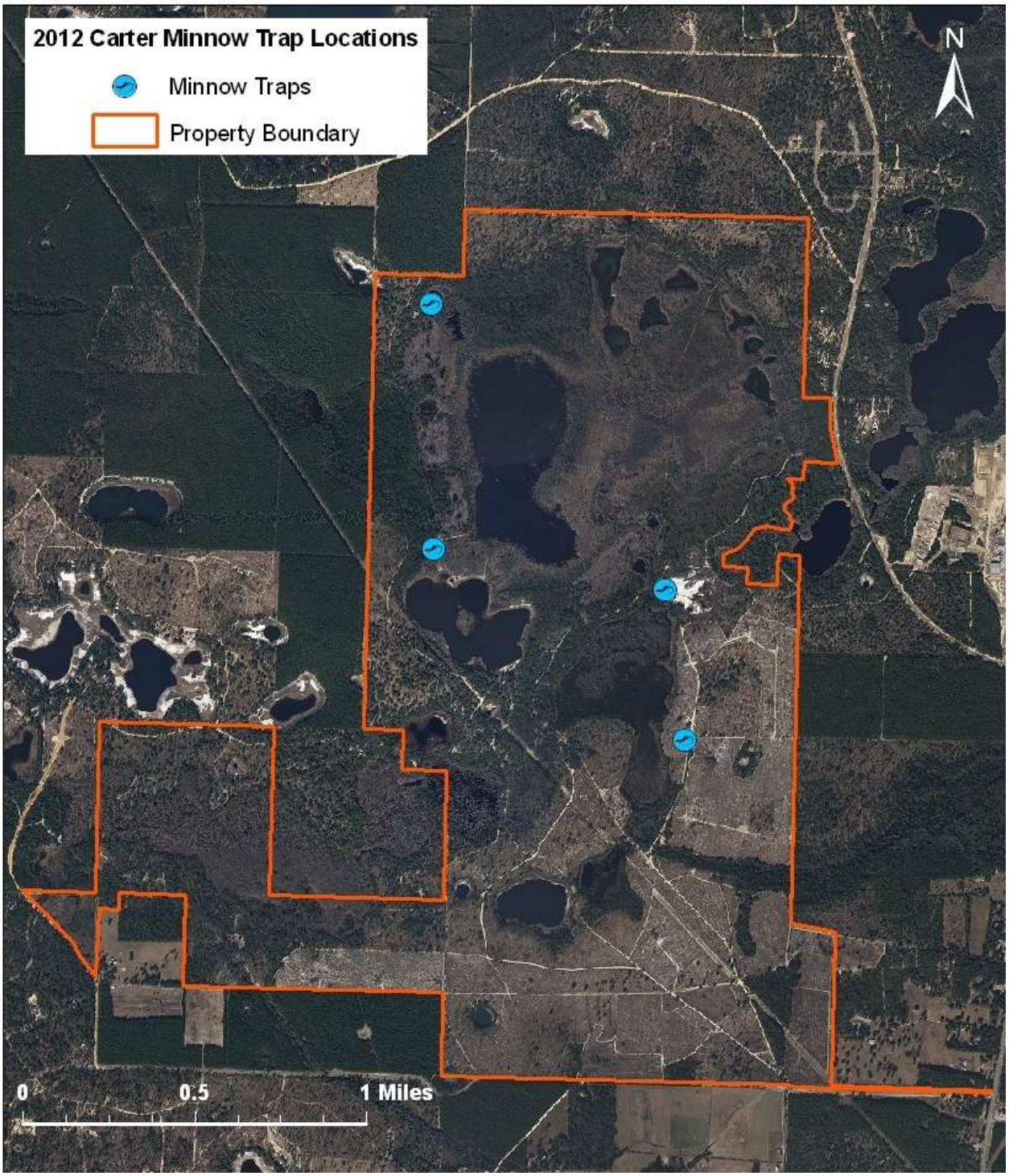


**Figure 51. Location of aquatic funnel (minnow) traps used for sampling herpetofauna on the Carter Tract of Econfina Creek WMA, Washington County, Florida, April 2012.**

***Frog Tubes***

In early spring 2010, treefrog tubes (n=24) were installed across the Carter Tract on trees adjacent to water bodies (Figure 52). Frog tubes were constructed of 1.5-inch diameter PVC tubing, capped on the bottom. Tubes are 24 inches in length and contain a 1/8-inch diameter hole in the side approximately four inches from the bottom to drain excess water. A nylon string attached to the side of the tube on the inside serves as an escape mechanism for non-target species. Frog tubes were not installed to assess frog population estimates at the Carter Tract, but rather to serve as a passive survey method for identifying new species. Therefore, frog tubes were not checked on a regular basis, but periodically based on season, ambient temperature, rainfall, etc. Periodic checks from July 2011 – June 2012 documented pinewoods, barking, and green treefrogs (*Hyla cinerea*) utilizing frog tubes around the Green Ponds. Frog tubes will remain in place each year and replaced as necessary. Frog tubes will continue to be checked periodically througout each year in an attempt to document/confirm the presence of new species. For example, the gray treefrog (*Hyla chrysoscelis/versicolor*) has been documented as occurring elsewhere in Washington County, but not on the Carter Tract to date, and the bird-voiced treefrog (*Hyla avivoca*) has been heard calling on the Carter Tract but staff have yet to capture this species.

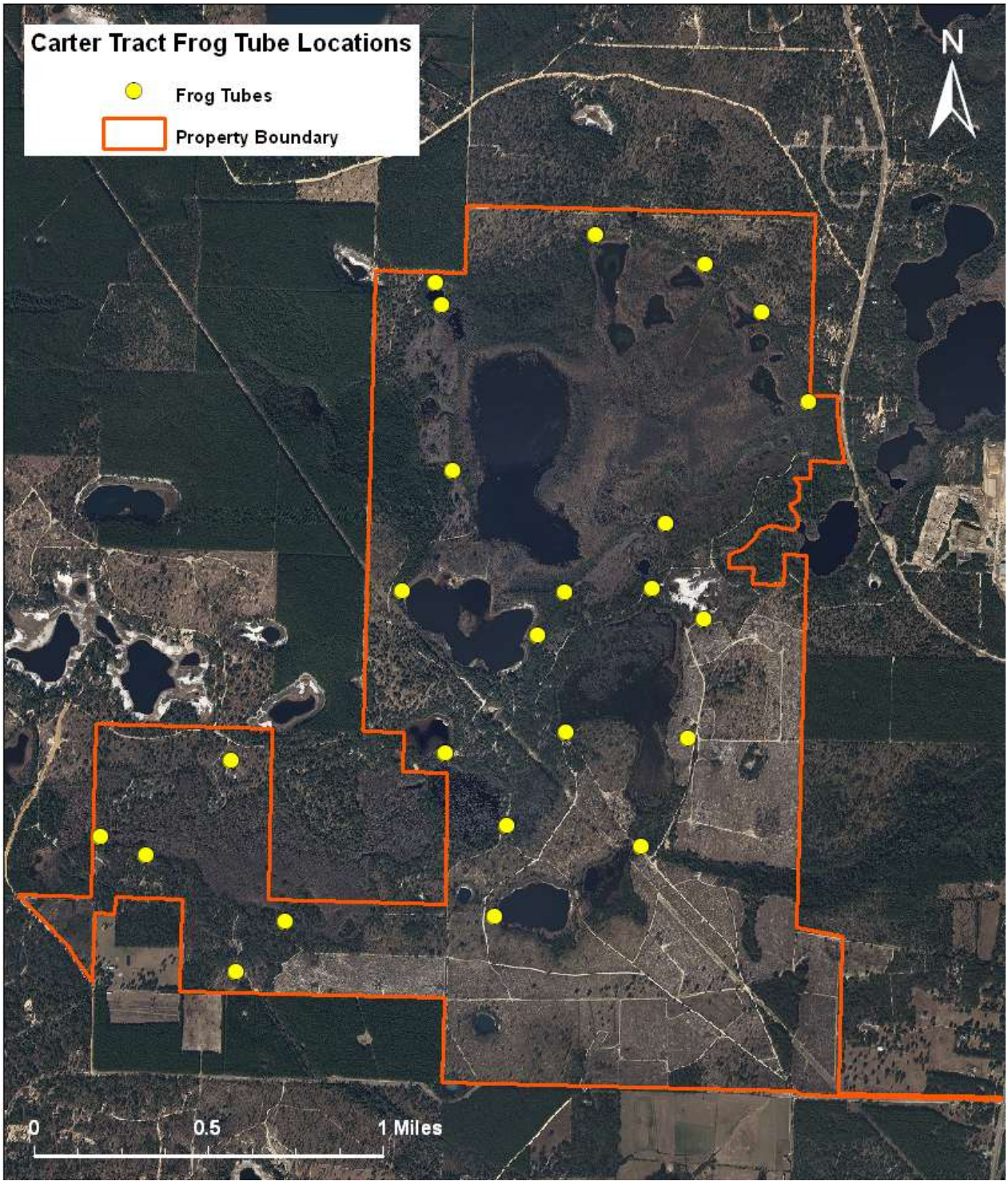


**Figure 52. Location of treefrog tubes on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

***Snake Traps***

Because of their size, large terrestrial snakes such as racers, rat snakes, coachwhips, Florida pine snakes (SSC), and the eastern indigo snake (Threatened) can be difficult to capture using traditional survey methods. Use of traps specifically designed to capture these large terrestrial species is the most effective method for documenting their numbers on the Carter Tract. We therefore constructed three box-style snake traps (Appendix XI) and installed them in conjunction with four 100-foot drift fence arms during spring 2010 (Figure 53). Three spatially distinct upland sandhill habitats were chosen based on their vegetation composition and structure, as well as proximity to mesic habitats (Figure 54). Two 5-gal buckets were installed on each side of the four arms of drift fence leading to the box trap (eight total buckets per array) to aid in capturing small-bodied terrestrial snakes, lizards, small mammals, and amphibians. Buckets were maintained with 1-2 inches of soil and a 3 x 5-inch sponge saturated with water to help prevent dessication. The bottoms of buckets were perforated to allow excess rainwater to drain and to prevent drowning of captured animals. Box traps were maintained with a 1.5-gal water tray, and were checked daily beginning in the early morning to prevent dessication and undue stress on captured animals. Traps contained a 22-ounce tin can filled with dried grass to act as refugia for any small mammals captured. All traps were built with a side access door capable of being propped open when traps are not in use.

**Figure 53. Upland snake trap used for surveying herpetofauna on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

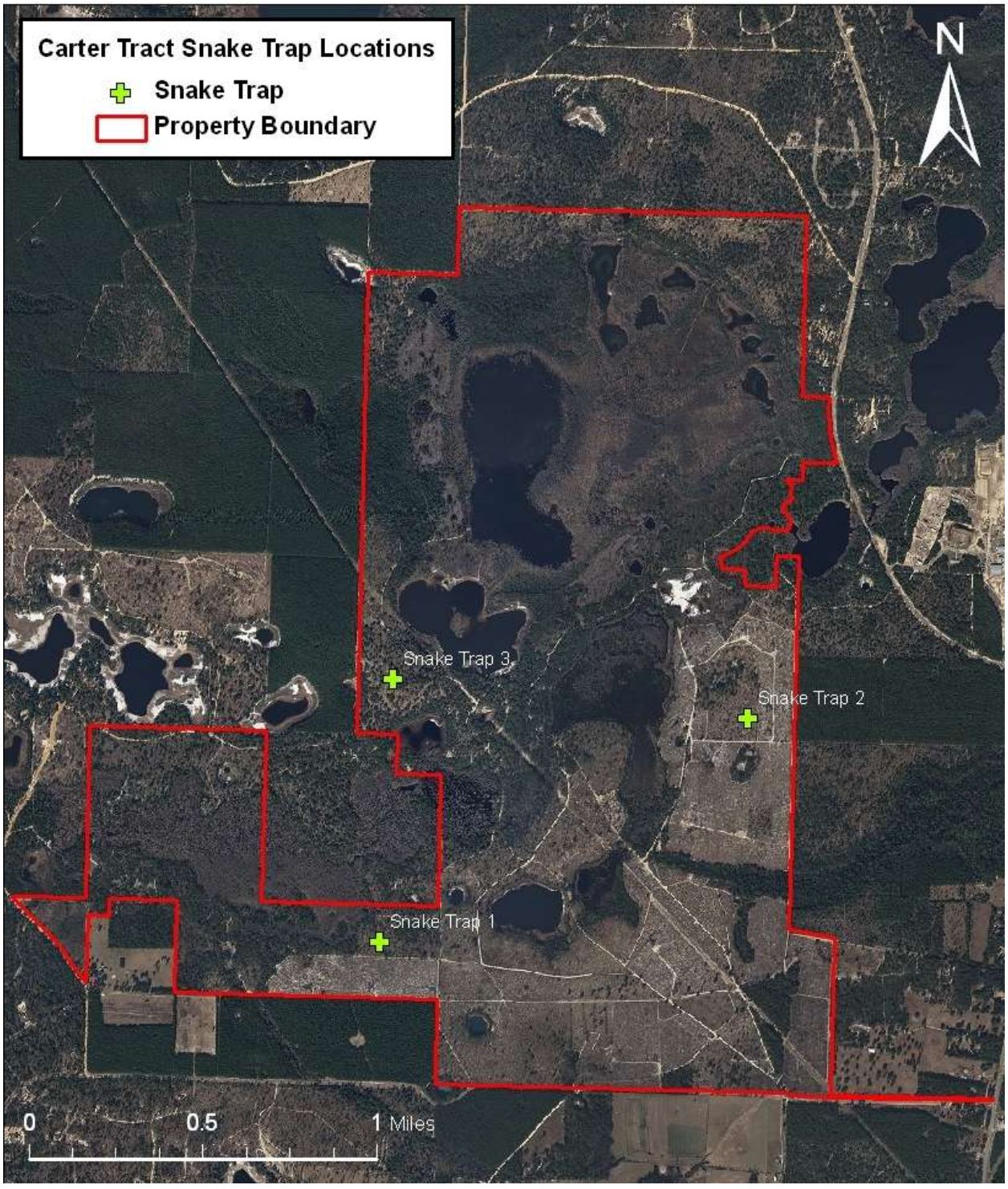


**Figure 54. Location of upland snake traps used for sampling herpetofauna on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Traps were set four days a week (Monday – Thursday) from September-October 2011 and March-May 2012. Over 189 trap nights, 169 individual animals representing 21 species were captured (Figure 55). Sixty-six percent of animals were captured in buckets while the remaining 34% were captured in box traps. Lizards were the most captured taxa group, with the majority (71%) being captured in buckets. Snakes were the second most captured taxa group, with the majority (60%) being captured via box trap. For the second year in a row the eastern coachwhip (*Masticophis flagellum*; n=16) and southern black racer (*Coluber constrictor priapus*; n=14) were the most frequently captured snake species. This is not surprising as these species are large snakes that actively hunt across the landscape, thus increasing their chances of encountering a trapping array. Two species of note that were captured include the eastern coral snake (*Micrurus fulvius*) and rarely encountered smooth earth snake (*Virginia valeriae*). All non-venomous adult snakes captured were marked by clipping belly scutes in a unique numerical pattern following procedures outlined by Enge (1997). Juvenile snakes that were too small were note marked via belly scute clipping.

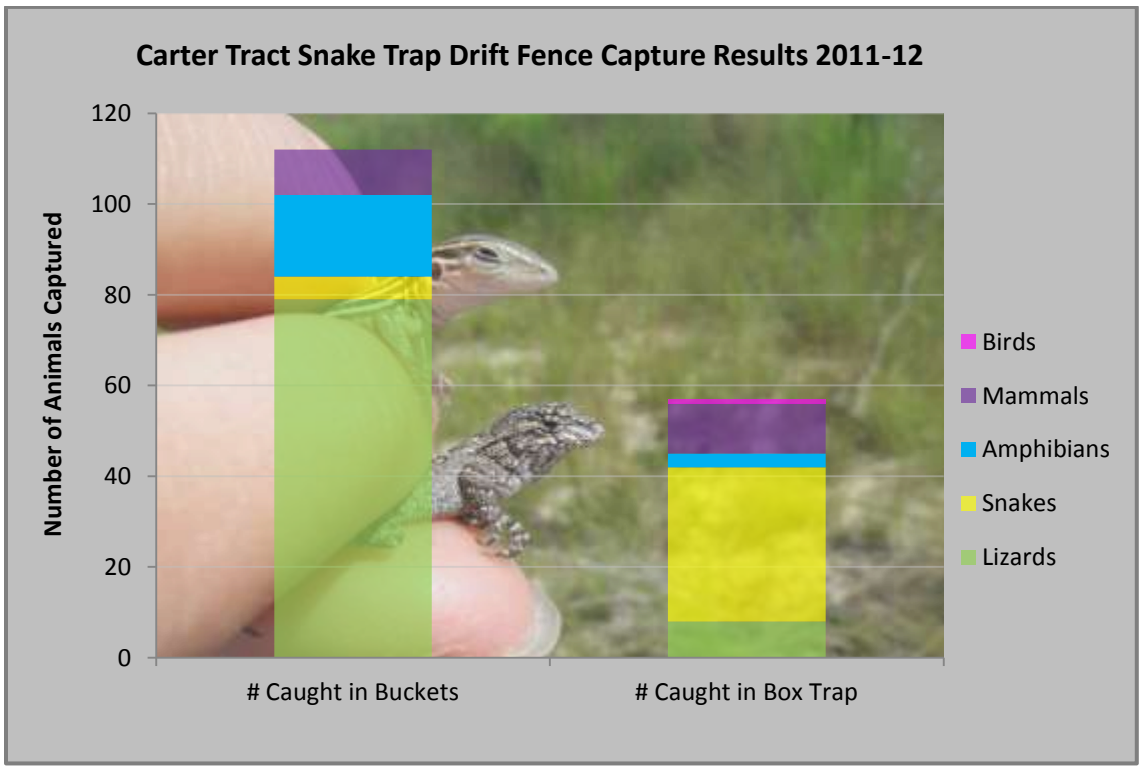


**Figure 55. Snake trap capture results from July 2011 - June 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Fence lizards (*Sceloporus undulatus*) and six-lined racerunners (*Cnemidophorus sexlineatus*) made up the vast majority of lizard captures, with 39 and 38 captures, respectively. The southern toad (*Bufo terrestris*) was the most captured amphibian (n=14). Twelve percent of animals captured were small mammals, including the oldfield mouse (*Peromyscus polionotus*; n=12), cotton mouse (*Peromyscus gossypinus*; n=6), southern short-tailed shrew (*Blarina carolinensis*; n=2), and hispid cotton rat (*Sigmodon hispidus*; n=1). Appendix XII details the number of species and individuals captured in snake trap arrays (note that species in red had previously been undocumented on the Carter Tract). Snake capture results from trap installation (March 2010) through July 2012 are presented in Figure 56. Based on data collected to date, opening traps from April – June should maximize the capture of snakes emerging from winter hibernacula in search of mates. Trapping during September and October should capture the majority of snakes dispersing across the landscape (including YOY born during late summer) before cooler weather forces them underground for the winter. It should be noted that FWC staff chose to open traps from March – May instead of April – June during 2012 due to an early spring weather pattern which prompted increased snake movement earlier in the year. Staff will continue to deploy snake traps on this general schedule, adjusting trapping efforts as dictated by weather patterns (i.e. drought conditions) and incidental snake activity observations.

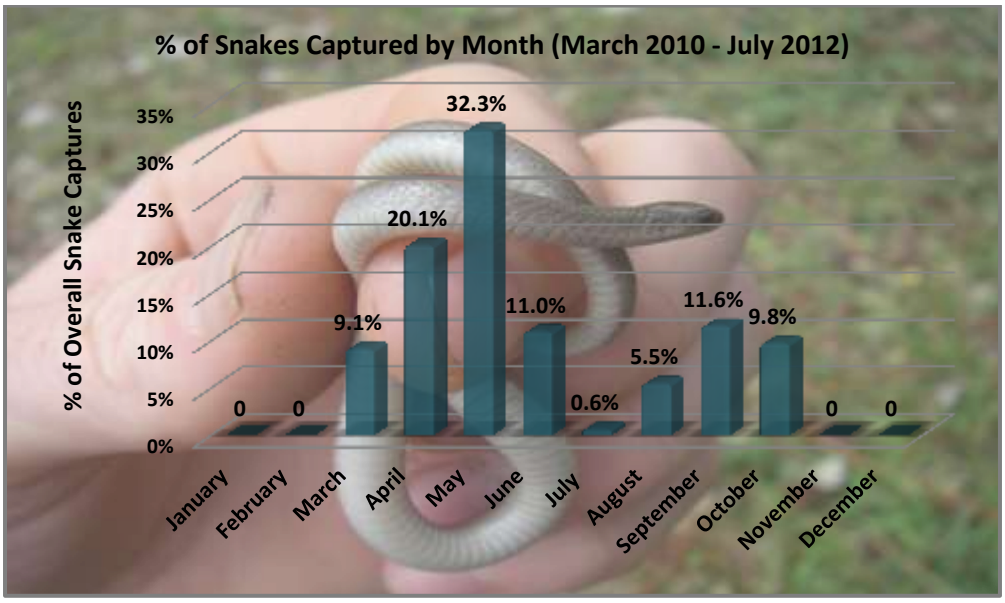


**Figure 56. Monthly snake capture rates using upland box-style snake traps from March 2010 July 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

# Additional Activities

***Mowing***

During early August 2011 FWC staff mowed powerline right-of-ways (ROWs) and road edges (Figure 57). This management activity not only improved the aesthetics of the Carter Tract, but mowing was strategically done following the peak bobwhite and wild turkey nesting seasons to prevent the inadvertent mowing over of nests. Further, mowing in mid-July through early August will increase insect abundance, which is highly beneficial to turkeys (specifically growing poults) as well as bobwhites. Care was taken to set mower deck height high enough to prevent damage to wiregrass clumps and mower operators were careful to avoid gopher tortoise burrows. FWC plans to continue annual mowing of road edges as necessary and to mow powerline ROWs every other year.

**Figure 57. FWC staff mowed powerline ROWs and road edges in August 2011 to approved aesthetics and increase insect abundance for gamebirds.**

***Wildfires***

Two wildfires occurred on or very near the Carter Tract during 2011-12, one in June 2011 and the other in April 2012. The June 2011 wildfire was a lightning-induced fire that burned

about two acres north of the Green Ponds (Figure 58). This fire was quickly contained by Florida Forest Service personnel via a fire break which was cleared using a bulldozer.

The April 2012 wildfire was a more substantial human-induced fire caused by sparks thrown from a chainsaw under extrememly dry conditions. This fire burned about 40 acres in Pine Log Creek just adjacent to the Carter Tract boundary. The Florida Forest Service employed four bulldozers to install fire lines around and contain this fire (Figure 59).

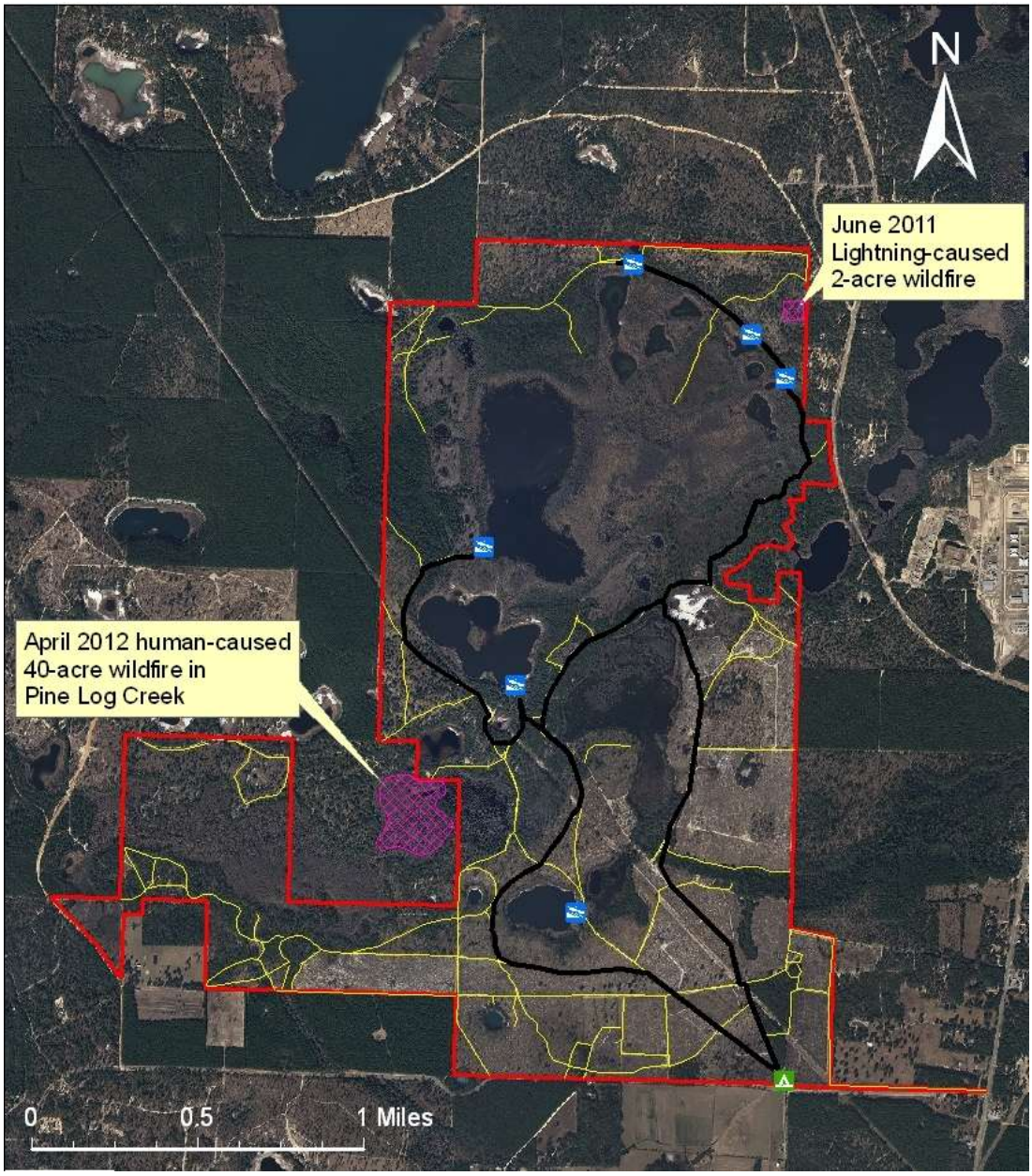


**Figure 58. Location of two wildfires on/adjacent to the Carter Tract during 2011-12.**

**Figure 59. Fire-line cleared via bulldozer to contain a 40-acre wildfire in Pine Log Creek adjacent to the Carter Tract (April 2012).**

***Green Pond 3 Trespass***

In February 2012 FWC staff identified a trespass violation near Green Pond 3. Tractor tracks were found around the edge of Green Pond 3 and led to an adjacent private property that borders the Carter Tract. The buttresses of nine downed cypress trees were cut and transported offsite and a large dog trap that was set in the vicinity was also stolen. FWC staff alerted FWC Law Enforcement who initiated an investigation. FWC LE Investigations Officer Drew Nelson led this investigation and interviewed both suspects and eye-witnesses. This investigation is currently ongoing pursuant to the finding of the cypress buttresses and/or dog trap which to date have not been located.

***Dry Pond Bat Roosts***

In April 2012 FWC staff identified two hollow cypress trees on Dry Pond that were being utilized by two bat species. A substantial number of Brazilian free-tailed bats (*Tadarida brasiliensis cynocephala*) and southeastern myotis (*Myotis austroriparius*) were observed roosting together in each tree (Figure 60).


**Figure 60. Brazilian free-tailed bats (*Tadarida brasiliensis*) and southeastern mytois (*Myotis austroriparius*) (left) were documented roosting in two cypress trees on Dry Pond (right) in April 2012, Carter Tract of Econfina Creek WMA, Washington County, Florida.**

Brazilian free-tailed bats have not been studied extensively in Florida, therefore overall population trends within the state are unknown. These bats almost exclusively roost in buildings in Florida, and their abundance appears to be limited by availability of roost sites (Humphrey, 1992). This species is occasionally found roosting in trees, but this behavior is considered uncommon (Jeff Gore and Melissa Tucker, pers. comm.). Brazilian free-tailed bats rely solely on insects for food, and are thus susceptible to pesticide poisoning. Further, because this species occurs in human habitations in Florida, they are particularly vulnerable to intentional eviction, roost destruction, vandalism, harassment, and large-scale colony destruction. Therefore attempts should be made to preserve known roost sites (Humphrey, 1992).

Southeastern myotis primarily roost in caves in Florida (Humphrey, 1992), so finding many individuals roosting in a single tree is uncommon (Jeff Gore and Melissa Tucker, pers. comm.). This species prefers to forage over water, feeding on small beetles, moths, mosquitoes, and other aquatic insects. Concentration of large numbers of these bats at just a handful of caves throughout the panhandle make this species vulnerable to natural disturbances (i.e. flooding), as well as land-use conversion and recreation (i.e. spelunking, etc.; Humphrey, 1992).

Given the vulnerability of these two bat species to potential population declines in the panhandle, FWC staff plan to monitor these roost sites seasonally to assess annual use.

## LAW ENFORCEMENT ACTIVITIES


FWC Law Enforcement Activities
(Lieutenant Mark Clements reporting)

Florida Fish and Wildlife Conservation Commission officers patrol the Carter Tract providing law enforcement to include wildlife and fisheries enforcement and general law enforcement including narcotics and trespass violations. This FY 2012-2013 officers provided approximately 103 hours of patrol directed to the Carter Tract. We had approximately 29 user contacts for the area with no arrests or written warnings issued. Area officers responded to three complaints in the Carter Tract in reference to alcohol and litter violations. One additional complaint was addressed with regard to damage of state lands and operating an off-road vehicle on state lands.

Officers conducted foot patrol and all terrain vehicle patrols of the interior roads and perimeter of the Carter Tract throughout the year. Officers targeted illegal hunting, trespassing, and baiting violations during the hunting season. Officers also conducted patrols to monitor night hunting in the Carter Tract and along the area boundaries. Area officers along with Carter Tract personnel continued to monitor the area for the free roaming wild dogs that had generated several complaints in years past. Two traps were stolen two years ago another trap set by biological staff for the wild dogs, was stolen this year. An FWC investigator worked on this issue along with another complaint of an off-road vehicle (tractor) being used to remove several freshly cut cypress stumps from one of the dry pond bottoms.

The main complaint was received from on-site biological staff in mid February. The staff reported that someone had driven a tractor onto the Carter Tract from some of the adjoining properties through one of the dry pond bottoms. With the low water levels of the ponds this allowed the violators to drive around the existing fences and access the property. Once in the Carter Tract the violators drove to several ponds and cut the stump portions from several deadfall cypress trees and used the tractor to haul them

out. Around this same time it was discovered that the third trap had been stolen from the interior portion of the Carter Tract. Due to the configuration of the trap it is suspected that the tractor was also used in the theft of the trap. FWC investigators and biological staff found significant tractor tire sign leading to an adjoining land owner's residence. At the residence there was a tractor matching the description of one reported being seen in the area by a fisherman. Our investigator conducted several interviews of persons of interest, however, there was not enough evidence to file charges in the case. Attached are photos of the damaged lands.

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**Appendix I. Fitzhugh Carter Tract of Econfina Creek WMA Regulations Summary and Area Map, July 1, 2011 – June 30, 2012.**

2011-2012 Hunting Season

# Fitzhugh Carter Tract

## Econfina Creek Wildlife Management Area

Regulations Summary and Area Map
July 1, 2011 - June 30, 2012

A cooperative public wildlife and recreational area

Northwest Florida Water Management District

Florida Fish and Wildlife Conservation Commission

MyFWC.com

This brochure is designed to provide the public with information and a summary of regulations pertaining to hunting, fishing and other recreational use on the Fitzhugh Carter Tract of Econfina Creek Wildlife Management Area. **Regulations that are new or differ substantially from last year are shown in bold print.** Area users should familiarize themselves with all regulations. For exact wording of the wildlife laws and regulations, see the Florida Fish and Wildlife Conservation Commission's wildlife code, on file with the Secretary of State and state libraries. This brochure, the Florida Hunting Regulations handbook, and quota permit worksheets should provide the information necessary for you to plan your hunting and fishing activities. These publications are available from any Commission office, county tax collector and at MyFWC.com.

Persons using wildlife management areas are required to have appropriate licenses, permits and stamps. The following persons are exempt from all license and permit requirements (except for quota permits when listed as "no exemptions", recreational use permits, antlerless deer permits and the Migratory Bird Hunting and Conservation Stamp [federal duck stamp]): Florida residents who are 65 years of age or older; residents who possess a Florida Resident Disabled Person Hunting and Fishing Certificate; residents in the U.S. Armed Forces, not stationed in Florida, while home on leave for 30 days or less, upon submission of orders; and children under 16 years of age. Children under 16 years of age are exempt from the duck stamp. Anyone born on or after June 1, 1975 and 16 years of age or older must have passed a Commission-approved hunter-safety course prior to being issued a hunting license, except the Hunter Safety Mentoring exemption allows anyone to purchase a hunting license and hunt under the supervision of a licensed hunter, 21 years of age or older, for one year.

Licenses and permits may be purchased from county tax collectors, license agents, at MyFWC.com/license or by telephone at 1-888-486-8356 (hunting) or 1-888-347-4356 (fishing). A no-cost Migratory Bird Permit is available when purchasing a hunting license. Any waterfowl hunter 16 years of age or older must possess a federal duck stamp; available where hunting licenses are sold, at most post offices or at duckstamp.com.

**QUOTA PERMIT INFORMATION:**
Archery - 15, no-cost, quota permits (no exemptions) for each of 2 hunts.
Muzzleloading Gun - 15, no-cost, quota permits (no exemptions).
General Gun - 15, no-cost, quota permits (no exemptions) for each of 3 hunts.
Spring Turkey - 5, no-cost, quota permits (no exemptions) for each of 3 hunts.
**Youth Turkey - 3, no-cost, quota permits (no exemptions).**

Daily Fishing Permits: Twenty anglers are allowed on the area per day. Ten daily permits are available first-come, first-serve at the check station; ten daily permits can be reserved in advance by calling 850-773-2631. If reserved permits are not filled by 11 a.m., they will become available at the check station first-come, first-serve. Permits are issued with specific lake designations, and anglers are allowed to fish only at the lake for which the permit is issued and must have the permit in their possession at all times.

Permit applications: Hunters must submit electronic applications for quota and special-opportunity permits through the Commission's Total Licensing System (TLS). Worksheets listing hunts, application periods, deadlines and instructions are available at county tax collector's offices, FWC offices or MyFWC.com. Quota application periods occur throughout the year beginning April 1; please refer to the hunting handbook or MyFWC.com for specific dates. Worksheets will be available about 2 weeks prior to each application period.

Guest hunters: For each non-transferable archery, muzzleloading gun, general gun, wild hog, spring turkey and mobility-impaired quota permit issued through the Commission's TLS, only one guest permit may be obtained. Guest permits are not issued for youth turkey quota permits. The following persons may be a guest hunter, but are not required to obtain a guest permit: a youth under 16 years of age, a youth supervisor, a mentor license holder or a mentor license supervisor. A quota permit holder (host) may only bring 1 guest hunter at a time. The following persons are not considered to be guest hunters: other quota permit holders, non-hunters and exempt hunters (on areas and during seasons that allow exemptions). The host must share the bag limit with the guest and the host is responsible for violations that exceed the bag limit. The guest and host must enter and exit the area together and must share a street-legal vehicle while hunting on the area. The guest may only hunt while the host is on the area. A person is only eligible for one guest permit per hunt. Guest permits may only be obtained from license agents or county tax collector's offices. Guest permits may be obtained up to and during the last day of the hunt. Refer to the quota hunt worksheets for additional information.

Youth and mentor license holders: A youth hunter (less than 16 years of age) must be supervised by a person at least 18 years of age. A mentor license holder must be supervised by a licensed hunter at least 21 years of age. Unless exempt, only those supervisors with proper licenses and permits may hunt. If the supervisor is hunting during any hunt (not including special-opportunity) for which quota permits are issued, at least one person in the party must be in possession of a quota permit. During a hunt that allows exemptions, a non-exempt supervisor of a youth must have a quota permit to hunt. A non-hunting supervisor is allowed to accompany a youth or mentor license holder during any hunt (including special-opportunity).

Transfer of permits: Quota and guest permits are not transferable. Except for youth under 16 years of age, a positive form of identification is required when using a non-transferable permit. The sale or purchase of any quota permit or guest permit is prohibited.

**GENERAL AREA REGULATIONS:**
All general laws and regulations relating to wildlife and fish shall apply unless specifically exempted for this area. Hunting or the taking of wildlife or fish on this area shall be allowed only during the open seasons and in accordance with the following regulations:

1. Any person hunting deer or accompanying another person hunting deer shall wear at least 500 square inches of daylight fluorescent-orange material as an outer garment, above the waistline. These provisions are not required when hunting with a bow and arrow during archery season.
2. Taking of spotted fawn, swimming deer or roosted turkey is prohibited. Species legal to hunt are listed under each season.
3. It is illegal to hunt over bait or place any bait or other food for wildlife on this area.
4. Driving a metal object into any tree, or hunting from a tree into which a metal object has been driven, is prohibited.
5. No person shall cut, damage or remove any natural, man-made or cultural resource without written authorization of the landowner or primary land manager.
6. Taking or attempting to take any game with the aid of live decoys, recorded game calls or sounds, set guns, artificial light, net, trap, snare, drug or poison is prohibited. Recorded calls and sounds can be used to hunt furbearers, wild hog and crows.
7. The wanton and willful waste of wildlife is prohibited.
8. Hunting, fishing or trapping is prohibited on any portion of the area posted as closed to those activities.
9. People, dogs, vehicles and other recreational equipment are prohibited in areas posted as "Closed to Public Access" by FWC administrative action.
10. Taking or herding wildlife from any motorized vehicle, aircraft or boat, which is under power is prohibited until power, and movement from that power, has ceased.
11. Most game may be hunted from ½ hour before sunrise until ½ hour after sunset (see exceptions for each season).
12. The release of any animal is prohibited, without written authorization of the landowner or primary land manager.
13. The head and evidence of sex may not be removed from the carcass of any deer or turkey on the area.
14. The planting or introduction of any non-native plant is prohibited, without written authorization of the landowner or primary land manager.
15. Wild hog may not be transported alive.
16. Littering is prohibited.
17. It is unlawful to set fire to any forest, grass or woodlands.
18. A Fish and Wildlife Conservation Commission Law Enforcement Officer may search any camp, vehicle or boat in accordance with law.
19. Falconers may hunt during the statewide falconry season anytime a management area is open for public access. Falconers are not exempt from quota permits during hunts requiring them.
20. The possession or consumption of intoxicating beverages is prohibited.

**PUBLIC ACCESS AND VEHICLES:**

1. Open to public access year round.
2. All persons shall enter and exit at a designated entrance (see map).
3. Parked vehicles may not obstruct a road, gate or firelane.
4. No motor vehicle shall be operated on any part of any wildlife management area that has been designated as closed to vehicular traffic.
5. Vehicles may be operated only on named or numbered roads.
6. Horses and the use of all-terrain vehicles and bicycles are prohibited.

**HUNTERS, ANGLERS AND CHECK STATIONS:**

1. Hunters and anglers shall check in and out at the check station when entering and exiting the area and shall check all game and fish taken.
2. Hunting equipment and dogs may be taken onto the WMA after 8 a.m. the day before the opening of a season and shall be removed by 6 p.m. one day after the end of the season.
3. Fishing on the Carter Tract is open Friday through Monday, starting at 6 a.m. Gates close at 8 p.m. during the summer period (March – October) and at 5 p.m. during the winter period (November – February). See the Fishing and Frogging section for more details.
4. On hunt days, the check station hours are 4:30 a.m. to 6 p.m.

**GUNS:**

1. All firearms shall be securely encased and in a vehicle, vessel, camper or tent, during periods when they are not a legal method of take. Persons in possession of a valid Concealed Weapon or Firearm License may carry concealed handguns.
2. Target practice is prohibited.
3. Hunting with a gun and light is prohibited.
4. Muzzleloading guns used for taking deer must be .40 caliber or larger if firing a single bullet, or be 20 gauge or larger if firing two or more balls.
5. Children under the age of 16 may not be in possession of a firearm unless in the presence of a supervising adult.
6. No person shall have a gun under control while under the influence of alcohol or drugs.
7. For hunting non-migratory game, only shotguns, rifles, pistols, bows, crossbows (during the general gun, small game and spring turkey seasons or by permit) or falconry may be used. **Hunting during the spring turkey season with firearms other than shotguns or using a shot size larger than #2 is prohibited.**
8. For hunting migratory game, only shotguns, bows, crossbows or falconry may be used. Shotguns shall not be larger than 10 gauge and shall be incapable of holding more than three shells in the magazine and chamber combined.
9. Firearms using rimfire or non-expanding, full metal jacket (military ball) ammunition are prohibited for taking deer.
10. Fully automatic or silencer-equipped firearms, centerfire semi-automatic rifles having a magazine capable of holding more than five rounds, explosive or drug-injecting devices and set guns are prohibited.

**DOGS:**

1. Hunting with dogs, other than bird dogs or retrievers, is prohibited.
2. No person shall allow any dog to pursue or molest any wildlife during any period in which the taking of wildlife by the use of dogs is prohibited.
3. Dogs on leashes may be used for trailing wounded game.
4. For purposes other than hunting, dogs are allowed, but must be kept under physical restraint at all times.

**CAMPING:** Prohibited.

**BAG AND POSSESSION LIMITS:** During quota hunts, host hunters and guests must share all bag and possession limits.

1. Deer - Daily limit 2, possession limit 4 (see legal to take for each season).
2. Wild hog - No size or bag limit.
3. Turkey - Daily limit 1, season limit 2, possession limit 2; **youth turkey, 1 per quota permit**.
4. Gray squirrel, quail and rabbit - Daily limit 12, possession limit 24 for each.
5. Raccoon, opossum, armadillo, beaver, coyote, skunk and nutria - No bag limits.
6. Migratory birds - See Migratory Bird Hunting Regulations pamphlet.

**ARCHERY SEASON:**
**October 22-28** and **October 29** through **November 6**

Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit, archery permit, deer permit (if hunting deer), wild turkey permit (if hunting wild turkey) and migratory bird permit (if hunting migratory birds).

Legal to Hunt - Any deer (except spotted fawn), wild hog, turkey of either sex, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.

Regulations Unique to Archery Season - In addition to these regulations, all General Area Regulations shall apply. Hunting with firearms or crossbows is prohibited, except that centerfire shotguns are allowed for hunting migratory birds when one or more species are legal to hunt (see Migratory Bird section and the current Migratory Bird Hunting Regulations pamphlet).

**GENERAL GUN SEASON:**
November 24-27, January 21-24 and 25-29.

Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit, deer permit (if hunting deer), migratory bird permit (if hunting migratory birds), and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - Deer with at least one antler 5 inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.

Regulations Unique to General Gun Season - In addition to these regulations, all General Area Regulations shall apply.

**MUZZLELOADING GUN SEASON:**

**December 3-5.**

Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit, muzzleloading gun permit, deer permit (if hunting deer) and migratory bird permit (if hunting migratory birds).

Legal to Hunt - Deer with at least one antler 5 inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.

Regulations Unique to Muzzleloading Gun Season - In addition to these regulations, all General Area Regulations shall apply. Hunting with archery equipment or firearms, other than muzzleloading guns, is prohibited, except that centerfire shotguns are allowed for hunting migratory birds when one or more species are legal to hunt (see Migratory Bird section and the current Migratory Bird Hunting Regulations pamphlet).

**SMALL GAME SEASON:**

**December 10-25.**

Permit, Stamp and License Requirements - Hunting license, management area permit, migratory bird permit (if hunting migratory birds) and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - Wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.

Regulations Unique to Small Game Season – In addition to these regulations, all General Area Regulations shall apply. Hunting with centerfire rifles is prohibited.

**SPRING TURKEY SEASON:**

**Youth Turkey: March 10-11.**

Spring Turkey: March **17-19**, March **30** through April **1** and April **13-15.**

Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit and wild turkey permit.

Legal to Hunt - Bearded turkey or gobbler.

Regulations Unique to Spring Turkey Season - In addition to these regulations, all General Area Regulations shall apply.

1. Legal shooting hours are ½ hour before sunrise until 1 p.m.
2. Hunting other animals is prohibited.
3. **Hunting with firearms other than shotguns or using a shot size larger than #2 is prohibited.**
4. **During the youth turkey hunt, only youth under 16 years of age may hunt and must be under the supervision and in the presence of an adult not younger than 18 years of age. Adults with required licenses and permits for taking wild turkeys may participate when in the presence of a youth, but may not harvest a wild turkey.**

**TRAPPING:** Prohibited.

**MIGRATORY BIRD SEASONS:**

Rails, common moorhen, mourning dove, white-winged dove, snipe, duck, geese, coot, woodcock and crows may be taken only during seasons that coincide with the archery, muzzleloading gun, general gun or small game seasons. Waterfowl hunting is allowed during the special September duck season.

Permit, Stamp and License Requirements - Quota permit (if hunting during any quota period), hunting license, management area permit, migratory bird permit and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - See Migratory Bird Hunting Regulations pamphlet.

Regulations Unique to Migratory Bird Seasons - In addition to these regulations, all General Area Regulations and migratory bird regulations shall apply.

1. Hunting duck, geese and coot with lead shot is prohibited.
2. Centerfire shotguns are allowed for hunting during established area seasons when one or more migratory birds are legal to take.

**FISHING AND FROGGING:**

Allowed Friday through Monday (except during periods open to hunting) by permit only.

Permit, Stamp and License Requirements - Daily fishing permit and fishing license (not required when frogging).

Legal to Take - All legal fish (except as provided below) and frogs. See Florida Freshwater Fishing Regulations Summary.

Regulations Unique to Fishing and Frogging - All General Area Regulations and General Freshwater Fishing Regulations shall apply.

1. Anglers shall check in and out at the check station when entering and exiting the area and shall check all fish taken.
2. Fishing is allowed in designated lakes and water bodies only. All other lakes, water bodies and restricted areas are closed to public fishing.
3. Boats are provided for use on each lake; these boats must be kept at the lake on which they are placed. No outside boats are allowed into the area.
4. Fish may be taken only by hook and line or rod and reel.
5. No person shall take more than 20 panfish in the aggregate per day. Any bluegill or redear sunfish less than 8 inches in total length must be released immediately. No person shall take more than 10 black crappie per day. Any black crappie less than 10 inches in total length must be released immediately. All largemouth bass are catch and release only.
6. Fish may not be filleted, nor the head or tail fin removed, until the angler has checked out at the check station.
7. Anglers will be given a creel kit and are expected to completely and accurately complete the information sheet and return it to the check station upon check out.
8. Shooting frogs is allowed only during the listed open hunting seasons and only with the legal methods of take during each particular season.

**GENERAL INFORMATION:**

1. Other recreational uses, including canoeing, kayaking, hiking and bird watching, are allowed on the area and are subject to all area rules and regulations.
2. Information for persons with disabilities can be found at MyFWC.com/ADA.
3. If you have any questions about this material, please call the Fish and Wildlife Conservation Commission at 850-265-3676 (TDD 800-955-8771).

**NORTHWEST FLORIDA WMD RULES AND INFORMATION:**

1. This land was acquired by the Northwest Florida Water Management District (District) to protect public water resources. The purpose of the District's land acquisition and management program is to conserve and protect unique and irreplaceable land and water resources, restore areas to their original condition as much as possible and allow controlled multiple recreational and educational uses consistent with this purpose.
2. Recreation maps of the area are available at nwfwmd/recreation/econfinacreek.html.
3. The District's land management activities for this area may include prescribed burning and timber harvesting during most months of the year. For personal safety reasons, area users should be aware of activities in the area and contact the District's Land Management office at 850-539-5999 with any questions. The District has no responsibility or obligation to identify and/or protect personal property while undertaking its land management activities.

**COOPERATION REQUESTED:**

*If you see law violators or suspicious activities, contact your nearest Commission regional office or call 1-888-404-FWCC. You may qualify for a cash reward from the Wildlife Alert Reward Association.*

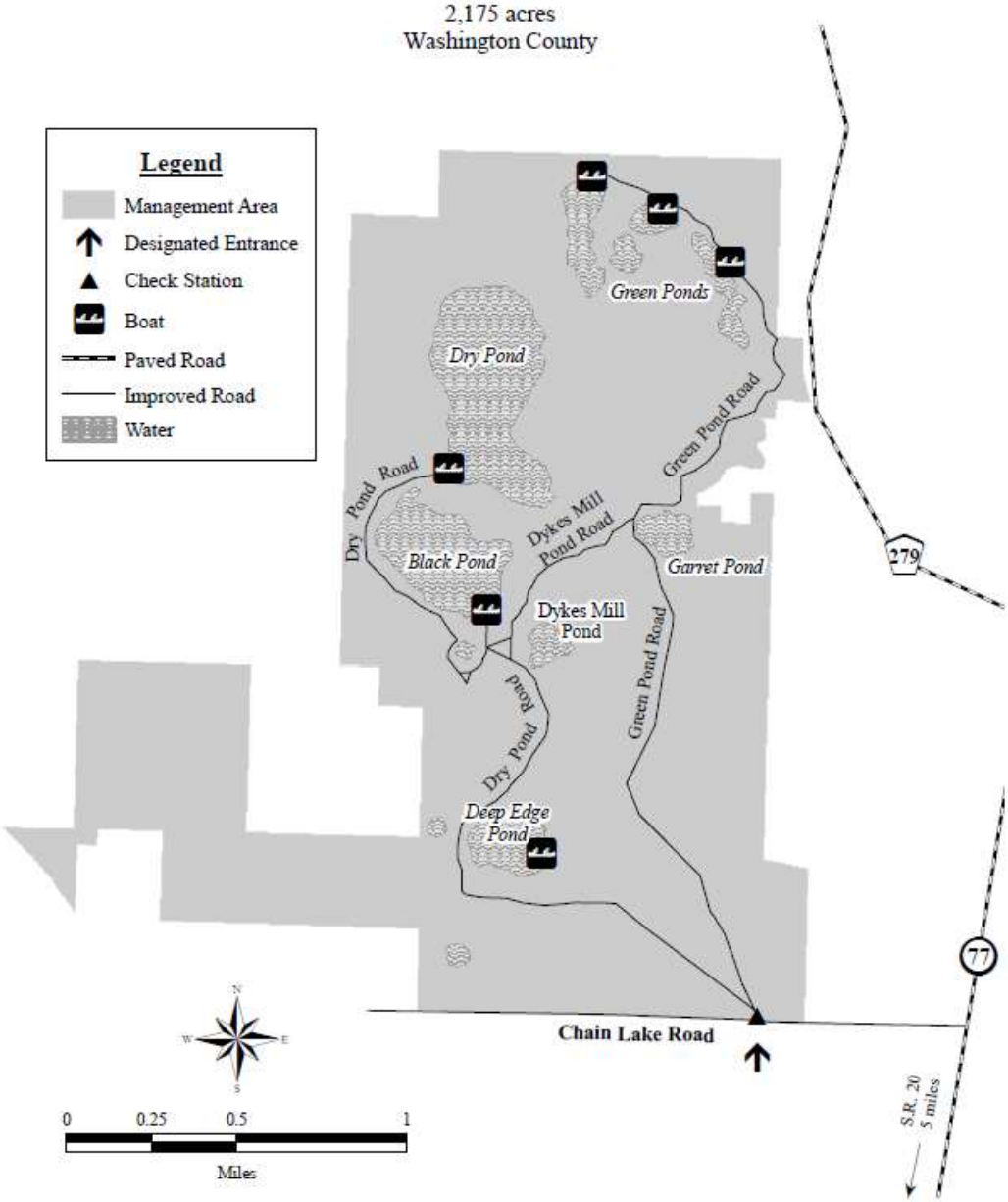
*The U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, age, sex or handicap. If you believe that you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please write to: The Office for Human Resources, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240. The project described in this publication is part of a program funded by federal dollars under the Wildlife Restoration Act. Federal funds pay 20 percent of the cost of the program.*

# FITZHUGH CARTER TRACT

**ECONFINA CREEK WILDLIFE MANAGEMENT AREA**

2,175 acres

Washington County



## Appendix II. 2011-2012 Annual Work Plan and Accomplishment Report for the Carter Tract of Econfina Creek Wildlife Management Area.

### FY 2011-12
### Project 7281 - NW FLORIDA WATER MANAGEMENT DISTRICT LANDS

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| Species 9100 - All freshwater fish | | | | | | | |
| Activity - 140 | Report writing/editing/manuscript preparation | | | | | | |
| | 2.00 | $400.88 | $19.64 | $0.00 | $420.52 | 0 | Prepare fisheries reports and proposals as needed. NFA. |
| Activity - 221 | Animal surveys | | | | | | |
| | 10.00 | $2,004.40 | $98.20 | $1,200.00 | $3,302.60 | 0 | Conduct sampling of fish populations via electroshocking and fyke nets as needed to assess population demographics (101920/19 = $200 for supplies and equipment) (100340/29 = $1,000 for supplies, materials, nets and other equipment). NFA. |
| Activity - 250 | Monitoring and assessments | | | | | | |
| | 6.00 | $1,202.64 | $58.92 | $100.00 | $1,361.56 | 0 | Population monitoring and assessment of aquatic resources. Comprehensive sportfish population assessment (101920/19 = $100 for misc. materials and supplies). NFA. |
| Activity - 342 | Public use administration (non-hunting) | | | | | | |
| | 9.00 | $1,803.96 | $88.38 | $18,309.00 | $20,201.34 | 0 | Conduct creel surveys at check stations. Administer public fishing events (109940/57 = $17,809 for OPS check station operators) (100340/29= $500 for supplies and |

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| | | | | | | | equipment). NFA. |
| Species 9100 Total | 27.00 | $5,411.88 | $265.14 | $19,609.00 | $25,286.02 | | |
| Species 9200 - All wildlife | | | | | | | |
| Activity - 100 | Administration | | | | | | |
| | 3.00 | $601.32 | $29.46 | $400.00 | $1,030.78 | 0 | General supervisory, clerical and administrative duties (100340/29 = $400 for office supplies and materials). |
| Activity - 101 | Project inspection | | | | | | |
| | 9.00 | $1,803.96 | $88.38 | $0.00 | $1,892.34 | 0 | Inspect area projects and activities. Field orientation of land boundaries, features and habitats. |
| Activity - 103 | Meetings | | | | | | |
| | 10.00 | $2,004.40 | $98.20 | $1,408.80 | $3,511.40 | 0 | Attend landowner, cooperator, scientific and agency meetings and training (101920/19 = $408.80 for travel, per diem and registration fees) (100340/29 = $1,000 for travel and perdiem). |
| Activity - 140 | Report writing/editing/manuscript preparation | | | | | | |
| | 8.00 | $1,603.52 | $78.56 | $1,150.00 | $2,832.08 | 0 | Prepare annual and wildlife management reports and proposals as needed (109940/57 = $550 for copying and binding) (100340/29 = $600 for copying and binding). |
| Activity - 150 | Personnel management | | | | | | |
| | 5.00 | $1,002.20 | $49.10 | $29,016.00 | $30,067.30 | 0 | Supervise volunteer activities. Recruit, hire and supervise OPS. (101920/19 = $29,016 for OPS |

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| | | | | | | | Field Technician). |
| Activity - 182 | Data management | | | | | | |
| | 10.00 | $2,004.40 | $98.20 | $641.00 | $2,743.60 | 0 | Digitize habitat features for use in GIS database. Incorporate all data into GIS database. Analyze and summarize WMA databases and pertinent information (109940/57 = $641 for office supplies and materials). |
| Activity - 200 | Resource Management | | | | | | |
| | 5.00 | $1,002.20 | $49.10 | $1,500.00 | $2,551.30 | 0 | Routine planning, paperwork, purchases and correspondences dealing with daily operations of the WMA (100340/29 = $1,500 for office and custodial supplies). |
| Activity - 204 | Resource planning | | | | | | |
| | 16.00 | $3,207.04 | $157.12 | $4,255.00 | $7,619.16 | 0 | Coordination of work projects related to management activities. Prepare written work plans and proposals (100340/29 = $3,000 for equipment, materials and supplies) (109940/57 = $1,255 for supplies and utilities). |
| Activity - 276 | Commission rule development and review | | | | | | |
| | 1.00 | $200.44 | $9.82 | $0.00 | $210.26 | 0 | Develop and submit area rule changes, includes preparation, review, advertisement, promulgation and publishing. NFA. |
| Activity - 291 | Technical assistance | | | | | | |
| | 3.00 | $601.32 | $29.46 | $0.00 | $630.78 | 0 | Provide technical |

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| | | | | | | | information and assistance to cooperators or other state agencies regarding wildlife management and habitat. |
| Activity - 294 | Program coordination and implementation | | | | | | |
| | 5.00 | $1,002.20 | $49.10 | $0.00 | $1,051.30 | 0 | Intra and interagency coordination. |
| Activity - 312 | Informational signs | | | | | | |
| | 3.00 | $601.32 | $29.46 | $500.00 | $1,130.78 | 0 | Erect and maintain informational signs and kiosks as needed (100340/29 = $500 for paint, stain, construction materials and supplies). |
| Activity - 320 | Outreach and education | | | | | | |
| | 5.00 | $1,002.20 | $49.10 | $200.00 | $1,251.30 | 0 | Make wildlife management presentations to elementary schools and general public (100340/29 = $200 for misc. materials and supplies). |
| Activity - 350 | Customer service support | | | | | | |
| | 5.00 | $1,002.20 | $49.10 | $0.00 | $1,051.30 | 0 | Provide information to callers regarding fish and wildlife-based recreation opportunities and area regulations. |
| Activity - 920 | FEM -- buildings/structures | | | | | | |
| | 3.00 | $601.32 | $29.46 | $4,000.00 | $4,630.78 | 1 | Maintain and repair area office as needed (100340/29 = for $3,000 for utilities, custodial supplies and materials) (109940/57 = $1,000 for office/building equipment). |
| Activity - 923 | FEM -- vehicles/equipment | | | | | | |

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| | 6.00 | $1,202.64 | $58.92 | $4,000.00 | $5,261.56 | 0 | Repair and maintain vehicles, boats, ATVs and associated equipment (100340/29 = $3,000 for repairs, parts and supplies) (109940/57 = $1,000 repairs and vehicle/equipment supplies). |
| Activity - 926 | FEM -- roads/bridges | | | | | | |
| | 1.00 | $200.44 | $9.82 | $0.00 | $210.26 | 0 | Make minor repairs to access roads as needed. |
| Activity - 928 | FEM -- fences | | | | | | |
| | 1.00 | $200.44 | $9.82 | $0.00 | $210.26 | 0 | Maintain and erect gates and fences as needed on access roads and boundaries. |
| Species 9200 Total | 99.00 | $19,843.56 | $972.18 | $47,070.80 | $67,886.54 | | |
| Species 9210 - Game wildlife | | | | | | | |
| Activity - 140 | Report writing/editing/manuscript preparation | | | | | | |
| | 3.00 | $601.32 | $29.46 | $0.00 | $630.78 | 0 | Prepare deer and game management recommendations and harvest reports as needed. |
| Activity - 182 | Data management | | | | | | |
| | 5.00 | $1,002.20 | $49.10 | $0.00 | $1,051.30 | 0 | Analyze data collected from biological samples from harvested game, surveys and inventories. |
| Activity - 221 | Animal surveys | | | | | | |
| | 9.00 | $1,803.96 | $88.38 | $0.00 | $1,892.34 | 0 | Conduct deer surveys and other game surveys as needed. |
| Activity - 285 | Nest structures | | | | | | |
| | 8.00 | $1,603.52 | $78.56 | $300.00 | $1,982.08 | 50 | Maintain and monitor 50 wood duck nest boxes (100340/29 = $300 for construction |

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| | | | | | | | materials and supplies). |
| Activity - 295 | Biological data collection, analysis, and reporting | | | | | | |
| | 7.00 | $1,403.08 | $68.74 | $1,000.00 | $2,471.82 | 0 | Collect biological data and samples from harvested game at check station (100340/29 = $1,000 for tools and supplies). |
| Activity - 341 | Public use administration (hunting) | | | | | | |
| | 12.00 | $2,405.28 | $117.84 | $8,500.00 | $11,023.12 | 0 | Review area hunt maps and brochures. Compile weekly harvest reports and hunter pressure. Administer public hunts (109940/57 = $8,500 for OPS check station operators). |
| Species 9210 Total | 44.00 | $8,819.36 | $432.08 | $9,800.00 | $19,051.44 | | |
| Species 9240 - Nongame wildlife | | | | | | | |
| Activity - 140 | Report writing/editing/manuscript preparation | | | | | | |
| | 2.00 | $400.88 | $19.64 | $0.00 | $420.52 | 0 | Prepare herpetofauna survey progress reports. NFA. |
| Activity - 221 | Animal surveys | | | | | | |
| | 18.00 | $3,607.92 | $176.76 | $2,000.00 | $5,784.68 | 0 | Conduct wading bird surveys and monitoring. Conduct herpetofauna surveys and monitoring. Install and monitor drift fence arrays (100340/29 = $2,000 for supplies and equipment). NFA. |
| Species 9240 Total | 20.00 | $4,008.80 | $196.40 | $2,000.00 | $6,205.20 | | |
| Species 9250 - Nongame wildlife (birds) | | | | | | | |
| Activity - 285 | Nest structures | | | | | | |
| | 3.00 | $601.32 | $29.46 | $0.00 | $630.78 | 0 | Maintain and monitor kestrel and bluebird |

| | Man Days | Salary | FuelCost | Other | Total | Units | Accomplishments |
|---|---|---|---|---|---|---|---|
| | | | | | | | nest boxes. |
| Species 9250 Total | 3.00 | $601.32 | $29.46 | $0.00 | $630.78 | | |
| Species 9280 - All threatened and endangered wildlife | | | | | | | |
| Activity - 140 | Report writing/editing/manuscript preparation | | | | | | |
| | 2.00 | $400.88 | $19.64 | $0.00 | $420.52 | 0 | Prepare gopher tortoise survey and monitoring progress report. NFA. |
| Activity - 182 | Data management | | | | | | |
| | 2.00 | $400.88 | $19.64 | $0.00 | $420.52 | 0 | Analyze and summarize gopher tortoise survey data. NFA. |
| Activity - 221 | Animal surveys | | | | | | |
| | 13.00 | $2,605.72 | $127.66 | $2,000.00 | $4,733.38 | 0 | Coordinate and conduct gopher tortoise survey and monitoring (100340/29 = $2,000 for equipment and supplies). NFA. |
| Species 9280 Total | 17.00 | $3,407.48 | $166.94 | $2,000.00 | $5,574.42 | | |
| Project 7281 Total | 210.00[1] | $42,092.40 | $2,062.20 | $80,479.80 | $124,634.40 | | |

**[1]Man-days for OPS Fish & Wildlife Technician (~210 man-days) and OPS Hunting & Fishing Check Station Operators (~382 man-days) not included. However, salary for such is included in "Other" expenses category.**

**Appendix III. Average percent occurrence of fish species sampled via fyke nets October 2011 and April 2012 on Black, Dry, and Green Ponds at the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| OCTOBER 2011 | POND | | | |
|---|---|---|---|---|
| **Species** | Green 3 | Green 1, 2 | Black | Dry |
| **Bluegill** | 41.9% | 56.9% | 57.9% | 17.8% |
| **Warmouth** | 43.8% | 26.2% | 16.0% | 54.9% |
| **Dollar Sunfish** | 9.5% | 5.4% | 15.2% | 9.0% |
| **E. Starhead Topminnow** | 2.1% | 7.6% | 7.1% | 14.2% |
| **Mosquitofish** | 2.4% | 3.0% | 0.3% | 0.3% |
| **Lake Chubsucker** | 0.0% | 0.2% | 3.0% | 0.4% |
| **Blue-spotted Sunfish** | 0.1% | 0.0% | 0.0% | 2.2% |
| **Brook Silverside** | 0.0% | 0.0% | 0.6% | 1.0% |
| **Spotted Gar** | 0.0% | 0.5% | 0.0% | 0.0% |
| **Pygmy Sunfish** | 0.2% | 0.0% | 0.0% | 0.0% |
| **Largemouth Bass** | 0.0% | 0.0% | 0.0% | 0.1% |
| **Pirate Perch** | 0.0% | 0.0% | 0.0% | 0.1% |
| **Unidentifiable Species** | 0.0% | 0.0% | 0.0% | 0.1% |
| **Swampdarter** | 0.0% | 0.1% | 0.0% | 0.0% |
| **Yellow Bullhead** | 0.0% | 0.0% | 0.1% | 0.0% |
| **APRIL 2012** | **POND** | | | |
| **Species** | Green 3 | Green 1, 2 | Black | Dry |
| **Bluegill** | 55.8% | 38.4% | 63.7% | 29.5% |
| **Mosquitofish** | 19.3% | 42.5% | 8.9% | 23.7% |
| **Largemouth Bass** | 3.1% | 0.0% | 0.7% | 69.3% |
| **Dollar Sunfish** | 10.9% | 4.0% | 17.8% | 11.7% |
| **E. Starhead Topminnow** | 2.7% | 5.9% | 3.7% | 27.8% |
| **Warmouth** | 4.3% | 7.9% | 4.2% | 4.2% |
| **Brook Silverside** | 0.0% | 1.3% | 0.0% | 4.0% |
| **Spotted Gar** | 1.2% | 0.0% | 0.1% | 1.5% |
| **Swampdarter** | 2.8% | 0.0% | 0.0% | 0.0% |
| **Blue-spotted Sunfish** | 0.0% | 0.0% | 0.7% | 0.2% |
| **Yellow Bullhead** | 0.0% | 0.0% | 0.0% | 0.2% |
| **Pygmy Sunfish** | 0.0% | 0.0% | 0.0% | 0.1% |
| **Lake Chubsucker** | 0.0% | 0.0% | 0.1% | 0.0% |
| **Black Crappie** | 0.0% | 0.0% | 0.1% | 0.0% |

**Appendix IV. Catch-per-unit-effort (CPUE) results for sportfish sampled via electrofishing at Black and Dry Ponds in October 2011 and April 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| | Black Pond | | Dry Pond | |
|---|---|---|---|---|
| **Fall 2011** | *n*[a] | CPUE[b] | *n*[a] | CPUE[b] |
| **Bluegill** | 71 | 2.05 | 27 | 0.71 |
| **Largemouth bass** | 11 | 0.32 | 5 | 0.08 |
| **Warmouth** | 13 | 0.38 | 35 | 0.92 |
| **Red-eared Sunfish** | 1 | 0.29 | 0 | 0 |
| **Black Crappie** | 0 | 0 | 1 | 0.03 |
| **TOTALS** | 96 | 3.04 | 68 | 1.74 |

**[a]Number of fish sampled**
**[b]Catch per unit effort (CPUE) measured in weight of fish/minute**

| | Black Pond | | Dry Pond | |
|---|---|---|---|---|
| **Spring 2012** | *n*[a] | CPUE[b] | *n*[a] | CPUE[b] |
| **Bluegill** | 64 | 1.75 | 50 | 0.98 |
| **Largemouth bass** | 15 | 0.41 | 13 | 0.25 |
| **Warmouth** | 1 | 0.03 | 2 | 0.04 |
| **Black Crappie** | 0 | 0 | 1 | 0.02 |
| **TOTALS** | 80 | 2.19 | 66 | 1.29 |

**[a]Number of fish sampled**
**[b]Catch per unit effort (CPUE) measured in weight of fish/minute**

**Appendix V. Number of fish caught and released per pond from July 2011- June 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| Species | | Pond | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Dry | Black | Green 3 | Green 2 | Green 1 | Deep Edge | All Ponds |
| **Bluegill (*Lepomis macrochirus*)** | | | | | | | | |
| | Kept | 530 | 436 | 54 | 0 | 0 | 36 | 1056 |
| | Released | 212 | 258 | 25 | 0 | 0 | 34 | 529 |
| | Total caught | **742** | **694** | **79** | **0** | **0** | **70** | **1585** |
| | | | | | | | | |
| **Black Crappie (*Pomoxis nigromaculatus*)** | | | | | | | | |
| | Kept | 76 | 127 | 21 | 0 | 0 | 0 | 224 |
| | Released | 23 | 20 | 11 | 2 | 0 | 1 | 57 |
| | Total caught | **99** | **147** | **32** | **2** | **0** | **1** | **281** |
| | | | | | | | | |
| **Largemouth Bass (*Micropterus salmoides*)** | | | | | | | | |
| | Total caught | **323** | **200** | **1** | **2** | **0** | **45** | **571** |
| | | | | | | | | |
| **Warmouth (*Lepomis gulosus*)** | | | | | | | | |
| | Kept | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| | Released | 36 | 2 | 0 | 0 | 0 | 2 | 40 |
| | Total caught | **39** | **2** | **0** | **0** | **0** | **2** | **43** |
| | | | | | | | | |
| **Catfish (*Ameirus nebulosus* and *Ameirus natalis*)** | | | | | | | | |
| | Kept | 0 | 8 | 1 | **0** | 0 | 0 | 9 |
| | Released | 3 | 5 | 8 | 0 | 0 | 1 | 17 |
| | Total caught | **3** | **13** | **9** | **0** | **0** | **1** | **26** |
| | | | | | | | | |
| **Other (Chain pickerel, Spotted Gar, Bowfin)** | | | | | | | | |
| | Kept | 35 | 12 | 0 | 0 | 0 | 0 | 47 |
| | Released | 106 | 33 | 11 | 0 | 0 | 1 | 151 |
| | Total caught | **141** | **45** | **11** | **0** | **0** | **1** | **198** |
| **Total catch** | | **1347** | **1101** | **132** | **4** | **0** | **120** | **2704** |

†Largemouth Bass are catch-and-release only on Carter Tract ponds

**Appendix VI. Percent nest success, no. of nests, avg. clutch size, and estimated duckling survival/clutch of wood duck (*Aix sponsa*) nest boxes (2006-2012) by water body on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| Year | Water Body | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **2006** | **Green 1&2** | **Green 3** | **Deep Edge** | **Black** | **LDE** | **Dry** | **Garrett** | **Warmouth** | **PLC** | **All Water Bodies** |
| **% nest success** | 0% | 0% | 0% | 0% | 50% | 0% | 100% | 0% | 0% | 33% |
| **# nests** | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 6 |
| **average eggs/clutch** | 0.0 | 9.5 | 0.0 | 0.0 | 8.0 | 0.0 | 5.0 | 0.0 | 9.0 | 8.2 |
| **hatched ducklings/clutch** | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 3.0 | 0.0 | 0.0 | 1.0 |
| **2007** | | | | | | | | | | |
| **% nest success** | 0% | 33% | 0% | 0% | 50% | 0% | 0% | 0% | 0% | 18% |
| **# nests** | 2 | 3 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 11 |
| **average eggs/clutch** | 0.0 | 0.7 | 4.5 | 0.0 | 6.0 | 11.0 | 0.0 | 0.0 | 0.0 | 6.8 |
| **hatched ducklings/clutch** | 0.0 | 0.7 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 |
| **2008** | | | | | | | | | | |
| **% nest success** | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 40% |
| **# nests** | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 5 |
| **average eggs/clutch** | 6.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.3 | 0.0 | 0.0 | 0.0 | 9.4 |
| **hatched ducklings/clutch** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.3 | 0.0 | 0.0 | 0.0 | 5.0 |
| **2009** | | | | | | | | | | |
| **% nest success** | 33% | 25% | 0% | 50% | 0% | 78% | 0% | 0% | 0% | 57% |
| **# nests** | 3 | 4 | 1 | 5 | 1 | 7 | 0 | 0 | 0 | 21 |
| **average eggs/clutch** | 6.3 | 6.5 | 6.0 | 6.8 | 12.0 | 10.0 | 0.0 | 0.0 | 0.0 | 8.4 |
| **hatched ducklings/clutch** | 0.3 | 1.5 | 0.0 | 2.7 | 0.0 | 4.6 | 0.0 | 0.0 | 0.0 | 2.7 |
| **2010** | | | | | | | | | | |
| **% nest success** | 40% | 33% | 100% | 40% | 0% | 50% | 100% | 0% | 50% | 48% |
| **# nests** | 5 | 6 | 1 | 5 | 0 | 8 | 2 | 0 | 2 | 29 |
| **average eggs/clutch** | 7.2 | 7.5 | 8.0 | 6.6 | 0.0 | 8.9 | 9.0 | 0.0 | 8.0 | 7.8 |
| **hatched ducklings/clutch** | 3.0 | 1.7 | 6.0 | 2.0 | 0.0 | 2.1 | 7.0 | 0.0 | 3.5 | 2.7 |
| **2011** | | | | | | | | | | |
| **% nest success** | 50% | 60% | 100% | 80% | 50% | 43% | 100% | 0% | 0% | 62% |
| **# nests** | 4 | 5 | 3 | 5 | 2 | 7 | 1 | 0 | 0 | 27 |
| **average eggs/clutch** | 5.5 | 7.2 | 5.5 | 11 | 10 | 5.6 | 9 | 0 | 0 | 7.4 |
| **hatched ducklings/clutch** | 2.75 | 3.6 | 4 | 6.4 | 1.5 | 1.57 | 9.00 | 0.00 | 0.00 | 3.40 |
| **2012** | | | | | | | | | | |
| **% nest success** | 75% | 100% | 100% | 100% | 100% | 100% | 0% | 100% | 50% | 86% |
| **# nests** | 4 | 4 | 2 | 3 | 3 | 3 | 0 | 1 | 2 | 22 |
| **average eggs/clutch** | 11 | 8.3 | 10 | 11 | 5 | 8.3 | 0.0 | 9 | 3 | 8.4 |
| **hatched ducklings/clutch** | 6.0 | 6.0 | 8.5 | 6.7 | 1.0 | 4.7 | 0.0 | 5.0 | 1.0 | 4.9 |

LDE = Little Deep Edge
PLC = Pine Log Creek

**Appendix VII. Wading bird survey results (2008-11) from Little Deep Edge Pond rookery at the Carter Tract of Econfina Creek WMA, Washington County, FL.**

| Species | | Number of Birds Observed | | |
|---|---|---|---|---|
| **Anhinga (*Anhinga anhinga*)** | **Year** | **Adults** | **Nesting** | **Chicks** |
| | 2008 | 6 | 3 | 0 |
| | 2009 | 3 | unknown | 3 |
| | 2010 | 2 | 0 | 0 |
| | 2011 | 2 | 0 | 0 |
| | 2012 | 0 | 0 | 0 |
| **Cattle Egret (*Bubulcus ibis*)** | 2008 | 25 | 18 | 0 |
| | 2009 | 0 | 0 | 0 |
| | 2010 | 0 | 0 | 0 |
| | 2011 | 14 | 12 | 24 |
| | 2012 | 0 | 0 | 0 |
| **Great Egret (*Ardea alba*)** | 2008 | 13 | 10 | 10 |
| | 2009 | 31 | 8 | 12 |
| | 2010 | 8 | 6 | 9 |
| | 2011 | 14 | 11 | 17 |
| | 2012 | 12 | 6 | 6 |
| **Little Blue Heron (*Egretta caerulea*)** | 2008 | 8 | 3 | 0 |
| | 2009 | 1 | 0 | 0 |
| | 2010 | 0 | 0 | 0 |
| | 2011 | 20 | 14 | 34 |
| | 2012 | 7 | 4 | 6 |
| **Tricolored Heron (*Egretta tricolor*)** | 2008 | 2 | unknown | 0 |
| | 2009 | 0 | 0 | 0 |
| | 2010 | 0 | 0 | 0 |
| | 2011 | 1 | 1 | 1 |
| | 2012 | 0 | 0 | 0 |
| **Snowy Egret (*Egretta thula*)** | 2008 | 0 | 0 | 0 |
| | 2009 | 3 | 0 | 0 |
| | 2010 | 0 | 0 | 0 |
| | 2011 | 2 | 2 | 5 |
| | 2012 | 0 | 0 | 0 |
| **Green Heron (*Butorides virescens*)** | 2008 | 1 | 0 | 1 |
| | 2009 | 2 | unknown | 1 |
| | 2010 | 1 | 0 | 0 |
| | 2011 | 0 | 0 | 0 |
| | 2012 | 0 | 0 | 0 |
| **Great Blue Heron (*Ardea herodias*)** | 2008 | 0 | 0 | 0 |
| | 2009 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| | 2010 | 1 | 0 | 0 |
| | 2011 | 0 | 0 | 0 |
| | 2012 | 0 | 0 | 0 |

## Appendix VIII. Bird species (n=124) documented on the Carter Tract of Econfina Creek WMA, as of June 2012.

**PODICIPEDIFORMES**
- **Podicipedidae (Grebes)**
  - ☐ Pied-billed Grebe *Podilymbus podiceps*

**PELICANIFORMES**
- **Phalacrocoracidae (Cormorants)**
  - ☐ Double-crested Cormorant *Phalacrocorax auritus*
- **Anhingidae (Darters/Anhinga)**
  - ☐ Anhinga *Anhinga anhinga*

**CICONIIFORMES**
- **Ardeidae (Herons, Egrets, and Bitterns)**
  - ☐ Great Blue Heron *Ardea herodias*
  - ☐ Great Egret *Ardea alba*
  - ☐ Snowy Egret *Egretta thula*
  - ☐ Little Blue Heron *Egretta caerulea*
  - ☐ Tricolored Heron *Egretta tricolor*
  - ☐ Cattle Egret *Bubulcus ibis*
  - ☐ Green Heron *Butorides virescens*
- **Threskiornithidae (Ibises and Spoonbills)**
  - ☐ White Ibis *Eudocimus albus*
  - ☐ Roseate Spoonbill *Platalea ajaja*
- **Ciconiidae (Storks)**
  - ☐ Wood Stork *Mycteria americana*
- **Cathartidae (New World Vultures)**
  - ☐ Black Vulture *Coragyps atratus*
  - ☐ Turkey Vulture *Cathartes aura*

**ANSERIFORMES**
- **Anatidae (Ducks, Geese, and Swans)**
  - ☐ Snow Goose *Chen caerulescens*
  - ☐ Wood Duck *Aix sponsa*
  - ☐ Blue-winged Teal *Anas discors*
  - ☐ Green-winged Teal *Anas crecca*
  - ☐ Redhead *Aythya americana*
  - ☐ Ring-necked Duck *Aythya collaris*
  - ☐ Bufflehead *Bucephala albeola*
  - ☐ Hooded Merganser *Lophodytes cucullatus*
  - ☐ Ruddy Duck *Oxyura jamaicensis*

**FALCONIFORMES**
- **Accipitridae (Hawks and Allies)**
  - ☐ Osprey *Pandion haliatus*
  - ☐ Swallow-tailed Kite *Elanoides forficatus*
  - ☐ Bald Eagle *Haliaeetus leucocephalus*
  - ☐ Northern Harrier *Circus cyaneus*
  - ☐ Sharp-shinned Hawk *Accipiter striatus*
  - ☐ Cooper's Hawk *Accipiter cooperii*
  - ☐ Red-shouldered Hawk *Buteo lineatus*
  - ☐ Red-tailed Hawk *Buteo jamaicensis*
- **Falconidae (Falcons and Caracaras)**
  - ☐ American Kestrel *Falco sparverius*
  - ☐ Merlin *Falco columbarius*

**GALLIFORMES**
- **Phasianidae (Grouse, Turkeys, and Allies)**
  - ☐ Wild Turkey *Meleagris gallopavo*
- **Odontophoridae (New World Quail)**
  - ☐ Northern Bobwhite *Colinus virginianus*

**GRUIFORMES**
- **Rallidae (Rails, Gallinules, and Coots)**
  - ☐ Common Moorhen *Gallinula chloropus*
  - ☐ American Coot *Fulica Americana*
- **Gruidae (Cranes)**
  - ☐ Sandhill Crane *Grus Canadensis*

**CHARADRIIFORMES**
- **Charadriidae (Plovers and Lapwings)**
  - ☐ Killdeer *Charadrius vociferous*
- **Scolopacidae (Sandpipers, Phalaropes, and Allies)**
  - ☐ Greater Yellowlegs *Tringa melanoleuca*
  - ☐ Lesser Yellowlegs *Tringa flavipes*
  - ☐ Solitary Sandpiper *Tringa solitaria*
  - ☐ Least Sandpiper *Calidris minutilla*
  - ☐ Common Snipe *Gallinago gallinago*
  - ☐ American woodcock *Scolopax minor*
- **Laridae (Gulls, Terns, and Allies)**
  - ☐ Least Tern *Sterna antillarum*
  - ☐ Forster's Tern *Sterna forsteri*

**COLUMBIFORMES**
- **Columbidae (Pigeons and Doves)**
  - ☐ Mourning Dove *Zenaida macroura*
  - ☐ Common Ground Dove *Columbina passerina*

**CUCULIFOMRES**
- **Cuculidae (Cuckoos, Roadrunners, and Anis)**
  - ☐ Yellow-billed Cuckoo *Coccyzus americanus*

**STRIGIFORMES**
- **Strigidae (Typical Owls)**
  - ☐ Eastern Screech Owl *Megascops asio*
  - ☐ Great Horned Owl *Bubo virginianus*
  - ☐ Barred Owl *Strix varia*

**CAPRIMULGIFORMES**
- **Caprimulgidae (Nighthawks and Nightjars)**
  - ☐ Common Nighthawk *Chordeiles minor*
  - ☐ Chuck-will's-widow *Caprimulgus carolinensis*

**APODIFORMES**
- **Apodidae (Swifts)**
  - ☐ Chimney Swift *Chaetura pelagica*
- **Trochilidae (Hummingbirds)**
  - ☐ Ruby-throated Hummingbird *Archilochus colubris*

**CORACIIFORMES**
- **Alcedinidae (Kingfishers)**
  - ☐ Belted Kingfisher *Ceryle alcyon*

**PICIFORMES**
- **Picidae (Woodpeckers and Allies)**
  - ☐ Red-headed Woodpecker *Melanerpes erythrocephalus*
  - ☐ Red-bellied Woodpecker *Melanerpes carolinus*
  - ☐ Yellow-bellied Sapsucker *Sphyrapicus varius*
  - ☐ Downy Woodpecker *Picoides pubescens*
  - ☐ Hairy Woodpecker *Picoides villosus*
  - ☐ Northern Flicker *Colaptes auratus*
  - ☐ Pileated Woodpecker *Dryocopus pileatus*

**PASSERIFORMES**
- **Tyrannidae (Tyrant Flycatchers)**
  - ☐ Eastern Phoebe *Sayornis phoebe*
  - ☐ Vermilion Flycatcher *Pyrocephalus rubinus*
  - ☐ Great Crested Flycatcher *Myiarchus crinitus*
  - ☐ Eastern Kingbird *Tyrannus tyrannus*
- **Laniidae (Shrikes)**
  - ☐ Loggerhead Shrike *Lanius ludovicianus*
- **Vireonidae (Vireos)**
  - ☐ White-eyed Vireo *Vireo griseus*
  - ☐ Red-eyed Vireo *Vireo olivaceus*
- **Corvidae (Crows and Jays)**
  - ☐ Blue Jay *Cyanocitta cristata*
  - ☐ American Crow *Corvus brachyrhynchos*
  - ☐ Fish Crow *Corvus ossifragus*

## Appendix VIII (continued)

**PASSERIFORMES (continued)**

**Hyrundinidae (Swallows and Martins)**
- ☐ Purple Martin *Progne subis*
- ☐ Tree Swallow *Tachycineta bicolor*
- ☐ Northern Rough-winged Swallow *Stelgidopteryx serripennis*
- ☐ Barn Swallow *Hirundo rustica*

**Paridae (Chickadees and Titmice)**
- ☐ Carolina Chickadee *Poecile carolinensis*
- ☐ Tufted Titmouse *Baeolophus bicolor*

**Sittidae (Nuthatches)**
- ☐ Brown-headed Nuthatch *Sitta pusilla*

**Troglodytidae (Wrens)**
- ☐ Carolina Wren *Thryothorus ludovicianus*
- ☐ Marsh Wren *Cistothorus palustris*

**Regulidae (Kinglets)**
- ☐ Golden-crowned Kinglet *Regulus satrapa*
- ☐ Ruby-crowned Kinglet *Regulus calendula*

**Sylviidae (Old World Warblers and Gnatcatchers)**
- ☐ Blue-gray Gnatcatcher *Polioptila caerulea*

**Turdidae (Thrushes)**
- ☐ Eastern Bluebird *Sialia sialis*
- ☐ Hermit Thrush *Catharus guttatus*
- ☐ Wood Thrush *Hylocichla mustelina*
- ☐ American Robin *Turdus migratorius*

**Mimidae (Mockingbirds and Thrashers)**
- ☐ Gray Catbird *Dumetella carolinensis*
- ☐ Northern Mockingbird *Mimus polyglottos*
- ☐ Brown Thrasher *Toxostoma rufum*

**Bombycillidae (Waxwings)**
- ☐ Cedar Waxwing *Bombycilla cedrorum*

**Parulidae (Wood-Warblers)**
- ☐ Orange-crowned Warbler *Vermivora celata*
- ☐ Northern Parula *Parula Americana*
- ☐ Yellow-rumped Warbler *Dendroica coronata*
- ☐ Yellow-throated Warbler *Dendroica dominica*
- ☐ Pine Warbler *Dendroica pinus*
- ☐ Prairie Warbler *Dendroica discolor*
- ☐ Palm Warbler *Dendroica palmarum*
- ☐ Black-and-white Warbler *Mniotilta varia*
- ☐ Prothonotary Warbler *Protonotaria citrea*
- ☐ Common Yellowthroat *Geothlypis trichas*
- ☐ Hooded Warbler *Wilsonia citrine*

**Thraupidae (Tanagers)**
- ☐ Summer Tanager *Piranga rubra*
- ☐ Scarlet Tanager *Piranga olivacea*

**Emberizidae (New World Sparrows)**
- ☐ Eastern Towhee *Pipilo erythrophthalmus*
- ☐ Chipping Sparrow *Spizella passerine*
- ☐ Field Sparrow *Spizella pusilla*
- ☐ White-throated Sparrow *Zonotrichia albicollis*
- ☐ White-crowned Sparrow *Zonotrichia leucophrys*
- ☐ Dark-eyed Junco *Junco hyemalis*

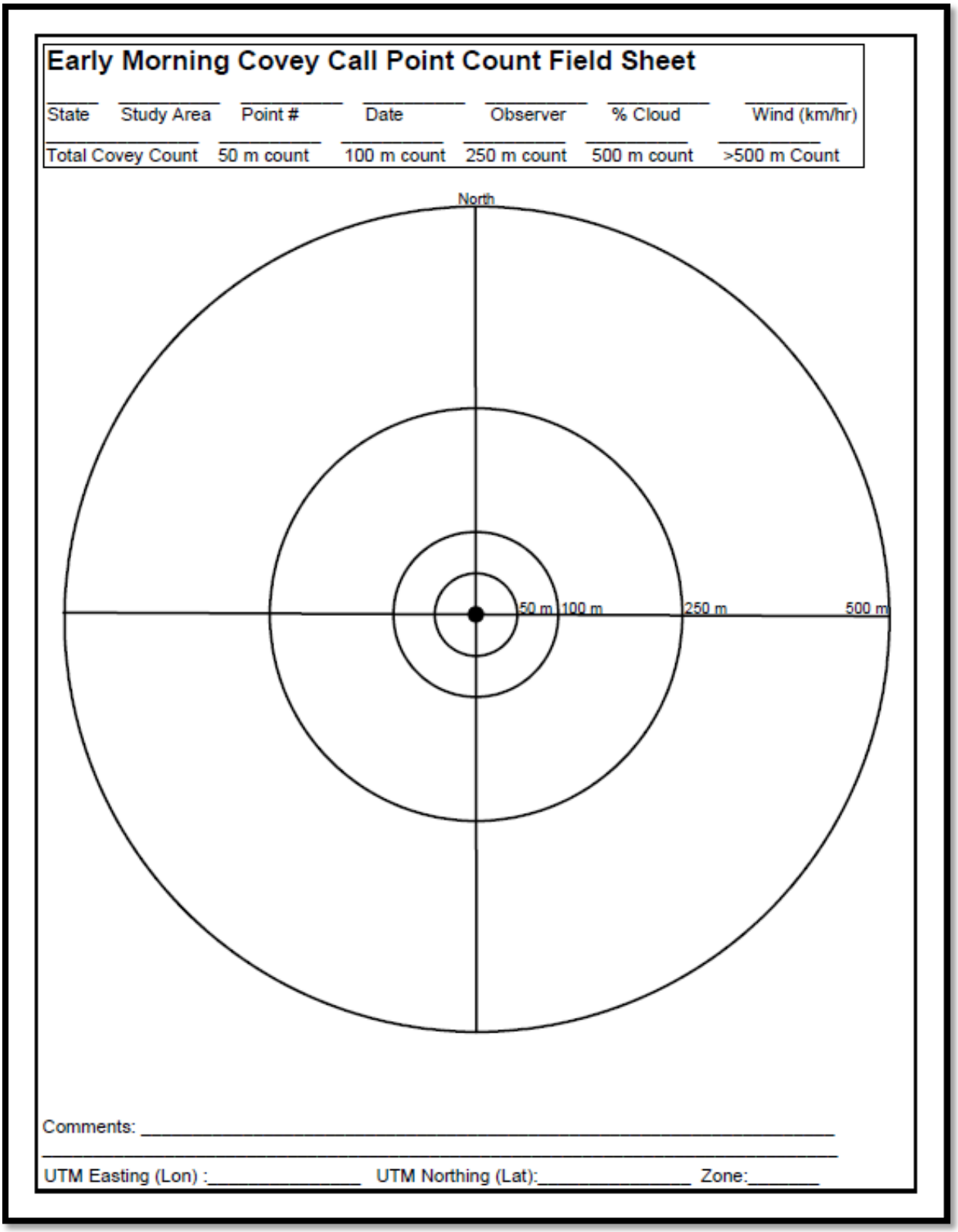
**Cardinalidae (Cardinals and Allies)**
- ☐ Northern Cardinal *Cardinalis cardinalis*
- ☐ Rose-breasted Grosbeak *Pheucticus ludovicianus*
- ☐ Blue Grosbeak *Passerina caerulea*
- ☐ Indigo Bunting *Passerina cyanea*

**Icteridae (Blackbirds, Orioles, and Allies)**
- ☐ Red-winged Blackbird *Agelaius phoeniceus*
- ☐ Eastern Meadowlark *Sturnella magna*
- ☐ Common Grackle *Quiscalus quiscula*
- ☐ Brown-headed Cowbird *Molothrus ater*
- ☐ Orchard Oriole *Icterus spurious*

## TOTAL NUMBER OF BIRD SPECIES = 124

* NOTE: species in red were previously undocumented prior July 2011.

**Appendix IX. Field data sheet used for conducting early morning autumn call counts for quail coveys on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**



## Early Morning Covey Call Point Count Field Sheet

State _____ Study Area _____ Point # _____ Date _____ Observer _____ % Cloud _____ Wind (km/hr) _____

Total Covey Count _____ 50 m count _____ 100 m count _____ 250 m count _____ 500 m count _____ >500 m Count _____



Comments: _____

_____

UTM Easting (Lon) :_____ UTM Northing (Lat):_____ Zone:_____

## Appendix X. Comprehensive list of herpetofaunal species (n=61) documented on the Carter Tract of Econfina Creek WMA, 2005 – present.

**CROCODILIA (Crocodilians)**

**Allitatoridae (Alligator and Caiman)**

- ☐ American alligator *Alligator mississippiensis*

**TESTUDINES (Turtles)**

**Kinosternidae (Musk and Mud Turtles)**

- ☐ Common Musk Turtle *Sternotherus odoratus*
- ☐ Eastern Mud Turtle *Kinosternon subrubrum*

**Emydidae (Box and Water Turtles)**

- ☐ Florida Box Turtle *Terrapene carolina bauri*
- ☐ Gulf Coast Box Turtle *Terrapene carolina major*
- ☐ Three-Toed Box Turtle *Terrapene carolina triunguis*
- ☐ Yellow-bellied Slider *Trachemys scripta*
- ☐ Florida Cooter *Pseudemys floridana floridana*
- ☐ Eastern Chicken Turtle *Deirochelys reticularia reticularia*

**Testudinidae (Gopher Tortoises)**

- ☐ Gopher Tortoise *Gopherus polyphemus*

**Trionychidae (Softshell Turtles)**

- ☐ Florida Softshell *Apalone ferox*

**SQUAMATA (Lizards and Snakes)**

**Lacertilia (Lizards)**

**Polychridae (Anoles)**

- ☐ Green Anole *Anolis carolinensis*

**Phrynosomatidae (Earless, spiny, side-blotched, and horned lizards)**

- ☐ Southern Fence Lizard *Sceloporus undulatus undulatus*

**Teiidae (Whiptails)**

- ☐ Six-lined Racerunner *Cnemidophorus sexlineatus sexlineatus*

**Scincidae (Skinks)**

- ☐ Ground Skink *Scincella lateralis*
- ☐ Five-lined Skink *Eumeces fasciatus*
- ☐ Broadhead Skink *Eumeces laticeps*
- ☐ Southeastern Five-lined skink *Eumeces inexpectatus*
- ☐ Northern Mole Skink *Eumeces egregius similis*

**Serpentes (Snakes)**

**Colubridae (Colubrid Snakes)**

- ☐ Florida Green Water Snake *Nerodia floridana*
- ☐ Banded Water Snake *Nerodia fasciata fasciata*
- ☐ Eastern Garter Snake *Thamnophis sirtalis sirtalis*
- ☐ Eastern Ribbon Snake *Thamnophis sauritus sauritus*
- ☐ Smooth Earth Snake *Virginia valeriae*
- ☐ Eastern Hognose Snake *Heterodon platirhinos*
- ☐ Mud Snake *Farancia abacura*
- ☐ Southern Black Racer *Coluber constrictor priapus*
- ☐ Eastern Coachwhip *Masticophis flagellum*
- ☐ Rough Green Snake *Opheodrys aestivus*

## Appendix X (continued)

- ☐ Corn Snake *Elaphe guttata guttata*
- ☐ Gray Rat Snake *Elaphe obsoleta spiloides*
- ☐ Florida Pine Snake *Pituophis melanoleucus*
- ☐ Scarlet Snake *Cemophora coccinea*
- ☐ Black Swamp Snake Seminatrix pygaea

**Elapidae (Coral Snakes)**

- ☐ Eastern Coral Snake *Micrurus fulvius*

**Viperidae (Vipers)**

**Crotalinae (Pit Vipers)**

- ☐ Florida Cottonmouth *Agkistrodon piscivorous conanti*
- ☐ Dusky Pigmy Rattlesnake *Sistrurus miliarius barbouri*
- ☐ Eastern Diamondback Rattlesnake *Crotalus adamanteus*

**CAUDATA (Salamanders)**

**Amphiumidae (Amphiumas)**

- ☐ Two-toed Amphiuma *Amphiuma means*

**Sirenidae (Sirens)**

- ☐ Greater Siren *Siren lacertina*
- ☐ Eastern Lesser Siren *Siren intermedia intermedia*
- ☐ Slender Dwarf salamander *Eurycea quadridigitata*

**Ambystomadidae (Mole Salamanders)**

- ☐ Mole Salamander *Ambystoma talpoideum*

**Salamandridae (Newts)**

- ☐ Central Newt *Notophthalmus viridescens louisianensis*

**Plethodontidae (Lungless Salamnders)**

- ☐ Southeastern Slimy Salamander *Plethodon grobmani*

**ANURA (Frogs and Toads)**

**Pelobatidae (Spadefoots)**

- ☐ Eastern Spadefoot Toad *Scaphiopus holbrooki*

**Bufonidae (Toads)**

- ☐ Southern Toad *Bufo terrestris*
- ☐ Oak Toad *Bufo quercicus*

**Hylidae (Treefrogs and Their Allies)**

- ☐ Florida Cricket Frog *Acris gryllus dorsalis*
- ☐ Green Treefrog *Hyla cinerea*
- ☐ Barking Treefrog *Hyla gratiosa*
- ☐ Pine Woods Treefrog Hyla femoralis
- ☐ Squirrel Treefrog *Hyla squirella*
- ☐ Bird-voiced Treefrog *Hyla avivoca*
- ☐ Southern Chorus Frog *Pseudacris nigrita nigrita*
- ☐ Ornate Chorus Frog *Pseudacris ornata*

**Microhylidae (Narrowmouth Toads)**

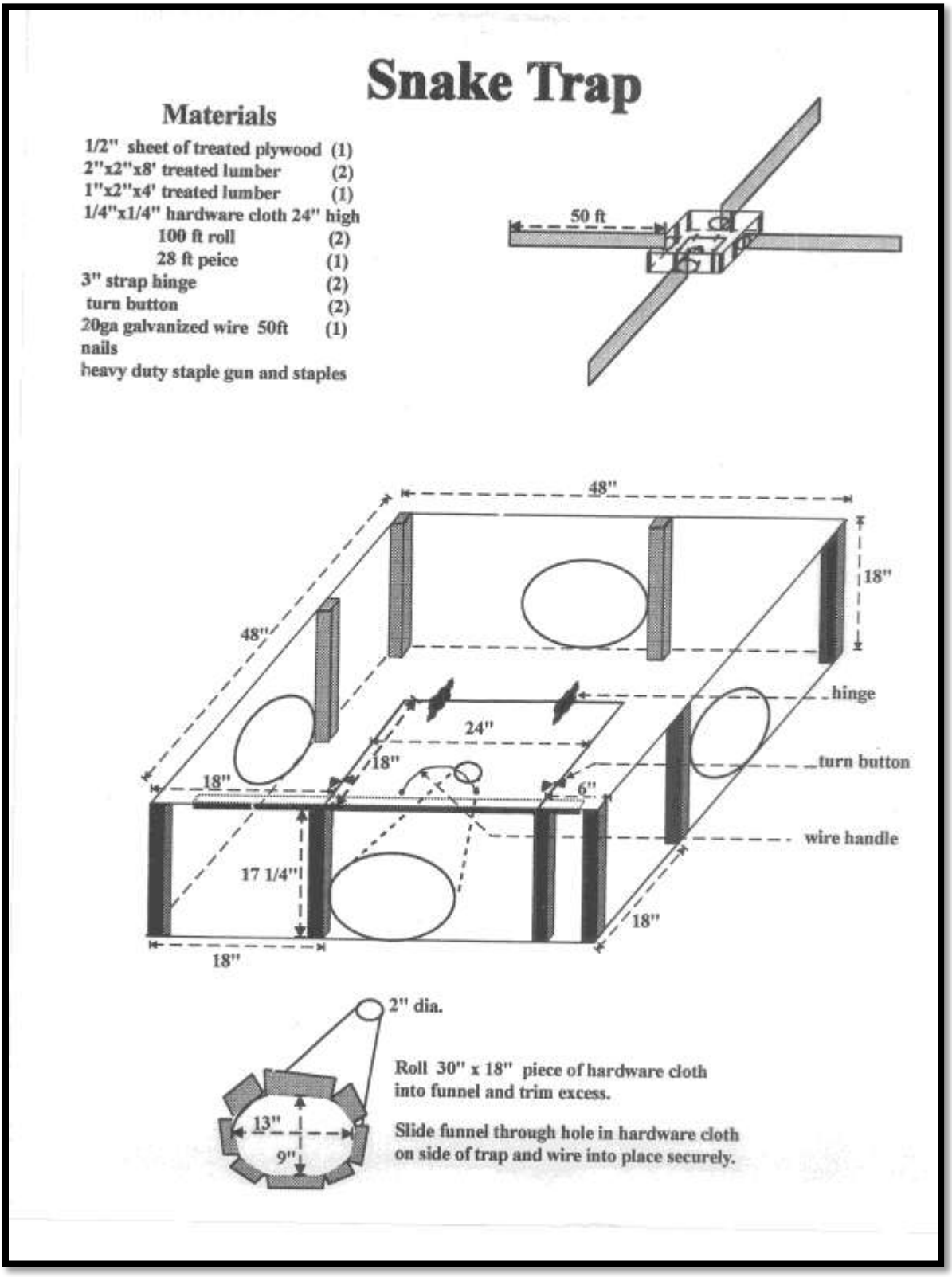
- ☐ Eastern Narrowmouth Toad *Gastrophryne carolinensis*

**Ranidae (True Frogs)**

- ☐ Bullfrog *Rana catesbeiana*
- ☐ River Frog *Lithobates heckscheri*
- ☐ Pig Frog *Rana grylio*
- ☐ Southern Leopard Frog *Rana sphenocephala*

****RED denotes previously unconfirmed species found during 2011-12**

**Appendix XI. General design and dimensions of upland snake traps used at the Carter Tract from March – July 2010 (NOTE: Actual trap and array dimensions differ slightly from those described below).**



**Appendix XII. Snake trap array capture results from July 2011 – June 2012 on the Carter Tract of Econfina Creek WMA, Washington County, Florida.**

| **Reptiles** | **Number captured** |
|---|---|
| Green anole (*Anolis carolinensis)* | 4 |
| Six-line racerunner (*Cnemidophorus sexlineatus*) | 38 |
| Southern black racer (*Coluber constrictor priapus*) | 14 |
| Northern mole skink (*Eumeces egregius similis*) | 1 |
| Southeastern five-lined skink (*Eumeces inexpectatus*) | 3 |
| Eastern hognose snake (*Heterodon platyrhinos*) | 4 |
| Eastern coachwhip *(Masticophis flagellum*) | 16 |
| Dusky pigmy rattlesnake *(Sistrurus miliarius barbouri*) | 3 |
| Coral snake (*Micrurus fulvius*) | 1 |
| Ground skink (*Scincella lateralis*) | 2 |
| Smooth earth snake (*Virginia valeriae*) | 1 |
| Eastern fence lizard (*Sceloporus undulatus*) | 39 |
| TOTAL REPTILES | 126 |
| NUMBER OF REPTILE SPECIES | 12 |

| **Amphibians** | **Number captured** |
|---|---|
| Southern toad (*Bufo terrestris*) | 15 |
| Eastern narrowmouth toad (*Gastrophryne carolinensis*) | 4 |
| Eastern spadefoot toad (*Scaphiopus holbrookii*) | 1 |
| Southern leopard frod (*Rana sphenocephala*) | 1 |
| TOTAL AMPHIBIANS | 21 |
| NUMBER OF AMPHIBIAN SPECIES | 4 |

| **Mammals** | **Number captured** |
|---|---|
| Southern short-tailed shew (*Blarina carolinensis*) | 2 |
| Cotton rat (*Sigmodon hispidus*) | 1 |
| Oldfield mouse (*Peromyscus polionotus*) | 12 |
| Cotton mouse (*Peromyscus gossypinus*) | 6 |
| TOTAL MAMMALS | 21 |
| NUMBER OF MAMMAL SPECIES | 4 |

| **Birds** | **Number captured** |
|---|---|
| Carolina wren (*Thryothorus ludovicianus*) | 1 |
| TOTAL BIRDS | 1 |
| NUMBER OF BIRD SPECIES | 1 |

| | |
|---|---|
| **TOTAL ALL TAXA** | **169** |
| **TOTAL SPECIES** | **21** |

**NOTE: species in red were previously undocumented prior to the July 2011-June 2012 trapping effort**