SANDHILL LAKES MITIGATION BANK

CARTER TRACT

ECONFINA CREEK WILDLIFE MANAGEMENT AREA

ANNUAL REPORT 2021-2022

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Wildlife Habitat Management Section

Division of Habitat and Species Conservation

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INTRODUCTION

The Sand Hill Lakes Mitigation Bank property (referred to hereafter as the Carter Tract) is a 2,175-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.

The responsibilities of FWC – Division of Habitat and Species Conservation on the Carter Tract are to conduct fish and wildlife population assessments (collect and analyze biological data), administer public fishing and hunting programs (provide recommendations, based on scientifically accepted practices, for adjustments to harvests to optimize fish and wildlife populations), and oversee other fish and wildlife-based recreational opportunities. Following fourteen years of successful partnership, in June 2019 this agreement was renewed for an additional five years through 2024. In support of this cost-share agreement, this annual report is a comprehensive summary of the biological surveys, management activities, public use, and law enforcement monitoring conducted from 1 July 2012 – 30 June 2021. The updated 2021-22 Fitzhugh Carter Tract Hunting and Fishing Regulations Summary and Area Map is included in Appendix I. The FWC Annual Work Plan and Accomplishment Report for this reporting period is included in Appendix II.

HABITAT

Ecological and Land Cover Classification

The Carter Tract harbors several distinct ecological communities. The largest single community on 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 875 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).

NWFWMD has led restoration efforts of the natural communities on Carter Tract that were degraded by timber operations and suppression of natural fire regimes. Restoration management has included mechanical reduction/herbicide of hardwoods and sand pine (*Pinus clausa*), native groundcover plantings, slash pine (*Pinus elliottii*) plantation thinning, and prescribed burning. There are many benefits of prescribed fire and selective herbicide application, including control of exotic invasive plants, increased plant community diversity, and restoration and/or maintenance of plant communities in an early successional state. The results are beneficial for both game and nongame wildlife species.

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 have been recorded monthly by FWC field staff since January 2006. Public fishing opportunities require adequate water levels on the area ponds. For example, extremely low water levels forced the closing of Green Ponds to public fishing from June 2011 until mid-July 2013 when heavy rains recharged the aquifer and refilled all area ponds. Water levels on Carter Tract have remained relatively stable since the last recharging event – notwithstanding the typical seasonal fluctuations (Figure 1). However, high water levels following Hurricane Sally's landfall in September 2020 prevented water gauge readings for Dry, Black, and Powerline Ponds in October 2020. In addition, the loss of water gauges at Joiner Lake Canal, Green Ponds and Dry Pond has prevented accurate reporting of water levels for those water bodies. Primary water bodies are depicted on the Area Map included within the Fitzhugh Carter Tract Hunting and Fishing Regulations Summary brochure (Appendix I).

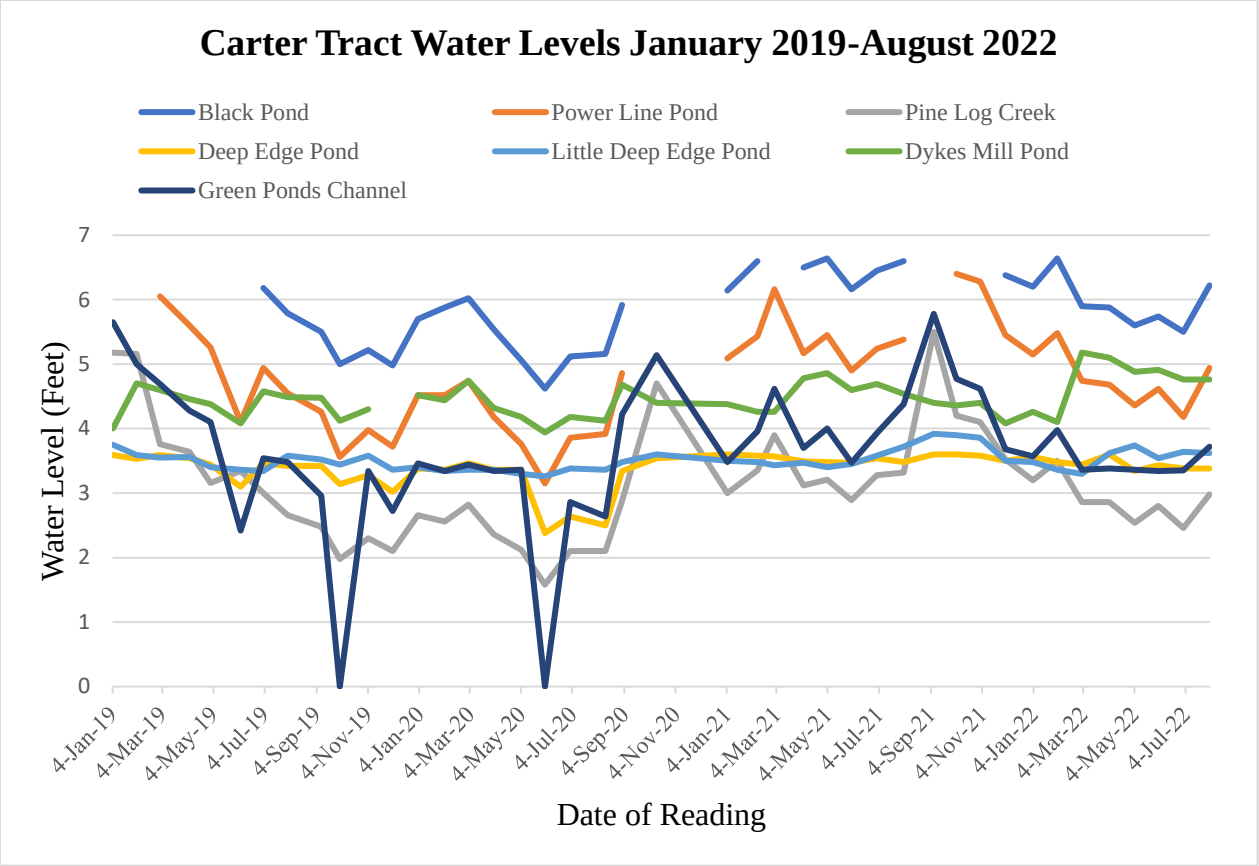

Figure 1. Water levels in feet for selected water bodies on Carter Tract for 2019-2022.

FRESHWATER FISH POPULATIONS

Population Assessment

FWC staff have employed a variety of methods, including electrofishing, to survey sportfish and baitfish populations on Carter Tract. Sampling conditions at Carter Tract have proven electrofishing difficult and somewhat ineffective. Conductivity between 100-500 microsiements/cm is considered ideal However, samplings on Black, Dry, and Green Ponds have yielded conductivity measurements between 23-25 microsiements/cm. The low conductivity yields less current to adequately shock the fish, making them less susceptible to detection. Furthermore, high water events can disperse fish into surrounding vegetation rendering the larger boats used for electrofishing inefficient. FWC fisheries biologists recommend that the information gathered from angler creel surveys continue in its present form as it will be more reliable for following sportfish composition and size trends, and for fisheries management decisions on Carter Tract (Josh Wilsey, FWC Division of Freshwater Fisheries (DFF), pers. comm.). On occasion, per recommendations from DDF, electroshocking may be utilized as needed for population assessment updates.

Public Fishing

The Special Opportunity public fishing program on the Carter Tract continues to provide anglers the unique opportunity to fish smaller bodies of water with low fishing pressures. Creel surveys from July 2021 – June 2022 yielded 667 anglers logging 2193.6 fishing hours (Figure 2). While these numbers are up from FY 2020-2021 they are still low compared to historical trends. This is due in part to a decrease in angler participation following the recent COVID-19 pandemic. However, angler participation has increased steadily since the 2019-20 reporting period, and we are confident that fishing pressure will return to previous trends.

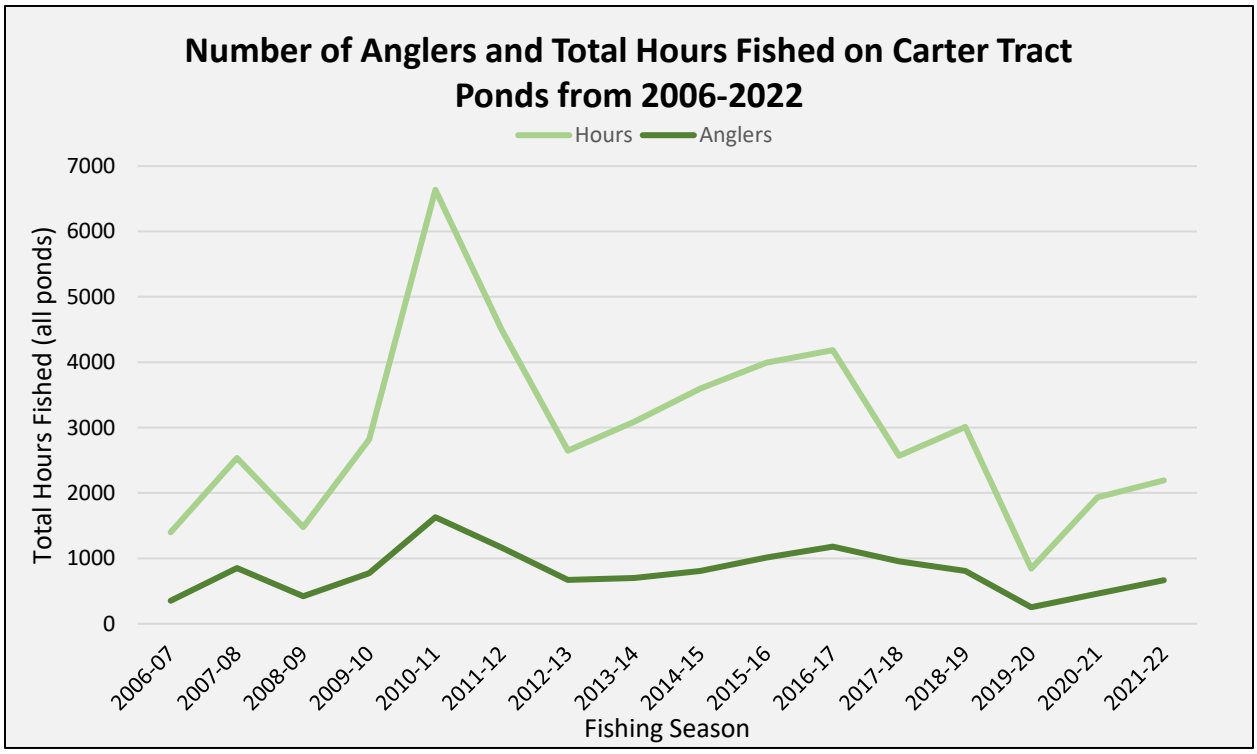

Figure 2. Total number of hours fished, and number of anglers, from 2006-07 to 2021-22 on all area ponds at the Carter Tract of Econfina Creek WMA, Washington Co., FL.

For 20221 – 2022, Dry Pond continued to be the most fished water body with 1170.5 hours. Black Pond was the second most fished with 682.35 hours, followed by Green Pond 3 (207.5 hours), Green Pond 1 (98 hours), Green Pond 2 (27.5 hours), and Deep Edge Pond (7.75 hours). The low number of hours fished on Deep Edge Pond is a result of the closure of public boat rentals on Deep Edge and the subsequent transfer of the public boat rental from there to Green Pond 3. July was the most popular month for fishing on the area with 116 anglers logging 383.25 hours of fishing. The least participation

occurred in December with nine anglers logging 42.5 hours of fishing, likely due to the number of days the area is closed to fishing for public hunts (Figure 3

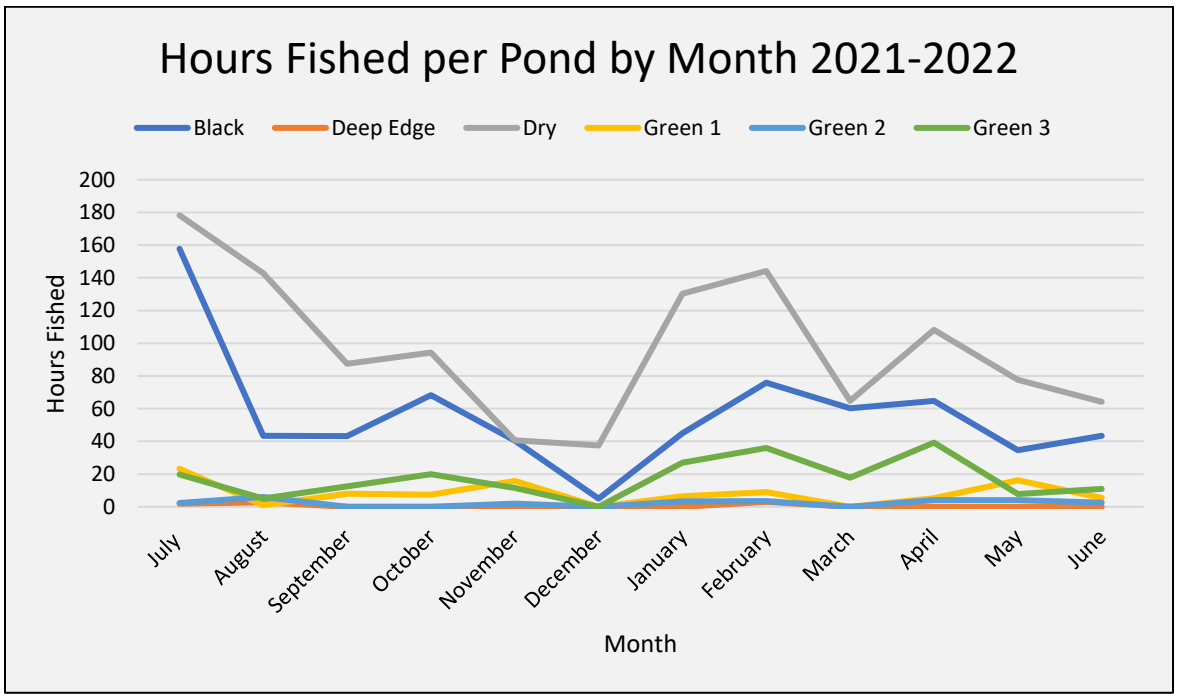

Figure 3. Hours fished per month on Dry, Black, Deep Edge, and Green Ponds during the 2021-22 public fishing opportunities at the Carter Tract of Econfina Creek WMA, Washington Co., FL.

A total of 1,977 fish representing six species were caught on Carter Tract ponds during 2021 – 2022 (Table 1, Figure 4). Bluegill (*Lepomis macrochirus*) comprised 66.97% of all fish caught, followed by largemouth bass (*Micropterus salmoides*; 14.11%), black crappie (*Pomoxis nigromaculatus*; 15.52%), warmouth (*Lepomis gulosus*; 0.25%) and catfish (*Ameirus nebulosus* and *Ameirus natalis*; 0.1%), and other (3.39%). A detailed table of all fish caught and released per pond is presented in Appendix III.

Angler success rate, defined as the number of fish caught per hour of fishing, was calculated for each pond and all water bodies combined for the 2021-2022 fishing season (Table 2, Figure 5). Deep Edge Pond was the most productive water body, followed by Dry Pond, Green Pond 2, Black, Green Pond 1, and Green Pond 3. Deep Edge Pond's unusually high success rate is likely an artifact of low sample size since it was only fished for 7.75 hours.

Table 1. Number of fish caught by species per pond at the Carter Tract of Econfina Creek WMA, Washington Co., FL from July 2021 – June 2022

Species	Dry Pond	Black Pond	Deep Edge	Green 1	Green 2	Green 3
Bluegill	919	312	12	12	16	53
Largemouth Bass	86	119	12	31	7	24
Black Crappie	260	35	0	5	0	7
Other	45	14	1	4	0	3

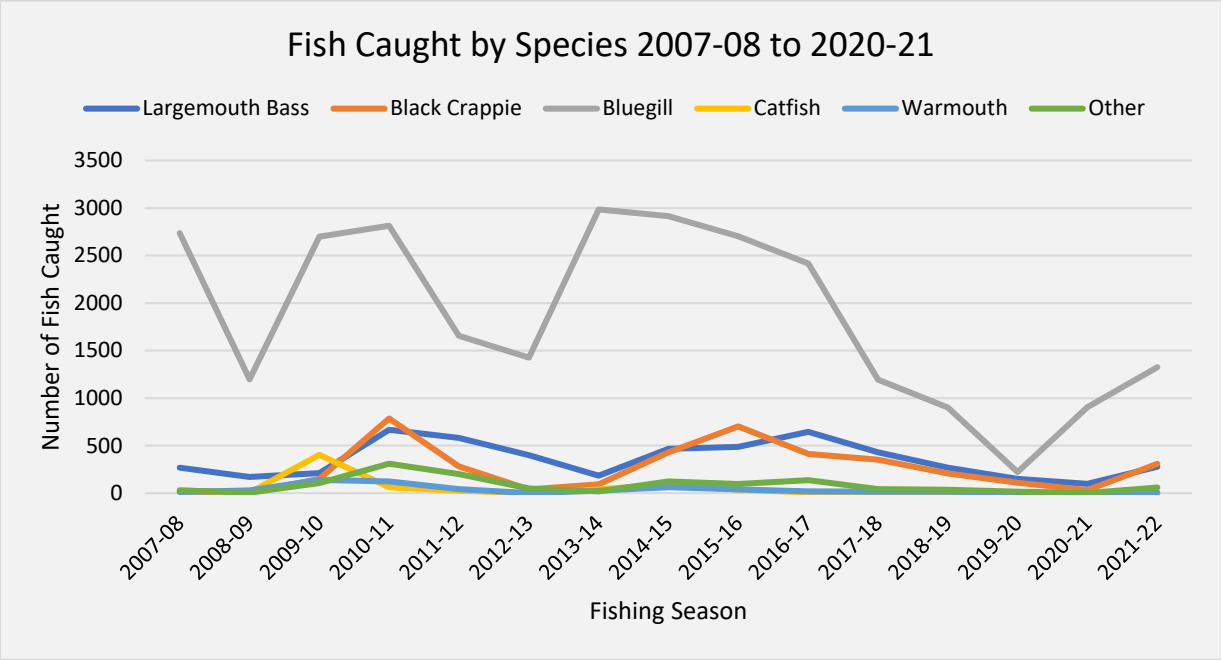

Figure 4. Angler creel trends from 2007-08 to 2021-22 on all area ponds of the Carter Tract of Econfina Creek WMA, Washington Co., FL. Other species include bowfin, chain pickerel, and spotted gar.

Table 2. Fishing success rates (fish caught per hour of fishing effort) on all area ponds at the Carter Tract of Econfina Creek WMA, Washington Co., FL, July 2021 – June 2022.

Pond	Success Rate (Fish/Hour)
Deep Edge	3.23
Dry	1.12
Green 2	0.84
Black	0.7
Green 1	0.53
Green 3	0.42
All Ponds	0.90

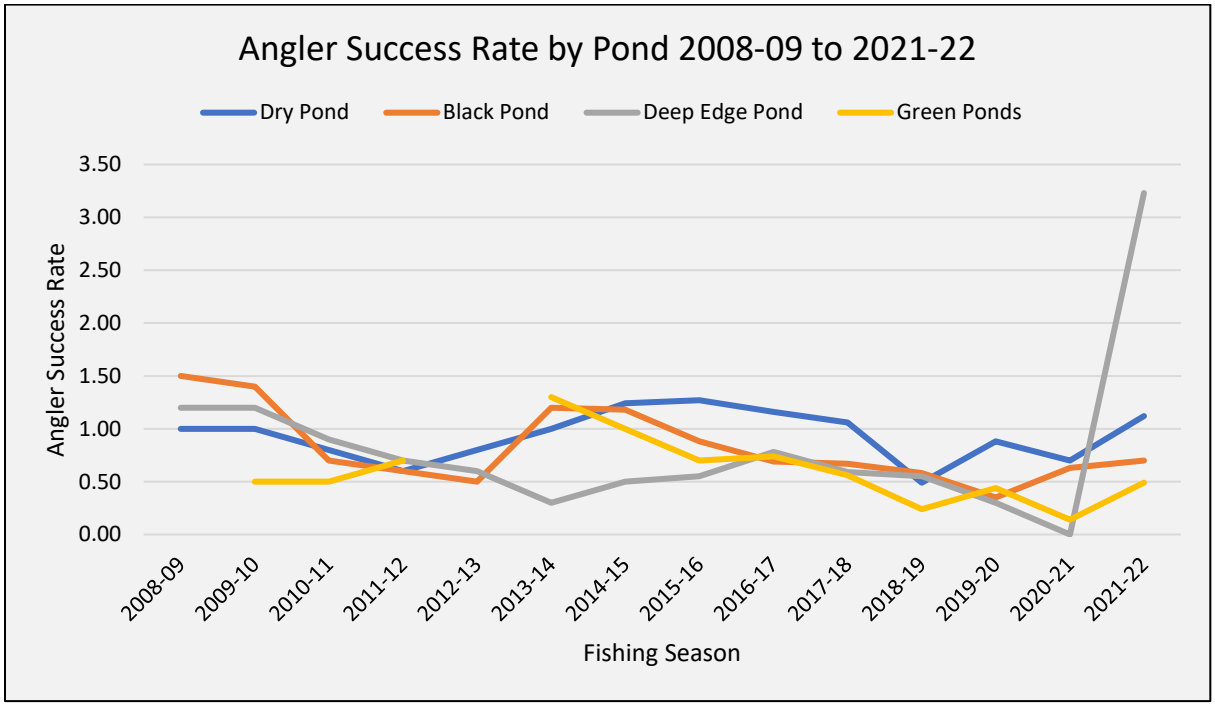

Figure 5. Angler success rate (number of fish caught per hour of fishing effort) from 2008-09 to 2021-22 on area ponds of the Carter Tract of Econfina Creek WMA, Washington Co., FL. Green Ponds were closed to fishing during the 2008-2009 and 2012-2013 fishing seasons due to drought conditions.

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+ year old 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.

Population Assessment

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, both 2.9 miles long and replicated six times from September to October 2021. Surveys began approximately one hour following official sunset and were driven along the pre-selected routes via pickup truck with an observer equipped with a Q-beam® spotlight. Routes were driven at a speed of roughly 3-5 mph. Deer were detected by eye shine and the number of deer, distance to deer, direction/bearing from vehicle, age (adult versus fawn), and gender (if determinable) were recorded. Distance and bearing data were calculated using a Leupold® RXB-IV digital rangefinder/binocular. Figure 6 depicts the line transect routes used on the Carter Tract along with locations of deer observed during 2021 surveys.

The preseason deer density for 2021 was estimated at 14.1 deer/mi^2 (95% CI: 8.2-21.2) using the software DISTANCE 5.0 Release 2 (Thomas et al. 2006; Appendix IV). The Cramér-von-Mises goodness-of-fit test performed on these data produced a *p*-value of 0.2. The 14.1 deer/mi^2 indicates a 38.7% decrease in population density from 2020 (23.0 deer/mi^2). Thus, it appears the population density on Carter Tract in 2021 has fallen below the desired 16-26 deer/mi^2 range. However, this index has fallen below desired density before and appears part of a normal cyclical fluctuation in the deer density estimate exhibited on the area over the last 10 years (Figure 7). Many factors influence deer detectability during spotlight transect surveys and may create what appear to be contradictory or confusing population estimates. For example, the 2021 surveys had a higher number of observations than 2020 (34 and 33 respectively), but a lower Density Deer/Mi^2 despite being identical transect locations and lengths. 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, hunting pressure, etc. can all influence deer activity. Although the density estimate varies annually, continued habitat management (prescribed burning, native groundcover restoration, exotics removal) should improve habitat quality for deer on Carter Tract.

Low sample size will also affect variance and 95% CI. Although a total observation count as low as 40 can be used, Buckland et al. (1993) recommends at least 60-80 observations for reliable density estimates. Not surprisingly, survey years with the largest 95% CI failed to achieve the minimum recommended 60 observations (Figure 7). Annually surveying the herd will continue to yield a reliable relative abundance index, from which stronger inferences of trends in population size can be drawn.

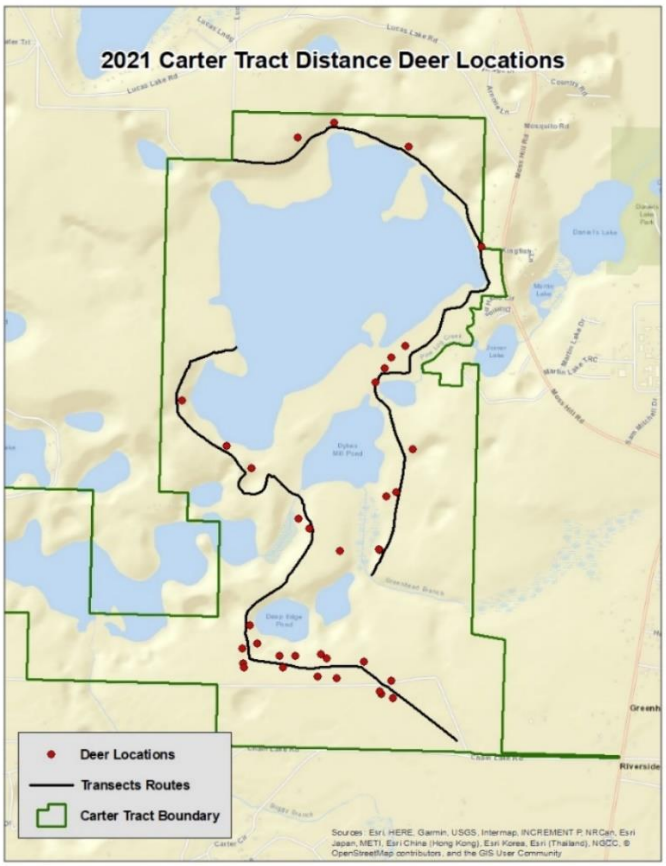

Figure 6. Survey routes and locations of observed deer during the September-October 2021 line-transect distance sampling conducted on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

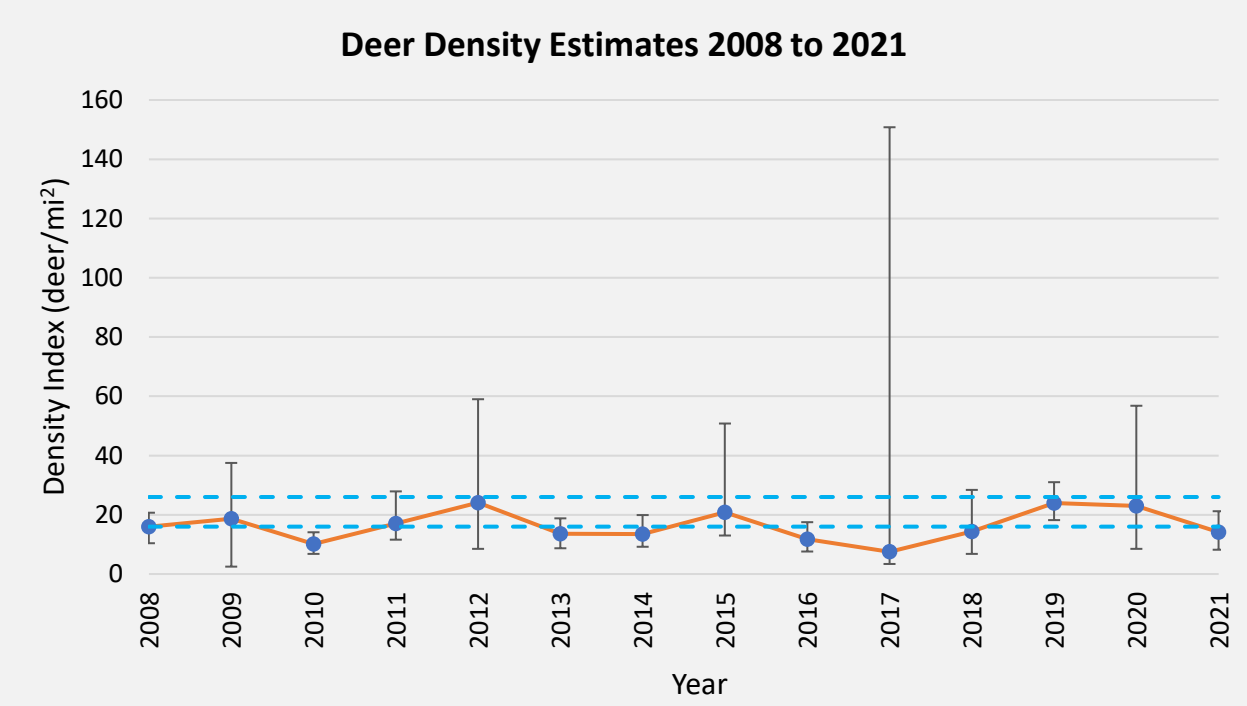

Figure 7. Trend in white-tailed deer density (orange line) as estimated using line-transect distance sampling at the Carter Tract of Econfina Creek WMA, Washington Co., FL from 2008 to 2021. Error bars represent 95% CI and dashed blue line represents the upper and lower limits of the target population density for the site.

Hunting Pressure and Harvest

There is a sixteen-day archery season (divided into two consecutive hunts), a three-day muzzleloading gun season, and a thirteen-day general gun season divided into three quota hunts, one in November and two in January. A non-transferable quota permit is required for each of these hunts, and permit numbers are capped at 15 on any given hunt day. All quota permit hunters and their guests were required to check-in/out at the Carter Tract check station to monitor hunter pressure and collect biological data from harvested deer. Deer hunters and their guests logged a total of 164 man-days during the 2021-2022 season, compared to 192 man-days in 2020-2021. The most popular quota hunts for the past year were the general gun hunts in November and January (103 man-days) followed by the Archery hunts in October - November (49 man-days; Figure 8).

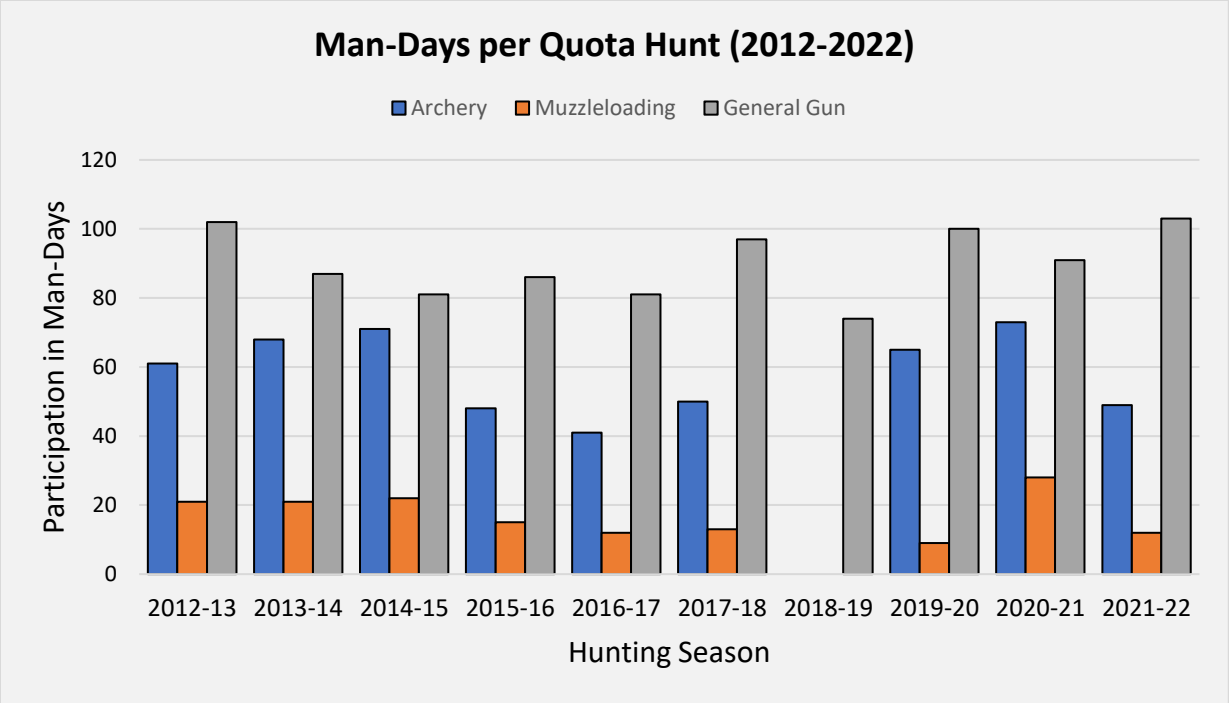

Figure 8. Hunter participation in each of three quota hunt types (archery, muzzleloading, general gun) from 2012-13 through 2021-22 on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Seven deer were harvested on the Carter Tract during the 2021-2022 hunting season. One doe was taken during the archery season, 5 bucks were taken during the first January general gun hunt, and one buck was taken during the fourth January general gun hunt. Deer hunter success rate was 4.27%, or 1 deer harvested per 23.43 man-days of effort, for 2021-2022 (Figure 9).

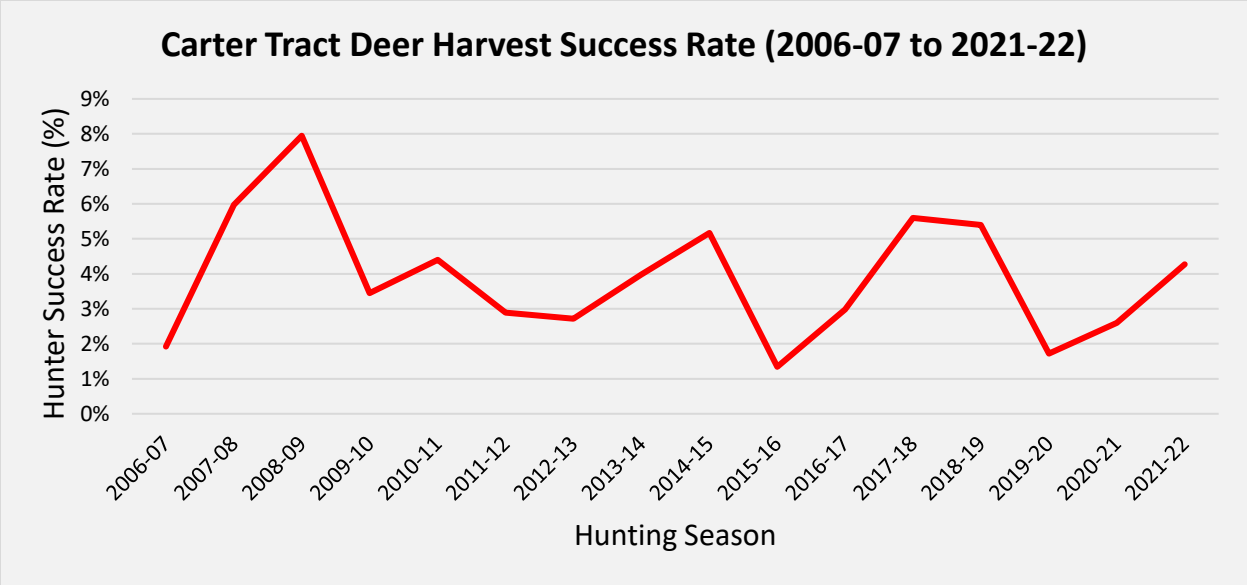

Figure 9. Overall hunter success rate for white-tailed deer from 2006-07 to 2021-22 at the Carter Tract of Econfina Creek WMA, Washington Co., FL.

The recent trend is for area bucks to be harvested primarily during the General Gun II & III hunts. These two hunts occur annually during the last week and a half of January which coincides with the primary rutting activity and mean conception dates for white-tailed deer in southern Washington County (Garrison et al. 2009).

We believe the full potential for deer hunting opportunities on the Carter Tract has yet to be realized, but we do expect continued improvement in conjunction with active habitat management. 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 goal 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 positively affect hunter success.

Chronic Wasting Disease

Chronic Wasting Disease (CWD) is a contagious neurological disease that has been found in captive and wild white-tailed deer, mule deer (*Odocoileus hemionus*), moose (*Alces alces*), and Rocky Mountain elk (*Cervus elaphus*). As of January 2021, CWD has been reported in free-ranging populations in at least 26 states and three Canadian provinces in North America. CWD also has been detected in Finland, Norway, Sweden, and South Korea. The disease causes degeneration of the brains of infected animals, resulting in emaciation, abnormal behavior, loss of bodily functions, and death.

Currently the only practical method for diagnosing CWD is through analysis of brain stem tissue or lymph nodes from dead animals. There is not a practical live-animal test. Since 2002, the FWC has been directing a comprehensive surveillance and monitoring program for CWD in the state. Staff continues to collect and test tissue samples from hunter killed deer from the Carter Tract and surrounding counties as part of this statewide monitoring program. The presence of any CWD-positive deer would be cause for concern, so we plan to continue CWD surveillance for the foreseeable future.

Wild Hog

Management

Since 2014, at the request of NWFWMD, FWC staff have assisted with wild hog (*Sus scrofa*) impact management on Carter Tract. Historically, hogs seem to have always been present. However, ongoing understory vegetative restoration efforts continue to be impacted. As this report covers the FWC Fiscal Year (FY) 2021-2022, only efforts from 1 July 2021 – 30 June 2022 are included. While we do not cease hog management activities on 30 June, but continue unabated into the next FY, those activities will be covered in future reports. FWC staff conducted frequent and routine scouting for presence of hogs on Carter (i.e. tracks, camera traps, and/or damage to vegetation) during FY 21-22. No hog presence was detected during this reporting period.

Boundary Fence Breach Management

Monitoring, and attempts to repair boundary fence breaches, continued despite the impact Hurricanes Michael and Sally had on the overall integrity of the entire boundary fence and in areas not awaiting FEMA funding. Extensive work will be needed to repair and/or replace the damage to the fence if it is expected to control the future ingress and egress of wild hogs. Obviously, wild hogs on the Carter Tract now have more entry and exit strategies available with new fenceless portions present, notably west of Dry Pond, in addition to the traditional Warmouth Pond, Pine Log Creek, and Garrett Pond/Diamond Head Canal interfaces.

Figure 10 is a snapshot of the Google Earth Boundary Breach Catalog (KMZ file) that has been created for tracking the condition of the entire boundary fence on the Carter Tract. This Boundary Breach Catalog is continuously updated. Breaches in the fence were visually verified and GPS tagged. The resulting data was converted into a KML file which precisely located the breach point with an interactive marker on a satellite image of the area. Clicking on the marker accesses the information for the breach, such as what is causing the breach (i.e. treefall), and the length of the breach. This file continued to provide a real time spatial snapshot of the condition of the fence, with both new breaches and recent repairs being mapped and catalogued. This large database will again be updated during the hunting

season, when the necessary manpower needed can be directed away from active surveying, monitoring, and trapping of hogs.

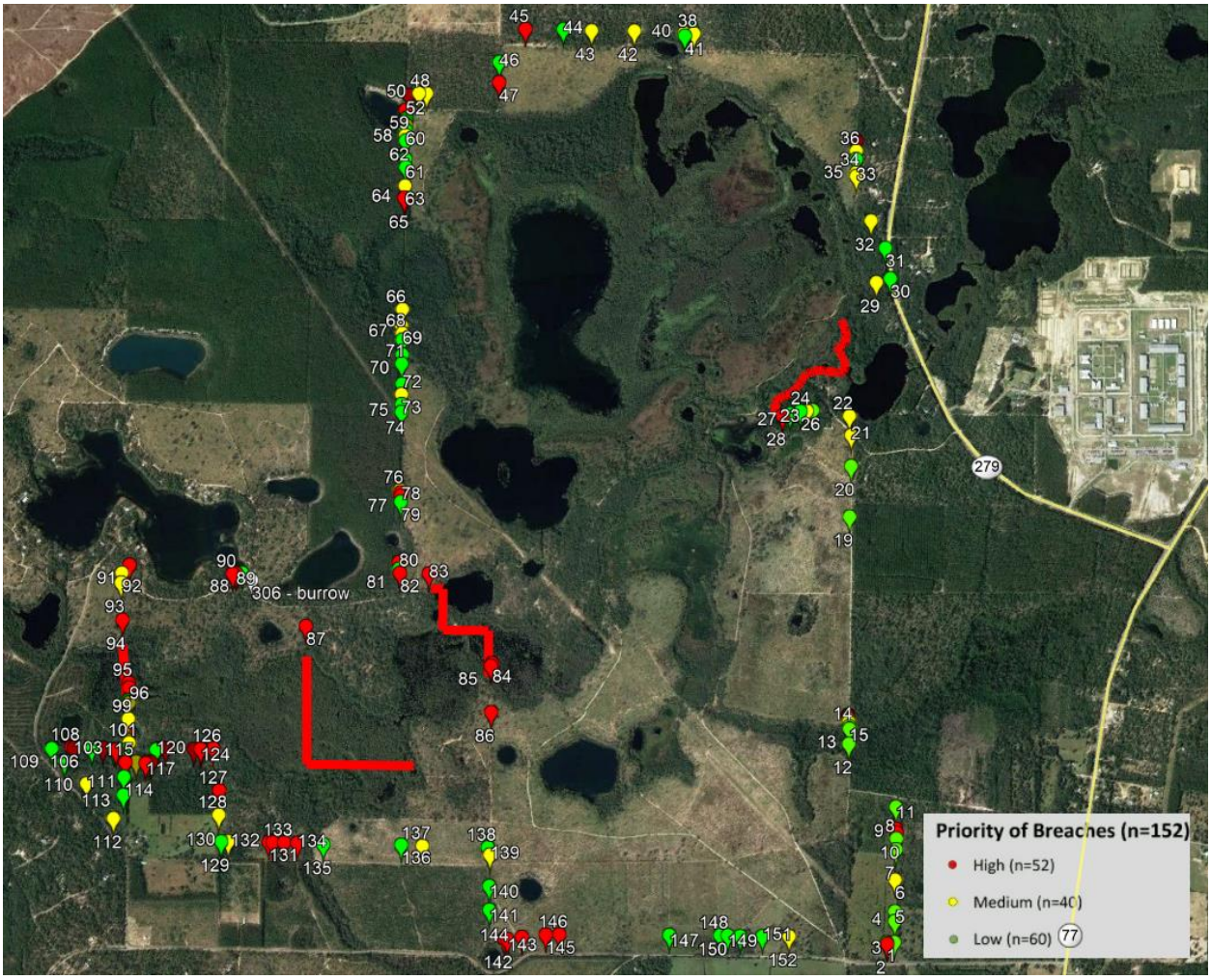

Figure 10. Snapshot of the Boundary Breach Catalog used for surveying and monitoring of the boundary fence for hog control on the Carter Tract of Econfina Creek WMA, Washington Co., FL as of June 2022.

Recommendations

Strong consideration must be given to an overhaul or replacement of the complete boundary fence now. Fenceless areas, gaps and extensive damage in the boundary must be addressed immediately. Any new fencing should be constructed with posts designed where any wild hog trying to enter the Carter Tract will be pushing against the posts and the fence (i.e. posts on the inside (Carter side) of the wire fence.

Continued hog monitoring, trapping, and harvest, concomitant with addressing the much-needed boundary fence breach issues, can keep this integrated hog impact management approach on the Carter

Tract a continued success. However, either activity alone will produce less than desired results. Trapping alone is only a temporary solution without an adequate perimeter fence. Even a few hogs can cause vegetation damage, but once a sounder locates the fenceless areas and follow the same route, large-scale vegetation damage is inevitable. Our detection rate will be immediate given the level of manpower we are exerting right now in monitoring; however, the damage will have been done.

Consideration for a limited hog-dog hunting season during the summer months could be another effective tool for the management of hogs on Carter Tract. Whether or not such a hunt results in successful harvest of hogs, the presence of dogs and the pressure exerted on the hogs has the potential to limit the impact of hog grazing on native vegetation during the critical summer growing season. This in turn supports the management objectives of this mitigation bank property. Given the cooperative efforts by FWC and NWFWMD in addressing the boundary fence breach issues, intensive surveying, monitoring, and trapping, and an abbreviated still-hunting season, it seems intuitive that the addition of a limited hog-dog hunting season could likely prove an integral part of the wild hog management program on the Carter Tract. Hunters will continue to be encouraged to harvest hogs at every available opportunity, and the ability to use center-fire rifles during the December small game season this upcoming year may increase hunter harvest.

Wild Turkey

Management Objectives

FWC personnel desire to encourage and maintain a strong population of wild turkey (*Meleagris gallopavo*) on the Carter Tract in order to provide a high-quality hunting experience for the public. We continued 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.

Hunting Pressure and Harvest

Spring Turkey season on the Carter Tract consisted of a two-day youth quota hunt and three quota hunts, each lasting three days. Permit holders for all turkey quota hunts were afforded one day prior to each hunt for scouting. Thirty-six total hunters participated in the 2022 spring turkey hunts with 2 hunters during the youth hunt and 34 during the remaining quota hunts. No turkeys were harvested during the Spring Turkey quota hunts. The turkey harvest success rate (calculated as the number of turkeys harvested per man-days of effort) for the Carter Tract for 2021-22 was 0.0%. Turkey harvest rates on the Carter Tract appear to be cyclic (Figure 11) and such trends can be attributed to weather conditions, experience level of hunters, and hunting pressure on surrounding properties affecting harvest success rates. Habitat should continue to improve as a more frequent burn regime is maintained for

controlling scrub oaks and producing open grassy/herbaceous areas for nesting and feeding. Further, more frequent mowing of powerline right-of-ways at strategic times of the year (just post nest-hatching) can provide better insect habitat 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.

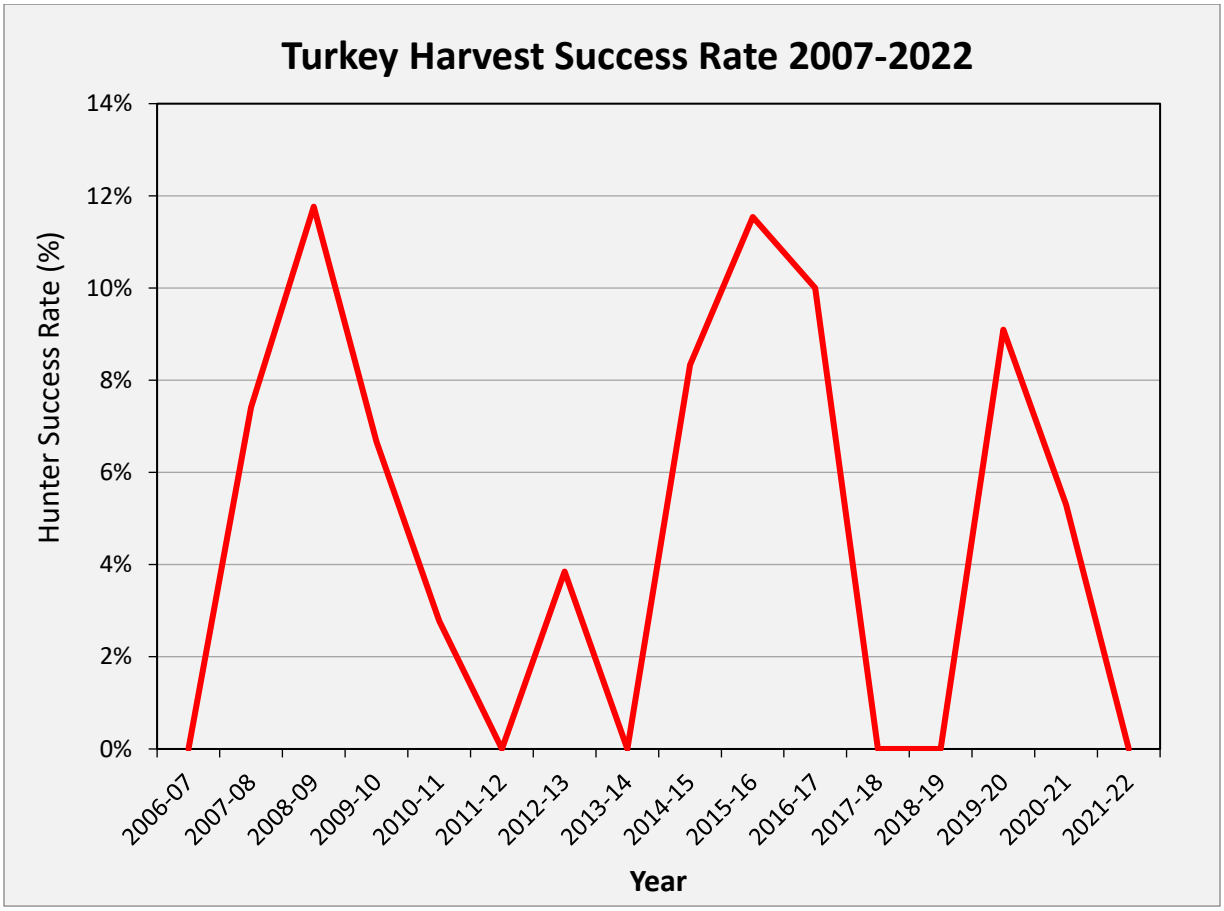

Figure 11. Turkey harvest success rate, calculated as the number of turkeys harvested per man-day of effort, for the years 2006-07 to 2021-22 on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Waterfowl

Hunting Pressure and Harvest

The Carter Tract provides duck hunting opportunities during a special early duck season each September and during portions of the general gun and small game seasons coinciding with the phase I and II waterfowl season as determined by the U.S. Fish & Wildlife Service (USFWS). Hunters devoted 85

man-days to duck hunting this season with a hunter success rate, calculated as the number of waterfowl harvested per man-day of effort, of 0.565 (Figure 12). Duck hunters harvested 48 ducks, representing five species, during the season (Table 3). Five wood ducks (*Aix sponsa*) and three blue-winged teal (*Spatula discors*) were harvested during the September early duck season. Thirty-six wood ducks, 2 ring-necked ducks (*Aythya collaris*), one hooded merganser (*Lophodytes cucullatus*), and one American coot (*Fulica americana*) were harvested during the general gun and small game seasons. The Green Ponds complex was the most successful water body hunted, followed by Dyke's Mill Pond, Dry Pond, and Black Pond (Figure 13).

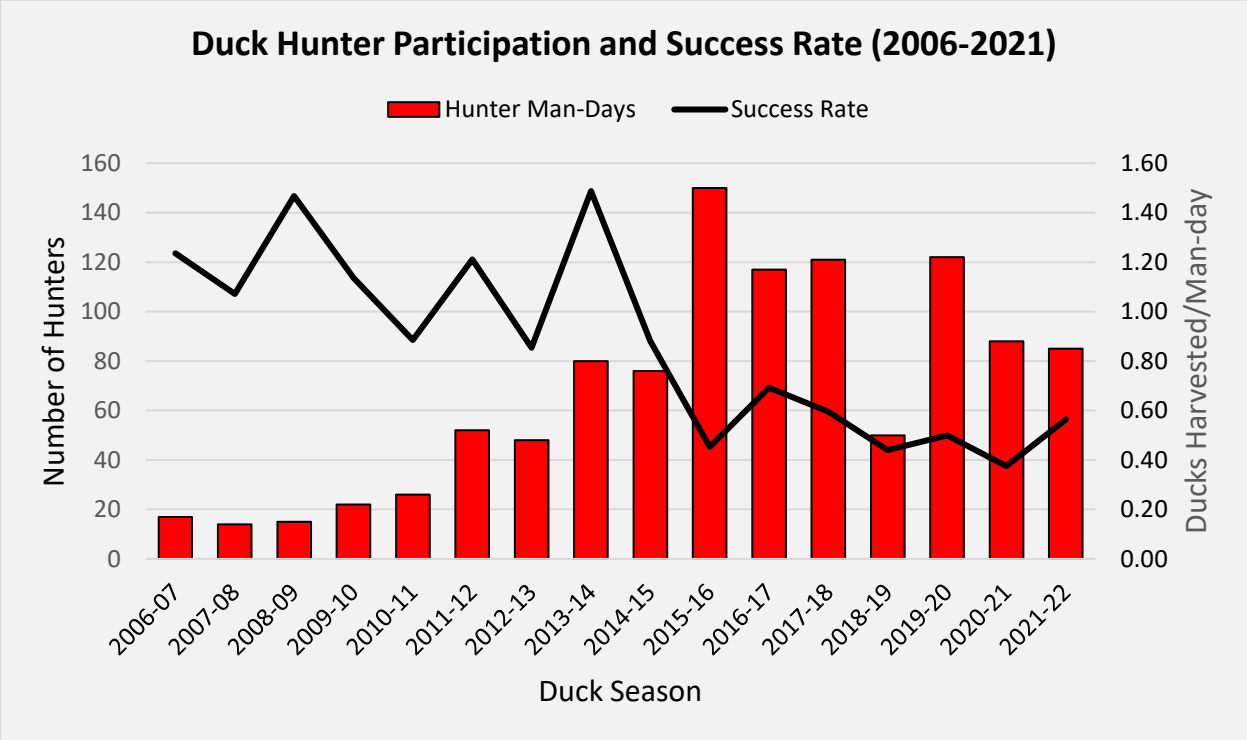

Figure 12. The number of hunters participating in duck season each year, and the success rate of hunters, from 2006-07 season to the 2021-22 season on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Table 3. Species of waterfowl harvested during all public hunting opportunities for ducks on the Carter Tract of Econfina Creek WMA (Washington Co., FL) during 2021-2022.

Species	Early Duck (Sept.)	Phase I & II	Totals
Wood Duck	5	36	41
Blue-winged Teal	3		3
Ring-necked Duck	0	2	2
Merganser		1	1
Coot		1	1

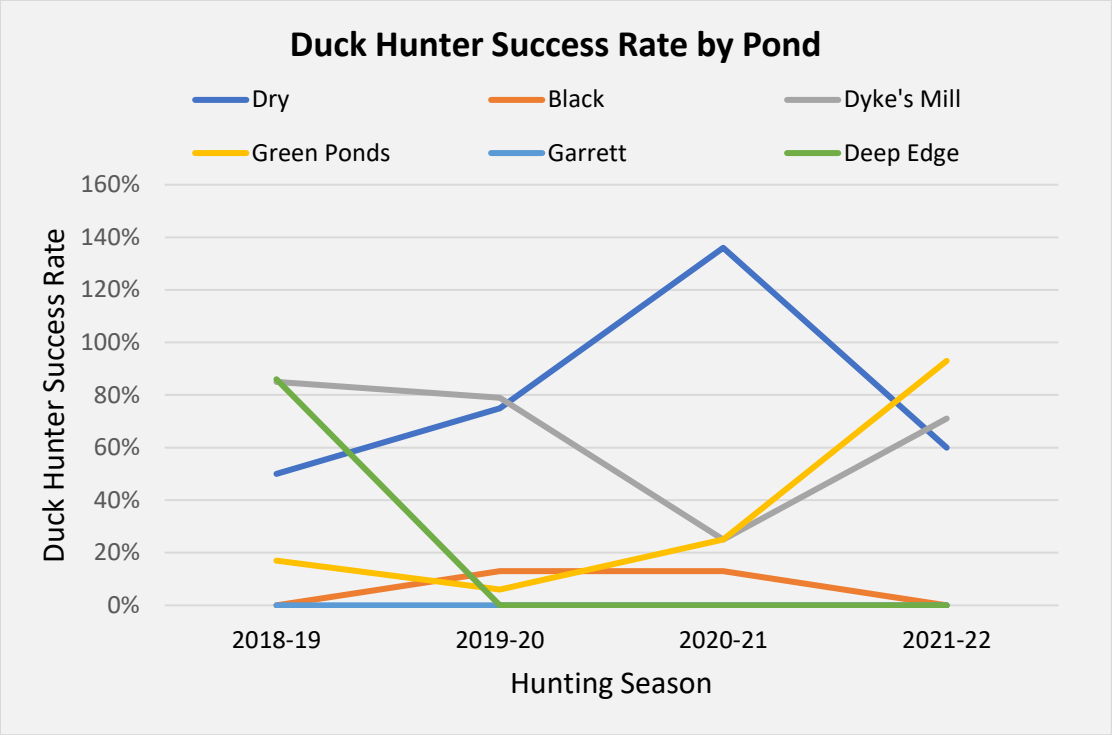

Figure 13. Duck hunter success rate, calculated as the number of waterfowl harvested per man-day of effort, for each of the selected water bodies frequented by duck hunters from the 2018-2019 season to the 2021-2022 season.

Wood Duck Nest Boxes

Efforts to facilitate local breeding populations of wood ducks continued with the maintenance and monitoring of 42 wood duck nest boxes located throughout the Carter Tract (Figure 14). Boxes are visited each winter to repair or replace nest boxes and predator guards and to replenish boxes with fresh wood shavings for the upcoming nesting season. During the nesting season, boxes are typically checked twice – once in March-April, and once May-June, to record box use and nest fate. However, there were no biologists present on Carter Tract during the May-June 2022 cycle, and boxes were only checked once in March. The nest boxes at Carter Tract have averaged approximately 19 clutches per nesting season since the first nest checks in 2006. Spring box checks in March 2022 yielded 23 active wood duck nests, some of which contained eggs. Since boxes were not rechecked, the number of successful hatches and predation rate could not be determined. Of the 42 nest boxes on Carter Tract, 41 of them were checked during the nesting season; 23 of which (56%) were in use. WC will continue to maintain and monitor the Wood Duck nest boxes in the future as they are an effective benefit to the species.

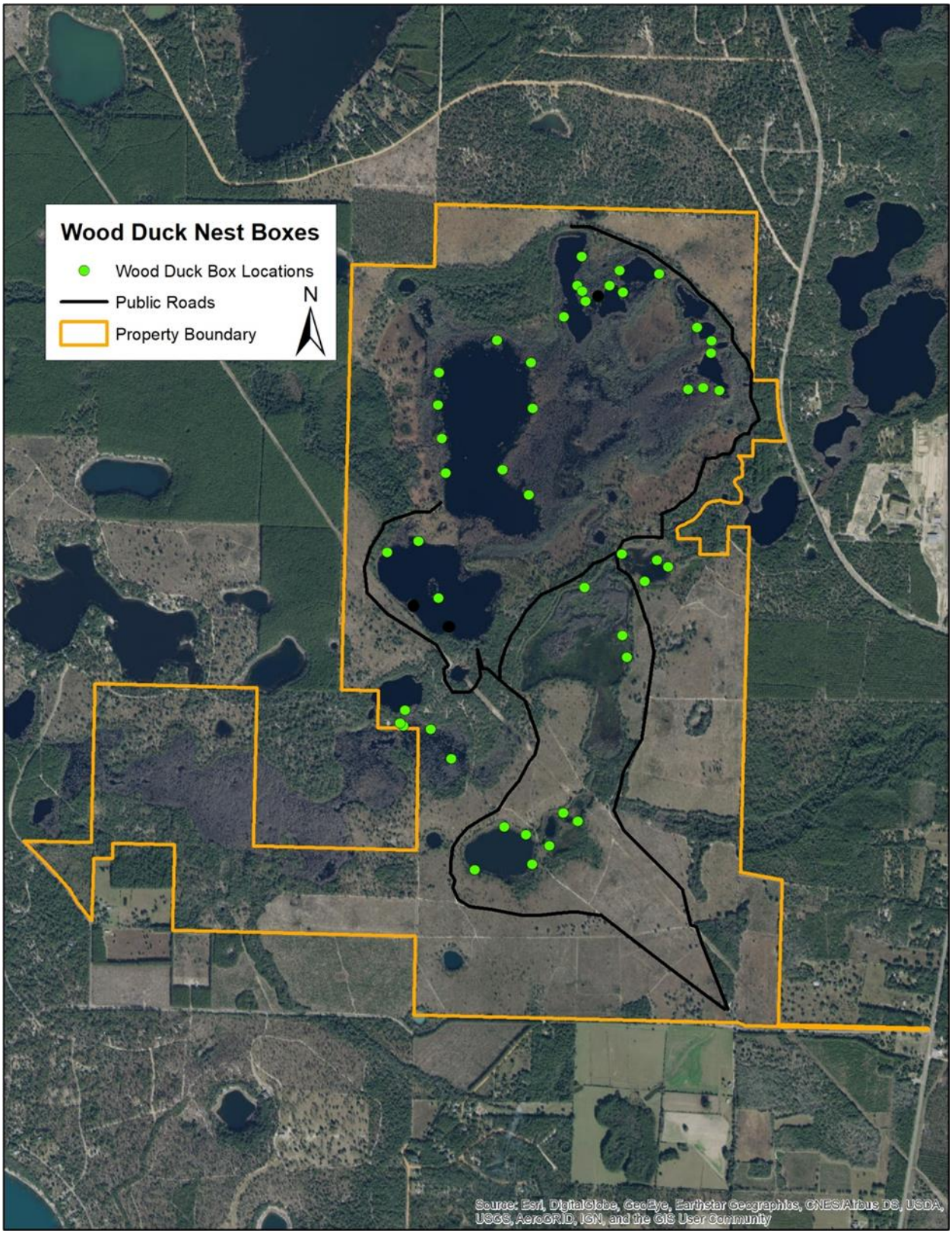

Figure 14. Current wood duck nest box locations as of June 2022 on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Small Game

Hunting Pressure and Harvest

The Carter Tract is open annually to small game hunting during a 16-day non-quota season each December. The area is open first-come first-served to a maximum 15 hunters on the area at any given time. Gray squirrel (*Sciurus carolinensis*), bobwhite quail (C*olinus virginiana*), wild hogs (*Sus scrofa*) and various waterfowl species are the primary species hunted. Check station operators record how many hunters pursue each game species for the duration of the small game season. Small game hunters accounted for 31 man-days during the small game season harvesting 4 quail and 12 squirrel (Table 4, Figure 15). It is important to note that hunters pursuing waterfowl are not included in this count but constituted over half of the hunters participating in the small game season (see: Waterfowl: Hunting Pressure and Harvest). Small game hunter participation decreased slightly from 2020 (37-man days, Figure 15), but we remain encouraged that the small game season is popular among the hunting public.

In addition to the designated season, small game may be hunted by permit holders during deer quota hunts provided there is a season overlap between the game being hunted and quota hunt dates; however, no small game were taken outside of the small game hunt season during 2021-2022.

Table 4. The number of man-days devoted, number harvested, and hunter success rate for each of three species targeted during the 2021 small game season at the Carter Tract of Econfina Creek WMA, Washington Co., FL. Table does not include those hunters targeting waterfowl (see: Waterfowl: Hunting Pressure and Harvest).

Species	Number of Hunters	Number Harvested	Success Rate
Quail	17	4	23.5%
Squirrel	12	12	100%
Wild Hog	1	0	0%
Dove	0	0	0%
Rabbit	1	0	0%

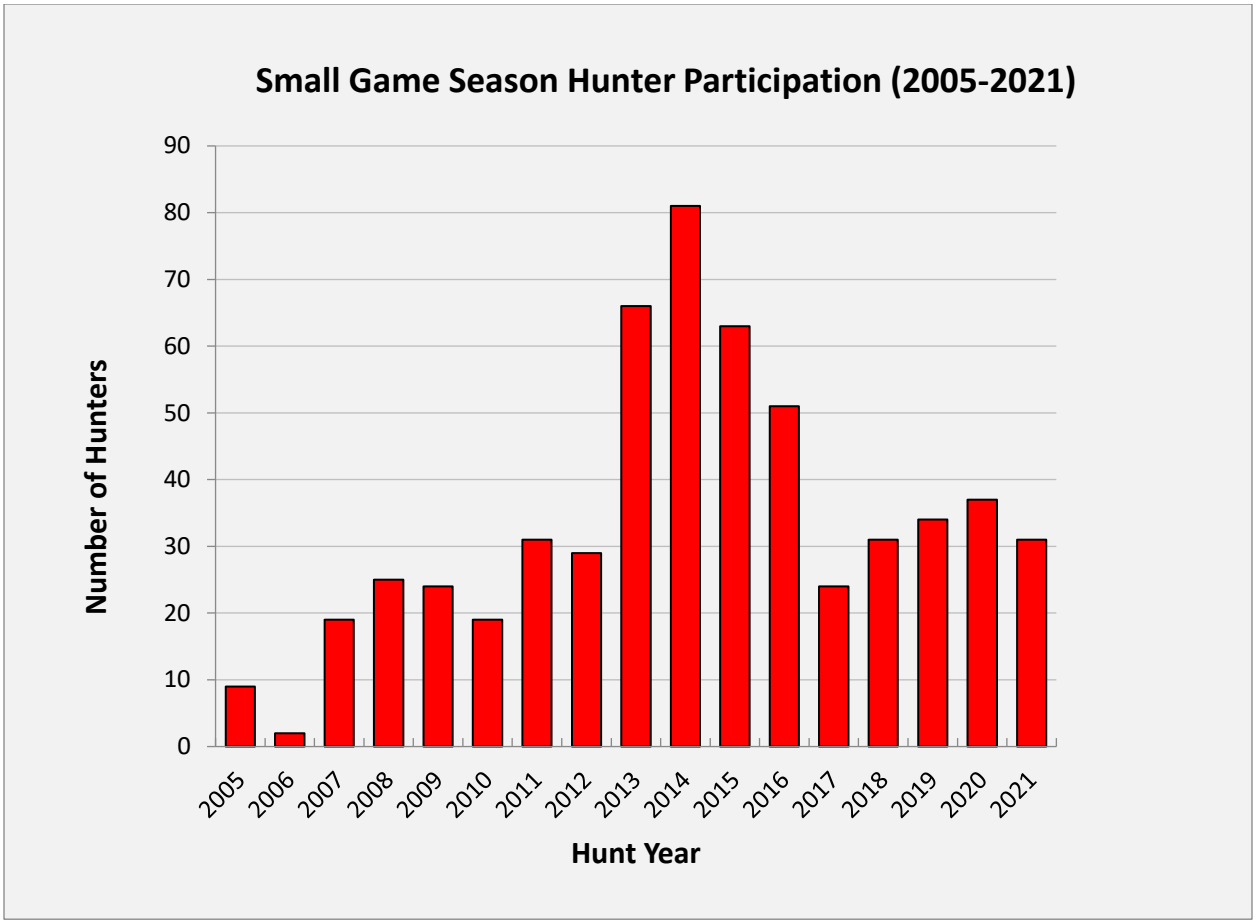

Figure 15. Small game season hunter participation from 2005 to 2021 on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Bobwhite Quail

Summer whistle counts for bobwhite quail (*Colinus virginianus*) are used to obtain a population index for this popular gamebird. It has been shown that there is a strong positive relationship between the number of quail whistling in the summer and the number of coveys established the following fall (Rosene 1984; Terhune et al. 2009). Since 2012, we have conducted annual summer whistle counts for quail to obtain a population index of this species and follow subsequent harvest success on the Carter Tract. As of this report, Carter Tract is now fully staffed, however, biologists were not present for summer whistle counts in 2022. Thus, no data were recorded but surveys will resume for the 2022-23 reporting period.

Wading Birds

Most wading birds nest semi-colonially along the edges of lakes or creeks, or in trees and shrubs growing out of water bodies. Many species of wading birds are locally affected by wetland drainage

associated with urbanization and agricultural expansion. The resulting loss of suitable foraging and breeding habitat in conjunction with increased predation are key threats to Florida's wading birds (FWC 2013). These issues highlight the importance of conservation of unspoiled wetland habitat such as that found on the Carter Tract. The Carter Tract historically supported two known wading bird colony's that were monitored every spring, Little Deep Edge Pond (LDE), which was surveyed from 2008 until 2021, and Dyke's Mill Pond from 2015-2019.

Wading bird colony monitoring has ceased at Carter Tract but will resume should any notable changes occur in the historic sites.

Breeding Bird Survey

Breeding bird point count surveys document 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). Point count locations are distributed among the different habitat types at Carter Tract as follows: sandhill habitat, wetland/rookery, lake edge, wet prairie, mixed-hardwood forest, and early successional grassland habitat.

As of this report, Carter Tract is now fully staffed, however, biologists were not present for summer point counts in 2022. Thus, no data were recorded but surveys will resume for the 2022-23 reporting period.

Bachman's Sparrow

Bachman's Sparrows (*Peucaea aestivalis*) were first documented on Carter Tract during the spring of 2015. This species has been identified as a species of greatest conservation need by FWC. Bachman's Sparrow was once a common species in the southeastern longleaf pine forests but has undergone dramatic population declines in recent decades (Cox 2014). An indicator of southern pine forests, Bachman's Sparrows nest and forage on the ground and are closely associated with areas with diverse, healthy ground cover conditions maintained by frequent prescribed fire. Playback surveys allow FWC to determine the presence and distribution of Bachman's Sparrow on Carter Tract.

As of this report, Carter Tract is now fully staffed, however, biologists were not present for spring Bachman's Sparrow counts in 2022. Thus, no data were recorded but surveys will resume for the 2022-23 reporting period.

Southeastern American Kestrel

The Southeastern American Kestrel (*Falco sparverius paulus)* is a subspecies of the American Kestrel (*Falco 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 are 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 (*Megascops asio*) (Hipes et al. 2001; U.S. Department of Agriculture 1999).

FWC staff observe kestrels annually at the Carter Tract during winter and early spring. 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 (1999). In 2019-2020, nest boxes were removed from mature longleaf pine trees in an attempt to reduce the impact of lightning strikes on the remaining, mature longleaf and reinstalled on 20ft tall poles, 15ft from the ground (Figure 16). Nest box monitoring followed protocol outlined by FWC's Fish and Wildlife Research Institute. Kestrel boxes were historically checked in early-April and have not shown any Southeaster American Kestrels use. However, biologists were not present for spring Bachman's Sparrow counts in 2022. Thus, no data were recorded but surveys will resume for the 2022-23 reporting period.

Although there has not been documented nesting by Southeastern American Kestrels on Carter Tract yet, a similar kestrel box project on Blackwater WMA has documented breeding kestrels one year following box installation. Kestrels continue to nest at Blackwater WMA every year since (Barbara Almario, Biologist III, Blackwater WMA, pers. comm.). With Blackwater WMA located just 75 miles west of the Carter Tract, we feel there is a good chance Southeastern American Kestrels will utilize nest boxes in the future here.

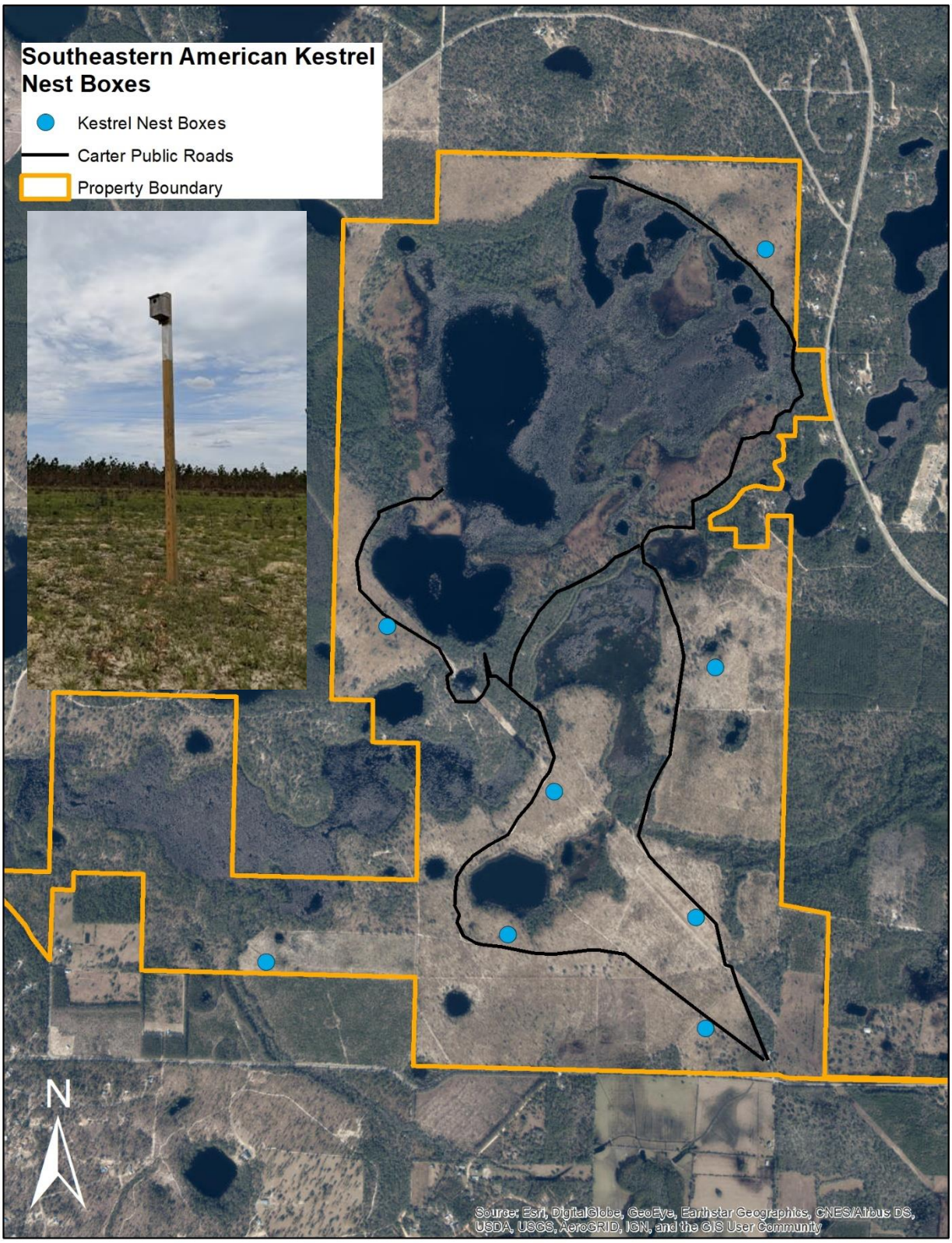

Figure16. Location of eight reinstalled (inset) Southeastern American Kestrel nest boxes on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Mourning Dove

FWC's Small Game Management Program solicited WMA participation throughout the state as part of a national long-term mourning dove (*Zenaida macroura*) banding program. Since 2007, Carter Tract staff have participated and contributed to Florida's statewide dove-banding project in cooperation with the U.S. Fish and Wildlife Services and Bird Banding Lab. 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 either via telephone or internet.

Trapping was conducted in mid-July 2021, with traps set in the early morning. Traps were checked after 1-2 hours depending on weather conditions. Doves were banded using USFWS metal identification bands, and age (HY = hatch year; AHY= after hatch year), sex, and molt sequence data were collected for each bird. Our trapping efforts yielded 39 mourning doves (20 HY; 19 AHY) successfully banded (Table 5).

Table 5. Number of mourning doves banded, by age class, from 2007 - 2021 on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Year	# HY (Hatch Year) birds banded	# AHY (after hatch year) birds banded	# unknown age birds banded	Total # birds banded
2007	29	7	2	38
2008	40	9	1	50
2009	10	9	1	20
2010	11	13	1	25
2011	11	9	0	20
2012	12	14	0	26
2013	14	11	0	25
2014	34	12	0	46
2015	9	6	0	15
2016	8	7	0	15
2017	21	10	4	35
2018	28	7	0	35
2019	16	9	0	25
2020	14	26	0	40
2021	20	19	0	39
Totals:	277	168	9	454

Herpetofauna

FWC staff have employed various methods for surveying and monitoring the herpetofauna population at the Carter Tract over the years. Methods used include box-funnel snake traps, pitfall traps, and incidental observations. A comprehensive list of all herpetofauna species (n=62) identified on the Carter Tract from 2005 to present has been compiled (Appendix VII). Sandhill and scrub habitats, as well as seasonal isolated wetlands and small ponds, are among the most important and imperiled habitats for southeastern herpetofauna. 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.

Snake Traps

Large terrestrial snakes, such as black racers, eastern coachwhips, Eastern diamondback rattlesnakes, and Florida pine snakes, can be difficult to capture using traditional survey methods due to their size. Use of traps specifically designed to capture these species is the most effect method for documenting their numbers on Carter Tract. Historically, upland snake traps surveys have been deployed on Carter Tract through the year, but these surveys had not been conducted in some time. Therefore, eight semi-permanent box-funnel arrays were constructed in April 2020 (Figure 17). The box-funnel arrays consisted of four 50-foot-long, 4-foot-tall drift fence arms connected to a box-funnel trap laid out along the cardinal directions. The box-funnel traps were outfitted with a side access door that allowed for escape of animals when traps were not in use.

The upland snake survey historically ran from 7 April – 28 May. However, biologists were not present for the spring snake survey in 2022. Thus, no data were recorded but surveys will resume for the 2022-23 reporting period.

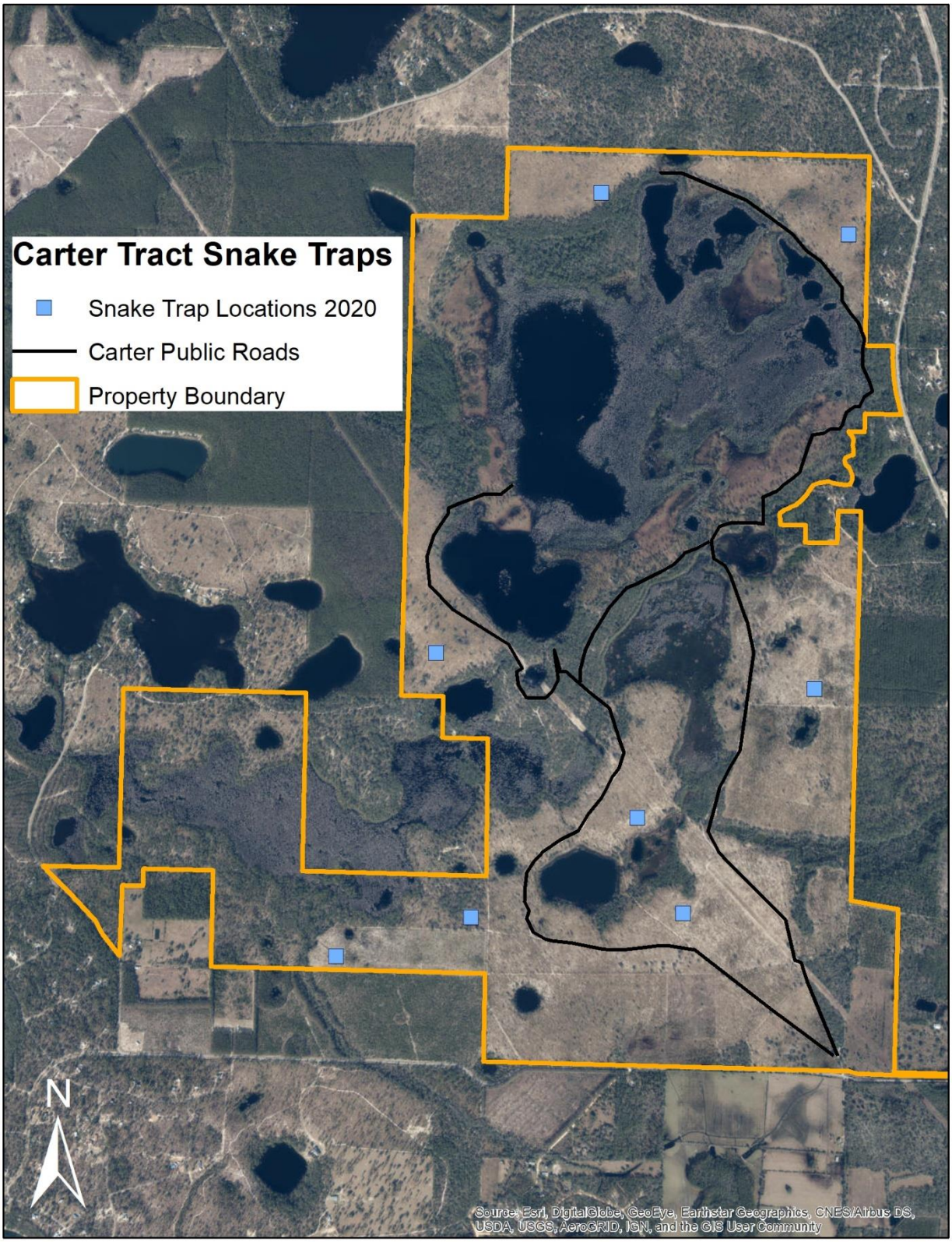

Figure 17. Location of eight box-funnel snake trap arrays used to determine abundance of upland snake species on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Gopher Tortoise

The presence of the gopher tortoise (*Gopherus polyphemus*) in the sandhill habitat of the property is significant not only because it is a state Threatened species, but also because their burrows (both active and abandoned) are used by a host of commensal species for shelter and foraging (Jackson and Milstrey 1989). Specifically, the federally Threatened eastern indigo snake (*Drymarchon couperi*), as well as the imperiled gopher frog (*Rana capito*) and Florida pine snake (*Pituophis melanoleucus mugitus*), are known to use gopher tortoise burrows (Moler 1992; Ashton and Ashton 2008). The most contemporary survey for gopher tortoises on the Carter Tract was contracted through the Florida Natural Areas Inventory (FNAI) in Spring 2017 (Berish and Sutton 2017). After a pilot survey to determine sampling intensity needed to adequately survey for the species on the Carter Tract, three surveys were conducted in March, April, and May of 2017. Twenty-five burrows with seventeen tortoises were encountered. Line-transect distance sampling (LTDS) estimated the population to be approximately 86 tortoises. Over half of the tortoises sampled were subadult or younger, indicating high recruitment to the local population. Future plans to monitor the local gopher tortoise population are to conduct periodic LTDS surveys as necessary.

Bat Houses

Since 2016, commercial bat houses have been erected near Garrett Pond and between Dry and Black Ponds (Figure 18). Each site contains two houses installed on opposite sides of the supporting pole and can hold up to 200 roosting bats, or 400 at each site. FWC staff installed the houses in response to the previously occupied roosting sites (two hollow cypress trees on Dry Pond) no longer being used. Because many bat species occur in human habitations in Florida, they are particularly vulnerable to intentional eviction, roost destruction, vandalism, harassment, and large-scale colony destruction, thus efforts should be made to preserve known roost sites (Humphrey 1992). Bat houses were periodically checked since 2018 as both houses were left unoccupied following Hurricane Michael however, no bat presence has been detected.

Figure 18. Two bat houses were installed on Carter Tract in January 2016. One house was installed between Dry Pond and Black Pond (left) and the other was installed at Garrett Pond (right).

ADDITIONAL MANAGEMENT ACTIVITIES

In addition to the biological sampling and monitoring activities conducted annually, FWC personnel are responsible for maintaining and improving the Carter Tract as needed. The check station, field office, compound, and area roads require continual upkeep. The special opportunity public fishing program requires year-round monitoring and maintenance of equipment to ensure public access and safety while utilizing this resource. Contract work conducted at the Carter Tract requires coordination, supervision, and reporting by FWC personnel when NWFWMD cannot be present. A comprehensive list of all additional management activities and custodial functions performed by FWC staff during the 2021-22 fiscal year can be found in Table 6 and is reflected in Appendix II.

Table 6. Management activities performed by FWC personnel, in addition to biological monitoring, during the 2021-22 fiscal year at the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Public Fishing Program	• furnished portable toilets at 3 boat landings • bailed 12 boats once per week • trash pickup at 6 boat landings and check station area • monitored bank fishing violations at Black Pond spillway
Contractor Supervision	• coordinated and assisted NWFWMD and FEMA engineers for Boggy Branch culvert repairs
Road Maintenance	• repairs and upkeep of ~6.5 miles of improved road • monitored Greenhead Branch bridge for beaver activity • removal of vegetation growing on all 3 bridges
Check Station and Compound Maintenance	• maintained utilities – service and repairs • distributed calendars and area brochures

LAW ENFORCEMENT ACTIVITIES

Lieutenant Warren Walsingham

Florida Fish and Wildlife Conservation Commission Law Enforcement Officers patrol the Fitzhugh Carter Tract of the Econfina Creek Wildlife Management Area providing policing to include wildlife, fisheries, and general law enforcement. This FY 2021-2022 officers provided approximately 186 hours of patrol directed to the Carter Tract. There were approximately 41 user contacts for the area.

Officers conducted foot patrol and all-terrain vehicle patrols of the interior roads and perimeter of the Carter Tract throughout the year. Officers targeted deer, turkey, duck hunting, trespassing, baiting violations, and night hunting during the hunting season. They focused on possession of alcohol, licensing, bag limit, no fishing areas, and size limit violations during the allowed fishing season. Game cameras were utilized to monitor ongoing criminal activity in the area.

Officers responded to and worked complaints about abandoned property, illegal baiting, illegal entry, dogs, improper check in, and an overdue public during the year.

With relationships built between biologists, check station staff, and officers most illegal activity was stopped prematurely through education. Law Enforcement also has added a sub office in the area where more information sharing between the public, biologists, and law enforcement officers have occurred. Officers regularly frequent the office and patrol the area.

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APPENDICES

Appendix I. 2021-22 Fitzhugh Carter Tract of Econfina Creek Wildlife Management Area Hunting and Fishing Regulations Summary and Area Map.

Florida Fish and Wildlife Conservation Commission

myfwc.com

Northwest Florida Water Management District

nwfwater.com

Econfina Creek - Fitzhugh Carter Tract

Wildlife Management Area

Regulations Summary and Area Map
July 01, 2022 - June 30, 2023

2022-2023 Hunting Season

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 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], if applicable): 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.

Youth and mentor license holders are required to be accompanied by a supervisor during any hunt. 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.

Licenses and permits may be purchased from county tax collectors, license agents, by telephone at 888-486-8356 or at GoOutdoorsFlorida.com. 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.

Quota Permit Information:
Archery - 15, no-cost, quota permits (no exemptions) for each of 2 hunts.
General Gun - 15, no-cost, quota permits (no exemptions) for each of 3 hunts.
Muzzleloading Gun - 15, no-cost, quota permits (no exemptions).
Youth Turkey - 3, no-cost, quota permits (no exemptions).
Spring Turkey - 5, no-cost, quota permits (no exemptions) for each of 3 hunts.

Daily Fishing Permits: 20 anglers are allowed on the area per day. 10 daily permits are available first-come, first-serve at the check station; 10 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 at GoOutdoorsFlorida.com. 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 GoOutdoorsFlorida.com, a quota permit holder (host) may take a guest hunter by obtaining a guest permit. Guest hunters are not allowed during youth turkey hunts. A guest hunter must possess a completed guest permit while hunting except the following persons may be a guest hunter without a guest permit: a youth under 16 years of age, a youth supervisor, a mentor license holder or a mentor license supervisor. A host may only bring 1 guest hunter at a time and may only use 1 guest permit per day. 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 guest hunter and host must enter and exit the area together and must share a street-legal vehicle while hunting on the area. The guest hunter may hunt only while the host is on the area. Refer to the quota hunt worksheets for additional information.

Youth and mentor license holders: If a youth or mentor supervisor is hunting during any hunt for which quota permits are issued, at least 1 person in the party must be in possession of a quota permit.

Transfer of permits: Quota and guest permits are not transferable. A positive form of identification is required when using a non-transferable permit, except for youth under 16 years of age. 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.
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, except by permit from FWC or written authorization from the landowner or primary land manager.
13. The head and evidence of sex **shall remain with any deer harvested on the area** and shall not be removed from the carcass of any turkey harvested 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. A hunting license is not required to hunt wild hog.
17. Littering is prohibited.
18. It is unlawful to set fire to any forest, grass or woodlands.
19. A Law Enforcement Officer may search any camp, vehicle or boat in accordance with law.
20. 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.
21. The possession or consumption of intoxicating beverages is prohibited.

Public Access and Vehicles:
1. Open to public access year round. During periods when the area is closed to hunting and fishing, public access other than by foot is prohibited.
2. All persons shall enter and exit at the designated entrance (see map).
3. Parked vehicles may not obstruct a road, gate or firelane.
4. No motor vehicle shall be operated in areas 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, Check Stations and Harvest Reporting:
1. Hunters must check in at the check station when entering and check out when leaving the area and check all game harvested.
2. Hunting equipment may not be taken onto the area until after 8 a.m. the day before the opening of any season and shall be removed by 6 p.m. 1 day after the end of every season.
3. On hunt days, the check station hours are 4:30 a.m. to 6 p.m. Refer to the Fishing and Frogging section for check station hours on days open to fishing.
4. In addition to checking all game at an area check station, hunters must log each harvested deer **or turkey** prior to moving it from the point of recovery and report any deer **or turkey** they harvest within 24 hours of recovery. See Florida Hunting Regulations handbook or MyFWC.com for deer **and turkey** harvest reporting instructions.

Guns:
1. Hunting at night with a gun is prohibited.
2. Muzzleloading guns used for taking deer must be .30 caliber or larger if firing a single bullet, or be 20 gauge or larger if firing 2 or more balls.
3. Hunting deer with rimfire or non-expanding, full metal jacket (military ball) ammunition is prohibited.
4. Hunting wildlife (other than migratory birds) with air guns is allowed. See Florida Hunting Regulations handbook for details.
5. Hunting deer with air guns is prohibited, except pre-charged pneumatic (PCP) air guns propelling a bolt, arrow or bullet .30 caliber or larger are allowed.
6. Hunting turkey with air guns is prohibited, except PCP air guns propelling a bolt or arrow are allowed.
7. Children under the age of 16 hunting with a firearm or air gun must be in the presence of a supervising adult.
8. No person shall discharge a firearm or have a loaded firearm in hand while under the influence of alcohol or drugs.
9. For hunting non-migratory game, only shotguns, rifles, pistols, air guns, bows, crossbows or falconry may be used.
10. 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 3 shells in the magazine and chamber combined.
11. Hunting with full-automatic firearms, centerfire semi-automatic rifles having a magazine capable of holding more than 5 rounds, explosive or drug-injecting devices and set guns is prohibited.

12. The discharge of a firearm outside of periods open to hunting or in areas closed to hunting is prohibited per s. 790.15 FS.

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: A guest hunter must share the host's bag limit for deer, turkey, and quail, except when these bag limits are specified as per person. The host is responsible for violations that exceed the bag limit.
1. Deer - No person shall exceed statewide bag limits.
   A. Area limits - See statewide limits below.
   B. Statewide limits - Annual limit 5 deer (only 2 of which may be antlerless), daily limit 2, possession limit 4.
   C. As part of the statewide annual deer limit, youth less than 16 years of age may harvest 1 deer annually not meeting antler point requirements but having at least 1 antler 5 inches or more in length.
2. Wild hog - No size or bag limit.
3. Turkey - No person shall exceed statewide bag limits.
   A. Area limits - Daily limit 1.
   Youth turkey - 1 per youth turkey quota permit.
   B. Statewide limits - All fall seasons combined limit 2, spring season limit 2, daily limit 2, possession limit 2.
4. Gray squirrel and rabbit - Daily limit 12 per person, possession limit 24 for each.
5. Quail - Daily limit 12, possession limit 24.
6. Raccoon, opossum, armadillo, beaver, coyote, skunk and nutria - No bag limits.
7. Migratory birds - See Florida Hunting Regulations handbook.
8. **Non-protected birds (African and Eurasian collared-doves, common pigeon, Egyptian goose, house sparrow, and common starling) - No bag limits.**

Archery Season:
October **22-28**, October **29** - 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 - Deer with at least 1 antler having 2 or more points (each point 1-inch or more in length) and having at least 1 antler 5-inches or more in length, antlerless deer (which includes does and bucks with antlers less than 5 inches in length, but not spotted fawn), wild hog, turkey of either sex, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria, migratory birds in season, **and non-protected birds**.
Regulations Unique to Archery Season - Only archery equipment may be used for hunting, except that centerfire shotguns are allowed for hunting migratory birds **and non-protected birds**. Hunting with crossbows is prohibited (except by disabled crossbow permit).

General Gun Season:
November **24-27**, January **21-24**, **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 1 antler having 2 or more points (each point 1-inch or more in length) and having at least 1 antler 5-inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria, migratory birds in season, **and non-protected birds**.

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), 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 1 antler having 2 or more points (each point 1-inch or more in length) and having at least 1 antler 5-inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria, migratory birds in season, **and non-protected birds**.
Regulations Unique to Muzzleloading Gun Season - Hunting with archery equipment or guns, other than muzzleloading guns, is prohibited, except that centerfire shotguns are allowed for hunting migratory birds **and non-protected birds**.

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, migratory birds in season, **and non-protected birds**.
Regulations Unique to Small Game Season - Hunting with centerfire rifles is allowed.

Spring Turkey Season:
Youth Turkey: March **11-12**

Spring Turkey: March **18-20**, March **31** - April **2**, April **14-16**
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 -
1. Legal shooting hours are ½ hour before sunrise until sunset.
2. Hunting other animals is prohibited.
3. Only bows, crossbows, PCP air guns propelling a bolt or arrow, and shotguns using a #2 or smaller shot size may be used for hunting.
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 Season:
Migratory game birds and crows may be hunted when their respective statewide seasons coincide with the seasons in this brochure where migratory birds are listed as legal to hunt. Migratory birds may also be hunted during the September duck seasons. See migratory game bird hunting regulations.
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 season dates, bag limits and regulations. **Non-protected birds may also be taken.**
Regulations Unique to Migratory Bird Seasons - All Migratory Bird Regulations shall apply.
1. Hunting ducks, geese, and coot with lead shot is prohibited.
2. Centerfire shotguns are allowed for hunting during established area seasons when migratory birds are legal to take.
3. Shooting hours for mourning and white-winged dove are noon until sunset during Phase 1 and ½ hour before sunrise until sunset during phases 2 and 3.

Fishing and Frogging:
Allowed year round.
Permit, Stamp and License Requirements - Daily fishing permit and fishing license (if fishing) or management area permit (if 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 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 starting at 6 a.m. Entrance gates close at 8 p.m. during the summer period (March – October) and at 5 p.m. during the winter period (November – February).
3. Fishing is allowed in designated lakes and water bodies only. All other lakes, water bodies and restricted areas are closed to public fishing.
4. 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. All state boating regulations, including the use of personal floatation devices (PFDs), apply.
5. Fish may be taken only by hook and line or rod and reel. The use or possession of nets, seines, fish traps, trotlines, set lines or bush hooks, spears, gigs, snatch hooks, crossbow, or bow and arrow is prohibited. Landing nets may be used for fish legally caught from a boat.
6. 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.
7. Fish may not be filleted, nor the head or tail fin removed, until the angler has checked out at the check station.
8. Anglers will be given a creel kit and are expected to accurately complete the information sheet and return it to the check station upon check out.
9. Shooting frogs is allowed only during the listed open hunting seasons and only with the legal methods of take during each particular season. Frogs may only be taken by firearms during daylight hours.

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).
4. The FWC is not responsible for protection of personal property and will not be liable for theft of or damage to personal property.
5. Please report the location of any sick or extremely skinny deer to the Chronic Wasting Disease hotline, toll free at 866-293-9282.

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. 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 888-404-FWCC. You may qualify for a cash reward from the Wildlife Alert Reward Association.

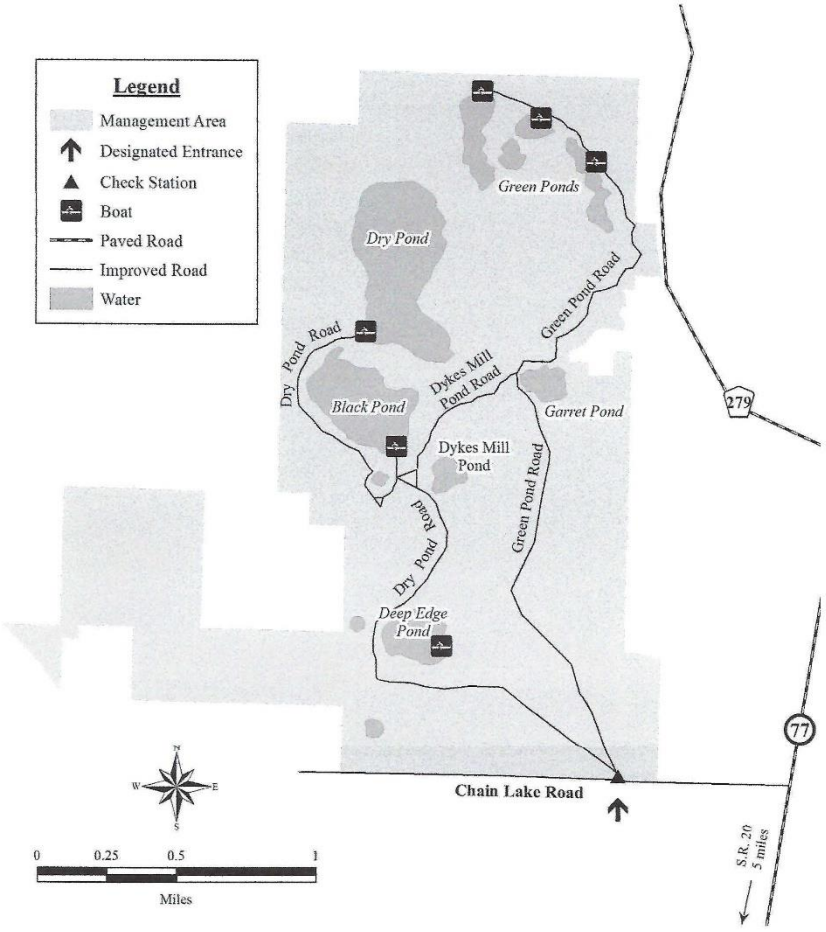
The U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, age, sex or disability. If you believe that you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please write to: The 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

2,174 acres

Washington County



DISCLAIMER: This graphical representation is provided for informational purposes and should not be considered authoritative for navigational, engineering, legal, and other uses.

Appendix II. 2021-22 Annual Work Plan and Accomplishment Report for the Fitzhugh Carter Tract of Econfina Creek Wildlife Management Area.

Yearly Accomplishments

Only Accomplishments with Man Days / Totals Displayed

Fiscal Year 2021 - 2022												
Project	Project Desc	Activity	Activity Desc	Species Species Desc	Man Days	Salary	Fuel Cost	Other	Total	Units	NFR	Accomplishments
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	101	Project inspection	9200 All wildlife	5.06	$1,746.73	$478.44	$8,246.78	$10,471.95		No	Inspected area projects and activities. Field orientation of land boundaries, features, and habitats.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	103	Meetings	9200 All wildlife	4.06	$1,476.39	$155.89	$2,724.60	$4,356.88		No	Attended landowner, cooperator, scientific, and agency meetings. Attended training workshops and seminars.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	128	New Vehicle and Equipment Purchases	9200 All wildlife	0.00	$0.00	$0.00	$14,181.31	$14,181.31	5.00	Yes	Purchased killer handle, transom, and boat motor. Purchased four portable radios and associated accessories, software, and cables.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	140	Report writing/editing/manuscript preparation	9200 All wildlife	1.19	$415.96	$115.64	$2,600.12	$3,131.72		No	Prepared and reviewed annual wildlife reports and completed annual accomplishment report.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	150	Personnel management	9200 All wildlife	30.25	$10,301.11	$577.93	$7,278.49	$18,157.53		No	Supervised volunteer activities. Recruited, hired, and supervised OPS personnel. Attended training workshops and seminars.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	182	Data management	9200 All wildlife	2.13	$646.94	$842.38	$19,049.21	$20,538.53		No	Incorporated all data collected into GIS database. Analyzed and summarized WMA databases and pertinent information.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	200	Resource Management	9200 All wildlife	0.00	$0.00	$546.16	$3,960.00	$4,506.16		No	Coordinated routine planning, paperwork, purchases and correspondences

												dealing with daily operations of the WMA.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	204	Resource planning	9200 All wildlife	9.44	$3,614.45	$1,375.70	$17,631.38	$22,621.53		No	Coordinated work projects related to management activities. Purchased supplies, materials, and equipment for performing routine WMA operations.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	207	Prescribed burning - dormant season	9200 All wildlife	0.44	$183.56	$28.34	$8,428.99	$8,640.89	2.00	Yes	Assisted Northwest Florida Water Management District with prescribed burning. Procured two UTV skid pumper units.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	210	Exotic species control	9200 All wildlife	0.00	$0.00	$7.37	$148.42	$155.79		No	Assisted Northwest Florida Water Management District with locating and treating cogon grass and other invasive exotic plant species on the area.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	212	Exotic plant control (chemical)	9200 All wildlife	0.00	$0.00	$19.27	$567.51	$586.78		No	Assisted Northwest Florida Water Management District with locating and treating cogon grass and other invasive exotic plant species on the area.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	221	Animal surveys	9210 Game wildlife	0.00	$0.00	$26.08	$395.69	$421.77	1.00	No	Conducted bobwhite surveys.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	221	Animal surveys	9211 White-tailed deer	3.06	$1,523.69	$43.65	$395.16	$1,962.50	1.00	No	Conducted deer spotlight surveys employing line transect distance sampling methodology.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	221	Animal surveys	9240 Nongame wildlife	0.13	$48.16	$66.89	$1,339.24	$1,454.29	1.00	Yes	Conducted herpetofauna surveys utilizing large snake traps.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	285	Nest structures	9210 Game wildlife	0.00	$0.00	$70.29	$1,736.67	$1,806.96	47.00	No	Maintained and monitored 47 wood duck nest boxes.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	291	Technical assistance	9216 Hogs	0.00	$0.00	$48.18	$789.95	$838.13		Yes	Assisted Northwest Florida Water Management District with controlling wild hogs on the area.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	294	Program coordination and implementation	9200 All wildlife	0.88	$367.56	$7.94	$0.00	$375.50		No	Coordinated inter-divisional and inter-agency wildlife management projects and activities.

7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	295	Biological data collection, analysis, and reporting	9210 Game wildlife	0.00	$0.00	$5.67	$107.72	$113.39		No	Collected biological data and samples from harvested game at check station.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	320	Outreach and education	9200 All wildlife	0.00	$0.00	$6.24	$199.87	$206.11		Yes	Participated in wildlife management presentations to area school groups and public outreach events.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	341	Public use administration (hunting)	9210 Game wildlife	3.31	$1,774.01	$1,353.70	$17,246.93	$20,374.64		No	Administered and managed public hunts. Reviewed area hunt maps and brochures. Compiled weekly harvest and hunting pressure reports. Salary for OPS check station operators included here.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	342	Public use administration (non-hunting)	9100 All freshwater fish	0.00	$0.00	$2,387.68	$26,226.24	$28,613.92		Yes	Administered public fishing program via check station. Salary for OPS fishing check station operators included here.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	920	FEM -- buildings/structures	9200 All wildlife	0.00	$0.00	$99.77	$3,226.62	$3,326.39	3.00	No	Maintained and repaired area office, storage shed, and equipment workshop.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	923	FEM -- vehicles/equipment	9200 All wildlife	1.06	$440.45	$157.02	$12,944.96	$13,542.43		No	Repaired and maintained vehicles, boats, ATVs and associated equipment, including services- parts and labor
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	926	FEM -- roads/bridges	9200 All wildlife	0.00	$0.00	$51.02	$13,519.34	$13,570.36		No	Made minor repairs to access roads and bridges as needed.
7281	NW FLORIDA WATER MANAGEMENT DISTRICT LANDS	928	FEM -- fences	9200 All wildlife	0.00	$0.00	$11.34	$187.10	$198.44		No	Maintained and erected gates and fences as needed on area.
# Accomplishments: 25					**61.01**	**$22,539.01**	**$8,482.59**	**$163,132.30**	**$194,153.90**			

Appendix III. Number of fish caught and released per pond during 2021-22 public fishing opportunities on the Carter Tract of Econfina Creek WMA, Washington Co., FL.

Species		Ponds						All Ponds
		Dry	Black	Deep Edge	Green 1	Green 2	Green 3	
Bluegill (*Lepomis macrochirus*)								
	Kept	557	95	9	6	14	6	687
	Released	362	217	3	6	2	47	637
	Total Caught	**919**	**312**	**12**	**12**	**16**	**53**	**1324**
Black Crappie (*Pomoxis nigromaculatus*)								
	Kept	260	35	0	5	0	7	307
	Released	61	3	0	5	0	6	75
	Total Caught	**199**	**32**	**0**	**0**	**0**	**1**	**232**
Warmouth (*Lepomis gulosus*)								
	Kept	3	2	0	0	0	0	5
	Released	1	2	0	0	0	0	3
	Total Caught	**2**	**0**	**0**	**0**	**0**	**0**	**2**
Largemouth Bass (*Micropterus salmoides*)								
	Total Caught*	**86**	**119**	**12**	**31**	**7**	**24**	**279**
Catfish (*Ameirus nebulosus, A. natalis*)								
	Kept	0	1	0	0	0	1	2
	Released	0	0	0	0	0	0	0
	Total Caught	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other**								
	Kept	42	11	1	4	0	2	60
	Released	22	9	1	4	0	2	38
	Total Caught	**20**	**2**	**0**	**0**	**0**	**0**	**22**

*Largemouth bass are catch-and-release only on Carter Tract ponds.

**Other species include: Chain Pickerel (*Esox niger*), Spotted Gar (*Lepisosterus oculatus*), and Bowfin (*Amia calva*)

Appendix IV. 2021-22 Line-Transect Distance Survey results for pre-season white-tailed deer density of the Carter Tract of Econfina Creek WMA, Washington Co., FL.

White-tailed Deer Line Transect Survey Results
Econfina Creek WMA – Carter Tract
Prepared by: Tracy Peters
November 4, 2021

Number of Transect	2
Number of Repetitions	6
Number of Observations	36
Number of Deer	50
Total Effort (km)	77

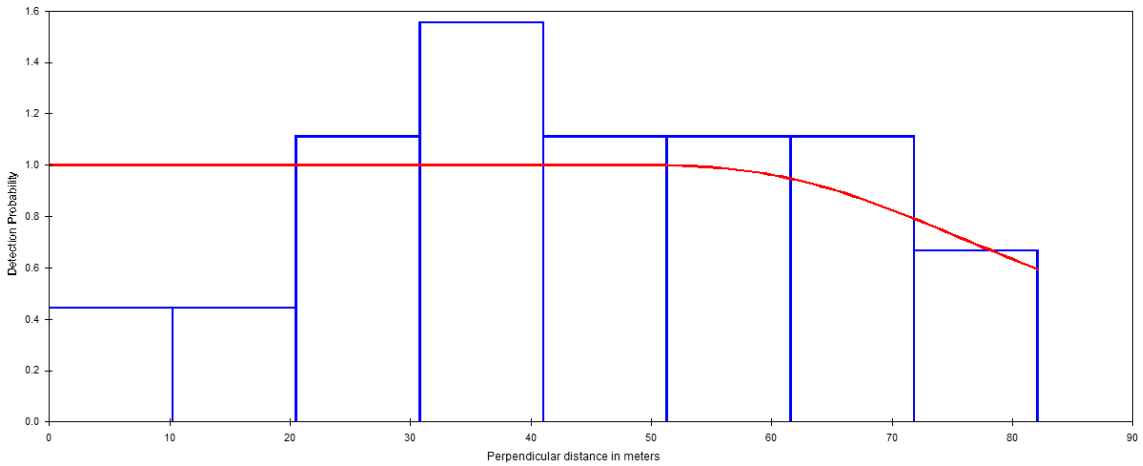
Truncation (T)	**Density Deer/Mi²**	**95% CI Lower**	**Upper**	**ESW (m)**	**CV%**	***p***
Right T 5%	14.1	8.2	21.2	78	23.1	0.200

Survey Type = please see appendix for explanation on right and left truncation
ESW = estimated strip width, half width of the transect. Area of visibility = Length of the transect * 2ESW
CV% = coefficient of variation of density **based on non-bootstrapped estimate

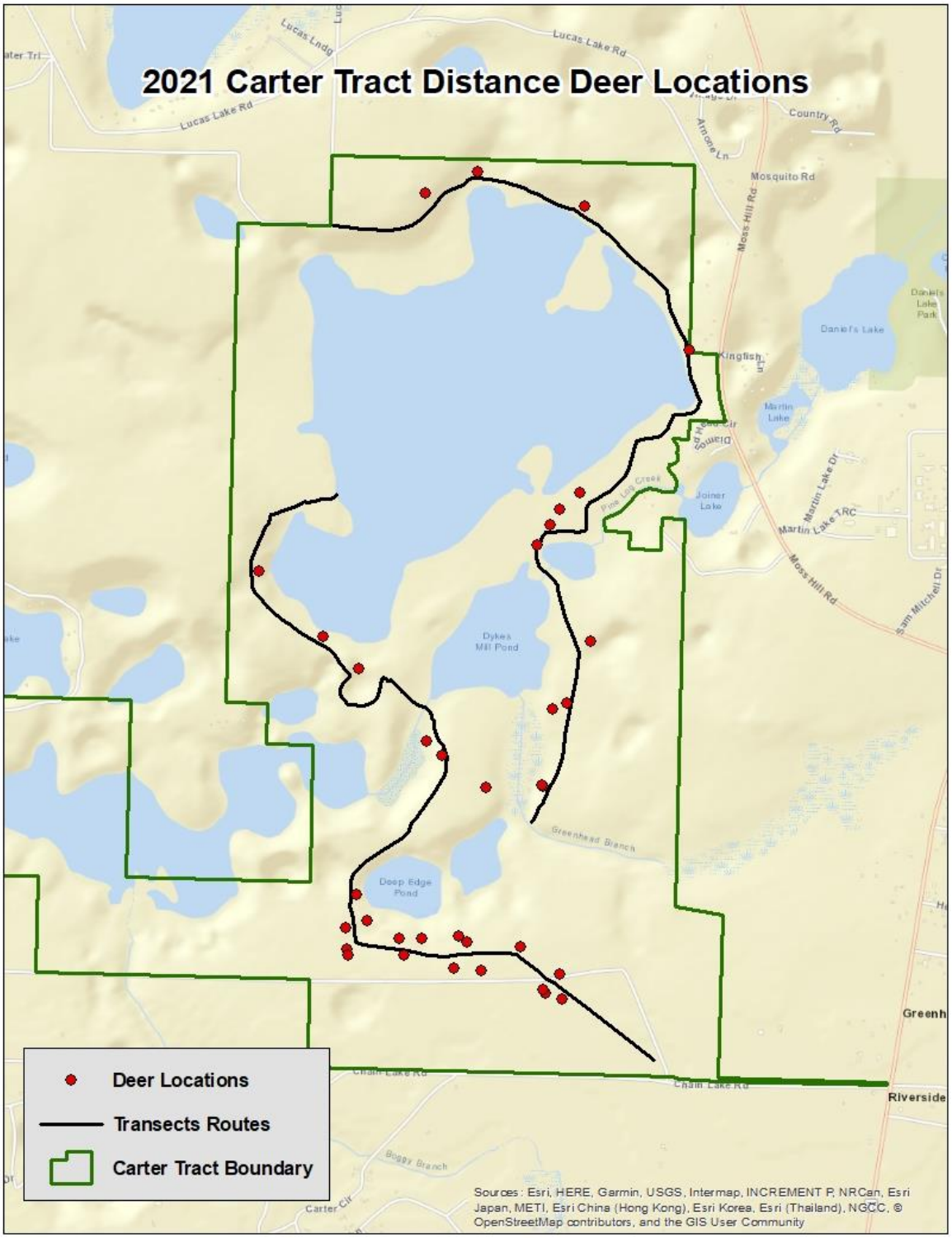
Summary of Results

The best fit model for Carter was Hazard Rate. The sample size of 36 observations was sufficient to run the analysis, however 60-80 observations are preferred and allowed for 5% right truncation. The *P*-value corresponding to the χ^2 goodness-of-fit was 0.200, indicating a slightly poor model fit. However, there was no evidence of either evasive movement off of the transect or avoidance of the transect therefore no left truncation was needed (histogram 1). The coefficient of variation percentage was 23.1 and was based on the bootstrapped estimates and therefore are very conservative.

Figure 1. Histogram of detection probability of white-tailed deer clusters at increasing distances from the transect, with (a) 5% right truncation (RT), Carter Tract – Econfina Creek WMA, 2021.



Map 1. Carter Tract – Econfina Creek WMA white-tailed deer line transect survey, 2021.



LTDS Data Analysis Methods

All survey data for line transect analysis was compiled in an excel database and deer locations were calculated using the range (distance to deer), bearing, and location at the point of observation (Pierce 2000) within the database. We checked the data for any outliers and other problems and excluded any locations that were determined as data entry or recording errors by overlaying deer and truck locations to area map layers (WMA boundary, roads, etc) in ArcMap. We used the Multiple Minimum Distance v9 tool to determine the closest perpendicular distance from each deer location to the transect.

Line transect density, variance and interval estimation

Line transect density estimates and confidence intervals were computed with the software DISTANCE 5.0. Release 2 (Thomas et al. 2006) where density of clusters is calculated as $D = n/(2 \times ESW \times L)$ where n is the total number of observations, ESW is the effective strip (half-) width, and L is the total length of the transects. Density of deer is calculated as the average cluster size x cluster density. ESW is the distance from the line at which as many animals are detected beyond ESW as are missed within ESW. ESW is calculated from the probability density function of the estimated detection function at zero distance. To address the non-independence of repeated surveys within one transect, all the data from a given transect were pooled over the survey nights prior to analysis (Buckland et al. 2001). The total length of a transect, or the effort, was therefore entered as the pooled effort (e.g. 10 km transect, surveyed 6 times, was entered as 60 km).

Each area was analyzed separately and data analysis included an exploratory phase, including visual examination of histograms and goodness-of-fit test to determine if any assumptions are violated. For goodness-of-fit we used the Cramér-von-Mises test with cosine weighting function. Cramér-von-Mises cosine weighing function puts more emphasis on the observation closer to zero and is believed to have more power due to its ability to detect departures from the fitted function (Thomas 2006). Unless sample sizes were very small or 5% truncation was inappropriate for the particular data set, we truncated 5% of the observation furthest from the line (Buckland et al. 1993). Theoretically, number of animals sighted should decrease as the distance from the line increases. However, this may not always be the case if the animals flush prior to observation or if they avoid the area close to the transect. If the model fit was poor due to low number of observations close to the transect, we chose an appropriate left truncation point.

We used the following as a priori models: uniform (adjusted with cosine series and polynomial series), half-normal (adjusted with hermite polynomials) and hazard-rate (adjusted with cosine series). We used the corrected Akaike's Information Criterion (AICc) to select the detection function model that best fit the data.

Typically, variance estimate in DISTANCE has 3 components: variance due to observers ability to detect animals along the transect (detection probability); variability between transect lines (encounter rate); and variance due to group size (cluster size). However, if the data comes from a single transect, it is not possible to estimate the encounter rate variance using the default empirical between-transect variation (Thomas 2006). Rather, the DISTANCE will assume the encounter rate is zero and the estimated variance is only appropriate for the density of the area that is actually sampled (area around the transect). To keep the method of estimating variance equivalent among the WMAs, we assumed the distribution was Poisson with overdispersion factor of zero in the areas with more than one transect

(Thomas 2006). We also estimated the variance using non-parametric bootstrap resampling. We set the number of bootstrap samples as 999 and selected observation as the sampling unit.

As recommend, we report the confidence intervals and coefficient of variation based on bootstrap results, but the report the density estimate based on the original data set (Buckland et al. 2001, Thomas et al.2006). Confidence intervals are calculated using the percentile method (Thomas et al. 2006).

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Appendix V. Avifauna (n=139) documented on the Carter Tract of Econfina Creek WMA as of June 2021.

ACCIPITRIFORMES

Accipitridae (Hawks and Allies)

- Bald Eagle *Haliaeetus leucocephalus*
- Cooper's Hawk *Accipiter cooperii*
- Mississippi Kite *Ictinia mississippiensis*
- Northern Harrier *Circus cyaneus*
- Osprey *Pandion haliatus*
- Red-shouldered Hawk *Buteo lineatus*
- Red-tailed Hawk *Buteo jamaicensis*
- Sharp-shinned Hawk *Accipiter striatus*
- Swallow-tailed Kite *Elanoides forficatus*

Cathartidae (New World Vultures)

- Black Vulture *Coragyps atratus*
- Turkey Vulture *Cathartes aura*

ANSERIFORMES

Anatidae (Ducks, Geese, and Swans)

- Blue-winged Teal *Anas discors*
- Bufflehead *Bucephala albeola*
- Canvasback *Aythya valisineria*
- Gadwall *Mareca strepera*
- Green-winged Teal *Anasa crecca*
- Hooded Merganser *Lophodytes cucullatus*
- Mallard *Anas platyrhynchos*
- Redhead *Aythya americana*
- Ring-necked Duck *Aythya collaris*
- Ruddy Duck *Oxyura jamaicensis*
- Snow Goose *Chen caerulescens*
- Wood Duck *Aix sponsa*

APODIFORMES

Apodidae (Swifts)

- Chimney Swift *Chaetura pelagica*

Trochilidae (Hummingbirds)

- Ruby-throated Hummingbird *Archilochus colubris*

CAPRIMULGIFORMES

Caprimulgidae (Nighthawks and Nightjars)

- Chuck-will's Widow *Caprimulgus carolinensis*
- Common Nighthawk *Chordeiles minor*

CHARADRIIFORMES

Charadriidae (Plovers and Lapwings)

- Killdeer *Charadrius vociferous*

Laridae (Gulls and Allies)

- Forster's Tern *Sterna forsteri*
- Least Tern *Sterna antillarum*

Scolopacidae (Sandpipers)

- American Woodcock *Scolopax minor*
- Common Snipe *Gallinago*
- Greater Yellowlegs *Tringa melanoleuca*
- Least Sandpiper *Calidris minutilla*
- Lesser Yellowlegs *Tringa flavipes*
- Solitary Sandpiper *Tringa solitaria*

CICONIIFORMES

Ardeidae (Herons, Egrets, and Bitterns)

- Cattle Egret *Bublucus ibis*
- Great Blue Heron *Ardea herodias*
- Great Egret *Ardea alba*
- Green Heron *Butorides virescens*
- Little Blue Heron *Egretta caerulea*
- Snowy Egret *Egretta thula*
- Tricolored Heron *Egretta tricolor*

Ciconiidae (Storks)

- Wood Stork *Mycteria americana*

Threskiornithidae (Ibises and Spoonbills)

- Roseate Spoonbill *Platalea ajaja*
- White Ibis *Eudocimus albus*

COLUMBIFORMES

Columbidae (Pigeons and Doves)

- Common Ground Dove *Columbina passerina*
- Mourning Dove *Zenaida macroura*

CORACIIFORMES

Alcedinidae (Kingfishers)

- Belted Kingfisher *Ceryle alcyon*

CUCULIFORMES

Cuculidae (Cuckoos, Roadrunners, and Anis)

- Yellow-billed Cuckoo *Coccyzus americanus*

FALCONIFORMES

Falconidae (Falcons and Caracaras)

- American Kestrel *Falco sparverius*
- Merlin *Falco columbarius*

GALLIFORMES

Odontophoridae (New World Quail)

- Northern Bobwhite *Colinus virginianus*

Phasianidae (Grouse, Turkeys, and Allies)

- Wild Turkey *Meleagris gallopavo*

GRUIFORMES

Gruidae (Cranes)

- Sandhill Crane *Grus canadensis*

Rallidae (Rails)

- American Coot *Fulica americana*
- Common Gallinule *Gallinula chloropus*
- Purple Gallinule *Porphyrio martinicus*

PASSERIFORMES

Bombycilidae (Waxwings)

- Cedar Waxwing *Bombycilla cedrorum*

Cardinalidae (Cardinals and Allies)

- Blue Grosbeak *Passerina caerulea*
- Indigo Bunting *Passerina cyanea*
- Northern Cardinal *Cardinalis*
- Rose-breasted Grosbeak *Pheucticus ludovicianus*

Corvidae (Crows and Jays)

- American Crow *Corvus brachyrhynchos*
- Blue Jay *Cyanocitta cristata*
- Fish Crow *Corvus ossifragus*

Emberizidae (New World Sparrows)

- Bachmann's Sparrow *Peucaea aestivalis*
- Chipping Sparrow *Spizella passerina*
- Dark-eyed Junco *hyemalis*
- Eastern Towhee *Pipilo erythrophthalmus*
- Field Sparrow *Spizella pusilla*
- Grasshopper Sparrow *Ammodramus savannarum*
- Savannah Sparrow *Passerculus sandwichensis*
- Song Sparrow *Melospiza melodia*
- White-crowned Sparrow *Zonotrichia leucophrys*
- White-throated Sparrow *Zonotrichia albicollis*

Hirundinidae (Swallows and Martins)

- Barn Swallow *Hirundo rustica*
- Cliff Swallow *Petrochelidon pyrrhonota*
- Northern Rough-winged Swallow *Stelgidopteryx serripennis*
- Purple Martin *Progne subis*
- Tree Swallow *Tachycineta bicolor*

Icteridae (Blackbirds, Orioles, and Allies)

- Brown-headed Cowbird *Molothrus ater*
- Common Grackle *Quiscalus quiscula*
- Eastern Meadowlark *Sturnella magna*
- Orchard Oriole *Icterus spurious*
- Red-winged Blackbird *Agelaius phoeniceus*

Laniidae (Shrikes)

- Loggerhead Shrike *Lanius ludovicianus*

Mimidae (Mockingbirds and Thrashers)

- Brown Thrasher *Toxostoma rufum*
- Gray Catbird *Dumetella carolinensis*
- Northern Mockingbird *Mimus polyglottos*

Paridae (Chickadees and Titmice)

- Carolina Chickadee *Poecile carolinensis*
- Tufted Titmouse *Baeolophus bicolor*

Parulidae (Wood-Warblers)

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

Regulidae (Kinglets)

- Golden-crowned Kinglet *Regulus satrapa*
- Ruby-crowned Kinglet *Regulus calendula*

Sittidae (Nuthatches)

- Brown-headed Nuthatch *Sitta pusilla*

Sylviidae (Old World Warblers and Gnatcatchers)

- Blue-gray Gnatcatcher *Polioptila caerulea*

Thraupidae (Tanagers)

- Scarlet Tanager *Piranga olivacea*
- Summer Tanager *Piranga rubra*

Troglodytidae (Wrens)

- Carolina Wren *Thryothorus ludovicianus*
- House Wren *Troglodytes aedon*
- Marsh Wren *Cistothorus palustris*
- Sedge Wren *Cistothorus stellaris*

Turdidae (Thrushes)

- American Robin *Turdus migratorius*
- Eastern Bluebird *Sialia sialis*
- Hermit Thrush *Catharus guttatus*
- Wood Thrush *Hylocichla mustelina*

Tyrannidae (Tyrant Flycatchers)

- Eastern Kingbird *Tyrannus*
- Eastern Phoebe *Sayornis phoebe*
- Eastern Wood Pewee *Contopus virens*
- Great Crested Flycatcher *Myiarchus crinitus*
- Vermilion Flycatcher *Pyrocephalus rubinus*

Vireonidae (Vireos)

- Blue-headed Vireo *solitarius*
- Red-eyed Vireo *olivaceus*
- White-eyed Vireo *griseus*
- Yellow-throated Vireo *flavifrons*

PELICANIFORMES

Phalacrocoracidae (Cormorants)

- Double-crested Cormorant *Phalacrocorax auratus*

Anhingidae (Darters/Anhinga)

- Anhinga

PICIFORMES

Picidae (Woodpeckers and Allies)

- Downy Woodpecker *Picoides pubescens*
- Hairy Woodpecker *Picoides villosus*
- Northern Flicker *Colaptes auratus*
- Pileated Woodpecker *Dryocopus pileatus*
- Red-bellied Woodpecker *Melanerpes carolinus*

- Red-headed Woodpecker *Melanerpes erythrocephalus*
- Yellow-bellied Sapsucker *Sphyrapicus varius*

PODICIPEDIFORMES

Podicipedidae (Grebes)

- Pied-billed Grebe *Podilymbus podiceps*

STRIGIFORMES

Strigidae (Typical Owls)

- Barred Owl *Strix varia*
- Eastern Screech-Owl *Megascops asio*
- Great Horned Owl *Bubo virginianus*

Appendix VI. List of herpetofauna (n=64) documented on the Carter Tract of Econfina Creek WMA as of June 2021.

CROCODILIA (Crocodilians)

Alligatoridae (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*

LACERTILIA (Lizards)

Anguidae (Legless lizards)

- Slender glass lizard *Ophisaurus attenuatus*

Polychridae (Anoles)

- Green anole *Anolis carolinensis*

Phrynosomatidae (Earless, spiny, and horned lizards)

- Southern fence lizard *Sceloporus undulatus undulatus*

Scinidae (Skinks)

- Ground skink *Scincella lateralis*
- Five-lined skink *Eumeces fasciatus*
- Broadhead skink *Eumeces laticeps*
- Southeastern five-lined skink *Eumeces inexpectatus*
- Northern mole skink *Eumeces egregious similis*

Teiidae (Whiptails)

- Six-lined racerunner *Cnemidophorus sexlineatus sexlineatus*

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 *Heterdon platyrhinos*
- Mud Snake *Farancia abacura*
- Southern black racer *Coluber contrictor priapus*
- Eastern coachwhip *Masticophis flagellum*
- Rough green snake *Opheodrys aestivus*
- 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*
- Brown water snake *Nerodia taxispilota*

Elapidae (Coral snakes)

- Eastern coral snake *Micrurus fulvius*

Viperidae (Vipers)

- Florida cottonmouth *Agkistrodon piscivorus 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*
- Dwarf Siren *Pseudobranchus striatus*

Ambystomatidae (Mole salamanders)

- Mole salamander *Ambystoma talpoideum*

Salamandridae (Newts)

- Central newt *Notophthalmus viridescens lousianensis*

Plethodontidae (Lungless salamander)

- Southeastern slimy salamander *Plethodon grobmani*
- Slender dwarf salamander *Eurycea quadridigitata*
- Hillis's dwarf salamander *Eurycea hillisi*

ANURA (Frogs and toads)

Pelobatidae (Spadefoots)

- Eastern spadefoot toad *Scaphiopus holbrookii*

Bufonidae (Toads)

- Southern toad *Bufo terrestris*
- Oak toad *Bufo quercicus*

Hylidae (Treefrogs and 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 ornate*

Microhylidae (Narrowmouth toads)

- Eastern narrowmouth toad *Gastrophryne carolinensis*

Ranidae (True frogs)

- Bullfrog *Rana catesbeiana*
- River frog *Rana heckscheri*
- Pig frog *Rana grylio*
- Southern leopard frog *Rana sphenocephala*
- Bronze frog *Rana clamitans clamitans*