

Georgia's Alligator Management Plan



Prepared by the
Game Management Section's
Alligator Committee

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Alligator Committee

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EXECUTIVE SUMMARY

Purpose Statement

The Purpose of Georgia's alligator management plan is to ensure the long-term conservation of Georgia's alligator population while providing sustainable harvest and other recreational opportunities, promoting its value to wetland ecosystems, and minimizing conflicts

Fundamental Objectives

To achieve the overarching goals of the Purpose Statement, the alligator committee has identified four fundamental objectives for the management of Georgia's alligator population:

- 1) Ensure Long-Term Conservation of Georgia's Alligator Population
 - a. Maintain a 3-year average spotlight index of 5 alligators per mile
 - b. Increase wetland habitat conservation
- 2) Provide Recreational Opportunity
 - a. Implement an alligator harvest strategy for each hunting zone
 - b. Periodically measure alligator hunter satisfaction and preferences
 - c. Encourage non-consumptive, alligator-related recreational opportunity
 - d. Provide other harvest opportunity as appropriate
- 3) Minimize Human-Alligator Conflicts
 - a. Provide efficient and successful nuisance abatement program for the public
 - b. Maintain a 75% capture rate of alligators per permit issued
 - c. Increase the availability of alligator life history and biology information
- 4) Increase Awareness of the Alligator's Economic Benefits
 - a. Increase awareness of the economic value of the alligator population in Georgia
 - b. Increase the availability of alligator life history, biology, and management information

These fundamental objectives are each supported by a set of smaller, means objectives and action items to accomplish the goals of the plan.

INTRODUCTION

The purpose of this management plan is to ensure the long-term conservation of Georgia's alligator population while providing sustainable harvest and other recreational opportunities, promoting its value to wetland ecosystems, and minimizing conflicts. Continuing present and ongoing management strategies along with the implementation of additional procedures will allow us to achieve these goals.

Historically (pre 1900's), alligator populations were abundant across the southeastern United States including the coastal plain of Georgia. However, due to unregulated harvests and poaching in the 1900's through the 1960's, the alligator population declined and reached its lowest point in Georgia in the late 1960's. In 1967, the United States Fish and Wildlife Service (USFWS) listed the alligator as endangered. This listing as well as the amended Lacey Act in 1969 resulted in greater protection. As a result, the alligator population recovered in Georgia and other southeastern states.

The Georgia Department of Natural Resources (GADNR) first estimated the total alligator population in 1973 at 29,954. By 1982, the population was estimated at 101,644. From these estimates, it was quite clear, that the alligator population had increased tremendously since 1973.

Due to the diverse nature and general inaccessibility of alligator habitats, an accurate census of alligators in Georgia is difficult, at best. In addition, various sex and age groups occupy different habitats depending on the season and climatic conditions (Giles and Childs 1949, Chabreck 1965, Joanen and McNease 1972, McNease and Joanen 1974). An important consideration in surveying alligator populations is the prevention of an over-count of one segment of the population that may be easily observed or an undercount of another segment that is not as observable (Chabreck 1966).

In Georgia, the American alligator is considered fully recovered with regards to population status and occupancy of traditional range. Alligators have been observed above the Fall Line in Georgia, but these sightings are considered the result of illegal relocations or escapes from alligator farms, except for the few alligators observed in close proximity to the fall line. Using 1984-2009 spotlight data, the trendline based on the 3-yr average number of alligators seen per mile has increased 2.2 times since the 1982 population estimate of 101,000. This increase is assumed to be indicative of a similar increase in the population as a whole; therefore, Georgia's current alligator population estimate is 222,000. The population is widely dispersed and density is variable based on both habitat quality and condition.

ALLIGATOR POPULATION SURVEYS

Spotlight Surveys

Spotlight counts reflect the minimum number of animals present and are a commonly used method of monitoring alligator populations. Additionally, the relationship of snout length to total length can be used to estimate length of animals during counts (Chabreck 1966, Woodward and Marion 1978). Woodward and Marion (1978) evaluated several factors affecting night counts of alligators and recommended late May or early June counts using a 200,000 C.P. spotlight to count alligators, as well as, obtain their representative size classes. The importance of standardization of time of year, cruising speed of the survey boat, and various environmental factors were also emphasized.

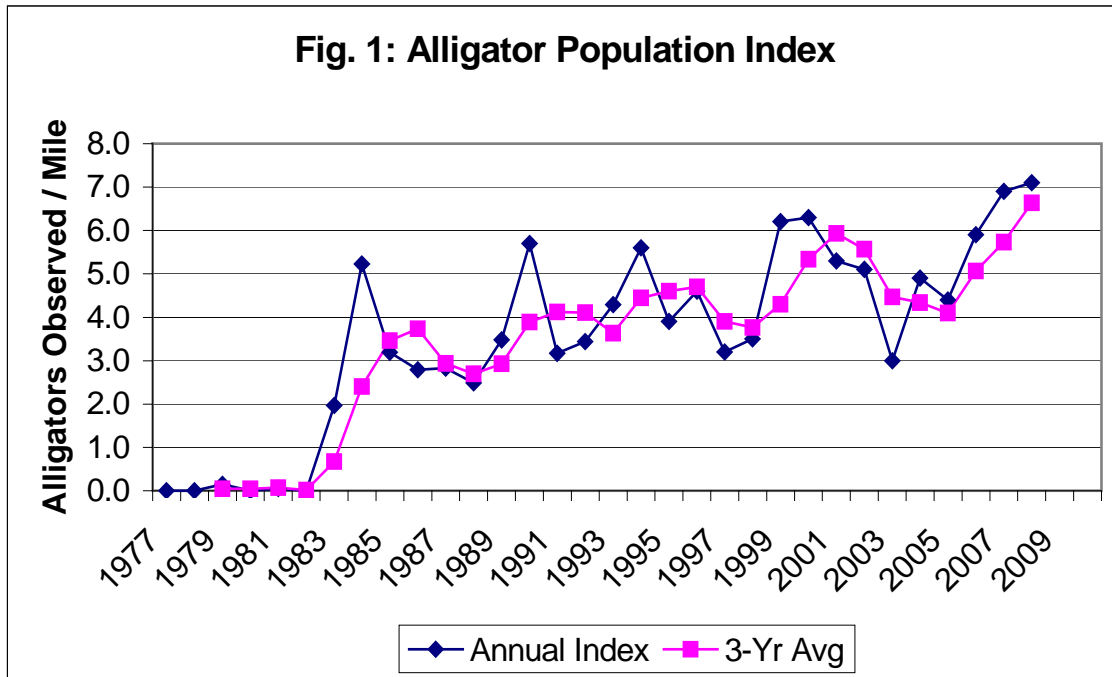
Population dynamics of an alligator population are affected by the size class composition (age structure) of the population. Size class information can be obtained in three ways: 1) live-capture of alligators, 2) harvest of alligators, and 3) spotlight counts of alligators. Spotlight counts are the most widely used technique for determining size class information, but they may over-represent the adult segment, which is more highly visible, while under-representing the juvenile and sub-adult segments that often occupy more inaccessible habitats (Taylor and Neal 1984).

The first spotlight counts in Georgia were conducted in 1977. Four routes in southwestern Georgia were run in 1977, 1979, 1981, 1982, and 1983. A coastal route was added in 1984, and additional routes were added between 1985 and 1987. Routes became somewhat standardized in 1989. Alligator survey route instructions and procedures for 2010 are in Appendix 1.

From 1989 through 1994, GADNR personnel ran 22 alligator spotlight count surveys with surveys being grouped according to habitat types. Some survey routes were run once or twice annually while others were run once every other year in an effort to provide an index to alligator populations across the state. In 1995, the number of survey routes was reduced to 18 with 13 routes being run once each year and 5 routes being run once every other year. Location and description of spotlight survey routes recommended by the Alligator Committee are in Appendix 2.

A study entitled, "Analysis of Georgia's American Alligator Monitoring Program" by Kenneth G. Rice and Scott T. Averitt, USGS-Biological Resources Division, was concluded in March 1999. Specific recommendations for enhancing GADNR's alligator monitoring program were as follows: 1) Power analysis suggested that two surveys per route are necessary to evaluate trends on most habitats, 2) Some quantitative measure of water level should be established for each survey route, 3) All aspects of survey methodology should be standardized, 4) A minimum water temperature for the initiation of spotlight counts should be adopted, 5) The same observers should conduct the same routes each year to reduce variance with inexperienced observers and reduce the number of alligators placed in the unknown size class, 6) Replicate counts should be conducted 15-30 days apart to allow mixing of the alligator population, and 7) Survey routes within habitats should be maintained from year to year.

Since 1999, improvements to our survey methodology have been incorporated, including changes to route frequency, changes in data forms and data collected, and changes to survey timing. However, not all of the recommendations in the 1999 report have been implemented (see Appendix 3 for the 1999 recommendations). Results of the spotlight surveys are shown in Figure 1.



Nest Surveys

Aerial nest surveys are one of the most accepted and best methods for estimating alligator populations and densities. Louisiana’s population estimate is determined by counting alligator nests along established aerial transects each year. With information from years of research and surveys, they have calculated that each nesting female represents 20 alligators in the population. Thus, simply multiplying the number of nests observed per given area by 20 will give the total population of that area. Employing this technique, Newsome and Joanen (1986) reported the density of nests in excellent habitat on Louisiana’s Rockefeller Refuge to be 1 per 5.2 hectares (ha), which translated to 1 alligator present per 0.26 ha.

While aerial nest count transects appear to work well in coastal Louisiana, aerial nest count transects in the coastal marsh of Georgia have been largely unsuccessful, except on managed impoundments such as Rhetts Island. During preliminary test transects, the only nests discovered in the natural marsh were associated with creeks, rivers, or other deep-water habitat where the female can stay in the vicinity of the nest and still be able to submerge even on low tide. Much of Georgia’s marsh is covered by only inches of water at high tide and, thus is probably of little use as alligator nesting habitat. In contrast to the natural marsh areas, however,

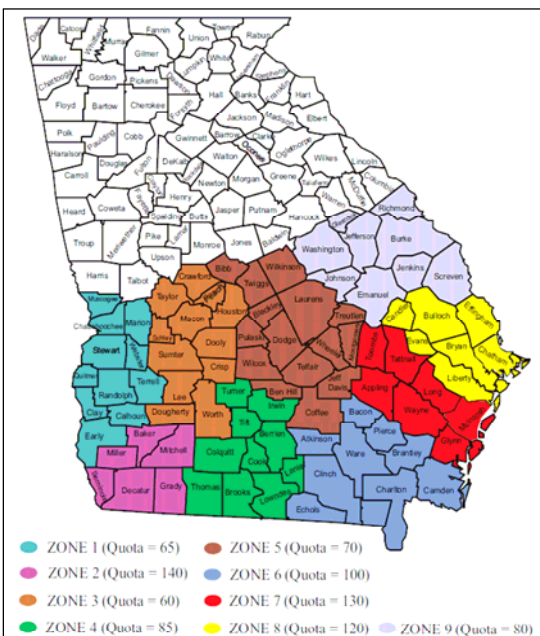
aerial transects run on the Rhetts Island study area (2,267 ha) appear to have been quite successful.

Alligator nest surveys were begun on Rhetts Island in 1982 and have continued ever since (with a few exceptions). During the period, 1982 – 2007, the number of nests occurring on this study area ranged from a low of 11 in 1982 to a high of 66 in 2002, with an average of 37 nests per year. The number of nests occurring on this area has been somewhat cyclic with a low number of nests followed the next year by a higher number of nests, which suggest that many female alligators may not nest each year. The availability of quality nesting habitat from year to year may also be a factor as the water level in the impoundments on Rhetts Island are infrequently lowered to facilitate maintenance and repair.

Overall the trend in the number of nests appears to be slightly increasing from 1982 through 2007. The number of nests will continue to be an important indicator of the alligator population status in the Altamaha River. Surveys conducted post 2003 show an average of 33 nests per year indicating that the harvest of alligators in the area has not had a negative impact on the number of nests produced.

ALLIGATOR HUNTING IN GEORGIA

Plans for an alligator-hunting season in Georgia were developing in the late 1980's when regulations concerning nuisance alligators were adopted and the framework for an alligator hunting season was enacted. From 2001 through 2003, when the first “modern” alligator hunting season was opened, GADNR held many public meetings, news releases, presentations, and many public comment opportunities to educate the public about alligators and alligator hunting in Georgia and hear their concerns. Public comment was supportive of the GADNR proposal to hunt alligators and the Board of Natural Resources adopted alligator hunting regulations in spring of 2003 and the season began in September of 2003.



The alligator population in Georgia is widely distributed across the coastal plain region and variable in density depending upon many factors such as habitat quality and availability. Due to this variability and to prevent alligators from being over-harvested in any one or two areas within the state, alligator hunting zones have been established across the state (Figure 2). These zones are delineated where possible by watershed. Alligator quotas were initially established for each zone based on nuisance alligator data, intuition about the density of alligators within each zone, and survey data. Quotas have changed since the beginning in 2003, as more counties have been included.

Alligator Harvest

Alligator harvest from the inaugural alligator hunting season was conservative. Hunter success rates ranging from 60-70% were anticipated; therefore, quota numbers were set relatively low. Hunter success rates were lower than expected, and quotas have been adjusted periodically (Table 1). The current recreational harvest remains under 200 alligators per year. In contrast, the nuisance harvest has averaged over 400 alligators per year during the last 5 years.

Year	Quota	# Harvested	% Success	Avg. Length
2003	184	73	40	8'
2004	300	101	34	8' 4"
2005	500	169	34	8' 1"
2006	500	183	37	7' 11"
2007	550	192	35	8' 3"
2008	551	169	31	8' 8"
2009	700	193	28	8' 5"

Biological data is collected from both hunter harvested and nuisance trapper harvested alligators. From this data, the average length of harvested alligators should be monitored regularly. Significantly decreasing lengths of alligators over time may indicate changes to the age structure of the population, which can affect reproduction. Additionally, length of observed alligators during the spotlight surveys can be analyzed for significant trends or differences to detect potential reductions in average length of alligators.

Alligator Harvest by Zone

Alligator harvest by zone has been variable and has ranged from a low of 6% success rate (3 alligators) in zone 3 in 2009 to a high of 63% success rate (22 alligators) in zone 1 in 2006. Zone 4 has the lowest overall success rate (15%), and zones 2 and 7 have the greatest overall success rates with 40% and 38%, respectively. Zones 2 and 7 have two of the three highest alligator survey results and abundant amounts of public water for alligator hunting. Zone 4, on the other hand, has public waters consisting of small rivers and creeks, one WMA for public access, and most wetlands occur on private property. While estimates indicate a healthy population of alligators in zone 4, public access is limited. The remaining zones have success rates ranging from 18% to 37%. The zone with the longest average length is zone 1 at 8' 11" and the zone with the shortest average is zone 6 with an overall 7' 6" average. Zone 2 has often produced the longest alligator since regulated alligator hunting was begun.

Alligator Hunter Survey

In November of 2003, a survey of all unsuccessful alligator hunters was conducted after the alligator hunting season. The survey was a one page return postage paid questionnaire designed to assess participation, reasons for lack of success, and hunter satisfaction.

Questionnaires were mailed to one hundred eleven (111) individuals. Fifty-one (51) questionnaires were returned for a 46% return rate. Nine (9) respondents indicated they did not

hunt alligators during the season. If linearly expanded, the number of selected applicants who did not hunt was 20 or 11% of the 184 hunters selected to hunt. Recalculating the overall hunter success rate based on the number of alligator hunters who actually hunted raised the success rate from 40% to 45%. While higher, this remained below the anticipated hunter success rate of 60-70%. The reasons most respondents reported being unsuccessful was failure to get close enough to attach a restraining line to an alligator and not finding an alligator large enough to meet the hunters desired size.

The overall rating by unsuccessful hunters was very positive. Seventy-one percent (71%) rated their alligator hunting experience as good to excellent. Only two respondents rated their experience as poor. Out of the fifty-one (51) returned questionnaires, only one individual indicated that they would not apply for another alligator hunting opportunity.

This survey was conducted again in 2008 to monitor hunter participation and satisfaction with Georgia's alligator hunting program. Three hundred ninety (390) surveys were mailed out to successful applicants who did not turn in an alligator harvest report form. Ninety-six (96) surveys were returned for a twenty-five percent (25%) return rate. Of the surveys returned, eighty-three (83) respondents indicated that they participated in the 2008 alligator hunt for a hunter participation rate of 86%. Four (4) respondents indicated that they do not plan on applying for alligator hunts in the future. The average number of days hunted by those that did participate was four (4) and the most common hunting implements utilized in the pursuit of alligators were archery equipment and harpoons. The most common reason for not harvesting an alligator was the hunter could not get close enough, followed by missing the alligator and not finding an alligator large enough to meet the hunters desired size.

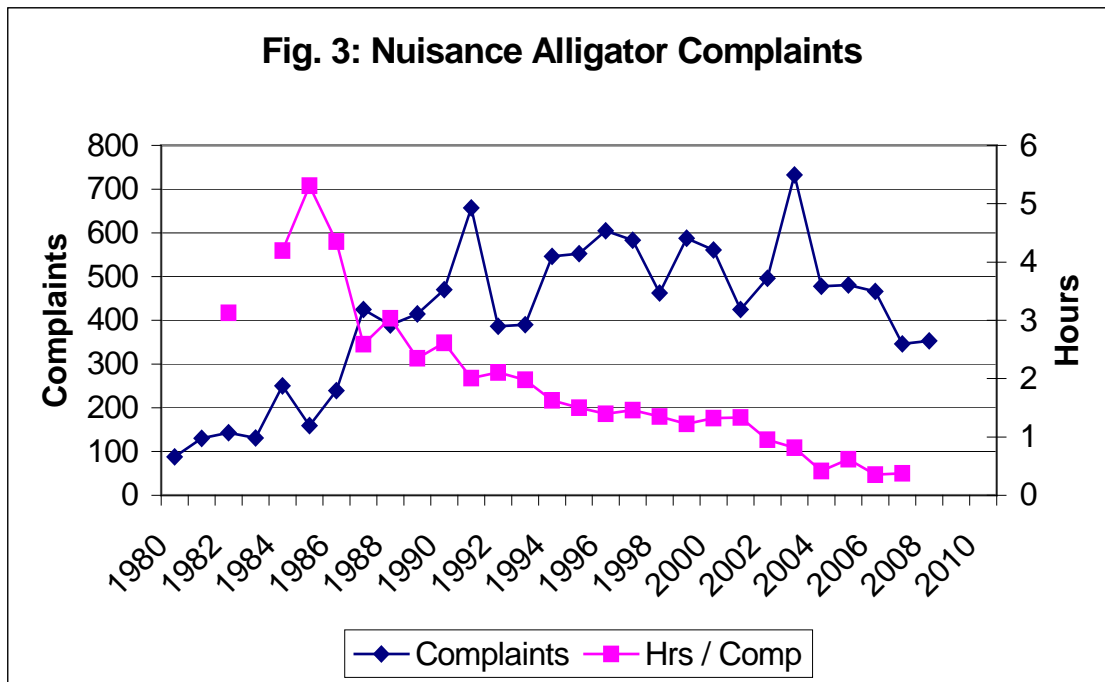
NUISANCE ALLIGATOR PROGRAM

The goal of Georgia's nuisance alligator program is to respond in a timely manner to public complaints about human/alligator conflicts, educate the public about the importance of alligators in Georgia and how to coexist with them, and remove alligators on a case-by-case basis where GADNR deems it necessary to ensure public health, safety, and welfare.

GADNR began receiving alligator complaints in the early 1960's, but only since 1980 have personnel been required to file a detailed report on each complaint. Specific reasons for complaints vary. The most common complaint involves a concern for the safety of pets, livestock, or humans, followed by a general fear of having an alligator in an unusual place such as a swimming pool, yard, highway, parking lot, etc. Other categories of complaints, in order of importance, are as follows: 1) eating fish (e.g., catfish ponds), 2) an injured or dead alligator, and 3) unusually aggressive alligator. A total of 10,625 removal permits have been issued and 8,353 alligators not less than 4 ft. have been caught since the nuisance alligator harvest program began.

The overall trend in nuisance alligator complaints and GADNR manhours per complaint is provided in Figure 3. Despite annual fluctuations, the number of complaints increased through 1992. Since that time, complaints have leveled off or decreased slightly.

As expected, most complaints occur where significant numbers of people reside in areas associated with good alligator habitat. More than 50% of the total statewide complaints through 1988 came from eight counties in the Coastal region. Chatham and Glynn Counties, home of the cities of Savannah and Brunswick, accounted for 61% of all complaints on the coast and almost a third of the statewide total.

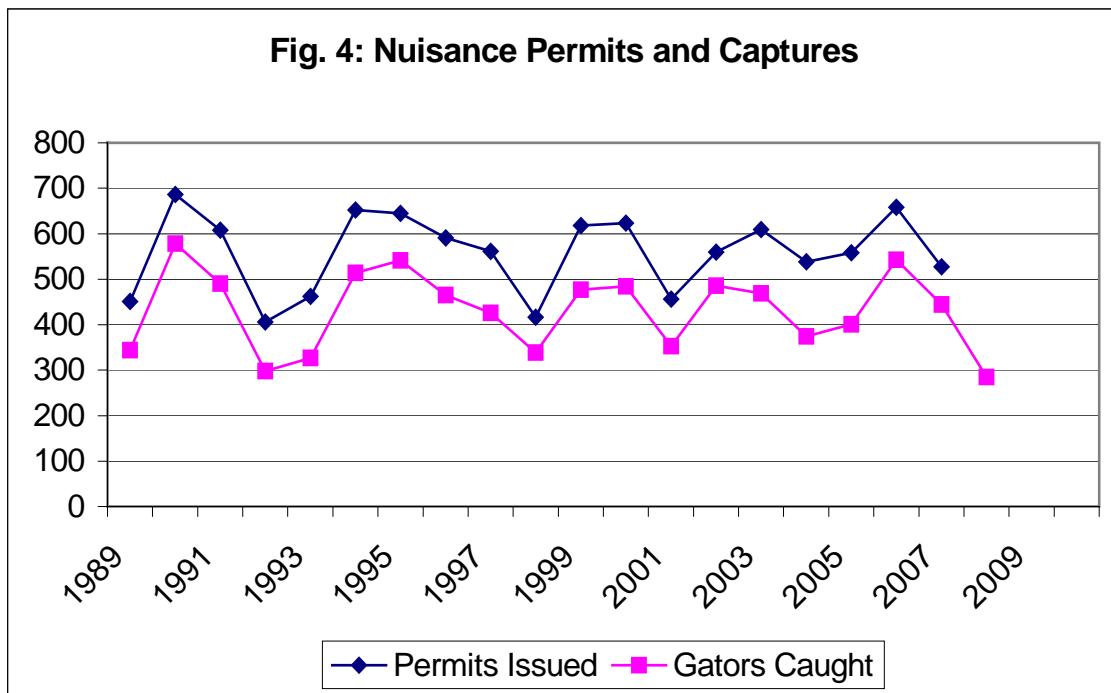


From 1980 through 1988, GADNR personnel handled all complaints. In some cases, complaints were handled by phone; but many times GADNR captured and relocated the alligator. Captured alligators were tagged, weighed, and measured, when possible. As complaints increased in the mid-1980s, GADNR spent a substantial amount of time resolving complaints. Over time, agency personnel became more efficient, but still averaged over 3 hours per complaint in 1988. Additionally, it became increasingly difficult to find a suitable location to release a nuisance alligator where it wouldn't become a problem again. Further, relocated alligators often returned to their capture site. In one case, a large male was captured three times from the same golf course pond over a 19-month period. The greatest return distance was approximately 24 miles.

In 1989, a new nuisance alligator program was initiated. Under this program, nuisance control activities vary based on the size of the alligator. Because alligators smaller than 4' in length do not pose a significant threat to people, they are handled differently than alligators larger than 4' in length. Small alligators (< 4') that require removal are handled in one of two ways: GADNR personnel (if available) capture and remove the alligator at no charge to the landowner, or 2) the landowner can hire a licensed nuisance wildlife control operator or alligator agent-trapper to capture and remove the alligator at the expense of the landowner. These alligators are relocated to areas of suitable habitat. Larger alligators (> 4') that require removal

are assigned to an alligator agent-trapper and are removed at no expense to the landowner. Captured alligators larger than 4' in length may be sold alive or may be slaughtered for the sale of alligator products. An extensive system of permits, meat seals, hide tags, and complaint forms are used to monitor the system. As indicated by the noticeable decline in manhours per complaint, the use of agent trappers has been very successful in improving GADNR efficiencies in handling nuisance alligator complaints.

The number of collection permits issued often exceeds the number of complaints because complaints may involve multiple alligators at a site. Collection permits issued (686) and number of alligators captured (578) peaked in 1990, the second year of the program (Figure 4). In 1992, the number of permits issued fell to 406 and the number of alligators captured dropped to 298, both lows for the nuisance alligator program. Since 1989, nuisance trappers have averaged greater than a 75% capture rate of alligators caught per permit issued.



The nuisance alligator harvest program appears to provide an adequate process for resolving human/alligator conflicts in Georgia without negatively impacting the wild alligator population.

ECONOMIC IMPACTS

The economic impacts of Georgia’s alligator population can be measured in several different ways. First, there is the direct expenditure of hunters for licenses, equipment, travel, meals, etc. Second are expenditures of wildlife watchers, those who travel to the outdoors for

photography, nature interpretation, hiking, etc. Finally, there are measures of the direct value of the alligator itself in terms of its hide and meat.

In 2009, there were 653 resident alligator hunting licenses and 73 non-resident alligator hunting licenses sold. Resident licenses cost \$50 each, and non-resident licenses cost \$200, for a total of \$47,250 in direct license revenue for GADNR. Lifetime licenses and honorary licenses already include the alligator license, so their expenditures are not included in this total. These hunters spent an average of 2.7 days hunting, for a total of 1,960 hunter-days in the field. Based on a 2006 U. S. Fish and Wildlife Service Report, the average migratory bird hunter spends about \$120 per day in the field. If we assume alligator hunters are similar to migratory bird hunters (duck hunters need a boat, a variety of specialized equipment, etc.) then we can assume that alligator hunters spend about \$120 per day as well. If 726 hunters spent 1,960 hunter-days in the field at \$120 per day, then they spent \$235,200 to alligator hunt in Georgia.

From the same report, there were 1,987,000 wildlife watchers in Georgia in 2006. Based on their spending for food, travel, equipment, and other associated costs, wildlife watchers in Georgia in 2006 spent \$1.6 billion to watch wildlife. While we don't know what portion of those were specifically looking for alligators, it is reasonable to assume that wildlife watchers are interested in all wildlife in all habitats, and that observing alligators would be a target of some of their outings.

Lastly, the value of the alligator itself can be estimated. At a price of \$20 per foot for alligator hides and \$5 per pound of alligator meat, the average harvested alligator in Georgia is worth about \$125 in meat (25 lbs from a 100 lb alligator) and \$160 in hide (average length of 8.167 feet). At that rate, the 193 alligators harvested during the 2009 hunting season would be valued at about \$55,000.

COMMERCIAL USES OF ALLIGATORS

Alligator farms in Georgia are regulated through a permit process administered through GADNR. Some alligator farms purchase nuisance alligators that have been captured by alligator agent trappers. Alligator farms that are operated in conjunction with poultry farms are subject to Georgia Department of Agriculture regulations as well. Because these farms do not impact the wild alligator population in Georgia, alligator farming is not addressed in this plan.

While egg and hatchling harvest are legitimate uses of the alligator resource, these are not currently available in Georgia. To meet the statutory mandate of using the best science available to manage Georgia's wildlife resources, GADNR must acquire more scientific data before implementing such strategies.

MANAGEMENT GOAL

The management goal for this plan is to accomplish the purpose statement below through four, fundamental objectives with specific goals and action items for each.

Purpose Statement

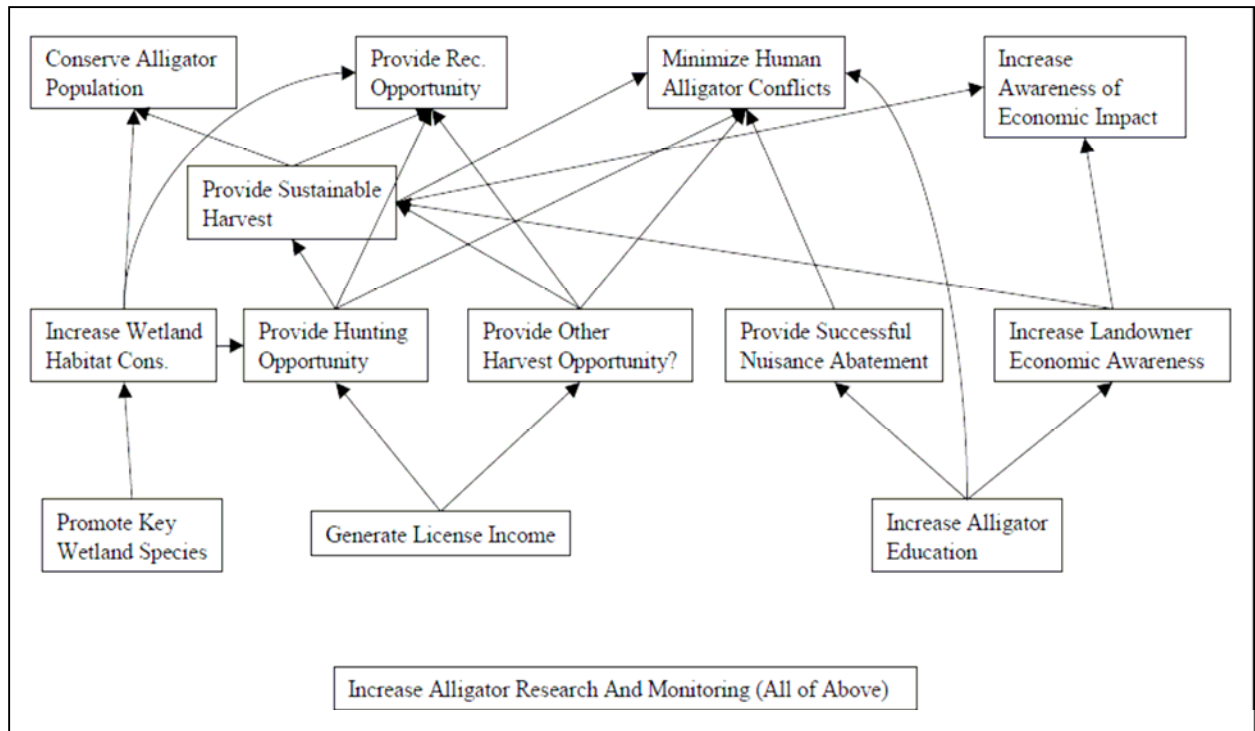
The Purpose of Georgia's alligator management plan is to ensure the long-term conservation of Georgia's alligator population while providing sustainable harvest and other recreational opportunities, promoting its value to wetland ecosystems, and minimizing conflicts

Fundamental Objectives

To achieve the overarching goals of the Purpose Statement, the alligator committee has identified four fundamental objectives for the management of Georgia's alligator population:

- 1) Ensure Long-Term Conservation of Georgia's Alligator Population
- 2) Provide Recreational Opportunity
- 3) Minimize Human-Alligator Conflicts
- 4) Increase Awareness of the Alligator's Economic Benefits

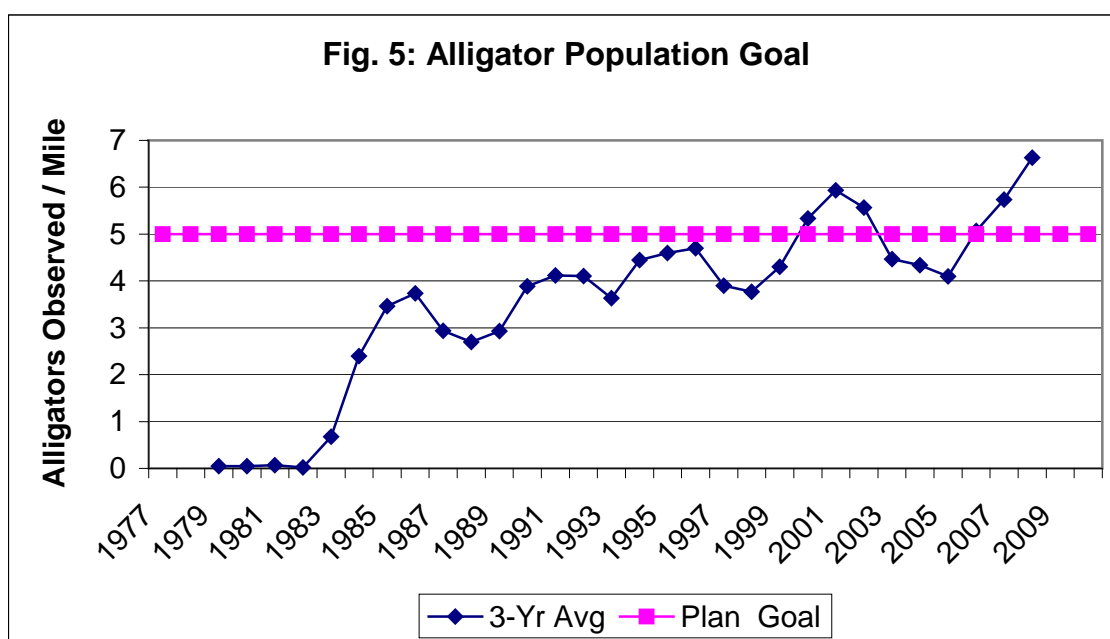
These fundamental objectives are each supported by a set of smaller, means objectives and action items to accomplish the goals of the plan.



1) Ensure Long-Term Conservation of Georgia's Alligator Population

Objective: Based on current spotlight index data, the range-wide alligator population goal for Georgia is a three-year average of 5 alligators per mile (Figure 5).

Georgia's alligator population is currently monitored through a spotlight index conducted across various wetland habitats in the lower half of the state. To achieve a balance between a growing alligator population and the potential nuisance conflicts that can arise from an overabundant population, the committee has set a range-wide population goal of five (5) alligators per mile as indexed through our current spotlight index. The population goal of 5 was chosen because it approximates the 20-year (1990-2009) average number of alligators seen per mile during our annual spotlight counts across the state.



Objective: Increase wetland habitat conservation.

Georgia's alligator's are an integral part of the wetland ecosystem. Ensuring the long-term conservation of alligators requires conservation of their habitat. Alligator's habitat needs should be considered in future habitat acquisition programs and grant requests (e.g. State Wildlife Grants, North American Wetland Conservation Act grants, Coastal Wetland grants, etc.)

Recommended Action Items:

- Continue spotlight survey and re-emphasize standardized methods (Appendix 1).
- Add routes as necessary to achieve at least 2 routes per hunting zone (Appendix 2)
 - Zone 1 - Initiate new survey route at north end of Lake Walter F. George
 - Zone 2 – Initiate new survey route from Lake Walter F. George dam south on Chattahoochee River
 - Zone 2 - Initiate Flint River route near Newton, GA

- Zone 4 - Add a route, potentially along Alapaha, Little, or Withlacoochee Rivers
- Zone 8 - Add a route along the Savannah River
- Zone 9 - Add a route along the Oconee River
- Implement 1999 spotlight survey recommendations from Rice and Averitt (Appendix 3).
- Correct raw spotlight data for effects of water depth and water temperature on observability based on matrix algebra method described in Nickerson and Brunell 1997.
- Develop a true population estimate, not an index. Possible methods include capture-recapture and habitat models based on alligators/mile, observability, habitat quantity, and occupancy rates.
- Investigate the possibility of conducting additional nest surveys.

2) Provide Recreational Opportunity

Objective: Implement an alligator harvest strategy in each hunting zone to determine when hunting pressure should be increased or decreased based on alligator population indices.

Recreational harvest opportunity should be provided in accordance with the goal of long-term conservation of the alligator population. To regulate hunting, the committee developed a harvest strategy that establishes population levels, as indexed through the spotlight counts, at which hunting opportunity should be increased or decreased in each hunting zone. This process will provide suitable harvest pressure in each zone dependent on the alligator's current population level in relation to its population goal.

In each zone, the 1990-2009 average alligator spotlight index was used as the baseline. When the 3-year average spotlight index is more than 33% above the baseline, harvest opportunity may be expanded until the population index drops back below the "+33%" level, and then harvest opportunity may remain stable or be decreased in that zone. Inversely, when the 3-year average spotlight index is less than 33% below the baseline, harvest opportunity may be decreased until the population index returns above the "-33%" level, and then harvest opportunity may remain stable in that zone. When the 3-year average spotlight index drops below 50% of the baseline, then harvest opportunity in that zone may be closed until the index climbs above the "-50%" level, and then it may be reopened.

These thresholds were selected using the following criteria:

The closure points were generally at levels seen in the mid to late 1980's or very early 1990's. This is our benchmark as the time when Georgia's alligator population made a noticeable increase. The restriction points were defined as the level at which the population fell noticeably below the long-term (20-yr) average. These ranged from about -25% to -45%, depending on the zone in question. The liberalization points were set at recent levels to slow down population growth in zones with an increasing population index, or were set at historic highs in zones with a stable or declining population index. Again, these typically fell within the +25% to +45% range. Once all of the hunt zones were complete, the committee looked for some consistent level at

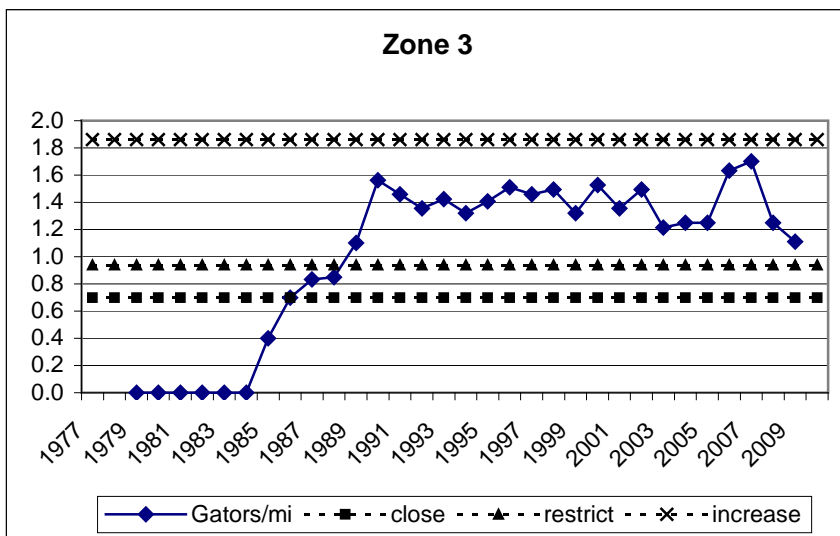
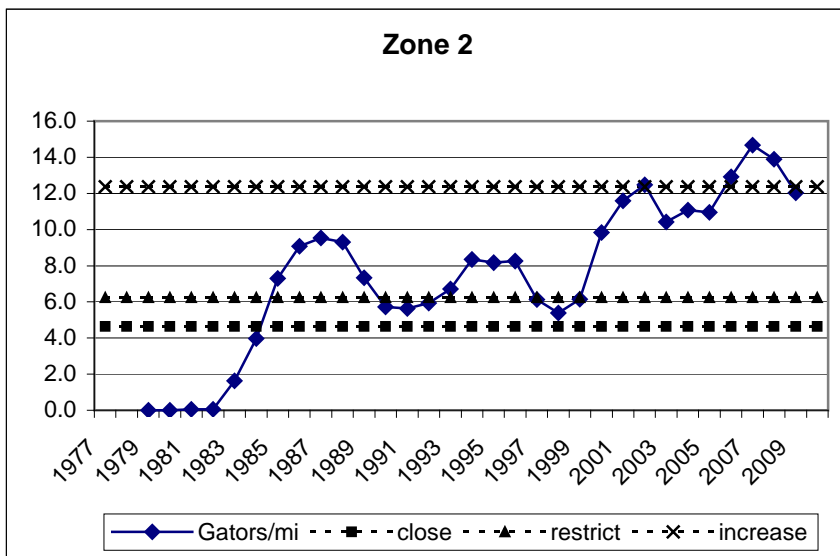
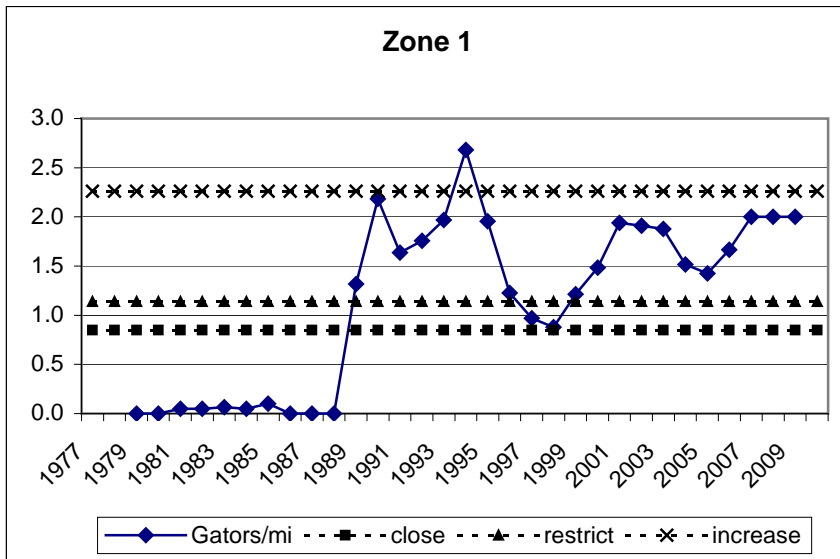
which to increase or decrease harvest that could be applied to all zones. The average value for the “cut points” in all zones was approximately $\pm 33\%$, so the committee decided to be consistent and apply the $\pm 33\%$ rule to each zone.

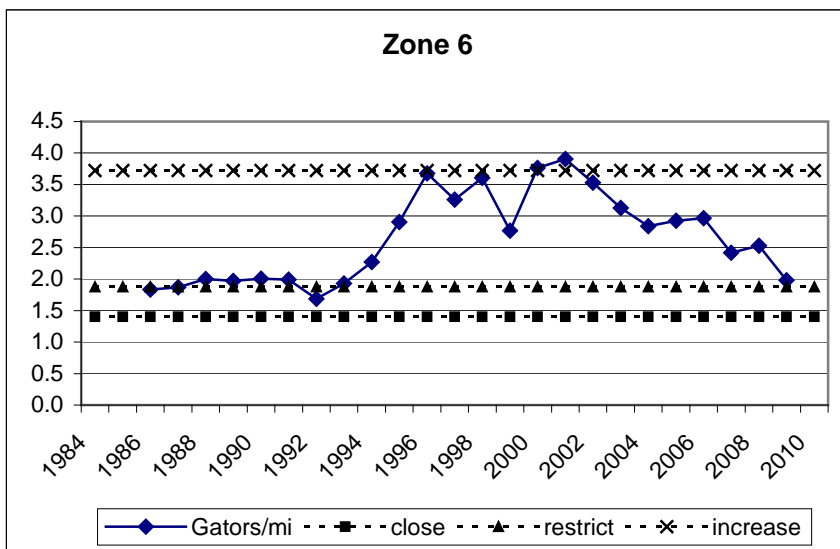
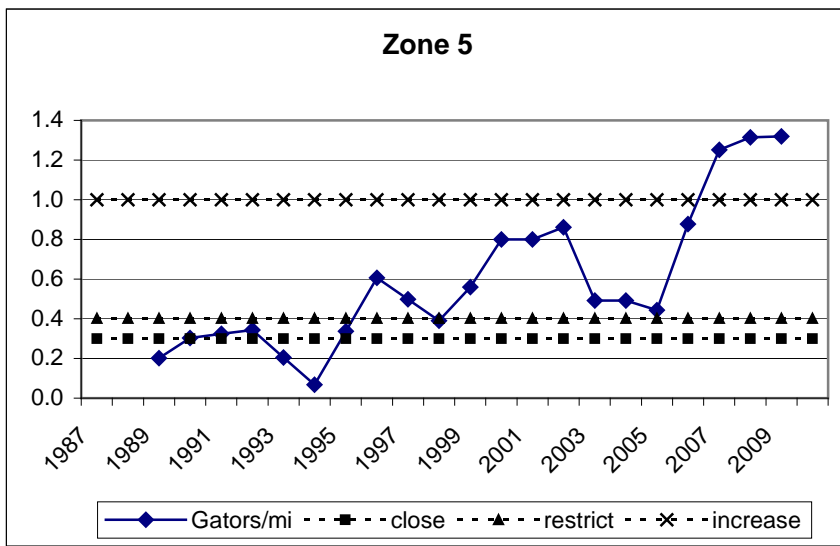
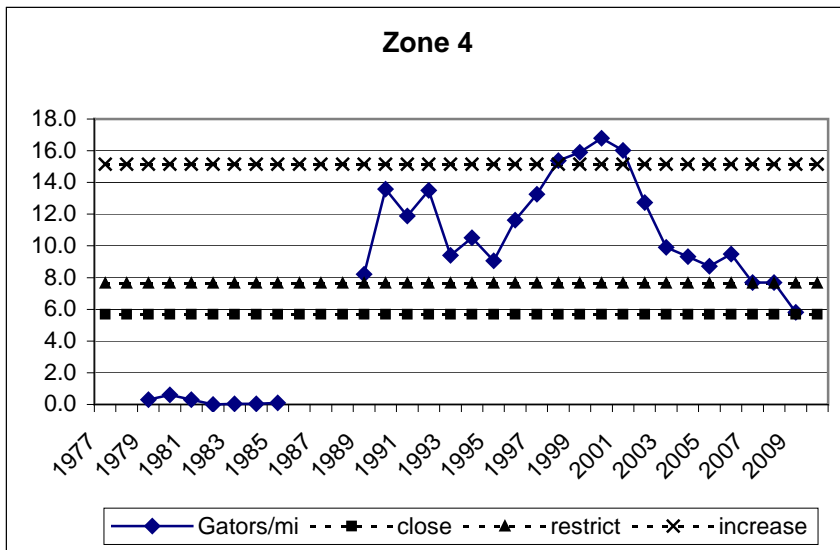
Without knowing the true harvest potential of the population, the Committee recommends a conservative approach when changing regulations. Opportunities for modifying harvest pressure in any given zone could include the following options:

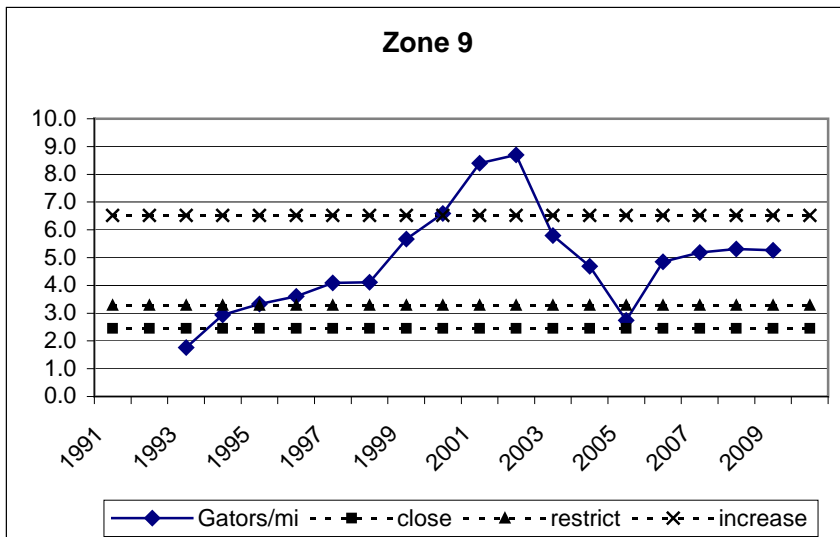
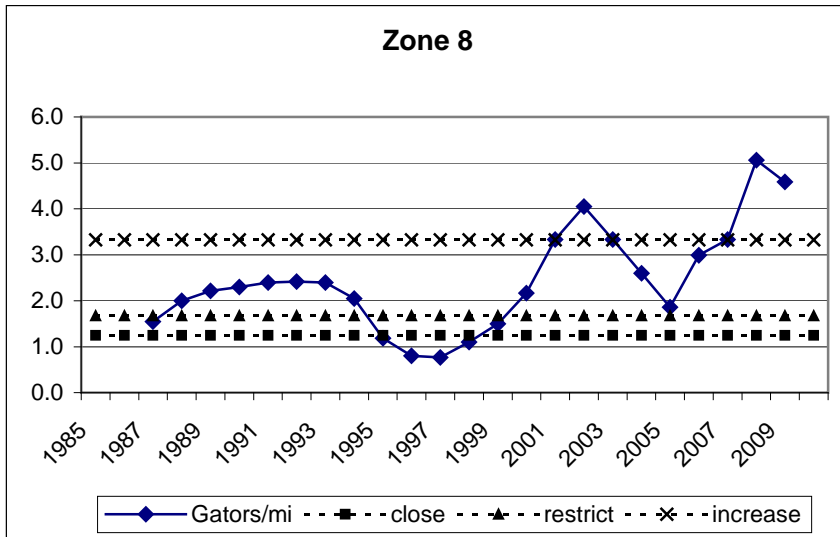
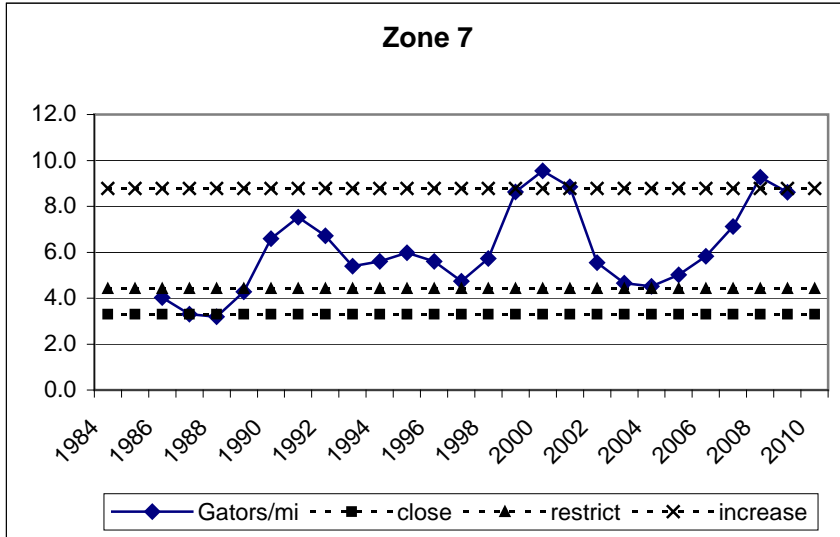
Increasing Opportunity: 1) increasing the number of overall quota permits by 10% during a regulation cycle, or 2) providing additional quota permits that are applicable to private lands only.

Decreasing Opportunity: 1) decrease the number of overall quota permits by 10% during a regulation cycle, or 2) decrease the number of general quota permits, while maintaining the number of private lands permits.

The committee does not recommend changing the length of the alligator hunting season. The committee recommends that regulatory actions adhere to the 2-yr regulatory cycle. Graphs for each of the nine hunting zones are shown below, with their respective trigger points for increasing and decreasing harvest opportunity based on the three-year average of spotlight index data.







Harvest Strategy Note #1: The committee set a minimum spotlight index of 1 as a benchmark before any expansion of the current harvest regulations can occur in any given zone. For example, in Zone 5, the long-term average spotlight index is 0.6, and a 33% increase in that zone would be 0.8. The committee did not feel comfortable providing additional harvest opportunity in any zone with a spotlight index less than 1.

Harvest Strategy Note #2: The committee feels that the graph for Zone 4 should be interpreted with caution because the only spotlight route currently operating in Zone 4 is Grand Bay, and the results from this one survey may not be reflective of the status of the alligator population across the zone. At least one additional spotlight route is recommended for implementation in this zone.

Objective: Periodically measure alligator hunter satisfaction and preferences.

Every 3-5 years, the agency will conduct a survey of licensed alligator hunters to measure their satisfaction levels and preferences for items such as regulations, hunting methods, opportunity, etc. This activity will ensure that the agency is meeting the needs of the hunter while conserving the resource.

Objective: Encourage non-consumptive, alligator-related recreational opportunity.

On state-owned department managed lands, we will strive to provide infrastructure to facilitate non-consumptive, alligator-related recreational opportunity. This could include signage, trails, boardwalks, canoe trails, or other methods of access for wildlife watching and nature interpretation by the public.

Objective: Provide other harvest opportunity as appropriate.

Action items to meet this objective could include egg collections or hatchling collections for permitted alligator farms in Georgia. However, the committee does not recommend providing this type of opportunity at this time. As future research is conducted on Georgia's alligator population to determine the true size of the population, the impacts of our current harvest, and the level of harvest that our population can sustain in the long-term, the committee may revisit this issue in future updates of the plan.

Recommended Action Items

- Implement harvest strategies in each hunting zone as depicted herein.
- Monitor alligator harvest and collect the necessary data (Appendix 4).
- Monitor changes in alligator length and ratio of young:adult in each hunt zone, as this may reflect a change in reproductive capacity of the population.
- Explore opportunities to shift some harvest pressure from public waters to private waters (e.g. possible creation of private lands tag system).
- Implement an alligator harvest card survey (possibly via website or e-mail) for alligator hunters similar to the turkey survey to provide information on hunting effort and alligator populations on both public and private water (Appendix 4).

- Implement a periodic alligator hunter satisfaction survey (possibly via website or e-mail).
- Increase access for wildlife watching on state-owned department managed lands.

3) Minimize Human-Alligator Conflicts

Objective: To provide improved alligator nuisance abatement to the public by reducing the number of manhours per complaint to less than 1 hour.

The nuisance alligator agent-trapper system seems to be working well. The trappers are able to capture and remove the alligators efficiently. Manpower expenditures for GADNR personnel have declined to well under one hour per complaint. Our goal is to continue at the same level of efficiency.

Objective: Maintain a 75% capture rate of alligators per permit issued.

As indicated in the previous objective, efficient handling of alligator complaints is an important goal for GADNR staff. Coupled with that is the assumption that nuisance alligator agent-trappers are handling the complaints to the satisfaction of the public. One measure of the trapper's efficiency is the average number of alligators caught per permit issued. The long-term average has been just over 75% of gators caught per permit issued. Our goal is to maintain that level of efficiency. If that metric declines over time, then additional agent trappers may be added to the system in geographic areas where they are needed to maintain current levels of efficiency.

Objective: Increase the availability of alligator life history and biology information.

Providing proper and accurate information to the public regarding alligator life history, biology, and behavior may help the public better understand alligators, reduce fear of alligators, and increase tolerance of alligators in their natural habitat. A better understanding of alligators may reduce nuisance calls from the public to the agency. One example of this type of information is the alligator display at the Go Fish Education center in Perry, Ga.

Recommended Action Items

- Continue monitoring nuisance calls and collect necessary data (Appendix 4).
- Continue, and possibly expand, the existing nuisance alligator trapper program.
- In recognition of fluctuating values of alligator hides and meat products, explore other potential incentives for agent-trappers to perpetuate this system.
- Develop and provide alligator related I&E materials, interviews, news releases, popular publications, social media, etc. as needed or requested.

4) Increase Awareness of the Alligator's Economic Benefits

Objective: Increase the awareness of the general public, as well as hunters, landowners, and policy makers, to the economic benefits of the alligator population in Georgia.

As discussed in the “Economic Impacts” section of this plan, Alligators are economically important because of the direct expenditures from hunters and wildlife watchers as well as the dollar values that can be placed on the products from the alligators themselves (hides, meat, etc.). Making the public, landowners, and policy-makers more aware of the economic importance of alligators may help drive conservation efforts and management actions in the future.

Objective: Increase the availability of alligator life history, biology, and management information for landowners.

Educated landowners may realize that the presence of alligators on their property can be economically beneficial. If hunters are willing to pay for access to private property, then landowners with well-managed wetland habitat may be able to provide income generating opportunities.

Recommended Action Items

- Provide economic information to the public and media as requested.
- Include economic information in alligator-related I&E programs and press releases.
- Investigate methods to connect selected hunters with landowners who have alligator hunting opportunity (e.g. WRD website, regional database, etc.).

RESEARCH AND MONITORING NEEDS

Research Priorities

Develop a true alligator population estimate

Methods may include capture-recapture, occupancy rates, aerial surveys, or other methods as deemed appropriate by the researcher.

Determine basic life history parameters

Survival rates, reproductive information such as percent females nesting, percent nest success, percent hatching success, hatchling survival, recruitment rate, growth rate, etc.

Determine habitat use and movement

Capture-recapture or telemetry methods could be used to determine movement patterns, home range size, habitat use, etc.

Determine impacts of regulations on harvest

Determine impact of harvest on population and population indices

Additional Monitoring Data to Collect

Additional spotlight routes for a minimum of 2 per hunt zone

Alligator hunter harvest survey card (Appendix 4)

REFERENCES

Chabreck 1965
Chabreck 1966
Giles and Childs 1949
Joanen and McNease 1972
McNease and Joanen 1974
Newsome and Joanen 1986
Nickerson and Brunell 1997
Rice and Averitt 1999
Steele 2002
Taylor and Neal 1984
Woodward and Marion 1978

APPENDIX 1

Alligator Survey Route Instructions and Procedures for 2010

Alligator survey forms for individual survey routes are attached or the regions already have them. Associates that run the survey routes should be familiar with these instructions and procedures to maintain standardization in running the survey routes. The same survey routes should be surveyed by the same two-man crew using the same observer if at all possible. All survey routes should be run twice between May 1 and June 30 with a goal of a 15-30 day interval between survey nights. If water level, manpower, or some other issue is a major concern, plan a minimum 10-day interval between survey nights.

Observer: Record the name of the person that observes and estimates the size of alligators seen and records the data on the survey form. The observer should be the same person for each survey route each year and should have experience in estimating alligator lengths. The observer usually sits in the bow of the boat or on the front seat and should direct the boat operator toward an alligator by hand signals.

Boat Operator: Record the name of the person that operates the boat. The boat operator should be positioned behind the observer to receive hand signals from the observer.

Boat speed should be slow enough to allow the observer to sweep both sides and the middle of the forward area being surveyed. If the observer is unable to sweep the total area with a slow sweep of the spotlight without missing bank area, the boat is being run too fast.

If possible, an attempt should be made to approach each alligator to determine size class. When the observer sees an alligator, the observer should signal the boat operator toward the alligator. The boat operator should slow down and slowly approach the alligator being held in the light of the observer. The boat speed must be enough to stay ahead of the wake created by the boat. If the wake gets to the alligator before the observer can estimate size class, the alligator will probably submerge. If an alligator submerges before size class can be estimated, the observer should direct the boat operator to pause for a minute or two, to see if the alligator will surface again. The objective is to count the alligators along a survey route and put them into some type of "known length" size classes.

If no alligators are being seen on a section of survey route, the boat operator could increase speed so as to barely get up on plane, providing that the observer can adequately survey the area.

Survey Route - The name of the survey route and the mileage contained in the route has already been typed into this space, however if there is a deviation please record it.

Date - This is the date that the survey actually was done. If the survey runs past midnight, record the date the survey was started.

Known Size Classes - The known size classes for recording alligators on the left margin of the form are in two-foot increments.

Unknown size classes - If at all possible, an observer should make a good effort to at least place alligators in the unknown < 6 ft. size class or in the unknown \geq 6 ft. size class rather than the unknown size class.

Survey Route Description - This is the survey route description provided by your region in 1998, already typed in the space, to insure that the right survey route is being surveyed. Survey route location may need to be verified on a map before doing the survey.

Survey beginning time - This is the time that the actual counting of the alligators on the survey route begins. Most survey routes will take in excess of 2 hours to complete.

Survey completion time - This is the time that the end of the survey is reached.

Type Boat - The boat should be big enough to navigate through all areas of the survey route, through deep and shallow water areas and through areas during low water conditions. The same type boat should be used to run the survey route each year. Boats in the 14 to 16 foot range are good boats for surveying alligators. Boats that can navigate through aquatic vegetation are a plus.

Type Motor - The motor should be big enough to safely push your boat through the deep water on your survey route and small enough to go through the shallow water areas, even in times of low water conditions. The boat motor will have to be operated at slow idle speeds to approach alligators. Motors that tend to run hot at slow speed, pick up debris in water pumps easily, or smoke excessively should be avoided. Recommended range is 15 HP to 40 HP.

Light Used - Each 2-man crew should have two lights. One light can be used for the survey route and one light can serve as a spare. Both lights should be taken on the survey. The candlepower of the spotlight used should be recorded in this column. The alligator committee made a decision to standardize the survey with regards to the light by using a 1 million candlepower spotlight, which you may have, or you can easily obtain.

Measured Air Temperature, F.- Air temperature shall be measured on-site and recorded at the beginning of each survey route.

Measured Water Temperature, F. - The water temperature shall be taken on-site at the beginning of the survey route using the same thermometer used to measure air temperature. Take the water temperature by holding the thermometer under water at a depth of one foot for one minute, then quickly read the thermometer and record the reading.

Time of next high tide - This is for use on tidal affected water such as found in Region VII. Record the time of the next, upcoming, high tide after the survey route is run, according to the nearest published site location (record site on form). Survey routes should always be run on the last two hours of low water or during the first hour of flood tide.

Percent Cloud Cover - Circle one of the choices according to your estimation. Survey routes should not be surveyed during stormy weather or during rain storms.

Wind Velocity - Circle one of the choices according to your estimation. Survey routes should be run on relatively calm nights. Nights with high winds and heavy wave chop conditions should be avoided. If an anemometer is available, the committee recommends recording actual wind velocity rather than an estimation.

Water Level - Research has shown that alligator counts can vary significantly with different water levels. Therefore, it is important that all counts on a survey route be done during similar water levels, if possible. To insure that water levels are known, they need to be taken from existing water level monitoring devices in the immediate area of the survey such as those maintained on rivers, streams, reservoirs by the U. S. Geological Survey (USGS) or the U. S. Army Corps of Engineers. In many cases, daily readings can be obtained from their web sites on the Internet.

If there is no monitoring device present on or near your survey route (within two miles of your survey route beginning site), a benchmark for measuring relative water level must be established prior to running the survey route. The following procedures are suggested for establishing a benchmark. A bridge piling or day marker can be used for establishing a permanent mark for use in measuring water level. Some pilings may already have water level markers established on them and can be used as they are. The mark that you establish should be above the high water mark, and you need to be able to locate this mark each year that the survey route is run. On the downstream side of a bridge piling, scratch a permanent mark into the concrete about as high as you can reach. Then paint over the mark with permanent reflective paint. On a wooden piling, two large nails could be driven into the piling, side-by-side, and marked with reflective paint to establish a mark. Measure the distance from your mark to the surface of the water in inches and record the number. Measure the distance from the water surface to the bottom, in a straight line below your mark. Record this water depth. This water depth reading will not have to be done each year. Next year, prior to running the survey, record the distance in inches from your mark to the water surface and record in the space provided.

A complete description of the location of the mark should be provided to the alligator survey coordinator on the back of the survey form. The exact piling should be accurately described (i.e., 3rd piling from east bank of river). Include the date and time of day the benchmark was set up, the names of the WRD personnel who established it, and the measurements asked for above (distance from mark to water surface and depth of water from water surface to the bottom, straight down below your mark).

Due to the involvement in establishing the mark and measuring the water levels, this work may need to be done a day or two prior to doing a survey route.

Tide Stage – For coastal routes in tidal waters, the tide stage shall be recorded at the beginning of the survey as low, medium, or high, and tide direction shall be recorded as incoming or outgoing.

Total Man-hours - Indicate the total number of man-hours used by technicians and biologists separately. If one of these was not used, place a zero in that blank. If another individual, other than a technician or a biologist was used for a boat operator. Mark out one type and write in what they were, such as LE Ranger or Private Citizen. Insert his/her total man-hours.

APPENDIX 2

Location and Description of Spotlight Survey Routes Endorsed By Committee

Hunt Zone 1

Walter F. George – Survey starts where the Hwy. 39 bridge crosses the Chattahoochee River in Omaha, GA. Travel the river south into Lake George following the channel. The survey ends at the Rood Creek boat ramp. Approximately 10.25 miles.

Chattahoochee River–Survey begins at high voltage power line immediately below Lake George dam (Clay County). Survey runs 10.25 miles south to River Mile Marker 63 (Early County). Approximately 10.25 miles.

Hunt Zone 2

Lake Seminole Spring Creek – Survey begins at the Lake Seminole WMA boat house, continues out of the canal to Stone’s Landing, down the canal to the Flint River arm of the lake, then downstream about 100-150 yds from the right shoreline, then through the small boat canal to the Spring Creek arm of the lake, then upstream to the Ralph King landing where the survey ends. Approximately 11.2 miles.

Lake Seminole Chattahoochee River – Survey begins at Desser Landing at end of County Road 219, continues out the canal to Chattahoochee River and downstream to end at Trail’s End Marina. Approximately 7.9 miles.

Flint River – Survey begins at power line crossing located 3.25 river miles north of the Pineland Plantation Boat Ramp. Survey runs south to the boat ramp in Newton, GA. Approximately 9.7 miles.

Hunt Zone 3

Flint River Taylor/Peach/Macon Counties – Survey begins at Highway 96 bridge and continues downstream to the Old Ferry Crossing boat ramp at Highway 127. Approximately 13.6 miles.

Lake Blackshear – Survey begins at Highway 27 bridge and follows channel markers past Highway 280 bridge and railroad bridge, and ends at the Georgia Veterans State Park boat ramp. Approximately 9.74 miles.

Hunt Zone 4

Grand Bay – Survey begins at the canoe trail beside the dike on Grand Bay WMA, continues along the dike and turns left out into the bay, and follows the canoe trail around the perimeter of the bay, and ends at the starting point. Approximately 5.38 miles.

Additional river - possibly Little, Withlacoochee, or Alapaha (To Be Determined in 2011)

Hunt Zone 5

Ocmulgee River Houston/Twiggs/Bleckley Counties – Crew enters river at Dykes Landing. Starting point is a sharp 90 degree bend to the east, 3 miles above the West Lake boat ramp identified as the first bend in the river above the long-straight run above West lake. Finishing point is the Georgia Power transmission line crossing the river behind the Ocmulgee WMA check station. Approximately 8.24 miles.

Altamaha/Ocmulgee River – Survey begins at Red Bluff Landing and continues upstream around the east side of the island, continues under the Highway 221 bridge and railroad trestle, survey ends at junction with the Oconee River. Approximately 10 miles.

Hunt Zone 6

White Oak Creek – Survey begins on the Satilla River approximately 0.8 miles downstream from the mouth of White Oak Creek and continues north on the Satilla River and turns left into White Oak Creek and continues upstream under the I-95 bridge and the Georgia Power transmission line, and ends at the Highway 17 bridge. Approximately 9.6 miles.

Big Satilla River – Survey begins at beginning of a long straight section of the river above the 3-R Fish Camp and continues downstream and ends at the Highway 252 Bridge. Approx. 6 miles.

Hunt Zone 7

Big Hammock/Altamaha River – Survey begins at the top of the bend in the Altamaha River at the eastern boundary of Big Hammock WMA and continues west up the river, and goes under the Highway 144 bridge, and ends at the mouth of the Ochopee River. Approximately 10.4 miles.

Rhetts Island – Surveys run the perimeter ditches of Pools 1, 2, and 3 on the Rhetts Island unit of the Altamaha WMA. Approximately 7.7 miles.

Darien/Altamaha River East – Survey begins where Black Island Creek meets the Darien River and continues east on the Darien River, then follows May Hall Creek north, and then follows Black Creek south and ends at the Darien River. Approximately 13 miles.

Darien/Altamaha River West – Survey begins at mouth of Minnow Creek on west end of Butler Island and follows the Altamaha River west around a big curve and continues right into Lewis Creek, and continues left onto Buzzard Creek (the second major creek on the left), then continues left on Upper Soldier Creek and stays left to rejoin the Altamaha River, and continues west on the Altamaha around the tip of Cambers Island and into the South Altamaha River, then continues left into Minnow Creek until it returns to the Altamaha River. Approx. 13 miles.

Dent Creek – Start survey at the mouth of Woods Cut. Travel South into the South Altamaha River and head downriver to Dent Creek. Follow Dent’s Creek until it intersects with Wally Leg Creek on the left. Turn around, discontinue survey, and follow Dent Creek back out to the mouth where it intersects with the South Altamaha River. Start survey again and follow the South Altamaha River downriver to the mouth where it intersects with the Intercoastal Waterway. Turn North in the Intercoastal Waterway and follow the bank to the intersection of One Mile Cut on the Left. Follow One Mile Cut into the Champney River and follow the South Bank of the Champney River upriver to the end of the survey at the mouth of Woods Cut.

Hunt Zone 8

Ogeechee River East – Survey begins at the railroad trestle east of Kings Ferry boat ramp and continues south into Valambrosia Canal, then continues north through 2 turns and then into a 90 degree right turn and into the upper reaches of Rockfish Creek then turns right (south) into Southfield Canal and continues to the Ogeechee River, then turns left (east) and left again into Walker Canal and ends at the junction of Walker Canal and Rockfish Creek. Approx. 9.3 miles.

Savannah River - Survey begins approximately 11.5 miles upstream from the Highway 25 boat ramp in Port Wentworth and continues approximately 11 miles downstream to the Highway 25 bridge.

Hunt Zone 9

Tuckahoe/Savannah River – Survey begins at the dividing line between the original Tuckahoe WMA and the Spring Lake Tract and continues downstream (surveying into each oxbow) to the mouth of Brier Creek. Approximately 13.75 miles.

Oconee River - Crew enters at the Beaverdam WMA boat ramp in Laurens County and runs 12.5 miles upriver to a railroad trestle that crosses the river. The survey begins at the railroad trestle and rund downstream back to the Beaverdam WMA boat ramp.

APPENDIX 3

1999 Recommendations from Rice and Averitt, USGS

1. Power analysis suggests that 2 surveys should be run per route per year. This should provide sufficient power to detect a 10% change in the population over a 5-10 year period.
2. Some quantitative measure of water level should be established for each survey route. Using known river level gages is the best (such as USGS or Corps of Engineers), if located relatively near the survey area.
3. All aspects of the survey methodology should be standardized.
4. A minimum water temperature should be adopted. If counts are only conducted when water temperature is above 28°C, then variations in alligator observability due to water temperature should be minimized.
5. Observers should be trained and should be encouraged to place alligators into the most specific size categories possible (other than unknown).
6. The same observers should conduct the survey routes year after year.
7. Replicate counts should be conducted 15-30 days apart to allow mixing of the population.
8. Routes should be placed into habitat categories based on some measure of vegetation, salinity, open water, etc. Currently, densities are highly variable among routes, and classifying routes may reduce variation.

Rice, K. G., and S. T. Averitt. 1999. Analysis of Georgia's American Alligator Monitoring Program. USGS-Biological Resources Division. Final Report. 88pp.

APPENDIX 4

Data Collection

Alligator population monitoring is accomplished through various types of data collection and analysis. This appendix documents the types of data that are being collected (or should be collected) and the types of analyses that can be utilized on these data.

Spotlight Surveys

Primarily an index to the population, these survey routes provide the number of alligators seen per mile of surveyed route. Regression analysis can be used to look for trends in the population over time. These surveys also provide information on the ratios of young alligators seen per adult, and size class information. When auxiliary data such as temperature and water depth are recorded, data can be corrected for visibility bias. Three-year averages will be used for decision-making.

Harvest Regulations

Recording season length, bag limit, quota numbers, hunter numbers, areas open, and total harvest can allow researchers to make associations between regulatory changes and changes in the harvest. The effects of regulations on the harvest are extremely important to population management. Ancillary data such as days hunted, assistants used, etc. from hunter surveys can also provide useful information for management purposes.

Harvest Survey Card

A harvest card similar to the one used by the turkey committee may provide useful information on hunter effort, areas hunted, amount of pressure on private versus public water, and indices to the population on private versus public water as indexed through alligators seen per hour hunted.

Harvested Alligators

Recording data from the alligators that are harvested through traditional hunting methods or nuisance collections can provide useful information. Tracking average length of alligators through time may be one way to detect changes in age class or reproductive changes in the population. Other statistics can be analyzed as well.

Nuisance Complaints

Recording information about nuisance complaints can aid the agency in providing a successful and efficient nuisance alligator program for the public. For example, manhours per complaint or alligators harvested per permit issued are both reasonable metrics of efficiency and success.

Attached below are data sheets for some of the types of data that are (or should be) collected:

Spotlight survey route data sheet

Alligator harvest report form (to be attached)

Alligator hunting permit (to be attached)

Alligator hunter survey report card

Periodic hunter satisfaction survey (to be attached)

ALLIGATOR SURVEY ROUTE FORM

Observer: _____

Survey Route: _____

Boat Operator: _____

Date: _____

Total Length (feet)	Number of Alligators Observed	Total
0 - 2		
2 - 4		
4 - 6		
6 - 8		
8 - 10		
10+		
Unknown <6		
Unknown ≥6		
Unknown		
Total		

Survey Route Description:

Survey beginning time: _____

Survey completion time: _____

Type Boat: _____

Type Motor: _____

Light Used: _____

Measured Air Temperature, °F: _____

Measured Water Temperature, °F: _____

Percent Cloud Cover (Circle One): 0 - 25% 26-50% 51-75% 76-100%

Wind Velocity (Circle One): 0 - 5 5 - 10 10 - 15

Water Level: _____ inches from mark to water surface.

Time of next high tide at survey start location: _____

Water Depth: _____ inches from water surface to water body bottom (below established mark).

Total Man-hours: _____ Technician _____ Biologist

(Includes preparation, travel time and survey time)

APPENDIX 5

Primary Data Analysis to Be Conducted Annually

Population Trends

The three-year average of the number of alligators observed per mile will be analyzed using linear regression to detect population trends. Analysis will be done at both the harvest zone and statewide scale. Raw data will be analyzed in the short-term, with the long-term hope that data will be corrected for water depth and temperature, and corrected data will eventually be the standard of comparison.

The ratio of young per adult (i.e. ratio of alligators under 6ft per alligators over 6ft) will be calculated annually and regression analysis or other sound statistical analyses will be used to determine significant changes over time.

The number of nests observed during the nest surveys will be tallied and compared to previous years using linear regression or other sound statistical methods for detection of significant changes over time.

Harvest Data

Basic summary statistics will be calculated each year as follows: number of quota permits, number of quota applications, number of hunters, number of alligators harvested, and length of alligators harvested. Regression analysis or other sound statistical analyses will be used to determine significant changes over time

Nuisance Data

Number of complaints received, number of permits issued, number of alligators taken, and manhours expended will be summarized annually. The number of manhours per complaint will be compared to previous years with a goal of less than one manhour per complaint. The number of alligators harvested per complaint will be calculated annually and compared to previous years with the goal of maintaining a 0.75 alligators per permit issued or better.