

# Nuisance-Alligator (*Alligator mississippiensis*) Control in Florida, U.S.A.<sup>1</sup>

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*Abstract* – Recovery of the American alligator population, following depletion during the 1960s, led to an increase in alligator complaints and attacks on humans in Florida during the 1970s. To reduce the risk of attacks and decrease the costs of handling a burgeoning nuisance alligator, Florida implemented a program in 1978 that used privately contracted trappers to harvest problem alligators. Trappers were compensated for their time and expense through the sale of skins and meat. The frequency of attacks has remained stable since 1977 and the rate of attacks per million Florida residents has shown some evidence of a decline. Costs to the State of Florida of removing alligators are about 25% of the costs of other removal options. Recent modifications in the program are designed to be more pro-active in removing nuisance alligators in areas with high risk of attacks.

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The population recovery of American alligators (*Alligator mississippiensis*), after being classified as endangered during the 1960s and 1970s, has been hailed as one of the endangered species success stories. However, this recovery has not been without complication. The frequency of attacks increased in Florida during the early years of population recovery (Hines and Keenlyne 1976, Fig. 1), eliciting a considerable amount of negative public opinion. In general, Floridians accept alligators in wild areas, but do not tolerate them in residential areas (Hines and Scheaffer 1977, Responsive Management 1996). Thus, the full restoration of alligator population is difficult to achieve in Florida. The conservation strategy for most crocodilians is to restore populations to natural levels in historic habitats. However, this may not be feasible for large, aggressive crocodilians in areas with heavy human populations (Pooley et al. 1989). Frequently, restoration efforts pit absentee stakeholders (those that do not live in close proximity to crocodilians but desire their protection) against resident stakeholders (those that live in close proximity to crocodilians and have to bear the associated risks and economic damage). In these situations, it may be necessary to strike a balance by reducing crocodilian population densities in high risk areas and removing selected problem animals, while maintaining viable populations. Florida developed a

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nuisance alligator control program in the late 1970s that was founded on this principle and continues to operate today (Hines and Woodward 1980, 1981). In this paper, we discuss the rationale for the program, summarize some of the operational procedures, evaluate its effectiveness, and discuss some of the more important considerations when developing and running such a program.

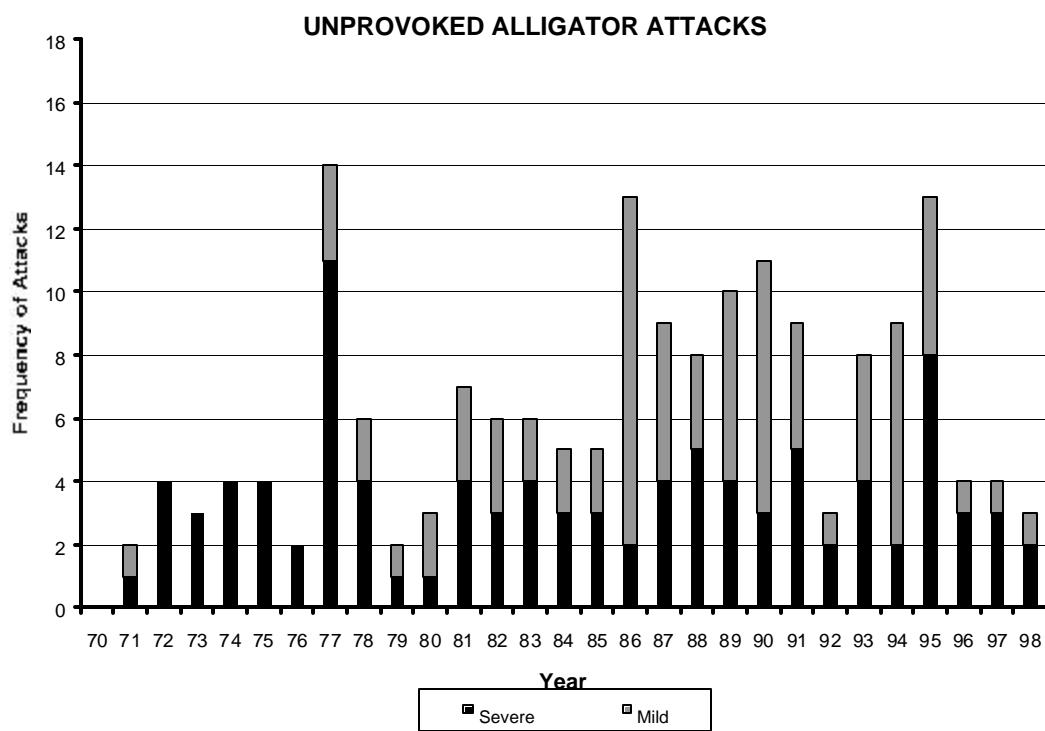
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### Rationale for Nuisance Alligator Control

Some early explorers and writers alluded to the ferocity of alligators (Van Dorn 1928, Kellogg 1929) but few substantiated accounts of alligators biting or killing humans can be found prior to the 1970s. Although alligators, are one of the largest crocodilians (large males are typically 3.5-4.0 m and 250-350 kg), naturalists during the early part of the 1900s considered alligators relatively harmless (Audubon 1931, McIlhenny 1935:47, Barbour 1944:178, Neill 1971:251). Only sketchy accounts of attacks can be found prior to 1948, when a woman was severely bitten by an alligator while swimming in the Weeki Wachee River in central Florida (Carle 1948). Although several alligator attacks occurred during the 1950s, the frequency of attacks did not increase markedly until alligators received protection from the Lacey Act in 1970 (Hines and Keenlyne 1976, 1977) and populations began to recover throughout Florida (Hines 1979, Woodward and Moore 1994). Since 1970, 177 unprovoked alligator attacks have been documented in Florida, of which 99 have been severe and 9 have been fatal (Fig. 1). Alligators also attack and eat domestic livestock and pets, cause damage to commercial fishing gear, and create traffic hazards when crossing roads (Woodward and David 1994).

Increasing concern by the public as to the danger of alligators, a 6-7% annual increase in the human population of the state (most of whom migrated from northern states and were unfamiliar with alligators) (Anon. 1998), an increased desire for waterfront living, and a >5% per year increase in the alligator population (Woodward and Moore 1994) combined to create an exponentially increasing probability of human-alligator encounters. Complaints about problem or “nuisance” alligators increased considerably in the early 1970s (Schemnitz 1974) and, by 1975, the Florida Game and Fresh Water Fish Commission (GFC), presently called the Florida Fish and Wildlife Conservation Commission (FWC), was responding to about 5,000 complaints per year and translocating 2,000 alligators (Hines and Woodward 1980). At that time, the Florida population of the American alligator was classified as endangered, and management options were limited to live-capturing and translocation. Most complaints were handled by wildlife officers, who were diverted from more important but less urgent law enforcement activities. The cost of dealing with nuisance alligators in 1975 was estimated to be

\$250,000 (equivalent to \$800,000 in year-2000). Live capture is not as effective as killing when removing alligators and, therefore, alligators were not always able to be removed expeditiously. Captured alligators were typically moved to more remote areas where it was hoped that they would not cause further problems. However, this created other potential problems by placing tame or potentially aggressive alligators in areas where they would be unexpected by recreationers and sportsmen. In many cases, existing populations in wild areas were nearing carrying capacity and the addition of new, large alligators caused the displacement of existing alligators. Further, translocated alligators have strong homing tendencies (Murphy and Coker 1983) and frequently returned to their original removal sites, causing additional problems on their return journey.



**Figure 1: Frequency of severe and mild alligator attacks on humans in Florida during 1970-1998.**

The GFC, as Florida's wildlife management agency, found itself in a somewhat paradoxical role of trying to ensure the recovery of Florida's alligator population while providing an acceptable level of public safety. For these reasons, the alligator research project was charged with developing a nuisance alligator control program that would increase the efficiency of removing nuisance alligators, reduce

agency costs, and stabilize or reduce the risk of attacks while maintaining viable alligator populations in all suitable habitats.

### **Nuisance-Alligator Program**

Hines and Woodward (1980) tested several management options for dealing with alligators. Two of the approaches involved killing nuisance alligators and selling their skins. Therefore, to conduct the study, the Florida population of the American alligator had to be reclassified from endangered to threatened. The use of contracted private agents working under the supervision of GFC biologists to remove alligators proved to be the most effective approach (Hines and Woodward 1980, 1981; Woodward et al. 1987). With this approach, agents used their own money and resources to remove nuisance alligators and recouped their costs through the sale of skins. The GFC legally owned the skins and sold them through a sealed-bid auction. Agents were distributed 70% of the proceeds and the state kept 30% to defray administrative costs. This approach was the most cost-effective approach for several reasons: (1) Agents had a financial incentive to remove the problem alligator as soon as possible and take good care of the skin; (2) The costs to the GFC were 25% of what it would have cost to do the task internally; and (3) The 30% retention of proceeds covered a substantial portion of the program's administrative costs.

In Florida, alligators  $\geq 1.2$  m total length (TL) that are presenting a danger to humans or their pets, livestock, or property are considered as nuisances. Alligators  $<1.2$  m rarely have been involved in unprovoked attacks. Further, small alligators have relatively little commercial value and harvesting them would not be economically feasible for private trappers. Obviously, alligators that have bitten or attacked humans or domestic animals are considered nuisances. However, this classification extends to alligators that behave in a manner that might lead to attacks. This may include alligators that have shown no wariness of humans or that have frequented areas that placed them in close proximity to humans or domestic animals. Usually, alligator complaints can be effectively evaluated by a trained telephone operator and a decision can be quickly rendered on the validity of the complaint. However, a small percentage of complaints, such as those that occur in wild or protected areas, require more thorough evaluations. In these cases, a nuisance alligator program coordinator questions the complainant and other individuals with a stake in the proposed removal. If the situation is still unclear, the coordinator may request a wildlife officer or wildlife biologist to go on-site and provide an evaluation. In cases where trappers find nuisance alligators to be  $<1.2$  m, alligators are usually live-captured and translocated.

Several important policies formed the basis for the general operation of the program as it was originally set up: (1) Complaints had to originate from the public or from government officials (i.e. park

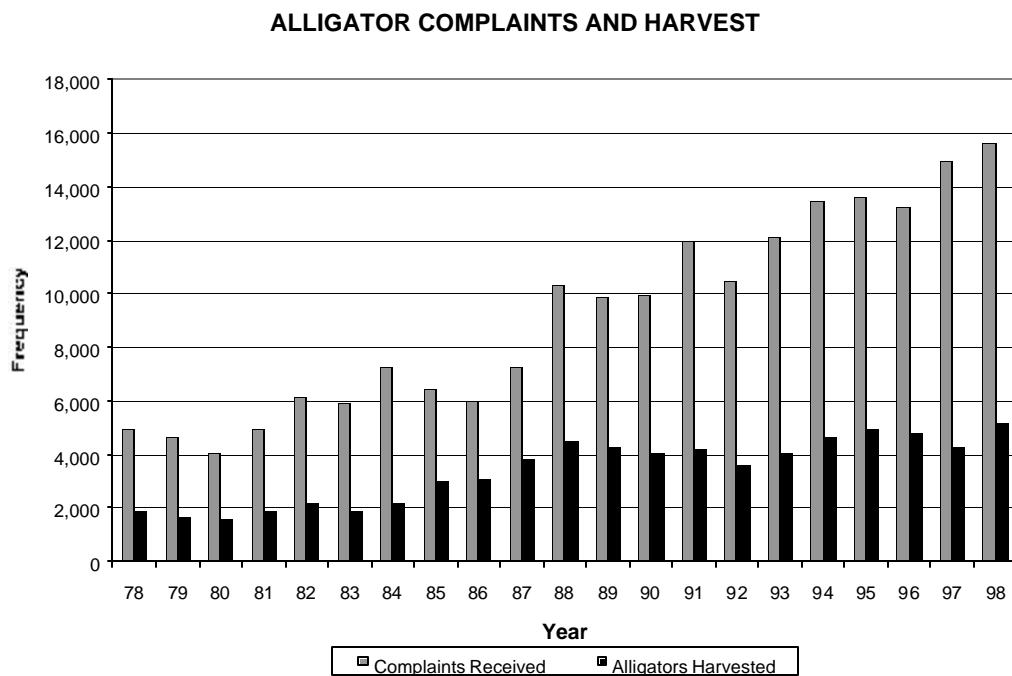
or refuge managers) - trappers were not allowed to generate complaints; (2) Complaints had to be directed to GFC regional offices for evaluation; (3) If a complaint was considered valid, the trapper could not remove an alligator until receiving authorization from GFC staff; (4) Trappers were permitted to take only specific targeted alligators within a specific area; and (5) All alligators taken had to be tagged within a set amount of time with a designated tag.

Since the inception of the nuisance alligator program in 1978, several modifications have been made. Meat sales were allowed in 1980 to help defray removal costs (Hines and Woodward 1981). In 1988, the ownership of skins was transferred to trappers immediately upon taking the alligator (Jennings et al. 1989). Ownership and marketing of skins is risky because they are perishable and markets fluctuate. Therefore, the GFC opted to transfer ownership to trappers at the time of taking and leave the responsibility of skin storage, marketing , and sale to the trappers. To defray administrative costs, the GFC required trappers to purchase an annual alligator trapping license (\$250) and pay up to \$30 to have each skin validated with a CITES tag. This worked well when skin prices were >\$5/cm. However, when skin prices dropped during the early 1990s, trappers had a difficult time achieving adequate compensation, and the GFC subsequently reduced validation fees for alligator skins <2.1 m to \$15. Continuing poor skin prices during the mid-late 1990s necessitated the reduction of validation fees for all skins to \$5 in 1998. Since 1998, the FWC has identified open permit areas where chronic dangerous situations occur, such as in high-use water recreation areas, fish camps, boat ramps, public parks, and refuges. Nuisance-alligator trappers are allowed to monitor these areas for potential nuisance alligators in a more proactive effort to preclude attacks.

### **Current Procedures for Dealing with Problem Alligators**

Nuisance-alligator complaints are received by radio dispatchers at five FWC regional offices. A toll-free line is provided in each region to facilitate filing of complaints. After complainants are questioned by agency personnel, frivolous and otherwise unwarranted complaints are dismissed. When complaints arise about alligators <1.2 m TL, FWC staff explain to complainants that they are not dangerous to humans. If complainants insist on having small alligators removed and alligators are causing damage (typically eating ducks or fish), wildlife reservists (volunteers) or wildlife officers are assigned to capture and translocate the alligators. When a nuisance alligator is confirmed by FWC staff, a permit is issued to a nuisance-alligator trapper, and the trapper is expected to make a concerted effort to remove the alligator. This may mean making multiple trips and using different methods to capture the alligator. Less than half of permits issued to take nuisance alligators are filled because problem alligators are either too small (<1.2 m), cannot be found, or cannot be trapped. In all, approximately 33% of

complaints result in the taking of an alligator (Fig. 2). The nuisance alligator trapper is expected to operate discreetly and to present a favorable image to the public. Therefore, trappers are required to capture and remove alligators alive to avoid the negative publicity of killing alligators in front of bystanders.



**Figure 2: Alligator complaints received and nuisance alligators harvested in Florida during 1978-1998.**

### Public Education

The FWC tries to educate the general public about the potential danger of alligators through annual news releases to the media. News releases are timed to coincide with the onset of increased alligator activity as temperatures increase in the spring. Messages include warnings that alligator can and do attack, how to avoid attacks, and what one should do if attacked by an alligator. The feeding of alligators conditions them to humans and can create a dangerous situation. Therefore, Florida Statute 372.667 prohibits the feeding or enticement of alligators. The FWC makes “Do Not Feed or Molest Alligators” posters available to businesses and individuals in close association with alligators to alert the public of the potential dangers of alligators. The FWC also makes two brochures, “Living with Alligators” and “American Alligator”, available to the public that provide information on how to avoid attacks. Recently a non-profit group, the American Alligator Cycle of Protection, in cooperation with the FWC, sponsored a program called “Be Gator Safe” designed to increase public awareness about potential

danger of alligators. Also, “Be Gator Safe” brochures stress precautions that should be taken when living or engaging in activities near alligators.

### **Is the Nuisance Alligator Program Effective?**

Over 15 alligator bites per year occur in Florida , but many of these are the result of people intentionally handling alligators such as hunters, exhibitors, farm employees, and people trying to illegally capture alligators. We were primarily concerned with the danger of unexpected attacks by alligators, so our assessment was limited to unprovoked attacks that resulted in bites. We classified alligator attacks into mild (bites resulting in superficial lacerations, abrasions, or minor puncture wounds requiring only first aide) and severe (fatalities or bites resulting in wounds requiring moderate to major medical care). Mild attacks usually occurred when small alligators bit people or when larger alligators bit people in an irresolute encounter. For example, a substantial number of attacks occurred when people bumped into alligators when retrieving golf balls in ponds or water hazards, or when they were wading in water. Typically, mild attack victims received scratches when they were raked by the alligator’s teeth or they received superficial puncture wounds.

Florida currently has 15 million residents and over 40 million user-occasions (swimming, wading, etc.) of humans in fresh water. The alligator population has been crudely estimated at approximately 1 million. Alligator complaints have increased ( $P < 0.01$ ) from approximately 5,000 in 1978 to 15,000 in 1998. Yet, during the past 10 years, an average of only 3.6 severe alligator attacks occurred per year. Although the frequency of all (severe and mild) alligator attacks increased ( $P = 0.062$ ) during 1970-1977 (Fig. 1), no trend ( $P > 0.55$ ) has been observed in the frequency of all attacks (mean = 6.9) and severe attacks (mean = 3.3) since the nuisance alligator program was implemented in 1978 (Fig. 1). The rate of severe attacks per million residents has shown some evidence of a decline ( $P = 0.104$ ) since 1977, suggesting that the probability of being the victim of an alligator attack has decreased. Nine fatal attacks occurred during 1970-1998, but no obvious pattern was associated with these incidents. Four of the nine fatal attacks occurred at state or county parks.

We believe that the attack rate has been kept in check because of several factors. First, although not wishing to encourage unwarranted complaints about alligators, the FWC makes the public aware of procedures for taking care of problem alligators through annual news releases and brochures. This helps alert us to potential problems before they happen. Second, toll-free telephone lines are available to facilitate reporting of suspected nuisance alligators. Third, trappers have a financial incentive to remove problem alligators as quickly as possible.

The number of alligators harvested has increased since 1978 along with the number of complaints

(Fig. 2). Because most nuisance alligators occur in widely scattered canals, small ponds, lakes, and streams the FWC has not been able to establish an index of alligator abundance in these areas. However, the number of nuisance-alligator complaints and alligators harvested has steadily increased over the past 21 years, suggesting that populations remain viable (Fig. 2).

## Economics

In Florida, 40 nuisance-alligator trappers respond to complaints in 67 counties. Removing nuisance alligators is expensive. Nuisance-alligator trappers are required to respond immediately to a complaint, which usually involves only one alligator, and remove the alligator as soon as possible. This may require several trips to remove a single alligator. Vehicle and labor costs are significant expense components. Trappers must then process the alligator at their own facility or have it contract-processed at a state-licensed processing facility. Trappers must then store, market, and sell their skins and meat. Average operating costs in 1995 were approximately \$222/alligator (Woodward 1998). Skin prices were \$5.51/cm. and meat prices were \$9.26/kg during 1991-1995. This yielded revenue of approximately \$362/alligator for a net income of \$140/alligator (Woodward 1998). Currently, skin prices are \$3.50/cm and net income is considerably less than it was in 1995.

The economic basis of Florida's nuisance-alligator program is being strained by low skin prices. The program was founded upon the concept of an underlying financial incentive providing the impetus for trappers to respond promptly to alligator complaints. Because nuisance alligator trappers provide a valuable service for the state and because of the reduced net income caused by low skin prices, the GFC has reduced tag fees. Start-up costs of purchasing vehicles, boats, and a Florida Health Department-approved processing facility are quite costly. Those trappers that have already purchased and paid for these items, particularly the processing facility, can operate at a lower break-even price. However, new trappers find it difficult to sustain a business on nuisance alligators alone. Many nuisance-alligator trappers participate in other alligator harvest programs offered in Florida including the private lands harvest program, guiding hunters during public waters hunts, collecting eggs for alligator farms, and processing alligators. These alternative harvest programs provide other sources of income and allow more efficient use of capital expense items such as vehicles and processing facilities, thereby lowering the per animal costs of participating in the nuisance-alligator program.

## Conclusions

The use of private nuisance-alligator trappers to remove problem alligators in Florida has proven to be a cost effective way of maintaining a low level of risk of alligator attacks. Although serious attacks

and occasional fatal attacks occur in Florida, it would be difficult to eliminate these altogether without severely reducing the alligator population, such as occurred in the 1960s. Such a reduction is not consistent with the mission of the FWC. Therefore, the FWC will continue its approach of targeting individual problem alligators for removal and reducing the density of alligators in areas with high-risk of attacks.

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