

American Alligator *Alligator mississippiensis*

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Common Names: American alligator, gator

Range: southeastern United States of America

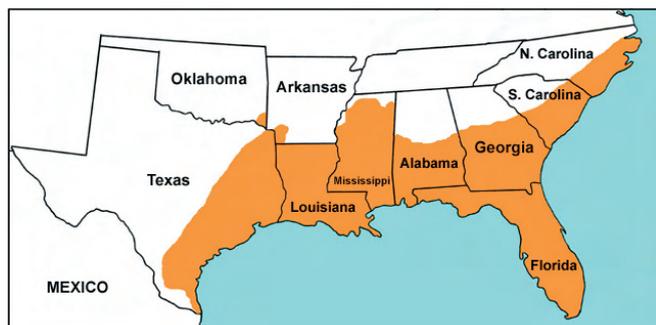


Figure 1. Distribution of *Alligator mississippiensis*.

Conservation Overview

CITES: Appendix II

2009 IUCN Red List: LR1c (lower risk/least concern; IUCN 2009) (last assessed in 1996).

CSG Action Plan:

Availability of survey data: Good

Need for wild population recovery: Low

Potential for sustainable management: Highest

Principal threats: Habitat destruction, environmental contamination, undesirable water management

Ecology and Natural History

Alligator mississippiensis is one of the best-known species in terms of behaviour and ecology (see Joanen and McNease 1989; Mazzotti and Brandt 1994). Alligators are widely distributed throughout the southeastern United States. Maximum adult size rarely exceeds 4.5 m for males and 3.0 m for females (Woodward *et al.* 1995).

American alligators are principally inhabitants of swamps, lakes, and marshes, although they may be found in lower densities along streams and rivers. In some regions alligators are even known to inhabit brackish water habitats.

The name “alligator” presumably derives from a corruption of the Spanish word “el lagarto”. The work of McIlhenny (1935) in Louisiana was among the first to document some of the remarkable aspects of the natural history of this species. More recent studies on alligator social behavior have demonstrated a significant degree of complexity in the species’ ability to communicate vocally (through bellows and headslaps), and visually (through a complex series of body postures) (Garrick *et al.* 1978; Vliet 1989).



Figure 2. *Alligator mississippiensis*. Photograph: Phillip Trosclair III.

Females become sexually mature at a size of about 1.8 m and 10 years of age in the more southern parts of the range. Courtship and mating take place during the spring warming period, and nesting and egg-laying is initiated during the early part of the warm, wet summers.



Figure 3. American alligator nest, with attendant female (at left in water), in Louisiana marsh. Photograph: Ruth Elsey.

Elsey, R.M. and Woodward, A.R. (2010). American Alligator *Alligator mississippiensis*. Pp. 1-4 in *Crocodyles*. Status Survey and Conservation Action Plan. Third Edition, ed. by S.C. Manolis and C. Stevenson. Crocodile Specialist Group: Darwin.

Females construct a mound nest of vegetation and lay 30-50 eggs. Incubation of eggs takes 63-84 days, depending on temperature (Lang and Andrews 1994), and young hatch in late August or early September. Females open the nest to help the young emerge, and will remain near the pod of hatchlings for up to 9 months and sometimes longer. In some cases hatchlings overwinter with the female in her den.



Figure 4. Hatchling *A. mississippiensis*. Photograph: Grahame Webb.

In many areas, alligators are well known burrowers and spend many of the cooler months inactive in these dens. Alligators are one of the most temperate species of crocodylians, and are known to survive short spells of below-freezing weather by resting in shallow water with their snouts at the surface, thus keeping a breathing hole open in the surrounding ice (Brislin *et al.* 1982).

Conservation and Status

The American alligator is the outstanding example of the application of sustainable use for the successful conservation of a crocodylian species. Although heavily exploited since the 1800s, and considered to be endangered in the early 1960s, populations have responded well to management and have recovered rapidly. Extensive surveys of alligator populations have been undertaken throughout the species' range. Continuous monitoring of numerous localities is conducted as part of sustainable use programs in several states. Overall, alligator populations are quite healthy. Owing to expanding human populations, programs to control alligators that occur near people and dwellings (termed "nuisance" alligator control) are an integral part of alligator management and conservation. In some states, near the periphery of the alligator's distribution, alligator populations are less dense and they are completely protected. The current total wild population is estimated to be 2-3 million alligators.

Sustainable management programs have been operating in Louisiana, Florida, Texas and other southeastern states for many years, based on a combination of farming, ranching and direct cropping of wild adults. Farming and ranching are now

being carried out on a large scale, particularly in Louisiana and Florida. Stocks in over 100 commercial farms and ranches throughout the country were well over 650,000 individuals as of December 2008. Captive breeding (farming) produces about 20,000 hatchlings annually. Commercial production of skins is highly regulated with a coordinated system of permits, licenses, periodic stock inventories, ranch inspections, and rigorous tagging and export permit requirements.

Louisiana: Utilization is primarily in the form of egg collection for ranches and a managed hunt that utilizes seasonal habitat segregation of female alligators into less accessible parts of the range to focus the hunt on males (65-75% of the harvest; Elsey *et al.* 1994, 2004). Wild harvest generates 30,000-35,000 skins annually. Hunting quotas are controlled by allocating a number of tags to each licensed hunter, based on the area and quality of alligator habitat and population estimates based on aerial nest surveys. Egg collection from private and state-owned lands has provided 350,000-500,000 eggs annually to ranches in recent years. Twelve percent of the animals commercially ranched (~1.2 m long) are required to be returned back to the wild. Skin production from ranches has ranged from 250,000-300,000 per year in recent years.

Florida: The Florida program includes farming, hunting and nuisance alligator control, as well as egg and hatchling harvests for ranching. Controlled hunting and egg collection on both private and public lands are based on harvest allocations generated from annual population surveys and nest counts for each area (David *et al.* 1996; Dutton *et al.* 2002). Long-term studies on harvested wetlands demonstrate that alligator populations remain stable when up to 6% of alligators over 1.8 m long are harvested annually (Allan Woodward, pers. comm. 2009) or up to 50% of located nests are collected for ranching (Rice *et al.* 1999). Harvest quotas based on annual monitoring of both nesting and population density is an integral part of the program. Annual production of skins in Florida is approximately 22,000 from wild alligators and 28,000 from farming/ranching. In recent years, 50,000-60,000 eggs and hatchlings have been transferred to farms in other states for rearing and harvest.

Other states: Texas allows both wild harvest of larger alligators and egg collection for ranching, which result in an annual production of 15,000-20,000 skins. South Carolina recently initiated a program allowing controlled hunting on private lands (Rhodes 1996, 2002) and public waters, and Mississippi and Arkansas have also conducted successful regulated hunts in recent years.

In most southeastern states, nuisance alligator control is achieved by licensed trappers who, acting under the direction of wildlife officials, respond to public complaints of alligators that are considered a potential threat to people, pets or livestock. Such animals are trapped and in most instances killed and their skin and meat sold to defray costs. These programs have converted an expensive animal control program into a self-financing public service and provided important re-assurance to the public who live in alligator habitat.

Alligator populations under these management programs are certainly stable or even increasing. The main threats to alligators are the loss of habitat to expanding agriculture and residential development, pollution, saltwater intrusion and habitat loss and water diversion. Several recent hurricanes (Hurricanes Katrina and Rita in 2005 and Hurricanes Gustav and Ike in 2008) have had short-term effects on alligators in coastal Louisiana and Texas, but this resilient species rapidly recovered to normal population distribution (Elsley *et al.* 2006, 2008).



Figure 5. Extensive research in Louisiana and Florida has contributed to the American alligator being one of the best-known of the world crocodilians. Photograph: Phillip Trosclair III.

Sustainable use of alligators in the USA generates more than \$US70 million dollars annually at the product level, providing a

substantial incentive for the public to retain habitat and tolerate alligators. Fees from the regulatory system provide funding for management, regulation, enforcement and research programs on alligators.

Priority Projects

Moderate priority

1. **Investigations on population biology:** The presence of healthy *A. mississippiensis* populations, and the availability of institutional and financial resources have led to numerous investigations of alligator biology over the years. Although the American alligator is the most thoroughly studied of all crocodilians, we still know relatively little about its population dynamics and behavior in the wild. A better understanding of the population ecology of this species would not only benefit the management of alligators, but other large crocodilians as well. These investigations are facilitated and financed by the presence of management programs such as cropping and ranching, and are currently underway in several states.
2. **Research on husbandry techniques:** Because of the extensive commercial ranching and farming industry in the USA, the American alligator is a prime candidate for research on captive husbandry. Captive breeding, incubation and rearing techniques need to be improved to increase the efficiency of the industry. Extensive research on these topics is currently underway, particularly in Louisiana and Florida.



Figure 6. *Alligator mississippiensis*. Photograph: Ruth Elsey.

References

- Brisbin Jr, I.L., Standora, E.A. and Vargo, M.J. (1982). Body temperature and behavior of American alligators during cold winter weather. *Am. Midl. Nat.* 107: 209-218.
- David, D., Brunell, D., Carbonneau, D., Dutton, H., Hord, L., Wiley, N. and Woodward, A. (1996). Florida's alligator management program, an update 1987-1995. Pp. 410-428 *in* Crocodiles. Proceedings of the 13th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Dutton, H.J., Brunell, A.M., Carbonneau, D.A., Hord, L.J., Stiegler, S.G., Visscher, C.H., White, J.H. and Woodward, A.R. (2002). Florida's alligator management program: an update 1987 to 2001. Pp. 23-30 *in* Crocodiles. Proceedings of the 16th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Elsy, R.M., Joanen, T. and McNease, L. (1994). Louisiana's alligator research and management program: an update. Pp. 199-229 *in* Crocodiles. Proceedings of the 12th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Elsy, R.M. and Kinler, N. (2004). Louisiana's alligator program: adapting management as populations recover and risk of unsustainable use decreases. Pp. 92-101 *in* Crocodiles. Proceedings of the 17th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Elsy, R.M., Kinler, N., Lance V. and Parke Moore III, W. (2006). Effects Of Hurricanes Katrina and Rita on alligators (*Alligator mississippiensis*) in Louisiana. Pp. 266-278 *in* Crocodiles. Proceedings of the 18th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Elsy, R.M., Lance, V.A., Trosclair, III, P.L. and Merchant, M. (2008). Effect of Hurricane Rita and a severe drought on alligators in southwest Louisiana. Pp. 134 *in* Crocodiles. Proceedings of the 19th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Garrick, L., Lang, J. and Herzog, H.A. (1978). Social signals of adult American alligators. *Bull. Amer. Mus. Nat. Hist.* 160: 155-192.
- IUCN (2009). IUCN Red List of Threatened Species. Ver. 2009.1 (www.iucnredlist.org; viewed 30 September 2009).
- Joanen, T. and McNease, L. (1989). The management of alligators in Louisiana, USA. Pp. 33-42 *in* Wildlife Management: Crocodiles and Alligators, ed. by G.J.W. Webb, S.C. Manolis and P.J. Whitehead. Surrey Beatty and Sons: Sydney.
- Lang, J.W. and Andrews, H.V. (1994). Temperature-dependent sex determination in crocodylians. *J. Exp. Zool.* 270: 28-44.
- Mazzotti, F.J. and Brandt, L.A. (1994). Ecology of the American alligator in a seasonally fluctuating environment. Pp. 485-505 *in* Everglades: The Ecosystem and its Restoration, ed. by S.M. Davis and J.C. Ogden. St. Lucie Press: Delray Beach, Florida.
- McIlhenny, E.A. (1935). The Alligator's Life History. The Christopher Publishing House: Boston.
- Rhodes, W. (1996). South Carolina alligator report. Crocodile Specialist Group Newsletter 16(1): 20-21.
- Rhodes, W.E. (2002). Differential harvest of American alligators on private lands in coastal South Carolina. Pp. 75-80 *in* Crocodiles. Proceedings of the 16th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.
- Rice, K.G., Percival, H.F., Woodward, A.R., and Jennings, M.L. (1999). Effects of egg and hatchling harvest on American alligators in Florida. *Journal of Wildlife Management* 63: 1193-1200.
- Vliet, K. (1989). Social displays of the American alligator (*Alligator mississippiensis*). *Amer. Zool.* 29: 1019-1031.
- Woodward, A.R., White, J.H. and Linda, S.B. (1995). Maximum size of the alligator (*Alligator mississippiensis*). *J. Herpetol.* 29(4): 507-513.

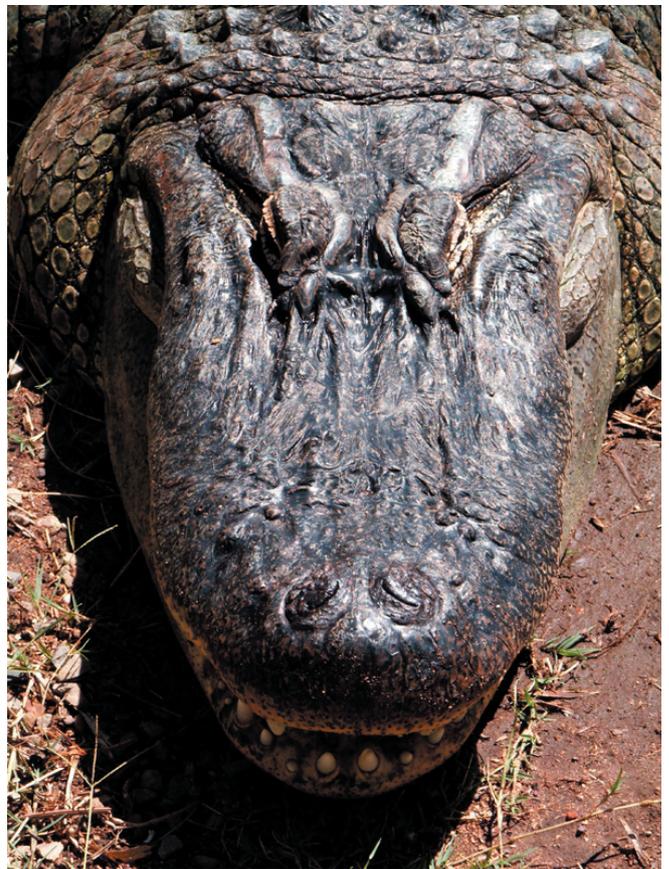


Figure 7. Adult male *Alligator mississippiensis*. Photograph: Grahame Webb.