

CITES II RATTLESNAKE PROPOSAL

A. PROPOSAL: U.S. Crotalids to be in CITES II

Inclusion of the species *Crotalus adamanteus* in CITES Appendix II.

B. PROPONENT

The United States of America

C. SUPPORTING STATEMENT

1. TAXONOMY

**Class: Reptilia
Order: Lepidosauria
Suborder: Squamata
Family: Viperidae
Genus and species: *Crotalus adamanteus*
Scientific synonyms: none
Common name: Eastern diamondback rattlesnake**

2. BIOLOGICAL PARAMETERS

2.1 Distribution and Habitat:

***Crotalus adamanteus* is the most venomous snake in North America (Behler and King 1985) and the largest rattlesnake in the world (Gopher Tortoise Council 1995). The species ranges along the coastal lowlands of southeast North Carolina to extreme eastern Louisiana, including all of Florida and its keys (Behler and King 1985) (Means 1986). *C. adamanteus* is extremely rare in Louisiana and most likely functionally extinct; specimens show up irregularly but in different localities (LaClaire and Vendevertter 1995).**

Martin and Means (1995) report that presettlement habitat distribution of *Crotalus adamanteus* was primarily open-canopied, pyro-climax, pine dominated communities, including longleaf pine/wiregrass sandhills and clayhills, flatwoods, and sand pine scrub. The species was also common in coastal strand and palmetto prairie and utilized temperate hardwood forest and tropical hardwood hammocks, especially where these were adjacent to pine-dominated habitats.

Today *C. adamanteus* occurs in the few remnants of the original habitats that remain plus various ruderal situations such as berms along canals, citrus groves, and old-field successional habitats.

C. adamanteus typically spends the coldest months of the year (November through March) in subterranean shelters, frequently emerging during warm spells (Means 1986) (Bennett 1995). Shelters from cold are used everywhere except extreme southern Florida and the Florida Keys (Martin and Means 1995). In the southern portion of its range, the species is sympatric with the gopher tortoise (*Gopherus polyphemus*). The extensive burrows are used by *C. adamanteus* for winter refuge sites (Conant 1975). In the northern portion of their range, stump holes are the preferred refuge site.

Crotalus adamanteus have large home ranges that may encompass as much as 500 acres. Males maintain larger home ranges than females. Home ranges of males and females in both study groups overlapped indicating that this species does not defend a specific territory (Timmerman, 1995).

This species is generally believed to exhibit diurnal or crepuscular activity patterns (Timmerman 1989). However nocturnal activity has been noted in the species. Timmerman (1989) characterizes *C. adamanteus* as holotemporal, a term introduced by Bruce Means. This term indicates that the eastern diamondback, as shown by Timmerman, is in readiness to capture prey at all times (Bennett 1995).

In the field, *C. adamanteus* is estimated to live an average of ten years or more (Means, 1985). There is one record of an individual surviving for over twenty-two years in captivity (Bennett 1995). The species has few enemies as an adult. Only deer, pigs and humans are known to kill an adult (Ernst 1992).

2.2 Habitat Availability:

C. adamanteus is a flagship species in the endangered longleaf pine ecosystem. The loss of longleaf pine habitat has been documented throughout the Southeast (Noss 1989). Conversion of longleaf habitat to intensively managed loblolly plantations, development, both residential and commercial, and agriculture have resulted in lost habitat for the species. In addition alteration of existing longleaf habitat, in particular removal of stumps, has likely contributed to the species' decline (Bennett, 1995).

Several species of amphibian, reptile and bird intimately associated with longleaf habitats are currently listed or being considered for listing as threatened or endangered: flatwoods salamander (*Ambystoma cingulatum*), gopher frog (*Rana captio*), pine snake, southern hognose snake (*Heterodon simus*), gopher tortoise, Bachman's sparrow (*Aimophila aestivalis*) and the red-cockaded woodpecker

(*Picoides borealis*). The decline of most if not all of these species is directly related to the loss and alteration of longleaf pine habitat in the Southeast. *C. adamanteus*, while likely to be suffering declines equal to many of the above-mentioned species, has until recently been overlooked in conservation efforts. This is doubtless due to the sociological problems inherent in any conservation effort directed at a venomous species that threatens human life. (Bennett) Concurrent with the decline of *C. adamanteus* has been the decline of the gopher tortoise (*Gopherus polyphemus*), for which the species is sympatric with in the southern portion of its range. Because of the decline in numbers, the gopher tortoise is listed as federally threatened in Louisiana, Mississippi, and Alabama west of the Mobile and Tombigbee rivers. Its decline has resulted from the same habitat degradation that has contributed to declines in *C. adamanteus* (LaClaire 1995).

The availability of subterranean shelters from fire and cold such as burrows of the gopher tortoise and armadillo, rotting and burned out bases of trees, tip up mounds and rotting logs may be very important in local abundance (Martin and Means 1995). The removal of stumps, which are used as refugia has seriously affected populations in many areas (Martin and Means 1995).

In addition, fire exclusion during the last century has degraded much habitat by allowing the development of closed -canopied forest with a dense shrub layer that shades the ground in many areas. Pine plantations can provide suitable habitat but if the trees are planted closed together as is the usual case, then the ground is eventually shaded and the habitat is not suitable (Martin and Means 1995).

2.3 Reproductive Biology:

Bennett (1995) references a 7-year study in Northern Florida which indicates that most courtship and mating takes place in August and September, and that females give birth at this same time to 8-29 young (average 14) every two and sometimes three years.

Sexual maturity takes at least two years (Bennett 1995), sometimes three (Martin, 1995), to attain. Series from more northerly parts of the range (Georgia, South Carolina and Mississippi) suggest that maturity is usually delayed about one year (Martin 1995).

Females generally give birth to live young during the fall every 2-3 years; brood size ranges from six to twenty-one (Bennett 1995). Juveniles are preyed upon by pigs, carnivorous mammals, raptors, wood storks, and other snakes, primarily kingsnakes (Ernst 1992).

Following the breeding season, feeding activity resumes and individuals return to previously used overwintering sites (Timmerman, 1989).

2.4 Population Status and Trends:

Crotalus adamanteus is believed to be substantially declining rangewide (Means 1989) (Bennett 1995) over the past four decades (Martin 1995); this decline continues unabated (Mount 1995). Anecdotal evidence exists to support this conclusion in the form of observations by numerous professional and amateur herpetologists. The species is listed as a Species of Concern in South Carolina (Bennett 1995) and is identified as a Species of Special Concern in Alabama (Means 1986).

In Florida, C. adamanteus is identified as a Candidate Species of Special Concern (Enge 1993). Florida's Nongame Wildlife Program developed a system to rank wild vertebrate taxa according to biological vulnerability, extent of current knowledge of population status, and management needs. A biological score was generated for each taxon to reflect different facets of distribution, abundance and life history. C. adamanteus was given a high biological score and matched the median score for those species already listed by the state as a Species of Special Concern. Enge (1993) states that a comparison of biological scores with trade data suggests that C. adamanteus, "...is the most likely candidate for some sort of protection from human harvest. It is somewhat vulnerable to extirpation and is heavily harvested..."

2.5 Geographic Trends: (unknown)

2.6 Role of the Species in its Ecosystem:

Crotalus adamanteus is a carnivore that preys primarily on rabbits and cotton rats. Other prey items include other rat and mouse species, squirrels, and several species of birds (Ernst 1992). Anecdotal evidence suggests that this species, along with other large stumphole dwelling snakes found in longleaf pine habitat, comprise an effective and important rodent population control system. Changes in the local population levels of C. adamanteus may result in changes in local rodent populations. Higher than normal rodent populations can have deleterious effects on such species as quail and other ground nesting birds through nest predation by rodents and direct competition for food (Bennett 1995).

2.7 Threats:

Habitat loss and alteration, collection for commercial use and indiscriminate killing are the three major factors believed to be responsible for a dramatic decline in Crotalus adamanteus (Bennett 1995). Habitat destruction affects the

species throughout its range. The commercial trade involves excessively high numbers of *C. adamanteus*; from 1990 to 1994, Florida hide dealers reported purchasing a total of 42,788 individuals (Enge 1995).

The fall breeding season of *C. adamanteus*, when they exhibit maximal surface activity, coincides with some game hunting seasons, increasing the likelihood of encounters between humans and rattlesnakes. This is supported by trade data; most purchases of the species by Florida dealers takes place from August through October (Enge 1995).

Methods of collection further threaten the species. Though illegal in Georgia and Florida and vehemently denied by snake hunters, the collection method of choice used extensively to this day is via spraying or pouring gasoline into burrows (Jones 1995) (Enge 1993). This is of detriment, not only to *C. adamanteus* but to a large community of other species of animals that utilize burrows (Speake and Mount 1994) (Means 1986). Snake hunters have stated that burrows that have been gassed can remain unoccupied by any animals for up to two years (Jones, L. 1995).

Enge (1993) also reports an apparent decline in the average size of *C. adamanteus* collected by reptile dealers in Florida. Such a decline should produce a concomitant reduction in the mean number of young per adult female. Heavily-harvested populations of *C. adamanteus* probably have their age ratios skewed to younger, and therefore smaller and less productive animals (Enge 1993).

Indiscriminate killing also takes a toll on wild populations. Rattlesnakes are maliciously killed by most people whenever they are confronted. Of animals rated in a nationwide survey, only the cockroach, mosquito, wasp and rat were disliked more than the rattlesnake (Enge 1993). Illustrating the political nature of conserving venomous snakes, a publication listing *C. adamanteus* as a Species of Special Concern (Means 1986) in Alabama closes with, "...it is unrealistic to assume that rattlesnakes can enjoy a generally favorable reputation, much less legal protection, in Alabama for many years to come..." Likewise, attempts to list *C. adamanteus* as a protected species by the Georgia Department of Natural Resources were unsuccessful (Enge 1993) primarily because of the species lack of popularity. Obviously, public education will play a critical role in the future conservation of this species.

3. UTILIZATION AND TRADE

3.1 National Utilization:

Crotalus adamanteus are captured for utilization in "rattlesnake roundups", the live pet trade, skin trade, meat trade and for sale as "novelties" (stuffed and mounted snakes, jewelry, key chains, etc...)

Georgia and Alabama still have rattlesnake roundups which utilize large numbers of the species. Four major roundups are annually held in the Southeast, along with a number of smaller events. Each of these four major roundups utilize an average of approximately 300 wild-caught **Crotalus adamanteus**. At one event in Georgia in 1994 an estimated 700 **C. adamanteus** were used (Jones, L. 1995). Florida, alone, collects information pertaining to the sale and trade of reptiles in the states. This allows us to view a sample of harvests of this species. Enge (1993) reports that from 1990 through 1992, a total of 428 live **C. adamanteus** were taken from the wild and sold in Florida for the pet trade. These numbers are underestimates of actual numbers of herptiles taken from the wild because the data does not include reptiles collected for personal use, those that die or are sold outside the state. From 1990 to 1994, Florida hide dealers reported purchasing a total of 42,788 **C. adamanteus** from Georgia (78%), Alabama (16%) and Florida (6%) (Enge 1995).

3.2 Legal International Trade:

The following U.S. export data was taken from the U.S. Fish and Wildlife Service, Division of Law Enforcement, Law Enforcement Management Information System (LEMIS) and Declaration for Importation or Exportation of Fish or Wildlife Forms (SF-171):

live individual	boots	meat(lbs)
1992 32	45	26.7
1993 57	06	119.8
1994 38	187	2419.7

novelties*	leather pieces
1992 4,449	1510
1993 330	1475
1994 964	0

*novelties include stuffed and mounted snakes, jewelry, key chains, hat bands, etc...

3.3 Illegal Trade: (unknown)

3.4 Actual or Potential Trade Impacts: (see Threats)

3.5 Captive Breeding or Artificial Propagation for Commercial Purposes Outside Country of Origin: *unknown*

4. CONSERVATION AND MANAGEMENT

Collection, sale and purchase of *Crotalus adamanteus* is unrestricted in South Carolina (Bennett 1995), Alabama (Levell 1995), Louisiana (Boundy 1996), Georgia (Beacham 1996) and Florida (Enge 1993). The species is listed as a Species of Concern in South Carolina (Bennett 1995) and is identified as a Species of Special Concern in Alabama (Means 1986). Such status affords no legal protection in either state. Florida merely requires a permit for selling reptiles and record-keeping detailing purchases and sales (Enge 1993). North Carolina effectively prohibits commercial harvests and sales of *C. adamanteus* (Wilson 1996). Similarly, in Mississippi, state regulations require a permit to collect reptiles and limits to four the number of individual animals that may be taken per year; reptiles taken from the wild, or their parts, cannot be bought, sold, offered for sale, bartered, or exported for sale (Jones, R. 1996).

4.2 Species Management:

4.2.1. Population Monitoring:

The Wildlife Diversity Section of the South Carolina Department of Natural Resources has initiated a study of *C. adamanteus* demography and ecology in the state (Bennett 1995). No other states have initiated population monitoring projects.

4.2.2. Habitat Conservation: (unknown)

4.2.3 Management Measures: No states which permit commercial harvest, purchase and sale of the species is known to implement any measures to limit or manage exploitation.

4.3 Control Measures:

4.3.1 International Trade: (none)

4.3.2 Domestic Measures: (see 4.1.1 National Legal Status)

5. INFORMATION ON SIMILAR SPECIES

It can be very difficult or impossible to distinguish skin, parts (e.g.: rattles, skulls, heads), or products of *Crotalus adamanteus* from that of *Crotalus atrox* (Western diamondback rattlesnake), a species which is subject to high levels of

both national and international trade. Identification is dependant on the amount of skin present, the location on the animal that the skin or part is from, and whether or not the product has been artificially colored.

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