

Proposed Indigo Snake Conservation and Management Plan

Introduction

The eastern indigo snake (*Drymarchon corais couperi*) population in Florida has declined drastically in the past 25 years. Several reasons for this decline include critical habitat loss, human population growth, new roads and highways, increased traffic on older roads, and over-collecting by hobbyists and commercial dealers. Today the indigo snake is federally listed as a threatened species. It continues to decline throughout its range in Alabama, Florida, Georgia, Mississippi, and South Carolina (Conant and Collins 1991). The state of Florida also lists it as a Species of Special Concern, whose continued existence is threatened. Because of the constant loss of important critical habitat, fragmentation and roadkills, indigo snake populations are on a continued decline (Speake and McGlincy 1981). Thus, there is a need and justification for an Indigo Snake Conservation and Management Plan.



Phase I: Obtaining Permits and Funding Via Research Grants

HA is currently developing a Conservation and Management Plan, specifically for the eastern indigo snake (*Drymarchon corais*) throughout its historic range in the southeastern United States. Baseline data for this indigo snake plan was obtained from similar snake conservation and management plans conducted in the New Jersey Pine Barrens for the State-endangered corn snake (*Elaphe guttata*), timber rattlesnake (*Crotalus horridus*), the State-threatened northern pine snake (*Pituophis melanoleucus*), and the eastern kingsnake (*Lampropeltis getula*). This conservation plan incorporates 45 years of personal knowledge and experience with rare snakes.



The draft plan includes drift fence trapping surveys to rescue snakes from disturbed construction sites, establishing assurance colonies, a captive breeding program, an experimental adult indigo snake translocation project and repatriation program, using captive-bred hatchling indigo snakes at several protected sites in the state of Florida (and elsewhere within the historic range). While HA will fund much of our staff resources for the preliminary research and field equipment, we will also seek matching fund grants from various nonprofit organizations, the U.S. Fish and Wildlife Service, and the Florida Fish and Wildlife Conservation Commission.

Phase I of this project will be initiated at Withlacoochee State Forest in Citrus County and in Ocala National Forest in Marion County, Florida. An intensive drift fence-trapping program will help capture study specimens. A mark-and-recapture study will be undertaken once the proper permits and funding are in place. All snakes will be injected with microchips (PIT tags) for permanent identification. The goal of **Phase I** is to identify stable indigo snake populations on protected state or federal lands. We will also surgically implant radio transmitters into all adult indigo snakes

with a SVL of 1 meter or greater and monitor the snakes for up to 3 years. This will help determine their activity range size, seasonal movement patterns, habitat use, foraging habits, mating season, nest site selection, and other important life history traits. This ecological information will help with the development of a Conservation and Management Plan (Landers and Speake 1980).

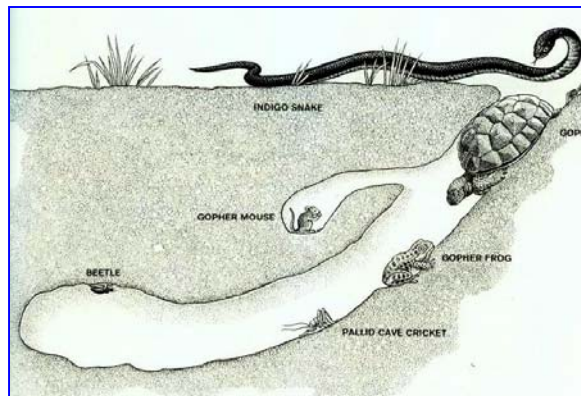
Achieving the Objectives of the Conservation and Management Plan

In order to achieve our objectives, this proposed, long-term conservation and management plan for the indigo snake will include the following tasks:

1. Obtain all the necessary Permits from the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission.
2. Select specific sites within the historic range of indigo snakes in Florida.
3. Establish assurance colonies and initiate a captive breeding program at zoos, nature centers, and/or HA's laboratory in Florida.
4. A captive breeding program will be initiated that includes 8 adult males and 24 adult females. These snakes will be kept individually in appropriate holding cages and facilities until breeding is attempted. Standard zoological husbandry and feeding regimes will be used while snakes are held in captivity.
5. Indigo snake nest survey, egg collection, and incubation of eggs in laboratory.
6. Prior to land clearing at various construction sites, conduct drift fence trapping/sampling programs and presence or absence surveys to obtain indigo snakes.
7. Translocate and repatriate Florida indigo snakes at two to four locations within the historic known range in Florida.
8. Long-term monitoring of indigo snakes at release sites, including radio tracking.
9. Construction of artificial dens and fenced holding corrals at release sites.
10. Inject PIT tags in all indigo snakes as part of the mark and recapture program.
11. Captive-bred indigo snakes (hatchlings), will be released onto suitable relocation sites.
12. Develop and experiment with different types of reusable, escape-proof enclosure fencing.
13. Continue to refine various successful methods of snake relocation and identify future sites with protected, suitable habitat for introducing translocated or captive bred indigo snakes.

Phase II: Captive Breeding, Translocation and Repatriation

With the approval of the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission, HA will start an experimental captive breeding program to repatriate indigo snakes to protected lands within their former range in Florida and elsewhere within the historic range. Possible release sites may be chosen in the Florida Panhandle and/or the Peninsula. The selection of each release site will be based upon detailed evaluations of biotic and abiotic landscape features. Required habitat structure at release sites includes suitable elevation, with longleaf pine and xerophytic oak forest (sandhill communities). It has been shown that there is a close relationship between the gopher tortoise (*Gopherus polyphemus*) and the indigo snake, as they both share upland, sandhill habitat. Likewise, pocket gopher (*Geomys pinetis*) and Florida pine snakes (*Pituophis melanoleucus mugitus*) colonies also share



the same habitat type as indigo snakes. Protected land with all these indicator species will make ideal translocation sites (Auffenberg and Franz 1982; Ashton and Ashton 2005; Zappalorti 2007). The habitat structure includes wire grass/longleaf pine stands, pine flatwoods, sand pine scrub, mixed hardwood-pine, hardwood swamps, and cypress swamps (Bogert and Cowels 1947). Various wetland areas (i.e., intermittent stream corridor, vernal pond, swamp, or lake habitats) as well as upland areas are important habitat features for these serpents. In addition, the release sites must have ample plant and wildlife food resources to support indigo snake and gopher tortoise colonies. Indigo snakes feed on a wide variety of prey animals, including small mammals, birds, reptiles, amphibians, and some invertebrates (Babis 1949; Zappalorti, personal observations).

Eastern Indigo Snake Bibliography and other References

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