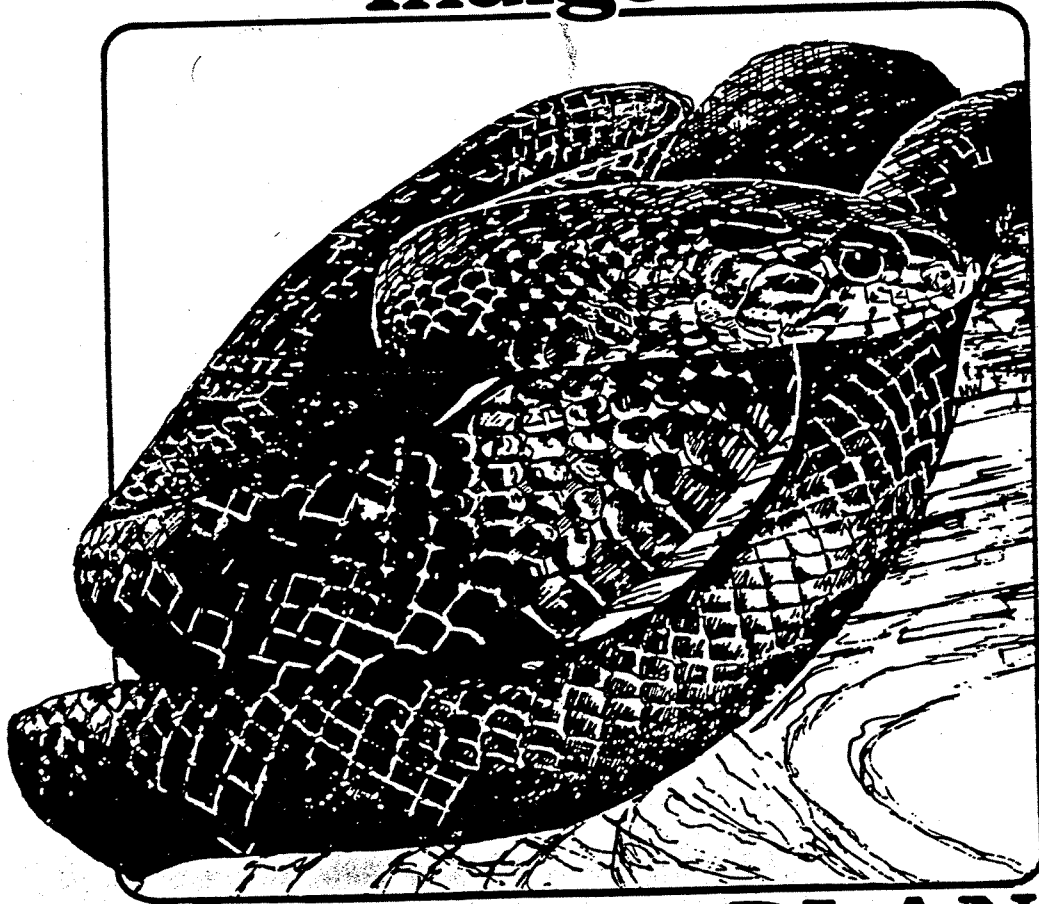
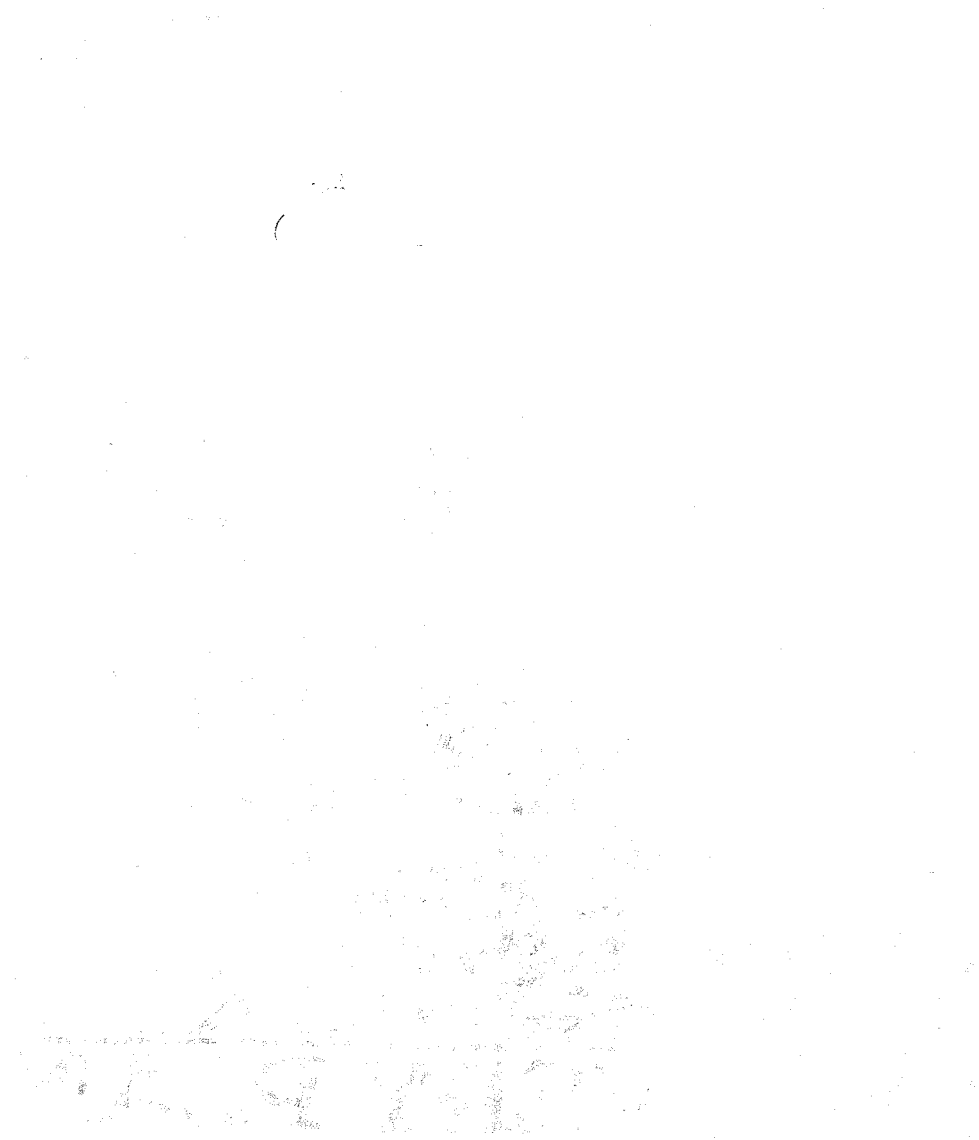


Eastern Indigo Snake



RECOVERY PLAN



EASTERN INDIGO SNAKE

RECOVERY PLAN

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U. S. Fish and Wildlife Service

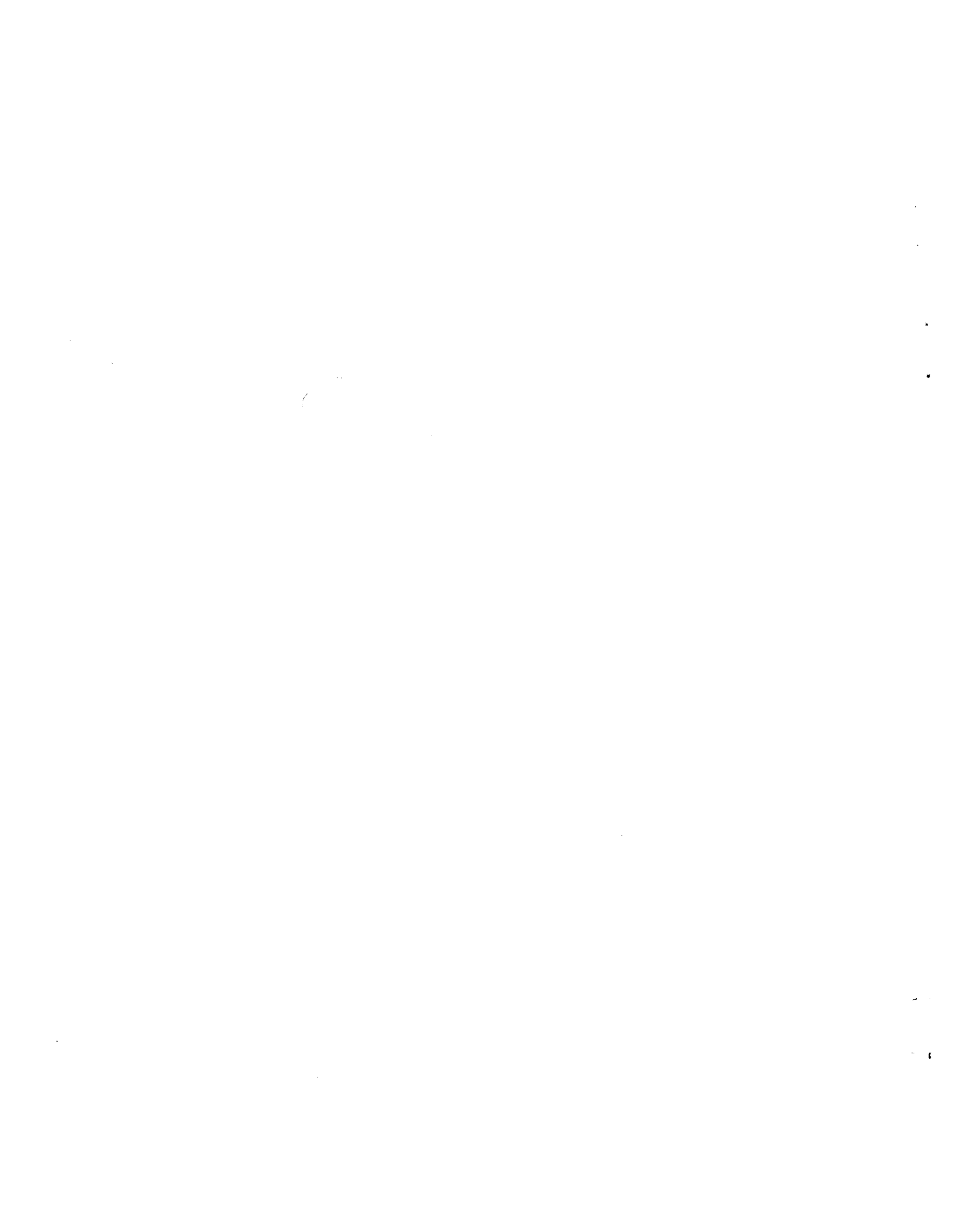
August 1981

Approved:

Robert A. Gantzen
Director, U. S. Fish and Wildlife Service

Date:

APR 22 1982



THIS IS THE COMPLETED EASTERN INDIGO SNAKE RECOVERY PLAN. IT HAS BEEN APPROVED BY THE U.S. FISH AND WILDLIFE SERVICE. IT DOES NOT NECESSARILY REPRESENT OFFICIAL POSITIONS OR APPROVALS OF COOPERATING AGENCIES.

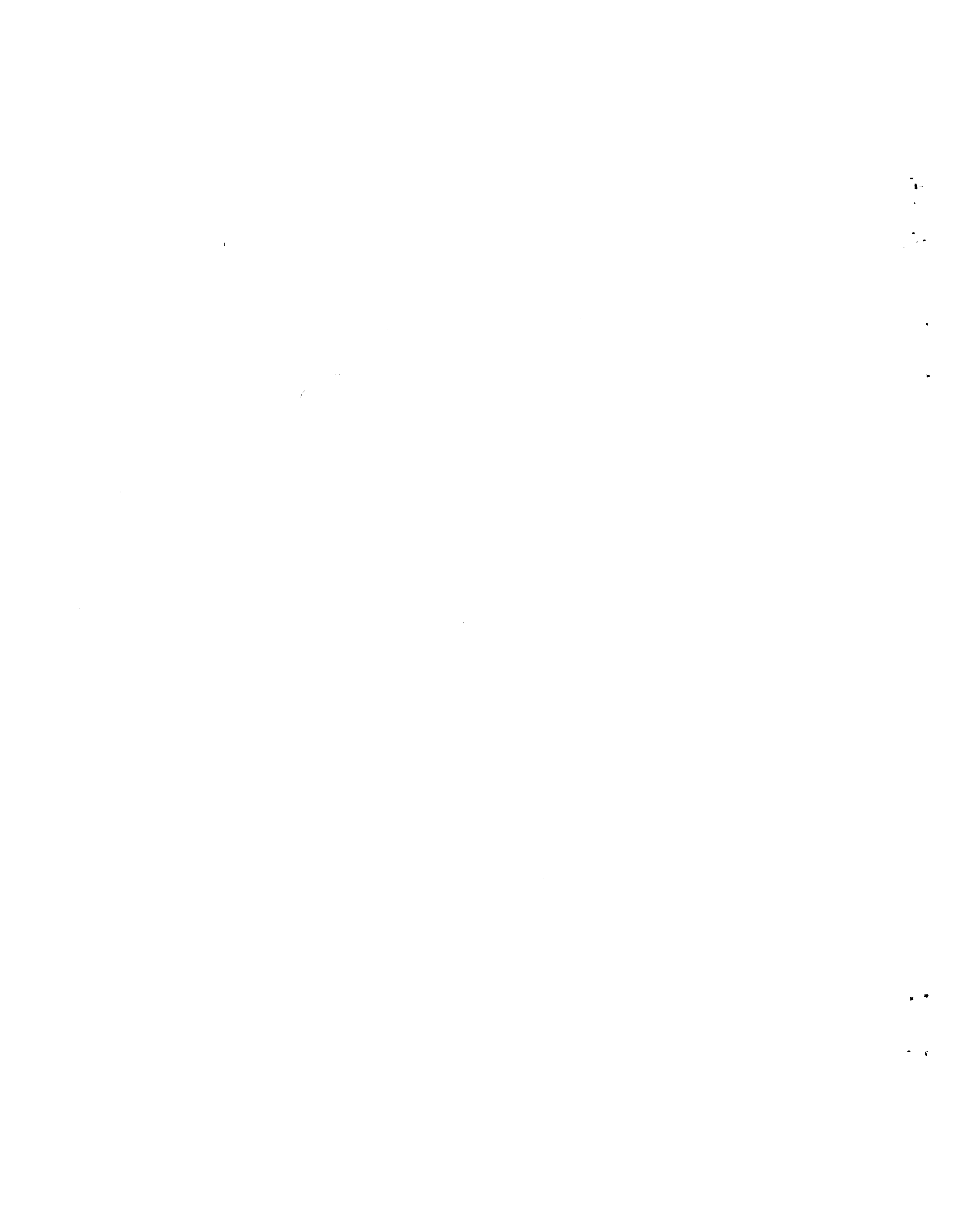
THIS PLAN IS SUBJECT TO MODIFICATION AS DICTATED BY NEW FINDINGS AND CHANGES IN SPECIES STATUS AND COMPLETION OF TASKS DESCRIBED IN THE PLAN. GOALS AND OBJECTIVES WILL BE ATTAINED AND FUNDS EXPENDED CONTINGENT UPON APPROPRIATIONS, PRIORITIES, AND OTHER BUDGETARY CONSTRAINTS.

LITERATURE CITATIONS SHOULD READ AS FOLLOWS:

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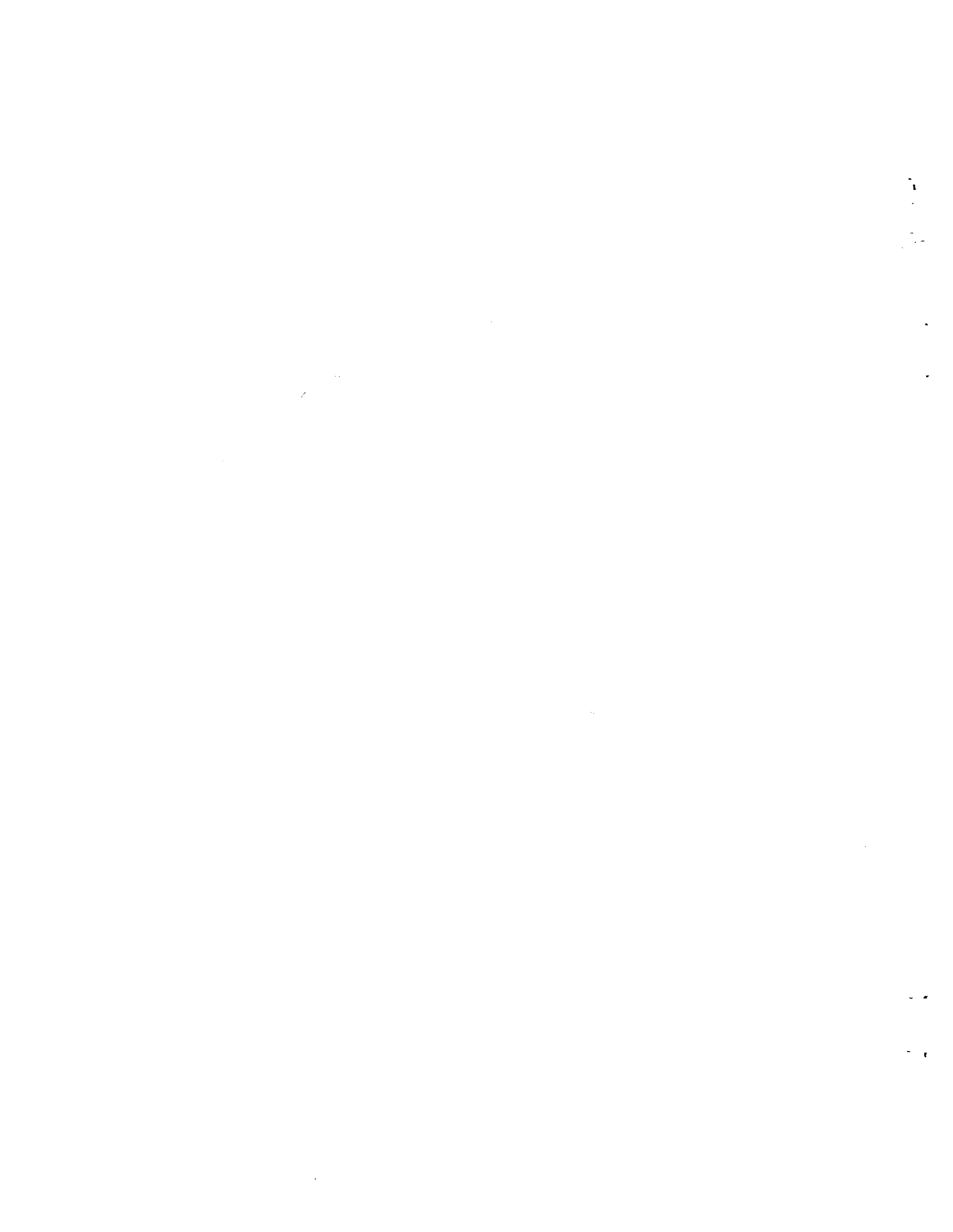
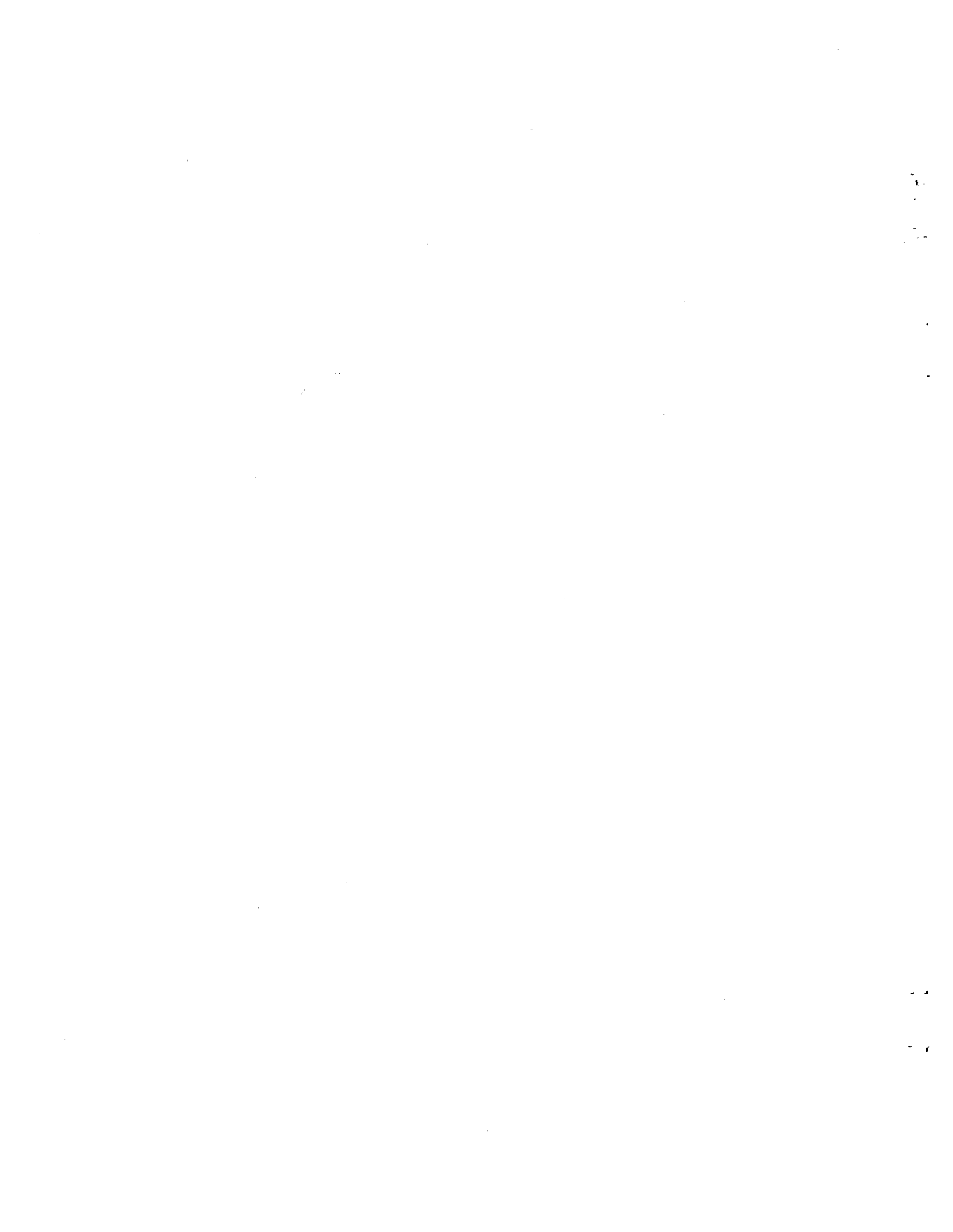


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PART I INTRODUCTION

The eastern indigo snake, Drymarchon corais couperi (Holbrook) is one of eight subspecies of a primarily tropical species. Spanning some 55° of latitude, the overall range of Drymarchon corais extends from the southeastern U.S. Coastal plain to northern Argentina (Smith 1941). Six of the eight subspecies are distributed in South or Central America; only the eastern indigo and the Texas indigo (Drymarchon corais erebennus) occur within the United States.

The eastern indigo is a very large, fairly stout snake attaining a maximum total length of about 8½ feet. The head is slightly, if at all, distinct from the neck; anal plate undivided; scales large, smooth, shiny, in 17 rows at midbody. The color is uniform lustrous blue-black, except for some reddish or cream-colored suffusion about the chin, throat, and cheeks. Spectacular coloration is not the eastern indigo snake's only physical attribute; the size of the animal is noteworthy as well. Adults average 1.8 m (6 feet) and the maximum recorded size is over 2.6 m (8.6 feet) (Conant 1975). This places the subspecies in contention for the title of the largest colubrid snake in North America. Despite its size, the eastern indigo snake is often mistaken for other black snakes within its range. Smaller specimens may resemble the common black racer (Coluber constrictor); however, the latter is generally a slender, fast-moving snake with a white chin and less glossy coloration. Positive identification can be achieved by inspection of the anal plate: single in indigos and divided in racers.

Status and Distribution

Past literature references to the distribution of the eastern indigo snake have usually been quite generalized. Ditmars (1940) mentioned its occurrence in the southeastern states and westward to the Rio Grande in Texas. In his review of the subspecies in 1941, Smith listed the range as extending from South Carolina to Florida and westward to southern Louisiana. Wright and Wright (1957) listed the range of couperi from South Carolina to Florida and problematical for Alabama, Mississippi, and Louisiana, with no valid records surfacing from the latter state. More recently, Conant (1975) reported the snake's occurrence in southeast Georgia and peninsular Florida to the Keys, with disjunct populations in the Florida panhandle and south Alabama. Behler and King (1979) followed suit but did not include Alabama in the current range. The only known Alabama records are those of Löding (1922), Haltom (1931) and Neill (1954). While Cooke (1954) acknowledged the subspecies' existence in Mississippi, no recent valid specimens have been found (Mount and Speake in press). However, two recent sightings in south Mississippi by zoologists were reported by Burris (personal communication). A sighting in Jasper County, South Carolina (northeast of Clyo, Georgia) occurred in 1954 (Brown, pers. comm.). The species is extremely rare if it still occurs naturally in the States of Alabama, Mississippi and South Carolina.

The type locality was described in Georgia (Holbrook 1842) as "the dry pine hills south of the Altamaha". Holbrook (1842) credits his knowledge of the snake to J. Hamilton Couper, Esq. of St. Simons Island. In the Report of the National Museum, Cope (1898) referred in passing to specimens from the sea islands of Georgia. However, an ecological survey of the

Georgia coast in the late 1960's (Johnson et al. 1974) revealed no indigo snake specimens on the barrier islands.

In providing a detailed description of the color of the snake, Wright and Wright (1957) referred to a 1922 specimen from the Okefenokee Swamp. Additionally, naturalist Franklin Russell described an encounter with an indigo snake in the Swamp during the late 1960's (Russell, 1973).

The overall Georgia distribution of the indigo snake was described by Martof (1956) simply as the lower and middle Coastal Plain. Subsequently, Conant (1975) provided a range map that included the southeastern quadrant of the state. In 1975, the Savannah Science Museum extended the range by providing an Effingham County location (Moulis 1976). In his paper on the eastern indigo snake's status in the southeast, Lawler (1977) mentioned an additional record outside Conant's basic range (Seminole County). A distribution map in Georgia's Protected Wildlife (Odom et al. 1977) designated current locations in 14 coastal plain counties. The most recent published indigo records have been provided by the Savannah Science Museum: ten specimen locales in nine counties (Williamson and Moulis 1979). A study by the Alabama Cooperative Wildlife Research Unit on the distribution of the indigo snake in Georgia is nearing completion. Recent sightings of indigo snakes have been made in 50 Georgia counties and the species is thought to be maintaining viable populations in protected areas of good habitat in the state.

In Florida, the status of the indigo is unknown at this time because no surveys have been conducted. Florida biologists (Tom Crutchfield, Howard Campbell, Rick Denner, Jim Layne, Barry Mansell, Paul Moler and John Storms, pers. comm.) generally agree that there are local populations throughout the

peninsula, and, in some localities, the snakes are common or abundant. In parts of southern Florida, from about Sarasota south, the snake is said to be locally abundant and common in many places. North of Sarasota, in the peninsula, the snake is thought to be common in several localities and abundant in a few. The panhandle has only a few known small populations and the indigo should probably be considered rare in that region.

Because of a rather precipitous decline in eastern indigo snake numbers in the 1960's and 1970's, the species has been considered threatened in the southeastern region (Mount and Speake in press) and endangered in Alabama (Mount 1976). The eastern indigo snake was granted full protection in Florida in 1971, was placed under protection in Georgia in 1977, and was listed as threatened by the Federal government (Federal Register Vol. 43 No. 52:11082 - 11093) in 1978.

Habitat

The habitat of the eastern subspecies varies somewhat latitudinally. Carr (1940) reported utilization of high pineland in central and north Florida, while flatwoods, dry glades, tropical hammocks, and muckland fields constituted the habitat in south Florida. Lawler (1977) stated that the species was often common along canal banks in south Florida, where crab holes were utilized in lieu of gopher tortoise burrows. Kochman (1978) listed the Florida indigo as occupying seven out of eight designated terrestrial habitat types (mixed hardwood-pine was omitted) and five of eleven wetland habitats. The species seems to be less restricted in habitat requirements in the southern portion of its range than in the north -- probably a function of climate and the species' winter behavior.

In Georgia, the indigo snake is strongly associated with the xeric sandridge habitat (Speake et al. 1978). Described by Harper (1906) in his discussion of the "Altamaha Grit" region of Georgia, these ridges occur primarily on the east or northeast side of the major coastal plain streams. Geologically, they are found on Miocene and Plio-Pleistocene deposits. The vegetational community supported by the deep droughty soils has been described as "sandhill" or "dry pine barren" (Harper 1906), oak-pine-heath (Bozeman 1971) and dwarf-oak forest (Wharton 1978). It is probably most commonly referred to as a longleaf pine-scrub oak association, with longleaf pine (Pinus palustris), turkey oak (Quercus laevis) and wiregrass (Aristida stricta) being the principal components. Regarded as fire sub-climaxes, these plant communities have an average burn frequency of 5 to 10 years (Wharton 1978) and succeed to a laurel oak (Quercus laurifolia) association in the absence of fire (Bozeman 1971). Intimately associated with this xeric habitat, in the southeastern coastal plain, is the gopher tortoise (Gopherus polyphemus) (Auffenberg and Franz 1975). The indigo snake utilizes the tortoise burrow as both a refuge and overwintering site. A recent Georgia study (Landers and Speake in press) shows that all radio-instrumented indigo snakes studied during winter (N=24) selected the sandhills as winter habitat and 94% of the winter dens were tortoise burrows. Indigo snakes also nested, foraged and denned in tortoise burrows during other seasons. The den of this one species plays an integral role in the sandhill ecosystem, providing a refuge for a host of vertebrate commensals (Pope 1946, Carr 1952, Speake and Mount 1973, Lawler 1977, Landers and Speake in press) as well as some 32 species of arthropods (Young and Goff

1939). Speake et al. (1978) showed that many Georgia indigo snakes move from sandhill habitat to the vicinity of agricultural fields and stream-bottom thickets in summer and that they make extensive movements during the late summer and fall.

Limiting Factors

In addition to the total loss of indigo snake habitat when land is converted to house sites or row crops, much of the forested sandhill habitat in south Georgia and parts of Florida is being degraded so that its value to the indigo snake is greatly reduced. "Natural" longleaf pine-turkey oak stands are frequently protected from fire too long and the oak component is allowed to become too dominant. Many areas that have been converted to pine plantations are not being control burned properly or have a pine overstory that is too dense. Habitat loss or degradation is probably the single most important indigo snake limiting factor.

Because the indigo snake is large, conspicuous, and relatively slow, it is an easy mark for persons who kill snakes on sight. Moreover, the docile nature and handsome appearance of this nonpoisonous snake give it a high value in the pet trade. Collection of the indigo snake combined with habitat destruction, highway fatalities, and deliberate persecution led to a noticeable decline of the indigo snake in Florida by 1971. According to Blaney and Blaney (1974), the decline in the numbers of indigo snakes in southern Florida can be directly attributed to overcollecting for the pet trade. The same authors point out that prices for indigo snakes among mail order dealers of reptiles and amphibians of the Southeast increased from \$17.00 in 1965 for an average sized adult to \$90.00 in 1973. Since that time prices have continued

to increase up to \$225.00 per specimen (Lawler 1977). Collectors for pet dealers were attempting to buy specimens from Georgia rattlesnake hunters in 1977 (Colvin, pers. comm.).

There is also serious concern about the future of this species in areas where gopher tortoise burrows may be gassed because it has been shown that indigo snakes, which commonly use such burrows for dens, are likely to be killed if the burrows in which they reside are gassed by rattlesnake hunters (Speake and Mount 1973). Effects of pesticides, which accumulate in indigo snakes since they are high on the food chain (Lawler 1977, Speake 1980 unpublished data), are not known. Natural limiting factors on the species are poorly known.

PART II RECOVERY

Primary Objective

The ultimate recovery plan objective should be to insure that numerous indigo snake populations exist and are reproducing and protected where suitable habitat still exists in the historical range of the species. This will require research and management along several lines as described in the plan. Once this is accomplished, and all States in the range of the snake provide legal protection, delisting might then be considered since the snake would be protected from interstate commerce by the Lacey Act.

Recovery Outline

1. Maintain and protect existing populations of eastern indigo snakes.
 11. Locate and delineate present populations through field surveys and distribution studies.
 12. Provide needed habitat.
 121. Acquire and/or manage and protect areas necessary to maintain viable populations.
 122. Determine habitat requirements.
 123. Conduct studies of population ecology, movements, and food habits.
 13. Provide improved protection for existing populations.
 131. Enact legislation protecting the indigo snake in each state where it occurs or probably occurs.
 132. Prohibit the practice of introducing toxic substances into gopher tortoise burrows on public lands and encourage ending the practice on private lands inhabited by indigo snakes.
 133. Enact legislation and/or regulations that will provide more protection for the gopher tortoise.
 134. Determine the effects and extent of exposure to pesticides and provide protection where possible.

14. Monitor populations and habitats.
 141. Determine methods for monitoring populations on study areas and sample areas.
 142. Monitor habitat trends.
2. Reestablish populations where feasible.
 21. Release indigos at chosen sites.
 211. Identify suitable reintroduction sites.
 212. Obtain stock for reintroduction.
 - 212-1. Maintain a captive breeding program and research on captive breeding and restocking potential as needed.
 - 212-2. Obtain stock from the wild when necessary.
 22. Monitor results of reestablishment attempts.
3. Improve the attitude of the public and their behavior towards indigo snakes.
 31. Educate the general public regarding the plight of the indigo snake and the need for recovery efforts.
 311. Publish scientific data.
 312. Produce and distribute educational materials for the various communications media.
 32. Make special efforts to contact owners or leaseholders of large tracts of sandhill habitat.

Recovery Outline Narrative

1. Maintain and protect existing populations of eastern indigo snakes.

11. Locate and delineate present populations through field surveys and distribution studies.

The status and distribution of the indigo snake is not well known in Florida and should be investigated in the near future. There is some reason to believe that protection established by the State in 1971 and strengthened by the Federal government in 1978 may have had an important beneficial effect. The species may no longer be threatened in southern Florida. Surveys have been recently completed for Alabama and are essentially complete for Georgia.

12. Provide needed habitat.

Task 121. Areas of suitable habitat throughout the historical range of the snake should be selected and designated as sanctuaries for indigo snakes and gopher tortoises. Management of the habitat should encourage the maintenance of community types that enhance the welfare of the snake. Ideally there should be permanent protection for two 10,000 acre tracts, one each in Georgia and Florida.

Management needs of the sandhill habitat have been outlined by Landers and Speake (in press). In longleaf pine-scrub oak stands, the hardwood component should be judiciously controlled. A high density of oaks is acceptable if the canopy is kept open and most stems are in the small diameter classes. Where trees are so dense that herbaceous ground cover is sparse, hardwoods should be thinned by mechanical or chemical means, or if feasible, by a hot summer burn.

Since this community originally included longleaf pines, a pine component should be reestablished where it has been reduced in the past; pine needles are important in carrying fire in the sparse understory. Where ground fuel is adequate in natural stands, burn frequency should be least once every 5 to 10 years, but intervals of 2 to 4 years between winter burns have been shown to be beneficial.

Slash pine plantations, if properly managed, can support viable gopher tortoise and indigo snake populations. Stands dominated by pine but which contain a significant scrub oak component can support breeding gopher tortoise colonies and receive use by indigo snakes and many associated species. Windrows within clear-cuts and plantations are used heavily by indigo snakes. Therefore, these brush piles should be left intact and not flattened during the rotation, a common practice for cosmetic purposes. Windrows are also beneficial to bobwhites (Brunswick and Johnson 1972), deer (Hazel et al. 1977), and other animals.

Commercial thinning is beneficial in opening the canopy and increasing understory development in pine plantations. In consideration for burrow-dwelling animals in forest management, it is recommended that low intensity site preparation (e.g. burning) be used rather than more intensive methods (e.g. root raking). The most important factor in plantation management is prescribed burning. Due to the great biomass in the understory, it is recommended that burning be practiced annually or biennially.

The habitat conditions outlined here which favor indigo snakes are produced by management schemes for bobwhites and white-tailed deer. Therefore, management for game animals on these xeric sites can be coordinated with that for the indigo snake, if adequate protection from exploitation of the latter is provided.

More research is needed to establish management techniques beneficial to the species. Promising areas for research include determination of optimum burning and thinning frequencies, and the density of tortoise burrows necessary to support indigo snake populations in the northern part of the range.

Task 122. In Georgia, individual indigo snakes use many tortoise burrows over a large home range (some are several hundred ha in size). The number of indigo snake locations is correlated with the number of tortoise burrows (Landers and Speake in press). Its distribution in the State is limited to areas with extensive sandhills interspersed with wetland habitats such as drainageways, river swamps, and cypress ponds.

The long seasonal movements of indigo snakes in Georgia, which can be several km in extent, have an important bearing on reestablishment of the species. Areas of habitat to be protected, managed, and restocked, if necessary, should ideally be several thousand acres in size, the larger the better.

In south Florida the snake occurs in a number of habitats, but it does seem to prefer pinewoods and terrestrial habitats, and avoids Everglades marsh. Further habitat studies are needed for this portion of the range.

Task 123. The indigo snake feeds largely on other snakes, small tortoises, small mammals, and amphibians and appears to be at the top of the insect-amphibian-reptile food chain of the sandhills.

For better management, more specific information is needed on food habits, mortality, reproductive rates, and movements throughout the range of the snake. High priority should be given to a south Florida study since work is already well underway in the northern part of the range.

13. Provide improved protection for existing populations.

Task 131. Federal protection should be continued and strictly enforced to prevent commercial exploitation. The species is not protected by Alabama law, and releases of 104 indigo snakes have recently been made in that State. Once all states in the range of the snake provide legal protection, and numerous reproducing populations exist in suitable habitat insuring long-term protection from adverse habitat modification, delisting might then be considered since the snake would be protected from interstate commerce by the Lacey Act.

Task 132. State laws prohibiting the gassing of tortoise burrows should be encouraged. Rules and regulations banning gassing should be established in National Forests, state parks, and other public lands. Large private landowners and leaseholders such as forest industries and hunting clubs should be encouraged to prevent tortoise burrow gassing on their lands.

Task 133. Protection of the gopher tortoise should be increased since the welfare of the indigo snake is so closely tied to that of the tortoise in some portions of its distribution.

Task 134. The impact of pesticides on the eastern indigo snake should be investigated. This species is apparently long-lived and relatively high on the food chain. It may be susceptible to pesticides directly by contact or secondarily through feeding on previously exposed prey animals.

14. Monitor populations and habitats.

Tasks 141. and 142. In order that population trends and status can be measured it will be necessary to develop techniques for estimating population levels. A long term monitoring program is also needed to track habitat trends.

2. Reestablish populations where feasible.

Research should be continued on reproductive biology, captive propagation, and restocking potential since exploitation and persecution have probably eliminated breeding stock from suitable habitat in the past and the species reproductive potential may be rather low. Research underway shows promising results with captive propagation; restocking potential of captive-hatched stock is currently under evaluation.

Task 21. Since 1979, the Alabama Cooperative Wildlife Unit has released indigos on an experimental basis at 9 sites in Florida, Alabama, Georgia, and Mississippi. Future releases will in part be contingent on the success of these experiments.

Task 211. Reintroduction sites should be a minimum of 200 ha in size and selected on the basis of (1) their similarity to the closest known habitat that is presently or was historically occupied by the species, and (2) the degree to which such sites will provide long-term security for the species and can possibly be managed if necessary. Habitat characterization studies under Task 122. have been completed for the northern part of the range, but further work is needed for south Florida.

Task 212-1. The Alabama Cooperative Wildlife Unit is currently being funded to develop propagation techniques, and to produce indigos for trial reintroductions. This type of work should be continued until the techniques are fully developed and/or it becomes evident there is no longer a need for captive propagation.

Task 212-2. Indigo snakes taken from the wild for reintroduction should come from areas where indigos are abundant, or where habitat is about to be destroyed. Released snakes should also come from parent stock originating as near as possible to the release site.

Task 22. Reintroductions should be monitored until it is evident that reproduction has occurred and a viable population has developed.

3. Improve the public attitude and behavior towards the indigo snake.

Task 311. As research is completed, the data should be made available to biologists and other professional conservationists through publications in technical journals and proceedings of symposia and other meetings. In this way the various governmental agencies that have some responsibility for indigo snake recovery will be better informed about how to proceed.

Task 312. Public opinion concerning snakes in general and indigo snakes in particular will need to be improved so that the common tendency to kill snakes on sight will be decreased. The general public can be reached through movies, television programs, lectures with slide series, and popular articles in newspapers and magazines. Emphasis should be placed on the harmless and beneficial nature of the species and the causes of its decline and a general description of recovery efforts.

Task 32. Very important segments of the public as far as indigo snakes are concerned are owners or leaseholders of large tracts of sandhill habitat. The habits of this species bring it into contact with agricultural workers, loggers, and hunters. Indigo snakes are especially vulnerable to hunters (snake, quail, and deer hunters) because of the snake's increased activities during the fall and winter breeding season and their tendency to concentrate on the sandridges and move about and bask during the winter. Owners and leaseholders of large tracts should be informed about the compatibility of indigo snake management with quail, deer, and timber production and the beneficial habits of the indigo snake. Habitat management measures such as controlled burning or thinning of stands should be emphasized along with protection of the indigo snake and the gopher tortoise.

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PART III.

IMPLEMENTATION SCHEDULE

Priorities within this section (Column 4) have been assigned according to the following:

- Priority 1 - Those actions absolutely necessary to prevent extinction of the species.
- Priority 2 - Those actions necessary to maintain the species' current population status.
- Priority 3 - All other actions necessary to provide for full recovery of the species.

Eastern Indigo Snake

IMPLEMENTATION SCHEDULE

General Category	Plan Task	Task Number	Priority	Task Duration	Responsible Agency			Estimated Fiscal Year Costs			Comments/Notes
					FWS Region	Program	Other *	FY 82	FY 83	FY 84	
I 6	Delineate populations	11	2	Ongoing	4		FL, MS, SC	40,000	20,000		GA distribution essentially completed. AL completed. Ongoing in FL under Coop. Agreement.
M3, A6	Acquire and/or manage necessary habitat	121	3	Indefinite	4		FL, GA, AL MS, SC, FS				Two 10,000-acre tracts recommended for acquisition: one in GA, one in FL.
O 3	Prohibit gassing tortoise burrows on public land	132	3	Indefinite			FS, DOD, PS, SA				
I 3	Determine habitat needs	122	3	Ongoing	4		FL, GA	20,000	20,000	20,000	Ongoing by AL Coop Unit and State of Florida. Task duration longer if habitat management techniques are evaluated.
I 14	Study population ecology, movements, and food habits	123	3	Ongoing	4		FL, GA	20,000	20,000	20,000	Ongoing by AL Coop Unit and State of Florida.
O 3	Enact State protection	131	3	1 yr.			AL				
O 3	Protect gopher tortoise thru State legislation or regulations	133	3	Indefinite			MS, GA, FL, FS, DOD, PS				
R 12	Evaluate pesticide effects	134	3	2 yrs.	4		Research FL, GA		15,000	15,000	
R 1	Develop population monitoring methods	141	3	3 yrs.	4		Research		15,000	15,000	
I 2	Monitor population and habitat trends	142	3	Indefinite	4		FL, GA, AL MS, SC				Ongoing by State of Florida under Coop. Agreement.

IMPLEMENTATION SCHEDULE

Eastern Indigo Snake (Continued)

General Category	Plan Task	Task Number	Priority	Task Duration	Responsible Agency		Estimated Fiscal Year Costs			Comments/Notes	
					FWS Region	Other *	FY 82	FY 83	FY 84		
I 7	Continue captive breeding studies	212-1	3	Ongoing	4	FL,GA,SC AL,MS		30,000	32,000	35,000	Ongoing by AL Coop Unit. Costs shown cover some trial releases (Task 21).
I 13	Capture wild stock for release	212-2	3	4 yrs.	4	FL,GA,SC, AL,MS					
I 13	Identify reintroduction sites	211	3	Ongoing	4	FL,GA,SC, AL,MS					Some work completed by AL Coop Unit.
I 13	Release indigos at chosen sites	21	3	Ongoing	4	FL,GA,SC, AL,MS					Trial introductions made by AL Coop Unit in FL, GA, MS, AL.
I 1	Monitor reestablishment	22	3	Ongoing	4	FL,GA,SC, AL,MS		10,000	10,000	10,000	Trial introductions being monitored by AL Coop Unit.
O 1	Publish research data	311	3	Ongoing	4	FL,GA		2,000	2,000	2,000	
O 1	Produce and distribute educational materials	312	3	Ongoing	4	FL,GA,SC, AL,MS,FS, ES,PS		2,000	2,000	2,000	
O 1	Seek cooperation of owners and leaseholders of large tracts of sandhill habitat	32	3	Ongoing	4	FL,GA,SC, AL,MS		1,000	1,000	1,000	
	*Abbreviations: FL - Florida Game and Fresh Water GA - Georgia Game and Fish Division SC - South Carolina Wildlife and Marine Resources Dep. AL - Alabama Division of Game and Fish MS - Mississippi Department of Wildlife Conservation						FS - U.S. Forest Service DOD - Department of Defense PS - U.S. Park Service SA - State Agencies ES - Cooperative Extension Service				

GENERAL CATEGORIES FOR IMPLEMENTATION SCHEDULES *

Information Gathering - I or R (research)

1. Population status
2. Habitat status
3. Habitat requirements
4. Management techniques
5. Taxonomic studies
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contaminant
13. Reintroduction
14. Other information

Management - M

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

Acquisition - A

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

Other - O

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

* (Column 1) - Primarily for use by the U.S. Fish and Wildlife Service.

