

## Threatened Species: A Review of the Eastern National Forests' Studies of These Animals

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### *Abstract*

The Eastern Region of the Forest Service has shown a deep interest in endangered and threatened species of wildlife. Throughout this Region, which corners roughly on Minnesota, Missouri, Maryland, and Maine, various studies of these rare animals have been undertaken. Most often, the Forest Service has preferred to contract with recognized authorities for these studies, rather than attempt to conduct them with Forest Service biologists. Many of these studies have been assigned to academic personnel, with generally favorable results.

In the past two decades there has been an accelerating pressure to provide increased protection to species of animals in which populations have declined to dangerously low levels. This movement resulted in the Endangered Species Act in 1966. The Act amounted to a governmental recognition of the potential extirpation of certain animal species, and was basically a preservation act.

In many respects, this Act was a palliative which did little to empower the actions needed to protect these species. The law failed to impose any restrictions on human activities, even though these activities were recognized as being the root cause of the precarious status of most of these threatened species. The Act, of course, provided no penalty provisions, nor any enforcement responsibilities, since it had prohibited no human actions. Further, it applied only to birds, mammals, and fish.

A later 1969 amendment to the Endangered Species Act expanded coverage to other vertebrates, mollusks, and crustaceans, but was chiefly aimed at blocking importation of internationally endangered wildlife. Congress eventually became convinced that a program with no punitive measures for deleterious activities by humans, with no enforcement responsibilities, and no funding, could not attain the intended goals. They passed the Endangered Species Act of 1973 which corrects some of the weaknesses of previous legislation.

Even before the 1973 Act, however, wildlife personnel of the Eastern Region of the Forest Service had become concerned about those species which had been nominated for the endangered species list. Originally, these animals had been categorized as "Endangered" (*i.e.*, in imminent danger of extirpation); "Rare" (low population levels; potentially in danger, at least in some portions of its range); and "Status Undetermined" (species for which insufficient data were available). We felt there were still other species (not listed in any of these three categories) which merited some consideration for special management. These were species that might be rare in the Eastern Region of the Forest Service (an area cornering on Minnesota, Missouri, Maryland, and Maine), but not threatened in other portions of their range. In

addition, we felt that trogloditic and troglophilic species (*i.e.*, cave-dwelling animals) had received insufficient consideration. We added another Forest Service category which we termed "Unique."

The development of a list of endangered, rare (later termed "threatened"), and unique species in the general area of the eastern National Forests was the simpler portion of our wildlife responsibilities. A more difficult assignment was the determination of what measures were necessary to protect the species of concern. As we confronted this issue, it appeared that we had by-passed an antecedent step. Before formulating elaborate management plans for a species—expensive in time, money, and personnel—we needed to know first that the particular species actually *occurred* within the National Forest. It would be not only embarrassing, but wasteful also, to design intricate plans, only to discover later that the animal did *not* reside within the National Forests.

Often our wildlife records or a literature search of faunal distribution studies validated the animal's occurrence within our area of responsibility.

Equally often, however, neither of these sources, nor correspondence with academic or State wildlife authorities, could establish the species' presence (or absence) on the National Forests. There remained a pressing need for this information before moving to the subsequent planning stage.

The voids in data for many of these species is understandable when one recognizes that fisheries and wildlife training, as well as management of the wildlife resource, is generally directed toward commercial or sporting species. State wildlife biologists, like Forest Service wildlife personnel, are more knowledgeable concerning game or commercially-important animals. The problem, of course, is that many of the threatened species are non-game, non-commercial species. Few State, Forest Service, or Fish and Wildlife Service biologists have a significant knowledge of the Indiana bat, the spring cavefish, the grotto salamander, the White Mountain fritillary, or other threatened, but lesser known animals. Life histories of these unusual animals is the twilight zone of wildlife biology.

Further, the Eastern Region of the Forest Service has a number of National Forests located in the karst-like regions of Missouri, Illinois, Indiana, and West Virginia. Because of its presence in these and other areas of limestone lithologies (New Mexico, Utah, California), the Forest Service may have more caves under its control than any other of the world's land managers. Attempts to acquire knowledge of the *community* interactions of cave fauna have not been productive; the synecology of troglophiles must be the midnight zone of wildlife biology.

The Forest Service turned to Academia for assistance. Through some personal knowledge of areas of interest of university personnel, and selective inquiries where this knowledge was lacking, we compiled a list of experts on the species of our concern. We then approached them on the possibility of making faunal surveys for us. If they were interested in doing this work, these experts drew up survey proposals

which the Forest Service reviewed. If the proposed survey met our needs, we issued cooperative agreement contracts for the work, and the studies were made, complete with terminal reports.

The only thing unusual about this approach was that most of the studies were contracted directly with the individual investigators, rather than through the university structure of the institutions with which they were associated. Since our funding for these studies was very limited, the avoidance of university overhead charges permitted us to fund additional (perhaps 25-40% more) investigations.

Although several projects have been completed, many are still in progress. The following list of studies will indicate the species, the area of interest, the investigator, and in some instances, a very terse summation of results. If more information is desired concerning a specific study, the Forest Service can provide the data in greater depth.

1. Studies on the Hoosier National Forest in Indiana:

- A. *Cave Inventory* by Carroll Ritter, a biology teacher and spelunker. This was a general inventory of caves within the Hoosier National Forest. Its primary objective was the determination of the fauna of these caves, but information was also collected on archaeological, geological, historical, and aesthetic values of caves. An index of cave importance or quality was developed. This survey pointed out 10 or 11 caves which should be explored more thoroughly for amblyopsid fish in their deeper zones.
- B. *Deep Zone Cavefish Survey* by Norbert Welch and James Keith, doctoral candidates at Indiana University and experienced speleobiologists. This survey was a follow-up of the previous one, and uncovered one significant population of cavefish (*Amblyopsis spelaea*). We will attempt to acquire this cave and protect this population.
- C. *Indiana Bat-Allegheny Woodrat Survey* by Dr. Russell Mumford, Purdue University mammalogist and bat expert. Dr. Mumford's survey located no Indiana bats (*Myotis sodalis*) nor any woodrats (*Neotoma floridana magister*). Dr. Mumford feels the Forest should develop no Indiana bat or woodrat habitat management plans unless these species are subsequently discovered within the Forest. One of Dr. Mumford's students will continue the search for the woodrat in the Perry County area.

2. Studies on the Shawnee National Forest in Illinois:

- A. *The Spring Cavefish Study* by Norbert Welch, doctoral candidate from Indiana University. The area of this study was the type locality for this species (*Chologaster agassizi*). The Shawnee National Forest staff was aware that the spring cavefish (also called spring fish) occurred in 3 or 4 springs in the Forest's Larue-Pine Hills Ecological Area. They were, however, troubled that *C. agassizi* numbers appeared to be decreasing, that collectors frequently raided these springs, and that a proposed reservoir in the adjacent valley might ad-

versely affect the flow regime of the springs. This study sought not only to determine the species distribution by searching other springs in the area, but to somehow measure the density of these assumedly discrete spring populations. By using subcutaneous injections of colored printer's inks, Mr. Welch was able to establish an identification procedure for these fish. Population estimates were then made for 8 springs, and the collective population of *Chologaster* in these 8 springs was calculated to be only 983 individuals. Within our knowledge this is the first population estimate ever made for this species. This study also expanded the Illinois range of this species from 3 or 4 springs to 13 springs or caves.

- B. *The Illinois Woodrat Survey* by a student of Dr. Willard Klimstra, Southern Illinois University. In recent years this species has declined from its few known localities in southern Illinois. This survey showed the woodrat still persisting in only two or three small areas in southwestern Illinois. Both numbers and range of this animal have decreased in the Shawnee National Forest area.
  - C. *Indiana Bat Survey* by Dr. John Whitaker, Indiana State University. Patterned after the Hoosier National Forest Survey by Mumford, this study is still in progress. Presently no *Myotis sodalis* have been found in the Shawnee National Forest. However, a significant colony of another rare bat, *Myotis grisescens*, has been recorded. This species, commonly known as the gray bat, or the gray myotis, is on the Illinois Threatened Species List.
  - D. *Rare Fish Studies* by Drs. Phil Smith and Larry Page, Illinois Natural History Survey. Several relatively rare species of fish occur within the Larue Swamps on the Shawnee National Forest. These include three lepomine species: the spotted sunfish (*Lepomis punctatus*); the bantam sunfish (*Lepomis symmetricus*); and the banded pigmy sunfish (*Elassoma zonatum*). Other species under study by the Illinois Natural History Survey are the starhead topminnow (*Fundulus notti*) and the stripetail darter (*Etheostoma kennicotti*). In addition, a sixth species, the blacktail shiner (*Notropis venustus*), is under study by the author. In Illinois, it occurs only in the Clear Creek basin in Union and Alexander Counties.
3. Studies on the Monongahela National Forest in West Virginia:
    - A. *Indiana Bat Survey* by Dr. John Hall, Albright College, Reading, Pennsylvania. Dr. Hall has located colonies of Indiana bats in three caves within the Monongahela National Forest. One of these caves contains one of the largest known colonies of this myotis east of the Mississippi River. The southern part of the Forest still remains to be surveyed.
  4. Studies on the Ottawa National Forest in Michigan:
    - A. *Sucker Lake Eagle Study* by James Matson, St. Cloud State College, St. Cloud, Minnesota. There was a proposal to improve

this shallow, eutrophic lake by providing an outlet structure to deepen the lake by about 3 m (10 feet). However, one bay of this lake was reputed to be an important regional feeding station for immature Northern Bald Eagles (*Haliaeetus leucocephalus alascanus*). In view of this critical wildlife value for a depleted eagle population, a study to evaluate this situation was contracted to a student of Dr. Dan Frenzel, an eagle authority. This study defined some habitat parameters for eagle feeding areas—one of which was quite puzzling and unanticipated.

- B. *Endangered and Threatened Plants of the Sylvania Area* by Dr. Forest Stearns, University of Wisconsin, Milwaukee. The Sylvania Area, an 18,000-acre tract of nearly pristine lakes and forests, was acquired in 1966 by the U.S. Government and assigned to the Ottawa National Forest for management. A number of rare plants occur in the tract and the southern part of the area was designated as a botanical reserve. In an earlier botanical survey, Dr. Voss, University of Michigan, developed a list of plant species, occurring in Sylvania. Dr. Stearns' study will concentrate on validation, location, and protective measures for endangered and threatened plant species within the Sylvania area. This study is still in progress.
5. Studies on the Huron National Forest in Michigan:
    - A. *Kirtland's Warbler Studies* by the National Audubon Society, Michigan Department of Natural Resources, the Fish and Wildlife Service, and the Forest Service. These are continuing studies of this endangered warbler (*Dendroica kirtlandi*) which nests only in a small jack pine area of the Huron National Forest in Michigan. The recent decline in numbers of nesting Kirtland's Warblers has elicited much concern among Forest Service and ornithological groups. Emphasis of present studies, however, has shifted from the Michigan nesting grounds of the bird to its wintering grounds in the Bahamas. These studies are continuing.
  6. Studies on the Hiawatha National Forest in Michigan:
    - A. *Sandhill Crane Study* by Dr. Ray Reilly, Lake Superior State College, Sault Ste. Marie, Michigan. The Greater Sandhill Crane (*Grus canadensis tabida*) nests in one area of the Hiawatha National Forest. This was an ecological study of that area aimed at determining the habitat selection and habitat requirements of this bird. This study has been completed.
    - B. *Scotts Marsh Study* by Dr. William Robinson, Northern Michigan University. Dr. Robinson will determine the vertebrate species present, and their population densities and distributions. This study will provide information on wildlife associated with various wetland types, with emphasis on unique and threatened wildlife. Scotts Marsh is a major proposed wetland development complex.
  7. Studies on the Nicolet National Forest in Wisconsin:
    - A. *Timber Wolf Survey* by Dr. Ray Anderson and Richard Thiel,

University of Wisconsin, Stevens Point. This survey will determine whether timber wolves presently exist on the Nicolet National Forest. Additionally, it will supply data on the efficacy of re-introduction of this species on this Forest. The survey is presently in progress.

8. Studies on the Superior National Forest in Minnesota:
    - A. *Timber Wolf Studies* by Dr. L. David Mech, U. S. Fish and Wildlife Service. These have been the most comprehensive studies of this species yet undertaken in the United States. Research has included life history data; population studies by mark-and-recapture methods; and pack range and movement analysis by biotelemetry. These studies are presently continuing under U.S. Fish and Wildlife Service funding.
  9. Studies on the Chippewa National Forest in Minnesota:
    - A. *Bald Eagle Study* by Dr. Dan Frenzel of the University of Minnesota. This study involves habitat preferences and nesting behavior of the Bald Eagle. The investigation began in 1970, and has had financial support from the University of Minnesota and the Hunt-Wesson Company.
    - B. *Orchid Bog Study*. This is a joint study by the Center for Environmental Studies of Bemidji State College and the Orchid Society of Minnesota. This study will provide a vegetative inventory of the botanical study area, a potential national orchid bog. Many rare and endangered species of plants exist in this area.
  10. Studies on the White Mountain National Forest in New Hampshire and Maine:
    - A. *Study of the Habitat of the Fisher (*Martes pennanti*)* by Dr. Wendell Dodge, University of Massachusetts. This is a two-year study to define habitat of the fisher. It will serve as basic data for the development of habitat management guides.
    - B. *Pine Marten Studies* by Mark Mowatt of the University of Maine. The Maine Department of Inland Fisheries and the New Hampshire Fish and Game Department. This is a two-year study with the first year devoted to an evaluation of the habitat of the pine marten (*Martes americanus*), and the second year involving re-introduction of the animal.
- Future studies which may be undertaken if funding becomes available include:
1. Major habitat survey and re-introduction of the Peregrine Falcon in the Green Mountain and White Mountain National Forests of Vermont, New Hampshire and Maine;
  2. Cave fauna of the National Forests in Missouri;
  3. Development of management guidelines for important feeding areas for Bald Eagles and Ospreys in the National Forests in Michigan, Wisconsin, and Minnesota;

4. Studies of the habitat requirements of the Whooping Crane (*Grus americana*), and the potential for its re-introduction on the Hiawatha National Forest in Michigan; and
  5. A survey of threatened or unique species of fish on the Monongahela National Forest in West Virginia.
- R 4—Indiana Soil Associations Compared to Earth Resources Technology Satellite Imagery. G. C. Steinhardt, D. P. Franzmeier, and J. E. Cipra. 7 pages.
- R 5—Analyzing Indiana's Soil Associations for Future Land Uses. Harry Galloway, Joseph Yahner, Donald Franzmeier, and G. Srinivasan. (Abstract) ½ page.
- R 6—Time of Plowing, Nitrogen Rate, and Cover Crop for Corn on Chalmers Silt Loam. Russell K. Stivers. 8 pages.
- S 1—Dominance Rank and Physiological Traits as Affected by Shifting Cows from One Group to Another. C. W. Arave, J. L. Albright. ½ page.
- S 2—Behavioral and Physiological Differences of Mice Grown at 4 C and 21 C. Jo Anne Mueller and Wayne Paul Mueller. ½ page.
- S 3—What Is the Future for Biological Control of Insects? Harold L. Zimmack. (Abstract) ½ page.
- S 4—Cadmium and Lead Levels in Palestine Lake, Palestine, Indiana. Randall S. Wentzel and James W. Berry. 8 pages.
- S 5—Foods of Some Fishes from the White River at Petersburg, Indiana. John O. Whitaker, Jr. 10 pages.
- S 6—Seasonal Activity of Bats at an Indiana Cave. Russell E. Mumford and John O. Whitaker, Jr. 7 pages.
- S 7—Preliminary Evaluation of a Tooth Wear Aging Technique for the Big Brown Bat, *Eptesicus Fuscus*. Ralph D. Kirkpatrick and Thomas W. Landrum. (Abstract) ½ page.
- S 8—Phytoseiid Mites of Pease Woods, Johnson County, Indiana, A Preliminary Study. C. Barry Knisley. ½ page.
- S 9—Effect of Aging on Erythrocytic 2, 3-DPG Concentration. Loren G. Martin, Kim L. Brokaw and James J. McGrath. ½ page.
- S10—A Study of Iron Deficiency Anemia in College Females. Joseph M. Poland. ½ page.
- S11—Evidence of Possible Superfetation or Delayed Implantation in the Opossum *Didelphis Virginiana*. Thomass Joseph. (Abstract) ½ page.
- S12—Studies of a Naturally Occurring Rudimentary Gonad Phenocyte in *Drosophila Melanogaster*. Lee Engstrom and Nick Pappas. ½ page.
- S13—Studies on Experimental Hypertension in Rats. W. J. Eversole. ½ page.
- S14—STH Maintenance in Hypophysectomized Rana Pipens with a Synergistic Affect. Gregory Caplinger. ½ page.
- S15—Blood Clearance and Tissue Uptake of AG in the Turtle, *Pseudemys Scripta*. Dianne Vermillion and William Brett. ½ page.

- S16—Tissue Uptake, Accumulation, and Retention of AG in the Rat, *Rattus Norvegicus*. Sheri Parr and William Brett.  $\frac{1}{2}$  page.  
The Respiratory Effects of Prostaglandin F<sub>2a</sub> in Anesthetized Cats. Max W. Talbott and Lloyd P. Gabel. 7 pages.
- L 1—Localization of Proteolytic Activity on Low pH-Urea, BSA-Included Polyacrylamide Gels. Thomas A. Cole. 2 pages.
- L 7— $\omega$ —Muricholate: A Rehabilitated Bile Acid of the Wistar Rat. D. C. Madsen, L. Chang, and B. Wostmann. 5 pages.

