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RARE AND ENDANGERED VERTEBRATES OF OHIO¹

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ABSTRACT

This paper, an annotated list of Ohio's rare and endangered vertebrate species, was compiled to supplement a similar national list and includes 10 mammals, 62 birds, 10 reptiles, 4 amphibians, and 33 fishes. Where possible, suggestions are made both as to causes of the rare or endangered status of these species and as to means of halting the trend. Ratings of "endangered," "rare," "peripheral," or "undetermined," as defined for the national classification, are given for each species.

Most critical of these species are those rated endangered. The Ohio list includes 1 mammal (Indiana Myotis Bat), 1 bird (Northern Bald Eagle), 1 snake (Northern Copperbelly), and 13 fishes. No reason is known for the decreasing numbers of the bat; population losses of the Bald Eagle are believed to be due to the effects of pesticides on their eggs, and losses of the Northern Copperbelly appear to relate to drainage of ponds and marshes. Reductions in populations of all the species of endangered fish are uniformly attributed to increased turbidities and siltation, in places related to the effects of ever more intensive land use.

INTRODUCTION

As the human population has grown and technology has developed, there has been much alteration of the soil, water, air, and vegetation which constitute the habitat of all animal life. Man is particularly aware of the highest forms of animal life—the vertebrates—because they provide much of his food and recreation and contribute to his aesthetic needs.

Man's impact on the environment has caused the extinction of a number of species and the drastic depletion of many others. This situation has so disturbed natural scientists and many other people that the Bureau of Sport Fisheries and Wildlife, U. S. Department of the Interior, assigned a committee to investigate the current status of wildlife species in the United States and its territories and to identify those species which are rare or endangered. As a result a list was published of those species considered rare and endangered in the United States (Bureau of Sport Fisheries and Wildlife, 1966). The objective was to help avoid, if possible, the extinction or serious depletion of still more species.

A rating system was developed by the U. S. Committee for the rare and endangered species listed by the Bureau of Sport Fisheries and Wildlife. The definitions of these ratings follow.

Endangered (E).—An endangered species or subspecies is one whose prospects of survival and reproduction are in immediate jeopardy. The peril may result from one or many causes—loss of habitat, change in habitat, overexploitation, predation, competition, or disease. An endangered species must have help or extinction will probably follow.

Rare (R).—A rare species or subspecies is one that, although not presently threatened with extinction, exists in such small numbers throughout its range that it may become endangered if its environment worsens. Close watch of its status is necessary.

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Peripheral (P).—A peripheral species or subspecies is one whose occurrence in the United States [Ohio for this compilation] is at the edge of its natural range and which is rare or endangered within the United States [Ohio], although not in its range as a whole. Special attention is necessary to assure its retention in our nation's [Ohio's] fauna.

Status undetermined (U).—A species or subspecies of undetermined status is one that has been suggested as possibly being endangered, but about which there is not enough information for its status to be determined.

Of the 41 mammals, 50 birds, 4 reptiles, 5 amphibians, and 30 fishes listed as endangered on the U. S. list, only three species are found in Ohio: the Indiana Myotis Bat (*Myotis sodalis*), the Lake Sturgeon (*Acipenser fluvescens*), and the Blue Pike (*Stizostedion vitreum glaucum*). The Southern Bald Eagle (*Haliaeetus leucocephalus leucocephalus*), listed as endangered on the national list, undoubtedly has wandered into Ohio in the post-breeding season, but does not nest in the state, according either to Peterson (1958) or to the A.O.U. check list (American Ornithologists' Union, 1957). The subspecies nesting near Lake Erie is the Northern Bald Eagle (*H. l. alascanus*).

In Ohio, as in the United States, there has been concern for rare and endangered species. Therefore the Ohio Chapter of The Wildlife Society established a Committee on Rare and Endangered Wildlife; the purpose of the Committee is to investigate the status of all vertebrates in Ohio, to find out which should be considered to be rare or endangered, and to determine means of avoiding the extinction or extirpation of any such species in this state. The authors compose this Committee. The first objective was to develop a list of the rare and endangered species of vertebrates in Ohio. This list follows. Included in this list, where known, are reasons for the rare or endangered status of each species, together, where possible, with suggestions as to ways to avoid complete extinction of the species in Ohio. Specific reasons for species decline, of course, are not always readily apparent and may be due to a multiplicity of sometimes-obscure factors. Thus meaningful suggestions for preventing the extinction of these species are not possible in all cases.

In order to determine critical population levels, because there are no precise measures of populations of most species, some arbitrary decisions have had to be made by the authors. Many species have different population levels in different parts of the state and population levels that vary from year to year. For these reasons this tabulation simply represents the authors' (and the many consultants') best judgments at this time. Thus this list should be considered provisional; it is intended that this list be revised periodically by the Committee as new information becomes available. The authors invite comments and suggested changes to this list by all knowledgeable persons.

The total numbers of endangered, rare, peripheral, and status-undetermined vertebrate species included in this Ohio list at present totals 119 species; the list may be broken down as follows:

Species	Endangered	Rare	Peripheral	Status undetermined	Total
Mammals	1	6	3	—	10
Birds	1	20	40	1	62
Reptiles	1	4	5	—	10
Amphibians	—	—	4	—	4
Fishes	13	12	1	7	33
Totals	16	42	53	8	119

In the following material, individual species in each of these groups of vertebrates are considered separately, the vertebrate classes being treated in the order in which they appear in this table.

MAMMALS

Ohio's mammals have not fared well since settlement of the state. Of 69 full species known to have lived originally in Ohio, at least 10 have been completely eliminated from the fauna. At least 3 others were extirpated, but have now become reestablished in the state. Of those presently occurring in the state, 10 species are so few in number or so restricted in range that they may be classed as rare or endangered. These are listed below, with the appropriate symbol to identify the status of each. The order and nomenclature follow Hall and Kelson (1959).

Pygmy Shrew, *Microsorex hoyi thompsoni* (Baird) (P)

The range of the Pygmy Shrew is mostly boreal, but extends south along the Allegheny Plateau. There is a single recent record from Muskingum County. Little is known of the habits of this species, and its presence would not be detected readily. However, this shrew must be considered to be a very rare resident of the state.

Indiana Myotis, *Myotis sodalis* Miller and G. M. Allen (E)

This cave-dwelling bat has been found in Ohio. The state is well within the range of the species, but this bat is nearly extinct here and is the only Ohio mammal that has been classified as endangered by the Bureau of Sport Fisheries and Wildlife (1966). The reason for its precarious status is unclear.

Rafinesque's Big-eared Bat, *Corynorhinus rafinesquii* (Lesson) (P)

The Big-eared Bat is reported only from extreme southern Ohio, which is the northern margin of its range.

Eastern Wood Rat, *Neotoma floridana magister* Baird (R)

The Wood Rat is apparently restricted in Ohio to localities with cliffs and rock outcroppings, which provide nesting sites in caves and crevices. Only the hilly portion of southern Ohio is included in its range. Because of the paucity of suitable habitat, this rat is found in very few places.

Coyote, *Canis latrans thomnos* Jackson (R)

Originally the Coyote may have occupied mainly prairie openings in western Ohio. In recent times the species has expanded its range and has invaded areas far to the east. In spite of this general flourishing, this species is still of rare occurrence in Ohio. Coyotes are reported from widely scattered localities in the state, but most frequently from the west-central portion. Coyotes hybridize readily with dogs, and hybrids are more common than pure coyotes. It would seem unwise to do anything which could encourage the increase of this animal in an agricultural area such as Ohio.

Black Bear, *Ursus a. americanus* Pallas (R)

There are scattered but persistent reports of black bears in south-central and southeastern Ohio. A sow with cubs was reported there several years ago, and as recently as the spring of 1973 several persons reported closely observing black bears in southern Ohio. There seems to be little doubt that this species is a very rare resident of the state. It should be protected in the hope that a more viable population might be established. However, there are few areas in the state that provide suitable habitat.

Ermine or Short-tailed Weasel, *Mustela erminea cicognanii* Bonaparte (P)

This species is included in the Ohio fauna on the basis of a single specimen taken in the extreme northeastern corner of the state. It must be considered to be very rare, if indeed a population exists. The extensive range of this species lies mostly to the north of Ohio.

Badger, *Taxidea t. taxus* (Schreber) (R)

This prairie species has no doubt expanded its range in Ohio. Although it has a rather wide distribution in the state, it is of rare occurrence. In the northern half of the state it has been reported from as far east as Carroll County, and there are scattered reports along the full length of the western boundary. There is doubt about the wisdom of encouraging the increase of this species in the state.

River Otter, *Lutra c. candensis* (Schreber) (R)

The Otter is reported on very rare occasions in the northern and eastern sections of the state. The only recent specimen is a large male taken by a trapper in Belmont County in 1955, but more recent credible reports have come from Fairfield, Tuscarawas, and Ashtabula Counties. This is a shy animal, intolerant of human disturbance, and prone to travel considerable distances along waterways. There seems little hope of ever again having in the state a population much larger than the scattered individuals presently noted.

Bobcat, *Lynx r. rufus* (Schreber) (R)

The Bobcat must be considered to be a very rare resident of Ohio. However, it is reported from widely distributed sites in the more hilly and forested sections of the state. Although this is a species which is often erroneously reported, there are enough credible reports to include it in this list.

BIRDS

More than twenty scientists and active birders were consulted by letter, telephone, or personal contact on the population status of Ohio bird species, for the purpose of developing a list of those considered as rare and endangered. All information was tabulated and status decisions were made from the combined data. Because most birds are migratory, it was decided to list only the species nesting in Ohio. One species is classed as endangered, 20 as rare, 40 as peripheral, and one as having status undetermined in Ohio at this date.

Three lists are given here: (1) rare and endangered species, (2) peripheral species, and (3) species with recent population declines. The authority for the bird nomenclature is that of the American Ornithologists' Union Check-List (1957) as amended in the April 1973 issue of *The Auk*.

*Rare and Endangered Birds*Great Egret, *Casmerodius albus egretta* (Gmelin) (R)

This species breeds on West Sister Island and feeds in the Lake Erie marshes during the nesting season. Since this provides only a limited area for expansion, these marshes should be preserved for the welfare of this species, as is currently being done in Magee Marsh in Ottawa County.

Least Bittern, *Ixobrychus e. exilis* (Gmelin) (R)

This species is sparsely distributed in the larger marshes, which should be preserved if this species is to remain in Ohio's fauna.

Hooded Merganser, *Lophodytes cucullatus* (Linnaeus) (R)

This is a very rare species, which nests near streams, marshes, and small lakes. Excessive human disturbance of these habitats should be avoided. This species may be close to an endangered status in Ohio.

Sharp-shinned Hawk, *Accipiter striatus velox* (Wilson) (R)

This small accipiter is an uncommon migrant. It rarely nests in Ohio, but is found in the state in limited numbers, especially in the northeast. It was never common, but in recent years it has shown a sharp decrease in numbers, which is alleged to be caused by the use of the chemical insecticide DDT or other chlorinated hydrocarbons. Suitable habitat does not appear to be in short supply. Enforcement of current laws prohibiting the shooting of hawks, except when in the act of doing damage to private property, should be vigorously supported.

Cooper's Hawk, *Accipiter cooperii* (Bonaparte) (R)

This once-common hawk has declined drastically in numbers in recent years. The fact that this bird has been unfairly persecuted for attacking chickens and game birds does not fully explain its rather sudden decline. The use of DDT or of other chlorinated hydrocarbons may account, as for the above species, for the population reduction.

Northern Bald Eagle, *Haliaeetus leucocephalus alascanus* Townsend (E) (fig. 1)

The most recent survey cites only 11 nests in Ohio in 1972; 6 of these were active, but none fledged young. In 1903 Dawson listed this species as a rare resident. Because a few nests still exist in the Lake Erie marsh area, and because recent nesting success has been almost nil, all current nest sites should



FIGURE 1. The Northern Bald Eagle (*Haliaeetus leucocephalus washingtoniensis*) was once a moderately familiar sight on the southwestern coast of Lake Erie in northwest Ohio, but in 1973 only seven of ten traditional nests were used and only two eaglets were hatched in one nest, according to Richard Branzell, Enforcement Officer with the Fish and Wildlife Service. Photo by courtesy of the Fish and Wildlife Service.

be vigorously preserved to reduce adversity to a minimum. Thin egg shells indirectly caused by pesticides in the environment are alleged to be the reason for the poor hatching record and thus the declining numbers of this bird.

Gray Partridge, *Perdix p. perdix* (Linnaeus) (R)

This introduced species was once common in western Ohio. About thirty years ago it declined drastically in numbers, for reasons that are not clear. This species does best in small-grain and pasture-type habitats.

Black Rail, *Laterallus jamaicensis* (Gmelin) (R)

This species is considered to be very rare in Ohio. It has been seen at migration time in late April. Its extremely secretive nature may be the reason that it is regarded as almost accidental.

King Rail, *Rallus e. elegans* Audubon (R)

Rare and local, the King Rail is found principally in the western Lake Erie marshes. These marshes should be preserved.

Piping Plover, *Charadrius melodus circumcinctus* (Ridgway) (U)

This bird was once a rare nester near the shores of Lake Erie. It has declined in numbers and may even be extirpated in Ohio as a nesting species.

Upland Sandpiper, *Bartramia longicuda* (Bechstein) (R)

This bird of the open pastures was common in the early 1900's. It is now rare, perhaps because of more intensive pasture management.

Common Tern, *Sterna h. hirundo* Linnaeus (R)

This fairly common migrant nested for years on Starve Island and other small islands near South Bass Island in western Lake Erie. The Starve Island colony has recently been deprived of its nesting site by increasing numbers of and competition with Herring Gulls. A few terns now nest on limited gravel bars near Toledo. If these limited areas should be put to other uses or if Herring Gulls continue to increase, as is taking place, this bird would be extirpated from Ohio as a nesting species.

Barn Owl, *Tyto alba pratincola* (Bonaparte) (R)

This species was common in the Scioto River valley in the early 1900's, but is now rare over most of the state. Large den trees should be preserved. Known nest trees could be protected with a Raccoon guard.

Bewick's Wren, *Thryomanes bewickii altus* Aldrich (R)

This species was rare at the turn of the century, according to Dawson (1903), and then increased in the 1930's, according to Hicks (1937). However, for unknown reasons, it is rarely seen now as a nesting species in the state.

Short-billed Marsh Wren, *Cistothorus platensis stellaris* (Naumann) (R)

This species is rare and very local. These birds are now seldom found in Ohio, even though their favored wet-meadow habitat is still present. No reason is known for this rarity.

Loggerhead Shrike, *Lanius ludovicianus migrans* Palmer (R)

Once fairly common in many areas over the state, this species is now rare even in the few areas in which it is still present. No reason is known for this. Habitat, which includes thorny trees used for impaling prey, does not seem to be critical.

Prothonotary Warbler, *Protonotaria citrea* (Boddaert) (R)

This is a rare and local summer resident in Ohio. It is found in swampy areas such as those along western Lake Erie and the Pymatuning marshes.

Northern Parula, *Parula americana* (Linnaeus) (R)

This bird, an uncommon breeder at the turn of the century, is now rare and local. It nests in wooded ravines in Ohio, generally where hemlocks are present.

Pine Warbler, *Dendroica p. pinus* (Wilson) (R)

This species has always been a rare breeder in Ohio pines. Hicks (1937) mentioned Scioto County as a location where this warbler was most apt to be seen, but it is occasionally found in other pine areas.

Orchard Oriole, *Icterus spurius* (Linnaeus) (R)

The Orchard Oriole is very local and rare, and is becoming rarer, except near western Lake Erie.

Lark Sparrow, *Chondestes g. grammacus* (Say) (R)

The range of this sparrow extends east to Ohio, where it is now found locally in Lucas and Adams Counties. In Hicks' time (Hicks, 1937), it was found also in eastern Ohio.

Bachman's Sparrow, *Aimophila aestivalis bachmani* (Audubon) (R)

Found locally in southern Ohio, Bachman's Sparrow has always been rare and has now become still more rare. It prefers oldfields with scattered shrubs and trees; this is a bird of the "oldfield" stage of plan succession.

Peripheral Species of Birds

A number of avian species are rare in Ohio because Ohio is on the very edge of their North American range. These species are designated peripheral (P) and are listed here separately because there are so many, and it is not desirable to dilute the list of truly rare species. Symbols following the name of each species indicate the direction of its primary range from Ohio. If these species disappeared from Ohio, and became reduced in numbers in the other states where their main population is now concentrated, they would become a rare species in all of North America.

Yellow-crowned Night Heron, *Nyctanassa v. violacea* (Linnaeus)—SW

Pintail, *Anas acuta* Linnaeus—NW

American Green-winged Teal, *Anas crecca carolinensis* Gmelin—NW

American Wigeon, *Anas americana* (Gmelin)—NW

Northern Shoveler, *Anas clypeata* (Linnaeus)—NW

Redhead, *Aythya americana* (Eyton)—NW

Lesser Scaup, *Aythya affinis* (Eyton)—NW

Ruddy Duck, *Oxyura jamaicensis rubida* (Wilson)—NW

Black Vulture, *Coragyps atratus* (Bechstein)—S

Long-eared Owl, *Asio otus wilsonianus* (Lesson)—N

Short-eared Owl, *Asio f. flammeus* (Pontoppidan)—N

Saw-whet Owl, *Aegolius a. acadicus* (Gmelin)—N

Chuck-will's Widow, *Caprimulgus carolinensis* Gmelin—S

Yellow-bellied Sapsucker, *Sphyrapicus v. varius* (Linnaeus)—N

Western Kingbird, *Tyrannus verticalis* Say—W

Least Flycatcher, *Empidonax minimus* (Baird and Baird)—N

Red-breasted Nuthatch, *Sitta canadensis* Linnaeus—NE

Brown Creeper, *Certhia familiaris americana* Bonaparte—NE

Winter Wren, *Troglodytes troglodytes hiemalis* (Vieillot)—N

Hermit Thrush, *Catharus guttata faxoni* Bangs and Penard—N

Swainson's Thrush, *Catharus ustulata swainsoni* (Tschudi)—N

Veery, *Catharus fuscescens salicicola* Ridgway—NW

and *Catharus f. fuscescens* (Stephens)—NE

Solitary Vireo, *Vireo s. solitarius* (Wilson)—N

Golden-winged Warbler, *Vermivora chrysoptera* (Linnaeus)—N

Nashville Warbler, *Vermivora r. ruficapilla* (Wilson)—N

Magnolia Warbler, *Dendroica magnolia* (Wilson)—N

Black-throated Blue Warbler, *Dendroica c. caerulescens* (Gmelin)—N

Black-throated Green Warbler, *Dendroica v. virens* (Gmelin)—N

Blackburnian Warbler, *Dendroica fusca* (Muller)—N

Chestnut-sided Warbler, *Dendroica pensylvanica* (Linnaeus)—N

Northern Waterthrush, *Seiurus noveboracensis notabilis* Ridgway—N

Mourning Warbler, *Oporornis philadelphia* (Wilson)—N

Canada Warbler, *Wilsonia canadensis* (Linnaeus)—N

Western Meadowlark, *Sturnella n. neglecta* Audubon—W

Purple Finch, *Carpodacus p. purpureus* (Gmelin)—N and E
 Pine Siskin, *Spinus p. pinus* (Wilson)—N
 Red Crossbill, *Loxia curvirostra minor* (Brehm)—N
 Dark-eyed Junco, *Junco h. hyemalis* (Linnaeus)—N
 White-throated Sparrow, *Zonotrichia albicollis* (Gmelin)—N

Bird Species with Recent Population Declines

These species are not rare, but have shown recent decreases in their populations in the state. Therefore they bear watching to determine whether anything need be done to avoid any further decline.

Pied-billed Grebe, *Podilymbus p. podiceps* (Linnaeus)
 American Bittern, *Botaurus lentiginosus* (Rackett)
 Red-shouldered Hawk, *Buteo l. lineatus* (Gmelin)
 Ring-necked Pheasant, *Phasianus colchicus* Linnaeus
 Virginia Rail, *Rallus l. limicola* Vieillot
 Common Gallinule, *Gallinula chloropus chachinnans* Bangs
 Black Tern, *Chlidonias niger surinamensis* (Gmelin)
 Screech Owl, *Otus asio naevius* (Gmelin)
 Whip-poor-will, *Caprimulgus v. vociferus* Wilson
 Rough-winged Swallow, *Stelgidopteryx ruficollis serripennis* (Audubon)
 Cliff Swallow, *Petrochelidon p. pyrrhonota* (Vieillot)
 Purple Martin, *Progne s. subis* (Linnaeus)
 Common Crow, *Corvus b. brachyrhynchos* Brehm
 Long-billed Marsh Wren, *Telematodytes palustris dissaeptus* (Bangs)
 Warbling Vireo, *Vireo g. gilvus* (Vieillot)
 Bobolink, *Dolichonyx oryzivorus* (Linnaeus)
 Northern (Baltimore) Oriole, *Icterus g. galbula* (Linnaeus)
 Grasshopper Sparrow, *Ammodramus savannarum pratensis* (Vieillot)
 Henslow's Sparrow, *Passerherbulus h. henslowii* (Audubon)
 Swamp Sparrow, *Melospiza g. georginana* (Latham)

REPTILES

The preservation of endangered species is a difficult task at best, even when the organism in trouble is familiar to the majority of people. It becomes even more difficult when the species is not well known, even by professionals. Some of Ohio's endangered species of amphibians and reptiles fall into this category.

For some species, Ohio is just on the edge of the range—even though the species may be rare in Ohio, it may not be rare throughout the rest of its range. The press of an increasing human population, with its accompanying habitat alteration, intensified farming, drainage, urban expansion, etc., will continue to pose problems for endangered amphibians and reptiles.

Most of the following species are not well known by the majority of people and many of the species are of unknown economic importance. Therefore responsibility must be accepted by professionals and specialists to keep track of existing populations. Where possible, these experts should initiate action to preserve known breeding sites and to discourage unnecessary collections by individuals. Public education is also an important aspect of the efforts to protect threatened species.

The authority for scientific and common names is Conant *et al.* (1956). Sequential arrangement of names follows Conant (1958).

Spotted Turtle, *Clemmys guttata* (Schneider) (R)

The Spotted Turtle is found in marshy meadows, bogs, swamps, small ponds, ditches, and other small bodies of water. In Ohio the species is recorded primarily from the northern and central counties. The unglaciated portion of Ohio does not fall within the range. This turtle is not particularly wary and

thus is easily collected. Overcollection and habitat destruction have both contributed to reducing its population in Ohio.

Wood Turtle, *Clemmys insculpta* (LeConte) (P)

Although the Wood Turtle is quite at home in water, it often wanders far afield and may be considered to be one of our most terrestrial turtles. It is found in woods, meadows, and farmlands. In Ohio the range extends along the south shore of Lake Erie in the area of Cuyahoga, Lake, and Ashtabula Counties. Ohio is, however, only on the edge of the range, the species being found primarily to the north and east of the state.

False Map Turtle, *Graptemys pseudogeographica* (Gray) (R)

Ohio does not lie within the continuous range of the False Map Turtle; however, specimens have been collected in central Ohio from the Scioto River. Specimens have also been recorded from the shore of the Ohio River (on the West Virginia side) just opposite Washington County, Ohio. Juvenile False Map Turtles are sold in large numbers by pet stores. Due consideration should be given to new Ohio records lest they be "escapes."

Red-eared Turtle, *Pseudemys scripta elegans* (Wied) (P)

This species is also called Mississippi Valley Terrapin; its range just touches extreme southwestern Ohio along the Ohio River. Within the state boundary, the species has been recorded from Davenport Pond, Pickaway County, and from a few localities along the Scioto River in Ross and Pickaway Counties in south-central Ohio. Like the False Map Turtle, this turtle is vended in vast quantities in pet stores. Because well-meaning owners often liberate their pets when they are no longer wanted, it is best to look very critically at new Ohio "records."

Smooth Softshell Turtle, *Trionyx muticus* (Lesueur) (P)

The Smooth Softshell Turtle is essentially a river turtle and has been recorded from streams ranging in size from creeks to rivers the size of the Ohio. Southern Ohio is on the northeastern edge of this turtle's range. This species has been collected along the Ohio River and its major tributaries.

Northern Copperbelly, *Natrix erythrogaster neglecta* Conant (E)

The Northern Copperbelly has been recorded from only a few restricted areas in Hardin and Williams Counties. Its habitat is small woodland ponds and other shallow marshy bodies of water. Drainage of ponds and marshes is quite detrimental to this species. Recent attempts to collect this snake have been unsuccessful.

Eastern Plains Garter Snake, *Thamnophis r. radix* (Baird and Girard) (R)

The Ohio representative of this western species is found in the few remaining areas of wet prairie in Wyandot, Crawford, and Marion Counties. The original prairie areas in Ohio have been almost completely destroyed by cultivation and grazing, and the former prairie vegetation is limited to remnants in locations such as cemeteries, public land, and railroad rights-of-way, hardly adequate territory for this snake.

Rough Green Snake, *Opheodrys aestivus* (Linnaeus) (P)

This species is an excellent climber, and a frequent habitat is dense vegetation. The snake freely enters water and at times seems almost semiaquatic. In Ohio it has been collected from the south-central and southwestern parts of the state. Ohio is, however, on the northern edge of its range, and the snake is not in danger outside the state.

Smooth Green Snake, *Opheodrys vernalis* (Harlan) (R)

The Smooth Green Snake is found in scattered localities in northeastern, north-central, and southwestern Ohio. Most locality records are represented by single specimens. Individuals of this species have been found under flat stones, along rivers, and even on university campuses; however, too few indi-

viduals have been collected to indicate any definite habitat preference or any any condition that might contribute to reduction in numbers of this species.

Black Kingsnake, *Lampropeltis getulus niger* (Yarrow) (P)

Common habitats of this snake include dry rocky hills, open woods, dry prairies, and stream valleys. In Ohio the Black Kingsnake has been collected in the area of Pike, Adams, Lawrence, Meigs, and Jackson Counties. Ohio is on the northeastern edge of the range. The species does not appear to be in danger outside the state.

AMPHIBIANS

The amphibians that are rare in Ohio are all peripheral in nature. The authority for scientific and common names is Conant *et al.* (1956). Sequential arrangement of names follows Conant (1958).

Wehrle's Salamander, *Plethodon wehrlei* (Fowler and Dunn) (P)

This salamander's habitat is upland forests, where it is found under stones, in rotting logs, in deep crevices, and at the entrances of caves. In Ohio this species is known from only two specimens from Washington and Monroe Counties.

Green Salamander, *Aneides aeneus* (Cope and Packard) (P)

In Ohio the Green Salamander is found only on sandstone and limestone outcrops along the Ohio River, but it is widespread throughout the Appalachian Mountains of eastern United States. It is a cliff dweller, found in crevices of damp rocks, under stones, logs, or loose bark, and even in open fields.

Cave Salamander, *Eurycea lucifuga* Rafinesque (P)

This species occurs in Ohio only around the Cincinnati area, but is common outside the state. Often found in entrances of caves where light is weak, it occurs also outside caves, beneath logs and stones, and under debris along streams.

Eastern Spadefoot, *Scaphiopus holbrooki* (Harlan) (P)

This toad is local and seasonal, and is normally seen only during brief breeding congresses. It is usually found in areas characterized by sandy or other loose soil. In Ohio the Eastern Spadefoot has been collected only from Adams and Lawrence Counties.

FISHES

The following list of endangered and rare fishes includes species that will probably be unfamiliar to many Ohioans. In many instances, these are the less "glamorous" fish or those that have received little or no publicity, mainly because their economic value is relatively unknown at this time. Many of these species have never been trapped, netted, or fished; their lowered populations are due primarily to some form of environmental change. In some cases, lack of specific information on present distribution and population levels has required that the opinions of persons knowledgeable in the field of fisheries management be sought prior to assigning a classification to certain species on the list. The taxonomic authority used is that published by the American Fisheries Society, Committee on Names of Fishes (1970).

The phenomena of declining fish populations and altered water quality did not occur overnight. Land-use changes and water pollution were primarily responsible for the extirpation of some fish species during the early 1900's, and the modification of many streams, by the addition of one or more dams, into long narrow lakes, where food and dissolved oxygen are greatly reduced, has affected others.

Lake Sturgeon, *Acipenser fulvescens* Rafinesque (E)

When the settlers pushed across the Northwest Territory, the Lake Sturgeon was abundant throughout its range, which included the drainage basins of the Mississippi River, the Great Lakes, and Hudson Bay. It was extremely

plentiful in Lake Erie and in the Ohio River basin prior to 1850. This sturgeon feeds over gravel and sandy bottoms on a variety of small invertebrates, including mollusks, leeches, and insect larvae. This slow-growing late-maturing species is now classified as endangered as the result of a combination of factors, including the inability to complete spawning activities as a result of dam construction, as well as habitat destruction by siltation, pollution, drainage, fishing, and decreasing food supplies.

Spotted Gar, *Lepisosteus oculatus* (Winchell) (R)

Although probably never particularly common, the Spotted Gar has decreased in abundance in recent years. Disappearance of aquatic vegetation in many of the bays and harbors of Lake Erie seems to be a major factor leading to population reduction of this fish.

Shortnose Gar, *Lepisosteus platostomus* Rafinesque (R)

This species prefers lowland lakes and backwater pools of clear low-gradient streams. Reduced populations may be the result, in part, of siltation.

Mooneye, *Hiodon tergisus* Lesueur (U)

The range of the Mooneye in Ohio is limited to Lake Erie, to sites immediately adjacent in its tributaries, and to the Ohio River and closely adjacent sites in its tributaries. Population reduction is probably due to siltation and water turbidity.

Great Lakes Cisco, *Coregonus a. artedii* Lesueur (R)

The Cisco inhabits the cool clear waters of the Great Lakes. Present reduced population levels in Ohio are the result of changing water quality and unregulated harvest.

Lake Whitefish, *Coregonus clupeaformis* (Mitchill) (R)

Like the Cisco, the Lake Whitefish inhabits the cool clear waters of the Great Lakes. Present reduced population levels in Ohio are the result of changing water quality and unregulated harvest.

Brook Trout, *Salvelinus fontinalis* (Mitchill) (R)

Although probably native to Ohio, the Brook Trout was reported to exist in only two streams in Ohio prior to 1850. Introductions since that time account for the majority of recent records. Extremely clean cold waters are a necessity and thus are the major limiting habitat requirement in Ohio.

Muskellunge, *Esox m. masquinongy* Mitchill (R)

This "muskie" is a resident of the Great Lakes, as well as of the St. Lawrence basin and several Ontario lakes. One of the first commercially important species in Lake Erie, its numbers have declined to a point where it may be in danger of extirpation from Ohio waters. Habitat destruction through stream ditching, marsh drainage, diking, turbidity, damming of streams, and elimination of vegetation is the major contributing factor to reproductive failure and resultant population decline.

Rosyside Dace, *Clinostomus funduloides* Girard (E)

The Rosyside Dace is limited to the clear-water limestone-bottomed streams of south-central Ohio. This rather restricted range, along with increased stream turbidity and resultant habitat destruction, has combined to cause this fish to decline in numbers.

Tonguetied Minnow, *Exoglossum laurae* (Hubbs) (E)

The range of the Tonguetied Minnow in Ohio has diminished to a point where it is presently known only in Kings Creek in west-central Ohio. Protection has been afforded the tonguetied minnow here by closure of a five-mile section of this stream to the taking of bait. Loss of habitat through siltation is the major cause for population decline.

Streamline Chub, *Hybopsis dissimilis* (Kirtland) (U)

The Streamline Chub inhabited the riffies of many central and southern Ohio streams which had the clean sand and gravel bars required for reproduction.

Pollution in the form of bottom siltation is the primary cause of declining populations.

Gravel Chub, *Hybopsis x-punctata* Hubbs and Crowe (U)

Preferred habitat conditions for the Gravel Chub are similar to those listed for the Streamline Chub. Siltation of sand and gravel beds appears to be the cause of recent population declines.

River Chub, *Nocomis micropogon* (Cope) (E)

The River Chub was once widely distributed throughout Ohio, inhabiting clear streams with bottoms of clean sand and gravel or bedrock and with little or no aquatic vegetation. Habitat destruction through turbidity and siltation has brought about extreme population declines. Specimens are now reported from only a few northeastern Ohio streams.

Bigeye Shiner, *Notropis boops* Gilbert (R)

Ohio's only known remaining Bigeye Shiner populations are limited to a few streams in Scioto and Pike Counties. Siltation and turbidity have drastically reduced the habitat preferred by this fish.

Ghost Shiner, *Notropis buechanani* Meek (U)

Originally found in the Ohio River and in several of its major tributaries, the Ghost Shiner's intolerance for turbidity apparently is the cause for declining populations.

Bigmouth Shiner, *Notropis dorsalis* (Agassiz) (R)

The range of the Bigmouth Shiner in Ohio is limited to several northeastern counties. Although never abundant, present declining populations may be the result of habitat destruction and of species competition with the Silverjaw Minnow.

Pugnose Minnow, *Notropis emiliae* (Hay) (E)

The Pugnose Minnow once was abundant in clear-water low-gradient streams throughout Ohio. Other elements essential to its habitat include an abundance of aquatic vegetation and stream bottoms consisting of sand or organic debris. Turbidity and siltation have eliminated much of the Pugnose's habitat and the species presently faces extirpation from Ohio water.

Longnose Dace, *Rhinichthys cataractae* (Valenciennes) (P)

This fish was formerly abundant along Lake Erie shores from September through May, apparently inhabiting deeper water during the summer months. Populations of this species are declining, according to recent records, perhaps because of reduced oxygen content in the deeper waters of Lake Erie.

Longnose Sucker, *Catostomus catostomus* (Forster) (R)

The Longnose Sucker was abundant in the deeper, cooler waters of Lake Erie in the early 1900's. A general population decline is indicated by recent records, probably mostly because of deteriorating water quality and reduced oxygen content in the deeper waters of the lake.

Lake Chubsucker, *Erimyzon sucetta* (Lacepede) (E)

The Lake Chubsucker once inhabited kettle lakes and larger streams of the glaciated portion of Ohio. Declining populations are the result of this species' inability to tolerate turbidity and siltation.

Ohio Redhorse, *Moxostoma macrolepidotum breviceps* (Cope) (U)

The Ohio Redhorse prefers larger streams with moderate-to-swift current, relatively clear water, and sand and/or gravel bottoms. Recent population declines appear to be related directly to industrial pollution.

Greater Redhorse, *Moxostoma valenciennesi* Jordan (E)

The range of the Greater Redhorse was originally limited to clear-water streams with clean sand and gravel bottoms in western Ohio. Industrial pollution, siltation, and stream-channel modification pose serious threats to the continued existence of this species.

Scioto Madtom, *Noturus trautmani* Taylor (E)

Twenty of these Madtoms were collected in Pickaway County in Big Darby Creek between 1943 and 1957. None have been taken since. Habitat destruction through bottom siltation and water turbidity seems to be the primary cause.

Pirate Perch, *Aphredoderus sayanus* (Gilliams) (E)

The Ohio range of the Pirate Perch is limited to selected streams in a few north-western counties. The habitat of this fish consists of low-gradient marsh-type waters with bottoms composed of organic matter. Modern ditching, draining, and some types of channelization activities pose serious threats to the continued existence of this species.

Burbot, *Lota lota* (Linnaeus) (R)

Primarily a Lake Erie species, the Burbot has declined in numbers in recent years. This is a deep cold-water species. Population reduction is probably the result of changing water quality and resultant reduced oxygen content in the deeper waters of the lake.

Eastern Sand Darter, *Ammocrypta pellucida* (Putnam) (E)

Once found throughout the state, the Eastern Sand Darter is a victim of loss of habitat through stream siltation. Its numbers have declined steadily since the early 1900's.

Iowa Darter, *Etheostoma exile* (Girard) (E)

At one time the Iowa Darter was generally distributed throughout the glaciated portion of Ohio. Increased turbidity in the clean-water natural lakes preferred by this species has greatly reduced its numbers.

Tippecanoe Darter, *Etheostoma tippecanoe* Jordan and Evermann (R)

Formerly found in the Scioto and Muskingum drainages, the Tippecanoe Darter is disappearing from much of its original range. Siltation of sand and gravel beds has caused destruction of preferred habitat and resultant population decline.

Channel Darter, *Percina copelandi* (Jordan) (E)

The Channel Darter was originally found in both the Lake Erie and Ohio River drainages. It inhabited the extensive sand and gravel beaches of Lake Erie and of larger rivers of Ohio, particularly where currents were sluggish. Siltation appears to be the major cause of population decline.

Slenderhead Darter, *Percina phoxocephala* (Nelson) (R)

Originally found on bars and riffles of clean sand and gravel in major tributaries of the Ohio River, the Slenderhead Darter has also fallen victim to habitat destruction through siltation and increased turbidity.

Sauger, *Stizostedion canadense* (Smith) (U)

At the turn of the century the Sauger was present in both the Ohio River and the Lake Erie drainage systems. At present the Sauger is very rare in Lake Erie, but is frequently taken in the Ohio River and its larger tributaries.

Blue Pike, *Stizostedion vitreum glaucum* Hubbs (E)

The Blue Pike, or Blue Walleye, was once common in the deeper clearer waters of Lake Erie, at which time it was of considerable economic value to the commercial fisheries of Lake Erie. Today it faces extirpation throughout its range, probably as a result of deteriorating water quality and reduced oxygen content in the deeper waters of Lake Erie.

Spoonhead Sculpin, *Cottus ricei* (Nelson) (U)

The Spoonhead Sculpin apparently prefers an environment with a sand, gravel, or bedrock bottom in the deeper waters of Lake Erie. Although little information is available about this species, the Spoonhead Sculpin's habitat has doubtless decreased as a result of the eutrophication of Lake Erie.

APPENDIX

The following species, once nesting in Ohio, are now extinct:

- Passenger Pigeon, *Ectopistes migratorius* (Linnaeus)
 Carolina Parakeet, *Conuropsis carolinensis* Gmelin. *C. c. ludoviciana* (Gmelin)
 was the subspecies found in Ohio

The following species, still present in the United States, once bred in Ohio, but are now extirpated from the state, judging from the lack of recent records.

Mammals

- Snowshoe Rabbit, *Lepus americanus virginianus* Harlan
 Gapper's Red-backed Mouse, *Clethrionomys gapperi paludicola* Doult
 Black Rat, *Rattus rattus* (Linnaeus)—once an established exotic
 Gray Wolf, *Canis lupus lycaon* Shreber
 Marten, *Martes a. americana* (Turton)
 Fisher, *Martes p. pennanti* (Erxleben)
 Mountain Lion, *Felis concolor cougar* Kerr
 Lynx, *Lynx c. canadensis* Kerr
 Wapiti or Elk, *Cervus c. canadensis* Erxleben
 Bison, *Bison b. bison* (Linnaeus)

Birds

- Common Loon, *Gavia immer* (Brunnich)
 Double-crested Cormorant, *Phalacrocorax a. auritus* (Lesson)
 Common Merganser, *Mergus merganser americanus* Cassin
 Swallow-tailed Kite, *Elanoides f. forficatus* (Linnaeus)
 Osprey, *Pandion haliaetus carolinensis* (Gmelin)
 Merlin (probably), *Falco c. columbarius* Linnaeus
 Greater Prairie Chicken, *Tympanuchus cupido pinnatus* (Brewster)
 Sandhill Crane, *Grus canadensis tabida* (Peters)
 Northern Raven, *Corvus corax principalis* Ridgway

Reptiles

No known extirpated species

Amphibians

No known extirpated species

Fishes

- Lake Trout (probably), *Salvelinus namaycush* (Walbaum)
 Silvery Minnow, *Hybognathus nuchalis* Agassiz
 Pugnose Shiner, *Notropis anogenus* Forbes
 Blackchin Shiner (probably), *Notropis heterodon* (Cope)
 Blacknose Shiner (probably), *Notropis heterolepis* Eigenmann and Eigenmann
 Harelip Sucker, *Lagochila lacera* Jordan and Brayton
 Crystal Darter (this species may even be extinct), *Ammocrypta asprella* (Jordan)
 Gilt Darter (probably), *Percina evides* (Jordan and Copeland)
 Longhead Darter (probably), *Percina macrocephala* (Cope)

The following species were once extirpated from Ohio, but have now been reestablished:

- Beaver, *Caster canadensis carolinesis* Rhoads
 White-tailed Deer, *Dama virginiana virginiana* Zimmermann
 Canada Goose, *Brania canadensis interior* Todd
 Turkey, *Meleagris gallapavo silverstris* Vieillo

The mammals have become reestablished through natural reentry, and the birds through reintroduction by the Ohio Division of Wildlife. Turkeys were obtained

from Missouri, West Virginia, Alabama, Kentucky, Arkansas, Texas, and Florida. Introductions of Canada Geese were of several subspecies; however, most are of the original subspecies, *Branta canadensis interior*. Many *Branta canadensis maxima*, the giant race which inhabited the prairies, have also been introduced.

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