INTRODUCTION

Pennsylvania possesses a diverse assemblage of amphibians and reptiles, including 4 orders, 17 families, 44 genera, and 73 species. Thirty-six species of amphipans are native, 14 frogs and toads, and 22 are salamanders. Pennsylvania is home to 37 species of reptiles: 13 turtles, 4 lizards, and 21 snakes. The varied physiography and presence of 3 major drainage systems contribute greatly to the diversity of Pennsylvania's herpetofauna.

AMPHIBIAN AND REPTILE STATUS

Twenty-two percent of the species of amphibians and reptiles native to Pennsylvania are of special concern or have been extirpated from the state. The eastern tiger salamander (Ambystoma tigrinum tigrinum), midland smooth softshell turtle (Trionyx muticus), and eastern mud turtle (Kinosternon subrubrum subrubrum) are considered extirpated. Species listed as State Endangered by the Pennsylvania Fish and Boat Commission are the eastern massasauga rattlesnake (Sistrurus catenatus catenatus), eastern mud salamander (Pseudotriton montanus montanus), Kirtland's snake (Natrix kirtlandii), New Jersey chorus frog (Pseudacris nigrita kalmi), and the southern leopard frog (Rana sphenocephala). Three species are listed as State Threatened: the redbelly turtle (Pseudemys rubriventris rubriventris), green salamander (Aneides aeneus), and rough green snake (Opheodrys aestivus aestivus). Three additional species have candidate status: Blanding's turtle (Emys blandingi), broadhead skink (Eumeces laticeps), and timber rattlesnake (Crotalus horridus horridus). One species, the bog turtle (Clemmys muhlenbergii), is listed as Endangered under the Federal Endangered Species Act.

EXOTIC SPECIES

Primarily due to its temperate climate, Pennsylvania is home to few exotic species of amphibians and reptiles. Most species that would likely be introduced into the state either accidentally or intentionally would come from the pet trade. The vast majority of species in this trade are tropical or semi-tropical and cannot survive the harsh winter climate of Pennsylvania. For example, there have been numerous reports of alligators within Pennsylvania waters. Although some individuals might be able to survive for more than a year, the climate precludes the possibility of successful reproduction. The Italian wall lizard (Podarcis sicula) established a breeding population in Philadelphia early in the 1900s (Kauffeld 1931) and persisted for a number of years. The population was assumed to be extinct (John Groves, pers. comm.), but recent reports indicate that Podarcis may still survive in parts of Philadelphia.

The red-eared slider (Pseudemys scripta elegans) has recently been reported in Lehigh County (Dennis Buchanin 1996, pers. comm., Lehigh Valley Herpetological Society) where numerous individuals of different sizes have been observed. At this time it is not known if it is a breeding population or simply a group of individuals released over a period of several years. The red-eared slider has established successful introduced populations throughout most of Maryland west of the Chesapeake Bay and east of the Allegheny Mountains (Conant and Collins 1991). Climatic conditions are not greatly different in southeastern Pennsylvania, so it is likely that the Lehigh County population is reproductive. In 1997, several volunteers for the Pennsylvania Herpetological Atlas Project reported observing red-eared sliders from several locations (i.e., Northampton, Crawford, and Philadelphia counties).

Several species that are native to Pennsylvania have been moved to areas of the state where they did not naturally occur. These species that have been introduced to regions outside of their natural range can be considered exotic, but only in the regions where they have been introduced. For example, the shorthead garter snake (Thamnophis brachystoma) is native to the unglaciated region of northern Pennsylvania and adjacent New York, but populations have been established in Erie, Butler, and Allegheny. The presence of this species in Mercer County may also be an introduction. While the eastern tiger salamander is extirpated in Pennsylvania, occasional specimens are found (usually well outside the species' original range). These most
likely constitute "bait-bucket" introductions. The presence of the mudpuppy (*Necturus maculosus*), which is native to the Ohio River drainage, in the Delaware River may have come from Lake Erie by means of the New York canal system. The northern cricket frog (*Acris crepitans crepitans*) no longer occurs in Allegheny County, although it was common there prior to the turn of the century. These populations were undoubtedly introduced from the eastern part of the state. Recently the spiny softshell turtle (*Apalone spinifera*) has been reported from the lower Delaware River (Marline Corn 1997, pers. comm., Churchville Environmental Center). The species' natural range is restricted to the Ohio River drainage.

**THREATS**

Present threats to the native amphibians and reptiles of Pennsylvania include, but are not limited to, habitat loss and degradation due to water pollution, acid precipitation, wetland drainage, and changing land-use patterns.

It appears that the historic ranges of many species have been dramatically altered over the past half century. For instance, there are records for the bog turtle from northwestern Pennsylvania prior to the early 1900s, but none has been collected since. While historic records exist for the hognose snake (*Heterodon platyrhinos*) from Presque Isle, Erie County, recent ones are lacking. The northern leopard frog (*Rana pipiens*), once commonly encountered in southwestern Pennsylvania, is now rare or absent throughout much of that area. Anecdotal reports suggest that the Fowler's toad (*Bufo woodhousei fowleri*) is far less common today than in the first half of the century. Few records exist for Fowler's toad from western Pennsylvania after 1952.

The greatest threat, however, to the herp fauna of Pennsylvania may be our astonishing lack of knowledge about most species of amphibians and reptiles. Because so little is known of their ecology, life history, demographics, and distribution, status and population trends cannot accurately be determined. For example, the eastern spadefoot (*Scaphiopus holbrooki holbrooki*), the northern coal skink (*Eumeces anthracinus anthracinus*), and the eastern earth snake (*Virginia valeriae valeriae*) are known to inhabit only a few localities. At present, none of these species is listed as either Threatened or Endangered.

**INVENTORY AND MONITORING METHODS**

The first successful attempt to inventory the amphibians and reptiles of Pennsylvania was made by C. J. McCoy, Curator of Amphibians and Reptiles at the Carnegie Museum. He gathered all records for Pennsylvania amphibians and reptiles from the Carnegie Museum as well as all other museums with holdings of Pennsylvania specimens (e.g., Academy of Natural Sciences, Philadelphia; American Museum of Natural History, New York; Museum of Comparative Zoology, Harvard; National Museum of Natural History, Washington, D.C.). These, together with literature records for Pennsylvania specimens, were incorporated into a series of species specific spot distributional maps for the state. These were incorporated into *Amphibians and Reptiles in Pennsylvania*, published in 1982 as Special Publication Number 6 of the Carnegie Museum of Natural History.

This first attempt at an inventory indicated significant gaps in our knowledge of the distribution of amphibians and reptiles within the state. Records, even for species expected to be common, were often scarce or absent. As a result, maps frequently did not convey the true distribution of species in the state. Additional field work is needed so that the distribution of the amphibians and reptiles in the Commonwealth more accurately reflect the actual distribution of species. Compare the 1982 map from the Herpetological Atlas Database for ringneck snake (*Diadophis punctatus*) with the one from 1996, or the 1982 map of redbelly snake (*Storeria occipitomaculata*) with the 1996 map, to see what additional field work can provide.

In addition, much of the locality data presented on the maps in McCoy (1982) are historical records that are at least 4 decades old. For example, 12 of 14 (86%) localities for eastern worm snake (*Carphophis amoenus*) are from 40 or more years ago, with some from the turn of the 20th century. Eighty-eight percent of the localities for five-lined skink (*Eumeces fasciatus*) are at least 40 years old and one individual represents the fourth specimen accessioned into the collection of amphibians and reptiles at the Carnegie Museum. Because of changing land-use patterns and successional events, some of these historic populations probably no longer exist. In any event, after several decades to an entire century of no records, it would be wise to re-confirm the existence of historic populations.
The North American Amphibian Monitoring Program (www.im.nbs.gov/amphibs. html) has recently developed a set of guidelines for anuran calling surveys that presumably are statistically defensible, but has not made recommendations for aquatic surveys, terrestrial salamander surveys, or atlas projects. Plans are under way to develop an anuran calling survey in Pennsylvania.

**PABS AMPHIBIAN AND REPTILE DATA AND COMMITTEE PROJECTS**

The PABS amphibian and reptile technical committee has been working on several projects. The first of these is the development of an annotated checklist of the amphibians and reptiles of the state. The checklist will include the common name and parenthetically the scientific name of each species. We have selected Conant and Collins (1991) as our source for common names. The checklist will also include the current status of each species and its presence or absence from the physiographic provinces of the state.

In conjunction with the Pennsylvania Fish and Boat Commission and Indiana University of Pennsylvania, the committee has initiated an amphibian and reptile atlas project that is designed to use volunteers to develop a detailed, statewide, distributional database for amphibians and reptiles. The project began in 1996 and is expected to be a multi-year project, ending in 2003.

Possible projects for the future include educational packets dealing with Pennsylvania herpetofauna, an informational poster (similar to those produced for butterflies and bats) for one or more groups of amphibians and reptiles, and an update of the status categories for all species of amphibians and reptiles found within Pennsylvania.

**REFERENCES**


