PURDUE
EXTENSION

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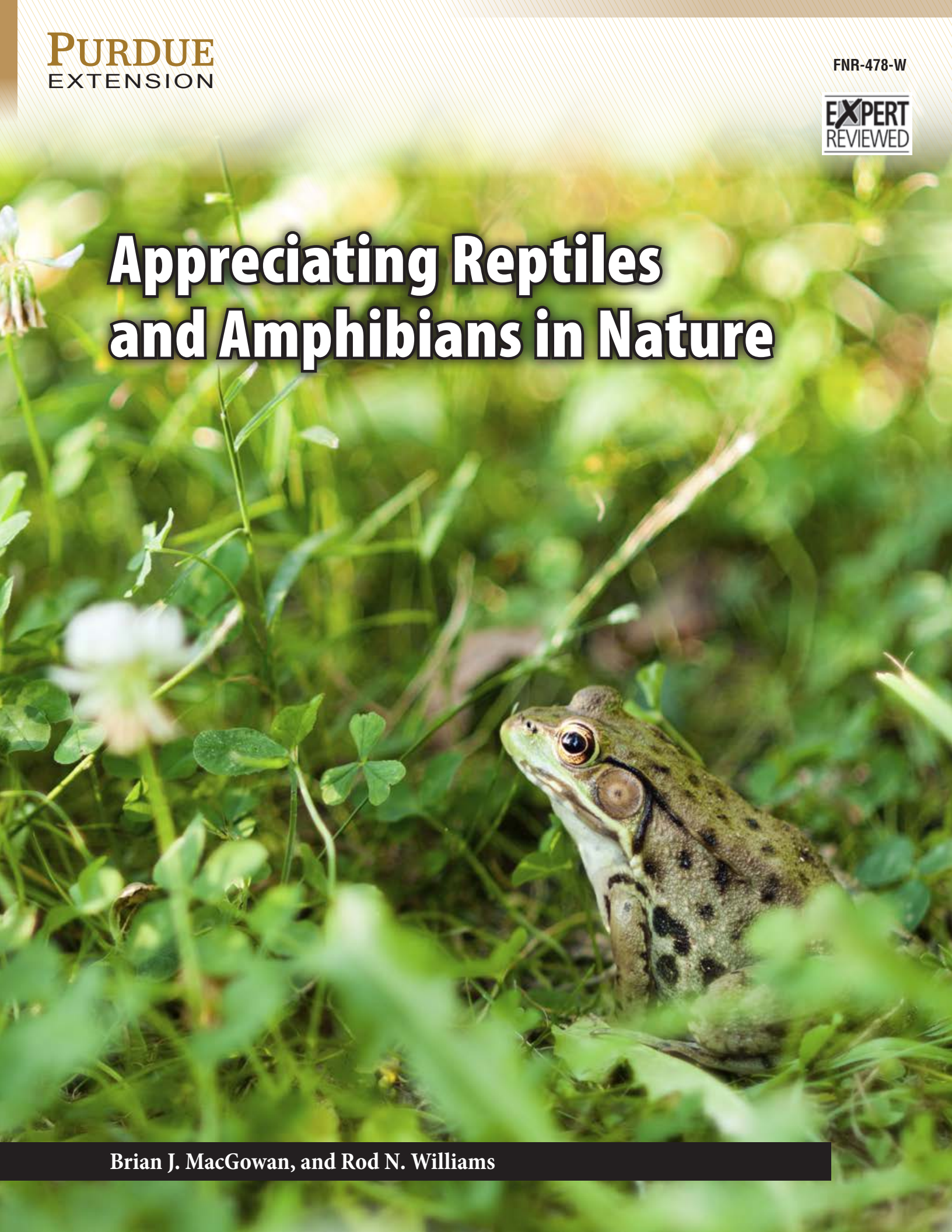
EXPERT REVIEWED

Appreciating Reptiles and Amphibians in Nature



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From the Authors

This publication will help amateur herpetologists and nature enthusiasts enjoy the diversity of amphibians and reptiles that call Indiana home, but in a responsible manner that maintains the resource for future generations to enjoy. We provide background information on why people are concerned about the future of reptiles and amphibians, give tips on enjoying reptiles and amphibians in the wild without disturbing them, suggest steps you can take in habitat management that can provide these animals a place to live, and discuss regulations that offer them protection.

– Brian MacGowan and Rod Williams

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INTRODUCTION

Dr. Durward Allen, a former professor of wildlife ecology and natural resources at Purdue University (1954-1976), authored several influential publications about wildlife conservation. In his book, *Our Wildlife Legacy* (1962), Dr. Allen wrote that people were part of the order of nature and, thus, wildlife management is in its true essence the management of people's experience with wildlife. Prior to this time, traditional wildlife management was more limited, focusing more on managing game for hunting. Dr. Allen recognized that game management was important, but emphasized that people are not separate from nature – management objectives should also include human values and that the daily decisions we make influence our environment positively or negatively.

This is a good lesson for how we interact with wildlife even today. With 78 percent of Indiana residents residing in urban counties, natural areas have become increasingly important for viewing wildlife, enjoying nature or just getting away from it all (Figure 1). In a recent survey by the Indiana Department of Natural Resources Division of Outdoor Recreation[1], 60 percent of Hoosiers reported participating in outdoor nature observation within the year. Observing nature or participating in other activities such as canoeing, wildlife photography, camping or bird watching allows people to reconnect with nature in ways that are personal to each, but often require people to get up close and personal with wildlife. Regrettably, these interactions aren't always positive for wildlife.

Reptiles and amphibians represent numerous examples where interactions between wildlife and people can have negative consequences despite the best of intentions. Many species of reptiles and amphibians are thought to be in decline. While the causes for declines are species-specific, the actions that people take can be a contributing factor (Figure 2).

[1]Indiana Statewide Outdoor Recreation Plan 2006-10

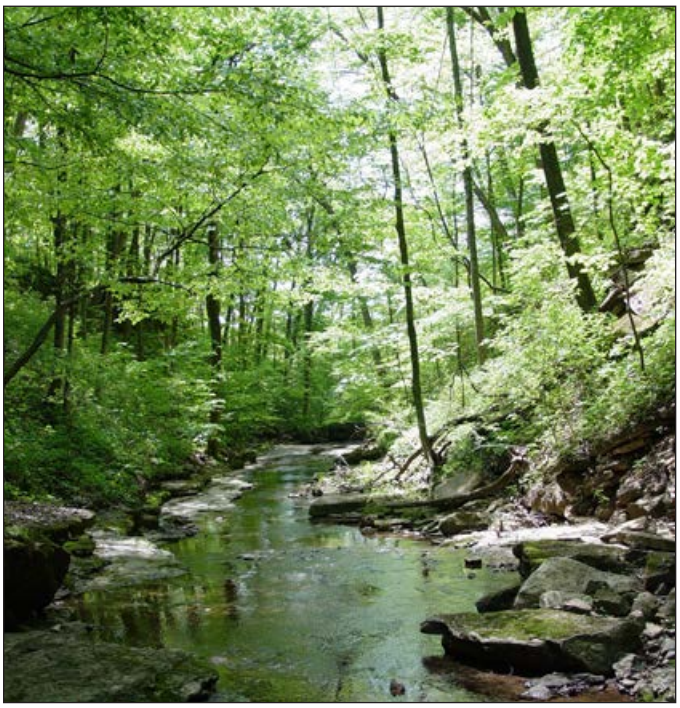

Figure 1. Natural areas provide both a great recreational resource for people and critical habitat for wildlife. Responsible use of these areas helps sustain the values they provide us all.

Figure 2. Eastern Hellbenders are critically endangered in Indiana and throughout much of their range. Hellbenders caught by anglers are sometimes killed because people sometimes incorrectly believe they eat sport fish when, in fact, hellbenders eat mostly crayfish.

Why Are We Concerned About Reptiles and Amphibians?

Reptiles and amphibians native to Indiana are an important component of healthy ecosystems. Reptiles and amphibians are formidable predators of small rodents (Figure 3), insects and mosquito larvae. In turn, reptiles and amphibians are a source of high-protein food for predators higher in the food chain. The role of amphibians and reptiles in food webs, however, is different than that of birds and mammals due to their reduced energetic needs. This is because of the fact that reptiles and amphibians are ectothermic and control their body temperatures externally. They move into the sun to increase their body temperatures and move into shade to cool down. This means they don't use the food they eat to maintain their internal temperatures. In fact, most of the energy (40-80 percent) from the prey that amphibians and reptiles consume is routed to body growth, which is energy that also can be passed along to predators. Conversely, up to 98 percent of all food intake is used for temperature regulation and activity in birds and mammals.

Furthermore, we can consider many amphibians as "bio-indicators" of environmental health for several reasons. Amphibians can be especially sensitive to changes in environmental conditions during the transition from eggs to larvae to adults, because they are highly susceptible to pollutants at these stages. Second, the permeable skin of amphibians allows

Figure 3. Timber Rattlesnakes feed on a variety of small mammals including chipmunks and tree squirrels. (Photo: John Vanek)

direct absorption of toxins and disease pathogens. Lastly, amphibians inhabit multiple habitat types because of their reliance on both aquatic and terrestrial habitats as a function of their biphasic (two-stage) life cycle. Disruptions in amphibian life cycles, or diseases and malformations, can alert us to problems in the aquatic and terrestrial habitats they occupy. These problems may, in turn, directly affect human health.

Amphibians and reptiles fill critical roles within many ecosystems as both predator and prey, yet populations are declining worldwide. According to the International Union for Conservation of Nature and Natural Resources (IUCN)[2], 32 percent of the world's frog and toad species, and 50 percent of the salamander and newt species, are threatened or extinct; population status is unknown for 25 percent of all amphibian species. Only 20 percent of reptiles have been formerly assessed by the IUCN. Of those, 28 percent are known to be threatened or extinct. Habitat loss/fragmentation, disease, roadways (Figure 4), illegal pet trade, over-harvesting (Figure 5) and poaching are all believed to contribute to the declines of many species. Estimating size and trends of wildlife populations can be very challenging. This is especially true for amphibians and reptiles, because most of these are secretive species and have one or more life history traits that make it difficult to observe and monitor their movements and populations (Figure 6).

Figure 4. Wildlife species that frequently cross roads, such as the Eastern Box Turtle (pictured), are at an increased risk for roadway mortality.

[2]http://www.iucnredlist.org/initiatives/amphibians/analysis/red-list-status, accessed July 3, 2012

Figure 5. The collection of amphibians and reptiles over time can have a tremendous impact on their populations. Some mistakenly think removing just a couple of animals will not have an impact. What they do not realize is that many people collecting animals from a site over time can cause local extinctions.

Figure 6. Many reptiles and amphibians are seasonally active, nocturnal, spend much of their time underwater or beneath leaf cover, occur in low densities, lack vocalizations, inhabit inaccessible areas, and/or have a small body size. These characteristics make amphibians and reptiles extremely difficult to observe and monitor in their natural habitats.

APPRECIATING REPTILES AND AMPHIBIANS IN THE WILD

Without a doubt some of our most enjoyable experiences revolve around excursions to the outdoors. You never know what you are going to see or experience. No two visits to the same place leave the same impression. Unlike other vertebrates, most reptiles and amphibians can be observed up close or even captured by hand – some more easily than others. Certain species tend to act more aggressively, but many can be quite docile and readily "pose" for pictures. Exploring beautiful habitats while searching for, catching and photographing reptiles and amphibians are great ways to gain hands-on experience with nature. However, be mindful that some activities, or the manner in which they are conducted, can harm the very creatures we value. While you enjoy a front row seat to some of nature's most spectacular and unique creatures, consider doing your part to help maintain them for future generations.

One of the easiest ways to enjoy native reptiles and amphibians is to attend an educational and interpretive program highlighting Indiana's herpetological diversity. Purdue University Extension (Box 1), Soil and Water Conservation Districts, and the Indiana Department of Natural Resources offer many educational programs throughout the year with information about native reptiles and amphibians. For example, the Indiana Master Naturalist, an introductory program of nature discovery and service learning for adults, usually includes a herpetology session.

Box 1 – As a land-grant institution, Purdue University provides the residents of Indiana with science-based information to help improve their lives and that of the public good. A component of the Extension mission at the Department of Forestry and Natural Resources at Purdue University focuses on wildlife conservation research, teaching and outreach, which includes reptiles and amphibians (see examples below). This mission is reached through many publications and programs offered to the public, often in cooperation with many government agencies, professional associations and non-government organizations.

Conservation Educational Resources – The "Got Nature?" blog (www.ag.purdue.edu/fnr/GotNature/) provides timely resources from Purdue researchers and specialists, and offers a forum for people to submit questions. The Indiana herpetology field guide series provides information on species identification, distribution and natural history. For these and other Purdue Extension publications, visit www.ag.purdue.edu/fnr/Pages/Extension.aspx.

Professionals and Continuing Education – Knowledge gained over five years of field research by multiple graduate students as a part of the Hardwood Ecosystem Experiment (www.HEEForestStudy.org) led to the development of forest management guidelines for native reptiles and amphibians (MacNeil et al. 2013). Extension specialists work regularly with professional organizations like the Society of American Foresters and the Wildlife Society to develop continuing educational programs for their members.

Youth Programming – The Nature of Teaching Program (www.purdue.edu/nature) provides a rich content of information, resources and workshops about nature that teachers and outdoor educators can use in the classroom. The Wildlife Habitat Education Program (WHEP) (www.four-h.purdue.edu/whep/) is a Purdue Extension 4-H and FFA youth natural resource program dedicated to teaching wildlife and fisheries habitat management to junior and senior level (ages 8-19) youth. Extension specialists also offer a variety of unique programs including the Indiana State Fair and service learning programs.

Tips and Best Practices

Following a few simple guidelines when observing any wildlife will help ensure that others, too, will be able to enjoy nature.

Where to go and when – The time of year and location is very important and varies from species to species. The best way to locate frogs and toads is to target temporary ponds, swamps, and other fishless water bodies immediately after warm spring rains. Frogs and toads breed in the spring and early summer, and their mating calls can be heard during nighttime visits. Visiting at night allows you to observe calling frogs that are hidden during the daylight hours. Most reptiles are best observed during the daylight hours when they are basking in the sun. During hot weather, it is best to target late morning or late afternoon; avoid the heat of the day.

Stay on roads and trail systems (Figure 7) – Human foot traffic can affect plants and animals in some habitats (e.g., you may have noticed the compressed soil and lack of vegetation on even lightly used foot trails). Focusing foot traffic on trails can minimize human impacts on sensitive plants and animals. It is also required on some public properties.

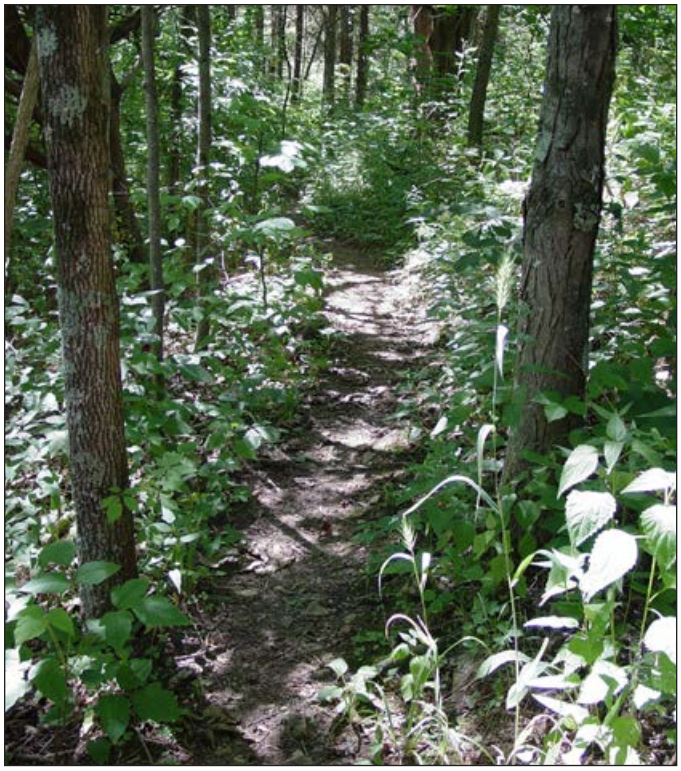

Figure 7. Trail systems allow people to access natural areas, and they are designed with much thought and planning. They minimize harm to the habitat by concentrating damage caused by food traffic.

Pets – Dogs make good companions when hiking outdoors. However, research has demonstrated dogs can disturb, harass or even kill wildlife. While impacts on reptiles and amphibians are unclear, it is good practice to keep your dog leashed while exploring natural areas. Many parks and properties require dogs to be leashed.

Turn over rocks and logs with care – Carelessly turning over logs and coarse woody debris (Figure 8) in search of reptiles and amphibians can destroy microhabitat features that took decades to create. Logs of some hardwood species provide cover and habitat for reptiles and amphibians, while harboring important prey, including invertebrates and small rodents. Destroying these microhabitats can be harmful to some species of reptiles and amphibians. It is also prohibited on many public properties. If you do find an animal under a log or rock, return the object to its original location then place the animal next to it rather than rolling the object directly over the animal.

Identification – There are nearly 100 species of reptiles and amphibians found throughout Indiana. Some are widespread while others are found only in select areas. Several identification guides and resources specific to Indiana are available and listed at the end of this publication. These guides include information

Figure 8. Downed woody debris, like this log, provides important habitat for many species of reptiles and amphibians.

about identification, general biology, food habits, habitat use and distribution for species found in Indiana. Geographic location, habitat type and time of year can narrow the list of potential species you might encounter to a more manageable number. Become familiar with potential species you may encounter before you begin your trip. Not knowing what you are looking at can be frustrating but, more importantly, there are many species that should not be handled, including endangered species and venomous snakes.

Venomous snakes – There are four venomous snake species in Indiana (Copperhead, Cottonmouth, Timber Rattlesnake and Massasauga), each with a generally limited distribution. All of the venomous snakes in Indiana are pit vipers, and each shares a suite of unique physical characteristics that separate them from nonvenomous species in the region. The most notable feature unique to pit vipers is the loreal, or sensory pit, located between the eye and the nostril on each side of the head (Figure 9). All other snakes in Indiana lack these sensory pits. The pupils of pit vipers are vertical (i.e., "cat-like") slits in bright daylight; pupils of non-venomous species are round. Pit vipers are relatively heavy-bodied and have thick, broad, spade-shaped heads that are distinctly wider than their narrow necks. However, the shape of the head may not offer a definitive way to differentiate some non-venomous snakes from their venomous cousins. Species such as watersnakes and hog-nosed snakes can be rather stout and may flatten their heads when threatened (Figure 10).

Common sense should dictate what you should do if you encounter a venomous snake. Like most wild animals, venomous snakes avoid people when possible. They are more likely to bite when harassed. Biting is a snake's last line of defense. Do not approach venomous snakes and remain at least 4 feet away. Stand still and the snake will simply find its escape route to cover and away from you. Attempting to kill the snake only brings you closer, and it increases your chance of being bitten. Most of Indiana's venomous snakes are state endangered so killing them, unless in self-defense, is also illegal.

There are several simple measures that can be taken to avoid encounters with venomous snakes when hiking. Be alert and scan the area ahead, particularly areas containing logs or rocks. Do not reach under rocks or logs, and do not step directly over logs. First step on the log, look and then continue. Always wear high-topped, leather hiking boots, rubber boots or knee-high boots. Snake-proof chaps and gaiters are commercially available.

Figure 9. Pit vipers (Timber Rattlesnake pictured) have heat-sensing pits located between the eye and the nostril on each side of the head. Only trained professionals with proper protective equipment should handle venomous snakes.

Figure 10. Many species of non-venomous snakes can flatten their heads (Eastern Hog-nosed Snake pictured) when threatened. To the untrained eye, people may confuse these snakes that have "wide heads" for their venomous cousins, the pit vipers.

Handling animals – if you must handle a wild reptile or amphibian (Figure 11), there are safe ways to hold and restrain them (but also see disease issues below). Safe handling procedures include the following:

- Avoid handling amphibians for long periods of time. Amphibians are prone to desiccation (drying out). There are no formal guidelines on the length of time to handle an amphibian, and it is not clear how handling impacts an animal's health and wellbeing. Common sense dictates that handling time should be minimized to the greatest extent possible. If a frog or salamander feels "dry," you have handled it too long and it should be returned to its location of capture immediately. Keep your hands moist and free of chemicals (e.g., bug spray or sunscreen).

- Avoid holding Eastern Snapping Turtles by the tail. If you must handle a snapping turtle it is important to grasp the turtle by the back of the shell (Figure 12). Holding large snapping turtles by the tail (or any other turtle for that matter) can seriously damage the tailbones.

Figure 11. Reptiles and amphibians offer a unique opportunity to view wildlife up close. Following a few common sense guidelines can help minimize harm to wildlife and the handler.

- Avoid grabbing lizards and salamanders by the tail. Many species of lizards and salamanders sacrifice (autotomize) their tails to avoid capture by predators, meaning they will literally break off in your hands. Until they regrow their tails, they are without this important defense mechanism. Tails are slow to regrow and they will not attain their original length.

- Support the weight of the snakes rather than grabbing and holding their heads. Snakes may bite and release musk when handled.

Figure 12. Bites from many wildlife species can cause painful wounds and injuries. If you must handle or restrain these animals, use extreme caution and care, as well as the proper technique.

Disease Issues

Most diseases of reptiles and amphibians are not transmissible to humans. Diseases that can be transmitted from animals to humans are called zoonotic diseases. Concerns about diseases contracted from reptiles and amphibians primarily are limited to people who contact *Salmonella* from the feces of animals they house or handle. *Salmonella*, bacteria which naturally occurs in the gastro-intestinal tract of reptiles and amphibians, causes a human disease called salmonellosis. Animals infected with *Salmonella* usually do not appear sick. According to the Centers for Disease Control (www.cdc.gov), reptiles are responsible for an estimated 74,000

cases annually. Diarrhea, fever and stomach pain are typical symptoms that usually clear up within one week. Severe cases can result in hospitalization and even death. If you think you have been exposed to *Salmonella*, seek medical attention and notify physicians of potential exposure.

The transmission of many diseases among animals can be facilitated by people. Perhaps the amphibian disease of most concern to scientists today is Chytridiomycosis. This disease, caused by the fungus *Batrachochytrium dendrobatidis*, is one of the greatest threats facing amphibian species worldwide. The first documented outbreaks of chytrid fungus occurred in the late 1990s in Central America and Australia. Since then it has been associated with severe population declines and documented extinctions worldwide.

The fungus most likely is spread directly between animals, vectors (e.g., crayfish) or infected water, although some species are resistant. Chytrid fungus has been found in Indiana but so far has not been associated with any major mortality events. Nature enthusiasts can potentially spread the chytrid fungus between animals or between sites by moving infected frogs or tadpoles (even resistant species such as American Bullfrog) among wetlands. This is one reason why it is important to never release an animal into an area where it was not originally collected. Note that animals infected with the chytrid fungus may not display any visible signs of sickness or infection. Other ways people can spread the chytrid fungus are by wearing infected clothing and using infected equipment, or not following proper hygiene after handling infected animals.

While the risk of disease transmission is low, there are a number of safeguards that can be implemented to not only protect you, but also the animal populations as well. To prevent spreading diseases and pathogens from one site to another, regularly wash clothing, and especially boots, that you use in the field. All equipment that contacts an animal or the water the animal was in should be decontaminated using a 1-3 percent bleach solution, or air dried for at least three hours before traveling to another water body. You also should use hand sanitizer before and after handling animals in nature. Before eating or handling food, thoroughly wash hands in hot, soapy water if possible; hand sanitizer is an acceptable substitute for remote locations.

Photography

Photography is a favorite pastime of millions of Americans (Figure 13). Amphibians and reptiles make excellent photogenic subjects with the wide variety of colors, shapes and reactions they can provide to the photographer. They can be approached close enough that specialized zoom lenses and equipment to photograph them are not necessary.

Most species can be photographed with a digital camera, Smartphone or point-and-shoot cameras. Digital single lens reflex (SLR) cameras offer more control over images you photograph, but are not required. However, when it comes to creating quality images, the quality of the lens is still important on even the most basic camera.

If you are considering asking a professional to identify a species based on a photograph, take photos of the head, back, sides and belly. High-resolution photos that show detailed features (e.g., scales, toes, eye color, etc.) increase the likelihood of positive identification. It may be helpful to have a common object in the photo to give a sense of "scale," such as a coin or pen. For characteristics of particular interest, reference the identification guides listed at the end of the publication.

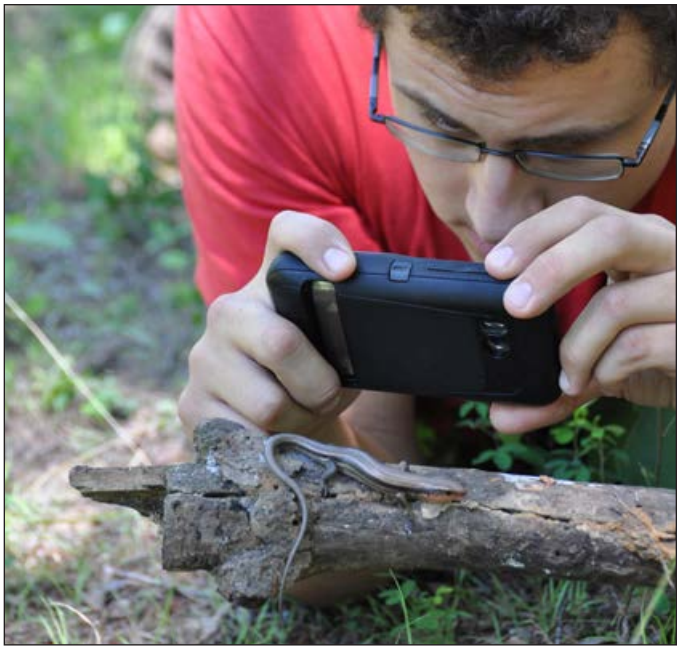

Figure 13. Photography is a great way to "capture" reptiles and amphibians without removing them from their habitat.

APPRECIATING REPTILES AND AMPHIBIANS AROUND THE HOME AND COMMUNITY

Habitat Management

Merely setting aside land may be inadequate in providing suitable habitat for wildlife. Quality habitat is a limiting factor for many species of wildlife.

Understanding the habitat needs of wildlife and how a property can provide their food, cover, water and space requirements can be challenging. Wildlife research has provided insights into habitat components that can benefit a wide diversity of amphibians and reptiles (Box 2).

Box 2 – Radio telemetry is among the most useful and widely used methods in the study of wild animals. Most animals are difficult, if not impossible, to observe in their natural settings. To overcome this limitation, wildlife researchers capture animals, attach a transmitter, and track their movements using specialized receivers. Radio telemetry allows researchers to assess the types and frequency of habitats used, how animals travel within their habitats, and how large an area they need throughout their life cycle. In addition to learning these basic habitat requirements, radio telemetry can be used to assess survivorship within wildlife populations.

Survival of animals often is difficult to determine, but biologically critical, for estimating long-term population viability and determining causes of mortality. This information is particularly useful for developing stewardship plans that benefit rare and declining species. High adult survival rates of endangered species (Table 1) do not guarantee that populations are doing well. Wildlife populations are not sustainable without the successful addition of young animals that live to grow and become new breeding adults. For example, a hypothetical population of 100 adult box turtles with a 96 percent annual survival rate will decrease to 46 turtles after 20 years without the addition of new turtles; only 17 turtles would remain after 20 years if annual survival decreased to 92 percent. From this example it is clear that just because you see box turtles out on the landscape does not mean that populations are doing fine. It demonstrates how the addition of a few additional animals in a given year can have a major impact on the health of the overall population. What you do is important. Removing a couple of turtles from an area can impact the entire population.

Table 1. Adult mortality rates of endangered species or species of special concern in Indiana. Estimates derived from animals tracked using radio telemetry. All animals were located 30-100 times per year over a 2-5 year period.

	Lifespan	Annual Mortality[1]	Causes of Mortality[1]
Box Turtle 	Up to 100 years	4%	Predation, disease, freezing
Timber Rattlesnake 	~ 25 years	7%	Predation (mostly by raptors), human persecution, overwintering factors, and vehicle traffic on roadways
Eastern Hellbender 	~ 30 years	20%	Human persecution, suspected predation, senescence (old age)

[1]Currylow et al. 2011, Olson et al. 2013a, Olson et al. 2013b, annual mortality estimates and causes of mortality

The "typical" backyard can be poor habitat for wildlife species. However, there are several basic activities you can do to improve habitat for wildlife on your property (Table 2). Implementing a few of the cultural practices and projects listed will help to enhance your property for reptiles and amphibians. Be aware that your local building codes or neighborhood association may restrict or prohibit water features or brush piles on your property. Do not place brush piles or logs near homes, garages, sheds or barns as this can attract carpenter ants, termites and rats.

Water – A water feature provides excellent habitat for amphibians and reptiles. The size and type of water gardens, ponds or wetlands you choose will depend on your budget, time and the area you want to devote to the project. Biebighauser (2011) describes design and construction of a wide variety of wetland sizes and types. Water features (Figure 14) that include variable depths, shallow slopes, sun and shade, logs for basking sites, partially submerged branches for amphibian egg attachment, aquatic and emergent plants in and around the water, and leaf litter and other natural debris are particularly valuable.

Cover – Habitat features, and especially those placed near or adjacent to a water feature, can be just as important as food or water. Rocks and rock piles, brush piles and logs (Figure 15) can all provide protective cover and nesting sites. When piling rocks and brush, place the larger limbs and rocks on the bottom to create hiding places. These structures can be placed along the edge of a woods or the back of the property.

A more subtle approach may be more suitable for small properties. Clay flower pots placed on their side and partially buried can provide "homes" for toads in your yard. Using rocks as groundcover in sunny areas can provide habitat for skinks and other lizards. The rocks should be large enough to allow for small pockets and hiding spaces. Small boards or large rocks can

Table 2. Examples of improvements to habitats that attract reptiles and amphibians.

		Toads	Frogs	Salamanders	Lizards	Snakes	Turtles
Water Features	Gentle slope	x	x	x		x	x
	Logs	x	x	x		x	x
	Submerged branches		x	x			
	Aquatic plants		x				x
	Emergent plants	x	x	x		x	x
	Leaf litter (in water)	x	x	x		x	x
Terrestrial Features	Rock pile				x	x	
	Brush pile				x		x
	Logs and downed woody debris	x	x	x	x	x	x
	Leaf litter	x	x	x	x	x	x
	Rocks				x	x	
	Trees		x	x	x	x	x
	Shrubs				x	x	x
	Wildflowers	x	x				x
	Sandy or loose soil		x			x	x

Figure 14. Small wetlands, or vernal ponds, offer important breeding habitats for many amphibian species that typical farm ponds do not provide. Property owners can construct small vernal ponds using a shovel and pond liner.

Figure 15. Rock used in landscaping or piled specifically for wildlife is excellent cover for Five-lined Skinks and other lizards.

be hidden in flowerbeds and gardens. Don't forget that native shrubs, wildflowers and ground cover can add important structural elements to any backyard wildlife habitat. See Miller and MacGowan (2004) for more ideas on backyard wildlife habitats, or visit www.purdue.edu/wildlife.

Pesticides – Many reptiles and amphibians eat insects, including many garden pests. When possible, limit pesticide use around the home.

Persecution – One of the easiest ways to help reptiles and amphibians is to simply let them be. Some species are susceptible to unwarranted killing, because they are believed to conflict with other uses on the property. For example, the myth that turtles and watersnakes cause declines in sportfish and duck populations may result in people killing these species. The truth is most turtles do not even eat fish and watersnakes eat mostly fish species that are not desired by anglers. They also serve an important ecological role by removing injured and diseased fish from the population. Snapping turtles can injure or kill ducks, but other semi-aquatic turtles such as sliders and painted turtles do not harm ducks.

Citizen Science

People can actively participate in reptile and amphibian conservation through monitoring programs. The North American Amphibian Monitoring Program (NAAMP) is a monitoring program to assess frog and toad population trends across North America, including in Indiana (www.pwrc.usgs.gov/naamp/). Frogs and toads have unique breeding calls (Figure 16) that allow their detection along established road routes surveyed by volunteers during their active season. The NAAMP compiles these data to calculate an index of population trends (increasing, stable or decreasing) for each species. The Division of Fish and Wildlife coordinates the NAAMP program in Indiana, and volunteers are always welcomed. You can email naamp@dnr.IN.gov for more information.

Figure 16. Gray Treefrogs and other frogs and toads use vocalizations to attract mates during the breeding season. They not only help us locate animals that are otherwise difficult to find, but also can be used to assess population trends using standardized scientific methods.

Figure 17. Indiana has many public properties that provide excellent opportunities to view and photograph wildlife and their habitats. Following property rules is a good way to sustain this valuable resource for future generations.

FrogWatch USA is another program using citizen science. For more than 10 years, volunteers have been trained to enter their FrogWatch USA information, and ongoing analyses of these data have been used to help develop practical strategies for the conservation of species. Visit www.aza.org/frogwatch/ to find a local chapter and information about volunteer training.

Possession of Wild Animals and Land Access

Public lands are used by a wide variety of outdoor enthusiasts (Figure 17). While the collection of most amphibians and reptiles is prohibited on these properties, many recreational herpetologists (a person who studies reptiles and amphibians) locate and photograph these animals in their native habitats. This type of use on Indiana public lands can be high and, when concentrated, could potentially spread disease among wildlife or harm the animals even though they are left in their environment. Access and collection rules vary by property depending on the land management agency. Some public properties have additional restrictions regarding signing in, trail use and prohibited areas or habitat disturbance. If you plan to visit public lands, check with the property office for rules and information.

Indiana, like many states, is making efforts to protect its native reptiles and amphibians by regulating collection of common species and granting complete protection for endangered species. Indiana law prohibits the taking of all reptiles and amphibians on Department of Natural Resources lands, except game species in season with a valid hunting license. For questions regarding the collection of reptiles or amphibians, contact the Indiana Department of Natural Resources Division of Fish and Wildlife at (317) 232-4080, www.in.gov/dnr/fishwild/, or a local DNR conservation officer.

Additional Points to Consider:

Reptiles and amphibians as pets – Indiana law allows for the collection and possession of a limited number of some reptiles and amphibians. While we recognize the potential value of this practice for education and as a means to gain firsthand experience with nature, we generally do not promote its practice since most wild amphibians and reptiles do not make good pets. For example, they are prone to disease in captivity and it is difficult to identify illness from changes in their behavior. Long-lived species (many live 30 years or more) can outlive the interest of most pet owners and, once in captivity, the animals are unsuitable for return to the wild.

Releasing captive wild animals – To prevent the spread of disease and other problems, a captive wild animal may not be released back into the wild in Indiana without a special permit unless the following conditions are met: *1) the animal has been held in captivity no longer than 30 days; 2) it has not been housed (caged) with other animals; and 3) the release is at the original location of capture.* In addition, any amphibian and reptile acquired outside of Indiana may not be released in the state under any circumstances. There are several cases that demonstrate why releasing animals outside of their natural range can cause environmental damage. For example, introduced bullfrogs have contributed to the decline of amphibians and even a few reptiles in the western United States.

Illegal collection and sale – Poaching and sale of wild-caught animals poses a significant threat to wild species. The purchase or sale of Indiana's native reptiles and amphibians is prohibited. Do not purchase animals that you suspect to have been collected illegally, and report suspicious activity to a conservation law enforcement officer. People with good intentions may rationalize the purchase of such animals since the animal is already collected, and they would at least provide care for it. However, purchasing these animals helps perpetuate this illegal practice.

FINAL REMARKS

It is one thing to read about nature in magazines and books or to watch nature unfold on television, but experiencing it in person can be an event that is not easily forgotten. Enjoying the outdoors provides many opportunities to see and hear wildlife, and to appreciate the great diversity of plants, animals and habitats that occur in Indiana. When we visit public and private lands, it is surprising what wildlife can exist in places no one thought possible.

The enjoyment of viewing amphibians and reptiles up close comes with some sense of environmental responsibility and treating wildlife with respect. Many of these species are known or suspected to be in decline. Following the tips provided in this guide will minimize your impact on this important resource. Additionally, you can take an active role in benefiting amphibians and reptiles by creating or improving habitat on your property or becoming involved in a citizen science program.

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[3]Available from Purdue University's The Education Store at https://mdc.itap.purdue.edu/, edustore@purdue.edu or (888) 398-4636

CHECKLIST OF INDIANA AMPHIBIANS AND REPTILES

Salamanders

Family: Sirenidae

☐ Western Lesser Siren (*Siren intermedia nettingi*) _____

Family: Cryptobranchidae

☐ Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*)_____

Family: Proteidae

☐ Common Mudpuppy (*Necturus maculosus maculosus*) _____

Family*: *Plethodontidae

☐ Northern Dusky Salamander (*Desmognathus fuscus*) _____
☐ Four-toed Salamander (*Hemidactylium scutatum*) _____
☐ Long-tailed Salamander (*Eurycea longicauda longicauda*)_____
☐ Southern Two-lined Salamander (*Eurycea cirrigera*)_____
☐ Cave Salamander (*Eurycea lucifuga*) _____
☐ Green Salamander (*Aneides aeneus*) _____
☐ Northern Slimy Salamander (*Plethodon glutinosus*) _____
☐ Northern Zigzag Salamander (*Plethodon dorsalis*) _____
☐ Eastern Red-backed Salamander (*Plethodon cinereus*) _____
☐ Northern Ravine Salamander (*Plethodon electromorphus*) _____

Family*: *Salamandridae

☐ Eastern Newt (*Notophthalmus viridescens*) _____

Family*: *Ambystomatidae

☐ Jefferson Salamander (*Ambystoma jeffersonianum*)_____
☐ Blue-spotted Salamander (*Ambystoma laterale*) _____
☐ Marbled Salamander (*Ambystoma opacum*) _____
☐ Mole Salamander (*Ambystoma talpoideum*) _____
☐ Spotted Salamander (*Ambystoma maculatum*) _____
☐ Eastern Tiger Salamander (*Ambystoma tigrinum tigrinum*) _____
☐ Small-mouthed Salamander (*Ambystoma texanum*) _____
☐ Streamside Salamander (*Ambystoma barbouri*)_____
☐ Unisexual *Ambystoma* _____

Frogs and Toads

Family*: *Scaphiopodidae

☐ Eastern Spadefoot (*Scaphiopus holbrookii*)_____

Family*: *Bufonidae

☐ American Toad (*Anaxyrus americanus*)_____

☐ Fowler's Toad (*Anaxyrus fowleri*)_____

Family*: *Hylidae

☐ Eastern Cricket Frog (*Acris crepitans*) _____

☐ Western Chorus Frog (*Pseudacris triseriata*) _____

☐ Spring Peeper (*Pseudacris crucifer*) _____

☐ Gray Treefrog (*Hyla versicolor*) _____

☐ Cope's Gray Treefrog (*Hyla chrysoscelis*) _____

☐ Green Treefrog (*Hyla cinerea*) _____

Family*: *Ranidae

☐ Green Frog (*Lithobates clamitans*) _____

☐ American Bullfrog (*Lithobates catesbeianus*) _____

☐ Crawfish Frog (*Lithobates areolatus*) _____

☐ Northern Leopard Frog (*Lithobates pipiens*) _____

☐ Southern Leopard Frog (*Lithobates sphenocephalus*) _____

☐ Plains Leopard Frog (*Lithobates blairi*) _____

☐ Pickerel Frog (*Lithobates palustris*) _____

☐ Wood Frog (*Lithobates sylvaticus*) _____

Turtles

Family*: *Chelydridae

☐ Eastern Snapping Turtle (*Chelydra serpentina serpentina*)_____

☐ Alligator Snapping Turtle (*Macrochelys temminckii*) _____

Family*: *Trionychidae

☐ Eastern Spiny Softshell (*Apalone spinifera spinifera*) _____

☐ Midland Smooth Softshell (*Apalone mutica mutica*) _____

Family*: *Kinosternidae

☐ Eastern Mud Turtle (*Kinosternon subrubrum subrubrum*) _____

☐ Stinkpot (*Sternotherus odoratus*) _____

Family*: *Emydidae

☐ River Cooter (*Pseudemys concinna*)_____

☐ Midland Painted Turtle (*Chrysemys picta marginata*) _____

☐ Red-eared Slider (*Trachemys scripta elegans*)_____

☐ Spotted Turtle *(Clemmys guttata)* _____

☐ Blanding's Turtle *(Emydoidea blandingii)*_____

☐ Northern Map Turtle (*Graptemys geographica*) _____

☐ False Map Turtle (*Graptemys pseudogeographica pseudogeographica*) _____

☐ Ouachita Map Turtle (*Graptemys ouachitensis*) _____

☐ Eastern Box Turtle (*Terrapene carolina carolina*)_____

☐ Ornate Box Turtle (*Terrapene ornata ornata*) _____

Lizards

Family*: *Phrynosomatidae

☐ Eastern Fence-lizard (*Sceloporus undulatus*) _____

Family*: *Anguidae

☐ Slender Glass-lizard (*Ophisaurus attenuatus*) _____

Family*: *Teiidae

☐ Six-lined Racerunner (*Aspidoscelis sexlineata*)_____

Family*: *Scincidae

☐ Common Five-lined Skink (*Plestiodon fasciatus*) _____

☐ Broad-headed Skink (*Plestiodon laticeps*) _____

☐ Little Brown Skink (*Scincella lateralis*)_____

Exotic Species

☐ Common Wall Lizard (*Podoacris muralis*)_____

Snakes

Family*: *Viperidae

☐ Copperhead (*Agkistrodon contortrix*)_____

☐ Cottonmouth (*Agkistrodon piscivorus*) _____

☐ Timber Rattlesnake (*Crotalus horridus*)_____

☐ Massasauga (*Sistrurus catenatus*) _____

Family*: *Colubridae

☐ North American Racer (*Coluber constrictor*) _____

☐ Yellow-bellied Kingsnake (*Lampropeltis calligaster*)_____

☐ Common Kingsnake (*Lampropeltis getula*) _____

☐ Milksnake (*Lampropeltis triangulum*) _____

☐ Rough Greensnake (*Opheodrys aestivus*) _____

☐ Smooth Greensnake (*Opheodrys vernalis*) _____

☐ Gray Ratsnake (*Pantherophis spiloides*) _____

☐ Western Foxsnake (*Pantherophis vulpinus*) _____

☐ Gophersnake (*Pituophis catenifer*) _____

Family*: *Natricidae

☐ Kirtland's Snake (*Clonophis kirtlandii*)_____

☐ Plain-bellied Watersnake (*Nerodia erythrogaster*) _____

☐ Diamondback Watersnake (*Nerodia rhombifer*)_____

☐ Northern Watersnake (*Nerodia sipedon*) _____

☐ Queensnake (*Regina septemvittata*) _____

☐ DeKay's Brownsnake (*Storeria dekayi*)_____

☐ Red-bellied Snake (*Storeria occipitomaculata*)_____

☐ Butler's Gartersnake (*Thamnophis butleri*)_____

☐ Western Ribbonsnake (*Thamnophis proximus*) _____

☐ Plains Gartersnake (*Thamnophis radix)*_____

☐ Eastern Ribbonsnake (*Thamnophis sauritus*)_____

☐ Common Gartersnake (*Thamnophis sirtalis*)_____

☐ Smooth Earthsnake (*Virginia valeriae*) _____

Family*: *Dipsadidae

☐ Eastern Wormsnake (*Carphophis amoenus*) _____

☐ Ring-necked Snake (*Diadophis punctatus*)_____

☐ Eastern Hog-nosed Snake (*Heterodon platirhinos*) _____

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