

Introduction

Background: Habitat Loss, Population Declines, and What We Can Do

Amphibians and reptiles are important creatures in the web of life. While they have not received as much attention as birds and mammals, they do play an important role in the “balance” of nature, and may also benefit us by eating insects, rodents, and other pest species. Given our developing awareness of their decline, **amphibians have been highlighted as aquatic “canaries in the coal mine,” revealing to us subtle declines in water quality and environmental health.** Reptiles and amphibians are also fascinating to see and learn about. For example, snakes can go for months without eating, many turtles live for more than 50 years, and some frogs can survive being frozen for long periods of time. **We hope you will agree they are worth protecting by proper habitat management.**

Across the Midwest, and indeed across the face of the Earth, amphibians and reptiles are in decline. There are many reasons for this, but a common one is the loss or degradation of suitable habitat. At the most basic level, this means that there simply is not enough of a particular kind of land or water type to support even those animals that were once common to an area. More subtly, it may be that the habitat is now too degraded, or that perhaps not all of an animal’s needs are being met. For example, maybe there is plenty to eat, but nowhere to hibernate.

As our awareness of habitat loss has grown, many people overseeing land-use decisions have become more concerned about the needs of these animals. Sometimes this is a land manager, but more frequently it is the private landowner. After all, in the Midwest, a majority of the land is privately owned and managed.

In spite of an earnest desire to help, many persons do not have all of the information they need to help protect amphibians and reptiles. We hope to change that by providing the kind of information you need to make a difference.

This guide is directed towards resource managers and private landowners who have a strong desire, or at least an obligation, to help protect reptiles and amphibians.

Our approach has been to identify the most important considerations for each habitat, explain why we think they are important, and then suggest what to do about it. Properly informed, you can take it from there if you are a trained resource manager. Alternatively, you can enlist the help from local trained experts to do what you can for the amphibians and reptiles on your land. This brings up an important point: **this guide is not intended to be exhaustive. For many of the suggested activities, you will need help or you may need to acquire specific training.** We would not, for example, want anyone to rush out and use fire to control successional growth.

Habitat conservation is preventative maintenance, and every little bit helps. If many landowners and land managers each implement some of these guidelines, then the cumulative effect can only be a positive one. We have not created a document that describes the needs of every species of amphibian and reptile. Instead, **we provide guidelines for managing habitats of the Midwest that have general positive benefits not only for the associated amphibians and reptiles, but also for other wildlife that share those habitats.**

These guidelines are not regulations, nor are they in any way an attempt to limit landowners’ rights. They should be regarded simply as recommendations for landowners and managers to consider the needs of amphibians and reptiles in the course of their land management activities.



C. Barlow

Fragmentation and degradation of the natural habitat is a common feature of the Midwestern landscape.

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How to Use These Guidelines

STEP 1: Identify the Habitats On Your Land

This guide is largely arranged in habitat sections or modules. Use the habitat descriptions to figure out which habitats you have on your property.

Each habitat module includes:

1. a brief habitat description,
2. discussion of amphibian and reptile species commonly associated with that habitat,
3. suggestions to maximize management benefits for amphibians and reptiles, and finally,
4. additional management suggestions when the primary focus of land management is not amphibian and reptile conservation.



C. Caldwell

Gus and his Bullfrog.

STEP 2: Identify What Needs to Be Done

Look over the habitat modules and consider what you can do for the reptiles and amphibians that live in the habitats you have. Read about the habitat and what kinds of amphibians and reptiles live there. When you have identified your habitats and have a grasp of what the animals need, you can think about management goals for the area. **You will be more effective if you have a basic understanding of the biology of reptiles and amphibians**, so that you may begin to identify their needs on your property. As part of the introduction, we provide you with a primer on the biology and ecology of reptiles and amphibians. We also provide an appendix containing a checklist of reptile and amphibian species. The list is arranged by state and habitat type for ease of use.

STEP 3: Review the Toolkit and Figure Out How to Do It

Develop a plan. If you are a professional land manager, perhaps you can take it from there. However, this may also be the point where you work with regional experts to develop the most effective means of management for resident amphibians and reptiles, and then implement your plan. **Keep in mind that sometimes the best thing to do is nothing at all.** Areas that are in good natural condition may simply need to be protected, not managed into something else.

STEP 4: Monitor Your Efforts for Success

We encourage you to monitor your efforts to see if they are being effective. If they are, then that's great. However, if things don't appear to be working, it may be time to revisit the drawing board, and possibly include more heads in making up the plans. After that, keep trying!

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Reptile and Amphibian Facts and Jargon

Amphibians and reptiles are frequently called “herps” or “herptiles.” These terms are abbreviations of the word “herpetofauna,” which refers collectively to both amphibians and reptiles. The branch of science that relates to the study of amphibians and reptiles, or herps, is called “herpetology” and a person who studies herps is called a “herpetologist.”

Amphibians and reptiles are commonly referred to as “cold-blooded,” but in fact they often don’t have cold blood, and some prefer to be warmer than humans. Most biologists focus instead on the fact that they need to acquire heat from their environment, and thus refer to them as ectotherms. “Ecto” refers to coming from the outside, and “thermy” refers to heat. **By selecting warm microhabitats, as in basking in the sun if they are too cold, or by seeking shade or going underground if they get too hot, herps can maintain their desired temperature, i.e., “thermoregulate.”** This is especially evident with reptiles, and it is not uncommon to see a turtle basking on a log, or a snake resting in a sunny spot. **The dependence upon the environment for thermoregulation ties these animals strongly to their environment.** If they cannot thermoregulate effectively in a particular area, they may leave or perish. Conservation efforts therefore need to provide for a diversity of temperature conditions with access to sunshine and refuges from extreme temperatures.



B. Kingsbury

Blanding’s Turtles live in shallow wetlands. Females may travel great distances to lay their eggs, and thus may be hit on roads as they make their way to nesting sites.



B. Kingsbury

Northern Cricket Frogs spend their lives along the moist border of wetlands.

Although amphibians can function at cooler temperatures than reptiles, the majority of them need ready access to moisture. Most amphibians breed in wetlands, so require such areas within their home ranges (the area where they live). Amphibians also need access to water or moist soil to avoid drying out. For some species this means they need to be within a few hops of open water to soak. For many others, they at least need moist soil. **As habitat dries, many amphibians will seek a moist shelter to wait for wetter weather.** This may result in periods of inactivity, referred to as aestivation. However, many salamanders may continue to be active underground in burrows, out of sight.

Many species of amphibians and reptiles use different habitats during the year. Salamanders may live in the forest but travel to wetlands to breed every spring. Turtles may live in the wetlands but must travel onto land to lay their eggs. In

many cases, the animals return to the same places year after year. For some species, hibernation sites may be few and far between and require extensive movements through other habitats to reach them. Given that many herps use different kinds of habitats at different times of the year, and that these areas may be far apart, animals traveling between areas may encounter a variety of dangerous situations. Roads may block their way or present risks from cars or predators that can see them. **Strategies for promoting herpetofaunal diversity must thus consider providing for a diverse variety of habitats close together and safe corridors between areas to reduce the risks for migrating individuals.**

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B. Kingsbury

The Eastern Massasauga Rattlesnake frequents wet meadows and bogs and hibernates underground in crayfish burrows.

Most Midwestern reptiles and amphibians hibernate or become less active during the winter. The classic “hibernacula” for snakes would be rocky outcroppings to which they migrate each fall, where numerous individuals may communally share a spot to overwinter. However, many species such as Garter and Water Snakes spend the winter underground in crayfish burrows. Oddly enough, they are hibernating underwater in such locations. Interestingly, the saturated soil actually resists freezing and thus protects the snakes. Other species find refuge in mammal burrows, under tree stumps, in barns, or other protected areas. Many species of turtles and frogs find shallow wetlands where the water is deep enough that it does not completely freeze. They burrow into the mud and wait for spring. Others use locations as described for snakes. The Wood Frog simply burrows into the leaves of the forest floor and is capable of tolerating freezing.

Amphibians and reptiles do not require much energy each day, so they can go a long time between meals. This is especially true for some snakes, which can eat large prey and then go months between meals if necessary. A snake may only require a few mice a year to get by!

Of all the herps in the Midwest, snakes may arouse the greatest fear and fascination. For many people, the first thing that comes to mind is whether or not a snake they have encountered is poisonous. However, almost none of the snakes of the Midwest are poisonous. In fact, **there are only six venomous snake species in the Midwest, and their distributions are generally rather limited.** All of these species belong to the pit viper family, so in addition to nostrils, they all have sensory pits located between the eye and the nostril on each side of their head. These pits detect heat and help the snake locate warm-blooded prey, even in the dark. Also, virtually all water snakes in the Midwest are *not* poisonous. Cottonmouths only occur in a few areas in the southernmost part of our region, and in most cases, are so unusual that few people actually ever see them. Finally, all of our rattlers will have stubby tails and rattles. Even the smallest ones have a little button rattle on the tip of their blunt tail.

Tadpoles, or “pollywogs” as they are often called, are the larval form of amphibians, much like caterpillars are the larvae of butterflies. Many species of amphibian go from egg to larvae to the adult-looking form in just a few months. That is why they can reproduce in wetlands that are dry by summer. Other tadpoles must survive until the following year, so they do not take on the adult form until their second summer. Either way, **if fish are introduced to the ponds where these amphibians live, they usually eat too many of the eggs and larvae for many species to persist.**

Reptiles and amphibians are important and fascinating creatures, and we hope you will agree they are worth protecting by proper habitat management. They do play an important role in the “balance” of nature and often benefit us by eating insects, rodents, and other pest species. **We also hope that with this guide we provide what you need to help you protect these spectacular animals.**



B. Kingsbury

Wood Frogs have the amazing capacity to survive being frozen over the winter!

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Effects of Habitat Fragmentation

Habitat loss is a major factor in the decline of amphibian and reptile species. The most obvious habitat loss occurs when entire areas of land are stripped of their natural vegetation. However, losses also occur when remaining habitat becomes subdivided, or “fragmented.” The value of an area of suitable habitat for a particular species tends to decrease as it becomes more isolated. For example, while two or more habitat “patches” may together equal the size of a larger patch, they may not be as valuable as the larger patch.

Smaller habitat patches, although of excellent quality, may be inadequate to support very many individuals of a particular species. One individual, or even five or ten, will not be enough to maintain a population. Even if fragments are large enough to support some species, small patch size can continue to be a factor in the decline of these species. **The smaller the patch, the smaller the population size, and small populations are more vulnerable to genetic challenges** such as inbreeding and to dramatic environmental events or changes.

Many amphibians and reptiles use different habitats during different times of the year. Snakes that forage for much of the year throughout the forest may use specific types of hibernation sites. Many salamanders spend most of the year dispersed in the forest, but they need appropriate wetlands within which to breed. This means that there must be connectivity between these different types of habitat.

Because of these requirements, fragmentation becomes a very real problem, especially when the distances between suitable areas are large. **If the required habitat components are isolated from one another, then the animal may not be able to get to them, or it may have to take great risks to do so.** If a road crosses between a snake’s summer activity area and appropriate hibernacula (overwintering site, commonly referred to as a “den”), or between a salamander’s usual stomping grounds and its breeding pond, then these animals may be in grave danger when they make the required migrations. Alternatively, they may not even try to cross the road and therefore they may not breed at all.



B. Kingsbury

When remaining natural habitat is disconnected, herps may not be willing to travel between the fragments, or they may be at risk if they do.

Barriers and Corridors

Barriers between habitat fragments can come in different forms, and are perhaps best thought of in terms of their “hardness” or “permeability.” Highways are clearly hard, impermeable boundaries. However, even gravel roads may form barriers, either because the openness intimidates the animals that consider crossing them, or because there is an actual risk: amphibians and reptiles may be run over or collected by people using the road.

Even agricultural areas may form barriers. Some amphibians and reptiles may not be willing to cross farm fields if they are too expansive and they may also be subject to increased risks when they do.

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If barriers cannot be avoided, the next best thing is to minimize their impact by developing useable corridors that penetrate them and connect habitats that herps need. Although corridor designs have not generally been established for amphibian and reptile species, an intuitive notion is that corridors that are wider than they are long will be the most effective. Also, corridors that contain habitat attractive to a species will have the greatest likelihood of being used.



B. Kingsbury

Infrequently traveled gravel roads are “softer” barriers than highways.

Maintaining or Re-establishing Habitat Connectivity

Maintaining or re-establishing natural corridors between remaining habitat patches is essential for amphibians and reptiles. Unlike birds and many insects that can fly over disturbed or developed areas in order to reach other habitat patches, these less mobile creatures are limited to overland travel to move between their essential habitats (e.g., moving from a grassland to a wetland for breeding).

Many amphibians and reptiles will use a variety of habitat types throughout their active season to complete their life cycles. A smaller number of species are habitat specialists, depending almost exclusively on a specific habitat type for all of their needs. Whatever the habitat needs of a species, allowing for travel between different or similar habitats is essential, especially where habitat patches are small.



C. Barlow

Forested corridors provide necessary links between habitats.

Land managers have many opportunities to avoid fragmentation. Foremost, of course, is that remaining habitat should not be removed if at all possible. **Where existing habitat must be removed, an effort should be made to avoid dividing an existing fragment.** For example, placing a food plot on the edge of suitable habitat is preferable to putting it in the middle. **When considering how to avoid dividing existing habitat, keep in mind the seasonal habitat shifts of species that might be in the region.** Furthermore, clusters of suitable fragments should be maintained as a whole whenever possible.

Land managers may also have opportunities to “repair” fragmentation either by outright restoration efforts or by the development of suitable corridors. Perhaps two adjacent habitat fragments can be connected with a strip of fallow fields and/or forest.