

# Toolkit

## *Management Techniques: A Practical Toolkit*

**IMPORTANT:** *This Toolkit is only an introduction to using these management techniques. Individuals must have the proper training to use many of the management techniques presented here. You are directed to your county conservation district office and other regional land resource personnel for more complete information on techniques.*

Recommendations for effectively managing habitat for reptiles and amphibians have been briefly highlighted in the various habitat modules of this guide. This portion of the guide describes specific management techniques in more detail, giving you additional information about possible management methods and considerations for use of these methods when amphibians and reptiles are of interest. **By integrating one or more of these techniques into your management plans, you may be able to make positive contributions to protecting, preserving, or increasing important habitat for reptiles and amphibians.** These management effects are likely to positively affect a host of other native animals and plants as well.



S. Ballard

Japanese honeysuckle is an aggressive exotic that can readily outcompete native plant species.

**There are a number of techniques that are used for both the promotion of suitable habitat for amphibians and reptiles and the control of undesirable vegetation.** Control of natural succession, wherein over time shrubs and trees replace more open habitat, is a common need, as is the control of non-native weed species. **There is a great deal of information available on the control of undesirable vegetation.** An excellent resource that promotes “wildlife-friendly” management techniques is the Nature Conservancy’s Wildland Invasive Species Program (please refer to the Resources module later in this guide).

**Some of the more common management techniques available include fire, in the form of prescribed burns and spot-burns; manual and mechanical techniques, including cutting, mowing and disking; grazing; the manipulation of water levels; the application of herbicides; and combinations of these practices.** Whatever you do, give your

approach careful consideration by doing your homework up front so that you don’t cause new, unwanted, and potentially expensive challenges for yourself. **In many cases you will need to identify local individuals with expertise to help you use these techniques.** Carefully choosing and using the appropriate techniques for your land and situation may greatly improve the quality, and possibly the quantity, of habitat available for amphibians, reptiles, and a host of other native species.

### PRINCIPAL TOOLS OF THE TRADE

- Prescribed burns—planned fires to control succession. Burning can be very hazardous and thus requires special training and permits.
- Manual techniques—mowing, disking, brush-hogging, and cutting by hand. Timing is often important with these techniques.
- Grazing—controlled use of livestock to inhibit succession. Overstocking can be detrimental.
- Alteration of water levels—using flooding to control shrubby vegetation growing in wetlands. For conservation, the focus is returning water fluctuations to their natural state rather than controlling them.
- Herbicides—using chemicals to remove unwanted vegetation. Can be effective but are often misused.
- **REMEMBER: If it isn’t broken, don’t fix it! Leave healthy, natural habitat alone.**

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## *Have a Plan*

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### Management Plan

**The first step in managing habitat for amphibians and reptiles, and ultimately for other species, is the development of a management plan.** An appropriate management plan (prescription) for any habitat should be based on an evaluation of the existing conditions on and adjacent to the habitat(s) being considered, both from a small scale and a landscape perspective. **In order to improve management success, you also need to have a realistic feel for the potential of your habitat to contribute to the health of local amphibian and reptile populations.** The input of both a herpetologist familiar with the local fauna and a local habitat management specialist, preferably an ecologist, can assist you greatly with plan development. While

interaction with such persons may not always be possible or feasible, it is worth the investment to develop a plan with realistic expectations and achievable goals. The more you are able to achieve, the better, but remember even small habitat improvements can help wildlife. Once goals are established, an implementation schedule can be developed. **Because the outcome of any management plan will vary in each situation, your plan should remain dynamic, being adjusted as you monitor the responses to management.** There are several agencies that can help you manage your property. **The Soil and Water Conservation Service (SWCD) and National Resources Conservation Service (NRCS) have district offices throughout the country, typically in every county.** See the Resources module of this guide for more information about them. These organizations are also excellent resources for information on funding opportunities you may be eligible to apply for to assist you with your management implementations.

## *Prescribed Fire*

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- Prescribed fire is often used as a technique to control succession and remove unwanted plants.
- Conducting burns requires specific training, permits, and a burn plan.
- Timing is critical for a burn to be successful at vegetative control while minimally damaging resident animals. Burns should be conducted in late fall through early spring when most herps are inactive.

**Fire was once an important part of the natural history of the Midwest.** However, in recent decades it has become less typical as a result of urban and agricultural development and fire suppression. **Today, prescribed fire is often used by land managers as a control measure for undesirable plants and to encourage the growth of native vegetation.** Habitats suitable for the application of prescribed fire include pinelands, savannas, prairies and grasslands, fens, and ephemeral wetlands. Fire may also be suitable in some forested habitats and peatlands.

**Before conducting a prescribed burn, it is important that you are well aware of the potential risks of the technique and the regulations that control its use.** Burns should be well planned and conducted by teams lead by a trained burn boss. Be aware of federal, state, and local regulations. Remember it is illegal to burn in many states without permission from appropriate agencies. **Make sure you contact the required agencies before using this management technique.**



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**Prescribed fire can be used as a control measure for undesirable plants as well as for the promotion of desired vegetation and species.**

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Some of the most important considerations to make before incorporating fire as part of your management strategy include understanding the associated risks of burning, deciding if fire is in fact the most suitable technique for a particular habitat, and deciding on the timing of the burn. Careful consideration must also be given when the fuel load is especially high. In these situations, a headfire burn rather than a back burn may be appropriate. Burning after periods of drought in areas supporting excessive fuel loads is discouraged, especially if the peat has dried to the point that it may burn. Spot-burning, or precision burning, which targets specific trouble areas, can also be used as a management technique and is sometimes preferable to large area burns, especially where the goal is to only burn individual woody stems. As the equipment (propane torch or similar device) itself provides the fuel for the fire, this technique has many advantages, especially in cases where there would be inadequate fuel to carry out a “normal” prescribed burn, such as when it is wet.



K. Hatch

**An Ornate Box Turtle with shell damage from a fire. Reptiles and amphibians are highly susceptible to the effects of fire because of limited mobility.**

**Local weather conditions on the day of the burn can have significant effects on the burn’s effectiveness.** While prescribed fire can be an excellent control technique, especially when used in conjunction with other control measures, it has the potential to have detrimental effects not only to the plant and animal species that inhabit an area but also on the safety of the people applying and controlling the burn and on the surrounding areas.

**Amphibians and reptiles are more susceptible to the effects of fire compared to other species because of their limited mobility.** Winter burns are least likely to affect the abundance of amphibians and reptiles (because they are in hibernation). However, prescribed fire is generally implemented during the early spring or fall under conditions that minimize environmental and vegetative moisture content, and thus provide the best burn conditions. This introduces risks for herps that are above ground during burns. **Try to restrict burns to times when herps are least likely to be active.** Ambient temperatures below 50°F (10°C) will inhibit reptile activity. However, spring rains following frost-out often trigger emergence of early breeding amphibians and the more cool-tolerant reptiles like Eastern Garter Snakes. Burning is thus best conducted before these events occur.

**In order to keep reptile and amphibian losses to a minimum and ensure the maintenance of adequate cover, we suggest burning habitats in patches,** thus leaving a mosaic of burned and unburned habitat. We also suggest burning no more than one-third of a patch in any one year. That way the unburned habitats will provide a refuge, protecting a large subset of the local reptile and amphibian population to help reoccupy and repopulate the burned area.



S. Ballard

**Consider strategic road placement that serves multiple purposes such as transportation and firebreaks.**

We also suggest burning no more than one-third of a patch in any one year. That way the unburned habitats will provide a refuge, protecting a large subset of the local reptile and amphibian population to help reoccupy and repopulate the burned area.

**Another idea for your fire management protocol is to consider multiple-use purposes for the placement of roads, trails, and firebreaks on your property.** Why not have roads and trails placed in strategic locations and maintained in such a manner that they can act as firebreaks between burn units? This may not be feasible in every instance, but if a new road does need to be added to your property, consider its placement carefully. **Having a multifaceted approach to planning issues such as these will go a considerable way towards the continued protection and enhancement of your property for many species of wildlife.**

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## *Manual and Mechanical Techniques for Vegetation Control*

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- **Manual techniques include mowing, plowing, and cutting/pulling by hand.**
- **Mowing and plowing must be timed to avoid active animals. Winter is preferred for work in areas with dense vegetation, while areas mowed as lawn during the active season should be mowed during cold, overcast weather or at the hottest time of the day.**
- **Manual pulling and cutting is labor-intensive, but allows excellent site control and may be used in conjunction with spot applications of herbicides.**

**Manual and mechanical techniques for use in vegetation control include, but are not limited to, techniques such as pulling, cutting, mowing and disking.** These techniques are usually conducted in small-scale settings and they generally have the advantage of being suitable for use in many habitat types. **Manual and mechanical techniques are the most favorable techniques for use in peatlands and forested areas, especially when burning is not a viable option.** One advantage to many manual techniques is that they are very specific and can be easily applied. Manual methods can usually be accomplished with a minimal amount of damage to both species and habitat when compared to other control techniques. However, a drawback to some of these techniques is that they may be very labor intensive.

**Plant pulling is perhaps the easiest manual technique to implement, and it is an especially effective technique for use in small areas, particularly in places where other methods such as herbiciding should not be used, such as along water courses or around wetlands.**

**Manual cutting is extremely effective for the removal of brush and small trees, but should be done either a year prior to a burn or in conjunction with a short-life herbicide that is appropriately applied to the cut stem.** See the Herbicides section for more details.



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**Manual cutting is an efficient technique for removing brush.**

**Mowing is commonly used as a management tool for the removal of shrubs.** Although mowing is often done routinely, there is much evidence that it causes direct mortality to amphibians and reptiles. A balance between the need to mow and the possible negative effects the practice may have on resident amphibians and reptiles needs to be reached wherever possible. By encompassing management decisions that can successfully minimize unnecessary mortalities to amphibian and reptile populations, you will be contributing in a very positive way to their continued presence on your land.

**Mowing should be done during times and conditions where amphibians and reptiles are least susceptible. We suggest that habitats be mowed during the amphibian-reptile inactive season without constraint.** This will depend on latitude, but is

typically late fall through early spring. Even with those restrictions, many amphibians will already be active. Early spring mowing should be avoided during amphibian migration events.

**During the activity season, when to mow will depend upon what is being mowed.** Many herps will exploit the edges of mowed lawns and other open habitats to bask under cool, sunny conditions, but avoid these same areas when it is hot. It is thus best to mow lawns when the air temperature is less than 50°F (10°C) and overcast or above 85°F (32°C) and sunny, during the hottest part of the day. Herps will be off the lawn at these times, so less vulnerable. Mowing and brush-hogging heavy brush or tall grass, however, will impact hidden individuals. It is best to do this type of work during the winter if at all possible.

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When mowing during the active season, other than to maintain lawns or trails, mower deck heights should be set at a minimum of 8 and perhaps even 12 inches. While increasing the mower deck height is a significant improvement, amphibians and reptiles may still be killed by the equipment's tires. As a further suggestion, **consider mowing in rows (e.g., back and forth across a field) as opposed to circular mowing (where you finish in the middle of a mowed field).** This way there is ample opportunity for wildlife to seek refuge away from the area being mowed.

**Patch mowing is advised when addressing brush, small tree, or exotic species invasions. No more than one third of a patch should be mowed at a time.** Excessive mowing, even at 12 inches, may remove too much cover, thereby reducing an animal's ability to adequately thermoregulate. **In areas where shorter grass must be maintained, such as lawns or trails, it is best to keep the grass continuously short** (under five inches), consequently keeping these areas in a less attractive state for amphibians and reptiles. Also, areas newly selected to be lawn should be brought to low height during the inactive season, then maintained as described above for lawn thereafter.

**Disking is more hazardous than burning or mowing, but may be necessary for healthy plant germination and growth when restoring an area supporting dense weeds to native vegetation. In these instances, disking should only be done during the dormant period for amphibians and reptiles.**

**Disking can permanently modify the soils of hibernacula, rendering them unusable or unattractive to the amphibians and reptiles that previously used them.** Most reptile and amphibian species can be expected to avoid ground that is disked routinely, such as fire lanes and rowcrop fields. If disking is done to maintain a firebreak, it should be disked frequently enough to avoid revegetation to the point of attracting amphibians and reptiles. Disking in uplands within wetland areas should only be conducted outside of the buffer area and during the inactive season. **Areas within 100 feet of known hibernacula should not be disked.**



**Note:** While for the most part disked areas will be avoided by herps, these areas may actually attract some turtle species during late spring and early summer for nesting habitat. **If you have an area that is used by turtles as nesting habitat, don't disk it.** Turtles generally nest between May and July and the eggs develop in the ground during the summer. In most cases hatchlings emerge during late summer and fall; however, some may wait in the nest until early spring before emerging.

## *Grazing*

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- **Light to moderate grazing can be used to maintain open habitats such as grasslands.**
- **Overgrazing can negatively impact native species and lead to invasion by non-native plant species.**
- **Livestock should be kept out of natural wetlands. Watering stations should either be at artificial sites, or at selected, closely controlled locations.**

Grazing is another management technique to help control undesirable vegetation, especially if practiced with low livestock densities (less than one animal per acre). **Light to moderate grazing is best used as a management technique in grasslands, savannas, barrens, and open woodlands.** Although it is not generally a technique that is successful by itself, it may have merits in some situations, especially if it can be incorporated with other management techniques. In areas where herbicides should not be applied or when it is not economically feasible, grazing may be an effective alternative. If not adequately managed, however, grazing can cause significant damage to habitats.

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If grazing is used on your property, it is important not to overgraze or overstock an area. **Light to moderate grazing may be used in rotations (spatial and temporal) among habitat patches, with no more than one third of the available habitat grazed in one year. Grazing should be discontinued in a patch as soon as 50 percent of the grasses and forbs in that patch are cropped to eight inches in height. Timing is also very important. The best time to introduce grazing animals is when they will be most likely to damage undesirable vegetation without significantly impacting native species.** It is important to keep grazing animals out of breeding ponds—access to streams and waterways should also be restricted to select managed locations to avoid habitat damage. **A preferable option is to provide watering troughs.**



A. Reseitar

It is important not to “overstock” livestock.

The Nature Conservancy’s Wildland Invasive Species Program Web site (see the Resources module later in the guide) provides a wealth of information on the use of grazing as a control technique.

## *The Alteration of Water Levels*

- Water-level manipulations generally have a negative effect on herps.
- The most beneficial alterations to water levels are often to return an area to its historic water levels and patterns of fluctuation.
- Timing is critical—avoid winter drawdowns.



Wisconsin DNR

Winter drawdowns can have devastating effects on hibernating snake and turtle populations.

**The manipulation of water levels has often had devastating impacts on wetland quality for reptiles and amphibians. The impacts of these wetland losses cannot be overstated.** Wetland drainage clearly leads to the demise of herps reliant on the habitat. This will include not only the obvious aquatic species but also numerous others that depend upon the wetland at some point in their lives. **Even if a wetland is not completely drained, lowering water levels of intact wetlands may have immediate consequences for many species of reptiles and amphibians in some areas, especially during winter.** Perhaps counterintuitively, ground water protects saturated substrates, and any animals imbedded in them, such as hibernating snakes and turtles, from freezing. **Equally detrimental to wetland areas and their resident fauna and flora are the many efforts employed to stabilize or raise water levels.** If it is natural for water levels to fluctuate in a system, then holding water in such areas will impact those species adapted to these fluctuations. Likewise, many reptiles and amphibians are adapted for life in shallow wetlands and by deepening these systems their value may be dramatically reduced.

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C. Barlow

Once a complex of forested and ephemeral wetlands, this area has been converted to a “permanent” wetland as a result of elevated and stabilized water levels after the creation of a levee.

**Because of the effects of water-level manipulations on resident amphibian and reptile species, we strongly discourage such alterations.** Water-level manipulations are also perhaps the most difficult management tool available to land managers. Their complexity lies in the fact that the application is not practical or even possible in many locations, and it may be expensive to implement.

**In many cases, the greatest benefit in terms of water-level manipulation will come from *undoing* previous alteration efforts. By restoring the historical water levels and patterns of fluctuation in an area, its value as habitat for native plants and animals will be substantially increased.** Wetland restoration projects often involve removing the structures or reversing activities that altered the area in the first place. Some of these structures and activities include tiles, ditches, and areas where a wetland has been completely filled. Tiles can be excavated but it may be necessary to plug the area to prevent draining the wetland. You may also need to plug open ditches, thus minimizing the amount of water leaving the wetland. In areas where wetlands have been filled, it is even possible to remove the fill material. However, these activities may require the use of heavy equipment. In these situations we advise

consulting local engineers and herpetologists for assistance in planning these activities. **The topography of your property may play a large role in planning how to best tackle the restoration project. After all, it would be very upsetting to discover that your good-willed endeavors resulted in the unforeseen flooding of adjacent agricultural fields!** The NRCS has a wealth of information on wetland restoration and can assist in the acquisition of permits required to pursue these activities.

## *Herbicides*

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- **Above all, follow the application instructions on the container!**
- **Herbicide use is discouraged unless negative impacts to surrounding habitat have been ruled out.**
- **Avoid wetlands and the natural buffers around them.**
- **Application techniques such as spot treatments should be used rather than broadcast spraying.**

**The application of herbicides is a widely used management technique, and every year the popularity of the approach increases** mainly due to ease of application. While herbicides are, in many cases, a preferred management technique due to their effectiveness and specificity in killing plants and retarding succession, little is known about their inherent effects on amphibians and reptiles, particularly in especially fragile ecosystems such as wetlands. As a result, **we discourage the use of herbicides unless they are applied in a manner that limits their effects on non-target organisms.**

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Before conducting herbicide treatments, **decide if herbicides really are the most suitable technique for a particular habitat. If you decide that herbicide application could potentially be a suitable technique for an area, site conditions such as distance to water and the presence of rare and endangered species need to be carefully considered.** Potential runoff and air-borne drift also need to be given serious consideration. **If at all possible, avoid applying herbicides near water sources, including both ground and surface waters or wetlands.** If some amount of control is desired near these areas, it is important to delineate a buffer zone of at least 50 feet as this will hopefully minimize any adverse effects to the aquatic/wetland system.



S. Ballard

Herbicide equipment.

**Follow the directions!** Sometimes people think that if the application of some herbicide or fertilizer is helpful, then using more would be even better. This is often not the case, and doing so may dramatically increase the damaging effects of these chemicals. Please follow all guidelines that are provided with such products.



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**Use spot treatments rather than broadcast applications to avoid over application and airborne drift. Such applications can be made with a wick, sponge, or a precision hand-held sprayer.** We also recommend wetland-approved herbicides when using herbicides near those habitats. These herbicides are generally of short-life and low persistence, such as glyphosate, and are unlikely to contaminate water sources or resident animals. These more “environmentally friendly” chemicals are preferred over long-persisting types such as Picloram and 2, 4-D. Refer to Tu et al. (2001) in the Resources module for more details.

**It is also very important to select products that target the plant species/assemblage of plant species you wish to control for.** Finally, avoid using diesel fuel as a carrier, using mineral or other recommended oils instead. Some manufacturers also suggest using liquid hand soaps as a surfactant.

**Selective pesticide application is preferred over broadcast spraying.**



This is the Toolkit module of the PARC publication, “Habitat Management Guidelines for Amphibians and Reptiles of the Midwest,” ISBN # 0-9667402-1-1. Please visit [www.parcplace.org](http://www.parcplace.org) for further information or copies of the complete document, or visit <http://herpcenter.ipfw.edu> for a Web-based version of these materials.