

# State Natural Areas Volunteer Handbook

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From showy Chiwaukee Prairie in the south to Lost Creek Bog in the north, Wisconsin is blessed with an abundance of places showcasing natural beauty. State Natural Areas protect these places along with the geology, plants, and wildlife within them. It is no wonder that Wisconsinites are proud to have built the nation's oldest and largest system of state natural areas to protect our natural heritage for our children and grandchildren to enjoy.

Caring for nearly 700 sites is a big job and one that gets more important as invaders like giant reed grass and buckthorn take over more ground across our state. To meet this challenge, the Department of Natural Resources is increasingly turning to volunteers to help multiply staff time, give more sites the attention they need, and develop dedicated, knowledgeable advocates for SNAs. As Aldo Leopold famously said, "When we see land as a community to which we belong, we may begin to use it with love and respect."

## What you'll find in this handbook

This manual seeks to help you, the SNA manager or lead volunteer, assess whether a volunteer group would benefit your sites and, if the answer is yes, to walk you through the steps to recruit, train, retain, and reward these volunteers. The handbook also spells out the legal requirements governing DNR use of volunteers and provides examples of the forms and other materials necessary to run safe, sustainable, and effective volunteer programs that benefit volunteers and SNAs alike.

The State Natural Areas volunteer program has modeled our structure on those of other state programs, county forest preserve districts, non-profit organizations, city volunteer programs, and the WDNR Park Program's volunteer positions. We modified those approaches according to our needs and incorporated lessons learned in a pilot volunteer program started in 2011. We follow the guidelines in the Wisconsin DNR Property Managers Guidance MC 1405.1 (2010), the Recreation Area Operations Handbook chapter 700 (MC 2505.1), and Safety Requirements for Chainsaw Operations (MC 9185.3).

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## Our goals and mission

Our goal is to establish a community of volunteers that supports the SNA program efforts to “protect outstanding examples of Wisconsin’s native landscape of natural communities, significant geological formations and archeological sites.” Volunteers will actively restore these sites across the state through opportunities that fit their available time and skills.

Our mission is to “engage, support, and empower volunteers who help take care of State Natural Areas.”

With growth, we believe the SNA Volunteer Program can enhance public interest, volunteer support, and the ecological health of State Natural Areas.

*Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has. - Margaret Mead*

## Acknowledgements

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Several volunteer programs have forged ahead and provided documents and models for use; notably The Stewardship Network, Lake County Forest Preserves, The Nature Conservancy, and Michigan State Parks Stewardship Unit.

Thank you to Matt Zine who decided to give this program a shot. And above all, thank you to our State Natural Area volunteers who have said yes to this vision from the beginning and are continually supportive even as we have been trying to figure everything out together. You have given credibility to the idea and have increased the quality of so many State Natural Areas.

Let's continue forward, to enjoy and care for Wisconsin's State Natural Areas together!

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## I. Wisconsin State Natural Areas Program

### A. Program history

Prior to European settlement, Wisconsin contained a mosaic of natural communities, ranging from prairies and oak savannas in the south, to pine forests and boggy wetlands in the north. In all, more than 75 unique types of natural communities made up Wisconsin's landscape of the early 1800s. Over the decades since intensive settlement began, the quality and extent of those communities have been extremely reduced by urbanization, agriculture, and industry, and by the ecological impact of fire suppression and the spread of exotic plant species. The last remaining vestiges of our native landscape are called natural areas. They harbor natural features essentially unaltered by human-caused disturbances or that have substantially recovered from disturbance over time.

We owe much to Wisconsin's early conservationists of the 1930s, 40s, and 50s – including Aldo Leopold, botanists Norman Fassett and Albert Fuller, and plant ecologist John Curtis – who recognized the importance of natural areas and the consequences of their loss. Under their guidance, the State Board for the Preservation of Scientific Areas was created in 1951 as the first state-sponsored natural area protection program in the nation. That first board evolved into today's State Natural Areas (SNA) program.

### B. Preserving our natural legacy

The SNA Program is located in the Department of Natural Resources' Bureau of Natural Heritage Conservation and advised by the Natural Areas Preservation Council, an 11-member group of scientists and conservationists. In 2015, the SNA program has grown to 673 sites encompassing 373,000 acres of land and water. SNAs are found in 70 of Wisconsin's 72 counties and range in size from less than one acre to more than 7,700 acres.

SNAs protect outstanding examples of [native natural communities](#), significant geological formations, and archaeological sites. They harbor

natural features essentially unaltered by human-caused disturbances or that have substantially recovered from disturbance over time. SNAs also provide the last refuges in Wisconsin for rare plants and animals. In fact, more than 90% of the plants and 75% of the animals on Wisconsin's list of endangered and threatened species are protected on SNAs.

### C. SNA establishment and protection

The process to establish a SNA begins with the evaluation of a site identified through field inventories conducted by DNR ecologists. Assessments take into account a site's overall quality and diversity, extent of past disturbance, long-term viability, context within the greater landscape, and rarity of features on local and global scales. Sites are considered for potential SNA designation in one or more of the following categories:

- Outstanding natural community;
- Critical habitat for rare species;
- Ecological benchmark area;
- Significant geological or archaeological feature; and/or
- Exceptional site for natural area research and education.

Site protection is accomplished by several means, including land acquisition from willing sellers, donations, conservation easements, and cooperative agreements. Sites on existing DNR-owned lands, such as State Parks and Wildlife Areas, are established as SNAs through the master planning process. Areas owned by other government agencies, educational institutions, and private conservation organizations are brought into the natural areas system by formal agreements between the DNR and the landowner. The SNA program owes much of its success to agreements with partners like The Nature Conservancy, USDA Forest Service, National Park Service, conservation organizations and county governments. High priority sites on private land are often acquired by partners and help fill gaps in the natural area system.

Once secured by purchase or agreement, sites are formally "designated" as SNAs and become part of the natural area system. Designation confers a significant level of land protection through state statutes, administrative rules, and guidelines. A higher level of protection is afforded by legal "dedication" of SNAs through Articles of Dedication, a special kind of perpetual conservation easement.

Our future may well depend on the preservation of biological diversity such as that protected in SNAs. Protected natural communities and their thousands of plant and animal species are irreplaceable genetic reservoirs of potential benefit to humans and are important in their own right. SNAs are vital to scientific research because they provide some of the best examples of natural processes acting over time with minimal human interference. They are valuable benchmarks against which we can judge the impact of our society on Wisconsin's natural landscape.

## D. SNA management and use

Land stewardship is guided by principles of ecosystem management. For some SNAs, the best management prescription is to "let nature take its course" and allow natural processes and their subsequent effects, to proceed without constraint. However, some processes, such as the encroachment of woody vegetation and the spread of invasive and exotic plant species, threaten the biological integrity of many SNAs. These sites require hands-on management and, in some cases, the reintroduction of natural functions - such as prairie fires - that are essentially absent from the landscape.

Public use of SNAs is channeled in two directions: scientific research and compatible recreation. Natural areas serve as excellent outdoor laboratories for environmental education and formal research on natural communities and their component species. A permit issued by the DNR is required to conduct studies or collect specimens on SNAs. Natural areas are not appropriate for intensive recreation such as camping or mountain biking, but they can accommodate low-impact activities such as hiking, bird watching and nature study. As such, many SNAs contain few or no amenities such as parking areas, restrooms, or maintained trails.

## E. Now and the future

Since human evolution over time was largely in a natural world, our future may well depend on the preservation of biological diversity such as that protected in SNAs. Protected natural communities and their thousands of plant and animal species are irreplaceable genetic reservoirs of potential benefit to humans and are important in their own right. SNAs are vital to scientific research because they provide some of the best examples of natural processes acting over time with minimal human interference. They are valuable benchmarks against which we can judge the impact of our society on Wisconsin's natural landscape.

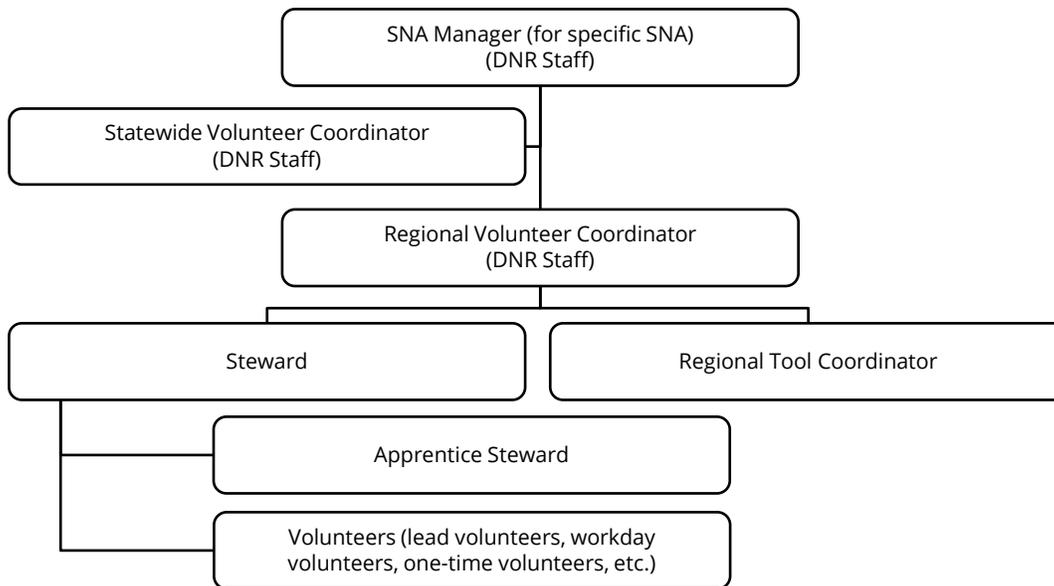
## F. For more information

The SNA Program publishes Wisconsin, naturally, a 184-page, full-color guidebook containing maps, location information, and descriptions for 150 of Wisconsin's best SNAs. For information about purchasing the guidebook, or about the SNA program in general, contact us at the address below. The program's website is also an excellent source of current information on SNAs and the DNR's Bureau of Natural Heritage Conservation.

State Natural Areas Program  
Bureau of Natural Heritage Conservation  
Wisconsin Dept. of Natural Resources  
P.O. Box 7921  
Madison, WI 53707-7921  
Website: [dnr.wi.gov/topic/lands/naturalareas/](http://dnr.wi.gov/topic/lands/naturalareas/)

## II. DNR staff and volunteer positions

Volunteers started to become more involved in the State Natural Areas Program in 2011 as a result of discussions of how to multiply program efforts. Since not all volunteers have the same knowledge, time, or interest they will have the opportunity to commit themselves at a level they see fit. The different volunteer commitments, from least to most, are: volunteer, apprentice steward, and steward. The relationship of DNR staff and volunteer positions is found in Figure 1.



**Figure 1.** Basic organizational structure of the people involved with the SNA Volunteer Program.

### A. Volunteers

The volunteers involved with the program range from individuals who show up once to those who return for twenty years. In the process of volunteering, individuals may gain enough experience and interest to emerge as leaders. Their experience and interest may lead to becoming a workday leader, apprentice steward, or steward. While some volunteers may become more involved, others may get busy elsewhere or decide the program is not for them. The program allows volunteers to come and go naturally as their interest, time, and personal life allow.

Participating in a workday is one of the main ways new or inexperienced volunteers can join the program. It is the least length of commitment, but workday volunteers donate a valuable amount of program hours. They would be the target audience for workday advertising. Anyone could come for a day to try different tasks, at different times of the year, or at various sites to see if the work is a good fit. Workday volunteers get the opportunity to learn, get exercise, socialize, and explore new places. They are trained on site by the workday leader.

The workday leader is a volunteer who leads or helps lead workdays at a State Natural Area (SNA). Workday leaders are volunteers who have enough experience to lead a group of people to accomplish a task. These volunteers do not need to be stewards but need to work with the steward to do projects that fit with the yearly management objectives. The workday leaders must fill out the Lead Volunteer Application and Permit (see [Appendix F](#)) and have appropriate training before leading a workday. Workday leaders must follow appropriate guidance and gain permission to lead workdays from an apprentice steward, a steward, a regional volunteer coordinator, or a SNA manager. See [Section V](#), “Coordinating Workdays” for more information and guidance. We also encourage regularly attending volunteers to fill out the Lead Volunteer Application and Permit. They will have a form that covers their work for several years and be contacted when volunteer appreciation potlucks occur.

## B. Apprentice Steward

Apprentice steward is a volunteer position that learns about and performs native plant community restoration on an assigned SNA. This is a learning position, so volunteers with little experience but available interest and time are welcome. Volunteers commit to a minimum of one year, with the goal of becoming a steward or co-steward in 1-3 years. This commitment includes 40 hours of volunteer time and 10 hours training that is funded by the program and could include: herbicide certification, chainsaw safety course, prescribed burn training, First Aid/CPR, etc. They will work closely with the experienced steward to learn how to perform native plant community restoration duties and develop management priorities. The apprentice steward will have opportunities to work independently as well as with others, take on new projects, meet interesting people, and discover

the unique challenges presented by restoration activities. Apprentice steward positions are created when an experienced steward is in favor of training an apprentice. Available positions are advertised, and interested volunteers can submit a letter of interest via email or mail to the regional volunteer coordinator including any relevant skills and qualifications, why they are interested in the position, and for which site or sites they would like to become the apprentice steward. After a year, the regional volunteer coordinator and steward will determine if the person is ready to become a steward or co-steward. See [Appendix H](#) for an example.

### C. Steward

A steward is an important volunteer position within the program and crucial to its success. The steward could be an individual or the leader(s) of an organized group. They are the contact for all volunteer activities at the corresponding SNA. They coordinate volunteer work, organize workdays, make management decisions based on discussions with the regional volunteer coordinator/SNA manager, evaluate success, and communicate with the public. In order to become a steward, the volunteer or group must demonstrate a lifelong learning approach to restoration, an interest in SNAs, commitment to the SNA volunteer program, and basic experience. There are several routes to becoming a steward, including one of the following:

- Volunteer has attended 5-10 workdays in addition to completing appropriate training such as herbicide certification, chainsaw safety, prescribed burn training, First Aid/CPR, etc.
- Volunteer has been an apprentice steward for one year.
- Volunteer has demonstrated equivalent experience/education with another organization and provides a reference.
- An organized group has one or more members who have met the above criteria.

To begin the process, a volunteer opportunity will be posted. The volunteer or experienced volunteers from an organized group must submit a letter of interest via email or mail including any relevant skills and qualifications, why they are interested in the position, and at which site(s) they would like to become the steward. The SNA manager and regional volunteer coordinator will conduct an interview or conversation to evaluate if the volunteer(s) are a good fit for the steward position and which site(s) would

match their interests. When signed on, the steward(s) will be given the position description in [Appendix G](#) that describes their duties.

The steward(s) supports the SNA program by implementing management objectives and maintaining a relationship with the SNA manager and/or regional volunteer coordinator. This may include, but is not limited to: communicating and meeting with the SNA manager/regional volunteer coordinator; completing appropriate training; completing necessary forms; invasive species management (pulling, brushcutting, herbiciding, chainsawing, collecting seed, mowing, monitoring, etc.); record keeping and reporting; maintaining knowledge of relevant safety practices; organizing workdays; and completing yearly management objectives. For a position description see [Appendix G](#).

Depending on the steward(s), workdays may be the main way to accomplish tasks. If the steward(s) has limited time but interested volunteers, workdays might be a great way to get tasks accomplished efficiently. Holding regular, intentional workdays is the best way to determine who the core group is and find new volunteers. See [Section V](#), "Coordinating Workdays" for more information and guidance.

## D. Regional Tool Coordinator

The regional tool coordinator takes responsibility for the tools in an area. Tool locations will be determined based on need and centrality. The tool coordinator handles regular maintenance, repairs, reservations, and new tool requests. They periodically make sure the tools are in their proper place and in good working order. The responsibilities of this position can be handled by a DNR staff person or a volunteer.

## E. Regional Volunteer Coordinator

The regional volunteer coordinator is the main DNR staff contact for volunteers within a region. This person will be assigned for all properties with active volunteers. The regional volunteer coordinator is responsible for maintaining a good relationship with volunteers by:

- Answering questions
- Meeting with volunteers once a year to determine yearly management objectives

- Provide coaching when needed
- Forward funding and equipment requests to statewide volunteer coordinator (or handle independently)
- Keep track of forms, submitting them once annually to statewide volunteer coordinator
- Once annually requesting accurate log information from volunteers
- Represent the program in the region
- Look for ways to engage volunteer talents
- Once annually distribute tokens of volunteer appreciation including hats and t-shirts

Ideally, the regional volunteer coordinator would look for ways to provide all volunteers with opportunities for advancement, training, and appreciation. The coordinator communicates with the SNA manager when management decisions are being discussed with volunteers.

The staff member who fills the regional volunteer coordinator role depends on the site, but this will be determined within the DNR and communicated to the volunteers. The staff member could be a field crew member, SNA volunteer coordinator, or SNA manager.

## F. Statewide Volunteer Coordinator

The statewide volunteer coordinator is responsible for advancing the mission of the volunteer program by looking for ways to assist current staff and volunteers. Depending on the stage of the program, they could take on the role of regional volunteer coordinator as needed. This is the point person responsible for the future vision of the program. Tasks include:

- Organizing workdays
- Posting workdays
- Providing trainings
- Recruiting volunteers
- Compiling statistics on the program
- Applying for grants
- Forging new partnerships
- Connecting groups
- Identifying needs
- Updating the website

- Coaching coordinators and volunteers
- Updating forms
- Addressing problems
- Volunteer appreciation

The statewide volunteer coordinator works primarily with the SNA manager and regional volunteer coordinators but could also work on important projects in the state.

## G. SNA Manager

The SNA manager is the staff member designated by the DNR to manage the specific SNA and may be known within the DNR as the property manager. On stand-alone SNAs (SNAs not embedded in a state park, forest, wildlife area, or in federal or private property), this person will usually be the regional ecologist. If an SNA is embedded within another DNR owned property, the SNA manager could either be the district ecologist or the manager of the property upon which the SNA is designated (e.g., state park superintendent or wildlife biologist). They have the final say in decisions made on SNAs and will be kept informed of volunteer activity by the regional volunteer coordinator. They may wish to take a greater or lesser role in managing volunteers depending on expertise and availability of the regional volunteer coordinator. If not already determined, the SNA manager will either designate a regional volunteer coordinator or take on the role of the regional volunteer coordinator for a specific SNA.

The SNA manager and/or regional volunteer coordinator help develop management objectives with the steward on a designated SNA. The SNA manager and/or regional volunteer coordinator support the steward by offering appropriate resources. This may include, but is not limited to, meeting with the steward to determine yearly management objectives, providing equipment as able (sprayers, brushcutters, herbicide, chainsaws, etc.), providing opportunities for training and materials as able, and periodic check-ins during the work season.

### III. Finding Volunteers

Starting a new volunteer group presents considerable challenges. New volunteers can learn from more experienced volunteers, multiplying the amount of work being accomplished on an SNA. But if no volunteers are currently working at a site we want to attract volunteers who are the best fit for the program to maximize DNR associated support costs. If qualified individuals are not already available from within the program (or to increase numbers of a volunteer group), work through the following steps:

1. Develop a list of management needs across sites of management responsibility.
2. Rank sites according to need and determine those where it will be easiest to establish a steward.
3. Identify and approach potential partner organizations.
4. Engage potential individuals/groups with workdays or projects (and see who emerges as a leader) or select individuals by advertising with job positions.
5. Take time to engage the volunteers who are currently involved.

#### A. Develop a list of management needs across sites of management responsibility.

The SNA manager/steward develops a list of needs that volunteers could be engaged to help with. Helpful questions to consider in this process:

- Do current staff members/volunteers have tasks they would like to share with others, freeing them up to do other things?
- What needs to be done that staff/volunteers don't have the skills or time to do effectively?
- What projects on the wish list are on the back burner because no one has time to do them?

#### B. Rank sites according to need and determine those where it will be easiest to establish a steward.

A high ranking would be given to sites with a high need for work, physically easy work, and close to possible volunteer sources. Rank sites based on these characteristics.

### *Quality need ranking*

Sites receiving a high quality need ranking would be those with high value for the SNA program. Rare remnant plant communities, large protected areas, and diverse and healthy remnants would increase a site's quality need ranking.

### *Ease of work ranking*

Sites receiving a high ease of work ranking would be those with projects that are easy for volunteers to accomplish (aspen girdling, seed collecting, phragmites bundling, brush cutting, pulling scattered invasive weeds, etc.). Volunteers enjoy dramatic results, so projects showing results quickly would increase a sites ease of work ranking. Sites with challenging access or physically challenging projects would fall lower on the ranking list.

### *Volunteer source ranking*

Sites with a high likelihood of attracting volunteers would receive a high volunteer source ranking. The likelihood of attracting volunteers increases first with established groups nearby who are experienced or interested in land management. Then with an available population source close by.

## C. Identify and approach potential partner organizations.

Organizations are very valuable sources of volunteers. Their mission may dovetail with the mission of the SNA volunteer program. They may be successful because there are multiple individuals and an organizational structure backing them up. Job descriptions or projects will be kept on hand in case groups are actively looking for ways to volunteer. Examples of groups to involve are: Friends groups, land trusts, Ice Age Trail Alliance, university clubs, hunting groups, Trout Unlimited, nature centers, school groups, church groups, scout troops, geocaching groups, lake associations, county parks, etc.

## D. Engage potential individuals/groups with workdays or projects (and see who emerges as a leader) or select individuals by advertising with job positions.

Occasionally all that needs done is to suggest the idea of a group having workdays. Other times, the group may be very interested but needs help getting started. Potential groups can get kick started by having someone (DNR staff or experienced volunteers) work with them to organize a workday or two. See [Section V “Coordinating Workdays”](#) for more information and guidance. Set goals that are fairly easy to accomplish at first and see how things go. After having several workdays, potential individuals/group volunteers who ask questions showing their engagement level may stand out. These people may be on board and experienced enough to start projects or schedule workdays.

The people who organize or regularly attend are the future leaders—spend the most time talking to and teaching them how to do the work, and then find ways to engage these potential leaders’ strengths to help the program and give them more ownership. When they are ready, allow them to lead teams and workdays themselves, staying involved as they take on new things. After they have lead several workdays, talk with the volunteer to see if becoming a steward is a good fit with the leader.

To get the word out about workdays advertise them on the SNA volunteer webpage and encourage people to sign up to the corresponding email list to receive updates. Workdays can be sent to the statewide or regional volunteer coordinator and posted on the webpage. Send notices at least two weeks in advance of the event. See [Appendix G](#) for an example.

Some possible positions: Seed Collector, Brush Clearer, Summer Invasive Species Specialist, Aspen Girdler, Steward, Apprentice Steward, Photopoint Monitor, Invasive Species Mapping Specialist, etc. There should be corresponding maps and any necessary descriptions associated with these positions. The needs are kept by the regional volunteer coordinator and may be published on the website. The SNA manager and regional volunteer coordinator determine the best method of ensuring the volunteer is properly trained in the field.

## E. Take time to engage the volunteers who are currently involved.

Staff and volunteer leadership time is best spent engaging, coaching, encouraging, and working with current or potential volunteer leaders.

Here are some ideas (from The Nature Conservancy) on what motivates volunteers.

- A sense of accomplishment.
- A sense of belonging. We like to think of an organization as “my chapter” or “my school.”
- People like personal responsibility, their own project or “turf,” yet they want to be part of the big picture and see how their efforts are contributing to an end result. Note: teams of people can also have turf.
- The opportunity to think and help make decisions. People want to feel they are part of the decision-making process. Whether or not every suggestion is used isn't nearly as important as the volunteer knowing that the steward is sincerely listening.
- Obtainable goals. People want to see their efforts come to fruition. Realistic goals are important to keeping a sense of momentum and accomplishment among volunteers. They must be able to see progress or know what the eventual result of their efforts will be.
- Purposeful, defined activity. Volunteers like to feel their efforts are accomplishing something worth their investment of time, talent, and effort. They also want to know exactly what is expected. Figure out in advance how much time a job requires, whether it can be done at home or on the site, and if it requires working alone or with others.
- Challenges within abilities. An assignment should be challenging, but if it is totally beyond one's abilities the person is likely to give up. Be available to give advice and give volunteers periodic training in the subjects applicable to their assignments. If a job seems huge, then break it down into two or three smaller jobs, or form a committee to do it.
- Information. This is probably the most important duty of the steward. Too many times we've heard someone say with a touch of bitterness, “No one tells me what's going on around here.” It takes

time to make that phone call or write an email, but it's worth the investment. Keep volunteers updated with newsletters and invitations to attend meetings and conferences, and encourage them to submit information and stories to the newsletter.

- Confidence. Some folks run the whole show, not because there is no one else to do it but because they don't trust others and may have conveyed that feeling. But you may have a volunteer whose skills exceed your own. Let them know you think they can do the job, then give them the freedom to do it.
- Recognition. It only takes seconds to say, "Thanks for your help. I really appreciate it." No matter how self-effacing people appear, most appreciate a little pat on the back. Think of ways to publicly thank volunteers as well.

## IV. Communication between volunteers and SNA managers

The vehicle that drives a successful volunteer program is communication. Good communication founded on listening and understanding builds trust. Poor communication can hurt trust and drive people away. When expectations are clear, both SNA managers and volunteers can plan for and feel comfortable with future goals. As a result, the volunteer is free to complete projects at their own pace, while the SNA manager is comfortable with what is going on.

### A. Yearly management objectives

The regional volunteer coordinator (and SNA manager) and volunteer should develop yearly management objectives of achievable goals to lay out expectations for the year. This may include the timeframe for projects along with a map for relevant work projects. It should remain fairly simple but with enough detail that everyone is on the same page. We suggest the plan include a map of the site with work areas delineated.

A timeline should be determined that fits the needs of the site. Working on the plan in the fall helps evaluate summer results and make adjustments for the following year when thoughts are fresh. Fall plans promote thinking about winter work and the seed collecting that will be needed. The benefit of working on plans in the spring is having ideas fresh in your mind when approaching the busy summer season.

Yearly management objectives are finalized after a site meeting between the SNA manager/regional volunteer coordinator and volunteers, which could occur annually. Use the following sections as guidelines for developing yearly management objectives (adapted from The Stewardship Network's *The Stewardship Manual*).

#### 1. Developing yearly management objectives

Many SNAs already have land management plans created by DNR staff. Consult this document as a starting point to familiarize yourself with the plant communities present, management needs, and future goals for the site.

The level of detail included in your yearly management objectives should correspond to your anticipated amount of work, the resources available, and the size of your work area. Consider the impacts changes to the site will have on users. Is there a trail through the site? Do people hunt there? What are the interests of the users that frequent the site? These users may become advocates for our work if they understand what we are doing.

Become familiar with the history of the site. Is it a remnant plant community? Was there an agricultural use (grazing, plowing, ditches, etc.)? Look at old aerial photos to determine tree density, fields, old roads, houses, etc. What kind of ecosystem was there in the past — a wetland, oak savanna, oak forest, prairie? Is there a history of fire or flooding?

What is the current condition of your site? Does it need fire to maintain the prairie, is it a floodplain forest that relies on frequent flooding, are there too many deer browsing the site, are there high-quality areas that need protection, are there low-quality areas that would be a lot of work to restore?

## 2. Determining the resources available

This will determine what you can prioritize for and what types of projects will work.

- What equipment is available to you?
- What herbicide do you have? Can you get more?
- What training do you need to provide?
- Who do you have to help you? How much time will they be able to commit? Are there people you might be able to recruit?
- How much time are you willing to commit? Will you work weekly, monthly, quarterly? Do you have more time during a certain season?

## 3. Determining the site objectives and management approach

What do you want to protect or restore at your site? Why are you working there? What is your objective? You might think your site objective is to remove buckthorn, but your objective is actually to restore oak/hickory forest with a diverse understory. The approach would be to remove

buckthorn, which is a stressor to the oak/hickory forest. It might be hard to keep this list relatively short since you really like your site and know there are lots of things to do. Don't get bogged down trying to make lots of goals and targets, keep it simple. Check the information on the SNA webpage for your site to see if the site objectives and management approach (or action steps) are already there.

If site objectives are not determined, volunteers may wish to work with the regional volunteer coordinator to develop them. Here are The Nature Conservancy's strategies for selecting objectives:

- Choose those species and communities for which the site is particularly noted.
- Consider those species and communities that if lost would cause you to stop working at the site.
- Choose species and communities for which it is feasible to meet meaningful goals.
- Target habitat types if they can meet the needs of a wide diversity of communities and species.
- Group species into functional groups or highly sensitive groups.
- Choose several objectives that encompass multiple levels of organization and various spatial and temporal scales.

#### 4. Identifying threats to site objectives

This information may also be present on the SNA webpage description of your site. What are the threats that need to be dealt with? You will most likely not be able to deal with all of them, but you can evaluate which ones are the most important by using criteria like the following:

- Severity (What is the impact of the threat?)
- Scope (How much of your site will it impact?)
- Immediacy (Is it impacting your site now or will it in the future?)
- Likelihood (If it is not impacting your site now, what is the probability of it occurring?)
- Reversibility (Can you address it through restoration or management?)
- Frequency (Is it chronic or intermittent?)

It might be helpful to assign rankings to each threat (e.g., 1-10, high, low, etc.).

## 5. Management approach

Determine how you will address your threats (e.g., plan a garlic mustard pulling workday, hold tree seed collecting days, map the spread of an invasive species). Other examples of strategies fall into these categories:

- Land protection (local land use decisions, easements)
- Management and restoration (reintroduce fire, plant oaks, stabilize creek banks)
- Community relations (education, partnerships, working with neighbors)
- Programmatic (equipment, people-power, financial resources)
- Research (into best management practices, natural systems, the effects of threats)

The strategies you develop will outline the best approach. Feel free to use creativity or invite others in to help.

## 6. Prioritizing and developing a timeline for management approaches

Prioritize your strategies. Typical areas of prioritization for land managers might be:

- Keep pristine areas free of invasive species (e.g., sweep through a high-quality savanna area to remove the random Japanese hedge parsley plants)
- Improve semi-degraded ecosystems (e.g., remove invasive species in an oak woodland to improve diversity of native wildflowers)
- Expand existing high-quality areas, merging them when possible (e.g., removing brush separating two prairie remnants or pushing back the edge of brush encroaching on a prairie)
- Create new ecosystems (e.g., removing dense brush and seeding with prairie plants or interseeding into brome fields to create prairie)

Use this information to break priorities down into yearly management objectives and organize them by month. It will be a valuable reference throughout the year.

## 7. Evaluating success

The best restorationists are those who are constantly learning and reevaluating what they are doing. Take opportunities to see how effective your work is at reaching your targets. Take pride in seeing things change even if they are very slow changes. Here are some ideas for ways to notice changes:

- Establish photopoints (minimally annual pictures in every cardinal direction from the same spot to document large-scale changes). See [Section XIII](#), “Setting up photopoints.”
- Use colored flagging to flag areas of interest (where you are actively working) and keep track of how it changes each year.
- Count the number of plant species that occur each year.

Don't be afraid to come up with different approaches if your current approach is not working.

## 8. Avoiding feeling bogged down

If you are new to stewarding a site, start small and get your feet wet. If you achieve your initial goals, set them higher for the next year. Restoration work is endless, so it's easy to feel overwhelmed. Simply strive to improve your site. You are a volunteer, so everything you do to improve the site is a bonus for the SNA program. Your work is allowing the program to focus resources elsewhere and/or accomplish new goals. Remember why you got into restoration work in the first place. Have fun! Take others on walks, spend time learning new plants, find new ways to appreciate your site, simply enjoy being out there.

## 9. Priority invasive species

Some sites have been managed by SNA crews. These sites might have plants that are seen by the SNA manager as priority invasive species and have been removed for many years. It is important to keep managing for these plants so momentum from years of work is not lost. For invasive species that have been labeled a priority by the SNA manager, the volunteer will discuss their removal plan with the SNA manager/regional volunteer coordinator. The volunteer needs to agree to remove the species in a given area or allow the SNA crew to do the removal.

If, for whatever reason, the volunteer recognizes they will not be able to complete removal as agreed upon, they must contact the SNA manager/regional volunteer coordinator to request crew assistance. This is likely to happen if there are more invasive species than expected, the volunteer has other commitments, or other problems arise. The volunteer needs to let the SNA manager/regional volunteer coordinator know at least a week before ideal removal conditions occur. The sooner the SNA manager/regional volunteer coordinator knows, the better they can have resources ready to help.

#### 10. Yearly management objectives example

This is an example of what yearly management objectives might look like. It is a rough estimate of the work planned for the year. It is not set in stone, but helps everyone to be thinking similarly. It may contain more or less detail based on the amount of work being accomplished.

**Kettle Moraine Oak Opening** Yearly management objectives March 2014 - February 2015

<b>Schedule</b>	<b>Target activity</b>	<b>Location</b>	<b>Priority</b>	<b>Notes</b>
March	Leaf blow fire break	Previous burn units	Medium	Leaf blower, chainsaw, brushcutter needed
March	Continue brush cutting	Kestol prairie	Low	Remove sumac, aspen, during workday
April	Spray knapweed	Bald Bluff, continue expanding sprayed areas on remnant prairie (see map)	Listed on map	
No Snow- mid May	Spray garlic mustard	See map	Medium	In areas with large patches
May 17	Aspen girdling workday	Bald Bluff, check Kestol, search for other areas	Medium	
Mid May- mid June	Garlic mustard pulling	Check areas sprayed, keep an eye out for new populations	Medium	
June 1	Wildflower hike	Ice Age Trail, prairie remnants	Medium	Advertise
June	Aspen girdling	Same as before	Medium	Check areas girdled in May
June	Oriental bittersweet population GPS	Walk areas on map	Medium	Check previous years sprayed populations, spray if necessary
June	Spray knapweed	Check areas where populations are scattered (or previously sprayed)	High	This time of year it will be easy to spot
June	Field trip	Ice Age trail	Medium	Take volunteers from the past year and others interested on a hike to learn and enjoy what has been accomplished
Late June	Yellow sweet clover removal	Areas circled on map will be checked	Priority weed	Search for new areas

Schedule	Target activity	Location	Priority	Notes
Early July	White sweet clover cutting	Search whole site	Priority weed	Plan a workday with others
June- September	Brush maintenance	See map	High	Check and retreat areas worked on during last year's winter
July	Seed collecting early species (shooting stars, kittentails, etc.)	Focus on prairie remnant areas	Medium	Continue to develop a grasp on where good seed populations are
Late July- early August	Remove Japanese Hedge Parsley	Search site where there is partial shade	Priority weed	If there are large patches, a workday may be scheduled
September	Look for oriental bittersweet	Search new areas	High	Bittersweet leaves will be easy to spot since they are yellow, look for other groups (Ice Age trail?) to help out
September 20	Seed collecting workday #1	See map	High	Collect for areas that will be cleared this winter
October 18	Seed collecting workday #2	See map	High	
Early November	Put in firebreaks?	Previous burn units	?	Check with SNA program if burn is a priority
Early November	Start creating small brush piles	Southern brush patches_- see map	Medium	Get piles started and ready for upcoming workdays
November 15	Brush cutting workday	Southern brush patches_- see map	High	
January 17	Brush cutting workday	Expand bald bluff area	High	

**Table 1.** Example of yearly management objectives from Kettle Moraine Oak Opening SNA.

# KMOO Bx Units

2014-2015 Volunteer Possible Work

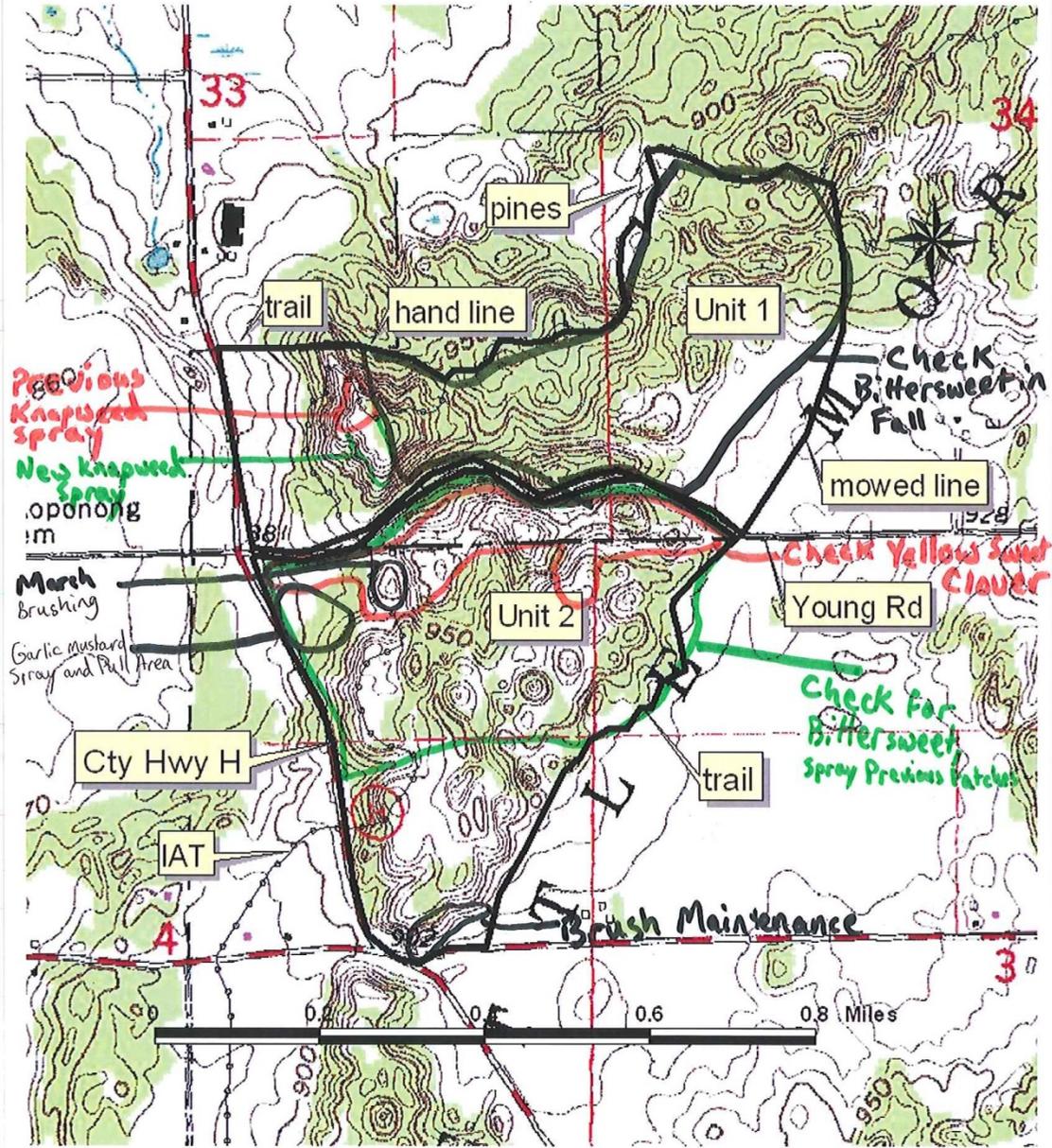
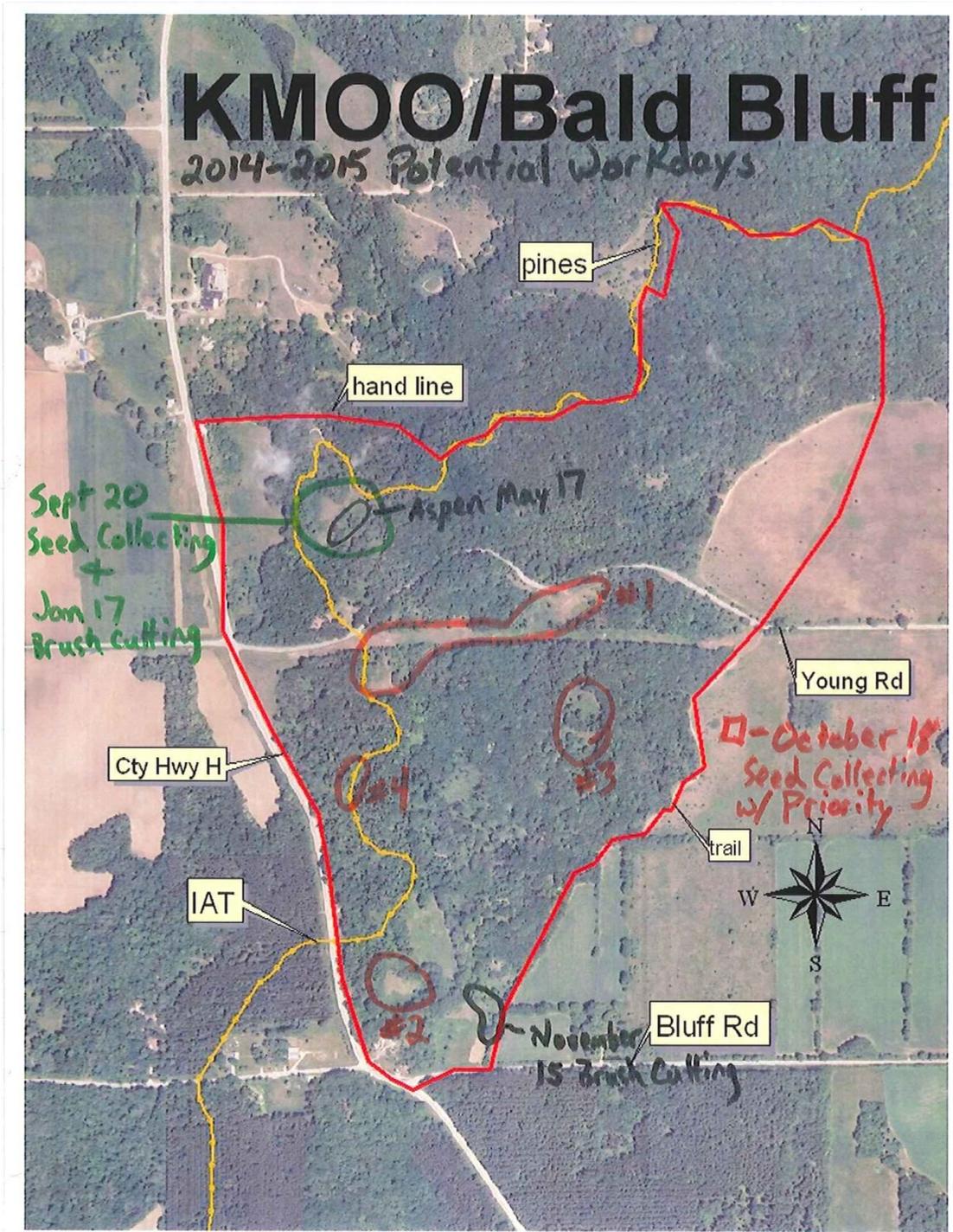


Figure 2. Example of yearly management objectives map for Kettle Moraine Oak Opening SNA.



**Figure 3.** Example of yearly management objectives map for planned workdays at Kettle Moraine Oak Opening SNA.

## B. Reporting

Thorough reporting is needed to strengthen grant requests, capture the work being done each year, learn from past experiences, and transfer knowledge to future stewards. Reporting is done in two ways: entering information into a Google spreadsheet called the volunteer log and submitting maps showing areas of work projects.

The volunteer log for each of the eight regions of the state is made available to all volunteers who will be submitting information and anyone who has the link. It contains drop-down menus that can be adjusted as needed. It is organized by date so that volunteers can see what was entered in the past. Stewards are responsible for entering or delegating someone to enter information for their properties in the correct manner. This information should be kept as up to date as reasonable with a deadline of December 1<sup>st</sup> for the current year's activities. See [Appendix D](#) for more information on filling out the volunteer log and [Appendix E](#) for links to each regions' log.

Simple maps showing volunteer projects are submitted by December 1<sup>st</sup> to the SNA manager/regional volunteer coordinator. At a minimum, these maps should include an area outline and the target activity accomplished. The volunteer may also find helpful keeping additional information like herbicide mix used, hours spent, and dates. If a project was conducted on the whole site (e.g., searched garlic mustard on the whole property), one map mentioning what project(s) were accomplished is sufficient.

### References:

The Nature Conservancy

Williams, B. 2011. "The Stewardship Manual." Draft.

## V. Coordinating Workdays

### A. Planning

The first step to a successful workday is thorough planning. First, determine a need that will be a good project for the group to focus on. It is good to focus volunteers on something that would be difficult for one or two people to accomplish, but still ensure that first-time volunteers feel a sense of accomplishment at the end of the day. Be sure to match the task with the ability your volunteers have (for example, a high school class would be better suited for a seed collecting day or pulling garlic mustard than a chainsaw project). Who is available to help you? Consider working with other core volunteers to determine what task you will accomplish. This creates a sense of teamwork, passes knowledge of how to make management decisions to others, and opens the door for hearing other people's insights. Set a date when these volunteers can come to help.

Examples of great workday projects are: aspen girdling, invasive plant pulling, seed collecting, and phragmites bundling. A more challenging, but very rewarding, activity is brush removal. Finally, remember that there will probably be something that doesn't go as planned. The goal is not to have a perfect workday but to learn and improve.

Plan what tools you will need and bring extras in case more people show up than expected. If it looks as though you will have more than eight volunteers, you may want to divide up into teams and establish team leaders before the workday so those volunteers can be prepared and thinking ahead. Monitor the weather and be ready to cancel if it looks as though the wind chill is below -20°F, the heat index is above 95°F, there is a risk of thunderstorms or tornados, or there is other inclement weather that will prevent performing the work.

### B. Workday advertising

Compose a notice for your workday. Information to include:

- Site
- Task to be performed
- Reason the work is important

- Any training requirements needed
- Date
- Time
- Detailed directions
- What volunteers should wear
- What volunteers should bring
- A cancellation plan
- Contact information

See [Appendix A](#) for the flyer template to use on the SNA volunteer website. You may want to ask volunteers to contact you before coming so you can have an idea of how many people to expect. Send your notice to the regional volunteer coordinator and post it at other locations (local boards, in the paper, etc.). The earlier you can plan, the better others can plan as well. It is beneficial to have a regular schedule so volunteers know when to expect another workday.

There are a couple of ways the event can be advertised. The program has an email list of people who would like to know about future events. The program also has a website –

<http://dnr.wi.gov/topic/lands/naturalareas/volunteer.html> – that posts upcoming workdays. If advertisement via internet or email notice is desired, notices for upcoming workdays should be in to the regional volunteer coordinator at least two weeks before the event. The sooner the regional volunteer coordinator knows, the better the event will be advertised. It is preferable that the event be planned a year in advance, or at least several months, to get the word out. Fill out the workday advertising template found in [Appendix A](#).

## C. Week before

Gather needed materials:

- Sign-up sheets and pens
- Maps or other documents
- Needed tools, equipment, camera, gloves, etc. See below for lists for specific activities.
- First aid kit

## D. Day of

Arrive early to the site and get everything operational before others arrive. Welcome volunteers as they arrive and consider assigning an experienced volunteer with the task of welcoming and making sure appropriate forms are signed.

If appropriate, record the amount of herbicide you'll be starting with (for end-of-day calculation).

## E. Briefing

Gather everyone and give a briefing before activities start for the day. It is good to include the following:

- Introduce yourself and explain your role as leader of the workday. Allow others to introduce themselves, their background, and interests.
- Show maps and point out any relevant trails.
- Ensure everyone has filled out the appropriate forms.
- Give a quick lesson on why the site is worth working at, what the history of management has been there, the goal of the day, and how the goal will be accomplished. Be sure to set a goal that is achievable.
- Let volunteers know that their work carries out the mission of the State Natural Area Program.
- Talk about the target species and how to identify them.
- Tell volunteers to work at their own pace. Encourage them to take breaks if they need to.
- Discuss safety concerns. Identify potential risks from tools, site hazards, and poisonous plants.
- Inform everyone that you have a first aid kit, emergency numbers, and cell phone.
- If appropriate, emphasize that caution should be taken to avoid trampling native plants.
- As appropriate, make volunteers aware of poison ivy, wild parsnip, or other noxious plants in the area and how to ID them.
- Find out if any participants have any health concerns you should know about (bee sting allergy, diabetes, etc.).
- Assign teams if relevant.

- Divide into teams in which the team leaders can assign tasks and explain how to operate equipment. Make sure the team leaders physically show volunteers how to identify or do something. (See the attached documents with tips for brush cutting, cedar cutting, and phragmites workdays).

## F. Getting the work done

Next comes the action portion of the workday. It takes time for people to settle into their task. It is important that the beginning starts well to spur on the rest of the day. These things are helpful:

- Periodically check in with inexperienced volunteers and/or team leaders.
- Spend the first half hour of the workday watching and checking in with volunteers as they perform their tasks. Ask them how it's going, answer questions they may have, correct their methods. This is a good time to take pictures as you wander around.
- Are workers safe? Watch for signs of fatigue, heat exhaustion, dehydration. Make sure that volunteers using power tools and/or herbicide are watching out for the safety of other volunteers.
- If an assigned task is too much for a volunteer, tactfully change their activity to something less demanding.
- If volunteers are not willing to partake in an activity they view as hazardous, provide another task, or give them a chance to leave with grace.
- Once you are sure volunteers are confident with what they are doing, join in, but be available for any questions or needs.
- Provide encouragement and enthusiastic positive feedback for volunteer work. Point out when positive changes to the landscape are visible.
- Take time to explain what you are doing and why to any interested neighbors or visitors. They may be advocates for your work in the future.

## G. Wrap-up

It may be beneficial to schedule a wrap-up at the end of the workday to hear what feedback everyone has and summarize what happened. It gives a sense of completion and accomplishment. Good things to include in a wrap-up are:

- Volunteers appreciate a reward for their hard work, even though they don't expect it. Offer treats and beverages at break time or at the end of the work party. Consider taking participants on a mini-field trip to see high-quality areas, scenic views, or beautiful or unusual plant/animal species. Learning opportunities are a big plus for volunteering. Remember you don't have to know everything — it's okay to say, "I don't know, I'll get back to you" or to ask others for help.
- End on time.
- Verbally thank every volunteer.
- It is helpful to have a brief feedback time with all volunteers or at least your team leaders to discuss what worked well and what could have been better.

After everyone leaves:

- Make sure you have all tools you started with.
- Record the appropriate information in the volunteer log and keep other relevant notes. (Herbicide use can easily be recorded by knowing how much you start with and subtracting how much you have left).
- Circle on a map where you worked and include what herbicide you used, how many volunteers were present, and what task you accomplished.

## H. Day after

- Send a wrap-up email after you get home to each volunteer summarizing what was accomplished with a picture or two. Including photos from workdays is particularly rewarding to volunteers.
- Store pictures.
- Organize, maintain equipment.

## I. Youth guidelines

- One adult supervisor for each 10 juveniles (under the age of 16). Juveniles are not allowed to use herbicides, chainsaws, or help on prescribed burns or other tasks that are deemed hazardous.
- Suggested age-appropriate activities for youth that stewards can use and adjust at their discretion. Time restrictions are also a factor

as younger kids should not be expected to work longer than 45 minutes.

Activity	Suggested Minimum Age
Garlic mustard pulling	8
Seed collecting	8
Planting plugs	10
Cutting brush with loppers	10
Cutting brush with bow saws	12
Roadside cleanup	12

(Lake County Forest Preserves Volunteer Handbook)

## L. Workday tips

See the following pages for tips on these workdays:

- Brush piling
- Cedar cutting
- Phragmites bundling
- Searching an area for invasive species
- Seed collecting
- Spraying herbicides

## *Brush Piling Workday Tips*

### Equipment:

- Cell phone to call county dispatch if burning piles
- Lead Volunteer form
- Workday Roster form
- Propane torches or leaf blower
- Fire starter (matches, lighter, or other)
- Drip torch (optional)
- Appropriate personal protective equipment
- Brushcutters
- Saws
- Loppers (optional in case there are more people than expected)
- Plenty of gas and oil
- Hard hats suggested
- Sleds to carry gear
- Herbicide and sprayers
- Extra chains

### Tips:

- There needs to be snow cover around the piles before burning can occur.
- Prep beforehand—get there early, call county dispatch and inform them of your plans and the nearest road intersection if burning piles.
- Do a briefing with everyone.
- Make sure you have enough herbicide and sprayers.
- Work in teams when possible.
- Know the amount of herbicide before work starts so you can record how much was used during the day.
- Use plenty of dye in herbicide so it's easy to see what stems were sprayed.
- Brushcutters are the best tool in smaller stemmed brush areas.

It works well to have piles started beforehand or have a pile starter team of a couple people. Select areas with poor-quality vegetation or excessive shade as locations for brushpiles since a burn scar is left after burning the pile. Keep the footprint of the scar small in size. Do not form a brushpile

under low branches or close to the trunk of a desirable tree as the flames may injure or kill the tree.

#### Brushpile Crew Leader Points:

- Brushpiles should be dense, not spread out (cutting the pile with a chainsaw periodically or cutting brush into smaller chunks before throwing on the pile helps with this). Stack brush in the same direction to help condense the piles.
- Make sure equipment works and is ready beforehand and periodically check in during the workday if someone new is using it.
- One saw/brushcutter to two haulers and one sprayer is a good number to start with (someone with a lopper and a sprayer getting small brush first may be helpful).

#### Cutter Points

- Make sure someone is treating for you. If you get far ahead, pile instead or wait for the herbicide applicator to catch up.
- It works well to cut up slope, move brush, then come down and repeat.
- Cut stumps low to avoid tripping hazards but high enough that sprayers can see them (above the snow level).
- Watch out for pilers or others moving through the area.
- Cut brush into sizes that pilers can handle.
- Periodically cut up brushpiles so that piles are compact and remain small in size.

#### Herbicide Applicator Points

- If the workday is near areas that were previously cleared, mark or point out these areas so they don't get sprayed again.
- Cover the entire cambium with herbicide. If there are missed gaps the tree will resprout.
- Note the difference between dead stems (pale) and live stems (have more color and sometimes are green).
- If using PVC dauber, make sure to open valve periodically to ensure enough herbicide is wicking to the tip.
- Herbicide application is the most important job—assign to someone who can pay attention to detail.

#### Piler Points:

- Try to pile high instead of out to keep piles compact.
- Stack smaller logs and brush parallel to keep the pile compact, making it easier to stack, keeping the burn scar small, and making it easy to burn in the future.

Call county dispatch when you leave to let them know you are finished.

## *Cedar Cutting Workday Tips*

Make sure there is snow cover so that piles can be burned.

Equipment:

- Cell phone to call county dispatch (report your plans and the nearest road intersection to where you are working)
- Lead Volunteer form
- Workday Roster form
- Propane torches or leaf blower
- Fire starter (matches, lighter, or other)
- Wedges and mallet
- Saws
- Plenty of gas and oil
- Hard hats
- Sleds to carry gear
- Herbicide and sprayer
- Extra chains

Tips:

- Wear proper clothing that's okay to get holes in (denim or cloth).
- Any health concerns? Ask about physical fitness level.
- Hard hats needed.
- Steep slopes may be a safety hazard.
- Light pile on the side receiving wind (if west wind, light west side).
- If removing clothing layers, put them away from ashes.

Sawyer (Chainsaw person) Points:

- Let them know what tree species to cut.
- Call out and make sure everyone is aware and out of danger when dropping a tree or rolling it downhill.
- Cedars are hard to drop because they are evenly balanced. Consider using wedges.
- Keep as many limbs on the trees as possible when felling so trees or tree chunks are more efficiently transported.
- For rolling cedars, grab the top to steer.
- Cut cedar into pieces if it's too big to roll down the hill.

- Ideally there are two areas per pile: cutting in one area, piling in another.
- Buck from bottom to top or vice versa (closest to fire to farthest from fire).
- Cut limbs according to pilers' ability/how big tree is.

Thrower Points:

- Give sawyer enough space to work.
- Throw pieces on the fire as opposed to on the sides so the fire doesn't grow too big. Periodically put unburned ends into the fire.

Call county dispatch when you leave to let them know you are finished.

## *Phragmites Bundling Workday Tips*

### Equipment:

- Lead Volunteer form
- Workday Roster form
- Baling twine
- Herbicide (Imazapyr)
- Clippers
- Knee boots

### Tips:

- Divide into teams of 5. Three bundlers, one clipper, one sprayer.
- Wear rubber boots if ground is soggy.
- If bundlers and clippers will be walking through treated areas, advise them that the treated bundles will have herbicide and dye on the tops and that the dye will stain clothing but usually will wash out.
- Phragmites leaves can be sharp, so they are a safety hazard.

### Bundler Points:

- Clipping and bundling is an art.
- Get most of the stems but not every last one (sprayers will get individual ones later).
- Wrap string 2 times around bundle at waist height or so, pull tight, and tie.
- Baler twine works well.
- Bundles should not be too big (so can't cut or are tripping over) or too small (wasting twine).

### Clipper Point:

- Cut stems as high and even as possible to provide a flat surface for treating.

### Herbicide Applicator Points:

- Need aquatic certification.
- Application of herbicide with a paintbrush works well.
- No surfactant is needed if cut stem treating.

## *Searching an Area for Invasive Species Workday Tips*

### Equipment:

- Lead Volunteer form
- Workday Roster form
- 2 rolls of flagging
- Appropriate invasive removal tools (herbicide sprayer, handtools, bags, etc.)
- Map of the site for everyone
- Compass (optional)
- GPS (optional)

### Tips:

- Determine boundaries of the area you will work on.
- Assign important roles to people you trust (line leader, flagger).
- A line leader is the person who starts a line by walking along a designated boundary. Everyone else follows them, apart from each other so all of the ground is surveyed.
- The second person follows the line leader, stopping if they get ahead of them, helping the line leader remove invasives if necessary. The second person keeps an eye on the third person and makes sure they don't get too far ahead of them, communicating relevant information to them and helping remove invasives if necessary.
- The third person follows the second person the same as the second follows the line leader. This continues down the line to the flagger.
- If a large invasive patch is encountered, multiple people may need to converge on the patch. The people in front of someone who finds a patch are responsible for asking if help is needed when they are free to help.
- The flagger hangs flags on trees or grass as they travel, marking an outside line of coverage. They put more flags up when vegetation is dense so they can find their way back.
- Once the end of a pass is reached, everyone swings around the flagger with the flagger's role switching to the line leader and the line leader becoming the flagger.

## *Seed Collection Workday Tips*

(adapted from Michigan Natural Areas Preservation)

### Equipment:

- Lead Volunteer form
- Workday Roster form
- Cloth or leather gloves
- Sturdy footwear
- Long pants
- Safety glasses
- Paper or poly bags or plastic milk jugs, cut for collection
- Permanent marker
- Pruners/scissors
- Map of the site for everyone (if spread over a large area)

### Tips:

- Scout the site beforehand to determine what you will collect and where you will collect it.
- Focus on good ID of native seeds to be collected. Show what seed looks like when ripe and ready to be collected.
- Show how to collect seeds (every plant has different seed collection method).
- Let volunteers know how much of the seed to collect. (Before the workday, talk with staff about how much of the seed to collect and how much to leave on the plant. Depending on the time of year and the species of plant and the site you may be collecting anywhere from ¼ of all the seeds to everything you can find.)
- If collecting one thing, suggest volunteers pick that species as a reference to help identify it.
- Supervise closely for the first ½ hour to 1 hour of the workday to confirm that volunteers:
  - know what the target species look like
  - know how to collect them
  - know what to do with them after collection
- This is a good time to take photos!
- Once you are sure volunteers are confident with species ID, join in on the collecting but be available for any questions or needs.

### *Spraying Invasives Workday Tips*

#### Equipment:

- Lead Volunteer form
- Workday Roster form
- Chemical resistant gloves
- Sturdy footwear
- Long pants
- Safety glasses
- Backpack sprayers
- Plenty of water for spraying
- Herbicide
- Surfactant
- Dye
- Wash water and soap
- Spill kit
- Chemical applicator signs
- Herbicide label
- Tools for equipment breakdowns

#### Tips:

- Think of other work options for people who do not wish to use herbicides.
- At the beginning, demonstrate the proper safety procedures and how to mix the herbicide.
- Divide into teams of no more than 5 with one leader.
- The team leader will initially observe their group to check:
- Safety techniques
- Avoiding unnecessary drift
- Only the target species is being sprayed
- **Sprayers should not spray anything they are unsure of—ask their team leader if they are unsure.**
- To record the appropriate amount of herbicide, determine the beginning amount or tell everyone to keep track of how much they spray.
- Make sure there is enough dye to see what has been sprayed.

- If appropriate, cover areas similar to the searching for an area workday.

### References:

Michigan Natural Areas Preservation

Smith, T. 2001. "Lake County Forest Preserve District Volunteer Steward's Manual."

The Nature Conservancy

## VI. Volunteer Appreciation

### A. Small tokens of appreciation

Volunteers will be honored in their accomplishments when possible by receiving gifts for a designated amount of service. This will be an official t-shirt once volunteers have reached 20 hours of service.

Volunteers donating 50 hours will be honored by receiving a hat with the program logo.

### B. Reports

An annual newsletter will highlight news about the volunteer program. This will acknowledge the accomplishments of volunteers, list new stewards, include an article about the Steward of the Year, and highlight other stories. Summaries will be given for impact of the program including numbers of volunteers, hours, number of sites impacted, acreage, and any other relevant information.

### C. SNA Steward of the Year

Committed volunteers will be invited to an annual event acknowledging their efforts. During this or other events the Steward of the Year award will be awarded to one individual or group who exhibit commitment to caring for SNAs through some or all of these qualities:

- Impacting the ecological health of an SNA
- Encouraging others to join in and inspiring them in the process
- Educating themselves and others
- Forming outstanding working relationships with SNA managers
- Achieving goals set in property management meetings
- Possessing exceptional knowledge of an SNA

A press release, Wisconsin Natural Resources magazine, and other publications may acknowledge the Steward of the Year.

## D. Potlucks

A potluck event for volunteers will occur annually. There is no official format but previous events have included a potluck style lunch and hike afterward at a site where management work has been conducted or is needed. The program offers free hamburgers and brats while volunteers are encouraged to bring sides. Multiple potlucks may be held around the state near active volunteers and will be coordinated by the regional volunteer coordinator.

## VII. Training

### A. Providing training

One of the main ways the SNA program can offer support to volunteers is by providing them with knowledge of needed and available training. A list of required training for specific tasks and current training offerings or relevant links will be kept by the program and may be posted on the webpage. For each training requirement, the SNA program will strive to have an available training opportunity for volunteers. When the need arises, if possible the SNA program will set up additional classes.

The training opportunities may require the volunteer to pay. The SNA program may choose to supply volunteers with free training based on current involvement with the program and program resources. Provided trainings/materials may include chainsaw safety classes, herbicide books, invasive species trainings, prescribed fire classes, informal training on site, etc. We would like a volunteer to show commitment by spending some time with the program before they are eligible to receive free trainings/materials.

### B. New training requirements

As a Wisconsin DNR volunteer, SNA volunteers are currently required to have the same training as DNR employees. Because of this state requirement, new training requirements will likely develop periodically for activities that contain levels of risk. The SNA program will work to fill training offering gaps from those new requirements as quickly as possible by setting up new classes. We will also work to streamline any excessive training requirement when possible, limiting the amount of burden on the volunteer.

## VIII. Legal Information

### A. A summary list of important forms

- Lead Volunteer Application and Permit (1700-072) ([Appendix F](#)) – good for two years typically
- State Natural Areas Work Day Roster (1700-072A) ([Appendix F](#)) – for one day work days
- Power Equipment Safety Acknowledgement (2500-120) ([Appendix F](#)) – does not expire
- Prescribed Burning Volunteer Agreement (DOA-3009) ([Appendix F](#)) – good for the time indicated
- Physical Requirements Acknowledgement (9100-240) ([Appendix F](#)) paired with Appendix B, Manual Code 9124.2 Job Task Analysis for Fire Management – good for the time indicated
- Parental Permission and Acknowledgement Form ([Appendix F](#)) – for a one day event
- Visitor Accident Report (2500-040) ([Appendix F](#)) – for one accident

### B. Necessary forms/documents

See [Appendix F](#) for links to forms. Below are the necessary training, forms, and documents listed for corresponding volunteer activities. Depending on where a specific State Natural Area is located and the current form policy, more forms may be required.

Forms/documents required are:

- To start
  - Form 1700-072: Lead Volunteer Application and Permit
- Record keeping
  - Log instructions document ([Appendix D](#))
  - Link to the Volunteer Log google spreadsheet: ([Appendix E](#))
  - Appropriate maps
- Workdays
  - Form 1700-072A: State Natural Areas Volunteer Work Day Roster
  - The work day leader needs to be a certified applicator if volunteers with no relationship to a DNR certified applicator

are applying herbicide. The leader can obtain a Right of Way and Natural Area certification (Category 6) and train others to use herbicides. Certifications must be renewed every 5 years. Training books can be ordered at:

[https://patstore.wisc.edu/secure/browse\\_cat.asp?category\\_id=19](https://patstore.wisc.edu/secure/browse_cat.asp?category_id=19).

- More information on the exam:  
<http://ipcm.wisc.edu/pat/certification/exam/>

- Herbicides

- If not certified, each volunteer using herbicides on state property needs to be supervised by a DNR staff person who has a “right-of-way and natural area pest control” (Category 6) Wisconsin Pesticide Applicators Certification (expires every five years). Except for applications in aquatic environments, DNR staff (including volunteers) may apply general use pesticides on DNR land even though they are not DATCP certified, but they must be working under direction of someone who is. The certified personnel should be in work status at the time of the application or be present at the site of the application. Designated certified personnel are responsible for assuring that general use pesticide applicators are given instructions for responsible and safe usage, clean-up and storage procedures, including necessary Personal Protective Equipment (PPE).
- If applying an **aquatic herbicide** below the high water mark **each applicator** needs to have an “aquatic and mosquito” (Category 5) Wisconsin Pesticide Applicators Certification. Certifications must be renewed every 5 years and can be gained by ordering a book and passing the test through Pesticide Applicator Training at:  
[https://patstore.wisc.edu/secure/browse\\_cat.asp?category\\_id=2](https://patstore.wisc.edu/secure/browse_cat.asp?category_id=2)
- Before using herbicides, we recommend volunteers become familiar with the label and MSDS of the herbicide being used. The regional volunteer coordinator will provide a copy of the correct label and MSDS sheets. If you lose them or do not have a copy of the label or MSDS, you can find them at:  
<http://www.cdms.net/LabelsMsds/LMDefault.aspx?t>
- For organizing workdays where new volunteers will be applying herbicides, one volunteer must be a certified applicator at the Category 6 level. Certified applicators are responsible for assuring that general use pesticide applicators are given instructions for responsible and safe usage, as well as clean-up and storage procedures, including necessary Personal Protective Equipment (PPE). Certifications must be renewed every 5 years and can be gained by ordering a book and passing the test through Pesticide Applicator Training at:  
[https://patstore.wisc.edu/secure/browse\\_cat.asp?category\\_id=2](https://patstore.wisc.edu/secure/browse_cat.asp?category_id=2)

- More information on the exam:  
<http://ipcm.wisc.edu/pat/certification/exam/>
- This guidance comes from the DNR Toolkit, which is based on the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) and DNR's policy in Manual Code 4230.1. DNR Toolkit for Herbicide Use:
- Chainsaws
  - Occupational Safety and Health Administration (OSHA) approved chainsaw safety course
  - Form 2500-120 Power Equipment Safety Acknowledgement (Volunteers need appropriate training)
  - Follow Manual Code 9185.3 (Safety Requirements for Chainsaw Operations)
- Prescribed burning
  - Training
    - I100 <http://training.nwcg.gov/courses/i100.html>
    - L-180 Human Factors in the Wildland Fire Service <http://onlinetraining.nwcg.gov/node/163>
    - IS700 The National Incident Management System <http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=IS-700.a>
    - S-190 Introduction to Wildland Fire Behavior <http://onlinetraining.nwcg.gov/node/169>
    - S-130 Firefighter Training <http://onlinetraining.nwcg.gov/node/177>
  - Form DOA-3009 Prescribed Burning Volunteer Agreement
  - Form 9100-240 Physical Requirements Acknowledgement paired with Appendix B, Manual Code 9124.2 Job Task Analysis for Fire Management
- Working with youth
  - If youth are 17 and under: Parental Permission and Acknowledgement Form
  - No applying herbicide if youth are under 16 years old
  - Volunteers under 16 must be accompanied by a parent or group leader who is responsible for their actions
- Injury
  - Form 2500-040 Visitor Accident Report (fill out if professional medical treatment is received)
- Other power equipment (ATVs, snowmobiles, etc.)
  - Training equivalent to DNR staff
  - Form 2500-120 Power Equipment Safety Acknowledgement

Any training must be completed prior to entering the hazard. Training must be documented, with a training certificate (summary of content, instructor, date, and length of training) kept by the regional volunteer coordinator.

## IX. Controlling invasive species

Invasive species are plants, animals, or pathogens that rapidly take over a new location and alter the ecosystem. They are non-native species, but many natives can be weedy and troublesome, especially when growing out of their natural context. Often these species spread because there are no natural predators, competitors, and processes in their new environment to keep their numbers in check. People are often the main vectors for moving invasives around.

Human-created conditions causing invasive spread are:

- introducing exotic species (from other regions or countries)
- disrupting the delicate balance of native ecosystems by changing environmental conditions—e.g., stream sedimentation, ditching, building roads) or by restricting or eliminating natural processes (fire for example); in such instances, even some native plants and animals can become invasive; and
- spreading invasive species through various methods. Some examples:
  - moving watercrafts from water body to water body without removing invasive plants and animals;
  - carrying seeds of invasive plants on footwear or pet's fur;
  - mowing along roadsides;
  - importing firewood and leaving in campgrounds;
  - driving and biking with invasive seeds in tire treads.

### *Kill the invaders attitude!*

Sometimes it's tempting to think about removing all of the invaders on a particular property before doing anything else. This may or may not be the best approach. Think about the created conditions that fostered the invaders' spread in the first place. The presence of invasives often indicates something larger that is wrong and needs to be dealt with first. For example, a large patch of reed canary grass in the middle of a nice sedge meadow might be an indicator of altered hydrology. To solve the problem, work should be focused on solving the major problem (if possible) before or along with trying to spray the reed canary grass. Or maybe fire needs to be reintroduced to top kill shrubs, increasing light levels and stimulating germination of native species. Try to establish conditions that will allow

native plants and animals to thrive. Consult local experts or literature for more help.

### *How do I attack invasives? They are everywhere!*

It is easy to feel overwhelmed when walking through a site and observing how many invasives are present. Don't be afraid to lower the bar. It might not be possible to wipe out all of the invaders in a specific State Natural Area. Look at the site and determine which areas are worth working in. Worthwhile areas are those that contain high diversity, few or easy to control invasives, and easy access. They might contain rare and endangered plants and animals. Think about prioritizing and focusing your efforts on invaders in the quality areas first. Once these areas look good, you can move on to other areas. Weigh what you can take on. Plan to devote some effort to controlling invaders in new areas for the long term. They will get easier to control with time, but some years may be harder and may require follow-up for 3-5+ years. Come up with a plan that states clear goals, assess progress periodically, and adapt the plan accordingly. More information follows in the Yearly management objectives section.

### *Dramatic landscape changes*

Dramatic landscape changes are changes that are large enough to affect the whole local ecosystem. They are the big picture goals of most restorations—going from agriculture field to prairie, oak woods to savanna. Catalysts of this change can range from blow downs to fire to brush cutting. But dramatic changes may not always be good. There may be a huge change in canopy cover with only a few invasives. Those invasives may be primed and ready to fill the gaps opened up from a closed canopy system. Be mindful of the challenges presented by large-scale changes beforehand.

For example, cedar removal is essential for hill prairie preservation, but sometimes it can cause a lot of problems for many years. Sumac, thistles, knapweed, and sweet clover may move in to cover bare ground patches. Failure to remove a small number of persistent invaders (like sweet clover) may mean you will be dealing with a seed bank and germinating individuals for many years. Other times native prairie naturally comes back without any coaxing. It is important that you are aware of what may fill in and the work it will take to ensure all your work is not lost. Think about planning follow-up work days in areas you make large-scale changes. Always be

thinking about the future goal and how best to get there but be ready for the unexpected.

## A. Methods to control invasive species

### *Girdling*

This method removes the cambium layer from the stem of a tree. It will cut the roots off from the supply of sugars produced from the leaves, causing a slow death. The tree may leaf out for a year or two before it dies since water and nutrients are still able to flow to the leaves from the roots through the xylem. It is moderately effective on aspen clones, ironwood, box elder, etc. It is a reliable way to control these trees without using herbicide. It should be done below the lowest live branch in spring-early summer after leaf out but before mid-summer.

Girdling can also be done together with the use of herbicide for the species that do not die without herbicide. It can be an efficient way to kill larger trees without a large amount of slash buildup right away. But beware; there will be dead trees for many years before they fall down.

### *Hand pulling*

The pros of hand pulling include being cheap, easy, no tools required, and visible progress. Cons are soil disturbance, bringing up seeds from the seed bank, being labor intensive, pulling desirable plants as well, not getting the entire root. It is possible to hand pull many invaders. There is usually a time of year when hand pulling is easier due to smaller plant roots or ease of finding the invasive.

### *Digging*

This is a more disruptive method than hand pulling and can be very effective on taproot species like wild parsnip. For wild parsnip and some other taproot species, it is possible to cut below the root crown (just below the soil) to achieve effective removal. Digging the entire root will leave a more noticeable disturbance and should be used sparingly on species that can be controlled with other methods.

### *Mowing*

Mowing can be effective at controlling some biennial plants that put all of their resources into flowering and producing seed in their second year

before dying. The drawback is that mowing can be non-selective and can damage non-target species, especially large-scale mowing. Some examples of biennials mowing may target are sweet clovers, Japanese hedge parsley, wild parsnip, some thistles, etc. Mowing timing is crucial and specific to the species, but it should be mowed at peak flowering before seeds are mature. Repeated mowing may be needed if cut stems resprout. Mowing is also an option to top kill brush. Repeated mowing can decrease the cover of brush species like sumac, honeysuckle, and dogwood. Mowing can often be done with mechanical equipment, which can make it more efficient than hand pulling.

### *Herbicides*

Herbicides can be applied in a variety of ways and can be very efficient and effective at controlling invasives. They are essential to control some species. Always read the pesticide label and follow directions. Anyone applying herbicide to aquatic areas must be a certified applicator in Wisconsin. See [Section XI](#), "Herbicides".

### *Prescribed fire*

Many of Wisconsin's plant communities relied on fire before the landscape was fragmented by European settlement and fires were extinguished. Prairies, wetlands, savannas, and oak woodlands are all dependent on fire to top kill brush, decrease canopy cover, stimulate natives, release nitrogen and other nutrients, warm the soil, etc. Fire can be a very efficient tool for invasive removal because a large area can be impacted with minimal effort. If favorable fuels are present (oak leaf litter, grasses), fire can drastically change the landscape. Fire will not be a magical cure because many undesirable areas do not have enough fuel to burn and undesirable woody plants will resprout, but it can be a great start. Find more specific species effects discussed in the Species section immediately below.

### *New methods*

Keep learning! There are always new methods out there to be discovered, those listed above are not exhaustive!

## B. Species

The following information is boiled down to the most important basics. This section is not meant to be exhaustive or authoritative. While these

methods have been obtained through research and experience, they may not work in all situations and more effective methods may exist or be developed. Please use other resources, consult experts, and make observational changes to correctly identify invasives and determine the best management method. **For the most comprehensive, up-to-date, and research proven methods in Wisconsin, we recommend checking the UW Extension weed science page at <http://fyi.uwex.edu/weedsci/> and searching for the specific invader.** There are factsheets for many of the invaders listed below with information on other methods and herbicides. Also see [Appendix B: Herbicide application rates chart](#), for a basic but more organized chart of effective herbicides and rates.

### Autumn Olive (*Eleagnus umbellata*)

#### *Damage to SNAs*

- Small tree that is a persistent spreader and quick grower in open areas, especially rocky and sandy sites.
- Spread - Birds eat the berries and disperse seeds (often from perches).

#### *Control*

- Cut stem - Cut autumn olive and apply an oil based herbicide like triclopyr in fall and winter.
- Other herbicide methods are also successful- basal bark treatment or foliar spray with triclopyr.
- Prescribed fire - Burning in areas with sufficient fuel load to carry fire kills young seedlings. Repeated prescribed burning can topkill trees and resprouts, setting them back.

### Aspens (*Populus spp.*)

#### *Damage to SNAs*

- Aspen are native to all of Wisconsin but have increased their range (especially in southern Wisconsin) to include areas where commonly occurring fires were ceased. They now occur in previously open areas such as hill prairies, wetlands, barrens, and wet prairies.
- Spread - Aspen are clonal trees and spread via extensive root systems as well as some seed production.

#### *Control*

- Girdling - Removing the outer bark in the spring and summer (May-June) of all trees in the clone is effective at separating the leaves

from the roots and stopping the flow of sugars to the root system. The trees may take a year or two to die, but typically do not resprout or sucker.

- Cut stem - Using a solution of aminopyralid and triclopyr with oil on cut stems (all included in the clone) can be effective.
- Foliar spray - Aminopyralid and triclopyr in water can control any small resprouts that occur.

### Black Locust (*Robinia pseudoacacia*)

#### *Damage to SNAs*

- Usually invading open or partially shaded areas, often in sandy soil, black locust is an aggressively spreading, clonal species that grows into large trees very quickly and is hard to control.
- It puts out chemicals into the soil and can shade out whatever was there before it occupied the area.
- It also very aggressively spreads after fires, making it a dangerous invasive in areas where prescribed burns occur.
- Spread - Via rhizomes and seed.

#### *Control*

- It is best to use aminopyralid in sandy soils due to chemical leaching from clopyralid.
- Basal bark - Using oil plus aminopyralid or clopyralid in a basal bark application for smaller (less than eight inches in diameter) trees is effective. Adding triclopyr can increase the effectiveness of this treatment.
- Girdle and treat - Use a chainsaw to girdle larger trees in fall or winter and spray aminopyralid or clopyralid with oil into the girdle left behind. Cut through the entire outer live bark to make the treatment effective. Follow up foliar treatments may be needed the next year(s) to kill resprouts. Adding triclopyr can increase the effectiveness of this treatment.
- Foliar spray - Use aminopyralid or clopyralid in water to treat smaller trees less than eight feet tall.
- Cut stem - Cutting small trees and treating stumps with aminopyralid or clopyralid may also be effective. Adding triclopyr can increase the effectiveness of this treatment.

### Buckthorns (*Rhamnus cathartica*, *Rhamnus frangula*)

#### *Damage to SNAs*

- Overshading, killing native understory plants and trees.
- Removing fuel from wetlands and prairies which prevents fire.
- Rubbing on larger trees resulting in branch kill and sometimes death.
- Prolific resprouter after being topkilled.
- Glossy buckthorn (*R. frangula*) is more likely to threaten wetlands and mesic prairies.
- Common buckthorn (*R. cathartica*) is more likely to threaten shaded environments like oak savannas, woods, etc.
- Spread - Birds eat and disperse seeds due to its laxative fruit.

#### *Control*

- Look for buckthorn populations in the fall (October-November) when it is still holding green leaves and other trees and shrubs have dropped their leaves.
- Stump treatment - Cut buckthorn and apply triclopyr with oil in fall and winter.
- Other methods may be successful- girdling, basal bark treatment or foliar spray with triclopyr.
- Prescribed fire - Burning in areas with sufficient fuel load to carry fire kills young seedlings. Repeated prescribed burning can topkill buckthorn trees and resprouts, setting them back, but they will be persistent.

#### Bush Honeysuckles (*Lonicera spp.*)

##### *Damage to SNAs*

- Prefers edges to full sun where it displaces other species through shading. But tolerates most light conditions and can be a problem in prairies, barrens, oak woods, etc.
- Spread - Birds eat and spread the seeds.

##### *Control*

- Stump treatment - Apply a glyphosate and water mixture to cut stems. Or when spraying buckthorn or other brush species use a 25% triclopyr and oil mixture with 5% glyphosate added in.
- Foliar spray - glyphosate in water is effective for smaller (less than eight feet) plants.
- Prescribed fire - Burning can topkill plants but they will resprout. Repeated burns can topkill large honeysuckle depending on intensity. Burning when plants are leafed out is more effective at

topkilling honeysuckle. Pairing foliar spraying resprouts after repeated prescribed burning can result in complete control.

### Canada Thistle (*Cirsium arvense*)

#### *Damage to SNAs*

- Can invade disturbed areas very quickly but also poses threats to wetlands and wet prairie where it can be persistent.
- Spread - Canada thistle is a clonal thistle that spreads vegetatively and via light wind-blown seeds.

#### *Control*

- Foliar spray - Using aminopyralid or clopyralid is an effective spot treatment of Canada thistle.
- Mowing - Mowing can be effective if cutting low to the ground the first week of flowering. After the first week of flowering viable seed may be produced by the cut stems. A second or third mowing treatment may be needed to prevent a second flowering period. Repeat mowings for several years.

### Cattails- Narrow-leaved Cattail (*Typha angustifolia*) and Hybrid Cattail (*Typha x glauca*)

#### *Damage to SNAs*

- Aggressive colonizer of wetland ecosystems. It easily takes over disturbed wet areas and can spread into higher quality wetland communities forming dense monocultures.
- Fire seems to encourage spread.
- Spread - New individuals establish from seeds which disperse via wind. Those individuals spread via thick rhizomes to form dense colonies.

#### *Control*

- Mowing - A combination of mowing and flooding can prove effective at discouraging cattails from growth as the rhizome system is dependant on green and brown leaf material for oxygen.
- Foliar spray - In monocultures an aquatic approved herbicide like imazapyr can have positive effects. Since imazapyr kills everything, other methods may be more appropriate when native vegetation is mixed in.
- Hand wicking - Pair a cheap fuzzy glove outside with a chemical glove on the inside for this method. It can be effective at eliminating more scattered individuals. A container of herbicide is carried, the

glove is dipped in the container and wicked on the cattail stem to apply the herbicide.

### Common Reed Grass (*Phragmites australis*)

#### *Damage to SNAs*

- Forms tall, dense clonal colonies that form monocultures and displace other native plants and animals. Preferred habitats are wetlands, shorelines, and roadsides.
- Hybridizes with the native common reed grass (*Phragmites australis subsp. americanus*), increasing the aggressiveness of the native. While a plant tissue sample is the only way to tell for sure whether a plant is native or non-native, this article compares the typical characteristics of the two: <http://www.nps.gov/plants/alien/fact/pdf/phau1-powerpoint.pdf>
- Spread - Primarily via rhizomes which can take over areas quickly.

#### *Control*

- Bundle and cut - This method is an effective way to minimize effect on native plant species. Tie stems together in the late summer to early fall after flowering with twine at chest height. Cut stems off above the twine and apply imazapyr (or glyphosate) to the cut stems. Herbicide travels to the root system and kills the clone.
- Foliar spray - Apply imazapyr (or glyphosate) to stems after flowering but before 50% brown up in September- early October.
- Follow-up treatments are often necessary.
- Mowing or burning in the winter/early spring makes herbicide treatment easier by removing standing old plant material. Plants should not be mowed or burned six weeks prior to treatment or two weeks after treatment.

### Crown Vetch (*Coronilla varia*)

#### *Damage to SNAs*

- Aggressive invader of disturbed and remnant open areas, shading out and displacing natives.
- Since it was often planted on roadsides it can invade from this starting point.
- Spread - This perennial spreads by rhizomes and abundant seed.

#### *Control*

- Foliar spray - Aminopyralid is effective at controlling crown vetch before flowering in summer or in the fall. Damage to other natives can be minimized by spraying in spring or early summer.
- Mowing - Mow before seeds are produced (early June) and mow a second or third time as plants leaf out. Mowing will not control, but does suppress crown vetch.
- Prescribed fire - Burning in late spring can control seedlings and small individuals but older plants will respond aggressively.

### Dame's Rocket (*Hesperis matronalis*)

#### *Damage to SNAs*

- Displacing native plants in edges or semi-open environments.
- Produces a large number of seeds per plant.
- Dame's rocket is a biennial, it germinates and overwinters the first year. In the second year it produces flowers, seeds, and then dies.
- Spread - Seeds are dropped closely to parent plant but are dispersed by water, animal fur, or hooves.

#### *Control*

- Hand pulling - Persistent hand pulling of second year plants is effective.
- Foliar spraying - Spring spraying (May- early June) before seeds are produced with triclopyr. Spray early to minimize damage to natives and pair with hand pulling when the plants are flowering to get any missed individuals.
- Prescribed fire - Late spring or fall burning can kill germinated first year plants and some second year plants.

### European Marsh Thistle (*Cirsium palustre*)

#### *Damage to SNAs*

- A biennial, it flowers and produces seeds the second year of growth, then dies.
- Aggressive colonizer in moist, acidic soils especially beach and dune areas of northern Wisconsin. Can displace native plants.
- Spread - Seeds dispersed by wind.

#### *Control*

- Mowing - Repeated mowing (3 times a year) can weaken second year plants if mowed just before buds begin to open.
- Foliar spraying - Spray with aminopyralid.

### Garlic Mustard (*Allaria petiolata*)

#### *Damage to SNAs*

- Very aggressive, becoming a monoculture in some areas by displacing native plants.
- Produces a large number of seeds per plant.
- Injects a fungus killing toxin into the soil which decreases the competitive advantage of native plants.
- Garlic mustard is a biennial, it germinates and overwinters the first year. In the second year it produces a flower, seeds, and then dies.
- Spread - Seeds are dropped closely to parent plant but are dispersed by water, animal fur, or hooves.

#### *Control*

- Hand pulling - Persistent hand pulling (late April- June) of second year plants can be effective. It is beneficial to return to areas a second time to catch any previously missed plants or late bolting individuals.
- Foliar spraying - Spring spraying (early April- May) before seeds are produced with triclopyr. Spray early to minimize damage to natives and pair with hand pulling when the plants are flowering to get any missed individuals.
- Prescribed fire - Late spring or fall burning can kill germinated first year plants and some second year plants, depending on fire intensity. Seeds may germinate very well after burns, making follow up treatments important.
- Propane torch - A torch mimics fire and may be effective for larger patches of first year and small second year plants. Only use when conditions are too damp for the fire to spread.

### Japanese Hedge Parsley (*Torilis japonica*)

#### *Damage to SNAs*

- Displacement of native plants due to aggressive spreading.
- Japanese Hedge Parsley is a biennial, it germinates and overwinters the first year. In the second year it produces a flower, seeds, and then dies.
- Spread - Via fuzzy seeds that stick to animals fur and clothing. Consequently, it travels quickly on deer trails, roads, brush edges, or other rights-of-way.

#### *Control*

- Foliar spray - Broadleaf herbicides are effective in the spring on first year plants.
- Hand pulling - The flowering or bolting plants are fairly easy to pull with gloves.
- Cutting - Since hedge parsley is a biennial, cutting low to the ground from peak flowering stage until brown fruit are present is an effective way to kill the plant and prevent viable seeds from forming.

### Japanese Knotweed (*Polygonum cuspidatum*)

#### *Damage to SNAs*

- A woody perennial that forms dense thickets which shade out other plants especially along waterways.
- Spread - Primarily via rhizomes, but new populations can start from small root or stem fragments. Since plant fragments establish easily it is important to eradicate knotweed as soon as possible to prevent spread.

#### *Control*

- Knotweed is challenging to control so there is a lot of information on different methods.
- Mowing - Repeated monthly mowing can reduce root reserves. This method is best paired with other methods.
- Foliar spray - Aminopyralid or imazapyr sprayed in the fall may be effective for larger populations. A better method is to cut the plants when they are 4-5 feet tall and spray when resprouts reach three feet in height in the fall.
- Cut stem - During the growing season glyphosate can be effective on cut stems.
- For more information see <http://www.clark.wa.gov/weed/>

### Leafy Spurge (*Euphorbia esula*)

#### *Damage to SNAs*

- Leafy spurge outcompetes natives even in remnant areas. Prolific spreader in open areas, very common on roadsides, and hard to control.
- Spread - Primarily via rhizomes, some seed dispersal as well.

#### *Control*

- Foliar spray - Application of aminocyclopyrachlor + chlorsulfuron at 0.15% in the fall (late August to October) before the first frost is the most effective treatment. This application should be made after good soil moisture is present but prior to the leafy spurge losing its milky sap flow due to a killing frost. To check and see if the milky sap flow has been affected by a frost simply break the main stem of the leafy spurge and if milky sap flows from the break then aminocyclopyrachlor + chlorsulfuron can still be applied.

### Multiflora Rose (*Rosa multiflora*)

#### *Damage to SNAs*

- This rose can become a thicket of thorns in oak savannas, oak woods, and some prairies, shading out competitors.
- Spread - Rose seeds (or hips) drop close to the parent plants but are also spread via birds and animals that eat the hips.

#### *Control*

- Hand control - Scattered individuals can be dug out in newly invaded areas. It is important to get all of the roots. Plant native seeds quickly to control soil erosion.
- Mowing - Mow every 4 to 8 weeks for 3 to 6 times each growing season. If repeated for two to four years, mowing can be effective at controlling multiflora.
- Foliar spray - Foliar spray with metsulfuron-methyl in water is most effective.
- Cut stem - If you dare confront the thorns, cut stem treatment with triclopyr in oil is effective also.

### Oriental Bittersweet (*Celastrus orbiculatus*)

#### *Damage to SNAs*

- Very aggressive vine which invades shaded to open environments. Kills native plants through shading. Can kill mature trees by shading or girdling them.
- Spread - Bittersweet is clonal, spreading vegetatively and via bird dispersal.

#### *Control*

- Look for new populations shortly after peak fall foliage because bittersweet hold its leaves longer than most native trees and shrubs.

- There is a native bittersweet (*Celastrus scandens*) which is very similar except for aggressive nature. Some differences between the two include flower and fruit position as well as fruit color. Use this link for help:  
<http://www.mda.state.mn.us/plants/badplants/orientalbittersweet/bittersweetdiffs.aspx>.
- Foliar spray - Use triclopyr mixed with water for control. Spray in the fall for easier ID and less damage to native vegetation. Some sources suggest spraying immediately after the first frost. Our crews have found spraying earlier than the first frost is also effective.
- Cut stump - Cut stems and apply a solution of triclopyr in oil to each stem. Watch for resprouts the next year.
- Prescribed fire - Research has shown that fire stimulates its growth. Fire can kill small individuals and seedlings, and can topkill clones-keeping them from travelling into the canopy, however resprouting will occur rapidly.
- Be persistent. Expect a need for follow up treatments.

### Purple Loosestrife (*Lythrum salicaria*)

#### *Damage to SNAs*

- A threat to wetlands, purple loosestrife can infiltrate rich to poor quality wetlands, displacing natives in the process.
- Spread - Via rhizomes and seeds.

#### *Control*

- Bio-control - *Gallerucella* beetles are very effective at reducing large populations to manageable levels.
- Pulling - Can be effective on younger plants if the entire root is removed. Look for plants to flower in late July or August. Bag and remove pulled material.
- Foliar spray - Remove and the flower heads of the plant and use a brush or glove method to wipe the plant with 0.3% imazapyr. Bag the heads if there are seeds present.
- Cut stem - Cut the plant close to the ground, bag and remove the stem material, and apply a 2% solution of imazapyr to the cut stem.
- Prescribed fire - Fires may kill seedlings and suppress mature plants but have not been shown to control populations. Other methods are needed.

### Reed Canary Grass (*Phalaris arundinacea*)

#### *Damage to SNAs*

- Spreads quickly in wetland and some upland habitat displacing natives. Seeds spread along waterways and streams and established patches spread by rhizomes. It really likes wetland areas with high nutrient content- typically areas with lots of runoff like floodplains of streams or wetlands.
- Spread - Primarily vegetative but some seed spread as well.

#### *Control*

- Foliar spray - Control is difficult as follow-up treatments are needed. Glyphosate is very effective, but not selective, so best used in dense stands lacking desirable plants. Clethodim is selective and will not kill dicot or sedge species but is not approved for aquatic use and cannot be used near water. Clethodim is most effective in spring or fall. Treatments at this time of year tend to minimize the impact on any natives in the area.
- Hand wicking - Pair a cheap fuzzy glove outside with a chemical glove on the inside for this method. It can be effective at eliminating individuals without impacting native vegetation. A container of herbicide is carried, the glove is dipped in the container and wicked on the grass stem to apply the herbicide.
- Prescribed fire - Repeated late spring burning (for five years) has been shown to be effective in reducing populations.

### Spotted Knapweed (*Centaurea maculosa*)

#### *Damage to SNAs*

- Aggressive in open disturbed and remnant dry areas especially sandy and rocky sites.
- Spread - Seeds drop close to the plant but remain viable in the soil for many years (eight or more).

#### *Control*

- Pulling - Pulling or cutting below the soil can keep a small population at bay if the top 3 inches of taproot are removed, but is not an efficient way to control large infestations. It is best used in sensitive areas or with other methods.
- Foliar spray - Apply a broadleaf specific herbicide like 2,4-D to plants in the spring, when bolting, or in the fall. Milestone (aminopyralid) is extremely effective at the same times of year for knapweed and has a multiple year residual effect. Spraying in fall or early spring minimizes damage to native plants. Rosettes remain green into

winter and spraying can be effective when temperatures are above 35 degrees.

- Mowing - Large patches can be mowed at peak flowering but the plants may resprout, so they need to be monitored to see if a second cutting is needed. This is not the most effective control since it does not kill the plants, but a year's seed supply can be removed this way.
- Prescribed fire - A late spring fire may control small individuals and suppress established plants. The most effective time for control is during summer when plants are flowering, but this may harm other species as well. At least three years of annual burning are needed to suppress populations.

### Yellow and White Sweet Clover (*Melilotus spp.*)

#### *Damage to SNAs*

- Easily colonize recently opened or disturbed areas from full sun to partial shade. Yellow sweet clover is less shade tolerant. Can remain in and overtake remnant prairie areas.
- Persist well in the seed bank.
- These plants are biennials which germinate in the first year and produce flowers and seeds the next year after overwintering. After this flush of seed production the plants die.
- Spread - Small seeds that fall close to the parent plant are transported by animal fur and feet.

#### *Control*

- Cutting - This method is commonly used for large areas and can be very efficient with a mechanical brushcutter. Cut the plant close to the ground at peak flowering, just as the very first seeds are starting to form. The plant will die since all of its resources are put into creating flowers. Watch for yellow sweet clover to bloom in early June, white sweet clover in early July.
- Pulling - Remove the root to ensure the plant will not resprout. Sweet clovers have large taproots and may be difficult to remove if waiting till flowering. Pulling can be done before the plants flower.
- Prescribed fire - Fires scarify clover seeds, encouraging them to germinate. Expect a flush of sweet clover one- two years after a burn. Two years of burning with the second burn conducted in late spring burning is thought to help control sweet clover.
- Foliar spray - A broadleaf herbicide (aminopyralid is most effective) provides control, but may cause damage to natives in quality areas.

### Wild Parsnip (*Pastinaca sativa*)

#### *Damage to SNAs*

- Persistent in low quality and disturbed open areas.
- Able to invade remnant wetlands and prairies.
- Wild parsnip is a biennial or monocarpic. It doesn't flower the first year it germinates. It stays in rosette form for a year or more before flowering. After flowering and producing seed, the plant dies.
- Spread - Via seeds that are dropped close to the parent plant.

#### *Control*

- Be aware of the phototoxic nature of wild parsnip. When the sap from the plant contacts bare skin and the skin is exposed to sunlight a painful rash develops. Some people are more sensitive than others.
- Pulling - Hand pull or cut below the root crown (just under the soil) to kill plants. Bag any seed material.
- Cutting - Mow or cut plants that are at full flower stage, before seeds enlarge, close to the ground. Since the plant will die after producing seeds, this will prevent seeds from developing and kill the plant. Resprouting will occur if the plant was cut too early.
- Foliar spray - Use a broadleaf specific herbicide such as metsulfuron-methyl (best option) 2,4-D amine, or triclopyr for control.

For more information try these helpful links on invasives:

Midwest Invasive Plant Network (MIPN): <http://mipn.org/>

Invasive Plants Association of Wisconsin (IPAW): <http://ipaw.org/>

Wisconsin DNR Invasive Species Information:

<http://dnr.wi.gov/topic/Invasives/what.html>

Recreational Best Management Practices (BMPs) to limit invasive spread:

<http://www.wisconsinforestry.org/initiatives/other/invasive-species-bmps/recreation-bmps>

#### References:

Czarapata, E. 2005. "Invasive Plants of the Upper Midwest: An Illustrated Guide To Their Identification and Control." University of Wisconsin Press: Madison.

Smith, T. 2001. "Lake County Forest Preserve District Volunteer Steward's Manual."

Williams, B. 2011. "The Stewardship Manual." Draft.

## X. Tools

Volunteers can't do the job without the right tools. As funding allows, the SNA program will provide appropriate tools for volunteers to use and share.

### A. Storage

Storage areas for each part of the state will be identified. As funding allows, equipment trailers may be purchased providing an access point for tools.

### B. Checkout

An online checkout system will ensure everyone understands tool availability. It includes equipment owned, who it was loaned to, when it was loaned, expected return date, what it was reserved for, and future reservations. Contact with the regional volunteer coordinator (or volunteer tool coordinator as appointed by the regional volunteer coordinator) should also be made so there is a point person with knowledge of where tools are travelling and how much they are being used.

### C. Safe usage

Safely using tools is important for volunteer safety and the ability of the program to use tools in the future. Safe usage of herbicides is addressed in [Section XI](#), "Herbicides". Additional knowledge is gained by acquiring a Wisconsin Pesticide Applicators Certification. Chainsaw safety is covered in chainsaw safety courses. Safe usage of brushsaws is covered in [Section XII](#), "Brushsaw safety". Consult the appropriate tool manuals (online) for important information on safe usage.

### D. Maintenance

Equipment needs to be returned in the same condition in which it was checked out. If the equipment is not in good working order the volunteer must contact the regional tool coordinator to let them know of the problem and any parts that need ordered. This is normal as tools will break with normal use. When returned, chainsaws should have sharp chains, air filters

cleaned, inside gunk brushed out; brushsaws should have reasonably sharp blades, air filters cleaned, periodically spark arrestors cleaned; and backpack sprayers should be triple rinsed after each use in the field so herbicides do not quickly corrode the moving parts and seals. Consult the appropriate tool manual (online) for the most helpful information on preventative maintenance. The regional volunteer coordinator will perform preventative maintenance on tools when needed or appoint a volunteer tool coordinator to do so. Volunteers should not perform maintenance if they do not feel comfortable doing it (ex: adjusting the carburetor settings on a chainsaw).

## XI. Herbicides

Herbicides are chemicals used to kill unwanted plants. They can be very effective tools for restoring SNAs on a landscape scale but can also be destructive if used in the wrong way. Remember it is much easier to destroy a remnant plant community than to restore it. Use herbicides very thoughtfully around rare plant communities. There may be other options-look into them if you are dealing with a sensitive area.

Herbicides have several different names. The trade name or common name is the name a company gives to an herbicide (ex: Garlon 4). It might change even though the same chemical composition is used. The chemical name of the herbicide identifies the active ingredient (ex: triclopyr).

Herbicides can be divided into two main groups. The two main groupings are contact herbicides and systemic herbicides. Contact herbicides kill only the parts of the plant that the herbicide touches. They will show results quicker than systemic herbicides but may not kill the plant. Many invasives are able to resprout from the root after being treated with contact herbicides, therefore most of the chemicals we use are systemic herbicides. Systemic herbicides are absorbed through the leaves or stem of the plant and transported to all of the plant tissue. Some chemicals may take several days or weeks to show an effect. The speed of travel throughout the plant depends largely on soil and air temperature. Cooler temperatures slow herbicide travel, so a plant treated in the spring may take a week or two longer to show an effect than a plant treated in the summer. Precipitation can also impact herbicide effectiveness and speed as plant pathways tend to slow or shut down during dry periods, decreasing herbicide effectiveness.

Herbicides can also be categorized by their mode of action (the mechanism in which they kill plants). There are several types of herbicides listed below along with their target species:

Auxin (growth regulator) mimics: triclopyr, 2,4-D, clopyralid, aminopyralid

Target species: These herbicides focus on broadleaves. Some of these herbicides are more generalists while clopyralid and aminopyralid only control certain families of broadleaves.

Amino acid inhibitor: glyphosate, imazapyr, imazapic

Target species: These chemicals are generalists and control most species.

Accase inhibitor: clethodim

Target species: Monocots (plants with one seed leaf at germination- including grasses, orchids, lilies, irises, bluebells, ginger, onions, etc.) are susceptible to these herbicides.

## A. Herbicide labels and safety data sheets (SDS)

The herbicide label is an important piece of information for utilizing. The label includes identifying information, safety information including what Personal Protective Equipment (PPE) is recommended to wear while using the herbicide and any side effects caused by exposure, environmental information intended to protect nontarget organisms, and use information. In the use information section you will find recommended application rates, methods, and target species the herbicide will control. Federal law requires using an herbicide in a manner consistent with its labeling.

The SDS is an OSHA regulated document which contains information on the herbicides physical and chemical properties, toxicological and ecological information, first-aid procedures, and emergency response. The SDS contains more technical information than the herbicide label.

## B. Before using herbicides

Non-aquatic herbicides: each person using non-aquatic herbicides on state property needs to have a "right-of-way and natural area pest control" (Category 6) Wisconsin Pesticide Applicators Certification (expires every five years) or be supervised by a DNR staff person or volunteer who has Category 6 Certification.

Aquatic herbicides: If applying an aquatic herbicide below the high water mark each applicator needs to have an "aquatic and mosquito" (Category 5) Wisconsin Pesticide Applicators Certification.

Except for applications in aquatic environments, DNR staff (including volunteers) may apply general use pesticides on DNR land even though they are not DATCP certified, but they must be working under direction of someone who is. The certified personnel should be in work status at the

time of the application or be present at the site of the application. Designated certified personnel are responsible for assuring that general use pesticide applicators are given instructions for responsible and safe usage, clean-up and storage procedures, including necessary Personal Protective Equipment (PPE).

Before using herbicides without DNR staff present, we recommend volunteers become familiar with the label and MSDS of the herbicide being used. The regional volunteer coordinator will provide a copy of the correct label and MSDS sheets. If you lose them or do not have a copy of the label or MSDS you can find them at:

<http://www.cdms.net/LabelsMsds/LMDefault.aspx?t>

The proper signage supplied by the regional volunteer coordinator must be in place when using herbicides. Warning signs must be posted at normal points of access to the application site and at any boundaries that lie within 300 feet of a residence, migrant labor camp, school, playground, day care facility, health care facility, commercial or industrial facility, public recreation area, or other nonagricultural area, except a public road, where individuals are likely to be present during the restricted entry interval specified on the pesticide label. Posting is required until sprays have dried or according to the pesticide label's Restricted Entry Interval.

## C. Limiting exposure

Using proper Personal Protective Equipment (PPE) is important to limit direct exposure to chemicals. Wear long pants, long sleeved shirts, shoes, and socks free from holes. Since most of the exposure (one study indicated 85% of total exposure is on hands and 13% on the forearms) comes around your hands gloves can be great protective gear. We recommend using nitrile gloves at least 14 mils thick that have enough length to provide protection for your wrists as well. Remember to wash your hands before putting your gloves on and wash your gloves after handling herbicide to minimize exposure on other parts of your body.

For more information on herbicide use see these links:

DATCP Videos:

[http://datcp.wi.gov/Plants/Pesticides/Applicator\\_Video/index.aspx](http://datcp.wi.gov/Plants/Pesticides/Applicator_Video/index.aspx)

DNR Herbicide Use Toolkit:

[http://intranet.dnr.state.wi.us/int/land/forestry/staff\\_tools/pesticides/](http://intranet.dnr.state.wi.us/int/land/forestry/staff_tools/pesticides/)

## D. Herbicide considerations

- Consider what impact the herbicides will have on non-target species. Use herbicides when they will cause more good than harm on a site or when they are the most efficient option for controlling a specific species. Look into other alternatives if dealing with sensitive plant communities.
- Is there a timing application that will limit the effect on desirable species (ex: foliar spraying garlic mustard in the spring before desirable species come up or foliar spraying knapweed in the fall when desirable plants have browned down)?
- Think about how to store, mix, transport, handle, and dispose herbicides and their containers before obtaining herbicides.
- Follow federal, state, and local regulations. It is a federal law that herbicides must be applied according to the herbicide label.
- Check with the regional volunteer coordinator if you have questions regarding regulations or liability.
- Applicators must wear all PPE required by the herbicide label.
- How much public traffic is around? Could location of signage prevent exposure to the public?
- Use an aquatic herbicide if applying within a couple feet of standing water. The applicator will need to be certified as an aquatic and mosquito applicator.
- Consider forecasted weather conditions
  - High winds will increase drift which is not desirable.
  - As a general rule, do not apply herbicides above 90 degrees. Apply in the morning of hot days before plants adapt to hot conditions and are less likely to absorb the herbicide.
  - If applying water based herbicides to stumps, antifreeze can only work above 15 degrees or so.
  - Stop foliar spraying when temps get below 35 degrees.
  - Do not apply if there is a good chance of rain in the next couple of hours. Check the label to see if there is a more specific drying period.
  - Do not apply foliar spray if there is heavy dew on the foliage of target species. This will dilute the herbicide you are applying decreasing its effectiveness.

## E. Herbicides recommended for use on SNAs

- **2,4-D Amine.** 2,4-D is commonly used on broadleaf species and was one of the original herbicides developed in the forties. The 2,4-D ester formula is not approved for use on SNAs due to its high volatility and potential to kill native plants due to drift. The 2,4-D amine version can be less effective than the ester, but still provides acceptable kill and can be used on SNAs. It is less expensive than some other broadleaf herbicides and will not kill monocots.
- **Aminopyralid.** Milestone is one example of a trade name for aminopyralid. This chemical came out in 2005 and is broadleaf specific. Since it is used in small quantities it has minimal impact on some broadleaves and tends to favor killing certain plant families like legumes and asters. It is especially effective on problematic invasives like spotted knapweed, crown vetch, black locust, Canada thistle, and some clonal species. Aminopyralid has a residual impact a few years after its use which may prevent seedling germination for susceptible species. It can have two to three years control on spotted knapweed. It can be mixed with water or oil at recommended rates.
- **Clethodim.** Clethodim is also known as Intensity. It is selective for grasses, and recommended for use on reed canary grass. However it is not aquatic approved, so application to water should be avoided.
- **Clopyralid.** One trade name for clopyralid is Transline. Like aminopyralid, clopyralid is effective on legumes and asters. However, the clopyralid label suggests not using it on sandy sites due to soil leaching. It is most commonly used on black locust, crown vetch, and thistles.
- **Glyphosate.** Glyphosate is commonly known as Roundup but goes under many other trade names. Some of these formulations are approved for aquatic use. Glyphosate is a non-selective herbicide and will kill most plants. Glyphosate is sometimes favored because it has minimal soil residual activity and tends to be less expensive than other herbicides.
- **Aminocyclopyrachlor + chlorsulfuron.** Aminocyclopyrachlor + chlorsulfuron is used on SNAs for treatment of leafy spurge. Its trade name is Perspective. The label gives specific instructions on time of year and application rates. This herbicide can have residual effects on other species so use carefully and sparingly.

- **Imazapyr.** Imazapyr comes in different forms and has a couple of trade names. An approved aquatic form of imazapyr is Habitat (generically known as Polaris). Stalker is one trade name of imazapyr for oil applications. Imazapyr is a non-specific herbicide and can kill most plant species. It is effective on difficult invasives like phragmites, narrow-leaf cattail, and unwanted brush species. It does have soil residual activity so may impact plants after application. It should be used with caution around canopy trees because it can travel from an invasive application through roots grafted on to larger trees and kill them. Treatments should not occur underneath the desirable tree drip line (the outermost circumference of the tree canopy where water drips down from leaves).
- **Liberate.** This chemical is a surfactant which helps the herbicide mixture spread out on the leaf surface and penetrate more of the leaf surface. It is better for use in aquatic environments that methylated seed oil and commonly used for those types of applications.
- **Methylated Seed Oil (MSO).** This chemical is a surfactant which helps the herbicide mixture spread out on the leaf surface and penetrate more of the leaf surface. It is commonly used in foliar applications as an addition to other herbicides to increase effectiveness.
- **Metsulfuron-methyl.** One trade name of metsulfuron-methyl is Escort. Metsulfuron-methyl is effectively used on broadleaves for both post and pre-emergence due to its residual activity in the soil. It is thought to be a selective chemical, allowing some natives to persist after spraying. Target species may take longer to show signs of application.
- **MCPA, Triclopyr, Dicamba.** These chemicals are combined to form a herbicide with a trade name of Progeny. This herbicide can be used for woody species and other broadleaf control. It is selective on broadleaf weeds.
- **Triclopyr.** Triclopyr is the chemical name of Garlon 3A and Garlon 4. It is an effective broadleaf specific herbicide that will not kill monocots and is very effective on many common woody species. Garlon 3A cannot be mixed in oil but is approved for use in aquatic environments. Generic versions are Element 3A and Element 4. We commonly use triclopyr for woody species such as buckthorn, autumn olive, garlic mustard, mesic tree species, etc. It is very effective on broadleaf species.

## F. Storage and transporting

It is important to consider how you are planning to store and dispose of herbicides before you receive them. Most herbicides need protection from extreme cold, heat, and moisture. Keep them in an area with temperatures ranging between 40-100° F. In colder temperatures some herbicides break down or could freeze and cause ruptures. Herbicides should be kept in a secure area where unauthorized people or animals are unable to get to. The storage area should be able to withstand chemical spills. A sealed floor would prevent any runoff from getting to ground water. Metal or plastic shelves are ideal for storage because they are easy to clean in the case of a spill. An absorbent material like kitty litter can be used to stop and clean spills. Ventilation will help prevent fumes from building up.

It is difficult to tell how long a herbicide will last before breaking down. When acquiring new herbicide, mark the containers with the date received and use the old ones up first. Try to only have enough herbicide on stock for a year or field season.

When transporting herbicides, use containers that will catch spills due to tip-over such as a 5 gallon bucket or large Rubbermaid tote. Keep paper towels, kitty litter, a dustpan, and a supply of water with you in case spills do occur.

## G. Mixing, loading, rinsing

Sometimes calculating the correct amount of herbicide can be a challenge. To mix an herbicide at a solution of 25% calculate how much herbicide concentrate to use by multiplying the total amount of mixed herbicide desired by 25%. For example if 2 gallons of 25% triclopyr in oil were needed, determine the total ounces you would need.  $128 \text{ ounces/gallon} \times 2 = 256 \text{ ounces}$ . Multiply  $256 \times 0.25 = 64 \text{ ounces}$ . Fill the container with 64 ounces of triclopyr and then add oil to the 2 gallon mark. If the oil is added first to the two gallon mark your mixture will be dilute and you will have more than 2 gallons.

Most herbicide exposure happens during mixing and loading. Since chemicals are undiluted the chance of exposure is high. Avoid dermal exposure to concentrated herbicide by wearing proper PPE which includes

long-sleeved clothing, chemical resistant gloves, and eye protection when mixing and loading. Have an extra supply of water and soap with you in case exposure occurs. Try to determine how much chemical you will need that day and don't mix much more than what you will use.

After each use rinse mixing equipment (funnels, measuring cups, etc.) and herbicide sprayers in the field. Triple rinse with water (rinsing the inside of the container with 10-20% filled capacity and dumping the rinsate water out three times) and spray through wands to remove any residual herbicide so it does not corrode moving parts. You will produce a rinsate by doing this which can be saved and used for future applications but we recommend discarding it on a site where you have used the herbicide. When mixed with water, oil based herbicides will form a sludge that is unusable. It is best to rinse oil-based herbicide containers on site and dispose the rinsate there.

Remember to keep track of how much herbicide you use during the day and report the concentrated herbicide amount in the volunteer log. It is required by law that the program reports its herbicide usage. For workdays it might be helpful to determine how much you have at the beginning and subtract that from how much you have left at the end of the day.

After working, wash hands and arms with soap and water. Keep an extra change of clothes in your vehicle in case of spills. Wash clothing worn during applications separately from other clothing to prevent cross contamination. After the work is over, take a shower as soon as possible to remove any residual herbicide from your skin.

### **Disposal**

After using herbicides you will end up with empty containers. These containers can go to a landfill after being triple rinsed with water and punctured.

If you have unwanted liquid a landfill will not accept it. These can be disposed at a Wisconsin Clean Sweep site but will require a substantial fee. It is best to avoid accumulating any kind of liquid waste by applying it all on site.

## Application methods

The method of application varies based on seasonality, species, effectiveness, and personal preference. These are all good options to consider when removing invasive plants.

- **Basal bark.** Spraying a band of oil based herbicide on the lower bark of a tree. The band touches the ground level and extends up twice the width of the tree. The herbicide seeps in through the bark and gets absorbed by the plant. Larger trees with corky bark may not die or may take over a year to show signs of treatment. Basal barking works well for smaller to moderate sized trees but can use a large amount of chemical.
- **Cut stem.** Using a tool to cut a tree down and applying a chemical to the stump left after cutting. This is a common method used in the winter to kill invasive trees and brush. Herbicide can be applied with a hand sprayer, wick applicator, or backpack sprayer. The entire cambium (the plant tissue between the bark and wood of trees) needs to be treated with herbicide in order to kill the tree. Many labels also suggest applying the herbicide further down the cut stem. Resprouts may still occur the next year and follow-up treatments may be needed.
- **Foliar boom spray.** A larger motorized or electrical sprayer powers multiple spray heads mounted on a long tube or boom that sprays herbicide. This equipment is often mounted on an ATV, truck, tractor, or helicopter that travels over the target area as it sprays. Boom spraying is effective for covering large areas with dense stands of target species but may threaten non-target species with drift.
- **Foliar spot spray.** One of the most common methods of applying herbicide is using a sprayer to build pressure and spray a liquid chemical on target plant leaves. A surfactant is needed to break down the tendency of water molecules to stick together. The surfactant allows the herbicide to spread over more of the leaf and penetrate into the plant cuticle, a thick waxy layer present on most plants. One of the drawbacks to using a foliar spray application is the damage caused to native plants via drift. It is beneficial to spray when drift is minimal due to season or low wind. A favorable season for minimizing drift may be in the spring or fall when target individuals are smaller or in the rosette stage. Auxin mimic herbicides are typically most effective when the target species is growing most aggressively (typically just before flower stage).

- **Foliar wick application.** Using a wicking or wiping tool can be a way to minimize impact to non-target species. For example, the glove of death method pairs a cheap fuzzy glove outside with a chemical glove on the inside. A container of herbicide is carried; the outside glove is dipped in the container and wicked on the target species to apply the herbicide. This method often uses a higher concentration of herbicide than foliar spraying. It can be effective at eliminating more scattered individuals but time consuming.
- **Girdle.** Removing the living tissue (cambium layer or bark) to prevent nutrient flow from the leaves to the roots. Girdling is moderately effective on clonal problem species like aspen but can also work on walnut, ironwood, and others. It tricks the plant from thinking it has been harmed by leaving the heartwood intact and discouraging resprouting. After a growing season or two girdled trees will die unless healing or resprouting occurs. Removing the outer bark is possible when sap is flowing- usually in late spring to early summer. A sharp tool is needed to cut into the bark, then the bark is pried off.
- **Hack and squirt (Frill).** A sharp tool is used to cut into the bark in several places and an herbicide is applied to that cut at a high concentration. This method may work on large trees or clonal species.

#### References:

Tomasko, S., R. Flashinski, and M. Renz. 2009. "Wisconsin Pesticide Applicator Training Manual- Right-of-way." 6<sup>th</sup> ed. University of Wisconsin Press: Madison.

Williams, B. 2011. "The Stewardship Manual." Draft.

## **XII. Brush saw safety**

Brushsaws are very effective tools for restoration of Wisconsin plant communities. They are effective at cutting invasive plants like sweet clover or wild parsnip even on steep slopes, removing small brush, and creating firebreaks through grassy or brushy areas. They can be a safety risk due to the fast spinning blade which does the work. We recommend wearing proper personal protective equipment (PPE) when using a brush saw. This includes safety glasses, hearing protection, long pants, and gloves. Non-users should remain a safe distance away from the blade during operation as rocks, sticks, or broken blades can be thrown away from where the cutter is placed.

Brushsaws come with several types of blades. The main types we suggest using are the three point blade for cutting grass, sweet clover, parsnip, and other weeds; and the saw blade for cutting brush and small trees (up to 1.5 inches in diameter). When using the saw blade, be aware of the kickback areas of the blade. Cut trees with the left side of the blade. Sharpen the blades with the correct files after each day of use to keep a sharp cutting edge. Be aware that blades will sometimes crack due to dull usage, cutting wires, dirt, or rocks. Cracked blades need to be replaced with new blades so that pieces don't fracture off the blade.

To keep the brush saw running smoothly, periodically clean the air filter, grease the head, and burn off built up carbon on the spark arrestor. Consult the appropriate tool manual (online) for more information on safe usage and maintenance of brushsaws.

### **XIII. Setting up photopoints**

Photopoints can be valuable measures of management change. They indicate success, failure, or large scale changes. They can be a fairly simple way to document projects. Take photos before and after management occurs (for example before a burn, before brush was removed, etc.) to document changes. You may want to take them once a year during peak vegetation growth (late July- October).

To create a photopoint, pound a t-post into the ground, put flagging on it for visibility, take a GPS point at the location, write down the coordinates and other comments, and take four photos, one in each cardinal direction.

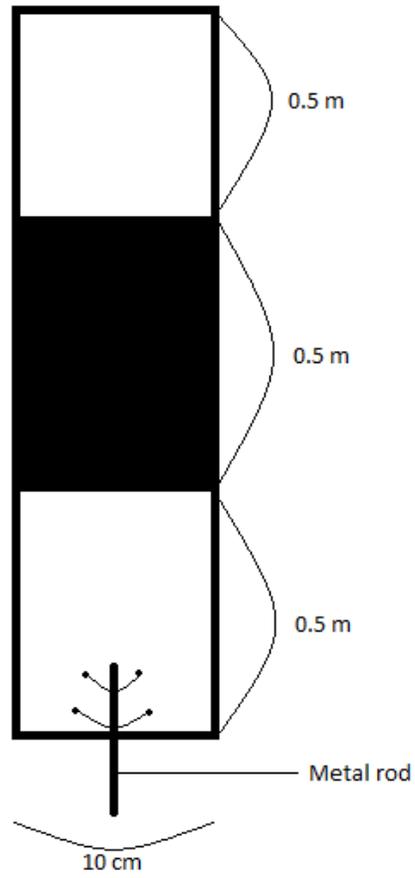
If necessary use an aerial photo of the site to mark photopoint locations and any helpful trails nearby. Place your points at easy to access locations so they are not hard to get to. Or locate them in an area where you expect to see change due to your restoration efforts.

Construct a target board (See Figure 4) for reference in the photos. It should be 1.5m by 10cm. Color it with black and white spray paint, alternating every 0.5m with white on the bottom. This black and white will indicate vegetation height in the photo. Drill four holes on one end, then insert two wires which form two loops on one side of the board. Tighten the wires to be a snug fit with the board and a metal rod. The rod acts as a pole for the board. It can be inserted into the ground and then the board slid down into the metal rod so the board stands up. Place the board 10 m away from the photopoint post in each cardinal direction and focus the center of the picture on the top part of the board. Instead of using a tape measure each time (inconvenient and likely inaccurate due to abundance of brush in some locations, you may want to use a pacing system to approximate distance with acceptable accuracy).

Name photos accordingly - Rock (site name) 3 (photopoint number) S (direction photo taken) 10-11-11 (date). So this photo would be called Rock3S10-11-11.

Taking pictures in four directions based only on a compass does not work. You might be able to see some similar features in the photo, but they aren't always comparable. To combat this, it is necessary to carry with you

printed copies of past photos so you can line up trees, topography, etc. to get the picture most closely related to past pictures. A monopod or other stabilizing device is helpful to ensure the camera is stable and the pictures are all taken at the same height. Other stabilizing devices could include shelf systems- drilling a fixed bracket into a tree for example.



**Figure 4.** Diagram of target board used for taking photopoint pictures.

## **XIV. References**

Czarapata, E. 2005. "Invasive Plants of the Upper Midwest: An Illustrated Guide To Their Identification and Control." University of Wisconsin Press: Madison.

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The Nature Conservancy.

Tomasko, S., R. Flashinski, and M. Renz. 2009. "Wisconsin Pesticide Applicator Training Manual- Right-of-way." 6<sup>th</sup> ed. University of Wisconsin Press: Madison.

Williams, B. 2011. "The Stewardship Manual." Draft.

## **XV. Appendices**

- A. Workday flier template
- B. Herbicide application rates chart
- C. Using pesticides safely (WI DNR)
- D. Log instructions document
- E. Sample log
- F. Relevant Forms
- G. Job Description: State Natural Area Steward
- H. Job Description: Apprentice Steward
- I. Job Description: Project Volunteer: Garlic Mustard Removal Volunteer
- J. Guidelines for visiting SNAs
- K. Seed collecting arranged by date
- L. Seed collecting arranged by species
- M. PVC wick applicator construction instructions and use

## Appendix A. Workday flier template

Fields highlighted in yellow need to be changed based on the event.

# Help Out on State Natural Areas



## Whitewater Oak Opening Workday



(Description of what and why.) Cut and/or pile buckthorn at Whitewater Oak Opening SNA. Come enjoy the fall weather and help volunteers during our monthly Southern Kettle Moraine SNA workdays. Help cut and pile brush, learn something, meet knowledgeable people, and enjoy the beauty of this open oak woodland in the process. Buckthorn can shade out native understory plants of open oak woods at this site. Follow up on efforts by the SNA program to use prescribed burns to decrease shading and increase understory plant diversity. No skills needed you will be trained onsite.

**Date:** November 15th, 2014

**Time:** 9am-noon

**Directions:** From Whitewater take Co Hwy P south past Hwy 12 and Kettle Moraine Drive. Take the fourth entrance lane on the left (east). Watch for a sign directing you.

**What to wear:** Dress for the weather and wear clothes that are OK to get beat up, long pants, long sleeves, gloves (we will have extra), sturdy footwear, safety glasses (we will have extra).

**What to bring:** Loppers (optional)

**Contact, RSVP info:** If you are interested please contact Jared Urban at [jared.urban@wisconsin.gov](mailto:jared.urban@wisconsin.gov) or 608-228-4349. But if you don't get around to notifying, come anyway!

**Cancellation or rescheduling plan:** If the workday is cancelled due to weather conditions, a message will be left at 608-228-4349 at least two hours prior to the event. If there is no cancellation message, the workday will continue as scheduled.

**Next workday (if applicable):** December 20<sup>th</sup>- Cutting and piling brush at Bluff Creek SNA



## Appendix B. Herbicide application rates chart

See next page

This sheet was last updated on 1.4.16 and is not meant to be exhaustive or authoritative. All of the rates here are intended to be applied through spot spraying with hand held or backpack sprayers. While these rates have been obtained through research and experience, they may not work in all situations and other, more effective methods may exist or be developed. Please use other resources, consult experts, and make observational changes to correctly identify invasives and determine the best herbicide rates. For the most comprehensive, up to date, and research proven methods in Wisconsin we recommend checking the UW Extension weed science page at <http://fyi.uwex.edu/weedsci/> and searching for the specific invader. There are factsheets for many of the invaders listed below with information on other methods and herbicides. **Anyone applying herbicides to an aquatic area must be aquatic certified. Always read and follow proper labels before using herbicides.**

Target Species	Active Ingredient	Application	Percent Rate	Per Gallon Rate of Concentrate	Surfactant?
Aspen	Triclopyr + Aminopyralid	Foliar	1% + 0.05%	1.3 oz + 0.06 oz/gal water	Yes
	Triclopyr + Aminopyralid	Cut Surface (in oil)	25% + 2%	32 + 2.5 oz/gal Bark Oil LT	
Autumn Olive	Metsulfuron-methyl**	Foliar	0.04%	1.5 g/gal water	Yes
	Triclopyr	Foliar	2%	2.6 oz/gal water	Yes
Black Locust	Aminopyralid	Foliar	0.20%	0.25 oz/gal water	Yes
	Clopyralid*	Foliar	0.70%	1 oz/gal water	Yes
	Clopyralid*	Cut Surface (in water)	10%	12.8 oz/gal water	Yes
	Aminopyralid	Cut Surface/Basal Bark	5%	6.4 oz/gal water or Bark Oil LT	
Black Oak	Clopyralid*	Basal Bark	5%	6.4 oz/gal Bark Oil LT	
	Triclopyr + imazapyr (Stalker)	Cut Surface	25% + 1.50%	32 oz + 2 oz/gal Bark Oil	
Box Elder	Triclopyr	Foliar	2%	2.6 oz/gal water	Yes
	Triclopyr	Cut Surface/Basal Bark	25%	32 oz/gal Bark Oil	
Brush Mixture	Metsulfuron-methyl+ Triclopyr	Foliar	.03% + 2%	0.04 oz + 2.6 oz/gal water	Yes
	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
Buckthorn	Triclopyr	Foliar	2%	2.6 oz/gal water	Yes
	Triclopyr	Cut Surface	25%	32 oz/gal Bark Oil	
	Triclopyr	Basal Bark	5%	6.4 oz/gal Bark Oil	
Canada Thistle	Aminopyralid	Foliar	0.15%	0.2 oz/gal water	Yes
	Clopyralid*	Foliar	0.30%	0.4 oz/gal water	Yes
Cattail	Imazapyr	Foliar	0.60%	0.75 oz/gal water	Yes
Crown Vetch	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Aminopyralid	Foliar	0.20%	0.25 oz/gal water	Yes
	Clopyralid*	Foliar	0.30%	0.4 oz/gal water	Yes
Dame's Rocket	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Triclopyr	Foliar	2%	2.6 oz/gal water	Yes
European Marsh Thistle	Aminopyralid	Foliar	0.15%	0.2 oz/gal water	Yes
	Clopyralid*	Foliar	0.30%	0.4 oz/gal water	Yes
Garlic Mustard	2,4-D Amine	Foliar	1%	1.3 oz/gal water	Yes
	Triclopyr	Foliar	2%	2.6 oz/gal water	Yes
	Glyphosate**	Foliar	2%	2.6 oz/gal water	Yes
	Metsulfuron-methyl**	Foliar in spring	0.01%	0.01 oz/gal water	Yes
Giant Hogweed	Metsulfuron-methyl**	Foliar in fall	0.03%	0.04 oz/gal water	Yes
	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Triclopyr (Element 3A)	Foliar	2.50%	3.2 oz/gal water	Yes
Honeysuckle	Progeny	Foliar	4.00%	5.28 oz/gal water	Yes
	Glyphosate**	Foliar	10%	12.8 oz/gal water	Yes
	Glyphosate**	Cut Surface	50%	64 oz/gal water	
	Triclopyr	Cut Surface	25%	32 oz/gal Bark Oil	
	Progeny	Cut Surface/Basal Bark	25%	32 oz/gal Bark Oil	
Japanese Barberry	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Triclopyr (Element 3A)	Foliar	4%	5 oz/gal water	Yes
Japanese Hedgeparsley	2,4-D Amine	Foliar	1%	1.3 oz/gal water	Yes
	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
Japanese Knotweed	Imazapyr	Foliar	1%	1.3 oz/gal water	Yes
	Aminopyralid	Foliar	0.30%	0.4 oz/gal water	Yes
Leafy Spurge	Aminocyclopyrachlor + chlorsulfuron	Foliar	0.15%	0.2 oz/gal water	Yes
Multiflora Rose	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Triclopyr	Foliar	2%	2.6 oz/gal water	Yes
Oriental Bittersweet	Triclopyr	Cut stem	20%	25 oz/gal oil	
	Imazapyr	Foliar	1%	1.2 oz/gal water	Yes
Phragmites	Glyphosate**	Foliar	0.75%	1 oz/gal water	Yes
	Imazapyr	Bundle and cut	4.60%	6.0 oz/gal water	Yes
Prickly Ash	Triclopyr	Foliar	1%	1.3 oz/gal water	Yes
	Triclopyr	Cut Surface/Basal Bark	25%	32 oz/gal Bark Oil	
Purple Loosestrife	Imazapyr	Foliar	0.50%	0.6 oz/gal water	Yes
	Imazapyr	Cut Surface	2%	3.0 oz/gal water	Yes
Reed Canary Grass	Glyphosate	Foliar	2%	3.0 oz/gal water	Yes
	Clethodim	Foliar	0.30%	0.4 oz/gal water	Yes
Spotted Knapweed	Aminopyralid	Foliar	0.20%	0.25 oz/gal water	Yes
	2,4-D Amine	Foliar	2.00%	2.6 oz/gal water	Yes
Sumac	Aminopyralid	Foliar	0.40%	0.5 oz/gal water	Yes
	Aminopyralid	Cut Surface (in oil)	5%	6.4 oz/gal water or Bark Oil LT	Yes
Sweet Clover	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Aminopyralid	Foliar	0.08%	0.1 oz/gal water	Yes
	Clopyralid*	Foliar	0.20%	0.25 oz/gal water	Yes
Tansy	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes
Teasel	Aminopyralid	Foliar	0.15%	0.2 oz/gal water	Yes
	Clopyralid*	Foliar	0.30%	0.4 oz/gal water	Yes
Wild Parsnip	Metsulfuron-methyl**	Foliar	0.03%	0.04 oz/gal water	Yes

\* Transline not for use on sandy soils

\*\*Mixing Instructions for Escort and Glyphosate below

**Mixing Instructions**

Escort	fill tank with 1/4 water and ammonia, add Escort XP while agitating, when dissolved add rest of water then surfactant
Glyphosate	fill tank with water, add water conditioner, add Glyphosate then surfactant

**Active Ingredient Key**

Trade Name	Active Ingredient	Trade Name	Active Ingredient	Trade Name	Active ingredient
Milestone	Aminopyralid	2,4-D Amine	2,4-D Amine	Element 3A	Triclopyr (can be applied in aquatic environments)
Transline	Clopyralid	Glyphosate	Glyphosate	Polaris	Imazapyr (can be applied in aquatic environments)
Escort	Metsulfuron-methyl			Stalker	Imazapyr (oil soluble)
Intensity	Clethodim			Perspective	Aminocyclopyrachlor + chlorsulfuron
Element 4	Triclopyr (oil soluble)			Progeny	MCPA, Triclopyr, Dicamba

## Appendix C. Using pesticides safely (WI DNR)

### **Legal Responsibility**

Pesticide labels are legal documents. If you don't read and follow label directions carefully, you are at fault and liable when problems result.

### **Rates and Application**

Mix dilutions thoroughly. Choose a calm, cool day to make applications in order to avoid movement (drift) of the material onto nontarget areas. This may prevent damaging a neighbor's property and reduce your potential risk. Follow label rates, and remember: More is not always better.

### **Safety Practices**

- Follow all label instructions carefully.
- Wash your hands, forearms, and face with soap and water after mixing, loading, applying, or otherwise handling pesticides and fertilizers.
- Measuring cups and spoons used for pesticides and fertilizers should never be reused for other purposes.
- Clothing worn during mixing, loading, and application should be washed separate from the family laundry.
- Posting is required on treated areas, outdoors, until sprays have dried or according to the Pesticide labels Restricted Entry Interval.
- Clean application equipment immediately after use, prior to storage. Sprayers should be rinsed by filling with water, shaking well, and pouring the rinsate onto the actual application site. Repeat at least once, preferably twice.

### **Safety Equipment and Clothing**

- Read the label before mixing and applying pesticides, wear the personal protective equipment required on the pesticide label. This may include the following:
- Use chemical-resistant gloves, cotton or leather can absorb chemicals.
- Wear long pants and sturdy shoes, not sneakers or sandals.
- Wear a long-sleeved shirt.
- Wear safety goggles or safety glasses to protect the eyes. Have clean water available in case of an emergency to irrigate eyes.

### **Storage, Transport, and Disposal**

- Store and transport pesticides according to label directions.
- Keep pesticides in original containers when possible; keep labels intact, legible, and plainly visible.
- Secure pesticides against unauthorized access. Prevent accidental poisonings by securing pesticides under lock. Provide signage to indicate where pesticides are stored.
- Use a pesticide storage area only for pesticides and pesticide equipment; never store pesticides with food, feed, seed, fertilizers, protective clothing, respirators, and other personal protective equipment.
- Keep pesticides separate to prevent cross-contamination. Herbicides, insecticides, and fungicides should be kept on separate shelves or areas.
- Pesticide storage areas should be well maintained, neat, dry, ventilated, with impervious floors and some type of climate control to prevent products from freezing.
- Provide pallets to keep drums or bags off the floor. Shelves for smaller containers should have a lip to keep containers from sliding off and containing spills. Steel shelves are easier to clean than wood if a spill occurs.
- Store pesticides where drainage is not towards water sources.
- Use kitty litter to absorb and remove spills.
- Do not transport pesticides in the passenger space of any vehicle.
- Never pour pesticides down the drain. Use them on labeled sites. Leftover products should be disposed in conjunction with local toxics disposal, or call your solid waste district for advice.
- Deplete pesticide inventories before purchasing new or additional products.

### **Emergency Telephone Numbers**

- Poison Control Center **800-222-1222**
- Emergency Response **911**

## Appendix D. Volunteer log entry explanations

**Date:** Month/Day/Year

**Site:** Choose from the dropdown menus. If site doesn't exist, let me know and I can add it.

**General Work:** This column divides things into basic categories that we can search for based on our grant work. Choose from the dropdown menu the best category. Most activities fall under woody (anything to do with trees or brush work) or herb (any work removing herbaceous invasive plants)

**Target Species/Activity:** This column shows which invasive plant you are removing. If it is several, choose the best option (ex: brush, or if you are removing several invasives that day you could put see notes and write the species there). If you are feeling ambitious it would also be useful for us if you divided your hours based on species and enter multiple entries but this is not necessary (ex: 4 hours on spotted knapweed, 2 hours on wild parsnip). Just be careful that hours, driving miles, herbicide, etc. are not counted twice.

**Specific Activity:** This column shows the method you used to remove the invasive plant, or the activity performed. If a different activity was conducted, you could put *other* and elaborate in the notes section.

**Number of Volunteers:** The total number of volunteers working that day.

**Total Volunteer Hours:** Total number of hours committed towards that particular task.

**Acres:** Estimated acreage. Use a number (even 0.5 is OK).

**Herbicide:** The trade name of chemical used that day. If two chemicals were mixed use a plus in between them (Element 4 + Stalker).

**Rate:** This is the % of concentrated herbicide used in your chemical application. It is not needed, but helpful for our records to assess effectiveness.

**Diluent:** This is almost always a type of oil or water.

**Surfactant:** The type of surfactant used if any was used.

**Total Mix Used:** The total amount of mixed herbicide that was used that day.

**Amount of Herbicide Concentrate Used (in oz):** Amount of herbicide used that day. Record this in ounces. This can easily be determined by multiplying the rate by the total mix used. For example if you used 16 ounces of 25% Element 4 mix that day the total amount of Element 4 used would be  $16 \times 0.25 = 4$  ounces. If two herbicides were mixed together use a plus sign (3 + 0.5). If two different herbicide mixes were used that day record them on two separate lines, making sure that hours, mileage, etc. is not counted twice.

**Total Mileage Driven:** The miles you drive from your house to the site and back. This driving time can be counted as hours.

**Volunteer Steward/Group:** The person/group entering the information. If additional people were present, they could be noted in the notes section.

**Office Use Only:** A column used by the crew to signify a transfer of information onto our grant spreadsheet. (Do not put anything in this column)

## Appendix E. Links to Volunteer Log

Southeast Region:

<https://docs.google.com/spreadsheets/d/1JSGvDfP7vJM6LIJPHk6T8WImaitffBsN41M4UUA8is/edit?usp=sharing>

Southwest Region (and Fitchburg crew sites):

<https://docs.google.com/spreadsheet/ccc?key=0AuNYaaoAKiE7dGh0dDRMTGctbEU2a1dxanlIRjBrX3c&usp=sharing>

Upper Lake Michigan Region:

<https://docs.google.com/spreadsheets/d/1mEJD7LdK8ipDxP26nHg97vWNPNNcKp6b8eymluveqwU/edit?usp=sharing>

## Appendix F. Relevant Forms

- Form 1700-072 Lead Volunteer Form
- Form 1700-072A State Natural Areas Work Day Roster
- Form 2500-120 Power Equipment Safety Acknowledgement  
<http://dnr.wi.gov/files/pdf/forms/2500/2500-120.pdf>
- DOA-3009 Prescribed Burning Volunteer Agreement
- Form 9100-240 Physical Requirements Acknowledgement  
paired with Appendix B, Manual Code 9124.2 Job Task Analysis  
for Fire Management
- Parental Permission and Acknowledgement Form  
<http://dnr.wi.gov/about/wcc/Documents/YCC/YouthConsCongressPermissionForm.pdf>
- Form 2500-040 Visitor Accident Report

**Notice:** Information requested on this form is required for any individual or organization who wishes to volunteer services on a DNR-owned/eased Property. The Department will not consider your application unless you provide complete information requested. Completion of this form constitutes an agreement with the Department of Natural Resources, under s. 23.09 (2)(h), Wis. Stats. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.).

**Lead Volunteer Information**

Lead Volunteer Name

Street Address	City	State	ZIP Code
----------------	------	-------	----------

Daytime Phone Number (include area code)	Evening Phone Number (include area code)	Email
--	--	-------

Do you have an interest in the following activities?	If yes, what training have you had?
Herbicide use <input type="radio"/> Yes <input type="radio"/> No Chainsaw <input type="radio"/> Yes <input type="radio"/> No Prescribed burning <input type="radio"/> Yes <input type="radio"/> No	

By signing below, the Lead Volunteer acknowledges the nature of the work and agrees to all terms and conditions stated on this application.

Signature of Lead Volunteer (Must be 18 years or older)	Title	Date Signed
---	-------	-------------

**Property & Project Information**

Property Name(s)	Estimated Number of Work Days Lead Volunteer(s) Plan to Schedule per Year
------------------	---

Type of Work Lead Volunteer(s) Expect to Do (Invasive Removal, Seed Collecting, Trash Removal, etc.)

**Leave Blank – Department of Natural Resources Use Only**

**Permit Approval**

The Department approves this permit for the Lead Volunteer to participate in the Volunteer program for the Property identified above. This permit is valid on this Property for the time period listed below. This permit is renewable with written notice from the Property office. The Department of Natural Resources reserves the right to modify or cancel this permit at any time.

Permit Number	Effective Date	Ending Date
---------------	----------------	-------------

Signature of Volunteer Coordinator (as appointed by the Property Manager)	Date Signed
---	-------------

# Lead Volunteer Application and Permit

Form 1700-072 (R 8/15)

Page 2 of 3

## Additional Lead Volunteer(s) Information & Signature

Lead Volunteer Name				
Street Address		City	State	ZIP Code
Daytime Phone Number (include area code)		Evening Phone Number (include area code)	Email	
Do you have an interest in the following activities?		If yes, what training have you had?		
Herbicide use <input type="radio"/> Yes <input type="radio"/> No				
Chainsaw <input type="radio"/> Yes <input type="radio"/> No				
Prescribed burning <input type="radio"/> Yes <input type="radio"/> No				
By signing below, the Lead Volunteer acknowledges the nature of the work and agrees to all terms and conditions stated on this application.				
Signature of Lead Volunteer (Must be 18 years or older)		Title		Date Signed

Lead Volunteer Name				
Street Address		City	State	ZIP Code
Daytime Phone Number (include area code)		Evening Phone Number (include area code)	Email	
Do you have an interest in the following activities?		If yes, what training have you had?		
Herbicide use <input type="radio"/> Yes <input type="radio"/> No				
Chainsaw <input type="radio"/> Yes <input type="radio"/> No				
Prescribed burning <input type="radio"/> Yes <input type="radio"/> No				
By signing below, the Lead Volunteer acknowledges the nature of the work and agrees to all terms and conditions stated on this application.				
Signature of Lead Volunteer (Must be 18 years or older)		Title		Date Signed

Lead Volunteer Name				
Street Address		City	State	ZIP Code
Daytime Phone Number (include area code)		Evening Phone Number (include area code)	Email	
Do you have an interest in the following activities?		If yes, what training have you had?		
Herbicide use <input type="radio"/> Yes <input type="radio"/> No				
Chainsaw <input type="radio"/> Yes <input type="radio"/> No				
Prescribed burning <input type="radio"/> Yes <input type="radio"/> No				
By signing below, the Lead Volunteer acknowledges the nature of the work and agrees to all terms and conditions stated on this application.				
Signature of Lead Volunteer (Must be 18 years or older)		Title		Date Signed

**Terms & Conditions**

1. **Relationship.** Volunteers are to be considered volunteers and not officers, employees, or agents of the State of Wisconsin, Department of Natural Resources (WDNR). Any injuries, claims, liabilities, suits or costs relating to this permit shall be the sole responsibility of the Volunteers.
2. **Waiver and Release.** Each party shall be responsible for the consequences of its own acts, errors, or omissions and those of its employees, boards, commissions, agencies, officers, and representatives and shall be responsible for any losses, claims, and liabilities which are attributable to such acts, errors, or omissions including providing its own defense. It is not the intent of the parties to impose liability beyond that imposed by state statutes.
3. **Volunteer Coordinator Appointment.** The Property Manager will either appoint a Volunteer Coordinator to work with Lead Volunteers, or the Property Manager will designate themselves as the Volunteer Coordinator.
4. **Approval of Permit.** Lead Volunteer approvals are at the discretion of the Volunteer Coordinator.
5. **Minimum Commitment.** Lead Volunteers will participate in and/or coordinate a minimum of one activity day per year. Activity dates are to be mutually agreeable to the Lead Volunteer and the Volunteer Coordinator. Lead Volunteers agree to work during daylight hours only.
6. **Work Day Training.** At the beginning of a work day Lead Volunteers shall provide appropriate "How To" training and instructions to volunteers regarding tasks to be completed during work days (how to collect seeds, use a brushcutter, pile brush, identify invasive species, etc.). Lead Volunteer may provide training regarding herbicide use if the Lead Volunteer has the appropriate certification. Volunteers, including the Lead Volunteer, must successfully complete a prescribed burning and/or chainsaw class which meet Department standards before engaging in those activities.
7. **Work Day Rosters.** Lead Volunteers shall ensure that any volunteer who participates in a work day organized under this permit by the Lead Volunteer signs Form 1700-072A Work Day Roster and is familiar with and understands relevant terms and conditions of this form.
8. **Work Day Information.** Lead Volunteers shall ensure the information contained in the permit and Form 1700-072A Work Day Roster is accurate and up to date.
9. **Juveniles.** Lead Volunteers will ensure there is at least one adult supervisor present for every 10 juveniles (under age 16). Juveniles will not be allowed to use herbicides, chainsaws, or help on prescribed burns or other tasks that may be deemed hazardous.
10. **Management Approach.** The Volunteer Coordinator will work with Lead Volunteers to develop a plan regarding management objectives and approach, with both parties acknowledging that the ultimate decision lies with the Volunteer Coordinator.
11. **Rare Species.** Management activities will take into account known rare plant and animal species, and when available, incorporate Incidental Take management protocols.
12. **Herbicide Use:**
  - A. Volunteers who are working with a Certified Applicator Volunteer Coordinator can apply non-restricted herbicides without certification but are responsible for reading and understanding the safety material. Safety material is to be obtained from the Volunteer Coordinator. Volunteers are responsible for requesting and ensuring that they obtain this information. By signing this form, volunteers acknowledge that they have received, read and understand the information prior to working with the herbicides.
  - B. Volunteers who are applying aquatic herbicides below the high water mark must have an aquatic certification.
  - C. Volunteers who are directly supervising or teaching other inexperienced volunteers must gain a pesticide applicators certification. This person will ensure proper safety procedures are taking place.
13. **Chainsaws.** Before using chainsaws, volunteers must complete Form 2500-120 (Power Equipment Safety Acknowledgement), acknowledging that they have had proper training and are using proper PPE.
14. **Prescribed Burning.** Volunteers must complete Federal Prescribed Burn course S130/190, and fill out the Physical Requirements Acknowledgment (Form 9100-240) before participating in a prescribed burn on WDNR-owned SNAs.
15. **Supplies.** All supplies and materials shall be used on the agreed upon Property, for the agreed upon purpose, and will be provided by the Volunteer Coordinator. Unused supplies and materials furnished by the WDNR may be retained by the volunteer group during the permit period, but must be returned to the Volunteer Coordinator at the end of the permit period.
16. **Items of Concern.** Any items found by the volunteers or situations which need further attention from the property staff, should be brought to the attention of the Volunteer Coordinator, or Property Manager, or other designated department contact.
17. **Motor Vehicle Use.** Lead Volunteer shall arrange for vehicle parking with the Volunteer Coordinator prior to undertaking any volunteer activities. Any exemptions to trail pass/vehicle admission sticker requirements granted by the Volunteer Coordinator shall be valid only while volunteers are participating in scheduled activity days. No motor vehicles will be allowed on any property unless specifically authorized by the Volunteer Coordinator.
18. **Photographic Release.** Lead Volunteers grant to WDNR the right to use photographic images and video or audio recordings of Lead Volunteer that are made by WDNR or others during volunteer activities conducted pursuant to this Agreement.
19. **In-kind Service.** The WDNR is eligible for grants that require received funds to be matched. Volunteer hours are a valuable source of match for WDNR. Lead Volunteers consent to the use of their volunteer time as a possible in-kind match for grants received by the WDNR.
20. **Invasive Species Dispersal.** The Volunteers will clean tools and clothing of soil and plant material prior to entering SNAs to avoid inadvertent dispersal of invasive species.
21. **Pets.** Dogs must be kept on a leash no longer than 8 feet. Owners will be solely responsible for any damage or injuries caused by their dog or other animal and the state will not afford them protection from liability for their animals actions nor will the state be responsible for any injury, illness, or death of their animal resulting from their participation as a volunteer.

**22. Additional Terms or Conditions:**

# State Natural Areas Volunteer Work Day Roster

Form 1700-072A (R 9/14)

Page 1 of 2



**Notice:** Volunteers should sign in review the agreement below and sign in each work day. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.).

Property: \_\_\_\_\_

Group Name (if applicable): \_\_\_\_\_

Date: \_\_\_\_\_

Work Day Leader(s): \_\_\_\_\_

Description of Activities: \_\_\_\_\_

## Volunteer Agreement

The Volunteer will be under the supervision, direction and control of the Work Day Leader(s) named above.

The Volunteer is not an officer, employee, or agent of the State of Wisconsin, Department of Natural Resources (WDNR). Any injuries, claims, liabilities, suits or costs relating to this work day shall be sole responsibility of the Volunteer.

The Volunteer is responsible for understanding and following all work rules found in the Lead Volunteer Application and Permit (Form 1700-072), as well as any oral directions given on site by Work Day Leader(s) or WDNR Staff.

The Volunteer understands that the WDNR will provide no compensation for activities conducted under this Agreement.

I have read and fully understand and agree to the above terms and conditions.

Volunteer (Printed)	Volunteer (Signed)	Date	E-mail	Round Trip Mileage	Hours Worked
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					

# State Natural Areas Volunteer Work Day Roster

Form 1700-072A (R 9/14)

Page 2 of 2

## Volunteer Agreement

The Volunteer will be under the supervision, direction and control of the Work Day Leader(s) named above.

The Volunteer is not an officer, employee, or agent of the State of Wisconsin, Department of Natural Resources (WDNR). Any injuries, claims, liabilities, suits or costs relating to this work day shall be sole responsibility of the Volunteer.

The Volunteer is responsible for understanding and following all work rules found in the Lead Volunteer Application and Permit (Form 1700-072), as well as any oral directions given on site by Work Day Leader(s) or WDNR Staff.

The Volunteer understands that the WDNR will provide no compensation for activities conducted under this Agreement.

I have read and fully understand and agree to the above terms and conditions.

Volunteer (Printed)	Volunteer (Signed)	Date	E-mail	Round Trip Mileage	Hours Worked
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
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29.					
30.					
31.					
32.					
33.					
34.					
35.					
36.					
37.					
38.					



**Prescribed Burning Volunteer Agreement**

Volunteer Name		Position Title		
Address		City	State	ZIP + 4
Daytime Phone No.	Cell Phone No.	Email Address		
Emergency Contact		Emergency Contact Daytime Phone Number		
Dates of Agreement (mm/dd/ccyy)		Scheduled Hours/Week	Schedule (e.g., every Friday, Wednesday through Saturday, varies, etc.)	
From	To			
<b>Volunteer Location</b>				
Name of State Agency		Site/Program/Activity		
Address		City	State	ZIP + 4
Volunteer Supervisor Name		Title	Phone Number	

This agreement for volunteer services is entered into by and between the volunteer and the State agency named above. The volunteer and the State agency mutually agree to the following responsibilities:

Volunteer

1. Will be under the supervision, direction and control of the supervisor named above.
2. Shall be available for scheduled service time(s) listed above.
3. Understands that s/he is a volunteer and NOT an employee of the State of Wisconsin or the State agency named above and is not eligible for any benefits, including Worker's Compensation.
4. Understands all duties expected to be performed that appear on the Position Description and that additional duties may be added as needed.
5. Understands all work rules that are to be followed.
6. Understands that the State agency named above will provide no compensation.
7. If volunteer will be driving a State vehicle as part of his/her assigned duties, s/he will only do so after completing a Volunteer Driver Vehicle Use Agreement (DOA-3685), receiving and understanding the statewide Fleet Driver and Management Policies and Procedures; meeting the minimum driving standards, receiving proper authorization to drive a State vehicle, and, when driving a vehicle, will strictly follow the route designated by the agency.
8. Shall meet, at a minimum, Wisconsin Dept. of Natural Resources "Prescribed Burn Position Standard FFT2 – Basic Fire Crew Member", and shall have completed the required training to meet the standard (NWCG sanctioned courses: I-100, S-190, S-130)  
**Verification of course completion certificates: Viewed and Confirmed by (State Agency Representative)**

Signature \_\_\_\_\_ or On File  or Attached to volunteer agreement

State Agency Named Above

1. Will provide the volunteer with a Position Description describing duties to be performed.
2. Will provide training required to perform the agreed upon duties.
3. Will educate volunteers on safety awareness in the workplace.
4. Will provide necessary volunteer safety and equipment related items.
5. Will subsequently and periodically review work performance with the volunteer.
6. Will regard the volunteer as an agent of the State as provided in s. 895.46, Wis: Stats. As an agent of the State, the volunteer will be entitled to all the protections provided by s. 895.46, Wis. Stats.
7. Will review and update this Volunteer Agreement on at least an annual basis.

**Either the volunteer or the State agency named above may cancel this agreement at any time.**

Volunteer's Signature	Date (mm/dd/ccyy)
Authorized State Agency Representative Signature	Date (mm/dd/ccyy)

**Notice:** All individuals who are asked to perform fireline or prescribed burn duties must complete this form before they may be authorized to assist in these duties. This applies to permanent and seasonal DNR managers who do not have fireline or prescribed burning duties in their position description. Submit completed form to DNR Safety and Risk Management at the address above. Those authorized shall re-submit this acknowledgment each calendar year and as the individual's ability to perform duties changes.

Personal information collected on this form will be provided to the Safety & Risk Management Section for the purpose of risk management and for no other purposes. Information is also accessible to requesters under Wisconsin's Open Records laws (s. 19.32 - 19.39, Wis. Stats.) and requirements.

Participant Information		
Last Name	First	MI

Participants must receive a copy of Job Task Analysis for Fire Management, as found in Appendix B, Manual Code 9124.2

I hereby acknowledge receipt and full understanding of the physical requirements and activities for the duties of fireline and/or prescribed burning.

I hereby declare and attest that I am not aware of any physical or mental condition that would preclude, inhibit or impact my ability to perform any and all of these physical requirements and activities.

Participant Signature	Date
-----------------------	------

DNR Employee Overseeing Fireline or Prescribed Burn Duties (Incident Commander)		
Last Name	First	MI
<input type="radio"/> Parks <input type="radio"/> Wildlife <input type="radio"/> Forestry <input type="radio"/> Endangered Resources		Region

**PHYSICAL REQUIREMENTS**

Indicate the % of time during a typical work day that each of the following strength requirements would be required.

Activity	Not Required	Less than 25%	25 to 49%	50 to 74%	75% or more
<b>Sedentary Work:</b> Exerting up to 10 pounds of force occasionally* and/or a negligible amount of force frequently**.			X		
<b>Light Work:</b> Exerting up to 20 pounds of force occasionally* and/or up to 10 pounds of force frequently**.		X			
<b>Medium Work:</b> Exerting 20-50 pounds of force occasionally* and/or 25-50 pounds of force frequently**.			X		
<b>Heavy Work:</b> Exerting 50-100 pounds of force occasionally* and/or 25-50 pounds of force frequently**.		X			
<b>Very Heavy Work:</b> Exerting in excess of 100 pounds of force occasionally* and/or in excess of 50 pounds of force frequently**.		X			

\* occasionally - activity of conditions exist up to 1/3 of the time.

\*\*frequently - activity or conditions exist from 1/3 to 2/3 of the time.

**PHYSICAL ACTIVITY**

Indicate the % of time during a typical work day that each of the following physical activities are performed.

Activity	Not Required	Less than 25%	25 to 49%	50 to 74%	75% or more
<b>Bending at the Waist:</b> Bending body downward and forward by bending the spine at the waist.				X	
<b>Kneeling:</b> Bending the legs at the knee to come to rest on the knee or knees.		X			
<b>Crouching:</b> Bending the body downward and forward by bending the legs and spine.			X		
<b>Crawling:</b> Moving about on the hands and knees or hands and feet.		X			
<b>Climbing:</b> Ascending or descending ladders, stairs, ramps, and the like, using the feet and legs and/or hands and arms.		X			
<b>Balancing:</b> Maintaining body equilibrium to prevent falling when walking, standing, crouching, on narrow, slippery, or erratically moving surfaces. This factor exceeds that need for ordinary maintenance of body equilibrium.					X

Activity	Not Required	Less than 25%	25 to 49%	50 to 74%	75% or more
<b>Lifting:</b> Raising or lowering an object from one level to another. This includes floor to waist, waist to chest and above the shoulders lifting.		X			
<b>Carrying:</b> Transporting an object, usually holding it in the hands or arms on the shoulder.				X	
<b>Pushing:</b> using upper extremities to press against with steady force in order to thrust forward, downward or outward.		X			
<b>Pulling:</b> Using upper extremities to exert force in order to draw, drag, haul or tug objects in a sustained motion.		X			
<b>Reaching:</b> Extending the hands and arms in any direction.			X		
<b>Handling:</b> Seizing, holding, grasping, turning, or otherwise working with the hand or hands					X
<b>Fingering:</b> Picking, pinching, or otherwise working with fingers primarily.					X
<b>Sitting:</b> (Particularly for long periods of time.)		X			
<b>Standing:</b> Particularly for long periods of time.			X		
<b>Talking:</b> Expressing or exchanging ideas by means of the spoken word.					X
<b>Hearing:</b> Perceiving the nature of sounds by the ear with or without correction.					X
<b>Seeing:</b> Obtaining impressions through the eyes of the shape, size, distance, motion, color, or other characteristics of object. X Clarity of vision at 20 feet or more X Clarity of vision at 20 inches or less X Ability to identify and distinguish colors.					X
<b>Walking:</b> Moving on foot					X

**Appendix C:  
Cooper Institute Assessment**

Mandatory Event	Pass Point
1.5 Mile Run	17 min 35 sec
300 meter	79 seconds
Vertical Jump	14"
1RM Bench	58% of body weight
Sit ups	26
Push Ups	18

DNR Property: \_\_\_\_\_  
Volunteer Activity/Event \_\_\_\_\_  
Date of Activity/Event \_\_\_\_\_

Parental Permission & Acknowledgment Form  
(For all youth 17 and under)

Name of Youth Volunteer \_\_\_\_\_ Group \_\_\_\_\_

Parent/Legal Guardian \_\_\_\_\_

Address \_\_\_\_\_  
Street/Apt # \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone # \_\_\_\_\_ Work Phone # \_\_\_\_\_

Emergency Contact Person \_\_\_\_\_ Relationship \_\_\_\_\_

Emergency Telephone Number \_\_\_\_\_

Physical/Medical Limitations \_\_\_\_\_  
\_\_\_\_\_

I \_\_\_\_\_ will, \_\_\_\_\_ will not be with my child while s/he is volunteering at the << insert DNR Property >> .

**PERMISSION STATEMENT**

In signing this form, I hereby give permission for my child named above to become a Youth Volunteer at << insert name of DNR Property & Event >> on << insert Date >> . I also authorize Wisconsin Department of Natural Resources staff to administer minor first aid to my child as deemed necessary.

In the event of a medical emergency, I understand that every effort will be made to contact me at the event or at the telephone numbers listed above and that emergency medical services will be called as deemed necessary.

**ACKNOWLEDGEMENT OF PARENTAL RESPONSIBILITY**

I acknowledge and assume all responsibility and risk as a result of my child's participation as a Youth Volunteer and agree to hold harmless Wisconsin Department of Natural Resources, its staff and volunteers from any and all liability resulting from my child's participation as a Youth Volunteer. I further acknowledge responsibility to pick up my child at the conclusion of her/his shift.

Parent/Legal Guardian \_\_\_\_\_ Date \_\_\_\_\_

This form must be returned to << insert applicable name and address >> before a Youth Volunteer can participate or brought to the event.

This form is to be filled out by Department personnel and completed for any visitor accident occurring on state property which resulted in professional medical treatment. Information provided may be used for administration of the Parks program.

Report Number
---------------

Name of Property	Region Code
------------------	-------------

Describe Injury (in one sentence, please)	Date	Day of Week	Time <input type="checkbox"/> am <input type="checkbox"/> pm
---	------	-------------	---

Type of Accident (Activity)

<input type="checkbox"/> Animal	<input type="checkbox"/> Camping	<input type="checkbox"/> Hunting	<input type="checkbox"/> Playing Sports	<input type="checkbox"/> Snowmobiling
<input type="checkbox"/> ATV	<input type="checkbox"/> Cliff Jumping	<input type="checkbox"/> Mopeding	<input type="checkbox"/> Rock Climbing	<input type="checkbox"/> Swimming
<input type="checkbox"/> Automobile	<input type="checkbox"/> Cutting Wood	<input type="checkbox"/> Motorbike Riding	<input type="checkbox"/> Rollerblading	<input type="checkbox"/> Walking
<input type="checkbox"/> Bicycling (road)	<input type="checkbox"/> Fishing	<input type="checkbox"/> Picnicking	<input type="checkbox"/> Running	<input type="checkbox"/> Water Sports
<input type="checkbox"/> Bicycling (path or rail trail)	<input type="checkbox"/> Hiking	<input type="checkbox"/> Playground	<input type="checkbox"/> Skiing	<input type="checkbox"/> Other
<input type="checkbox"/> Bicycling (off-road/mountain biking)	<input type="checkbox"/> Horseback Riding	<input type="checkbox"/> Playing	<input type="checkbox"/> Sledding	

Specific Location of Accident

Victim's Name (First, Middle, Last)	Statement Received From Victim Yes <input type="checkbox"/> No <input type="checkbox"/>
-------------------------------------	--

Street or Route	Date of Birth	Age
-----------------	---------------	-----

City	State	ZIP Code	Sex Male <input type="checkbox"/> Female <input type="checkbox"/>	Telephone Number
------	-------	----------	--	------------------

First Aid Yes <input type="checkbox"/> No <input type="checkbox"/>	By Whom (First, Middle, Last Name)	Transported to Treatment Yes <input type="checkbox"/> No <input type="checkbox"/>	Ambulance Other <input type="checkbox"/>
---	------------------------------------	--	---

Name & Location of Treatment Facility	Name of Doctor (First, Middle, Last)	Time Left Property <input type="checkbox"/> am <input type="checkbox"/> pm
---------------------------------------	--------------------------------------	---

Describe Victim's Clothing (including any safety gear used)

Photos Taken Yes <input type="checkbox"/> No <input type="checkbox"/>	Weather Clear <input type="checkbox"/> Rain <input type="checkbox"/> Cloudy <input type="checkbox"/> Snow <input type="checkbox"/> Fog/Haze <input type="checkbox"/> Temp _____	Light Conditions Daylight <input type="checkbox"/> Dawn/Dusk <input type="checkbox"/> Dark <input type="checkbox"/>	Visibility Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/>	Wind Calm <input type="checkbox"/> Light <input type="checkbox"/> Strong <input type="checkbox"/>
---	--	--	---	--

Surface Material Grass <input type="checkbox"/> Blacktop <input type="checkbox"/> Wood <input type="checkbox"/> Dirt <input type="checkbox"/> Cement <input type="checkbox"/> Other <input type="checkbox"/> Rocks <input type="checkbox"/> Gravel <input type="checkbox"/> _____	Surface Condition Dry <input type="checkbox"/> Other <input type="checkbox"/> Wet <input type="checkbox"/> Snow/Ice <input type="checkbox"/> _____
--	---

List Physical Evidence Collected, Where Stored, Who In Possession

If victim(s) was(were) juvenile, were the parents notified? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Date _____ Time _____ a.m. _____ p.m.	Property Superintendent Notified? Yes <input type="checkbox"/> No <input type="checkbox"/> Date _____ Time _____ a.m. _____ p.m.	Sheriff Notified? (If fatal or suspicious circumstances) Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Coroner Notified? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Special Tests Required, i.e., BAC. Yes <input type="checkbox"/> No <input type="checkbox"/>
--	---	--	--

Enforcement Action Taken Yes <input type="checkbox"/> No <input type="checkbox"/> Statute or DNR Code No. _____	By _____ Citation No. _____
---	--------------------------------

# Visitor Accident Report

Form 2500-040 (R 1/12)

Page 2 of 2

Name of Witness (First, Middle, Last)	Name of Witness (First, Middle, Last)	Name of Witness (First, Middle, Last)
Street or Route	Street or Route	Street or Route
City, State, Zip Code	City, State, Zip Code	City, State, Zip Code
Telephone Number (include area code)	Telephone Number (include area code)	Telephone Number (include area code)
Signed Statement Yes <input type="checkbox"/> No <input type="checkbox"/>	Signed Statement Yes <input type="checkbox"/> No <input type="checkbox"/>	Signed Statement Yes <input type="checkbox"/> No <input type="checkbox"/>

Describe What Happened (include source of information, times, property damage, etc.). Attach supplemental sheets if necessary.

---

Draw Diagram of Accident Scene, including Measurements (attach map if appropriate)

Report Prepared By	Date	Noted - Legal Services (if a death/paralysis occurred)	Date
Noted - Property Manager	Date	Bureau of Parks and Recreation	Date
Noted - District Parks Supervisor	Date		

## Appendix G. Volunteer Steward Job Description

### **Job Title: State Natural Area Steward**

**Mission:** A volunteer position that will support the Wisconsin DNR by performing native plant community restoration vital to the health of rare species living on an assigned State Natural Area (SNA). They will be the volunteer leader of the site.

**Supervision:** Regional Volunteer Coordinator, SNA Manager

**Length of Appointment:** Minimum of two years.

**Time Commitment:** A minimum of 40 hours volunteer time per year.

### **Key Responsibilities:**

- Perform native plant community restoration duties as necessary which may include but are not limited to: invasive species removal, brush removal, seed collecting, planting seed, mowing, preparing fire breaks, monitoring, etc.
- Work with the Regional Volunteer Coordinator to develop native plant community restoration priorities and objectives, including yearly management objectives.
- Regularly record activities and hours as instructed by the Regional Volunteer Coordinator.
- Visit the chosen SNA on a quarterly basis to function as a look out for invasive plants, check for rare species, observe effectiveness of management activity, check sign upkeep, and watch for illegal activities.
- Maintain communication with the Regional Volunteer Coordinator regarding activities, plans, and observations.
- Use manual or mechanical means (brushcutters, chainsaws, loppers, herbicide, etc.) to remove invasive species.
- Organize volunteer work days as able.
- Train and lead other volunteers as needed.
- Sign and manage appropriate forms.
- Other duties as assigned.

**Qualifications:** 18 years old, able to travel to site, complete Apprentice Steward position or have necessary plant community restoration

experience, an interest in SNAs, able to cultivate a positive environment, able to tolerate various weather conditions and traverse on uneven terrain lifting loads as needed, ability to work independently and as a team, ability to mobilize a group of volunteers not needed but desired, willingness to learn, other skills are welcome.

**Support:** Communication with the Regional Volunteer Coordinator as needed. An annual meeting will be scheduled with the Regional Volunteer Coordinator to develop yearly management objectives. Workdays will be advertised on the SNA volunteer website.

**Benefits:** The Volunteer Steward will have the opportunity to learn what it takes to manage a high quality remnant site. Training, tools, and herbicides for this position will be provided as needed. There are opportunities to work independently as well as with others, take on new projects, meet interesting people, train others, and discover the unique challenges presented by restoration activities.

## Appendix H: Apprentice Steward Job Description

### **Job Title: State Natural Area Apprentice Steward**

**Mission:** A volunteer position that will support the Wisconsin DNR by learning about and performing native plant community restoration vital to the health of rare species living on an assigned State Natural Area (SNA).

**Supervision:** Volunteer Steward, Regional Volunteer Coordinator

**Length of Appointment:** Minimum of one year, with the goal of becoming a Volunteer Steward or Co-Steward in one to three years' time.

**Time Commitment:** A minimum of 40 hours volunteer time, 10 hours of course training.

#### **Key Responsibilities:**

- Work closely with the experienced Volunteer Steward to learn how to perform native plant community restoration duties and develop management priorities.
- Perform native plant community restoration duties as necessary which may include but is not limited to: invasive species removal, brush removal, seed collecting, planting seed, mowing, preparing fire breaks, monitoring, etc.
- Use manual or mechanical means (brushcutters, loppers, herbicide, etc.) to remove invasive species.
- Regularly record and activities and hours as instructed by the Regional Volunteer Coordinator.
- Sign and manage appropriate forms.
- May supervise other volunteers.
- May organize and lead volunteer workdays.
- Other duties as assigned.

**Qualifications:** 18 years old, able to travel to site, interest in SNAs, able to cultivate a positive environment, able to tolerate various weather conditions and traverse on uneven terrain and lift loads as needed, dependability, ability to work independently and as a team, ability to lead a group of volunteers not needed but desired. This is a learning opportunity so a qualified person with limited plant and restoration skills is welcome.

**Support:** Communication with the Regional Volunteer Coordinator and Volunteer Steward as needed.

**Benefits:** The Apprentice Steward will have the opportunity to work under the guidance of an experienced Volunteer Steward to learn what it takes to manage a high quality site. Training, tools, and herbicides for this position will be provided as needed. There are opportunities to work independently as well as with others, take on new projects, meet interesting people, and discover the unique challenges presented by restoration activities.

## Appendix I. Garlic Mustard Removal Volunteer Job Description

### **Job Title: Garlic Mustard Removal Volunteer**

**Mission:** The Garlic Mustard Removal Volunteer will support the Wisconsin Department of Natural Resources by controlling the spread of Garlic Mustard on State Natural Area(s)(SNAs).

**Supervision:** Volunteer Steward, Regional Volunteer Coordinator

**Length of Appointment:** As available.

**Time Commitment:** A minimum of 16 hours/year in April through June.

### **Key Responsibilities:**

- Visit the chosen SNA to function as a look out for garlic mustard and observe the effectiveness of management activity.
- Pull, spray, or bag garlic mustard as needed.
- Regularly record and activities and hours as instructed by the Regional Volunteer Coordinator.
- Join in or organize work days as available.
- Sign and manage appropriate forms.
- Other duties as assigned.

**Qualifications:** 18 years old, able to travel to site, interest in SNAs, able to tolerate various weather conditions and traverse on uneven terrain and lift loads as needed, ability to mobilize a group of volunteers desired but not necessary, various skills are welcome.

**Support:** Communication with the Regional Volunteer Coordinator as needed.

**Benefits:** The Garlic Mustard Removal Volunteer will have the opportunity to experience new high quality remnant sites and learn what it takes to manage them. Training, tools, and herbicides for this position will be provided as needed. There are opportunities to work independently as well as with others, take on new projects, meet interesting people, and discover the unique challenges presented by restoration activities.

## Appendix J. Guidelines for visiting SNAs

Guideline	Description
Camping	Camping and fires are generally not permitted. However, some SNAs within our state forests allow for primitive camping. Check with the state forest for details.
Climbing	Rock climbing and rappelling are prohibited, except at East Bluff and Dalles of the St. Croix SNAs.
Collecting	Do not collect animals, fungi, rocks, minerals, fossils, archaeological artifacts, soil, downed wood, or any other natural material, alive or dead.
Geocaching	<p>Geocaching is not permitted. Earthcaching and virtual caching, in which a container is not hidden on the property, is permitted. The procedure for a virtual cache on an SNA is:</p> <ol style="list-style-type: none"> <li>1. Record the coordinates of the location to be used in the SNA. Also record the name of the SNA, a description of the area, the type of cache, and if it is a "virtual" stage of a multi-cache, the proposed question to answer.</li> <li>2. Submit this information to the DNR Endangered Resources staff for review. Send to: <ul style="list-style-type: none"> <li><a href="#">Thomas Meyer</a></li> <li>DNR</li> <li>PO Box 7921</li> <li>Madison WI 53707</li> </ul> </li> <li>3. Upon approval from Thomas Meyer, DNR, submit the Geocache Notification Form to him (contact information above) and he will follow up with the appropriate DNR land manager for the cache placement. Thomas will then forward the completed Geocache Notification Form to the appropriate land manager.</li> <li>4. If this is a multi-cache or offset cache, the physical geocache container can be placed. Be sure any containers or waypoint tags are outside of the boundaries of the SNA.</li> <li>5. Submit the geocache to geocaching.com. Please be sure to include in the long description the notice that the geocache notification form has been submitted. You can find that note at: <a href="http://www.wi-geocaching.com/hiding">http://www.wi-geocaching.com/hiding</a>. Also include in a "To Reviewer" note all of the information obtained in Step 1. Be sure and use the "waypoints" tool to enter the information for other stages if it is a multi-cache.</li> </ol>

Guideline	Description
Horses	Horseback riding is generally prohibited except on established trails, as posted, within certain state forests.
Hours	Most SNAs are open to the public year-round unless otherwise noted in the SNA site descriptions or posted at the site. Most <b>DNR-owned</b> SNAs are also open year-round, 24 hours a day, unless they are embedded within another DNR property type such as a State Park that has specific property hours.
Hunting	The vast majority of DNR-owned State Natural Areas are open to hunting in accordance with state regulations. Refer to the "Ownership" tab on individual SNA pages to determine if the SNA is owned by the DNR or by a program partner. More details may also be available under the "Access" tab on individual SNA pages. Hunting may also be allowed on SNAs owned by our partner organizations and agencies, such as The Nature Conservancy, U.S. Forest Service, and county forest departments. Specific rules vary depending on the partner's policies, and some may require a special hunting permit. Refer to the "Ownership" tab on individual SNA pages to determine if the SNA is owned by a partner and contact them directly for more information on hunting on their properties. Links to partner websites are provided at the top of individual SNA pages.
Plants	Do not collect plants including seeds, roots or other parts of herbaceous plants such as wildflowers or grasses.
Pets	Pets are allowed on most DNR-owned SNAs, although they are prohibited in Parfrey's Glen. Dogs must be kept on a leash no longer than 8', unless they are being used for hunting purposes in areas that are open to hunting during the established season.
Research	A <a href="#">permit</a> is required for collecting and scientific research on SNAs. Please contact: <a href="#">Thomas Meyer</a> for more information.
Vehicles	Prohibited vehicles include bicycles, ATVs, aircraft and snowmobiles except on trails and roadways designated for their use. Access is only by foot, skis, snowshoes and watercraft. Some trails are wheelchair accessible.
Wild edibles	Edible fruits, edible nuts, wild mushrooms, wild asparagus and watercress may be removed by hand without a permit for the purpose of personal consumption by the collector. "Edible fruits" means fleshy fruits from plants including apples,

<b>Guideline</b>	<b>Description</b>
	plums, pears, blueberries, raspberries, blackberries, juneberries and strawberries that are harvested for human consumption. "Edible nuts" means walnuts, hickory nuts, acorns and other similar nuts from trees and shrubs.

Appendix K. Seed collecting arranged by date (from Tom and Kathy Brock)

Seed collecting dates	Latin name	Common name
Late May	<i>Anemone patens</i>	Pasque flower
Late May	<i>Erigeron pulchellus</i>	Robin's plantain
Late May	<i>Geum triflorum</i>	Prairie smoke
Late May-Early June	<i>Antennaria neglecta</i>	Field pussytoes
Late May-Early June	<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
Late May-Early June	<i>Packera (Senecio) plattensis</i>	Prairie ragwort
Late May-Mid June	<i>Viola pedata</i>	Bird's foot violet
Early June	<i>Oxalis violacea</i>	Violet wood-sorrel
Early June	<i>Sanguinaria canadensis</i>	Blood root
Early-Mid June	<i>Pedicularis canadensis</i>	Wood betony
Early-Late June	<i>Thalictrum dioicum</i>	Early meadow-rue
Mid June	<i>Ranunculus abortivus</i>	Small-flowered buttercup
Mid June	<i>Saxifraga pensylvanica</i>	Swamp saxifrage
Mid June	<i>Scheuchzeria palustris</i>	Arrow grass
Mid June	<i>Sisyrinchium angustifolium</i>	Narrow-leaved blue-eyed grass
Mid June	<i>Viola canadensis</i>	Tall white violet
Mid June-Early July	<i>Scutellaria sp</i>	Skullcap
Mid June-Early July	<i>Sisyrinchium campestre</i>	Blue-eyed grass
Mid June-Mid July	<i>Aquilegia canadensis</i>	Wild columbine
Mid-Late June	<i>Geranium maculatum</i>	Wild geranium
Mid-Late June	<i>Heuchera richardsonii</i>	Prairie alum-root
Mid-Late June	<i>Lupinus perennis</i>	Wild lupine
Mid-Late June	<i>Packera (Senecio) pauperculus</i>	Balsam ragwort
Mid-Late June	<i>Stipa spartea</i>	Needle grass
Late June-Early July	<i>Krigia biflora</i>	False dandelion (Cynthia)
Late June-Early July	<i>Polemonium reptans</i>	Jacob's ladder
Late June-Early July	<i>Polygala senega</i>	Seneca snakeroot
Late June-Mid July	<i>Lithospermum incisum</i>	Fringed puccoon

Seed collecting dates	Latin name	Common name
All July	<i>Angelica atropurpurea</i>	Great angelica
Early July	<i>Allium canadense</i>	Wild garlic
Early July	<i>Camassia scilloides</i>	Wild hyacinth
Early July	<i>Ceanothus herbaceous</i>	Inland New Jersey tea
Early July	<i>Comandra umbellata</i>	False toadflax
Early July	<i>Helianthemum bicknellii</i>	Bicknell's rock rose
Early July	<i>Panicum latifolium</i>	Broad-leaved panic grass
Early-Mid July	<i>Tradescantia ohioensis</i>	Common spiderwort
Early-Mid July	<i>Pedimelum esculentum</i>	Pomme-de-prairie
Mid July	<i>Blephilia ciliata</i>	Downy wood mint
Mid July	<i>Carex pensylvanica</i>	Pennsylvania sedge
Mid July	<i>Carex rosea</i>	Sedge
Mid July	<i>Phlox pilosa</i>	Downy phlox
Mid July-Early August	<i>Actaea rubra</i>	Red baneberry
Mid July-Early August	<i>Lobelia spicata</i>	Pale spiked lobelia
Mid July-Late August	<i>Osmorhiza longistylis</i>	Smooth sweet cicely
Late July	<i>Castilleja coccinea</i>	Indian paintbrush
Late July	<i>Castilleja sessiliflora</i>	Downy paintbrush
Late July	<i>Helianthemum canadense</i>	Rock rose
Late July-Early August	<i>Taenidia integerrima</i>	Yellow pimpernel
Late July-Mid September	<i>Arabis canadensis</i>	Sickle pod
Late July-Mid September	<i>Bromus kalmii</i>	Kalm's brome
Late July-Mid September	<i>Elymus villosus</i>	Silky wild rye
July-Early August	<i>Dodecatheon meadia</i>	Shooting star
All August	<i>Bromus ciliatus</i>	Fringed brome
All August	<i>Elymus hystrix</i>	Bottlebrush grass
All August	<i>Koeleria macrantha</i>	June grass
Early August	<i>Anemone canadensis</i>	Meadow anemone
Early August	<i>Cicuta maculata</i>	Water-hemlock
Early August	<i>Festuca subverticillata</i>	Nodding fescue

Seed collecting dates	Latin name	Common name
Early August	<i>Galium boreale</i>	Northern bedstraw
Early August	<i>Heliopsis helianthoides</i>	False sunflower (ox-eye)
Early August	<i>Hieracium longipilum</i>	Hairy hawkweed
Early August	<i>Lathyrus venosus</i>	Veiny pea
Early August	<i>Lithospermum canescens</i>	Hoary puccoon
Early August	<i>Opuntia humifusa</i>	Prickly-pear cactus
Early August	<i>Penstemon grandiflorus</i>	Large bear-tongue
Early August	<i>Scrophularia marilandica</i>	Late figwort
Early August	<i>Zigadenus elegans glaucus</i>	White camas lily
Early August	<i>Zizia aptera</i>	Heart-leaved golden alexander
August-Early September	<i>Agrimonia gryposepala</i>	Tall agrimony
August-Mid September	<i>Desmodium glutinosum</i>	Pointed tick-trefoil
Early August-Early September	<i>Desmodium illinoense</i>	Illinois tick-trefoil
Early August-Mid September	<i>Thalictrum dasycarpum</i>	Purple meadow-rue
Early August-Mid September	<i>Zizia aurea</i>	Golden Alexander
Mid August	<i>Bouteloua hirsuta</i>	Hairy grama
Mid August	<i>Geum canadense</i>	White avens
Mid August	<i>Potentilla argentea</i>	Silvery cinquefoil
Mid August	<i>Spartina pectinata</i>	Prairie cord grass
Mid August-Early October	<i>Bouteloua curtipendula</i>	Side oats grama
Mid August-Early October	<i>Potentilla arguta</i>	Prairie cinquefoil
Mid August-Early September	<i>Actaea alba</i>	White baneberry
Mid August-Early September	<i>Baptisia alba</i>	White wild indigo
Mid August-Early September	<i>Cryptotaenia canadensis</i>	Honewort
Mid August-Mid October	<i>Oenothera biennis</i>	Common evening-primrose
Mid August-Mid October	<i>Polygonatum biflorum</i>	Smooth Solomon's seal
Mid August-Mid September	<i>Campanula rotundifolia</i>	Harebell
Mid August-Mid September	<i>Euphorbia corollata</i>	Flowering spurge
Mid August-Late October	<i>Linum medium texanum</i>	Small yellow flax
Mid August-Late October	<i>Smilacina racemosa</i>	False Solomon's seal

Seed collecting dates	Latin name	Common name
Mid August-Late September	<i>Monarda fistulosa</i>	Wild bergamot
Mid August-Late September	<i>Phryma leptostachya</i>	Lopseed
Late August	<i>Eragrostis spectabilis</i>	Purple Lovegrass
Late August- Early October	<i>Elymus riparius</i>	Woodland rye
Late August-Early October	<i>Anemone cylindrica</i>	Thimbleweed
Late August-Early October	<i>Bromus altissimus</i>	Woodland brome
Late August-Early October	<i>Panicum virgatum</i>	Switch grass
Late August-Early October	<i>Parthenium integrifolium</i>	Wild quinine
Late August-Mid September	<i>Cirsium muticum</i>	Swamp thistle
Late August-Mid September	<i>Napaea dioica</i>	Glade mallow
Late August-Mid September	<i>Polygala sp</i>	Milkwort
Late August-Mid September	<i>Teucrium canadense</i>	Germander
Late August-Late September	<i>Silphium perfoliatum</i>	Cup plant
Late August-Late September	<i>Sporobolus heterolepis</i>	Prairie dropseed
Late August-Late September	<i>Verbena hastata</i>	Blue vervain
Late August-Late September	<i>Verbena urticifolia</i>	White vervain
Late August-Late September	<i>Veronicastrum virginicum</i>	Culver's root
Late August-October	<i>Anemone virginiana</i>	Tall anemone
Late August-October	<i>Hieracium kalmii</i>	Canada hawkweed
Late August-September	<i>Allium cernuum</i>	Nodding wild onion
Late August-September	<i>Amorpha canescens</i>	Lead-plant
Late August-September	<i>Dalea candida</i>	White prairie clover
Late August-September	<i>Dalea purpureum</i>	Purple prairie clover
Late August-September	<i>Desmodium canadense</i>	Showy tick-trefoil
Late September-October	<i>Agastache nepetoides</i>	Yellow giant hyssop
All September	<i>Arisaema triphyllum</i>	Jack-in-the-pulpit
All September	<i>Arnoglossum atriplicifolium</i>	Pale Indian-plantain
All September	<i>Astragalus canadensis</i>	Milk vetch
All September	<i>Goodyera sp</i>	Rattlesnake plantain
All September	<i>Kuhnia eupatorioides</i>	False boneset

Seed collecting dates	Latin name	Common name
Early September	<i>Agastache foeniculum</i>	Blue giant hyssop
Early September	<i>Baptisia bracteata</i>	Cream wild indigo
Early September	<i>Chamaecrista fasciculata</i>	Golden cassia
Early September	<i>Echinacea pallida</i>	Pale purple coneflower
Early September	<i>Elymus canadensis</i>	Canada wild rye
Early September	<i>Helianthus strumosus</i>	Woodland sunflower
Early September	<i>Lactuca canadensis</i>	Wild lettuce
Early September	<i>Polygonum virginianum</i>	Woodland knotweed
Early September	<i>Polytaenia nuttallii</i>	Prairie parsley
Early September-Early October	<i>Eupatorium maculatum</i>	Spotted Joe-Pye-weed
Early September-Early October	<i>Eupatorium perfoliatum</i>	Common boneset
Early September-Early October	<i>Verbena stricta</i>	Hoary vervain
Early September-Mid October	<i>Silphium integrifolium</i>	Rosinweed
Early September-Late October	<i>Pycnanthemum virginianum</i>	Common mountain mint
Early-Mid September	<i>Silphium terebinthinaceum</i>	Prairie dock
Early-Mid September	<i>Tephrosia virginiana</i>	Goat's-rue
Early-Late September	<i>Silphium laciniatum</i>	Compass plant
Mid September	<i>Aralia racemosa</i>	Spikenard
Mid September	<i>Carex bicknellii</i>	Bicknell's sedge
Mid September	<i>Gaura biennis</i>	Gaura
Mid September	<i>Monarda punctata</i>	Dotted horsemint
Mid September	<i>Panax quinquefolium</i>	Ginseng
Mid September	<i>Phlox glaberrima</i>	Smooth phlox
Mid September	<i>Physalis virginiana</i>	Ground cherry
Mid September-Early October	<i>Eryngium yuccifolium</i>	Rattlesnake master
Mid September-Early October	<i>Liatris aspera</i>	Rough blazing star
Mid September-Early October	<i>Liatris cylindracea</i>	Dwarf blazing star
Mid September-Early October	<i>Liatris pycnostachya</i>	Prairie blazing star
Mid September-Mid October	<i>Lobelia siphilitica</i>	Great blue lobelia
Mid September-Mid October	<i>Rosa sp.</i>	Rose

Seed collecting dates	Latin name	Common name
Mid September-Mid October	<i>Rudbeckia hirta</i>	Black-eyed Susan
Mid September-Mid October	<i>Sorghastrum nutans</i>	Indian grass
Mid September-Late October	<i>Solidago ptarmacoides</i>	Stiff aster
Mid September-Late October	<i>Triosteum perfoliatum</i>	Early horse gentian
Mid-Late September	<i>Asclepias verticillata</i>	Whorled milkweed
Mid-Late September	<i>Asclepias viridiflora</i>	Short green milkweed
Mid-Late September	<i>Eupatorium purpureum</i>	Purple joe-pye weed
Mid-Late September	<i>Gnaphalium obtusifolium</i>	Old field balsam
Mid-Late September	<i>Lysimachia ciliata</i>	Fringed loosestrife
Mid-September	<i>Amphicarpaea bracteata</i>	Hog peanut
Mid-September	<i>Apocynum cannabinum</i>	Hemp-dogbane
Mid-September	<i>Pyrola sp</i>	Shinleaf
Late September	<i>Asclepias incarnata</i>	Swamp milkweed
Late September	<i>Cirsium altissimum</i>	Woodland thistle
Late September	<i>Cirsium discolor</i>	Pasture thistle
Late September	<i>Hasteola suaveolens</i>	Sweet Indian plantain
Late September	<i>Helianthus occidentalis</i>	Naked-stemmed sunflower
Late September	<i>Helianthus pauciflorus</i>	Prairie sunflower
Late September	<i>Campanula americana</i>	Tall bellflower
Late September-Early October	<i>Eupatorium sessilifolium</i>	Woodland boneset
Late September-Early October	<i>Helianthus grosseserratus</i>	Saw-toothed sunflower
Late September-Mid October	<i>Vernonia fasciculata</i>	Common ironweed
Late September-Late October	<i>Prenanthes alba</i>	Lion's foot
Late September-Late October	<i>Schizachyrium scoparium</i>	Little bluestem
Late September-October	<i>Andropogon gerardii</i>	Big bluestem
Late September-October	<i>Asclepias syriaca</i>	Common milkweed
Late September-October	<i>Asclepias tuberosa</i>	Butterfly weed
Late September-October	<i>Aureolaria grandiflora</i>	Yellow false foxglove
Late September-October	<i>Chelone glabra</i>	Turtlehead
Late September-October	<i>Coreopsis palmata</i>	Prairie tickseed

Seed collecting dates	Latin name	Common name
Late September-October	<i>Gentiana andrewsii</i>	Bottle gentian
Late September-October	<i>Helenium autumnale</i>	Sneezeweed
Late September-October	<i>Hypericum pyramidatum</i>	Great St. John's wort
September-Early October	<i>Lespedeza capitata</i>	Round-headed bush clover
September-Early October	<i>Ratibida pinnata</i>	Yellow coneflower
September-Mid October	<i>Ceanothus americanus</i>	New Jersey tea
All October	<i>Asclepias exaltata</i>	Poke milkweed
All October	<i>Cypripedium calceolus pubescens</i>	Large yellow lady-slipper
All October	<i>Lilium michiganense</i>	Turk's cap lily
All October	<i>Lobelia cardinalis</i>	Cardinal flower
All October	<i>Pedicularis lanceolata</i>	Swamp betony (lousewort)
All October	<i>Rudbeckia triloba</i>	Brown-eyed Susan
Early October	<i>Asclepias purpurascens</i>	Purple milkweed
Early October	<i>Eupatorium altissimum</i>	Upland boneset
Early October	<i>Smilax herbacea herbacea</i>	Carrion flower
Early October	<i>Viburnum prunifolium</i>	Black haw
Mid October	<i>Bidens sp</i>	Beggar's tick
Mid October	<i>Euthamia graminifolia</i>	Grass-leaved goldenrod
Mid October	<i>Liatris spicata</i>	Dense gay-feather
Mid October	<i>Prenanthes crepidinea</i>	Great white-lettuce
Mid October-Early November	<i>Solidago nemoralis</i>	Old-field goldenrod (grey; dye
Mid-Late October	<i>Aster novae-angliae</i>	New England aster
Mid-Late October	<i>Aster oolentangiensis</i>	Sky-blue aster
Mid-Late October	<i>Aster puniceus</i>	Swamp aster
Mid-Late October	<i>Aster sagittifolius</i>	Arrow-leaved aster
Mid-Late October	<i>Aster sericeus</i>	Silky aster
Mid-Late October	<i>Lilium philadelphicum</i>	Wood lily
Mid-Late October	<i>Solidago rigida</i>	Stiff goldenrod
Mid-Late October	<i>Gentianella quinquefolia</i>	Stiff gentian
Late October	<i>Aster ericoides</i>	Heath aster

Seed collecting dates	Latin name	Common name
Late October	<i>Aster laevis</i>	Smooth blue aster
Late October-Early November	<i>Aster lateriflorus</i>	Side flowering aster
Late October-Early November	<i>Elymus virginicus</i>	Virginia wild rye
Late October-Early November	<i>Solidago flexicaulis</i>	Zig zag goldenrod
October	<i>Solidago juncea</i>	Early goldenrod
October	<i>Solidago missouriensis</i>	Missouri goldenrod
October-Early November	<i>Solidago speciosa</i>	Showy goldenrod
October-Early November	<i>Solidago ulmifolia</i>	Elm-leaved goldenrod
Early November	<i>Gentiana alba</i>	Cream gentian
Early November	<i>Lobelia inflata</i>	Indian tobacco

Appendix L. Seed collecting arranged by species (from Tom and Kathie Brock)

Latin name	Common name	Seed collecting dates
<i>Actaea alba</i>	White baneberry	Mid August-Early September
<i>Actaea rubra</i>	Red baneberry	Mid July-Early August
<i>Agastache foeniculum</i>	Blue giant hyssop	Early September
<i>Agastache nepetoides</i>	Yellow giant hyssop	Late September-October
<i>Agrimonia gryposepala</i>	Tall agrimony	August-Early September
<i>Allium canadense</i>	Wild garlic	Early July
<i>Allium cernuum</i>	Nodding wild onion	Late August-September
<i>Amorpha canescens</i>	Lead-plant	Late August-September
<i>Amphicarpaea bracteata</i>	Hog peanut	Mid-September
<i>Andropogon gerardii</i>	Big bluestem	Late September-October
<i>Anemone canadensis</i>	Meadow anemone	Early August
<i>Anemone cylindrica</i>	Thimbleweed	Late August-Early October
<i>Anemone patens</i>	Pasque flower	Late May
<i>Anemone virginiana</i>	Tall anemone	Late August-October
<i>Angelica atropurpurea</i>	Great angelica	All July
<i>Antennaria neglecta</i>	Field pussytoes	Late May-Early June
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes	Late May-Early June
<i>Apocynum cannabinum</i>	Hemp-dogbane	Mid-September
<i>Aquilegia canadensis</i>	Wild columbine	Mid June-Mid July
<i>Arabis canadensis</i>	Sickle pod	Late July-Mid September
<i>Aralia racemosa</i>	Spikenard	Mid September
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	All September
<i>Arnoglossum atriplicifolium</i>	Pale Indian-plantain	All September

Latin name	Common name	Seed collecting dates
<i>Asclepias exaltata</i>	Poke milkweed	All October
<i>Asclepias incarnata</i>	Swamp milkweed	Late September
<i>Asclepias purpurascens</i>	Purple milkweed	Early October
<i>Asclepias syriaca</i>	Common milkweed	Late September-October
<i>Asclepias tuberosa</i>	Butterfly weed	Late September-October
<i>Asclepias verticillata</i>	Whorled milkweed	Mid-Late September
<i>Asclepias viridiflora</i>	Short green milkweed	Mid-Late September
<i>Aster ericoides</i>	Heath aster	Late October
<i>Aster laevis</i>	Smooth blue aster	Late October
<i>Aster lateriflorus</i>	Side flowering aster	Late October-Early November
<i>Aster novae-angliae</i>	New England aster	Mid-Late October
<i>Aster oolentangiensis</i>	Sky-blue aster	Mid-Late October
<i>Aster puniceus</i>	Swamp aster	Mid-Late October
<i>Aster sagittifolius</i>	Arrow-leaved aster	Mid-Late October
<i>Aster sericeus</i>	Silky aster	Mid-Late October
<i>Astragalus canadensis</i>	Milk vetch	All September
<i>Aureolaria grandiflora</i>	Yellow false foxglove	Late September-October
<i>Baptisia alba</i>	White wild indigo	Mid August-Early September
<i>Baptisia bracteata</i>	Cream wild indigo	Early September
<i>Bidens sp</i>	Beggar's tick	Mid October
<i>Blephilia ciliata</i>	Downy wood mint	Mid July
<i>Bouteloua curtipendula</i>	Side oats grama	Mid August-Early October
<i>Bouteloua hirsuta</i>	Hairy grama	Mid August
<i>Bromus altissimus</i>	Woodland brome	Late August-Early October
<i>Bromus ciliatus</i>	Fringed brome	All August

Latin name	Common name	Seed collecting dates
<i>Bromus kalmii</i>	Kalm's brome	Late July-Mid September
<i>Camassia scilloides</i>	Wild hyacinth	Early July
<i>Campanula americana</i>	Tall bellflower	Late September
<i>Campanula rotundifolia</i>	Harebell	Mid August-Mid September
<i>Carex bicknellii</i>	Bicknell's sedge	Mid September
<i>Carex pensylvanica</i>	Pennsylvania sedge	Mid July
<i>Carex rosea</i>	Sedge	Mid July
<i>Castilleja coccinea</i>	Indian paintbrush	Late July
<i>Castilleja sessiliflora</i>	Downy paintbrush	Late July
<i>Ceanothus americanus</i>	New Jersey tea	September-Mid October
<i>Ceanothus herbaceus</i>	Inland New Jersey tea	Early July
<i>Chamaecrista fasciculata</i>	Golden cassia	Early September
<i>Chelone glabra</i>	Turtlehead	Late September-October
<i>Cicuta maculata</i>	Water-hemlock	Early August
<i>Cirsium altissimum</i>	Woodland thistle	Late September
<i>Cirsium discolor</i>	Pasture thistle	Late September
<i>Cirsium muticum</i>	Swamp thistle	Late August-Mid September
<i>Comandra umbellata</i>	False toadflax	Early July
<i>Coreopsis palmata</i>	Prairie tickseed	Late September-October
<i>Cryptotaenia canadensis</i>	Honewort	Mid August-Early September
<i>Cypripedium calceolus pubescens</i>	Large yellow lady-slipper	All October
<i>Dalea candida</i>	White prairie clover	Late August-September
<i>Dalea purpureum</i>	Purple prairie clover	Late August-September
<i>Desmodium canadense</i>	Showy tick-trefoil	Late August-September
<i>Desmodium glutinosum</i>	Pointed tick-trefoil	August-Mid September

Latin name	Common name	Seed collecting dates
<i>Desmodium illinoense</i>	Illinois tick-trefoil	Early August-Early September
<i>Dodecatheon meadia</i>	Shooting star	July-Early August
<i>Echinacea pallida</i>	Pale purple coneflower	Early September
<i>Elymus canadensis</i>	Canada wild rye	Early September
<i>Elymus hystrix</i>	Bottlebrush grass	All August
<i>Elymus riparius</i>	Woodland rye	Late August- Early October
<i>Elymus villosus</i>	Silky wild rye	Late July-Mid September
<i>Elymus virginicus</i>	Virginia wild rye	Late October-Early November
<i>Eragrostis spectabilis</i>	Purple Lovegrass	Late August
<i>Erigeron pulchellus</i>	Robin's plantain	Late May
<i>Eryngium yuccifolium</i>	Rattlesnake master	Mid September-Early October
<i>Eupatorium altissimum</i>	Upland boneset	Early October
<i>Eupatorium maculatum</i>	Spotted Joe-Pye-weed	Early September-Early October
<i>Eupatorium perfoliatum</i>	Common boneset	Early September-Early October
<i>Eupatorium purpureum</i>	Purple joe-pye weed	Mid-Late September
<i>Eupatorium sessilifolium</i>	Woodland boneset	Late September-Early October
<i>Euphorbia corollata</i>	Flowering spurge	Mid August-Mid September
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	Mid October
<i>Festuca subverticillata</i>	Nodding fescue	Early August
<i>Galium boreale</i>	Northern bedstraw	Early August
<i>Gaura biennis</i>	Gaura	Mid September
<i>Gentiana alba</i>	Cream gentian	Early November
<i>Gentiana andrewsii</i>	Bottle gentian	Late September-October
<i>Gentianella quinquefolia</i>	Stiff gentian	Mid-Late October
<i>Geranium maculatum</i>	Wild geranium	Mid-Late June

Latin name	Common name	Seed collecting dates
<i>Geum canadense</i>	White avens	Mid August
<i>Geum triflorum</i>	Prairie smoke	Late May
<i>Gnaphalium obtusifolium</i>	Old field balsam	Mid-Late September
<i>Goodyera sp</i>	Rattlesnake plantain	All September
<i>Hasteola suaveolens</i>	Sweet Indian plantain	Late September
<i>Helenium autumnale</i>	Sneezeweed	Late September-October
<i>Helianthemum bicknellii</i>	Bicknell's rock rose	Early July
<i>Helianthemum canadense</i>	Rock rose	Late July
<i>Helianthus grosseserratus</i>	Saw-toothed sunflower	Late September-Early October
<i>Helianthus occidentalis</i>	Naked-stemmed sunflower	Late September
<i>Helianthus pauciflorus</i>	Prairie sunflower	Late September
<i>Helianthus strumosus</i>	Woodland sunflower	Early September
<i>Heliopsis helianthoides</i>	False sunflower (ox-eye)	Early August
<i>Heuchera richardsonii</i>	Prairie alum-root	Mid-Late June
<i>Hieracium kalmii</i>	Canada hawkweed	Late August-October
<i>Hieracium longipilum</i>	Hairy hawkweed	Early August
<i>Hypericum pyramidatum</i>	Great St. John's wort	Late September-October
<i>Koeleria macrantha</i>	June grass	All August
<i>Krigia biflora</i>	False dandelion (Cynthia)	Late June-Early July
<i>Kuhnia eupatorioides</i>	False boneset	All September
<i>Lactuca canadensis</i>	Wild lettuce	Early September
<i>Lathyrus venosus</i>	Veiny pea	Early August
<i>Lespedeza capitata</i>	Round-headed bush clover	September-Early October
<i>Liatris aspera</i>	Rough blazing star	Mid September-Early October
<i>Liatris cylindracea</i>	Dwarf blazing star	Mid September-Early October

Latin name	Common name	Seed collecting dates
<i>Liatris pycnostachya</i>	Prairie blazing star	Mid September-Early October
<i>Liatris spicata</i>	Dense gay-feather	Mid October
<i>Lilium michiganense</i>	Turk's cap lily	All October
<i>Lilium philadelphicum</i>	Wood lily	Mid-Late October
<i>Linum medium texanum</i>	Small yellow flax	Mid August-Late October
<i>Lithospermum canescens</i>	Hoary puccoon	Early August
<i>Lithospermum incisum</i>	Fringed puccoon	Late June-Mid July
<i>Lobelia cardinalis</i>	Cardinal flower	All October
<i>Lobelia inflata</i>	Indian tobacco	Early November
<i>Lobelia siphilitica</i>	Great blue lobelia	Mid September-Mid October
<i>Lobelia spicata</i>	Pale spiked lobelia	Mid July-Early August
<i>Lupinus perennis</i>	Wild lupine	Mid-Late June
<i>Lysimachia ciliata</i>	Fringed loosestrife	Mid-Late September
<i>Monarda fistulosa</i>	Wild bergamot	Mid August-Late September
<i>Monarda punctata</i>	Dotted horsemint	Mid September
<i>Napaea dioica</i>	Glade mallow	Late August-Mid September
<i>Oenothera biennis</i>	Common evening-primrose	Mid August-Mid October
<i>Opuntia humifusa</i>	Prickly-pear cactus	Early August
<i>Osmorhiza longistylis</i>	Smooth sweet cicely	Mid July-Late August
<i>Oxalis violacea</i>	Violet wood-sorrel	Early June
<i>Packera (Senecio) pauperculus</i>	Balsam ragwort	Mid-Late June
<i>Packera (Senecio) plattensis</i>	Prairie ragwort	Late May-Early June
<i>Panax quinquefolium</i>	Ginseng	Mid September
<i>Panicum latifolium</i>	Broad-leaved panic grass	Early July
<i>Panicum virgatum</i>	Switch grass	Late August-Early October

Latin name	Common name	Seed collecting dates
<i>Parthenium integrifolium</i>	Wild quinine	Late August-Early October
<i>Pedicularis canadensis</i>	Wood betony	Early-Mid June
<i>Pedicularis lanceolata</i>	Swamp betony (lousewort)	All October
<i>Pediomelum esculentum</i>	Pomme-de-prairie	Early-Mid July
<i>Penstemon grandiflorus</i>	Large bear-tongue	Early August
<i>Phlox glaberrima</i>	Smooth phlox	Mid September
<i>Phlox pilosa</i>	Downy phlox	Mid July
<i>Phryma leptostachya</i>	Lopseed	Mid August-Late September
<i>Physalis virginiana</i>	Ground cherry	Mid September
<i>Polemonium reptans</i>	Jacob's ladder	Late June-Early July
<i>Polygala senega</i>	Seneca snakeroot	Late June-Early July
<i>Polygala sp</i>	Milkwort	Late August-Mid September
<i>Polygonatum biflorum</i>	Smooth Solomon's seal	Mid August-Mid October
<i>Polygonum virginianum</i>	Woodland knotweed	Early September
<i>Polytaenia nuttallii</i>	Prairie parsley	Early September
<i>Potentilla argentea</i>	Silvery cinquefoil	Mid August
<i>Potentilla arguta</i>	Prairie cinquefoil	Mid August-Early October
<i>Prenanthes alba</i>	Lion's foot	Late September-Late October
<i>Prenanthes crepidinea</i>	Great white-lettuce	Mid October
<i>Pycnanthemum virginianum</i>	Common mountain mint	Early September-Late October
<i>Pyrola sp</i>	Shinleaf	Mid-September
<i>Ranunculus abortivus</i>	Small-flowered buttercup	Mid June
<i>Ratibida pinnata</i>	Yellow coneflower	September-Early October
<i>Rosa sp.</i>	Rose	Mid September-Mid October
<i>Rudbeckia hirta</i>	Black-eyed Susan	Mid September-Mid October

Latin name	Common name	Seed collecting dates
<i>Rudbeckia triloba</i>	Brown-eyed Susan	All October
<i>Sanguinaria canadensis</i>	Blood root	Early June
<i>Saxifraga pensylvanica</i>	Swamp saxifrage	Mid June
<i>Scheuchzeria palustris</i>	Arrow grass	Mid June
<i>Schizachyrium scoparium</i>	Little bluestem	Late September-Late October
<i>Scrophularia marilandica</i>	Late figwort	Early August
<i>Scutellaria sp</i>	Skullcap	Mid June-Early July
<i>Silphium integrifolium</i>	Rosinweed	Early September-Mid October
<i>Silphium laciniatum</i>	Compass plant	Early-Late September
<i>Silphium perfoliatum</i>	Cup plant	Late August-Late September
<i>Silphium terebinthinaceum</i>	Prairie dock	Early-Mid September
<i>Sisyrinchium angustifolium</i>	Narrow-leaved blue-eyed grass	Mid June
<i>Sisyrinchium campestre</i>	Blue-eyed grass	Mid June-Early July
<i>Smilacina racemosa</i>	False Solomon's seal	Mid August-Late October
<i>Smilax herbacea herbacea</i>	Carrion flower	Early October
<i>Solidago flexicaulis</i>	Zig zag goldenrod	Late October-Early November
<i>Solidago juncea</i>	Early goldenrod	October
<i>Solidago missouriensis</i>	Missouri goldenrod	October
<i>Solidago nemoralis</i>	Old-field goldenrod (grey; dye	Mid October-Early November
<i>Solidago ptarmacoides</i>	Stiff aster	Mid September-Late October
<i>Solidago rigida</i>	Stiff goldenrod	Mid-Late October
<i>Solidago speciosa</i>	Showy goldenrod	October-Early November
<i>Solidago ulmifolia</i>	Elm-leaved goldenrod	October-Early November
<i>Sorghastrum nutans</i>	Indian grass	Mid September-Mid October
<i>Spartina pectinata</i>	Prairie cord grass	Mid August

Latin name	Common name	Seed collecting dates
<i>Sporobolus heterolepis</i>	Prairie dropseed	Late August-Late September
<i>Stipa spartea</i>	Needle grass	Mid-Late June
<i>Taenidia integerrima</i>	Yellow pimpernel	Late July-Early August
<i>Tephrosia virginiana</i>	Goat's-rue	Early-Mid September
<i>Teucrium canadense</i>	Germander	Late August-Mid September
<i>Thalictrum dasycarpum</i>	Purple meadow-rue	Early August-Mid September
<i>Thalictrum dioicum</i>	Early meadow-rue	Early-Late June
<i>Tradescantia ohioensis</i>	Common spiderwort	Early-Mid July
<i>Triosteum perfoliatum</i>	Early horse gentian	Mid September-Late October
<i>Verbena hastata</i>	Blue vervain	Late August-Late September
<i>Verbena stricta</i>	Hoary vervain	Early September-Early October
<i>Verbena urticifolia</i>	White vervain	Late August-Late September
<i>Vernonia fasciculata</i>	Common ironweed	Late September-Mid October
<i>Veronicastrum virginicum</i>	Culver's root	Late August-Late September
<i>Viburnum prunifolium</i>	Black haw	Early October
<i>Viola canadensis</i>	Tall white violet	Mid June
<i>Viola pedata</i>	Bird's foot violet	Late May-Mid June
<i>Zigadenus elegans glaucus</i>	White camas lily	Early August
<i>Zizia aptera</i>	Heart-leaved golden alexander	Early August
<i>Zizia aurea</i>	Golden Alexander	Early August-Mid September

## Appendix M. Assembly and use of PVC wick applicators

### **Cut-Stump Herbicide Applicator**

The description below is of the original design. However, a more recently modified version can be found here:

<https://prairienebraska.files.wordpress.com/2012/12/killstick-flyer.pdf>

### **Original Design**

<http://www.stewardshipnetwork.org/sites/default/files/Herbicide-applicator.pdf>

Designed by Jack McGowan-Stinski, The Nature Conservancy – Michigan Chapter

### **Parts**

- 1 – 1 inch diameter PVC threaded male cap
- 1 – 1 inch diameter PVC threaded female cap
- 1 – ¾ inch diameter PVC cap, unthreaded
- 1 – 1 inch diameter PVC threaded female coupling
- 3 – 1 inch diameter PVC threaded male coupling
- 1 – 1 inch diameter PVC 45° elbow coupling, unthreaded
- 1 – 1 inch diameter PVC threaded ball valve
- 1 – 1 inch diameter PVC pipe (12 to 15 inches)
- 2 – 1 inch diameter PVC pipe pieces, approximately 1 inch long
- 4 – 1¼ inch diameter rubber lavatory gaskets
- Heavy-duty sponge (2 x 4 x 1½ inches)
- PVC cement
- PVC pipe cutters or hacksaw
- Drill, 1/16 inch bit, ¾ inch bit
- Ruler
- Scissors

### **Assembly Instructions**

Cement threaded male coupling onto one end of a length of PVC pipe (12 to 15 inch length suggested). Cement the threaded female coupling onto the other end of the pipe (reservoir). Additional PVC sections can be thread together to make a longer handle or reservoir when needed. Slip one rubber gasket over a threaded male cap and attach it to the threaded female end of reservoir. Slip one rubber gasket over threaded male end of

reservoir, and attach one end of a threaded ball valve. The rubber gaskets will allow the sections of applicator to be tightened together snugly so that no herbicide will leak out around coarse PVC threads.

To make the “drip holes” for herbicide, cut off the bottom of the  $\frac{3}{4}$  inch diameter PVC cap so that a flat disk remains. File disk until it fits snugly into the unthreaded 1 inch diameter PVC 45° elbow coupling. A ridge inside the elbow will keep the disk centered. Use a 1/16 inch drill bit to make two holes near the center of the disk. Cement the disk inside one end of the elbow coupling. Using the 1 inch diameter PVC pipe pieces (1 inch length or less), cement 1 inch diameter threaded male couplings onto each end of the elbow. Slip rubber gaskets over each threaded male coupling. The end of the completed elbow without the drip holes disk attaches to the other end of the ball valve. Drill a  $\frac{3}{4}$  inch hole into the end of the 1 inch diameter PVC threaded female cap. The sponge tip twists into this  $\frac{3}{4}$  inch hole, and this cap is then threaded onto the end of the elbow with the drip holes disk.

The sponge tip, which is roughly 1 inch diameter by 1  $\frac{1}{2}$  inch length, can be cut with scissors, or a 1 inch diameter metal pipe section that is sharpened on one end can be used to rapidly cut out numerous sponge tips. Wet the sponge tip before twisting it into threaded female cap with the  $\frac{3}{4}$  inch hole. Allow  $\frac{1}{4}$  to  $\frac{1}{2}$  inch of sponge to extend out of tube to treat stump tops.

### **To Use**

With ball valve in the “OFF” or “CLOSED” position, pour the herbicide mix into the reservoir and close it with the threaded male cap (the top of applicator). Open the ball valve then slightly open the threaded male cap to allow air into the reservoir. Once the sponge tip begins to saturate, tighten the threaded male cap and close the ball valve. When the sponge is saturated, only a light touch to a cut-stump is needed. Open the ball valve when more herbicide is needed in the sponge tip.

### **Helpful Hints**

- During colder weather the ball valve may have to be left open to allow enough herbicide to saturate the sponge. Drip holes also can be made larger if faster herbicide flow is desired.
- Do not allow left-over herbicide mix to remain in the reservoir in extreme temperatures.

- Always clear drip holes of any residue before using the applicator again. A paper clip works well for cleaning out residues.
- When the sponge becomes worn, replace it (recommended after every work day at a minimum).
- When using the applicator during freezing conditions, duct tape a disposable chemical hand warmer around the section with the drip hole disk to reduce the chance of drip holes freezing shut.
- Use an herbicide dye to check for leaks, monitor applications, and identify any exposure to the person using the applicator.

For application of an oil based herbicide cut pieces of a floor finish applicator refill for the tip of the applicator. A heavy duty sponge can be cut for application of a water based herbicide. The tip should extend about ½" outside the tip. Adjust the ball valve to get the right amount of herbicide flow through the sprayer. The wand should be saturated and a quick touch to the stump should apply enough herbicide. It may be necessary to leave the valve all the way open, close it partially, or fully. The top cap also may need to be opened partially to increase herbicide flow.