Ecological Stewardship Volunteer Program

Managing Invasives Course

TABLE OF CONTENTS

INTRODUCTION

Managing invasive species is fundamental to maintaining and improving ecosystem health and function. This training is designed to help Stewardship Leaders lead effective workdays while employing best practices for managing invasive species.

Invasive species management occurs year-round, utilizing a variety of control methods and approaches. Effective invasives management is based on correctly identifying target species and determining the appropriate method of control. Stewardship Leaders are responsible for instructing volunteers on how to safely carry out stewardship activities within the site's approved management schedule.

LAND MANAGEMENT

Land Management Guidelines

The Land Management Guidelines (see Resources) is a document that reflects the land management policy and practices of the Forest Preserves. It is approved by the Forest Preserve District Board of Commissioners and acts as the "pledge" that is made to the Board that establishes guidelines on how the Forest Preserves will operate. The revised edition was approved in June of 2017 and includes a provision requiring a review within five years so that the policy and practices stay current.

The Guidelines govern all land management activities conducted on Preserve property by Preserve staff, contractors, other agencies, Conservation Corps and volunteers. It includes the overall framework of our policy on land management issues. This policy is then further defined in more specific documents such as management schedules, training manuals, procedures, etc.

Natural and Cultural Resources Master Plan

This Master Plan aims to provide the guidance needed to implement the 2014 Next Century Conservation Plan's natural resource goals. It also provides a natural and cultural resources framework for future land acquisition, recreation development, and capital improvement.

Chicago Wilderness Biodiversity Recovery Plan

The Biodiversity Recovery Plan was developed in collaboration between landowners, government agencies and partner organizations to develop a strategic vision for protecting, managing and restoring natural communities in the Chicago Wilderness region.

Management Schedules & Plans

Each of our volunteer managed sites has a guiding document that defines all approved stewardship activities that may be conducted by staff, Conservation Corps, contractors, and volunteers. These are either management schedules or management plans.

A Management schedule is a document that lays out the site management priorities and approaches for the short-term future (1-2 years). Typically, schedules do contain a general long-term vision for the site as part of the site description. Management schedules are prepared collaboratively with the Regional Ecologist and the Site Steward(s). These are living documents and may be updated as needed, although they typically require an annual edit or full update. The Regional Ecologist and Site Steward work together to develop management schedules for volunteer managed sites. The Site Steward's level of involvement depends on their interest, knowledge and time. The schedule

defines which stewardship activities are to be completed by volunteers and also states the role of contractors, Conservation Corps and/or Resource Management crews in site management.

Management plans are prepared for dedicated Nature Preserves and Land and Water Reserves. Plans include a detailed history of the site, what makes the site ecologically valuable and long-term (5 years) goals for site management. In addition to the short-term stewardship activities included in the management schedule section. Besides the Site Steward(s) and Regional Ecologist, plans are developed in collaboration with the Illinois Nature Preserves Commission. There are 27 Nature Preserves and 5 Land and Water Reserves within the Forest Preserves of Cook County.

Although the Site Steward(s) is the primary point person for FPCC in the development and update of the management schedules, input from other leaders at the site is strongly encouraged, depending on their knowledge, time and interest in leadership development. Minimally, all site leaders should be familiar with the management schedule. The most current copy is available to site leaders through Volunteer Resources. If a new activity or area is identified for possible stewardship efforts, the Site Steward(s) should discuss the proposed changes with the Regional Ecologist so that the schedule can be updated as needed.

All stewardship activities conducted at a site should be reflected in the management schedule. In addition to Site Stewards and Stewards, Stewardship Workday Leaders are also responsible for knowing what activities are approved within the schedule and should plan their workdays accordingly. There are many tasks that go into the stewardship of a site. It is important to know how specific tasks and workdays fit in the overall sequencing of activities and goals for the site. Performing a task in isolation is not always the best decision for the overall goal for a site.

A sample management schedule is available in the Appendix.

Forest Preserves of Cook County Staff Connections

Stewardship volunteers in leadership positions work with various departments, units or sections within the Forest Preserves.

Volunteer Resources (VR) – This unit handles the human resource and administrative component of the relationship between the Stewardship community and the Forest Preserves. Within this unit are the Stewardship Program Coordinator, Volunteer Program Specialists, Stewardship Program Aides, and an Administrative Clerk who support the Stewardship program. Areas that they coordinate include:

- Training and development of volunteers
- Recruitment of new volunteers
- Connection to third-party monitor agencies
- Connection to school groups, community groups, and corporations for workdays

- Certification of volunteer leaders
- Online Volunteer System (OVS) support
- Reporting volunteer work to Preserves management
- Coordinating tool and herbicide supplies
- Permitting – regular workdays and special events
- Liaison with other Preserves staff

Resource Management (RM) – This unit is responsible for all the land management being done in the Forest Preserves. It includes RM Crews, Ecology, Project Management, Trail Maintenance, Wildlife and Fisheries sections.

Ecology – Ecologists collaborate with the Stewardship community and FPCC staff, including Wildlife, Fisheries, and other Resource Management teams to develop ecological management priorities and approaches. Forest Preserve sites are divided into five ecology regions, each having its own designated Regional Ecologist. As a Stewardship Workday Leader, you should know your Regional Ecologist and will have opportunities to work with them. The Regional Ecologist connects to the site via the Site Steward.

RM Crews – There are 5 RM crews that do the work in natural areas as well as picnic groves, trails, building grounds, etc. . Because of their training, experience, access to equipment, etc. they are able to work on larger scale projects at stewardship sites.

Project Management – This unit oversees all contract work done in natural areas as well as picnic groves, trails, building grounds, etc. . Regional ecologists submit contractor requests on behalf of the Site Steward and Project Management oversees contract performance and communication with the Site Stewards.

Landscape Maintenance Department – This department maintains picnic groves, picnic shelters, driveways, trash removal, and restroom facilities.

Role of Conservation Corps, Contractors, Resource Management Crews

In many cases, there is overlap between work conducted by third-party agencies, Conservation Corps, contractors and RM Crews. In all cases, the management schedule drives what work should be done. Decisions on resource allocation are based on the complexity of the project, timing, availability, and urgency. Ecologists and Project Management collaborate in this process and maintain communication with the Site Steward.

Volunteer Site Management Roles

Site Stewards are responsible for overseeing all volunteer stewardship activities at their site. Site Stewards collaborate with Forest Preserves staff and other volunteers who are part of their stewardship team to create or update management schedules that guide all stewardship work at their site. The stewardship team may be composed of the site stewards with other knowledgeable volunteers.

Stewards assist the Site Steward with overseeing volunteer work done at their site. A Steward has the skill set, knowledge, experience, and capacity to be a Site Steward but does not have the ultimate administrative responsibilities. While Site Stewards are the primary contact person for site management, Stewards play a pivotal role in stewardship efforts, stewardship volunteer days, planning, and site administration.

Stewardship Workday Leaders are authorized to lead groups of volunteers (or work individually) in stewardship activities. All work requires approval and at least indirect supervision by a Site Steward. Stewardship Workday Leaders are responsible for immediate decisions at workdays in the absence of a Site Steward.

MANUAL REMOVAL

Effective invasive species management may involve multiple control methods employed at different stages through the growing and dormant season. Many variables influence management strategies including the target species, seasonality, the skill level of the volunteer, community composition, available resources, etc. Effective control may involve a combination of multiple methods.

Soil disturbance should always be considered when making the decision to use pulling or digging as a control method. The benefit of removing the plant(s) must be weighed against the damage to the soil structure and the removal of organic material. Soil disturbance can also facilitate germination of the invasive being controlled, although in some cases this might be desirable if the goal is to exhaust the seed bank, such as with garlic mustard. Soil disturbance and the removal of root systems can also lead to erosion issues. All of these factors should be considered before plants are pulled or dug up.

Pulling

There are a few species that can be pulled out with their root system intact. These are potential candidates for pulling since regeneration from established root systems does not occur. Pulling is the primary control method for garlic mustard. It is an alternative method for purple loosestrife and sweet clover. Wet soils make pulling easier but can increase the potential for soil compaction. It is a method that is better employed in an area with scattered invasives rather than a mass population.

Digging

For several reasons, digging is not recommended. Digging often causes even more soil disturbance than pulling; roots can be cut and left to regenerate later (teasel). Time may be better spent removing a species at a later stage when pulling or seed head removal is more efficient (garlic mustard). If digging is used, it should be done only in degraded areas and for very small isolated populations and must be an approved control method on the management schedule.

Cutting

A common characteristic of invasive species is that they are prolific seed producers and their seed may be widely dispersed by wind, water or animals. Ideally, these species are chemically treated or mechanically removed before plants have set seed. However, when treatment does not occur or was ineffective, mechanical removal of seed heads or the entire plant may be an effective management strategy.

Seed Head removal is used on teasel, reed canary grass, and purple loosestrife. Seed heads should be cut by pruners/cut ‘n’ holds then bagged and removed. It has limited effect on garlic mustard or sweet clover since partial plants can

regenerate a new seed head depending on seasonal conditions and growing cycle.

Plant cutting is used on sweet clover and garlic mustard. Whole plants are removed by hand cutting, scything, mowing or brush cutting. Plants are often cut below seed head height. If any generate new seed heads, they are cut again at a later date. This often requires a second and third cutting until regeneration of seed heads no longer occurs.

TIPS:

- Care should be taken not to spread or disperse seed while actively removing plants. Brushing against plants, shaking plants, etc. can disperse seeds quickly.
- In all cases, work gloves are recommended.
- If seed heads are to be removed from the site, always use a heavy-duty bag or bucket. Avoid using plastic grocery sacks as they are easily snagged and torn which ultimately spreads seeds. Contractor weight bags or yard waste bags with all seams taped to prevent leakage of seeds can be effective.
- Remember to consider soil disturbance in your decision on whether to use a manual method

Composting

Certain species like garlic mustard or sweet clover may be composted on site. After removal, seed heads and/or full plants may be piled in a degraded area or on an old brush pile burn scar. There still may be some viable seed that germinates but stacking the plants localizes the seed source. These pile areas can be reused year upon year.

TIPS:

- Fewer large piles are preferred to many small piles as this practice will localize and limit potential seed sources
- Public visibility should be considered. Compost piles in remote areas are fine but the placement of piles is prohibited along paths, trails, parking lots, driveways, etc.
- When deciding on composting vs. offsite removal, consider the distance needed to remove plants from the site. Composting may leave some viable seed and may require follow up. Measure that against the risk of spreading or carrying seed across long distances as well as the amount of effort to physically remove the plants from the site.

Offsite Removal

Species that can re-establish easily from composted seed heads should be disposed of rather than composted. Also, in areas within public view, full removal should be used instead of composting. As noted above, the distance to an off-site location needs to be part of the decision. Although removal may be desirable, it isn't always possible.

Heavy-duty plastic garbage bags (available from FPCC) should be used. When bags are full, tie a flagging ribbon around the neck of the bag. Place the bags by the road sign for the site or next to the map sign. Do not put these "yard waste" bags near the trash cans or dumpsters as they can be easily confused with other

garbage. We do not want this "yard waste" type material to go into our regular trash system. Instead, we will compost it in a controlled setting.

E-mail or call Volunteer Resources with the number of bags and location.

TIPS:

- Any sites that have public visibility issues should use disposal rather than composting.
- Inform Volunteer Resources in advance that "yard waste" pickup will be needed at your Site. We like to move these off site as quickly as possible.

CUTTING AND SAWING

Section VII of the Land Management Guidelines covers Vegetation Management. Sections B & C addresses removal of vegetation. Removal by cutting or sawing is just one of the steps to completing the work. Cutting stumps to ground level (or no more than 2") and herbiciding stumps are both necessary additional steps that must be part of the workday plan. The Land Management Guidelines also state the requirement that the removal of any trees larger than 6" dbh (diameter at breast height) must have prior approval by Resource Management.

Removing invasive species creates a disturbance. Major removal creates a newly cleared open area which now has more sunlight and low competition. This can allow other invasives to rapidly colonize. It is important to frequently monitor recently disturbed sites to assure early detection of any new invasives which will enable a quick management response.

Recommendations on seasonal considerations are in the management schedules for each site. Seasonality can help predict site conditions (i.e. the ground is typically frozen in winter and wet in spring). However, actual site conditions on the day that work is being done should inform the decision for management activities. Adjustments to a planned workday should be ground-truthed and adjusted based on site and weather conditions. Winter is a great time to do mechanical removal because the ground is frozen, specimens are easier to manage without leaves, and brush pile burns feel good. However, deep snow can affect how we do the removal and care for the site. See notes about working in the snow at the end of this section.

Pruners

Pruners can be used for seed head removal but are not practical for woody invasives removal. Even youth can operate loppers more easily than pruners.

Loppers

A good guideline is the "rule of thumb": loppers are good for cutting brush that is the size of your thumb or smaller. It is important to keep loppers sharp. They cut much more easily and are safer to use when sharp. Loppers should be sharpened periodically using a flat file.

Leather gloves must be worn while using loppers. Stems should be cut as low as possible with a flush, level cut. Angled/pointed stumps may not be left on site for safety reasons. They become "impalers."

Instruction tips:

- Kneel or squat low to the ground, keep the lopper parallel to the ground and cut as close as possible to the ground.
- When cutting down a larger shrub or tree, it is sometimes helpful to use loppers to cut off branches for better maneuverability and for more direct access to the base of the trunk. This

also helps prevent injury from being scratched by branches.
- If the lopper is causing you to struggle or force a cut, the stem is too large and a bowsaw should be used
- Applying extreme force can bend or break loppers
- If the effort being made is requiring that you twist or turn the lopper, it is probably too big for a lopper and a bow saw should be used.

Bow Saws

Bow saws can be used for brush and trees up to the allowed 6" dbh maximum. Trees over 6"dbh may NOT be felled with a bow saw.

There are practical limits on size for each individual. Inexperienced volunteers and youth should not fell larger brush or trees. Larger trees are sometimes best left for a chainsawyer to do at a later date.

It is important to always use a sharp saw. When the blade becomes dull, rusty, or bent, it should be replaced. Bow saws cannot be re-sharpened due to the hardness of the blade. FPCC uses a live wood blade that is different than the standard bow saw that is equipped with a dead-wood blade.

Leather gloves must be worn while using bow saws. When transporting or walking with bow saws, sheaths should be used to cover the blade if available. If not available, saws should be carried by their handles with the blade facing backwards and close to your body. Stems or trunks should be cut as low as possible to the ground with a flush, level cut. Angled/pointed stumps may not be left on site for safety reasons. Again, this can create "impalers".

Instruction tips:
- Kneel or squat low to the ground, keep saw parallel to the ground and cut as close as possible to the ground.
- The pull stroke is the cutting stroke so push saw forward with minimal effort and pull using a long, smooth stroke through the wood.
- Don't overpower the saw; let it do the work.
- Brace the wood to be cut against a solid support or grasp the upper section firmly.
- If the cut starts to bind, apply pressure to keep the cut open.
- With the proper technique, the two-person method of cutting larger trees is fast and requires less effort. The two take turns pulling the saw (neither pushes). The result is easy back and forth strokes, requiring less work for either sawyer.

Scythe/Snaths

A scythe is an interesting tool that is effective for specific uses. The long-curved handle is called a snath. Scythes are very effective on stands of grasses or sweet clover. Be aware that there is a different blade for sweet clover than for grasses. Scythes are useful for selective or "surgical" control of tall goldenrod, rubus, etc. in areas where there are other desirable species. Scythe blades are kept sharpened using a whetstone.

Instruction tips:
- The cutting stroke is a short, repeated stroke, not a wide, golf type stroke

- Different blade styles can be used for different target species

Brushcutters

Brushcutters are line trimmers fitted with a round saw blade and a protective shield over the blade. They are a very efficient way of cutting grasses, resprouts and even small diameter trees or shrubs (recommended up to 3" diameter). They are much safer to operate than chainsaws. There are several styles of blades available for the full range from grasses to small trees.

Operation tips:

- Brushcutters must be operated at a safe distance away from other volunteers
- Long use can be tiring on shoulders
- When making a cut, keep saw at full throttle
- If cutting blade becomes loose, tighten immediately
- Hard helmet, eye, and hearing protection are required
- Leather boots are recommended but not OSHA required
- Use the right style blade for the right job
    - 3 or 4 tooth blade – Grass
    - Chisel or sawtooth – Brush and fibrous stemmed plants

Chainsaws

Chainsaws are powerful tools for removing brush and trees. However, there are safety and noise issues to consider when making them part of your workday.

A full description of Chainsaw policy is presented in the Chainsaw Safety class but a few main points are presented here.

Personal Protective Equipment All volunteers operating chainsaws on FPCC property must be certified and outfitted in the required personal protective equipment (PPE). The minimum required PPE includes Kevlar boots, chaps, operator's helmet with earmuffs, leather gloves and eye protection. Kevlar boots may be provided by the volunteer or can be obtained through the District free of charge with a chainsaw work commitment.

Certification All volunteers, especially volunteer leaders, are encouraged to take the chainsaw class even if they do not intend to become sawyers. Having a full understanding of chainsaw safety will keep our workdays safe. This class is led by Resource Management.

In addition to classroom attendance, the certification requires one field observation by RM staff. You do not have to do the field observation if you do not intend to become certified to operate a chainsaw. Instead, you will be designated as a Chainsaw Operator Assistant.

Size limits Certified sawyers may fell trees up to 6 inches diameter at breast height (DBH). An advanced sawyer certification is also available through classroom training and field observation from Resource Management. This class is by invitation only. Candidates are selected by Resource Management, Ecology or Volunteer Resources. Advanced sawyers may fell trees up to 12 inches dbh with

specific District approval. All tree removal must be approved in the management schedule for the stewardship site.

Safety During chainsaw operation, volunteers and members of the public must be kept at a safe distance from the chainsaw operator. Non-certified volunteers cannot enter the chainsaw worksite. All chainsaw required PPE must be worn inside the worksite. Chainsawyers cannot operate alone. There must be a designated Chainsaw Operator Assistant who assists in brush removal, crowd control, and overall safety. Although this person can be a fellow sawyer, they cannot be sawing while performing the duties of this role. They are also required to wear a helmet with earmuffs and must be certified as a Chainsawyer (Feller 1 or 2) or Chainsaw Operator Assistant.

When clearing brush, the Chainsaw Operator Assistant must maintain a safe distance from the sawyer and may only approach the sawyer while the saw is in idle, assuring that the immediate area is kept secure. When felling larger diameter trees, the Chainsaw Operator Assistant is monitoring a larger drop-zone which includes 360° around the tree, not just the expected felling direction. The drop-zone should be approximately two times the height of the tree being felled.

Chipping

Chipping should only be utilized when burning is not possible due to site conditions, or if issues exist with smoke-sensitive neighbors, volunteers or other public concerns. If chipping is required, the drop site must be accessible to a chipper. This will require brush to be stacked neatly 1 foot from a curb, sidewalk or parking area. All stacked brush should have the cut ends facing the direction of access by the chipper. All chipping requests must be communicated to Volunteer Resources in advance of the workday.

Brush Pile Burning

Burning is the most effective way of eliminating cut brush. Brush pile burning at stewardship workdays requires a certified Brush Pile Burn Boss be on site. To become a Brush Pile Burn Boss you must complete the Brush Pile Building and Burning class and then complete 2 field observations.
Brush pile burn policy is presented in greater detail in the Brush Pile Building and Burning class. The Brush Pile Burn Boss or the Stewardship Workday Leader is required to make all the pre-and post calls to local fire or police, have Illinois EPA & Cook County Department of Environmental Control permits on site, check weather and Air Quality Index (AQI) and have sufficient suppression tools on site as warranted by site conditions. They are also responsible for posting hot coals signs and must assure that there is no live flame when volunteers leave the site.

End of Day Considerations

The Stewardship Leader must wind down the workday in enough time to clean up the site and leave it in a tidy or at least organized state.

Unburned brush should be stacked neatly to be burned at the next workday.

Ideally, this should be burned as soon as possible. Mini workdays to finish the burning can be added. Waiting until next workday is also permissible if wildlife habitat considerations are considered. Policy on unburned brush is covered in the Brush Pile Building and Burning class.

Punji sticks, impalers and "buckthorn graveyards" Our overall policy as stated in the Land Management Guidelines is to leave all stumps (large or small) trimmed down to no more than 2" at the end of the workday. Different circumstances impact how strictly and how quickly that policy is adhered to.

- **Snow** affects access to the base of the specimen being cut. If snow is light to moderate (2-4"), brush away the snow and make a good low flush cut no more than 2" high. The snow removal also facilitates better and safer herbicide stump treatment. If snow is deeper, a higher cut may be the only thing possible that day. But a plan for trimming them down to 2" and applying herbicide should be in place as soon as snow depth allows.
- **Size of specimen** impacts the decision for safety reasons. Falling on something that is 8" high and 1" in diameter can impale and cause serious injury. Falling on something that is 8" high and 6" in diameter can still hurt and bruise but is not as likely to cause serious injury.
- **Visibility** if the work area is visible to the public, i.e. along a path, driveway or road, it creates a negative perception of the great work that we are doing. It is difficult to look at a "buckthorn graveyard" and see the positive impact of stewardship work. If the "buckthorn graveyard" with all of its 3' high markers are in a remote area it still looks unsightly but is far less likely to generate negative comments from the public.
- **Youth or inexperienced volunteers** may not be physically able or don't have the tool-savvy to get a good low flush cut. In these cases, stumps may be cut at waist level at first and then followed up with cutting down to the below 2" level. If you are unable to cut all the way to the base, higher is better than almost to the base.

Bottom line, the very best option for efficiency, safety and beauty is to flush cut down to no more than 2" off the ground. We recognize that this may not always be possible.

- When snow is not an issue, the cutting should be done as soon as possible and should not be left for more than a day or two.
- When snow is an issue, the chainsaw finish needs to be addressed as soon as the snow has receded to a few inches. They should not be left indefinitely or automatically delayed until spring. It should be on the group's radar to finish as soon as conditions allow.
- Contact Volunteer Resources if stumps are left more than 24 hours.

Re-application of herbicide is highly recommended when cutting previously herbicided stumps, to prevent resprouts. Herbicide should not be applied to tall stumps, apply once the stumps are flush cut.

HERBICIDES

Chemical management is one of the primary methods used to manage invasive plants. Herbicides are part of a broader group of chemicals called Pesticides which are chemicals used for destroying insects or other organisms harmful to cultivated (desired) plants or animals. Chemicals that are toxic to plants are called herbicides. Herbicides can efficiently and effectively suppress or kill unwanted plants and should be used judiciously, safely, and in a way that minimizes adverse effects on non-target resources.

This section will cover who can apply herbicides, what herbicides may be used, how to obtain them when to use them and other policies related to herbicide use.

The choice of herbicide and concentration level depends on the target species, stage of growth, time of year, the presence of desirable species that may be affected, the proximity of water resources and weather conditions (high winds and temperatures). Additionally, there may be some areas where chemical control is inappropriate, for example, if rare species are present. Herbicides must always be applied in accordance with the label.

Always use the lowest concentration of herbicide that is effective and preferentially use more selective herbicides that degrade and break down quickly. General guidelines are in the Species ID section of this manual and in some management schedules.

Types of Herbicides

Contact herbicides: injure only the portion of the plant contacted by the herbicide
Systemic herbicides: are translocated from the leaves to the roots causing plant mortality

Broad Spectrum herbicides: kill or suppress all vegetation because they affect physiological processes common to all plants. Example: Round-Up Custom (glyphosate)

Grass Specific herbicides: formulated to kill or suppress only grasses without harming forbs or sedges. Example: Intensity herbicide

Broadleaf herbicides: formulated to kill forbs and other broadleaf plants without harming grasses or sedges. Examples include Vastlan & Transline.

Herbicide Additives

Surfactants are compounds that lower the surface tension of a liquid. Surfactants are adjuvants, chemicals that increase the effectiveness of herbicide chemicals. Surfactants are used to help herbicides adhere to plants, penetrate into the vasculature of the plant which allows more of the herbicide to be retained by the plant after rainfall. Surfactants help spread out herbicide over the leaves so that it does not run off. Surfactants can also make the herbicide rain-safe faster.

Colorant is added to herbicide mixtures to allow the applicator to verify that the herbicide formulation was applied to the intended target and to provide notice to the others who may be using the site. Colorants are required by the FPCC.

The following additives are also available:

- Premier Typically used as a carrier oil for Garlon 4
- Colorant
- Methylated seed oil: Used as a carrier oil for grass-specific herbicides
- Surfactant

Herbicide Decisions

Characteristics, traits, limitations

Round up Custom (Aquaneat, Rodeo)

- Active ingredient is glyphosate
- Broad spectrum, systemic herbicide for use near aquatic environments and over standing water
- Kills anything green
- Rainfast 6 hours after application
- Restricted entry interval is 4 hours

Vastlan

- Active ingredient is triclopyr
- Systemic, broadleaf specific herbicide mixed with water
- Foliar application for Herbaceous and Woody Plants
- Can be used near water or drainages but not over open water
- Volatilizes at high temperatures and should not be applied over 85F
- Rainfast 2 hours after application
- Restricted entry interval is 24 hours

Element 4 (Tahoe 4 or Garlon 4)

- Active ingredient is triclopyr
- Broadleaf specific herbicide mixed with oil for stump treatment or water for foliar treatment
- Volatilizes at high temperatures and should not be applied over 85F
- Rainfast 2 hours after application
- Restricted entry interval is 12 hours

Intensity

- Active ingredient is Sethoxydim
- Systemic herbicide for control of annual and perennial grass mixed with water and methylated seed oil
- Grass specific herbicide that will not damage forbs or sedges
- For control of reed canary grass, early season application is most effective
- Very expensive and labeled for low concentrations
- For use in uplands areas only
- Rainfast 2 hours after application with surfactant
- Restricted entry interval is 12 hours

Milestone

- Active ingredient is clopyralid
- Broadleaf specific herbicide mixed with water and is especially effective on legumes including bird's foot trefoil, crown vetch, sweet clover and is very effective at controlling teasel, thistle, and tall goldenrod
- Cannot be applied in the presence of water. For use in upland areas only
- Rainfast 1 hour after application
- Restricted entry interval is 12 hours

Different brands of these herbicides are supplied. The chemical formulations will remain consistent across these brands.

No other herbicides may be used in the Forest Preserves without the prior approval of your Regional Ecologist. If you become aware of an herbicide that you think may have some practical use at your site, please present it to your Regional Ecologist. They can research it with area contractors and other agencies.

HERBICIDE HANDLING

Mixing

The Applicator is responsible for mixing herbicides for themselves and all Operators that work under their license. They must assure that they are mixed properly so that they retain their properties and toxicity. It is illegal to mix pesticides with other products that are prohibited on the label.

Herbicide concentrate needs to be carefully handled, measured and transferred. Eye protection, long sleeves, and rubber/latex gloves must be worn when mixing herbicides. Always mix herbicide on flat, level surfaces and in areas that are well ventilated.

- Herbicide packs, sprayers, and storage containers should be flushed after each use with rinse water sprayed on target species.
- All containers must be clearly labeled and should include the name of the chemical, the percent solution and what date the herbicide was mixed.
- When switching from a broad spectrum to broadleaf specific herbicide, all packs/applicators must be triple rinsed or unintended plant mortality may occur after application.
- All measuring cups, funnels, containers, etc., must be triple rinsed after usage.
- If possible, mix herbicides out of public view.
- Dye is extremely concentrated and will persist on pavement long after many rain showers.

Storage

The Applicator is responsible for setting up the proper storage methods for each chemical and instructing Operators on proper methods. Product labels must be on all containers. In addition, concentration levels of any herbicides that have already been mixed must be indicated on the container.

Transporting

Never transport herbicide within a closed cab vehicle. Herbicide should be stowed in an open-air bed or in a closed trunk compartment. Double check all lids, fittings, nozzles, and containers before placing herbicide sprayers/containers in vehicles to reduce the chance of spillage.

Container Disposal

Herbicide containers should be triple rinsed with water and then punctured so that they can't be accidentally repurposed. You can use the rinse water on a patch of invasives. Although this is highly diluted, it could have some positive effect and is better than running it into a drain system. Check with your local recycling to see if they recycle these types of containers.

Recordkeeping

FPCC requires that records are kept of herbicide usage. (See Appendix for a sample form). These forms can be kept by the Applicator and are turned into the Forest Preserves periodically. The records are useful to provide historical information on what methods, chemicals

and concentrations were used to inform future practices. They are also needed to answer any complaints made by other agencies or the public. Data must be kept for three years to prove that the herbicides were applied properly and within the law.

Labels and MSDS/SDS Sheets

The label is a legal document. The Applicator and Operator are legally responsible for following the label directions on the product container. As a Stewardship Workday Leader, you should also read the label before herbicide is applied at a workday that you are leading.

Detailed information about labels and MSDS/SDS Sheets is given in the Herbicide training class but a few key points to look for are:

- Product Information – Ingredients, EPA registration number, Emergency Contact information and Danger rating
- Precautionary Statements - Human and animal hazards, Personal Protective Equipment (PPE) needed, First Aid and Hazard Statements
- Directions for use - Agricultural or Forestry Use Requirements, Worker Protection Standard (WPS), Reentry information/notification (for unprotected people) and PPE required for workers; Directions for application; Storage/ disposal directions; Use Restrictions

Safety Data Sheets (SDS) communicate the dangers of using hazardous chemical products. They were formerly known as Material Safety Data Sheets (MSDS). Every chemical manufacturer, distributor, or importer is required to make these available to the general public. They contain more information about chemical composition, toxicity, exposure control, first aid, disposal, and other topics. Safety Data Sheets should be read by both Operators and Applicators in conjunction with the label, but it is not a substitute for reading and understanding a pesticide label. Stewardship Leaders should be aware of their content in particular as it addresses safety.

Personal Safety

The herbicide label has minimum safety requirements set by OSHA. In general, being dressed properly and avoiding spills and splashes are keys to safety.

Minimum requirements:

- Closed toe footwear
- Long pants
- Long sleeved shirt
- Protective eyewear – safety glasses or goggles
- Chemical Resistant Gloves
- Rinse water for first aid

Safe mixing setting:

- Funnel, measuring cups or other appropriate tools
- Level work surface
- Proper containers & labels
- Water available for cleaning and for first aid if needed
- First Aid Kit
- Emergency Spill Kit

HERBICIDE METHODS

The method used to apply herbicide is dependent on point in the annual growth cycle, weather conditions, species, site conditions, etc. All necessary tools are available from FPCC.

Foliar Spray

Herbicide application by foliar spray is one of the most cost-effective methods for treating many types of herbaceous and woody invasive plant species. With this method, herbicide mixtures are applied to the foliage and especially the growing tips of woody plants, or to completely cover herbaceous plants. Backpack or handheld sprayers are effective tools for controlling larger populations.

Foliar treatment can only be used when winds are low as winds can cause drift and non-target damage. If non-target foliage is accidentally sprayed, clip or remove treated foliage to prevent herbicide uptake. It is important to note that Glyphosate is non-selective, meaning it will kill almost any plant. Thus, foliar spraying is generally reserved for invasive "monocultures" and may not be advisable when desired native species are present in an area. In such cases, a more targeted approach may be preferred (see below).

Roller/paintbrush

Rollers are effective tools for applying low volumes of oil-based herbicides directly to stems and cut stumps. Attached to wooden extension rods, 2" paint rollers are dipped into a container of herbicide. Avoid over saturating rollers to the point of excessive dripping.

Wicking: small diameter brush can be effectively controlled with basal bark herbicide application. Use the roller around the entire circumference of the stem, applying herbicide evenly in a wide band. If possible, apply herbicide to the root crown. Avoid herbicide application to soil.

Cut Stump: use the roller over the surface of a cut stump and down the side of the stem with an even application of herbicide. If possible, apply herbicide to the root crown. Avoid herbicide application to soil.

Weed Wand

Handheld weed wands apply ultra-low volumes of herbicide by wiping the mix onto the target leaf surfaces or bark. The herbicide mixture is contained in the handle of the wand making this method effective for small infestations. It is efficient on small diameter items such as resprouts but would be too tedious to use on larger diameter growth.

Handwick/glove

Handwicking is typically used in wetlands to control reed canary grass, cattails and phragmites but can be used on a variety of species. If invasives are in dense pockets, foliar spraying might be the best option. Handwicking is effective in areas with small, diffuse populations where foliar treatment may be too detrimental

to surrounding native species. Size and density of the invasive population and quality of the surrounding plant community should always be taken into consideration. Handwicking is a slower process but is highly effective and greatly limits collateral damage.

Handwicking requires rubber/latex gloves and a sponge or cotton glove. Place a cotton glove over a latex/rubber gloved hand or hold a sponge in a latex/rubber-gloved hand. Dip hand/sponge into the appropriate herbicide and limit the saturation so that herbicide does not drip or run. Wipe down both sides of the leaf blades from base to tip. Be sure to get complete coverage and to treat each leaf and all stems. Follow up treatment may be needed.

SAFETY & FIRST AID

Public Safety

The Stewardship Workday Leader and the Site Stewards are responsible for the safety of the other volunteers during the workday as well as the general public who may be using the area after the workday. In addition to requiring that colorant be used in mixing herbicide, FPCC requires the following signs be used to inform the public that herbicides were used at the site.

Herbicide Notice: This alerts volunteers and other Forest Preserve patrons that herbicide has been applied to a stewardship site. The sign indicates the time when re-entry is safe. This reusable sign should be posted in a highly visible location before herbicide application begins. It is commonly taped to a tree near the work site. The re-entry time and date are required. If the re-entry time is not specified on the chemical label, use the default of 12 hours from time of application.

Herbicide Notice Flags: Wire or plastic staked flags that indicate the use of pesticides at a stewardship site are placed around the perimeter of the area where herbicide was applied. Reasonable flag intervals are recommended as dictated by site conditions, proximity to trails, and public use. Although immediate removal is not required, the less time the signs and flags are displayed the better. Leaving them out there for weeks at a time gives the impression that we are continually herbiciding It is desirable for a volunteer to return to the site the next day to remove the sign and the flags.

Remember:

- **ALWAYS read and follow label**
- Always wear appropriate personal protective equipment, including eye protection, rubber gloves, long sleeves and proper footwear.
- Be aware of high wind speeds that cause drift and non-target damage.
- Know rain-safe times & restricted entry interval (REI) for each herbicide.
- Know how to engage the trigger lock and always keep wand tip pointed low when spraying, transporting and stowing
- If wand tip is leaking, get it repaired. If it is a slow leak, keep wand tip up-turned to avoid injuring desired plants.
- Bend at the knees, not the waist. Herbicide can leak out the top of backpack sprayers.
- Use O-ring lubricant on O-ring on top of backpack sprayer cap to avoid leakage.
- Always post Managed Area signage and Herbicide Notice Flags when applying herbicide

First Aid

External irritants cause:

- Redness, blisters, rash, and/or burns on skin
- Swelling, a stinging sensation, and/or burns in eyes, nose, mouth, and throat

Ingested (Pesticide poisoning) may cause:

- Excessive sweating, chills, and/or thirst
- Chest pains
- Difficulty breathing
- Muscle cramps or body aches

First Aid Treatment: The following are *general* guidelines for pesticide exposure. They are not a substitute for reading the pesticide label to understand its toxicity, effects, and specific first aid procedures. Remember: The toxic effect of pesticide exposure depends on the quantity of pesticide involved and the duration of exposure.

Get medical advice quickly if you or any of your fellow volunteers have unusual or unexplained symptoms. Call 911 in an emergency.

Pesticide on skin:

- Thoroughly flush or soak the victim's skin and clothing with water
- Wearing gloves, remove all contaminated personal protective equipment
- Wash skin and hair with a gentle liquid detergent and water
- Dry victim and wrap in clean, loose clothing or blanket

Oral exposure:

- Thoroughly rinse mouth with water
- Provide the victim with up to one quart of milk or water to neutralize the pesticide
- Induce vomiting only if instructions to do so are on the pesticide label

Pesticide in the eye:

- Flush eyes for 15 minutes with saline (first aid eyewash) solution or clean water
- Seek prompt medical attention
- Do not use chemicals or drugs in the eyewash water

Inhaled pesticide:

- Move the victim to fresh air
- Loosen any clothing that would constrict breathing
- If other people are in or near the area of contamination, warn them of the danger
- Monitor breathing. Rescue breathing or CPR may be necessary. If required, use barrier device to prevent direct contact with the victim's mouth

General precautions:

- Get medical advice quickly if you or any of your fellow workers have unusual or unexplained symptoms starting at work or later the same day
- If other people are in or near the area of contamination, warn them of the danger
- Know where the nearest phone and hospital are located. Maps and phone numbers to the closest hospitals and a first aid kit should always be kept with the pesticide.
- Take the pesticide container (or the labeling) to the physician

Reporting First priority is handling the medical situation. After that, the spill itself should be handled and then last, the Incident Report Form documenting the incident should be completed and sent to Volunteer Resources.

Herbicide Spills

Given the potential for many herbicides to cause harm to humans and the environment, it is imperative that all herbicide users understand the procedure for dealing with spills. The priorities for addressing spills should always be preventing/treating injuries, containment, and disposal of the herbicide. Considerations for dealing with spills may vary slightly according to the quantity of herbicide spilled, type of herbicide, concentration, and other factors as determined by the herbicide label and SDS.

Minor Spills:

- **Prevent/Treat Injuries**
  - Control access to the area. Keep others away from spilled herbicides. If possible, rope off the area to prevent others from coming into contact with the herbicide.
  - Do not leave the area unless someone is there to confine the spill and warn of the danger
  - If the pesticide was spilled on anyone, wash it off immediately. If necessary, begin first aid procedures outlined in this manual.

- **Containment:** Spilled herbicide can be confined through the use of absorbents. Absorbent material includes cat litter, absorbent pillows or pads, soil, sawdust, or absorbent clay to soak up the spill. It is important to prevent spilled herbicide from reaching water.

- **Disposal:** If there is no danger to employees or the public, shovel or sweep contaminated material into a leak-proof container for disposal. Consult the pesticide label for specific directions for other information about herbicide disposal. Do not hose down the area as this spreads the herbicide. Always work carefully and do not hurry. Control access to the area until the spill is completely cleaned up.

Major Spills: The cleanup of a major spill may be too difficult for you to handle, or you may not be sure of what to do. In either case, keep others away, give first aid if needed, and confine the spill. Then call 911 for assistance.

Reporting of Spills

Applicators must report any major spills to the EPA. Notify the FPCC (Volunteer Resources or Resource Management) as well.

HERBICIDE LICENSING

Categories of Licenses

All volunteers using herbicides at FPCC stewardship sites must possess a valid Public Category Pesticide License issued by the Illinois Department of Agriculture. Three levels of licenses are offered: **Operator, Applicator, and Alternative Herbicide License.** The operator or applicator must have their license with them whenever they are applying herbicide.

Operator

Is a person who uses herbicides at a stewardship site under the guidance of the stewardship site's pesticide Applicator. Operators cannot be licensed without an Applicator being licensed. Operators are expected to be in contact with their supervising Applicator the day of herbicide application. Operators may not legally work under another supervising Applicator.

Applicator

Is a person who is responsible for herbicide ordering, storage, handling, mixing, transportation, and providing guidance to Operators working under their license. Each stewardship site should have at least one person licensed as an Applicator. They must be available Testing year-round is offered by the Illinois Department of Agriculture.

Operators must pass the 100-question General Standards exam. Applicators must pass the General Standards and pass one or more 50-question Category exams. for supervision of the Operator while herbicide is being applied. That means that the Applicator cannot be unavailable while an Operator is applying herbicide. In some cases, an Applicator may be willing to oversee Operators at multiple stewardship sites.

While Operators make valuable contributions to the stewardship process, the Forest Preserves strongly encourages all volunteers interested in herbicide application to earn the Applicator license.

Alternative

Must attend the FPCC Practical Herbicide class and the license is only valid for the year that the class was taken. Someone with this license can only apply herbicide, they cannot mix nor refill the herbicide tool.

Testing Process

Typically, two pesticide license exam sessions – one on a weekday and one on a Saturday - are offered each fall at a FPCC facility. On-demand study materials are available upon request and a review workshop is also offered in conjunction with these sessions to help aspiring license holders prepare for the exam.

All pesticide exams are valid for a period of three years.

Besides offering the review class and testing, the Forest Preserves provides manuals and practice workbooks to assist in exam preparation.

Renewal Process

The certification is valid for 3 years. Testing is required every three years. All pesticide licenses expire on December 31st of the expiring year.

Notices for testing will be sent by Volunteer Resources in early November. The Forest Preserves pays for the licenses but not any late fees or duplicate license fees. All paperwork must go through the Forest Preserves for processing. The license application forms must be completed and returned to Volunteer Resources. The process has many steps and often takes several weeks to accomplish.

To view your license online please visit:
https://www2.illinois.gov/sites/agr/Pesticides/Pages/Pesticide-Licensee-Results.aspx

INPC Indemnification Form

Volunteers are also required to fill out an Illinois Nature Preserve Commission (INPC) indemnification waiver each year. For those who test at an FPCC-sponsored exam session, the INPC waiver can be completed on the day of testing. For all others, the form will be sent out by FPCC with the application.

OTHER MANAGEMENT METHODS

Fire is essential to the diversity and maintenance of natural communities of Cook County; it helps restore soil fertility through nutrient cycling, increases light availability to promote understory growth, helps control some aggressive species, and enhances some native seed germination. Federal and state agencies, accredited colleges and universities, and the Chicago Wilderness consortium endorse prescribed burning as a vital ecological management tool. The Forest Preserves safely conducts controlled burns in urban and suburban areas by adhering to established guidelines and policies. Section VII, Part A of the Land Management Guidelines covers our policy on prescribed (controlled) burning.

Prescribed Fire at FPCC

FPCC staff and contractors conduct prescribed fire in spring and fall. The fire return interval and seasonal considerations per site are covered in the management schedule. Spring burning is dependent on the rate of snowmelt, the timing of emergence of plants, reptiles, amphibians, insects, and mammals. Fall burning is more dependent on fuel moisture and precipitation.

Site Stewards submit burn requests to the regional ecologist who collaborates with the Site Steward to refine the request, before submission to Resource Management. Due to proximity to roads, homes and other development, certain sites may have very specific fire requirements including specified wind directions and fuel conditions. Weather, location, fuels, and crew size all determine burn feasibility. All burn schedules and prioritization is subject to change.

Biological Controls

Animals, fungi, and pathogens can be used as control mechanisms for invasive plant populations. Control organisms usually come from the native range of the target species and require a period of study to ensure that they will remain specific to the target population. Biological control typically does not eliminate the invasive species. However, biological control has been effective for some species. For example, the Galerucella beetle has been used with some success to control the European perennial purple loosestrife (*Lythrum salicaria*).

ADMINISTRATIVE

Tool/Supply and Herbicide Ordering

Volunteer Resources provides and loans most of the tools and all the herbicides needed to run successful workdays. Supplies are delivered to various Forest Preserves sites across the county. The catalog of available tools can be found on the resources section of the fpdcc.com/volunteer. The Volunteer Supply Order link, Herbicide Order Form, and the Supply Loaner link can also be found in the resources section of the website.

Ordering Procedure

- Site Stewards download the most up to date copy of the *order form or use the online link* available on the resources page at http://fpdcc.com/volunteer/resources/#supplies
- Complete the fields in the top portion of the supply order form: name, email/phone, site, and need by date, and delivery location (options are identified in the Facilities Directions and Hours).
- Select the items needed.
- Submit or send completed order form and any questions to Volunteer.fpd@cookcountyil.gov.

Delivery Procedure Volunteer Resources can deliver requested items to one of twenty different FPCC facilities located around the county. Drop-off site options are on the *Facilities Directions and Hours* overview.

Pick-up Another option is for the volunteer to come to the VRC to pick up the items. All items to be picked up will be waiting for them in the VRC office on the first floor.

Deliveries are typically conducted each Thursday and Friday. To ensure timely delivery of your items, please submit your supply order form no later than one week prior to their intended use.

Herbicide ordering Procedures for ordering herbicide are the same as the tool/supply order procedure outlined above, except that a different form is used and it must show the license number of the Applicator.

Loaner Tool Requests

Stewardship groups and FPCC facilities typically have enough supplies for most projects and workdays. However, for larger projects or workdays, Stewardship groups may need additional tools. Volunteer Resources loans out tools for these purposes. The order and delivery process is the same as tools, supplies, and herbicides except for that arrangement for the pickup of the items must be defined.

Given that loaner items are used for short periods, it is imperative that loaner items be returned to Volunteer Resources by the agreed upon return date, typically 1-5 days after the workday.

STEWARDSHIP DAY CONSIDERATIONS

Before and After the Stewardship Day

Determining the flow of the workday is the responsibility of the Stewardship Leader and must consider the volunteers attending, the other leaders available and the site conditions.

- **Chainsaws** sawing before or after a workday or at a distance from the main group may allow for a more enjoyable (quieter) or safer workday especially if there are a lot of youth or new volunteers present. Non chainsaw certified volunteers are not permitted to enter the chainsaw worksite.
- **Burning** brush is the most efficient way to dispose of it, and many volunteers enjoy this activity. . Some things to consider, is anyone sensitive to smoke? Are volunteers appropriately dressed? If yes, then ask the volunteers to keep a safe distance from the brush pile burn, or assign them a different stewardship activity with another stewardship leader.
- **Herbiciding** is applied with a licensed herbicider and required to prevent resprouts. It's best to apply herbicide after volunteers have moved away from the work area so that volunteers are not walking through newly herbicide areas. Mark areas after herbicide application, if working in a very public area.

Flagging and Marking

Flagging plants to be protected or cut and marking plants to be removed is an option to assure that the right plants are being cut.

Flagging desired species or species to be cut with colored ribbon (available from FPCC) is a best practice. The colored ribbon alerts people to avoid cutting a desirable plant or which plant to cut. Make sure people understand what color means what, green and red flagging is often used.

Marking plants to be cut with orange spray paint (available from FPCC) is helpful on workdays when you have mostly inexperienced volunteers. For invasive brush that is tangled with native species, be sure to flag the native, and mark the brush where it needs to be cut.

Working with Youth

While youth can be wonderful volunteers at garlic mustard pulls and buckthorn removal workdays, special considerations for workdays involving youth include:

Tips:

- Explain the purpose of stewardship, the nature of invasive plants, and teach youth how to identify and remove the invasive species
- Emphasize that buckthorn should be cut low and flat (flush cut)
- Communicate and work with chaperones and teachers, and review expectations for the workday prior to the start of the workday

- Teach youth how to identify poison ivy before the start of the workday
- Remember that your primary responsibility is for managing the workday, not managing students in a school group. Managing the school group is the primary responsibility of chaperones and teachers
- Provide youth with safety glasses or goggles (available from FPCC) at brushcutting workdays. Youth are required to wear safety glasses/goggles at brushcutting workdays. Encouraging and modeling safety eyewear at all times is a great way to keep everyone safe
- Remember that not every volunteer needs a tool
- Review tool, fire, and felling rules with youth prior to the start of the workday
- Ground-truth before the workday to identify and mitigate hazards (proximity to the high-usage bike trail, poison ivy, etc.)
- Chainsaws cannot be used near uncertified volunteers, including youth
- Apply herbicide after the youth have left the worksite
- Explain why using herbicide is an important ecological management tool

Managing group size and subgroups

Dividing larger groups into smaller groups is discussed in Group Leadership class. It is important that every volunteer either has good ID skills and good tool skills or is being guided by or has access to another volunteer who has those skills. If you don't have a lot of experienced people, still divide them into small groups of 3 or 4 so that they can challenge each other on ID skills and speak to safety issues of each other.

Tool Management

Each volunteer site has tool storage options. This varies tremendously from site to site. The Stewardship Leaders should work with the Site Steward to determine where the tools are kept, how to access them, the quantity needed, etc.

Bringing extra tools to the site may be difficult. It is best to have enough tools for everyone, if there are not enough tools – you can assign volunteers to help with plant ID, move cut brush to the brush pile, etc. Three people can work together easily with one lopper, one bowsaw, and one person to drag the brush to the brush pile.

To assure that tools are not lost during the workday, you should have a system in place to make sure all tools are accounted for. Counting, numbering or naming the tools (Alfred, Bertha, Clarence, etc.) and then checking your inventory before you leave the site is suggested.

Group Safety

Stewardship days, if organized, are safe, positive and minimize risk. If it is unorganized, the risks increase and a workday can become hazardous. The Stewardship Leaders should maintain a continual awareness of what is going on and adjust the tasks as needed to assure safety. Particularly on workdays with inexperienced volunteers, leaders need to be walking around the work site, supporting the volunteers and observing the weather and team dynamics.

ENGAGING THE PUBLIC

Visitors and Preserve User Passersby

Visitors to the preserves are not always familiar with the need to manage natural areas and may object to non-intuitive activities such as cutting trees and applying herbicide. Questions and challenges can be an opportunity for education, although efforts at explanation are not always successful. In those few cases, there are guidelines for how the public may or may not interact during the workday. These rules protect both volunteers and the public.

Education

- If part of the site has been restored, show them the "after" effect of stewardship by asking them to compare how the two areas look
- Inform them about invasive species vs. natives. That invasives have an unfair advantage and what you are doing is just returning the advantage to the natives
- Explain how our ecosystems are fire dependent based on natural fires and Native Americans' historic use of fire. You are substituting mechanical brush removal with what fire would have removed had it been allowed. Plants characteristic of many of our natural ecosystems (including oak trees) require a fair amount of sunlight to grow, and they are being eliminated due to excessive shade levels in most of our wooded areas.
- Explain that a healthy woodland allows people and animals to move through it and see through it which isn't possible with invasive thickets of brush.

Guidelines for interaction with Public with concerns or questions

- Avoid arguing or confronting anyone
- Respectfully let them know that by law, they must keep at least 30 feet away from the worksite
- Also by law, no one can take pictures of any youth under 18 without explicit parental consent
- If individuals continue to interfere with the workday, call FPCC police at 708-771-1001 and ask for their assistance. They are trained
- to deal with these situations.
- If the situation is uncomfortable, take a work break until Police arrive
- If you feel that your safety is being threatened in any way, extinguish the fire, pick up the tools and herbicide and walk away. The safety of the volunteers is most important.

At some sites where we anticipate protestor activity, we can get FPCC Police to monitor the workday and in cases where youth groups are present, they will stay at the workday from start to finish. These are not common or universal experiences, but if they do occur, FPCC wants volunteers to feel safe and protected so please involve us when needed.

Resources & References:

Books
Simonds, Roberta L., and Henrietta H. Tweedie. Wildflowers of the Great Lakes region. Stipes Publishing, 1997

Wilhelm, Gerould and Rericha, Laura. Flora of the Chicago Region: A Floristic and Ecological Synthesis. Indiana Academy of Science, 2017

Young, Dick. Kane County Wild Plants and Natural Areas: Kane County, Illinois. Kane County Environmental Department, 1986

Newcomb, Lawrence. Newcomb's wildflower guide, 1977

Harris, James G., and Melinda Woolf Harris. Plant identification terminology: an illustrated glossary. No. QK9 H37 2001. Spring Lake, Utah: Spring Lake Publishing, 1994

FPCC
Resources https://fpdcc.com/volunteer/volunteer-training-leadership/#documents
Land Management Guidelines (PDF)
Best Management Practices – Cutting, Removing, Treating of Invasive Brush and Trees (PDF)
Seed Source Policy & Guidelines (PDF)
Natural and Cultural Resources Master Plan

Websites
Invasive Plants Fact Sheets & Management Guidelines
http://na.fs.fed.us/fhp/invasive_plants/weeds/
Illinois Invasive Species http://www.invasive.org/illinois/SpeciesofConcern.html

Early Detection and Distribution Mapping System https://www.eddmaps.org/

Center for Invasive Species and Ecosystem Health University of Georgia https://www.bugwood.org/

SPECIES SPECIFIC TREAMENT & ID

European & Glossy Buckthorn

Rhamnus cathartica & frangula

Origin: Introduced during the early 1800s from Europe primarily as an ornamental hedge plant, Buckthorn escaped cultivation and has established throughout the north-central and northeastern United States and the maritime provinces of Canada.

Description: European buckthorn leaves are dark green, smooth, oval, finely toothed and grow opposite or nearly opposite each other on the twigs. Leaves remain dark green late into the fall. When ripe, black fruit on the female trees is about ¼ inch in diameter. There is usually a small spine at the end of each twig. Inner stem/bark is typically orange in color. Glossy buckthorn has shiny leaves which are alternate but may appear almost opposite near branch tips.

Habitat: Can grow nearly anywhere, thriving best in partially shaded areas. European buckthorn inhabits woodlands, savannas, and encroaches on prairies and abandoned fields. Glossy buckthorn prefers moister soils.

Impact on Natural Areas: Buckthorn can form dense thickets and overtake entire forest mid-stories, completely shading out ground flora. Buckthorn can out-compete native shrub and tree seedlings and native flora for rooting space, soil water and nutrients, and light availability. Prairies, savannas and wetlands are also prone in invasion.

Buckthorn emits toxins (allelopathy), which have been found to inhibit seed germination of surrounding species and to leach into water, adversely impacting amphibian life cycles.

Similar Species: *Rhamnus* can be confused with the native Plum (*Prunus americana)* which has no terminal spine and distinctly different fruit but similar bark.

Common Treatments*:

Foliar Spray: Seedlings and small shrubs can be foliar sprayed with 4-8% Vastlan or 5-10% Glyphosate.

Cut-and-Treat: Larger shrubs should be cut and stumps should be left no higher than 2 inches high & treated with 50% Glyphosate or 25% oil based Garlon 4.

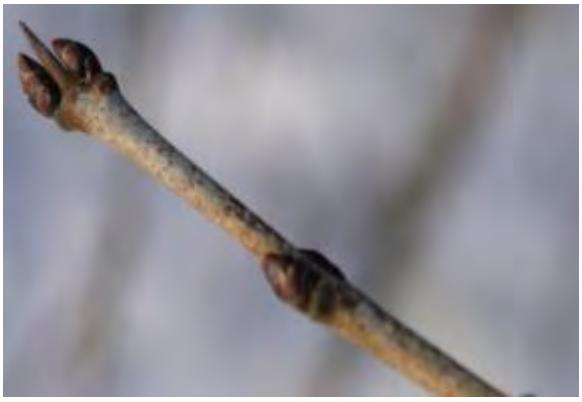
Basal Bark: Using weed wand, paint roller or backpack sprayer, apply 25% oil based Garlon 4 to the base of small stems in a wide band during dormant season. Herbicide should be applied to root crown.

Prescribed Fire: Where ground fuels are sufficient to carry intense fire, seedlings and small diameter stems may be effectively controlled. Mortality rates depend on fire intensity and fuel loads.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Distinct terminal "thorn"

Leaf has arcuate venation & finely toothed



Note the terminal "thorn" during winter ID

Ripe, deep purple/black fruit

Buckthorn's distinct inner orange bark

Multiflora Rose
Rosa multiflora

Origin: Native to regions of East Asia, multiflora rose was introduced to the eastern United States in 1866 as rootstock for ornamental roses. Beginning in the 1930s, the U.S. Soil Conservation Service promoted it for use in erosion control and as "living fences" to confine livestock.

Description: A multi-stemmed shrub, sometimes climbing vine, with arching stems and recurved thorns. Leaves are alternate on stems and divided into 5-11 leaflets (usually 7-9). Each leaflet is broadly oval and toothed along its margin. Clusters of numerous, white flowers, 1.5in. across, blossom in late spring. The fruits are small, firm, red hips that may remain on the plant well into winter.

Habitat: Commonly occurs in successional fields, pastures, and roadsides. It also may occur in woodlands, particularly near disturbances such as tree fall gaps. It tolerates a wide range of soil, moisture and light conditions and is able to invade many habitats.

Impact on Natural Areas: Multiflora rose grows aggressively and produces large numbers of fruits (hips) that are eaten and dispersed by a variety of birds. Dense thickets of multiflora rose exclude most native shrubs and herbs from establishing and may be detrimental to nesting of native birds.

Similar Species: Multiflora Rose can be distinguished from Illinois' native roses by the presence of a feathery or comb-like margin on the narrow stipules found at the base of each leaf stalk. Illinois' native rose species all have stipules at the base of the leaf stalk, but stipules of the native roses do not have feathery margins

Common Treatments*:

Foliar Spray: Seedlings and small shrubs can be foliar sprayed with 3-5% Vastlan or 5-10% Glyphosate.

Cut-and-Treat: Larger bushes should be cut and burned/chipped. Stems should be left no higher than 2 inches & treated with 50% Glyphosate or 25% oil based Garlon 4.

Prescribed Fire: where ground fuels are sufficient to carry intensive fire, seedlings and small diameter stems may be effectively controlled. Mortality rates depend on fire intensity and fuel loads.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

White flower and buds, 1.5in across

Recurved thorns and hairy stipule at the base of the stem

Open growth form in prairie community

Dormant season rose hips

Sharply toothed leaflets, hairy stipule at base of stem

Asian Honeysuckle
Lonicera spp.

Origin: In 1897, the Foreign Seed and Plant Introduction section (USDA) first brought Asian *Lonicera* to America. Native to East Asia, it was widely planted for wildlife cover and soil retention but long ago escaped from plantings and spread into natural areas. Two invasive species include Amur (*L. maackii)* and Tatarian (*L. tatarica*).

Description: Honeysuckle is an erect, multi-stemmed, deciduous shrub that grows from 6-20ft tall and has a shallow root system. It has opposite, simple leaves and often older branches are hollow. Honeysuckle flowers from May to June. The fleshy berries are usually red, rarely yellow, and ripen from June through October. The stems are hollow with stringy tan bark.

Habitat: Honeysuckle has tolerance for a broad range of soil moisture, soil types and light levels. Invasion most often occurs in disturbed or disturbance-dependent forest communities including savannas, upland and riparian forests, and successional stands. Most natural communities including prairies, wetlands and fens are susceptible to invasion.

Impact on Natural Areas: *Lonicera* prevents reestablishment of many native plants, shrubs and tree species by casting a heavy shade and competing for soil nutrients. It leafs out earlier than most natives and retains its leaves late into the fall. Honeysuckle emits toxins (allelopathy), which have been found to inhibit germination of surrounding seeds.

Similar Species: American fly honeysuckle (*L. canadensis*) is very rare and has been reported only from Cook County in Illinois. It has straggling, solid branches that are up to 6.5ft tall. Its yellowish flowers are up to 3/4in. long and occur in pairs.

A native honesysuckle bush in a different genus is *Diervilla lonicera*.

Common Treatments*:

Foliar Spray: Seedlings and small shrubs can be foliar sprayed with 5-10% Glyphosate.

Cut-and-Treat: Larger bushes should be cut with stems left no higher than 2 inches & treated with 50% Glyphosate.

Basal Bark: Not effective.

Prescribed Fire: Where ground fuels are sufficient to carry intensive fire, seedlings and small diameter stems may be controlled. Mortality rates depend on fire intensity. Many plants may be top-killed and require multiple burns for control.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Simple, opposite leaves, green above, paler and slightly fuzzy below

Bright red fruit ripe June – October

Fragrant flowers are tubular with very thin petals and appear in late spring

Open growth

Hollow stem pith

Larger, cut stems with bark pattern

Oriental Bittersweet

Celastrus orbiculatus

Origin: Native to regions of East Asia, Oriental Bittersweet was introduced into the U.S. in the 1860s as an ornamental plant and is often associated with old home sites, from which it has escaped into surrounding natural areas.

Description: Other common names include Chinese bittersweet, Asian bittersweet, Round-leaved bittersweet, and Asiatic bittersweet. Leaves are alternate, 2-4in long and oblong-obovate. Margins are crenate-serrate. Petioles are 0.5-1in long. Stems and branches are round, glabrous and light to dark brown with discernible lenticels. The small greenish flowers occur in a cluster terminating the secondary branches, with terminal flowers blooming first. The green fruit are borne in clusters of 1-3 in July and becomes orange in color in September; opening to reveal the orange-red aril surrounding the seeds.

Habitat: Oriental Bittersweet has a wide range of habitat preferences including a variety of forest types, including undisturbed mesic and dry-mesic forests and is shade tolerant, readily germinating and growing under a closed forest canopy.

Impact on Natural Areas: Oriental bittersweet climbs over and smothers vegetation that may die from excessive shading or breakage. When bittersweet climbs high up on trees the increased weight can lead to uprooting and blow-over during high winds and heavy snowfalls.

Similar Species: The native climbing bittersweet (*C. scandens*) has significantly greater fruit volume and lesser seed number than the invasive. The flowers and fruit of the native are on the tips of branches while on the invasive they are in the axils of leaves.

Common Treatment*:

A combination of cutting/treating vines and foliar follow up on seedlings and resprouts may be an effective treatment option.

Foliar Spray: Extensive patches can be treated with 4-8% Vastlan or 5-10% Glyphosate.

Cut-and-Treat: Larger vines should be cut with stems left no higher than 2 inches & treated with 50% Glyphosate or 25% oil based Garlon 4.

Basal Bark: Using weed wand, paint roller or backpack sprayer, apply 25% oil based Garlon 4 to the base of small stems in a wide band during dormant season.

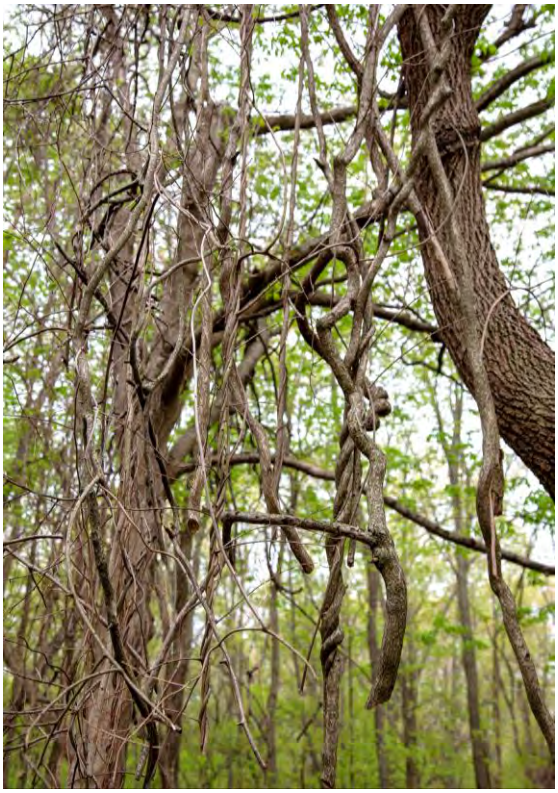
Prescribed Fire: Spring fires have been found to reduce establishment rates of Bittersweet in prairies and woodlands.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Clusters of 1-3 fruits orange in September

Alternate, 2-4in oblong leaves

Yellow fruit capsule and red fruit inside



Dense vines forming in woodland

Vines climbing/wrapping tree

Japanese Barberry

Berberis thunbergii

Origin: Japanese barberry was introduced to the U.S. as an ornamental plant in 1875 in the form of seeds sent from Russia to the Arnold Arboretum in Boston.

Description: This dense, deciduous, spiny shrub that grows 2-8ft high. The branches are brown, deeply grooved, somewhat zig-zag and bear a single spine at each node. The leaves are small (.5-1.5in), oval, green/bluish-green, or dark reddish purple. Flowering occurs from mid-April to May. Pale yellow flowers about ¼in across hang in umbrella-shaped clusters of 2-4 flowers each along the length of the stem. The fruits are bright red berries about 1/3in long that are borne on narrow stalks.

Habitat: Barberry is shade tolerant, drought resistant, and adaptable to a variety of open and wooded habitats, wetlands and disturbed areas. It prefers to grow in full sun to part shade but will flower and fruit even in heavy shade.

Impact on Natural Areas: Japanese barberry forms dense stands in natural habitats and alters soil pH, nitrogen levels, and biological activity in the soil. Once established, barberry displaces native plants and reduces wildlife habitat and forage.

Similar Species: Japanese barberry may be confused with American barberry (*Berberis canadensis*), but this species is not found in Cook County.

Common Treatment*:

Japanese barberry leafs out very early in the season, thus it is easy to identify and removal efforts should begin in early spring.

Foliar Spray: Bushes can be treated with 5-10% Glyphosate or 4% Vastlan.

Cut-and-Treat: Larger bushes should be cut and stems left no higher than 2 inches & treated with 50% Glyphosate or 25% oil based Garlon 4. Thick gloves should be worn to avoid injury from the many sharp spines.

Basal Bark: Using weed wand, paint roller or backpack sprayer, apply 25% oil based Garlon 4 to the base of small stems in a wide band during dormant season.

Prescribed Fire: Barberry is very susceptible to prescribed fire. Treating top-killed resprouts is an effective control strategy.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Bright red fruit and prominent thorns

Small, oval leaves

Pale flowers, umbrella shaped clusters of 2-4

Grooved bark and thorns on nodes

Open growth form in a prairie/wetland

Garlic Mustard

Alliaria petiolata

Origin: Native to Europe, garlic mustard was first recorded in the United States around 1868, from Long Island, New York, and was likely introduced by settlers for food and medicinal purposes.

Description: Biennial herb with a 2-year generation time. Seeds germinate in early spring, usually before April. First year plants develop basal rosettes by early summer and overwinter in the rosette stage. Second year plants bolt and bloom the following year. Flowering usually occurs in April or May. Crushed leaves will smell of garlic. The flowering stalks can reach heights between 6in–3ft. The leaves are triangular, 1–6in broad and long, have a sharp point and are coarsely toothed. The inflorescence is terminal but flowers can also occur in the leaf axils. The white flowers are small, .25in., have four petals and six stamens.

Habitat: Garlic Mustard prefers moist, shaded areas but occupies a wide variety of habitats including upland and floodplain forests, savannas, wet meadows, pastures, and edges of trails. Garlic Mustard responds positively to soil disturbance.

Impact on Natural Areas: Garlic Mustard has displaced spring flora in vast areas of our woodlands and savannas. Garlic mustard has been found to emit toxins which harm larvae of the native butterflies and also negatively impact fungi which inhibit germination of native tree species.

Similar Species: Blooming at the same time as garlic mustard are Toothwort (*Dentaria laciniata*), 4-petaled white flowers and seedpods and purple cress (*Iodanthus pinnatificus*), 4-petaled flowers (pale violet) and leaves somewhat similar to Garlic Mustard. Smooth bank cress (*Arabis laevigata*) is another common like-alike but unlike garlic mustard with up-curved seed pods, smooth bank cress seed pods curve downward.

Common Treatments:*

Manual/Cutting: Before seed pods form, plants can be pulled and left in the field with roots up-turned to prevent re-rooting. Once seed pods form, plants should be bagged and removed from site or dumped in an on-site compost pile or burn scar. Take care to minimize soil disturbance and trampling of spring flora.

Foliar Spray: Garlic Mustard is biennial. If you have large populations of 1st year plants and there will be little/no collateral damage, an option is to foliar spray with 1.25% Vastlan or 2% Glyphosate. There will be over wintering mortality of 1st year plants so mechanical removal of 2nd year flowering and seed producing plants should be the priority. Second year plants can also be foliar sprayed prior to flowering.

Prescribed Fire: Garlic Mustard can be susceptible to prescribed fire, especially after bolting and flowering. Control can be effective after successive fires.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Triangular, coarsely toothed, broad leaves

1st year basal rosette

Terminal, white flowers with 4 petals

Seed pods before seed burst

Dense cover of 1st year basal rosettes

Cutleaf/Common Teasel

Dipsacus laciniatus/D. sylvestris

Origin: Originally from Europe and northern Africa, common teasel was first introduced to North America in the 1700's and has since spread from coast to coast.

Description: Although usually described as a biennial, teasel is perhaps more appropriately described as a monocarpic (plant that bears fruit once and dies) perennial. Flowering plants have large, oblong, opposite, sessile leaves that form cups and are prickly, especially on the lower midrib. Stems also are prickly. Teasel's unique inflorescence makes the plant readily identifiable when blooming. Flowers are small and packed into dense oval heads. Cut-leaf usually has white flowers, while Common has purple flowers. Leaves of cut-leaf teasel are irregularly lobed and those of common teasel have smooth margins.

Habitat: Teasel grows in open sunny habitats, ranging from wet to dry conditions. Teasel sometimes occurs in high quality prairies, savannas, and sedge meadows, though roadsides and heavily disturbed areas are the most common habitats.

Impact on Natural Areas: Teasel can create large, dense stands and is a highly competitive plant in open, grassy habitats. Teasel is common in roadsides and other highly disturbed areas. It can also invade prairies and out complete native grassland species.

Similar Species: Prior to flowering, teasel can be confused with compass plant (*Silphium laciniatum*) or cup plant (*Silphium perfoliatum*). Teasel and compass plant have dissected leaves; however, compass plant has alternate leaves that are rough, but not prickly. Teasel and cup plant both have opposite, sessile leaves that form a cup and can hold water, but cup plant leaves lack prickles.

Common Treatments*:

Timing of treatment is critical for this species. Early spring should focus on chemical treatment of rosettes while late season efforts should focus on seed head removal

Manual/Cutting: Clipping heads too early in flowering stage can cause the plant to re-flower. Maturing seed heads can be clipped, bagged, and disposed of. Avoid spreading and dispersing seeds once plant is in seed-stage. Thick leather gloves should be worn in order to avoid the sharp spines on the stem and flower/seed head.

Foliar Spray: Non-bolted basal rosettes can be effectively controlled by foliar spray with 0.25% Milestone at rosette, flowering, or bolting stage or 2% Glyphosate may be applied only at rosette stage. Early spring treatment limits damage to surrounding plants and teasel rosettes are easily identified.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Common Teasel: Sessile leaves that form water holding "cup"

Cut-leaved Teasel: irregularly lobed forming a "cup"

1st year basal rosette

Sharp spines stem and seed heads, and multiple inflorescences

Yellow/White Sweet Clover

Melilotus officinalis/alba

Origin: Sweet clover was brought to North America as early as 1664 as a forage crop. Since then, it has spread from cultivation and thrives in waste places and roadsides. White sweet clover is found in every state in the United States and all but 2 Canadian provinces.

Description: Sweet Clovers usually grow as biennials, putting their energy into root development during the first growing season and into flower and seed production the second season. The stems are highly branched and up to 5ft tall. Leaves are alternate, divided into three finely toothed leaflets, middle leaflet grows on a short stalk. The leaflets are oblong, 1.5-2in long with entire margins except for small teeth at the tip. The small, pea-like, white or yellow flowers are .25in. long and densely crowded on a 4in spike. Each spike may have 40-120 flowers arranged in one-sided racemes. Generally yellow sweet clover flowers 1 to 3 weeks earlier than white sweet clover.

Habitat: Sweet clovers are adapted to a variety of conditions and habitats and often increase following disturbances including burning and brush removal. It grows well in direct sunlight, but is intolerant of full shade. Open natural communities including prairies, savannas, and meadows are most susceptible to sweet clover invasion.

Impact on Natural Areas: Sweet clover invades and degrades native grasslands by overtopping and shading native sun-loving plants thereby reducing diversity.

Similar Species: True clovers (*Trifolium spp.)* lack a tap root and have flowers in round, hemispherical, or cylindrical heads, head-like racemes or umbels. Sweet Clovers may be confused with Purple Prairie Clover and White Prairie Clover.

Common Treatments*:

Manual/cutting: In wetter soils or after rain events, 2nd year plants can be easily hand pulled. If late flowers or seeds are present, plants should be removed from the site or piled in a single spot. Dense stands of 2nd year sweet clover can be scythed, brush cut or mowed at any time, provided that the plant is cut beneath the lowest live leaf.

Foliar Spray: Hand pulling or brushcut preferred.

Prescribed Fire: Sweet Clovers respond positively to disturbances, including autumn fire, which stimulates seed germination. Anticipate an increase in Sweet Clover populations after prescribed fires.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

White Sweet Clover - Small, pea-like flowers, crowded on spiked, one sided raceme

Yellow Sweet Clover Branched growth form

Oblong leaflets

White Sweet Clover - Ribbed, fibrous stalk

NATIVE white prairie clover (*Dalea candida*) with similar leaves. Flower heads are distinctly different.

Purple Loosestrife
Lythrum salicaria

Origin: It was introduced into the east coast of North America in the 1800s. First spreading along roads, canals, and drainage ditches, then later distributed as an ornamental, this exotic plant is in 40 states and all Canadian border provinces.

Description: This perennial grows from 3-8ft tall, with an average height of 5ft. It has stiff, 4-sided stems that may appear woody at the base of large plants and may be pubescent especially in the upper portion. The leaves are lance-shaped, 1-4in long, opposite or in whorls of three, sessile and lack teeth. The rose-purple flowers have 5 or 6 purple petals and 8 stamens. The most notable characteristic of purple loosestrife is the showy terminal spike of flowers it displays from early July to September.

Habitat: Occurs widely in wet habitats, such as marshes, bogs, fens, sedge meadows and wet prairies, but it also occurs in roadside ditches, abandoned fields, and along the banks of streams, rivers and ponds.

Impact on Natural Areas: Purple loosestrife invades marshes and lakeshores, replacing cattails and other wetland plants. This species can form dense, impenetrable stands that are unsuitable as cover, food, or nesting sites for a wide range of native wetland animals.

Similar Species: Winged loosestrife (*L. alatum*) is smaller with a 4-angled, slightly winged stem and grows in moist, open areas, most commonly occurring in prairies. Purple loosestrife has dense terminal flowers while the native flowers are along the stem/axis. The leaves of the invasive are larger and generally opposite (almost perfoliate) while the native leaves are smaller and alternate. Swamp milkweed (*Asclepias incarnata*) has similar leaves but distinctly different flowers.

Common Treatments*:

Manual/Cutting: In wetter soils or after rain events, plants can be hand pulled but care should be taken to limit soil disturbance. However, removal of the entire root is needed since the plant spreads vegetatively. Loosestrife is an extremely prolific seed producer (>2 million per plant annually). Any flowers should be cut, placed in a sturdy bag and removed from the site.

Foliar Spray: Loosestrife is easily identified in mid-summer through early fall and herbicides are most effective at this time. Plants should be sprayed with 3% Glyphosate or 1.25% Vastlan. However, treatment should start as soon as plants can be positively identified and there should be aggressive follow up and monitoring.

Biological Control: There are 4 species of insect known to be effective biological controls including two leaf-feeding beetles, one root-boring weevil and one flower-feeding weevil.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Purple loosestrife – full growth form near standing water

Purple loosestrife - Lance-shaped leaves, opposite on a square stem, sessile and lack teeth

Purple loosestrife - 5-6 purple petals and 8 stamens

NATIVE: Swamp milkweed (*Asclepias incarnata*) veins form acute angles at midrib

NATIVE: Monkey Flower (*Mimulus ringens*) has toothed leaves unlike the invasive with smooth

Lesser Celandine

Ficaria verna

Origin: Native to Europe and Northern Africa, Lesser Celandine (aka fig buttercup) was introduced to the United States as an ornamental plant. It is still available commercially in the U.S. along with many colorful varieties.

Description: Plants consist of a basal rosette of tender, succulent, dark green, shiny, stalked kidney- to heart-shaped leaves. Flowers are symmetrical, bright buttery yellow with a slightly darker center, have 8 (typical) to 12 petals, and are borne singly on delicate stalks that rise above the leaves. Tiny cream colored bulblets are produced in stem axils and become apparent later in the flowering period. Abundant fingerlike tubers are produced by the roots and are easily visible when plants are pulled up. When in bloom, large infestations of lesser celandine appear as a green carpet with yellow dots.

Habitat: This species thrives in moist alluvial soils in forested floodplains. It also invades meadows, roadsides, and less frequently open woodlands.

Impact on Natural Areas: Lesser celandine is a vigorous growing plant that forms large, dense patches in floodplain forests and some upland sites, displacing many native plant species, especially those with the similar spring-flowering life cycle. Because it emerges well in advance of natives, it has a developmental advantage that allows it to establish and overtake areas rapidly.

Similar Species: Marsh marigold (*Caltha palustris*) is native to marshes, wet meadows and stream margins. Marsh marigold does not produce tubers or bulblets, has only 5 petals and does not form a continuous carpet of growth. Swamp Buttercup (*Ranunculus septentrionalis*) grows together with Celandine. Swamp buttercup has deeply divided leaves while Celandine has spade-shaped leaves.

Common Treatments*:

Due to its short life cycle, the window for controlling Celandine is very short. It can be accomplished with persistence using methods that are appropriate for the site and size of infestation. Satellite and outlier populations should be treated first before treatment of monoculture areas.

Foliar Spray: The use of systemic herbicide is most effective because it kills the entire plant including the roots and minimizes soil disturbance. Effective treatment includes 4% Glyphosate applied early in the season, after snow melt but before other plants emerge, before and during flowering stage.

Manual/Cutting: An important consideration when manually removing Celandine is limiting disturbance to the soil which can actually encourage the target invasive as well provide openings for invasion by other exotic species. For this reason, manual and mechanical removal should be only used for very small and single outlier populations.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Lesser Celandine - invasive

Lesser Celandine - Kidney/heart shaped leaf

Lesser Celandine – distinct tubers mechanically removed

Lesser Celandine - 8 petals, symmetrical flower

NATIVE: Marsh Marigold – 5-petals

NATIVE: Swamp Buttercup with 5 petals and are deeply cleft leaves

Common Reed
Phragmites australis

Origin: Introduced *Phragmites* is thought to have arrived in North America accidentally, most likely in ballast material in the late 18th or early 19th centuries. It established itself along the Atlantic coast and over the course of the 20th century, spread across the continent.

Description: The stems are erect, smooth, rigid, tough, hollow and 6–13 feet tall. The leaves are alternate, flat, smooth, 10–20 inches long, up to 2 inches wide at the base, tapering to a point at the apex. Leaf bases form overlapping, smooth sheaths around the stems. Ligules are 1/16 to 1/8in. The inflorescence is a terminal, purplish-brown panicle that becomes open and feathery at maturity.

Habitat: Occurs along stream banks, ditches, ponds, lake edges, sloughs, wetlands, and marshes. Although common reed can occur in pristine areas, habitat manipulations and disturbances are thought to favor this species as it preferentially colonizes depauperate areas in wetlands that result from disturbances.

Impact on Natural Areas: Once *Phragmites* invades a site it quickly can take over a marsh community, crowding out native plants, changing marsh hydrology, altering wildlife habitat, and increasing fire potential.

Similar Species: There are few wetland grasses to confuse this species with due to the width of leaves and height of plants. A native subspecies (*P. australis americanus*) occurs in Cook County. The native grows less vigorously and the stem may be dark red at nodes and internodes.

Common Treatments*:
Areas with large, established populations of Phragmites are best managed using herbicides in combination with mowing and prescribed burning.

Foliar Spray: Plants can be foliar sprayed with 3% Glyphosate.

Hand Wicking
In areas with small populations, hand wicking with 3% Glyphosate can be effective.

If a population can be controlled soon after it has established chances of success are much higher because the below-ground rhizome network will not be as extensive. Herbicides are most effective during flowering either as a cut stump treatment or as a foliar spray. It is often necessary to do repeated treatments for several years to prevent any surviving rhizomes from resprouting.

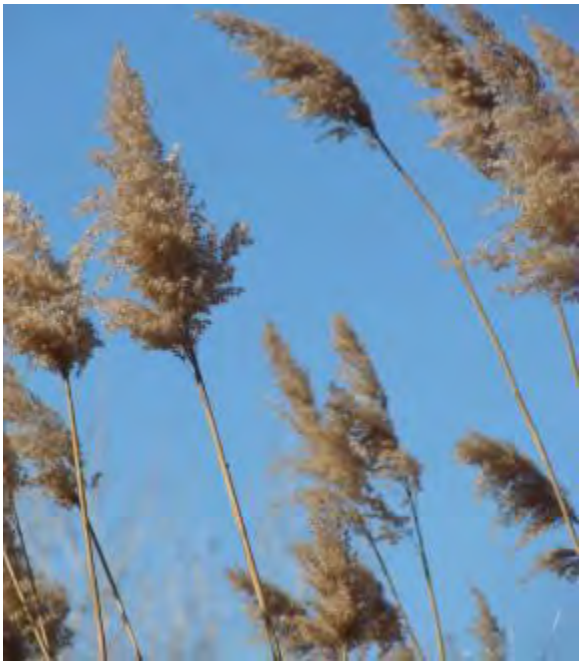
Prescribed Fire: Prescribed burning after the plant has flowered, in combination with herbicide treatment, may also be effective. Burning after herbicide treatment also reduces standing dead stem and litter biomass which may help to encourage germination of native plants in the following growing season.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Dense growth form, up to 13ft tall

Broad 2in. wide leaves, 10-20in. long

Purple-brown panicle that feathers out at maturity/seed set



Feathery seed heads, visible the next season

Reed Canary Grass
Phalaris arundinacea

Origin: While possibly native to North America, European cultivars have been widely introduced for use as hay and forage on the continent; there are no easy traits known for differentiating between the native plants and European cultivars.

Description: This large, coarse grass has erect, hairless stems, usually from 2-6 feet tall. The ligule is prominent and membranous, 1/4-inch-long and rounded at the apex. The gradually tapering leaf blades are 3-9in long, up to 1in wide, flat, and often harsh on both surfaces. Single flowers occur in dense clusters in May to mid-June. Inflorescences are green or slightly purple at first then become tan. Leaves generally have a blue/green color. Often just referred to as RCG.

Habitat: This species occurs in wetlands, including marshes and forested wetlands, wet to mesic prairies, wet meadows, fens, swales, and stream banks. Stream banks, ditches, and waterways often serve as seed dispersal corridors. It is still being widely used in Illinois for wastewater disposal wetlands, erosion control, and forage.

Impact on Natural Areas: Reed canary grass forms dense, highly productive single species stands that pose a major threat to many wetland ecosystems. The species grows so vigorously that it is able to inhibit and eliminate competing species.

Similar Species: Blue Joint Grass (*Calamagrostis Canadensis*) & Prairie Cord Grass (*Spartina pectinata*) are two quality native wetland grasses species that may be confused with Reed Canary Grass.

Common Treatments*:

Reed Canary Grass can be treated at any point in the growing season but early season spraying combined with late season treatment can limit negative impacts on non-target species.

Foliar Spray: Intensity herbicide can effectively control Reed Canary with a 2% solution. Because Poast is more selective than broad spectrum herbicides, it can be used effectively in areas of forb and sedge diversity. A second spraying in the fall is recommended for increased control.

Plants can be foliar sprayed with 3% Glyphosate in early spring. Once plants are in flower, inflorescences should be cut, placed in a sturdy bag and removed from the site. Foliar application during the fall is also highly effective.

Prescribed Fire: Early burns will stimulate RCG; timing and frequency of prescribed fire critical. Combinations of mowing, burning and chemical treatment increase control rates.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Prominent papery rounded ligule hairless stem

1in wide, 3-9in long leaves. Color can vary from green to blue-green.

RCG starting to flower

RCG in flower

Callery Pear
Pyrus calleryana

Origin: Native to China and Vietnam. Named for the French Jesuit, Joseph M. Callery, who collected it in China and brought it to the attention of U.S. horticulturists in 1858. A commonly planted ornamental tree species, Callery Pear escaped cultivation and quickly invaded disturbed areas.

Description: Callery Pear is a deciduous tree, with a pyramidal-oval shape that spreads with age. Attains a mature height of 30-50 ft., width 20-35 ft. The leaves are alternate, ovate, 1 ½ to 3 in. long and wide. Leaves are very glossy and dark green, changing to a rich reddish purple in fall. May have thorns. Fruit consists of small, round, brown inedible "pears". Profuse spring flowers are five-petaled, creamy white, each ¾ in. wide in dense corymbs. The flowers have an unpleasant, rotten fish like smell.

Habitat: This species occurs in open, disturbed habitats such as degraded open woodlands, woodland borders, thickets, fence rows, and fallow fields.

Impact on Natural Areas: Callery Pear can spread quickly by seed and vegetative means, often forming dense thickets that outcompete native species. It leafs out earlier than native trees, shading out spring wildflowers.

Similar Species: Serviceberry (*Amelanchier)*, plums (*Prunus*), and crabapples (*Malus*) bloom at approximately the same time as Callery Pears with similar five-petaled whitish flowers. Apple and crabapple flowers have a slightly pink hue. Apple branches are less uniform than the Callery Pear's vertical, symmetrical branching. Native plums have stamens that are longer than the flower petals.

Common Treatments*:

Foliar Spray:
Leaves and green stems can be foliar sprayed with 5-10% Glyphosate or 4-8% Vastlan in mid-late summer and early fall.

Cut-and-Treat: Larger trees should be cut and burned or chipped. Stumps should be left no higher than 2 inches high & treated with 25% oil based Garlon 4.

Basal Bark: Using weed wand, paint roller or backpack sprayer, apply 25% oil based Garlon 4 to the base of small stems in a wide band during dormant season. Herbicide should be applied to root crown if possible.

Prescribed Fire: Burns will kill fruit and first year stems. Older seedlings often survive and have higher rates of epicormic stem growth. Combinations of cutting, burning and chemical treatment may increase control rates.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Pyramidal/oval growth form.

Five creamy white petals, 3/4" wide, in dense corymbs.

Native plums have stamens that are longer than the petals (see threadlike stalks in center of flower).

Apple and crabapple flowers have a slightly pink hue.

Burning Bush

Euonymus alatus

Origin: Burning bush is a shrub native to Asia. It was first introduced to the United States in the 1860's and widely planted as an ornamental.

Description: Burning Bush is a perennial, deciduous woody shrub that may grow to 15 ft. high and wide. Leaves are medium to dark green, 1-3" long with a short petiole. Leaves are opposite to slightly alternate, elliptical to oval, with finely toothed margins. Leaves mature to a bright red in the fall. Small yellow-green 5 petaled flowers bloom in late May. Fruits are small, green in summer and mature to a dark red warty capsule. Green stripes occur along a thick stem, surrounded by very prominent tan to brown corky "wings".

Habitat: This species occurs in habitats such as degraded open woodlands, mature hardwood forests, fence rows, and prairies.

Impact on Natural Areas: Seeds are widely disseminated by wildlife species. May form dense thickets that outcompete native plants.

Similar Species: Burning Bush is not likely to be confused with other species. Eastern Wahoo (*Euonymus atropurpureus*) can be distinguished from Burning Bush by finely pubescent leaves, smooth seed capsules, and 4 reddish purple flower petals.

Common Treatments*:

Foliar Spray:
Leaves and green stems can be foliar sprayed with 5-10% Glyphosate or 4% Vastlan in early spring and late fall. Considered mainly for large infestations.

Cut-and-Treat: Larger shrubs should be cut and burned or chipped. Stumps should be left no higher than 2 inches high & treated with 25% oil based Garlon 4.

Basal Bark: Using weed wand, paint roller or backpack sprayer, apply 25% oil based Garlon 4 to the base of small stems in a wide band throughout the year as long as the ground is not frozen. Herbicide should be applied to root crown if possible.

Prescribed Fire: Burns may only top kill Burning Bush. The root system forms a dense mat just below the soil surface that is difficult to destroy by fire.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Growth form

Opposite to slightly alternate leaves

Burning bush flower

Winged-like structures found on branch

4 lobed purple capsules

Canada Thistle

Cirsium arvense

Origin: Contrary to the common name, Canada Thistle is originally from Eurasia. It is believed to have been introduced to the United States in the 1700's as a contaminant of crop seed.

Description: Canada Thistle is a perennial herbaceous plant that grows 2-5 ft. tall with rhizomatous roots. Stems are pubescent, slender, grooved, and branch only at the top. Leaves are green on both sides, oblong, tapering, sessile, spiny with deep lobes. Rosette leaves are produce the first year and flower stems the second. Light purple or white flowers are in bloom June to September. Seeds are small and attached to a tuft of "hair".

Habitat: Canada Thistle occurs commonly in open disturbed areas such as old fields, weedy meadows and degraded prairies.

Impact on Natural Areas: Canada Thistle forms dense colonies that can be difficult to eradicate. Unlike most Illinois biennial thistles with a taproot, Canada Thistle is a rhizomatous perennial. Seeds may persist up to 20 years.

Similar Species: Canada Thistle can be distinguished from other thistles as it tends to bloom earlier in the year, is shorter with slender stalks, and has small compact flower heads. The native Pasture Thistle (*Cirsium discolor*) has white undersides of its leaves.

Common Treatments*:

For best results, herbicides should be applied when Canada Thistle plants have flower buds, but not fully developed flowers; mid-June to early July, or in the fall after mowing. Applications outside of these timeframes will not be sufficient because the plants will have enough energy to survive and reproduce. Rosettes can also be sprayed prior to bolting.

Foliar Spray:
Leaves can be foliar sprayed with 0.25% Milestone.

Mowing:
Mowing prior to flowering inhibits seed production and long-distance seed dispersal. Mowing is best used when in conjunction with herbicide applications.

Prescribed Fire: Burns can result in an increase of growth initially, but is reported to decrease over time with continued burns. Combinations of mowing, burning and chemical treatment increase control rates.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules.

Flowers

Clumps of Thistle

Ridged stem

Leaves

Birdsfoot Trefoil

Lotus corniculatus

Origin: Birdsfoot trefoil is native to Eurasia and North Africa. It was introduced into the United States for erosion control and livestock forage and is still sold commercially.

Description: Birdsfoot trefoil is a low growing, perennial herbaceous plant, 12-24" tall. Three clover-like leaflets occur on a short stem with two additional leaflets at the base of the stem. Yellow pea-like flowers grow in flat-topped clusters of 3-12, 0.5" long. Flowers are sometimes tinged with red. Blooms most of the summer. Long brown 1 in. seeds pods are produced in clusters, resembling a bird's foot.

Habitat: Birdsfoot Trefoil occurs in disturbed open areas such as pastures, roadsides, wetlands, and degraded grasslands.

Impact on Natural Areas: Birdsfoot Trefoil forms dense mats choking and shading out other vegetation.

Similar Species: Butter-and-Eggs (*Linaria vulgaris*) has alternative leaves and more closely resembles a garden snapdragon. Prairie Trefoil (*Lotus unifoliolatus*) has 3 leaflets per compound leaf and flowers occur individually

Common Treatments*:

For best results, effective herbicides should be applied when Birdsfoot Trefoil is just beginning to flower, typically in June.

Foliar Spray:
Leaves can be foliar sprayed with 0.25% Milestone.

Mowing:
Mowing frequently at a height of less than 2 in. for several years can be effective.

Prescribed Fire: Prescribed burns increase seed germination and promote seedling establishment.

*These treatments, percentages and methodologies are common treatments but are not comprehensive. Always refer to herbicide labels and management schedules

Flower

Clover like leaves

Seed pods

Small infestation

Forest Preserves of Cook County Herbicide Guidelines

Refer to the Forest Preserves of Cook County Herbicide Guidelines document for the most current herbicide guidelines. Only aquatic approved Glyphosate may be used. All Glyphosate supplied by the FPCC is aquatic approved.

Resources & References:

Herbicide Use in Natural Areas – The Nature Conservancy & Illinois Nature Preserves Commission

Illinois Nature Preserves Commission – Management Guidelines
https://www2.illinois.gov/dnr/INPC/Pages/INPCManagementGuidelines.aspx

FPCC Natural and Cultural Resources Master Plan
https://fpdcc.com/downloads/plans/FPCC-Natural-Cultural-Resources-Master-Plan-3-9-15-012219.pdf

Volunteer Resources
https://fpdcc.com/volunteer/

Volunteer Resources' Ecological Stewardship Resources
http://fpdcc.com/volunteer/resources/#ecological-stewardship