Southern Illinois Invasive Species Strike Team
January, 2016 – April, 2017 Report
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Prepared by:

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Executive Summary

The Nature Conservancy, in partnership with the Illinois Department of Natural Resources, and the USDA Forest Service Northeast Area State and Private Forestry Program developed the Southern Illinois Invasive Species Strike Team (ISST) “formally known as the Southern Illinois Exotic Plant Strike Team” to control exotic plants in state parks, state nature preserves and adjacent private lands that serve as pathways onto these properties. This Strike Team is modeled after the very successful National Park Service Exotic Plant Management Team Program, and deploys a highly trained, mobile force of two plant management specialists who assist state parks and preserves, federal land, and adjacent private landowners in controlling invasive, exotic plants. This report covers the results from the seventh and first half of the eighth year of the Strike Team program (January, 2016 – April, 2017) which was initiated in 2008-09.

This program focuses on detection and removal of the invasive plant species and populations which pose the greatest threat to the ecological integrity of the natural areas in the southern Illinois region. Once risk has been identified, the Strike Team also serves as a Rapid Response Team. Applying the Early Detection & Rapid Response approach to invasive species management greatly improves the likelihood that invasions will be addressed successfully while populations are still localized and containable. The Southern Illinois Invasive Species Strike Team has primary responsibility for species identification, containment, eradication, and monitoring.

The Invasive Species Strike Team serves 11 counties (Alexander, Gallatin, Hardin, Jackson, Johnson, Massac, Pope, Pulaski, Saline, Williamson and Union) in southern Illinois. The Strike Team works under the direction of The Nature Conservancy, the United States Forest Service, and the Illinois Department of Natural Resources approved management schedules, Integrated Weed Management Plans, and work plans for natural areas, state parks and preserves. The Nature Conservancy works with US Forest Service and Illinois Department of Natural Resources biologists and the River to River Cooperative Weed Management Area Coordinator to determine priorities for the Strike Team for combating exotic plants that reflect the needs and resources of the parks they serve. Priorities are based on the following factors: severity of threat to high-quality natural areas and rare species; extent of targeted infestation; probability of successful control and potential for restoration; opportunities for public involvement; and park commitment to follow-up monitoring and treatment. The Strike Team conducts and evaluates the removal of exotic species, and take appropriate native species restoration efforts.

The Invasive Species Strike Team worked year-round and treated 14,112.17 acres of different non-native invasive plant species at 51 different natural areas throughout the Southern Illinois region. Treating exotics was the focal point of the Strike Team comprising 40 percent of their time. Comprehensive time and treatment records were taken by the Strike Team and will be used to refine the team’s operations and assess treatment success.
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Introduction

“On a global basis… the two greatest threats to biodiversity are habitat destruction and invasion by exotic species”
- E.O. Wilson

In a 2005 report, the economic costs associated with exotic species in the United States were estimated at over $120 billion/year. (Ecological Economics (52):273-288). In southern Illinois alone, over two dozen species of invasive plants have been marked as priority for removal. Invasive plants change the structure and composition of native ecosystems by contributing to soil erosion, altering the availability of water, changing soil chemistry, and choking out native flora. Because they have no natural enemies, and thus spread rapidly, invasive species diminish biodiversity and pose a threat to rare and unique species while effecting enormous costs on agriculture, forestry, fisheries and other human enterprises.

With funding from USDA Forest Service, Northeastern Area, State and Private Forestry, Forest Health Protection Program, the National Fish and Wildlife Foundation (NFWF) pulling together initiative, the Illinois Department of Natural Resources and cooperation from the River to River CWMA, The Nature Conservancy established a two-person team to work full-time, year-round on monitoring and controlling invasive plants in southern Illinois. NFWF pulling together initiative provides grants to manage invasive species management. These grants are intended to help support the creation of local cooperative weed management partnerships. Major funding for the Pulling Together Initiative is provided by the Bureau of Land Management, U.S. Fish and Wildlife Service, and USDA Forest Service.

In the fall of 2008, the Southern Illinois Invasive Species Strike Team (ISST) began work. The strike team helped control invasive species in nature preserves and natural areas in the southernmost 11 counties of Illinois. Using pesticides, mechanical methods and prescribed fire, the ISST was able to suppress well established infestations as well as prevent future infestations by controlling source populations and implementing best management practices. By responding to early detection events, mitigating the spread of seed and vegetative material, and controlling invasive species in pathways, the ISST decreased the potential spread of invasive plants into natural areas. The Strike Team also assists private landowners with the eradication of Kudzu when treatments are too costly or impractical.

This report reflects the Invasive Species Strike Team’s seventh full year of invasive species treatments. From January 2016 through April 2017, the Strike Team completed treatments at 51 management sites throughout southern Illinois.

The areas surveyed for invasive species as well as the control methods used to treat the exotics in these areas were recorded in detail using ESRI’s Collector App. This information allows populations of invasive plants to be monitored and compared year to year, and helps determine the best methods of control for exotic plants.

The goal of the ISST is to reduce the effect of existing infestations, manage new infestations, and re-establish native plant communities to restore ecosystem functions.
Program Accomplishments

The ISST plays an important role in many aspects of managing the invasive species found in the natural areas of southern Illinois including research, surveying and monitoring, treatment, and prevention.

From January 2016 through April 2017, the ISST surveyed and treated 14,112.17 acres of invasive plants, including 16 species in 51 natural areas. A chart displaying acres treated per individual species can be seen in Appendix E.

<table>
<thead>
<tr>
<th>Treated Method</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemically Treated:</td>
<td>276.27</td>
</tr>
<tr>
<td>Manually Treated:</td>
<td>53.34</td>
</tr>
<tr>
<td>Treated with Prescribed Fire:</td>
<td>13,782.56</td>
</tr>
<tr>
<td>Total Acres Treated:</td>
<td>14,112.17</td>
</tr>
</tbody>
</table>

Constantly evolving, the ISST adopts and develops additional methods and tactics to efficiently control and understand the invasive species of southern Illinois. In the past year, many upgrades to the project took place, from more innovative control tactics, to continuous invasive plant education and research, and a complete upgrade of the strike team’s mapping system. New control tactics implemented include winter reconnaissance during woody treatments that allow for prioritized foliar treatments in the following spring, and an integrated control tactic for herbaceous species, such as garlic mustard, consisting of chemical treatments in the late fall and winter months followed up with extensive manual treatments during seed set as an attempt to eliminate all seed from a given generation. In mid-January, 2015, the team evolved from using The Nature Conservancy’s Weed Information Management System (WIMS) program to ESRI’s Collector App program. This program has facilitated in field data collection and displays management practices implemented by the strike team accurately and efficiently throughout the southern Illinois region.

To ensure the efficiency of control methods, the ISST has taken on site-specific reconnaissance of invasive species. Working with adjoining land owners when possible, they utilize watershed-wide monitoring to determine where to begin control. As the team has evolved their monitoring strategy, control tactics have taken on multi-species treatments when applicable. The foliar treatments of multiflora rose while treating Chinese yam in June, for example, can achieve management goals for two species in one visit.

To aid in regional invasive species botanical knowledge, the ISST collects detailed phenology observations. The data is reported to, and compiled by, Chris Evans, Extension Forestry and Research Specialist for the University of Illinois Extension Forestry Program. The ISST began collecting voucher herbarium specimens of local invasive species in January 2011 for the River to River Cooperative Weed Management Area and continued to do so in 2016 for the Extension Office. These specimens will add to the local knowledge of southern Illinois’ flora. A completed phenology sheet can be seen in Appendix D.

The ISST maintains a constant revision of GIS and mapping technology. With the help of TNC and IDNR staff, the ISST updates mapping equipment with the latest version of ArcMap, ArcPad, Collector, land ownership data and aerial imagery. Currently, we utilize ArcMap 10.3.1 on our laptops and use ESRI’s online base map selection for field use. The team uses their IPhones and IPADs when collecting data via ESRI’s Collector App in the field. The free app was downloaded in mid-January 2015 from the online app store and is able to collect streaming data by using our smartphones internal GPS receivers, eliminating the need for a data plan.
The required accuracy was set to 5 meters and the streaming interval to 5 seconds during infield data collection throughout the 2015, 2016, and 2017 field seasons.

Research

To effectively treat invasive species, the ISST works with IDNR District Natural Heritage biologists, USFS botanists, and the River to River CWMA to plan treatment methods for each infestation. This information, combined with a detailed description of each site (e.g. GPS coordinates, area sensitivity, landowner information, etc.), was compiled into a work order for each site. The Strike Team then used these work orders to prioritize and plan treatments. ISST led research includes simple observational studies completed on a site by site basis to improve understanding of control tactics and chemical effectiveness on different species. Beginning in the spring of 2016, the ISST began collecting local phenology observations of exotic, nonnative species. These observations, along with those recorded by local partners, are compiled by the University of Illinois Extension Forestry Program into a southern Illinois-specific phenology report then shared with local partners for future prioritized treatment.

Surveying and Monitoring

The ISST surveys natural areas to find and document both new and known infestations. These mapped areas were either treated same-day, or were scheduled for later treatment when specific control would be most effective based on plant phenology. The ISST works with landowners adjacent to, and upstream of, a specific natural area to complete a watershed-wide monitoring effort. This tactic ensures greater treatment efficiency, thus lowering overall treatment costs.

To document and monitor the areas surveyed and treated, the ISST employed the Collector App for Arc GIS, created by ESRI. The Collector App allows the user to map occurrence points (corresponding to a specific weed infestation), as well as polygons (denoting the area of each infestation) using our smartphones internal GPS receiver.

This data was overlain on NAIP 2010 aerial imagery to create color maps of the infestations and treatment areas. Such compositions are useful when planning for future treatments, determining changes in size and density of infestations, and identifying possible sources of contamination (such as waterways or neighboring lands). This allowed the ISST to monitor their progress over time. Additionally, Collector was used to record area treated, site ownership, date, herbicide type, rate, and amount used for each treatment, specie treated, phenology of specific specie, treatment type (chemical, mechanical, Rx fire, reconnaissance, or occurrence), time spent during each treatment, and additional notes on population all entered via drop down menus created in ArcCatalog 10.3.1 to facilitate infield data collection. Such information is essential to determining the best control methods.
Treatment Methods and Prevention

Treatment, or control, of invasive plants was the focal point of the ISST. By implementing mechanical and chemical treatment techniques as well as prescribed fire the ISST treated 14,112.17 acres from January 2016 through April 2017. Tables illustrating treatment activities by species can be seen in Appendix E. Our official total acres treated is represented by the Collector report separating chemical treatments, mechanical treatments, and prescribed fire treatments. No maps for kudzu treatments on privately owned land are included in this report. These landowners have kudzu management agreements with the Illinois Department of Natural Resources. By treating near and along high-use areas such as campgrounds, trails and roads, the ISST helps to prevent the spread of seed to new areas. Controlling infestations along stream corridors and drainages helped prevent spread downstream to sensitive areas.

In addition to treating invasive species, the ISST developed a system to clean equipment to prevent the spread of invasive species. Boots and clothing were cleaned on site using a site boot brush station or vacuum. The truck and ATVs were washed on-site and vacuumed to prevent seeds from being transferred from one site to the next.

The ISST employs an integrated approach for the control of exotic species including chemical, mechanical, manual, and prescribed fire treatments. With the guidance of IDNR Heritage Biologists, USFS botanists, and the River to River CWMA, the ISST determine the most efficient and effective combination of techniques to achieve desired control. Most invasive plant species require a combination of treatment methods, and the ISST utilizes time-tested control tactics integrated together to achieve desired control. Following are examples of control tactics and equipment that the ISST utilizes to achieve management goals.

Chemical Treatments:

- **Foliar**- Backpack sprayers, slide-in ATV pumps, truck-mounted pump.

- **Basal bark**- backpack sprayers, hand-pump sprayers

![Treatment Tools and Safety Precautions](Image1.png)

![Foliar Application on Garlic Mustard](Image2.png)
• **Cut stem**- backpack sprayers-hand-pump sprayers, herbicide wands.

**Mechanical Treatments:**

• **Cut stem**- chainsaw, brushcutter, hand loppers, bush hog mower.
• *follow-up with chemical treatment

**Manual Treatments:**

• **Hand pulling** and bagging, seed head removal and bagging.

**Cooperation and Collaboration**

To increase the effectiveness of the ISST, cooperation and coordination between partnering agencies and private landowners was essential. While the ISST is employed by The Nature Conservancy, funding comes from the Illinois Department of Natural Resources (IDNR), the United States Fish and Wildlife Service (FWS), the United States Forest Service (USFS), and the Shawnee RC&D. Additionally, the River to River Cooperative Weed Management Area (CWMA), local IDNR Natural Heritage Biologists, and local USFS Botanists provided guidance and specific control advice throughout the year. Through inter-agency cooperation, the ISST was able to acquire all the equipment and knowledge necessary for chemical and prescribed fire treatments, as well as the resources to collect and manage infestation data. Working with private landowners in areas adjoining state-dedicated natural areas, the ISST helped prevent the spread of exotics in ecologically sensitive areas.
The following are examples that demonstrate collaborative work that the Strike Team participated in this past year:

- **U.S. Fish and Wildlife Service** – Working with the FWS the ISST assisted with the chemical treatments of Japanese stiltgrass at Rocky Bluff Trail and phragmites growing along the northeastern corner of Devils Kitchen Lake within Crab Orchard National Wildlife Refuge. The ISST also helped implement ten prescribed burns on the refuge totaling 488.66 acres.

- **Champaign County Forest Preserve** – In February, the team joined the Champaign County Forest Preserve District staff in Mahomet, IL, in order to present information regarding the use of ArcGIS and the ESRI Collector App in the management of invasive species. In mid-January of 2015, the team transferred from The Nature Conservancy’s Weed Information Management Systems (WIMS) and began using ESRI’s Collector App in the field to collect treatment data. The team set up the Forest Preserve geodatabase and Collector information based off of species, chemical, control methods, etc. taking place in the Urbana, IL area.

- **Pyramid State Park** – Working with IDNR staff, the Strike Team traveled to Perry County to assist with two large grassland burns. The objectives were to diminish woody shrubs, such as autumn olive and bush honeysuckle, within the grassland compartments and promote regeneration of thick grassland cover for wildlife, specifically ground nesting birds.

- **Headwaters Invasive Plant Partnership** – In February, the ISST was asked to travel up to Urbana, Illinois to present on the Strike Team Model at the Urbana Park District Planning and Operations Office. The team presented on the Strike Team Model, sharing the framework and motives of the very successful Southern Illinois Invasive Species Strike Team.
• **Trail of Tears State Forest Honeysuckle Roundup** – The ISST, The Nature Conservancy’s Interagency Fuels Crew, River to River CWMA, IDNR, Shawnee RC&D, and other partners held an interagency woody invasive control work day and pot-luck lunch at the forest in December of 2016. The event required the participation of many individuals from different agencies who collaboratively worked in six different infested areas that totaled 121 acres.

![Crew taking a lunch break at Trail of Tears State Forest](image1)

• **Japanese Chaff Flower and Sesbania at Cypress Creek National Wildlife Refuge** – The ISST was contacted by an IDNR Heritage Biologist to address two rather large infestations of Japanese chaff flower south of the Cache River in 2015. While continuing treatment in 2016, the team was asked by a refuge biologist to treat an infestation of Sesbania in a moist soil unit on the refuge.

![Japanese chaff flower before treatment](image2)

• **Illinois Prescribed Fire Council** - The Strike Team traveled to Champaign in February to attend the Fire Symposium and collaborate with partners on control methods taking place throughout the state of Illinois via prescribed fire. The symposium was very enlightening and beneficial to the development of the Strike Team program, in that the learning of new control techniques based off of detailed data, can then be implemented in the control of invasive exotic plant species in Southern Illinois by the Strike Team and local partners.

• **Illinois Native Plant Society Presentation** – In March of 2016, the team was asked to speak at a Native Plant Society gathering and covered topics such as early detection and rapid response (EDRR), GIS mapping, and plant phenology while highlighting their
work throughout the Shawnee National Forest. They presented on their successful model and gave the group an update on their current and upcoming invasive species work throughout the area. After the presentation, they answered questions and provided insight from their past experiences in the field.

**Private Land Rx Fires** – The Strike Team installed fire line and helped burn two private landowners’ woodland properties during the 2016 field season. Both properties were adjacent to natural areas and required partner support to aid in ecological restoration efforts.

**Shawnee National Forest Wilderness Area Inventory** – During the summer of 2016, the Strike Team acted as crew leaders for a Forest Service and Chicago based Green Corp project, aimed at inventorying Garden of the Gods and Panther Den Wilderness Areas for invasive plant species. The ISST provided the mapping and recording technology via Collector and shared local botany skills with the crew.

**Cadaver Botany Hike** – In January of 2016, the ISST attended cadaver botany identification hike hosted by the Illinois Native Plant Society at Trail of Tears State Forest. The workshop covered aspects of both native and nonnative plant identification in the dormant season that aid the Strike Team in identifying and understanding the ecology of southern Illinois in all stages of growth.

**Invasive Plant Phenology Report** – Throughout the past two field seasons, the ISST has been recording phenology notes on invasive plants species in the area and submitting them to the University of Illinois Extension Forestry Program. They are then compiled into a monthly report by Chris Evans, Extension Forester and Research Specialist, and shared with local partners. The reports are created and shared to finetune invasive plant species growing patterns, characteristics, and reproduction processes to allow for prioritized treatment in the future.
• **Interagency Fuels Crew** – In the late summer of 2016, Nathan Speagle and Hugo Goulet-Papazian were hired as members of the Interagency Fuels Crew. Toby Warren, the third and final member, was hired in the early winter of 2017. The collaboration is one between The Nature Conservancy, the United States Forest Service, and the Illinois Department of Natural Resources. The Strike Team and Interagency crew work often together; installing fire line, assisting with prescribed burns, and treating invasive species throughout the Shawnee National Forest.

• **Forest Restoration Support Team (FRST)** – The Strike Team joined the Forest Restoration Support Team at Fern Rocks Nature Preserve in the late winter of 2016 for a woody invasive work day. The teams and volunteers used cut-stump and basal bark methods to control invasive species encroaching the unique nature preserve at Giant City State Park.

• **Trail of Tears State Forest TSI** – The Strike Team has assisted the Interagency Fuels Crew with the IDNR Timber Stand Improvement project at the state forest. The project is aimed at selectively thinning shade tolerant tree species and regenerate favorable conditions for the more merchantable oak-hickory species to grow.

• **11th Annual Illinois Forestry Association & Society of American Foresters Meeting** – In the fall of 2016, the Strike Team attended the local “Restoring Illinois Oak Forests Conference” at Southern Illinois University’s Touch of Nature facility in Makanda, IL. The team sat in on various presentations and local projects aimed at restoring the oak composition in forests throughout the state of Illinois.
• **Kudzu on private land** – The ISST has treated kudzu on numerous private properties for years and continued to do so in the summer of 2016. These landowners have management agreements with the IDNR, and would not be able to control this species without the Strike Team’s help.

![Kudzu Treatment on Private Land](image)

• **Invasive Species Awareness Month Garlic Mustard Pull** – In April of 2016, the ISST joined the River to River Cooperative Weed Management Area, Shawnee National Forest, and other volunteers at the Leisure City Project Area in Pope county to hand-pull garlic mustard. By eradicating the biennial invasive plant before another seed set, the team and other partners could eliminate the potential of further spread.

![Strike Team and Shannan Sharp, USFS Botanist after the work day at Leisure City](image)

**Safety**

The ISST often works in demanding and potentially hazardous areas; safety is thus an important component of the ISST’s work. The ISST often hikes long distances carrying backpack sprayers and navigating uneven and steep terrain. The inherent dangers of prescribed fire and the use of equipment such as herbicides, chainsaws, brush cutters and ATVs can also pose safety hazards. To address safety concerns, the ISST received extensive training in CPR, first aid, herbicide application, wildland fire, and chainsaw use. Each member of the ISST holds NWGC wildland fire Red Card certification, with training emphasis on prescribed fire. Proper PPE is available and utilized during any chemical application and prescribed fire. The Strike Team came across multiple venomous snakes while out treating this past year and received Snake Gators from IDNR to offer further protection. At each site, the ISST works as a pair to mitigate any safety issues that may arise. Planning, researching local terrain and weather, as well as using radios, topographic maps and GPS systems in the field, contribute to a safe work environment.

**Early Detection Rapid Response**

Once established, invasive plant species frequently have long lag times before they begin to have dramatic effects. Introduced species that initially escaped many decades ago are only now being recognized as invasive. The early detection of these new, small infestations is critical to effective control and spread prevention. Early Detection, Rapid Response (EDRR) events are an important aspect of the Invasive Species Strike Team’s daily work. By detecting new infestations when they are controllable, and treating the populations
before they spread, valuable time and resources are saved. As a preventative measure, EDRR is aimed at furthering the success of restoration efforts and maintaining the pristine quality of existing ecological resources. While on reconnaissance and treatment missions to natural areas, the Strike Team is continuously observing for the presence of known invasive species as well as escaped alien ornamental species. Through contact with the River to River CWMA, the IDNR, the Southern Illinois Weed Watch program, concerned citizens, and the Strike Team, new infestations are reported and treated. During the year, the ISST completed the following Early Detection and Rapid Response events:

- **Rocky Bluff Nature Preserve CONWR** – In 2014, the ISST was contacted by a FWS biologist to assist in a Japanese stiltgrass treatment that was growing along the main foot trail through the nature preserve. The preserve was relatively clear of stiltgrass other than the foot trail so quick response by the ISST aided in maintaining native diversity by eliminating a potential quick invader. The team followed up treatment in the summer of 2015 and 2016.

- **Italian Arum at Kinkaid Lake State Park** – During a mechanical treatment of garlic mustard, a small population of *Arum italicum* was found growing amongst Giant Cane west of the spillway in 2014. The ISST treated this specie with a selective herbicide from DOW Agro Sciences in the spring of 2015 and again in 2016.

- **Piney Creek Ravine Nature Preserve** – The Strike Team received a call from the IDNR regarding a small population of Japanese stiltgrass growing alongside the creek in 2014. The population was treated within a few days from receiving the call and a thorough reconnaissance up and downstream from the know population was performed to ensure no new ecological threats to the nature preserve were taking place. During the summer months of 2015 and 2016, the ISST once again performed a
thorough reconnaissance at the nature preserve, chemically treating all stiltgrass found on the preserve.

Piney Creek flowing in the early fall
The Invasive Species Strike Team focused on the 11 southernmost counties in Illinois, working primarily on land managed by the Forest Service, as well as several properties owned by the Illinois Department of Natural Resources, the United States Fish and Wildlife Service, The Nature Conservancy, and some adjacent private properties. The Strike Team also assisted in treatments three counties north of the southernmost work area in Illinois. Those counties include: Monroe, Perry, and Randolph.
Areas by County:

**Alexander**
- Bean Ridge Road
- Cypress Creek National Wildlife Refuge
- Opossum Trot Trail Area
- Ozark Hill Prairie Research Natural Area

**Hardin**
- Garden of the Gods Recreation & Wilderness Area
- Harris Branch
- Illinois Iron Furnace Historic Site & Recreation Area
- Tower Rock Recreation Area

**Jackson**
- Ava Cave Zoological Area
- Buttermilk Hill
- Crab Orchard National Wildlife Refuge
- Faulkner-Franke Pioneer Railroad Prairie Nature Preserve
- Fern Rocks Nature Preserve
- Giant City State Park
- Grassy Knob
- Inagheh
- Kinkaid Lake State Fish & Wildlife Area
- Piney Creek Ravine Nature Preserve
- Talbott Hollow

**Johnson**
- Cache River State Natural Area
- Cave Creek Glade Nature Preserve
- Cypress Creek National Wildlife Refuge
- Fink Sandstone Barrens Ecological Area
- Lake of Egypt Recreation Area
- Wise Ridge State Natural Area

**Massac**
- Grassy Slough Land & Water Reserve
- Mermet Swamp Nature Preserve

**Monroe**
- Fults Hill Prairie State Natural Area

**Perry**
- Pyramid State Park

**Pope**
- Ashby Tract
- Bell Smith Springs Ecological & Recreation Area
- Double Branch Ecological Area
- Garden of the Gods Recreation & Wilderness Area
- Golconda Job Corps Civilian Conservation Center
- Jackson Falls Recreation Area
- Jackson Hole Ecological Area
- Lake Glendale Recreation Area
- Leisure City Project Area
- Lusk Creek Wilderness Area
- McConnell Tract
- One Horse Gap
- Rothamel Tract East
- Whiteside

**Pulaski**
- Cache River State Natural Area
- Cypress Creek National Wildlife Refuge
- Grassy Slough Land & Water Reserve

**Randolph**
- Piney Creek Ravine Nature Preserve

**Saline**
- Cave Hill Research Natural Area
- Eagle Mountain Research Natural Area
- Garden of the Gods Recreation & Wilderness Area
- Simpson Barrens Ecological Area
- Sahara Woods State Fish and Wildlife Area
- Saline County State Fish and Wildlife Area

**Union**
- Aldridge
- Berryville Shale Glade Nature Preserve
- Cypress Creek National Wildlife Refuge
- Giant City State Park
- Grassy Knob
- LaRue Pine Hills-Otter Pond Research Natural Area
- Panther Den Wilderness Area
- Trail of Tears State Forest
- Union County State Fish and Wildlife Area

**Williamson**
- Panther Den Wilderness Area
Aldridge

Site Statistics
County: Union
Size: ~10 acres
Ownership: USFS
Days worked at site: 3
Man hours: 5.5
Acreage chemically treated: 0.14

Site Description
The Aldridge site is along a levee near the Mississippi and Big Muddy Rivers. During the Great Flood of 1993, this area was heavily impacted by the record flooding. The site is part of the Inahgeh Project, which was developed to allow landowners in the Mississippi floodplain to sell their property to federal agencies. Those lands are now being restored to wetland habitat. The area adjacent to the levee was previously an agricultural field; it is now filling in with brush and small trees.

Site Treatment History
This site has been prescribed burned several times since at least 2004. In the late summer of 2016 the Strike Team was contacted by a Forest Service Botanist to eradicate two infestations of phragmites found growing along Muddy Levee Road. The team foliar sprayed the two infestations during the plants flowering stage in late summer to ensure full susceptibility of the chemical. The team retreated the infestation in the fall and sprayed any remaining stems that were showing signs of healthy growth. Follow up treatment is scheduled for the summer of 2017.

Chemical Treatment

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phragmites australis</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Ashby Tract Unit 2

Site Statistics
County: Pope
Size: 126 acres (openlands)
Ownership: USFS
Days worked at site: 1
Man hours: 20
Acreage treated with prescribed fire: 660.19

Site Description
The Ashby Prescribed burn lies in the Shawnee Hills where topography is generally characterized by its broad ridges running east to west with associated valleys and drainages.

Site Treatment History
This unit has been burned on at least three different occasions by Forest Service personnel. The objective of the Ashby Prescribed Fire is to reduce encroaching brush and trees to maintain grass dominance, reduce shade tolerant species in the understory, and reduce non-native species. Specifically, for unit 2 the intent was to maintain early seral habitat for a variety of wildlife species and crucial vegetative structure for at least part of their life cycle. The Strike Team assisted with most recent prescribe burn in the spring of 2016, offering additional on the ground resources for holding and ignition operations.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Ashby Tract Unit 2

Legend
- Prescribed Fire
- Shawnee National Forest

0 300 600 1,200 Meters

April 30, 2017
Map Created by:
Caleb Grantham
Invasive Species Strike Team
Map Projection: NAD 1983 UTM Zone 16N

TNC Disclaimer: The Nature Conservancy provides this information “as is.” TNC makes no guarantee or warranty concerning the accuracy of information contained in the geographic data.
Ava Cave Zoological Area

Site Statistics
County: Jackson
Size: 1,193 acres
Ownership: USFS
Days worked at site: 9
Man hours: 51.75
Acreage chemically treated: 4.30
Acreage manually treated: 3.60

Site Description
The Ava Cave Zoological Area is known for its caves, both terrestrial and aquatic. Limestone cliffs and perennial streams are also present within its Dry to Mesic Upland Forest habitat.

Site Treatment History
Garlic mustard is an herbaceous exotic that quickly forms monocultures in the understory. Left untreated, the species will outcompete and displace many native species of herbaceous and woody plants. Garlic mustard infestations have been hand-pulled by Forest Service staff for several years at this site. In 2015, contractors foliar sprayed those infestations with glyphosate. In the early spring of 2016, the ISST treated garlic mustard growing along both sides of the road via foliar application on the basal rosettes. The team revisited the natural area in late spring to find some plants bolting and beginning to produce seed. The Strike Team followed up chemical treatment by hand pulling and removing from site any second-year plants that were found. By pulling and removing the plants, the team eliminated any chance of new seed being dropped at this natural area in 2016. In the summer months, the team revisited the site and treated a Chinese yam infestation that was found growing alongside Little Kinkaid Creek via foliar application. Given the fact that Chinese yam can quickly form homogeneous populations along riparian areas and adjacent uplands, it is crucial to inhibit the invasive potential this plant has and continue treatment here for years to come. In the spring of 2017, the ISST once again hand pulled all second-year garlic mustard plants found. Follow up treatment for Chinese yam is scheduled for the summer of 2017. Total eradication is the overall goal for both the garlic mustard and Chinese yam infestations at this high quality natural area.

Chemical Treatments
<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td><em>Dioscorea polystachya</em> (Chinese yam)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

Manual Treatment
<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>Hand pull</td>
</tr>
</tbody>
</table>
Bean Ridge Road

Site Statistics
County: Alexander
Size: 8 acres
Ownership: USFS and private
Days worked at site: 4
Man hours: 15.5
Acreage chemically treated: 1.42
Acreage manually treated: 0.49

Site Description
Bean Ridge Road is Forest Service road located on a ridge. A small hunter’s camp is found on the east side of the road. Further to the southwest, the road accesses Bean Ridge Pond. It is surrounded by Dry to Mesic Upland Forest.

Site Treatment History
Garlic mustard was mapped at this site in 2008. It was treated by hand pulling in the spring and fall from 2012 to 2014. Contractors treated the infestation at the site by foliar spraying with glyphosate in May 2015. The Strike Team continued garlic mustard treatment in November 2015 via foliar application along the road. The team continued treatment here during the 2016 season performing two rounds of basal rosette treatment, once in the late fall and again in mid-winter. During the 2017 field season, the ISST chemically treated the basal rosettes twice in the early winter months and then hand-pulled any flowering and bolting plants found in the late spring. The infestation grows on both sides of the road but does not proceed very far from the ridge top. Total eradication is the overall goal for this infestation.

Chemical Treatment
Species (common name) % Herbicide (Chemical Name) Method
Alliaria petiolata (garlic mustard) 2% Aquaneat (glyphosate) Foliar

Manual Treatment
Method
Alliaria petiolata (garlic mustard) Hand pull
Bell Smith Springs Ecological & Recreation Area

Site Statistics
County: Pope
Size: 1,134 acres
Ownership: USFS
Days worked at site: 3
Man hours: 14.5
Acreage chemically treated: 2.09

Site Description
Bell Smith Springs Ecological Area is a United States Forest Service natural area. Bell Smith Spring Recreational Area (about 328 acres) is located within it. This area is known for its scenic canyons bordered by sandstone cliffs and barrens. There are seven miles of interconnected hiking trails that go through rock formations such as Devil’s Backbone, Boulder Falls, and a natural rock bridge. Due to the area’s combination of geological and ecological diversity, it has been designated a National Natural Landmark. Birders come from all over the country to view tanagers, sparrows, pileated woodpeckers, eastern phoebes and several different species of vireos. The canyons and wooded slopes provide habitat for over 700 species of flowering plants, ferns and lichens. That is about 20% of the total number of plants and lichens known in the entire state of Illinois. This natural area contains 15 sensitive (Regional Forester’s Sensitive) plants, all but one of which is state-threatened or endangered, as well as one additional state threatened plant.

Site Treatment History
Japanese stiltgrass is an extremely aggressive annual warm season grass that can easily form pure stands under both full sun and completely shaded conditions. Left unchecked, it will prevent tree regeneration of native bottomland hardwood species such as oak, gum, and cypress as well as displace native herbaceous vegetation. Japanese stiltgrass was herbicide treated for the first time at this site in 2015 by the Strike Team. Dense infestations were found on the sandy banks adjacent to the streams. Given the large amount of foot traffic and various stream systems at this site, Japanese stilt grass has a great potential to take over. Seeds can be transported easily by the flowing water and shoes of recreationists. The Strike Team thoroughly treated this area via chemical-foliar application in the summer months prior to seed set in 2015. Chinese yam forms pure stands in upland disturbed habitats and in riparian corridors. The infestations are primarily a threat to the establishment of native trees, shrubs, and herbaceous vegetation. In the summer of 2016, the Strike Team focused on Chinese yam and herbicide treated infestations found on several sand bars adjacent to the foot trails interspersed throughout Bay Creek. Follow up treatment is scheduled for the summer of 2017.

Chemical Treatment
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<tr>
<td>Dioscorea polystachya (Chinese yam)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
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</tbody>
</table>
Berryville Shale Glade Nature Preserve

**Site Statistics**
- County: Union
- Size: 40.72 acres
- Ownership: IDNR
- Days worked at site: 4
- Man hours: 26
- Acreage treated with prescribed fire: 25.47

**Site Description**
Like Brown Barrens Nature Preserve, and situated just one mile to the south, Berryville Shale Glade Nature Preserve is located on an outcrop of Springville shale in Union County. Barrens are plant communities that contain widely scattered and stunted trees. The trees develop their stunted growth forms because of the thin poor soil which contains little moisture and few nutrients. Common trees present in this barren are blackjack oak, post oak, black oak, hickory and winged elm. The herbaceous flora of the site is naturally stunted due to the moisture and mineral deficiencies of the shale. Herbaceous plants that are present here include little bluestem, butterfly weed, prairie spurge and false boneset.

**Site Treatment History**
At Berryville Shale Glade Nature Preserve, populations of Chinese yam were found in and along the creek bank that runs the western border of the preserve. Due to the infestation’s location in the riparian zone, the most probable source for the infestation is vegetative material likely carried from private property downstream into the preserve. Woody invasive species found at this preserve include autumn olive, bush honeysuckle, and multiflora rose. 2015 marked the ISST’s fifth year of Chinese yam treatment, with a noticeable decrease in the infestation’s density in and along the creek bank compared to previous year’s treatments. Multiflora rose was treated simultaneously with Chinese yam in the early summer of 2015 via foliar application. In the fall of 2014, the ISST continued treatment of autumn olive throughout the property. Two large populations were removed in the open field at the south end of the preserve moving north along the creek into the barren community. In the early spring of 2015 the Strike Team installed fire line on the preserve to allow for a widespread woody treatment via an Rx burn; however, weather conditions proved to be poor for a spring burn. In 2016, the Strike Team cleared the fire line once again and the unit was burnt in February, aiding in the restoration of native forbs and flora by eliminating encroaching woody stems of invasive shrubs. In the early spring of 2017, the ISST assisted a local heritage biologist once again with the implementation of fire line around the entire glade unit.

**Prescribed Fire Treatment**

**Species (common name)**
- *Elaeagnus umbellata* (autumn olive)
- *Lonicera maackii* (bush honeysuckle)
- *Lonicera japonica* (Japanese honeysuckle)
Buttermilk Hill

Site Statistics
County: Jackson
Size: 25 acres
Ownership: USFS
Days worked at site: 9
Man hours: 45.75
Acreage chemically treated: 6.71
Acreage manually treated: 18.77

Site Description
Buttermilk Hill Road is the site of a large infestation of garlic mustard. The area was affected by high winds from the May 2009 derecho that blew through that part of Jackson County. Many of the trees in the surrounding forest were toppled. Part of Waterfall Trail, a Forest hiking trail, follows Buttermilk Hill Road. With high levels of disturbance, it is no surprise that many non-native invasive plant species grow at this site.

Site Treatment History
The garlic mustard infestations at Buttermilk Hill have been hand-pulled for several years by Forest Service staff. Satellite infestations along Taylor Road to the east have been hand-pulled since 2012. Contractors foliar sprayed the Buttermilk Hill infestations with glyphosate in 2015. The largest infestation was originally measured at about 24 acres; it has decreased considerably after years of treatment. In January of 2016, the ISST continued treatment on these known infestations by chemically treating the basal rosettes and then later hand pulling second year plants in the spring. The team revisited the site in the late fall and early winter to perform the second-round chemical treatments on the basal rosettes. In the spring of 2017, the team revisited the site and hand pulled second year garlic mustard plants where previous treatments had taken place in years prior.

Chemical Treatment
Species (common name) | % Herbicide (Chemical Name) | Method
--- | --- | ---
Alliaria petiolata (garlic mustard) | 2% Aquaneat (glyphosate) | Foliar

Manual Treatment
Method
Alliaria petiolata (garlic mustard) | Hand pull |
Cache River State Natural Area

Site Statistics
County: Johnson and Pulaski
Size: 14,354 acres
Ownership: IDNR
Days worked at site: 7
Man hours: 85.5
Acreage treated with prescribed fire: 1,375.98

Site Description
Cache River State Natural Area is composed of two distinct management units including Little Black Slough and the Lower Cache. Situated in southernmost Illinois, Cache River State Natural Area lies within a floodplain carved long ago by glacial floodwater of the Ohio River. Lower Cache is best known for its remnant examples of high quality wetland natural communities, including bald cypress and tupelo gum swamps with trees more than 1,000 years ago. Native oak and hickory trees grow in the flatwoods and wet forest next to the swamps. Little Black Slough is also known for its swamps, as well as upland woods with small patches of limestone barrens. Wetlands within Cache River State Natural Area are so important to migratory waterfowl and shorebirds that in 1996 the RAMSAR Convention collectively designated them a Wetland of International Importance, only the 19th wetland in the United States to receive the distinction. With its diversity of soils, bedrock and landforms, the Cache River Valley contains four distinct ecological regions. This area contains 39 state-threatened or endangered plant and animal species and eleven state champion trees.

Site Treatment History
A relatively new invader to the forests of southern Illinois, Bradford pear has made a transition from ornamental cultivation to natural areas invader. At the Cache River SNA, the ISST discovered it invading the hardwood forest restoration in March 2011 and has been treating satellite populations via cut stump method ever since. In 2010, Garlic mustard was found in abundance along a roadside that bisects the natural area close to Section 8 Woods Nature Preserve. 2015 marked this infestation’s fifth year of treatment by the Strike Team. In the late winter months of 2016, the team spent several days installing fire line around Wildcat Bluff Nature Preserve. Later that spring, the team assisted the IDNR with two large prescribe burns within the State Natural Area. The units included Wildcat Cat Bluff Nature Preserve and Boss Island Nature Preserve. The ISST once again assisted in burning Boss Island Nature Preserve in the spring of 2017. Both units were burnt to aid in the restoration of bottomland hardwood species and to control encroaching, nonnative invasive species present within the State Natural Area.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Cave Creek Glade Nature Preserve

Site Statistics
County: Johnson
Size: 25 acres
Ownership: IDNR
Days worked at site: 2
Man hours: 13
Acreage treated with prescribed fire: 19.56

Site Description
Cave Creek Glade is 25 acres of high quality limestone glade and dry upland forest of the Lesser Shawnee Hills Section of the Shawnee Hills Natural Division. This area, located on top of a steep limestone boulder slope, was identified as one of the best limestone glades in southern Illinois. The glade itself is approximately 0.8 acres in size and is essentially undisturbed. A variety of common prairie grasses and wildflowers flourish here, including little bluestem, Indian grass, big bluestem, side-oats grama, wild rye, dropseed, panic grass, milkweeds, asters and coneflowers. The glade edge grades into an upland forest, forming a savanna-like community of stunted post oak and chinquapin oak. A narrow band of wet-mesic floodplain forest also adds to the diversity.

Site Treatment History
Sericea lespedeza was first noted at the foot of the slope by the IDNR District Heritage biologist in 2010. The ISST’s first treatment of this infestation was late summer 2011. While treating the lespedeza at the preserve in 2014, the Strike team also followed up treatment of two species of teasel present in low numbers along the highway right of way below the glade. While treating the teasel on site, Japanese stiltgrass was found scattered throughout the lower drainage below the glade parallel to the highway right of way and treated that same day. The glade was burned in March 2014 to aid in the overall restoration efforts of the highly diverse glade, which resulted in an impressive wildflower display later that summer. No exotics were detected atop the high-quality limestone glade during a burn assessment in May of 2014; however, the team located and submitted an EOR form for a population of a state listed plant at the site. In 2015, the ISST continued treatment on the cutleaf teasel, stiltgrass, and lespedeza, with only a few plants remaining on site. In 2016, the glade was subject to another prescribe burn to again aid in native plant restoration, by eliminating any competing woody invasive plant species. The Strike Team implemented fire line in 2016 and again in the early spring of 2017 to aid local heritage biologists in the prescribe burn of the steep glade unit.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Cave Hill Research Natural Area

Site Statistics
County: Saline
Size: 1,662 acres
Ownership: USFS
Days worked at site: 4
Man hours: 35
Acreage chemically treated: 0.24
Acreage treated with prescribed fire: 1,595.40

Site Description
Cave Hill Research Natural Area is notable for its geology and biological diversity. It is located on a fault-line scarp that forms a hog-back like ridge rising from a flat plain. A maze cave with both terrestrial and aquatic cave habitat is found there. The rocky terrain and thin soils on this hill have prevented farming and logging from taking place, so its forests remain relatively undisturbed. Other than the cave, additional habitats there are loess hill prairies, sandstone and loess barrens, Xeric Upland Forest, Dry Woodland, Dry to Mesic Upland Forest, and springs.

A number of rare plant and wildlife species have been found within the Cave Hill Research Natural Area. Federally listed species reported there are the Indiana bat (Myotis sodalis), northern long-eared bat (Myotis septentrionalis), and Mead’s milkweed (Asclepias meadii). Species at the site ranked as rare in the Eastern Region of the USDA Forest Service include southeastern myotis (Myotis austroriparius), eastern woodrat (Neotoma floridana), timber rattlesnake (Crotalus horridus), shining false indigo (Amorpha nitens), Bradley’s spleenwort (Asplenium bradleyi), and heartleaf plantain (Plantago cordata). State-listed species reported at the Cave Hill Research Natural Area include Packard’s cave amphipod (Crangonyx packardi), sharpscale sedge (Carex oxylepis), and chestnut oak (Quercus montana).

Site Treatment History
This site has been prescribed burned several times in the past decade to improve habitat for Mead’s milkweed and to reduce garlic mustard infestations. The most recent treatment was burned simultaneously with the IL-DNR who treated with fire 378 acres. In April of 2016, the Strike Team aided the Forest Service in a prescribe burn to restore native biodiversity and eliminate encroaching woody invasive species in the forest understory. Later that summer, the ISST returned to treat phragmites that was found growing along Eagle Mountain Road. The team returned in the early fall to perform a retreatment.

Chemical Treatment
Species (common name)  % Herbicide (Chemical Name)  Method
Phragmites australis (phragmites)  2% Poast Plus (sethoxydim)  Foliar

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Crab Orchard National Wildlife Refuge

Site Statistics
County: Jackson
Size: 43,890 acres
Ownership: USFWS
Days worked at site: 5
Man hours: 67
Acreage chemically treated: 3.93
Acreage treated with prescribed fire: 488.66

Site Description
The Refuge exists to protect, enhance, and manage natural resources and the Refuge landscape through an ecosystem approach that sustains optimum populations of migratory waterfowl, native fish and wildlife species, and threatened and endangered wildlife. The Refuge seeks to provide opportunities for and encourage agricultural uses that help attain wildlife conservation goals, benefit the local economy, and are compatible with other Refuge purposes. CONWR manages an industrial complex fully utilized by compatible tenants that conform to prescribed safety, health, environmental, and maintenance standards. The Refuge provides safe and equitable public use programs and facilities so that visitors have an enjoyable recreational experience and gain an appreciation for fish and wildlife resources, natural and cultural history, outdoor ethics, and environmental awareness.

Site Treatment History
Throughout the 2014 field season, the Strike Team assisted Fish and Wildlife Service (FWS) in six controlled burns consisting of both grassland and timber units throughout the refuge. Grassland unit burns were conducted to eliminate the encroaching woody components and provide a food source for wildlife. The two timber units were located just east and a few miles north east of Devil’s Kitchen Lake. Japanese stiltgrass was growing along Rocky Bluff Trail and treated by the Strike Team and two FWS biotech’s. The ISST was contacted by a CONWR biologist in September 2014, to tackle several populations of phragmites scattered throughout the refuge’s Heron Flatts wildlife overlook. In 2015, the team assisted in the prescribe burns of two woodland units and five grassland units on the wildlife refuge. The ISST continued treatment on Japanese stiltgrass at Rocky Bluff Trail in 2015 and again in 2016, marking the third consecutive year of treatment. Growing along the northeast corner of Devil’s Kitchen Lake, the team spotted and chemically treated some phragmites. The team also assisted with four prescribe burns in the spring of 2016 and six in the spring of 2017, consisting of six woodland compartments and four grassland type units. Each burn was aimed at eliminating encroaching woody invasive plant species and restoring native flora throughout.

Chemical Treatments
Species (common name) | % Herbicide (Chemical Name) | Method
--- | --- | ---
*Microstegium vimineum* (Japanese stiltgrass) | 2% Poast Plus (sethoxydim) | Foliar
*Phragmites australis* (phragmites) | 2% Aquaneat (glyphosate) | Foliar

Prescribed Fire Treatments
Species (common name)
*Elaeagnus umbellata* (autumn olive)
*Lonicera maackii* (bush honeysuckle)
*Lonicera japonica* (Japanese honeysuckle)
Cypress Creek National Wildlife Refuge

Site Statistics
County: Union, Johnson, Pulaski, Alexander
Size: 16,400 acres
Ownership: USFWS
Days spent at site: 10
Man hours: 56.25
Acreage chemically treated: 65.06

Site Description
Cypress Creek National Wildlife Refuge (CCNWR) is located in southern Illinois just north of the confluence of the Ohio and Mississippi Rivers. This 16,000-acre area supports rich floodplain forests, wetlands, and cypress-tupelo swamps. The area is situated within the Cache River Basin, which is at the intersection of four major physiographic regions of the United States, creating a unique area with a rich natural history. Within the Cache River basin, floodplain forests contain a greater diversity of bottomland tree species than any other watershed in Illinois.

Site Treatment History
At Cypress Creek NWR, populations of Japanese chaff flower have been found in 4 separate locations since 2012. Three of the locations are along the Cache River and Limekiln Slough, within the riparian zone, and therefore the most probable source for infestation is seed that is being carried downstream along both these waterways. One of the four locations was along the Hickory Bottoms Hiking Trail and probably spread by hikers or hunters using the trail. All four locations have been treated each year including spot spraying and pulling. At two of the sites, the populations appear to have been eradicated. In the summer of 2015, the ISST continued treatment of the two locations where plants were observed. In the summer of 2016, the Strike Team focused most of their efforts along Limekiln Slough spraying chaff flower east along the banks. In addition to treating chaff flower, the team was asked by an IDNR heritage biologist to spray some river hemp that was found growing in a moist soil unit at the Bellrose Reserve located on the refuge. The team also chemically treated phragmites via foliar methods that was found growing in a wildlife opening field southeast of Limekiln Slough. Follow up treatment for all previously treated species is scheduled for the summer of 2017.

Chemical Treatments

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Achyranthes japonica</em> (Japanese chaff flower)</td>
<td>2% Element 3A (triclopyr)</td>
<td>Foliar</td>
</tr>
<tr>
<td><em>Phragmites australis</em> (phragmites)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td><em>Sesbania herbacea</em> (river-hemp)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Legend

- Sesbania
- Achyranthes japonica

Streams

Map Projection: NAD 1983 UTM Zone 16N

Map Created by:
Caleb Granham
Invasive Species Strike Team

TNC Disclaimer: The Nature Conservancy provides this information "as is." TNC makes no guarantee or warranty concerning the accuracy of information contained in the geographic data.
Dennison Hollow Research Natural Area

Site Statistics
County: Saline
Size: 462 acres
Ownership: USFS
Days worked at site: 6
Man hours: 36.5
Acreage mechanically treated: 0.44
Miles of reconnaissance: 2.4
Proposed burn unit acreage: 542

Site Description
Dennison Hollow Research Natural Area was established Forest Service natural area in 1980. Originally 205 acres, it was subsequently expanded to its present size. This site contains high quality dry upland forest, sandstone glades, and sandstone cliff communities. It is home to a state threatened bird, the Loggerhead Shrike. It also contains several rare plants including 1 federally threatened; 2 sensitive (Regional Forester’s sensitive), 1 of which is state-threatened; and 1 additional state threatened species. The Dennison Hollow-Eagle Mountain prescribed fire unit lies in the Shawnee Hills where topography is generally characterized by broad ridges and associated valley and drainages. Dennis Hollow Research Natural Area exists within the boundaries of the prescribed fire unit where Mead’s Milkweed is found. Approximately 30 percent of the unit consists of Shortleaf, Loblolly, and White Pine. The remaining over story is mainly dominated by a mature Oak-Hickory with varying degrees of other species in the understory. A small portion of the unit contains barrens and glades that are mainly found in the higher elevations where thin soils exist. In addition, the Dennison Hollow unit have known dens for the state listed Timber Rattlesnake.

Site Treatment History
Scattered infestations of garlic mustard have been hand-pulled within and near this natural area since 2011. The Strike Steam continued hand pulling garlic mustard at this natural area in the late spring of 2015 and again in 2017. The ISST worked along the west into southwest end of the natural area, performing a thorough reconnaissance along the way. A small satellite population was found and hand pulled on the west edge of the natural area and then a larger population was found and hand pulled at the southwest corner of the natural area. The Strike Team also assisted the Forest Service with the installation of fire line around the Eagle Mountain burn unit just south of the natural area. This site has been burned approximately three times.

Manual Treatment
Alliaria petiolata (garlic mustard)  Hand pull

Mechanical Treatment
Install fire line
Double Branch Ecological Area

Site Statistics
County: Pope
Size: 100 acres
Ownership: USFS
Days worked: 1
Man hours: 3
Acreage chemically treated: 1.88

Site Description
Double Branch Hole Ecological Area is one of 80 natural areas on the Shawnee National Forest. Prominent features of this site are sandstone cliffs and barrens, which surround Hayes Creek. Dry Upland Forest and Dry to Mesic Upland Forest are also present. A number of plant species found at the site are ranked as sensitive in the Eastern Region of the USDA Forest Service: Willdenow’s sedge (Carex willdenowii), eastern hay-scented fern (Dennstaedtia punctilobula), Yadkin’s panic grass (Dichanthelium yadkinense), French’s shooting star (Dodecatheon frenchii), rock clubmoss (Huperzia porophila), American ginseng (Panax quinquefolius), and Appalachian bristle fern (Trichomanes boschianum). This is also the site of a historic occurrence of deerberry (Vaccinium stamineum), a sensitive plant that was last reported in 1962.

Site Treatment History
Garlic mustard was hand-pulled within the natural area in 2014 by Forest Service personnel. In the spring of 2017, the Strike Team performed a thorough reconnaissance of the natural area and chemically treated all basal rosettes found.

Chemical Treatment

<table>
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<tr>
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<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
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<tbody>
<tr>
<td>Alliaria petiolata (garlic mustard)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Faulkner-Franke Pioneer Railroad Prairie Nature Preserve

Site Statistics
County: Jackson
Size: 4.14 acres
Ownership: Private
Days worked: 1
Man hours: 9
Acreage treated with prescribed fire: 5.47

Site Description
The Faulkner-Franke Pioneer Railroad Prairie Nature Preserve contains 4.14 acres of dry-mesic prairie near DeSoto in Jackson County, Illinois. The preserve is part of the DeSoto Railroad Prairie INAI site, containing dry-mesic, mesic and wet-mesic prairie, which is adjacent to the Illinois Central Railroad and is approximately one mile in length. The land was purchased for preservation purposes by two families, and the dedication is the family’s way of passing that legacy on to its future generations. The prairie is one of only two remaining high quality prairies in the Southern Till Plain Natural Division.

Site Treatment History
Faulkner-Franke Pioneer Railroad Prairie’s proximity to a railroad and a well-traveled highway expose it to exotic invasion. Seedlings of bush honeysuckle, autumn olive and Japanese honeysuckle occur along the preserve’s western border with the Illinois Central railroad. The Strike Team helped IDNR heritage biologists burn this prairie unit in 2010 and again during the spring of 2016. Prescribe burns are implemented at this site to reduce the nonnative woody component and restore native grasses, forbs and wildflowers.

Prescribed Fire Treatments
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Fern Rocks Nature Preserve

Site Statistics
County: Jackson
Size: 170 acres
Ownership: IDNR
Days worked at site: 3
Man hours: 20
Acreage chemically treated: 8.68
Acreage treated with prescribed fire: 417.1

Site Description
Fern Rocks contains high quality dry and mesic upland forest, cliff and bedrock outcrops of the Greater Shawnee Hills Section of the Shawnee Hills Natural Division. The importance of this portion of the Shawnee Hills as a natural science study area was recognized as early as 1870 when Southern Illinois Normal University botanist George Hazen French named the area for its abundance of ferns including Christmas fern, marginal fern, maidenhair, lady fern and several spleenwort ferns. The forested portions of the preserve are dominated by oaks and hickories or by maples. Outstanding sandstone cliffs, bluffs and shelter communities support a large variety of vegetation. Along the north facing slope, shade-loving species are found including mosses and liverworts. Notable crevice-occurring species are Forbes’ saxifrage, partridge-berry and small alumroot. Fern Rocks is the type locality for two at the plants discovered by French in the late 1800’s: French’s shooting star and Forbes’ saxifrage. It contains one of the most spectacular spring wildflower displays to be seen anywhere in the state.

Site Treatment History
Both Japanese stiltgrass and Chinese yam can quickly form homogeneous populations along riparian areas and adjacent uplands. At Fern Rocks Nature Preserve, populations of these species were found along the Stonefort Creek floodplain on the northern and eastern boundaries, along Trillium Trail by the northwestern preserve access, and along the park road and day use areas adjacent to the Nature Preserve. 2015 marked the sixth year of Chinese yam and Japanese stiltgrass treatment along Stonefort Creek. The Strike Team also treated stiltgrass along the entire Trillium Trail in the summer of 2015. During the 2016 field season the Strike Team joined the River to River Cooperative Weed Management Area coordinator, the Forest Restoration Support Team, Giant City staff, and local Master Naturalist volunteers for two different winter work days at the nature preserve controlling various invasive woody shrubs and vines. Control techniques implemented were chemical cut stump and basal bark application methods. In March of 2017, the ISST assisted site staff and local heritage biologists with the prescribe burn of the nature preserve and an adjacent unit south of the preserve within Giant City State Park. The burn was implemented to reduce encroaching, woody nonnative invasive species and restore the diverse flora that grows native to the nature preserve.

Chemical Treatments

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosa multiflora (multiflora rose)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
<tr>
<td>Lonicera maackii (bush honeysuckle)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
<tr>
<td>Elaeagnus umbellata (autumn olive)</td>
<td>20% Element 4 (triclopyr)</td>
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</tr>
</tbody>
</table>
Celastrus orbiculatus (oriental bittersweet) 20% Element 4 (triclopyr) Basal bark
Euonymus fortunei (winter creeper) 20% Element 4 (triclopyr) Basal bark
Euonymus alatus (burning bush) 20% Element 4 (triclopyr) Basal bark

**Prescribed Fire Treatments**

**Species (common name)**

*Elaeagnus umbellata* (autumn olive)
*Lonicera maackii* (bush honeysuckle)
*Lonicera japonica* (Japanese honeysuckle)
Fink Sandstone Barrens
Ecological Area

Site Statistics
County: Johnson
Size: 604 acres
Ownership: USFS
Days worked at site: 4
Man hours: 50
Acreage treated with prescribed fire: 603.08

Site Description
Finks Sandstone Barrens Ecological Area is known for its sandstone cliffs and barrens. They are surrounded by areas vegetated with Dry Upland Forest, Dry to Mesic Upland Forest, and Mesic Upland Forest. Several species reported at this site are ranked as rare in the Eastern Region of the USDA Forest Service: eastern small-footed myotis (*Myotis leibii*), Turk’s-cap lily (*Lilium superbum*), sunbright (*Phemeranthus parviflorus*), and fewflower nutrush (*Scleria pauciflora*).

Site Treatment History
This site has been burned several times to improve habitat of its forests and barrens. In the fall of 2016, the Strike Team helped the Forest Service install fire line around both units and then implement the actual prescribe fires a couple weeks later. Rx burns were executed to enhance the high quality barren community by controlling nonnative woody invasive species that were encroaching the forest understory and open barren compartments.

Prescribed Fire Treatments
Species (common name)
*Elaeagnus umbellata* (autumn olive)
*Lonicera maackii* (bush honeysuckle)
*Lonicera japonica* (Japanese honeysuckle)
Fults Hill Prairie Nature Preserve

Site Statistics
County: Monroe
Size: 532 acres
Ownership: IDNR
Days worked at site: 1
Man hours: 24
Acreage treated with prescribed fire: 42

Site Description
Fults Hill Prairie lies within the rugged topography of the Northern Section of the Ozark Natural Division. In 1986, the preserve was designated as a National Natural Landmark by the U.S. Department of the Interior. It was dedicated as the 30th Illinois Nature Preserve in October of 1970. The site contains the largest complex of the highest quality, essentially undisturbed loess hill prairies along the Mississippi River in Illinois. However, many different natural communities are present, including upland forest, savanna, hill prairie, limestone glade, limestone cliff and sink hole ponds. The dry upland forest sites are dominated by white oak, black oak, post oak and black hickory, which give way to more mesic species, red oak, sugar maple, white ash and black walnut in the ravines. The steep, dry, open areas support hill prairie communities. Common grasses include little bluestem, big bluestem, Indian grass and side oats gramma. Prairie wildflowers are abundant. Unusual animals found in the preserve are plains scorpion, coachwhip snake, and narrow-mouthed toad.

Site Treatment History
Management of the preserve includes the use of prescribed burning to control woody encroachment in the hill prairies. Other exotic treatments include yellow and white sweet clover, tree of heaven, Japanese honeysuckle, multiflora rose, and crown vetch. During the spring of 2017, the Strike Team assisted the IDNR and local staff and volunteers with the prescribed burn of the unit, running flanking ignition operations.

Prescribed Fire Treatments
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Garden of the Gods Recreation & Wilderness Area

Site Statistics
County: Saline, Pope, and Hardin
Size: 3,996 acres wilderness
       195 acres recreation area
Ownership: USFS
Days worked at site: 12
Man hours: 125
Acreage chemically treated: 0.96
Acreage manually treated: 0.54

Site Description
Garden of the Gods Wilderness was designated as a wilderness area by the Illinois Wilderness Act of 1990. It is home to massive sandstone rock formations and thick hardwood forests. Its caves, canyons, bluffs and ridges were home to indigenous people and later to European settlers. The quarter-mile Garden of the Gods Observation Trail in the recreation area is the most popular site on the Shawnee National Forest, with named rock formations such as Camel Rock, Table Rock, and Devil’s Smokestack. The wilderness and recreation areas include 16.9 miles of trails. This area contains 1 USFS natural area, as well as 2 state-threatened or endangered plants, both of which are listed as sensitive (Regional Forester’s sensitive) by the USFS.

Site Treatment History
Infestations of garlic mustard have been hand-pulled along Indian Point Trail in the Garden of the Gods Wilderness site since 2009. Sites in the camping and recreation areas have been herbicide treated since 2009. The Strike Team continued garlic mustard treatment in in the spring of 2015, via both foliar and mechanical applications in the appropriate locations. During the summer of 2016 the ISST served as Crew Leaders for a wilderness area inventory of all invasive plant species with a Green Corp crew from Chicago and local Forest Service Recreation employees. The team aided in plant identification and used their mapping technology to drop points and record GPS locations for prioritized treatment in years to come. During the winter and spring months of 2017, the team continued with garlic mustard treatments utilizing both chemical and manual techniques. The team foliar-sprayed basal rosettes in the late winter and then hand-pulled second year plants in the spring.

Chemical Treatment
Species (common name) % Herbicide (Chemical Name) Method
Alliaria petiolata (garlic mustard) 2% Aquaneat (glyphosate) Foliar

Manual Treatment
Species (common name) Method
Alliaria petiolata (garlic mustard) Hand pull
Giant City State Park

Site Statistics
County: Jackson & Union
Size: 4000 acres
Ownership: IDNR
Days worked at site: 12
Man Hours: 131.25
Acreage chemically treated: 8.88
Acreage treated with prescribed fire: 819.15

Site Description
Giant City is home of the “Giant City Streets” formed 12,000 years ago by huge bluffs of sandstone. The massive sandstone structures give the area its name. Eons of geological faulting and folding have molded a landscape like none other, which is now clothed in lush garments of fern, moss, large flowering mints, hundreds of species of wild flowers and 75-plus varieties of towering trees. The natural splendor of Giant City has made it a renowned retreat that attracts more than 1.2 million visitors annually.

Site Treatment History
Garlic mustard and Chinese yam are herbaceous exotics that quickly form monocultures in the understory. Left untreated, the species will outcompete and displace many native species of herbaceous and woody plants. At Giant City State Park, garlic mustard and Chinese yam were found in abundance along the Indian Creek watershed and along the Indian Creek Trail. The Strike Team treated the garlic mustard growing throughout the Indian Creek drainage via chemical and mechanical methods in 2015. Cutleaf teasel is a highly-invasive biennial forb that is listed as a noxious weed in at least four states nationally. It can be seen invading communities with full sun exposure; at Giant City State Park, cutleaf teasel is found along a main road to the north and west of the maintenance buildings. 2014 was the ISST’s fourth treatment year for this specie. An infestation of kudzu on the property that was thought to be extirpated from the site was treated with assistance of the IDNR District Heritage Biologist in 2011 and treated again in 2014 and 2015 by the Strike Team. An IDNR heritage biologist contacted the ISST for assistance with a prescribed burn to promote the growth of the state threatened Trilium viride (Green Trillium) parallel to the Indian Creek Drainage system at Giant City State Park in March 2014. Scattered individuals of autumn olive, bush honeysuckle and multiflora rose were found in warm season grass plantings and were controlled with ISST-assisted prescribed burns in August 2014 and again in the spring of 2015. In 2015 the ISST assisted with 11 grassland burns. The Strike Team continued treatment on a known population of tree of heaven adjacent to the Post Oak trail off the side of the road at Giant City State Park. The population was treated in January, 2014 and again in November, 2014 with a noticeable decline in the population’s density. The ISST also treated some woody invasive species via basal application in some grassland wildlife fields that are scheduled for upcoming burns. In the fall of 2015, the strike team foliar treated autumn olive on the border and interior of more wildlife opening grassland fields that are also subject to upcoming prescribed burn. Throughout the summer of 2015 the ISST treated Japanese stiltgrass in a wide range throughout the park. The infestations were found along many roads and trails and over by the horse stable. The Strike Team also foliar treated some multiflora rose along the Red Cedar Trail in the spring of field season 2015. During the 2016 field season, the Strike Team retreated the Chinese yam found on site and assisted with prescribe burning several wildlife fields to inhibit encroaching, woody species from invading the thick grassland habitat. During the spring of 2017, the team assisted with the fire line and
implementation of several woodland burns and helped the local wildlife biologist with burning several wildlife fields.

**Chemical Treatments**

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dioscorea polystachya (Chinese yam)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td>Rosa multiflora (multiflora rose)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
<tr>
<td>Lonicera maackii (bush honeysuckle)</td>
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<td>Lonicera umbellata (autumn olive)</td>
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<td>Celastrus orbiculatus (oriental bittersweet)</td>
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</tr>
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**Prescribed Fire Treatment**

<table>
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<tr>
<th>Species (common name)</th>
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<tbody>
<tr>
<td>Elaeagnus umbellata (autumn olive)</td>
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<tr>
<td>Lonicera maackii (bush honeysuckle)</td>
</tr>
<tr>
<td>Lonicera japonica (Japanese honeysuckle)</td>
</tr>
</tbody>
</table>
Golconda Job Corps Civilian Conservation Center

**Site Statistics**
County: Pope  
Size: 23 acres  
Ownership: USFS  
Days worked at site: 2  
Man hours: 11.5  
Acreage chemically treated: 1.32  
Acreage manually treated: 5.91

**Site Description**
The Golconda Job Corps Center is an administrative facility that includes a campus and surrounding woodlands. The Job Corps Center provides no cost education and technical training for young people from the ages of 16 to 24 and is administered by the Department of Labor. It is located near the Ohio River and Big Grand Pierre Creek. Manyflower flatsedge (*Cyperus lancastriensis*), a state threatened plant has been reported at this site.

**Site Treatment History**
Two infestations of garlic mustard have been treated at the site. One infestation is about 21 acres and the other is about 2 acres. Forest Service personnel treated the larger infestation with glyphosate annually from 2012 to 2014 and treated the smaller infestation with glyphosate in 2014. Contractors sprayed both sites with glyphosate in 2015. In April of 2017, the ISST performed two rounds of treatment on the garlic mustard. First the team foliar sprayed the basal rosettes and then returned later that month and hand-pulled all second-year plants as well.

**Chemical Treatments**

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<th>Species (Common Name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>2% <em>Aquaneat</em> (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

**Manual Treatment**

<table>
<thead>
<tr>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand pull</td>
</tr>
</tbody>
</table>
Grassy Knob

Site Statistics
County: Jackson
Size: ~10 acres
Ownership: USFS
Days worked at site: 1
Man hours: 7
Acreage chemically treated: 5.75

Site Description
This site is along Scatters Road, located at the base of the limestone cliffs of Clear Springs Wilderness and Pine Hills Annex Ecological Area of the Shawnee National Forest. It is adjacent to the Big Muddy River floodplain. An infestation of garlic mustard runs along this road for about a mile.

Site Treatment History
The garlic mustard infestation at this site was hand-pulled by Forest Service personnel in 2012 and 2014. It was herbicide treated with glyphosate in 2015 by contractors. The Strike Team continued treatment here in the spring of 2017, spraying all basal rosettes along the roadside.

Chemical Treatments
Species (Common Name) | % Herbicide (Chemical Name) | Method
Alliaria petiolata (garlic mustard) | 2% Aquaneat (glyphosate) | Foliar
Harris Branch

Site Statistics
County: Hardin
Size: 520 acres
Ownership: USFS
Days worked at site: 4
Man hours: 37
Acreage treated with prescribed fire: 764

Site Description
The Harris Branch Prescribed Fire Unit is located near Karber’s Ridge. In the early 1930’s non-native pines were introduced to this area to arrest erosion from abandoned and depleted farmsteads. These farmsteads were originally native hardwood timber stands that were cleared for farming. Recently some of the Pine timber stand has been commercially harvested to allow for sunlight to release natural hardwood seedlings.

Site Treatment History
Currently the only treatment that has occurred on the unit has been the commercial timber harvest, removal of small shade tolerant species, and fire line construction. The Strike Team assisted the Forest Service with fire line construction throughout the early winter of 2017 and later that spring helped on the prescribed burn, offering additional ignition and holding resources.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Inagheh Units 1 North, 1 South, and 6

Site Statistics
Counties: Jackson & Union
Size: 89 acres
Ownership: USFS
Days worked at site: 1
Man hours: 7.25
Acreage treated with prescribed fire: 57.56

Site Description
The site is part of the Inagheh Project, which was developed to allow landowners in the Mississippi floodplain to sell their property to federal agencies. These particular units are part a larger project that encompasses 557 acres. Presently these lands are part of the Wetland Reserve Program as well as the Mississippi River Corridor Wetlands Project. Those lands are now being restored to wetland habitat.

Site Treatment History
These specific units have been burned 2 times in the past. The Strike Team offered additional resources for a prescribed burn here in the fall of 2016.

Prescribed Fire Treatment
Species (common name)
*Elaeagnus umbellata* (autumn olive)
*Lonicera maackii* (bush honeysuckle)
*Lonicera japonica* (Japanese honeysuckle)
Illinois Iron Furnace Historic Site & Recreation Area

Site Statistics
County: Hardin
Size: 30 acres
Ownership: USFS
Days worked at site: 6
Man hours: 22
Acreage chemically treated: 5.03
Acreage manually treated: 4.72

Site Description
Illinois Iron Furnace Historic Site features the only remaining iron furnace structure in the state of Illinois. Built in 1837 and rebuilt and enlarged in 1856, it was in operation until 1887. Iron castings were transported to the Ohio River and shipped from there to manufacturers. The furnace was partially destroyed by the CCC to supply rubble for the Hog Thief Creek Bridge. It was reconstructed in 1967. This area contains 2 state-threatened or endangered plants, both of which are listed as sensitive (Regional Forester’s sensitive) by the USFS.

Site Treatment History
The garlic mustard infestation within the recreation area has been hand-pulled and herbicide treated since 2012. The garlic mustard site just south of Big Creek has been hand-pulled since 2013. The Strike Team continued treatment on the basal rosettes via foliar application south of the furnace adjacent to the creek in the late fall of 2015. Treating the rosettes in the fall and winter months eliminates seed set from happening later that spring. The ISST continued chemically treating the garlic mustard basal rosettes in the late fall and early winter of 2016 and found the infestation is somewhat continuous east along Big Creek from the parking lot. The team treated a larger population in 2016 than they did in 2015 and continued treatment in the spring of 2017. The ISST completed one more round of chemical treatment, spraying basal rosettes, followed by three rounds of hand-pulling all second-year plants in April. The overall goal is total eradication to inhibit further spread downstream.

Chemical Treatments
<table>
<thead>
<tr>
<th>Species (Common Name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliaria petiolata (garlic mustard)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

Manual Treatment
<table>
<thead>
<tr>
<th>Alliaria petiolata (garlic mustard)</th>
<th>Method</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hand pull</td>
</tr>
</tbody>
</table>
Jackson Falls Recreation Area

Site Statistics
County: Pope
Size: ~750 acres
Ownership: USFS
Days worked at site: 1
Man hours: 5.5
Acreage manually treated: 0.56

Site Description
Jackson Falls is an area in the Shawnee National Forest known for its scenic falls, technical rock climbing, and hiking. Sandstone cliffs are common in the Dry to Mesic Upland Forest habitat there. A federally listed wildlife species has been reported in the vicinity — northern long-eared bat (*Myotis septentrionalis*). Several species ranked as rare in the Eastern Region of the USDA Forest service have also been found there: eastern small-footed myotis (*Myotis leibii*), Appalachian bugbane (*Actaea rubifolia*), and Appalachian bristle-fern (*Trichomanes boschianum*).

Site Treatment History
Garlic mustard infestations at the Jackson Falls site have been hand-pulled by Forest Service personnel for several years. The populations are very scattered and relatively small. The Strike Team performed a thorough reconnaissance throughout the recreation area covering the trail and stream systems. Three populations and a few scattered occurrence points were found, hand-pulled, and removed from site to ensure no new seed was dropped.

Manual Treatment

<table>
<thead>
<tr>
<th>Alliaria petiolata (garlic mustard)</th>
<th>Method</th>
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</thead>
<tbody>
<tr>
<td>Hand pull</td>
<td></td>
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</tbody>
</table>
Jackson Hole Ecological Area

**Site Statistics**
County: Pope  
Size: 158 acres  
Ownership: USFS  
Days worked at site: 4  
Man hours: 17  
Acreage chemically treated: 0.80

**Site Description**
Jackson Hole Ecological Area is notable for its sandstone cliffs, glades and overhangs. It also supports relatively high quality Xeric Upland Forest. Several plants ranked as rare in the Eastern Region of the Forest service have been reported there: Willdenow’s sedge (*Carex willdenowii*), Yadkin’s panic grass (*Dichanthelium yadkinense*), French’s shooting star (*Dodecatheon frenchii*), and rock clubmoss (*Huperzia porophila*).

**Site Treatment History**
Microstegium was hand-pulled by Forest Service personnel for several years at this site up to 2009, but has not been treated since. The Strike Team treated Chinese yam here during the summer of 2016. The main population is found in a large field opening northeast of the natural area. The team performed a thorough reconnaissance of the trail systems present and found an additional population of yam growing well south of the know population. The team foliar sprayed each population and retreated each population twice during the summer of 2016. Total eradication is the overall goal at this high quality natural area.

**Chemical Treatments**

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<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dioscorea polystachya</em> (Chinese yam)</td>
<td>2% <em>Aquaneat</em> (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Kinkaid Lake State Fish & Wildlife Area

**Site Statistics**
County: Jackson  
Size: 5850 acres  
Ownership: IDNR  
Days worked at site: 1  
Man hours: 2  
Acreage chemically treated: 0.15

**Site Description**
Located in southwestern Illinois' Jackson County, Kinkaid Lake is approximately 5 miles north of Murphysboro and 100 miles southeast of St. Louis. Built in 1968, the lake encompasses 2,750 acres. The ownership of the surrounding land is divided among the Illinois Department of Natural Resources, which manages approximately 4,000 acres; the U.S. Forest Service, which administers 5,000 acres; and Kinkaid-Reed's Creek Conservancy District, which oversees 300 acres. Topography varies from sandstone bluff formations to rolling hills surrounding the lake where oaks and hickories predominate. Numerous flat contours are planted with prairie grasses, cool-season grasses and wildlife food plots.

**Site Treatment History**
Garlic mustard is a biennial forb that quickly forms monocultures on the forest floor. Left untreated, the species will out compete and displace many native species of herbaceous and woody plants. At Kinkaid Lake State Fish and Wildlife Area, garlic mustard was found below the dam in an isolated stand of rocky oak-hickory forest. 2011 was the ISST’s first treatment year for garlic mustard at Kinkaid Lake and 2016 marks the fifth with a noticeable decline in the infestations density. Although site staff noted that the population has persisted for several years here, the infestation is very small, and total eradication is the management goal. In 2014 the ISST responded to an EDRR request from the River to River Cooperative Weed Management Area to treat a new invader to the area known as Italian arum. The invasive from Europe was found growing amongst the giant cane just west of the garlic mustard infestation. The ISST followed up treatment in 2015 and additionally treated any autumn olive, bush honeysuckle, multiflora rose, and Japanese honeysuckle found while treating the arum and garlic mustard simultaneously. In the spring of 2016, the Strike Team once again treated the arum and garlic mustard simultaneously, finding only scattered individuals in the forest understory.

**Chemical Treatments**

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<tr>
<td>Elaeagnus umbellata (autumn olive)</td>
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<td>Foliar</td>
</tr>
<tr>
<td>Rosa multiflora (multiflora rose)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td>Lonicera maackii (bush honeysuckle)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td>Lonicera japonica (Japanese honeysuckle)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td>Arum italicum (Italian arum)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Lake Glendale USFS

**Site Statistics**
County: Pope
Size: 11 acres
Ownership: USFS
Days worked at site: 7
Man hours: 42
Acreage chemically treated: 2.47
Acreage manually treated: 11.72
Acreage treated with prescribed fire: 3.96

**Site Description**
Lake Glendale is a highly disturbed, forested site that has a large infestation of garlic mustard.

**Site Treatment History**
Garlic mustard has been hand-pulled at this site for several years. Contractors foliar sprayed the infestation with glyphosate in 2015. During the 2016 field season, the ISST continued treating the garlic mustard infestations using both manual and chemical techniques based on plant phenology and seasonal timing. The team also aided in the fire line construction and implementation of the prescribed burn in the fall of 2016 on the dam unit. In the early winter of 2017 the team continued treatment of garlic mustard, spraying basal rosettes and then returned to site and hand-pulled garlic mustard in the spring. The garlic mustard infestation is rather large and very scattered throughout the forest floor. During the spring of 2017, the ISST also found Japanese Chaff flower growing within the garlic mustard infestation and dropped an occurrence point for prioritized treatment in the future.

**Chemical Treatments**

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</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>2% <em>Aquaneat</em> (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

**Manual Treatment**

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>Hand pull</td>
</tr>
</tbody>
</table>

**Prescribed Fire Treatment**

<table>
<thead>
<tr>
<th>Species (common name)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Elaeagnus umbellata</em> (autumn olive)</td>
</tr>
<tr>
<td><em>Lonicera maackii</em> (bush honeysuckle)</td>
</tr>
<tr>
<td><em>Lonicera japonica</em> (Japanese honeysuckle)</td>
</tr>
</tbody>
</table>
Lake of Egypt

Site Statistics
County: Johnson
Size: ~2.5 acres
Ownership: USFS
Days worked at site: 1
Man hours: 4.5
Acreage manually treated: 0.68

Site Description
This site is along Recreation Road, just east of its intersection with Creal Springs Road. Recreation Road goes to the old Lake of Egypt Recreation Area, which is no longer in use. The largest infestation of garlic mustard is located just east of Wagon Creek north of the road. This site is flat with mesic hardwood vegetation. A smaller infestation is located further west on the north side of the road. No rare plants have been reported from this site.

Site Treatment History
The ISST hand-pulled garlic mustard here in the spring of 2017. Two main populations growing roadside and adjacent to a drainage were found along with an additional two occurrence points with a few plants found at each.

Manual Treatment
<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliaria petiolata (garlic mustard)</td>
<td>Hand pull</td>
</tr>
</tbody>
</table>
LaRue Pine Hills-Otter Pond Research Natural Area

Site Statistics
County: Union
Size: 3,342 acres
Ownership: USFS
Days worked at site: 17
Man hours: 118
Acreage chemically treated: 4.78
Acreage manually treated: 2.48
Acreage treated with prescribed fire: 1,163

Site Description
LaRue Pine Hills/Otter Pond Research Natural Area was established as research natural area in 1991. Its 150-foot-high limestone bluffs rise from bottomlands and swamps that are part of the Mississippi floodplain. Habitats here are incredibly diverse and include limestone cliffs, barrens, xeric upland forest, dry to mesic upland forest, terrestrial and aquatic caves, floodplain forests, springs, swamps, and sinkhole ponds. Over 1350 plant species have been identified in this area, about 35% of plant species known in the state. A high diversity of mammals, birds, reptiles, amphibians, and aquatic animals have been found here. LaRue Road (a.k.a. Snake Road) is known for its twice-yearly migration of reptiles and amphibians. In spring, hibernating animals move from the cliffs to the swamp; in the fall, they return to the cliffs. The road is closed during the migrations. This area contains 14 sensitive (Regional Forester’s sensitive) plants, 9 of which are also state-threatened or endangered. An additional 4 state-threatened or endangered plants have also been identified at this site.

Site Treatment History
Japanese stiltgrass is an extremely aggressive annual warm season grass that can easily form pure stands under both full sun and completely shaded conditions. The species’ main vector of invasion is by water movement and travel on boots, animals, and equipment. The Strike Team performed a very thorough Japanese stiltgrass treatment throughout the summer of 2015, visiting the site several times for treatment. The infestations were primarily along both sides of Snake road and treated via foliar application throughout the summer of 2015. Stiltgrass is of high concern at this natural area due to the unique composition of the forest and bottomlands within. Left unchecked, it will prevent tree regeneration of native bottomland hardwood species such as oak and cypress as well as displace native herbaceous vegetation. Garlic mustard infestations have been hand-pulled at this natural area since 2006. Garlic mustard was herbicide treated here for the first time during the spring of 2015. The strike team manually removed garlic mustard during the spring of 2016 and then herbicide treated basal rosettes in the early winter of 2017 and again in the spring. The ISST treated Chinese yam here as well in the summer of 2016, visiting and treating the site multiple times. In the spring of 2017, the ISST helped install fire line and later prescribed burn a large timber unit at this research natural area. The ISST was also contacted by a Forest Service botanist to assist the Recreation Crew with the restoration of a hill prairie. The team cut and stump treated woody species with herbicide to allow for more sunlight to hit the forest floor and rejuvenate the historic seedbank. Follow up yam and stiltgrass treatments are scheduled for the summer of 2017.
## Chemical Treatment

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
<tr>
<td><em>Dioscorea polystachya</em> (Chinese yam)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

## Manual Treatment

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>Hand pull</td>
</tr>
</tbody>
</table>

## Prescribed Fire Treatment

<table>
<thead>
<tr>
<th>Species (common name)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Elaeagnus umbellata</em> (autumn olive)</td>
</tr>
<tr>
<td><em>Lonicera maackii</em> (bush honeysuckle)</td>
</tr>
<tr>
<td><em>Lonicera japonica</em> (Japanese honeysuckle)</td>
</tr>
</tbody>
</table>
Leisure City Barrens

Site Statistics
County: Pope
Size: 3 acres
Ownership: USFS
Days worked at site: 1
Man hours: 7
Acreage manually treated: 2.88

Site Description
The Leisure City garlic mustard infestation site is located on a sandstone bluff and cliff overlooking Big Grand Pierre Creek to its east. It is surrounded by Dry to Mesic Upland Forest. Two federally listed bats have been reported in the vicinity: Indiana bat (Myotis sodalis) and northern long-eared bat (Myotis septentrionalis). Chuck-will’s widow (Caprimulgus carolinensis), a state threatened bird, and least brook lamprey (Lampetra aepyptera), a state threatened fish, have also been found nearby.

Site Treatment History
Garlic mustard forms pure stands in almost any mesic habitat and especially in riparian corridors. The infestations are primarily a threat to the establishment of native trees, shrubs, and herbaceous vegetation. Part of the garlic mustard infestation was hand-pulled at this site in 2014 by Forest Service personnel. The Strike Team attended a collaborative work day with Forest Service personnel and the River to River Cooperative Management Area during the spring of 2016 and hand-pulled garlic mustard here.

Manual Treatment
Species (common name)               Method
Alliaria petiolata (garlic mustard)  Hand pull
Lusk Creek Wilderness Area

Site Statistics
County: Pope
Size: 6,298 acres
Ownership: USFS
Days worked at site: 3
Man hours: 21
Acreage chemically treated: 2.05
Acreage manually treated: 0.13

Site Description
Lusk Creek Wilderness was designated as a wilderness area by the Illinois Wilderness Act of 1990. Hiking and equestrian trails through the area provide scenic views, cross over natural bridges, go through canyons and bluffs, and pass near abandoned homesteads. This wilderness contains 5 USFS natural areas, as well as 14 sensitive (Regional Forester’s sensitive) plants, 11 of which are also state-threatened or endangered. An additional 2 state-threatened or endangered plants have been identified at this site.

Site Treatment History
Garlic mustard was hand-pulled at the large infestation in the wilderness in 2013. In the spring of 2015, the ISST continued hand-pulling garlic mustard and foliar sprayed basal rosettes in December, 2015. The Strike Team also treated kudzu within the wilderness area via foliar application in the summer of 2015. The ISST returned to the wilderness area in the spring of 2017 and treated garlic mustard via both chemical and mechanical application methods.

Chemical Treatments
Species (common name) | % Herbicide (Chemical Name) | Method
--- | --- | ---
Alliaria petiolata (garlic mustard) | 2% Aquaneat (glyphosate) | Foliar

Manual Treatment
Species (common name) | Method
--- | ---
Alliaria petiolata (garlic mustard) | Hand pull
McConnell Tract

Site Statistics
County: Pope
Size: ~ 664 acres
Ownership: USFS
Days worked at site: 1
Man hours: 6.5
Acreage of burn unit: 658

Site Description
The project is located on national forest and private land, within the Shawnee National Forest, on the Glendale and Stonefort Quadrangles in Pope County, Illinois. The project lies within the Little Bay Creek-Bay Creek watershed. In the center of the unit is a broad plateau. The northern and western parts of the unit slope northwest and west to Little Bay Creek, while the southern portion of the unit slopes southward to the Bay Creek impoundment. Slopes are mostly gentle, but moderately steep in places. There are many bluffs and boulders in the Little Bay Creek valley. There are few places to ascend or descend the bluff line.

At the center of the project area on the top of the plateau are three distinct openland units separated by narrow, timbered old fencerows. These fields consist of a variety of warm and cool season grasses and some shrubs. Warm season grass is also found in several open fields on the private land in the southeast portion of the project area. Oak-hickory timber stands are found on the south and west facing slopes in the project area and are the majority fuel type.

Site Treatment History
At least portions of McConnell Tract have been burned 6 times to reduce encroaching brush and trees to maintain grass and forb dominance in openlands, reduce shade-tolerant species in the understory and midstory in oak stands, and to reduce non-native plant species such as fescue and Japanese honeysuckle. The Strike Team assisted the Forest Service with the installation of fire line around the unit in the early winter of 2017.
Mermet Swamp Nature Preserve

Site Statistics
County: Massac
Size: 43 acres
Ownership: IDNR/Private
Days worked at site: 1
Man hours: 1
Acreage chemically treated: 0.14

Site Description
Mermet Swamp contains original vegetation once typical of the Bottomland Section and Cretaceous Hill Section of the Coastal Plain Natural Division. The preserve is a level, wooded, bottomland swamp, with a small part of the preserve extending up a steep hillside. The swamp is under water most of the year and is characterized by a thick stand of young cypress trees, most of which are less than 15 inches in diameter. Buttonbush and Virginia willow are dominant shrubs, while unusual plants include storax, arrow alum and red iris. Many common mammals are found here as well as unusual and rare species including swamp rabbit, golden mouse and rice rat. The swamp also provides habitat for a wide diversity of birds, amphibians and reptiles.

Site Treatment History
The Strike Team treated Japanese stiltgrass via chemical-foliar application in 2010 and treated two small patches of phragmites in the late summer of 2015. The grass was found growing on the eastern border of the nature preserve. The ISST returned to site and treated the phragmites during the summer of 2016 via chemical-foliar application.

Chemical Treatment
<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phragmites australis (phragmites)</td>
<td>2% Poast Plus (sethoxydim)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

One Horse Gap

Site Statistics
County: Pope
Size: ~1,700 acres
Ownership: USFS
Days worked at site: 1
Man hours: 24
Acreage treated with prescribed fire: 1,570

Site Description
One Horse Gap Prescribed is located near One Horse Gap Lake and Dutton Chapel. The area is well known for the annual 9-day trail ride and is used continuously through the year by equestrians. There are many miles of trails in the area and multiple private campgrounds that cater to equestrians. The area is also a popular hunting area. 40% of the area is made up of pine plantations with the remainder of the area consisting of mixed hardwoods. The unit is burned to enhance wildlife habitat, reduce the risk and potential resource damage from a wildfire, and to help control non-native invasive species.

Site Treatment History
This site has been prescribe burned approximately four times over the past 20 years or so. Numerous infestations of garlic mustard in this area have been hand-pulled since their discovery in the 1990’s. The Strike Team assisted the Forest Service with a prescribed burn here in the spring of 2016.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Opossum Trot Trail Area

Site Statistics
County: Alexander
Size: 10 acres
Ownership: USFS
Days worked at site: 2
Man hours: 14
Acreage chemically treated: 3.01

Site Description
Opossum Trot Trail is a road, with a small section bordering the Opossum Trot Trail Botanical Area, a USFS natural area about 200 acres in size. The general area is on the Ozark Hills and features chert outcrops with steep slopes and deeply cut valleys. The road is on a ridge and is surrounded by dry upland forest.

Site Treatment History
Garlic mustard is a biennial forb that quickly forms monocultures on the forest floor. Left untreated, the species will out compete and displace many native species of herbaceous and woody plants. Garlic mustard infestations have been hand-pulled along the road since 2014. The ISST continued hand-pulling garlic mustard throughout the spring of 2015 and revisited the site in late November to treat basal rosettes via foliar application. Treating garlic mustard rosettes in the fall and winter months diminishes the amount of second year plants that will set seed in the spring of 2016. The Strike Team continued to treat garlic mustard via chemical-foliar application throughout the winter months of 2016 and again in the early winter of 2017.

Chemical Treatment
Species (common name) \( \text{Alliaria petiolata (garlic mustard)} \) % Herbicide (Chemical Name) \( 2\% \text{ Aquaneat (glyphosate)} \) Method Foliar
Ozark Hill Prairie Research Natural Area

Site Statistics
County: Alexander
Size: 550 acres
Ownership: USFS
Days worked at site: 1
Man hours: 22
Acreage treated with prescribed fire: 1,237

Site Description
The Ozark Hill Prairie Research Natural Area is located on a high ridge. It is part of the Illinois Ozark Hills Subsection of the Missouri Ozark Hills physiographic region, which is characterized by rugged upland bluffs that border the eastern edge of the Mississippi River Valley. The research natural area is dissected by narrow ridges, steep slopes, and V-shaped valleys that drain into the Mississippi bottomland via small streams running into Happy Hollow, Dongola Hollow, Ripple Hollow, and Clear Creek Ditch. Because of the rugged terrain, Ozark Hill Prairie remained relatively undisturbed. Little livestock grazing has occurred there. Only a few agricultural fields were found on its ridges, and those were abandoned before the 1920’s. Some selective logging for oaks took place there in the 1940’s and 50’s.

The Ozark Hill Prairie Research Natural Area is most notable for its loess prairies, but it has a variety of habitats that support rare plant and animal species. The bedrock is cherty limestone and soils are generally dry. Several sites have developed deep loess soils that support both prairies and gravel barrens. Forest types found here are Dry Upland Forest, Dry to Mesic Upland Forest, and Mesic Upland Forest. A number of plant species found at this natural area are ranked as sensitive in the Eastern Region of the USDA Forest Service: black edge sedge (Carex nigromarginata), greater yellow lady’s slipper (Cypripedium parviflorum var. pubescens), plain gentian (Gentiana alba), Turk’s-cap lily (Lilium superbum), and American ginseng (Panax quinquefolius). Two state listed plants have also been reported there: sand hickory (Carya pallida) and white wand beardtongue (Penstemon tubaeﬂorus), both state endangered. The timber rattlesnake (Crotalus horridus) has also been found at this site; it state threatened and is also ranked as sensitive in the Eastern Region of the USDA Forest Service.

The prescribed burning project is located on National Forest and private land, in the Natural Area (NA) and Non-Motorized Recreational Areas (NM) Management Areas within the Clear Creek watershed, on the McClure and Mill Creek Quadrangles in Alexander County, Illinois. The project area occupies ridges and valleys on and near Ozark Hill Prairie Natural Area. The topography is very steep with dissected ridges running in multiple directions. The Project area drains generally west into Clear Creek.

The primary vegetation types are closed and open timber stands, comprised of mixed oaks and other mixed hardwoods. Understory species include a great diversity of native and non-native forbs, grasses, trees, shrubs, and woody vines. In addition, small areas of barrens and glades feature rock outcroppings, bare ground, and sparse grasses. Damage from ice storms in the winters of 2008 and 2009 increased the fuel load in the burn unit. The damage was discontinuous and mostly consisted of tree tops and branches, though in places whole trees were downed.
Site Treatment History
Ozark Hill Prairie has been burned twice as well as years of mechanical restoration work done on the actual hill prairies to restore the native plant and animal communities to a higher biological quality and to maintain species diversity. This site was prescribed burned in March 2015 and again in the spring of 2017. The Strike Team assisted the Forest Service with the most recent burn this past spring.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Panther Den Wilderness Area

**Site Statistics**
County: Union and Williamson
Size: 821 acres
Ownership: USFS
Days worked at site: 5
Man hours: 30
Acreage manually treated: 0.55

**Site Description**
Panther Den Wilderness was named after a sandstone rock formation. An ancient waterway flowed through the site, forming Panther Den Valley with its 70-foot-high cliffs. The bluffs, cliffs, and overhangs provide habitat for two plants ranked as rare in the Eastern Region of the USDA Forest Service: Bradley’s spleenwort (*Asplenium bradleyi*) and French’s shooting star (*Dodecatheon frenchii*). Oldfield milkvine (*Matelea decipiens*), a state endangered plant, has also been recorded in this area.

Panther Den Wilderness offers many recreational opportunities. Crab Orchard Wildlife Refuge borders it to the north. Three fingers of Devils Kitchen Lake extend into its northern section, where visitors can fish, canoe, and kayak. The River to River Trail winds through much of the wilderness, along with other trail loops that branch off it. The trails are open to hiking and horseback riding. Panther Den Valley is a good sight for bird watching, as well as for viewing a wide variety of wildlife species and wildflowers. Ancient rock shelters used by Native Americans for centuries can also be seen in the valley.

**Site Treatment History**
Garlic mustard infestations have been hand-pulled at this site in 2013 and 2014 by Forest Service personnel and volunteers. Microstegium infestations at the southern part of the wilderness were hand-pulled in 2014 by the YCC group. During the fall of 2016 the ISST served as Crew Leaders for a wilderness area inventory of all invasive plant species with a Green Corp crew from Chicago and local Forest Service Recreation employees. The team aided in plant identification and used their mapping technology to drop points and record GPS locations for prioritized treatment in years to come. The ISST hand-pulled garlic mustard within the wilderness area during the spring of 2017.

**Manual Treatment**

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alliaria petiolata</em> (garlic mustard)</td>
<td>Hand pull</td>
</tr>
</tbody>
</table>
Piney Creek Ravine Nature Preserve

Site Statistics
County: Randolph and Jackson
Size: 195 acres
Ownership: IDNR
Days worked at site: 1
Man hours: 8.5
Acreage chemically treated: 0.41
Acres of reconnaissance: 4.33

Site Description
Piney Creek contains forest, stream, and sandstone habitat of the Central Section of the Ozark Natural Division. This area was glaciated during the Illinois stage of the Pleistocene glacializations. When the glaciers retreated, windblown loess covered the glacial till and meltwaters carved through sandstone creating Piney Creek Ravine. The dry upland forest on rocky slopes and canyon bluff tops are, for the most part, undisturbed and contain the most notable features. Within the post oak-black jack oak forest, scattered xeric forest/sandstone glade communities exist. The exposed rock and thin soil conditions are ideal for shortleaf pine, farkleberry, and lowbush blueberry.

Site Treatment History
Japanese stiltgrass is an extremely aggressive annual warm season grass that can easily form pure stands under both full sun and completely shaded conditions. Stiltgrass spreads through seed dispersal by means of water, wind, man, animal, equipment, etc. Left unchecked, it will prevent tree regeneration of native bottomland hardwood species such as oak and cypress as well as displace native herbaceous vegetation. The ISST received a call from an IDNR biologist regarding a small population of stiltgrass growing on a creek bank adjacent to the historic petroglyphs on site. Given the high-quality stream system that flows through the ravine, it is crucial to inhibit the growth of stiltgrass, a quick growing and easily dispersed exotic invader. The Strike Team performed a thorough reconnaissance up and down stream of the only two small populations found at the nature preserve in 2014. Follow up treatment took place in the summer of 2015. The Strike Team performed another thorough reconnaissance throughout the foot trails and creek within the preserve, treating all stiltgrass found. The ISST again followed-up treatment in the summer of 2016 and performed a thorough reconnaissance and chemically treated satellite populations of stiltgrass found. In addition to the stiltgrass found, the ISST treated multiflora rose simultaneously. Follow up treatment is scheduled for the summer of 2017. The management objective for Japanese stiltgrass at this high-quality nature preserve is total eradication.

Chemical Treatment
<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microstegium vimineum (Japanese stiltgrass)</td>
<td>2% Poison Plus (sethoxydim)</td>
<td>Foliar</td>
</tr>
<tr>
<td>Rosa multiflora (multiflora rose)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Pyramid State Park

Site Statistics
County: Perry
Size: 19,701 acres
Ownership: IDNR
Days worked at site: 1
Man hours: 12.5
Acreage treated with prescribed fire: 1,550.88

Site Description:
Pyramid State Recreation Area consists of wide open grasslands, heavily forested hills and many lakes and ponds. Pyramid is the largest State Recreation Area in Illinois at 19,701 acres. Pyramid gets its name from a coal mine that once existed here. In 1962, the state's first strip-mine reclamation law became effective. The most common method of reclamation in the 1930's was tree planting, but this was discouraging as the trees brought no quick economic return. A mature hardwood timber consisting of mostly White Oak and Hickory on the West edge of the park is an area about 20 acres which was not strip-mined. Several stands of conifers were planted years ago, and there is a timber cover of cottonwood, box elder and sycamore. Oak and hickory trees are increasing in number. Many species of wildlife may be found in the area, including songbirds, deer, squirrels, beavers, rabbits, turkey, bobcat, raccoons, possums, coyotes, weasel, mink, woodchucks and waterfowl. Also, the site is known for its population of short-eared owls. More than 500 acres of water form lakes varying in size from 0.1 acres to 276 acres.

Site Treatment History
At Pyramid State Park the IDNR found autumn olive and honeysuckle seedlings growing among the warm season grass plantings along with phragmites on the pond shorelines. Prescribed fire was utilized with the assistance of the ISST to control woody invasive encroachment into the grasslands. While prescribed fire does not control phragmites, it is an effective intermediate step between herbicide treatments. The ISST assisted in burning two large grassland compartments within the Galum unit during the spring of 2015. The team returned in the spring of 2016 and assisted with two more grassland prescribed burn units.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Phragmites australis (phragmites)
Rothamel Tract East

Site Statistics
County: Pope
Size: 250 acres
Ownership: USFS
Days worked at site: 1
Man hours: 5
Acreage of burn unit: 42

Site Description
This unit is situated in the Temple Hill, IL area east of Hwy 145. It is popular for hunting. The area is primarily considered an openlands with Oak-Hickory and pine dispersed throughout. Trees and shrubs have encroached into the openlands in places. The area is burned to reduce encroaching brush and trees to maintain grass dominance in openlands, reduce shade-tolerant species in the understory and midstory in Oak stands, and to reduce non-native species such as Fescue and Japanese Honeysuckle.

Site Treatment History
This unit has been burned approximately 5 times in the past. The Strike Team assisted with the fire line implementation around the perimeter of this unit in the fall of 2016 and it is scheduled to be prescribed burned in 2017.
## Sahara Woods State Fish and Wildlife Area

### Site Statistics
- **County:** Saline
- **Size:** 4,100 acres
- **Ownership:** IDNR
- **Days worked at site:** 1
- **Man hours:** 6
- **Acreage chemically treated:** 0.10

### Site Description
The fish and wildlife area is made up of former bituminous coal properties strip-mined by the Sahara Coal Company. The park currently consists of approximately 2,300 acres of open space, 1,500 acres of timber and brush, and 275 acres of lakes, ponds, and wetlands. The IDNR describes the topography of the parcel as “a former surface mine which consists of spoil ridges interspersed with timber, grasslands, small ponds and a large lake.” After shutting down the mine in 1993, Sahara Coal donated the land making up the mine to the state of Illinois in 1999. Remediation work continues. The park was partly opened to deer hunters in 2003. As of 2016, the park continues to be managed for hunting purposes, with archery deer, dove, quail, rabbit, squirrel, turkey, and various fur-bearing small game availabilities. Permits and licenses are required.

### Site Treatment History
The Strike Team received a call from a IDNR Heritage Biologist about treating some kudzu at this state fish and wildlife area. The ISST performed a thorough reconnaissance in the fall of 2016 and found and treated two small patches of kudzu via chemical-foliar application. Follow up treatment is scheduled for the late summer to early fall of 2017.

### Chemical Treatments

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pueraria montana</em> (kudzu)</td>
<td>0.5% <em>Transline</em> (clopyralid)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>
Saline County State Fish and Wildlife Area

Site Statistics
County: Saline
Size: 1,270 acres
Ownership: IDNR
Days worked at site: 1
Man hours: 15
Acreage treated with prescribed fire: 73.92

Site Description
Saline County State Fish & Wildlife Area, 5 miles southeast of Equality in southeastern Illinois, was the site of springs and wells that furnished brine for one of the two salt works. Although the springs and wells are not visible today, the area primarily is a recreational site. The initial acquisition of 524 acres of land was made in 1959 by the state of Illinois, and the total acreage now totals 1,270 acres, including a beautiful 105-acre lake. Salt is the theme of the early history in the area around Equality in Gallatin County. One of several counties originally part of Gallatin, Saline County takes its name from the salt works. American Indians made salt here long before the first settlers appeared. In 1803 the Indians ceded their "Great Salt Springs" to the United States by treaty. Congress refused to sell the salt lands in the public domain but did authorize the Secretary of the Treasury to lease them to individuals for a royalty. The leases required the holder to produce a certain quantity of salt each year, or pay a penalty. Although the northwest ordinance prohibited slavery in this area, special territorial laws and a constitutional provision permitted exceptions at these salines. The leasees brought in slaves or indentured servants and used them extensively in manufacturing salt. The census of 1820 for Gallatin County listed 239 slaves or servants. In 1818, as part of the process of making a new state, Congress gave the salines to Illinois but forbade the sale of the land. The state continued to lease the springs and used the revenue to finance part of its operating expenses. Eventually Congress allowed the outright sale of the land. The commercial production of salt made the expense of extracting it from the brine prohibitive. Glen O. Jones Lake, with a maximum depth of 35 feet and a 2.7 mile shoreline, is the focal point of the area. The lake was named for a prominent Saline County citizen who served in the Illinois General Assembly. Senator Jones also was twice elected state's attorney of Saline County and was a member of various social and fraternal organizations. Saline County State Fish & Wildlife Area is a combination of bottomland bordering the Saline River and hilly land bordering the Shawnee National Forest. The rugged, rocky hills are heavily timbered and surrounded by brushy areas that provide cover for quail and rabbits. Waterfowl also use the bottomland areas when the streams overflow and water is available. Several wood ducks nest on the river, slough and lake. The lake contains a variety of fish including largemouth bass, bluegill, redbear, crappie and channel catfish. Four designated hiking trails are designated--Lake, Cave Hill, River and Wildlife Nature Trail offer 9 miles for a scenic exploration. The site has several miles of horse trails and a separate campground for riders and their horses is available.

Site Treatment History
The fall of 2016 was the Strike Team’s first time at this site and they assisted site staff, IDNR biologists and foresters, and the Southern Illinois Prescribed Burn Association (SIPBA) in the prescribed burn of a timber unit that borders the southern edge of a lake. The burn was implemented to reduce nonnative, invasive shrub species and restore the oak-hickory component in the over story to provide consistent food for wildlife.
Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Simpson Barrens Ecological Area

Site Statistics
County: Saline
Size: 69.92 acres
Ownership: USFS
Days worked at site: 4
Man hours: 16
Acreage chemically treated: 3.80
Acreage manually treated: 0.001

Site Description
Simpson Township Barrens is a unique ecological area containing several native plant communities such as limestone barrens, seeps, dry and dry-mesic upland forest, an intermittent creek drainage and support a rich diversity of plants. The limestone barrens communities are characterized by very dry, calcium rich soils that support a flora more commonly encountered on the tall grass prairies found north of the Shawnee National Forest. At the Simpson Township Barrens Ecological Area two limestone barrens are located within a matrix of dry and dry-mesic upland forest each with a southwestern aspect. The dry and dry-upland oak forests are dominated by post oaks (Quercus stellata), white oaks (Quercus alba) and black oaks (Quercus velutina). Pignut hickory (Carya glabra), and mockernut hickory (Carya tomentosa) are also commonly encountered. Unlike the barrens community the forested matrix is characterized by sandstone cliffs, sandstone boulders and other sandstone rocks giving the soils a somewhat sandy consistency. The soils are acidic and support a flora completely different from the limestone barrens.

Site Treatment History
The Strike Team was contacted in June 2014 by Jody Shimp, regional coordinator for the Illinois Department of Natural Resources to control white sweet clover growing roadside along the high quality barren community. Given the unique characteristics of the adjacent barren community, the infestation was considered top priority and control was implemented just a few days after initial contact. The ISST revisited the site in late September 2014 to control Japanese stiltgrass and Chinese lespedeza. The Strike Team manually removed all lespedeza found to eliminate any potential seed source and controlled the stiltgrass growing on both sides of the road that makes up the eastern border of the barren community. In the summer of 2015, the Strike Team followed up treatment on Japanese stiltgrass found growing along both sides of the road. The ISST returned in the summer of 2016 and again treated all sweet clover found growing roadside via chemical-foliar application. While doing an assessment and retreatment later that summer, the team found an occurrence of Chinese yam and garlic mustard. The yam was foliar sprayed and the bolting garlic mustard plant was hand-pulled and removed from site. Follow up treatment for all four invasive plant species is scheduled for the early summer of 2017.

Chemical Treatments

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melilotus alba (white sweet clover)</td>
<td>2% 2,4-D</td>
<td>Foliar</td>
</tr>
<tr>
<td>Dioscorea polystachya (Chinese yam)</td>
<td>2% Aquaneat (glyphosate)</td>
<td>Foliar</td>
</tr>
</tbody>
</table>

Manual Treatment

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliaria petiolata (garlic mustard)</td>
<td>Hand pull</td>
</tr>
</tbody>
</table>
Talbott Hollow USFS

Site Statistics
County: Jackson
Size: 7 acres
Ownership: USFS
Days worked at site: 3
Man hours: 24
Acreage chemically treated: 10.58

Site Description
The Talbott Hollow garlic mustard sites are located south of the Dry Hill Community along two roads. The western infestation is along Logan Hollow Road and a powerline right-of-way; it is about 3 acres in size. The eastern infestation surrounds a bend of Forest Service Road 798 and is about 4 acres. Areas surrounding the roads are highly disturbed Dry to Mesic Upland Forest. The powerline right-of-way is periodically mowed and cleared of brush and is also highly disturbed.

Site Treatment History
Until 2013, both infestations were hand-pulled by Forest Service staff. In 2014 Forest Service personnel foliar sprayed the western infestation with glyphosate. In 2015 contractors foliar sprayed and hand-pulled both the eastern and western infestations. The Shawnee National Forest has planned to conduct prescribed burns in tracts surrounding these infestations since 2009, but so far, no burns have taken place there. Throughout the 2016 field season, the ISST sprayed the garlic mustard infestations twice, once in the early winter and again in the late fall. So far in the 2017 field season the team foliar sprayed all basal rosettes found in the early spring. Follow up treatment is scheduled for the fall and winter of 2017.

Chemical Treatment
Species (common name) % Herbicide (Chemical Name) Method
Alliaria petiolata (garlic mustard) 2% Aquaneat (glyphosate) Foliar
Tower Rock Recreation Area

Site Statistics
County: Hardin
Size: 30 acres
Ownership: USFS
Days worked at site: 5
Man hours: 42
Acreage chemically treated: 11.26
Acreage manually treated: 7.06

Site Statistics
Tower Rock is a recreation area located along the Ohio River in extreme southern Hardin County. The site includes a 1/8 mile trail leading to Tower Rock, which provides a scenic view of the river, as well as a campground, picnic area, and boat ramp. The area contains 1 state-threatened lichen, which is also listed as a USFS sensitive (Regional Forester’s Sensitive) species.

Site Treatment History
Garlic mustard grows in the forest understory in a wide range of light availability and soil moisture conditions. Left untreated, it can form large, homogeneous populations and displace almost all native vegetation. Garlic mustard has been herbicide treated at this site since 2012. The Strike Team continued treating garlic mustard rosettes here in the late fall of 2015 via foliar application. During the 2016 field season, the team hand-pulled garlic mustard plants several different times throughout the spring growing season. In the late winter and early spring of 2017, the ISST sprayed basal rosettes in the previously treated areas and then returned to hand-pull second year plants to ensure no new seed was being dropped on site. The ISST will follow-up treatment throughout the late fall and early winter of 2017, in hopes to eliminate any seed from being set on site in the spring of 2018.

Chemical Treatment
Species (common name) | % Herbicide (Chemical Name) | Method
--- | --- | ---
Alliaria petiolata (garlic mustard) | 2% Aquaneat (glyphosate) | Foliar

Manual Treatment
Species (common name) | Method
--- | ---
Alliaria petiolata (garlic mustard) | Hand pull
Trail of Tears State Forest

Site Statistics
County: Union
Size: 5114 acres
Ownership: IDNR
Days worked at site: 11
Man hours: 75
Acreage chemically treated: 121
Acreage treated with prescribed fire: 820.17
Acreage of TSI: 6.63

Site Description
Trail of Tears State Forest lies within the southern section of the Ozark Hills Natural Division, one of the most rugged landscapes in Illinois. Trail of Tears State Forest is a multiple-use site managed for timber, wildlife, ecosystem preservation, watershed protection and recreation. The variety in plant communities is influenced by the terrain, soils and unique geology. Dry ridgetops and south-facing slopes have black oaks, white oaks and hickories. Extremely dry sites contain prairie-like openings (barrens and hill prairies) with a mingling of gnarled open-grown trees and shrubs like wild azalea, farkleberry and low-bush blueberry. The shaded north-facing slopes and protected coves support stands of American beech, sugar maple, red oak, tuliptree and cucumber magnolia. A rich understory of shrubs, including pawpaw, buckeyes, bladdernut and hornbeam, exists in moist sites. In stream valleys, a canopy of American elm, sweetgum, tuliptree, sycamore and sugar maple over a shrub layer of redbud, deciduous holly and spicebush, and thickets of wild cane occur. The wildflower flora of the forest's lower slopes and valleys is lush and diverse.

Site Treatment History
At Trail of Tears State Forest, the ISST targeted nine species of invasives. Bush honeysuckle, multiflora rose, autumn olive, and winged burning bush are widespread throughout certain areas of the understory. In early January, 2015 the Strike Team implemented basal treatments on these species throughout the forest. Japanese stiltgrass treatment was concentrated to the day use areas and along major trails to prevent distribution by park users. A small population of kudzu that was thought to be eradicated was discovered by the ISST in 2010, and was treated during flowering for the fourth year in 2014. In 2015, there was relatively no new shoots of growth so the ISST treated the few stems found via basal application. The population has decreased significantly since treatment started in 2010. Chinese yam treatment took place this summer with a noticeable decline in its population as 2015 was the fourth year of treatment for this species. Two satellite populations of oriental bittersweet were found north of the originating infestation that sits just behind the old nursery bunker. These populations were considered an EDRR treatment and were controlled in December, 2014. The ISST assisted IDNR and site staff with three prescribed fire timber units burned March 21 and November 14, 2014 and one timber unit in the spring of 2015. The Strike Team also participated in a River to River CWMA and IDNR one day collaborative treatment effort to control bush honeysuckle and autumn olive in the forest understory in December 2014 and once again in December 2015 treating winged burning bush as well. Throughout the 2016 field season, the ISST installed fire line and assisted with the prescribed burn of a large timber unit at the state forest. The team once again participated in a collaborative work day focusing on woody invasive species in early December. The team also began work on a TSI project with collaborative partners, targeting beech and maple species using cut stump techniques to restore oak-hickory dominance at
the state forest. Throughout the early winter of 2017, the team continued to work on the TSI project and again implemented fire line and assisted with the prescribed burn on another high-quality hardwood unit. The team will continue to assist with the TSI project throughout the 2017 field season and plans to spray Japanese stiltgrass throughout all the fire trails on both the north and south ends of the state forest.

**Chemical Treatments**

<table>
<thead>
<tr>
<th>Species (common name)</th>
<th>% Herbicide (Chemical Name)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lonicera maackii</em> (bush honeysuckle)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
<tr>
<td><em>Elaeagnus umbellata</em> (autumn olive)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
<tr>
<td><em>Rosa multiflora</em> (multiflora rose)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
<tr>
<td><em>Euonymus alatus</em> (winged burning bush)</td>
<td>20% Element 4 (triclopyr)</td>
<td>Basal bark</td>
</tr>
</tbody>
</table>

**Prescribed Fire Treatment**

<table>
<thead>
<tr>
<th>Species (common name)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Elaeagnus umbellata</em> (autumn olive)</td>
</tr>
<tr>
<td><em>Lonicera maackii</em> (bush honeysuckle)</td>
</tr>
<tr>
<td><em>Lonicera japonica</em> (Japanese honeysuckle)</td>
</tr>
<tr>
<td><em>Euonymus alatus</em> (winged burning bush)</td>
</tr>
</tbody>
</table>
Union County State Fish and Wildlife Area

Site Statistics
County: Union
Size: 6,202 acres
Ownership: IDNR
Days worked at site: 1
Man hours: 5.5
Acreage treated with prescribed fire: 34.77

Site Description
The Union County State Fish & Wildlife Area was acquired by the Illinois Department of Natural Resources in the late 1940s and developed a wintering goose population in excess of 50,000 birds by 1964. Since then, controlled harvest through the quota system and continued provision of quality winter sanctuary and food have contributed to a total southern Illinois winter population of nearly 500,000 Canada geese. The Union County segment of this population varies from 50,000 to 100,000 each winter. Union County State Fish & Wildlife Area encompasses 6,202 acres in the Lower Mississippi River bottomlands division of Illinois. Numerous shallow sloughs and other water areas totaling approximately 1,100 acres are scattered throughout the area. More prominent water areas include Grassy Lake (350 acres) and Lyerla Lake (275 acres). Of the 5,350-acre land area, approximately 2,400 acres are cultivated. The remaining acreage is timber, brush or permanent grass cover. By far the most intensive activity on the area is farming. Each year a variety of hard grain and green forage crops are planted and left standing to provide food for wintering geese. More than 2,400 acres of corn, sunflower, wheat, clover and other crops are established for this purpose. Union County State Fish & Wildlife Area is a haven for many diverse forms of wildlife. The most prominent throughout five months of the year are the phenomenal flocks of wintering Canada geese and other waterfowl. White-tailed deer, bald and golden eagles, and many other interesting types of wildlife are commonly observed by visitors to the area.

Site Treatment History
In the spring of 2017, the Strike Team assisted the local district wildlife biologist with prescribe burning a grassland field within the refuge. The burn was implemented to increase thick, native grassland cover for ground nesting birds and decrease encroaching, woody stems scattered throughout the unit. The team assisted with ignition operations and mop up to ensure all fuel was consumed and no adjacent fields had been ignited.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Ailanthus altissima (tree of heaven)
Whiteside

Site Statistics
County: Pope
Size: 315 acres
Ownership: USFS
Days worked at site: 2
Man hours: 24
Acreage treated with prescribed fire: 315

Site Description
The project is located on national forest land, within the Shawnee National Forest, on the Waltersburg Quadrangle in Pope County, Illinois. The project lies within the Lusk Creek watershed. The project area lies in the Shawnee Hills where topography is generally characterized by its broad ridges running east to west with associated valleys and drainages. The project area can be described as a fairly flat to gently rolling stand of timber. Elevation changes throughout the unit are a maximum of 100 feet. There are two intermittent streams that bisect the unit from west to east. Overall topography slopes downhill to these two streams.

The primary vegetation type is a closed timber stand of fairly dense short leaf pine with a minor component of hardwoods. The pine stands are mature 40–70 year old short leaf plantations that occur throughout the unit. Mixed hardwoods present include oak, hickory, red maple, sugar maple, sweet gum, ash, box elder, yellow poplar, red bud, and dogwood. Riparian and cove hardwoods occur between the two intermittent streams and around the pond near the western boundary of the project area. Understory vegetation is primarily poison ivy and Japanese honeysuckle; however other shrub species and ferns exist in small numbers throughout the unit. Non-native invasive plants are fairly common throughout the unit such as multi-flora rose, autumn olive, Japanese stilt grass, Japanese honeysuckle, and Ailanthus.

Site Treatment History
Whiteside has been burned 4 times since 2004 to reduce shade-tolerant species (maple, elm, etc.) in the understory and increase sunlight penetration to the forest floor to promote shade-intolerant species (oak, hickory) and associated species. The Strike Team assisted with the fire line and burning the unit in the early spring of 2017.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Ailanthus altissima (tree of heaven)
Wise Ridge State Natural Area

Site Statistics
County: Johnson
Size: 555 acres
Ownership: IDNR
Days worked at site: 1
Man hours: 20
Acreage treated with prescribed fire: 274.60

Site Description
Wise Ridge (LWR) is a 381-acre Illinois Department of Natural Resources-owned, natural area. The area contains dry upland forest, dry-mesic upland forest, and mesic upland forest. The vegetation on this tract includes both open and dense stands of oak-hickory timber. The site also has approximately 47 acres of non-native pine planted approximately 1987. In 1980, biologists identified several (3-4) small limestone glades. Both big and little bluestem was found on these glades. Indiangrass was found in open woods but was not common in the glades. In presettlement times, the entire area was forested and much forest remains. Wise Ridge LWR is located in the Shawnee Hills Natural Division, Greater Shawnee Hills Section.

Site Treatment History
Three miles of permanent fire lines were installed in July 2015. The work was completed by contract. Funding came from the Wildlife Habitat Fund $9,999. Forest Inventory of the property was completed by IDNR staff in June 2015 for the West Unit. The site was further inspected by IDNR staff and a scope of work completed for selective tree and shrub removal for woodland enhancement, additional permanent fire line installation, and invasive species projects to be completed in 2016 with funding from T-84-D-1 Statewide Public Lands Forest Wildlife Habitat Restoration Project. IDNR staff completed upcoming prescribed burn plans for the site in the summer of 2015. In November, 2015 a 97-acre burn was conducted by IDNR staff and The Nature Conservancy’s Southern Illinois Invasive Species Strike Team. The west unit was burnt to eliminate competing woody vegetation and restore native hardwood regeneration throughout the IDNR property. In February, 2017 the Strike Team offered additional resources in prescribe burning all three units within the state natural area with IDNR and other staff.

Prescribed Fire Treatment
Species (common name)
Elaeagnus umbellata (autumn olive)
Lonicera maackii (bush honeysuckle)
Lonicera japonica (Japanese honeysuckle)
Appendix A: Time Allocation

The Invasive Species Strike Team keeps detailed records of man hours spent on various activities each day. Time is recorded in six different categories. The breakdown of man hours and percent of total time worked from January 2016 through April 2017 is as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Man Hours</th>
<th>Percentage of Total Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>523.25</td>
<td>12</td>
</tr>
<tr>
<td>Collector (Inventory &amp; Mapping)</td>
<td>457.50</td>
<td>11</td>
</tr>
<tr>
<td>Control (Treatments)</td>
<td>1766.25</td>
<td>40</td>
</tr>
<tr>
<td>Equipment Maintenance</td>
<td>195.50</td>
<td>5</td>
</tr>
<tr>
<td>Training</td>
<td>574.75</td>
<td>13</td>
</tr>
<tr>
<td>Travel</td>
<td>849.75</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,367</td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

![Time Allocation (In Man Hours) Pie Chart]

- **Administrative** 12%
- **Collector (Inventory & Mapping)** 11%
- **Control (Treatments)** 40%
- **Equipment Maintenance** 5%
- **Training** 13%
- **Travel** 19%
Appendix B: New Invasive Species Alert

Japanese Chaff Flower - *Achyranthes japonica* (Miq.) Nakai

A new exotic species has been found in southern Illinois. Japanese chaff flower, *Achyranthes japonica* (Amaranthaceae), is a perennial herbaceous plant that is native to Eastern Asia. It was first found in the United States in eastern Kentucky in the early 1980s and has quickly spread along the Ohio River and tributaries. It is currently found in seven states (Alabama, Illinois, Indiana, Kentucky, Ohio, and Tennessee). In Illinois, it was first found in 2008 in Massac County, but has since been found in Pulaski and Williamson counties.

Japanese chaff flower is easy to identify. Plants can be up to 2 meters tall (particularly in sunny areas). The leaves are opposite, simple, and entire along the margins. The flowers occur on erect spikes at the end of the stems and upper branches. Flowers are small, lack petals, and occur in a tight cluster at the end of the spike. The flowers diverge at nearly a right angle from the spike, giving the flowers somewhat of a bottle-brush look. When the fruit are formed, the spikes elongate greatly and the fruit lay flat against the spike. Each fruit has a pair of stiff bracts that aid the fruit in attaching to clothes or fur.

Japanese chaff flower seems to grow best in areas with partial sun and moist soils, but can also grow in heavily shaded and drier environments. Dense infestations have been found in bottomland forests, riverbanks, field edges, and ditches. This plant can produce an abundance of seed that is easily transported by sticking to shoes, clothing, or animal fur via the stiff, recurved bracts. If you plan on hiking in areas where this plant is present, please be sure to thoroughly clean all seeds off of your clothing and pet’s hair. If you find any infestations of Japanese chaff flower in Illinois, please contact Chris Evans at 618-998-5920 or rivertoriver@gmail.com.
### Invasive Plant Treatment Calendar

<table>
<thead>
<tr>
<th>Plant</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kudzu</td>
<td></td>
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<tr>
<td>Chinese Yarn</td>
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<tr>
<td>Japanese Honeysuckle</td>
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<tr>
<td>Garlic Mustard</td>
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<tr>
<td>Stiltgrass</td>
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<tr>
<td>Tree-of-Heaven</td>
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<tr>
<td>Bush Honeysuckle</td>
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<td></td>
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<tr>
<td>Wintercreeper</td>
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<tr>
<td>Bittersweet</td>
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</tr>
</tbody>
</table>

Legend:
- Green: Cut stump/basal bark – 20% triclopyr
- Light blue: Foliar – 1-1.5% glyphosate
- Light blue: Foliar – 2% glyphosate
- Dark blue: Foliar – 0.6% chlorpyralid
- Orange: Foliar – 1.5% Sethoxydim
- Red: Hand pull
### Appendix D: Southern Illinois Invasive Species Phenology Sheet

**Invasive Species Observation Form**

<table>
<thead>
<tr>
<th>Observer name(s)</th>
<th>Coleb Grantham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species Name</td>
<td><em>Italian Arum</em> (A. rum)</td>
</tr>
<tr>
<td>Observation Date(s)</td>
<td>May 22, 2017</td>
</tr>
<tr>
<td>County</td>
<td>Jackson</td>
</tr>
<tr>
<td>Location of Observation</td>
<td>Kirkwood Lake Spillway</td>
</tr>
<tr>
<td>Phenology stage #1</td>
<td>Seedling</td>
</tr>
<tr>
<td>Notes</td>
<td>Seedling under Zephyr Engine</td>
</tr>
<tr>
<td>Phenology stage #2</td>
<td>Seedling</td>
</tr>
<tr>
<td>Notes</td>
<td>growing amongst a zone patch</td>
</tr>
<tr>
<td>Other phenology notes:</td>
<td></td>
</tr>
</tbody>
</table>

**Invasive Species Observation Form**

<table>
<thead>
<tr>
<th>Observer name(s)</th>
<th>Coleb Grantham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species Name</td>
<td><em>Chinese Yam</em> (A. Pop)</td>
</tr>
<tr>
<td>Observation Date(s)</td>
<td>May 3rd, 2017</td>
</tr>
<tr>
<td>County</td>
<td>Union</td>
</tr>
<tr>
<td>Location of Observation</td>
<td>Lavine Fire Hills</td>
</tr>
<tr>
<td>Phenology stage #1</td>
<td>Seedling</td>
</tr>
<tr>
<td>Notes</td>
<td>abundant along Lavine Rd</td>
</tr>
<tr>
<td>Phenology stage #2</td>
<td>Seedling</td>
</tr>
<tr>
<td>Notes</td>
<td>already growing about adjacent plants</td>
</tr>
<tr>
<td>Other phenology notes:</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix E: Acres Treated Per Species

<table>
<thead>
<tr>
<th>Species</th>
<th>Acres Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn olive (E. umbellata)</td>
<td>3,467.10</td>
</tr>
<tr>
<td>Bush honeysuckle (L. maackii)</td>
<td>3,467.10</td>
</tr>
<tr>
<td>Chinese yam (D. polystachya)</td>
<td>7.65</td>
</tr>
<tr>
<td>Garlic mustard (A. petiolaris)</td>
<td>98.05</td>
</tr>
<tr>
<td>Italian Arum (Arum Italicum)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Japanese chaff flower (A. japonica)</td>
<td>64.46</td>
</tr>
<tr>
<td>Japanese honeysuckle (L. japonica)</td>
<td>3,467.10</td>
</tr>
<tr>
<td>Japanese stiltgrass (M. vimineum)</td>
<td>4.23</td>
</tr>
<tr>
<td>Kudzu (P. montana)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Multiflora rose (R. multiflora)</td>
<td>3,467.10</td>
</tr>
<tr>
<td>Oriental Bittersweet (C. orbiculatus)</td>
<td>28.25</td>
</tr>
<tr>
<td>Phragmites (P. australis)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>River hemp (S. scop)</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Sweet clover (M. alba)</td>
<td>3.80</td>
</tr>
<tr>
<td>Winged euonymus (E. alatus)</td>
<td>28.25</td>
</tr>
<tr>
<td>Winter creeper (E. fortunei)</td>
<td>8.68</td>
</tr>
</tbody>
</table>

From January 2016 through April 2017, the Invasive Species Strike Team treated 16 species of exotics for a total of 14,112.17 acres treated.
Appendix F: Standard Operating Procedures

Standard Operating Procedures for the ISST Duty Station, Giant City State Park

Office Procedures:
- Enter/leave the building through the front door or the garage door (if left open by the wildlife biologist). Make sure to lock and close the front door and garage after entering/leaving.
- Turn off any lights upon leaving the Strike Team office.
- To use the phone, dial 9-9-1 to get out of the building (do not hit a line button before dialing; simply pick up the phone).
- The fax and copier can be found in the main office. These are shared with the on-site wildlife biologist. Be sure to leave everything as you found it.
- The back storage room adjacent to the wildlife biologist’s office has a refrigerator where you can store your lunch. You are welcome to use the room, but leave everything as you found it. Do not leave the light on.
- It is your responsibility to keep the office clean.

Benefits, Holiday Calendar, Employee E-Binder
- All of this information can be found in the folder Desktop\Documents for Staff\Admin
- The E-binder is especially helpful for new employees to help get oriented with the company.

Phone and Internet
- Check all phone messages on the desk by the office door. Return any phone calls as soon as possible.
- Check cell phone messages. You may either wait until you get service or call the cell phone from the office landline and hit # when the voicemail begins. Then enter the password: 12535. The charger for the cell phone is in the desk and the car charger is left in the truck.
- To access the web, you will need to connect to the Verizon jetpack via wifi within the office. The password to connect to this is
- Log on to email.tnc.org and check email. The domain/user name for email is the same as the username to log into remote.tnc.org.
- Log onto the TNC VPN on a weekly basis, at a minimum. This is to update local security certificates.
- A list of emails and phone numbers can be found on the bulletin board. Numbers available on the board are Hobson, Shimp, Ballard, Guetersloh, Rohling, Evans, Flinn and site offices.

Weekly Meetings
- Make weekly conference call with Tharran Hobson, Jody Shimp, Shannan Sharp, and Kevin Rohling at 8:30 AM every Monday.
- Once a month, email updated Strike Team Action Plan to all IDNR, CWMA and TNC primary contacts.

Timesheets (Deltek), Reimbursements (Concur), Benefits (Peoplesoft), Strike Team Diary
- From the remote.tnc.org homepage, you can also access Deltek (timesheet), Concur (for reimbursements) and Peoplesoft (to change benefit preferences and direct deposit).
- In Deltek, the login is your staff ID number, and the domain is TNC.ORG Once logged in, click on timesheet to either open a new timesheet or view previous pay periods.
- Click on ‘Cost Center’ and then type in the two Strike team cost centers written on the bulletin board. Distribute your hours evenly between both cost centers, excluding sick, holiday, or vacation hours.
- Enter your hours and click ‘Save’. Make sure to sign your timesheet at the end of the pay period. Log off when done.
At the end of the day, be sure to enter your hours into Deltek**

- In Peoplesoft, the user ID is your staff ID number.
- Click on ‘Self Service’ and follow the appropriate links for payroll, benefits, etc.
- In Concur, the login is your staff ID number.
- Click on ‘Create’. Enter all of the fields: the report date should be the day of the first reimbursement item; the business purpose should include a list of all the reimbursement items and the associated dates.
- Find the correct expense type by using the links on the right side of the page. Enter all of the information and click ‘Save’.
- Travel Protocol: You can choose to claim the entire miles driven when you drive somewhere work related when you don't go to the office. If you go to the office during the trip then you subtract your to/from work commute from the total miles driven and claim that amount.
- When all of your expenses are accounted for, click on ‘Print Report.’ Click the ‘TNC Fax Receipt Cover Page’ and ‘Itemization’ box. Click on ‘Print Preview’ and then print the Fax Cover Page. Follow the instructions on the page.
- After a few minutes, click the ‘Check Receipts’ link to make sure your receipts have been added. When this is complete, click ‘Submit’. After Tharran approves the reimbursements you will be sent a check or it will be directly deposited, if applicable.

Diary

- At the end of each day or week, open the Strike Team Diary spreadsheet in the folder C:\Documents and Settings\Admin\Desktop\Documents for Staff\Forms. Fill out each of the columns according to your activities for the day. Follow previous formatting explained at the top of the spreadsheet. Make sure to fill out the worksheets for treatments (Site Diary), assessments (Dates of Assessment), and daily weather observations found under the other tabs of the file. The archived, comma delimited weather observation data for Carbondale can be pasted into the Excel spreadsheet. This data can be found as weekly, monthly, or set to a custom time frame and is located under the favorites in Chrome or at www.wunderground.com. This info will be used to fill out the annual report, so it’s important you take the time to fill it out.

IPhone and Laptop Set-up, Data Transfer and Storage

- The ESRI collector app program requires that the user creates a database to house the information gathered in the field.
- To prevent having several databases with different records, install and operate the Collector app database on only one PC.
- In order to use multiple devices the database needs to be shared in an online group. An invitation can be sent by the publisher.
- Before streaming any data ensure that the devices GPS accuracy is set to ( 5m )
- All of the streaming data collected is saved to the cloud and can be accessed by logging into the enterprise account and opening the shared map in the “My Content” tab, or by dragging the published service to your ArcMap from your catalog window from the “published services” tab.

Data Entry/ Uploading

- At the end of each day, press the sync icon located within the map selection window of the collector app.
- The Collector app shapefiles can be combined with an online basemaps for viewing.
- Basemaps are added by clicking the “add data” tab in the ArcMap window and choosing from the provided selection.
- Additional data is added by clicking the “add data” tab and choosing from the selection of shapefiles saved to the computer or external hard drive.
Storage
- Each IPhone needs to be charged after every use in the field. The charger and accessories are kept in the desk drawer.
- The laptop must be shut down and locked every night.

Reference Materials – Pesticides, Website, Work Orders, Collector, GIS, ArcPad
- The MSDS folder, pesticide applicator training manuals and invasive species field guides/books can be found in the shelves on the desk, and the tan file cabinet. There is also a copy of the MSDS in the truck.
- The TNC Global Invasive Species Team website contains a lot of information on treatment, specifics on chemicals, and related subjects. Refer to the website http://www.invasive.org/gist/handbook.html.
- The Green binder marked ‘Work Orders’ contains all of the work orders, organized by species. The file ‘Work Orders’ in the folder: C:\Documents and Settings\Admin\Desktop\Documents for Staff\Forms has all work orders for species by site. Update this when you receive a new work order. The work orders can also be found on the website (beginning in October 2011).
- Additional reference can be found in the bookmarks bar of the internet browsers.
- For additional information on building a database and using the Collector app visit www.training.esri.com & www.resources.arcgis.com/en/help/
- Using the “help” tab within the ArcMap program is a good resource.

Pesticide Storage and Recycling
- All pesticides must be stored in the green chest at the southernmost end of the garage a Giant City.
- Maintain a monthly inventory of pesticides, and give to Jody Shimp
- All recyclable material is to be appropriately broke down, cleaned (triple rinsed), etc… for placement in the recycling receptacle located south of the office. All non-recyclable material is to be placed in the dumpster south of the office.

Truck
- On daily basis be sure to have: cellphones, camera, gloves, flagging, eye wash, toolboxes, PPE (personal protective equipment), water for drinking and eye wash, water for mixing pesticide, roadside assistant kit, bung wrench, state cell phone and charger, bungees, tarp, instant soap and water, towels, trash bags, tool boxes, inverter, extra gas, brushes and compressor for boot cleaning, a few gallons of water and pressure washer for cleaning truck tires, and MSDS safety sheets.

Maintenance
- Check fluids and tire pressure on a weekly basis. Refer to IDNR for any major repairs. It is your responsibility to keep vehicles up to date with fluid changes, tire rotations, etc. Call the State Garage in Carbondale to schedule work. Their number is on the bulletin board behind the office desk.

Fueling
- Credit card is to be kept in glove compartment; do not leave the pin # with the card. Have card, truck mileage, and pin # ready at pump.
- **Not all stations accept the credit card, so be sure to have enough fuel if you are in an unfamiliar area.
- Be sure to keep the receipts with the credit card. At the end of each month, report the total cost of the receipts and the ending mileage to Josie at the IDNR region 5 office in Benton.
- Josie’s email is josie.walters@illinois.gov

Parking/ Keys
- Leave in the office garage overnight, locked. Store the keys in the office in the desk drawer.
- Leave one spare key hidden on the truck either in a hide a key box or somewhere hidden in the bed. One other spare key is to be placed in a desk in the office.
Winterizing

- Before winter season flush entire tank and pump with antifreeze thoroughly to keep from freezing and rupturing pump on sprayer. Drain tank of all water/pesticide, fill with 5 to 10 gallons of antifreeze and run pump and sprayer until all sprayed liquid is bright pink (or color of specific antifreeze).
- Use a fuel stabilizer in the pump engines (Seafoam), if they may sit idle during winter.

Shop/ Equipment Maintenance

- Storage of items: the shop is ours to use, but ask Calvin Beckman if you want to use or move any equipment around.
- Burn equipment includes: gas powered blowers, chainsaws, saw kit, drip torches, gasoline/oil mix, drip torch mix, hand tools, radios, PPE (helmet, eye protection, leather boots, leather gloves, nomex pants/shirt).
- Blowers should be tested before each use by starting and running for a few minutes to ensure good condition. If stored for a long period of time either start every other week to let gas run through the motor or treat fuel with fuel stabilizer.
- Chainsaws require close attention before and during any use. Frequently check chain tension on bar, sharpness of chain, gas and bar oil levels before and during use. Periodically check air filter and clean if necessary. If stored for a long period of time treat with a fuel stabilizer and store in a high dry area.
- Saw kit includes extra chains, wedges, small ax, and tools for servicing chainsaw. Pulaskis should be sharpened periodically according to use.
- Ensure that the radios are in the chargers overnight if planning for a burn the next day.
- Pesticide treatment equipment includes: PPE, gas powered brush cutter, chainsaw, loppers, handsaws, hand and backpack sprayers.
- Brush cutters should be tested before each use by starting and running for a few minutes to ensure good condition. If stored for a long period of time either start every other week to let gas run through the motor or treat fuel with fuel stabilizer.
- Sprayers should be emptied if they are not going to be used for a few days. Extra pesticide can be stored in triple-rinsed pesticide containers; just print off a label and affix it to the container. Rinse the sprayer with the tank cleaner; make sure to spray the cleaner through the hose until all pesticide is removed from the hose.

Safety/ First Aid

- A first aid kit can be found in the truck and in the shop.
- MSDS safety sheets can be found in the truck or in the ISST office on the desk.

Standard Operating Procedures for Field Work, Invasive Species Strike Team

Pesticide Application Preparation

- Check weather for the day on the internet. Ensure that the forecast is suitable for ecologically responsible pesticide application.
- If you are unsure of which pesticides or treatment methods to use, ask Kevin Rohling or one of the heritage biologists, or refer to the TNC Global Invasive Species Team Handbook link on Chrome.
- All of the equipment can be found in the shop and the pesticides can be found in the locked storage unit at the southernmost end of the shop.
- Radios can be found in the office.
- You can fill up water at the office from the water hose on the south end of the building, or at several DNR site offices. For larger jobs when larger volumes are required, you may purchase water from the city of Vienna, Mounds, Cobden, Marion or other regional municipalities for around 25 cents per 50 gallons.
When mixing pesticides, you must triple-rinse any empty containers and add the rinsate to your existing tank mix. This habit will eliminate the need for special rinsate disposal in the future.

For spills: paper towels and an orange box containing kitty litter, etc. can be found inside the truck.

**On-Site Pesticide Application**

- Be sure to reference the work order to see if there are special considerations for the site-this is your responsibility.
- Flagging the treatment sites is optional, but is helpful if you are working at one site for several days. Also, the GPS is not too accurate, so if you plan to revisit the same patches the following year, flagging will save you time.
- For spills: paper towels and an orange box containing kitty litter, etc. can be found inside the truck.
- Lunch is eaten on-site; there is instant soap and water and paper towels in the truck you can use to clean your hands.

**Collector and Treatment Record Keeping**

- For each treatment area collect the following data in Collector:
  - **Occurrence**: this refers to a point inside of an infestation (one occurrence per species if there is more than one invasive present). You must have at least one occurrence per assessment and treatment (limit: 14 occurrences per treatment polygon).
- In order to use the collector app, the strike team first created a database to house streaming data while in the field. This database was created using ArcMap 10.2.
- After the database was created and all of the desired attributes were added it was published to TNC’s online enterprise account as a “GIS Service”
- The “GIS Service” was used to create the ISST_2015 online map, and has been used during the 2015 field season.
- To access the online map go to [www.tnc.maps.arcgis.com](http://www.tnc.maps.arcgis.com). Using your TNC email address fill in your username and password and press “log in”.
- All of the attributes that are collected are stored on a table within the online map.
- This table is accessible using ArcMap, but edits are done online or with an IPhone, Ipad or Android smart phone.
- The features collected while in the field are area, chemical, ownership, species, treatment-type, specific notes on a certain population, date, rate of chemical, phenology, acres treated, gallons used, bags filled and time spent.

**Truck Usage in the Field**

- Make sure to lock the truck when you are out in the field and remove any items from the bed of the truck that might be stolen.
- Pesticide and any other sensitive equipment are to be kept and locked in the toolbox on the bed.
- Cover the pump engine and any other equipment (especially any small engines) with the oil tarp if you are out in rainy weather.
- The overhead lights on the truck can be used if you are operating in a high traffic area. The controls are on the dashboard to the right of the steering column. The overheads are not easily visible from the rear of the truck, so it is recommended that the hazard lights are used as well.
- The winch control cable can be found inside the truck. The ‘IN’ button sticks, so you may have to fiddle with it. If the winch is not operational, check the breaker attached to the truck’s battery and reset.

**ATV Usage**

- ATVs are stored at Giant City State Park northeast of the office along with the trailers.
- The ball and hitch pin are in the truck.
- Make vehicle checks prior to leaving- tire psi, etc.
• The keys for the ATVs are already in the machines.
• The two Polaris Rangers have safety lights you can use if you will be working on the roadside or at a burn.

Truck/ Boot Cleaning
• At the end of each day, hook the inverter to the battery on the truck and attach the air compressor. Use the hose to spray off your boots; there are several brush scrubbers you can use as well. Make sure to wash your boots in the area you were working, before you return to the Giant City office.
• If the truck has been parked in an area that may have invasive seeds (e.g. not on a road), you will also need to wash the tires. If you have clean water in the main truck tank, simply use the engine to wash down your equipment.
• When back to the shop, utilize the shop vacuum to clean and quarantine seeds from the grill and engine compartments of the truck and ATVs.

Collector App Daily Data Backup
• In order to use the collector app, the strike team first created a database to house streaming data while in the field. This database was created using ArcMap 10.2.
• After the database was created and all of the desired attributes were added it was published to TNC’s online enterprise account as a “GIS Service”
• The “GIS Service” was used to create the ISST_2015 online map, and has been used during the 2015 field season.
• To access the online map go to www.tnc.maps.arcgis.com. Using your TNC email address fill in your username and password and press log in.
• The features collected while the strike team is streaming their location in the field are area, chemical, ownership, species, treatment-type, specific notes on a certain population, date, rate of chemical, phenology, acres treated, gallons used, bags filled and time spent.
• At the end of each day, press the sync icon located within the map selection window of the collector app.
• All of the streaming data is saved to the cloud and can be accessed by logging into the enterprise account and finding the shared map in the “My Content” tab, or by dragging the shared service to your ArcMap from your catalog window from the “published services” tab.
• All edits are completed online using the enterprise account login. Only those accepted to the ISST’s group have access to their online map and associated data.
• After a treatment is complete and the data has been synced it is outlined and saved as a shapefile to report on acreage and other information. This data is then backed up to an external hard drive at the end of each week.
• These outlined treatment polygons are used to report on acreage counts and additional quarterly reports.

Creating Maps in ArcGIS
• To expedite the map making process, create a map template with the following items (State and Federal boundaries, ISST_2015 map service, aerial imagery with labels) Within the layout view insert the following items (legend, scale bar, north arrow, TNC logo, TNC disclaimer, Illinois counties inset and a title bar)
• Title the map FINAL TEMPLATE and Save it to your desktop. This will save time and ensure map conformity.
• Export an “arcmap.doc” and a “pdf.” version of each site so edits can be made after the map is closed.
• Open a new project
• Click on “add data” and select a basemap
In order to use the shapefiles created using the Collector app in ArcMap, you will need to drag the desired published map from the “published services” tab. This is located in your catalog window.

All streaming features created using the app can be isolated and saved using the “clip” tool.

Using the select features tab, choose which features to clip.

In the geoprocessing tab choose the clip tool and follow the instructions in the table that appears. This will be automatically saved to the default database.

Export each shapefile to a separate file titled FINAL POLYS to use for records.

Job Objectives and Reports

A summary of job objectives can be found in the Job Objective document you create with Tharran.

An in-depth explanation of the position can be found in the ‘Contract’ document in C:\Documents and Settings\Admin\Desktop\Documents for Staff.

Quarterly reports:

Base your report off previous reports such as ‘Strike Team Progress Report Jan to March 09’ found in: C:\Documents and Settings\Admin\Desktop\Documents for Staff\reports\old progress reports

(if needed) Using the data from the Strike Team Diary, create two pie charts: one for the total number of person hours for the TNC categories and one chart for the total number of person hours based on IDNR categories.

Use the Collector app along with ArcMap to calculate the acreage for each quarter.

Use data from the Diary to calculate the time reporting.

End of Year Reports and Layouts

The End of Year Report can be found in C:\Desktop\Documents for Staff\2015

For each of the sites, you need to generate information about time spent, acreage treated, etc. Methods are listed below:

- Dates of assessment and treatment: Use strike team diary; dates are listed under ‘site diary’ and ‘dates of assessment’ tabs.
- Man Hours: Use Strike team diary; add up the man hour columns for the site under the ‘site diary’ and ‘dates of assessment’ tabs.
- Acreage chemically treated: report Treatment Acres/Hours, by Type and select the specific area.
- Add your photos from the burn season and chemical treatments.
- Site descriptions from the previous year can be re-used and there are additional descriptions in: C:\Documents and Settings\Admin\Desktop\Documents for Staff\reports.
- To report year end totals:
  - Acreage surveyed/monitored: use the total area treated chemically and mechanically (be sure to subtract any area that was treated both chemically and mechanically). Do not include prescribed fire unless you actually surveyed the area prior to burning.
  - Acres infested: use the report ‘weed inventory by area’ and add up the acreage in the ‘gross acres’ column.
- Acreage Mechanically and Chemically treated: same as infested.
- Other reports:
  - Collector reports can be generated using the online table with the attributes collected throughout the year.
- It is important to fill in all attributes while in the field for the integrity of the data.

Prescribed Burns

For each individual burn, refer to IDNR Heritage Division staff for instructions on flagging fire line, blowing and cutting line, and ignition, monitoring, and extinguishing fire. Be sure to record the prescribed fire data in Collector for ArcGIS.

Make sure to have all possible equipment staged and ready to go the night prior to the burn.
Prior to leaving the morning of the burn, it is useful and necessary to monitor fire weather prescriptions for the day and area you are planning on burning. This information is available in the ‘Fire Weather Forecast’ link at the following website: http://www.crh.noaa.gov/pah/?n=firewx. Print yourselves out a copy.

**Items to Work on During Inclimate Weather**
- Update Collector treatment maps
- Research new treatment methods/chemicals
- Clean truck/shop
- Data entry/maintenance
- Equipment rehab