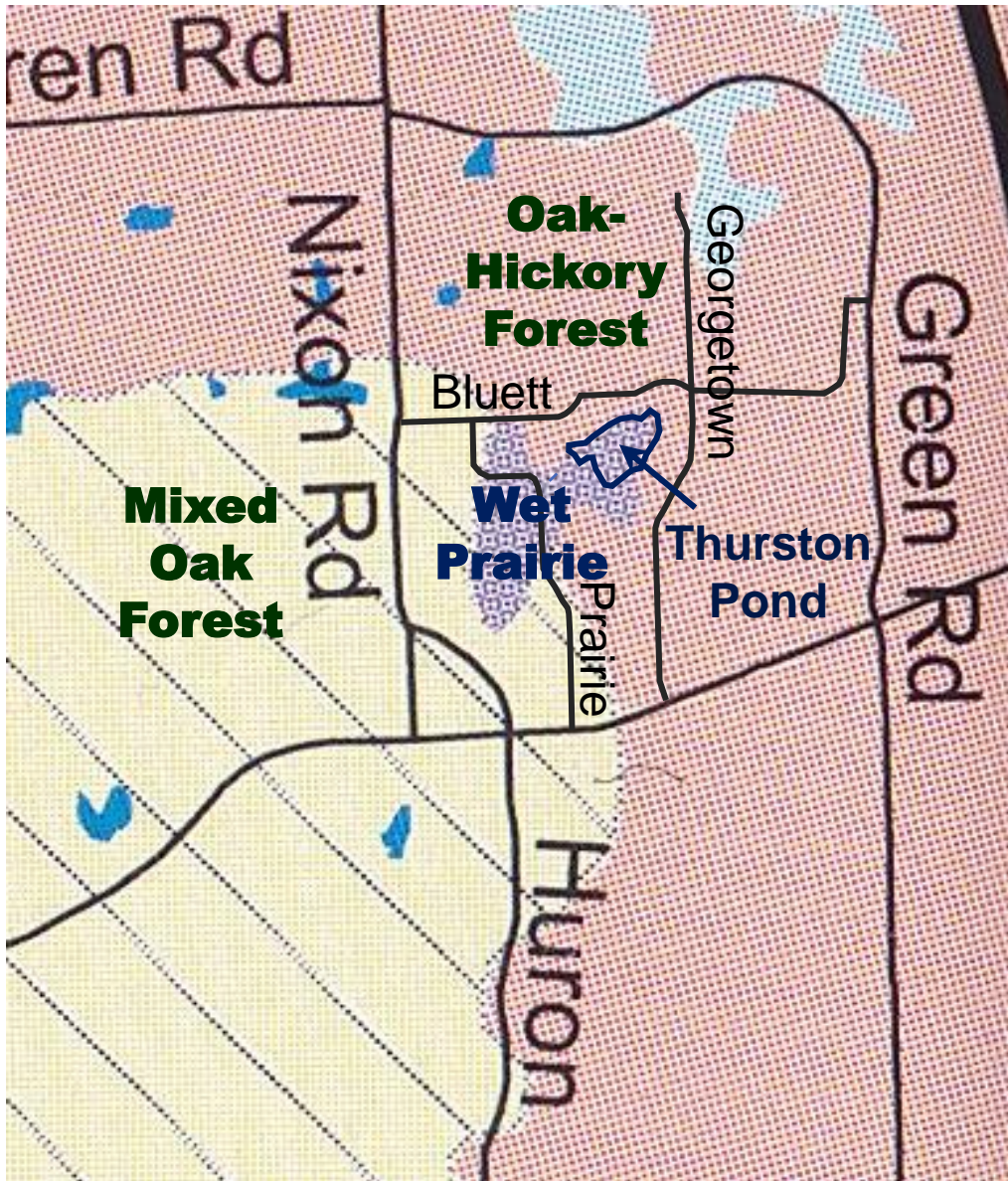


Invasive Plant Control and Controlled Ecological Burns in Thurston Nature Center



The Area in the Early 1800's



The only remaining portion of the Oak-Hickory Forest within TNC is on the north side of the pond.

It is severely degraded due to invasion by non-native plants, few native grasses and flowers, and lack of regeneration of oak and hickory trees.

Many other areas within TNC are similarly degraded.

Historical Plant Cover from "Atlas of Early Michigan's Forests, Grasslands, and Wetlands" by Albert, Comer and Enander, MSU Press, © 2008
Michigan Natural Features Inventory.

TNC Ecosystem Management Plan

- Developed by the U of M School of Natural Resources and Environment.
 - 142 pages, published May, 1997
- Covered all aspects of Thurston Nature Center:
 - Historical background
 - Description of each habitat (pond, wet woodland, upland oak woodlot, tall grass prairie, old field)
 - Social/educational aspects (trails, signage, etc.)
 - Plants (native & non-native) and animals in each habitat
 - Problem areas
 - Management plan for each habitat
- Plan included use of controlled burns to control invasive plants, regenerate the oak/hickory woodland, and promote native plant growth

Excerpt From 1997 UM Management Plan

Problem: Poor Oak/Hickory Regeneration

The young trees in the oak woodland are not oaks and hickories, but are primarily sugar maple, red maple and white ash [and non-native buckthorn and honeysuckle]. These trees belong to the beech-maple forest community. Without fire, research has found that an oak-hickory woods generally succeeds into a more mesic (moist) plant community, like the beech-maple.

Option 1: Let Natural Succession Take Place

Allowing the oak forest to continue in its path to a beech-maple may provide Thurston with yet another example of ecological dynamics. This option represents the easier of the options presented here. However, to prevent this woods from becoming dominated by exotic species, such as buckthorn and honeysuckle, these plants will still need to be monitored and eradicated.

Option 2: Burning the Oak Forest

Prescribed burns are a tested method for encouraging the regeneration of oak forests and is the management choice for ensuring the long-term existence of the oak woods. Burning has the added benefits of being a less labor-intensive way to eliminate exotic plant species, as well as recycling nutrients back into the soil. This in turn will create a “healthier” oak habitat that is more resistant to exotic invasions.

Option 3: Planting Oak Seedlings

This option is more socially acceptable, however it doesn't have the “health” benefits or exotic plant control benefits that burning the oak woods does. Essentially, planting oak seedlings in sunny areas in the forest, caused by new gaps in the tree canopy, is managing the oak woods for its existence in the short-term. In the long run, oaks can't maintain their dominance of an area without fire. The trees will be out-competed by more mesic species, unless intensive management efforts are undertaken.

Buckthorn and Honeysuckle in TNC



- Buckthorn (left) and non-native honeysuckle (right) are the primary invasives harming the TNC habitats
- Both are prolific and hard to kill without chemicals or burning
- Control includes uprooting mid-size ones, cutting and daubing the trunk of large ones with glyphosate, and burning (this will kill the thousands of small non-natives and top-kill larger ones, weakening them and preventing seeding)

Photos from TNC North Prairie prior to 2011 eradication project

Why We Cannot Ignore Invasive Plants

"To the untrained eye, the lush, green landscapes often associated with invasives may create the illusion of a vibrant, flourishing ecosystem when, in fact, many species have been lost and complex natural processes have been disrupted."

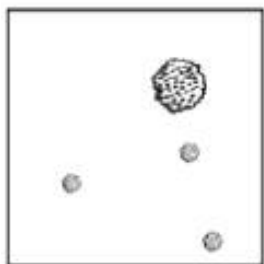
"Our mighty oaks, unusually sensitive to intense shade as saplings, are being overwhelmed by common buckthorn. Once the older trees eventually die, there will be no young oaks available to replace them. Name just about any other native tree such as hickory, ironwood, ash, beech, basswood, butternut, aspen, sugar maple, cherry, or elm. It will eventually lose in a face-off against buckthorn."

"Invasive weeds destroy wildlife habitat and food sources. Having evolved with native plant species, our wildlife relies on them for survival. If invasive weeds cause the diversity and quantity of native plants to diminish, the diversity and quantity of native wildlife will diminish as well."

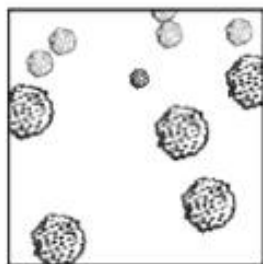
From: <http://www.wildones.org/wp-content/uploads/2012/09/WhyWeCannotIgnoreInvasive.pdf>.

Prairie/Forest Continuum

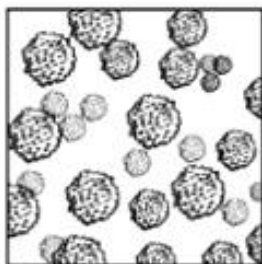
Aerial View of Tree Cover



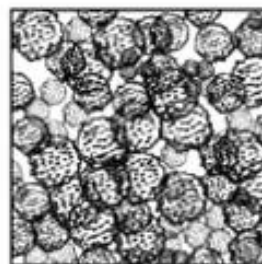
1. Prairie



2. Savanna



3. Woodland



4. Forest

From “*The Tallgrass Restoration Handbook: For Prairies, Savannas, and Woodlands (The Science and Practice of Ecological Restoration Series)*.”

1. Prairie: A grassland with few or no trees.

2. Savanna: A grassland with scattered trees. Trees are characteristically oaks, well spaced, or in clusters. May include native shrubs (e.g., Hazelnut, New Jersey Tea).

3. Woodland: An open forest with vigorous turf of **grasses and flowers throughout the growing season. Depends on frequent fires.** Many trees have **spreading lower limbs. Bright enough for oak reproduction (<80% canopy cover).** Typically dominated by oaks, but may contain hickory, walnut, elm, dogwood, plum and many other woody species.

4. Forest: Intermediate between oak woodland and maple forest. Maple forest is fire intolerant. Most tree trunks have **few or no lower branches.** Shade tolerant understory trees and shrubs, including **invasives**, are present. **Herbaceous plants are mostly ephemeral (dormant in summer) or scattered.**

↙ What we want in the Oak/Hickory Woodland

↙ What we have now, due to thick understory of invasives

Additional problem: Our Oaks and Hickories are mostly the same (old) age, with few younger trees to take their place

Why Do Controlled Ecological Burns?

- Controlled (or prescribed) burns are used for several reasons:
 - Control the growth of invasive non-native plants like buckthorn and honeysuckle that rob native plants of water, nutrients and sunlight
 - Stimulate growth of native trees and prairie and woodland plants (grasses and flowers)
 - ✧ Return nutrients to the soil
 - ✧ More sunlight to the ground
 - ✧ Essential for regeneration of oaks/hickories
 - ✧ Grasses and wildflowers are adapted to fire due to their deep roots
 - ✧ Increase native plant diversity
 - ✧ Promote seed and fruit production, providing food for wildlife
 - Prepare sites for native plant seeding (so seeds make contact with soil)
 - Create a mix of habitats, some more open than others, to benefit a greater variety of birds and other animals
 - Remove brush and plant litter, reducing the risk of uncontrolled fires



Black Swallowtail on Va. Mtn. Mint

Oak/Hickory Woodlands Subjected to Fire

- 30-80% canopy cover; sunlight can reach ground
- Oaks/hickories able to regenerate and thrive – they are fire-resistant, but saplings need light to grow
- Trees have widely-spaced lower branches
- Ground level consists of grasses and flowers that bloom spring to fall and attract butterflies and birds
- Shrubby undergrowth and invasives kept in check
- Woodland burns are slow with low flames usually 6-18" in height. Leaves and small branches on the ground, but not live trees, are usually the only materials that burn



Are Controlled Burns Safe?

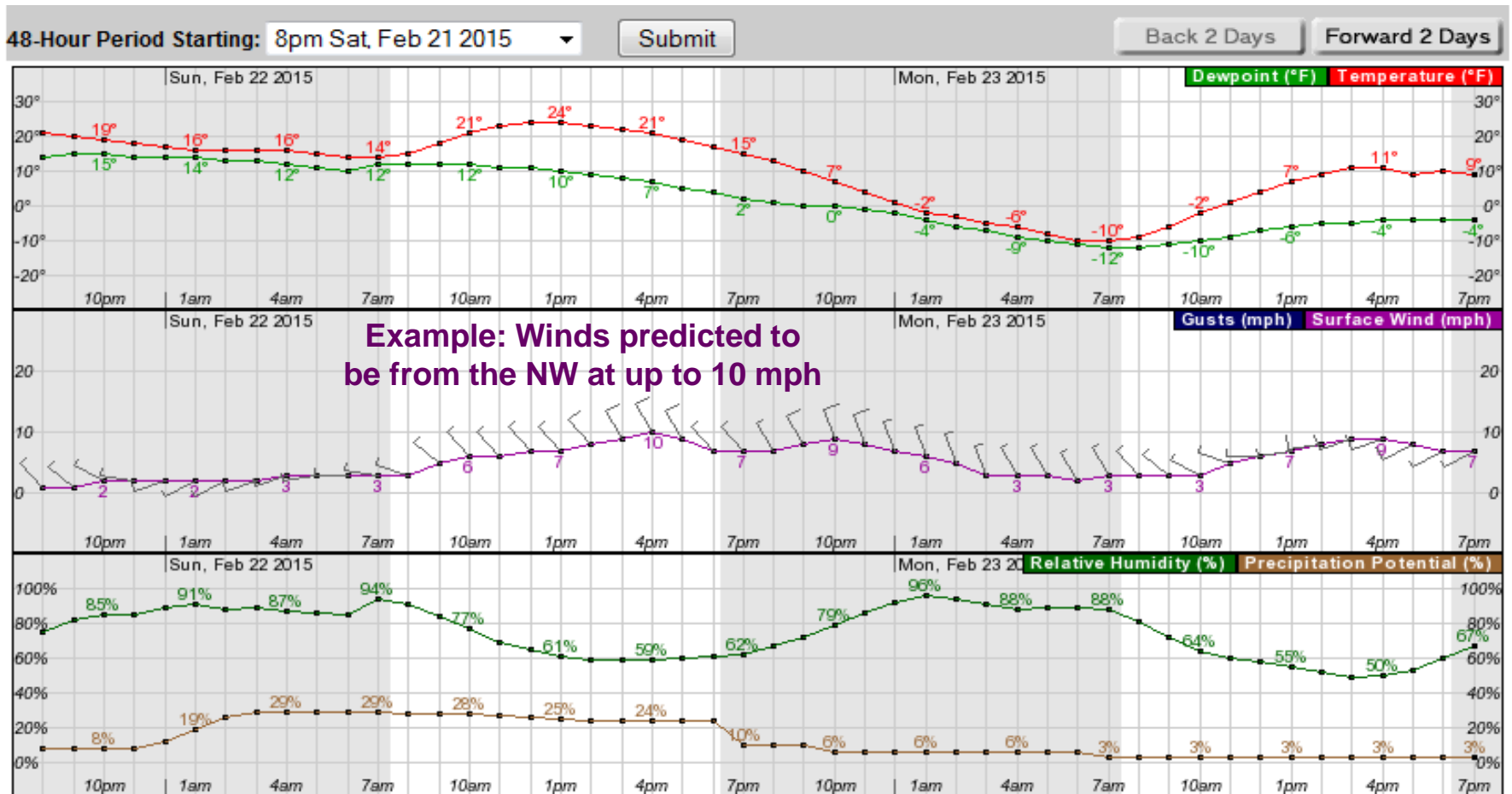
- Thurston Nature Center has several volunteers with burn training and experience from various private and public organizations. For larger areas, we have hired a professional burn crew to assist us
- Fire is set only under "prescribed" conditions:
 - Burn permit required from A² Fire Marshal
 - ✧ Requires a detailed plan for each burn area
 - ✧ Conditions and procedures must allow for control of fire spread and smoke dispersal
 - ✧ Plan includes weather, personnel, equipment and procedures
 - Weather conditions must be within specified ranges
 - Staffing and equipment must meet all plan requirements
 - Pre-burn crew briefing to ensure everyone knows the plan
 - Burn breaks are created first to prevent fire escaping from the area
 - Post-burn mop-up and monitoring
- By conducting burns under these conditions, the staff can control the location, intensity, and duration of the fire
- Fire Department Dispatch is notified before and after each burn



TNC Phragmites Burn, March 2014

What About Smoke?

- One of the conditions specified in the burn permit is wind speed and direction.
- National Weather Service forecasts are used to help ensure we are burning at times when the winds meet these conditions.



Animal Safety

- Burn timing:
 - Avoid periods when animals are breeding and raising families
 - Migrating birds are generally not here
 - Most insects are underground hibernating
- During the burn, animals retreat to burrows or move to surrounding areas, as the fire spreads slowly and only a portion of the area is burned
 - Burrowing animals need only be 1/2 inch underground to avoid the heat
 - Animals/insects under downed logs are safe
- Animal habitat is generally improved as a result of controlled fires, which stimulate a diverse, healthy natural plant community



How Quickly Do Areas Recover?

- Areas re-green very rapidly after spring burns
 - Solar energy absorbed by the blackened surface warms the soil
 - Burn returns nutrients to the soil
 - Plants respond by vigorously sprouting and sending up shoots
- This is one of the many ecological benefits of prescribed burns

These pictures are in Thurston Prairie, just seven days after the 2014 burn



When Do We Do Burns?

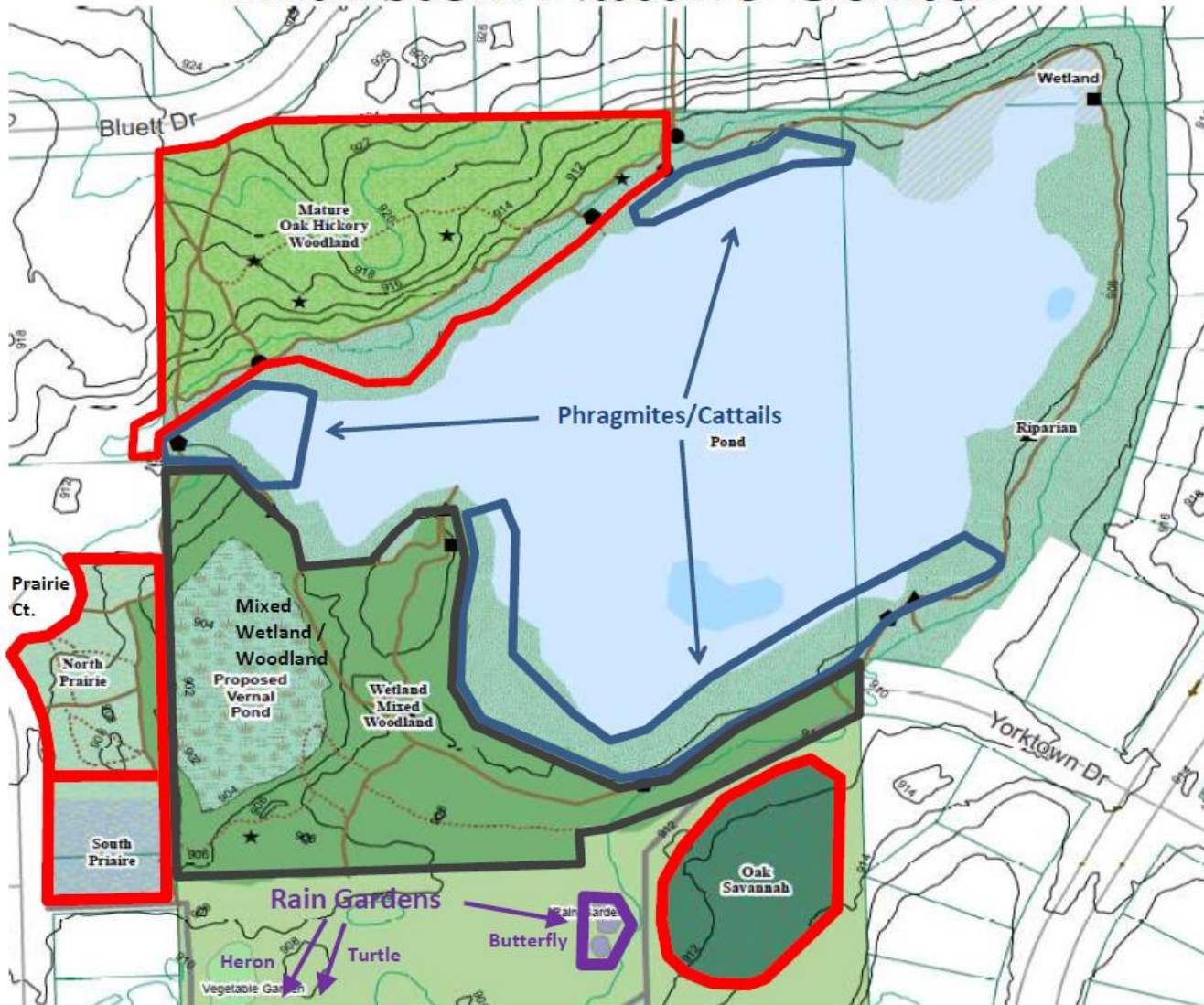
- Most burns are done in the Spring, after the areas have dried out enough to get good flame spread.
 - This is before most plants have started emerging from the ground.
- Occasionally, a burn will be done in Fall, but by the time most plants have turned brown and will burn, the weather is usually too rainy.
- Fall burns are better at killing buckthorn and honeysuckle, which are trying to send energy back to their roots in Fall.
- Because we cannot burn while school is in session, burns are done in the late afternoon, on weekends, and during school breaks. We welcome volunteers!



Burn at
Thurston
Elementary's
"Turtle" Rain
Garden,
3/22/2015

Areas Covered Under Our Burn Permit

Thurston Nature Center



- We have a burn permit on file with the Ann Arbor Fire Dept for these areas
- We renew our burn permit annually in January
- Sites are not all burned in a given year, depending on our ability to meet all permit conditions
- We do not burn while Thurston and Clague schools are in session.

Example TNC Burn Prescription (Page 1 of 2)

Information Common to All Thurston Nature Center Burn Areas

Site Ownership:	Primarily Ann Arbor Public Schools. Eastern-most portion of Center is owned by Orchard Hills Athletic Club.
Site Coordination:	Thurston Nature Center sub-committee of Thurston Elementary School PTO.
Fire Jurisdiction:	City of Ann Arbor.
On-site Contacts and Burn Leaders:	Jim Vallem (burn leader): 248-508-0753; Frank Commiskey: 734-369-0992 Michael Tucker: 734-649-8942; Colin Brooks: 734-604-4196
Other Contacts:	Fire Emergency: 911. If contact cannot be made, dial fire dept non-emergency number, 734-994-2770. Ann Arbor Fire Marshall: Kathy Summersgill (burn permits) <KSummersgill@a2gov.org>. Thurston School office (Natasha York, Principal): 734-994-1970 <yorkn@aaps.k12.mi.us> A2 Public Schools Physical Properties: 734-994-8118
People to Notify Prior to Burn:	Ann Arbor Fire Dept Dispatch: 734-477-6550 (Notify prior to, and following, the burn). Annual letter/e-mail to Nature Center neighborhood. Supplement with street signs day of burn. E-mail to Thurston School Principal.
Smoke Management:	<ol style="list-style-type: none">1) Remove any brush or downed logs prior to burn. Alternately, create burn breaks around these spots.2) Burn when wind is away from homes, or when less than 8 knots toward nearest homes.3) Create burn breaks around desirable trees and wood-chipped paths.4) Control size of fire to minimize smoke thickness.
Burn Timing:	Spring prior to greening of native plants, or fall.
Burn Objectives:	<ol style="list-style-type: none">1) Stimulate growth of native plant community.2) Suppress invasives (buckthorn, honeysuckle, phragmites).
Desired Fire Behavior:	1'-3' flames with enough intensity to kill/suppress woody invasives. (Flames will be higher in prairie areas, lower in wooded areas where leaves are the fuel)

Example TNC Burn Prescription (Page 2 of 2)

Desired Conditions:	Winds aloft 0 - 10 mph if blowing towards nearby buildings, otherwise 0-20 mph. Relative humidity under 50%.
Road Closures:	None required.
Public Viewing:	Allowed upwind on any side of area, away from any flames.
Crew size:	Minimum of three in all areas, except two for rain gardens.
Equipment Needed:	Backpack sprayers, brush cutters, rakes, flapper, drip torch, street signs, hoses.

Common Info (Continued)

Burn Prescription for North Prairie

Site Description:	Mostly level, 0.8 acre prairie, with native grasses, wildflowers, and many desirable trees not to be burned. There are large numbers of buckthorn seedlings throughout, and mature buckthorn/honeysuckle in spots.
Location:	Prairie Street near east end of Renfrew Street, two blocks north of Thurston Elementary School.
Fire Truck Access:	Truck access on Prairie Street.
Nearest Fire Hydrant:	Hydrant along Prairie St just south of site.
Smoke Sensitive Areas:	Neighbor homes on east side of Prairie St (to south), and Prairie Court (to north). Neighbor homes on west side of Prairie St (across Prairie St, to west). Thurston Elementary School (2 blocks south).
Burn Breaks:	Sidewalk on west side. Thurston Prairie (to be burned first) is to the south. Use trimmer to cut down fuel around desirable trees, then rake. Alternately, wet down the area. Paths edged with ash trunks. Remove loose bark. Trim nearby fuel, rake, wet down trunks & wood chips. Start burn at downwind edge (back burn) followed by flanking burns, then at upwind edge (head burn).
Water source:	Hoses from nearest neighbor's homes, on north and south sides of site. Backpack sprayers.

Example TNC Burn Permit (Renewed Annually)



City of Ann Arbor Fire Department
 Fire Prevention Division
 111 North Fifth Avenue
 Ann Arbor, Michigan 48104

Phone: 734.794.6979

www.a2gov.org/fire

Fax: 734.761.3592

TO:	Thurston Nature Center & Thurston School c/o Jim Vallem (734)358-0336
FROM:	Kathleen Summersgill, Fire Marshal (734)794-6962
DATE of ISSUE:	January 28, 2019
SUBJECT:	Prescription Burn
EXPIRATION:	January 27, 2020 <ul style="list-style-type: none"> Burn permit allows multiple burns, if necessary, within one year (365 days) from date of issue.
LOCATION:	Thurston Nature Center and Thurston Elementary School <ol style="list-style-type: none"> North and South Prairies Three Rain Gardens Oak Savanna (off Yorktown) Phragmites/Cattails (Westland) Mature Oak/Hickory Woodland Mixed Wetland/Woodland
OWNER:	Ann Arbor Public Schools and Orchard Hills Athletic Club

The Burn Plan attached shall be followed. This permit issued is based on the attached conditions (pg. 2).

January 28, 2019

TNC Burn Permit (Continued)

City of Ann Arbor Fire Department
Fire Prevention Division
111 North Fifth Avenue
Ann Arbor, Michigan 48104
www.a2gov.org/fire

Phone: 734.794.6979

Fax: 734.761.3592

- 1) Prior to burn, area shall be surveyed for hazards.
- 2) Neighbors adjoining the prairie are to be notified prior to burn.
- 3) Only one (1) area should be burned at a time. Each area shall be satisfactorily extinguished and cooled prior to another area being burned.
- 4) Wind conditions must be such that smoke does not drift onto roadways.
- 5) All combustible materials within ten (10) feet of the burn site shall be thoroughly wet down with water prior to burn beginning.
- 6) Minimum of three (3) crew members shall be present. If any safety violations are noted, the permit can be revoked.
- 7) Extinguishing source must remain charged and available during the entire duration of the burn.
- 8) Burn will occur on a day when atmospheric conditions will allow for adequate lifting and dispersion of smoke.
- 9) Post burn site shall be conducted to check for hot spots by a responsible party.