Welcome
Thank you to .....

Thank You
Washtenaw County Parks
Carls Foundation
HRWC Members
HRWC, based in Ann Arbor, is a professional staff of 9 who work in 3 program areas: scientific research, technical assistance and education. With volunteers corps of more than 400 people. Member organization supported by member contributions, grants from foundations and federal agencies. Pitch membership
What is the Huron River watershed?

- 900 square miles
- 63 communities
- 7 counties
- >525,000 people
The Huron River is the cleanest urban river in Michigan which can be mostly attributed to the substantial amount of natural area throughout the watershed. About 44% of the natural area remains in the form of forest, wetland, and fields.
The Bioreserve Project has been performing assessments on parcels that include at least 10 acres of natural area.

Green Infrastructure is the term used to describe natural features, such as forest and wetlands, where “gray” infrastructure would be roads, buildings, etc.
Michigan has a rich amount of natural area types because a slight change in topography can cause a change from wet meadow to forest. Our glacial history has also shaped the way our natural areas form, with different soil types changing abruptly and allowing different habitats to thrive.
Dominated by oaks like red, black, and white and hickories like pignut and shagbark.
Large open grown oaks with prairie surrounding, maintained by fires.
Usually in wetter soils than oak/hickory forests
Found in areas that hold water for at least part of the year. Can include red maple, cottonwood, swamp white oak, and ash.
A native grassland that occurs on frequently saturated soils. This ecosystem was common in southeastern Michigan until its rich soils were drained and converted to agriculture.
Often flooded with emergent vegetation with some standing water. This ecosystem hosts many interesting rare species and plants and animals. It has also experienced a dramatic reduced in area since European settlement.
78 species, 11 plant communities, and one heron rookery listed as state threatened, endangered or of concern
The glacial debris was left where it lay as the glaciers receeded.
Esker: a long, narrow ridge of stratified sand and gravel deposited by a subglacial meltwater stream. They can range from 16-160 feet in height and from 160-1,600 feet in width. Some are in broken segments, but some esker can run for tens of miles.

Moraine: an accumulation of rock debris carried or deposited by a glacier. A ground moraine is an irregular blanket of debris deposited under a glacier while an end moraine is the pushed up, ridge at the outermost edge of an ice advance.
Glacial Deposits

- Till
  - Unsorted
    - Boulders, cobbles, pebbles, sand, silt, & clay
    - End moraine, ground moraine
- Outwash
  - Sorted and stratified (Outwash Plains)
    - Outwash plain
    - Outwash Channel
      - Sands and gravels
  - Ice Contact Features
    - Ice disintegration features
    - Kettles, kames, eskers, lake terraces
No need to get into a detailed description here—the basic information will be presented later, when going over the SITE OVERVIEW worksheet.
You can see by comparing the last slide to this one how the vegetation follows roughly the soil type.
Benefits of Natural Areas

Filter & Cool Runoff
Water supply
Groundwater Recharge
Storm and flood damage protection
Erosion control

Clean Air
Regulate climate
Store and cycle nutrients
Conserve and generate soils
Pollinate crops and other plants
Pest control
Forest and food products
Wildlife Habitat
Recreation
Scenery
Biodiversity/ Genetic library
People are starting to quantify the benefits of natural areas.
Little runoff prior to development

Water infiltrates into humus and porous soil

Plants take up much water

Very little runoff in a forest
With development we change the vegetation and topography
Which alters what water does
Topsoil removal, along with bacteria, roots, and micorrhizae
Which alters the ability to clean water
Through vs Over

Water that just runs over the ground doesn’t have the opportunity to filtrate through soil, going directly into streams and rivers uncleaned and at high volume.

Going through soil and roots can help filtrate and clean water, it can be used by plant species, and stored in groundwater.
Under 10% Impervious Surface

- Low banks
- Natural buffer
- Good habitat
- Cool water
- Clear water
Between 10 and 25% Impervious Surface

- Higher, undercut banks
- Sediment
- Less diverse habitat
- Warmer water
Over 25% Impervious Surface

- Steep, eroded banks
- Little buffer
- Very little habitat
- Warm water
- Flashy
Why rapid assessment?

- Can’t protect it all
- Can’t inventory of all natural areas
- Identify areas for detailed inventory
- Contribute to land-use planning
- Enjoy the outdoors!
Look at the pre-European settlement map to get an idea of what the landscape would be like without shopping malls, towns, etc. Kind of an “a priori” – what the watershed “should” look like, view.
Now look at what it has turned into
Fragmentation increases “edge” habitat which can be ideal for invasive species. It also decreases connectivity between patches, making it more difficult for birds, butterflies, mammals, and plants to move between them.
Future Trends

- 40% of the remaining open space is projected to be developed in the next 20 years.
- Master Plans and Zoning Ordinance build outs show little designated natural area.
- Almost all natural areas in private ownership and designated for some kind of use.
- Current development patterns are low density = more natural area converted per new person.
Figure 2.13
Huron Chain of Lakes Watershed
Land Use at Buildout According
to Master Plans
Map showing current imperviousness calculated for the subwatersheds of the pilot communities. Imperviousness is indicated with shades of blue, ranging from light blue (0-10% sensitive) to dark blue (10-25% impacted). The darkest shade of blue (25-100% nonsupporting) is not shown in the map. Sources: HRWC.
Map 3. Projected Imperviousness Calculations for the Subwatersheds in the Pilot Communities

Imperviousness

- 0 - 10%: Sensitive
- 10 - 25%: Impacted
- 25 - 100%: Nonsupporting

Note: Refer to pages 29 & 31 for definitions of sensitive, impacted and nonsupporting subwatersheds.

Source: HRWC
HRWC Key Message

To maintain the Huron River watershed’s health:

I. Encourage higher density where infrastructure already exists.

II. Preserve natural areas so they can continue to provide the ecological services necessary to maintain quality of water, air, land, and life.
Bioreserve Project Tasks “holding on to our natural areas”

A. Map & rank remaining natural areas
B. Further ground-truth and examine natural areas with a rapid ecological assessment
C. Strategize for natural areas protection
Aerial maps were used to outline remaining natural areas, shown here in orange.
Bioreserve Map

- Watershed includes 994,346 acres
  - 5 counties, 63 townships
- >1,700 sites mapped as potential natural areas
- Total of 247,000 acres
- ~25% of watershed’s area
How GIS Map Ranked
15 criteria, weighted equally

- Total size
- Size of core
- Topographic diversity
- Geological diversity
- Waterway
- Upland/wetland
- Remnant plant community
- Groundwater recharge
- Connectivity
- Corridors
- Restorability
- Amount of change since 1800
- Fragmentation
- MNFI “bio-rarity” index
- MNFI “special” communities

For details
www.hrwc.org/bioreserve
The assessment will describe and give qualitative measurements to these factors.
Rapid Ecological Assessment Office Procedure

- HRWC chooses sites from Bioreserve Map
- HRWC obtains permission
- HRWC forms volunteer assessment team: using Google Calendar
- Prepare: route map, preliminary plant community boundaries
- Organize site visit
- HRWC scores site
- HRWC releases report on site to volunteers, community, other participating organizations and partners
Rapid Ecological Assessment Field Tasks

- You pick dates from Google Calendar:

- Team forms, picks tasks: one expert, one captain/team leader, one records

- HRWC provides packets (Guide, forms, maps, directions)

- Site visit (3 - 4 hours per visit). Bring camera
This site contains all information on volunteering, including where to find our calendar, and more details about the project.
Assessing the Site

- Examine photo, map
- Walk through marked areas
- Assess soils, vegetation, disturbance
- Alter boundaries as needed
- Code with worksheets
- Summarize
The site overview and summary should be read first and filled out last.
I. Instructions & Site Map

1. The attached aerial photo is marked to indicate a proposed route and provisional boundaries of different natural areas types: Wetlands, Grasslands, Marshlands, Forests, and Creeks.

2. As you walk through the site, fill out a worksheet for each different natural area (wetland vs. grassland vs. forest vs. creek) that you encounter (this may be different from what is indicated on the aerial). Make sure to label each topic of the worksheet, since you may find more than one wetland, forest or grassland as you walk the site. LABEL EACH WORKSHEET. If there is more than one natural area, note by a letter on the map and the worksheet (fill in the blank on both sides of the worksheet: "WETLAND_A")

3. Make sure to fill out every question on worksheet.

1. Check how many of each worksheet you filled out.
   - 1) Wetlands Worksheet: Area has meandering water (rivers, creeks) occasionally or periodically during year: __________
   - 2) Forests Worksheet: Trees occupy >50% of the area: __________
   - 3) Grasslands/Marshlands Worksheet: Green: __________
   - 4) Creeks Worksheet: __________

4. Sketch the actual boundaries of each natural area you survey on the aerial. In the office, we will be recording the size of each natural area.

5. Sketch the route you took through the property.

6. After completing all the worksheets, fill out the SITE OVERVIEW WORKSHEET on the reverse side of this page and the SITE SUMMARY WORKSHEET (last page).

- Change routes and boundaries on map, if needed
- Use multiple worksheets if needed
- Noncontiguous wetlands can be on same sheet if you think they are similar/connected.
- Could have a bunch of vernal pools within a forest
I. Site Map

- Provisionally identifies community types
- Map marked with boundaries
- Use to figure out route
  - Traverse each community
  - Travel perimeter of wetlands or length of creeks
- List how many worksheets used for each community type
I. General Community Types

Four types marked on site photo:

- **III. Wetlands**
  - Standing water part or all of year

- **IV. Grasslands/Shrublands**
  - < 50% trees

- **V. Forests**
  - > 50% trees

- **VI. Creeks**
You may not be assigned to do the entire site, or you may plan to do it but discover that you run out of time before you can complete it. That's okay! The important thing is to clearly label on the map which areas you DID assess, and to clearly indicate on the worksheets which part of the map they correspond to.
For site overview: If you are not going to cover whole site in one visit, do site overview questions, but note which sections of map they cover.
III. WETLANDS

### III. WETLANDS WORKSHEET

#### III.1. Hydrological conditions. Wetlands are areas that have standing water periodically, for at least some part of the year, where plants with particular adaptations to wet conditions typically grow, and manual (shovel or hand) soil analysis may be necessary. Characterize the area where this wetland occurs. Check all that apply:

- [ ] In or near a river, stream, or gravel bar
- [ ] In or near a lake, pond, or pool
- [ ] In or near a swamp or marsh
- [ ] In or near a lake or wetland
- [ ] In or near a delta or estuary
- [ ] In or near a wetland or marsh
- [ ] In or near a river or stream
- [ ] In or near a lake or pond
- [ ] In or near a coastal wetland
- [ ] In or near a riverine wetland
- [ ] In or near a lacustrine wetland
- [ ] In or near a saline wetland

#### III.2. Appearance of soil. If there is a large soil in the area from a tree, topsoil, or erosion, characterize the soil. Check all that apply:

- [ ] Sandy
- [ ] Loamy
- [ ] Clayey
- [ ] Silt
- [ ] Organic

#### III.3. Vegetation structure. Observe the features and patterns of the vegetation. Check all that apply:

- [ ] Vegetation changes in different areas or regions
- [ ] Vegetation changes in the same species, same species, same species, same species
- [ ] Vegetation changes in the same areas, same areas, same areas, same areas
- [ ] Vegetation changes in the same species, same species, same species, same species

#### III.4. Vegetation type. Check off all species that you recognize in the following vegetation groups. For Within each group of species, circle one that dominates:

- [ ] Natives evergreen and floating-leaved plants:
  - [ ] Rhododendron
  - [ ] Willow

- [ ] Natives grasses and grass-like plants (sedge, sedge, sedge, sedge):
  - [ ] Sedges
  - [ ] Sedges
  - [ ] Sedges
  - [ ] Sedges

- [ ] Natives herbs:
  - [ ] Labrador tea
  - [ ] Labrador tea
  - [ ] Labrador tea

- [ ] Natives shrubs:
  - [ ] Labrador
  - [ ] Labrador
  - [ ] Labrador

Continue on reverse side.
III.1. Wetlands: Hydrological Conditions

Stream, river, pond, or lake margin

Groundwater seeps, spring-fed streams

Ravines, depressions
III.1. Wetlands: Hydrological Conditions

Seasonally or intermittently flooded (may have standing water in spring)

Circle:
Vernal pond
Vs.
Floodplain
Note: DNR
vernal pond
survey
III.1. Wetlands: Hydrological Conditions

Buttressed or stained tree trunks, spreading roots, and bare soil indicate wet conditions.
III.2. Wetland soils

Mucky & peaty soils

Photo by Richard Bigley
III.3. Wetlands: Vegetation Structure

Open water with emergent marsh area

Wet meadow (grass-like plants)

Emergent marsh with shrubs
III.3. Wetlands: Vegetation Structure

- Dense, tall shrub area
- Forb area – broad-leaved herbs (wildflowers)
- Wet meadow with shrubs
- [Image]
III.3. Vegetation Structure

- Forested swamp
- Bog (evergreen shrubs, sphagnum)
- Vernal pond
- Forested floodplain
III.3. Wetlands: Vegetation Types

- Open water, emergent plants
- Native grasses and grasslike plants (sedges and rushes): may be emergent
- Forbs
- Shrubs
III.4.1. Native Emergent Plants

- Giant bur-reed
- Buttonbush
- Pickerelweed
III.4.2. Native Grasses, Sedges, Rushes

- Tussock sedge
- Bluejoint grass
- Three-way sedge
- Bulrush
- Hop sedge
- Lake sedge
III.4.3. Native Forbs
(Broad-leafed herbs)

- Ferns
- Joe-pye weed
- Lobelias
III.4.4. Native Shrubs

Clockwise, from top left: red-osier dogwood; poison sumac; shrubby cinquefoil; shrub willows.
III.4.5. Native Trees

Northern white cedar

Yellow birch

Tamarack
III.4.6. Native Bog Plants

Clockwise, from top left: Pitcher plant flower; pitcher plant leaf; bog with black spruce, leatherleaf, cottongrass; sundew; sundew on sphagnum.
III.4.7 Wetland Invasives

- common reed (Phragmites)
- Cat-tails (if growing densely)
- Purple loosestrife
- Reed canary grass
III.4.8 Total # Species

- Have your Plant ID person make a tally as you go along.
- Mystery Plants: tally unknown plants
- Make a note on plant list, e.g. “Mystery Plant #1”, then take a picture and note it on picture form.
- Count checkmarked plants + listed plants + mystery plants
- May add fudge factor number.
Now estimate the area covered by each type of plants.

### III.5 Vegetation Cover

#### III.4.8. Estimate the total number of species of all types (even if you can't identify them): ________

#### III.5. Vegetation cover. Estimate the area covered by each type of plants. (Vegetation types may overlap, so total cover can be greater than 100%).

<table>
<thead>
<tr>
<th>Type</th>
<th>None (0%)</th>
<th>A little (1–10%)</th>
<th>Common (10–25%)</th>
<th>Abundant (25–50%)</th>
<th>Dominant (&gt;50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native emergent plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native grasses, grass-like plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native forbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native shrubs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native bog/fen plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invasive species (all types)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remember, you are just estimating percentages.
So, are invasives really just along trail edges, or within interior? Then, are they just in little isolated areas? Did you find large stands? Were they all over the place?
III.7-8. Human disturbance type, extent

Ditching

Look for signs of draining (ditches) and alterations to water flow (e.g., berms)
IV. Grasslands, Shrublands

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### IV. GRASSLANDS-SHRUBLANDS WORKSHEET

**Time spent at site:** [ ]

**Surveyor:** [ ]

#### IV. Appearanace of soil: If there is bare soil and the area from a tree line-up, animal digging or human activities, characterize the soil. Check all that apply:

- [ ] Loamy
- [ ] Sandy, silty, heavy clay
- [ ] Silt or gravel
- [ ] Choke water fens
- [ ] Poor
- [ ] Light tan or brown
- [ ] Dark brown
- [ ] Black (Cirque morain, fens)
- [ ] Top 2-4" [ ] Higher or fraction
- [ ] Top 2-4" [ ] Lower
- [ ] Top 2-4" [ ] Surface
- [ ] Top 2-4" [ ] Surface

**NOTE:** If soil is完全ly or partly, or if there is standing water (24 hours after a rain or >1 week after snowfall), **PLEASE FILL OUT A WETLANDS WORKSHEET (SB) FOR THIS AREA.**

#### IV.2. Vegetation structure: Trees and shrub canopy. Check all that apply:

- [ ] 2-20 stems (100-1,000) [ ] 2-20 stems (100-1,000)
- [ ] 20 stems (1,000-2,000) [ ] 20 stems (1,000-2,000)
- [ ] 20 stems (10,000-20,000) [ ] 20 stems (10,000-20,000)
- [ ] 20 stems (100,000-200,000) [ ] 20 stems (100,000-200,000)
- [ ] 20 stems (1,000,000-5,000,000) [ ] 20 stems (1,000,000-5,000,000)
- [ ] 20 stems (2,000,000-20,000,000) [ ] 20 stems (2,000,000-20,000,000)
- [ ] Light tan, small tree and brush understorey [ ] Light tan, small tree and brush understorey
- [ ] Light tan, open canopy [ ] Light tan, open canopy
- [ ] Light tan, brush understorey [ ] Light tan, brush understorey
- [ ] Light tan, brush understorey [ ] Light tan, brush understorey

#### IV.3. Vegetation structure: Tree size distribution. Estimate the area covered by each of the following size classes.

**NOTE:** DHM = diameter at breast height, visual estimate based on comparison to the 1" by 1" sheet of paper on elephant.

<table>
<thead>
<tr>
<th>Size Class</th>
<th>Area Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;-2&quot;</td>
<td>1%</td>
</tr>
<tr>
<td>2&quot;-3&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>3&quot;-4&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>4&quot;-5&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>5&quot;-6&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>6&quot;-7&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>7&quot;-8&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>8&quot;-9&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>9&quot;-10&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>10&quot;-11&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>11&quot;-12&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>&gt;12&quot;</td>
<td>2%</td>
</tr>
</tbody>
</table>

#### IV.4. Vegetation types. Check off all species that you recognize in the following species groups.

- **Within each group of species, circle the entry that predominates:**

  **IV.4.1. Native grasses:**
  - [ ] Big Salax
  - [ ] Little Bluestem
  - [ ] Bunchgrass
  - [ ] Cylindrical grass
  - [ ] Bluegrass
  - [ ] Circular
  - [ ] Round
  - [ ] Circle
  - [ ] Other (circle)

  **IV.4.2. Non-native grasses (grass yearly & late in season):**
  - [ ] Peramas (k. Cenil)
  - [ ] Dried grass
  - [ ] Dead grass
  - [ ] Orchiella grasses (grass)
  - [ ] Orchid
  - [ ] Leaf
  - [ ] Other (leaf)

  **IV.4.3. Native forbs:**
  - [ ] Erosion control
  - [ ] Cylindrical,处罚 control
  - [ ] Erosion control,处罚 control
  - [ ] Erosion control,处罚 control
  - [ ] Other (control)

  **IV.4.4. Non-native forbs (native & non-native old-field weed):**
  - [ ] Bunchgrace,处罚 (处罚处罚)
  - [ ] Bunchgrace,处罚处罚
  - [ ] Bunchgrace,处罚处罚
  - [ ] Bunchgrace,处罚处罚
  - [ ] Other (处罚处罚)

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Continue on reverse side
Less than 50% trees
Areas that originally contained savanna or barrens communities likely to have sandier, lighter textured and lighter colored soils. Darker, heavier soils with more organic matter can indicate either wetland conditions or area that was likely forested, then cleared, likely plowed and used for agriculture.
An open-grown tree, also called a wolf tree, could be indicative of a second growth forest on old farm field. The wolf tree was grown with no other trees around it, and then the forest grew up around.
Choose which option is most common in the ecosystem

<table>
<thead>
<tr>
<th>IV.2. Vegetation structure: Tree and shrub canopy.</th>
<th>Choose “a” or “b” for each</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 1a) No mature (mud-ig) trees</td>
<td>□ 2b) Mature trees close, branches touch or overlap</td>
</tr>
<tr>
<td>□ 1b) Mature trees have low, spreading canopies</td>
<td>□ 3a) Trees cast dappled shade</td>
</tr>
<tr>
<td>□ 2a) Mature trees far apart; branches do not touch</td>
<td>□ 3b) Trees cast dense shade</td>
</tr>
<tr>
<td>□ 2b) Saplings, small trees scattered, occasional</td>
<td>□ 4a) Saplings, small trees in dense thicket</td>
</tr>
<tr>
<td>□ 4b) Saplings, small trees in dense thicket</td>
<td>□ 5a) Sight lines open across area</td>
</tr>
<tr>
<td>□ 5b) Sight lines blocked by saplings, shrubs</td>
<td>□ 4b) Saplings, small trees in dense thicket</td>
</tr>
</tbody>
</table>
IV.3 Vegetation structure: Tree size distribution

IV.3. Vegetation structure: Tree size distribution. Estimate the area covered by each of following size classes of trees. NOTE: DBH = estimated diameter at breast height; visual estimates based on comparison to this 8.5" by 11" sheet of paper are adequate.

<table>
<thead>
<tr>
<th>Size Class</th>
<th>None (0%)</th>
<th>A little (1–10%)</th>
<th>Common (10–25%)</th>
<th>Abundant (25–50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV.3.1. Very large (&gt;18 dbh)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IV.3.2. Large (&gt;10&quot; dbh)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IV.3.3. Medium (6–10&quot; dbh)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IV.3.4. Small (2–6&quot; dbh)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IV.3.5. Saplings (&lt;2&quot; dbh, 3–15' tall) and seedlings (&lt;2&quot; dbh, &lt;3' tall)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Remember, you are just estimating tree sizes.
Get green later in spring (mid-May-June); tend not to set seed until late August-September. Seed heads persist brown and dried through much of the winter.
Key: Green early (late March-April); set seed mid-summer. Seed heads often quite dry or disintegrating by the time the natives start to seed. Smooth brome: silky-looking grass often planted along roadsides. Canada bluegrass and close cousin, Kentucky blue grass, are widely used lawn grasses.
Lupine not on list, but a nice find
IV.4.4. Non-native forbs
(Old-field weeds)

Clockwise, from top left:
- Mullein
- Daisies
- Knapweed
- Sulfur cinquefoil
- Queen Anne’s lace
- Sweet clover
- Perennial pea
- Queen Anne’s lace
- Tall goldenrod.
IV.4.4. Non-native forbs (Old-field weeds)

- Bladder campion, smooth brome
- Queen Anne's lace with tall goldenrods
- Spotted knapweed
- White sweet clover (front)
IV.4.5. Native Shrubs

hazelnut; prairie rose;
### IV.4.6. Native trees

1. **Trees. Check off ALL size classes in which you observe each species.**

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Very Large</th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Sapling/Seedling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Ash</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Black cherry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Black locust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Beech</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Maple (note species next to size)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Oak</td>
<td></td>
<td></td>
<td></td>
<td>BSNP</td>
<td>BSNP</td>
</tr>
<tr>
<td>(note species next to size)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Other (name)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*BSNP: Blank Space Not Provided*
IV.4.7. Non-native shrubs and trees

- Common buckthorn
- Glossy Buckthorn
- Multiflora rose
- Oriental bittersweet
- Black alder
To estimate the numbers of species, you can add up your plant list plus your mystery plants and you can add a fudge factor if you feel you were missing some part of the site you couldn’t get to ….
A large monotypic stand is a large area dominated only by the invasive species, where pervasive means that the invasive continues throughout the ecosystem abundantly.
IV.7. Evidence of plowing

Grass in clumps (not plowed recently)

Soil buildup along fencerows

Ridges and furrows visible
## V. Forests

### V. FORESTs WORKSHEET

#### V.1. General forest structure and appearance

<table>
<thead>
<tr>
<th>Structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old stand</td>
<td>A stand that has been in place for a long time</td>
</tr>
<tr>
<td>Young stand</td>
<td>A stand that is newly developing</td>
</tr>
<tr>
<td>Dead trees in canopy</td>
<td>Trees that are dead or dying in the upper part of the forest</td>
</tr>
<tr>
<td>Live trees in canopy</td>
<td>Trees that are alive and in the upper part of the forest</td>
</tr>
<tr>
<td>Shrubs</td>
<td>Small trees or bushes that are growing in the forest</td>
</tr>
<tr>
<td>Mosses</td>
<td>Small plants that grow on the ground or on the forest floor</td>
</tr>
<tr>
<td>Lichens</td>
<td>Fungal and algal growths that grow on rocks or trees</td>
</tr>
</tbody>
</table>

#### V.2. Appearance of soil

- Sandy
- Clay
- Loamy
- Gravelly
- Stony
- Peaty

#### V.3. Vegetation diversity

<table>
<thead>
<tr>
<th>Vegetation Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>Includes deciduous and evergreen trees</td>
</tr>
<tr>
<td>Shrubs</td>
<td>Includes shrubs and bushes</td>
</tr>
<tr>
<td>Grasses</td>
<td>Includes annual and perennial grasses</td>
</tr>
<tr>
<td>Forbs</td>
<td>Includes non-woody flowering plants</td>
</tr>
</tbody>
</table>

#### V.4. Vegetation cover

<table>
<thead>
<tr>
<th>Vegetation Type</th>
<th>Cover Value</th>
</tr>
</thead>
</table>
| Trees | 0%
| Shrubs | 0%
| Grasses | 0%
| Forbs | 0%
Several questions on wetland indicators
V.1. Forest Structure: Wetland Indicators

Buttressed or stained tree trunks, spreading roots, and bare soil indicate wet conditions.

Forested wetland or wet forest? May end up doing 2 worksheets for one area.
If the wetland is forested, and there’s no clear distinction between the two, you can label a sheet “Forest A/Wetland A"
Tip up mounds area convenient place to observe the soil composition and structure.
V.3. Forest Canopy Structure
### V.3 Vegetation structure: Tree size distribution

#### V.5. Vegetation structure: Tree sizes. Estimate and circle the overall area covered by each size class of trees.

**NOTE:** DBH = estimated diameter at breast height; visual estimates based on comparison to this 8.5" by 11" sheet of paper are adequate.

<table>
<thead>
<tr>
<th>Size Class</th>
<th>None (0%)</th>
<th>A Little (1–10%)</th>
<th>Common (10–25%)</th>
<th>Abundant (25–50%)</th>
<th>Dominant (&gt;50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.3.1. Very large (&gt;18 dbh)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>V.3.2. Large (&gt;10&quot; dbh)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>V.3.3. Medium (6–10&quot; dbh)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>V.3.4. Small (2–6&quot; dbh)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>V.3.5. Saplings and Seedlings (&lt;2&quot; dbh, under 15&quot; tall)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Remember, you are just estimating tree sizes.
Tree size is general indicator of tree age and/or site conditions (soil fertility), along with regeneration.
## V.4.1 Tree species & size

### V.4.1. Vegetation types: Tree species
Check off ALL tree species in which each species appears.

<table>
<thead>
<tr>
<th>Species</th>
<th>Large to Very Large</th>
<th>Medium</th>
<th>Small</th>
<th>Sapling/Seedling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ashen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Bayberry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Birch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Black (balsam)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Black cherry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Box elder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7a. Cedar, Northern white</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8a. Red oak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b. Larch (lamarck)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Maple (near species next to size)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Oak (note species next to size)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Sycamore</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Invaders (e.g., Norway maple, Scotch pine, white mulberry)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

List species observed.

10. Other (List):
V.4.1. Forest Tree Species

Sugar maple

American Beech
V.4.1. Forest Tree Species

- Black oak, red maple seedling ground cover
- Black oak
- Hemlock
V.4.2. Shrubs and Woody Vines

Poison ivy: aerial rootlets; leaf and fruit

At right, from top: spicebush; witch-hazel; blueberries.
V.4.3. Ground Cover and Spring Flora

- Marsh marigold
- Trillium
- Trout lily
Invasive species questions will be asked on both forest and wetland sheets, be sure to include the distribution and disturbance levels for each ecosystem specifically. While invasive species may be common in the forest, they may not be in the wetland.
V.4.5. Total # Species
V.5. Vegetation Cover

V.4.5. Estimate the total number of species of all types (even if you can't identify them): ___

V.5. Vegetation cover. Estimate the area covered by each type of plants. (Vegetation types may overlap, so total cover can be greater than 100%).

<table>
<thead>
<tr>
<th>Type</th>
<th>None (0%)</th>
<th>A little (1–10%)</th>
<th>Common (10–25%)</th>
<th>Abundant (25–50%)</th>
<th>Dominant (&gt;50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.5.1. Native trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.5.2. Native shrubs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.5.3. Native ground cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.5.4. Invasive species (all types)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remember, you are just estimating percentages
V. Additional Forest Questions

6. Invasive species distribution
   - Edges vs. Interior, then check all rest that apply:
   - Isolated pockets vs Large monotypic stands vs.
     pervasive

8-9. Disturbance
   - Type
   - Extent
VI. Creeks

### VI. CREEKS WORKSHEET

<table>
<thead>
<tr>
<th>Date:</th>
<th>Surveyor:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### VI. Width of creek
- 1) 10 feet
- 2) 10 - 25 feet
- 3) > 25 feet

#### VI.2. Stream structures and stream banks
- 1) Water channel is straight or curved
- 2) Water channel is straight or meandering
- 3) Water channel is irregular
- 4) Water is dominated through trampling
- 5) Water is dominated through deposition
- 6) Gravel bars
- 7) Sabkha
- 8) Other (describe)

#### VI.3. Aquatic vegetation
- 1) Neotropical
- 2) Neotropical
- 3) Neotropical
- 4) Neotropical
- 5) Neotropical
- 6) Neotropical
- 7) Neotropical
- 8) Neotropical

#### VI.4. Water appearance and quality, standing or running water
- 1) Clear
- 2) Tannin
- 3) Turbid
- 4) Silt
- 5) Dust
- 6) Other (describe)
- 7) Algae bloom or scum
- 8) Algae bloom or scum
- 9) Algae bloom or scum
- 10) Algae bloom or scum

#### VI.5. Water color
- 1) Blue
- 2) Green
- 3) Yellow
- 4) Brown
- 5) Red
- 6) Other (describe)

#### VI.6. Human disturbances adjacent to or affecting the waterway
- 1) Dirt road
- 2) Gravel road
- 3) paved road
- 4) Road
- 5) Road
- 6) Road
- 7) Road
- 8) Road
- 9) Road
- 10) Road
- 11) Road

#### VII. Characterize the source of the human disturbances
- 1) Runoff
- 2) Runoff
- 3) Runoff
- 4) Runoff
- 5) Runoff
- 6) Runoff
- 7) Runoff
- 8) Runoff
- 9) Runoff
- 10) Runoff
- 11) Runoff

#### VIII. Additional notes (continue on reverse side if necessary)
Natural streams have bends and curves where a straight, channelized stream is manmade. Channelized streams often have steep banks and high erosion where naturally curving streams do not.
A natural steam will have gradually sloping banks, where channelized streams tend to have steep banks due to erosion.
VI.2. Stream structure

Straight channels, steep banks
Natural streams have differences in flowing water. A run is a stretch of faster moving water, where a riffle is an area of slower moving water, sometimes behind a large boulder or fallen tree.
Some streams naturally have sediment that makes them look muddier, usually in the slowest moving parts.
VI.4 Water appearance and quality

Foamy

Orange

Clear
VI.6. Human Disturbance
VI.7. Extent of disturbance

Berms for water control (or result of ditching)

Road beds act as dams

Channels or ditches to divert water

Rubble
II. Site Overview Worksheet

- Landscape, landform
- Site-wide disturbance
- Patterns of species invasions
- Wildlife habitat
- Fill in after you’ve assessed the whole site
## II. Site Overview

### Site Name: [Site Name]

#### Site Overview Worksheet

1. **Date:**
2. **Site Name:** [Site Name]
3. **Site Location:**

#### Site Overview Worksheet

1. **Site Overview Worksheet:** Keep these questions in mind as you visit the site, and answer them considering how they apply to the entire site. Use additional sheets of paper as necessary.

### Site Overview Worksheet

#### III. Characteristics of the landscape and landform in the site (check all that apply)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Trees</td>
</tr>
<tr>
<td>02.</td>
<td>Vegetation</td>
</tr>
<tr>
<td>03.</td>
<td>Structure</td>
</tr>
<tr>
<td>04.</td>
<td>Utility lines</td>
</tr>
<tr>
<td>05.</td>
<td>Natural features</td>
</tr>
<tr>
<td>06.</td>
<td>Human activity</td>
</tr>
<tr>
<td>07.</td>
<td>Abandoned structures</td>
</tr>
<tr>
<td>08.</td>
<td>Archeological features</td>
</tr>
<tr>
<td>09.</td>
<td>Historical significance</td>
</tr>
<tr>
<td>10.</td>
<td>Other (describe)</td>
</tr>
</tbody>
</table>

#### IV. Characteristics of the soil condition in the site (check all that apply)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
</table>
| 01. | Soils
| 02. | Soils
| 03. | Soils
| 04. | Soils
| 05. | Soils
| 06. | Soils
| 07. | Soils
| 08. | Soils
| 09. | Soils
| 10. | Soils

#### V. Characteristics of the extent of the disturbance (check all that apply)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
</table>
| 01. | Extent (0-10% of site)
| 02. | Extent (10-50% of site)
| 03. | Extent (50-100% of site)
| 04. | Extent (100% of site)
| 05. | Extent (0-10% of site)
| 06. | Extent (10-50% of site)
| 07. | Extent (50-100% of site)
| 08. | Extent (100% of site)

#### VI. Effects of previous or current land use on soil (check all that apply)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Fertilizer application</td>
</tr>
<tr>
<td>02.</td>
<td>Herbicide application</td>
</tr>
<tr>
<td>03.</td>
<td>Nutrient addition</td>
</tr>
<tr>
<td>04.</td>
<td>Compaction</td>
</tr>
<tr>
<td>05.</td>
<td>Moisture modification</td>
</tr>
<tr>
<td>06.</td>
<td>Other (describe)</td>
</tr>
</tbody>
</table>

#### VII. Effects of previous or current land use on vegetation (check all that apply)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Fertilizer application</td>
</tr>
<tr>
<td>02.</td>
<td>Herbicide application</td>
</tr>
<tr>
<td>03.</td>
<td>Nutrient addition</td>
</tr>
<tr>
<td>04.</td>
<td>Compaction</td>
</tr>
<tr>
<td>05.</td>
<td>Moisture modification</td>
</tr>
<tr>
<td>06.</td>
<td>Other (describe)</td>
</tr>
</tbody>
</table>

#### VIII. Wildlife Habitat

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Wildlife</td>
</tr>
<tr>
<td>02.</td>
<td>Habitat</td>
</tr>
<tr>
<td>03.</td>
<td>Wildlife</td>
</tr>
<tr>
<td>04.</td>
<td>Habitat</td>
</tr>
<tr>
<td>05.</td>
<td>Wildlife</td>
</tr>
<tr>
<td>06.</td>
<td>Habitat</td>
</tr>
<tr>
<td>07.</td>
<td>Wildlife</td>
</tr>
<tr>
<td>08.</td>
<td>Habitat</td>
</tr>
<tr>
<td>09.</td>
<td>Wildlife</td>
</tr>
<tr>
<td>10.</td>
<td>Habitat</td>
</tr>
</tbody>
</table>

Additional notes on wildlife (including species or other associated evidence from land-use):

---

Has been modified and condensed
II.1. Site Overview: Landscape and Landform

- Describe landscape
  - Flat
  - Gently rolling hills
  - Steep hills
- Identify glacial landforms if known
  (we have this information in the office)
II.2. Site Overview: Disturbance

Identify type of disturbance and extent
II.2. Site Overview: Disturbance

- Tree plantation
- Logging
- Ditching
- Bulldozed clearing
II.3. Site Overview: Extent of Disturbance

This is the natural areas overall, so don’t address non-natural areas on property.
II.4. Site Overview:
Effects of disturbance on soil
II.5. Site Overview: Patterns of species invasions

- Edge (forest, trail)
- Interior
- Isolated clump
- Large monotypic stand
II.6. Site Overview: Wildlife signs

Bones, scat, nests, tracks, etc.
II.6. Site Overview: Deer signs

Clockwise, from top left: browsed twigs; trampled paths; antler rubs; hoofprints; resprouts following repeated browse damage.
VII. Additional Species

- List all plants
- List "mystery plants"
- Tally unknown plants
- We have database of over 650 different species from these lists

<table>
<thead>
<tr>
<th>Community (wetland A, Forest A, etc.)</th>
<th>Species name: Latin (if known) or common</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
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<tr>
<td>6</td>
<td></td>
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<td>7</td>
<td></td>
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<td>11</td>
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<td>12</td>
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<td>14</td>
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<td>15</td>
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<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

VIII. ADDITIONAL SPECIES OR OTHER NOTES

Use this sheet to record species that are not included in the checklists. List to which community you found species (e.g., Wetlands, A, Grasslands, A, Forest A, etc.). Then list species by common name. You may use an extra sheet for other notes.
VI. Summary

You don’t have to answer every question.

Add any observation of interest that doesn’t fit in worksheets.
You don’t have to fill out the file name necessarily. Emailed pictures with names like “Mystery Plant 1, 2, 3…X” or however they are labelled on the species list will be fine.
Accessible through the HRWC website.
We love using pictures of volunteers having fun in our newsletters, website, and other publications!
Tips

- Each assessment takes about 2-3 hours.
- Assign roles, like captain, plant ID expert, notetaker
- After assessment, spend a few minutes finishing up the worksheets, making sure all the questions are answered.
- Decide who will be returning the completed worksheets to HRWC’s offices.
- Remember to draw the actual boundaries of wetlands, forests, etc., on your site map.
- Fill in your names and the site name on the top of every worksheet.
- Please answer every question. Inputters are relying on decisive, clear entries.
- Check all boxes that apply for each question.
- If ecosystem patches seem similar, you can fill out one worksheet to represent the different patches, as long as they seem similar to you.
What Comes Next?

- Score, evaluate worksheets
- Track findings in database
- Summarize and report on findings
- Work with conservancies, parks, land use planning officials to develop strategies to protect natural areas
- Update map to highlight notable natural areas
Progress So Far

- Field assessments performed on over 300 properties
- Seven properties (356 acres) under permanent preservation due to field assessment reports
- Five properties in process (547 acres)
- 230 people trained
- 750 ecosystems assessed
- Field assessments used by HCMA
- SEMIWILD
Focus preservation decisions for all watershed Conservancies, Greenbelt, Washtenaw County, Scio, Ann Arbor, Webster Townships

Assess existing protected properties for Livingston, Legacy and Southeast MI conservancies, University of Michigan, HCMA

Provide conservation planning and GIS support for Southeast MI and Livingston conservancies
SEMIWILD, or the South East Michigan Wilds is an aggregation of associations striving to protect and preserve natural areas.
Getting to lots of Legacy Land Conservancy’s priorities: Waterloo/Pinckney, headwaters, Webster Twp.
The Best Sites

*= highest scoring Bioreserve sites
Today's Assessment

- Examine photos, map
- Walk through, forest
- Assess soils, vegetation, disturbance
- Record findings on worksheet
- Reconvene to summarize, review