

Abstract



Current building practices lead to loss of habitat for much of the wildlife in Ohio, including birds. Birds serve an important role in the health of a local ecosystem, such as being an alarm for prey animals, pollinators, and pest management. Most modern home development landscape designs are simplistic and made for the primary purpose of aesthetics. According to Michelle Mastro for *The Spruce* “gardens with modern landscaping designs might focus on standout garden structures, but the garden, itself, should feel uncluttered and simple, allowing the viewer’s eye to rest on a few memorable items” (Mastro, 2024). This means that most modern designs are relatively barren as it is shooting for a cleaner aesthetic where the negative space emphasizes the plants selected, this capstone talks about why that needs to change and practices that can help improve the landscapes not only for people’s enjoyment but also for birds. In Ohio there are currently 2 extinct bird species, and 5 extirpated species, meaning that due to habitat loss and loss of food sources that species have been forced to leave the region and have not been seen in that region since. There are also 5 threatened species and 10 endangered. Of the 22 bird species on those list 30% of them are native to prairies and another 36% are native to wetlands and marshes. Prairies have been disappearing throughout Ohio since the 1700s. There were over 1,000,000 acres of documented prairie land in Ohio in the 1700s now that number is less than 10% of what it used to be. The rest of this project touches on why the future of birds is so important and how landscape design can help.

Upland Sandpiper

Scientific Name: *Bartramia longicauda*

Ecosystem: its preferred habitat is grasslands. Seventy percent of the breeding population of Upland Sandpipers occurs in grassland areas of the central and northern Great Plains (Houston et al. 2011).

Food: Upland Sandpipers eat mostly insects, which they pick from the ground or low vegetation as they walk. Among their known prey are grasshoppers, crickets, weevils, billbugs, cutworms, leaf beetles, click beetles, May beetles, larvae of many sorts of flies (horsefly, crane fly, sawfly), moths, ants, and bugs. In addition to insects, they eat centipedes, millipedes, snails, spiders, ticks, and earthworms. Upland Sandpipers also consume seeds of grasses, weeds, and forbs, as well as wheat, rye, and berries.

Description: The Upland Sandpiper is a medium-sized shorebird of about 28-32 cm in length. Some distinguishing features of the Upland Sandpiper include its dove-like head, thin neck, long thin legs, camouflage olive-brown coloring, and yellow bill with a black tip. The under parts of the Upland Sandpiper are whitish or yellowish in color. The sides and breast of the Upland Sandpiper are strongly patterned with dark and pale brown buff. The call of the Upland Sandpiper is a distinctive, long “wolf whistle.”

Citations: <https://ecos.fws.gov/ecp/species/9294>,
<http://bna.birds.cornell.edu/bna/species/580>,
https://www.allaboutbirds.org/guide/Upland_Sandpiper/lifehistory#:~:text=Back%20to%20top-,Food,moths%2C%20ants%2C%20and%20bugs.





Northern Harrier

Scientific Name: *Circus cyaneus*

Ecosystem: Across its range, the Northern Harrier prefers open habitats, including marshes and grasslands. Harriers typically nest on the ground, either alone or in loose colonies. Outside of the breeding season, harriers roost communally on the ground, sometimes with Short-eared Owls.

Food: Northern Harriers search for prey in open habitats, typically while flying close to the ground in buoyant gliding and flapping flight. The species prefers to hunt in open areas with mixed vegetative cover and tends to avoid areas with only short vegetation. Harriers rarely hunt while perched. In winter, individuals sometimes rob prey from each other. The harrier's owl-like facial ruff and tendency to fly close to the ground allows the species to hear, as well as see, potential prey, and the species often locates its prey by sound. Adult males tend to be the most successful hunters, followed by adult females.

Description: Northern Harriers have long wings, long and narrow tails, and owl-like faces. The species is lightly wing-loaded and often rocks in the wind like a Turkey Vulture while flying with its wings held in a dihedral or "V" above its back. Harriers have three distinct plumages: the largely light gray adult male, the largely light brown adult female, and the largely dark brown juvenal. In all three plumages the species has a conspicuous white rump patch. Adult males, which are sometimes referred to as the "gray ghosts," are mostly gray above and whitish below with black trailing edges on their underwings and black wingtips. Adult females are mostly brown above with buffy underparts that are heavily streaked with dark brown. Juveniles are mostly dark brown above with cinnamon breasts and bellies. Females are 10-20% larger and weigh approximately 50% more than males.

Citations: <https://www.hawkmountain.org/raptors/northern-harrier#:~:text=Across%20its%20range%2C%20the%20Northern,sometimes%20with%20Short-eared%20Owls>

Lark Sparrow

Scientific Name: *Chondestes grammacus*

Ecosystem: Lark Sparrows breed in open grassy habitats with scattered trees and shrubs including orchards, fallow fields, open woodlands, mesquite grasslands, savanna, sagebrush steppe, and grasslands.

Food: Lark Sparrows eat insects and seeds, consuming more insects in the summer months and more seeds in the winter months.

Description: Adults have a bold, blocky facial pattern that sets them apart from other sparrows. Chestnut and white stripes streak across the head, a black mustache runs down the sides of the throat, and the cheeks have chestnut spots. The outer tail feathers are tipped in white and a black spot marks the center of the chest.

Citations:

https://www.allaboutbirds.org/guide/Lark_Sparrow/id#:~:text=Adults%20have%20a%20bold%2C%20blocky,the%20center%20of%20the%20chest,
https://www.allaboutbirds.org/guide/Lark_Sparrow/lifehistory#:~:text=ConservationLow%20Concern-,Habitat,%2C%20sagebrush%20steppe%2C%20and%20grasslands.





Loggerhead shrike

Scientific Name: *Lanius ludovicianus*

Ecosystem: Open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns.

Food: Loggerhead Shrikes eat insects and other arthropods, amphibians, reptiles, small mammals, and birds; they also occasionally feed on roadkill. Their staple foods include agricultural pests such as grasshoppers, beetles and rodents. Insects generally dominate the Loggerhead Shrike's diet during breeding season, while winter brings a greater reliance on vertebrate prey. They are sit-and-wait predators, diving at prey upon seeing it. When diving towards vertebrate prey, Loggerhead Shrikes aim for the nape of the neck, paralyzing its prey. Whole prey items are often impaled on thorns or barbed wire fences for later consumption.

Description: Loggerhead Shrikes are thick-bodied songbirds. Their gray head contrasts with the wide, black mask, black bill, and white throat. Their tail is black with white corners; the wings are black with white at the base of the primaries, forming a small handkerchief spot when the wing is closed and larger white patches in flight. Juveniles have darker barring above and below.

Citations: http://www.allaboutbirds.org/guide/Loggerhead_Shrike/id,
<http://www.blm.gov/pgdata/etc/medialib/blm/wy/wildlife/animal-assessmnts.Par.94347.File.dat/LoggerheadShrike.pdf>,
http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm91_054295.pdf,
<http://bna.birds.cornell.edu/bna/species/231>

Barn Owl

Scientific Name: *Tyto alba*

Ecosystem: The barn owl lives in open areas, forest edges, and clearings, farmland, and cities.

Food: The barn owl is a nocturnal hunter. It eats small mammals like mice, shrews, voles, and rats. It also eats birds. It has a keen sense of smell, which along with the ability to see in low light, helps it catch its prey. Its soft feathers also muffle sound so it can silently sneak up on its prey.

Description: The barn owl is 14-20 inches in length and has a wingspan of close to four feet. It is golden-brown on its upper sides and grayish-white on its chest and belly. It has dark specks on both its underside and upper side. It has a heart-shaped white face with a ring of brown feathers around it. Its wings are rounded, and it has a short tail and long legs. It doesn't hoot like other owls, instead it makes a raspy hissing or shrieking sound.

Citations:

<https://nhpbs.org/natureworks/barnowl.htm#:~:text=Australia%2C%20and%20Asia.-,Habitat,in%20cliffs%2C%20or%20in%20riverbanks.>





Greater-Prairie Chicken

Scientific Name: *Tympanuchus cupido*

Ecosystem: The Greater Prairie-chicken (*Tympanuchus cupido*) historically occupied much of the Great Plains, possibly reaching north into Canada and as far south as Texas (Johnson et al. 2020, Svedarsky et al. 2022). However, the range has contracted substantially because of habitat loss. Today, the primary range of the Greater Prairie-chicken occurs in portions of the prairie states of Kansas, Nebraska, and South Dakota. Isolated populations remain in Wisconsin, Illinois, Iowa, Missouri, Oklahoma, Colorado, Minnesota, and North Dakota.

Food: Greater Prairie-Chickens eat leaves, seeds, buds, fruits, acorns, cultivated grains such as corn, sunflower, soy, and sorghum, and insects such as grasshoppers, crickets, and beetles.

Description: The Greater Prairie-chicken is a medium-sized grouse. The plumage has buff and dark brown barring on the chest, and the tail is short and rounded, which is distinctly different from the Sharp-tailed Grouse (*Tympanuchus phasianellus*), which has a V-shaped pattern on the chest feathers and a white pointed tail. The males have a conspicuous courtship display in which they make a low booming sound as they inflate yellow-orange air sacs on the side of their necks, erect dark elongated feathers behind the head and engorge a bare orange patch above the eyes while jumping, strutting, and stomping.

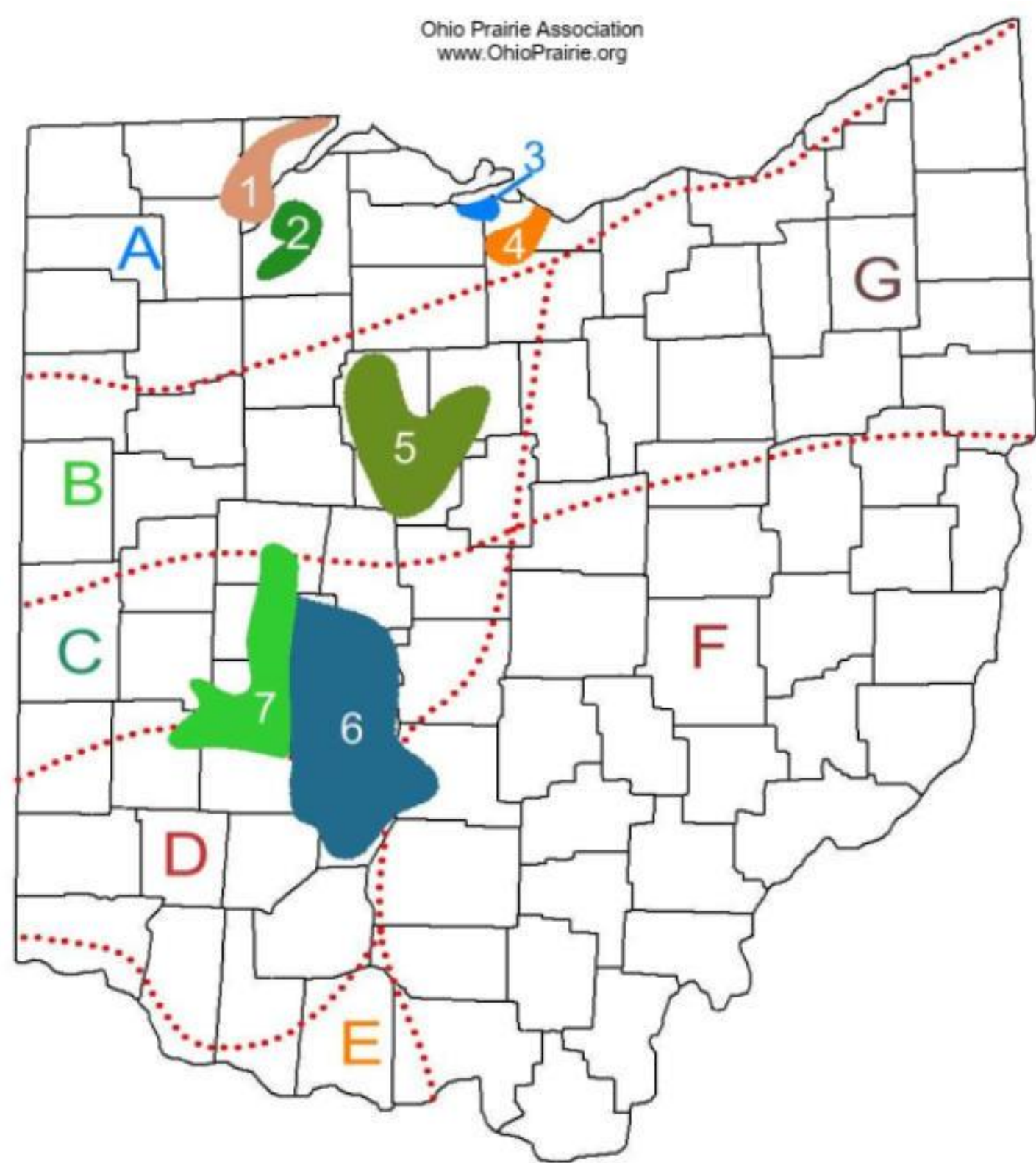
Citations:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNLC13010>, https://www.allaboutbirds.org/guide/Greater_Prairie-Chicken/lifehistory#:~:text=Greater%20Prairie-Chickens%20eat%20leaves,grasshoppers%2C%20crickets%2C%20and%20beetles.

Citations

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- <https://www.audubon.org/field-guide/bird/greater-prairie-chicken>
- <https://www.audubon.org/field-guide/bird/northern-harrier>
- <https://www.nature.org/en-us/about-us/where-we-work/united-states/ohio/stories-in-ohio/a-little-management-on-the-prairie/>
- <https://www.metroparks.org/wp-content/uploads/2016/01/MetroParks-Prairie-Plants-Brochure.pdf>
- <https://u.osu.edu/marionprairie/ohio-prairie-regions/>
- <https://u.osu.edu/marionprairie/prairies-around-ohio/>
- <https://abcbirds.org/bird/northern-harrier/>
- <http://www.ohioprairie.org/faq%20p2.htm>

Pre-settlement Ohio Prairies



- Prairie Region Name**
- A Lake Plains Prairie Region
 - B Central Till Plain Prairie Region
 - C Southern Till Plain Prairie Region
 - D Southwest Ohio Prairie Region
 - E Lexington Plain Prairie Region
 - F Unglaciaded Appalachian Plateau Prairie Region
 - G Glaciaded Appalachian Plateau Prairie Region

- Large Original Landscape Prairies of Presettlement Ohio**
- 1 Oak Openings Prairies
 - 2 Wood County Prairies
 - 3 Castalia-Sandusky Bay Prairies
 - 4 Firelands Prairie
 - 5 Sandusky Plains Prairie
 - 6 Darby Plains Prairie
 - 7 Mad River Prairie Fens

<http://www.ohioprairie.org/faq%20p2.htm>



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Stevie Famulari Gds

Spring 2025

Bachelors of science in Horticulture



Roy Diblik's Approach to Naturalistic Landscaping for Ecosystems

- Roy Diblik is a naturalist garden designer. This means that his landscape designs take a more ecological approach. Roy's designs lean towards a more prairie-like design, and his designs always took wildlife into consideration. Roy currently runs a YouTube channel where he discusses his experiences and discusses his design philosophies and ideas. One of Roy's notable designs is the Shedd Aquarium & Oceanarium in Chicago Illinois. The goal of the design was to provide a source of year-round food and shelter for migratory birds (Nedbalski, 2022). Roy Diblik also wrote a book called "*know maintenance*" where he not only teaches how to do his garden designs but also how goes more in depth on his own design philosophies. The goal of this book was to provide designs that had very little maintenance work that needed to be done. Roy's no maintenance approach is great for wildlife design as it often causes underbrush and a denser area for animals like birds to be able to hide in. It also increases insect activity within the designs. This source of protein is vitally important to birds especially during nesting season, 96% of all terrestrial birds rely on insects at some point in life. Roy's designs are geared for the health of an ecosystem and by extension providing food and shelter to the bird population.



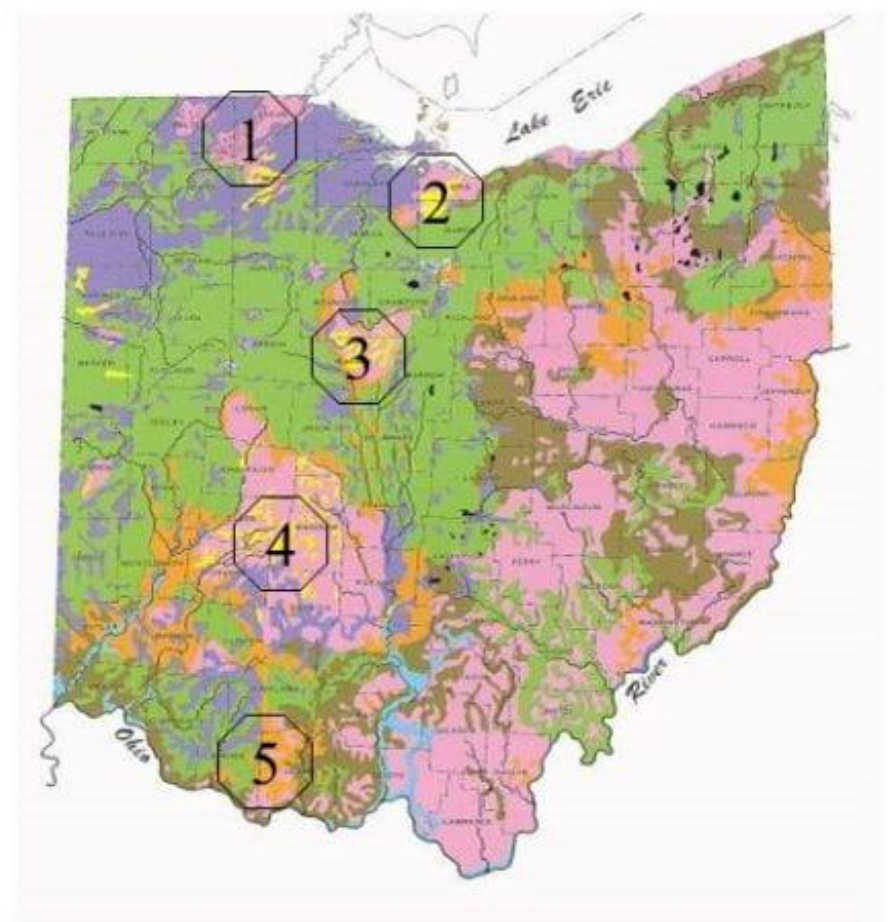
Solution

How can Ohioans solve this issue of a declining prairie habitat; through garden designs. As naturalistic garden designs tend to mimic a natural prairie very efficiently as they both tend to have lots of flowering plants and grass and few woody ones. The future of saving these endangered species is going to be through the work of landowners and garden designers. Often there are spaces that go unused and are just large fields of turf grass that do not serve a purpose other than aesthetics. These three designs of a green roof, unused green space, and residential home are to show how a prairie garden design might look for different areas that these naturalistic garden designs can be applied.

These large swaths of garden designs not only serve an aesthetic function but an ecological one as well. These gardens will not only attract pollinators and other wildlife, serving as way stops for migrating birds, they also help to manage stormwater runoff helping in cases of heavy rain. Storm water management is just vital to the health and safety of an area but there are many government programs that offer credits to businesses with sustainable practices.

Major Prairie Regions in Ohio

1. **Oak Openings** of Lucas County
2. **Firelands** of Erie and Huron Counties
3. **Sandusky Plains** of Marion, Crawford and Wyandot Counties
4. **Darby Plains** of Madison, Clark, Union, Fayette and Greene Counties
5. **Dry Hill Prairies** of Adams and Scioto Counties.



NATURAL VEGETATION OF
OHIO AT THE TIME OF THE
EARLIEST LAND SURVEYS

WILDFLOWERS FOUND IN METROPARKS' PRAIRIE AREAS



Stiff Goldenrod

Oligoneuron rigida

BLOOM TIME:
September to early October

VALUE TO POLLINATORS:
native bees, Monarch butterflies



Fringeleaf Wild Petunia

Ruellia humilis

BLOOM TIME:
June - July
VALUE TO POLLINATORS:
butterflies



Prairie Cordgrass

Spartina pectinata

BLOOM TIME:
August - September

VALUE TO POLLINATORS:
cover for birds



Deertongue Panicgrass

Dichanthelium clandestinum

BLOOM TIME:
August - October

VALUE TO POLLINATORS:
bees and butterflies



Royal Catchfly

Silene regia

BLOOM TIME:
July - August

VALUE TO POLLINATORS:
hummingbirds



Big Bluestem

Andropogon gerardii

BLOOM TIME:
June - September

VALUE TO POLLINATORS:
skippers



Butterfly Milkweed

Asclepias tuberosa

BLOOM TIME:
June

VALUE TO POLLINATORS:
Monarchs and other butterflies



Sweet Everlasting

Pseudognaphalium obtusifolium

BLOOM TIME:
July - September

VALUE TO POLLINATORS:
butterflies



Prairie Dock

Silphium terebinthinaceum

BLOOM TIME:
July - August

VALUE TO POLLINATORS:
bumble bees and native bees



Pinnate Coneflower

Ratibida pinnata

BLOOM TIME:
July - September

VALUE TO POLLINATORS:
butterflies and native bees



Virginia Mountain Mint

Pycnanthemum virginianum

BLOOM TIME:
August - September

VALUE TO POLLINATORS:
butterflies and bees



New England Aster

Symphyotrichum novae-angliae

BLOOM TIME:
August - September

VALUE TO POLLINATORS:
bees and butterflies



Dense Blazing Star

Liatris spicata

BLOOM TIME:
July - August

VALUE TO POLLINATORS:
butterflies and bumble bees



Little Bluestem

Schizachyrium scoparium

BLOOM TIME:
August to early October

VALUE TO POLLINATORS:
native bees, Monarch butterflies



Wild Senna

Senna hebecarpa

BLOOM TIME:
July - August

VALUE TO POLLINATORS:
hummingbirds



Indian Hemp

Apocynum cannabinum

BLOOM TIME:
July - September



Purple Coneflower

Echinacea purpurea

BLOOM TIME:
June - August

VALUE TO POLLINATORS:
butterflies and hummingbirds



Whorled Rosinweed

Silphium trifoliatum

BLOOM TIME:
July - September

VALUE TO POLLINATORS:
native bees



Jerusalem Artichoke

Helianthus tuberosus

BLOOM TIME:
September

VALUE TO POLLINATORS:
butterflies, bees and hummingbirds



Biennial Gaura

Gaura biennis

BLOOM TIME:
July - October



Northern Blazing Star

Liatris scariosa

BLOOM TIME:
September - October

VALUE TO POLLINATORS:
native bees



Indian Grass

Sorghastrum nutans

BLOOM TIME:
June - September

VALUE TO POLLINATORS:
bees, Monarch butterflies



Wild Bergamot

Monarda fistulosa

BLOOM TIME:
June - August

VALUE TO POLLINATORS:
butterflies, bees and hummingbirds



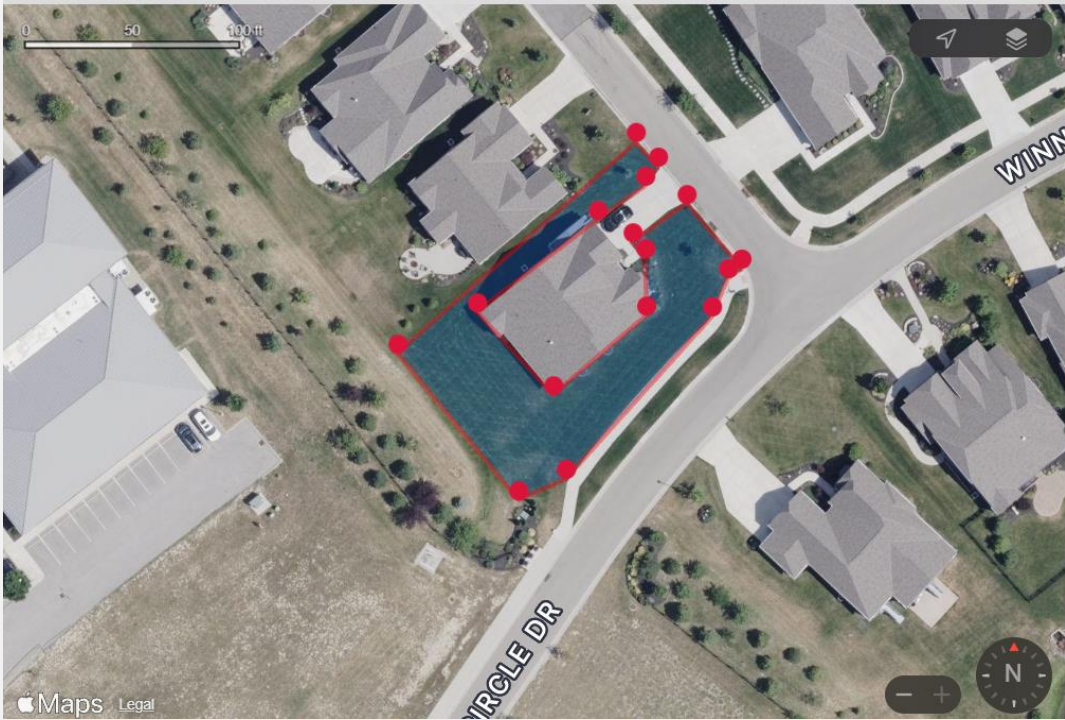
Black Eyed Susan

Rudbeckia hirta

BLOOM TIME:
July - August

VALUE TO POLLINATORS:
butterflies and bees

Site Analysis



☐ Distance ☒ Area

868.6627 m²
0.0009 km²
9350.1984 ft²
1038.9119 yd²
0.0003 mi²
0.2147 ac

Last Coordinate:
39.397005,-84.450868

Searched Address:
Winners Circle Dr, Liberty Twp, OH
45011, United States

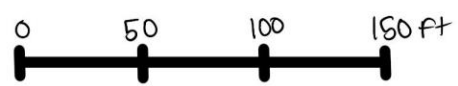


☐ Distance ☒ Area

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92779.6359 ft²
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0.0033 mi²
2.1299 ac

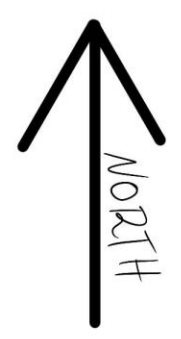
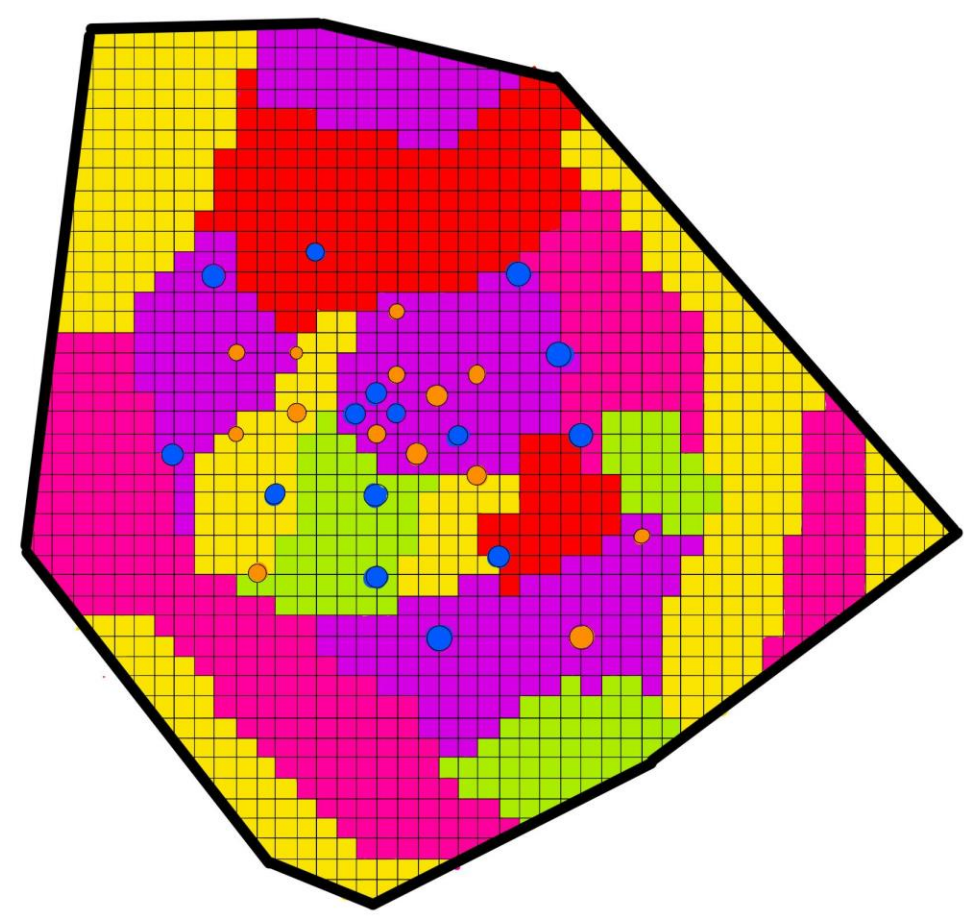
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45011, United States



Plant List

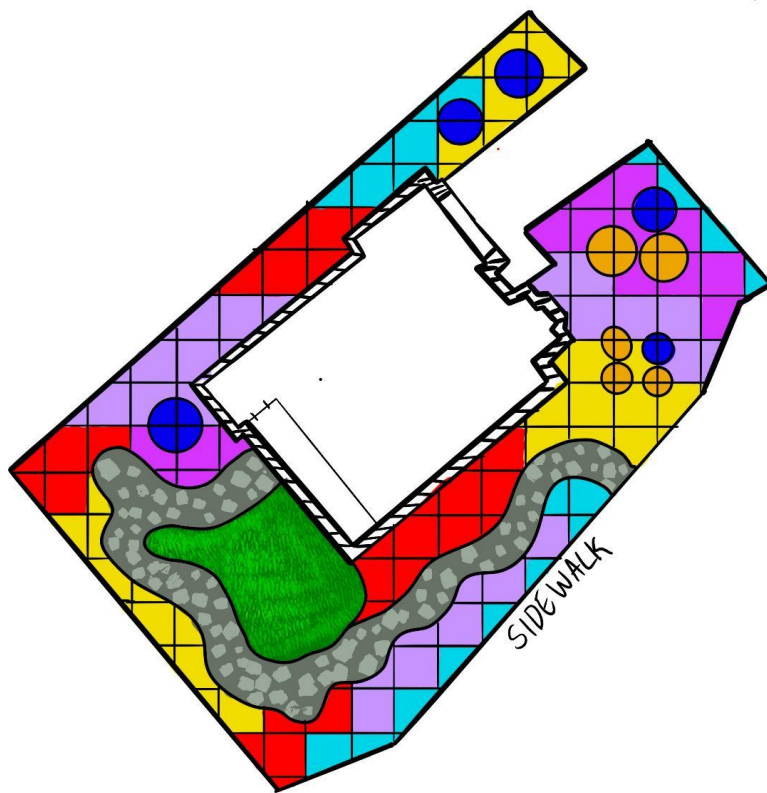
- *Spartina pectinata*
- *Andropogon gerardii*
- *Rudbeckia hirta*
- *Echinacea purpurea*
- *Symphoricarum novae-angliae*
- *Ratibida pinnata*
- *Asclepias tuberosa*



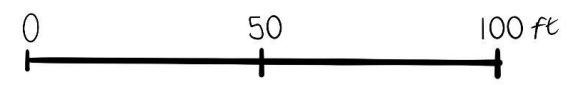
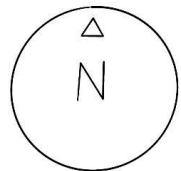
HOA Design

Residential Design

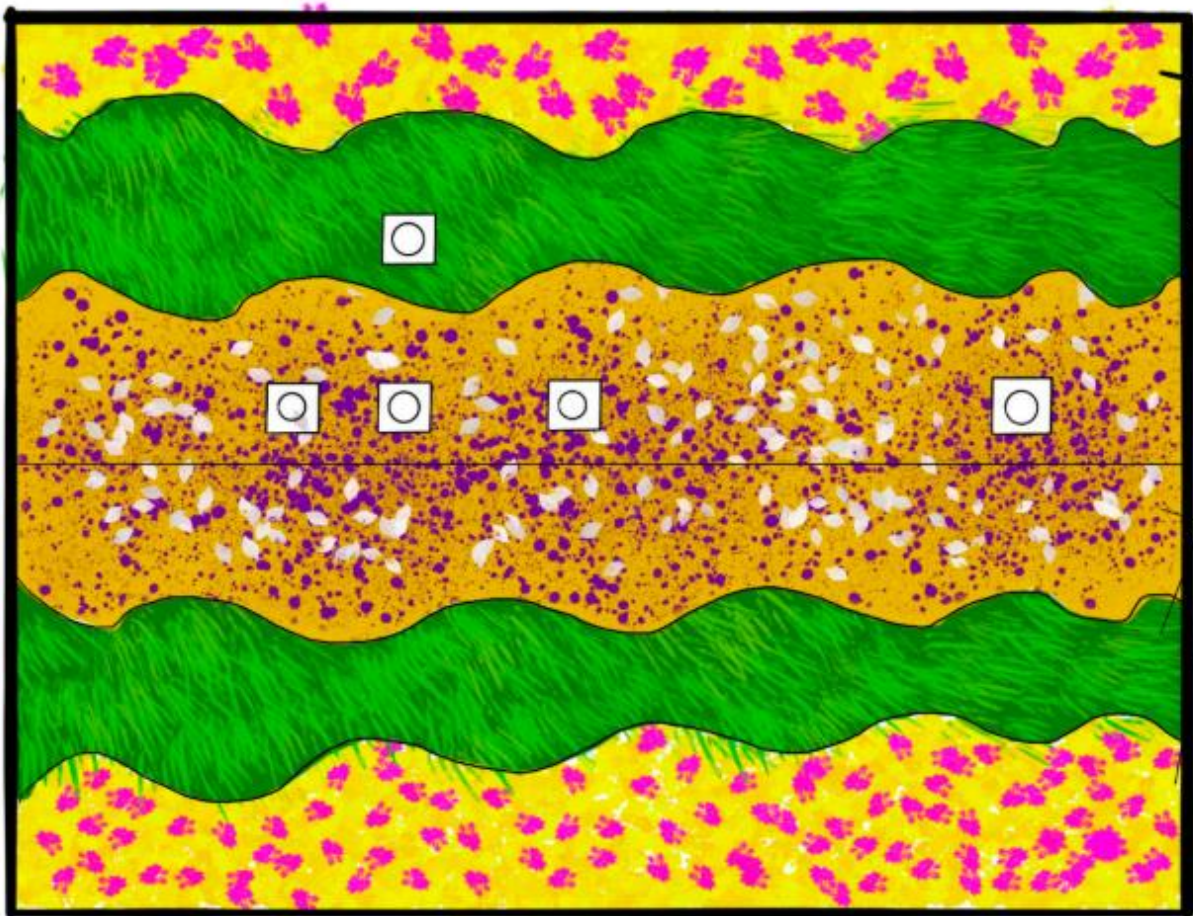
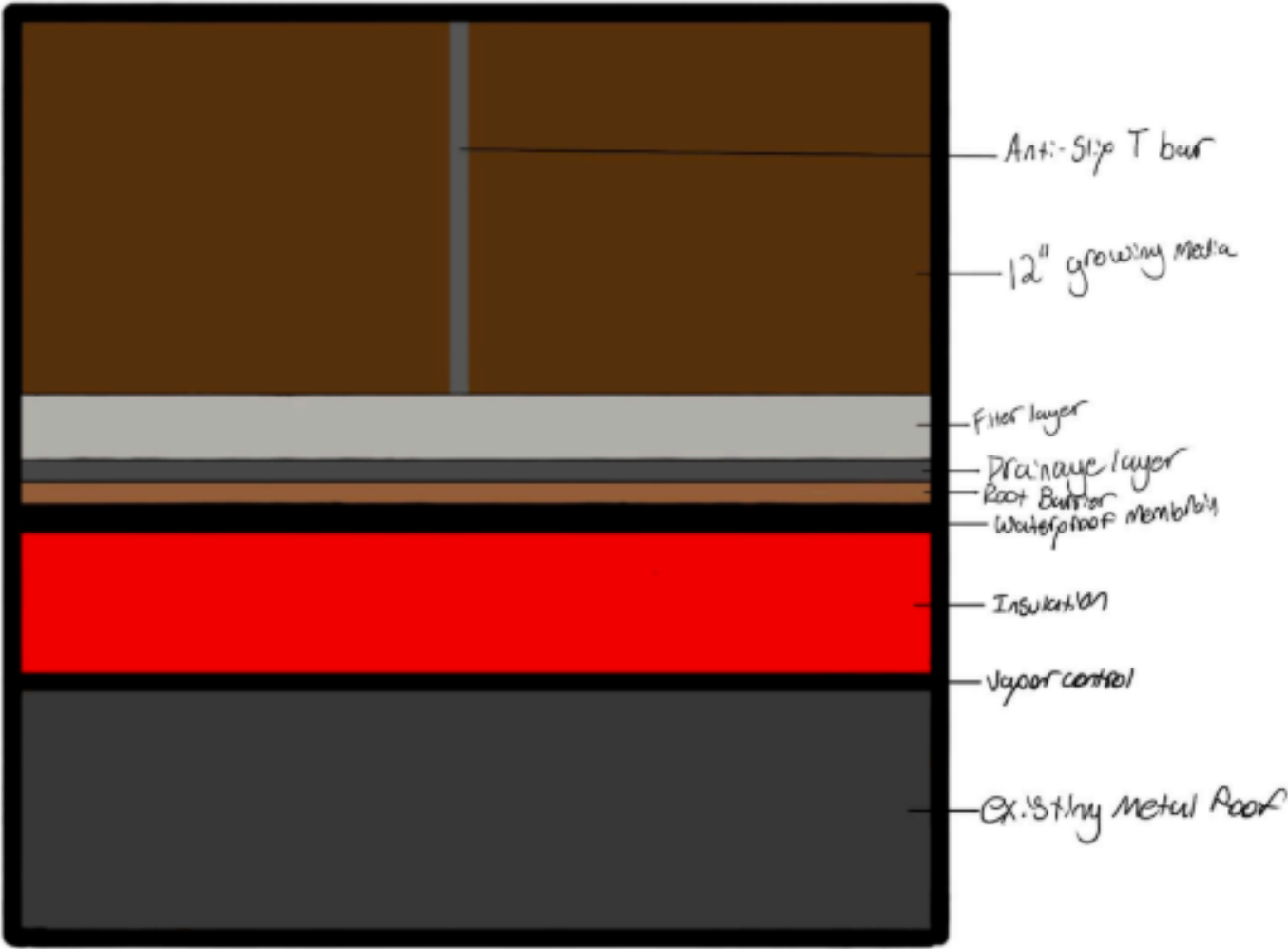
PLANT LIST



-  *Sorghastrum nutans*
-  *Sorobolus heterolepis*
-  *Andropogon gerardii*
-  *Liatris scariosa*
-  *Ruellia humilis*
-  *Silene regia*
-  *Asclepias tuberosa*



Green Roof Design



Rudbeckia & Noddy onion
Parcupine grass & Prairie Sun grass
Purple coreflower & Smooth Peristemon

