

Natural Areas: Restoration, Re-creation and Stewardship

- Jensen Ecology Intro
- Restoration Philosophy
- Project Examples
- Questions/discussion



JENSEN ECOLOGY



Midwest-based Ecological Restoration and Consulting Madison, WI

- Ecological Restoration
 - Planning, inventory, design, master planning, mapping
 - Implementation: installation, prescribed fire, invasives management
- Stormwater/stream restoration
- Threatened and Endangered Species
- Forestry
- Collaboration
 - Roy Diblik, Jeff Epping, Austin Eischied
 - Golf Architects
 - Landscape Architects
 - Engineers
 - Historic Preservation
 - Remediation



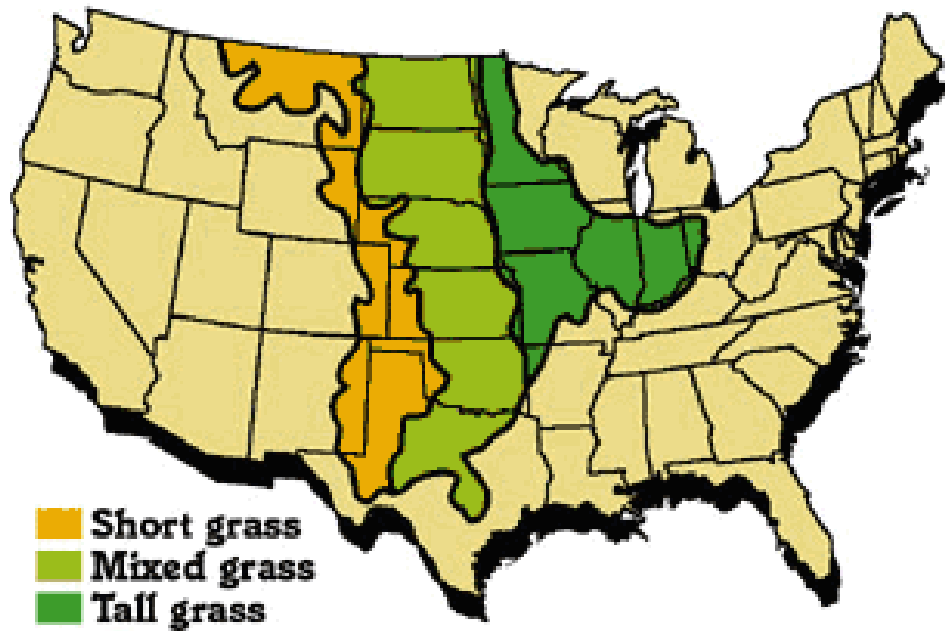
Midwest-based Ecological Restoration and Consulting Madison, WI

- How/why do clients come to us?
 - Pro-active restoration work
 - Master Planning
 - Aesthetics matter
 - Specific habitat work
 - Birds
 - Pollinators
 - Fish
 - Regulation: permitting, mitigation (wetlands TE)
 - Part of a larger project
 - Civil engineering
 - Parks
 - Wetlands
 - Stormwater
 - Invasive Species work

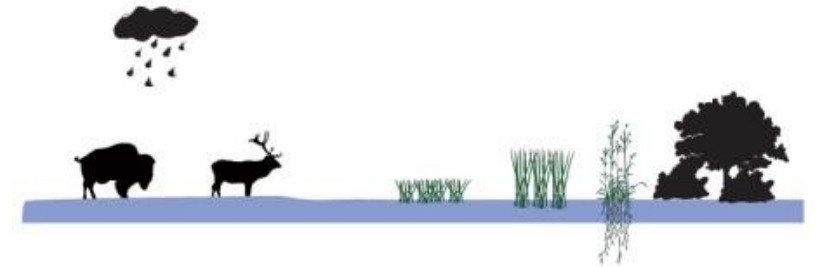
Native Midwest Ecosystems

The Prairie Landscape-A Lost Landscape

- Initially, prairie was considered untillable. The dense, deep root systems made conventional plowing impossible.
- Once an obstacle, prairie soils proved to be among the most productive in the world. Over thousands of years since the last ice age, the continual development and decay of the extensive root systems of prairie plants helped develop some of the most fertile soils in the world.
- This fertile soil led to the demise of this once extensive ecosystem as when farmers figured out to plow and drain the soil, the prairie was converted to agriculture at a swift rate. Today less than 0.1% of Iowa's original tallgrass prairie remains.



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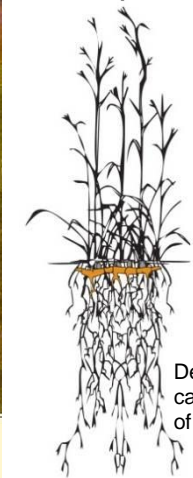
The prairie ecosystem is the result of natural and human-influenced fire patterns and grazing by large mammals such as bison and elk.



PRAIRIE FIRES OF THE GREAT WEST.

<http://alphabetilately.com/Trains/Candle-Prairie-Fires.jpg>

Plant adaptations include:



Narrow, upright, divided leaves reduce the amount of direct sunlight.

Underground buds that can survive fire and grazing impacts.

Deep roots that can find reserves of water

Restoration, Re-creation, large scale gardening?

We try to re-create native plant communities with the goal of biodiversity, aesthetics, sustainability and re-introducing some of the native processes where practical (fire, disturbance, grazing). We match the plants to the existing site and soil conditions (ie not introducing new soil substrate etc)

Early Restoration Efforts-UW Arboretum



Hand-planting Curtis Prairie



Natural Areas and Sustainability

- Conservation of biodiversity
- Genetic diversity vs. monotypic plantings
- Topsoil preservation
- Lower maintenance
- Aesthetics
- Groundwater recharge
- Sense of place



Stewardship

“Tools in the Toolbox”

- Overseeding/Replanting
- Mowing
- Invasive Control
- Prescribed Burning
- Adaptive management



Climate Change Adaptability

Uncertainty

Durability

There is much uncertainty what the exact affects of climate change will be. There will most likely be more extremes in temperature weather events and precipitation that will need to be adapted for.



Upper Miss. River Showing evidence of major water fluctuation. Water lotus stems sticking way out of the water



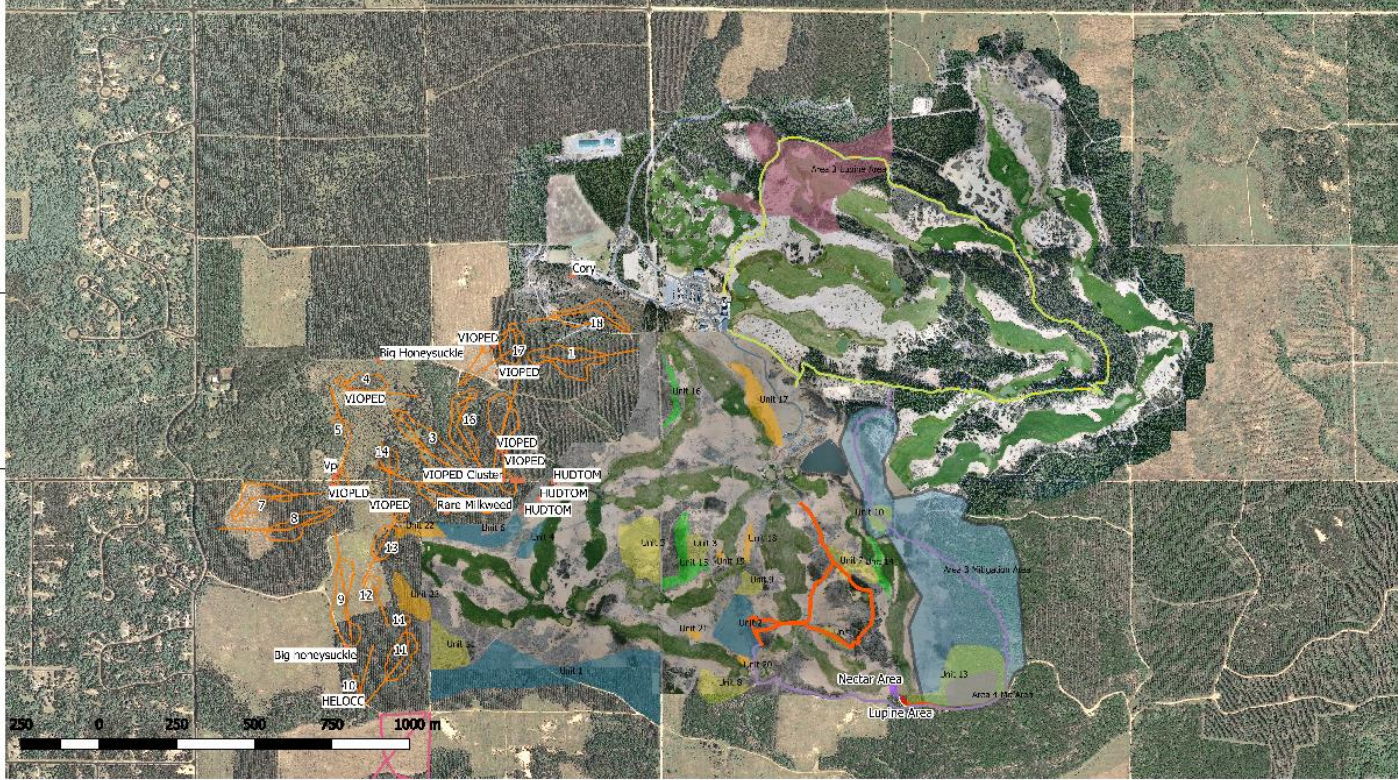
The goal is to produce diverse, sustainable, durable landscapes. Diversity is durable (aesthetics matter too).



Diversification: transform from monoculture to diverse landscapes



Red pine plantation, beginning to be converted to a diverse plant community



RESTORATION AND KBB MAP



Sand Valley Golf Course Property
Rome, Adams County, WI

DATE: 5/24/19
DRAWN BY: JRJ





GLENWAY GOLF COURSE RESTORATION PLAN

MAY 2022

Madison, WI

DATE: 5/10/22
DRAWN BY: JRJ



Turf to prairie conversion, drilling seed into dead turf, Fall 2021



Same site as the image on the left, Summer, 2022 (results may vary!)



May 2022 Glenway golf course, Madison, WI. Native seeding area showing signs of seed emerging along with Oak regeneration. Oaks were previously unable to survive here as this was a mowed area.



Sterling, IL Riverfront: restored prairie at a new park created at the site of a former steel mill.

Natural Garden Natives®

Natural Garden Natives (Midwest
Groundcovers)

St Charles, IL

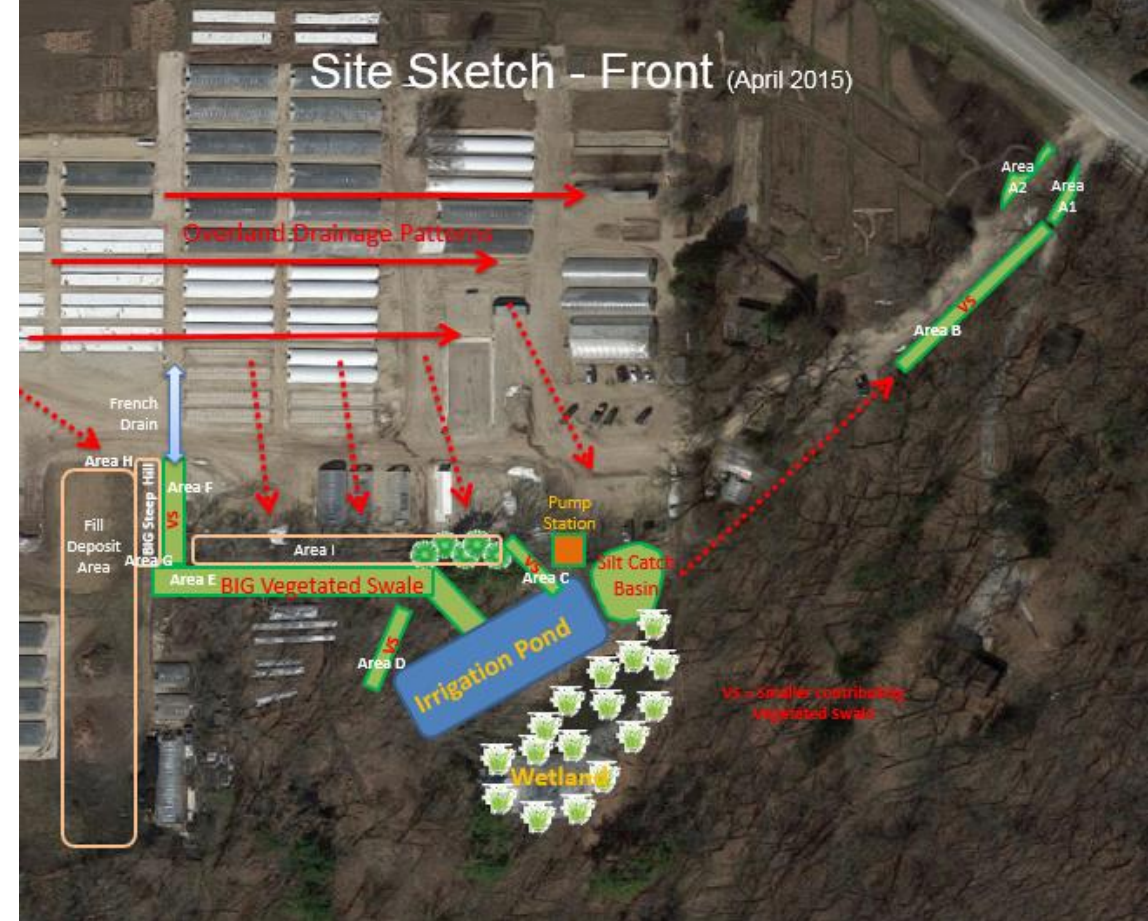
- Harvesting runoff for irrigation
- Natural areas management
 - Invasive Control
 - Prescribed Burning
 - Re-seeding
- Stream re-meander
- Demonstration gardens

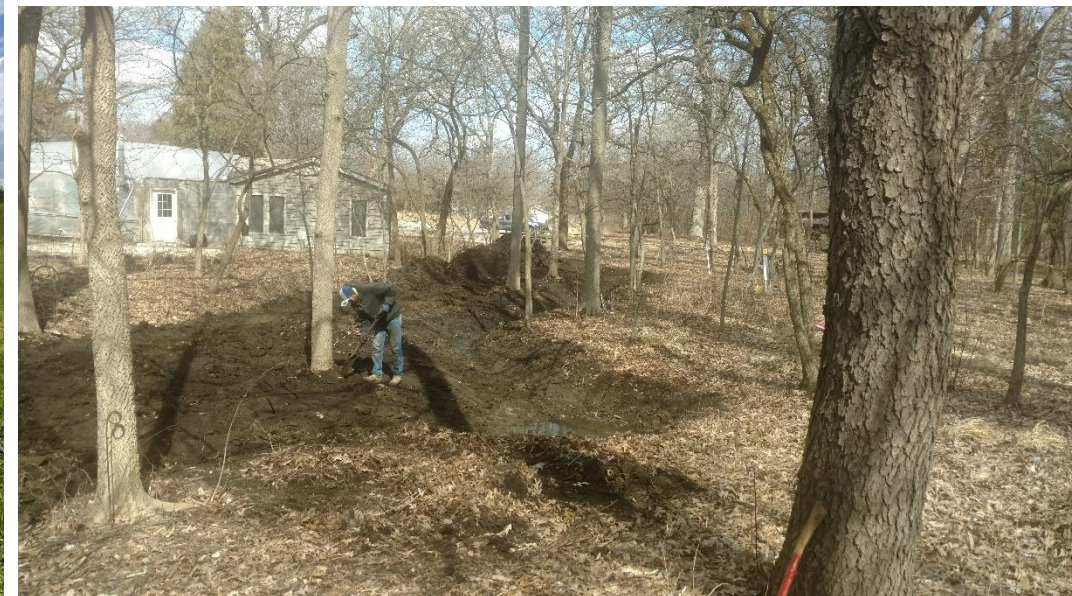
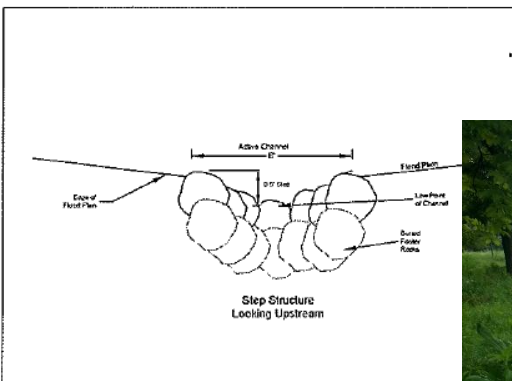
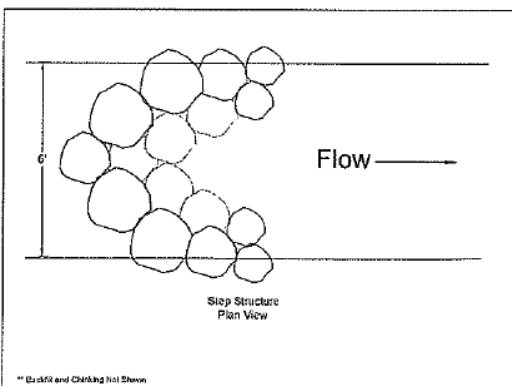
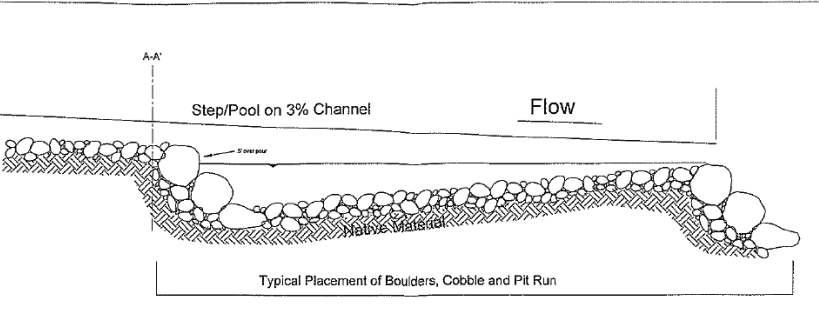


ECOLOGICAL RESTORATION AND MANAGEMENT PLAN BASE MAP

Midwest Natural Gardens
St Charles, IL

DATE: 5/16/16
DRAWN BY: IRJ







Natural Garden Natives®

Demonstration Gardens

- All native plants
- Different scales
- Designed with Austin Eischied



Blazing Star, Flowering Spurge, Spotted Beebalm, Agastache



Little Bluestem, Prairie Dropseed, Coreopsis, Echinacea, Wild Quinine, Butterfly milkweed, bluestem goldenrod, Prairie clover, Winged loosestrife, spiderwort



Little Bluestem, Prairie Dropseed, Agastache, Blazing star, Echinacea, Butterfly Milkweed



Little Bluestem, Prairie Dropseed, Coreopsis, Echinacea, Wild Quinine



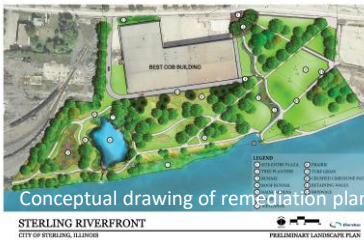
Green Infrastructure Riverfront Revitalization



NWSW in operation



1998 aerial



Conceptual drawing of remediation plan
STERLING RIVERFRONT
CITY OF STERLING, ILLINOIS
PRELIMINARY LANDSCAPE PLAN



Original slab in 2015

Part of the remediation work was demolishing a large slab that stretched out over the shoreline and grading it into a more natural slope with vegetation.



Rubble after demolition



Naturalized slope after placing fill

This project began with funding from the Illinois Green Infrastructure Grant (IGIG). The land was once part of the historic Northwestern Steel and Wire (NWSW) mill. After the plant closed, the City of Sterling acquired this portion the land with the intent to redevelop and revitalize Sterling's riverfront while improving water quality in the Rock River. Due to contamination issues, remediation was required before repurposing the land. This remediation included excavating contaminated soil (where the pond now sits) and placing over 35,000 cubic yards of fill above the concrete foundation on the rest of the site. The land was then planted to native prairie with trees and shrubs, transforming 17 acres of concrete into riverside greenspace. This beautiful riverfront park, along with the planned reconstruction of Wallace St., will be



Timeline

2001	Northwestern Steel and Wire Closes
20xx	Land purchased by City of Sterling
20xx	Building demolition
201x	Remediation plan developed
2015	Demolition of slab, placing of fill, planting
2016	Remediation of pond
2019	Entry Plaza constructed Best Cob Building demolished Fill being placed to bring Best Cob area to grade with rest of site, then planted to prairie

Future:



ty to the east
t and

llace



Fall 2015



Summer 2018



Spring 2015



Fall 2015



Summer 2018

This prairie is was planted with over 30 native grasses and wildflowers. Prairies provide a variety of ecosystem services. Diverse naturalized areas help with stormwater, as runoff is slowed by the vegetation and ground infiltration is increased as compared to buildings and pavement. Prairies thus help with water quality in our waterways by filtering runoff and reducing the rate of runoff during storm events. The deep roots of these plants hold the soil in place and increase soil porosity. This new prairie provides habitat for a variety of insects, mammals, and grassland birds. Several species of milkweed, the host plant for the Monarch Butterfly caterpillar, grow here. The diversity of wildflowers also provides critical habitat and food for honeybees and our many native wild bee pollinators, all of which have been declining in recent years.

Ecological Restoration and Forestry Summary

**Sand Valley Golf Course
Sand Valley Restoration Fund (SVRF)
Rome, Adams County, WI**

Glacial History

-Area was at the bottom of a glacial lake-Glacial Lake Wisconsin- from about 18,000 ya to 14,000 ya

-Glaciers started to recede, ice dam failed, lake drained quickly, carving the Wisconsin Dells, draining into the Lower Wisconsin River



Image: dnr.wi.gov



Image: dnr.wi.gov



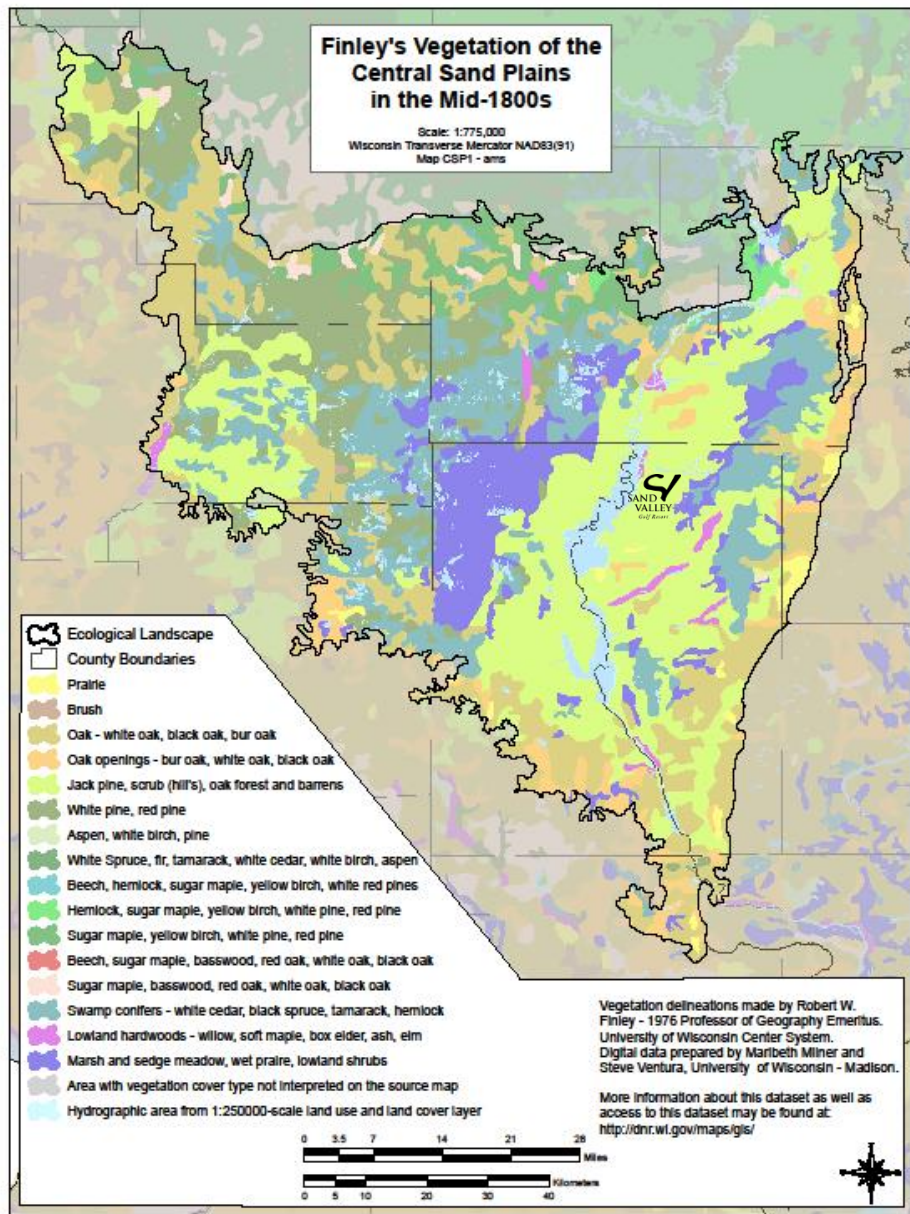
Image: dnr.wi.gov

**SAND
VALLEY**
Golf Resort

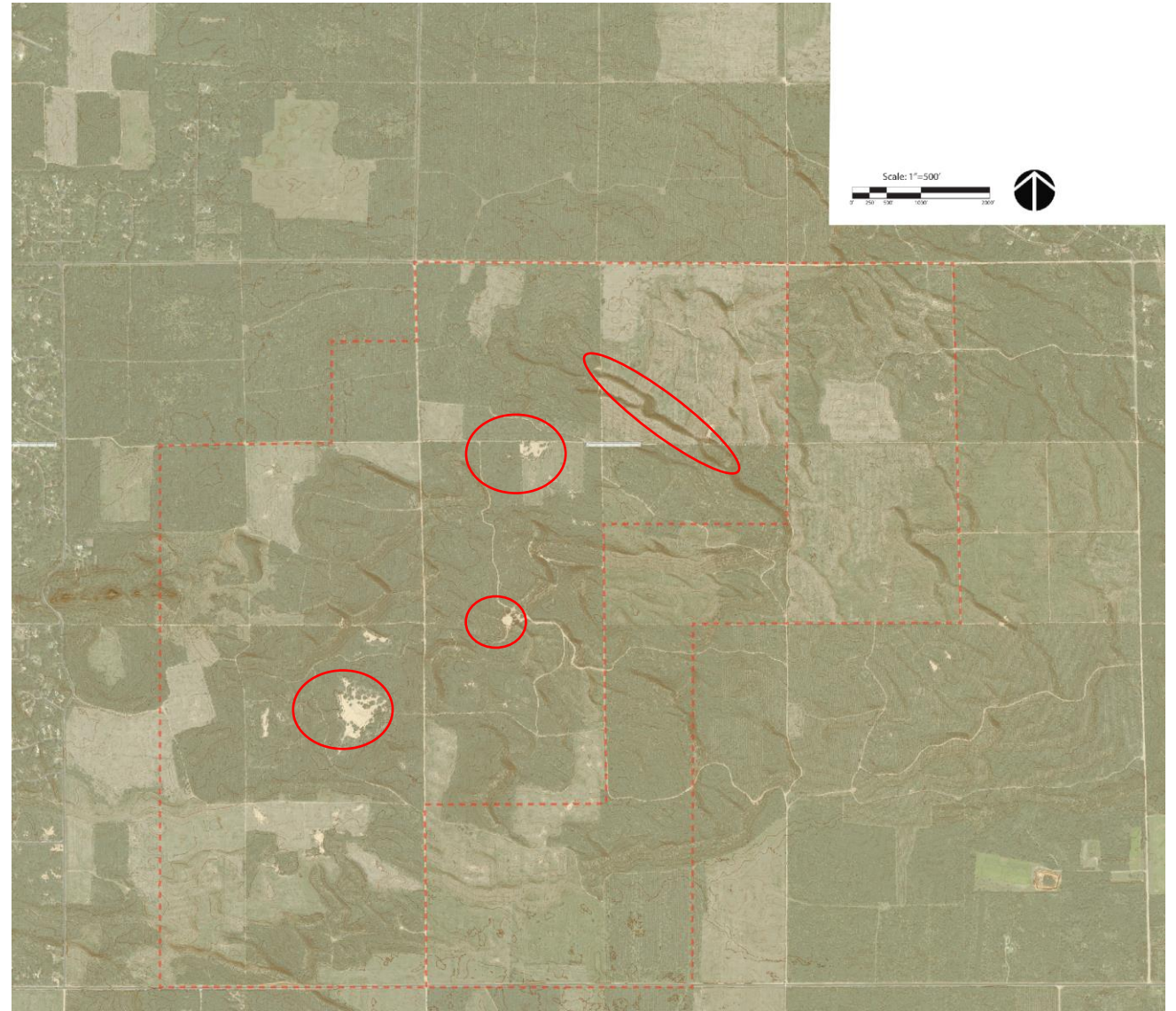


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Ecological Landscapes of Wisconsin Handbook - 1805.1 ©WDNR, 2011



Initial Site Conditions

- Pine Plantation, not farmed (ie, not tilled and/or sprayed every year for 80+ years)
- protect remnant plant communities where its practical, chunk vegetation
- need to re-introduce disturbance (clearing, fire), get sunlight to the ground
- supplement with seeding
- control invasives**



Remnant



Remnant sand barrens/black oak savanna habitat on-site.

Remnant plant community in area that was not previously pine plantation. Groundcover dominated by *Carex pennsylvanica* along with Black Oak (*Quercus velutina*) in the background.



Remnant



Starry Solomon's Seal (*Smilacina stellata*), in the sand blowout atop the 'volcano' on-site. We would expect this species to expand in this area with the lessened ATV traffic.

Monarch feeding on a Butterfly Milkweed (*Asclepias tuberosa*).

Site Clearing

Area that was cleared in 2013 showing regeneration of some of the native seedbank. Brush will need to be controlled by either fire or selective clearing to maintain an open habitat.



Photo 6: Typical shot of some of the pine plantation areas that were cleared. In between the old plantation rows are mostly remnant vegetation from the seedbank. This seedbank is beneficial in controlling invasive species and re-establishing native plant communities.

Seeding



Seeding in fall 2014. To ensure proper seed distribution, seeding was done in two passes, one for small seed, and one for larger seed.



5/26/15: area seeded in fall of 2014 starting to emerge. Note the seed settled into tracks made by excavating equipment.



Pink Corydalis (*Corydalis sempervirens*) appeared in one the areas disturbed by tree clearing and construction.



6/25/15: Seedlings of Rudbeckia, Coreopsis, Penstemon and others beginning to emerge in seeded areas.

Seeding





Results of chunking at #7



Butterfly milkweed in flower at native landscapes around cottages.



Prince's pine found in pine barrens on-site



Monarch and bees pollinating Liatris at Cottages



9/11/15: Winged Pigweed (*Cycloloma atriplicifolium*) colonizing some of the disturbed ground on site. Winged pigweed is noted for its unique color, shape and tumble-weed like seed dispersal.

SONGBIRD TRAIL

Approximately 1.2 mile round trip, moderate difficulty



Butterfly milkweed in restored prairie



Large-flowered beardtongue in restored prairie



Pink lady slipper orchid

The Sand Valley Golf Course property was mostly a red pine plantation, however, some native landscapes still subsisted. These natural communities exist on a continuum from bare sand (sand barrens or sand blowouts), to mostly herbaceous vegetation with some open sand areas (sand prairie), to scattered open grown trees with prairie vegetation underneath (black oak and jack pine savanna). Sand Valley is actively restoring some of these landscapes within the course property.

The Songbird Trail will take you through a sampling of the restoration and remnant areas as well as past golf landscapes and an intact red pine plantation.

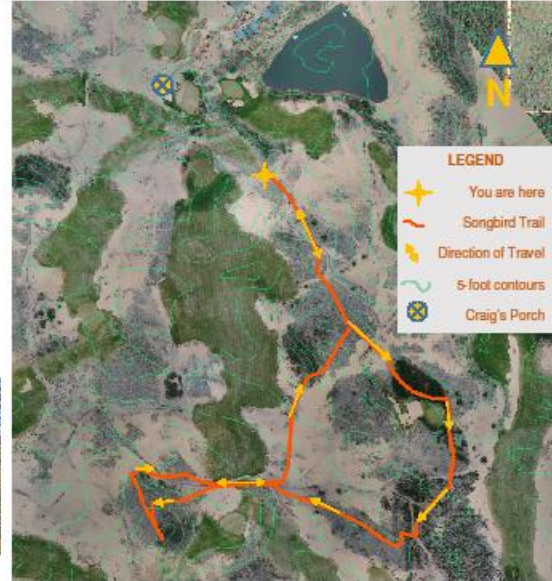
The trail has 20 actively monitored Bluebird nesting boxes. The Town of Rome is a Bird City Wisconsin and a member of the Bluebird Restoration Association of Wisconsin.



Karner Blue Butterfly



Nesting box



LEGEND

-  You are here
-  Songbird Trail
-  Direction of Travel
-  5-foot contours
-  Craig's Porch

RIDGE TRAIL

Approximately 2.2 mile round trip, moderate difficulty

Glacial Lake Wisconsin

The unique landforms and sandy soils in this part of Wisconsin owe their existence to a large glacial lake that was once present here. Glacial Lake Wisconsin formed about 19,000 years ago when the Green Bay lobe of the Wisconsin glaciation dammed the outflow of the ancient river channel now occupied by the Wisconsin River. The lake was in existence for about 5,000 years and was huge at its largest extent: approximately 70 miles long and 160 feet deep in places. When the climate warmed and the lake drained about 14,000 years ago, the sand remained.

In some areas, wind action formed the sand into dunes. These dunes support barrens plant communities and ecosystems now known as the Central Sand Plains Ecological Landscape. This trail takes you through some of these habitat types, across pine plantations, amongst golf landscapes and features scenic vistas along dunes and ridges.



Aerial view of golf construction on the Mammoth Dunes course from 2016 showing a sample of the expansive sand deposits of this region



Central Sands Ecological Landscape Image: dnr.wi.gov



LEGEND

-  You are here
-  Ridge Trail
-  5-foot contours

Opportunities

- Great remnant plant communities and a seed bank that is responding to our activities
- very unique plant community and soil conditions
- large scale restoration
- less concern with compaction in the sand

Challenges

- large acreage of land being disturbed-prone to invasion by invasive species
- fire management
- large scale restoration

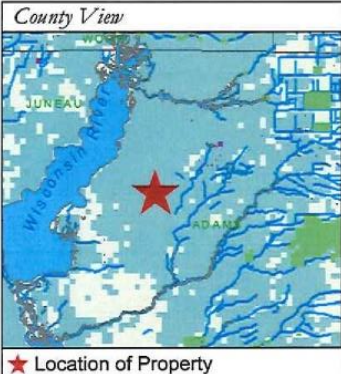


Plum Creek Timberlands Northern Unit

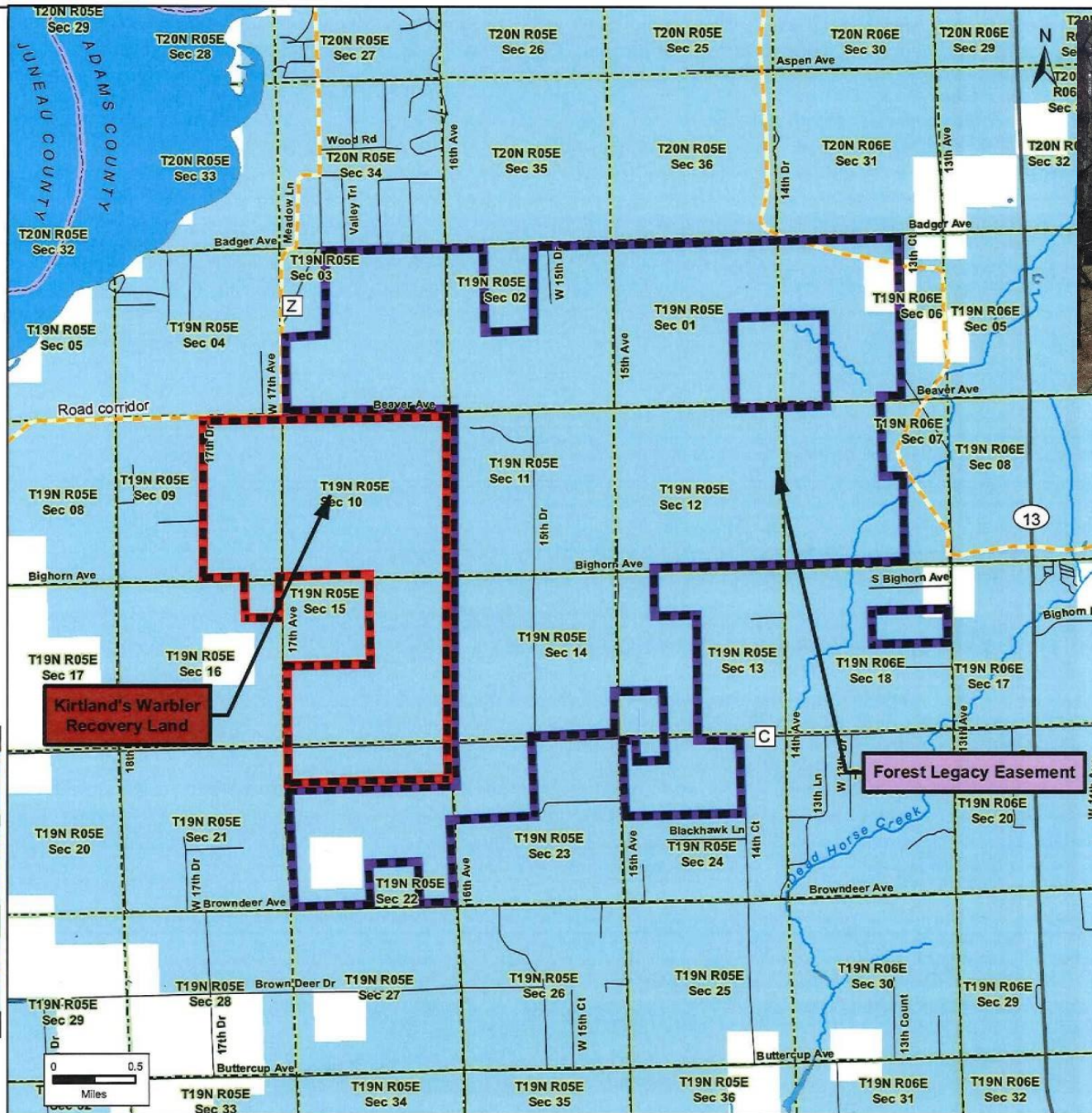
T19N R5E Sec 3, 9, 10, 15, 16 & 22
Town of Monroe, Adams County
And
T19N R5E Sec 1, 2, 11, 12,
13, 14, 23 & 24
Town of Big Flats, Adams County
And
T19N R6E Sec 6, 7 & 18
Town of Big Flats, Adams County

 Kirtland's Warbler
Recovery Land
 Forest Legacy Easement

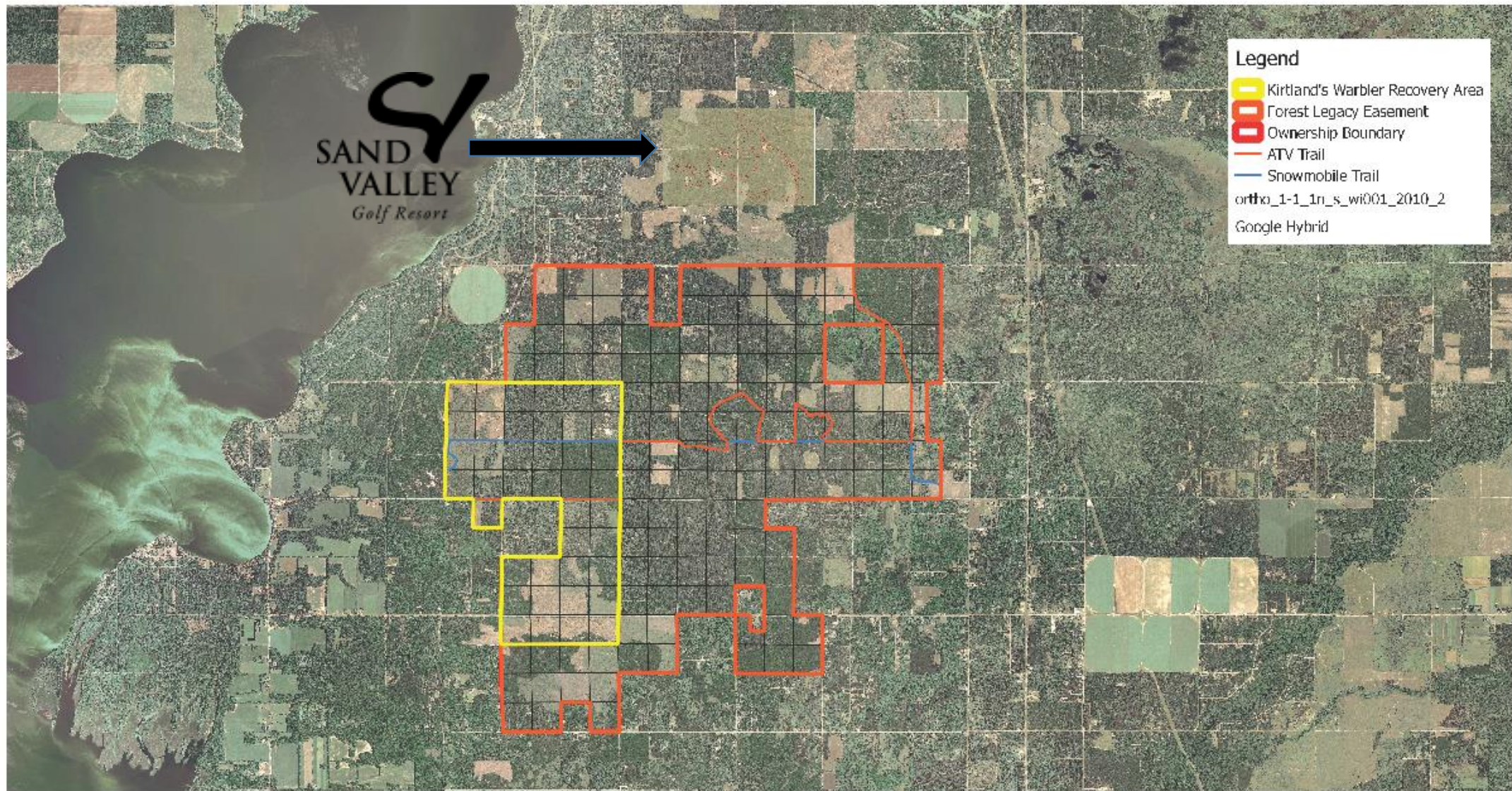
 High Potential Range for
Karner Blue Butterfly
 Recreation
 Trail
 PLSS Section Line
 WDNR Owned
 WDNR Easement



 WISCONSIN DEPARTMENT
OF NATURAL RESOURCES
Bureau of Facilities of Lands
Map Created: Jan 17, 2013 kmh



 SAND
VALLEY
Golf Resort



CONSERVATION PROPERTY BASE MAP

Sand Valley Golf Course Property
Rome, Adams County, WI



DATE: 12/18/16
DRAWN BY: JRJ

Sand Valley Restoration Fund

Project Scope

- Harvest Red Pine plantations to allow regeneration of native sand barrens mosaic plant communities
- Restore the site through the re-introduction of natural processes such as prescribed fire while controlling invasive species and re-introducing native flora where possible
- Work with public and private partners to restore and manage the habitat of threatened flora and fauna of the sand barrens
- Allow and manage for both passive and active recreation that is in concert with site restoration objectives

Aerial view of large swaths of pine plantation on the property



Sand Valley Restoration Fund

Central Sands Ecological Landscape



Sand Valley Restoration Fund

Central Sands Ecological Landscape



Karner Blue Butterfly (WDNR, photo by Steve Apps)



Kirtland's Warbler (Cornell Lab of Ornithology, photo by Laura Erickson)



Northern Bobwhite (WDNR, photo by Jack Bartholmai)



Sharp-tailed Grouse(WDNR, photo by Brian Collins)

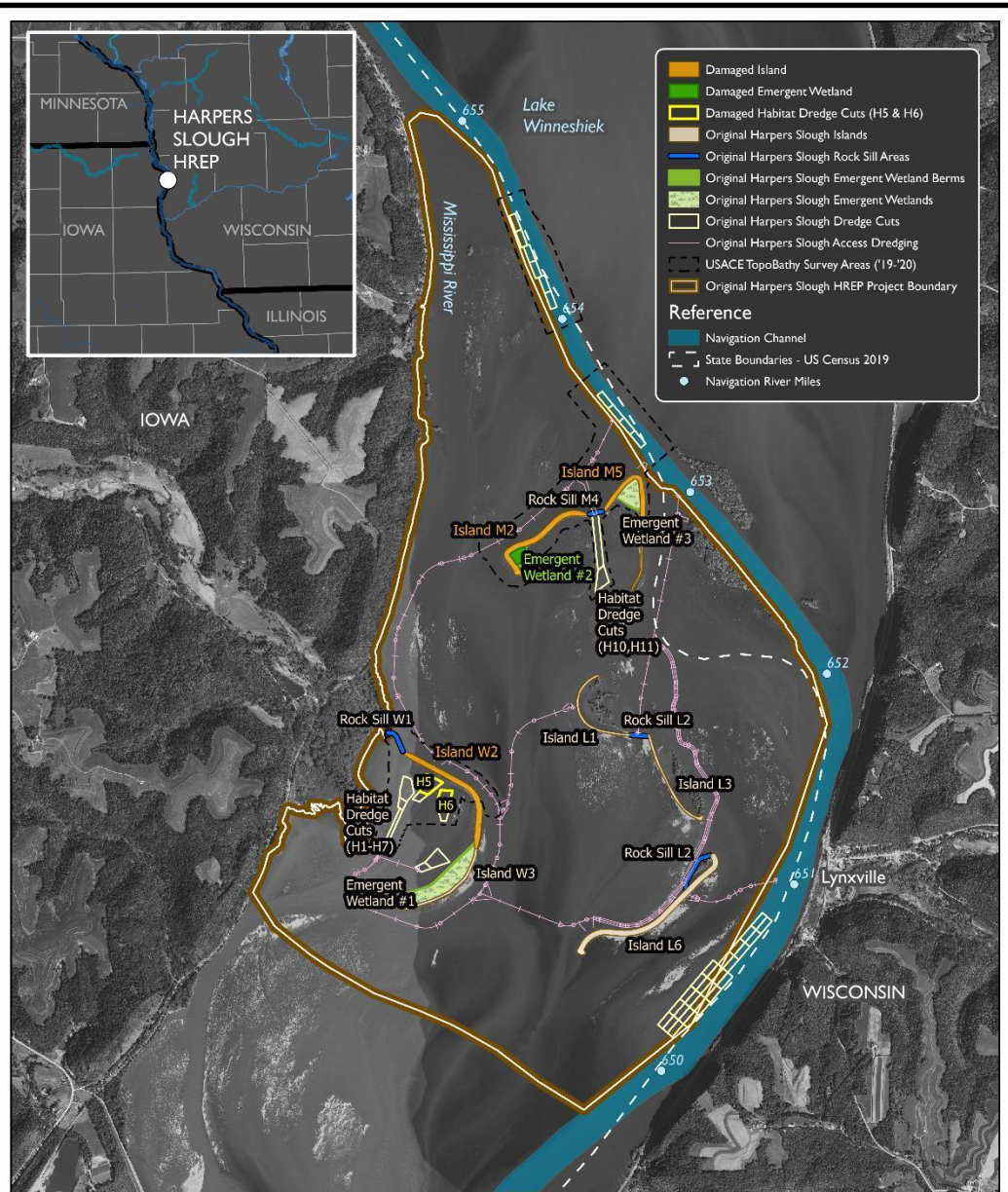


Slender Glass Lizard (WDNR, photo by A.B. Sheldon)



Greater Prairie Chicken (WDNR, photo by Dave Menke)





Mapping

Large-scale drone mapping of
Invasive species

Mapped ~2500 acres of wetlands
in SE Wisc.

Phragmites

2021-2023



Lessons Learned

Prairie Park

- Prairie and wetland complex as part of a 30-acre Museum campus
- Designed in 2011, implemented in 2012 (drought year)
- Many initial seedings did not take because of drought conditions
- Stewardship was not begun immediately
- Lack of staff on-site for stewardship



Restoration of initial implementation

- 2015: formed committee to address site issues
- Some areas responded well (seed was most likely dormant during dry period and germinated under the right conditions in subsequent years)
- Brought in local landscaper to perform stewardship with oversight from restoration ecologist
- Prioritization of areas to work on helped focus efforts (very large site)
- Some re-seeding efforts were done
- Site has responded well, site is manageable, items lower on the priority list are now able to be taken on



Questions?
Thank You

