

Using Agricultural Drones in Ecological Restoration





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Davey Resource Group, Inc.
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- 10+ years in Wildlife and Wetland Management
- Wildlife and Fisheries Management from West Virginia University
- Lead Pilot DRG Ecological Consulting
- Lifelong Waterfowler, Birder and Wildlife Artist



Drones provide a cost-effective, time-cutting solution to large-scale land management projects such as invasive vegetation spraying or seeding. Pairing drone technology with boots-on-the-ground expertise allows our restoration ecologists to:

- » Decrease the amount of equipment and crew members needed on site which reduces soil disturbance
- » Reduce transmission of invasive species via equipment
- » Significantly reduce the time it takes to spray or seed large-scale projects
- » Significantly reduce exposure to herbicides
- » Provide a more precise application to the area and a decreased likelihood of windswept herbicide as compared to helicopters
- » Provides chemical output data, GPS data files, and detailed maps of the treatment areas for accurate project tracking



CONTACT DAVEY RESOURCE GROUP FOR MORE INFORMATION ON DRONE CAPABILITIES.

DRG Drone Fleet



DJI Agras MG-1P



DJI Agras T10



DJI Mini 3



Bath Nature Preserve
Bath, OH



Niss Restoration
Manfield, OH



Entrikin Wetland Mitigation
Salem Township, OH


Project Layout



Deer Creek

Drone Seeding

Legend

 Feature 1

Google Earth

Deer Creek Mitigation
Salem, Ohio





900 ft



Pinebrook

Phragmite Spraying
9/26/2022

Legend

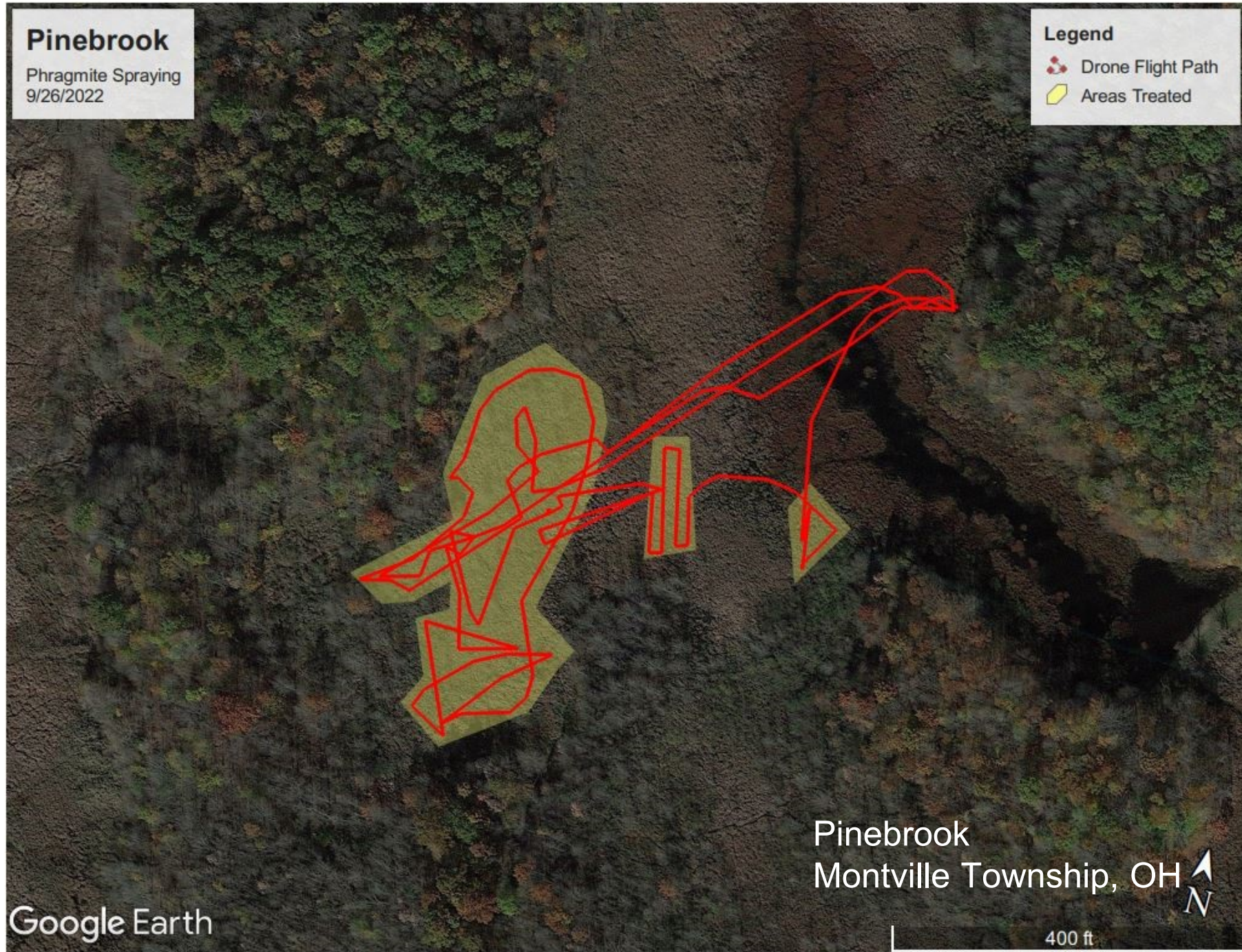
-  Drone Flight Path
-  Areas Treated

Google Earth

Pinebrook
Montville Township, OH



400 ft



Drone Spraying

How is it different from Backpack spraying?

- Accesses harder to reach areas
- Saves time, more precise/better coverage
 - 16ft swath width
- Reduces exposure to herbicides
- Measure herbicide percentage by acreage
- Drone tank holds 2+ gallons of herbicide
 - Sprays an acre in 2-3 minutes!



Cleveland Metroparks, Park Synagogue

Invasive Vegetation Control



Summit Metro Parks, Hardy Rd
Akron, OH

Site Conditions



Mill Creek Wildlife Sanctuary

- Flat, no obstacles (tall trees, wires)
- Secluded
- Accessible launch site
- Autonomous flying

Vaughn Farm





- Obstacles, obstacles, obstacles
- High traffic area
- Challenging access
- Manual flying



**Summit Metro
Parks
Wetmore**
Peninsula, OH
(Akron Area)





Project Examples



Mill Creek Wildlife Sanctuary

Canfield, OH
(Youngstown Area)



- 10.2 Acres
- Mapped by walking
- On site time: 4 hours
- 21 gallons of herbicide mix



Mill Creek MetroParks Wildlife Sanctuary

Aerial Invasive Plant Management
10.2 Acres
9/13/2023

Legend

-  Drone Treatment Area
-  Flight Path





Google Earth

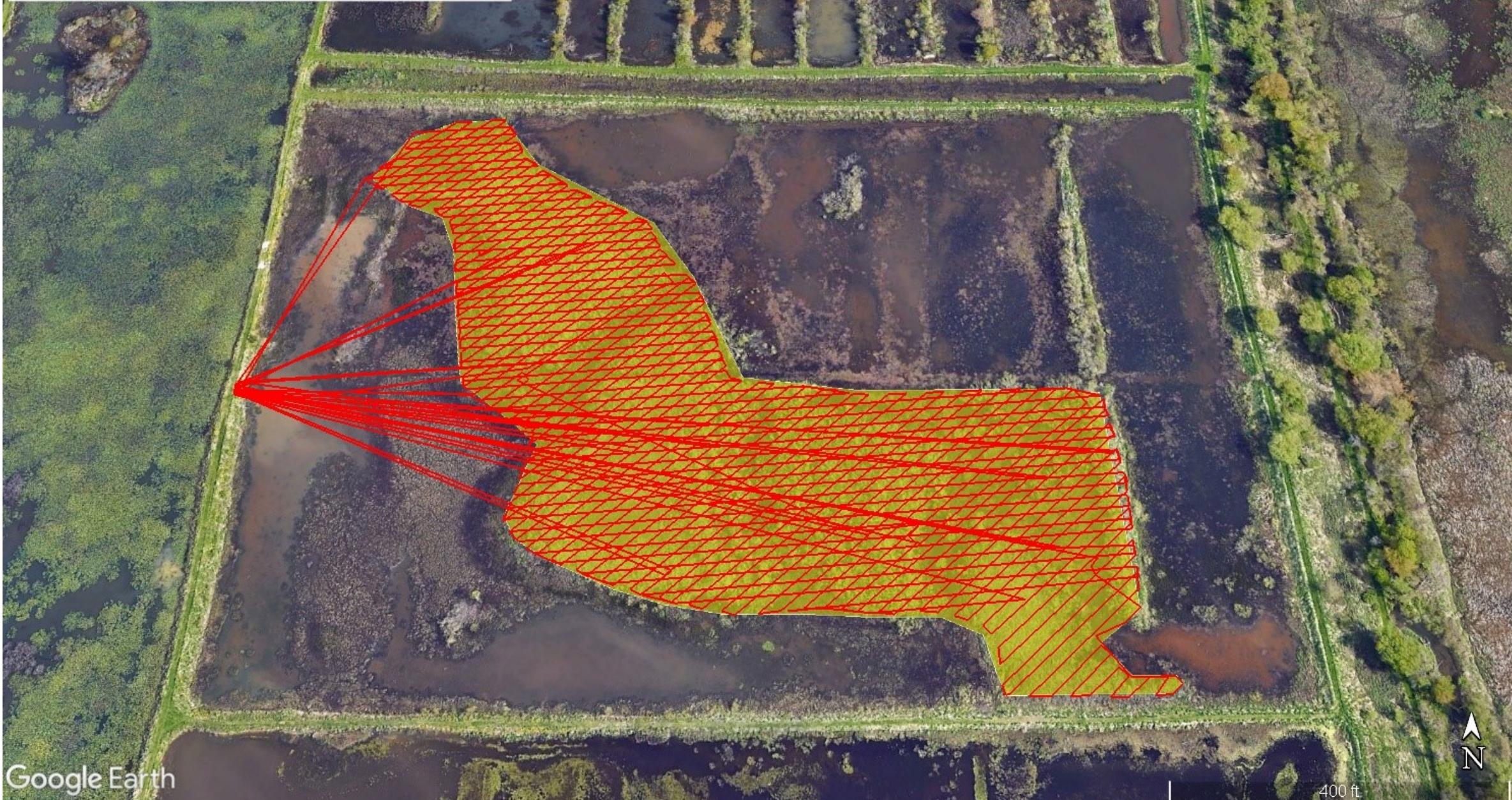
400 ft

Mill Creek MetroParks Wildlife Sanctuary

Aerial Invasive Plant Management
10.2 Acres
9/13/2023

Legend

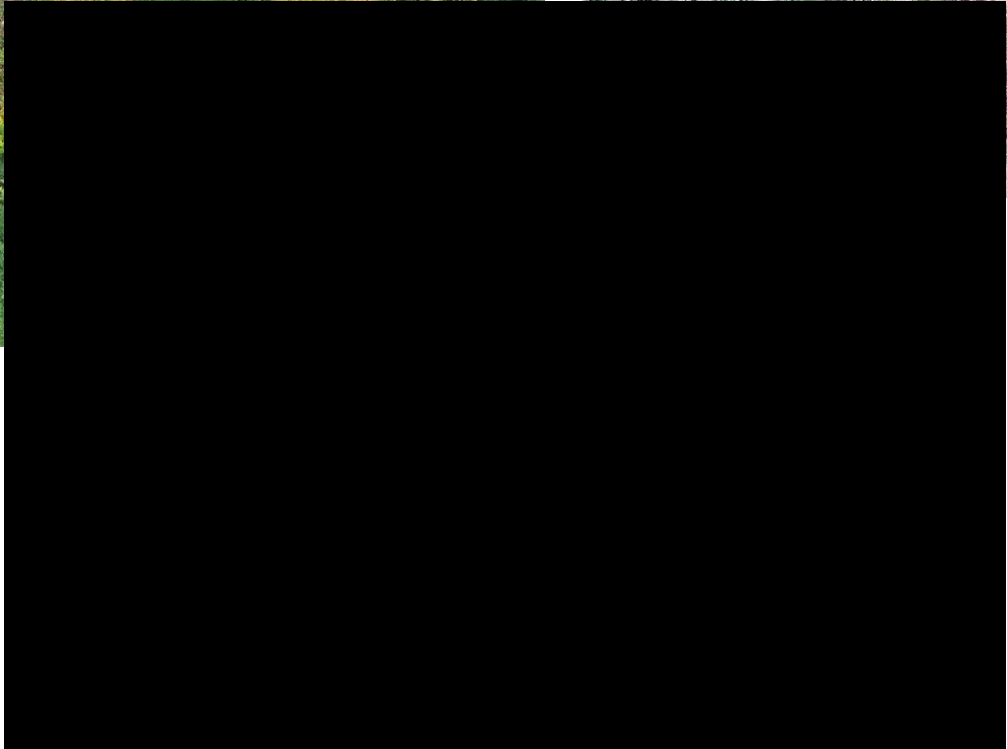
-  Drone Treatment Area
-  Flight Path





Ducks Unlimited, Oatka Creek

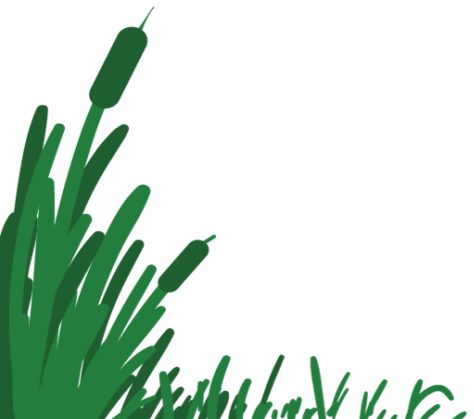
Warsaw, NY



Summit Metro Parks

Olson Bog

Twinsburg, OH



Future Projects



Lockington Dam
Dayton, OH



Municipal Park Basin
Hudson, OH



Drone Seeding



Entrikin Wetland Mitigation
Salem Township, OH



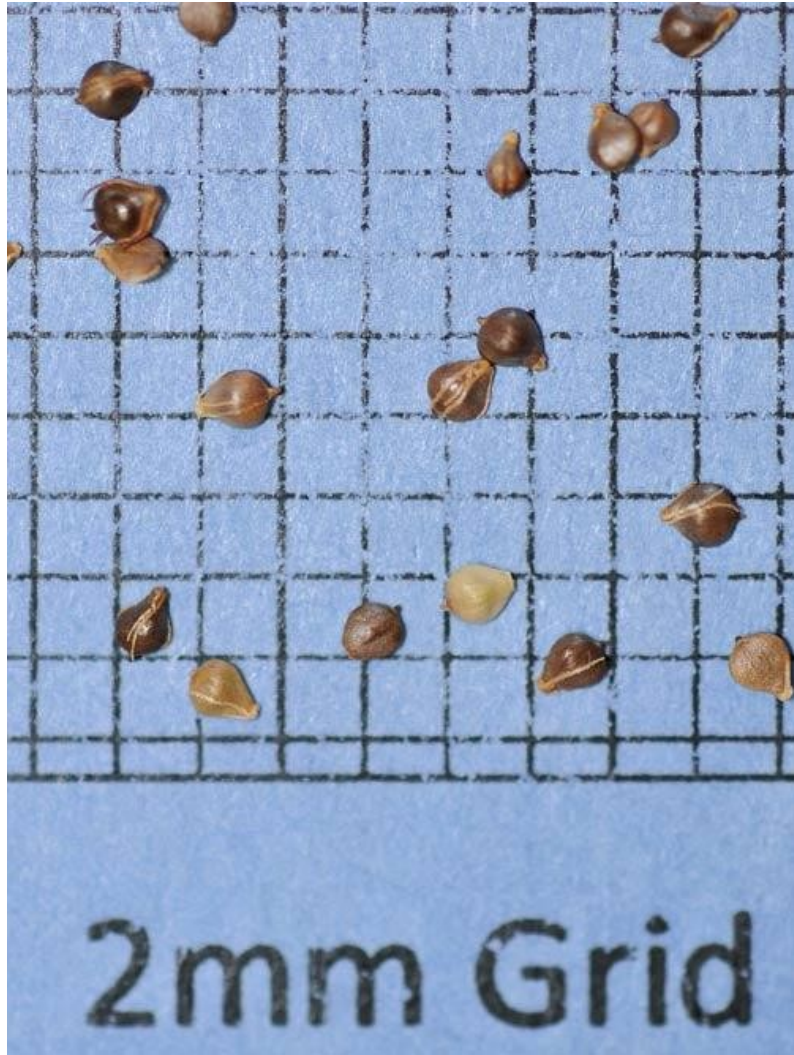


Cover crop (Winter Rye) coverage on ice at 30 lbs/acre

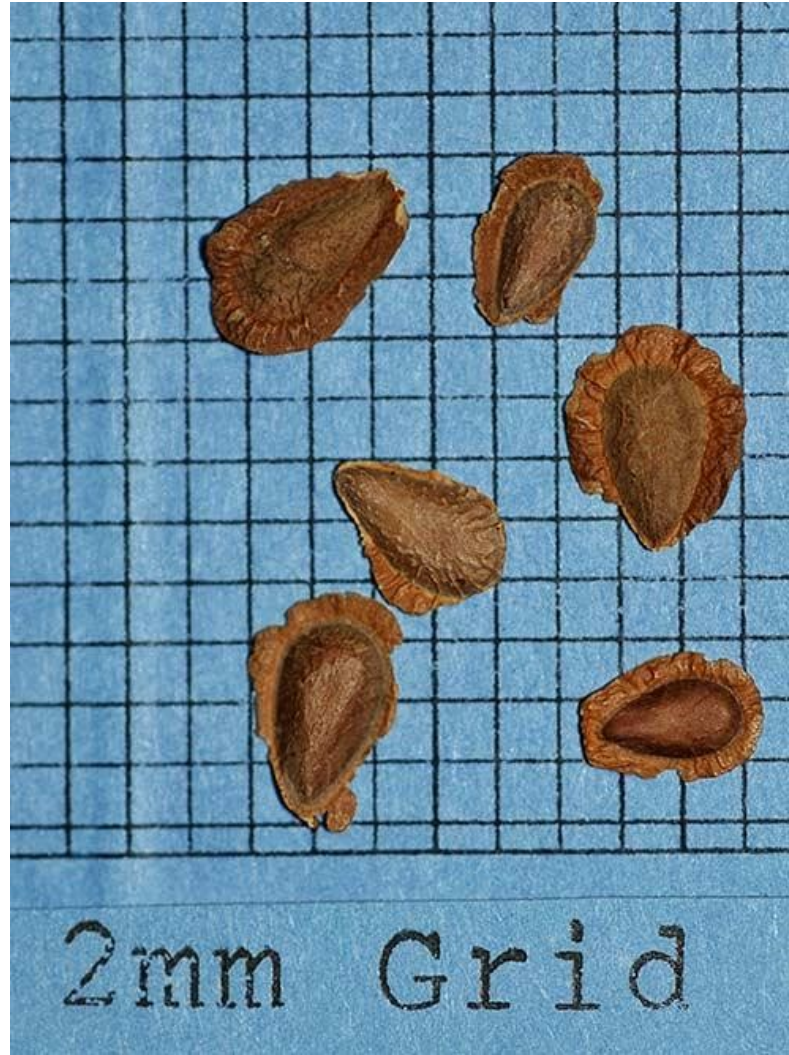


Native wetland seed mix coverage at 12 lbs/acre

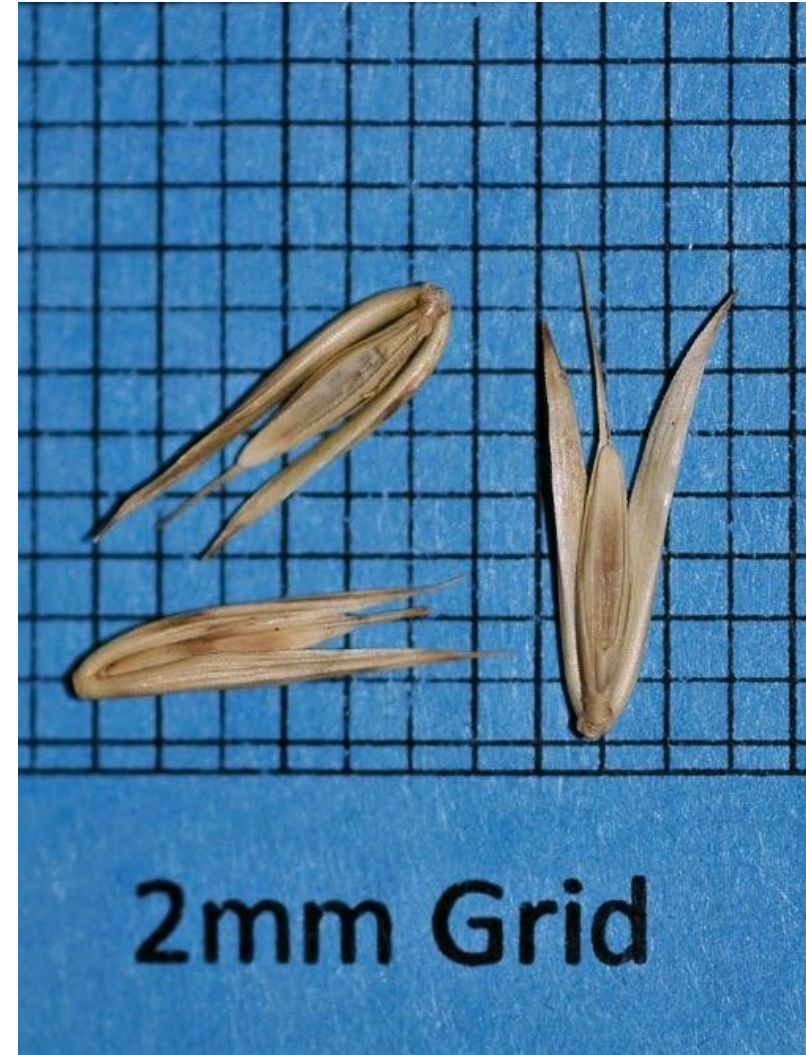




Schoenoplectus tabernaemontani



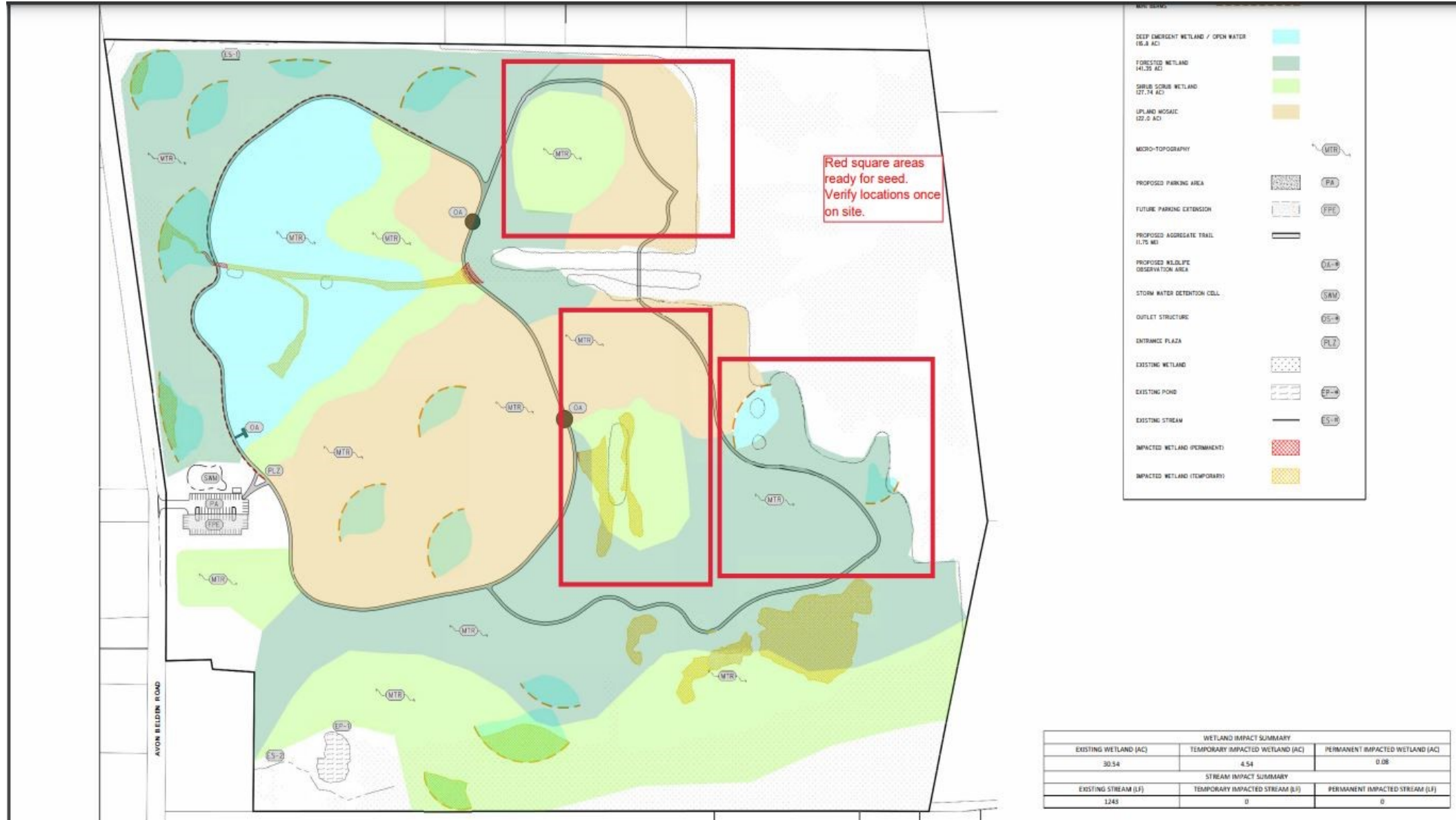
Asclepias syriaca



Elymus virginicus

Litchfield Wetland Restoration

Medina County Park District



May 2023





☉ 209°SW (T) ☉ 41°11'33"N, 82°1'5"W ±16ft ▲ 973ft



Devey Resource Group MG

Litchfield
09 Nov 2022, 11:47:13





Litchfield Seeding

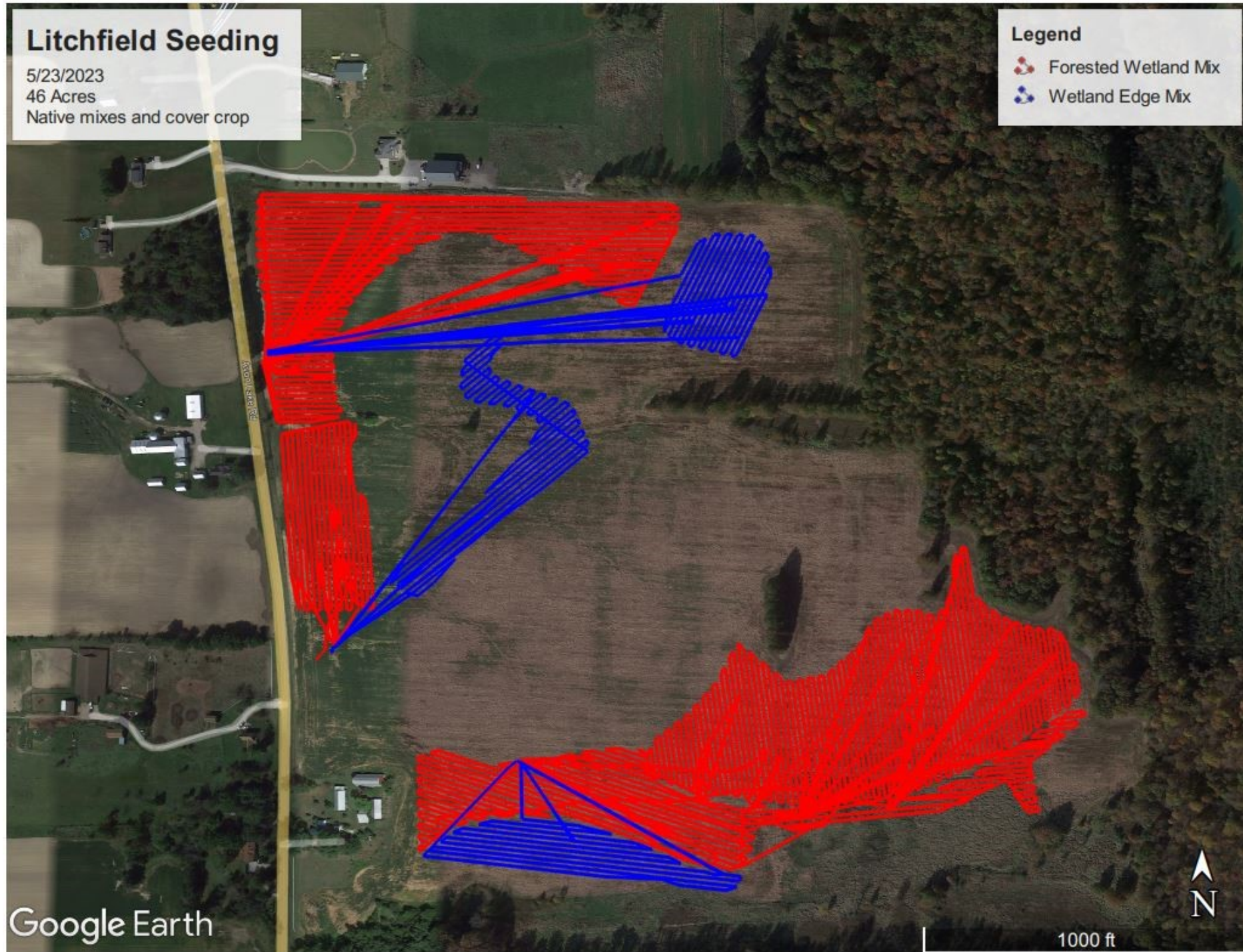
5/23/2023
46 Acres
Native mixes and cover crop

Legend

- Forested Wetland Mix
- Wetland Edge Mix

Google Earth

1000 ft



June 2023



August 2023



Lucas Compressor Station

TC Energy Drone Seeding
2/16/2024

Legend

- Drone Seeded Area
- Drone Flight Path
- Hand Seeded Area
- LUCAS



- Drone Seeded
 - 5.4 Acres
- Hand Seeded
 - ~1.5 Acres
- On site time
 - 3 Hours



The Pros of Using Ag Drones in Restoration Work

- Reduces equipment necessary, crew effort and time
- Reduces applicators' health risks
- Reduces site disturbance and invasive species transmission
- Reduces overspray/waste in comparison to traditional methods
- Increases employee engagement and professional development



Current Limitations and Looking Forward

- Drone Capacities
 - 2 - 18 gallons
 - 20 - 180 pounds
- Battery Life
 - 10-15 Minutes
- Label Restrictions and Language
 - Labels have not caught up with drone industry yet
 - Drone applications rates not included
- Mapping Integration
 - Cannot upload shapefiles (DJI Agras)
- Price point for entry
 - Drones, truck setups
 - Training and permitting



What do you need to operate?

- Pesticide applications license
 - Correct categories: Aerial, wetland, forest pests...
- Part 107
 - FAA certified remote pilot of small unmanned aircraft systems
- Part 137
 - FAA approval to perform “agricultural” operations with an aircraft
- Wavers
 - Over 55 pounds
 - Swarming
 - Out of sight

Questions?



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