



Establishment and Maintenance of Native Vegetation

AARON FEGGESTAD & JASON BEHREND

4/13/2023 10:30-11 AM



Presentation Outline

1. Habitat Establishment Definition & Examples
 - What is meant by “establishment”?
 - Local standard: Waukesha County LRD Planting Verification
 - Value of ecological expertise
2. Project Lifecycle Considerations to Achieve Success
 - What are common issues at various life cycle stages?
3. Questions & Discussion





Habitat Establishment Definition & Examples

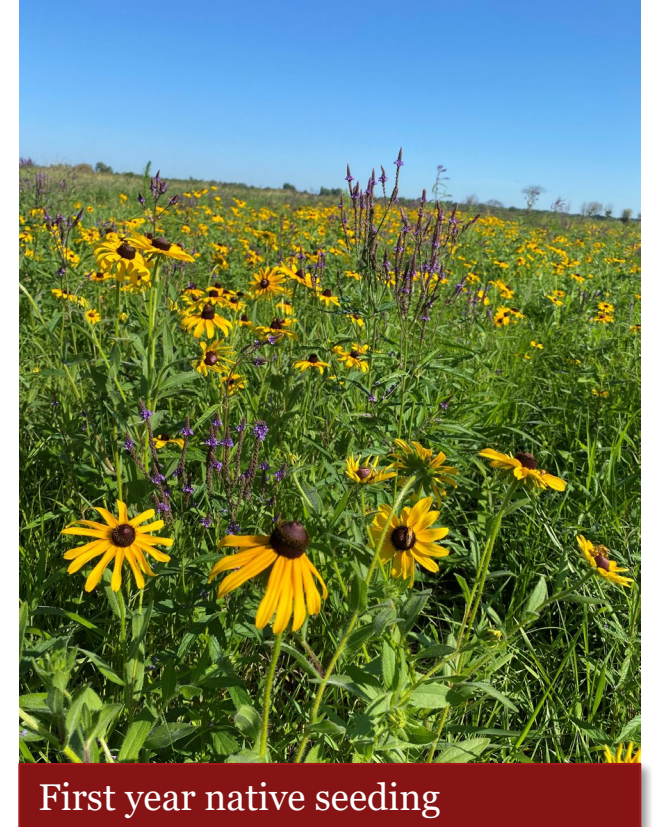
What is “successful” establishment?

Establishment is a term that’s used a lot! What does it mean?

It depends on the standards or other objectives for the native planting:

- **Permit / regulatory standards:** specific and measurable (“pass-fail”)
- **Ecological objectives:** habitat and/or species
- **Stormwater function:** native plant cover to enhance infiltration
- **Other:** aesthetics, conservation certifications

The standards or other specific objectives **inform** the steps that are taken to design, install, adaptively manage, and assess a native planting



Regulatory example #1: stormwater basin wetland planting



Wetland planting around a basin





Restored wetland (wet prairie) from native seeding



Planted median infiltration area

<https://www.terravessasustainability.com/>





Prairie planting on a utility right-of-way



Pollinator planting on a new solar development



Monarch on swamp milkweed (host plant)



Bumble bee on a native flower

Stormwater function example: turf to prairie conversion



Before: non-native turf / meadow



3 years after: young restored prairie

Waukesha County Stormwater Management & Erosion Control Ordinance

<https://www.waukeshacounty.gov/globalassets/parks--land-use/land-conservation/stormwater/final-2005-stormwater-ordinance---waukesha-co-web-version.pdf>

Sec. 14-335. Stormwater Permit Requirements

(d) Construction and Planting Verification

2. Verification

“If warm season or wetland plantings are involved, a landscape architect or other native plant specialist shall verify the planting process and its successful establishment, in accordance with LRD standards.”



Infiltration basins the first spring after native seeding

Stormwater Practices Planting Types

“WARM SEASON PLANTING”



Established prairie seeding (5 years old)

“WETLAND PLANTING”



Established native wetland planting (5 years old)

Example stormwater practices: infiltration basins, bioretention basins, rain gardens



Guidelines for Planting Verification

<https://www.waukeshacounty.gov/globalassets/parks--land-use/land-conservation/stormwater/planting-verification-procedure.pdf> (revised 3/21/2023)

FAQs

- ***Who's responsible for verifying?*** The permit holder.
- ***Who can do the verification?*** A professional qualified to evaluate percent cover and species diversity. The professional needs to be verified ("pre-qualified") by Waukesha Co. LRD.
- ***When is it done?*** Typically, 3 years following seeding. But...annual assessments by a professional are recommended to inform adaptive management plans.
- ***How is it done?*** Using the vegetation sampling protocol established by LRD.
- ***Is it difficult to achieve Planting Verification?*** It depends...



2 Years Post-seeding: On-track Basin

Would receive sign-off after 3 years

- 4 of the species included in the approved restoration plan by the end of the third growing season
- 70% cover
- Set-up for success from Day 1
 - Native planting plan
 - Ecological contractor
 - Ecological maintenance
 - Monitoring and adaptive management



Predominance of native vegetation 2 years after seeding

3 Years Post-seeding: Failing Basin



Invasive vegetation around a basin planted with native seed

Would not receive sign-off after 3 years

Root cause: lack of ecological maintenance and monitoring following native seeding

- Permit sign-off and transfer delayed at least 3 years
- Additional investment required to establish to standards (start over: prep / install / manage a new native seeding)
- Financial Assurances held back

Value of Ecological Expertise

Technically Sound Design, Installation, and Maintenance

- **Designing for nature**: utilize proven concepts of prairie and wetland restoration to create successful project plans
- **Site-specific** design considerations
- **Full life-cycle experience** is key to anticipating and avoiding common issues before they become a problem



Monarch on dogbane flower

Value of Ecological Expertise

Reduce Uncertainty and Risk

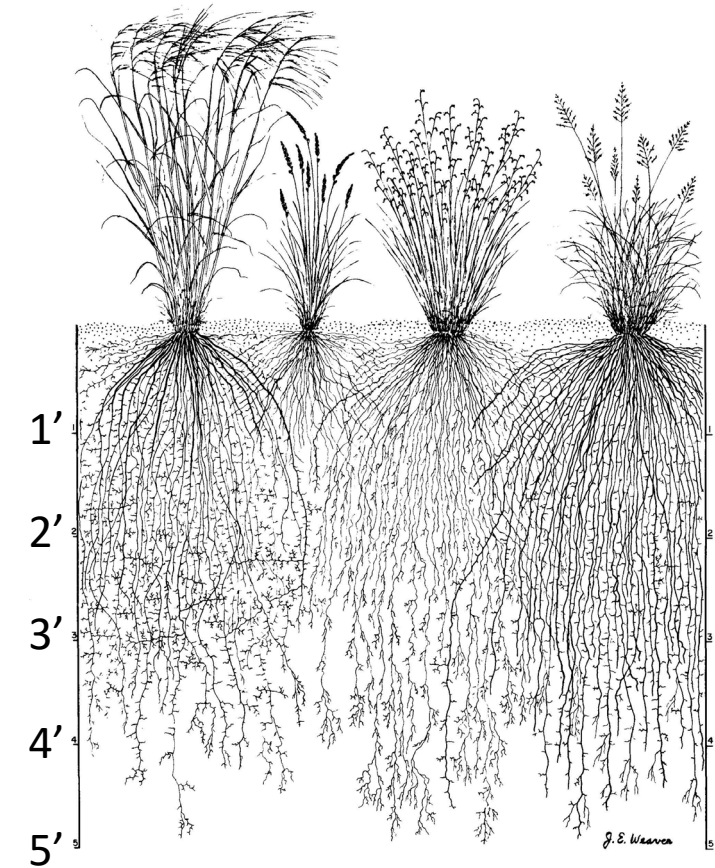
- Increase confidence in meeting vegetation standards and/or expectations
- Deliver on-time and on-budget

Value Added Components

- Enhance function of the designed storm water system
- Acceptance by the community

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

ROOT SYSTEMS OF PRAIRIE PLANTS



(4) Tops and roots of grasses common to drier upland prairie plant communities on calcareous moderately fine-textured Haplustoll soils such as Steinauer clay loam. Plant species from left to right are porcupinegrass (*Stipa spartea*), prairie jungrass (*Koeleria cristata*), little bluestem (*Andropogon scoparius*), and prairie dropseed (*Sporobolus heterolepis*). (Based on work by Dr. J. E. Weaver, University of Nebraska)

VED-603-LINCOLN, NEBR. 1944

5,P-22,586.4

Root Systems of Common Prairie Grasses



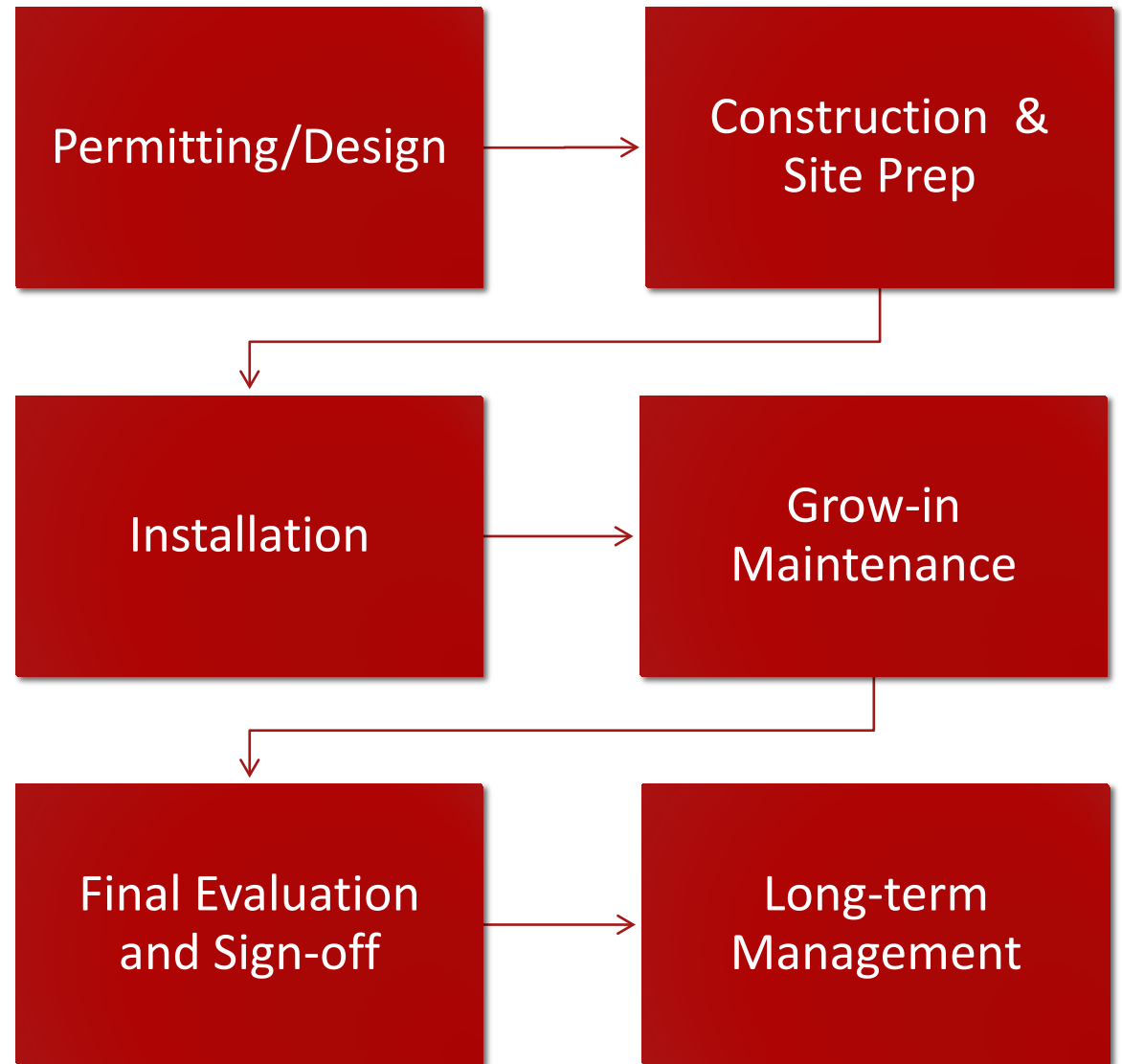


Life-cycle Considerations

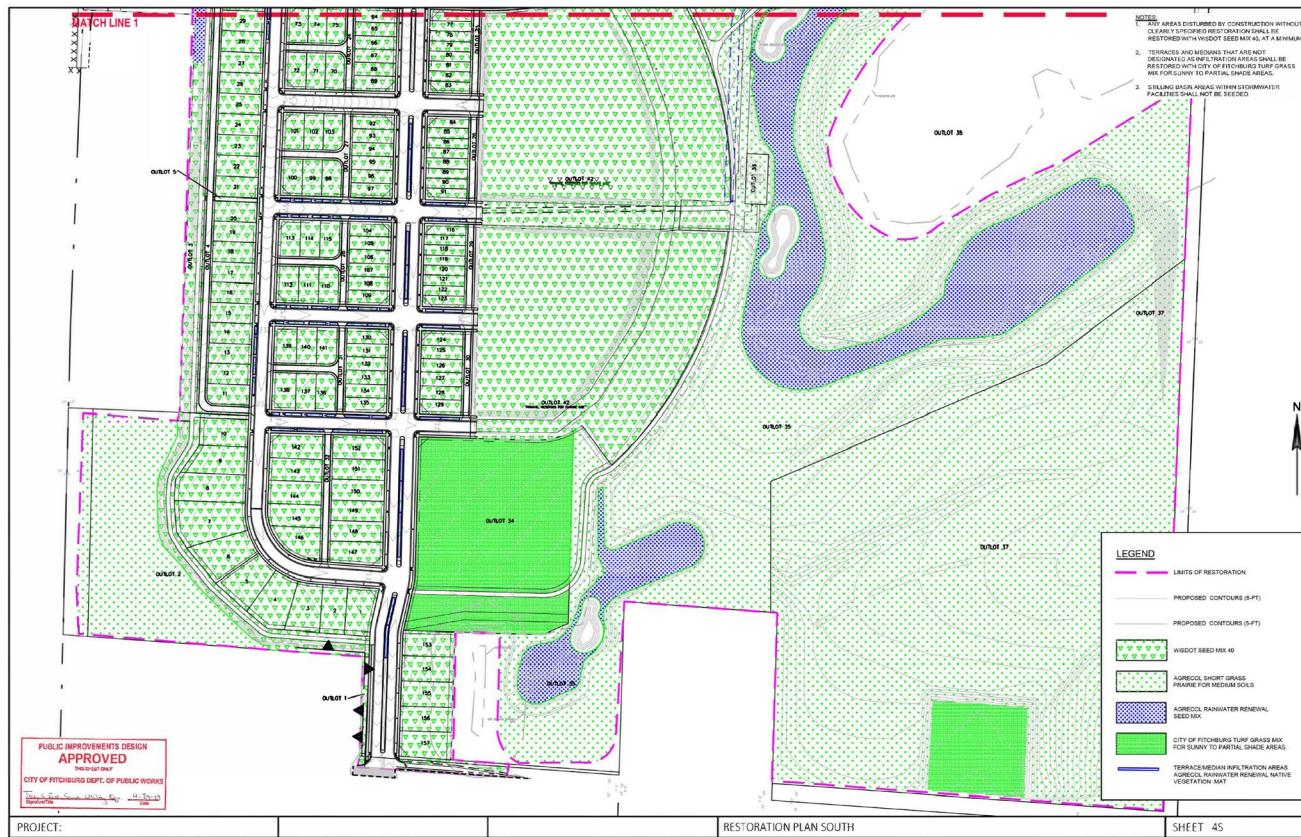
What are typical issues that lead to failure to meet performance standards?

How can ecological expertise be involved at various life cycle stages?

Typical Project Lifecycle



Ecological Design



- Incorporate ecological expertise and full life-cycle experience early in the design
- Design must account for required standards or objectives
- What are the common issues that come up during design?
 - Plant species selection (species and diversity)
 - Seeding and planting density
 - Lack of notes (specs)

Example construction document for naturalized stormwater infrastructure



Ecological Design: Native Planting Plans

*What's in a **Native Planting Plan**?*

- Reference to applicable standards and purpose & objectives
- Notes: invasive and noxious species, site prep, planting, maintenance care, long-term management, monitoring
- Planting figures (zones by hydrology and soils)

Waukesha County LRD Technical Design Guidance:

<https://www.waukeshacounty.gov/globalassets/parks--land-use/land-conservation/stormwater/tech-design-guidancesamples/infiltration-practice-vegetation-establishment-03-23-23.pdf> (dated 3/23/2023)



Construction, Site Prep, Installation

- Vegetation installation is **not a standalone process**. The stage is set during the facility construction and grading.
- What are the common issues that arise during construction?
 - Subsoil mixing and compaction
 - Erosion and sedimentation
 - Weedy and invasive species: fallow soils, infested stockpiles
- Consider involving ecological contractor during grading



Final grading and soil prep inspection

Construction, Site Prep, Installation

- What are the common issues that arise during site prep and installation?
 - Lack of suitable seedbed preparation
 - Improper seeding timing
 - Improper seeding equipment



Typical native seed installation equipment



Grow-in Maintenance

- Appropriately timed management efforts are **CRITICAL** to:
 - Achieve native seed germination and growth
 - Reduce the potential for establishment of weedy and invasive specie
- Three full growing seasons are often needed to establish native seed mixes
 - Typical management of seeded areas include:
 - Maintenance mowing - years 1-2
 - Herbicide spot treatments - years 1-3
 - Prescribed burning - by end of year 3



Targeted mowing of infiltration areas

Grow-in Maintenance

- What are common issues during this phase?
 - Improper maintenance techniques
 - Failing to identify or respond quickly to weedy and invasive species
 - Ongoing weedy and invasive species seed rain from stockpiles and construction areas
 - Failing to recognize ecological “indicators” of pending success or failure



Basin that has been mowed too often and too short

Use of Indicators during Monitoring



Young prairie planting with many “marker” species

- How do we know if things are on track?
We assess:
 - Presence of:
 - “Marker” plant species: easy to establish but not often persistent
 - “Conservative” plant species: more difficult to establish but representative of ideal conditions for native plant communities
 - Persistence of weedy and invasive species
 - Indicators of nuisance wildlife
 - Adjacent areas (e.g., ongoing invasive species infestations)

Adaptive Management

On-site assessments of conditions to inform ongoing management needed

Are adjustments needed based on conditions that have developed following installation and initial grow-in maintenance?



Timed mowing as part of an adaptive management plan

Final evaluation and sign-off

Use of ecological expertise throughout the project lifecycle reduces uncertainty and risk when it comes to sign-off

Should be just a formality to achieve and sign-off on vegetation standards after the required management and monitoring period



Ecologist conducting a vegetation assessment



Prescribed burn of established native planting

Long-term Management

- May occur after sign-off
- If not stewarded, areas will likely lose native plants and revert to turf or weedy and invasive species
- Causes loss of investment and reduces or eliminates community benefits of usable green space and aesthetic values

Questions & Discussion

Aaron Feggstad, Senior Ecologist
aaron@heartlandecological.com

Jason Behrends, Senior Technical Lead
jason@heartlandecological.com

