

Resurgence of the Wild After Bulldozers; September 2009 N. Aten



Airline Yards Landscape Restoration Plan (LRP)
Detailed Plan
09 February 2011
Nancy M. Aten, Landscapes of Place, LLC
prepared for Menomonee Valley Partners, Inc.

This is Part Two / Three of the Landscape Restoration Plan for Airline Yards. Part One is the Concept Plan, which provided the background and ecological restoration goals, proposed land and soil preparation, and offered plans describing vegetation communities for team and stakeholder review. This resulted in agreement of the restoration zones and plant communities, probable implementation sequencing, and acceptable techniques. Part Two /Three, the Detailed Plan, provides plans, specifications, and estimates, resolving the sequencing of implementation work with materials, quantities, equipment, techniques, and timing. [This document does not yet contain completed material quantities or completed technique details - although they are shown in part - or revised estimates].

INTRODUCTION

The Airline Yards Landscape Restoration Detailed Plan extends the model developed in the LRP Concept Plan (16 February 2010, Landscapes of Place, LLC). This Detailed Plan can stand alone, however, it is informed by the LRP Concept Plan which provides vital reference to understand the history of this place, implementation concepts, restoration techniques and plant community references. Together these two documents, Concept Plan and Detailed Plan, form the LRP.

A part of this Detailed Plan provides twelve diagrams which are broken into two sections of six diagrams each. These sections are the plant community functions and time sequencing steps. The first section of six diagrams describe the site from a functional ecological community perspective. These show overviews of the suggested target community locations, phasing and management. These diagrams embody the restoration goals provided by the stakeholders. Some important project details are also called out in these diagrams.

The second group of six diagrams offers time sequences for the implementation steps. These implementation steps include recommended time frames for the application of cover crop, native seeding, plantings (for herbaceous, shrub and tree) and maintenance regimes. This group covers the time frames beginning in the fall of 2012 and running through the spring of 2016, with one final diagram offering suggestions for future years.

Together these twelve diagrams can be used to introduce the LRP implementation concept, knowing that important concepts and details are provided in the body of the document.

This Detailed Plan provides detailed species list for the dry mesic prairie, mesic prairie, dry mesic savanna, mesic savanna, shrubland cover, shrubs for target dry forest, shrubs for target mesic forest, shrubs for target northern mesic forest, low meadow, stormwater swale, annual cover, and prairie-compatible cover (holding patterns) #1 and #2. Each species list is broken into functional plant groups. Each species within the list are further described by recommend means of delivery (seed, plant or cutting), C value and special notes. Those species unmarked with “seed” or “plant” are to be contemplated by the land manager for future inclusion when conditions would allow, as part of long-term goals.

The LRP documents the stakeholders’ ideas in a format that can be implemented by way of detailed budgets and contract specifications. Bid documents and management plans are outside the scope of work under the Landscapes of Place contract.

The development of the landscape concepts and the LRP has relied heavily on applying stakeholder input to the Society for Ecological Restoration (SER) process. This practice should continue through the future bid, implementation and management portions of the project.

GOALS AND OBJECTIVES

The Society for Ecological Restoration (SER) Framework that the LRP is using articulates a systematic planning process, that makes sure relevant factors are considered, and helps develop a plan that is clear in vision, clear in implementation steps, and allows for implementation progress monitoring and evaluation that works with adaptive management.

LRP Part One articulated conceptual goals, throughout but particularly p. 8-9 and p. 15. Here, we elaborate project goals and objectives based on feedback to LRP Part One. Project goals and objectives are expressed using a combination of characteristics, measures, and references -- including structure; composition including functional groups; biodiversity of gene, species, community; floristic quality index as end goal; reference models/sites; habitat goals; etc.

Goals and objectives provide the basis for considering restoration trajectories, methods, phasing. Goals and objectives also assist in the long-term management, enabling monitoring/assessment methods to have a basis for evaluating progress and perhaps adapting management.

“All ecological restoration projects share a common suite of ecological goals that consist of recovering ecosystem integrity, health, and the potential for long-term sustainability... A project may have additional ecological goals, such as to provide habitat for particular species or to reassemble particular biotic communities... Statements of ecological goals should candidly express the degree to which recovery can be anticipated to a former state or trajectory... [The] restored ecosystem will undoubtedly differ in some respects from its model, owing to the complex and seemingly random (stochastic) aspects of ecosystem dynamics... Other possible goals of restoration might include the accommodation of activities of social consequence, such as the strengthening of a community through the participation of individuals in a restoration project.” (SER Framework)

Part of the process is considering site natural history, current conditions and restoration possibilities, and establishing the reference ecosystem(s), completed in LRP Part One.

“The reference model represents the future condition or target on which the restoration is designed and which will serve later as a basis for project evaluation... The selection of the reference increases in difficulty in instances where contemporary constraints and conditions alter the historic trajectory or in other instances where the bioregion lacks comparative ecosystems of the kind being restored... The degree to which the reference can serve as a model for a restoration project and for its evaluation depends on its specificity and its appropriateness, and both can vary widely among projects. In some projects, the reference can serve almost as a template. In others, it can only hint at the direction of development.” (SER Framework)

Project Restoration Goal:

To transform the irreversibly altered land and hydrologic conditions to a mosaic of biodiverse landscapes, including forest, prairie, and ephemeral wetland, native to Milwaukee County and ecologically appropriate for new conditions. To provide measurable sustainable trajectories, within 3 to 8 years, to [long-term] target habitat goals. To incorporate, from day one, environmental literacy learning through participatory restoration and science. To provide the experience of wildness. To engender community support as measured through safe use of trails and meaningful UEC program participation.

Objectives:

Ecological Function

To enable and foster successional trajectories toward biotic goals -- thwarting invasive exotic species; facilitating the establishment of target biodiversity including conservative species; providing good land management

To maintain the integrity of the cap in perpetuity

To have working ecosystem services -- rainfall infiltration; biomass and decomposition; root development, soil structure, and soil biotics; pollinators; food chain support; viable reproduction

To support fauna habitat -- patch size; appropriate spatial and topographic arrangement; physical characteristics, enabling existing and arriving species of special concern or needed function

To be manageable -- with phasing and techniques that match resources; capable of not crashing - i.e. no big setbacks if management fails

Examples of LRP responses include: range of C values and families in seedings; effective cover crops; manageable phases; furrows and microtopographic variation to minimize runoff; species that quickly make root networks; suggest planting over seeding in flashy zones; matching species to microhabitat; providing soil composition/structure guidance; provide perches for birds, woody debris for cover, dead wood both horizontal and vertical; provide migrating bird food quickly - insect nectar spring, fruits fall; sizing and adjacency of habitat types; provide phasing options and easy "holding pattern" phases.

Examples of Land Manager responses include: promote working toward prescribed fire; continual management; adaptive management; erosion monitoring; following ecotype guidelines; establish vegetation monitoring...

Learning

Provide opportunity from beginning for deep environmental education, universally inclusive, engaging all senses

Enable participatory restoration

Become outdoor laboratory for science

Examples of LRP responses include: access to varied habitats of different phases; sufficient patch size to perceive / understand; expression of multiple successional times; look for ecorevelatory

opportunities; consider plant texture, scent, sound/wind, edible; growing, planning, seeding, planting opportunities that could be manual; multi-year and multi-season restoration activities; habitat zones that facilitate monitoring.

Examples of Land Manager responses include: planning for participatory restoration; encourage monitoring plans and baselines.

Intrinsic Value of Nature

Express sense of place

Maximize biodiversity at both habitat and species level

Make examples of rare ecosystems

Examples of LRP responses include: plan locally native habitats whose transitions are ecologically coherent; allow human movement on trails to experience a variety of habitats, and varied patterns within; incorporate sensible variants of habitats, e.g. dry forest and mesic forest, dry prairie to mesic prairie; ensure resources allocated to high species diversity in seed and plants; propose oak savanna and potentially oak barrens as rarer ecosystems that could be incorporated.

Wildness

Enable individual discovery (discovery always better than being told) -- less sense of having been "designed"; landscapes that provide clues to understanding them and make sense; provide for heightened awareness

Provide mystery and promote curiosity -- multiple layers of variety and diversity; full sensory experiences

Being in a space that you want to explore

Offering isolation and the ability to linger; watching, listening and waiting to be taught by this place

Examples of LRP responses include: partially obscured other trails; local variability in species that makes ecological sense; use of patterns of species that make ecological sense; use of "visual essence" species; partially obscure views; incorporate artifacts and natural debris; make variability in provision for five senses (e.g. large seeded vs. small seeded, minty-scented vs. soapy-scented); provide plant density variability (tied to soil types and habitat types); provide strong seasonal changes and seasonal identity.

Examples of Land Manager responses include: monitoring for opportunities to enhance wildness character.

Delight

Convey an intentional, functional, progressing, healthy restoration process -- the place looks loved; that this is nobody's front yard lets it define its own aesthetic :)

Tangible connection to home

Intuitively appreciated landscapes

Examples of LRP responses include: initially clear restoration zones and phases that fade over time; attention to species at trail edges; incorporation of pioneer species for early response; support magical views to community and surroundings; integrate community gardens; use of marker trees to develop over time; use of characteristic species; use of patterns of species that are characteristic and legible; attention to incorporating species that are seasonally characteristic for habitat.

Examples of Land Manager responses include: match management resources to phasing plan; manage for magical views; attention to plant cover and to weeds/invasives that considers both ecology and perception. This should include implementation of details that demonstrate this place is (well loved) cared for.

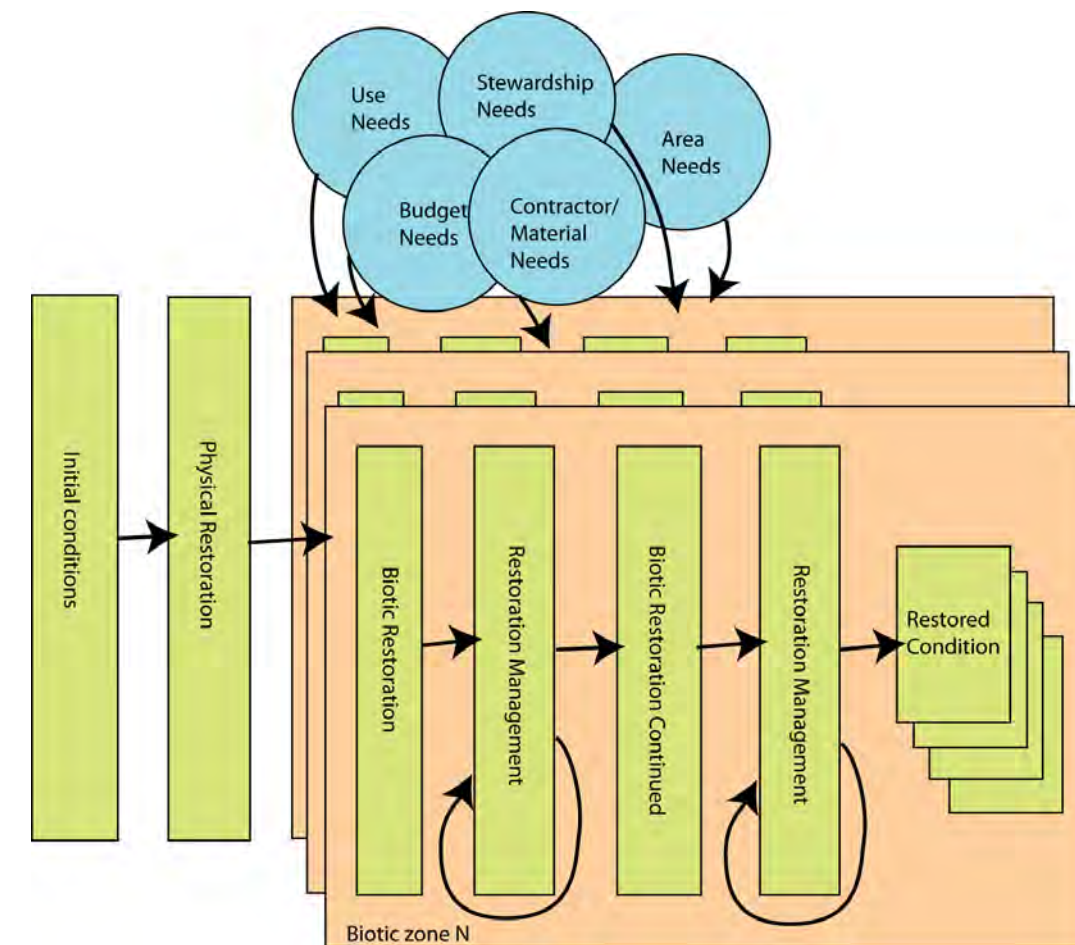
TRAJECTORIES AND PHASING

We are restoring this place to a desired future condition . We have restoration goals to use as guidance and measurement. There are two broad sequencing categories to consider, which interact with each other:

- (1) Restoration trajectory. This describes the anticipated stages of restoration from starting conditions to desired goals. *“An agreed-upon trajectory and its projection as embodied in reference model serve above all as signposts, yardsticks, beacons, and where needed, foghorns to indicate that the ecologically young system has self-sustaining and self-organizing characteristics and that the shared goals of the people who have agreed to work together to achieve holistic restoration are being followed and respected... The anticipated trajectory serves most importantly as part of the vision that drives restoration. It is ultimately unimportant whether the vision is entirely attained. What is important is that the vision leads to the development of a fully functional, resilient, self-organizing, sustainable ecosystem that complements contemporary environmental conditions and imparts enduring service and value to people.”* (Clewell/ Aronson)
- (2) Sequencing needs and phasing options. Given a restoration trajectory for a particular target and in a particular area, there are phasing options. This can include delaying the start of biotic restoration in a certain area(s) -- for example, thinking of restoration as building outward from the existing riparian forest remnants, or thinking of restoration as building from west end to east end, or tackling one mound and then another. Other phasing options relate to the speed at which a restoration trajectory is pushed (within limits).

There are needs that impact phasing choices, and these include:

- Use/Engagement Needs (areas complete for community-engaged restoration; areas complete for full school programs)
- Budget Needs (availability of funding from season to season)
- Contractor and Material Needs (ability of skilled contractor to manage volume and type of work in that time period, and availability of seeds and plants)
- Area Needs (e.g. West to East based on trail traffic and UEC programs)
- Management/Stewardship Needs (transition from restoration complete to management in progress can be supported by resources).



Questions to consider impacting project success:

- What are the likely funding scenarios for implementation, season by season, year by year, as estimated now, and as they evolve?
- What management resources can be applied to contract and field management of the LRP contractors?
- Is it planned to engage volunteers/staff in restoration (not just landscape management/stewardship)? Does this include a nursery? What is the timing?
- What are the anticipated stewardship resources over time -- how much per year can be taken on in management of native landscapes? (Stakeholders can make a conscious decision about whether to apply resources thinly and increase restoration risk, or apply more effectively but in a slower process over time).



HABITAT CHARACTER AND HABITAT OBJECTIVES

The habitat species lists in this plan provide narratives that discuss habitat character and habitat objectives. The plan drawings are in two sets. The first set of drawings are an overall view of target habitat goals showing the LRP response to the project goals and corresponding management concerns. The second set of drawings expresses implementation in a set of restoration steps, that address trajectories and phasing.

“Restoration projects should be designed to reduce the need for mid-course corrections that inflate costs and cause delays. In that regard, special care should be given to the design of site preparation activities that precede the introduction of biotic resources. Once biotic resources are introduced, it may become exceedingly difficult and expensive to repair dysfunctional aspects of the physical environment on account of inadequate site preparation.

...Restoration interventions require aftercare or continuing periodic maintenance after initial implementation. These tasks are predictable and can be written into the implementation plans under their respective objectives. Examples of maintenance tasks include the repair of erosion on freshly graded land and the removal of competitive weeds and vines from around young plantings.” (SER Framework) [This is described broadly in this plan but actual management plans are not in LRP scope].



*Successful implementation will require ongoing and coordinated activity of the stakeholders
(photos courtesy M. White)*

Forest and Prairie Target Plant Communities

13 acres Prairie mosaic

(incl. 2.8 acres Swale complex)

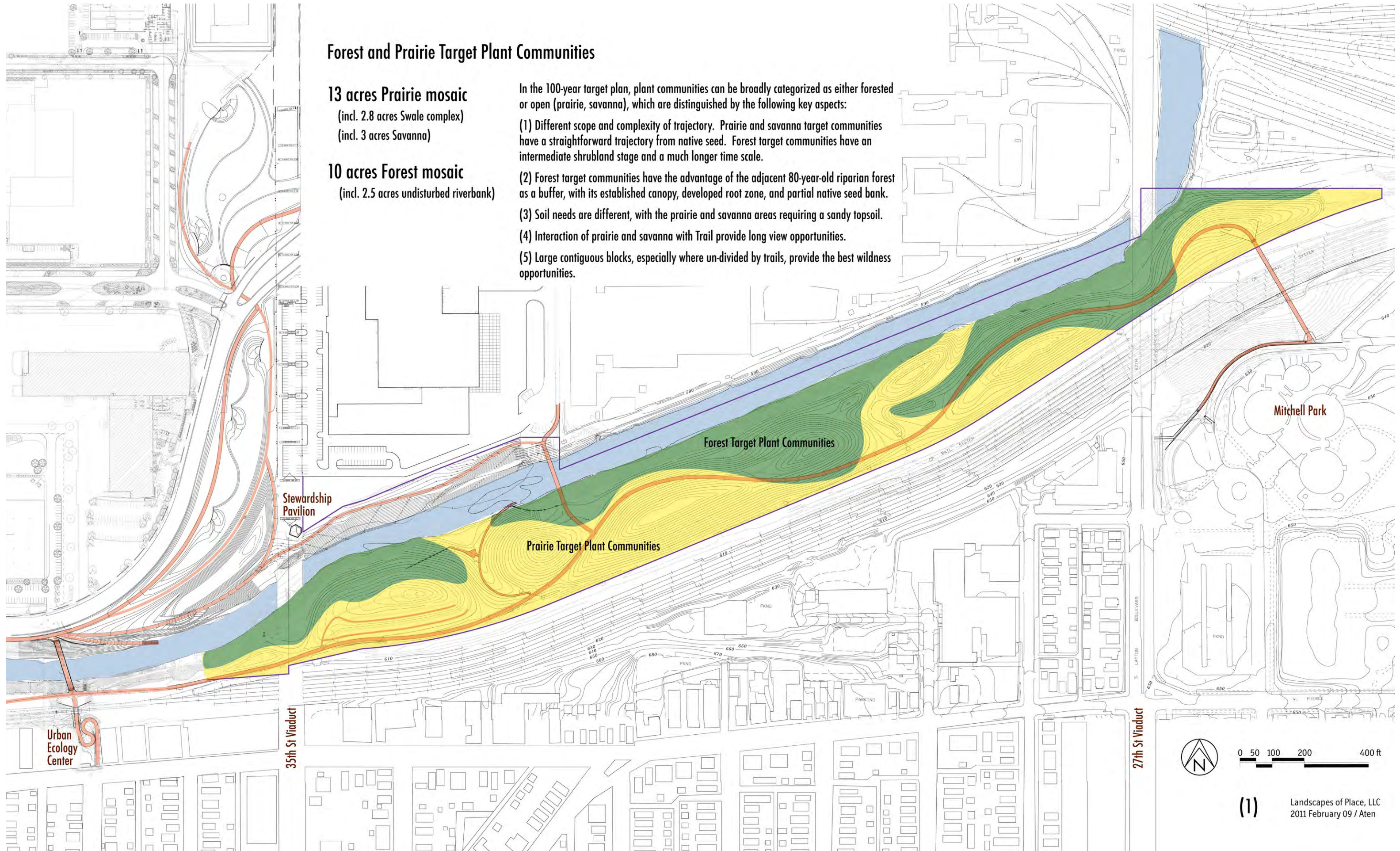
(incl. 3 acres Savanna)

10 acres Forest mosaic

(incl. 2.5 acres undisturbed riverbank)

In the 100-year target plan, plant communities can be broadly categorized as either forested or open (prairie, savanna), which are distinguished by the following key aspects:

- (1) Different scope and complexity of trajectory. Prairie and savanna target communities have a straightforward trajectory from native seed. Forest target communities have an intermediate shrubland stage and a much longer time scale.
- (2) Forest target communities have the advantage of the adjacent 80-year-old riparian forest as a buffer, with its established canopy, developed root zone, and partial native seed bank.
- (3) Soil needs are different, with the prairie and savanna areas requiring a sandy topsoil.
- (4) Interaction of prairie and savanna with Trail provide long view opportunities.
- (5) Large contiguous blocks, especially where un-divided by trails, provide the best wildness opportunities.



Potential Management Zones

13 acres Prairie mosaic

(6 acre prescribed burn zone west of viaduct)
(1.4 acre prescribed burn zone east of viaduct)

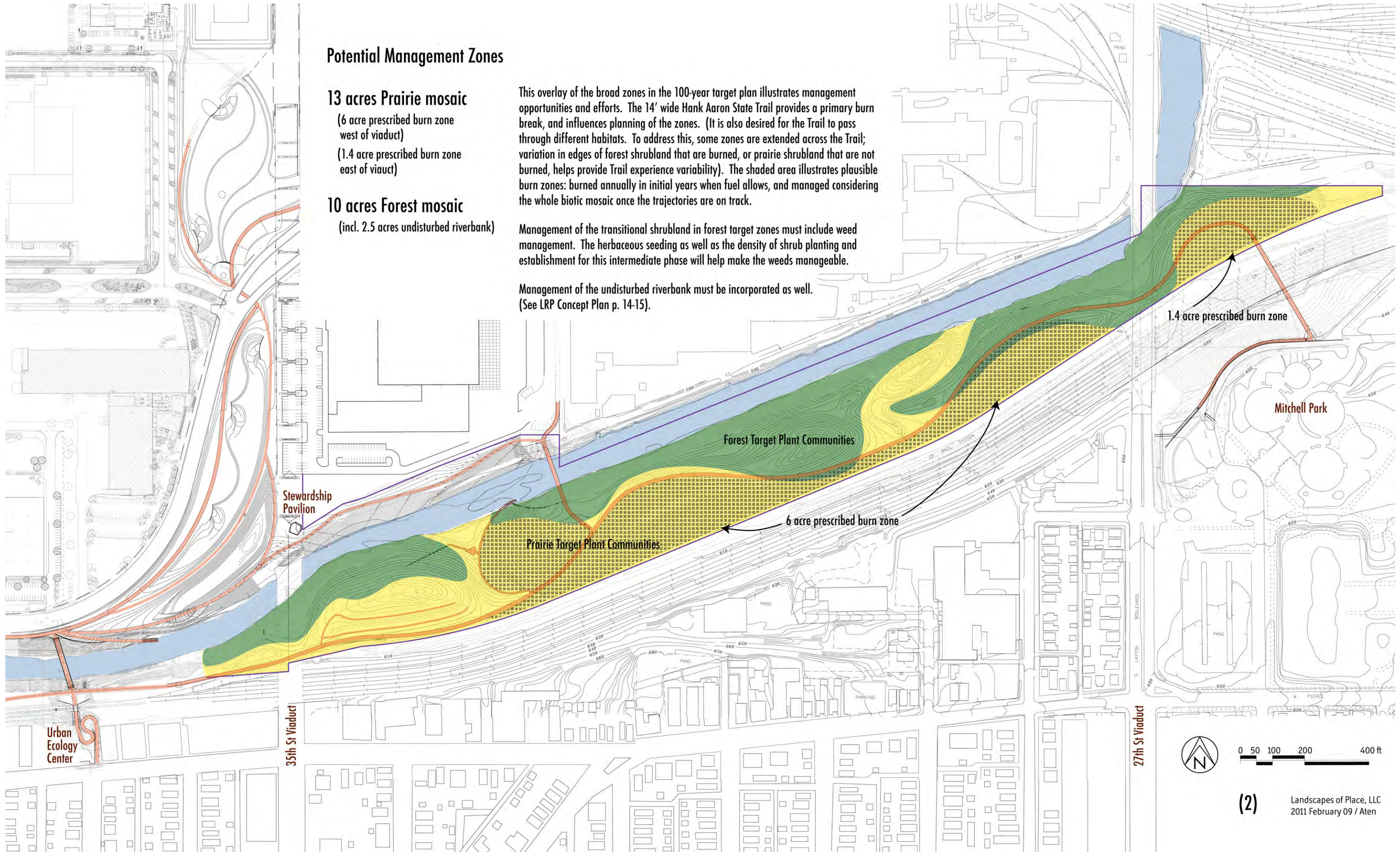
10 acres Forest mosaic

(incl. 2.5 acres undisturbed riverbank)

This overlay of the broad zones in the 100-year target plan illustrates management opportunities and efforts. The 14' wide Hank Aaron State Trail provides a primary burn break, and influences planning of the zones. (It is also desired for the Trail to pass through different habitats. To address this, some zones are extended across the Trail; variation in edges of forest shrubland that are burned, or prairie shrubland that are not burned, helps provide Trail experience variability). The shaded area illustrates plausible burn zones: burned annually in initial years when fuel allows, and managed considering the whole biotic mosaic once the trajectories are on track.

Management of the transitional shrubland in forest target zones must include weed management. The herbaceous seeding as well as the density of shrub planting and establishment for this intermediate phase will help make the weeds manageable.

Management of the undisturbed riverbank must be incorporated as well. (See LRP Concept Plan p. 14-15).



1.4 acre prescribed burn zone

Forest Target Plant Communities

6 acre prescribed burn zone

Prairie Target Plant Communities

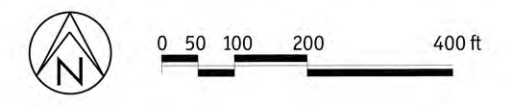
Mitchell Park

Stewardship Pavilion

Urban Ecology Center

35th St Viaduct

27th St Viaduct



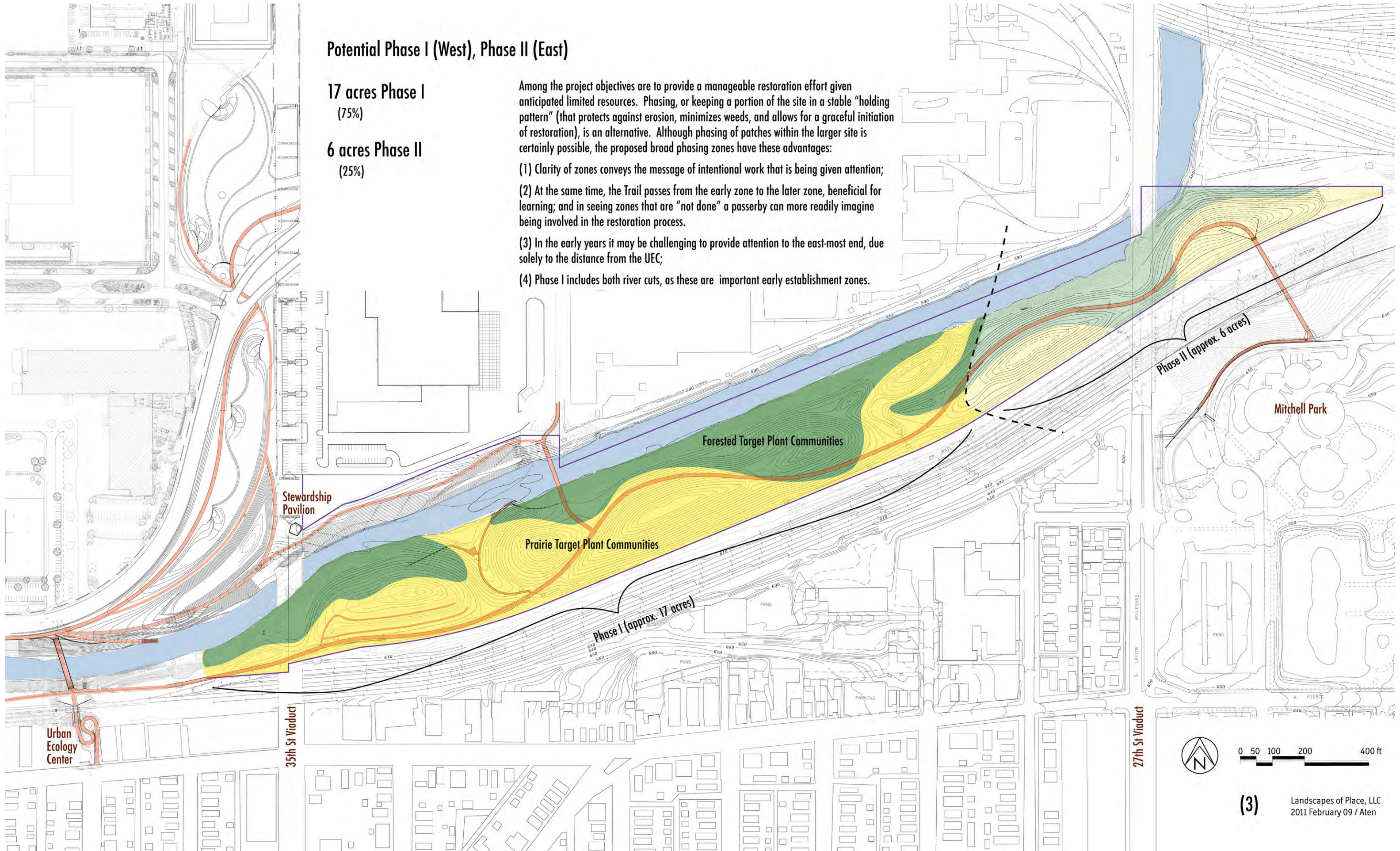
Potential Phase I (West), Phase II (East)

17 acres Phase I
(75%)

6 acres Phase II
(25%)

Among the project objectives are to provide a manageable restoration effort given anticipated limited resources. Phasing, or keeping a portion of the site in a stable "holding pattern" (that protects against erosion, minimizes weeds, and allows for a graceful initiation of restoration), is an alternative. Although phasing of patches within the larger site is certainly possible, the proposed broad phasing zones have these advantages:

- (1) Clarity of zones conveys the message of intentional work that is being given attention;
- (2) At the same time, the Trail passes from the early zone to the later zone, beneficial for learning; and in seeing zones that are "not done" a passerby can more readily imagine being involved in the restoration process.
- (3) In the early years it may be challenging to provide attention to the east-most end, due solely to the distance from the UEC;
- (4) Phase I includes both river cuts, as these are important early establishment zones.



Forest Target Plant Communities

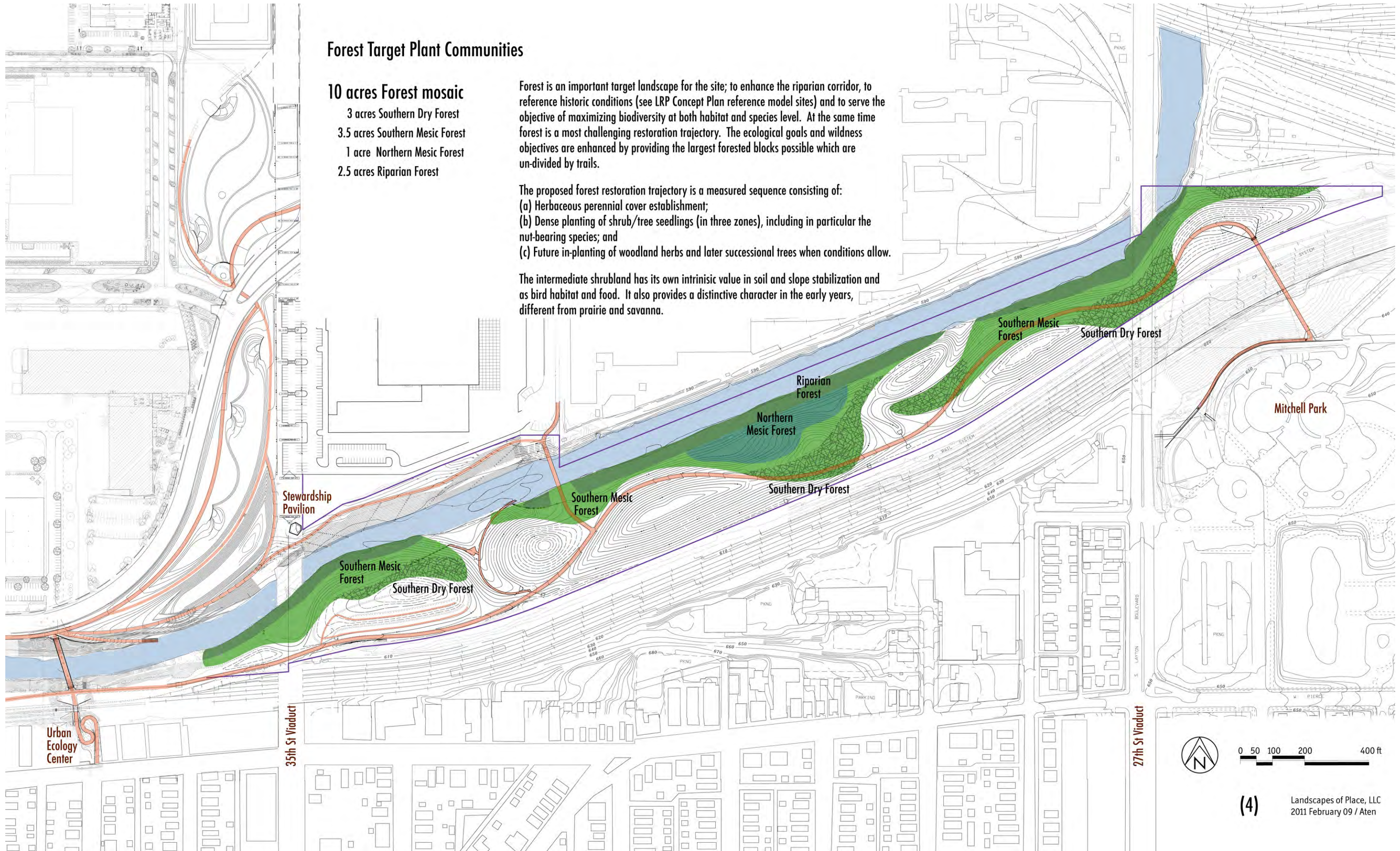
10 acres Forest mosaic

- 3 acres Southern Dry Forest
- 3.5 acres Southern Mesic Forest
- 1 acre Northern Mesic Forest
- 2.5 acres Riparian Forest

Forest is an important target landscape for the site; to enhance the riparian corridor, to reference historic conditions (see LRP Concept Plan reference model sites) and to serve the objective of maximizing biodiversity at both habitat and species level. At the same time forest is a most challenging restoration trajectory. The ecological goals and wildness objectives are enhanced by providing the largest forested blocks possible which are un-divided by trails.

The proposed forest restoration trajectory is a measured sequence consisting of:
(a) Herbaceous perennial cover establishment;
(b) Dense planting of shrub/tree seedlings (in three zones), including in particular the nut-bearing species; and
(c) Future in-planting of woodland herbs and later successional trees when conditions allow.

The intermediate shrubland has its own intrinsic value in soil and slope stabilization and as bird habitat and food. It also provides a distinctive character in the early years, different from prairie and savanna.



Prairie and Savanna Target Plant Communities

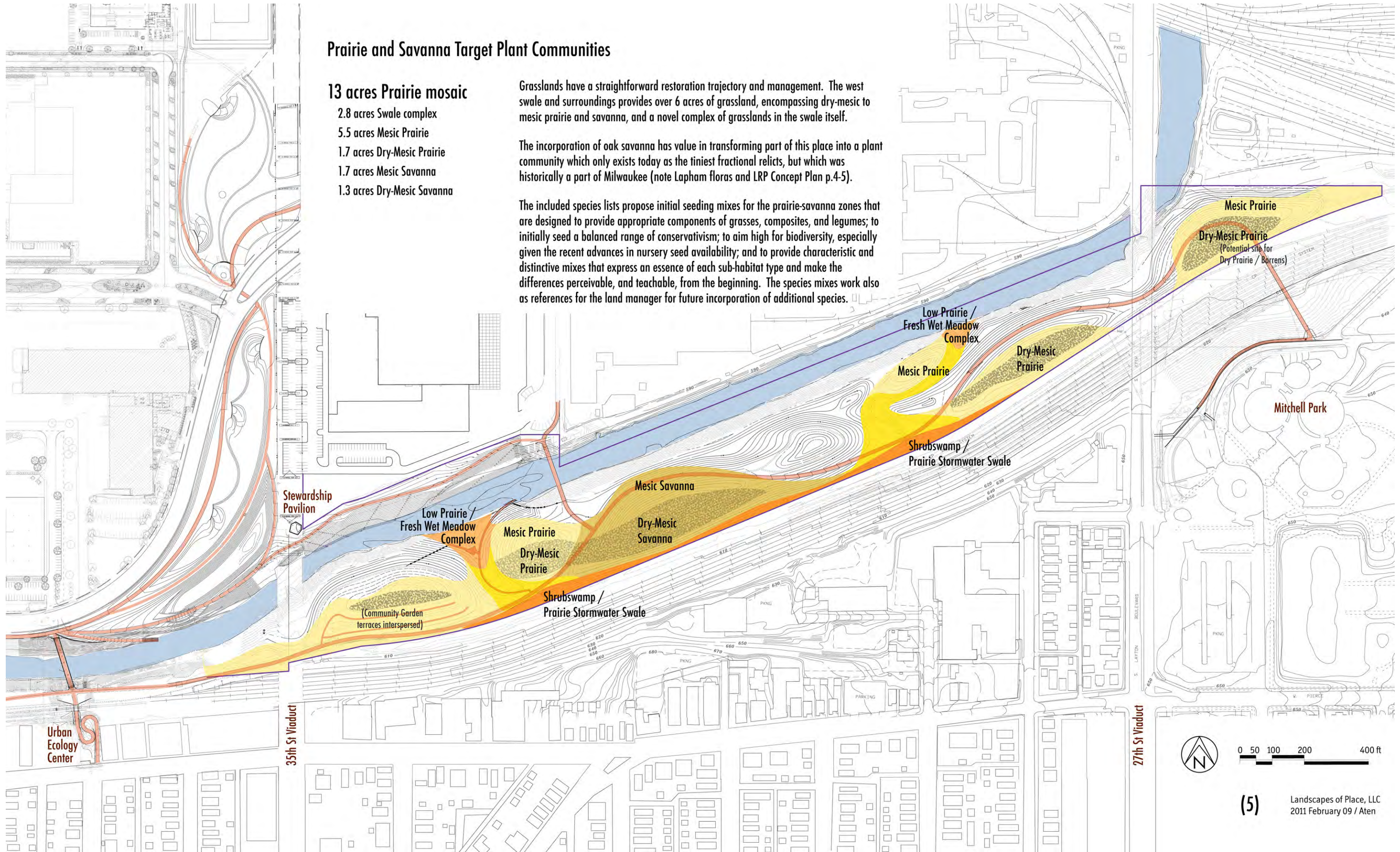
13 acres Prairie mosaic

- 2.8 acres Swale complex
- 5.5 acres Mesic Prairie
- 1.7 acres Dry-Mesic Prairie
- 1.7 acres Mesic Savanna
- 1.3 acres Dry-Mesic Savanna

Grasslands have a straightforward restoration trajectory and management. The west swale and surroundings provides over 6 acres of grassland, encompassing dry-mesic to mesic prairie and savanna, and a novel complex of grasslands in the swale itself.

The incorporation of oak savanna has value in transforming part of this place into a plant community which only exists today as the tiniest fractional relicts, but which was historically a part of Milwaukee (note Lapham florals and LRP Concept Plan p.4-5).

The included species lists propose initial seeding mixes for the prairie-savanna zones that are designed to provide appropriate components of grasses, composites, and legumes; to initially seed a balanced range of conservatism; to aim high for biodiversity, especially given the recent advances in nursery seed availability; and to provide characteristic and distinctive mixes that express an essence of each sub-habitat type and make the differences perceivable, and teachable, from the beginning. The species mixes work also as references for the land manager for future incorporation of additional species.



Overall Matrix of Target Plant Communities

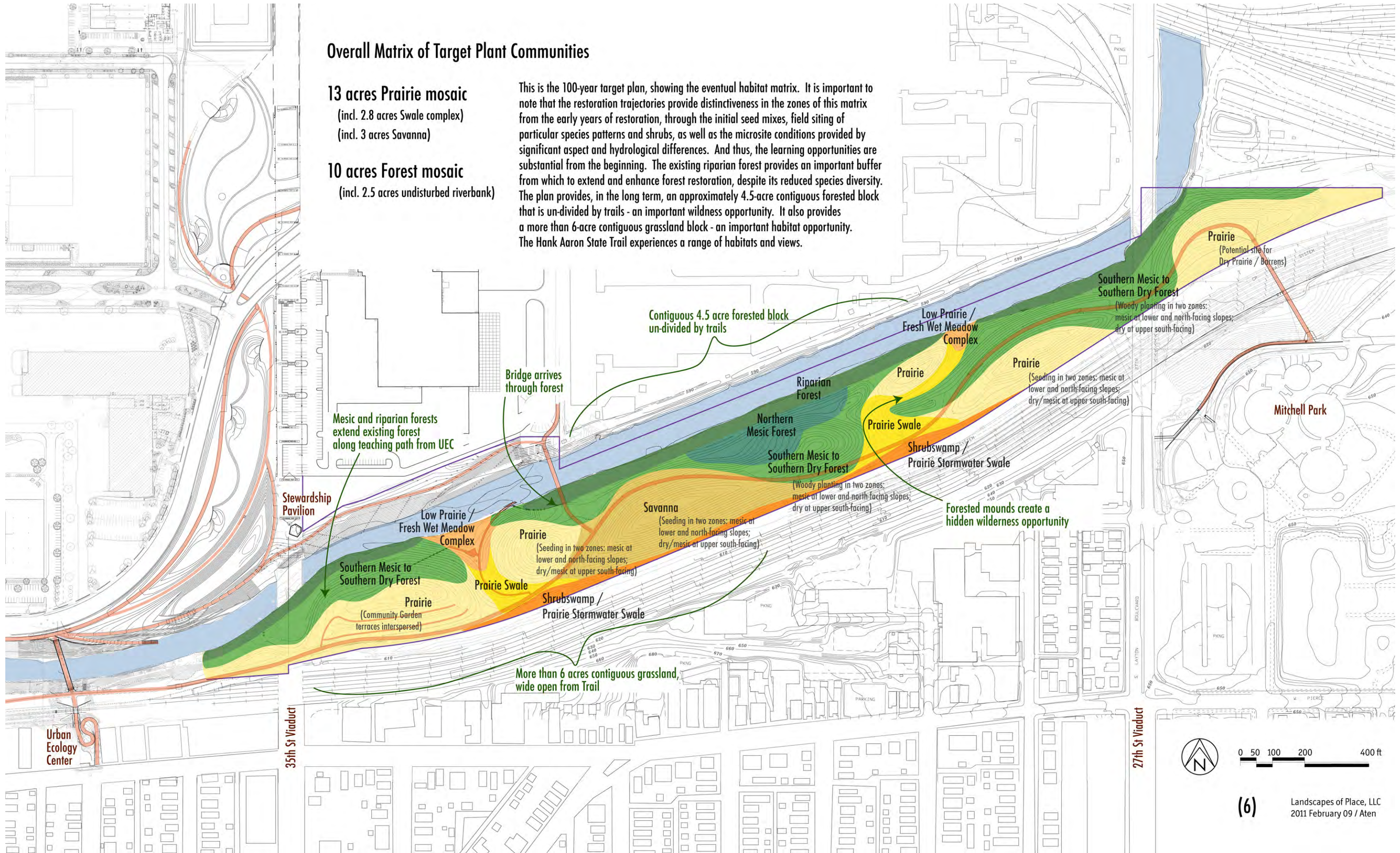
13 acres Prairie mosaic

(incl. 2.8 acres Swale complex)
(incl. 3 acres Savanna)

10 acres Forest mosaic

(incl. 2.5 acres undisturbed riverbank)

This is the 100-year target plan, showing the eventual habitat matrix. It is important to note that the restoration trajectories provide distinctiveness in the zones of this matrix from the early years of restoration, through the initial seed mixes, field siting of particular species patterns and shrubs, as well as the microsite conditions provided by significant aspect and hydrological differences. And thus, the learning opportunities are substantial from the beginning. The existing riparian forest provides an important buffer from which to extend and enhance forest restoration, despite its reduced species diversity. The plan provides, in the long term, an approximately 4.5-acre contiguous forested block that is un-divided by trails - an important wildness opportunity. It also provides a more than 6-acre contiguous grassland block - an important habitat opportunity. The Hank Aaron State Trail experiences a range of habitats and views.



Contiguous 4.5 acre forested block un-divided by trails

Bridge arrives through forest

Mesic and riparian forests extend existing forest along teaching path from UEC

Stewardship Pavilion

Low Prairie / Fresh Wet Meadow Complex

Southern Mesic to Southern Dry Forest

Prairie (Community Garden terraces interspersed)

Prairie (Seeding in two zones: mesic at lower and north-facing slopes; dry/mesic at upper south-facing)

Prairie Swale

Shrubswamp / Prairie Stormwater Swale

Savanna (Seeding in two zones: mesic at lower and north-facing slopes; dry/mesic at upper south-facing)

Northern Mesic Forest

Southern Mesic to Southern Dry Forest (Woody planting in two zones: mesic at lower and north-facing slopes; dry at upper south-facing)

Prairie Swale

Shrubswamp / Prairie Stormwater Swale

Forested mounds create a hidden wilderness opportunity

Low Prairie / Fresh Wet Meadow Complex

Prairie

Prairie

Southern Mesic to Southern Dry Forest (Woody planting in two zones: mesic at lower and north-facing slopes; dry at upper south-facing)

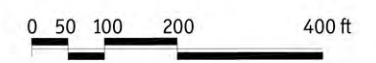
Prairie (Potential site for Dry Prairie / Barrens)

Mitchell Park

Urban Ecology Center

35th St Viaduct

27th St Viaduct



(6)

Landscapes of Place, LLC
2011 February 09 / Aten

Restoration Step 1: Fall 2012

Entire site seeded

20.5 acres
(excluding undisturbed riverbank)

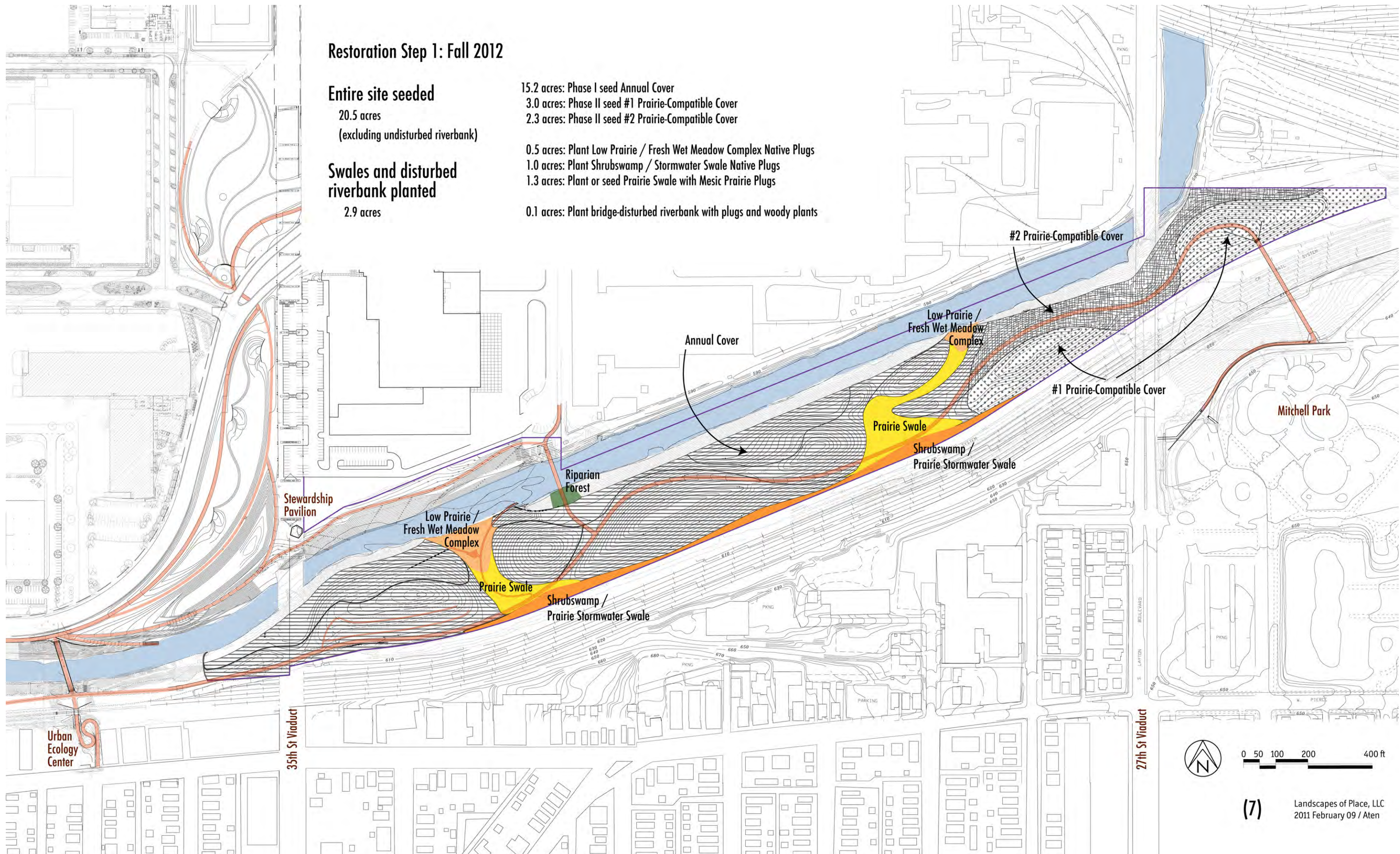
Swales and disturbed riverbank planted

2.9 acres

15.2 acres: Phase I seed Annual Cover
3.0 acres: Phase II seed #1 Prairie-Compatible Cover
2.3 acres: Phase II seed #2 Prairie-Compatible Cover

0.5 acres: Plant Low Prairie / Fresh Wet Meadow Complex Native Plugs
1.0 acres: Plant Shrubswamp / Stormwater Swale Native Plugs
1.3 acres: Plant or seed Prairie Swale with Mesic Prairie Plugs

0.1 acres: Plant bridge-disturbed riverbank with plugs and woody plants



Restoration Step 2: June 2013

Phase I native seeded

12.3 acres

(excluding previously planted swale complex)

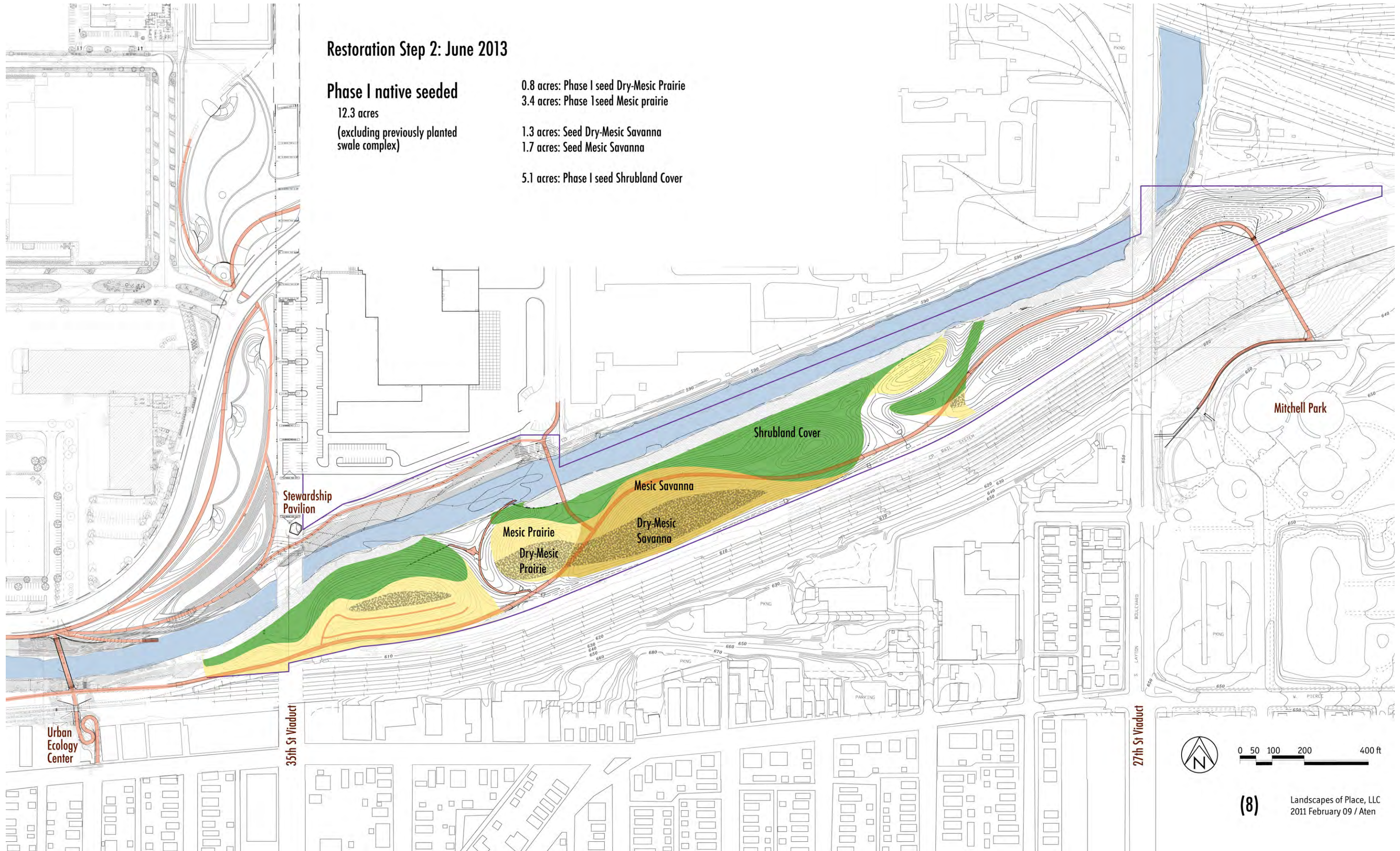
0.8 acres: Phase I seed Dry-Mesic Prairie

3.4 acres: Phase I seed Mesic prairie

1.3 acres: Seed Dry-Mesic Savanna

1.7 acres: Seed Mesic Savanna

5.1 acres: Phase I seed Shrubland Cover



Restoration Step 3: Spring 2014

Phase I shrubland planted

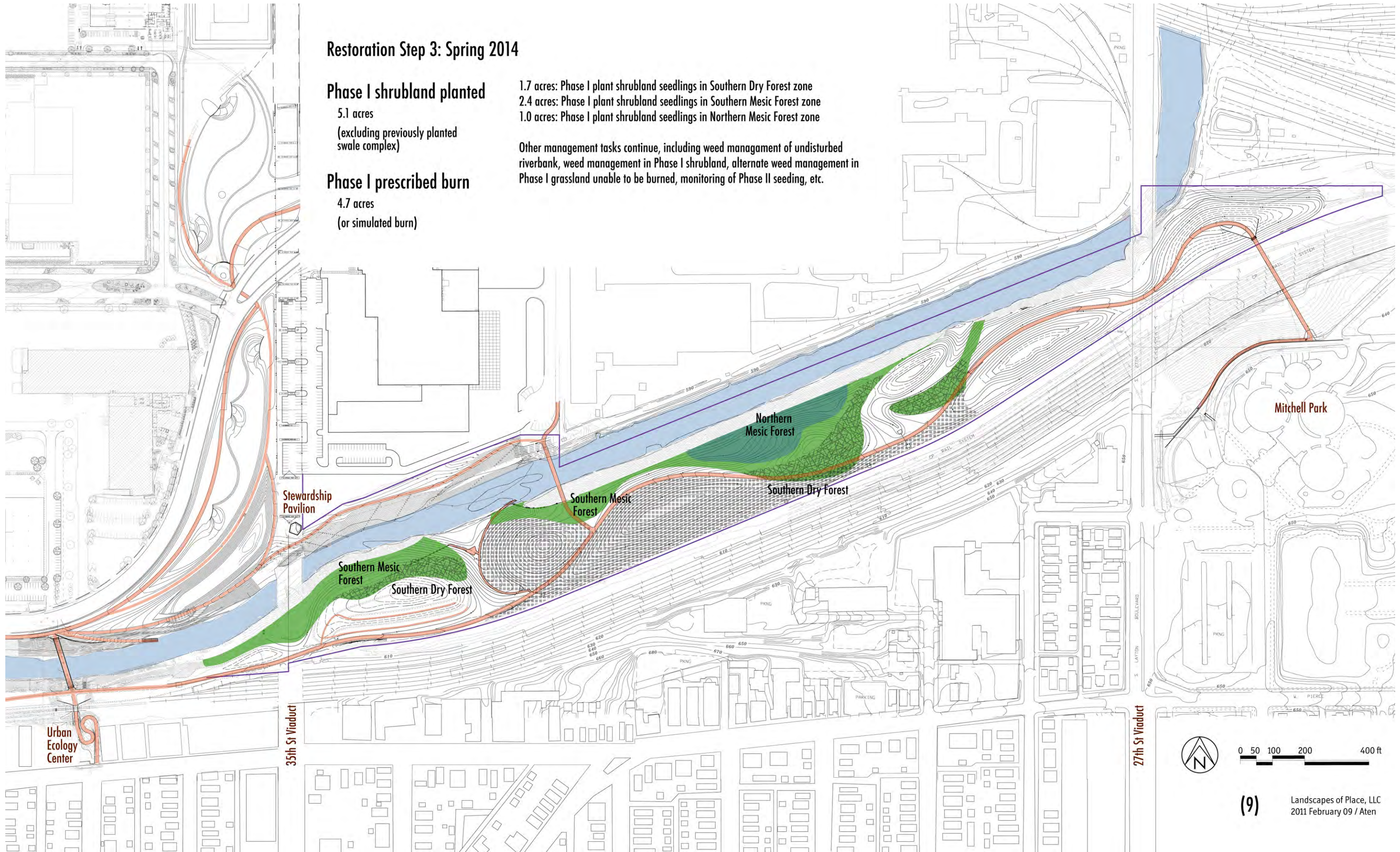
5.1 acres
(excluding previously planted
swale complex)

Phase I prescribed burn

4.7 acres
(or simulated burn)

1.7 acres: Phase I plant shrubland seedlings in Southern Dry Forest zone
2.4 acres: Phase I plant shrubland seedlings in Southern Mesic Forest zone
1.0 acres: Phase I plant shrubland seedlings in Northern Mesic Forest zone

Other management tasks continue, including weed management of undisturbed riverbank, weed management in Phase I shrubland, alternate weed management in Phase I grassland unable to be burned, monitoring of Phase II seeding, etc.



Restoration Step 4: Spring to June 2015

Phase II native seeded

5.3 acres

1.1 acres: Phase II seedbed preparation and seed Dry-Mesic Prairie

1.9 acres: Phase II seedbed preparation and seed Mesic Prairie

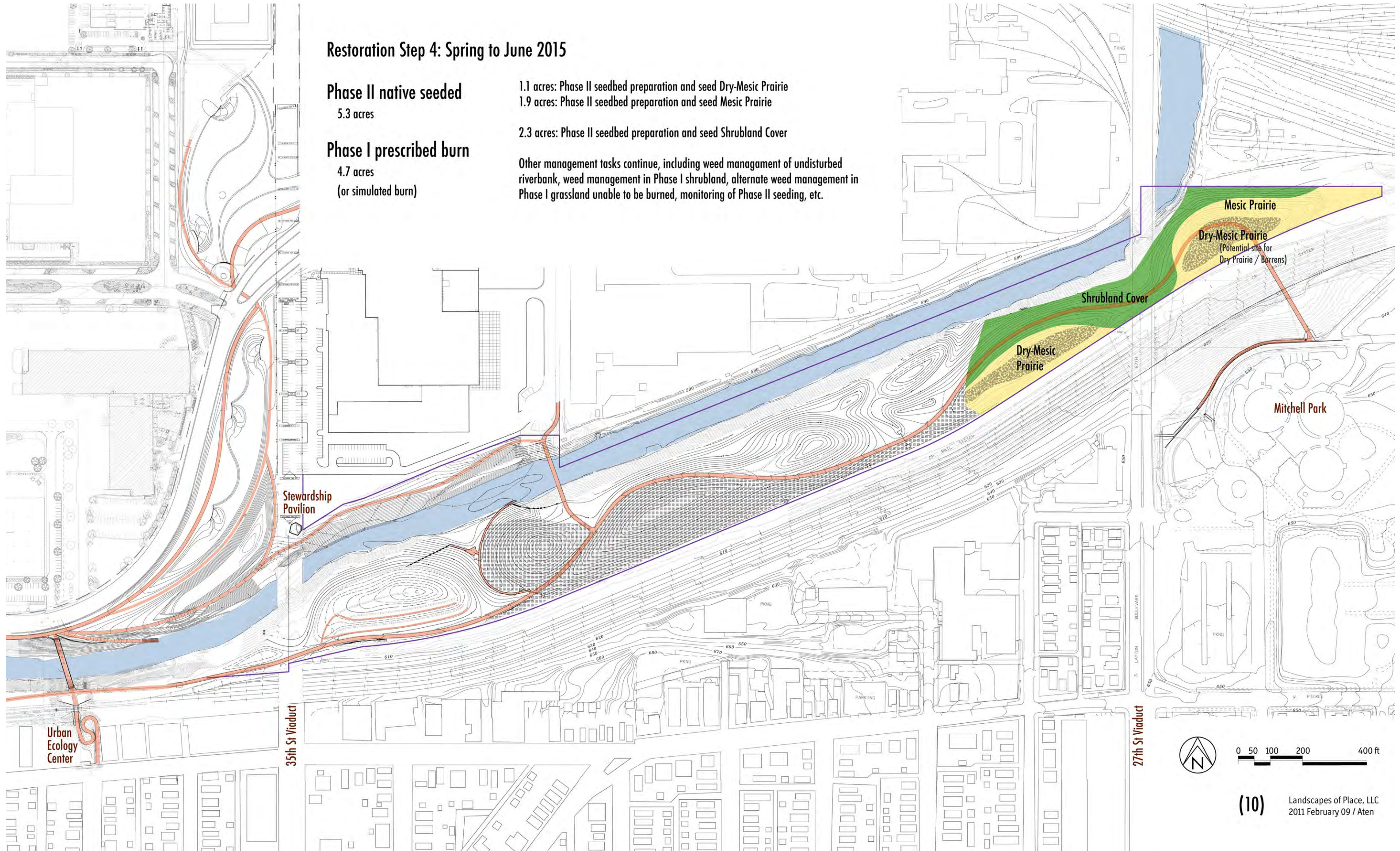
Phase I prescribed burn

4.7 acres

(or simulated burn)

2.3 acres: Phase II seedbed preparation and seed Shrubland Cover

Other management tasks continue, including weed management of undisturbed riverbank, weed management in Phase I shrubland, alternate weed management in Phase I grassland unable to be burned, monitoring of Phase II seeding, etc.



Restoration Step 5: Spring to June 2016

Phase II shrubland planted

2.3 acres

1.0 acres: Phase II plant shrubland seedlings in Southern Dry Forest zone
1.3 acres: Phase II plant shrubland seedlings in Southern Mesic Forest zone

Phase I/II prescribed burn

7.4 acres

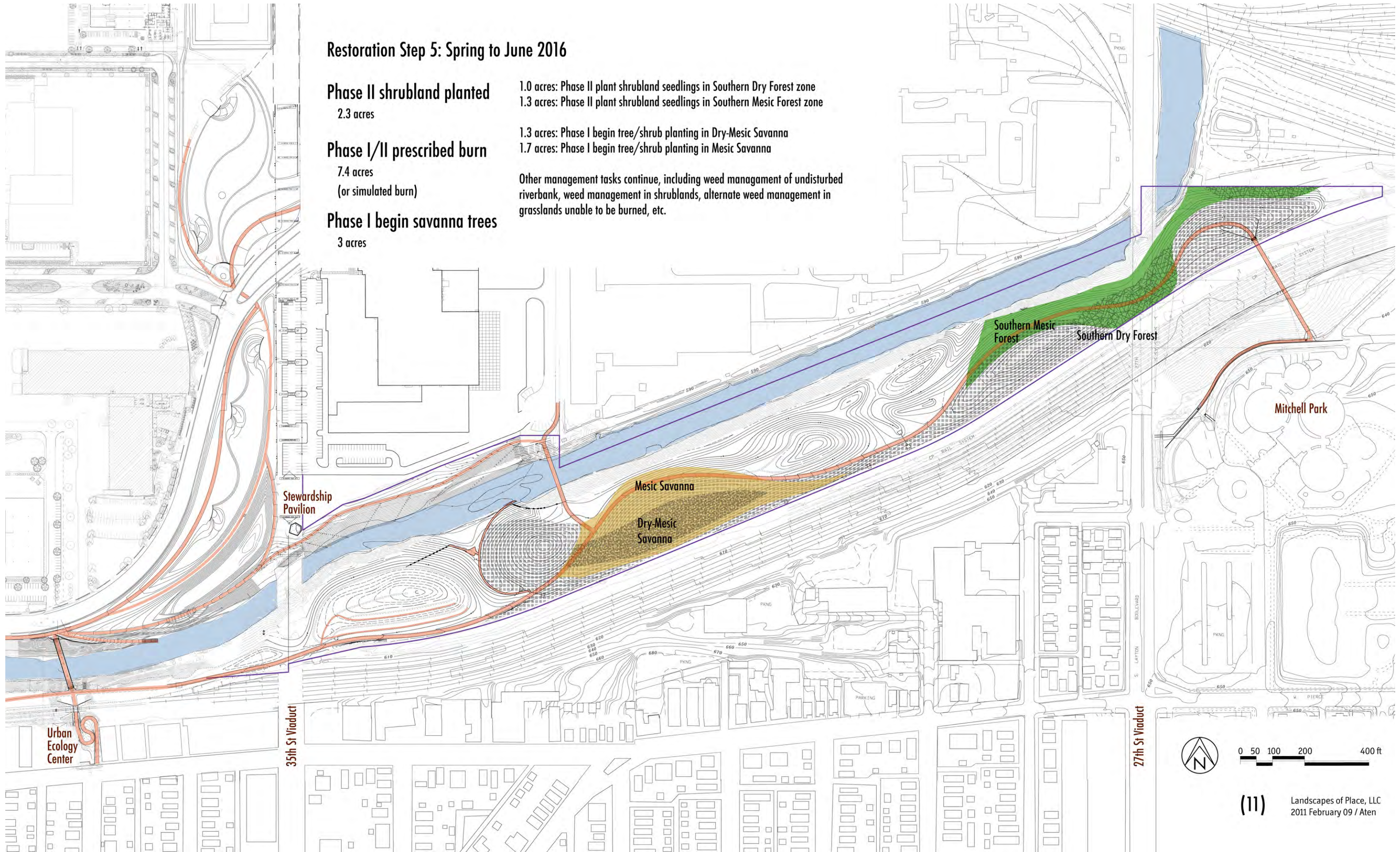
(or simulated burn)

1.3 acres: Phase I begin tree/shrub planting in Dry-Mesic Savanna
1.7 acres: Phase I begin tree/shrub planting in Mesic Savanna

Phase I begin savanna trees

3 acres

Other management tasks continue, including weed management of undisturbed riverbank, weed management in shrublands, alternate weed management in grasslands unable to be burned, etc.



Restoration Step 6: Future Year

Phase I/II prescribed burn

7.4 acres
(or simulated burn)

Phase I/II begin forest final phase

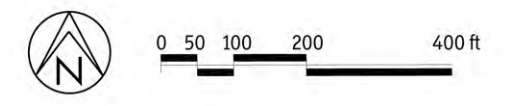
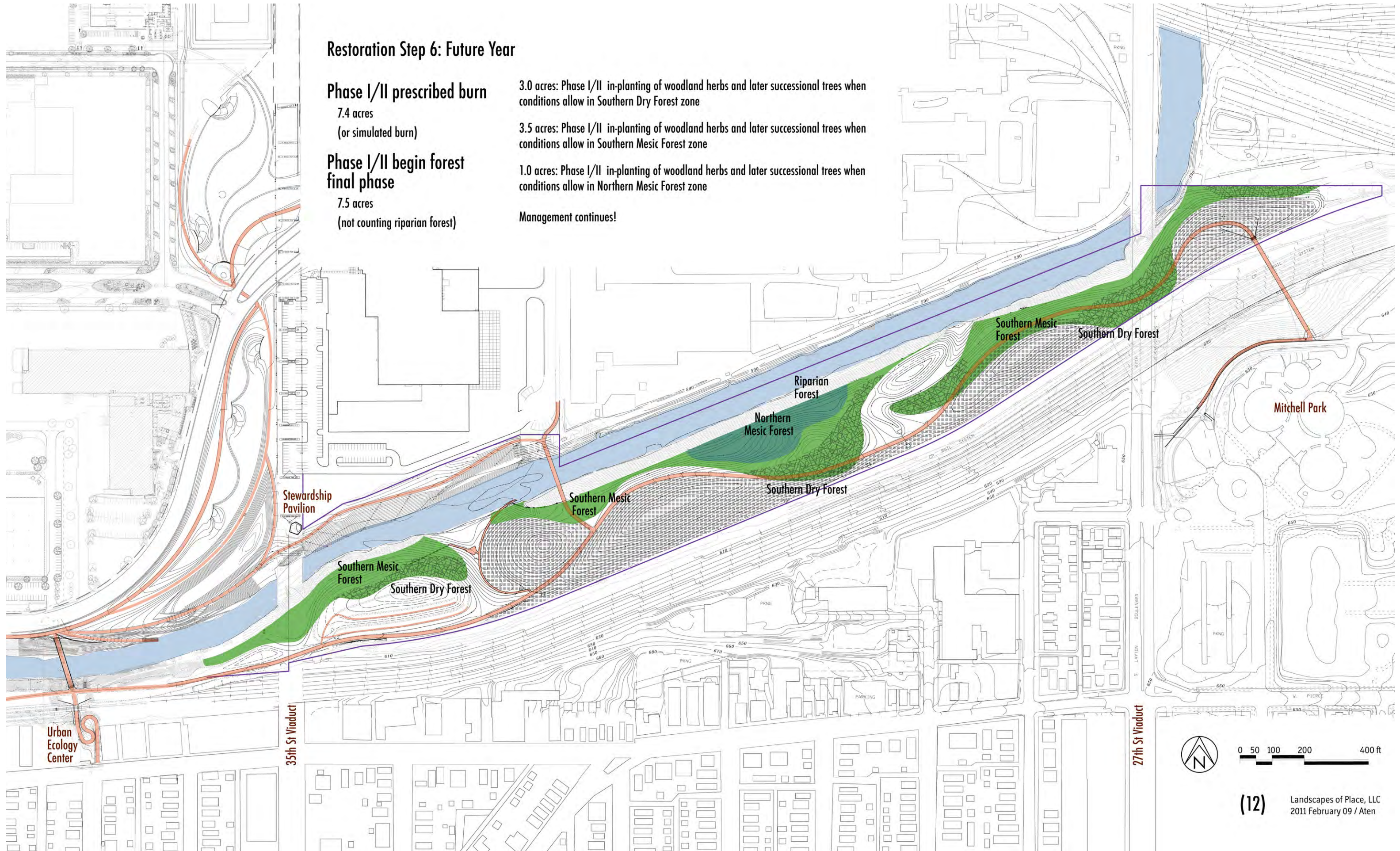
7.5 acres
(not counting riparian forest)

3.0 acres: Phase I/II in-planting of woodland herbs and later successional trees when conditions allow in Southern Dry Forest zone

3.5 acres: Phase I/II in-planting of woodland herbs and later successional trees when conditions allow in Southern Mesic Forest zone

1.0 acres: Phase I/II in-planting of woodland herbs and later successional trees when conditions allow in Northern Mesic Forest zone

Management continues!



9 February 2011
For the Hank Aaron State Trail Natural Area
Landscape Restoration Plan
Landscapes of Place, LLC / Aten

Attached are preliminary species lists for the zones identified in the plans of 19 January 2011.

The **prairie** and **savanna** communities represent a straightforward trajectory from annual cover crop to initial native seeding, to be enriched over time by the land manager. Whole potential community lists are included for future reference. Although certain highly conservative species have been excluded, others remain in the reference; our goals are ambitious and long-term; a quality natural area is the goal.

The initial seeding selections in these communities represent mostly species that are probably commercially available with appropriate ecotype. Many have been verified against area seed suppliers. (Native seed nurseries continue to expand their resources and species). However, the initial seeding recommendations do include species not likely to be commercially available - but with the advance planning of the land manager, could probably be obtained either through advance contract with a nursery, or through advance collection arrangements with other area land managers.

The native seedings could be done mechanically with a seed drill, or hand-sown along with a method of seed-soil contact/cover (e.g., light raking). In either case, there are three special circumstances where hand-sowing by the land manager is desirable: (a) for key species to be pattern-seeded; (b) very-small-seeded species that are better hand-broadcast; and (c) seed held back and hand-broadcast in its appropriate zones directly alongside the Hank Aaron State Trail, to pay special attention to seed cover along the trail.

As mentioned, soil in these areas should be a sandy loam - 50% sand or sandy loam and 50% compost, with regional sand, and the sandy loam contains a large range of aggregate sizes. This in addition to the very important and previously communicated needs of uncompaction in the topsoil and 2' cap profile, and microtopographic variability.

The **shrubland** lists represent a trajectory from shrubland herbaceous cover (a novel mix), to dense shrub (with a lesser mix of tree seedling) plantings, to the shrubland management and eventual incorporation of forest herbaceous and woody species by the land manager in distant years.

The **low meadow** and **stormwater swale** lists are to be largely planted rather than seeded, because they are impacted by floodwaters and stormwater, and also because some of these species are not available by seed. These two zones represent novel urban conditions. At the low end ("low meadow"), the zone has interaction with river flows as well as some degree of groundwater connection, and must cope with flashiness, siltation, and a significant weed seed vector along the river corridor. At the high end ("stormwater swale"), the zone collects and infiltrates stormwater anticipated by the VPII team to arrive from the RR and the south, but also anticipated to be without water quality concerns; the zone thus copes with alternating wet and dry conditions, although the clay cap will retain some deep moisture between rains.

Quantities are not yet specified; only the species to be included in initial seeding/planting. Those unmarked with "seed" or "plant" are to be contemplated by the land manager for future inclusion when conditions would allow.

All of the preliminary species lists have been compiled by the LRP team based on restoration goals, strategies, our experience, and the following references in particular:

Leitner / Flora of Milwaukee County (a handful of exceptions of species are included, due to another source or a compelling reason and site nearby).
UW Arboreta (Stevens Point and Madison) (C values, wetland indicators, and Wisconsin plant community references)
Curtis / Vegetation of Wisconsin 1959/1971 (especially prevalent and modal species in communities)
Lapham / Milwaukee Floras 1836-1840
GLO Land Surveys / 1836 (as translated in LRP Part One)
Bader / UW Arboretum / Developing a Species List for Oak Savanna... / Ecological Restoration 2001
Pruka / Indicator Plant Species of Recoverable Oak Savannas... / Restoration and Management Notes 1995
Cochrane and Iltis / Atlas of the Wisconsin Prairie and Savanna Flora 2000
Packard and Mutel / The Tallgrass Restoration Handbook 2005
Swink and Wilhelm / Flora of the Chicago Region 1994 (especially associates)
Hipp / Field Guide to Wisconsin Sedges 2008
Gargiullo / A Guide to Native Plants of the New York City Region 2007 (natives for degraded conditions)
Reference sites from LRP Part One, especially Genessee Depot Oak Opening and Messenger dry prairies

DRY MESIC PRAIRIE

The dry-mesic prairie mix is for those zones of the prairie in the driest microclimate - south-facing, mid and upper slopes. The zones give us the opportunity to skew the character of the species by zone with more emphasis than may develop naturally, to provide a degree of distinctness. In the absence of hand-seeding certain species in characteristic patterns, this zone distinctness helps with perception of the different communities in early years, and increases learning opportunities.

Here, the character emphasizes the “thinness” of dry prairies, emphasizing narrow-leaved and sparse-leaved species, grasses and otherwise. It includes characteristic dry prairie species like Dalea and the grasses Bouteloua, Koeleria, and Schizachyrium.

This mix requires a sandy loam - 50% sand or sandy loam and 50% compost.

Seed mix to include 1/3 poaceae, 1/3 asteraceae, 1/6 fabaceae, and 1/6 all other families. Approximately equal proportions by weight of non-conservative (C value 2-4), somewhat conservative (C value 5-7), and conservative (C value 8-10) native species. June seeding preferable. Seeding rate: _____

Certain species (woody plants; herbaceous species not easy to germinate and better planted; certain seed species to be pattern-seeded; or small-seeded species that are better hand-broadcast): to be quantity-specified and zone-specified, but placed on-site by land manager with landscape architect.

Tall boneset, pale indian plantain, cup plant, and switch grass are all examples of native species with ecotype/genotype issues that make them uncondusive to the long-term maintenance of biotic diversity and ecosystem services in the southeastern Wisconsin landscape. There may be reasonably local native genotypes available, but the material on the market right now is too risky to use.

oz/acre (tbd)	Family	Genus	Species	Common	C	Presence	Ave Freq	Curtis	Cochran e/Iltis: Curtis or note	Messen- ger	Packard/ Mutel: Morgan
COMPOSITES											
	Asteraceae	Ambrosia	artemisifolia*	Common Ragweed	0	77	15	1	yes (DP)		
plant	Asteraceae	Antennaria	neglecta	Field Pussy Toes	3	59	2	1		1	
seed	Asteraceae	Artemisia	campestris*	Field Sagewort	4	88	13	1	yes (DP)		
seed (small amt, hand broadcast, dry areas)	Asteraceae	Artemisia	ludoviciana	White Sage	3				yes		1
seed	Asteraceae	Aster	ericoides	Heath Aster	4	77	14	1	yes		1
seed	Asteraceae	Aster	laevis	Smooth Blue Aster	6	41	2	1			1
seed	Asteraceae	Aster	oolentangiensis	Sky Blue Aster	5	47	1	1	yes		1
seed	Asteraceae	Aster	sericeus*	Silky Aster	8	94	31	1	yes (DP)	1	1
	Asteraceae	Erigeron	strigosus*	Rough Fleabane	2	82	4	1	yes (DP)		
seed	Asteraceae	Helianthus	occidentalis	Western Sunflower	6						1
seed (small amt)	Asteraceae	Helianthus	laetiflorus	Hybrid Prairie Sunflower	7	59	8	1			
	Asteraceae	Helianthus	pauciflorus	Showy Sunflower	7						1

	seed	Asteraceae	Heliopsis	helianthoides	False Sunflower	5						1
	seed	Asteraceae	Kuhnia	eupatorioides	False Boneset	5						1
	seed	Asteraceae	Liatris	aspera	Rough blazing star	5					1	1
	seed (driest)	Asteraceae	Liatris	cyclindracea*	Dwarf blazing star	9	71	20	1	yes (DP)	1	1
		Asteraceae	Parthenium	integrifolium	Wild Quinine	8						1
	seed	Asteraceae	Ratibida	pinnata	Gray-headed Coneflower	4					1	1
		Asteraceae	Rudbeckia	hirta	Black-eyed Susan	4					1	1
		Asteraceae	Silphium	integrifolium	Rosinweed	6						1
		Asteraceae	Silphium	laciniatum	Compass Plant	8						1
		Asteraceae	Silphium	terebinthinaceum	Prairie Dock	7						1
	seed	Asteraceae	Solidago	nemorialis*	Gray goldenrod	4	94	34	1	yes (DP)	1	1
	seed	Asteraceae	Solidago	ptarmicoides*	Stiff Aster	8	59	3	1	yes (DP)		1
	seed	Asteraceae	Solidago	rigida	Stiff Goldenrod	5	77	19	1			1
		Asteraceae	Solidago	speciosa	Showy Goldenrod	5						1
LEGUMES												
	seed (scarify and inoculate)	Fabaceae	Amorpha	canescens*	Leadplant	7	100	20	1	yes (DP)	1	1
	seed	Fabaceae	Astragalus	canadensis	Canada Milk Vetch	8						1
		Fabaceae	Baptisia	alba macrophylla	White Wild Indigo	8						1
	seed	Fabaceae	Baptisia	bracteata leucophaea	Cream Wild Indigo	7						1
	seed	Fabaceae	Dalea	candida	Purple prairie clover	8					1	1
	seed	Fabaceae	Dalea	purpurea*	Purple prairie clover	7	100	23	1		1	1
		Fabaceae	Desmodium	canadense	Showy Tick Trefoil	4						1
	seed	Fabaceae	Desmodium	illinoense	Illinois Tick Trefoil	6						1
	seed	Fabaceae	Lespedeza	capitata	Round-headed Bush-clover	5					1	1
GRASSES												
	seed	Poaceae	Andropogon	gerardii	Big Bluestem	4	94	23	1		1	1
	seed	Poaceae	Bouteloua	curtipendula*	Side-oats grama	6	100	36	1	yes	1	1
		Poaceae	Bromus	kalmii	Prairie Brome	8						1
	seed (driest)	Poaceae	Danthonia	spicata	Poverty Oat Grass	4				added		
	seed	Poaceae	Dichanthelium	perlongum*	Longstalked Panic Grass	7	77	32	1			
	seed	Poaceae	Elymus	canadensis	Canada Wild Rye	4						1
	seed	Poaceae	Eragrostis	spectabilis	Purple Love Grass	3				yes		
	seed	Poaceae	Koeleria	macrantha	June Grass	7	59	7	1	yes		
	seed	Poaceae	Panicum	oligosanthes	Scribner's Panic Grass	4				yes		
		Poaceae	Panicum	virgatum	Switch Grass	4						1
	seed	Poaceae	Schizachyrium	scoparium*	Little Bluestem	4	100	45	1	yes	1	1
	seed	Poaceae	Sorghastrum	nutans	Indian Grass	5				yes (DM)	1	1
	seed	Poaceae	Sporobolus	cryptandrus	Sand Dropseed	3				added		
	seed	Poaceae	Sporobolus	heterolepis*	Prairie dropseed	10	82	25	1		1	1
		Poaceae	Sporobolus	vaginiflorus	Poverty Dropseed	1				added		
	seed	Poaceae	Stipa	spartea	Porcupine Grass	9	53	7	1	yes		1
OTHER												
		Liliaceae	Allium	canadense	Wild Garlic	4						1
	seed	Ranunculaceae	Anemone	patens	Pasque flower	7	94	3		yes (DP)	1	

seed	Ranunculaceae	Anemone	cylindrica	Thimbleweed	6	59	2	1			1
seed (small amt)	Apocynaceae	Apocynum	sibiricum	Indian Hemp	3					1	
seed	Brassicaceae	Arabis	lyrata	Sand Cress	4	41	3	1			
seed	Caryophyllaceae	Arenaria	stricta*	Rock Sandwort	7	88	18	1	added		
seed	Asclepiadaceae	Asclepias	tuberosa	Butterfly Weed	6				yes		1
seed	Asclepiadaceae	Asclepias	verticillata*	Whorled Milkweed	2	88	19	1	yes (DP)		1
	Asclepiadaceae	Asclepias	viridiflora*	Short Green Milkweed	9	41	1	1	yes (DP)		1
	Scrophulariaceae	Besseyia	bullii	Kittentails	9					1	
	Lamiaceae	Blephilia	ciliata	Ohio Horse Mint	7						1
seed	Cyperaceae	Carex	bicknellii	Bicknell's Sedge	6						
	Cyperaceae	Carex	cephalophora	Oval-headed Sedge	4						
seed	Cyperaceae	Carex	meadii	Mead's Sedge	6						
	Cyperaceae	Carex	siccata	Dry-spiked Sedge	4						
	Scrophulariaceae	Castilleja	sessiliflora*	Downy Paintbrush	10	47	12	1			
seed	Santalaceae	Comandra	umbellata	Bastard Toadflax	6	59	2	1			
seed	Asteraceae	Coreopsis	palmata*	Prairie Coreopsis	8	82	11	1		1	1
	Primulaceae	Dodecatheon	meadia	Shooting Star	7					1	1
seed (ensure local origin)	Apiaceae	Eryngium	yuccifolium	Rattlesnake Master	8				added		1
seed	Euphorbiaceae	Euphorbia	corollata	Flowering Spurge	4	94	48	1		1	1
seed	Onagraceae	Gaura	biennis	Biennial Gaura	2						1
seed	Gentianaceae	Gentianella	quinquefolia	Stiff Gentian	7				yes		1
seed	Rosaceae	Geum	triflorum*	Prairie smoke	7	59	3	1	yes (DP)	1	1
	Lamiaceae	Hedeoma	hispida*	Rough Pennyroyal	1	65	15	1	yes (DP)		
	Hypericaceae	Hypericum	punctatum	Spotted St. John's Wort	4						1
seed	Amaryllidaceae	Hypoxis	hirsuta	Yellow Star Grass	8					1	
seed (if avail)	Liliaceae	Lilium	philadelphicum	Prairie Lily	9						1
seed (if avail)	Boraginaceae	Lithospermum	canescens	Hoary Puccoon	10					1	
	Boraginaceae	Lithospermum	caroliniense	Puccoon	10					1	
	Lobeliaceae	Lobelia	spicata	Pale Spiked Lobelia	6						1
seed	Lamiaceae	Monarda	fistulosa	Bergamont	3	77	4	1		1	1
seed	Lamiaceae	Monarda	punctata	Dotted Horsemint	3						
seed	Onagraceae	Oenothera	biennis	Common Evening Primrose	1	59	3	1	yes		1
	Scrophulariaceae	Pedicularis	canadensis	Lousewort	8						1
	Polemoniaceae	Phlox	pilosa	Sand Prairie Phlox	7						1
seed	Solanaceae	Physalis	heterophylla	Clammy Ground Cherry	3				yes (DP)		
	Solanaceae	Physalis	longifolia*	Longleaved Ground Cherry	2	65	7	1			
seed (if avail)	Solanaceae	Physalis	virginiana	Virginia Ground Cherry	4	41	7	1			
	Plantaginaceae	Plantago	rugelii	American Plantain	0				yes		
	Apiaceae	Polytaenia	nuttallii	Prairie Parsley	9						1
seed	Rosaceae	Potentilla	arguta	Tall Cinquefoil	7	53	6	1		1	1
seed	Lamiaceae	Scutellaria	parvula	Small Skullcap	6	53	9	1			
seed	Iridaceae	Sisyrinchium	campestre	Prairie Blue-eye Grass	7	47	10	1	yes	1	
seed	Iridaceae	Sisyrinchium	albidum	Pale Blue-eyed Grass	7				added		
seed	Commelinaceae	Tradescantia	ohiensis	Spiderwort	5					1	1

	seed	Verbenaceae	Verbena	stricta*	Hoary Vervain	3	77	8	1	yes		1
	seed	Violaceae	Viola	pedata	Birdsfoot Violet	7					1	
		Violaceae	Viola	pedatifida	Prairie Violet	9					1	1
	seed	Apiaceae	Zizia	aptera	Heartleaved Meadow Parsnip	9						1
WOODY												
	plant	Rosaceae	Aronia	x prunifolia	Chokeberry	7				yes (DP)		
		Rhamnaceae	Ceanothus	americanus	New Jersey Tea	9					1	
		Cupressaceae	Juniperus	virginiana	Red Cedar	3					1	
		Rosaceae	Malus	ioensis	Prairie Crab	4					1	
	plant	Roaceae	Rosa	blanda	Early Wild Rose	4	82	24	1			
	plant	Rosaceae	Rosa	carolina	Pasture Rose	4			1			

MESIC PRAIRIE

The mesic prairie mix is for those zones of the prairie in the moistest microclimate - north-facing and lower slopes. The zones give us the opportunity to skew the character of the species by zone with more emphasis than may develop naturally, to provide a degree of distinctness. In the absence of hand-seeding certain species in characteristic patterns, this zone distinctness helps with perception of the different communities in early years, and increases learning opportunities.

Here, the character emphasizes the form, texture, and color richness of the mesic prairie, and the height of the prairie sod species. It has a especially high variety of summer-to-fall-blooming composites and a richness of the classic prairie grasses.

This mix requires a sandy loam - 50% sand or sandy loam and 50% compost.

Seed mix to include 1/3 poaceae, 1/3 asteraceae, 1/6 fabaceae, and 1/6 all other families. Approximately equal proportions by weight of non-conservative (C value 2-4), somewhat conservative (C value 5-7), and conservative (C value 8-10) native species. June seeding preferable. Seeding rate: _____

Certain species (woody plants; herbaceous species not easy to germinate and better planted; certain seed species to be pattern-seeded; or small-seeded species that are better hand-broadcast): to be quantity-specified and zone-specified, but placed on-site by land manager with landscape architect.

Tall boneset, pale indian plantain, cup plant, and switch grass are all examples of native species with ecotype/genotype issues that make them uncondusive to the long-term maintenance of biotic diversity and ecosystem services in the southeastern Wisconsin landscape. There may be reasonably local native genotypes available, but the material on the market right now is too risky to use.

	oz/acre (tbd)	Family	Genus	Species	Common	C	Presence	Ave Freq	Curtis	Cochran e/Iltis: Curtis or note	Packard/ Mutel: Morgan
COMPOSITES											
		Asteraceae	Achillea	millefolium*	Yarrow	1	62	3	1	added	
		Asteraceae	Ambrosia	artemisifolia	Common Ragweed	0	51	23	1		
		Asteraceae	Antennaria	neglecta	Field Pussy Toes	3	56	7	1		
		Asteraceae	Artemisia	ludoviciana	White Sage	3					1
		Asteraceae	Aster	ericoides	Heath Aster	4	76	44	1		1
	seed	Asteraceae	Aster	laevis*	Smooth Blue Aster	6	89	35	1	yes	1
	seed	Asteraceae	Aster	novae-angliae	New England Aster	3				yes (WM)	1
		Asteraceae	Aster	oolentangiensis	Prairie Heart-leaved Aster	5	56	16	1		
		Asteraceae	Aster	pilosus	Frost Aster	1				added	
	seed (wet)	Asteraceae	Cacalia	plantaginea	Prairie Indian Plantain	8				yes (WM)	
	seed	Asteraceae	Cirsium	discolor*	Prairie Thistle	4	71	13	1	yes	
	seed	Asteraceae	Coreopsis	palmata	Prairie Coreopsis	8	76	34	1		1
		Asteraceae	Euthamia	graminifolia	Grass-leaved Goldenrod	4					1

		Asteraceae	Helianthus	grosseratus	Saw-toothed Sunflower	2	44	2	1		
	seed (small amt)	Asteraceae	Helianthus	laetiflorus*	Hybrid Prairie Sunflower	7	87	40	1		
	seed (dry)	Asteraceae	Helianthus	occidentalis*	Naked-stemmed Sunflower	6	44	19	1	yes	
	seed (small amt)	Asteraceae	Helianthus	pauciflorus	Showy Sunflower	7				yes	1
	seed	Asteraceae	Heliopsis	helianthoides	False Sunflower	5				yes	1
		Asteraceae	Lactuca	canadensis*	Wild Lettuce	2	47	7	1	yes	
	seed	Asteraceae	Liatris	aspera*	Rough Blazing Star	5	87	18	1	yes	1
	seed	Asteraceae	Liatris	ligulistylis	Showy Blazing Star	7				yes	
	seed	Asteraceae	Liatris	pycnostachya	Prairie Blazing Star	7				yes (WM)	1
	seed	Asteraceae	Liatris	spicata	Marsh Blazing Star	8				yes	1
	seed	Asteraceae	Parthenium	integrifolium	Wild Quinine	8				yes (WM)	1
	seed	Asteraceae	Ratibida	pinnata	Grey-headed Coneflower	4	85	32	1	yes (WM)	1
	seed	Asteraceae	Rudbeckia	hirta	Black-eyed Susan	4	44	3	1	yes (WM)	1
	seed	Asteraceae	Rudbeckia	triloba	Brown-eyed Susan	4					1
	seed	Asteraceae	Senecio	aureus	Golden Ragwort	6				yes (WM)	
	seed (small amt)	Asteraceae	Silphium	integrifolium	Rosinweed	6	40	3	1	yes (WM)	1
	seed	Asteraceae	Silphium	laciniatum*	Compass Plant	8	78	8	1	yes	1
		Asteraceae	Silphium	perfoliatum	Cup Plant	4					1
	seed	Asteraceae	Silphium	terebinthinaceum	Prairie Dock	7				yes (WM)	1
	seed	Asteraceae	Solidago	juncea	Early Goldenrod	4				yes	
	seed	Asteraceae	Solidago	rigida*	Stiff Goldenrod	5	76	15	1	yes (WM)	1
	seed	Asteraceae	Solidago	speciosa*	Showy Goldenrod	5	62	11	1	yes	1
	seed (wet)	Asteraceae	Vernonia	fasciculata	Ironweed	5				yes (WM)	
LEGUMES											
		Fabaceae	Amorpha	canescens	Leadplant	7	73	32	1		1
	seed	Fabaceae	Astragalus	canadensis	Canadian Milk Vetch	8				yes	1
	seed	Fabaceae	Baptisia	alba	White Wild Indigo	8				yes (WM)	1
	seed	Fabaceae	Baptisia	bracteata*	Cream Wild Indigo	7	44	3	1	yes	1
		Fabaceae	Dalea	candida	White Prairie Clover	8					1
	seed	Fabaceae	Dalea	purpurea	Purple Prairie Clover	7	60	7	1		1
	seed (small amt)	Fabaceae	Desmodium	canadense	Showy Tick-trefoil	4	49	3	1	yes (WM)	1
		Fabaceae	Desmodium	illinoense*	Illinois Tick-trefoil	6	64	20	1		1
	seed	Fabaceae	Lathyrus	venosus	Forest Pea	6	51	2	1	yes (WM)	
	seed	Fabaceae	Lespedeza	capitata	Round-headed Bush Clover	5	58	18	1		1
	seed	Fabaceae	Vicia	americana	American Vetch	4				yes (WM)	
GRASSES											
	seed	Poaceae	Andropogon	gerardii*	Big Bluestem	4	98	29	1	yes	1
	seed	Poaceae	Bromus	kalmii	Prairie Brome	8					1
	seed	Poaceae	Dichanthelium	leibergii*	Prairie Panic Grass	10	62	46	1	yes	
	seed	Poaceae	Elymus	canadensis	Canada Wild Rye	4	42	5	1	yes	1
	seed	Poaceae	Panicum	virgatum	Switch Grass	4					1
	seed	Poaceae	Schizachyrium	scoparium	Little Bluestem	4	69	28	1		1

	seed	Poaceae	Sorghastrum	nutans	Indian Grass	5	58	13	1	yes (DM)	1
	seed	Poaceae	Sporobolus	heterolepis	Prairie Dropseed	10	64	35	1		1
	seed (drier)	Poaceae	Stipa	spartea	Needle Grass	9	69	58	1		
OTHER											
	seed	Liliaceae	Allium	canadense	Wild Garlic	4				yes	
	seed	Liliaceae	Allium	cernuum	Nodding Wild Onion	7				yes	1
		Ranunculaceae	Anemone	canadensis	Meadow Anemone	4					1
	seed	Ranunculaceae	Anemone	cylindrica	Thimbleweed	6	51	5	1		1
	seed	Apocynaceae	Apocynum	androsaemifolium	Spreading Dogbane	2	42	6	1		
	seed	Apocynaceae	Apocynum	cannabinum	Indian Hemp	3				yes	
	seed (small amt)	Asclepiadaceae	Asclepias	syriaca	Common Milkweed	1	76	13	1	yes (WM)	
	seed	Lamiaceae	Blephilia	ciliata	Ohio Horse Mint	7				yes (WM)	
		Convolvulaceae	Calystegia	sepium*	Hedge Bindweed	2	49	13	1	yes	
		Cyperaceae	Carex	alopecoidea	Brown-headed Fox Sedge	5					
	seed	Cyperaceae	Carex	bicknellii	Bicknell's Sedge	6					
		Cyperaceae	Carex	bromoides	Brome-like Sedge	8					
		Cyperaceae	Carex	crisatella	Crested Oval Sedge	4					
		Cyperaceae	Carex	granularis	Limestone Meadow Sedge	3					
	seed	Cyperaceae	Carex	molesta	Field Oval Sedge	2					
	seed	Cyperaceae	Carex	normalis	Intermediate Sedge	5					
		Cyperaceae	Carex	prairea	Prairie Sedge	10					
		Cyperaceae	Carex	scoparia	Broom Sedge	4					
		Cyperaceae	Carex	tenera	Narrow-leaved Oval Sedge	4					
		Cyperaceae	Carex	tetanica	Rigid Sedge	9					
		Santalaceae	Comandra	umbellata	Bastard Toadflax	6	53	32	1		
	seed	Primulaceae	Dodecatheon	meadia	Shooting Star	7	53	3	1	yes (WM)	1
	seed	Apiaceae	Eryngium	yuccifolium*	Rattlesnake Master	8	53	21	1	yes	1
		Euphorbiaceae	Euphorbia	corollata	Flowering Spurge	4					1
	seed	Rosaceae	Frageria	virginiana	Wild Strawberry	1	56	16	1		
	seed	Rubiaceae	Galium	boreale	Northern Bedstraw	5	40	8	1		1
		Gentianaceae	Gentiana	alba	Pale Gentian	7				yes	
	seed	Gentianaceae	Gentiana	andrewsii	Closed Gentian	6				yes (WM)	1
		Saxifragaceae	Heuchera	richardsonii	Alum Root	7					1
		Hypericaceae	Hypericum	pyramidatum	Great St. John's Wort	6					1
	seed	Juncaceae	Juncus	tenuis	Path Rush	1					
	seed (wet)	Liliaceae	Lilium	philadelphicum	Wood Lily	9				yes	
		Boraginaceae	Lithospermum	canescens	Hoary Puccoon	10	53	5	1		
		Lobeliaceae	Lobelia	spicata	Pale Spiked Lobelia	6					1
		Lythraceae	Lythrum	alatum	Winged Loosetrife	6				yes (WM)	
	seed	Lamiaceae	Monarda	fistulosa	Bergamot	3	73	22	1		1
		Onagraceae	Oenothera	perennis	Small Sundrops	5				yes (WM)	
	seed	Polemoniaceae	Phlox	pilosa	Prairie Phlox	7	53	21	1	yes (WM)	1
		Solanaceae	Physalis	virginiana	Virginia Ground Cherry	4	42	8	1		
		Apiaceae	Polytaenia	nuttallii	Prairie Parsley	9				yes (WM)	1

	seed	Rosaceae	Potentilla	arguta	Prairie Cinquefoil	7	58	13	1		
	seed	Lamiaceae	Pycnanthemum	virginianum	Mountain Mint	6				yes (WM)	1
		Saxifragaceae	Saxifraga	pennsylvanica	Swamp Saxifrage	7				obl	
	seed	Iridaceae	Sisyrinchium	albidum	Blue-eyed Grass	7					1
	seed	Ranunculaceae	Thalictrum	dasycarpum	Purple Meadow Rue	4					1
	seed	Commelinaceae	Tradescantia	ohiensis	Spiderwort	5	64	31	1		1
	seed	Scrophulariaceae	Veronicastrum	virginicum	Culver's Root	6				yes (WM)	1
		Violaceae	Viola	pedatifida	Prairie Violet	9	42	13	1	yes	1
	seed	Apiaceae	Zizia	aptera	Heart-leaved Meadow Parsnip	9				yes	1
	seed	Apiaceae	Zizia	aurea	Golden Alexander	7				yes (WP)	1
WOODY											
		Rhamnaceae	Ceanothus	americanus*	New Jersey Tea	9	66	9	1	yes	
	plant	Anacardiaceae	Rhus	glabra	Smooth Sumac	2	42	5	1		
	plant	Rosaceae	Rosa	blanda	Early Wild Rose	4	91	36	1	yes	
	plant	Rosaceae	Rosa	carolina	Pasture Rose	4			1	yes	

DRY MESIC SAVANNA

The dry-mesic savanna mix is for those zones of the savanna in the driest microclimate - south-facing, mid and upper slopes. The zones give us the opportunity to skew the character of the species by zone with more emphasis than may develop naturally, to provide a degree of distinctness. In the absence of hand-seeding certain species in characteristic patterns, this zone distinctness helps with perception of the different communities in early years, and increases learning opportunities.

Here, the character emphasizes the range of light and moisture gradients that bring a great diversity to the savanna that is distinct from the prairie. Restoration reports indicate that species sort themselves out to shade conditions relatively quickly (a few years) as trees are incorporated. The species mix here is a greater number of species, diversified among families. Key species in the dry-mesic savanna include the legumes Amorpha and Lespedeza; Euphorbia, and Polemonium. (To be hopefully introduced later are the classic Lithospermum and the also-characteristic Smilacina). Important initial components also include a modest contingent of woody shrubs and brambles.

This mix requires a sandy loam - 50% sand or sandy loam and 50% compost.

Seed mix to include 1/3 poaceae, 1/3 asteraceae, 1/6 fabaceae, and 1/6 all other families. Approximately equal proportions by weight of non-conservative (C value 2-4), somewhat conservative (C value 5-7), and conservative (C value 8-10) native species. June seeding preferable. Seeding rate: _____

Certain species (woody plants; herbaceous species not easy to germinate and better planted; certain seed species to be pattern-seeded; or small-seeded species that are better hand-broadcast): to be quantity-specified and zone-specified, but placed on-site by land manager with landscape architect.

Trees for the savanna are to be planted in future years, as determined by the land manager.

oz/acre (tbd)	Family	Genus	Species	Common	C	Genessee Depot Oak Opening	Bader D/DM, PS/SU	Pruka Indicator 1	Presence	Ave Freq	Curtis	Cochrane/Iltis: Curtis or note	Packard/Mutel: Interseeding
COMPOSITES													
	Asteraceae	Achillea	millefolium	Yarrow	1				43	8	1		
seed	Asteraceae	Antennaria	neglecta *	Field Pussytoes	3	1	1		79	7	1	yes	
seed	Asteraceae	Antennaria	plantaginifolia	Pussy Toes	3		1					sand barren	1
seed	Asteraceae	Artemisia	campestris	Field Sage-wort	4		1		36	3	1		
	Asteraceae	Artemisia	ludoviciana	White Sage	3		1						
seed	Asteraceae	Aster	ericoides	Heath Aster	4		1						
seed	Asteraceae	Aster	laevis	Smooth Blue Aster	6		1						
seed	Asteraceae	Aster	lateriflorus	Calico Aster	3		1						
seed	Asteraceae	Aster	oolentangiensis	Sky Blue Aster	5	1	1						
	Asteraceae	Aster	sagittifolius	Arrow-leaved Aster	3		1		36	8	1		
seed (drier)	Asteraceae	Aster	sericeus	Silky Aster	8	1	1						

seed	Asteraceae	Aster	shortii	Short's Aster	7		1							yes	
	Asteraceae	Cacalia	plantaginea	Prairie Indian Plantain	8		1								
	Asteraceae	Cirsium	altissimum	Tall Thistle	6		1	1							
	Asteraceae	Cirsium	discolor	Pasture Thistle	4		1								
	Asteraceae	Coreopsis	lanceolata	Lance-leaved Coreopsis	8		1								
seed	Asteraceae	Coreopsis	palmata	Prairie Coreopsis	8	1	1		71	7	1				
seed	Asteraceae	Erigeron	pulchellus	Robin's Plaintain	4	1	1	1						yes	1
seed	Asteraceae	Erigeron	strigosus	Daisy Fleabane	2	1	1								
	Asteraceae	Eupatorium	purpureum	Purple Joe Pye Weed	6		1							yes	
	Asteraceae	Gnaphalium	obtusifolium	Cat's-foot	3		1							sand barren	
	Asteraceae	Helianthus	decapetalus	Pale Sunflower	7		1								
	Asteraceae	Helianthus	hirsutus	Hairy Sunflower	5		1								
seed	Asteraceae	Helianthus	occidentalis	Western Sunflower	6	1	1		43	7	1				
seed	Asteraceae	Helianthus	strumosus	Woodland Sunflower	4	1	1							yes	
seed	Asteraceae	Hieracium	kalmii	Kalm's Hawkweed	5		1	1						bracken	
	Asteraceae	Hieracium	scabrum	Rough Hawkweed	6		1							yes	1
seed	Asteraceae	Krigia	biflora *	Two-flowered Cynthia	4	1	1	1	50	3					1
	Asteraceae	Kuhnia	eupatorioides	False Boneset	5		1								
	Asteraceae	Lactuca	biennis	Tall Blue Lettuce	3		1								
	Asteraceae	Lactuca	canadensis	Wild Lettuce	2		1								
seed	Asteraceae	Liatris	aspera	Rough Blazing Star	5	1	1		71	5	1				
seed	Asteraceae	Liatris	cylindracea	Dwarf blazing star	9		1								
	Asteraceae	Liatris	pycnostachya	Prairie Blazing Star	7	1	1								
seed	Asteraceae	Parthenium	integrifolium	Wild Quinine	8		1								
	Asteraceae	Polymnia	canadensis	Pale Leafcup	7		1								
seed	Asteraceae	Ratibida	pinnata	Gray-headed Coneflower	4	1	1								
seed	Asteraceae	Rudbeckia	hirta	Black-eyed Susan	4	1	1		71	4	1				
seed	Asteraceae	Senecio	pauperculus	Northern ragwort	4		1								
	Asteraceae	Silphium	integrifolium	Rosinweed	6	1	1								
seed	Asteraceae	Silphium	laciniatum	Compass Plant	8		1								
	Asteraceae	Silphium	perfoliatum	Cup Plant	4		1								
seed	Asteraceae	Silphium	terebinthinaceum	Prairie Dock	7	1	1								
	Asteraceae	Solidago	canadensis	Canada Goldenrod	1	1	1								
	Asteraceae	Solidago	flexicaulis	Zigzag Goldenrod	6		1								
	Asteraceae	Solidago	juncea	Early Goldenrod	4	1	1								
	Asteraceae	Solidago	missouriensis	Missouri Goldenrod	7		1								
seed	Asteraceae	Solidago	nemoralis	Oldfield Goldenrod	4		1		57	9	1				
seed	Asteraceae	Solidago	rigida	Stiff Goldenrod	5	1	1								
seed	Asteraceae	Solidago	speciosa	Showy Goldenrod	5	1	1								
seed	Asteraceae	Solidago	ulmifolia	Elm-leaved Goldenrod	5		1							yes	
seed	Asteraceae	Tephrosia	virginiana *	Goat's Rue	6				50	8	1				
LEGUMES															
seed	Fabaceae	Amorpha	canescens	Leadplant	7	1			93	25	1				
seed	Fabaceae	Amphicarpa	bracteata	Hog Peanut	5	1	1		43	13	1			yes	
seed	Fabaceae	Astragalus	canadensis	Canadian Milk Vetch	8		1	1							

	Liliaceae	Allium	canadense	Wild Garlic	4		1						
seed	Ranunculaceae	Anemone	cylindrica	Thimbleweed	6	1	1		64	3	1		
	Ranunculaceae	Anemone	patens	American Pasqueflower	7		1						
	Ranunculaceae	Anemone	quinquefolia	Wood Anemone	6		1						
seed	Ranunculaceae	Anemone	virginiana	Tall Anemone	5		1	1					
seed	Apocynaceae	Apocynum	androsaemifolium	Spreading Dogbane	2	1	1		57	7	1		1
seed	Apocynaceae	Apocynum	cannabinum	Indian Hemp	3		1						
seed	Ranunculaceae	Aquilegia	canadensis	Columbine	5	1	1						
	Brassicaceae	Arabis	canadensis	Sickle-pod	7		1						
	Brassicaceae	Arabis	hirsuta	Hairy Rock Cress	6		1						
	Brassicaceae	Arabis	laevigata	Smooth Back Cress	5		1						
seed	Brassicaceae	Arabis	lyrata	Sand Cress	4		1		43	4	1		
	Araliaceae	Aralia	hispida	Bristly Sarsaparilla	5		1						
	Caryophyllaceae	Arenaria	lateriflora	Wood Sandwort	6		1						
	Asclepiadaceae	Asclepias	amplexicaulis	Clasping Milkweed	8		1						
	Asclepiadaceae	Asclepias	exaltata	Poke Milkweed	7	1	1						
	Asclepiadaceae	Asclepias	ovalifolia	Oval Milkweed	8		1						
seed	Asclepiadaceae	Asclepias	syriaca	Common Milkweed	1	1	1		50	2	1		
	Asclepiadaceae	Asclepias	tuberosa	Butterfly Milkweed	6		1						1
seed	Asclepiadaceae	Asclepias	verticillata	Whorled Milkweed	2		1						
	Asclepiadaceae	Asclepias	viridiflora	Green-flowered Milkweed	9		1						
	Polypodaceae	Athyrium	filix-femina	Lady Fern	5		1						
seed	Scrophulariaceae	Aureolaria	grandiflora	Large-flowered yellow foxglov	8		1	1					1
	Scrophulariaceae	Besseyia	bullii	Kittentails	9	1	1	1					
	Convolvulaceae	Calystegia	sepium	Hedge Bindweed	2		1	1					
seed	Campanulaceae	Campanula	americana	Tall Bellflower	4		1						
seed	Campanulaceae	Campanula	rotundifolia	Bluebell	5		1						
seed	Cyperaceae	Carex	blanda	Common Wood Sedge	3		1						
	Cyperaceae	Carex	cephalophora	Short-headed Bracted Sedge	4		1						
	Cyperaceae	Carex	eburnea	Ivory Sedge	8		1						
	Cyperaceae	Carex	meadii	Mead's sedge	6		1						
plant/seed	Cyperaceae	Carex	pennsylvanica	Penn Sedge	3	1	1		50	12	1		
	Cyperaceae	Carex	radiata	Straight-styled Wood Sedge	4		1						
	Cyperaceae	Carex	rosea	Curly-styled Wood Sedge	4		1						
	Scrophulariaceae	Castilleja	sessiliflora	Downy Paintbrush	10		1						
	Onagraceae	Circaea	lutetiana	Enchanter's Nightshade	2		1						
	Portulacaceae	Claytonia	virginica	Spring Beauty	6		1						
seed	Santalaceae	Comandra	umbellata *	Bastard Toadflax	6	1	1		86	15	1	yes	
seed	Primulaceae	Dodecatheon	meadia	Shooting Star	7	1	1	1					1
	Liliaceae	Erythronium	albidum	White Trout Lily	7		1						
seed	Euphorbiaceae	Euphorbia	corollata *	Flowering Spurge	4	1	1		100	36	1	yes	
	Rosaceae	Fragaria	vesca	Thin-leaved Wild Strawberry	3		1						
seed	Rosaceae	Fragaria	virginiana	Wild Strawberry	1	1	1		71	11	1		
seed (if avail)	Rubiaceae	Galium	boreale	Northern Bedstraw	5	1	1		36	10	1		
	Rubiaceae	Galium	circaezans	Smooth Wild Licorice	7		1						

	Rubiaceae	Galium	concinnum	Shining Bedstraw	6		1						yes	1
seed	Onagraceae	Gaura	biennis	Gaura	2		1							
	Gentianaceae	Gentianella	quinquefolia	Stiff Gentian	7		1							1
	Geraniaceae	Geranium	bicknellii	Northern Cranesbill	4									1
	Geraniaceae	Geranium	maculatum	Wild Geranium	4	1	1		57	10	1			
seed	Rosaceae	Geum	canadense	White Avens	2	1	1							
	Rosaceae	Geum	triflorum	Prairie smoke	7		1							
	Orchidaceae	Goodyera	pubescens	Rattlesnake Plantain	7		1							
	Lamiaceae	Hedeoma	hispida	Rough pennyroyal	1		1							
	Cistaceae	Helianthemum	bicknellii	Bicknell's rock-rose	6		1							
seed	Cistaceae	Helianthemum	canadense *	Common rock-rose	6		1		64	13	1	yes		
seed	Saxifragaceae	Heuchera	richardsonii	Alum Root	7	1	1	1	43	2	1			1
	Hypericaceae	Hypericum	punctatum	Spotted St. John's Wort	4		1							
	Amaryllidaceae	Hypoxis	hirsuta	Yellow Star Grass	8	1	1	1						1
	Liliaceae	Lilium	michiganense	Turk's Cap Lily	6	1	1							
	Liliaceae	Lilium	philadelphicum	Prairie Lily	9		1	1						
	Orchidaceae	Liparis	lilifolia	Purple Twayblade	5		1							
	Boraginaceae	Lithospermum	canescens *	Hoary Puccoon	10	1	1		71	4	1	yes		
	Boraginaceae	Lithospermum	carolinense	Puccoon	10		1							
	Lobeliaceae	Lobelia	inflata	Indian Tobacco	2		1							
	Lobeliaceae	Lobelia	spicata	Great Blue Lobelia	6		1							
	Juncaceae	Luzula	multiflora	Common Wood Rush	5		1							
	Primulaceae	Lysimachia	ciliata	Fringed Loosestrife	5		1							
	Primulaceae	Lysimachia	quadrifolia	Whorled Loosestrife	6		1	1					pine barren	
seed	Lamiaceae	Monarda	fistulosa	Bergamot	3	1	1		50	10	1			
seed	Lamiaceae	Monarda	punctata	Dotted Horsemint	3		1							sand barren
	Onagraceae	Oenothera	perennis	Small evening primrose	5									
seed	Onagraceae	Oenothera	biennis	Evening Primrose	1	1	1		50	3	1			
	Orobanchaceae	Orobanche	uniflora	Cancer-root	6		1							
	Apiaceae	Osmorhiza	claytonii	Hairy Sweet Cicely	5		1							
	Apiaceae	Osmorhiza	longistylis	Smooth Sweet Cicely	4		1							
seed	Scrophulariaceae	Pedicularis	canadensis	Lousewort	8		1	1						
	Scrophulariaceae	Penstemon	hirsutus	Hairy beard-tongue	4		1							
	Polemoniaceae	Phlox	divaricata	Woodland Phlox	7		1							
seed	Polemoniaceae	Phlox	pilosa	Prairie Phlox	7	1	1	1						
seed	Phrymaceae	Phryma	leptostachya	Lopseed	5	1	1							
	Solanaceae	Physalis	heterophylla	Clammy Ground Cherry	3		1							
seed	Solanaceae	Physalis	virginiana *	Virginia Ground Cherry	4		1		64	4	1	yes		
	Lamiaceae	Physostegia	virginiana	Obedient Plant	7									
	Berberidaceae	Podophyllum	peltatum	Mayapple	4		1							
seed	Polemoniaceae	Polemonium	reptans	Jacob's Ladder	6		1	1					yes	
	Polygalaceae	Polygala	sanguinea	Field Milkwort	5		1							
seed	Polygalaceae	Polygala	senega	Seneca Snakeroot	8	1	1	1						
	Polygalaceae	Polygala	verticillata	Whorled milkwort	8		1							
	Liliaceae	Polygonatum	biflorum *	Solomon's Seal	4	1	1		57	6	1	yes		

seed	Rosaceae	Potentilla	arguta	Tall Cinquefoil	7	1	1		43	2	1		
seed	Rosaceae	Potentilla	simplex	Common Cinquefoil	2		1					yes	
plant	Polypodiaceae	Pteridium	aquilinum	Bracken Fern	2		1		57	15	1		
	Lamiaceae	Pycnanthemum	virginianum	Mountain Mint	6	1	1						
	Pyrolaceae	Pyrola	elliptica	Elliptic shin-leaf	6		1						
	Ranunculaceae	Ranunculus	abortivus	Small-flowered Buttercup	1		1						
	Ranunculaceae	Ranunculus	fascicularis	Hooked buttercup	6		1	1					
	Papaveraceae	Sanguinaria	canadensis	Bloodroot	6		1						
seed	Apiaceae	Sanicula	gregaria	Clustered Black Snakeroot	3	1	1						
seed	Scrophulariaceae	Scrophularia	lanceolata	Early Figwort	4		1						
	Scrophulariaceae	Scrophularia	marilandica	Late Figwort	4		1						
	Lamiaceae	Scutellaria	ovata	Heart-leaved Skullcap	9		1						
	Lamiaceae	Scutellaria	parvula	Small Skullcap	6		1						
	Caryophyllaceae	Silene	antirrhina	Sleepy catchfly	2		1						
seed	Caryophyllaceae	Silene	stellata	Starry Campion	7		1	1					
	Iridaceae	Sisyrinchium	albidum	Pale Blue-eyed Grass	7								
	Iridaceae	Sisyrinchium	campestre	Prairie Blue-eyed Grass	7	1	1						
	Liliaceae	Smilacina	racemosa	False Solomon's Seal	5	1	1		64	13	1	yes	
	Liliaceae	Smilacina	stellata	Starry False Solomon's Seal	5	1	1		71	13	1	yes	
seed (if avail)	Liliaceae	Smilax	ecirrhatta	Upright Carrion Flower	5	1	1						
	Liliaceae	Smilax	lasioneura	Hairy Carrion Flower	4							added	
seed	Apiaceae	Taenidia	integerrima	Yellow Pimpernel	7							added	
	Lamiaceae	Teucrium	canadense	Germander	4		1						
	Ranunculaceae	Thalictrum	thalictroides	Rue Anemone	7		1						
seed	Commelinaceae	Tradescantia	ohiensis	Spiderwort	5	1	1		64	12	1		
	Liliaceae	Trillium	recurvatum	Red Trillium	6		1						
seed	Caprifoliaceae	Triosteum	aurantiacum	Early Horse Gentian	5		1	1					
seed	Caprifoliaceae	Triosteum	perfoliatum	Late Horse Gentian	5		1	1				yes	
	Liliaceae	Uvularia	grandiflora	Bellwort	7		1						
seed	Verbenaceae	Verbena	stricta	Hoary Vervain	3		1						
	Scrophulariaceae	Veronicastrum	virginicum	Culver's Root	6	1	1	1					
seed	Violaceae	Viola	pedata	Birdsfoot Violet	7	1	1		43	9	1		
	Violaceae	Viola	sororia	Blue Violet	3		1						
	Apiaceae	Zizia	aptera	Heart-leaved Meadow Parsnip	9		1						
seed	Apiaceae	Zizia	aurea	Golden Alexander	7	1	1	1					
WOODY - INITIAL													
	Rosaceae	Amelanchier	laevis	Serviceberry	6		1						
	Rosaceae	Amelanchier	sanguinea	Round-leaved Serviceberry	7		1						
plant	Rhamnaceae	Ceanothus	americana	New Jersey Tea	9		1	1					1
plant	Celastraceae	Celastrus	scandens	American Bittersweet	3		1						
	Cornaceae	Cornus	racemosa	Gray Dogwood	2		1		57	6	1		
plant	Betulaceae	Corylus	americana	Hazelnut	5		1		79	18	1		1
	Rosaceae	Crataegus	crus-galli	Cockspur Hawthorn	3		1						
	Rosaceae	Crataegus	flabellata	Fan-leaf Hawthorn	4		1						
	Caprifoliaceae	Diervilla	lonicera	Northern Bush Honeysuckle	6		1						

	Caprifoliaceae	Lonicera	dioica	Mountain Honeysuckle	7	1						
	Caprifoliaceae	Lonicera	reticulata	Grape Honeysuckle	6	1						
	Vitaceae	Parthenocissus	quinquefolia	Virginia Creeper	5	1						
	Vitaceae	Parthenocissus	vitacea	Woodbine	4	1						
	Rosaceae	Physocarpus	opulifolius	Ninebark	6	1						
plant	Rosaceae	Prunus	americana	Wild Plum	3	1						
	Rosaceae	Prunus	pensylvanica	Pin Cherry	4	1						
	Anacardiaceae	Rhus	aromatica	Fragrant Sumac	10	1						
	Anacardiaceae	Rhus	glabra	Smooth Sumac	2	1	57	2	1			
	Anacardiaceae	Rhus	typhina	Staghorn Sumac	2	1						
	Saxifragaceae	Ribes	cynosbati	Prickly Gooseberry	3	1						
	Saxifragaceae	Ribes	missouriense	Smooth Gooseberry	4	1						
plant	Rosaceae	Rosa	blanda	Early Wild Rose	4	1						
plant	Rosaceae	Rosa	carolina	Pasture Rose	4	1						
plant	Rosaceae	Rubus	alleghehiensis	Common Blackberry	2	1						
	Rosaceae	Rubus	flagellaris	Common Dewberry	3	1						
	Rosaceae	Rubus	occidentalis	Black Raspberry	2	1						
	Salicaceae	Salix	humilis	Prairie Willow	6	1	50	5	1			
	Caprifoliaceae	Symphoricarpos	occidentalis	Snowberry	5	1						
	Caprifoliaceae	Viburnum	rafinesquianum	Downy Arrow-wood	7	1						
	Vitaceae	Vitis	riparia	Frost Grape	2	1	43	4	1			
	Rufaceae	Zanthoxylum	americanum	Prickly Ash	3	1						
WOODY - FUTURE								IV	Constancy			
Timing and which species tbd												
	Juglandaceae	Carya	ovata	Shagbark Hickory	5		6	21	1			
	Rosaceae	Prunus	serotina	Black Cherry	3		4	29	1			
	Fagaceae	Quercus	alba	White Oak	7		18	57	1			
	Fagaceae	Quercus	ellipsoidalis	Hill's Oak	5		24	14	1			
	Fagaceae	Quercus	macrocarpa	Bur Oak	5		12	29	1			
	Fagaceae	Quercus	rubra	Red Oak	5		1	14	1			
	Fagaceae	Quercus	velutina *	Black Oak	5		235	93	1			
	Ulmaceae	Ulmus	americana	American Elm	3		1	7	1			

MESIC SAVANNA

The mesic savanna mix is for those zones of the savanna in the moistest microclimate - north-facing and lower slopes. The zones give us the opportunity to skew the character of the species by zone with more emphasis than may develop naturally, to provide a degree of distinctness. In the absence of hand-seeding certain species in characteristic patterns, this zone distinctness helps with perception of the different communities in early years, and increases learning opportunities.

Here, the character emphasizes again the distinctive diversity of the savanna, becomes an increasingly broad-leaved community, and increases the shrub and bramble component. More of the species are present that live in the woods as well, including open woods grasses like certain Bromus, Festuca, and Elymus hystrix, and forbs like a few Anemones, Geranium, Helianthus strumosus, and an increased contingent of Carex species. Restoration reports indicate that species sort themselves out to shade conditions relatively quickly (a few years) as trees are incorporated.

This mix requires a sandy loam - 50% sand or sandy loam and 50% compost.

Seed mix to include 1/3 poaceae, 1/3 asteraceae, 1/6 fabaceae, and 1/6 all other families. Approximately equal proportions by weight of non-conservative (C value 2-4), somewhat conservative (C value 5-7), and conservative (C value 8-10) native species. June seeding preferable. Seeding rate: _____

Certain species (woody plants; herbaceous species not easy to germinate and better planted; certain seed species to be pattern-seeded; or small-seeded species that are better hand-broadcast): to be quantity-specified and zone-specified, but placed on-site by land manager with landscape architect.

Trees for the savanna are to be planted in future years, as determined by the land manager.

oz/acre (tbd)	Family	Genus	Species	Common	C	Genessee Depot Oak Opening	Bader M, PS/SU	Pruka Indicator 1	Presence	Ave Freq	Curtis	Cochran e/Ittis: Curtis or note	Packard/ Mutel: Interseeding
COMPOSITES													
	Asteraceae	Antennaria	neglecta	Field Pussytoes	3	1			53	8	1		
	Asteraceae	Antennaria	plantaginifolia	Pussy Toes	3								1
seed	Asteraceae	Artemesia	ludoviciana	White Sage	3		1						
	Asteraceae	Aster	ericoides	Heath Aster	4		1						
seed	Asteraceae	Aster	laevis	Smooth Blue Aster	6		1						
seed	Asteraceae	Aster	lateriflorus	Calico Aster	3		1						
seed	Asteraceae	Aster	macrophyllus	Large-leaved Aster	4								1
seed	Asteraceae	Aster	novae-angliae	New England Aster	3	1	1						
	Asteraceae	Aster	oolentangiensis	Sky Blue Aster	5	1	1						
	Asteraceae	Aster	sagittifolius	Arrow-leaved Aster	3		1						
	Asteraceae	Aster	shortii	Short's Aster	7		1						1

?	Asteraceae	Cacalia	muhlenbergii	Great Indian Plantain	8		1	1					
	Asteraceae	Cacalia	plantaginea	Prairie Indian Plantain	8		1						
?	Asteraceae	Cacalia	suaveolens	Sweet Indian Plantain	8		1						
	Asteraceae	Cirsium	altissimum	Tall Thistle	6		1	1					1
	Asteraceae	Cirsium	discolor	Pasture Thistle	4		1						1
seed	Asteraceae	Coreopsis	palmata	Prairie Coreopsis	8	1	1		63	14	1		
seed	Asteraceae	Erigeron	strigosus	Daisy Fleabane	2	1	1						
see invasive note	Asteraceae	Eupatorium	altissimum	Tall Boneset	4		1						
seed (wet)	Asteraceae	Eupatorium	purpureum	Purple Joe Pye Weed	6		1						1
seed (wet)	Asteraceae	Euthamia	graminifolia	Grass-leaved Goldenrod	4		1						
	Asteraceae	Helianthus	decapetalus	Pale Sunflower	7		1						
	Asteraceae	Helianthus	giganteus	Tall Sunflower	4		1						
seed (small)	Asteraceae	Helianthus	grosseratus	Sawtooth Sunflower	2	1	1						
seed	Asteraceae	Helianthus	laetiflorus	Hybrid Prairie Sunflower	7	1			32	12	1		
seed (small)	Asteraceae	Helianthus	pauciflorus	Stiff Sunflower	7		1						
seed	Asteraceae	Helianthus	strumosus	Woodland Sunflower	4	1	1		47	13	1		1
seed	Asteraceae	Helopsis	helianthoides *	False Sunflower	5	1	1		42	22	1		1
	Asteraceae	Hieracium	kalmii	Kalm's Hawkweed	5		1	1					
	Asteraceae	Hieracium	scabrum	Rough Hawkweed	6		1						1
seed	Asteraceae	Krigia	biflora	Two-flowered Cynthia	4	1	1	1					1
seed	Asteraceae	Kuhnia	eupatorioides	False Boneset	5		1						
	Asteraceae	Lactuca	biennis	Tall Blue Lettuce	3		1						
	Asteraceae	Lactuca	canadensis	Wild Lettuce	2		1						1
seed	Asteraceae	Liatris	aspera	Rough Blazing Star	5	1	1						
seed	Asteraceae	Parthenium	integrifolium	Wild Quinine	8		1						
	Asteraceae	Polymnia	canadensis	Pale Leafcup	7		1						
	Asteraceae	Prenanthes	alba	Lion's Foot	5	1	1	1	47	3	1		1
	Asteraceae	Ratibida	pinnata	Gray-headed Coneflower	4	1	1						1
	Asteraceae	Rudbeckia	hirta	Black-eyed Susan	4	1	1						
seed	Asteraceae	Rudbeckia	triloba	Brown-eyed Susan	4								1
	Asteraceae	Silphium	integrifolium	Rosinweed	6	1	1						
	Asteraceae	Silphium	laciniatum	Compass Plant	8		1						
	Asteraceae	Silphium	perfoliatum	Cup Plant	4		1						
	Asteraceae	Silphium	terebinthinaceum	Prairie Dock	7	1	1						
	Asteraceae	Solidago	caesia	Blue-stemmed Goldenrod	8								1
	Asteraceae	Solidago	canadensis	Canada Goldenrod	1	1	1						
seed	Asteraceae	Solidago	flexicaulis	Zigzag Goldenrod	6		1						1
seed (wet)	Asteraceae	Solidago	gigantea	Late Goldenrod	3		1						
seed	Asteraceae	Solidago	juncea	Early Goldenrod	4	1	1						1
	Asteraceae	Solidago	missouriensis	Missouri Goldenrod	7		1						
	Asteraceae	Solidago	nemoralis	Oldfield Goldenrod	4		1						1
	Asteraceae	Solidago	rigida	Stiff Goldenrod	5	1	1						
seed	Asteraceae	Solidago	speciosa	Showy Goldenrod	5	1	1						1
seed	Asteraceae	Solidago	ulmifolia	Elm-leaved Goldenrod	5		1						1

LEGUMES													
seed	Fabaceae	Amorpha	canescens	Leadplant	7	1				79	34	1	
seed	Fabaceae	Amphicarpa	bracteata	Hog Peanut	5	1	1			79	41	1	1
seed	Fabaceae	Astragalus	canadensis	Canadian Milk Vetch	8		1	1					1
seed	Fabaceae	Baptisia	alba	White Wild Indigo	8		1	1					1
seed	Fabaceae	Baptisia	bracteata	Cream Wild Indigo	7		1	1					
	Fabaceae	Dalea	candida	White Prairie Clover	8	1	1						
seed	Fabaceae	Dalea	purpurea	Purple Prairie Clover	7	1	1			63	13	1	
seed (small)	Fabaceae	Desmodium	canadense	Showy Tick-trefoil	4	1	1	1					1
	Fabaceae	Desmodium	cuspidatum	Bracted Tick-trefoil	7		1						1
seed	Fabaceae	Desmodium	glutinosum	Pointed-leaf Tick-trefoil	6	1	1			58	19	1	1
	Fabaceae	Desmodium	illinoiense	Illinois Tick-trefoil	6		1						
	Fabaceae	Desmodium	nudiflorum	Bare-stemmed Tick-trefoil	7		1						
	Fabaceae	Lathyrus	ochroleucus	Pale Vetchling	7		1						1
	Fabaceae	Lathyrus	palustris	Marsh Vetchling	5		1						
	Fabaceae	Lathyrus	venosus	Veiny Pea	6		1						1
seed	Fabaceae	Lespedeza	capitata	Roundheaded Bush Clover	5	1	1			47	8	1	
seed (small)	Fabaceae	Vicia	americana	American Vetch	4	1	1						1
	Fabaceae	Vicia	caroliniana	Wood Vetch	7		1						
GRASSES													
seed	Poaceae	Agrostis	hymalis v. scabra	Tickle Grass	4		1						
seed	Poaceae	Andropogon	gerardii	Big Bluestem	4	1	1			68	19	1	
	Poaceae	Bouteloua	curtipendula	Side-oats Grama	6		1						
seed	Poaceae	Bromus	altissimus	Ear-leaved Brome	6		1						
seed	Poaceae	Bromus	ciliatus	Fringed Brome	7								added
seed	Poaceae	Bromus	kalmii	Prairie Brome	8		1	1					1
seed	Poaceae	Bromus	pubescens	Woodland Brome	6		1						1
	Poaceae	Calamagrostis	canadensis	Bluejoint Grass	5		1						
	Poaceae	Danthonia	spicata	Poverty Oat Grass	4								1
	Poaceae	Elymus	canadensis	Canada Wild Rye	4		1						1
seed	Poaceae	Elymus	hystrix	Bottlebrush Grass	6		1						1
	Poaceae	Elymus	trachycaulus	Slender Wheat Grass	4		1						1
seed	Poaceae	Elymus	villosus	Silky Wild Rye	6		1	1					1
seed	Poaceae	Elymus	virginicus	Virginia Wild Rye	6		1	1					1
seed	Poaceae	Festuca	subverticillata	Nodding Fescue	4		1						1
	Poaceae	Koeleria	macrantha	June Grass	7		1						
seed	Poaceae	Leersia	virginica	White Grass	5		1						1
	Poaceae	Muhlenbergia	frondosa	Wire-stem Muhly	3		1						
	Poaceae	Muhlenbergia	mexicana	Leafy Satin Grass	4		1						1
	Poaceae	Muhlenbergia	schreberi	Nimble-will	1		1						
	Poaceae	Panicum	latifolium	Broad-leaved Panic Grass	7	1	1						1
seed	Poaceae	Panicum	leibergii	Leiberg's Panic Grass	10	1	1			58	11	1	
	Poaceae	Panicum	oligosanthes	Scribner's Panic Grass	4	1	1						
	Poaceae	Panicum	virgatum	Switch Grass	4		1						
seed	Poaceae	Schizachyrium	scoparium	Little Bluestem	4	1	1			58	12	1	

		Cyperaceae	Carex	granularis	Pale Sedge	3		1						
seed		Cyperaceae	Carex	molesta	Field Oval Sedge	2		1						
seed		Cyperaceae	Carex	normalis	Spreading Oval Sedge	5		1						
plant/seed		Cyperaceae	Carex	pennsylvanica	Penn Sedge	3	1	1		32	8	1		1
		Cyperaceae	Carex	radiata	Straight-styled Wood Sedge	4		1						
		Cyperaceae	Carex	rosea	Curly-styled Wood Sedge	4		1						1
		Cyperaceae	Carex	tenera	Narrow-leaved Oval Sedge	4		1						
		Scrophulariaceae	Castilleja	coccinea	Indian Paintbrush	6		1	1					
		Onagraceae	Circaea	lutetiana	Enchanter's Nightshade	2		1						
		Portulacaceae	Claytonia	virginica	Spring Beauty	6		1						1
seed		Santalaceae	Comandra	umbellata	Bastard Toadflax	6	1	1		84	11	1		1
seed		Apiaceae	Cryptotaenia	canadensis	Honewort	4		1						1
seed		Dioscoreaceae	Dioscorea	villosa	Wild Yam	4		1						1
		Primulaceae	Dodecatheon	meadia	Shooting Star	7	1	1	1					1
		Apiaceae	Eryngium	yuccifolium	Rattlesnake Master	8		1						
		Liliaceae	Erythronium	albidum	White Trout Lily	7		1						
		Euphorbiaceae	Euphorbia	corollata	Flowering Spurge	4	1	1		89	34	1		
		Rosaceae	Fragaria	vesca	Thin-leaved Wild Strawberry	3		1						
seed		Rosaceae	Fragaria	virginiana	Wild Strawberry	1	1	1		68	14	1		
seed		Rubiaceae	Galium	boreale	Northern Bedstraw	5	1	1		79	33	1		
		Rubiaceae	Galium	circaezans	Smooth Wild Licorice	7		1						1
seed		Rubiaceae	Galium	concinnum	Shining Bedstraw	6		1		42	12	1		1
		Rubiaceae	Galium	triflorum	Sweet-scented Bedstraw	5		1						
		Onagraceae	Gaura	biennis	Gaura	2		1						
		Gentianaceae	Gentiana	alba	Pale Gentian	7		1						1
seed		Gentianaceae	Gentiana	andrewsii	Bottle Gentian	6		1						
		Gentianaceae	Gentianella	quinquefolia	Stiff Gentian	7		1						1
		Geraniaceae	Geranium	bicknellii	Northern Cranesbill	4								1
seed		Geraniaceae	Geranium	maculatum	Wild Geranium	4	1	1		68	16	1		
seed		Rosaceae	Geum	canadense	White Avens	2	1	1						
		Orchidaceae	Goodyera	pubescens	Rattlesnake Plantain	7		1						
		Apiaceae	Heracleum	lanatum	American Cow Parsnip	3		1						
seed		Saxifragaceae	Heuchera	richardsonii	Alum Root	7	1	1	1					1
seed		Hypericaceae	Hypericum	punctatum	Spotted St. John's Wort	4		1						
seed		Amaryllidaceae	Hypoxis	hirsuta	Yellow Star Grass	8	1	1	1				yes	1
seed		Juncaceae	Juncus	tenuis	Path Rush	1								
		Liliaceae	Lilium	michiganense	Turk's Cap Lily	6	1	1						
		Liliaceae	Lilium	philadelphicum	Prairie Lily	9		1	1					
		Orchidaceae	Liparis	liliifolia	Purple Twayblade	5		1						
		Boraginaceae	Lithospermum	canescens	Hoary Puccoon	10	1	1		68	15	1		
		Lobeliaceae	Lobelia	inflata	Indian Tobacco	2		1						
seed		Lobeliaceae	Lobelia	siphilitica	Great Blue Lobelia	5								1
		Lobeliaceae	Lobelia	spicata	Pale Spiked Lobelia	6		1						
		Juncaceae	Luzula	multiflora	Common Wood Rush	5		1						1
		Primulaceae	Lysimachia	ciliata	Fringed Loosestrife	5		1						

		Primulaceae	Lysimachia	quadrifolia	Whorled Loosestrife	6		1	1					
seed		Menispermaceae	Menispermum	canadense	Moonseed	5								1
seed		Lamiaceae	Monarda	fistulosa	Bergamot	3	1	1		84	23	1		1
		Onagraceae	Oenothera	biennis	Evening Primrose	1	1	1						
		Onagraceae	Oenothera	perennis	Small Sundrops	5								1
seed		Apiaceae	Osmorhiza	claytonii	Hairy Sweet Cicely	5		1						
seed		Apiaceae	Osmorhiza	longistylis	Smooth Sweet Cicely	4		1						
		Osmundaceae	Osmunda	claytoniana	Interrupted Fern	6		1						
		Scrophulariaceae	Pedicularis	canadensis	Lousewort	8		1	1					
seed		Polemoniaceae	Phlox	divaricata	Woodland Phlox	7		1						1
seed		Polemoniaceae	Phlox	pilosa	Prairie Phlox	7	1	1	1	42	3	1		
seed		Phrymaceae	Phryma	leptostachya	Lopseed	5								1
		Solanaceae	Physalis	heterophylla	Clammy Ground Cherry	3		1						
		Solanaceae	Physalis	virginiana	Virginia Ground Cherry	4				37	3	1		
seed		Lamiaceae	Physostegia	virginiana	Obedient Plant	7		1						1
		Berberidaceae	Podophyllum	peltatum	Mayapple	4		1						
		Polemoniaceae	Polemonium	reptans	Jacob's Ladder	6		1	1					1
		Polygalaceae	Polygala	sanguinea	Field Milkwort	5		1						
		Polygalaceae	Polygala	senega	Seneca Snakeroot	8	1	1	1					1
		Liliaceae	Polygonatum	biflorum	Solomon's Seal	4	1	1		53	4	1		1
		Polygonaceae	Polygonum	virginianum	Woodland Knotweed	7		1						
		Apiaceae	Polytaenia	nutalli	Prairie Parsley	9		1	1					
		Rosaceae	Potentilla	arguta	Tall Cinquefoil	7	1	1						
		Rosaceae	Potentilla	simplex	Common Cinquefoil	2		1						
plant		Polypodiaceae	Pteridium	aquilinum	Bracken Fern	2		1		37	6	1		
seed (small)		Lamiaceae	Pycnanthemum	virginianum	Mountain Mint	6	1	1						
seed		Ranunculaceae	Ranunculus	abortivus	Small-flowered Buttercup	1		1						
		Ranunculaceae	Ranunculus	fascicularis	Early Buttercup	6							yes	
		Ranunculaceae	Ranunculus	recurvatus	Hooked Buttercup	5		1						
		Papaveraceae	Sanguinaria	canadensis	Bloodroot	6		1						1
seed		Apiaceae	Sanicula	gregaria	Clustered Black Snakeroot	3	1	1						
seed (small)		Apiaceae	Sanicula	marilandica	Black Snakeroot	5		1						
		Cyperaceae	Scleria	triglomerata	Tall Nut Rush	8		1						
seed		Scrophulariaceae	Scrophularia	lanceolata	Early Figwort	4		1						1
		Scrophulariaceae	Scrophularia	marilandica	Late Figwort	4		1						
		Lamiaceae	Scutellaria	ovata	Heart-leaved Skullcap	9		1						
		Caryophyllaceae	Silene	stellata	Starry Champion	7		1	1					1
		Iridaceae	Sisyrinchium	angustifolium	Blue-eyed Grass	6								1
		Iridaceae	Sisyrinchium	campestre	Prairie Blue-eyed Grass	7	1	1						
		Liliaceae	Smilacina	racemosa	False Solomon's Seal	5	1	1		79	12	1		1
		Liliaceae	Smilacina	stellata	Starry False Solomon's Sea	5	1	1						1
		Liliaceae	Smilax	ecirrhata	Upright Carrion Flower	4	1	1						1
		Liliaceae	Smilax	lasiocarpa	Hairy Carrion Flower	4							added	
seed		Apiaceae	Taenidia	integerrima	Yellow Pimpernel	7	1	1	1					1
seed		Lamiaceae	Teucrium	canadense	Germander	4		1						

	Rosaceae	Salix	discolor	Pussy Willow	2		1						
	Salicaceae	Salix	humilis	Prairie Willow	6		1						
	Caprifoliaceae	Symphoricarpos	occidentalis	Snowberry	5		1						
	Caprifoliaceae	Viburnum	lentago	Nannyberry	4		1						
plant	Caprifoliaceae	Viburnum	rafinesquianum	Downy Arrow-wood	7		1						
	Caprifoliaceae	Viburnum	trilobum	American Highbush Cranberry	6		1						
	Vitaceae	Vitis	riparia	Frost Grape	2		1	79	12	1			
	Rufaceae	Zanthoxylum	americanum	Prickly Ash	3		1						
WOODY - FUTURE										IV	Constancy		
Timing and which species tbd													
	Aceraceae	Acer	negundo	Ash-leaved Maple	0			1	13	1			
	Betulaceae	Betula	papyrifera	Paper Birch	3			6	25	1			
	Juglandaceae	Carya	ovata *	Shagbark Hickory	5			20	56	1			
	Oleaceae	Fraxinus	americana	White Ash	5			-	6	1			
	Oleaceae	Fraxinus	pennsylvanica	Green Ash	2			2	6	1			
	Juglandaceae	Juglans	nigra	Black Walnut	3			-	6	1			
	Cupressaceae	Juniperus	virginiana	Eastern Redcedar	3			1	6	1			
	Salicaceae	Populus	grandidentata	Big-tooth Aspen	3			1	6	1			
	Salicaceae	Populus	tremuloides	Quaking Aspen	2			5	31	1			
	Rosaceae	Prunus	serotina	Black Cherry	3			7	19	1			
	Fagaceae	Quercus	alba	White Oak	7			62	63	1			
	Fagaceae	Quercus	ellipsoidalis	Hill's Oak	5			9	25	1			
	Fagaceae	Quercus	macrocarpa *	Bur Oak	5			105	88	1			
	Fagaceae	Quercus	rubra	Red Oak	5			4	13	1			
	Fagaceae	Quercus	velutina	Black Oak	5			72	88	1			
	Tiliaceae	Tilia	americana	Basswood	5			1	13	1			
	Ulmaceae	Ulmus	americana	American Elm	3			-	6	1			
	Ulmaceae	Ulmus	rubra	Slippery Elm	4			2	19	1			

SHRUBLAND COVER

This is the herbaceous seeding that precedes dense shrub planting, for all forest types, and works as a cover against erosion. It is a novel mix, to gracefully accompany the shrubs. Many of the species will diminish with eventual shade. It includes species from grasslands and woodlands. The following criteria affected the mix:

Minimizing presence of C4 grasses, not necessarily because the shrubs won't compete (they should) but to anticipate the herbaceous changes the shrub cover will induce.

Skew to early successional savanna herbs

Inclusion of some woodland herbs that grow in transitional habitats

Choosing more readily commercially available seed (not requiring collection effort)

Influenced by savanna species and also Curtis bracken grassland species

	oz/acre (tbd)	Family	Genus	Species	Common	C
COMPOSITES						
	seed	Asteraceae	Aster	laevis	Smooth Blue Aster	6
	seed	Asteraceae	Aster	novae-angliae	New England Aster	3
	seed	Asteraceae	Aster	sagittifolius	Arrow-leaved Aster	3
	seed	Asteraceae	Aster	shortii	Short's Aster	7
	seed	Asteraceae	Aster	umbellatus	Flat-top Aster	6
	seed	Asteraceae	Bidens	frondosus	Common Beggar's Ticks	1
	seed	Asteraceae	Erigeron	annuus	Daisy Fleabane	0
	seed	Asteraceae	Erigeron	strigosus	Daisy Fleabane	2
	seed	Asteraceae	Eupatorium	purpureum	Purple Joe Pye Weed	6
	seed	Asteraceae	Euthamia	graminifolia	Grass-leaved Goldenrod	4
	seed	Asteraceae	Helianthus	decapetalus	Pale Sunflower	7
	seed	Asteraceae	Helianthus	strumosus	Rough-leaved Sunflower	4
	seed	Asteraceae	Heliopsis	helianthoides	False Sunflower	5
	seed	Asteraceae	Parthenium	integrifolium	Wild Quinine	8
	seed	Asteraceae	Rudbeckia	hirta	Black-eyed Susan	4
	seed	Asteraceae	Rudbeckia	triloba	Brown-eyed susan	4
	seed	Asteraceae	Solidago	flexicaulis	Zigzag Goldenrod	6
	seed	Asteraceae	Solidago	nemoralis	Gray goldenrod	4
	seed	Asteraceae	Solidago	ulmifolia	Elm-leaved Goldenrod	5
LEGUMES						
	seed	Fabaceae	Amphicarpa	bracteata	Hog Peanut	5
	seed	Fabaceae	Desmodium	glutinatum	Cluster-leaf Tick-trefoil	6
	seed	Fabaceae	Lathyrus	venosus	Forest Pea	6
GRASSES						
	seed	Poaceae	Bromus	altissimus	Ear-leaved Brome	6
	seed	Poaceae	Bromus	kalmii	Prairie Brome	8

	seed	Poaceae	Danthonia	spicata	Poverty Oat Grass	4
	seed	Poaceae	Elymus	canadensis	Canada Wild Rye	4
	seed	Poaceae	Elymus	hystrix	Bottlebrush Grass	6
	seed	Poaceae	Elymus	trachycaulus	Slender Wheat Grass	4
	seed	Poaceae	Elymus	villosus	Silky Wild Rye	6
	seed	Poaceae	Elymus	virginiana	Virginia Wild Rye	6
	seed	Poaceae	Festuca	subverticillata	Nodding Fescue	4
	seed	Poaceae	Stipa	spartea	Needle Grass	9
OTHER						
	seed	Rosaceae	Agrimonia	gryposepala	Common Agrimony	2
	seed	Liliaceae	Allium	canadense	Wild Garlic	4
	seed	Ranunculaceae	Anemone	cylindrica	Thimbleweed	6
	seed	Ranunculaceae	Anemone	virginiana	Tall Anemone	5
	seed	Apocynaceae	Apocynum	androsaemifolium	Spreading Dogbane	2
	seed	Ranunculaceae	Aquilegia	canadensis	Columbine	5
	seed	Asclepidaceae	Asclepias	exaltata	Poke Milkweed	7
	seed	Asclepiadaceae	Asclepias	syriaca	Common Milkweed	1
	seed	Campanulaceae	Campanula	americana	Tall Bellflower	4
	seed	Cyperaceae	Carex	bicknellii	Bicknell's Sedge	6
	plant/seed	Cyperaceae	Carex	pennsylvanica	Pennsylvania Sedge	3
	seed	Rosaceae	Fragaria	virginiana	Wild Strawberry	1
	seed	Geraniaceae	Geranium	maculatum	Wild Geranium	4
	seed	Rosaceae	Geum	canadense	White Avens	2
	seed	Juncaceae	Juncus	tenuis	Path Rush	1
	seed	Lamiaceae	Monarda	fistulosa	Bergamot	3
	seed	Onagraceae	Oenothera	biennis	Evening Primrose	1
	seed	Apiaceae	Osmorhiza	claytonii	Sweet Cicely	5
	seed	Polemoniaceae	Phlox	divaricata	Blue Phlox	7
	seed	Polemoniaceae	Phlox	pilosa	Prarie Phlox	7
	seed	Rosaceae	Potentilla	simplex	Old-field Five-fingers	2
	seed	Ranunculaceae	Ranunculus	abortivus	Little-leaf Buttercup	1
	seed	Apiaceae	Sanicula	gregaria	Black snakeroot	3
	seed	Apiaceae	Taenidia	integerrima	Yellow Pimpernel	7
	seed	Lamiaceae	Teucrium	canadense	Germander	4
	seed	Caprifoliaceae	Triosteum	aurantiacum	Early Horse Gentian	5
	seed	Caprifoliaceae	Triosteum	perfoliatum	Late Horse Gentian	5
	seed	Scrophulariaceae	Veronicastrum	virginicum	Culver's Root	6
	seed	Apiaceae	Zizia	aurea	Golden Alexander	7

**SHRUBLAND
FOR DRY-MESIC
FOREST**

Oaks dominate. The southern dry forest zones will skew to the upper slopes and those with more sun exposure. This habitat is important to provide the logical transition from prairie and savanna to forest in the landscape. In addition to *Quercus alba* (White Oak), *Quercus velutina* (Black Oak), *Quercus macrocarpa* (Bur Oak), *Quercus rubra* (Red Oak), *Quercus muhlenbergii* (Chinquapin Oak), characteristic target trees include *Prunus serotina* (Black Cherry), *Carya ovata* (Shagbark Hickory), *Ulmus americana* (American Elm).

Shrubland components in restoration trajectory may include the brambles, *Rubus* spp, *Cornus racemosa* (Gray Dogwood), *Corylus americana* (American Hazelnut), *Ceanothus americana* (New Jersey Tea), *Rhus glabra* (Smooth Sumac). It is characteristic of this forest type that the shrub layer can be well-developed, but from fewer species. That is the kind of characteristic pattern we build upon in this restoration.

For eventual southern dry forest

	#/acre -	Family	Genus	Species	Common	C	Presence	Ave Freq	Curtis
SHRUBS									
	yes	Rhamnaceae	Ceanothus	americanus	New Jersey Tea	9			
		Celastraceae	Celastrus	scandens	American Bittersweet	3	37 - 67	5 - 8	1
	yes	Cornaceae	Cornus	racemosa *	Gray Dogwood	2	87 - 70	24 - 12	1
	yes	Betulaceae	Corylus	americana *	Hazelnut	5	87 - 82	16 - 11	1
		Rosaceae	Crataegus	chrysoarpa	Fireberry Hawthorn	4			
		Rosaceae	Crataegus	crus-galli	Cockspur Hawthorn	3			
		Rosaceae	Crataegus	flabellata	Fan-leaf Hawthorn	4			
		Rosaceae	Crataegus	pedicellata	Scarlet Hawthorn	4			
		Ericaceae	Gaultheria	procumbens	Wintergreen	6			
		Ericaceae	Gaylussacia	baccata	Huckleberry	6			
		Vitaceae	Parthenocissus	quinquefolia	Virginia Creeper	5			
		Vitaceae	Parthenocissus	vitacea *	Woodbine	4	87 - 85	29 - 23	1
		Rosaceae	Physocarpus	opulifolius	Ninebark	6			
		Rosaceae	Prunus	americana	Wild Plum	3			
		Rosaceae	Prunus	pensylvanica	Pin Cherry	4			
		Rosaceae	Prunus	virginiana	Choke Cherry	3			
		Rutaceae	Ptelea	trifoliata	Hop-tree	6			
		Anacardiaceae	Rhus	aromatica	Fragrant Sumac	10			
	yes	Anacardiaceae	Rhus	glabra	Smooth Sumac	2			
	yes	Anacardiaceae	Rhus	typhina	Staghorn Sumac	2			
		Saxifragaceae	Ribes	americanum	American Black Currant	4			
	yes	Saxifragaceae	Ribes	cynosbati *	Prickly Gooseberry	3	50 - 74	5 - 4	1
		Saxifragaceae	Ribes	missouriense	Smooth Gooseberry	4	27 -		1
		Rosaceae	Rosa	blanda	Early Wild Rose	4	67 -	4 -	1
		Rosaceae	Rosa	carolina	Pasture Rose	4	67 -	4 -	1
	yes	Rosaceae	Rubus	alleggheniensis *	Common Blackberry	2	67 - 52	16 - 8	1
		Rosaceae	Rubus	flagellaris	Common Dewberry	3			
	yes	Rosaceae	Rubus	idaeus	Red Raspberry	3	53 - 48	11 - 10	1

		Rosaceae	Rubus	occidentalis	Black Raspberry	2			
		Salicaceae	Salix	humilis	Prairie Willow	6			
		Caprifoliaceae	Symphoricarpos	occidentalis	Snowberry	5			
		Ericaceae	Vaccinium	angustifolium	Low-bush Blueberry	4			
		Caprifoliaceae	Viburnum	rafinesquianum	Downy Arrow-wood	7	- 32		1
		Vitaceae	Vitis	riparia	Frost Grape	2	- 43	3 -	1
		Rufaceae	Zanthoxylum	americanum	Prickly Ash	3	- 48	- 4	1
TREES							IV	Constancy	
		Aceraceae	Acer	negundo	Ash-leaved Maple	0	2 -	10 - 3	
		Aceraceae	Acer	rubrum	Red Maple	3	2 - 5	14 - 25	
		Aceraceae	Acer	saccharum	Sugar Maple	5	- 23	2 - 47	
		Betulaceae	Betula	alleghaniensis	Yellow Birch	7	-	- 1	
		Betulaceae	Betula	papyrifera	Paper Birch	3	- 1	8 - 12	
	yes	Juglandaceae	Carya	cordiformis	Bitternut Hickory	6	2 - 5	16 - 43	
	yes	Juglandaceae	Carya	ovata *	Shagbark Hickory	5	8 - 8	53 - 49	
		Ulmaceae	Celtis	occidentalis	Hackberry	4	-	2 -	
		Fagaceae	Fagus	grandifolia	Beech	8	-	- 23	
		Oleaceae	Fraxinus	americana *	White Ash	5	1 - 12	10 - 44	
		Oleaceae	Fraxinus	nigra	Black Ash	8	-	- 5	
		Oleaceae	Fraxinus	pennsylvanica	Green Ash	2	1 - 1	2 - 4	
		Juglandaceae	Juglans	cinerea	Butternut	6	- 3	6 - 25	
		Juglandaceae	Juglans	nigra *	Black Walnut	3	3 - 3	34 - 25	
	yes	Betulaceae	Ostrya	virginiana	Ironwood	5	1 - 9	10 - 47	
		Salicaceae	Populus	grandidentata	Big-tooth Aspen	3	1 - 7	18 - 32	
		Salicaceae	Populus	tremuloides	Quaking Aspen	2	2 -	16 - 3	
	maybe	Rosaceae	Prunus	serotina *	Black Cherry	3	23 - 6	86 - 60	
	yes	Fagaceae	Quercus	alba *	White Oak	7	80 - 52	88 - 92	
		Fagaceae	Quercus	bicolor	Swamp White Oak	7	-	- 1	
	yes	Fagaceae	Quercus	ellipsoidalis	Hill's Oak	5	11 -	10 -	
	yes	Fagaceae	Quercus	macrocarpa *	Bur Oak	5	26 - 2	64 - 19	
		Fagaceae	Quercus	muhlenbergii *	Chinquapin Oak	8	3 -	2 -	
		Fagaceae	Quercus	rubra *	Red Oak	5	22 - 104	54 - 97	
	yes	Fagaceae	Quercus	velutina	Black Oak	5	98 - 5	92 - 34	
		Tiliaceae	Tilia	americana	Basswood	5	1 - 29	10 - 77	
		Ulmaceae	Ulmus	americana	American Elm	3	4 - 4	24 - 30	
		Ulmaceae	Ulmus	rubra	Slippery Elm	4	4 - 17	20 - 61	
	yes	Ulmaceae	Ulmus	thomasii	Rock Elm	6	-	- 3	

**SHRUBLAND
FOR MESIC
FOREST**

Locally familiar. Characteristic target tree species for us include *Acer saccharum* (Sugar Maple), *Tilia Americana* (Basswood), *Quercus rubra* (Red Oak), *Carya cordiformis* (Bitternut Hickory), *Ostrya virginiana* (Ironwood). There are a number of characteristic herbaceous species that have a broader ecological amplitude and can be established a bit earlier than those reliant on full development of soil; these include *Geranium maculatum* (Wild Geranium), *Hydrophyllum virginianum* (Virginia Waterleaf), *Podophyllum peltatum* (Mayapple), etc.

Shrubland components in restoration trajectory may include our *Ribes* spp (Gooseberries), *Corylus americana* (American Hazelnut), *Viburnum lentago* (Nannyberry), *Viburnum prunifolium* (Blackhaw), *Viburnum rafinesquianum* (Downy Arrowwood), *Cornus racemosa* (Gray Dogwood).

Of the high river terraces within this habitat, we suggest one planted with a grove of *Viburnum lentago* (as seen on a river terrace along the Menomonee River in Menomonee Falls), and one planted with a break of *Sambucus canadensis* (as seen in the UW Field Station forest).

For eventual southern mesic forest

	#/acre -	Family	Genus	Species	Common	C	Presence	Ave Freq	Curtis
SHRUBS		Rosaceae	Amelanchier	sanguinea	Round-leaved Serviceberry	7			
		Celastraceae	Celastrus	scandens	American Bittersweet	3	38	2	1
		Ranunculaceae	Clematis	virginiana	Virgin's Bower	4			
	yes	Cornaceae	Cornus	alternifolia	Pagoda Dogwood	7			
	yes	Cornaceae	Cornus	racemosa *	Gray Dogwood	2			
	yes	Betulaceae	Corylus	americana	Hazelnut	5			
		Rosaceae	Crataegus	calpodendron	Sugar Hawthorn	5			
		Rosaceae	Crataegus	chrysoarpa	Fireberry Hawthorn	4			
		Rosaceae	Crataegus	flabellata	Fan-leaf Hawthorn	4			
		Rosaceae	Crataegus	mollis	Downy Hawthorn	2			
		Rosaceae	Crataegus	pedicellata	Scarlet Hawthorn	4			
	yes	Hamamelidaceae	Hamamelis	virginiana	Witch-hazel	7			
		Caprifoliaceae	Lonicera	dioica	Mountain Honeysuckle	7			
		Caprifoliaceae	Lonicera	reticulata	Grape Honeysuckle	6			
		Vitaceae	Parthenocissus	quinquefolia	Virginia Creeper	5			
		Vitaceae	Parthenocissus	vitacea	Woodbine	4	65	13	1
	yes	Rosaceae	Prunus	virginiana	Choke Cherry	3			
	yes	Rutaceae	Ptelea	trifoliata	Hop-tree	6			
	yes	Anacardiaceae	Rhus	glabra	Smooth Sumac	2			
	yes	Saxifragaceae	Ribes	americanum	American Black Currant	4			
	yes	Saxifragaceae	Ribes	cynosbati	Prickly Gooseberry	3	46	3	1
	yes	Saxifragaceae	Ribes	missouriense	Smooth Gooseberry	4			
	yes	Caprifoliaceae	Sambucus	pubens	Red-berried Elder	5			
	yes	Caprifoliaceae	Sambucus	canadensis	Elderberry	3			
	yes	Staphyleaceae	Staphylea	trifolia *	Bladdernut	7	16		1
	yes	Caprifoliaceae	Symphoricarpos	occidentalis	Snowberry	5			
		Caprifoliaceae	Viburnum	acerifolium	Maple-leaved Viburnum	7			
	yes	Caprifoliaceae	Viburnum	lentago	Nannyberry	4			

	yes	Caprifoliaceae	Viburnum	prunifolium	Blackhaw	8					
	yes	Caprifoliaceae	Viburnum	rafinesquianum	Downy Arrow-wood	7					
		Caprifoliaceae	Viburnum	trilobum	American Highbush Cranberry	6					
		Vitaceae	Vitis	riparia	Frost Grape	2					
		Rufaceae	Zanthoxylum	americanum	Prickly Ash	3					
TREES							IV	Constancy			
	yes	Aceraceae	Acer	rubrum	Red Maple	3	1	4			
		Aceraceae	Acer	saccharum *	Sugar Maple	5	126	100			
		Betulaceae	Betula	papyrifera	Paper Birch	3	1	6			
		Betulaceae	Carpinus	caroliniana	Musclewood	6					
	yes	Juglandaceae	Carya	cordiformis *	Bitternut Hickory	6	5	47			
	yes	Juglandaceae	Carya	ovata	Shagbark Hickory	5	2	19			
	yes	Ulmaceae	Celtis	occidentalis	Hackberry	4	2	13			
		Fagaceae	Fagus	grandifolia	Beech	8	30	34			
		Oleaceae	Fraxinus	americana	White Ash	5	7	49			
		Oleaceae	Fraxinus	nigra	Black Ash	8	1	6			
		Oleaceae	Fraxinus	pennsylvanica	Green Ash	2		4			
	yes	Caesalpiniaceae	Gymnocladus	dioica *	Kentucky Coffee Tree	7	2	6			
	yes	Juglandaceae	Juglans	cinerea *	Butternut	6	5	26			
		Juglandaceae	Juglans	nigra	Black Walnut	3	1	9			
	yes	Betulaceae	Ostrya	virginiana *	Ironwood	5	16	79			
	yes	Salicaceae	Populus	grandidentata	Big-tooth Aspen	3	1	13			
	yes	Rosaceae	Prunus	serotina	Black Cherry	3	2	32			
		Fagaceae	Quercus	alba	White Oak	7	6	38			
		Fagaceae	Quercus	bicolor	Swamp White Oak	7		2			
		Fagaceae	Quercus	macrocarpa	Bur Oak	5		2			
	yes	Fagaceae	Quercus	rubra	Red Oak	5	21	55			
		Fagaceae	Quercus	velutina	Black Oak	5		2			
	yes	Tiliaceae	Tilia	americana *	Basswood	5	34	96			
	yes	Ulmaceae	Ulmus	americana	American Elm	3	5	40			
	yes	Ulmaceae	Ulmus	rubra *	Slippery Elm	4	26	72			
	yes	Ulmaceae	Ulmus	thomasi	Rock Elm	6		2			

**SHRUBLAND
FOR NORTHERN
MESIC FOREST**

Here is an opportunity in support of habitat diversity goals, where conditions permit, to plant for a more northern forest. Characteristic target tree species in addition to our southern mesic species would include *Tsuga canadensis* (Hemlock) and *Betula allegheniensis* (Yellow Birch). Characteristic herbaceous species may be longest wait of any habitat here for conditions to develop.

Shrubland components in restoration trajectory may include *Corylus cornuta* (Beaked Hazelnut), *Diervilla lonicera* (Northern Bush Honeysuckle), *Sambucus canadensis* (Elderberry), *Viburnum lentago* (Nannyberry), *Viburnum acerfolium* (Mapleleaf Viburnum), *Cornus rugosa* (Roundleaved Dogwood).

For eventual northern mesic forest

	#/acre -	Family	Genus	Species	Common	C	Presence	Ave Freq	Curtis
SHRUBS									
		Cornaceae	Cornus	alternifolia	Pagoda Dogwood	7			
	yes	Cornaceae	Cornus	stolonifera	Red-osier Dogwood	3			
	yes	Cornaceae	Cornus	rugosa	Round-leaved Dogwood	7			
	yes	Betulaceae	Corylus	cornuta	Beaked Hazelnut	5	41	4	1
	yes	Caprifoliaceae	Diervilla	lonicera	Northern Bush Honeysuckle	6			
		Thymelaeaceae	Dirca	palustris *	Leatherwood	9			
	yes	Celastraceae	Euonymus	atropurpurea	Eastern Wahoo	7			
		Ericaceae	Gaultheria	procumbens	Wintergreen	6			
		Ericaceae	Gaylussacia	baccata	Huckleberry	6			
	yes	Hamamelidaceae	Hamamelis	virginiana	Witch-hazel	7			
		Caprifoliaceae	Lonicera	dioica	Mountain Honeysuckle	7			
		Caprifoliaceae	Lonicera	reticulata	Grape Honeysuckle	6			
		Vitaceae	Parthenocissus	quinquefolia	Virginia Creeper	5			
		Vitaceae	Parthenocissus	vitacea	Woodbine	4			
		Saxifragaceae	Ribes	americanum	American Black Currant	4			
		Saxifragaceae	Ribes	cynosbati	Prickly Gooseberry	3			
	yes	Caprifoliaceae	Sambucus	canadensis	Elderberry	3			
	yes	Caprifoliaceae	Sambucus	pubens *	Red-berried Elder	5			
		Eleagnaceae	Sheperdia	canadensis	Buffaloberry	7			
		Caprifoliaceae	Symphoricarpos	occidentalis	Snowberry	5			
	yes	Taxaceae	Taxus	canadensis	American Yew	10			
	yes	Caprifoliaceae	Viburnum	acerifolium	Maple-leaved Viburnum	7			
	yes	Caprifoliaceae	Viburnum	lentago	Nannyberry	4			
		Caprifoliaceae	Viburnum	rafinesquianum	Downy Arrow-wood	7			
		Caprifoliaceae	Viburnum	trilobum	American Highbush Cranberry	6			
		Vitaceae	Vitis	riparia	Frost Grape	2			
		Rufaceae	Zanthoxylum	americanum	Prickly Ash	3			
TREES							IV	Constancy	
	yes	Aceraceae	Acer	rubrum	Red Maple	3	5	34	

	yes	Aceraceae	Acer	spicatum	Mountain Maple	6		4		
		Aceraceae	Acer	saccharum	Sugar Maple	5	107	97		
	yes	Betulaceae	Betula	alleghaniensis	Yellow Birch	7	29	77		
	yes	Betulaceae	Betula	papyrifera	Paper Birch	3	5	33		
		Betulaceae	Carpinus	caroliniana	Musclewood	6				
	yes	Juglandaceae	Carya	cordiformis	Bitternut Hickory	6	1	6		
		Juglandaceae	Carya	ovata	Shagbark Hickory	5		1		
		Fagaceae	Fagus	grandifolia *	Beech	8	40	41		
		Oleaceae	Fraxinus	americana	White Ash	5	4	37		
		Oleaceae	Fraxinus	nigra	Black Ash	8	1	16		
		Juglandaceae	Juglans	cinerea	Butternut	6		9		
		Betulaceae	Ostrya	virginiana	Ironwood	5	7	64		
	yes	Pinaceae	Pinus	strobus	White Pine	5	2	10		
		Salicaceae	Populus	grandidentata	Big-tooth Aspen	3	1	7		
	yes	Salicaceae	Populus	tremuloides	Quaking Aspen	2	1	3		
	yes	Rosaceae	Prunus	pensylvanica	Pin Cherry	4		1		
		Rosaceae	Prunus	serotina	Black Cherry	3	1	7		
		Fagaceae	Quercus	alba	White Oak	7		4		
		Fagaceae	Quercus	ellipsoidalis	Hill's Oak	5		1		
		Fagaceae	Quercus	muhlenbergii	Chinquapin Oak	8				
	yes	Fagaceae	Quercus	rubra	Red Oak	5	7	27		
	yes	Cupressaceae	Thuja	occidentalis	Northern White Cedar	9	2	17		
		Tiliaceae	Tilia	americana	Basswood	5	16	69		
		Pinaceae	Tsuga	canadensis *	Hemlock	8	79	73		
		Ulmaceae	Ulmus	americana	American Elm	3	7	37		
	yes	Ulmaceae	Ulmus	rubra	Slippery Elm	4	3	19		

LOW PRAIRIE / FRESH WET MEADOW COMPLEX

The low prairie / fresh wet meadow complex is essentially the 100-year flood zone in the river cuts, extending to the toe of slope. Conditions are dependent on pending details of the toe of slope stabilization measures and profile details (e.g. terraces). In any case, this zone has interaction with river flows as well as some degree of groundwater connection, and must cope with flashiness, siltation, and a significant weed seed vector along the river corridor.

In the lowest zones most exposed to flashiness and siltation, a limited number of species tolerant of the tough conditions are included. On its margins, still occasionally flooded and with roots reaching groundwater, the low meadow should smell minty and look umbellicious, and those species are important components in the mix. There is a cultural/educational desire to keep this a grassland community, to express a large grassland complex that extends to grasslands on the adjoining mounds. Shrubs do remain an important but lesser component, and will be located to microsite conditions.

This mix requires a sandy loam - 50% sand or sandy loam and 50% compost.

Since this zone is to be planted, a planting plan will be developed, or alternatively, the land manager with landscape architect can stake out on-site, adapting to microsite conditions.

Species could be contract grown to ensure appropriate genotype and availability.

	oz/ac	Family	Genus	Species	Common	
WET TERRACES						
GRASS/SEDGE/RUSH						
	plant	Poaceae	Calamagrostis	canadensis	Blue Joint Grass	5
	plant	Poaceae	Glyceria	striata	Fowl Manna Grass	4
	plant	Poaceae	Leersia	oryzoides	Rice Cut Grass	3
	plant	Cyperaceae	Scirpus	atrovirens	Dark Green Rush	3
	plant	Sparganiaceae	Sparganium	eurycarpum	Bur-Reed	5
OTHER HERBS						
	seed	Asteraceae	Bidens	cernuus	Nodding Beggar-ticks	4
	seed	Polygonaceae	Polygonum	pennsylvanicum	Pennsylvania Smartweed	1
	seed	Polygonaceae	Polygonum	punctatum	Dotted Smartweed	5
SLOPES, MARGINS						
GRASS/SEDGE/RUSH						
	plant	Poaceae	Bromus	ciliatus	Fringed Brome	7
	plant	Poaceae	Calamagrostis	canadensis	Blue Joint Grass	5
	plant	Cyperaceae	Carex	Bebbii	Bebb's Sedge	4
	plant	Cyperaceae	Carex	comosa	Bristly Sedge	5
	plant	Cyperaceae	Carex	crisatella	Crested Oval Sedge	4
	plant	Cyperaceae	Carex	granularis	Limestone Meadow Sedge	3
	plant	Cyperaceae	Carex	grayi	Common Bur Sedge	7
	plant	Cyperaceae	Carex	grisea	Wood Gray Sedge	4
	plant	Cyperaceae	Carex	hystericina	Bottlebrush Sedge	3
	plant	Cyperaceae	Carex	lupulina	Common Hop Sedge	6
	plant	Cyperaceae	Carex	normalis	Intermediate Sedge	5

	plant	Cyperaceae	Carex	stipata	Common Fox Sedge	2
	plant	Cyperaceae	Carex	tenera	Narrow-leaved Oval Sedge	4
	plant	Cyperaceae	Carex	vulpinoidea	Brown Fox Sedge	2
	seed	Cyperaceae	Cyperus	strigosus	False Nut Sedge	1
	plant	Poaceae	Cinna	arundinacea	Common Wood Reed	5
	plant	Poaceae	Elymus	villosus	Silky Wild Rye	6
	plant	Poaceae	Elymus	virginicus	Virginia Wild Rye	6
	plant	Poaceae	Glyceria	striata	Fowl Manna Grass	4
	plant	Poaceae	Hierchloe	hirta (odorata)	Northern Sweet Grass	7
	plant	Juncaceae	Juncus	dudleyi	Dudley's Rush	4
	plant	Juncaceae	Juncus	torreyi	Torrey's Rush	4
		Poaceae	Muhlenbergia	glomerata	Marsh muhly	9
	plant	Poaceae	Spartina	pectinata	Prairie Cord Grass	5
OTHER HERBS						
	plant	Ranunculaceae	Anemone	canadensis	Canada Anemone	4
	plant	Apiaceae	Angelica	atropurpurea	Angelica	6
	plant	Asclepiadaceae	Asclepias	incarnata	Swamp Milkweed	5
	plant	Asteraceae	Aster	umbellatus	Flat-top Aster	6
	plant	Asteraceae	Cacalia	suaveolens	Sweet Indian Plantain	8
	plant	Scrophulariaceae	Chelone	glabra	Turtlehead	7
	plant	Asteraceae	Eupatorium	maculatum	Joe Pye Weed	4
	plant	Asteraceae	Helenium	autumnale	Sneezeweed	4
	plant	Asteraceae	Helianthus	giganteus	Giant Sunflower	4
	plant	Asteraceae	Helianthus	grosseratus	Saw-tooth Sunflower	2
	seed	Apiaceae	Heracleum	lanatum	American Cow-parsnip	3
	plant	Hypericaceae	Hypericum	pyramidatum	Giant St. John's-wort	6
	seed	Balsaminaceae	Impatiens	capensis	Jewelweed	2
		Fabaceae	Lathyrus	palustris	Marsh Pea	5
	plant	Lobeliaceae	Lobelia	siphilitica	Great Blue Lobelia	5
	plant	Lamiaceae	Lycopus	americana	Common Water-horehound	4
		Polypodiaceae	Matteucia	struthiopteris	Ostrich Fern	5
	plant	Lamiaceae	Mentha	arvensis	Wild Mint	3
		Scrophulariaceae	Mimulus	ringens	Monkey Flower	6
	plant	Dryopteridaceae	Onoclea	sensibilis	Sensitive Fern	8
		Osmundaceae	Osmunda	cinnamomea	Cinnamon Fern	7
	seed	Apiaceae	Oxypalis	rigidior	Cowbane	6
	plant	Lamiaceae	Pycnanthemum	virginianum	Mountain Mint	6
	plant	Asteraceae	Rudbeckia	laciniata	Golden Glow	6
	plant	Apiaceae	Sium	suave	Water Parsnip	5
	plant	Asteraceae	Solidago	giganta	Late Goldenrod	3
	plant	Verbenaceae	Verbena	hastata	Blue Vervain	3
SHRUBS						
Live-staking has been successfully used as a method on the north bank.						
	plant	Betulaceae	Alnus	incana rugosa	Speckled Alder	4
	plant	Rubiaceae	Cephalanthus	occidentalis	Buttonbush	9

	plant	Cornaceae	Cornus	amomum	Silky Dogwood	4
	plant	Cornaceae	Cornus	stolonifera	Red Osier Dogwood	3
	plant	Salicaceae	Salix	bebbiana	Bebb's Willow	7
		Salicaceae	Salix	discolor	Pussy Willow	2
		Rosaceae	Spiraea	alba	White Meadowsweet	4

SHRUBSWAMP / PRAIRIE STORMWATER SWALE

The shrubswamp / prairie stormwater swale mix is for the swales running largely along the south edge of the property. This zone collects and infiltrates stormwater anticipated by the VPII team to arrive from the RR and the south, but also anticipated to be without water quality concerns; the zone thus copes with alternating wet and dry conditions, although the clay cap will retain some deep moisture between rains.

The shrubs and the tall expansive herbs in this mix (like Euthamia, Pycnanthemum...) help provide a natural visual buffer from the fence and RR as well. The mix is heavy on composites and on sedges; the narrow habitat provides a great teaching opportunity with a variety of sedges, and if stormwater flows are significant, the sedges/rushes tend to not flatten.

This mix requires a sandy loam - 50% sand or sandy loam and 50% compost.

Since this zone is to be planted, a planting plan will be developed, or alternatively, the land manager with landscape architect can stake out on-site, adapting to microsite conditions and creating patterns (e.g., the rhizomatic growth of many carices tends to create patches, which can be expressed in initial planting; clonal behavior of the dogwoods can be expressed as well). The number of carices available commercially continues to increase. For those species with plants not commercially available of appropriate ecotype, seed can generally be substituted, or plants can be contract grown ahead of time.

	quantity	Family	Genus	Species	Common	C
COMPOSITES						
	plant	Asteraceae	Aster	novae-angliae	New England Aster	3
	seed	Asteraceae	Bidens	frondosus	Common Beggar-ticks	1
	plant	Asteraceae	Eupatorium	maculatum	Joe Pye Weed	4
	plant	Asteraceae	Eupatorium	perfoliatum	Common Boneset	6
	plant	Asteraceae	Euthamia	graminifolia	Grass-leaved Goldenrod	4
	plant	Asteraceae	Helianthus	tuberosus	Jerusalem-artichoke	2
	plant	Asteraceae	Helenium	autumnale	Sneezeweed	4
	plant	Asteraceae	Liatris	pycnostachya	Prairie Blazing Star	7
	seed	Asteraceae	Rudbeckia	hirta	Black-eyed Susan	4
	plant	Asteraceae	Rudbeckia	triloba	Brown-eyed Susan	4
	plant	Asteraceae	Solidago	ridellii	Ridell's Goldenrod	7
	plant	Asteraceae	Vernonia	fasciculata	Ironweed	5
LEGUMES						
GRASSES						
	plant (small amt)	Poaceae	Andropogon	gerardii	Big Bluestem	4
	plant	Poaceae	Bromus	ciliatus	Fringed Brome	7
	seed	Poaceae	Elymus	canadensis	Canada Wild Rye	4
	seed	Poaceae	Elymus	virginicus	Virginia Wild Rye	6
	seed (if native genotype)	Poaceae	Panicum	virgatum	Switch Grass	4
	plant	Poaceae	Spartina	pectinata	Prairie Cordgrass	5
	plant (small amt)	Poaceae	Sorghastrum	nutans	Indian Grass	5
OTHER						
	plant	Cyperaceae	Carex	bicknellii	Bicknell's Sedge	6

	plant	Cyperaceae	Carex	brevior	Plains Oval Sedge	3
	plant	Cyperaceae	Carex	comosa	Bristly Sedge	5
	plant	Cyperaceae	Carex	crisatella	Crested Oval Sedge	4
	plant	Cyperaceae	Carex	granularis	Limestone Meadow Sedge	3
	plant	Cyperaceae	Carex	lupulina	Common Hop Sedge	6
	plant	Cyperaceae	Carex	molesta	Field Oval Sedge	2
	plant	Cyperaceae	Carex	normalis	Intermediate Sedge	5
	plant	Cyperaceae	Carex	stipata	Common Fox Sedge	2
	plant	Cyperaceae	Carex	tenera	Narrow-leaved Oval Sedge	4
	plant	Cyperaceae	Carex	vulpinoidea	Brown Fox Sedge	2
	plant	Juncaceae	Juncus	dudleyi	Dudley's Rush	4
	plant	Juncaceae	Juncus	tenuis	Path Rush	1
	plant	Juncaceae	Juncus	torreyi	Torrey's Rush	4
	plant	Lamiaceae	Pycnanthemum	virginianum	Mountain Mint	6
	plant	Ranunculaceae	Thalictrum	dasycarpum	Purple Meadow Rue	4
	plant	Verbenaceae	Verbena	hastata	Blue Vervain	3
	plant	Scrophulariaceae	Veronicastrum	virginicum	Culver's Root	6
	plant	Apiaceae	Zizia	aurea	Golden Alexander	7
WOODY						
	plant	Ranunculaceae	Clematis	virginiana	Virgin's Bower	4
	plant	Cornaceae	Cornus	amomum	Silky Dogwood	4
	plant	Cornaceae	Cornus	stolonifera	Redosier Dogwood	3
	plant	Salicaceae	Salix	bebbiana	Bebb's Willow	7
	plant	Salicaceae	Salix	discolor	Pussy Willow	2
	plant	Salicaceae	Salix	exigua	Sandbar Willow	2
	plant	Rosacea	Spiraea	alba	Meadowsweet	4

2011 February 09 / Landscapes of Place, LLC			
ANNUAL COVER			
Annual cover seed mix, to be used in early fall 2012 in all areas.			
lb/acre	Genus	Species	Common
tbd	Avena	Sativa	Oats
tbd	Fagopyrum	esculentum	Buckwheat
tbd	Linum	usitatissimum	Common Flax
tbd	Lolium	multiflorum	Annual Rye
tbd	Chamaecrista	fasciculata	Partridge Pea

2011 February 09 / Landscapes of Place, LLC

#1 PRAIRIE-COMPATIBLE COVER

Perennial/annual cover seed mix, to be used in delayed zones whose planned target community is prairie.

lbs/acre	Genus	Species	Common
4	Phleum	pratense	Timothy
4	Festuca	rubra var. commutata	Chewing's Fescue
2	Festuca	rubra var. lanuginosa	Creeping Red Fescue
4	Lolium	multiflorum	Annual Ryegrass
2	Trifolium	pratense	Red Clover
2	Trifolium	repens	Ladino Clover
5	Linum	usitatissimum	Common Flax

2011 February 09 / Landscapes of Place, LLC

#2 PRAIRIE-COMPATIBLE COVER

Perennial/annual cover seed mix, to be used in delayed zones whose planned target community is forest.

lbs/acre	Genus	Species	Common
5	Fagopyrum	esculentum	Buckwheat
2	Lolium	perenne	Perennial Ryegrass
1.5	Medicago	sativa	Alfalfa
6	Phleum	pratense	Timothy
1	Trifolium	hybridum	Alsike Clover
1	Trifolium	repens	Ladino Clover
1.5	Trifolium	pratense	Red Clover