Floodplain Forest Native Plant Communities

Hannah Texler, Plant Ecology Supervisor, Minnesota Biological Survey
September 2015
Summary

- Native plant community definition
- Minnesota’s classification
- Floodplain forest native plant communities in the Upper Mississippi River System
- Plant adaptations of floodplain forest plants
- Biodiversity significance of UMRS floodplain forests
Native Plant Communities

Definition: A group of native plants that interact with each other and the surrounding environment in ways not greatly altered by humans or by introduced plant or animal species.

These groups of native plants form recognizable units, such as an oak forest, a prairie, or a marsh, that tend to repeat across the landscape and over time.
Native Plant Community Classifications in the Upper Mississippi River Area

- Each state has its own native plant community classification
- National Vegetation Classification (NVC) developed by Natureserve
- I will use Minnesota’s classification
- A good future project: compile a native plant community map of the entire UMRS using the NVC
Minnesota’s Native Plant Community Classification

A Minnesota DNR collaborative effort of:

The Ecological Land Classification Program, Division of Forestry
The Division of Ecological and Water Resources

Based on over 5000 “releve” vegetation plots

Gives us a common language

Resource

“MHn44”
Described in field guides
Organized by ecological provinces
## Classification Hierarchy

**Figure 2.** The NPC classification is hierarchical and has six levels.

<table>
<thead>
<tr>
<th>Classification Level</th>
<th>Dominant Factors</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SYSTEM GROUP</strong></td>
<td>Vegetation structure &amp; hydrology</td>
<td>Upland Forest &amp; Woodland Systems</td>
</tr>
<tr>
<td><strong>ECOLOGICAL SYSTEM</strong></td>
<td>Ecological processes</td>
<td>Fire-Dependent Forest/Woodland</td>
</tr>
<tr>
<td><strong>FLORISTIC REGION</strong></td>
<td>Climate &amp; paleohistory</td>
<td>Central</td>
</tr>
<tr>
<td><strong>NPC Class</strong></td>
<td>Local environmental conditions</td>
<td>Central Dry Pine Woodland</td>
</tr>
<tr>
<td><strong>NPC Type</strong></td>
<td>Canopy dominants, substrate, or finer environmental conditions</td>
<td>Jack Pine - (Yarrow) Woodland</td>
</tr>
<tr>
<td><strong>NPC Subtype</strong></td>
<td>Finer distinctions in canopy dominants, substrate, or environmental conditions</td>
<td>Ericaceous Shrub</td>
</tr>
</tbody>
</table>
Breaking down the codes

MHc36  FDs27  FPs63
FFs59   APn81  WFs57
Context for UMRS Floodplain Forest
Native Plant Communities

• Part of a larger landscape of bluffs and terraces with many native plant community types

From blufftop....

....along the slopes

....to the river
Presettlement and current vegetation

Presettlement Vegetation

Current native plant communities: <11 percent of the landscape
Context for UMRS Floodplain Forest Native Plant Communities

- The floodplain is a matrix that includes emergent marsh, shrub swamp, and sedge meadow as well as floodplain forest. Much diversity was eliminated by locks and dams, making remaining high quality areas significant.

- Floodplain forest native plant communities occur on terraces as well as in the deeper floodplains, and have differences in structure and native plant community composition.
UMRS Floodplain Forest
Native Plant Communities

- **Southern Floodplain Forest class (FFs68) - S3 (vulnerable to extirpation)**

- One type: Silver Maple - (Virginia Creeper) Floodplain Forest (FFs68a)
  - Annually flooded sites on the Mississippi River
  - Canopy strongly dominated by silver maple with occasional green ash, cottonwood, or American elm
  - Subcanopy and shrub layers sparse
  - Climbing plants and vines important: wild grape, moonseed, climbing poison ivy
  - Ground layer sparse in spring due to inundation and scouring by floodwaters, becoming variable by midsummer (up to 50% cover)
    - Annual plants and flood-tolerant perennials
    - Common species: false nettle, cleavers, Ontario aster, Virginia wild rye, cut grasses, cattail sedge, wood nettle
UMRS Floodplain Forest
Native Plant Communities

- **Southern Terrace Forest class (FFs59)**
- **Characteristics:**
  - Occasionally flooded sites along terraces of large rivers to small streams; flooding occurs only in wet years or following major rains
  - Soil drainage dependent on height of terrace above river level
  - Climbing plants and vines sparse to patchy
  - Ground-layer cover interrupted to continuous
    - Dominated by perennial forbs
    - Common species: wood nettle, Virginia waterleaf, spotted touch-me-not, tall coneflower, stinging nettle, cleavers
Southern Terrace Forest types:

Silver Maple – Green Ash – Cottonwood Terrace Forest (FFs59a) – S3

- **Characteristics:**
  - Occurs on Mississippi River terraces
  - Common canopy trees: American elm, silver maple, box elder, green ash (occasional cottonwood and hackberry)
  - Most of these species common in the understory
  - Important shrubs: wahoo, red-berried elder, hawthorns, prickly gooseberry
  - Important groundlayer plants: Ontario aster, jack-in-the-pulpit, Maryland black snakeroot, Clayton’s sweet cicely, early meadow-rue, virgin’s bower
Southern Terrace Forest types:

Swamp White Oak Terrace Forest (FFs59b) – S1 (critically imperiled)

- **Characteristics:**
  - Occurs on terraces of the Mississippi River
  - Swamp white oak occurs in the canopy and often in the understory
  - Other common canopy and understory trees: green ash, hackberry, silver maple, bitternut hickory, American elm, basswood, with occasional cottonwood and river birch
  - Important shrubs: prickly ash, wild black currant, grey dogwood
  - Important vines: climbing poison ivy, greenbrier, wild grape, Canada moonseed
  - Important ground layer species: Virginia knotweed, sensitive fern, rough bedstraw, obedient plant, false nettle, Virginia wild rye, nodding fescue.
  - Fire may have been important in maintaining this type.
Southern Terrace Forest types:

Elm - Ash – Basswood Terrace Forest (FFs59c) – S2 (imperiled)

- **Characteristics:**
  - Occurs on terraces of small to large rivers, such as the Root, Cannon, and Zumbro Rivers.
  - Common canopy trees: American elm, box elder, basswood, black ash, red elm.
  - Occasional canopy trees: cottonwood, hackberry, silver maple, black walnut, rock elm.
  - Important shrubs: Missouri gooseberry, chokecherry.
  - Important ground-layer species: Virginia waterleaf, cleavers, stinging nettle, anisernoot, blue phlox, false rue anemone, stemless blue violets, cow parsnip, Virginia bluebells, mayapple, yellow trout lily.
Adaptations – trees

- Tolerate prolonged flooding: silver maple, green ash, cottonwood, black willow
- Tolerate moderate flooding: hackberry, bur oak, swamp white oak, American elm, river birch, box elder
- Many trees stay dormant during flooding
- Stems sprout following damage
- Seed germination immediate (no dormancy)
- Seeds survive inundation
Adaptations – herbaceous plants

- Annuals and biennials have seeds that survive flooding (10% of plants in floodplains are annuals or biennials - more than all other native plant communities)
- Many perennial herbs form large dense mats
Blufflands: a center of natural diversity

- 39% of all state-listed rare species in Minnesota occur in the Paleozoic Plateau (blufflands)
  - more than in any other part of the state
Rare plants of floodplain forests

- At least 13 state-listed rare plant species occur in floodplain forests in southeastern Minnesota

<table>
<thead>
<tr>
<th>Plants</th>
<th>Scientific Name</th>
<th>Class</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Water-pennywort</td>
<td><em>Hydrocotyle americana</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
<tr>
<td>Catchfly Grass</td>
<td><em>Leersia lenticularis</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
<tr>
<td>Cattail Sedge</td>
<td><em>Carex typhina</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
<tr>
<td>Davis' Sedge</td>
<td><em>Carex davisii</em></td>
<td>vascular plant</td>
<td>threatened</td>
</tr>
<tr>
<td>Glade Mallow</td>
<td><em>Napaea dioica</em></td>
<td>vascular plant</td>
<td>threatened</td>
</tr>
<tr>
<td>Ovate-leaved Skullcap</td>
<td><em>Scutellaria ovata var. versicolor</em></td>
<td>vascular plant</td>
<td>threatened</td>
</tr>
<tr>
<td>Purple Rocket</td>
<td><em>Iodanthus pinnatifidus</em></td>
<td>vascular plant</td>
<td>endangered</td>
</tr>
<tr>
<td>Raven's Foot Sedge</td>
<td><em>Carex crus-corvi</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
<tr>
<td>Sessile-flowered Cress</td>
<td><em>Rorippa sessiliflora</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
<tr>
<td>Snow Trillium</td>
<td><em>Trillium nivale</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
<tr>
<td>Snowy Campion</td>
<td><em>Silene nivea</em></td>
<td>vascular plant</td>
<td>threatened</td>
</tr>
<tr>
<td>Three-leaved Coneflower</td>
<td><em>Rudbeckia triloba var. triloba</em></td>
<td>vascular plant</td>
<td>special concern</td>
</tr>
</tbody>
</table>
Newly listed in Minnesota

- Green dragon (*Arisaema dracontium*)
- Found only in floodplain forests
Rare animals of floodplain forests

At least eight state-listed animal species occur in floodplain forests in southeastern Minnesota.

<table>
<thead>
<tr>
<th></th>
<th>Scientific Name</th>
<th>Category</th>
<th>Conservation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bald Eagle</td>
<td><em>Haliaeetus leucocephalus</em></td>
<td>bird</td>
<td>special concern</td>
</tr>
<tr>
<td>Blanchard's Cricket Frog</td>
<td><em>Acris blanchardi</em></td>
<td>amphibian</td>
<td>endangered</td>
</tr>
<tr>
<td>Blanding's Turtle</td>
<td><em>Emydoidea blandingii</em></td>
<td>reptile</td>
<td>threatened</td>
</tr>
<tr>
<td>Cerulean Warbler</td>
<td><em>Setophaga cerulea</em></td>
<td>bird</td>
<td>special concern</td>
</tr>
<tr>
<td>Louisiana Waterthrush</td>
<td><em>Parkesia motacilla</em></td>
<td>bird</td>
<td>special concern</td>
</tr>
<tr>
<td>Massasauga</td>
<td><em>Sistrurus catenatus</em></td>
<td>reptile</td>
<td>endangered</td>
</tr>
<tr>
<td>Red-shouldered Hawk</td>
<td><em>Buteo lineatus</em></td>
<td>bird</td>
<td>special concern</td>
</tr>
<tr>
<td>Woodland Vole</td>
<td><em>Microtus pinetorum</em></td>
<td>mammal</td>
<td>special concern</td>
</tr>
</tbody>
</table>
Finger Lakes – Weaver Dunes Area

Native Plant Communities, Rare Species, and Sites of Biodiversity Significance

FFs59b – Swamp White Oak Terrace Forest

Copyright 2015, State of Minnesota, Department of Natural Resources (DNR)

Rare Features Data were provided by the Division of Ecological and Water Resources, Minnesota DNR, and were current as of September 14, 2015. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.
Stewardship and protection

- Keep context and biodiversity in mind – protect and manage significant natural areas
- Look for opportunities to restore native plant communities on appropriate parts of the landscape