

5th National Conference on Ecosystem Restoration

Policy & Partnership for Ecosystem Restoration

Alliance for the Great Lakes



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Lake Michigan Watershed

Ecosystem Partnership Coordinator

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Agenda

1. Background

- Alliance for the Great Lakes
- Lake Michigan Watershed Ecosystem Partnership
- Great Lakes Restoration Initiative

2. Ravine Project '11-'13

- On-the-Ground Restoration (public & private)
- Local Capacity Building:
 - ✓ Tool #1: Rapid Assessments
 - ✓ Tool #2: Residential Guide

3. Land Use Practices and Policies

The Alliance at a Glance

Mission

To conserve and restore the world's largest freshwater resource using policy, education and local efforts, ensuring a healthy Great Lakes and clean water for generations of people and wildlife.

Supporters

More than 12,000 supporters throughout the region back the Alliance's efforts in a variety of ways.

Why Now?

The Great Lakes contain nearly 20 percent of the earth's surface fresh water, providing drinking water to more than 40 million people. Threats to the Great Lakes today are many, however, ranging from pollution and invasive species to wasteful water use and climate change. All demand our attention and commitment.

A Community that Cares for the Great Lakes

Formed in 1970, the Alliance for the Great Lakes is the oldest independent Great Lakes citizens' organization in North America. Our community today includes...

- Individuals
- Businesses
- Elected officials
- Teachers and students
- Environmental advocates
- Policy leaders
- Recreational enthusiasts
- Civic organizations



Photo: McKinley Middle School students, Racine, WI

The Alliance is the only independent policy organization working solely to improve the Great Lakes every day.



Lake Michigan Watershed Ecosystem Partnership

Watershed Partnership

- Organized by IL DNR
- Alliance coordinated since 2007
- Coalition of public, private, & non-profit
 - ✓ Build consensus
 - ✓ Prioritize science-based actions
 - ✓ Focus resources
 - ✓ **Maximize benefits to the environment and local communities**



Watershed Partnership

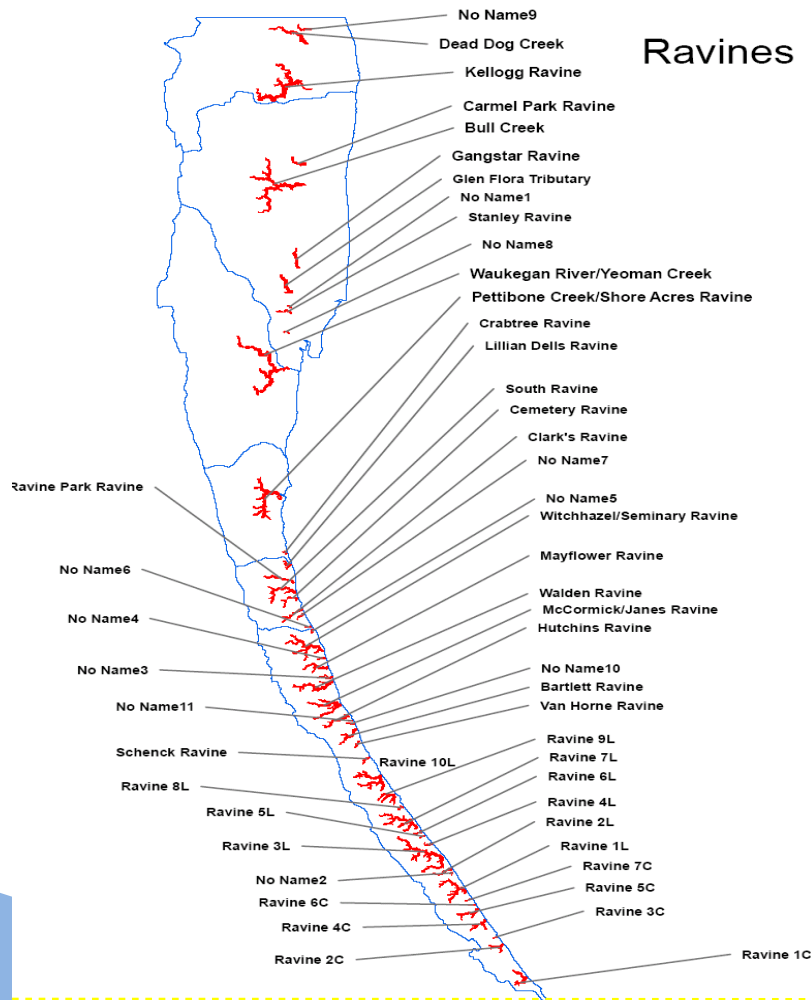
Priority natural area: Lake Michigan ravines

Strategies:

- **On the-ground conservation & protection**
.....
- Watershed planning & implementation
- Climate risk assessment and adaptation
- Green infrastructure implementation

Watershed Partnership

Wisconsin



IL Coastal Ravine Communities

Winthrop Harbor

Zion

Beach Park

Waukegan

North Chicago

Lake Bluff

Lake Forest

Highland Park

Winnetka

Chicago

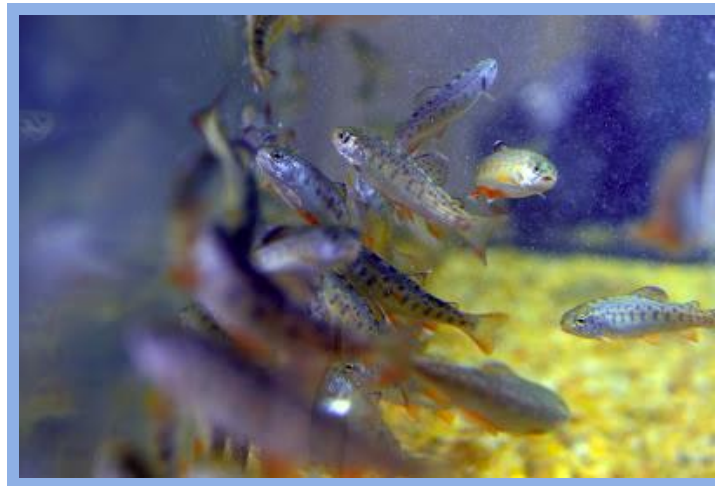
Watershed Partnership

Why Ravines? Environmental reasons...

- ❖ Unique coastal habitat
- ❖ Illinois' only natural drainage system to Lake Michigan



Dog Violet, Viola conspersa;
Credit: Ravine Restoration Toolkit



Rainbow Trout, released in to ravines as part of Park District of Highland Park's Trout in the Classroom project



Ravine at Ft. Sheridan, Credit: Lake County Forest Preserves

Watershed Partnership

Why Ravines? Quality of life reasons...

- ❖ Protects drinking water quality
- ❖ Protects property values
- ❖ Improves recreational amenities
- ❖ Priceless educational opportunities



Park District of Highland Park staff teaching children about the ravines.



Recreational kayaker. Credit: Llyod Degrane



Exposed water use line

Watershed Partnership

Ravine Stressors

- ❖ **Erosion**, stormwater runoff enters the ravines at high speeds and in large volumes, causing erosion of ravine slopes and beds, and sending valuable soil, seeds, and plants out to Lake Michigan.



Watershed Partnership

Ravine Stressors

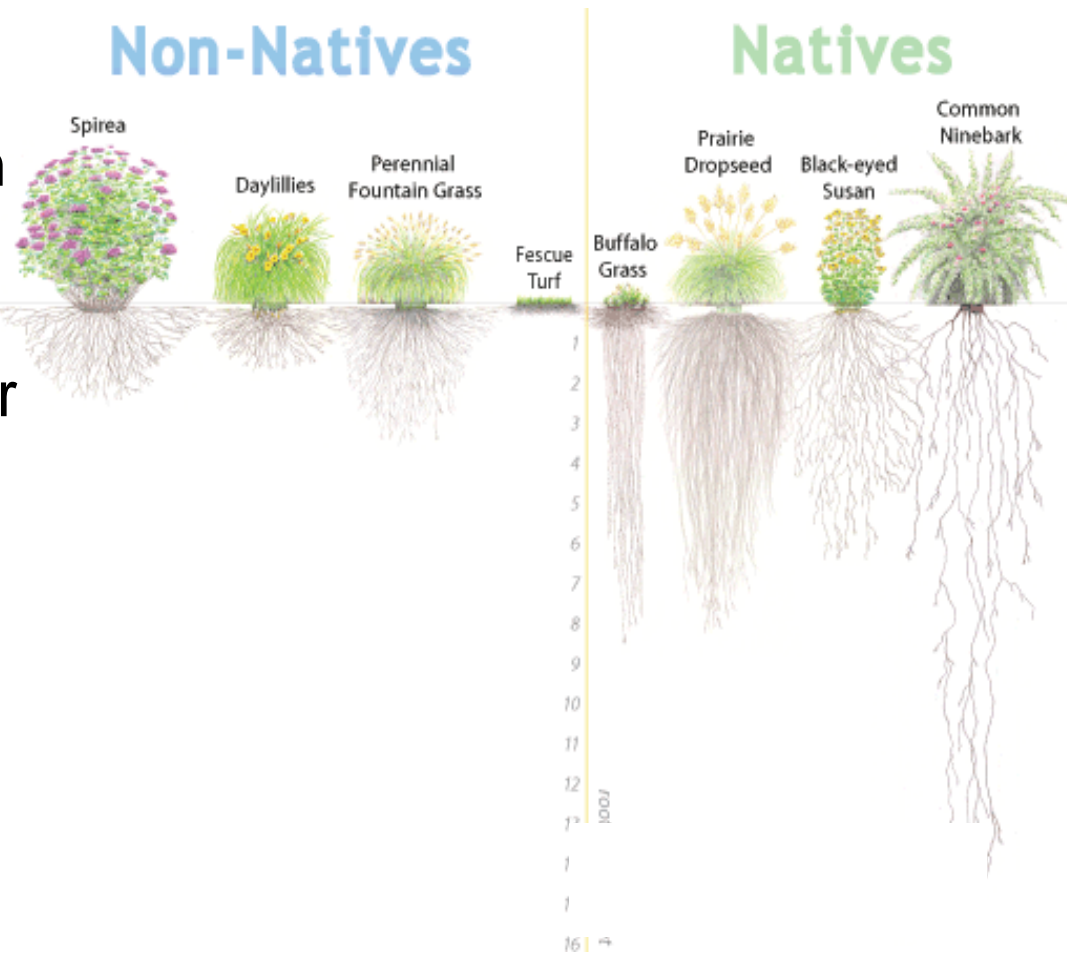
❖ **Non-Point Source Pollution**, as water flows across hard surfaces and lawns it picks up many pollutants (pesticides, cleaners, oil, fertilizers, detergents, lawn and animal waste, soil, heat), which makes the water unsuitable aquatic life.



Watershed Partnership

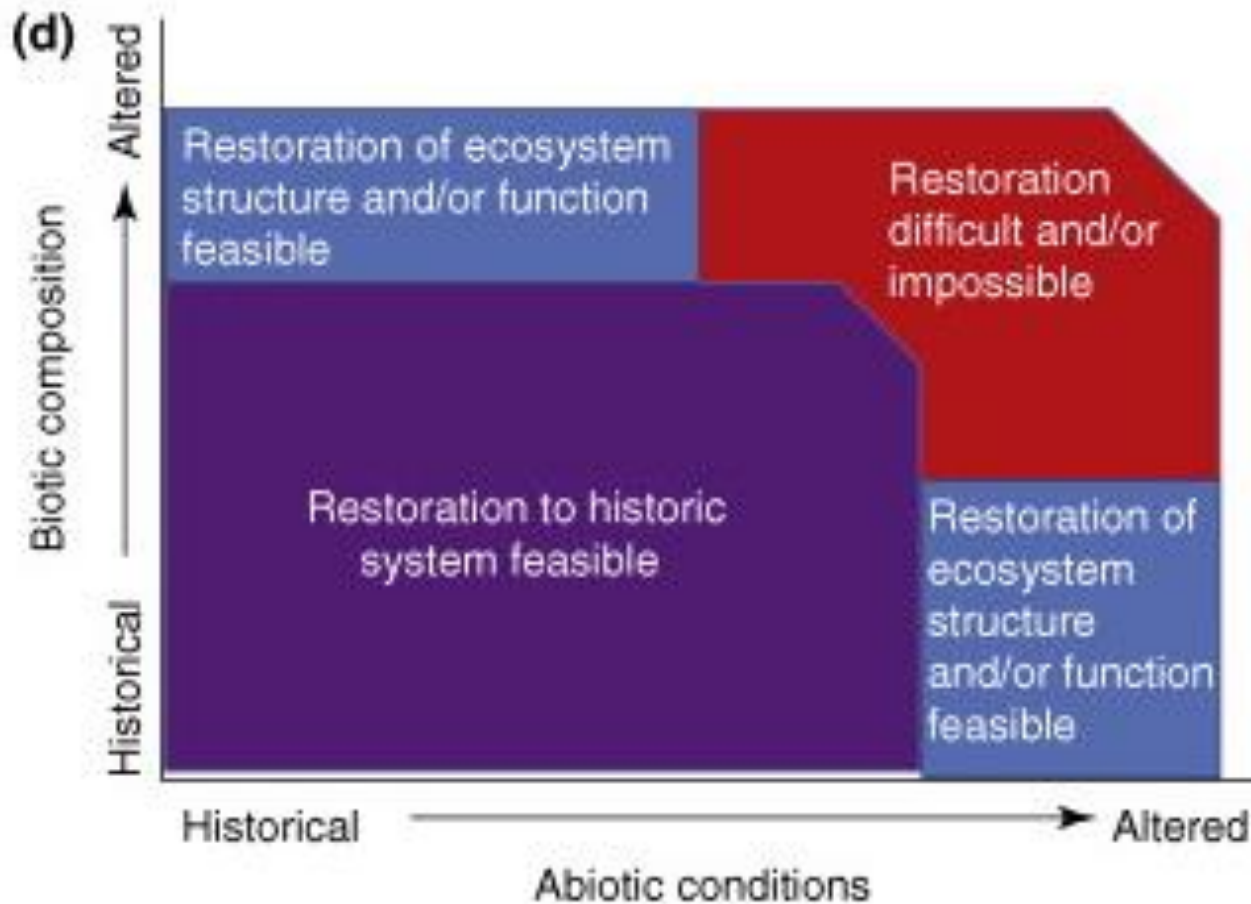
Ravine Stressors

❖ **Invasive Species,** many invasive species can thrive in poor soil, and once established, they can outcompete native plant for space, light, and nutrients, reducing habitat biodiversity and resiliency to other stressors like climate change.



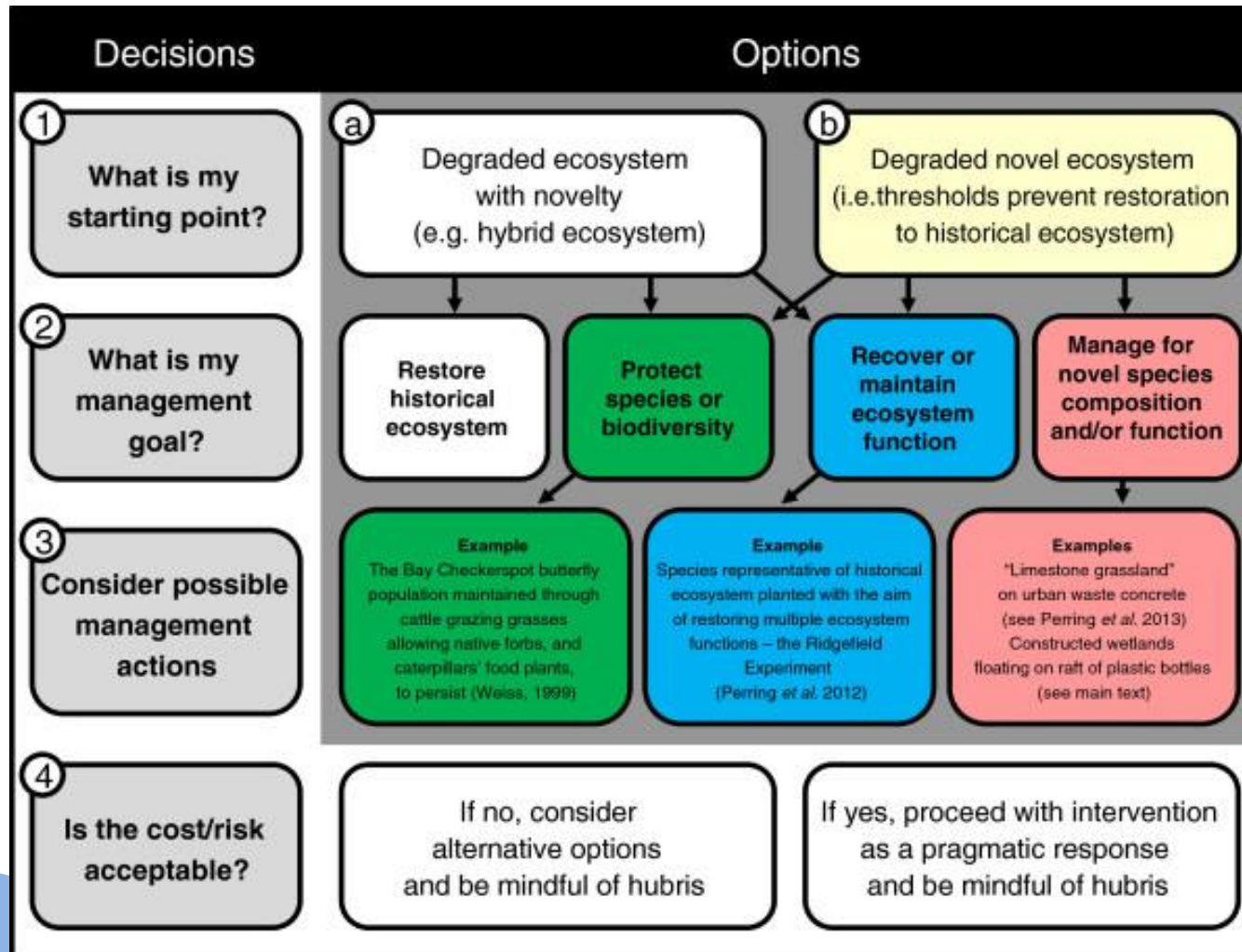
Watershed Partnership

Theory



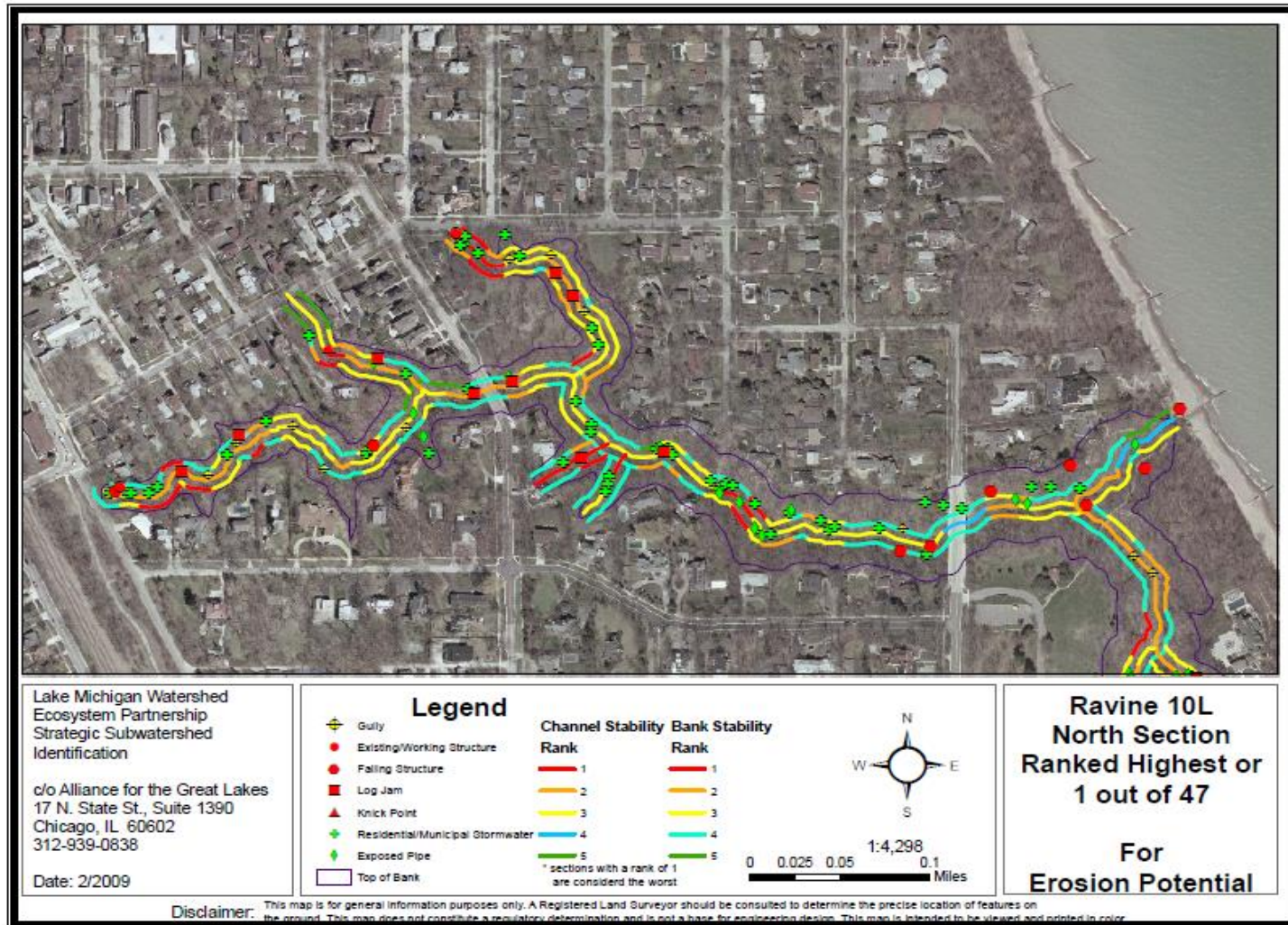
Watershed Partnership

Theory



Watershed Partnership

2009 baseline data, erosion, stability, stormwater





Funding for the Illinois Ravine Communities

Project Name	Projects	Amount
1. Coastal Wetlands Restoration, Chiwaukee Prairie	2	\$1,748,022
2. Dune and Beach Restoration for Beach Health	1	\$349,934
3. Dead Dog Creek Restoration	1	\$832,850
4. Lake County Ravine #8, IL	3	\$1,312,000
5. Millard Park, IL	3	\$178,000
6. <u>Northeast Illinois Ravine Restoration and Monitoring</u>	1	\$150,000
7. Ravine and Fish Habitat Restoration at Millard Park	1	\$200,000
8. Rosewood Park, IL	2	\$420,000
9. Yeoman Park Restoration, IL	1	\$9,000
10. Zion Beach and Ridge, IL/WI	2	\$864,000
TOTALS	17	\$6,063,806

Ravine Restoration Project, 2011-2013



Ravine Restoration Project

1. Publically held lands - \$80,000
2. Residential demonstration project - \$20,000
3. Local Capacity Building - \$50,000
 - Tool #1: Rapid Assessment
 - Tool #2: Residential Landowner Manual



Ravine Restoration Project

Goals

1. Implement on-the-ground projects and policies with measurable environmental benefits
2. Strengthen the local knowledge network & increase local capacity to implement ravine conservation and protection actions

Ravine Restoration Project

Strategies

1. Develop suite of standardized assessment and restoration practices with other “bridging” organizations (Bidwell, 2013)
 - large public land managers/owners of ravines
 - local institutions with a restoration focus
2. Develop a customizable tool for local communities to target where and what practices should be implemented

Ravine Restoration Partners

Lake County Forest Preserves

Debbie Maurer

Assistant Manager of Natural Area & Ecologist

Ken Klick

Restoration Ecologist



Lake County Forest Preserves

Preservation, Restoration, Education & Recreation

Ravine Restoration Partners

Openlands

Linda Masters

Restoration Specialist

Aimee Collins

Lakeshore Preserve Site Manager



openlands

conserving nature for life

Ravine Restoration Partners

Chicago Botanic Garden

Susanne Masi

Plant Conservation, Manager of Regional Floristics

Rachel Goad

Plants of Concern Program Research Assistant



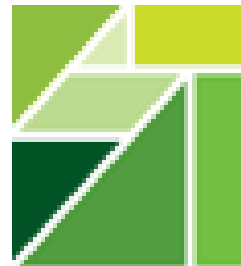
CHICAGO BOTANIC GARDEN

Ravine Restoration Partners

Illinois Natural History Survey

Ed Dewalt

Research Scientist



**ILLINOIS NATURAL
HISTORY SURVEY**
PRAIRIE RESEARCH INSTITUTE

Ravine Restoration Partners

Northwater Consulting

Jeff Boeckler

*Principle Water Resource Specialists / Environmental
Planner*



Northwater

Consulting

Ravine Restoration Partners

Conservation Research Institute

Gerould (Jerry) Wilhelm, Ph.D.

Director of Research, Principle Botanist/Ecologist

CONSERVATION
RESEARCH INSTITUTE

www.conservationresearchinstitute.org



On-the-Ground Ravine Restoration: Janes & Hutchinson Ravines



Lake County Forest Preserves

Preservation, Restoration, Education & Recreation

Janes and Hutchinson Ravines



Lake County Forest Preserves

Preservation, Restoration, Education & Recreation

Janes and Hutchinson Ravines



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Janes and Hutchinson Ravines



Lake County Forest Preserves

Preservation, Restoration, Education & Recreation

ENSURING A LIVING RESOURCE FOR ALL GENERATIONS

Ravine Rapid Assessments

Rapid Assessments

WHO can do the rapid assessments?

- Municipal / park district staff
- Consultants
- Interns
- Stewards

Rapid Assessments

WHY should you do a Rapid Assessment?

Take a *first look* at ravine stability/erosion, water quality, and vegetation

- Locate valued or degraded areas for restoration or study
- Collect baseline data before and after a restoration project
- Document erosion that is threatening property or rare plants
- Provide homeowners with information
- Evaluate best management practices (e.g. green infrastructure, outreach/education)

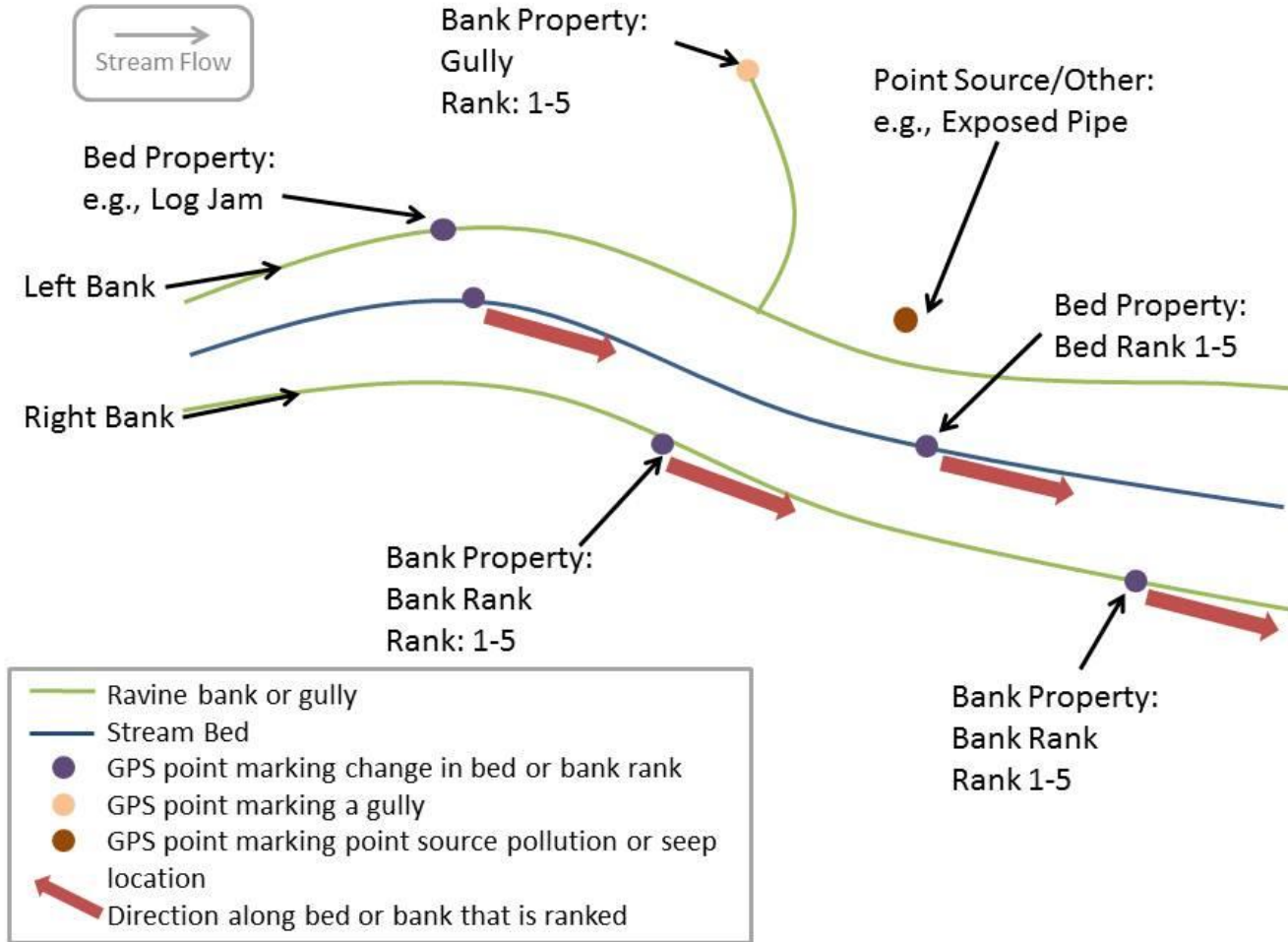
Rapid Assessments

WHEN & HOW?

The **field guides** are a standardized methodology to assess *stability, water quality, and vegetation* and include:

- Protocols / process
- Data collection forms / spreadsheets, and
- Photo identification guides

Rapid Assessment – Stability Guide



Rapid Assessment – Stability Guide



Rapid Assessment – Stability Guide



Rapid Assessments - Water Quality Guide

- Macroinvertebrates used as indicators
 - Long-lived guardians
 - Found in all streams
 - Simple to recognize
 - Long history of use in area

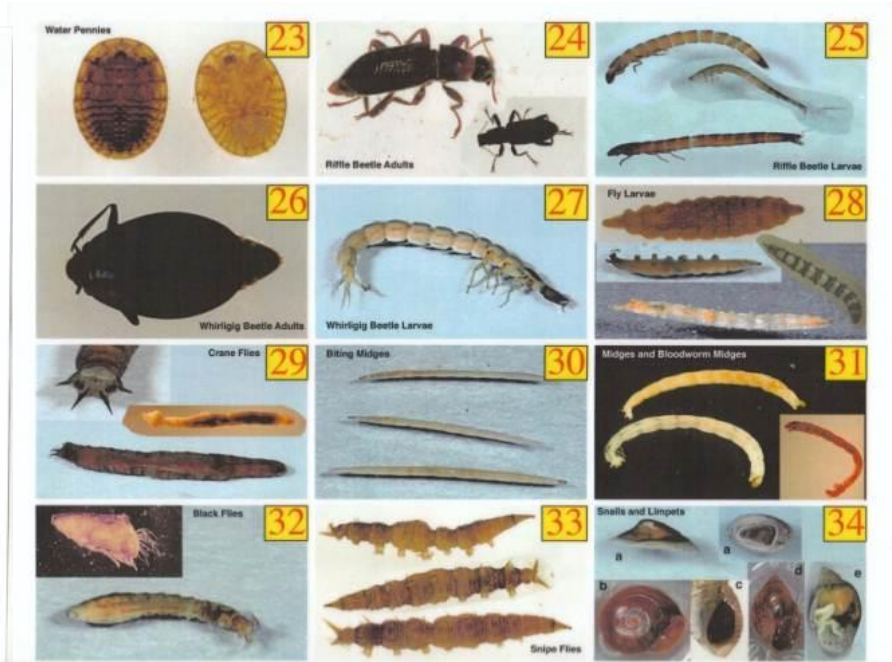


Rapid Assessments - Water Quality Guide

- Land manager/owner led sampling
 - Sample in May annually
 - Simple procedure – riffle and 100 ct
 - Simple worksheet
 - Laminated field guide
 - Quality assurance-INHS and AGL



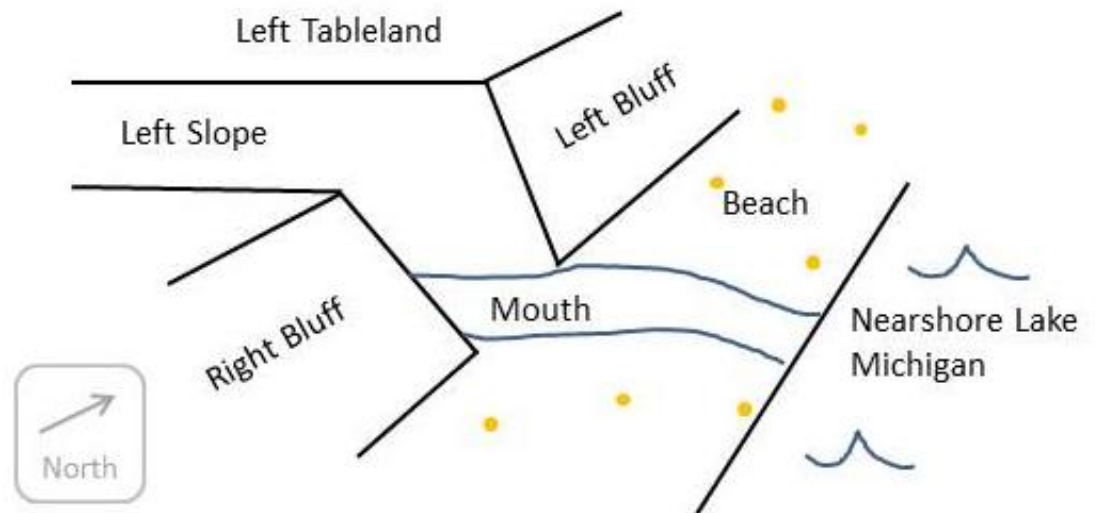
Rapid Assessments - Water Quality Guide



Rapid Assessment Vegetation Guide

Sample vegetation (native & invasive) across habitats

- Slope
- Tableland
- Bluff
- Beach



Two assessment times capture seasonal variation

- Spring & Late Summer

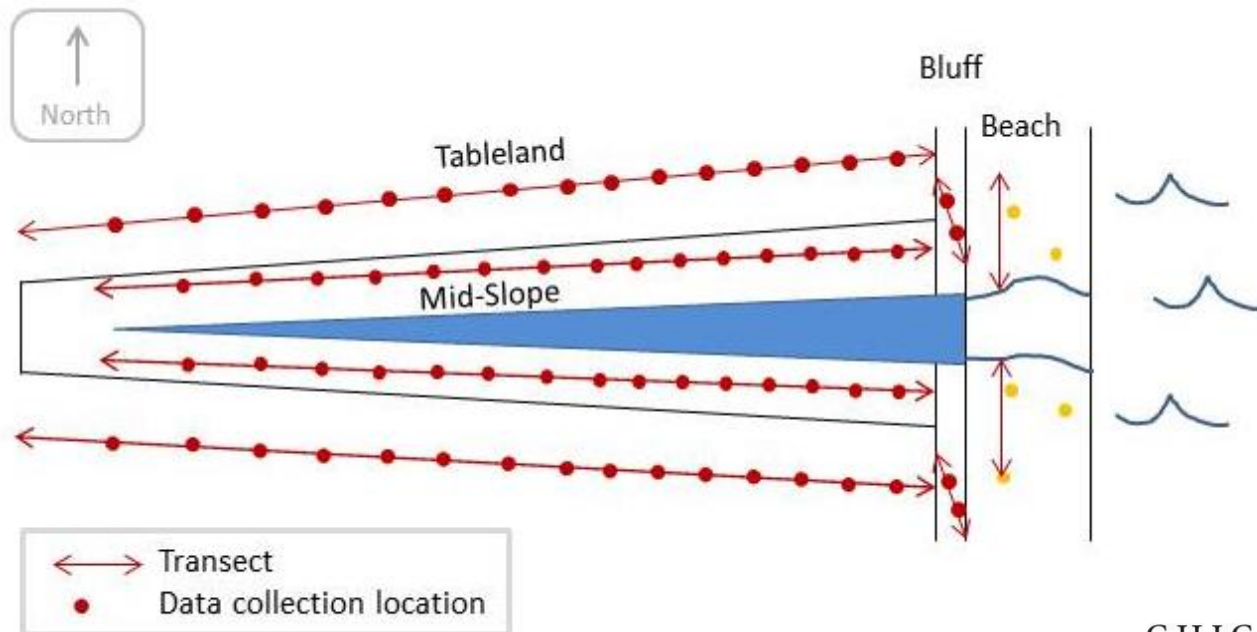
Rapid Assessment Vegetation Guide

66 points of assessment (Slope, Table, and Bluff)

- Estimate % cover of species in 10 foot radius

2 areas of assessment (Beach)

- Estimate % cover within 50 feet north and south of stream



Rapid Assessment Vegetation Guide

Rapid Color Guide will help assessors identify:

- Common native species and Plants of Concern
- Invasive species



Rapid Assessment Vegetation Guide

CANOPY SPECIES



1 *Acer negundo*
BOX ELDER: Opposite leaves of 3-7 leaflets. Stems and bark furrowing with age. Young plants resemble poison ivy.



2 *Acer saccharum*
SUGAR MAPLE: Opposite, 5-lobed leaves. Paired fruits rough, gray-brown bark. 5 lobed leaves lighter on undersides.



3 *Betula papyrifera* ★
PAPER BIRCH: White papyery bark with dark horizontal stripes.



9 *Tilia americana*
BASSWOOD: Large heart-shaped leaves. Leaf margins serrated, leaf bases asymmetrical. Fragrant, cream colored flowers in early summer. Fruits attached to parachute formed by persistent bracts.



10 *Robinia pseudoacacia* ☒
BLACK LOCUST: Stout thorns at bases of leaf stalks. Fragrant clusters of white flowers. Long, straight, leathery seed pods.



SHRUB AND VINE SPECIES



4 *Carya cordiformis*
MUSTARD BUD: Bark thin with small platy scales or shallow ridges & fissures. End buds slender and fuzzy yellow. Compound leaves of 7-9 leaflets.



5 *Fragaria pennsylvanica* var. *subintegrifolia* (LEFT) & *F. americana* (RIGHT), GREEN & WHITE ASH: Branches and twigs opposite. Diamond-shaped furrows in gray bark. Twigs with velvety hairs (Green) or smooth with few hairs (White). Leaves compound with up to 9 leaflets, pale green underneath (Green), or whitened and sometimes hairy on bottom (White).



6 *Prunus serotina*
CHERRY: Rounded to oval, serrated leaves end in a prominent elongated tip...



11 *Carpinus caroliniana*
MUSCLEWOOD/BLUE BEECH: Small tree with muscular, sinewy-looking trunk. Alternate, elliptical leaves are ranked in pairs; double serrated margins. Hanging papyery fruit.



12 *Cornus rugosa* ★
ROUNDLEAF DOGWOOD: Opposite twigs green, pith white. Leaves round, hairy below. Flowers white, fruits pale blue.



13 *Diervilla lonicera* ★
HONEYSUCKLE: Erect shrub to 3' high. Oblong, finely toothed leaves taper to a tip; opposite. Yellow, funnel-shaped flowers tinged red.

NEED photo (whole plant/leaves)

14 *Hamamelis virginiana*
WITCH HAZEL: Shrubby, multi-branched tree. Oval leaves with wavy margins; uneven base...



6 *Prunus serotina*
CHERRY! ... Bark is smooth and peels off in plates with age; thorny.



7 *Populus deltoides*
COTTONWOOD: Grey to black, deeply furrowed bark. Triangular, prominently veined leaves. Finely toothed leaf margins. Sticky leaf buds.



8 *Quercus rubra* (TOP) & *Quercus alba* (BOTTOM)
RED OAK & WHITE OAK: Leaves lobed (pointed in Red; rounded in White). Bark with dark vertical striping (Red), shallowly furrowed and grey-whitish with patches (White). End buds clustered.



14 *Hamamelis virginiana*
WITCH HAZEL: ... Yellow flowers with contorted petals bloom in the fall. Fruits resemble woody acorns.



15 *Juniperus communis* ★
JUNIPER: Spreading evergreen with 3 sided needles and branchlets. Needles in whorls of 3; bluish-green. White band on upper leaf surface. Fruits are powdery, blue-black berry-like cones.



16 *Juniperus virginiana*
EASTERN RED CEDAR: Bark reddish, thin, crown column-like. Leaves are minute scales. Berry-like fruits have a powdery white coating.



17 *Lonicera dioica* ★
LIMBER HONEYSUCKLE: Vine. Oval leaves opposite; uppermost pair perfoliate. Tubular red flowers in whorls. Berries red.

Rapid Assessment Vegetation Guide



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BASSWOOD: Large heart-shaped leaves. Leaf margins serrated, leaf bases asymmetrical. Fragrant, cream colored flowers in early summer. Fruits attached to parachute formed by persistent bracts.



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SHRUB AND VINE SPECIES



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HERBACEOUS SPECIES GROUP 2: Summer-Blooming Species



29 *Aster macrophyllus*
LARGE-LEAFED ASTER: Large, heart-shaped basal leaves. Purple to reddish stems. White to lavender flowers.



30 *Eupatorium purpureum*
PURPLE JOE-PYE WEED: Tall and un-branched, with whorls of 3 to 4 leaves. Domed mass of small, pink to purple flowers. Crushed leaves aromatic.



31 *Helianthus strumosus*
PALE-LEAFED SUNFLOWER: Narrow, ovate leaves with pale undersides. Flowers yellow in loose clusters at branch tips.



32 *Solidago flexicaulis*
ZIG-ZAG GOLDENROD: Stem zig-zags; leaves broadly ovate, toothed, on a winged petiole (leaf stalk).



33 *Solidago ulmifolia*
ELM-LEAVED GOLDENROD: Inflorescence branches arching; leaves ovate to elliptic or lance-elliptic with coarsely toothed edges.



HERBACEOUS SPECIES GROUP 3: Grasses and Sedges

NEED



34 *Bromus pubescens*
WOODLAND BROME: Floppy leaves; medium green and shiny above, duller below. Nodes and drooping inflorescences are finely hairy.



35 *Carex pennsylvanica*
PENNSYLVANIA SEDGE: Stem sharply 3 angled and smooth. Bright green arching leaves to 12" long. Blooms in early spring.



36 *Carex pedunculata* ★
LONGSTALK SEDGE: Rosette forming. Strap-like leaves dark green with red bases. Fruits appear in May.



37 *Elymus villosus*
SILKY WILD RYE: Long, straight, linear awns extend from inflorescence. Leaf auricles wrap around stem. Plant hairy.

38 *Hystrix patula*
BOTTLEBRUSH GRASS: Greyish green, arching leaves. Erect, smooth, central stem to 5 feet. Bottle-brush shaped terminal floral spikes.

Rapid Assessment Vegetation Guide



HERBACEOUS SPECIES GROUP 4:
High Quality Seep Plants

39 *Oryzopsis racemosa* ★
BLACK SEEDED RICE GRASS: Stems arise from a knotty rhizome. Upper leaf surface hairy, lower leaf surface rough. Seeds black.



40 *Caltha palustris*
MARSH MARIGOLD: Wide, heart-shaped, glossy leaves. Thick branching stem. Flowers bear 5 petal-like sepals; deep yellow.



41 *Eupatorium maculatum*
JOE-PYE WEED: 3-5 feet tall; un-branched. Leaves lanceolate with forward pointing teeth; in whorls of 4 to 5. Pink flowers in flat-topped flower clusters. Stems slightly hairy with purple spots.



48 *Elymus canadensis*
CANADA WILD RYE: Long narrow leaves; green above, bluish below. 5 - 9" nodding flower spike. Long seed awns curve outward.



49 *Potentilla anserina*
SILVERWEED: Low spreading plant from red stolons. Leaflets oblong, sharply toothed, lower surfaces silver. Flowers 5-petaled, yellow.

Extra space (will be removed in final document)

HERBACEOUS SPECIES GROUP 6:
Invasive herbs



50 *Alliaria petiolata* ☒
GARLIC MUSTARD: Lower leaves heart-shaped, upper leaves more oval, light green...



42 *Symplocarpus foetidus*
SKUNK CABBAGE: Early blooming plant of wet habitats. Distinctive spike of minute flowers (spadix) enclosed in a speckled, brownish purple hood (spathe). Leaves initially basal becoming larger and conspicuously quilted over the growing season.



HERBACEOUS SPECIES GROUP 5:
Beach Species



43 *Ammophila breviligulata* ★
MARRAM GRASS: Stiff, erect beach grass. Inner surfaces of leaves have a bluish tint. Flower spikes are long and tightly packed, turning a bright golden color in the fall.



50 *Alliaria petiolata* ☒
GARLIC MUSTARD ...Leaf margins deeply wavy. Strong aroma of garlic when crushed.



51 *Carduus nutans* ☒
MUSK THISTLE: Deeply pinnately lobed leaves with thorns. Purple flowers nod. May grow to six feet.



52 *Cirsium arvense* ☒
CANADA THISTLE: Leaves narrow, lobed; thorns along margins. Upper leaves clasp stem. Purple flower heads.



53 *Coronilla varia* ☒
CROWN VETCH: Densely spreading. Compound leaves with 11-25 leaflets. Pink to white pea-like flowers.



44 *Artemisia caudata*
BEACH WORMWOOD: Reddish tinted, upright, central stem. Leaves divided, silvery, leather-like. Small nodding, yellow flowers.



45 *Cakile edentula* ★
SEA ROCKET: Succulent leaves with undulating margins. White to light purple flowers have four petals. Two-chambered seed pods at ends of stems.



46 *Calamovilfa longifolia*
SAND REED GRASS: Arching leaf blades; grayish-green. Sheaths somewhat hairy. Fruits are pale grains with tufted hairs.



47 *Chamaesyce polygynifolia* ★
SEA SIDE SPURGE: Mat-like and sprawling with red stems. Small, oblong leaves have a prominent mid-vein.



54 *Dipsacus spp.* ☒
TEASEL: Basal rosette leaves lobed or entire. Leaves clasp tall, prickly stalk. Flowers white or purple arranged on a dense, spiny head.



55 *Elymus arenarius* ☒
LYME GRASS: Conspicuous bluish leaves. Spreads aggressively in sandy areas crowding out native dune species.



56 *Hemerocallis fulva* ☒
DAYLILLY: Sword-like leaves bright green, smooth. Tall flowering stalk bears bright orange and yellow flowers.

Residential Landowner Guide, and Demonstration Project



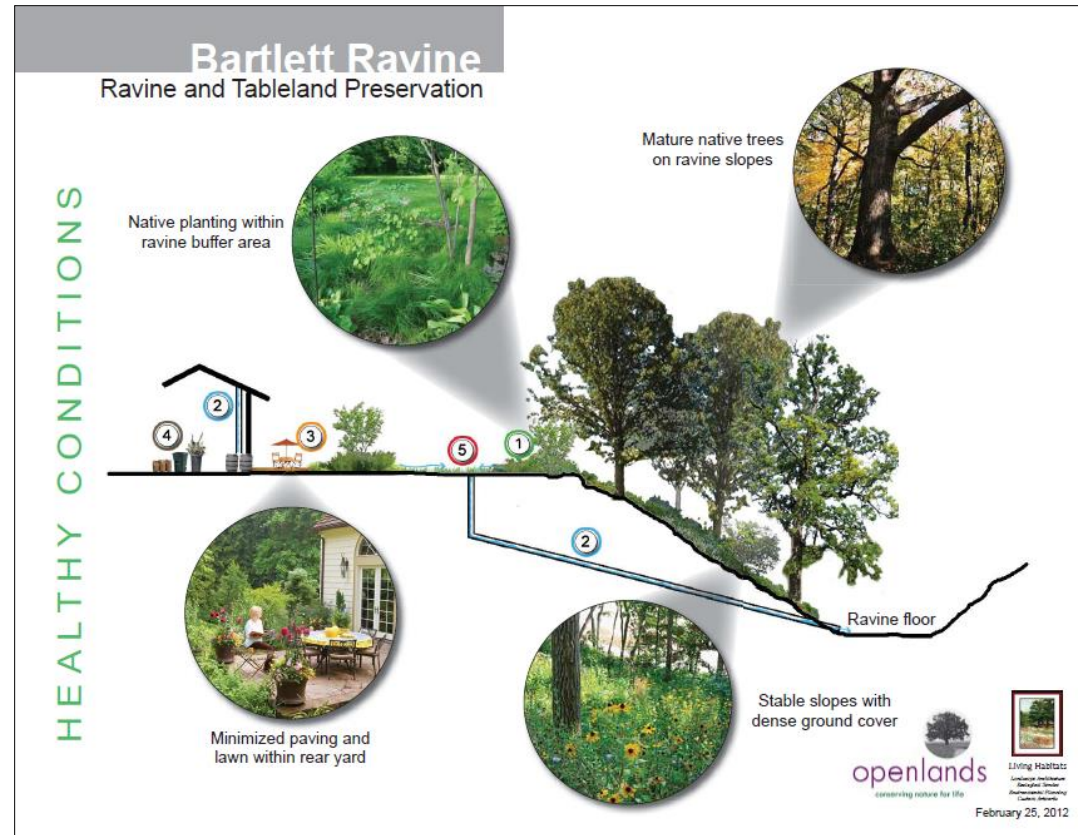
openlands
conserving nature for life

Residential Landowner Guide

60%-70% of all ravines in Illinois
are owned by residential landowners

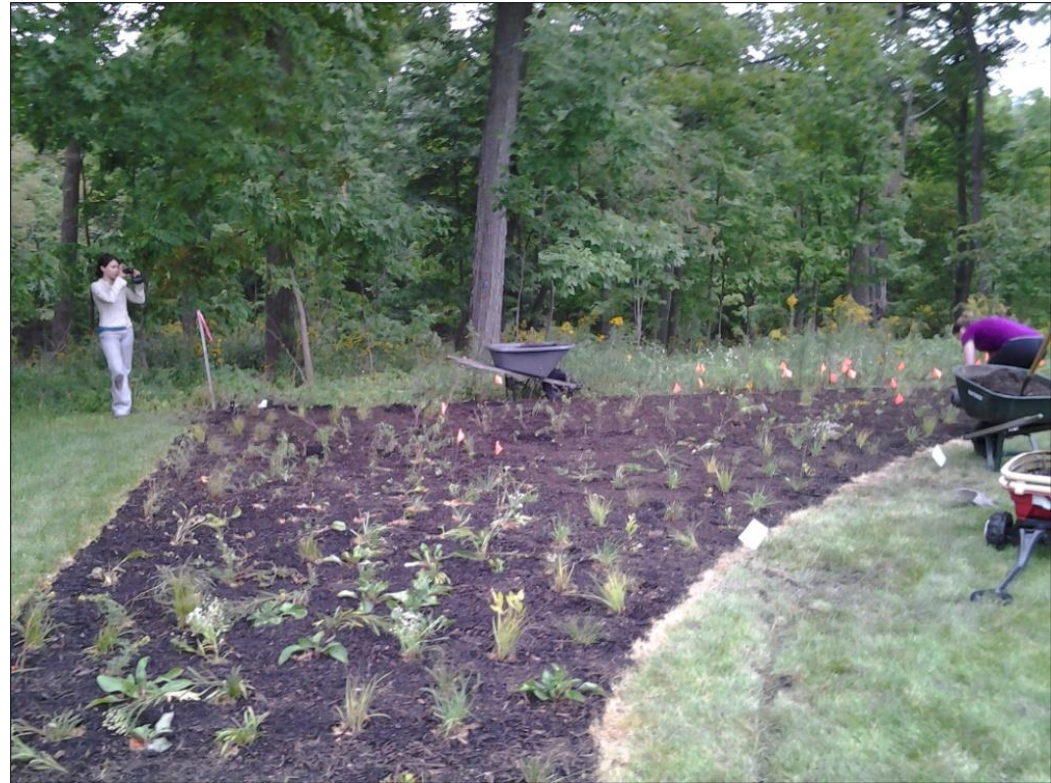
Residential Landowner Guide

- For landowners with ravines or adjoining uplands
- Simple introduction to sustainable management approaches
- Designed for those with no or little knowledge of ravines



Residential Demonstration Project

- Reached out to neighbors along Bartlett Ravine (35 properties)
- Selected one household for demonstration project
- installed over 2500 native plugs
- Cost-shared for design and assisted with installation



Land Use Practices and Policies

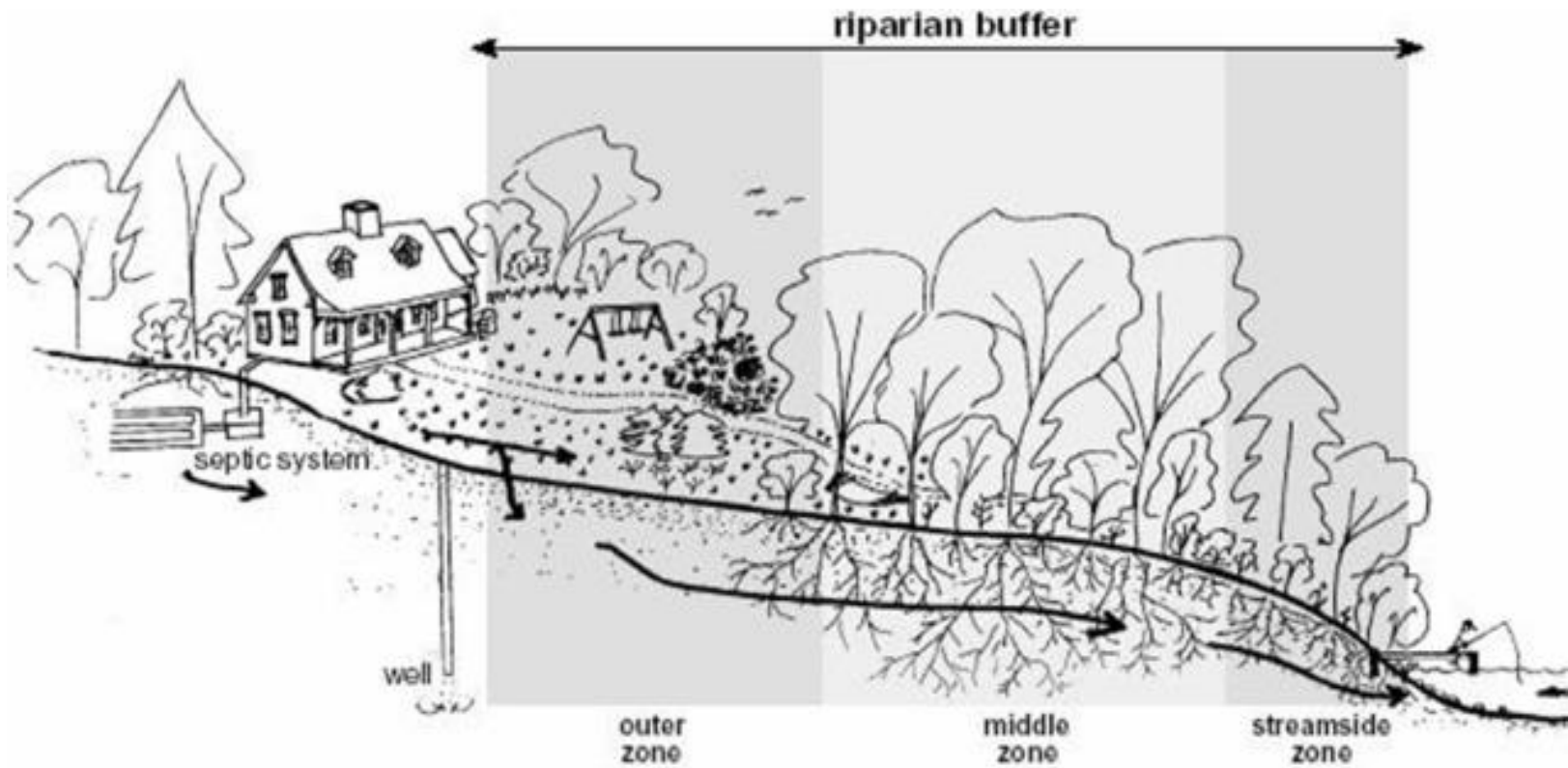
Land Use Practices and Policies

What are the land use practices and policies that will both reduce the primary stressors to the ravines (i.e. storm water erosion, non-point source pollution and invasive species) and are the most affordable to implement?

Ravine Buffers

- Corridors adjacent to waterbodies
- Minimize the impact of human activities
- Measurable positive effects on water quality, aquatic and terrestrial habitat, recreation, aesthetics, and quality of life.

Ravine Buffers - Zones



Ravine Buffers - Benefits

Benefits from Ravine Buffers (ranging from 10' to 300')

- runoff velocities and flow is reduced
- increased channel/bank stability
- deep rooted native plants hold the soil on the slopes and trap sediment
- improved water quality through removal of nitrogen, phosphorus, chemicals
- moderated water temperature, which is important for aquatic life
- reduced risk of flooding and other unmanaged stormwater effects
- improved habitat and food supply
- provision of wildlife habitat and corridors
- increased biodiversity
- relatively cost effective

Ravine Buffers - Widths

- The wider the buffer the greater the benefits
- Different widths are needed to achieve the different benefits, however on average many benefits are possible with a 50' buffer
- Waterbodies surrounded by steep slopes should add additional buffers due to erosion vulnerability

15%-17% slope	50' + 10'
18%-20% slope	50' + 30'
21%-23% slope	50' + 50'
24%-25% slope	50' + 60'
> 25% slope	50' + 70'

Ravine Buffers – Land Managers

Several “rules of thumb” for successful ravine buffers:

- Wider buffers are better than narrow buffers
- Continuous buffers (or corridors) are better than fragmented buffers
- Locate buffers along dispersal and migration routes
- Expanded buffers around rare, threatened, or endangered species
- Minimize all disturbance (e.g. excavation, clear cutting, tree topping)
- Deep-rooted native species diversity should be promoted
- Non-native species invasions should be actively managed
- Restore hydrology, bank stability, in-stream habitat and connectivity
- Restore/retrofit connections to the Lake for passage of aquatic species

Ravine Buffers – Residential

In Illinois for every **20 acres of un-buffered ravines 7,000 pounds** (the size of pick-up truck) of valuable soil and native seeds wash into Lake Michigan annually.

If just **40 homeowners:**

- installed rain gardens at disconnected downspouts,
- replaced half of their lawns with native plants, and
- increased tree cover on their lots by 25%,

a **51% reduction** in run-off from their lot could be achieved, and **installing buffers alone** could achieve a **65% reduction** in sediment and phosphorus.

Land Use Practices and Policies

What are the actual policy vehicles that will get us to the desired land uses?

Land Use Practices and Policies

Green infrastructure

- **Chicago Wilderness** <http://www.chicagowilderness.org/index.php/what-we-do/protecting-green-infrastructure>
- **Chicago Metropolitan Agency for Planning** <http://www.cmap.illinois.gov/strategy-papers/stormwater-best-management-practices/green-infrastructure>

Residential Incentive programs

- **Conserve Lake County** <http://www.conservelakecounty.org/conservationhome/welcome-to-eco-friendly-landscaping>

Low Impact Design

- **Low Impact Development Center, Inc.:** <http://www.lid-stormwater.net/index.html>

Reduce impervious surfaces

- **Stormwater Floodplain Ordinance** http://www.dupageco.org/edp/stormwater_management/1165.

Steep slopes

- <http://www.cityhpil.com/documents/21/31/50/ART19%20STEEP%20SLOPE%20ZONE.PDF>.

Land Use Practices and Policies

What are the incentives and how do we pay for it?

Land Use Practices and Policies

Stormwater utilities

- **The Value of Stormwater Utilities for Local Governments in the Chicago Region,** http://222.goto2040.org/documents/20583/25603/Value_of_Stormwater_Utilities_Local_Govts_Chicago_Region-1-8-12.pdf/f93651d3-616d-4549-b199-a6a8df86aadd;
- **Resources on stormwater utility fees: “Stormwater Utilities in Illinois?”** Hoskins, M., http://www.floods.org/PDF/IAFSM_Stormwater_Utilities.pdf

Funding for open space acquisition and management

- **Bond referendum** <http://web.co.dekalb.ga.us/greenspace/bondProgram1.html>.

Land Use Practices and Policies

Anything a little more innovative and/or politically palatable?

- Financing portfolios where local businesses and corporate sponsors, along with individual donors, help finance the implementation of watershed based priorities.

Thank you!

You can find all the resources discussed today online:

<http://www.greatlakes.org/RavineRestoration/Toolkit>

Questions, comments, suggestions?

Contact Angela Larsen, alarsen@greatlakes.org

Want to do more? www.greatlakes.org/getinvolved

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