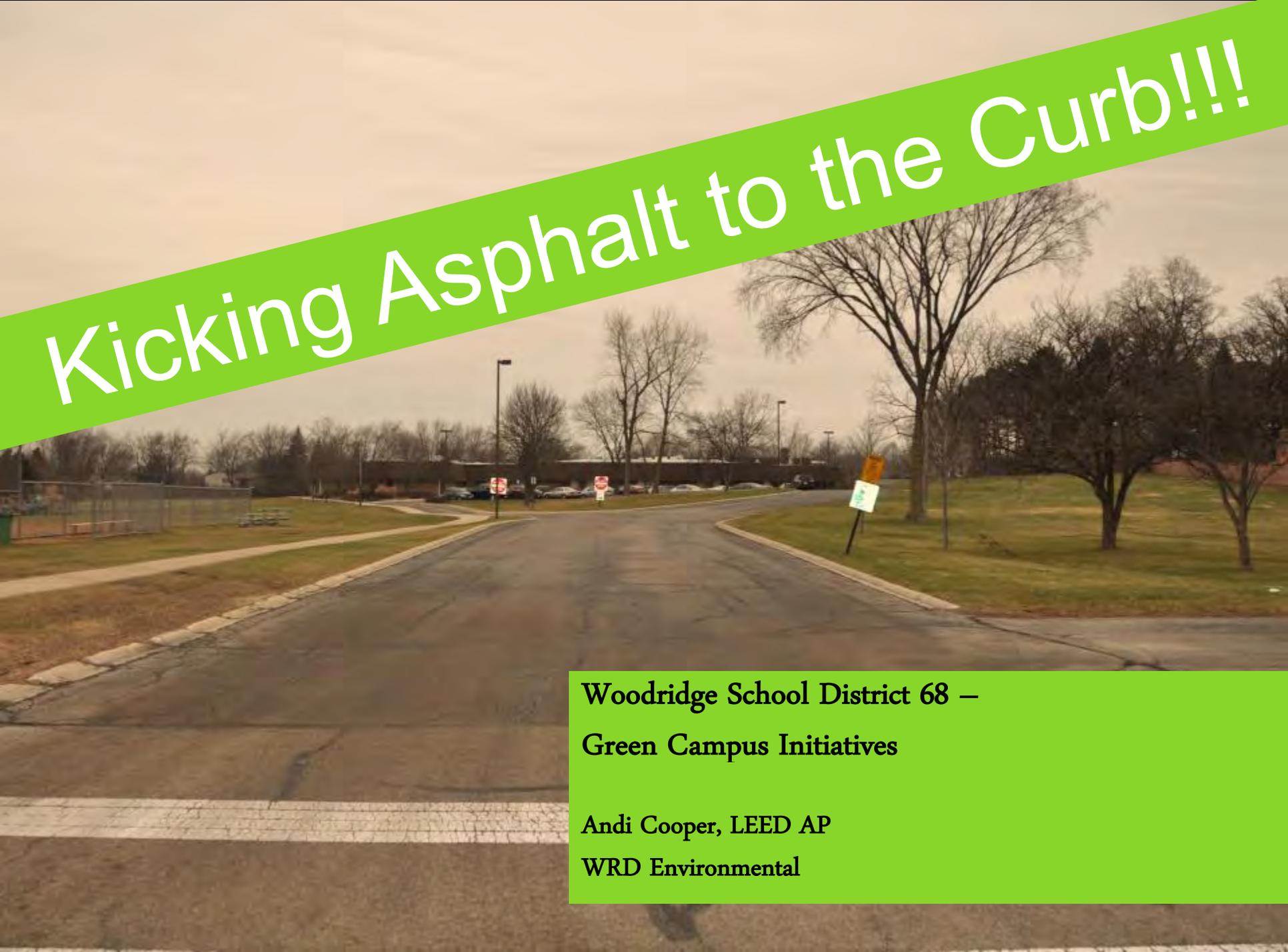


Kicking Asphalt to the Curb!!!



**Woodridge School District 68 –
Green Campus Initiatives**

**Andi Cooper, LEED AP
WRD Environmental**

This whole project started with a simple question...





For Woodridge School District 68 it came down to on-going maintenance and water issues.

Why rethink asphalt?

RUN-OFF

TEMPERATURE

BANK SCOUR

VOLATILE ORGANIC
COMPOUND

ANNUAL MAINTENANCE

CARCINOGENIC

LIFE CYCLE
COST

POLLUTANT LOADS

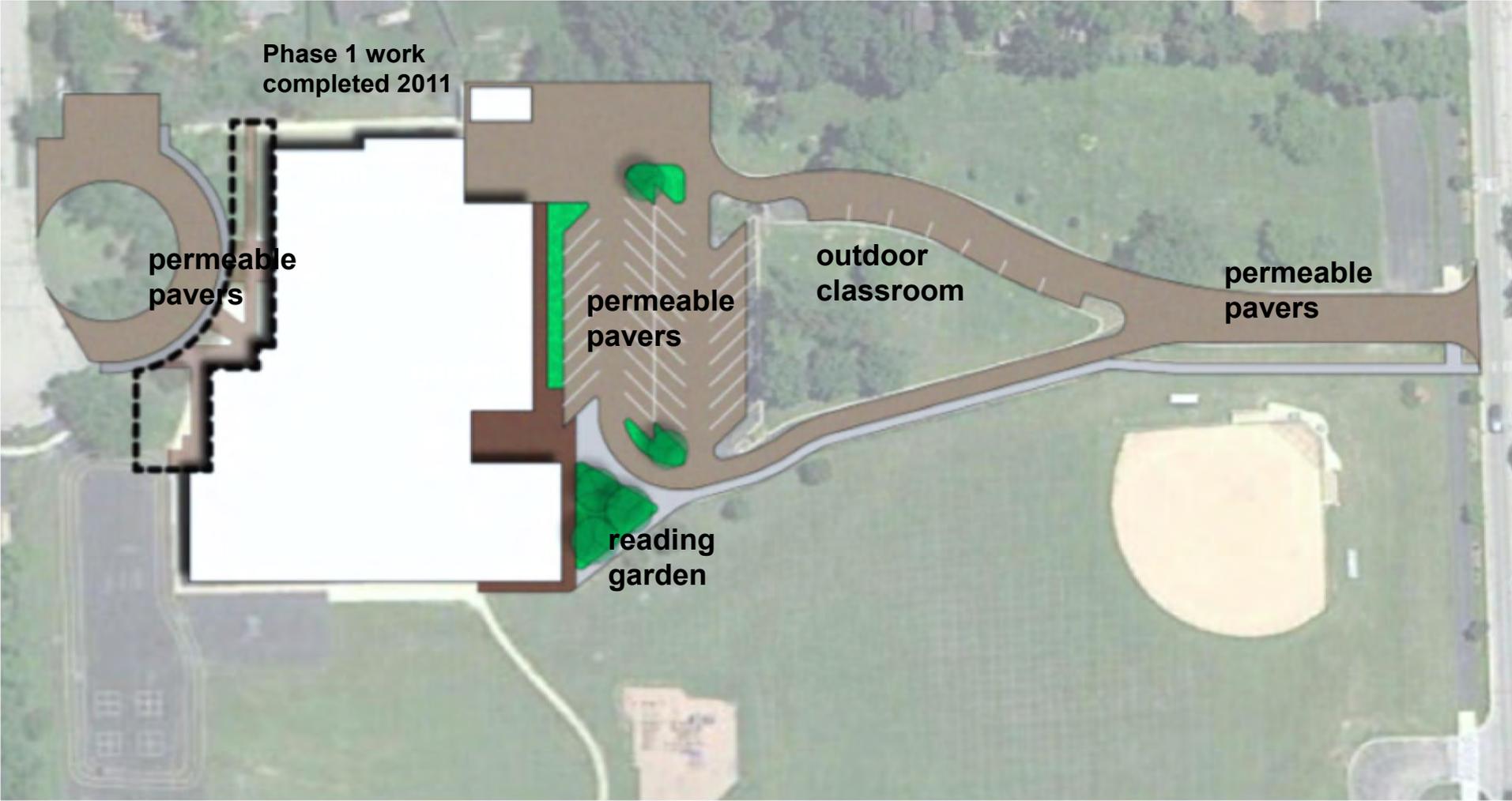
Woodridge School District 68

Green Campus Initiative – Willow Creek Elementary School



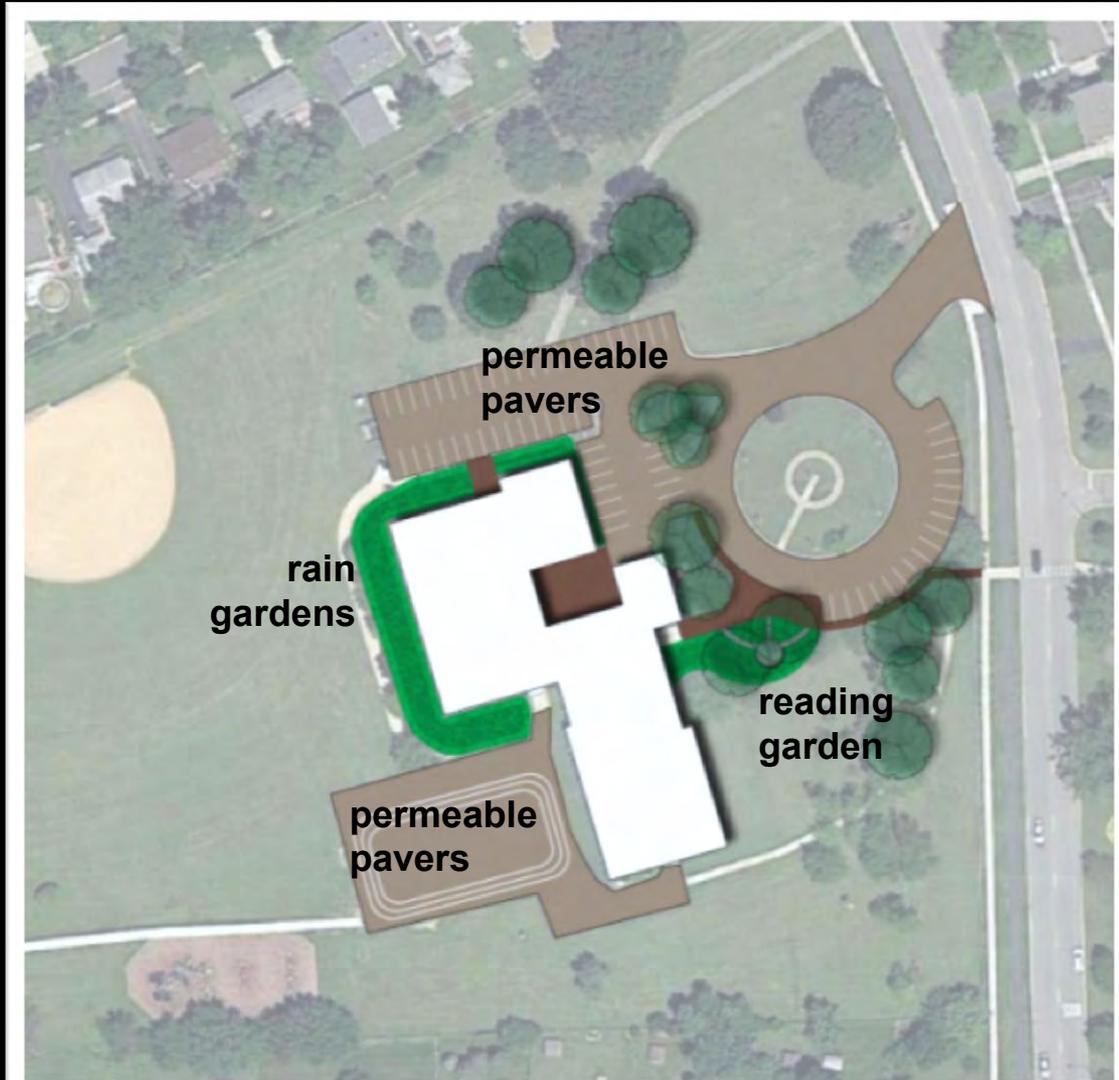
Woodridge School District 68

Green Campus Initiatives – Siple Elementary School



Woodridge School District 68

Green Campus Initiatives – Edgewood Elementary School



Objective



1. eliminate maintenance issues, hazards, and reduce costs

Solution



1. Replaced asphalt and concrete with more durable materials

Objective



2. correct stormwater and icing issues

Solution



1. Installed rain gardens, infiltration zones, permeable pavers

Objective



3. create outdoor education spaces

Solution



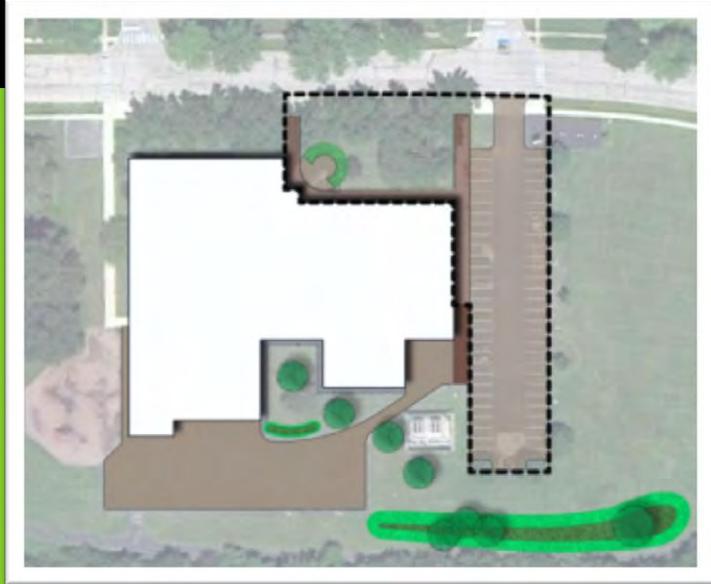
3. created learning landscapes,
for all ages...

Solution



3. installed reading gardens at the entry to each school

Sustainable Results



WSD 68 will have installed

At the end of
2014:

128,500 sf of Permeable Pavers (almost 3 acres of pavers)

10,400 sf of Rain Gardens

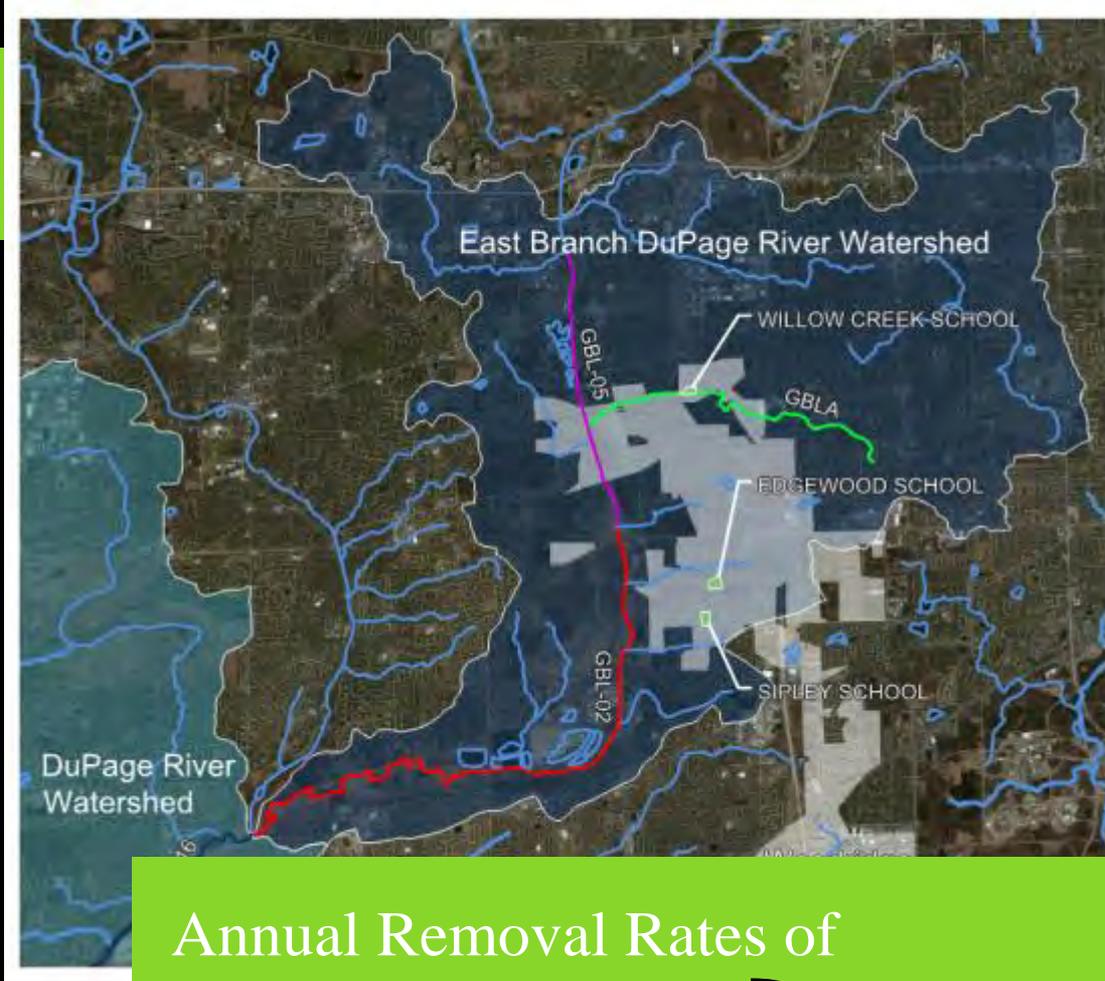
815 lf of Infiltration Trenches

6,000 sf of Native Filter Strips

3 Outdoor Classrooms

And...

- lower life cycle costs
- longer service life
- better structural support for vehicles
- reduced runoff by 60% to 90%
- increased habitat
- provides environmental education
- reduced road salt use
- 80% pollutant load removal



Annual Removal Rates of

Bod	152	} LBS/YR
Cod	2,800	
Tss	15,932	
Lead	5	
Zinc	7	
tn	95	
Tp	11	

Funding



IEPA 319 Grant



The Verdict

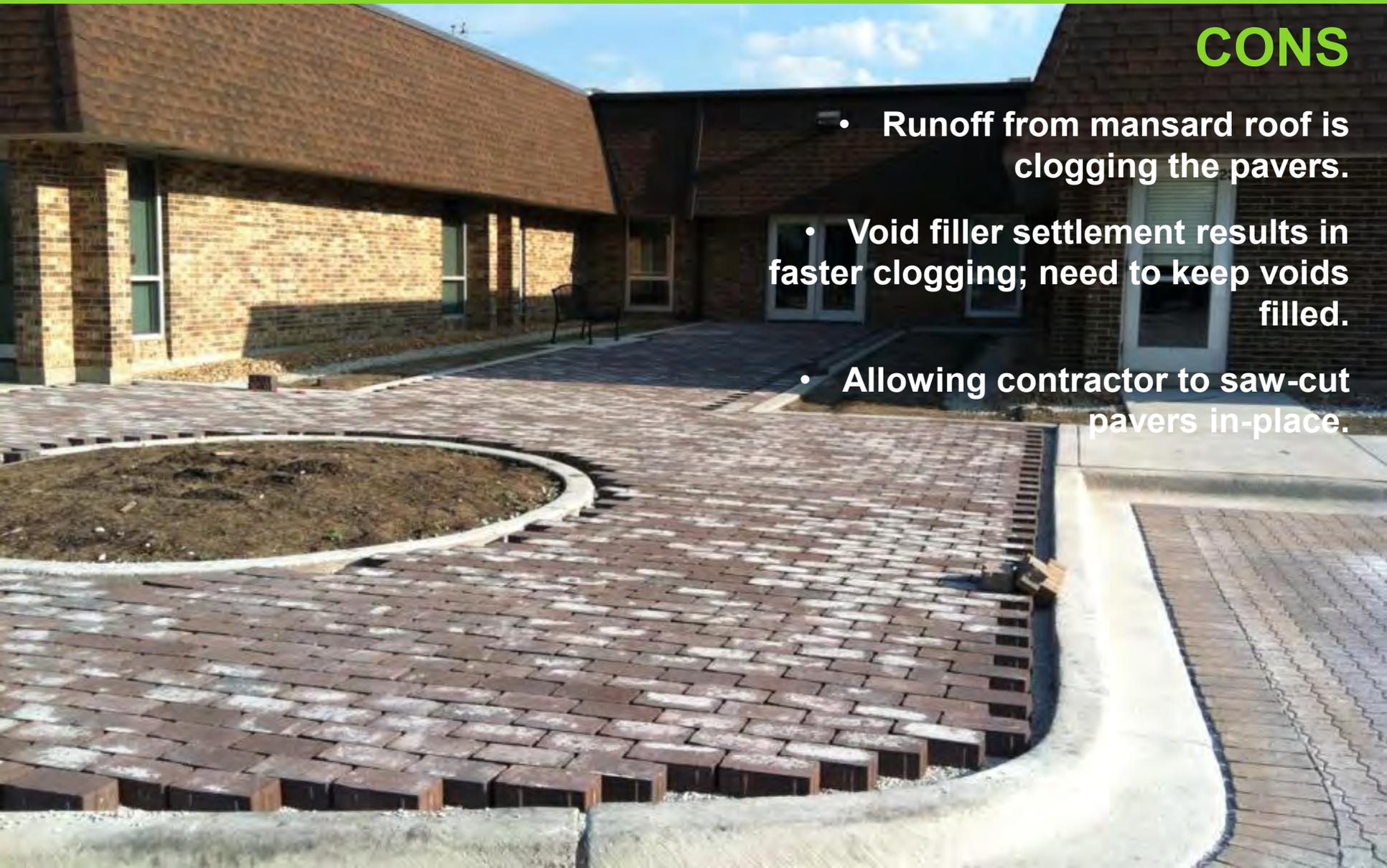
Lessons Learned

- Exclude the use of recycled aggregates from specifications.
- Make sure contractors are experienced with permeable pavements.
- Public outreach and education.

The Verdict

CONS

- **Runoff from mansard roof is clogging the pavers.**
- **Void filler settlement results in faster clogging; need to keep voids filled.**
- **Allowing contractor to saw-cut pavers in-place.**





Payback on investment is less than seven ye

Priceless...

Thank You.



Andi Cooper, ASLA, LEED AP

Landscape Architect

acooper@wrdenvironmental.com



Sustainable Landscapes:

Using Low-Maintenance Native Plants

andy stahr, RLA, LEED AP

Principal

ecology + vision, llc.
ecological consultants
Leland, IL

www.ecologyllc.com



ecology

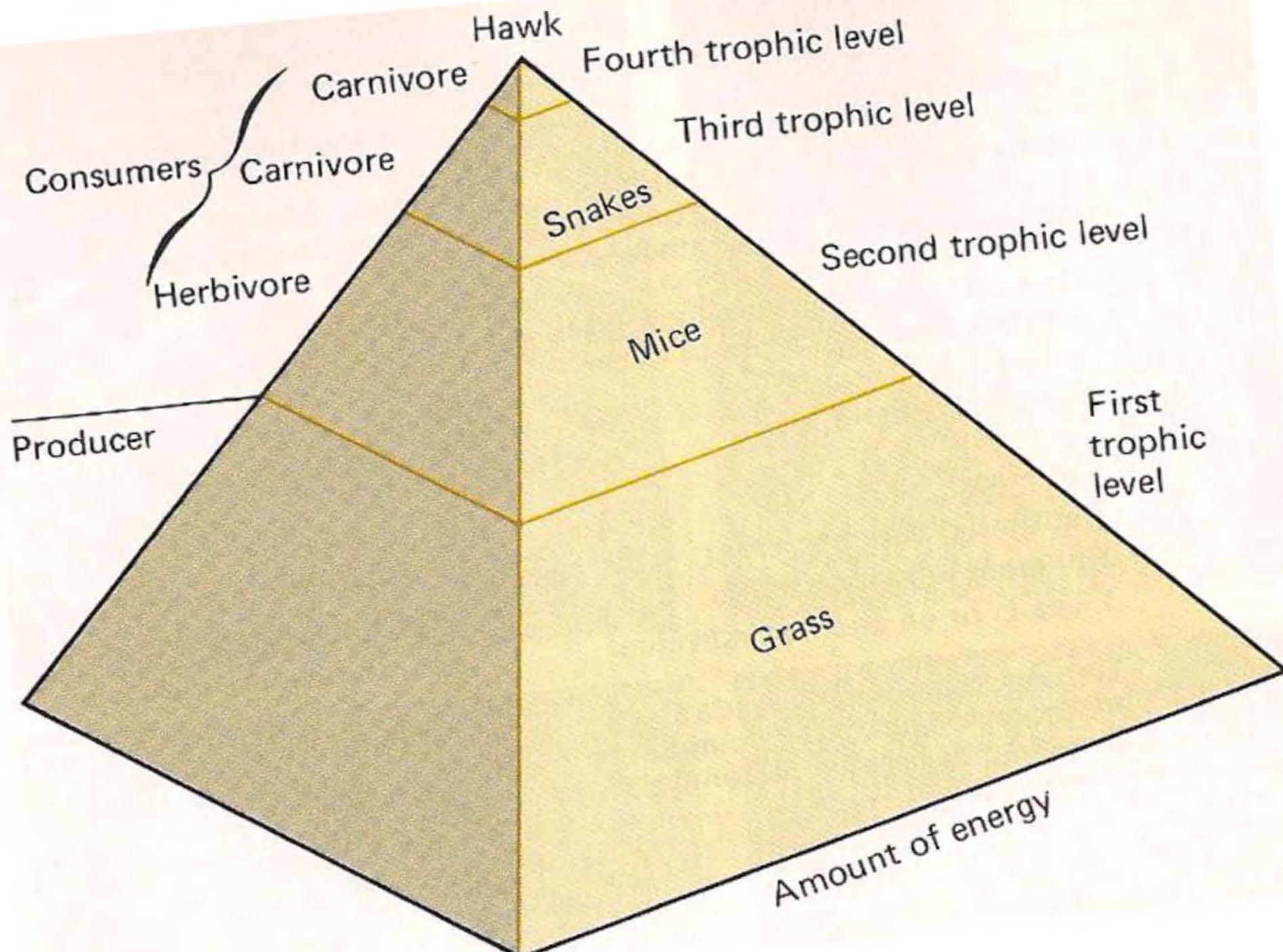
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Why are native landscapes important???



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Understanding the Critical Role of Native Plants



If you count all of the terrestrial **bird species in North America that rely on insects** and other arthropods (typically, the spiders that eat insects) to feed their young, you would find that figure to be **about 96 percent** – in other words, nearly all of them. (Tallamy 2007)

Understanding the Critical Role of Native Plants

Since insects are so important within the food chain, why does plant selection matter...can't insects eat alien plants?

- Up to **90 percent of all plant-eating insects are considered specialists** because they have evolved in concert with no more than a few plant lineages. It takes long evolutionary time spans rather than short ecological periods for insects to adapt to the specific chemical mix that characterizes different plants.
- The evolution of specialized abilities to eat the tissues of one particular plant lineage usually decreases an insect's ability to eat other plants that differ in timing of development, leaf chemistry, or physical defenses.
- Of all of these the most difficult to overcome is leaf chemistry, which make a leaf distasteful and typically toxic to all animals that have not developed the enzymes needed to detoxify them.

Many of the **ornamental alien plants** that have succeeded in North America have been imported specifically because of their **unpalatability** to native insects...species that are **"pest free"** are favored by the ornamental industry.



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HOSTING CAPACITY OF ALIEN PLANTS INTRODUCED TO NORTH AMERICA

Plant Species	Herbivores Supported in Homeland	Herbivores Supported in North America	Years Since Introduction to North America	Reference
<i>Clematis vitalba</i>	40 species	1 species	100	Macfarlane & van den Ende 1995
<i>Eucalyptus stellulata</i>	48 species	1 species	100	Morrow & La Marche 1978
<i>Melaleuca quinquenervia</i>	409 species	8 species	120	Costello et al. 1995
<i>Opuntia ficus-indica</i>	16 species	0 species	250	Annecke & Moran 1978
<i>Phragmites australis</i>	170 species	5 species	300+	Tewksbury et al. 2002



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WOODY PLANTS RANKED BY ABILITY TO SUPPORT LEPIDOPTERA SPECIES

Common Name	Family	Plant Genus	Species Supported
Oak	Fagaceae	<i>Quercus</i>	534
Willow	Salicaceae	<i>Salix</i>	456
Cherry, plum	Rosaceae	<i>Prunus</i>	456
Birch	Betulaceae	<i>Betula</i>	413
Poplar, cottonwood	Salicaceae	<i>Populus</i>	368
Crabapple	Rosaceae	<i>Malus</i>	311
Blueberry, cranberry	Ericaceae	<i>Vaccinium</i>	288
Maple, box elder	Aceraceae	<i>Acer</i>	285
Elm	Ulmaceae	<i>Ulmus</i>	213
Pine	Pinaceae	<i>Pinus</i>	203
Hickory	Juglandaceae	<i>Carya</i>	200
Hawthorn	Rosaceae	<i>Crataegus</i>	159
Alder	Betulaceae	<i>Alnus</i>	156
Spruce	Pinaceae	<i>Picea</i>	156
Ash	Oleaceae	<i>Fraxinus</i>	150
Basswood, linden	Tiliaceae	<i>Tilia</i>	150
Filbert, hazelnut	Betulaceae	<i>Corylus</i>	131
Walnut, butternut	Juglandaceae	<i>Juglans</i>	130
Beech	Fagaceae	<i>Fagus</i>	126
Chestnut	Fagaceae	<i>Castanea</i>	125

Benefits?

- Reduce Construction Costs
- Reduce Maintenance Costs
- Reduce Chemical Inputs (Herbicide)
- Eliminate Fertilizers & Pesticides
- Eliminate or Reduce Irrigation
- Increase Aesthetic Value
- Reduce Carbon Footprint
- Meet Carbon Sequestration Goals
- Improve Surface and Ground Water Quality
- Infiltration of Stormwater
- Prevent Shoreline Erosion
- Stop the spread of Invasive Plant species
- Improve Floral / Faunal Diversity
- Increase Habitat
- Solve Goose Problems



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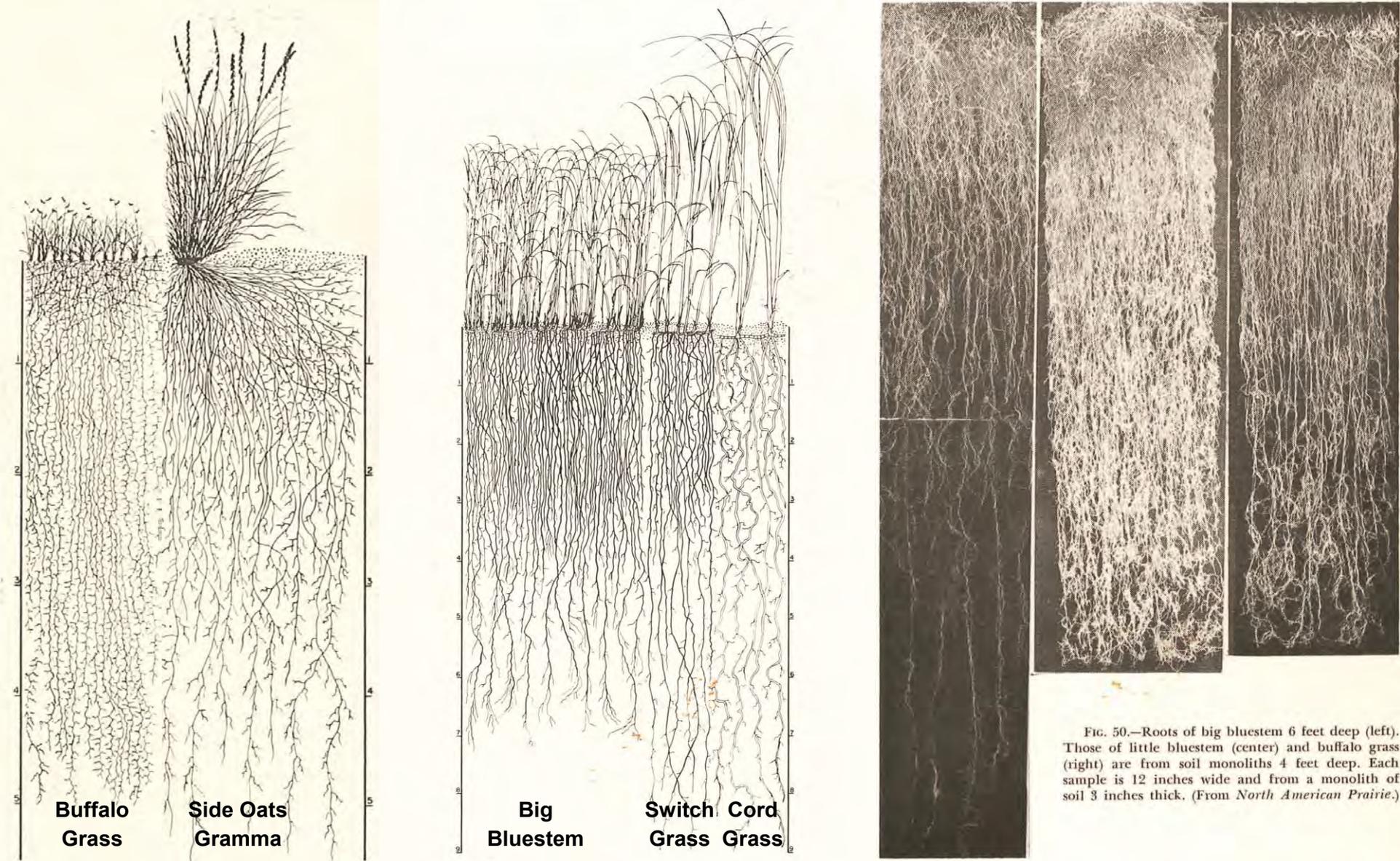


FIG. 50.—Roots of big bluestem 6 feet deep (left). Those of little bluestem (center) and buffalo grass (right) are from soil monoliths 4 feet deep. Each sample is 12 inches wide and from a monolith of soil 3 inches thick. (From *North American Prairie*.)

Prairie Roots

Images from “Native Vegetation of Nebraska”
By J.E. Weaver, 1965

Native species have deep root systems to help them survive drought, severe cold and fire...all of which were common in the Midwest pre-settlement

Simple enough, what's the problem?



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Misrepresentation of a Natural Area

This native planting is full of annual/biennial weeds

Failed plantings like this re-enforce the perception that sustainable landscapes are weedy...



Misrepresentation of a Natural Area

This native planting is full of annual/biennial weeds

Failed plantings like this re-enforce the perception that sustainable landscapes are weedy...

What should they look like?



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Appropriate Planning & Installation...



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55.03 A11004 55.01 27.50	160 a	160 a	160 a	40.00 40.00 56.40 -160 a- A120.62 40.00 40.00 40.00 24.27	39.30 39.80 40.00 40.00 A116.08 A158.71 30.66 38.32 39.03 39.68	160 a	160 a	160 a	160 a
54.88 A10960 54.72 Sec. 7 A.538.64 54.60 A10904 54.44 27.18	160 a	Sec. 8.	Sec. 9.	40.00 40.00 40.00 A159.48 A155.83 40.06 40.06 40.06 40.16 40.09 40.09 40.09 40.15 A160.44 A160.52 40.13 40.13 40.13 40.15	40.00 40.00 40.00 A113.25 -160 a- 51.82 40.00 40.00 40.00 40.00 -160 a- 40.00 40.00	Sec. 10.	Sec. 11.	Sec. 12.	
54.27 A10850 54.23 Sec. 13. A.536.98 54.26 A10848 54.22 27.10	160 a	Sec. 17.	Sec. 16.	56.47 38.97 40.00 A124.40 0 A150.45 40.00 27.93 31.48 40.00 A.1281.08 A.1277.74 40.00 37.41 40.00 A156.68 A123.98 40.00 39.27 40.00	56.47 38.97 40.00 A124.40 0 A150.45 40.00 27.93 31.48 40.00 A.1281.08 A.1277.74 40.00 37.41 40.00 A156.68 A123.98 40.00 39.27 40.00	Sec. 14.	Sec. 13.		
54.31 A10876 54.45 Sec. 19 A.538.00 54.55 A10924 54.69 27.18	160 a	Sec. 20.	Sec. 21.	40.09 40.09 40.09 40.16 A160.30 A160.59 40.06 40.06 40.06 40.25 40.04 40.04 40.04 40.40 A.1625.70 A160.10 A144.71 40.01 40.01 40.01 42.6	40.00 54.40 29.80 40.12 A134.40 A104.61 40.00 34.35 40.04 A.1161.69 A.1354.44 40.13 40.07 A160.40 28.55 40.10 40.10 40.10	Sec. 22.	Sec. 23.	Sec. 24.	road to Chicago
54.98 A11002 55.04 Sec. 30 A.539.90 54.91 A10988 54.97 27.50	160 a	Sec. 29.	Sec. 28.	40.00 40.00 -160 a- 40.00 40.00 A.372.01 40.00 40.00 59.02 A154.43 A128.49 40.00 34.43 29.47 40.00	40.00 40.00 A.486.9 40.13 40.07 A160.40 28.55 40.10 40.10 40.10	Sec. 27.	Sec. 26.	Sec. 25.	
55.45 A11070 160 a	160 a	39.95 39.95 39.95 39.95	53.97 39.51 40.14 A128. A159.65	53.97 39.51 40.14 A128. A159.65				Prairie	

- Saturated soils
- Landscapes
- Species difficult to germinate



Large Seed – Virginia Wild Rye



Small Seed – Common Mountain Mint



Fluffy Seed – Stiff Goldenrod



Truax Native Seed Drill

A no-till drill designed for native seed installs

There are three seed boxes on this seed drill; one for small seed, one for large seed and one for fluffy seed.






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June, 2009
Seeded May 2009





Belco Native Drop-seeder

A drop-seeder designed for native seed installs on loose soil

There are three seed boxes on this seeder; one for small seed, one for large seed and one for fluffy seed.



June, 2009
Seeded May 2009





Industry Standard vs. The ecology Way...



Industry Standard Seed Sources & Seeding Rates

October, 2009

Seeded Fall 2008

The  ecology Way...


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November, 2009
Seeded Fall 2008

Industry Standard Seed Sources & Seeding Rates



June, 2010

Seeded Fall 2008

The  ecology Way...



June, 2010
Seeded Fall 2008









Industry Standard Seed Sources & Seeding Rates



The ecology Way...



Stewardship...



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Herbicide Applications



Supplemental Planting



Prescribed Fire



Mowing







Beebalm

False Sunflower

Purple Prairie Clover

Pale Purple Coneflower

Yellow Coneflower

Golden Alexanders

Stiff Goldenrod

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August, 2009

Rows of native plants are visible here germinating after being seeded with a Truax native seed drill




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This first year seedling has grown 4" above the soil and 12" below the soil !



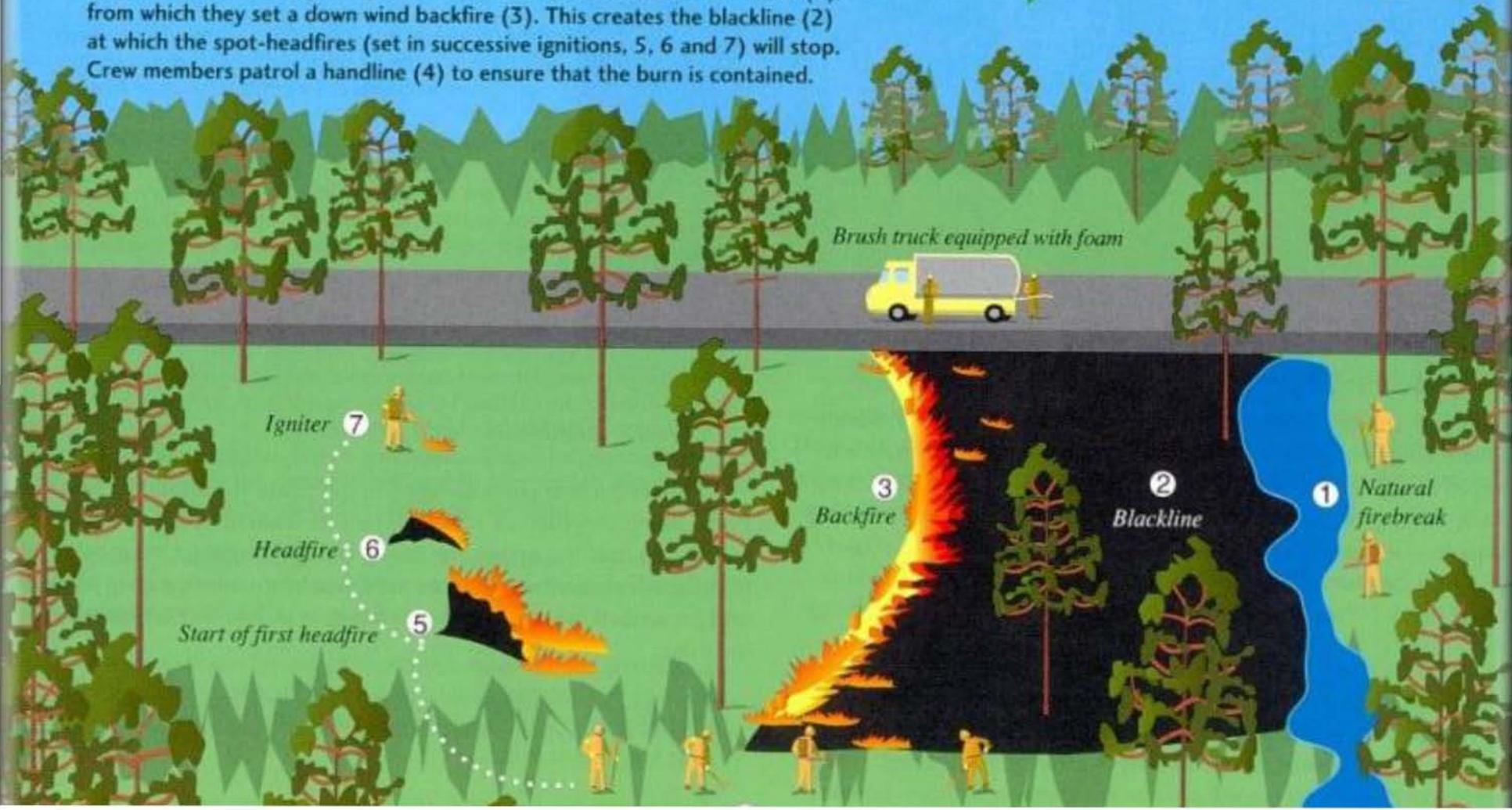
Prescribed Fire...



Anatomy of a Prescribed Burn

WIND DIRECTION

Prescribed burn managers try to find a natural firebreak, such as a creek (1), from which they set a down wind backfire (3). This creates the blackline (2) at which the spot-headfires (set in successive ignitions, 5, 6 and 7) will stop. Crew members patrol a handline (4) to ensure that the burn is contained.













Madison Club HOA
Bur Ridge, IL

The Savanna & Shoreline
restored...and the Cattails are gone!
(2003)



Madison Club HOA
Bur Ridge, IL

Diversity and aesthetics have been maintained through appropriate, consistent Stewardship (2007)

THANK YOU!

andy stahr, RLA, LEED AP®

Principal

815.751.2470

andys@ecologyllc.com

SERVICES:

- Greenline®
- LEED Landscape Design
- Natural Areas Masterplanning
- Natural Areas Assessment
- Wetland Delineation
- Permitting
- Vegetation Monitoring & Reporting
- Natural Areas Training



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References:

- Enger, Kormelink, Smith & Smith “Environmental Science” 1983.
- Tallamy, Douglas W. “Bringing Nature Home: How you can sustain Wildlife with Native Plants” 2007.