Ecosystems Past and Present: An Introduction

Bringing the science of ecology to all land-use decisions
Ecological Systems
Past & Present
Historic Landscapes and Ecosystems

• Diverse
• Dynamic
• Productive
• Stingy
Ecological Systems

Hydrologic/Topographic Gradient
Degradation of Wetlands
Contaminants in the Ecosystem
Healthy & Degraded Oak Savanna
Trends in Tall Grass Savanna Degradation

pre-1820

1950±

1970±

1989-2000

28+ (n=1)

300±

22± (n=2)

150±

15± (n=2)

<50

4± (n=5)

<25

BIRD RICHNESS

VEGETATION RICHNESS
Stream Degradation and Watershed Development Trends
PRE-SETTLEMENT
Log-Normal Duration Plot. Des Plaines River at Riverside, IL, 1969-1973

Drainage Area=160.00 sq mi.

Single Point

780 cfs
Example Projects

Larger Ecological Restorations
Kankakee Sands, Indiana

Key Features:

• Hydrology restoration
• Soil restoration
• Vegetation restoration
• Endangered Species restoration
Newton County, Indiana
Fair Oaks Farm
Topography
Fair Oaks Farm
Ditch Hierarchy and Restoration

Proposed Control Structures
- Major Controls
- Minor Controls
- Drainage System
- Abandon
- District Main Ditch
- Regional Main
- Field Drain
- Local Feeder
Fair Oaks Farm
1997 Digital Aerial Photography & Hydrology
Fair Oaks Farm
1997 Digital Aerial Photography & Drain Tiles
Fair Oaks Farm
Restoration plans
Excavating Swales, Disabling Tiles, Backfilling Ditches
Soil BioEngineering of Degraded Channels
Brush Layering Technique
Soil BioEngineering of Degraded Channels
Stabilized Channel
1st growing season
8th growing season
Example Projects

Conservation Development
Prairie Crossing - Plan & Photographs

Ecology, Economy and Culture
Stormwater Treatment Train

- Swale
- Prairie
- Wetland
- Lake

% removed

Total suspended solids
Phosphorus
Nitrogen
Metals
Hydrocarbons
Annual Hydrographs and Normal Average Water Levels for Restored Wetlands.
Designed by Engineers vs. Ecologists

Engineering Approach to Hydrology
* Unpredictable Swings in Water Levels
* Creates Biological Instability
* Promotes Habitats for Weeds and Poor Aesthetics
* Promotes Poor Water Quality

Ecologist Approach to Hydrology
* Annual Seasonal High and Low
* Predictable Hydraulics and Seasonal Trajectory
* Promotes Habitat for Stable yet Dynamic Plant Communities
  (Diversity of Plants and Animals)
Formal Native Landscapes
Native Landscaping

"The Wild Look"
Hydrograph Comparison
Prairie Crossing - Lake Water Quality
Thank You
Questions?