

Illinois Rural Streams Stabilization and Enhancement

PAST, PRESENT, FUTURE?

Rural streams contain the majority of Illinois stream miles (@ 40,000) –

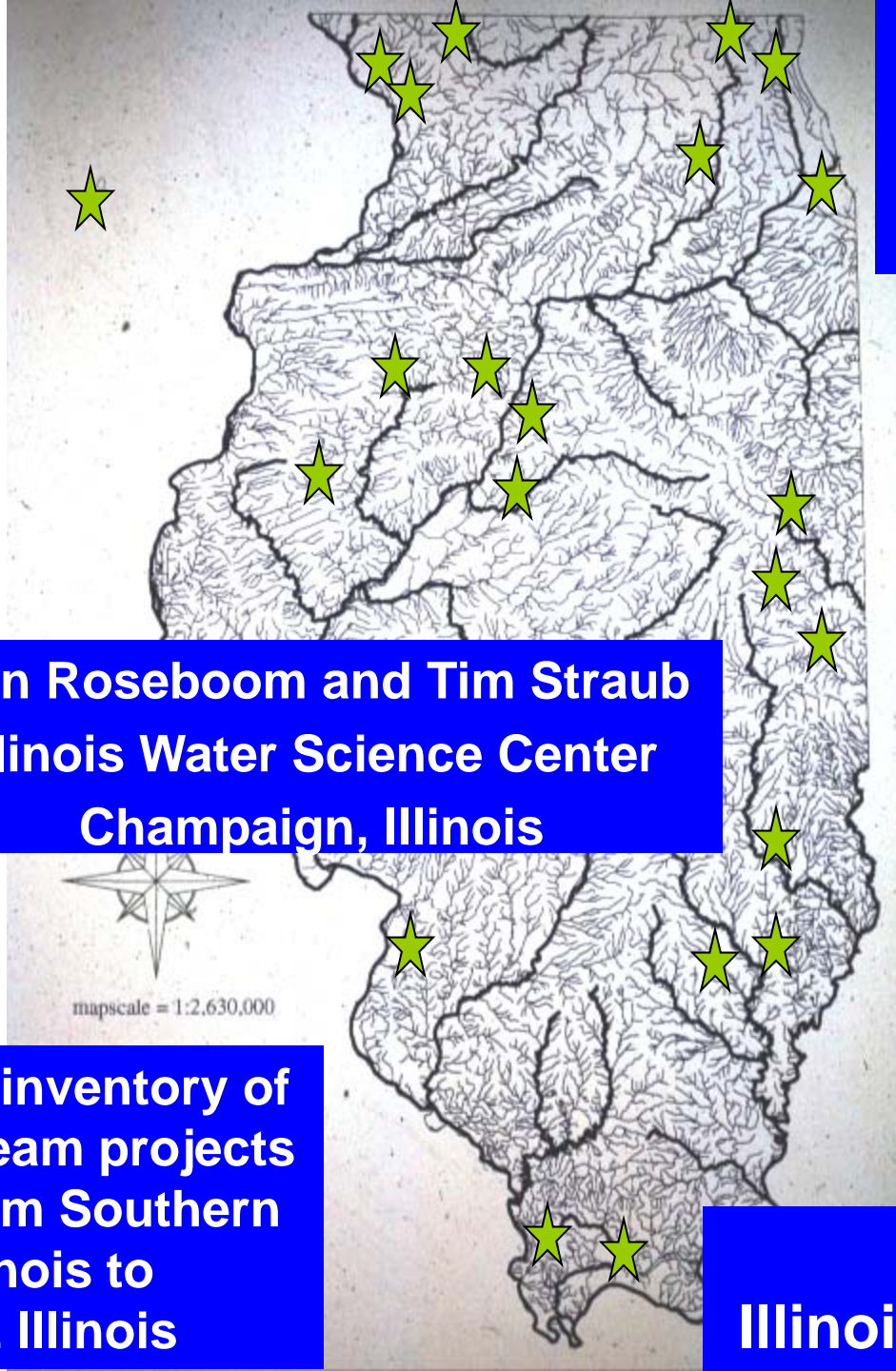
Stream condition determines the amount of sediment and nutrients delivered to the Illinois, Mississippi, Ohio Rivers

Stream rehabilitation can address multiple water quality problems – erosion, sedimentation, nutrient reduction, instream habitat

Don Roseboom and Tim Straub
Illinois Water Science Center
Champaign, Illinois

funded by Illinois EPA and
Illinois Department of Agriculture

An inventory of
stream projects
from Southern
Illinois to
NE Illinois



Current Stream Projects

Mackinaw River 2008



@ 90 percent of stream projects since 2000 do not require repairs

Clear Creek 2008



IDOA bank stabilization for less than federal feasibility study

Stream Barbs
Illinois Department of Agriculture,
with IEPA 319 funding

**Kickapoo Creek
Eastern Illinois
Illinois Dept of Agriculture**

Four barbs

2008



**Stream barbs decrease bank erosion
and increase instream habitat
In heavy bedload streams**



**Big Creek, IDOA- IDNR
Southern Illinois,
2008**



**Rowcrop field
protected with
two barbs**



**Big Creek
Southern Illinois
IDNR and IDOA
Rock Riffles
2008**



**Floods driving 60 ft trees thru 40 ft channels -
increasing bank erosion and testing rock riffles**



Little Minominee River



Jo Davies County, NW Illinois

**Illinois Department
of Agriculture**

Sinsinawa River

Little Minominee River

2008

Sinsinawa River



Little Minominee River



2008



**Blue Heron Creek – IDNR –
South Kishwaukee River
old wetland
agriculture**



**Hurricane Creek
Eastern Illinois
Illinois Dept of Agriculture
2008**



**Newbury rock riffles increased
habitat diversity without
increasing instability**

**Same reach of Hurricane
Creek without riffles**



BUT - - -

2004



**Shaw Creek- 2004 – small stream
outwash on to Fox River floodplain**

**High erosion potential –
tough to stabilize**

Incomplete applications of BMP's

2007

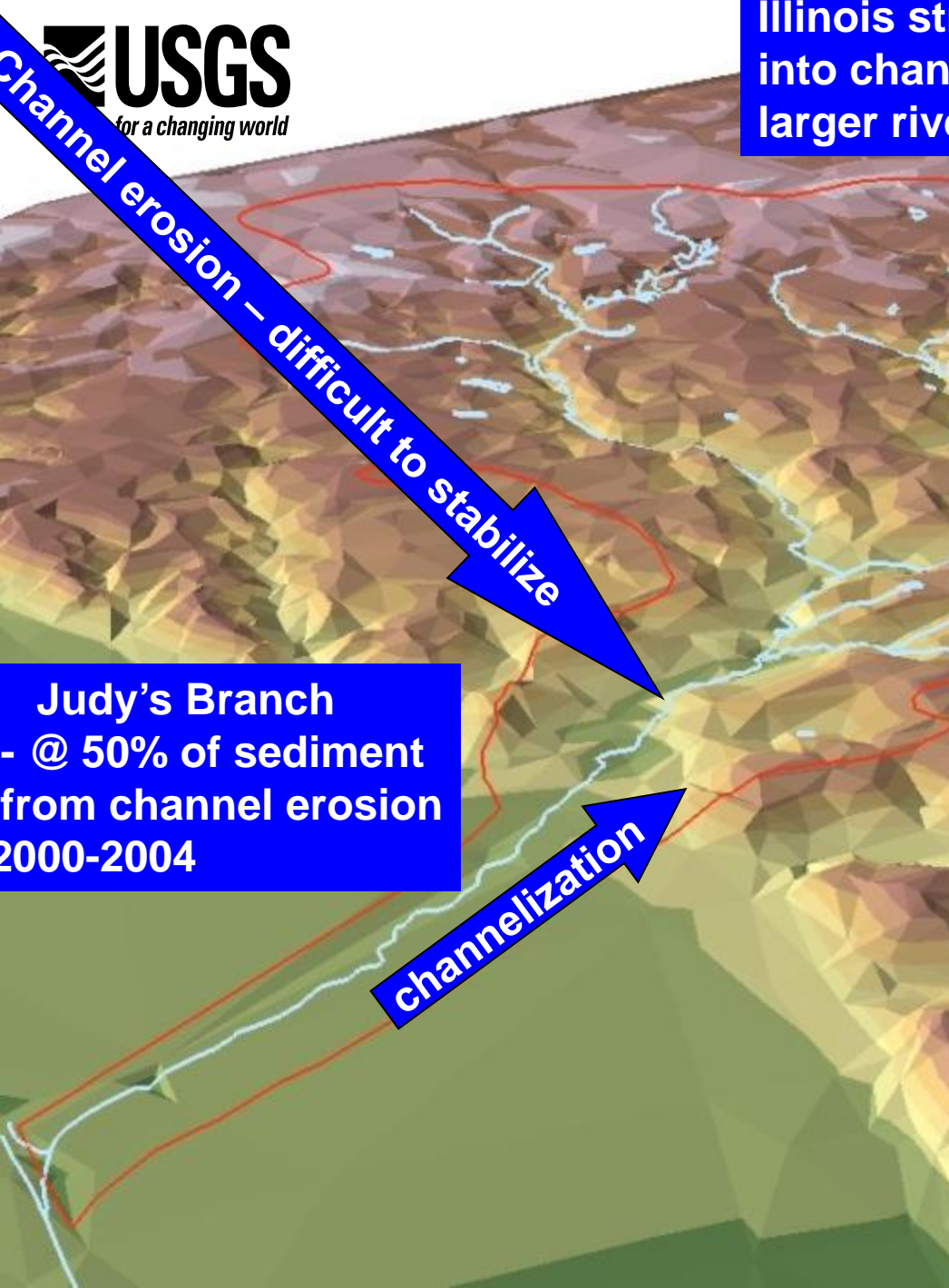


**Widen floodway and revegetate
with native plants and geotextiles**

Limited rock grade controls

**However 90% of all stream
projects were stable.**

Illinois streams run off altered watersheds into channelized ditches in floodplains of larger rivers - Judy's Branch, Crow Creek, ect



Judy's Branch
- @ 50% of sediment
from channel erosion
2000-2004



Fraze
Sand layers
Below soils

Judy's Branch, St Louis Metro East



1 Utilizing both bank-rod data and resurveyed cross-section data, it was determined that approximately half of the suspended-sediment yield at Route 157 during July 2000-June 2004 came from bank retreat.



Tim Straub measures bank erosion rates



**Many trees are undercut – increased scour
- common in unstable channels
Floods force 60 ft trees thru 40 ft channels**



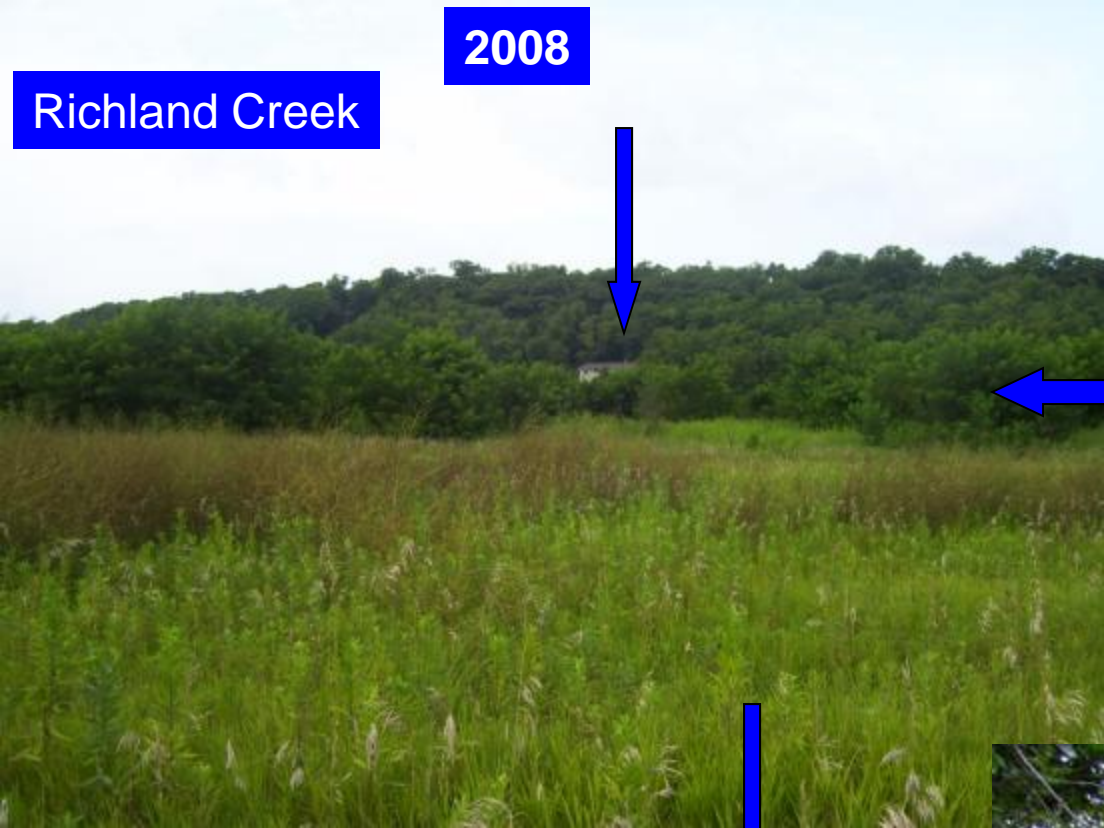
Past Projects – 1990s
The problem of vegetation
in such unstable streams



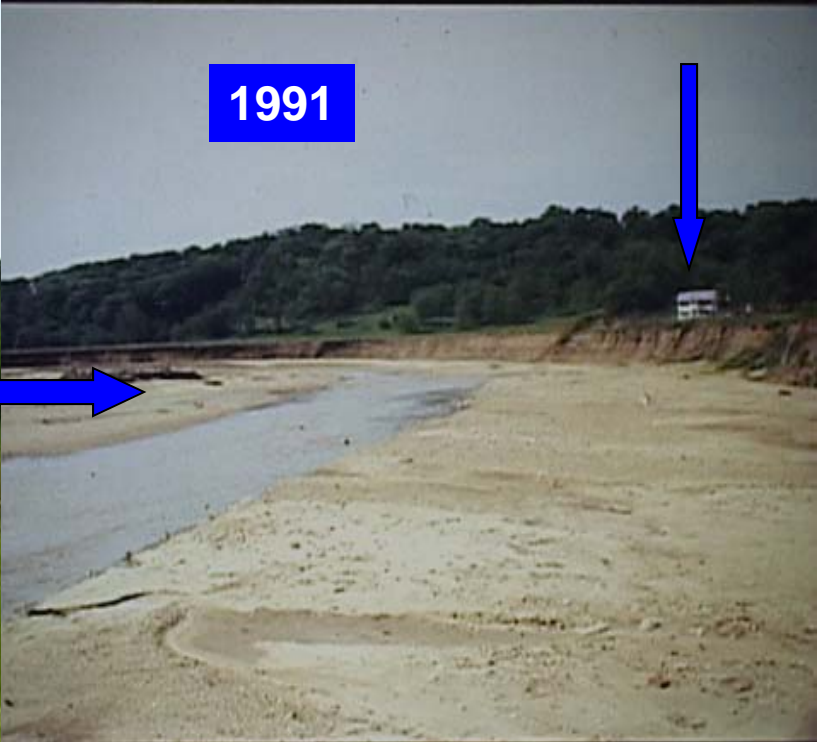
Richland Creek - Willow Posts - IDNR funding
Illinois River Soil Conservation Task Force 1987- 1993

Richland Creek

2008



1991

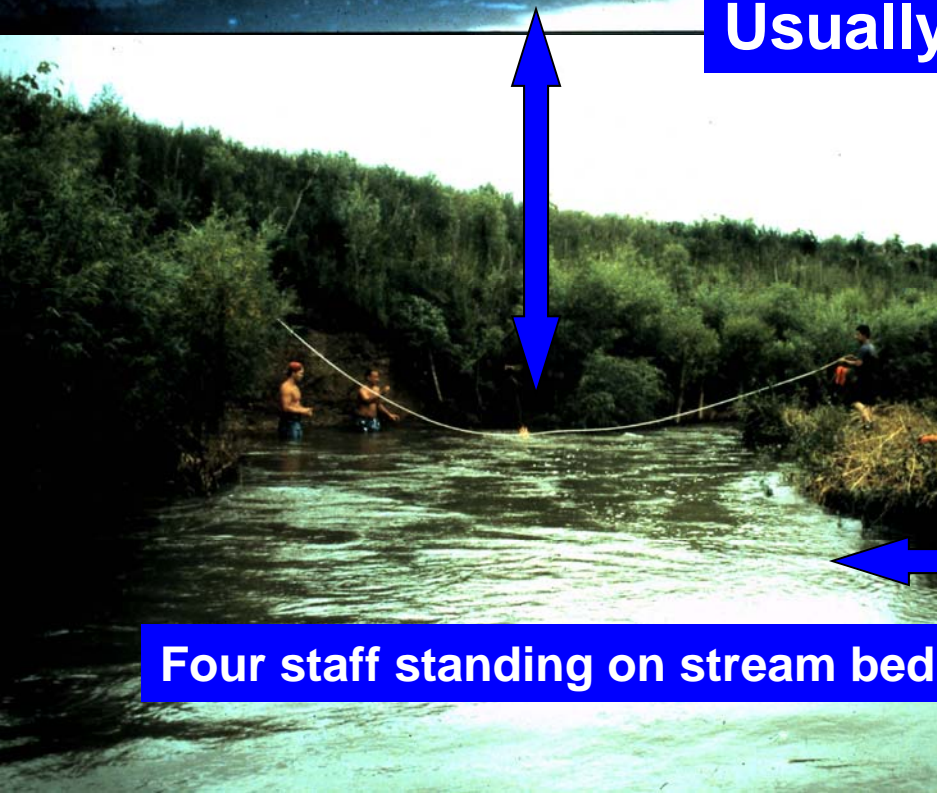


Crow Creek

Most willow post BMPs
in severe erosion sites
eroded out in the 1990s



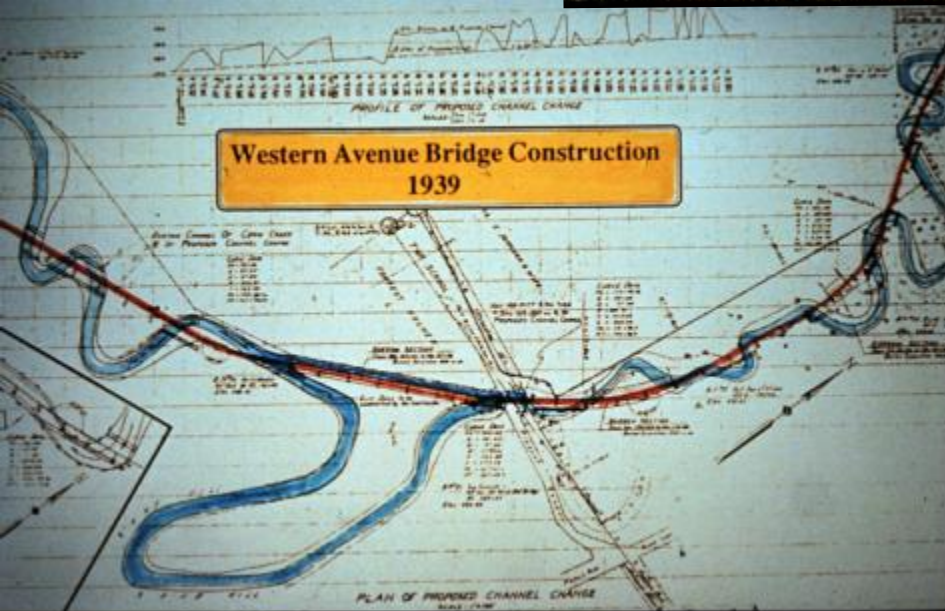
Usually undercut root zone



Four staff standing on stream bed



Crow Creek 1989-2001



**2 days later
Repair of piers**

Live booms after major 1991 flood, which blew out downstream bridge.



Atlanta's Robin Sotir's 1990 bank stabilization with live booms – mounds of compacted soil layers between layers of willow fascines. Mounds are covered with hand-placed riprap and willow stakes

When point bar vegetated.
Sand deposition raised bar 6 ft



remains of boom 2008

4 of 12 booms undercut –
No grade control

Boom being undercut



1998



Blue Creek – IEPA - Lake Pittsfield

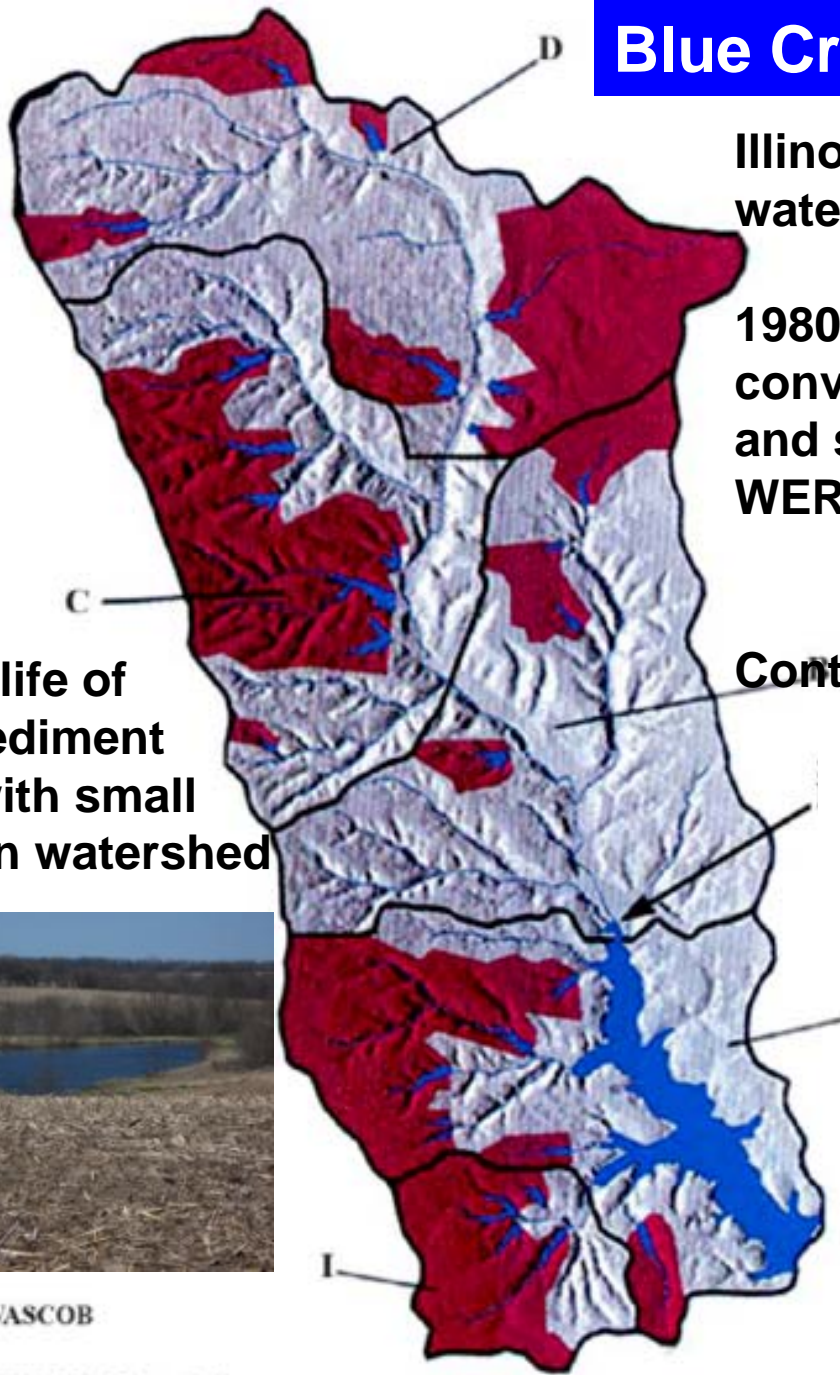
Illinois EPA guidelines for comprehensive watershed approach –

1980 agricultural BMPs and land use conversion from agriculture to pasture and shrub lands reduced erosion BUT WERE NOT ENOUGH

Extend life of large sediment basin with small basins in watershed

Control larger sediment sources near lake

Large Sediment Basin – trapped 90 % of sediment from Blue Creek



- WASCOB
- WASCOB Watershed

Channel incision into sandy loam bank failure



1997

NRCS also considered channel erosion in Blue Creek and installed rock riffles



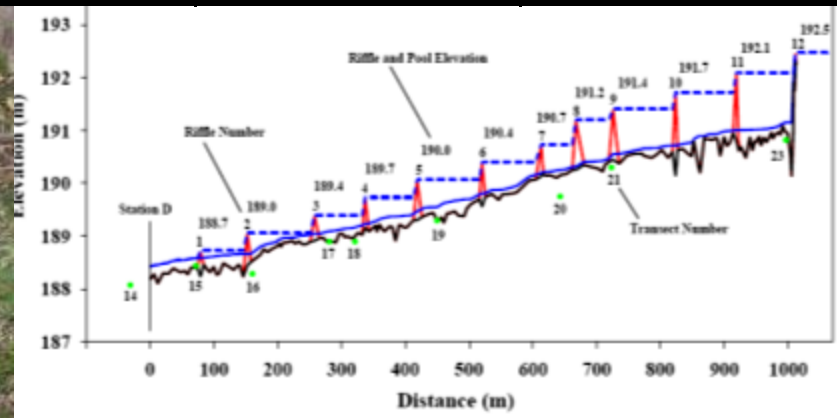
1999



Note leaning tree in following slides



1993-1996 No treatment	1.0 tons/ac/yr 3,411 mg/l ave.	2.3 tons/ac/yr 6,757 mg/l ave.
1996-1998 Ponds and dams	1.6 tons/ac/yr 5,655 mg/l ave.	1.7 tons/ac/yr 4,835 mg/l ave.
1999- 2001 Rock weirs	0.2 tons/ac/yr 1,300 mg/l ave.	0.7 tons/ac/yr 1,550 mg/l ave.



Maintaining deep pools dampens floodwater velocity - even the 2001 100 yr flood





**Nippersink Creek, Northern Illinois
Riffles and remeander of drainage ditch
Chicago District Corps of Engineers
2008**



**Installed riffles after flood discharges
from Wonder Lake increased
channel erosion in meanders**





**Dr. Richard Schultz
Iowa State, Ames, IA**

**12 year study of Bear Creek
Riparian buffers - wetlands**

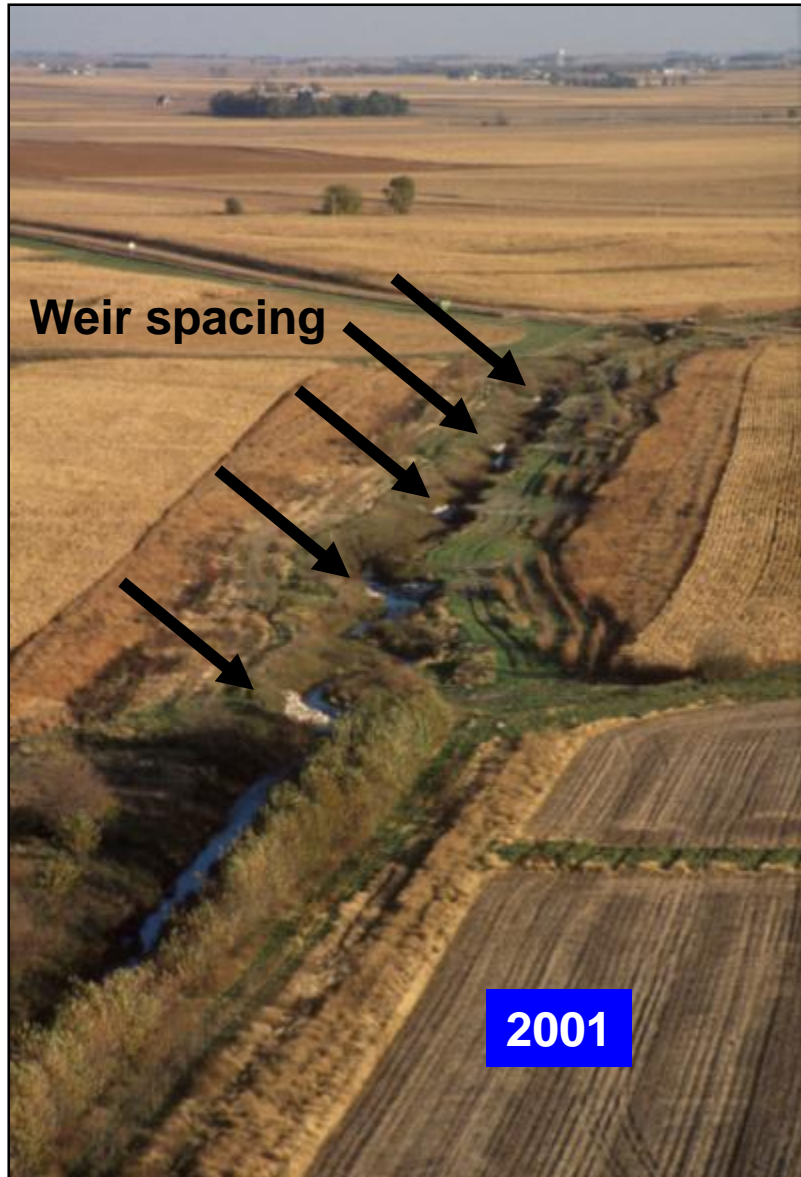
**Future design of
rural stream projects ??**

**Include nutrient reduction,
riparian wetlands, habitat**



**Added rock riffles to reduce
erosion of buffers and bank**

Bear Creek, Iowa State University, old prairie, agriculture, riparian buffer



Weirs spaced about 300 ft apart. Total length of one weir about 75 ft.



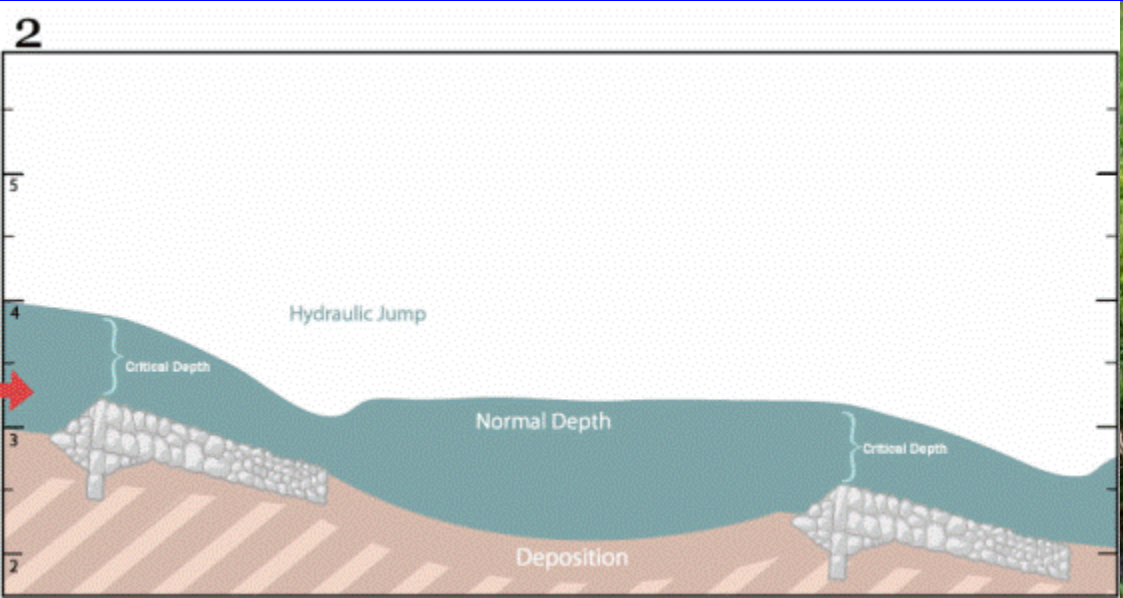
Bear Creek rock riffles after 3 inch rain

Dr Dick Schultz in Bear Creek during Iowa Trees Forever workshop

2007

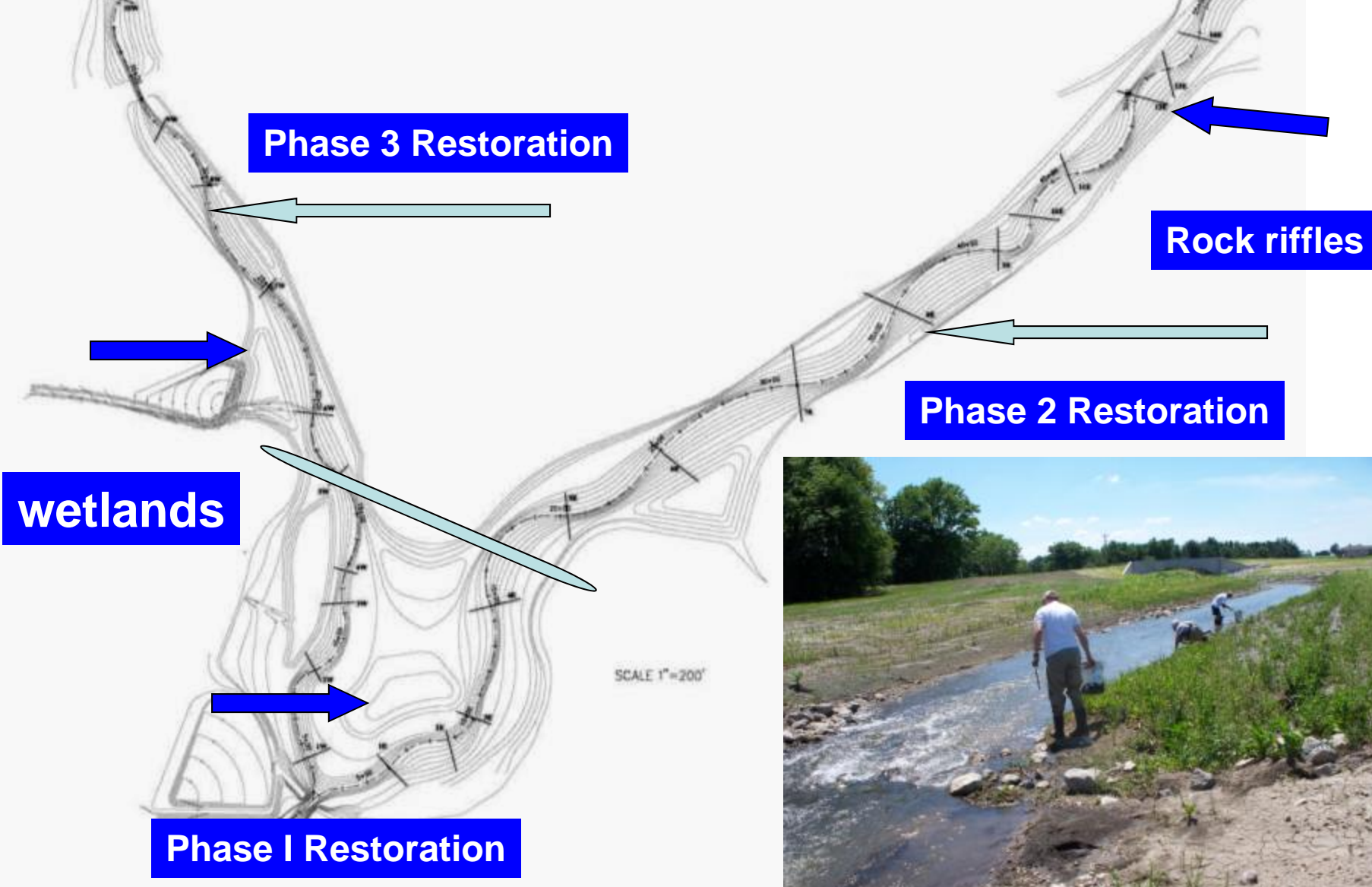


Stream velocity will scour pool deeper and maintain sediment transport since energy line is not decreased



The Grove Stream and Wetlands - IEPA

Slow flood flow, increase nutrient uptake,
Stabilize channel, limit floodplain deposition



**Kickapoo Creek 2008 – IEPA and IDNR funding - in Phase 2 construction
- slow floodwaters and maximize contact with emergent plants
in the floodplain wetlands and wide riparian buffers**

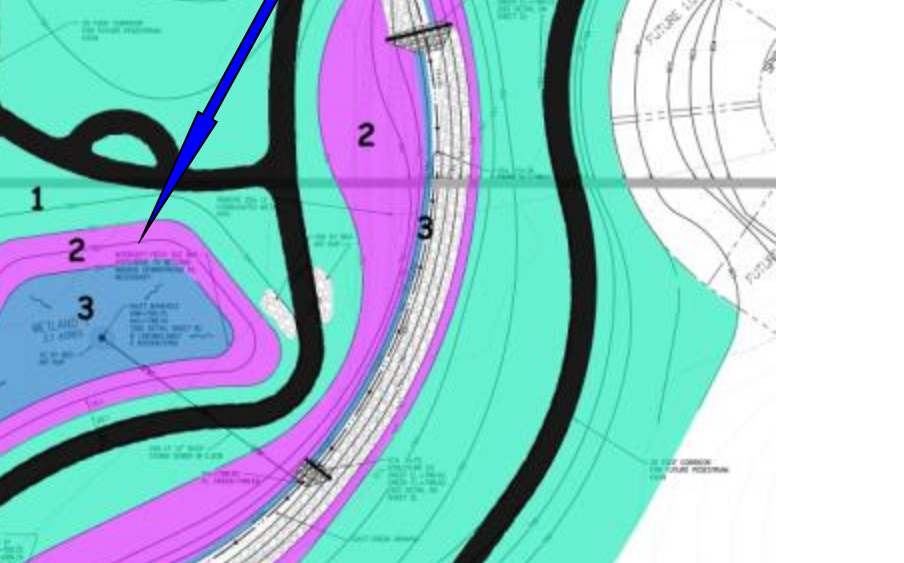


2009

The “IOWA” plan – create larger wetlands but trap less sediment



2007



Establish native prairie and wetland species



DATE AND TIME OF SURVEY: 08/11/11
PROJECT: IRELAND DRIVE ROAD
SCALE: AS SHOWN
DRAWN BY: [unreadable]
CHECKED BY: [unreadable]
DATE: 08/11/11

Phase 2 Restoration

4600 ft of stream
And 6 wetlands

