

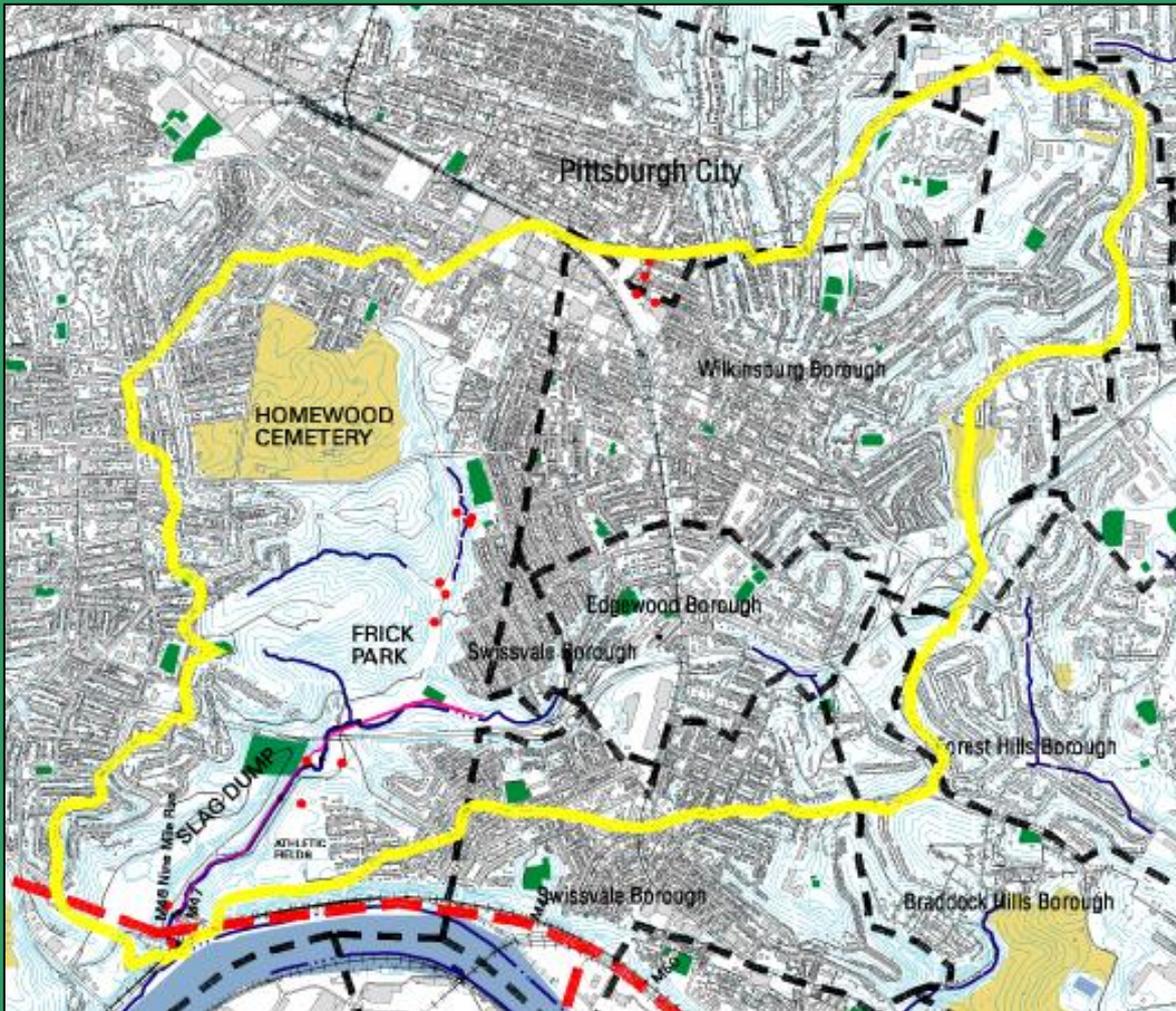
Nine Mile Run Aquatic Ecosystem Restoration

From STINK CREEK
to
Beautiful VALLEY



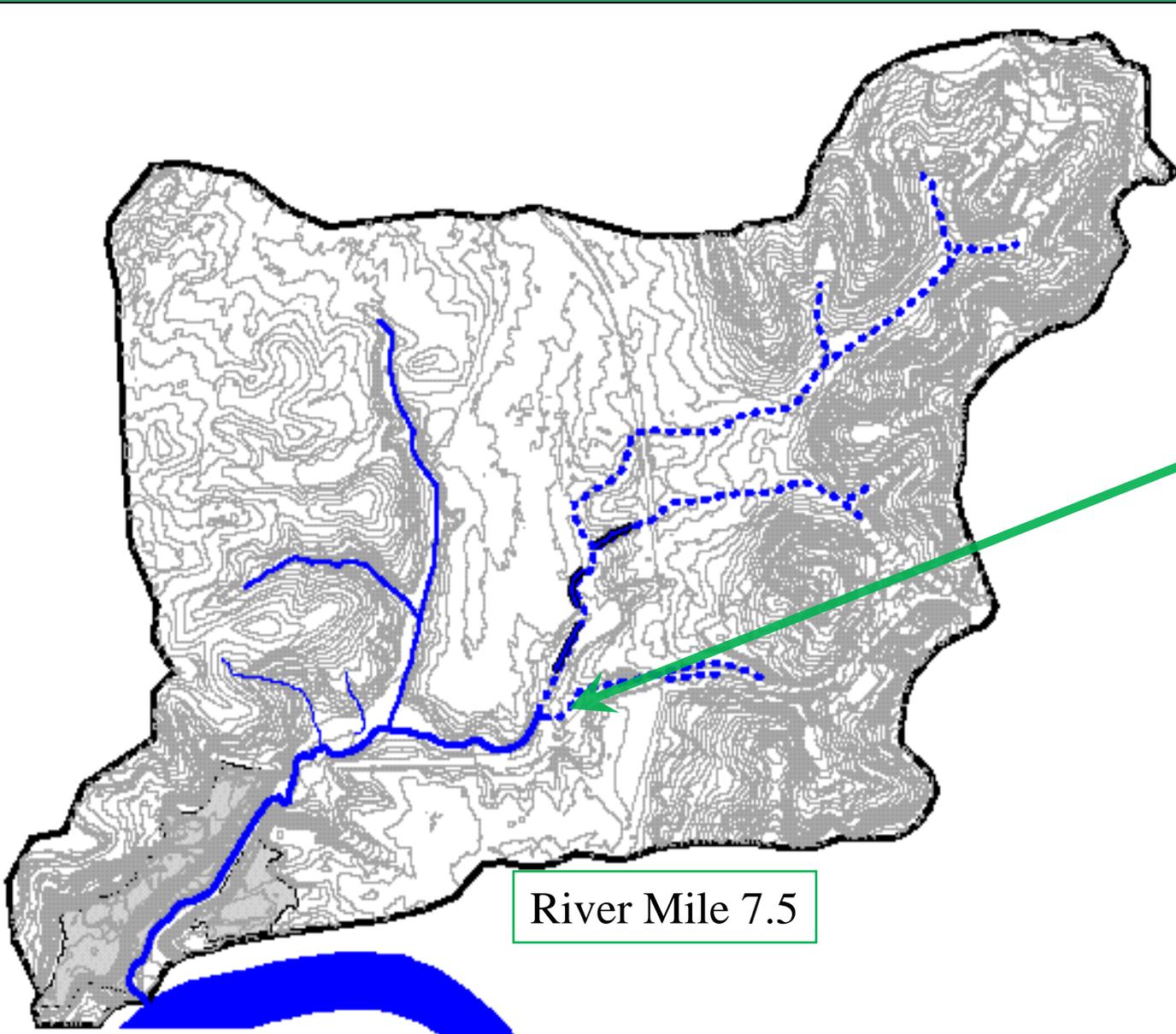
benefits of an urban stream restoration

Nine Mile Run Area



- The total Nine Mile Run watershed is 6.5 square miles
- Upper section of the watershed is primarily hard surface typical of urban watershed
- Lower section is dominated by an industrial dump site.

Nine Mile Run Culverted Stream and Tributaries



Nine Mile Run is an urban stream, 1.8 miles in length from Braddock Avenue Culvert to its mouth at the Monongahela River

River Mile 7.5

THE PROBLEMS

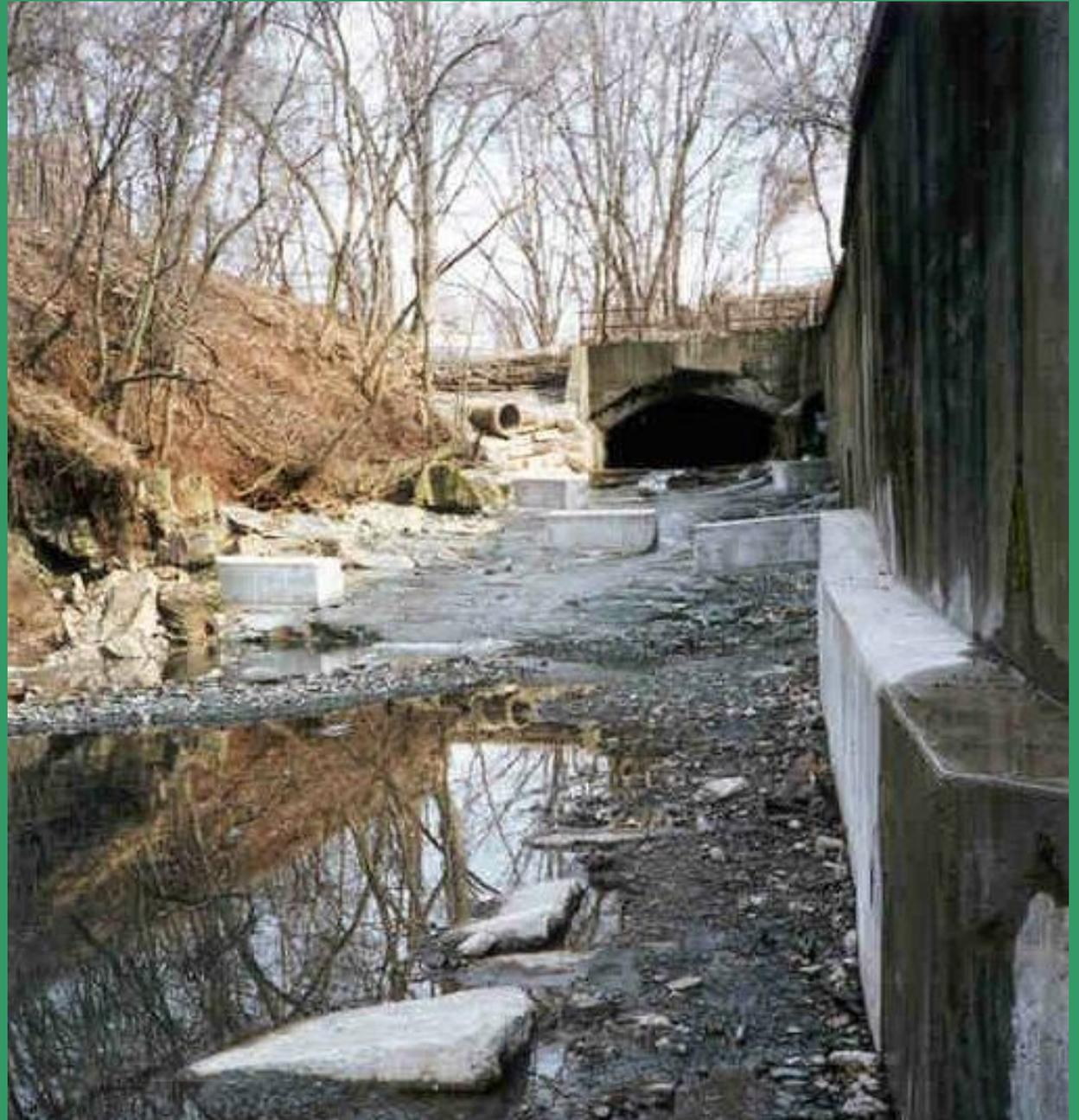
NMR Sec 206 Aquatic

Ecosystem Restoration Project

- Urban Ecosystem
- Storm water runoff -- “flashy”
- Water Quality_(runoff/sewage)
- Slag and Toxicity
- Public Access and Use
- Historic and Future Development

Braddock Avenue Culvert

Dry
weather



THE PROBLEMS

Storm Water Discharges

Braddock
Avenue
Culvert

Wet
Weather



THE PROBLEMS

Sewage

- **Sewer upgrades to control the release of sanitary and combined sewer overflows are not able to be funded under Section 206.**
- **However, sewer repairs are essential to improving Nine Mile Run. Some have been lined or replaced.**

THE PROBLEMS

Sewage



THE PROBLEMS

Sewage



THE PROBLEMS

Sewer Line Crossings



THE PROBLEMS

Sewer Line Crossings



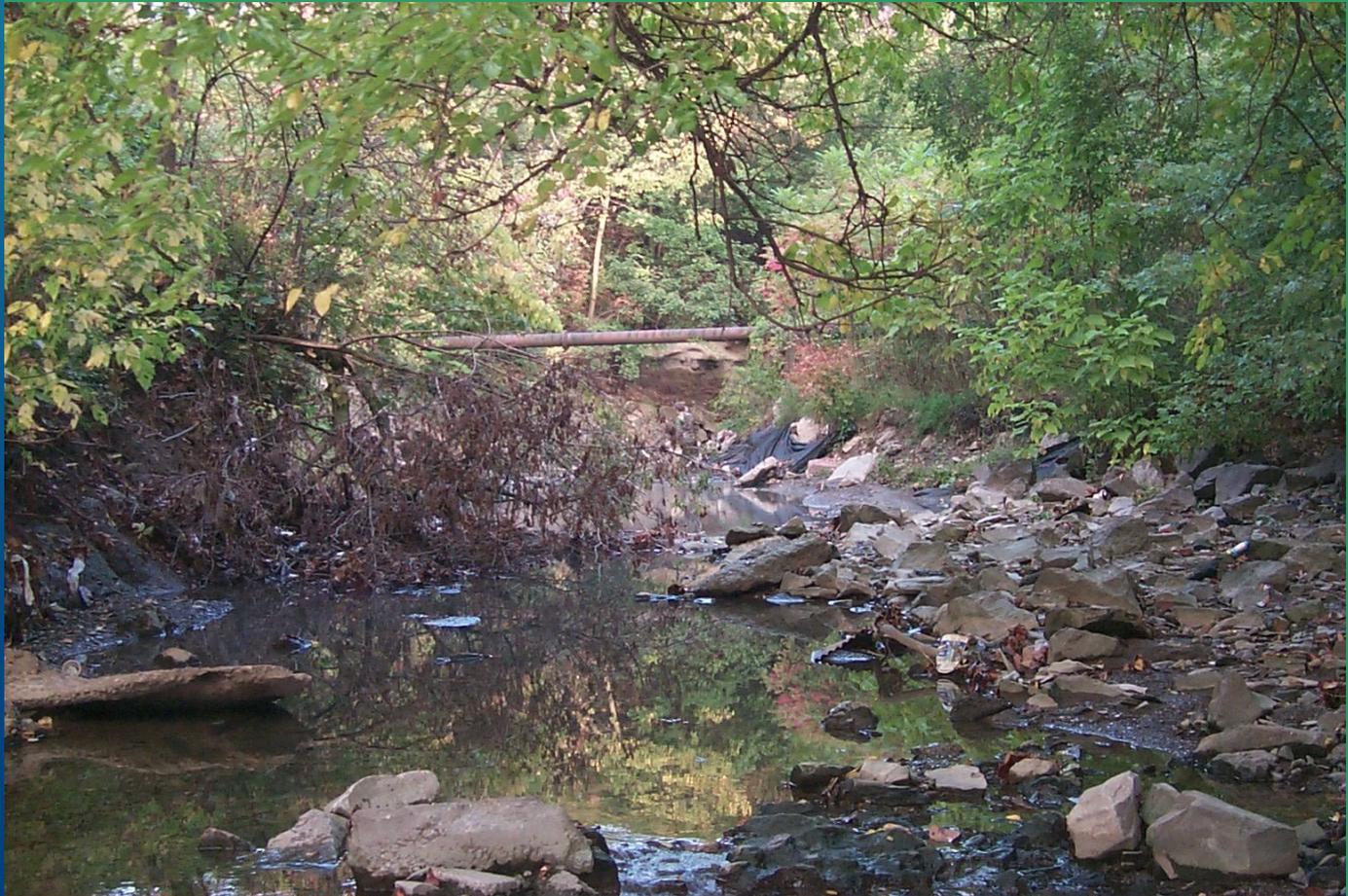
THE PROBLEMS

Erosion



THE PROBLEMS

Headcutting



THE PROBLEMS

Lack of Sinuosity



THE PROBLEMS

Slag leachate



THE PROBLEMS

Public Use



THE PROBLEMS

Public Use



THE PROBLEMS

Public Use



THE PROBLEMS

Public Use



THE PROBLEMS

Future Development



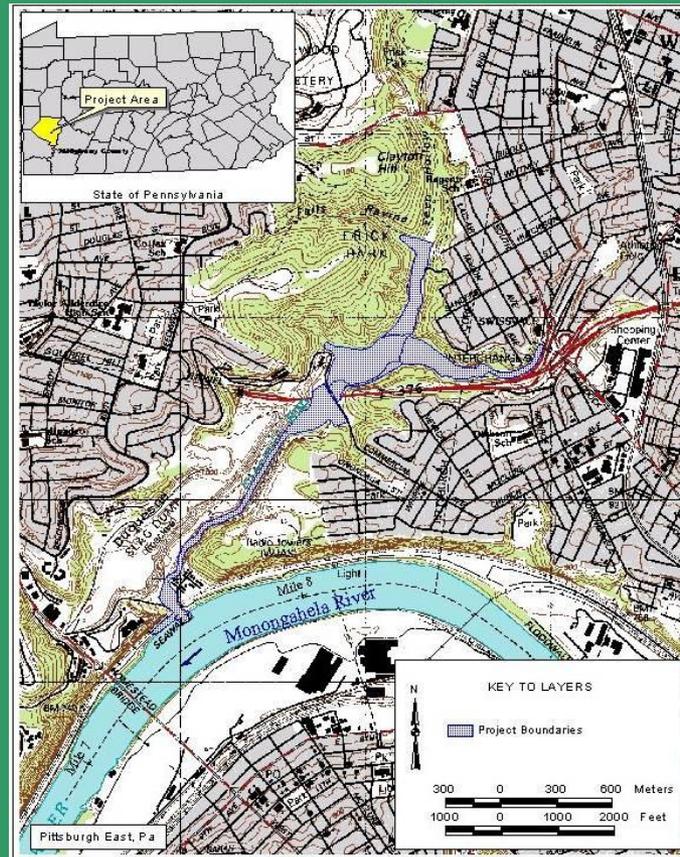
City of Pittsburgh

Nine Mile Run Rivers Conservation Plan

City of Pittsburgh Project Goals

- Protect, restore, and enhance the natural, cultural, and scenic values of a post-industrial urban watershed
- Promote public understanding, appreciation, and enjoyment of this heritage within a sustainable greenway program.

NMR Section 206 Aquatic Ecosystem Restoration Project



CHALLENGES

NMR Sec 206 Aquatic Ecosystem Restoration Project

- **Multiple partners**
- **Multiple agendas**
- **Complicated coordination**
- **Real estate issues with utility owners**

NMR Section 206 Aquatic Ecosystem Restoration Project

Team:

- US Army Corps of Engineers
- City of Pittsburgh
- Three Rivers Wet Weather Demonstration Project (TRWWDP)
- Allegheny County Sanitary Authority (Alcosan)

PROPOSED SOLUTIONS

NMR Sec 206 Aquatic Ecosystem Restoration Project

Goals:

- Improve and restore aquatic habitat downstream of Braddock Avenue
- Stabilize banks to prevent erosion and sedimentation
- Increase total wetland acreage to protect and improve downstream habitat
- Re-establish a native species fishery
- Extend embayment area at mouth of NMR

PROPOSED SOLUTIONS

NMR Sec 206 Aquatic Ecosystem Restoration Project

Goals:

- Create a unique habitat
- Preserve one of the last free flowing streams in the City
- Produce an enhanced greenway connection from Frick Park to the Monongahela River.

SOLUTIONS

Stream Bank Stabilization:

Techniques include:

- **Structural -- rip rap**
- **Bioengineering -- boulders**
- **Biological --**



SOLUTIONS



SOLUTIONS

R-5 & R-6 stone on left (used for key & to choke larger stone), large riprap on right used for Engineered Rocked Riffles (ERR), Single Stone Bendway Weirs (SSBW), & bank stabilization.



SOLUTIONS



12-2009



SOLUTIONS

Changes to Stream Form and Structure:

- **Modify the stream channel to incorporate a variety of environments--pools, riffles, runs, meandering**
- **Create flow avoidance structures to provide sheltered habitat for fish and other organisms during highest flow periods**
- **Create an embayment for habitat at mouth of stream along Mon River**

SOLUTIONS



SOLUTIONS



SOLUTIONS



SOLUTIONS



SOLUTIONS

Changes to Stream Form and Structure:

Create optimum conditions in terms of:

- **Temperature**
- **Pool velocity and depth**
- **Riffle velocity and depth**
- **Adequate Dissolved Oxygen**

SOLUTIONS



SOLUTIONS



06/13/2006

NMR Sec 206 Aquatic Ecosystem Restoration Project

Costs:

- **\$7.69 Million planning through construction cost**
- **Cost share was 65% Federal cost and 35% Non-Federal**
- **Work-in-kind and Real Estate credit counted toward city's 35% share**

PARTNERS

NMR Sec 206 Aquatic Ecosystem Restoration Project



PARTNERS

NMR Sec 206 Aquatic Ecosystem Restoration Project



PARTNERS

NINE MILE RUN
WATERSHED ASSOCIATION



Operation, Maintenance, Monitoring NMR Section 206 Aquatic Ecosystem Restoration Project

Team:

- City of Pittsburgh
- Nine Mile Run Watershed Association
- US Army Corps of Engineers
- Three Rivers Wet Weather Demonstration Project (TRWWDP)
- Allegheny County Sanitary Authority (Alcosan)

Nine Mile Run Watershed Association NMR Aquatic Ecosystem Restoration

Work Plan:

- **Monitoring, sampling and/or bio-assessment to fill critical data gaps**
 - Streambed/bank Erosion Survey
 - geo-morphologic analysis
- **Watershed modeling**
- **Public Involvement**
- **Development of Watershed Management Plan**

Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring

Re-establish a native species fishery:

- Discussions with the Pennsylvania Fish and Boat Commission indicate that the species expected to be in a tributary to the Monongahela, such as Nine Mile Run, are primarily varieties of fish such as:
 - bluegill
 - sunfish
 - minnow
 - darters
 - redhorse
 - suckers,
 - creek chub
 - smallmouth bass
(possible)
 - game fish (occasional)

Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring

FISH SAMPLING RESULTS

- **3 Sport fish found**
- **Total fish species + 140%**
- **# of Fish + 130%**
- **Biomass of fish sampled + 650%**
- **GOAL ATTAINED!!!**

Operation, Maintenance, Monitoring



Operation, Maintenance, Monitoring

Reconstruction Dec. 2009
from big summer storm (June 9)
damage

Bend #2

Rebuild the Engineered Rocked Riffle
& extend & vegetate keys.

Operation, Maintenance, Monitoring

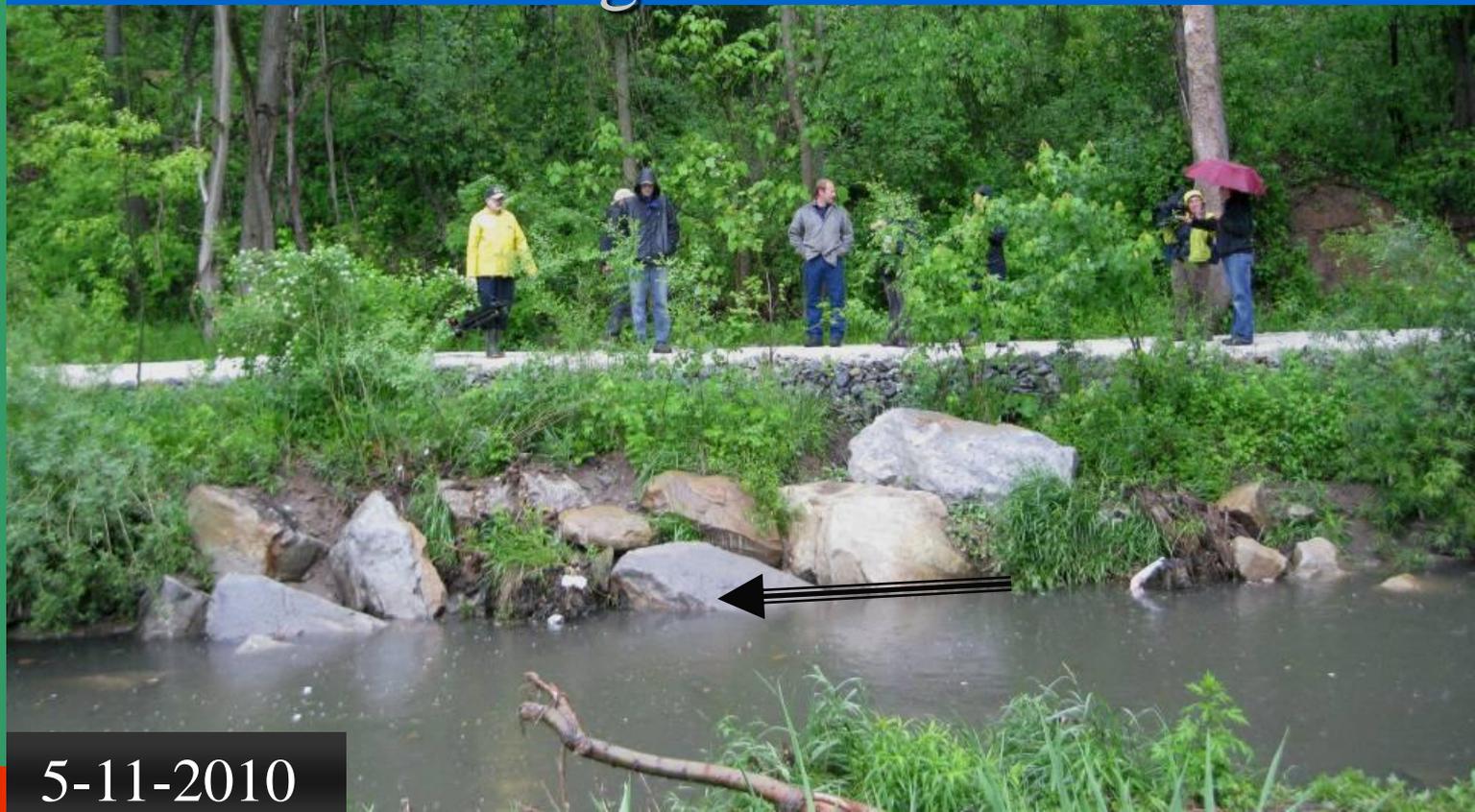
bank protection, veg, & Single Bendway Weir . Flat bench will provide flow to the DS point bar.



12-9-2009

Operation, Maintenance, Monitoring

RAIN & HIGHER FLOW-Looking @ a right bank repair. Deep but Bendway Weirs are working well.



5-11-2010

RAIN & HIGHER FLOW-Looking DS @ great Bend #4 veg.



5-11-2010

Operation, Maintenance, Monitoring

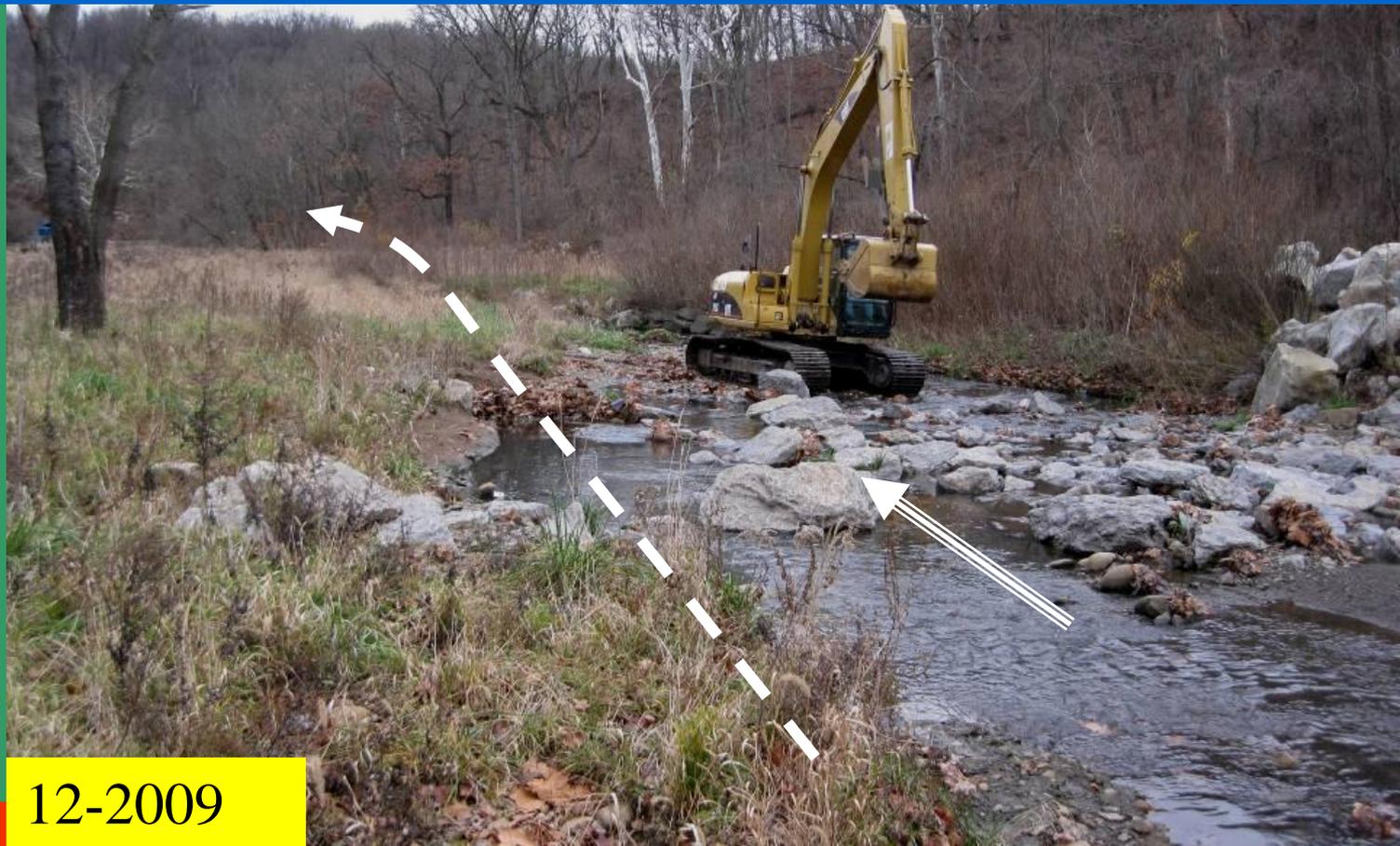
RAIN & HIGHER FLOW-Looking DS @
where the old channel was located
(between hill & tree line)



5-11-2010

Operation, Maintenance, Monitoring

Looking DS @ blown out left key & left bank of the Bend #5 ERR (all to left of dotted line).



12-2009

Operation, Maintenance, Monitoring

Looking DS into Bend #6. Bend protection is in good shape, willow growth is dense & vigorous.



Operation, Maintenance, Monitoring

RAIN & HIGHER FLOW-Looking DS @
the DS crossing & into Bend #6. Flow
well-aligned.



5-11-2010

NMR Section 206 Aquatic Ecosystem Restoration Project

