# Nine Mile Run Aquatic Ecosystem Restoration

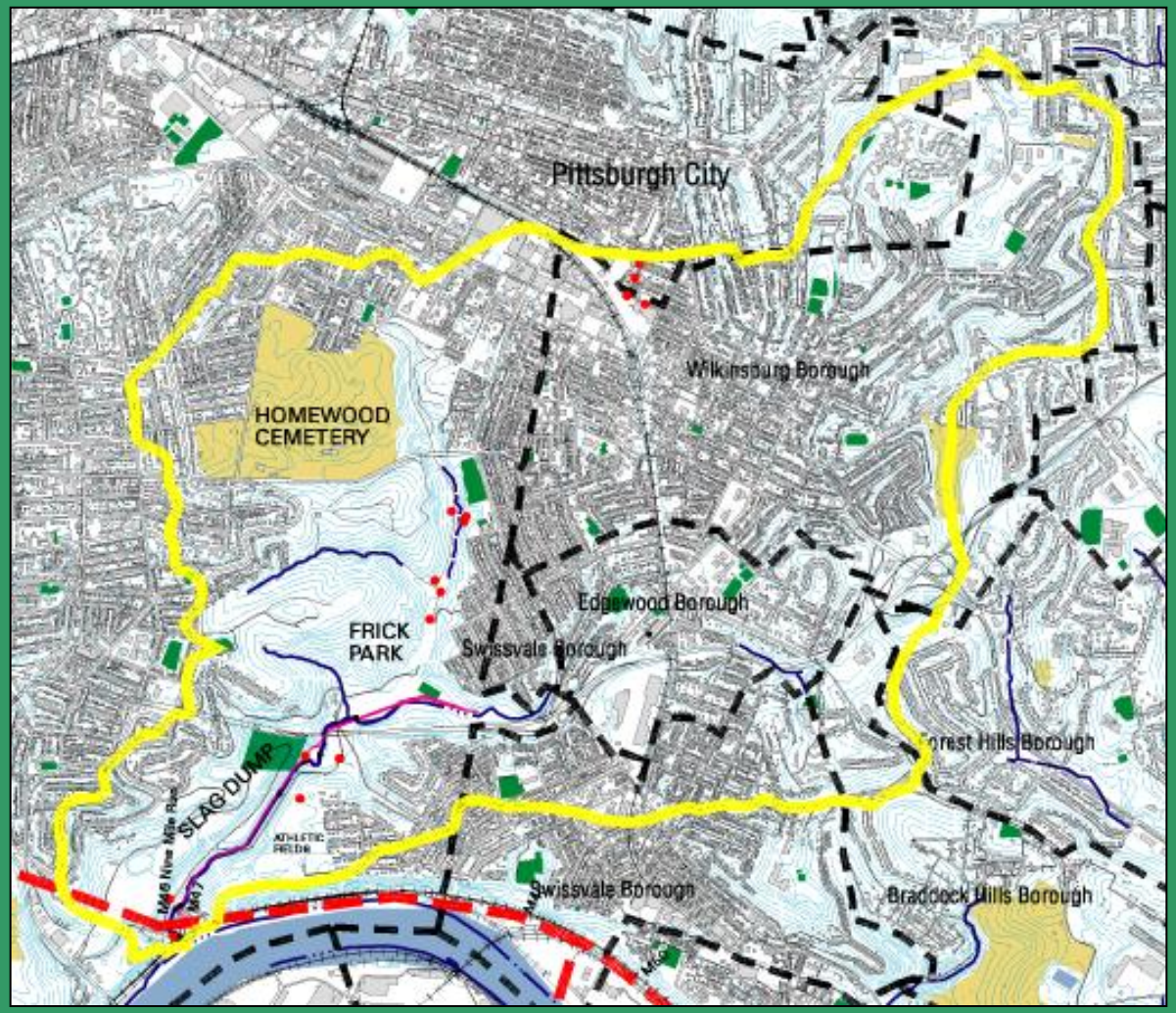
From STINK CREEK

to

B e a u t i f u l  VALLEY

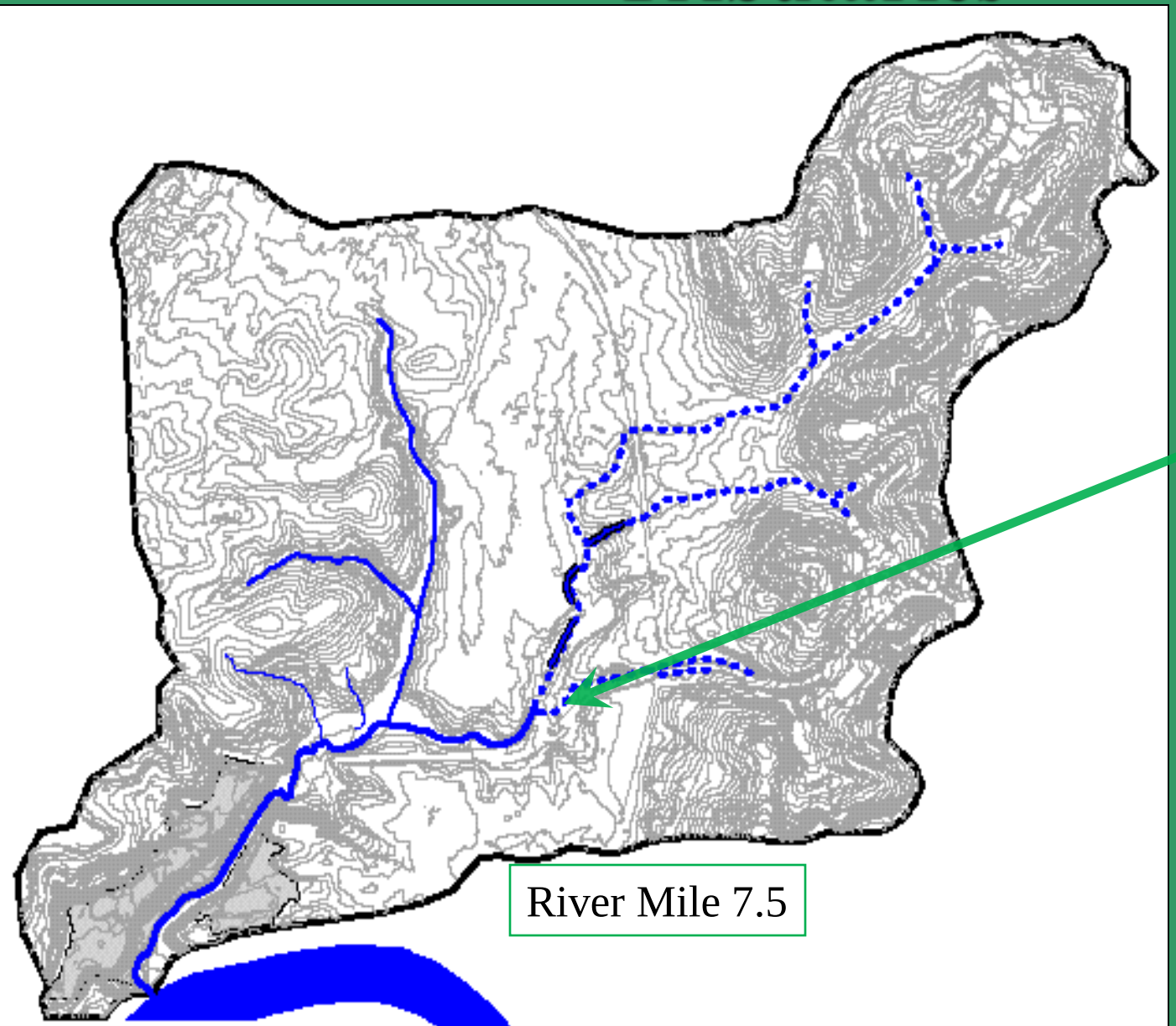

benefits of an urban stream restoration

# 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

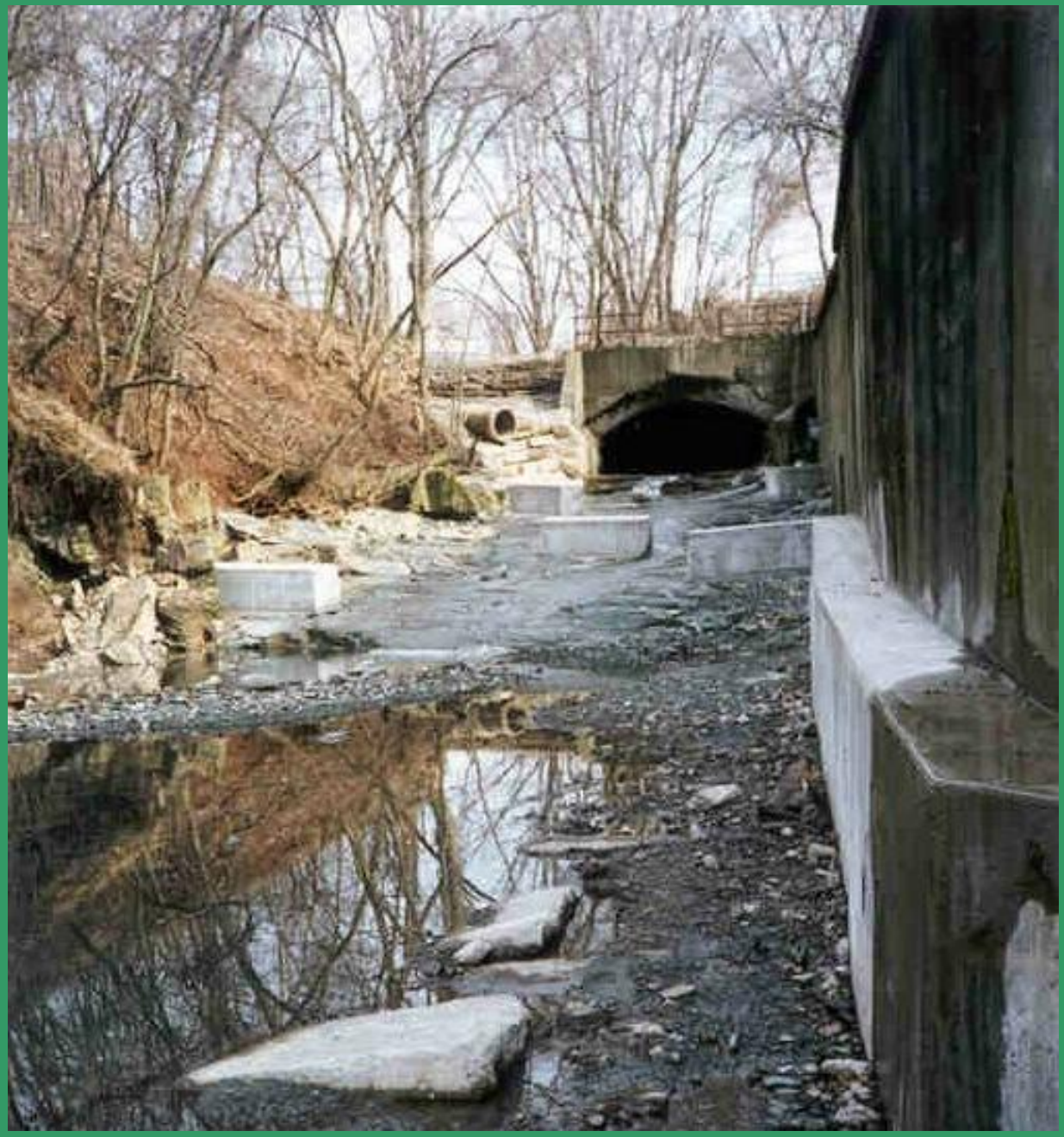
# THE PROBLEMS

## 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

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## Sewer Line Crossings

# THE PROBLEMS

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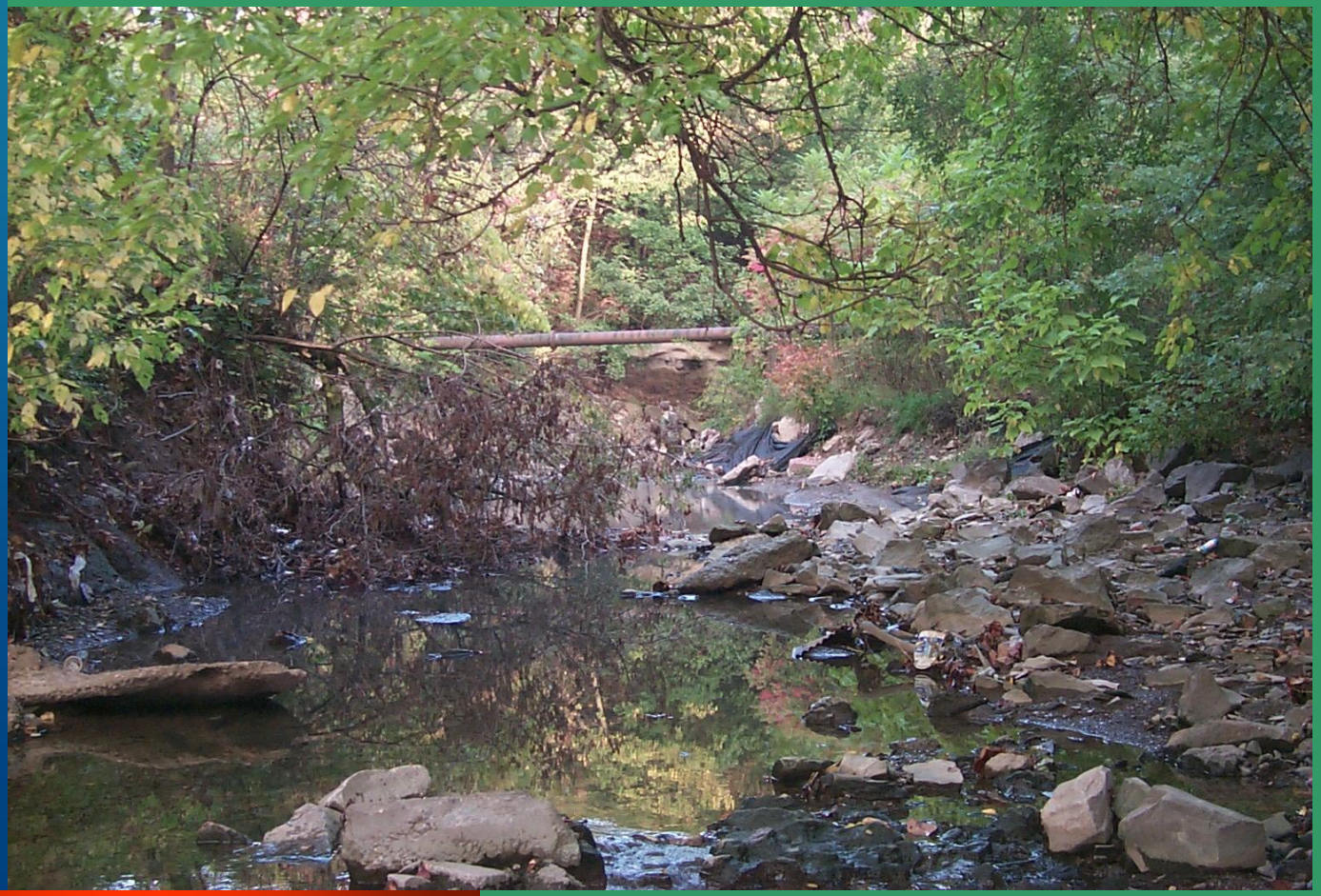
# THE PROBLEMS

## Erosion

# THE PROBLEMS

## Headcutting



# THE PROBLEMS

## Lack of Sinuosity

# THE PROBLEMS

## Slag **leachate**

# THE PROBLEMS

## Public Use

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THE PROBLEMS

# Future Development

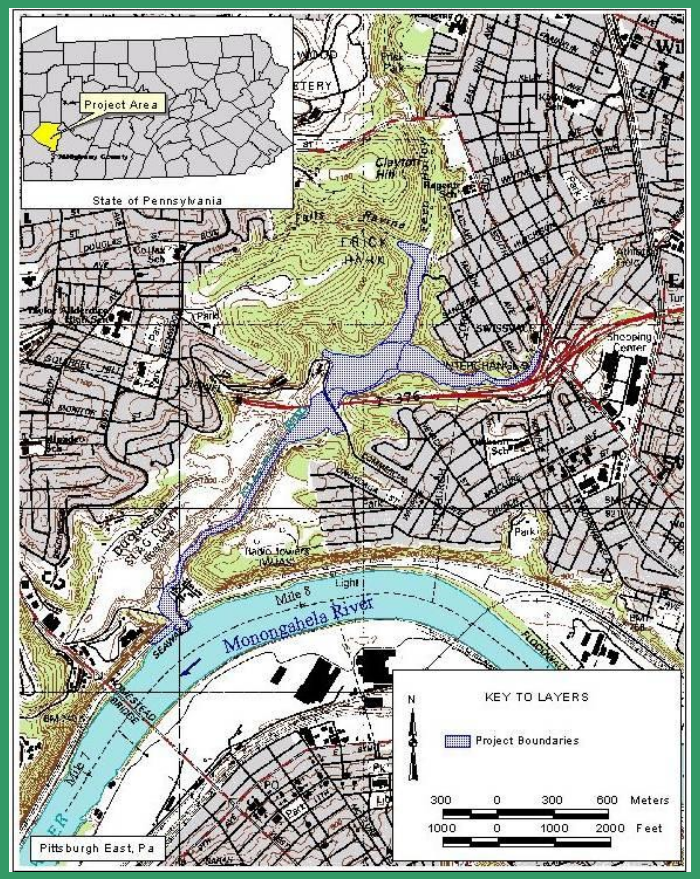
# City of Pittsburgh

# 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 206Aquatic 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

# 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

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# 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

# 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

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# 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

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# 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

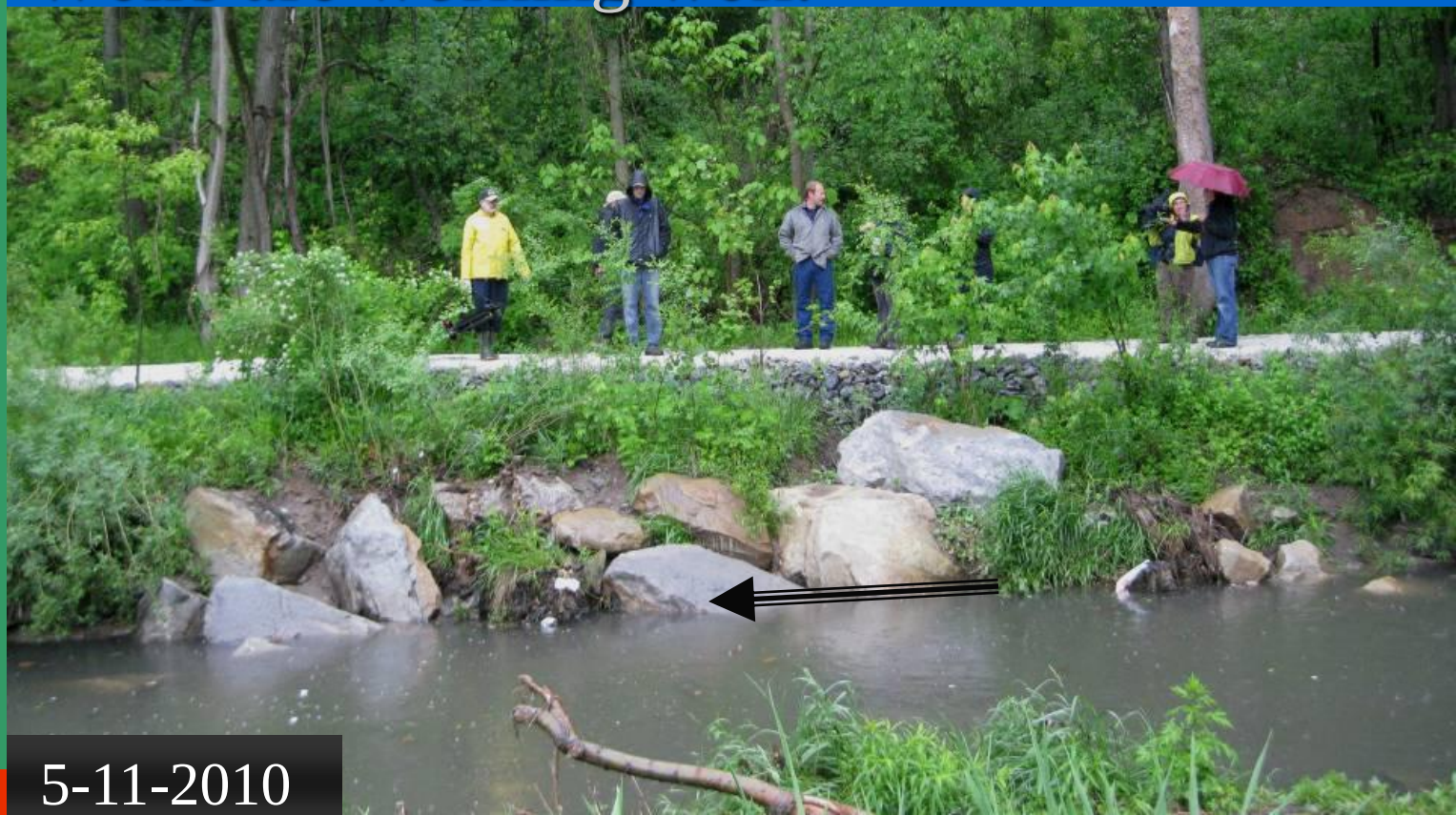
Bend #2
Rebuild the Engineered Rocked Riffle & extend & vegetate keys.

# Operation, Maintenance, Monitoring

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

# Operation, Maintenance, Monitoring

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



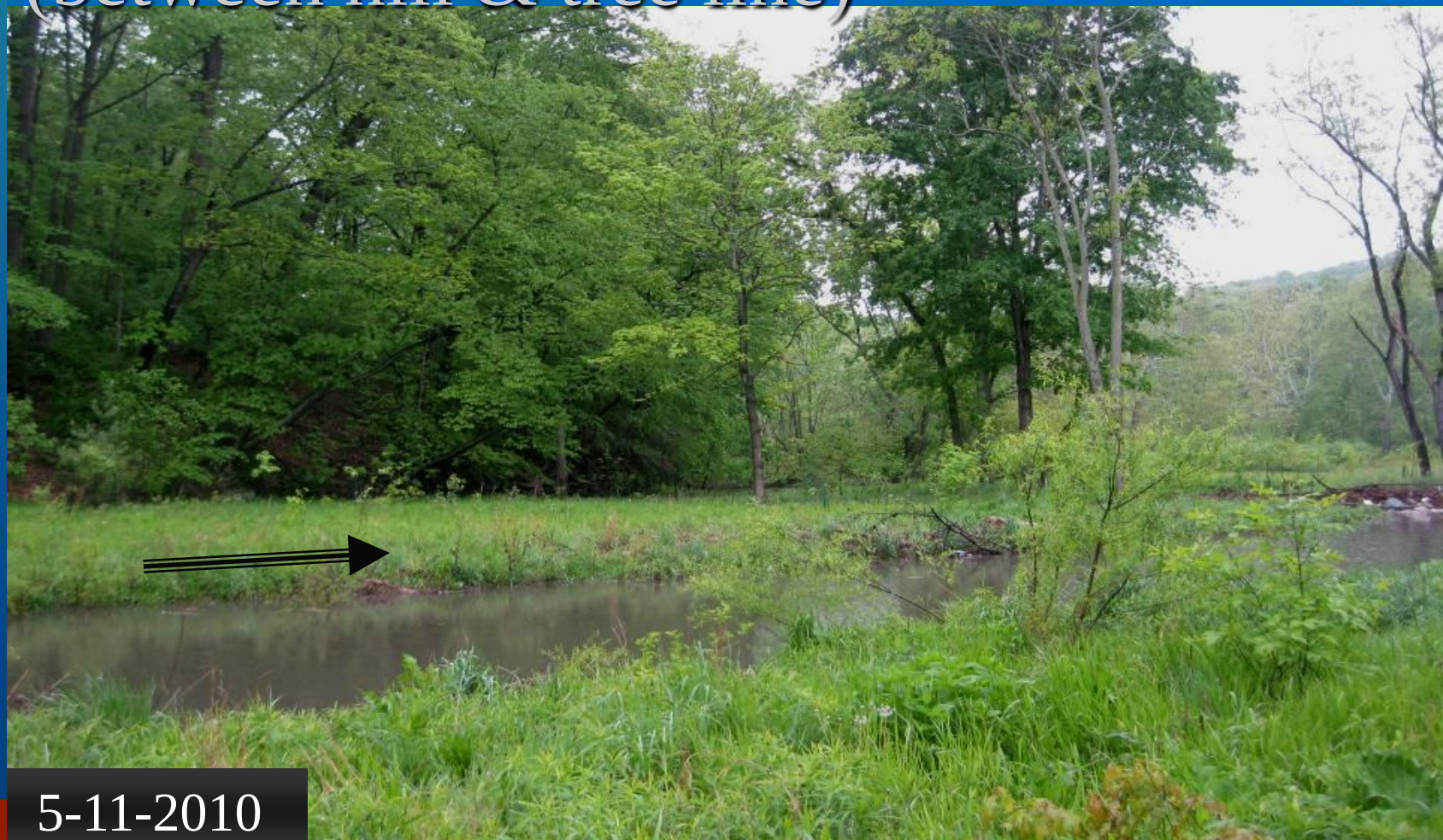
5-11-2010

# 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