HUFF RUN STREAM RESTORATION PROJECT

HOW MITIGATION MONEYS ARE HELPING COMPLETE THE STORY

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WHERE IS HUFF RUN?

- TUSCARAWAS AND CARROLL COUNTIES
- SMALL HUC-12 WATERSHED
- DRAINS TO CONOTTON CREEK JUST
  UPSTREAM OF CONFLUENCE WITH
  TUSCARAWAS RIVER
- STREAM IS 9.3 MILES LONG AND
  DRAINS 14.1 SQUARE MILES
HUFF RUN WATERSHED RESTORATION PARTNERSHIP

• Nonprofit registered in 1996
• Formed with community interest & agency support
• Still meet quarterly
• Fundraising Arm – Grants & Donations
MINING FOR COAL & CLAY IN HUFF RUN STARTED IN 1834
WATERSHED ACTION PLAN (WAP)

• Written in 2001, Endorsed in 2006

• Included extraction history, watershed inventory, impairments beyond AMD, implementation goals & partner information
HUFF RUN WATERSHED MISSION

TO RESTORE THE HUFF RUN WATERSHED BY IMPROVING WATER QUALITY AND ENHANCING WILDLIFE HABITAT THROUGH COMMUNITY SUPPORT AND INVOLVEMENT

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AMDAT PLAN/TMDL

- 1988 – FIRST PROJECT
- 1996 – HRWRP FORMED
- 2000 – FIRST ACID MINE DRAINAGE ABATEMENT & TREATMENT PLAN (TMDL)
  - RESTORATION OR REMEDIATION OF THE EFFECTS OF PAST SURFACE AND UNDERGROUND COAL MINING WITHIN THE WATERSHED.
  - OUTLINED ALL THE AMD SOURCES AND MADE RECOMMENDATIONS FOR RESTORATION/TREATMENT
  - APPROVED AS AN EQUIVALENT OHIO EPA TMDL
PROJECTS IDENTIFIED & PRIORITIZED

#1 HR-16 (HARSHA)
#2 HR-12 (BELDEN)
#3 HR-13A AND HR-13B (LINDEN)
#4 HR-42 (FERN HILL)
#5 HR-31 (SOUTHSIDE TIPPLE/FARR)
#6 HR-33 (LYONS)
#7 HR-17A (HARSHA)
#8 HR-17B (HARSHA)
HUFF RUN TECHNICAL COMMITTEE MEETINGS
FUNDING SUPPORT

- ODNR Watershed Coordinator Grant for 16 years
- US EPA Targeted Watershed Grant for Beldon
- Numerous Office of Surface Mining Grants
- Ohio EPA Section 319 Clean Water Grants
- Funding support on every project by ODNR – Division of Mineral Resources Management
# PROJECTS COMPLETED

#1  HR-16 (HARSHA) : CONSTRUCTED 2006
#2  HR-12 (BELDEN) : CONSTRUCTED 2008
#3  HR-13A AND HR-13B (LINDEN) : CONSTRUCTED 2002
#4  HR-42 (FERN HILL) : CONSTRUCTED 2008
#5  HR-31 (SOUTHSIDE TIPPLE/FARR) : CONSTRUCTED 2002
#6  HR-33 (LYONS) : CONSTRUCTED 2005/2011
#7  HR-17A (HARSHA) : CONSTRUCTED 2006
#8  HR-17B (HARSHA) : CONSTRUCTED 2006
HOW’S THE WATER QUALITY?

- AFTER 20 YEARS OF RESTORATION EFFORTS BY HRWRP, ODNR, OSM, OEPA & USEPA
- AFTER 20 PROJECTS
- AFTER MORE THAN $6 IN FUNDING
AMDAT ADDENDUM IN 2013

- **SUCCESSFUL** in improving chemical and biological water quality
- The majority of water quality improvements have occurred in the **LOWER 2.0 RIVER MILES**
- **PH OF 6.5** or higher has been maintained in the Huff Run main stem
- Pre-treatment **ACID LOAD** has been **reduced by 100%**
- Pre-treatment **METAL LOAD** has been **reduced by 54%**
- **IBI** at the mouth has increased from a **16 TO A 30**
- **INCREASE** in the number of species present in a given sample from **1 TO 16**
H O W E V E R

HUFF RUN AMDAT

<table>
<thead>
<tr>
<th>River Mile</th>
<th>QHEI</th>
<th>IBI</th>
<th>MAIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4 – Sattler Bottom Road</td>
<td>66</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>1.4 – Lindentree Road</td>
<td>71</td>
<td>32</td>
<td>2</td>
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</table>

- QHEI & IBI MEET WWH CRITERIA
- MAIS MACROINVERTEBRATE AGGREGATED INDEX FOR STREAMS) DO NOT MEET WWH CRITERIA
MACROINVERTEBRATES

• MACROINVERTEBRATE POPULATIONS HAVE BEEN SLOWER TO RECOVER

• SHOWING ONLY SLIGHT INCREASES IN MAIS SCORES FROM 2006 TO 2014

• LIMITED AVAILABILITY OF MICROHABITAT, CAUSED BY THE EXCESSIVE AMOUNT OF IRON PRECIPITATE REMAINING. THIS PRECIPITATE COATS THE SUBSTRATE

• GENERAL TREND IS A DECREASE IN THE MAIS SCORES FROM THE HEADWATERS TO THE MOUTH
Huff Run

- Average QHEI of 60
HUFF RUN

- LIMITING METRICS – SUBSTRATE QUALITY & EMBEDDEDNESS

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LYONS OUTFALL

- 2005 CONSTRUCTION
- RECLAIMING TOXIC MINE SPOIL & AMD PASSIVE TREATMENT
- SUCCESSFUL IN REDUCTION OF ACID LOADS
- STILL CONTRIBUTES 43% IRON LOAD TO HUFF RUN
- NEEDS SETTLING BASIN
LYONS
FARR OUTFALL

- 2002 CONSTRUCTION
- AMD PASSIVE TREATMENT OF DEEP MINE DRAINAGE
- CONSTRUCTION UNCOVERED A FLOW 3X WHAT WAS PLANNED FOR TREATMENT
  - SYSTEM DRastically UNDERsIZED
- SLATED FOR RE-CONSTRUCTION IN 2017/2018
- NET ALKALINE DISCHARGE
- CONTRIBUTES 38% OF THE IRON LOAD TO HUFF RUN
RESTORATION PLAN

• REPLACE IRON PRECIPITATE EMBEDDED SUBSTRATES

• BRING IN NEW GRAVEL/COBBLE MIXTURE

• BUILD A NEW BANKFULL CHANNEL ADJACENT TO THE EXISTING HUFF RUN

• ABANDONED EXISTING CHANNEL FOR FUTURE AMD TREATMENT SETTLING
PERMITTEE RESPONSIBLE MITIGATION

IN 2015 ODOT RFP FOR STREAM MITIGATION FOR THE SUM-76 PAVEMENT & LANE ADDITION PROJECT

- TUSCARAWAS RIVER WATERSHED
- 8,000 LF OF STREAM RESTORATION
- $1.7 MILLION
- RFP PROCESS REQUESTED SPECIFIC PROJECT DETAILS
HUFF RUN STREAM RESTORATION PROJECT

- TUSCAWARUS RIVER WATERSHED
- +11,000 LF STREAM RESTORATION
- CATEGORY 3 WETLANDS
- AMD IMPACTS
- HISTORIC IRON PRECIPITATE EMBEDDED SUBSTRATES
- LIMITED MACROINVERTEBRATE HABITAT
- REPLACE SUBSTRATE OR CREATE A NEW CHANNEL

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PROJECT – FUNDING MATCH

• PROJECT WITH SPECIFIC WATER QUALITY IMPROVEMENT GOALS
  • NOT JUST WILL MEET MITIGATION NEED

• FUNDING WITH PARAMETERS THAT MEET THE AVAILABLE PROJECT
  • WITHOUT THE TRADITIONAL RESTRAINTS LIKE MATCH REQUIREMENTS, LOW BID PROCESS OR FREE LAND USE
INTER-PROJECT QUALITY ASSURANCE

Oxbow River & Stream Restoration

ODOT  
US ACOE  
Ohio EPA

HRWRP/Rural Action  
ODNR

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PROPERTY OWNERSHIP

10 LANDOWNERS

• VILLAGE OF MINERAL CITY
• MUSKINGUM WATERSHED CONSERVANCY DISTRICT (MWCD)
• DECEASED LANDOWNER/PROPERTY HAS NOT TRANSFERRED
• TRANSFER OF OWNERSHIP SINCE PROJECT STARTED
CONSERVATION EASEMENT OR ENVIRONMENTAL COVENANT

- Riparian width 100 to 200’ from the stream bank
- Both sides of the stream
- Legal agreement between landowner and private or public entity that places limits on land use in order to preserve the property's resources and features.
- The easement seeks to protect specific conservation values, such as water quality.
- It is legally binding, in perpetuity, regardless of whether the ownership changes.
CONSERVATION EASEMENT OR ENVIRONMENTAL COVENANT

• UNLIKE PROJECTS UP TO THIS POINT,

LANDOWNERS COULD GET PAID TO PLACE AN EASEMENT ON THEIR PROPERTY
PERFORMANCE STANDARDS

• CREATE A STABLE CHANNEL FORM.

• ADDITION OF COARSE SAND, GRAVEL AND COBBLE SUBSTRATES AND THE CREATION OF DEFINED RIFFLE-POOL FEATURES SHOULD PROVIDE QUALITY MACROINVERTEBRATE HABITAT WHICH IN TURN SHOULD INCREASE THE BIOLOGICAL DIVERSITY.
PREDICTION

• CAN WE ACHIEVE A WATER QUALITY IMPROVEMENT?
WATER QUALITY IMPROVEMENT PREDICTION

• **INCREASE** IN QHEI SCORE A MINIMUM OF 10 POINTS
  • BASED ON IMPROVEMENTS TO SUBSTRATE CONDITIONS.

• **INCREASE** IN MAIS SCORE A MINIMUM INCREASE OF 7 POINTS
  • BASED ON THE INCREASE AND IMPROVED QUALITY OF SUBSTRATE MATERIALS

• **INCREASE** IN IBI SCORE A MINIMUM OF 6 POINTS
  • BASED ON THE INCREASE OF AVAILABLE MACROINVERTEBRATES AS A FOOD SOURCE
RECRUITMENT

CONOTTON CREEK - THE RECEIVING STREAM

- LARGE POPULATION OF NORTHERN PIKE, LARGE STREAM SUCKER SPECIES LIKE THE SILVER REDHORSE (*MOXOSTOMA ANISURIUM*), AND GAME SPECIES SUCH AS BLACK CRAPPIE (*POMOXIS NIGROMACULATUS*), YELLOW PERCH (*PERCA FLAVESCENS*) AND LARGEMOUTH BASS (*MICROPTEROUS SALMOIDES*)

- POTENTIAL MIGRATION TO THE LOWER REACHES OF HUFF RUN
NEW CHANNEL DESIGN

• NATURAL CHANNEL DESIGN TECHNIQUES
• EMPHASIS ON QHEI METRICS
  • SUBSTRATE
  • IN-STREAM HABITAT
  • STABLE CHANNEL MORPHOLOGY
  • MINIMIZE SITE IMPACTS – WORK ACCESS AREA

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SUBSTRATE & VERTICAL SINUOSITY

INTERSTITIAL FLOWS

Stream Flow

Riffles

pool

DOWNWELLING

UPWELLING

PERMEABLE HYDROHEIC SEDIMENTS

bedrock

pool

Riffles

Stream Flow

bedrock

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FLOODPLAIN CONNECTION

• ENTIRE PROJECT AREA IS IN THE USACOE FLOODAGE EASEMENT FOR THE DOVER DAM

• CONSTRUCTION OF A BANKFULL CHANNEL ONLY

• NO ADDITIONAL FLOODPLAIN CUT REQUIRED