



Emerging Trends in Ecological Offsets

Citizens Advisory Council Meeting

November 14, 2017



Agenda

- Overview of Ecological Offsets
 - Market-based, generating offset products, at large scale
- Wetland/Stream Mitigation
 - Mitigation Banking
 - Site Selection Process
 - Project Examples & Results
- Endangered Species Mitigation
- Water Quality/ Stormwater Offsets
- Additional Considerations & Topics
 - Regulatory Challenges

Ecological Offset Drivers



Compensatory Mitigation Requirements

National and state regulations requiring the protection, restoration, improvement, and/or offsetting negative impacts on critical natural resources, i.e. compliance with Clean Water Act, Endangered Species Act, etc.



Environmental Lawsuits

Administrative settlement requiring private companies to perform some form of restoration-based injunctive relief, i.e. restoration of watershed to resolve criminal settlement of oil spill



Federal, State & Local Government Environmental Commitments

Environmental recompense actions required of state and local governments by the federal government because of non-compliance with varying regulations, i.e. pollution of Chesapeake Bay, TMDL's, MS4, etc.



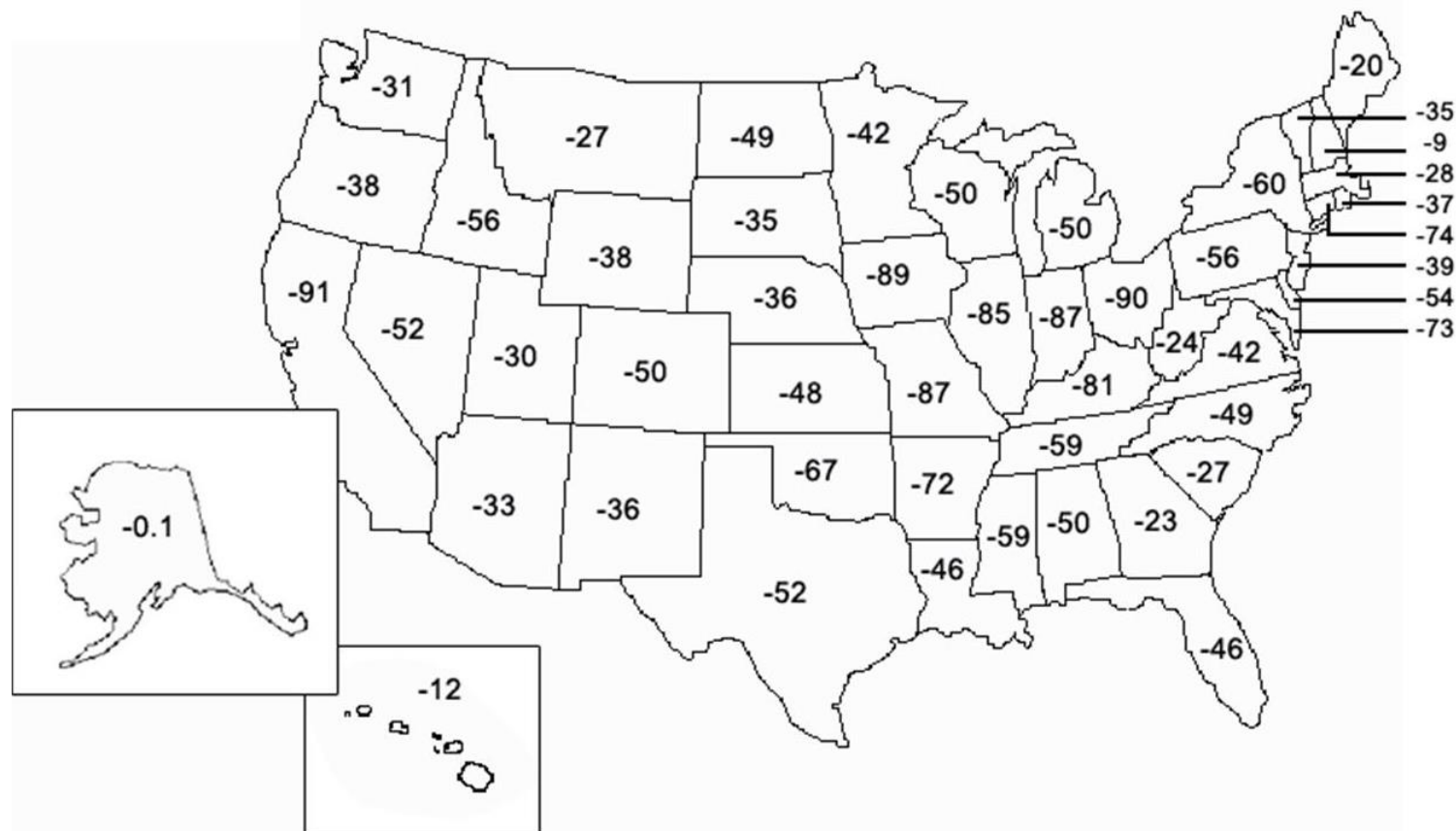
Corporate Sustainability

Programs instituted by private organizations to contribute to the greater good by creating positive environmental impacts, i.e. Amazon builds wind farm to offset energy consumption

Wetland/ Stream Mitigation Overview

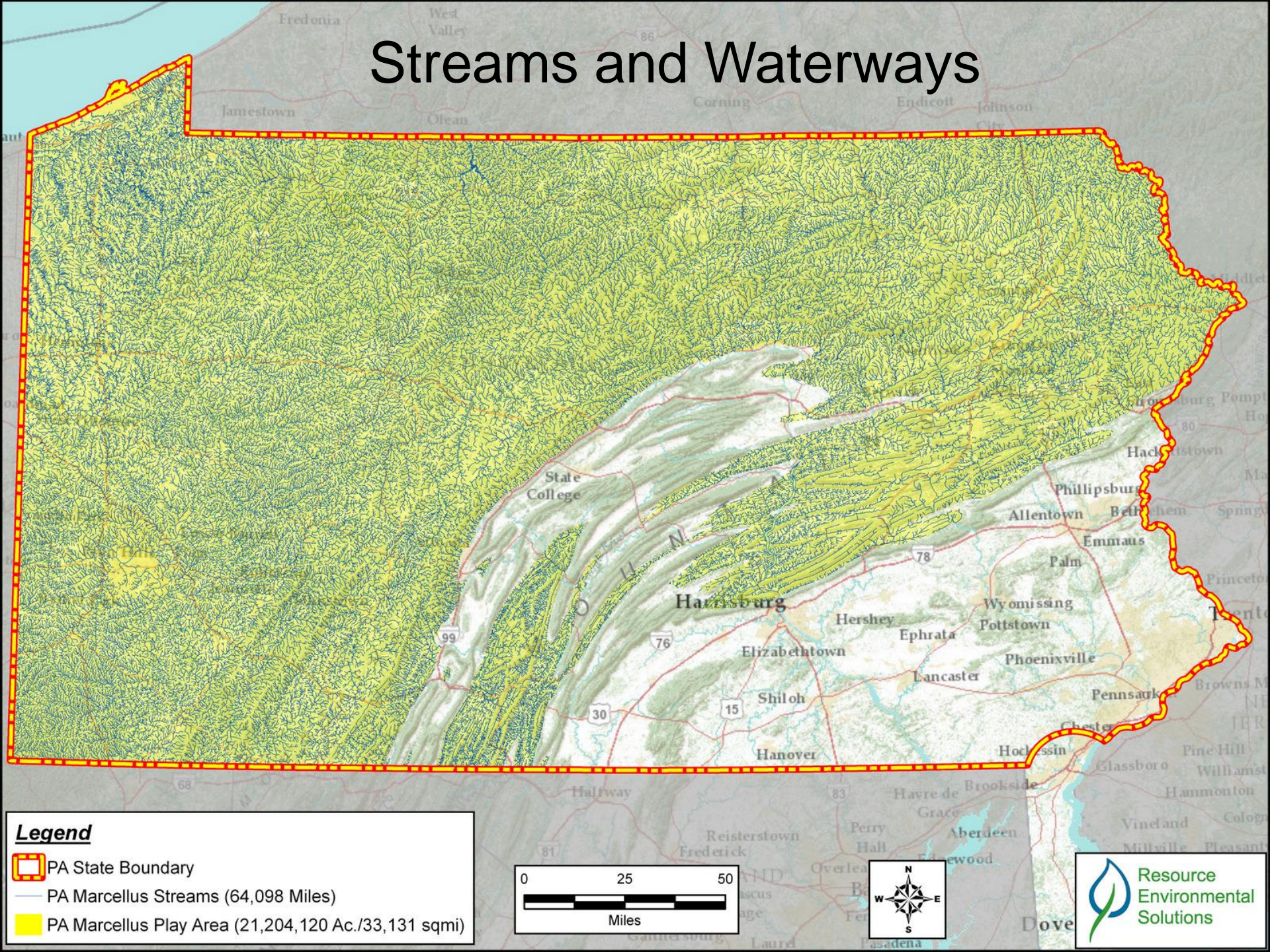
Complex Problem

Percentage of Wetlands Acreage Lost, 1780s-1980s




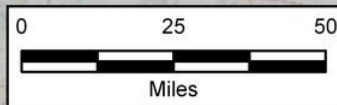
Source: www.ce.utexas.edu/prof/maidment/grad/dugger/WETLANDS/contents.html

Streams and Waterways



Legend

-  PA State Boundary
-  PA Marcellus Streams (64,098 Miles)
-  PA Marcellus Play Area (21,204,120 Ac./33,131 sqmi)



Compensatory Mitigation Under the Clean Water Act (CWA)

Framework

- Statutory: CWA Section 404
- Regulatory: 33 CFR 332 (2008 Mitigation Rule), PA: Chapter 105
- Policy: 1990 WRDA / “No Net Loss”

Sequence

- 1. Avoidance
- 2. Minimization
- 3. *Mitigation*

Mechanisms

- **Mitigation Banks**
- In-Lieu Fee (ILF) Programs
- Permittee-Responsible Mitigation (PRM)

Mitigation Banking

What is a Mitigation Bank?

A wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or (in certain circumstances) preserved to provide compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation.

A bank can be created by a government agency, corporation, nonprofit organization, or other entity that undertakes these activities under a formal agreement with a regulatory agency.



Why Use Mitigation Banks?

- Reduce uncertainty over whether the compensatory mitigation will be successful in offsetting project impacts (**LESS RISK**);
- Assemble and apply extensive financial resources, planning, and scientific expertise not always available to many permittee-responsible compensatory mitigation proposals (**BETTER/ BIGGER RESTORATION PROJECTS**); and
- Reduce permit processing times and provide more cost-effective compensatory mitigation opportunities benefiting regulators and applicants (**LESS TIME AND MONEY**).

Mitigation Bank Permitting Process

IRT Process

- Mitigation Banking Instrument / Mitigation Site Plan
 - Site Selection
 - Mitigation Approach
 - Crediting & Release Schedule
 - Financial assurances
 - Legal protective instruments
 - Adaptive Management
 - Long-term Maintenance and Monitoring
 - Reporting timeline and structures
 - Long-term easement holders

DEP Process

- 105 Program is jointly reviewed by Region and Central Office
- Joint Permit Application covers
 - Mitigation Approach
 - PNDI (T&E Species)
 - Construction Review
 - H&H Review
 - Alternatives Analysis
 - Crediting
 - PA DEP Functional Credit Calculations & Ratio Credit Calculations

Legal & Practical Considerations: Bank Sponsors

1. Regulatory Landscape
2. Property Rights
3. Mitigation Banking Instrument (MBI)
4. Site Protection Instrument / Long-Term Management
5. Financial Assurances
6. Credit Sales

Legend

- USACE District
- 8-Digit HUC
- Counties
- SubBasinNo. Subbasin

1, Upper Delaware River Subbasin	3, Lower Delaware River Subbasin	9, Central West Branch Susquehanna River Subbasin	15, Lake Erie Subbasin
2, Central Delaware River Subbasin	4, Upper Susquehanna River Subbasin	10, Lower West Branch Susquehanna River Subbasin	16, Upper Allegheny River Subbasin
	5, Upper Central Susquehanna River Subbasin	11, Upper Juniata River Subbasin	17, Central Allegheny River Subbasin
	6, Lower Central Susquehanna River Subbasin	12, Lower Juniata River Subbasin	18, Lower Allegheny River Subbasin
	7, Lower Susquehanna River Subbasin	13, Potomac River Subbasin	19, Monongahela River Subbasin
	8, Upper West Branch Susquehanna River Subbasin	14, Genesee River Subbasin	20, Ohio River Subbasin

Counties: ALLEGHENY, BUTLER, CAMERON, CLARION, ERIE, FRANKLIN, HARRIS, HUNTERDON, JEFFERSON, LANCASTER, LEHIGH, MERCER, MONTGOMERY, NORTHAMPTON, NORTHDAKOTA, PENN, PHILADELPHIA, PITTSBURGH, SCHOENBERG, SHERIDAN, SULLY, TOWNSHIP, UNION, WASHINGTON, WYOMING, YORK.

Subbasins: 1, Upper Delaware River Subbasin; 2, Central Delaware River Subbasin; 3, Lower Delaware River Subbasin; 4, Upper Susquehanna River Subbasin; 5, Upper Central Susquehanna River Subbasin; 6, Lower Central Susquehanna River Subbasin; 7, Lower Susquehanna River Subbasin; 8, Upper West Branch Susquehanna River Subbasin; 9, Central West Branch Susquehanna River Subbasin; 10, Lower West Branch Susquehanna River Subbasin; 11, Upper Juniata River Subbasin; 12, Lower Juniata River Subbasin; 13, Potomac River Subbasin; 14, Genesee River Subbasin; 15, Lake Erie Subbasin; 16, Upper Allegheny River Subbasin; 17, Central Allegheny River Subbasin; 18, Lower Allegheny River Subbasin; 19, Monongahela River Subbasin; 20, Ohio River Subbasin.

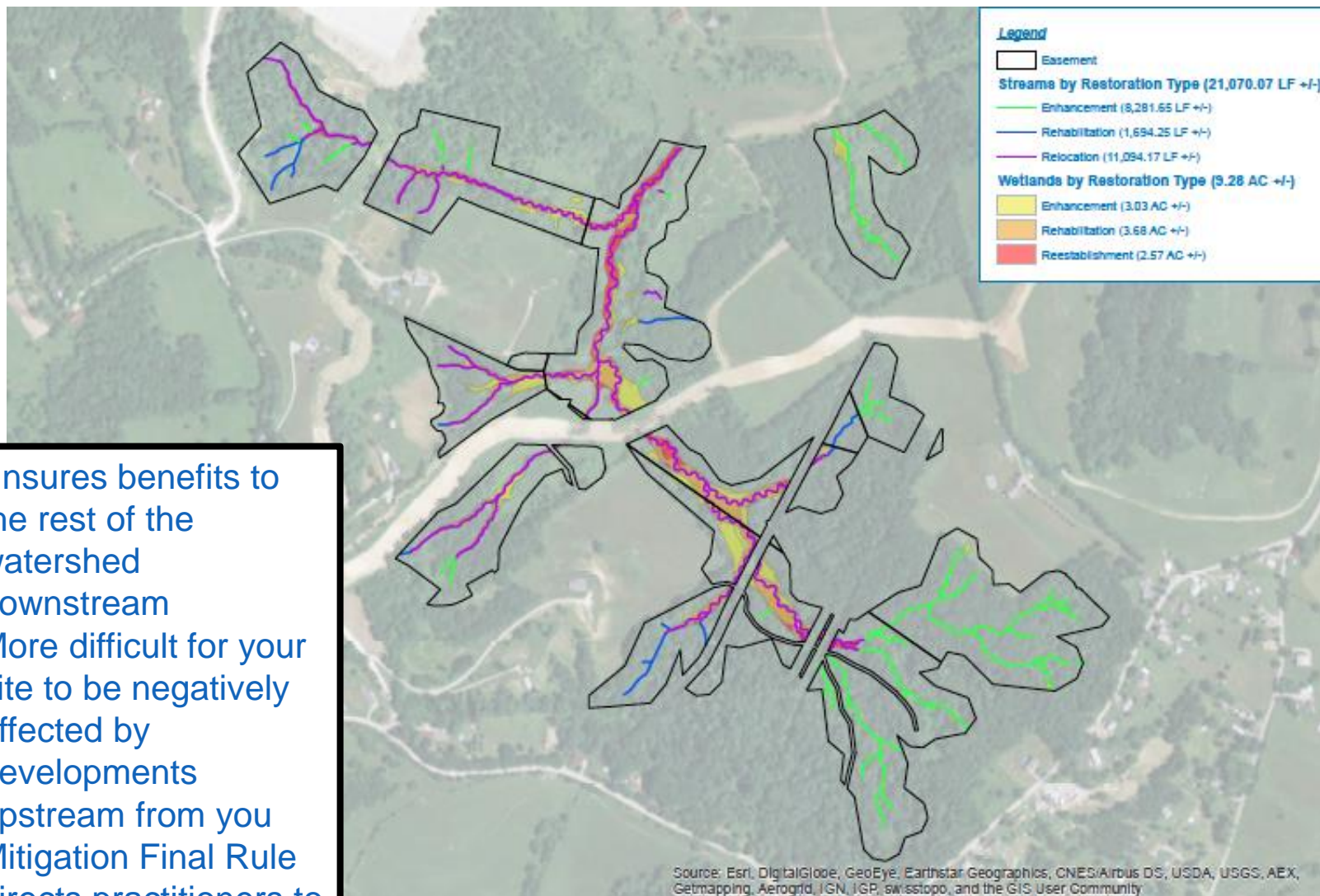
Regions: Buffalo District, Pittsburgh District, Baltimore District, Philadelphia District, New York District.

PENNSYLVANIA STATE WATER PLAN

res Resource Environmental Solutions

Site Selection Process

Headwaters on down...



- Ensures benefits to the rest of the watershed downstream
- More difficult for your site to be negatively affected by developments upstream from you
- Mitigation Final Rule directs practitioners to use a watershed approach

Just because it's forested, doesn't mean it's high quality



Just because it's forested, doesn't mean it's high quality

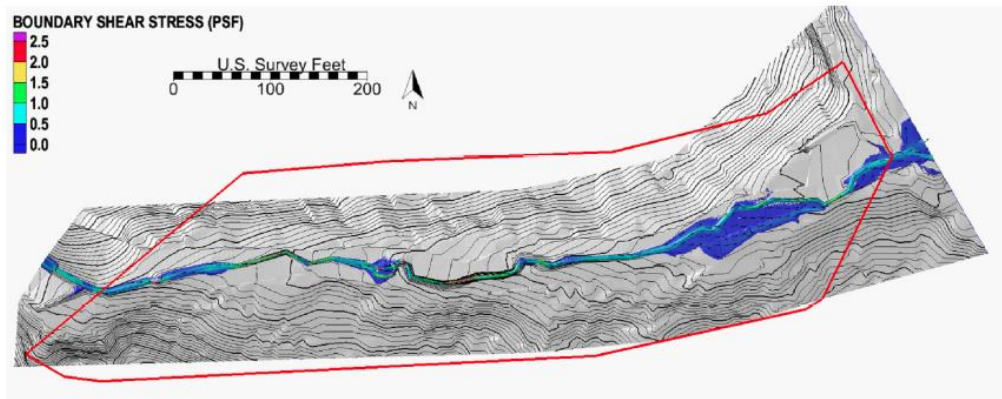


Subsurface Data

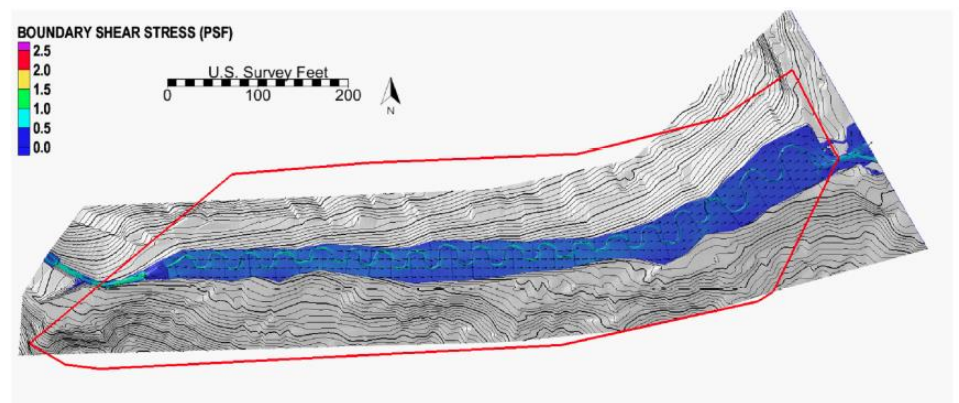


Data Validation

Pre-restoration 2-year storm event



Post-restoration 2-year storm event



Project Examples & Results

Upper Susquehanna River Mitigation Bank – Northern PA

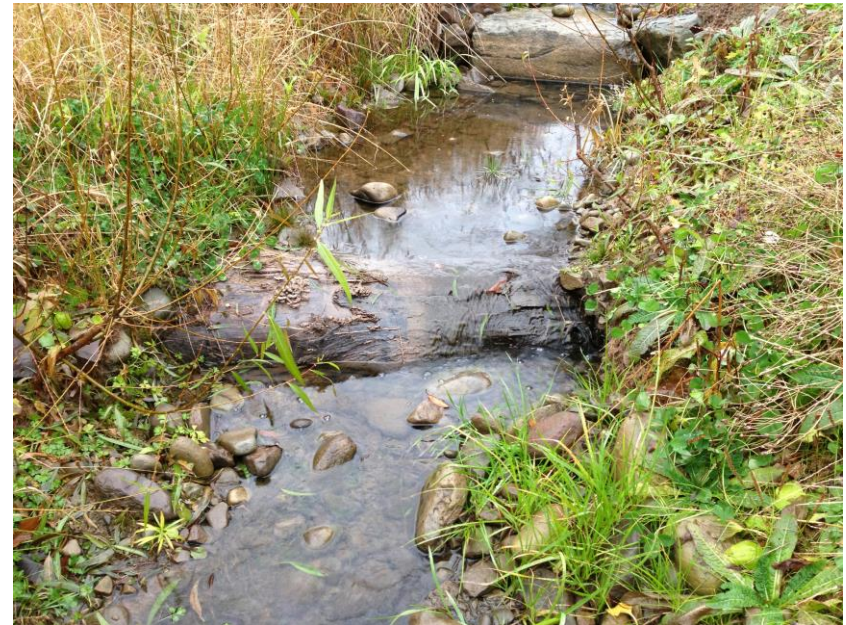
1,935 linear feet – Stream Restoration / 28 acres – Riparian corridor

Before



Prior to restoration this site consisted of cattle pasture with a degraded stream running through it

After

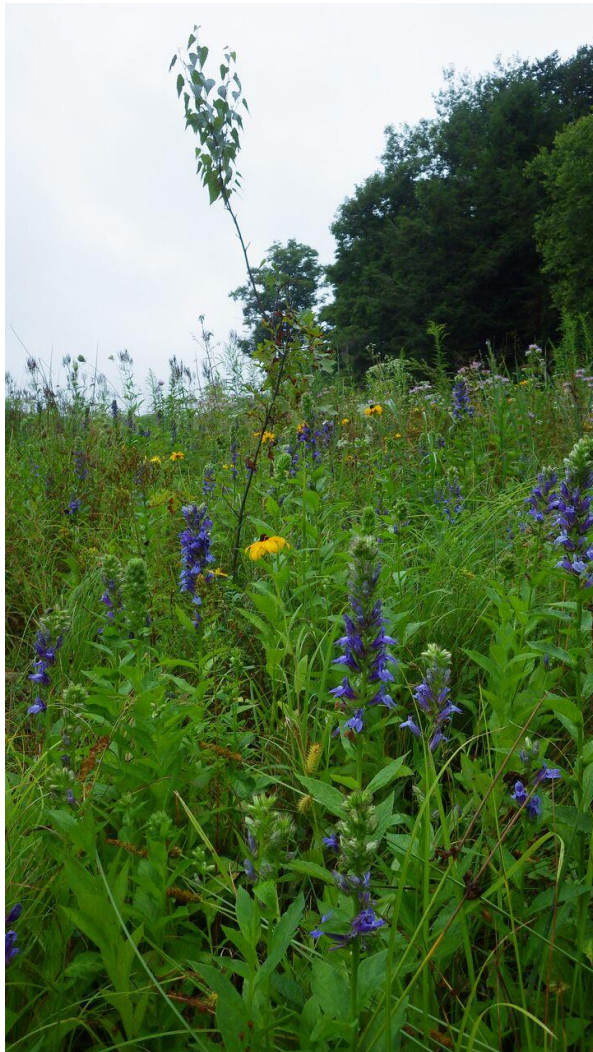


The site has been restored to contain a fully functional and stable stream with an adjacent bottomland hardwood riparian corridor

Upper Susquehanna River Mitigation Bank – Northern PA

1,935 linear feet – Stream Restoration / 28 acres – Riparian corridor

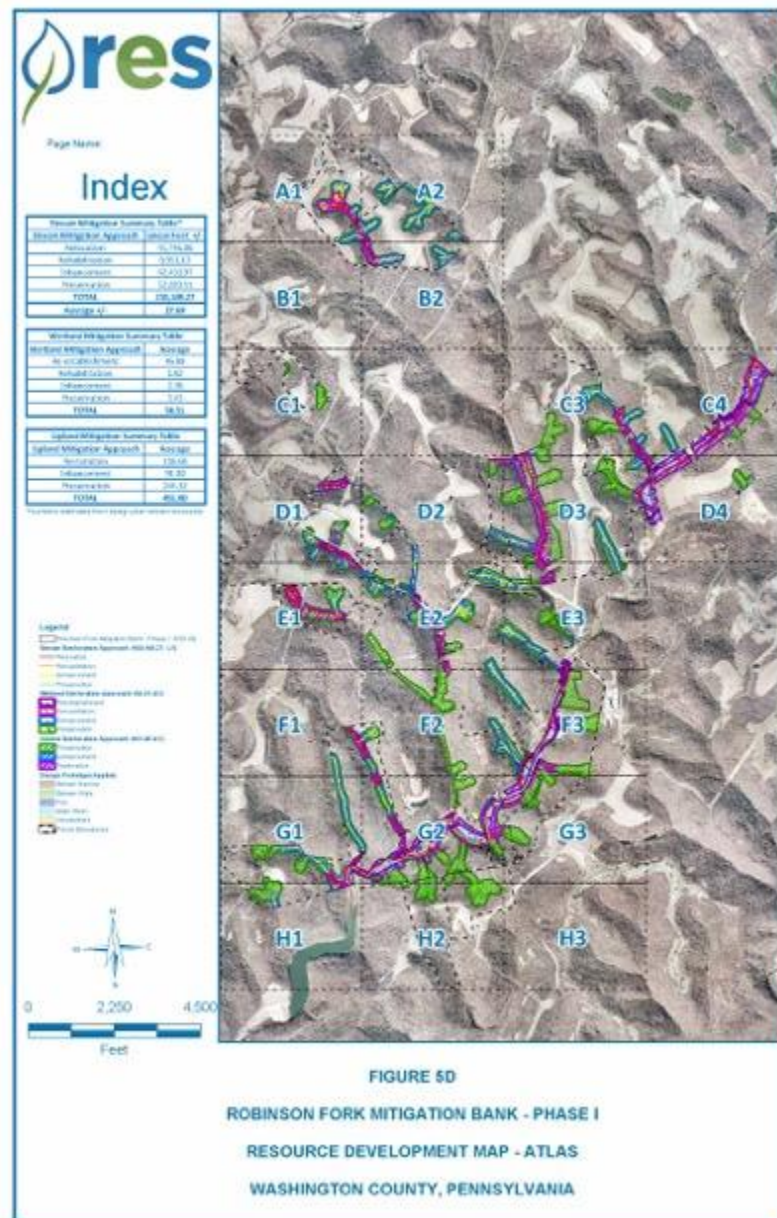
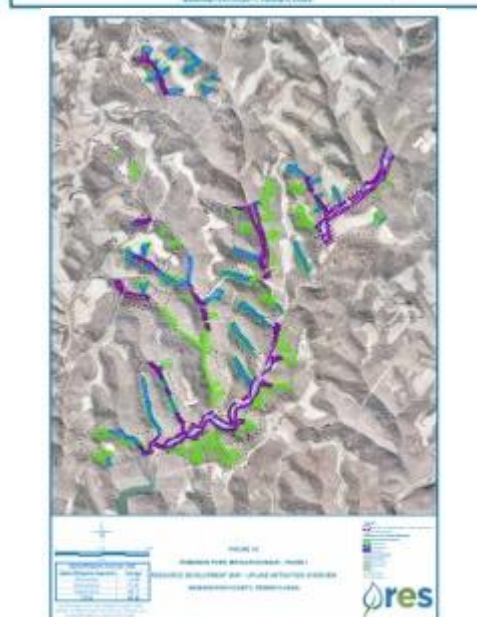
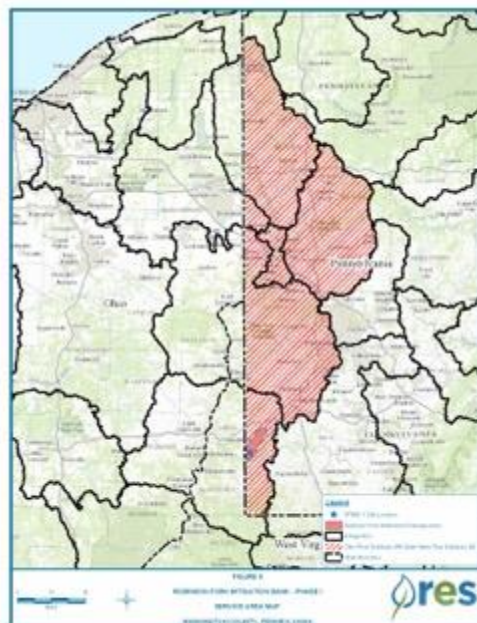
After



After



533.29 acres Total Site on 21+ parcels / 136,558.66 linear feet – Stream Restoration / 54.42 acre – Wetland Restoration



Robinson Fork Mitigation Bank Phase 1, Washington County, PA

533.29 acres Total Site on 21+ parcels / 136,558.66 linear feet – Stream Restoration / 54.42 acre – Wetland Restoration

Before & After



Larger reach- during construction



Larger reach- just after construction



Larger reach- few months post-construction



Example reach- immediately post-construction



Example reach- few months post-construction



Endangered Species Mitigation

Species/ Conservation Banking Background

- Established “industry” in California, Florida, and a few other states
- Gaining momentum nationally:
 - 1973 Endangered Species Act
 - 2015 Presidential Memorandum
 - 2016 Revised Mitigation Policy
 - 2017 New admin: notice for review of DOI mitigation policies
- Typically driven by federally-listed species (common critters including bats, herps, mussels, sage grouse, prairie chicken, etc.)
- Likely to follow the hierarchy of banks -> ILF's -> project-specific approaches

Species/ Conservation Banking in PA

- Targets in PA: Bats, Bog turtle, Mussels
- 2017 Update: Approved Indiana bat conservation bank in PA, offsetting pipelines, powerlines, roadways, mining, etc.= conservation work on the ground



Stormwater/ Water Quality Offsets

Stormwater/ Water Quality Offsets

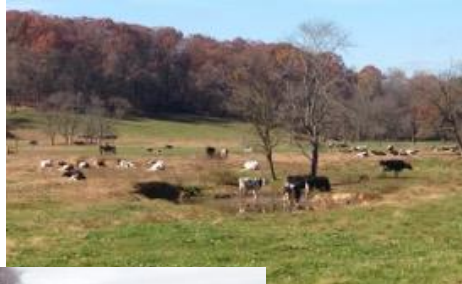
- Stormwater
 - Existing focal point in urban areas due to EPA consent decrees for combined-sewer overflows (Phila., Pittsburgh, Harrisburg, etc.)
 - Typically focus on volume, utilizing grey vs green infrastructure
 - Suburban municipalities adopting/considering “stormwater taxes”
- NPDES Permitting
 - Volume vs. water quality
 - On-site vs off-site
- MS4/ TMDL Compliance
 - Huge topic across Pennsylvania, and will continue to be so, innovative approach in York County

Water Quality Project Example- TMDL/MS4

Location: Howard County, Maryland

Solution: Nutrient Offsets

- 14+ wetland acres
- 6,000+ linear feet stream
- 62 Acres of Impervious Surface Credits
- TN, TP, TSS Removal



Cattle in creek



Eroding bank showing soil profile

Vertical bank collapse and over widening caused by unrestricted cattle access



Regenerative Stormwater and Wetland Restoration



Maryland Agricultural
Preservation Foundation

<u>Material</u>	<u>Load</u>	<u>Annual Removal</u>	<u>20 Years</u>
TN (lbs./yr.)	23,230 lbs./yr.	799 lbs./yr.	19,975 lbs.
TP (lbs./yr.)	3,592 lbs./yr.	532 lbs./yr.	13,300 lbs.
TSS (tons/yr.)	1719 tons/yr.	802 tons/yr.	20,050 tons

Add'l Example- Nutrient Trading and BMP Maint.

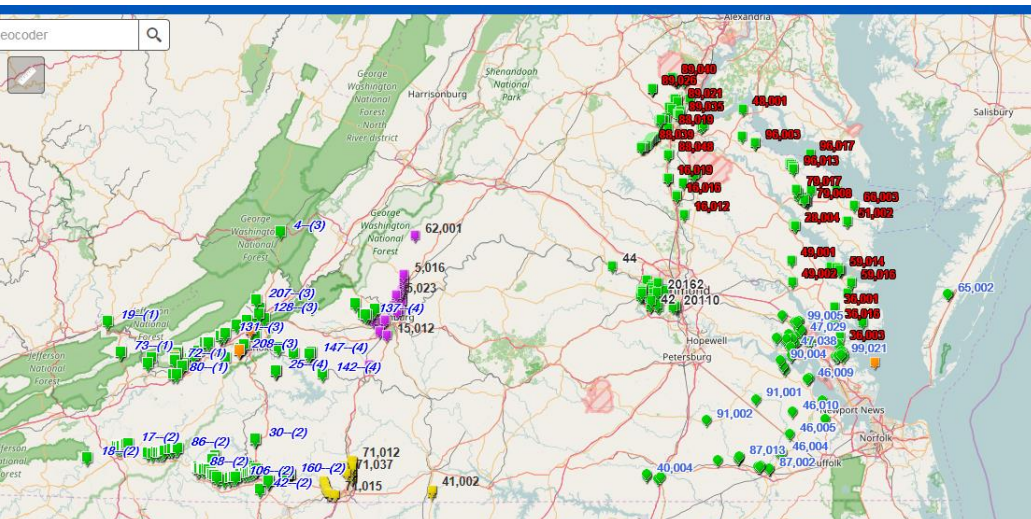
BMP Maintenance: Multiple DOT Districts, Virginia



Maintain 400+ SWM BMP Facilities

Up to 5-year renewal periods on each contract

Asset management (maintain, monitor, report)



Nutrient Trading: Multiple Districts

NPDES-permit focused

DOT manages volume on-site, offsets mitigated off-site

Over 50% cost savings compared to all on-site

Challenges and Additional Considerations/Topics

Regulatory Challenges

- Review timelines
 - Banking outside the PDG policy
 - Workload and staffing challenges at PADEP
- New approaches take time
 - Water quality trading
 - What works in other states may not work in PA
- Functional Protocol roll-out
 - First half, or impact assessment implemented in summer 2017
 - Second half, related to mitigation, likely in late 2017/ 2018

Additional Considerations & Topics

Final Thoughts

- Credit stacking
- Integrate wetlands, streams, and species
- Creative partnerships



GHG Emission Offsets



PADEP Functional Protocol assessment methodology



Riparian Buffer/ Act 162



Water Quality Trading (WQT)

Staff/ Offices

- Pittsburgh, PA office, Eight-four, PA nursery, remote offices around state
- 1 full-time PA employee in 2012 ---> 40 full-time employees 2017
- 25+ miles of stream restoration, 200+ acres of wetland restoration, 500+ acres of endangered species conservation implemented or under construction to date in PA (***including over 15 miles of stream restoration in 2017 alone***)

Contact info:

Jon Kasitz

jon@res.us

717-371-6797

Resource Environmental Solutions, LLC

<http://www.res.us>

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