

Introduction to WVWRAM: WV Wetland Rapid Assessment Method



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Jack Hopkins
John Wirts
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Thursday,
April 10, 2008

Catalyst for developing WVWRAM:

2008 Mitigation Rule

- Evaluate aquatic resource function
- “No Net Loss”

Federal Register

Part II

Department of Defense

Department of the Army, Corps of
Engineers

33 CFR Parts 325 and 332

Environmental Protection Agency

40 CFR Part 230

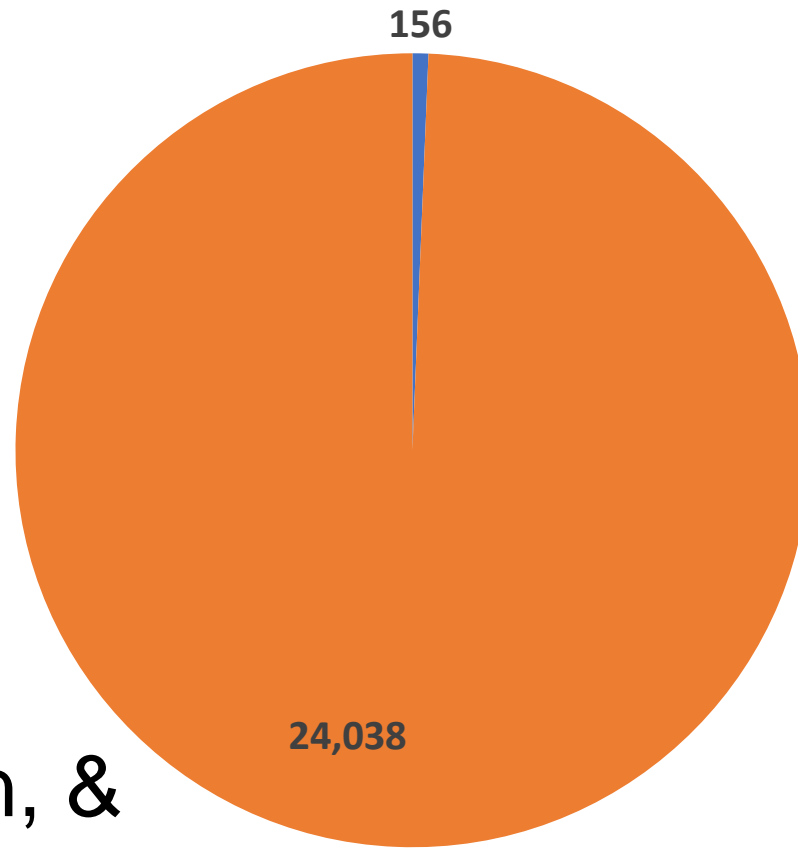
Compensatory Mitigation for Losses of
Aquatic Resources; Final Rule

Regulatory Protection of Wetlands

- **Clean Water Act 1972**
 - 2008 Mitigation Rule
- **WV Water Pollution Control Act**



Total Wetland Area in WV (in square miles)



avoidance,
minimization, &
compensation

■ Wetland ■ Upland



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Wetlands

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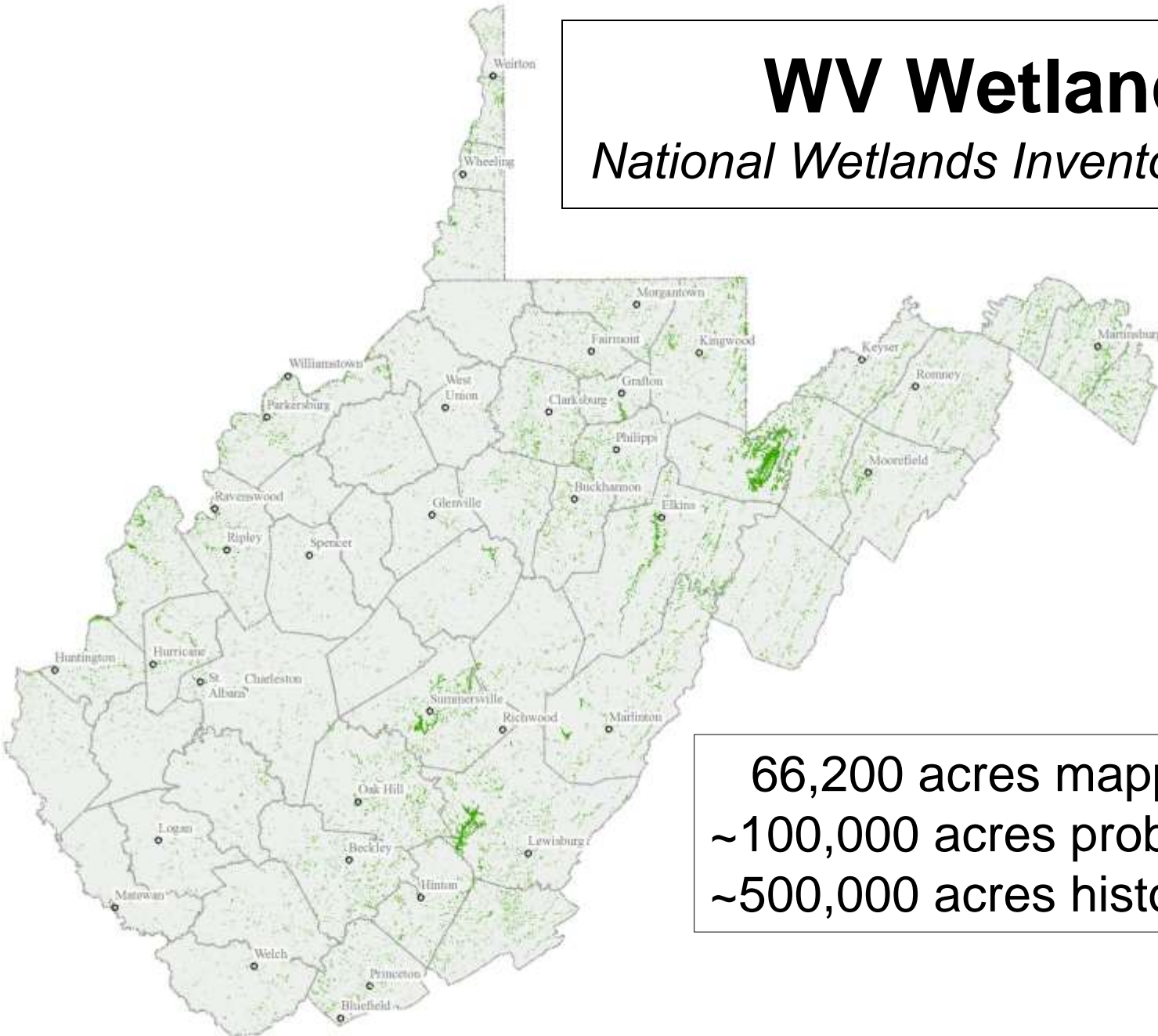
[Types](#)

[Functions](#)

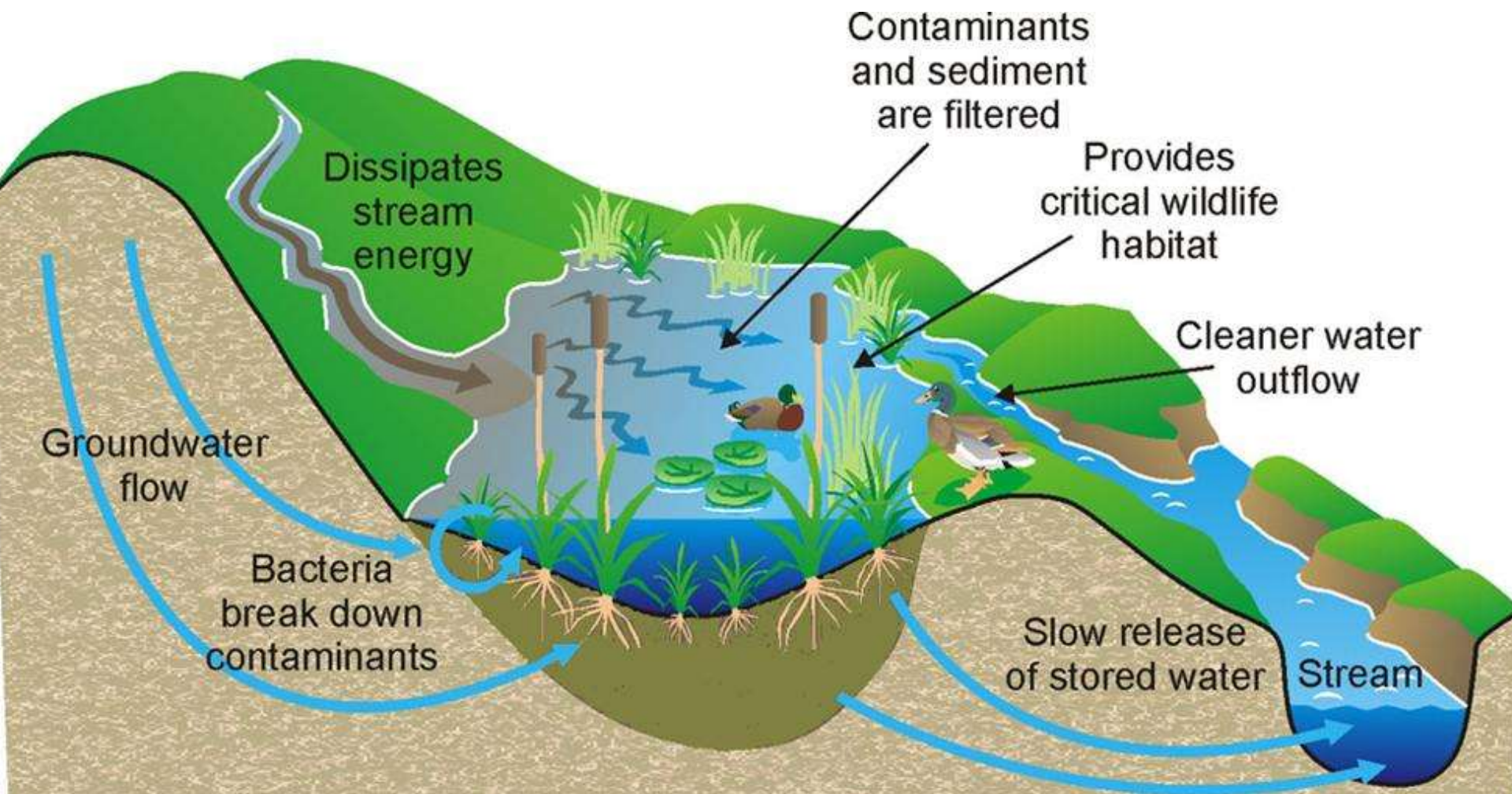
Wetland Program Development Grants and EPA Wetlands Grant Coordinators

WV Wetlands

National Wetlands Inventory (1980's)



66,200 acres mapped
~100,000 acres probably exist
~500,000 acres historically

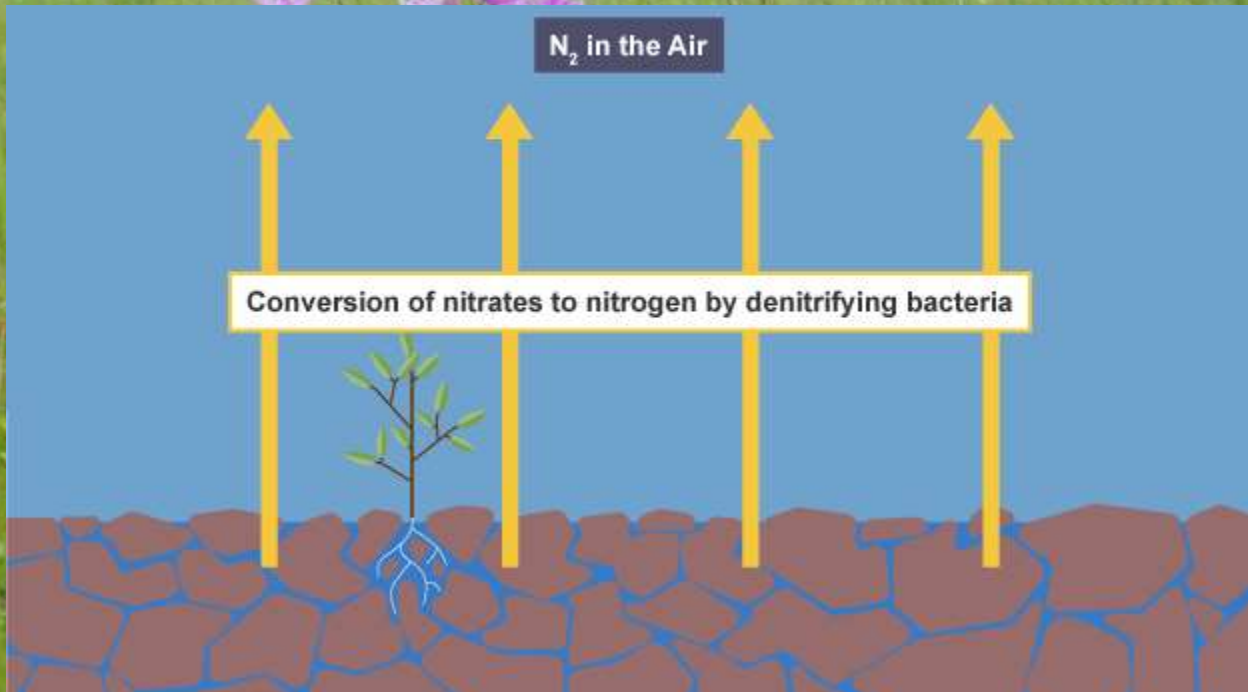


How wetlands work

Fish & wildlife, rich biodiversity, productivity



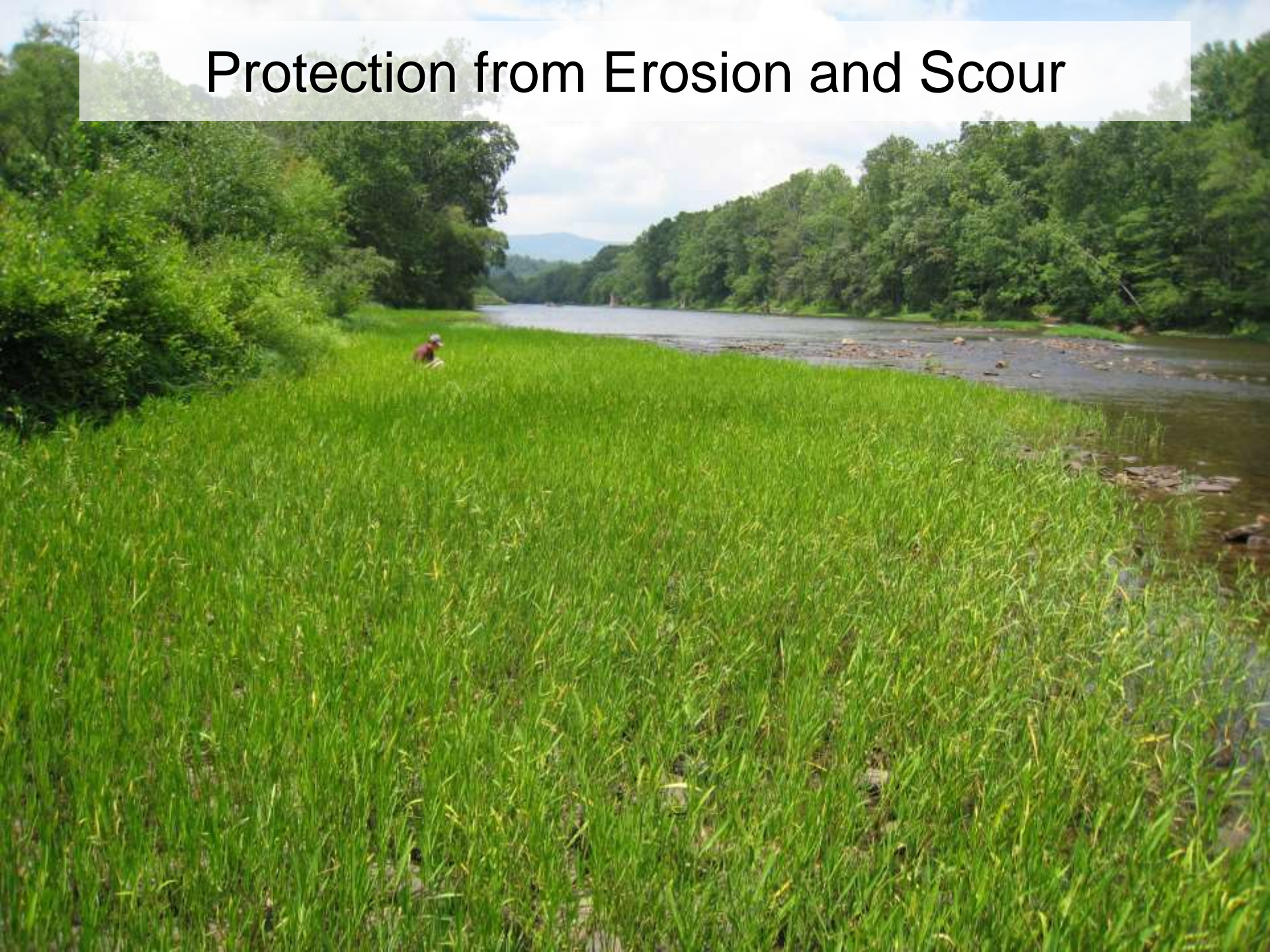
Kidneys of the Landscape



Stabilize Water Supply



Protection from Erosion and Scour





2015-16 Develop tool for
functional assessment of
wetlands

DEPARTMENT OF **ECOLOGY**
State of Washington

Calculating Credits and
Compensatory Mitigation
of Eastern Wash

Final Report
August 2012

JULY 2010

Manual for the
**Oregon Rapid Wetland
Assessment Protocol**
(ORWAP)
version 2.0.2

Paul Adams, Ph.D.
Adaptus Resource Assessment, Inc.

Janet Morlan, FWS
Kathy Winkle, CPSS
Oregon Department of State Lands

California Rapid Assessment Method
for Wetlands
User's Manual
Version 6.1

NatureServe Ecological Integrity Assessment:
Protocols for Rapid Field Assessment
of Wetlands
v2.0

State of Ohio
Environmental Protection Agency

Ohio Rapid Assessment Method for Wetlands
User's Manual and Scoring Form

February 1, 2001

Rapid Floristic Quality Assessment
Manual

Montana Department of Transportation
Montana Wetland Assessment Method

Prepared for:
Montana Department of Transportation
Environmental Services

The Watershed Approach
A Statewide Decision Support Tool
for Restoring and Protecting Wetland Services

Tom Bernthal, Nick Miller, Matt Matrise,
Joanne Kline, Max Axler, Chris Smith,
John Wagner, Michele Kille

The Nature Conservancy
WAWTA GIS-RAM Matrix - FINAL for GIS TEAM Analysis

Built on the best available existing science

Robert A. Tate, Governor
State of Ohio

Chris Wood
Executive

P.O. Box 1060, Lakewood Government Center, 100 S. Front Street, Columbus

Minnesota Pollution Control Agency



801 N. Last Chance Gulch, Suite 101
Helena, Montana 59601-3360

March 2008

Wetland Type	Assessment Method	Scoring System	Notes
14.1
14.2

Efficacy of Natural Wetlands to Retain Nutrient...

A.E. Giblin, R.A. Salo, E.W. Turner, and E.L. ...
Wetlands are important water quality through natural processes including sedimentation, nutrient assimilation and retention of plant debris. ...

Biogeochemical Hot Moments at the Terrestrial and Aquatic Interface

Michael E. McClain, Elizabeth Sarah E. Gorgol, Nancy B. Grimm, Judson W. Harvey, Carol A. Johnson, William H. McDowall

Abstract: Wetlands provide numerous and profound natural biogeochemical storage and release services to the overall ecological functioning of ecosystems. ...

Realizing ecosystem services along a gradient of ...

Thomas L. McClain, ...
School of Ocean Resources and Conservation, University of Maryland, P.O. Box 38

Abstract: Wetlands provide numerous and profound natural biogeochemical storage and release services to the overall ecological functioning of ecosystems. ...

RECOMMENDATIONS FOR RECONSTRUCTION OF WETLAND ASSESSMENT TECHNIQUES



Final Report - Apal ...
As previously printed in Wetland News, February 2008, Association of State Wetland Managers, Inc.

Wetland Assessment: Measuring the Quality of the Nation's Wetlands
By Leah Steiner, ASWM

A commonly accepted principle among architects and designers is that "form ever follows function, which dictates that the shape or appearance of a structure should be predicted by its intended purpose—whatever it does. ...

Condition describes the "health" of a wetland. The National Wetland Monitoring & Assessment Work Group's working definition of condition is, "the state of a resource, generally referring a combination of physical, chemical, and biological characteristics such as temperature, water clarity, chemical composition, or the status of biological communities." (U.S. EPA, 2007)

A unifying approach for ... communities at ...

Carol A. Johnson, ...
Department of Biology and Microbiology, University of Missouri, 610 North Lincoln Drive, Columbia, MO 65211

Abstract: Assessment of wetland health is complicated by the fact that it is a complex system. ...

A Regional Geomorphologic Assessment of the Hydrogeomorphic Valleys of the ...

Harm M. Williams, ...
Wetlands Regulatory Agency

Abstract: Assessment of wetland health is complicated by the fact that it is a complex system. ...

The Use of Wetlands in ...



State of Ohio Department of Natural Resources
Wetland Ecology Group
Division of Surface Water
AN ECOLOGICAL AND FUNCTIONAL ASSESSMENT OF URBAN WETLANDS IN CENTRAL OHIO
VOLUME 3: A COMPARISON OF THE AMPHIBIAN COMMUNITIES OF URBAN AND REFERENCE WETLANDS, USING LEVEL 1, 2 AND 3 ASSESSMENT TOOLS
Ohio EPA Technical Report RET-2008-2



Ohio EPA Technical Report RET-2008-2
Ohio EPA Technical Report RET-2008-2
Ohio EPA Technical Report RET-2008-2



...DEP looked only at tested, validated methods & metrics



2017-18 Field-testing:
69 stakeholders from
22 organizations



2019 Training:
112 stakeholders from
40 organizations



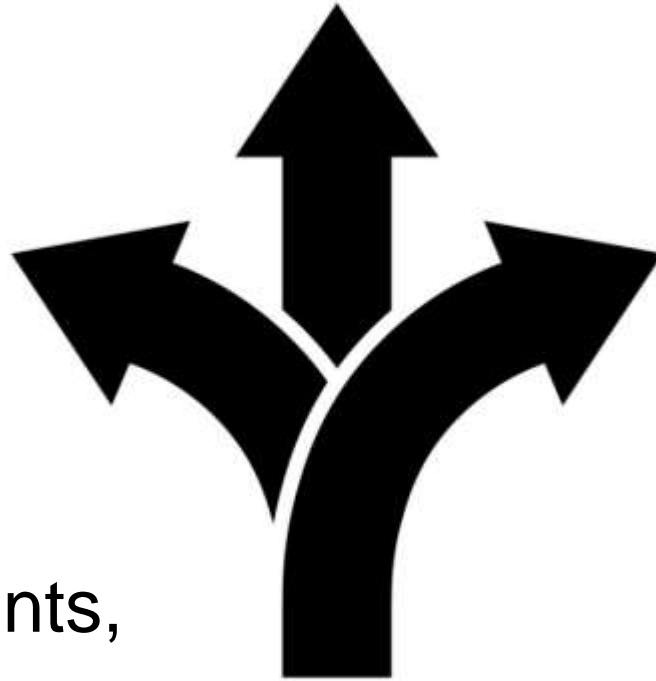
2020
public notice
and moving
toward agency
adoption



Ecological integrity & wildlife habitat



Water quality:
sediment, nutrients,
pollutants



Flood
attenuation

3 composite functions



65 metrics in 6 categories (regulatory)

	Intrinsic Potential	Landscape Opportunity	Value to Society
Water Quality	vegetation, soil, hydrology	50 m buffer, contributing watershed	public use, planning
Flood Attenuation	vegetation, soil, hydrology	50 m buffer, contributing watershed	economic risk
Habitat/ Ecological Integrity	vegetation, soil, hydrology	perimeter, 300 m / 1 km buffer, contrib. watershed	investment, public use, access



Roll-up of metrics into stakeholder-requested scores:

- **Regulatory Score: physical, chemical & biological**
- Full function (all metrics)
- State lands acquisition
- Condition assessment





GIS plus rapid field assessment: the best of landscape-level assessment + metrics that must be obtained in the field



+



= **Regulatory
score**

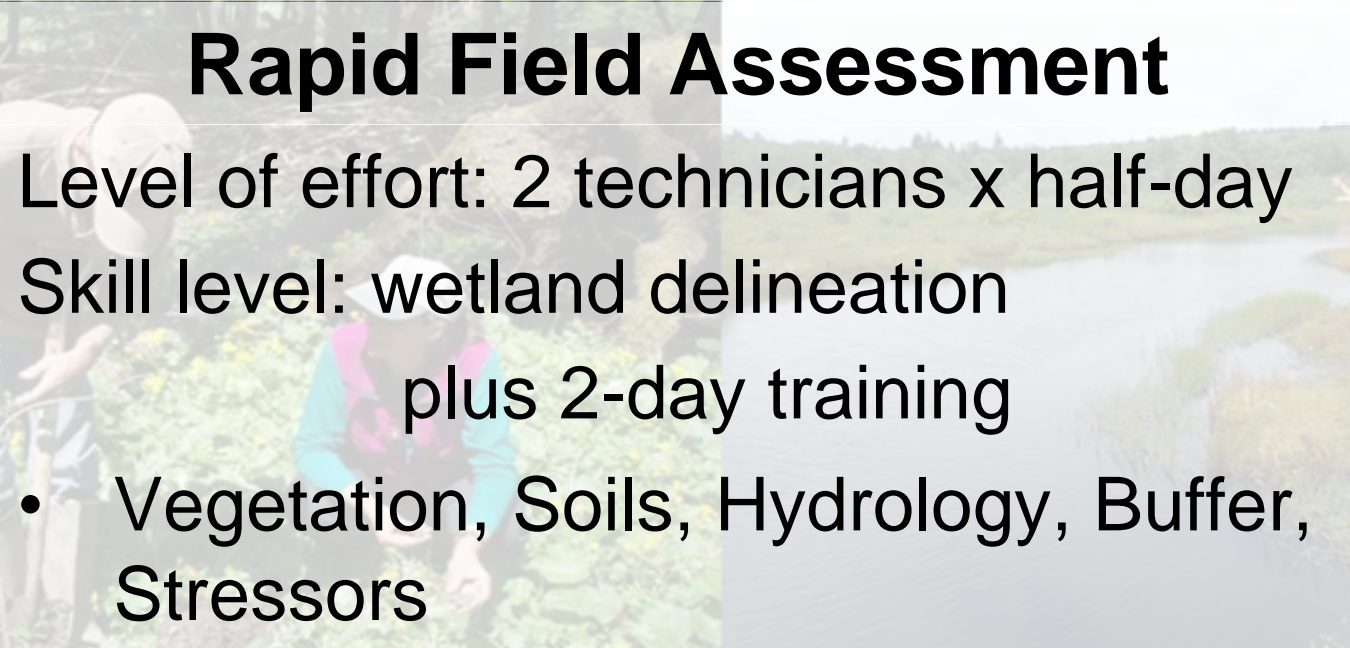
Rapid Field Assessment

Level of effort: 2 technicians x half-day

Skill level: wetland delineation

plus 2-day training

- Vegetation, Soils, Hydrology, Buffer, Stressors





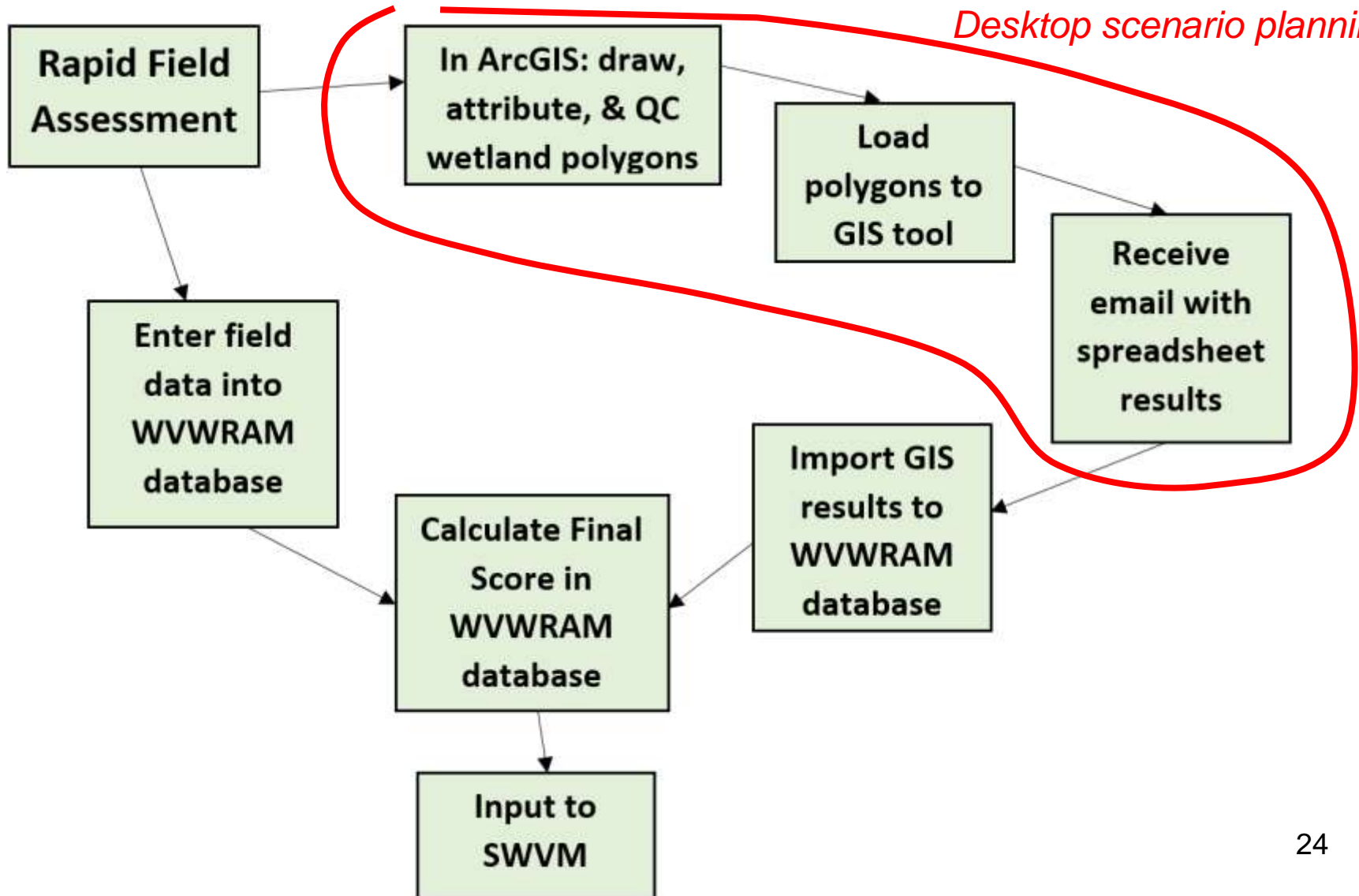
62 statewide GIS datasets

- Biodiversity
- Ecosystems
- Elevation
- Geology
- Hydrology
- Imagery
- Infrastructure
- Jurisdiction
- Landcover
- Landform
- Soils
- Stressors

WVWRAM Work Flow



Desktop scenario planning



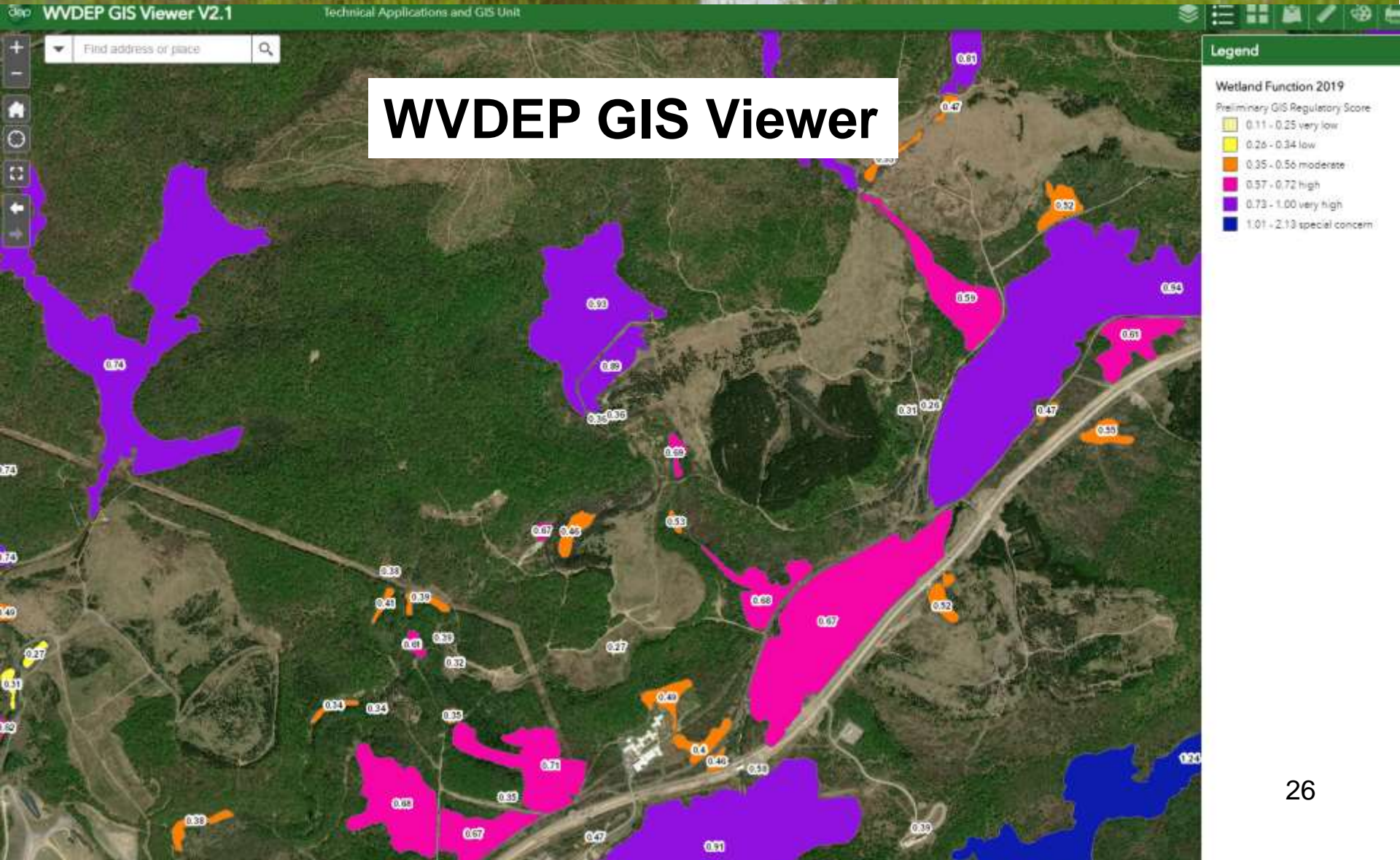
WVWRAM Allows Scenario Planning

- GIS-based desktop planning supported
- Predict mitigation costs of different sites or corridors
- Compare potential mitigation credits at different sites prior to land acquisition



WVDEP Watershed Assessment Branch

Preliminary GIS Score for every mapped wetland in WV





Watershed Map
Water Quality Monitoring
Biological Monitoring
Water Quality and Impaired Streams
Total Maximum Daily Loads (TMDL)
Reports
Special Studies
Nonpoint Source Program
Water Quality Standards
Algae
Watershed Improvement Branch
Wetland Assessment
WVWRAM

[Home](#) > [Water and Waste Management](#) > [Watershed Management](#) > [Wetland Assessment](#) > [WVWRAM](#)

WVWRAM

The Watershed Assessment Branch of DEP has developed a standardized method for rapidly assessing some of the important natural functions of all types of wetlands present in West Virginia. It is called the West Virginia Wetland Rapid Assessment Method (WVWRAM). WVWRAM uses on-site observations and off-site spatial data. This is a regulatory assessment tool for agency staff and environmental professionals. It requires a knowledge of Geographic Information Systems (GIS), wetland soils, plants, hydrology, and stressors.

WVWRAM has two components: (1) GIS tool for preliminary scoring and off-site metrics, and (2) rapid field method for final scoring. Both components are required for regulatory use, but the GIS tool can be used as a stand-alone for planning purposes.

[Download the WVWRAM Datasheets](#)

[Download the WVWRAM User Manual](#)

[Download the WVWRAM Reference Manual](#)

[View information about our WVWRAM Trainings 2019](#)

[Download the WVWRAM Database](#)

[WVWRAM GIS Tool Website](#)

Type "WVWRAM" into your search engine

WVWRAM Manuals

User Manual for the West Virginia Wetland Rapid Assessment Method

(WVWRAM)

May 31, 2019 Version 0.52



Elizabeth A. Byers, Senior Wetland Scientist
Watershed Assessment Branch
Division of Water and Wastewater Management
WV Department of Environmental Protection



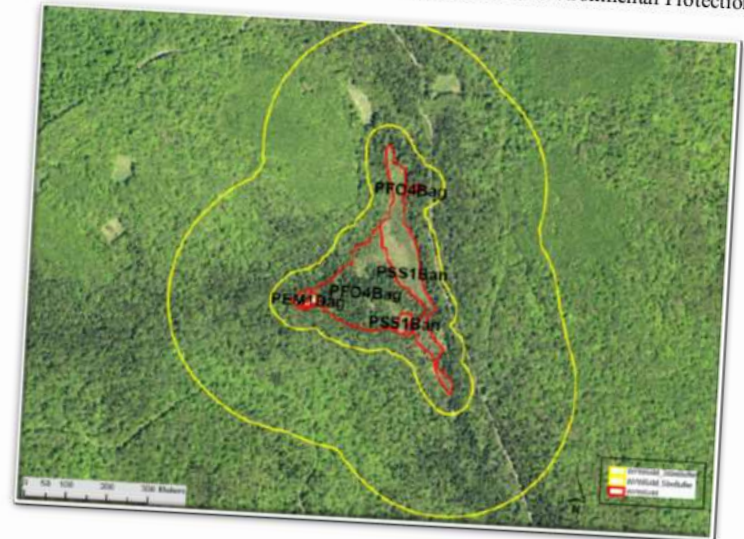
Reference Manual for the West Virginia Wetland Rapid Assessment Method

(WVWRAM)

April 10, 2019 Version 0.5



Elizabeth A. Byers, Senior Wetland Scientist
Watershed Assessment Branch
Division of Water and Wastewater Management
WV Department of Environmental Protection



WVWRAM Database

WVWRAM_20190604_blank_with_examples (1) : Database- C:\Users\A021503\Downloads\WVWRAM_20190604_blank_with_exan

File Home Create External Data Database Tools Help Tell me what you want to do

View Paste Cut Copy Format Painter Filter Ascending Descending Remove Sort Selection Advanced Toggle Filter Refresh Save Delete More New Totals Spelling Find Replace Go To Select

Clipboard Sort & Filter Records Find Text Formatting

#Data_Main



West Virginia Wetland Rapid Assessment Database

Enter New Record

To enter a new record, type the Site Event Code and Site Name in the boxes below. Then click Create New Record.

Site Event Code:

Site Event Name:

Create New Record

Review Record

To review a record, either type the Site Event Code in the box below or select site from the dropdown. Then click Review Record.

Site Event Code:

Review Record

Site Event Name:

Review Record

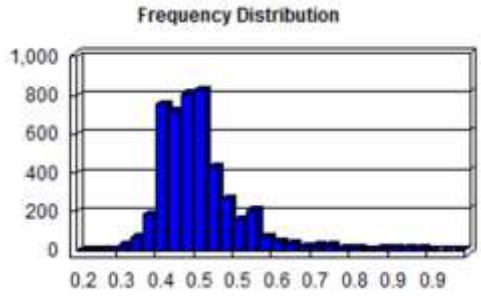
GIS Tool: <https://mapwv.gov/wetlands/>

The image shows a web browser window displaying the WV Wetland Functional Assessment tool. The browser address bar shows the URL <https://mapwv.gov/wetlands/>. The application interface includes a sidebar with navigation options like 'Your Email', 'Project', and 'Input Wetland'. The main content area features a map with a red polygon drawn over a wetland area, and a 'Double-click to complete' tooltip. The application also has buttons for 'Zoom To', 'Layers', 'Measure', and 'Basemaps'. Below the browser window, a Microsoft Excel spreadsheet is visible, showing a table with columns for 'OBJECTID', 'SiteEventID', 'WUKey', 'Length', 'Area', 'SiteName', 'SurveyDate', 'Function', 'RegPrelim', 'RegFunction', 'Condition', 'DNRLandAcq', 'BRank', 'FAFunction', 'FAOpportun', 'FAPotential', 'FASociety', 'HCondition', 'HFuncNoBR', 'HFunction', 'HOpportun', and 'HPotential'. The first row of data is as follows:

OBJECTID	SiteEventID	WUKey	Length	Area	SiteName	SurveyDate	Function	RegPrelim	RegFunction	Condition	DNRLandAcq	BRank	FAFunction	FAOpportun	FAPotential	FASociety	HCondition	HFuncNoBR	HFunction	HOpportun	HPotential
1	1	1	787.926464	18528.08788				61	0.647058785	33	47	53	none	21	4	14	3	22	22	22	6



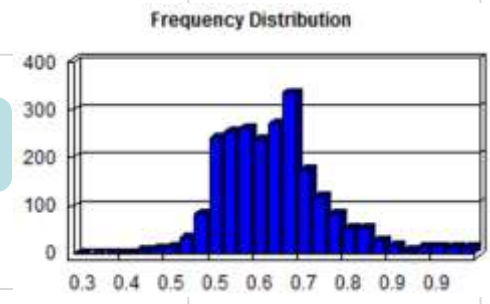
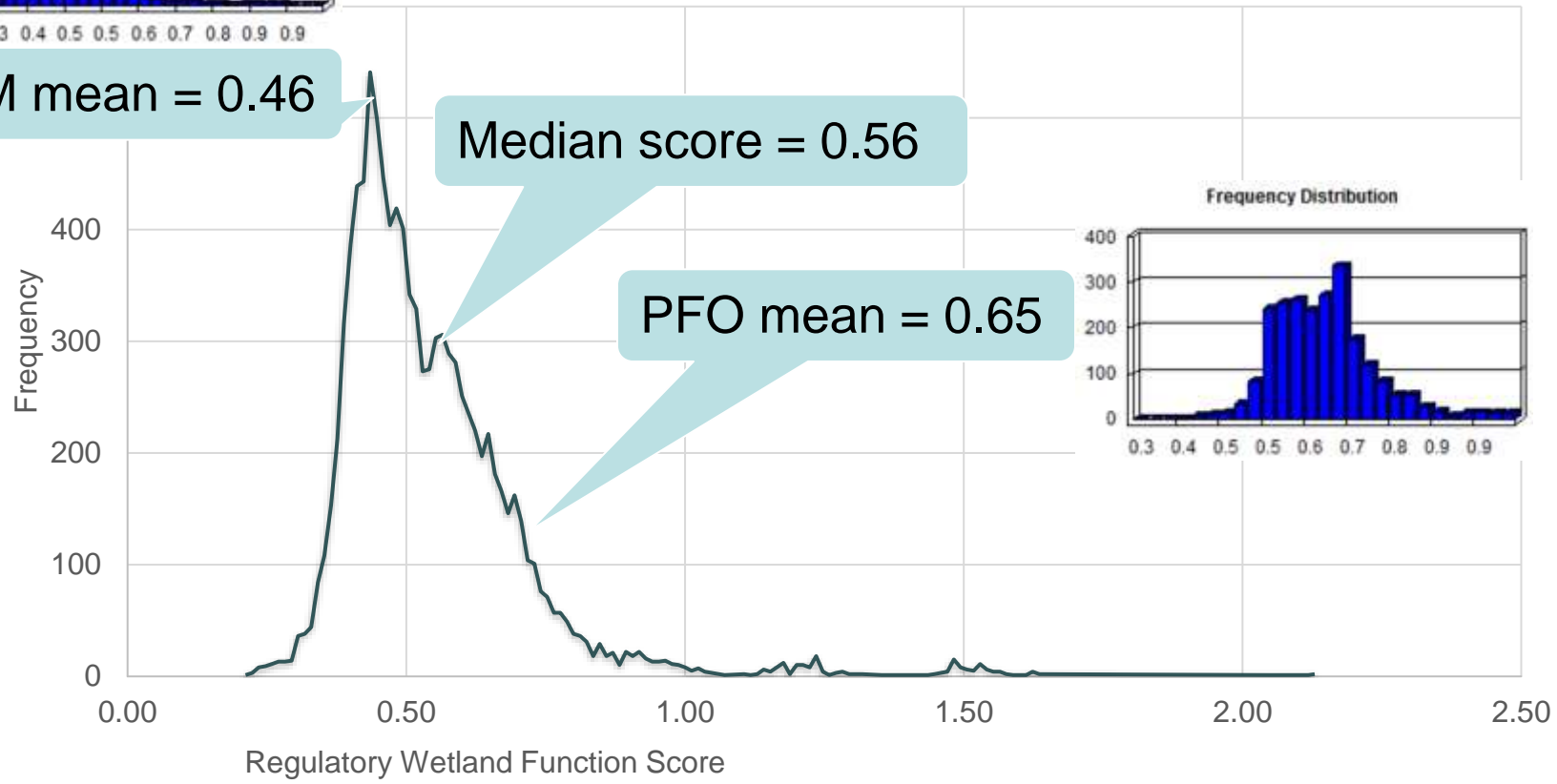
Preliminary Regulatory Scores (GIS only)



PEM mean = 0.46

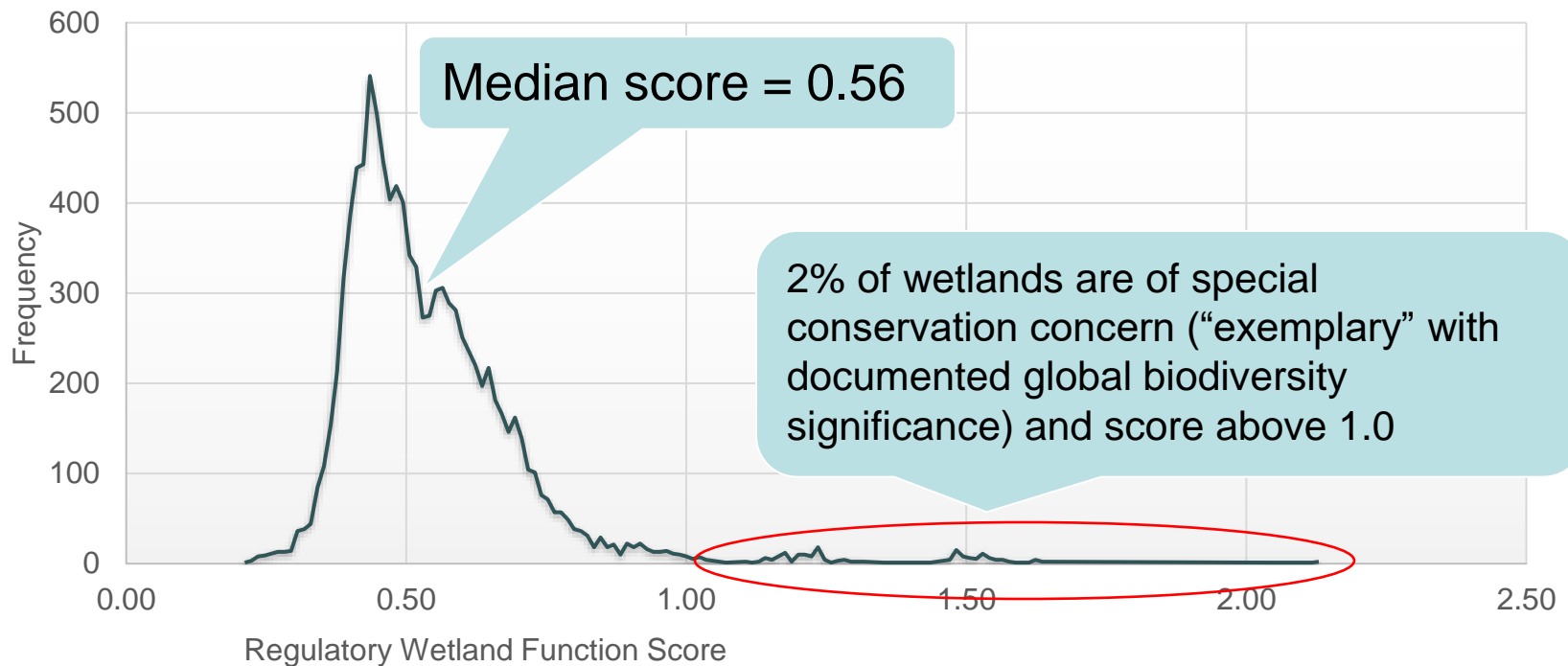
Median score = 0.56

PFO mean = 0.65



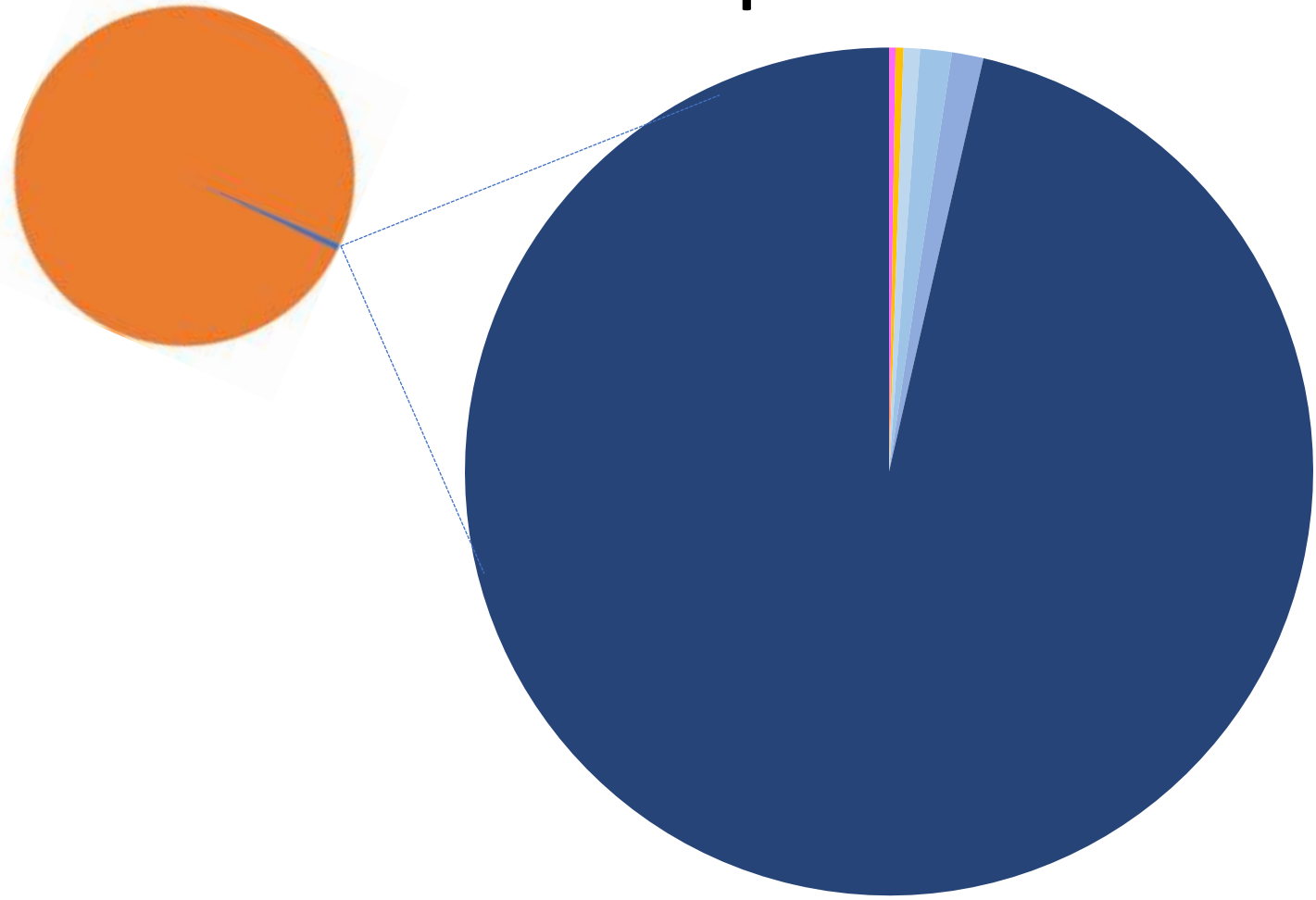
Avoiding High-Functioning Wetlands

Preliminary Regulatory Scores (GIS only)
for 10,416 vegetated wetlands





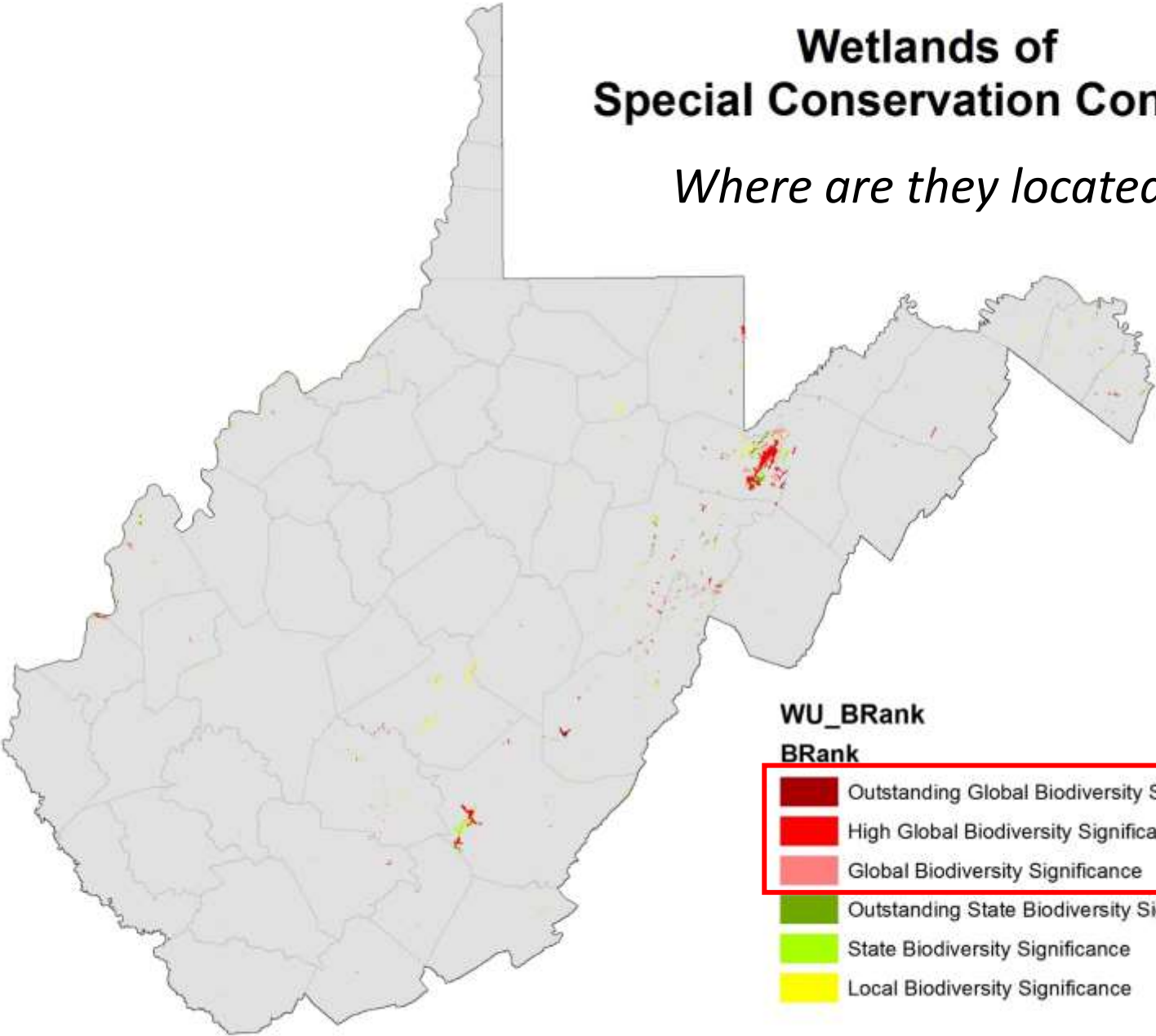
WV Wetlands of Special Conservation Concern



- B1
- B2
- B3
- B4
- B5
- B6
- none

Wetlands of Special Conservation Concern

Where are they located?



WU_BRank

BRank

- Outstanding Global Biodiversity Significance
- High Global Biodiversity Significance
- Global Biodiversity Significance
- Outstanding State Biodiversity Significance
- State Biodiversity Significance
- Local Biodiversity Significance

WVWRAM Credits/Debits are Cost-Neutral

- Average amount of mitigation required statewide will not change due to WVWRAM
- However, individual projects will see changes
- Low-functioning wetlands will require less mitigation than under the current system
- High-functioning wetlands will require more mitigation than under the current system



Compliance with the 2008 Mitigation Rule

- WV is currently in compliance with the mitigation rule for streams, but NOT for wetlands
- WVWRAM was developed at the request of the Inter-Agency Review Team.
- WVWRAM as part of SWVM offers simple & streamlined permitting, predictable costs



WVWRAM will be required when:

- There will be permanent impacts to wetlands, which includes conversion from PSS/PFO to PEM.
- Section 404/401 permitting is triggered

WVWRAM will NOT be required for projects when:

- wetlands are avoided or temporarily impacted (< 1 year) and Section 404/401 NOT triggered

WVWRAM score will be an input to SWVM



WVDEP Watershed Assessment Branch

Representative Sampling

- Wetlands that are < 1 acre in size AND with preliminary GIS scores varying < 10% from one another may be considered as a comparable assessment group.
- Field assessments of a randomly selected 10% of these wetlands will be accepted as representative of the whole group.



Year-round Assessment

- WVWRAM is designed to produce robust, repeatable results during the growing season. Assessors are strongly encouraged to perform the assessment during the months of May-September (June-September for elevations above 3000 feet).
- Outside this period, the maximum score for the Rapid Floristic Quality metric will be assigned to debits.



WVWRAM

Mitigation Banking, In-Lieu Fee, PRM

- WVWRAM will become part of the baseline and monitoring requirements for credit release
- WVWRAM will be an input to SWVM calculation of credits for restoration, enhancement, and preservation



Predicting WVWRAM Scores

- Prep work (checking nearby wetland scores or running desktop scenarios) before you go to the field will allow you to ballpark estimate the WVWRAM score while still in the field.



Proposed new mitigation bank (submit this polygon to the GIS tool for a preliminary estimate of future credits)

PEM1Atn

Existing mitigation bank

PEM1Fxa

Hydric soils shown in purple

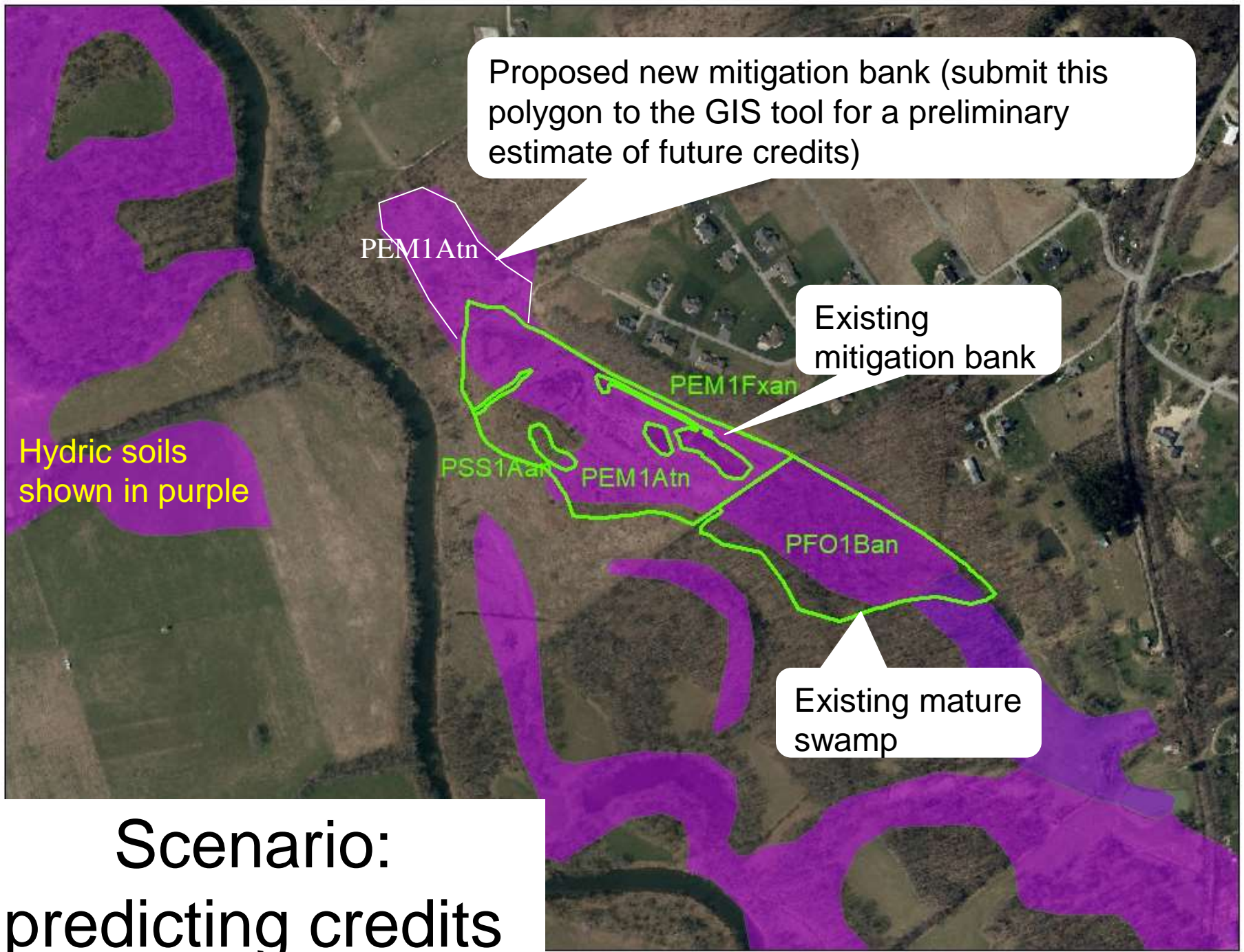
PSS1Aan

PEM1Atn

PFO1Ban

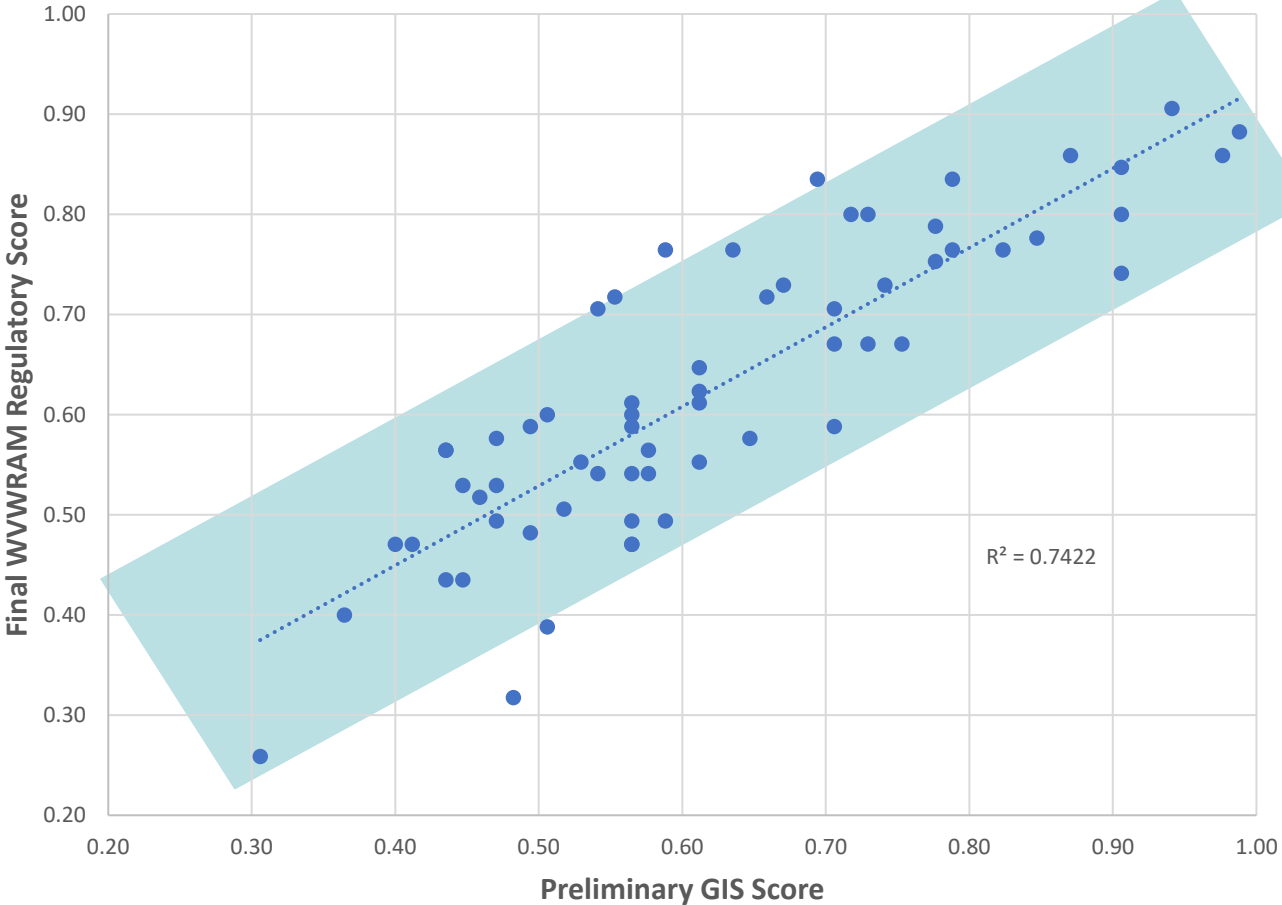
Existing mature swamp

Scenario:
predicting credits





Preliminary GIS Score vs. Final Score





Thank you

Brian.L.Bridgewater@wv.gov, Elizabeth.A.Byers@wv.gov,
Sara.Miller@wv.gov, John.C.Wirts@wv.gov