Wetland Vulnerability to Climate Change

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State College, PA

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Project Overview

Objective: Evaluate Relative Wetland Vulnerability

Use Widely Available Data

Relate Vulnerabilities to Ecosystem Services

Using…..

1 - Hydrology Model: **Current (Historic) and Future Climate Scenario**

2 - Coarse HGM Tagging:

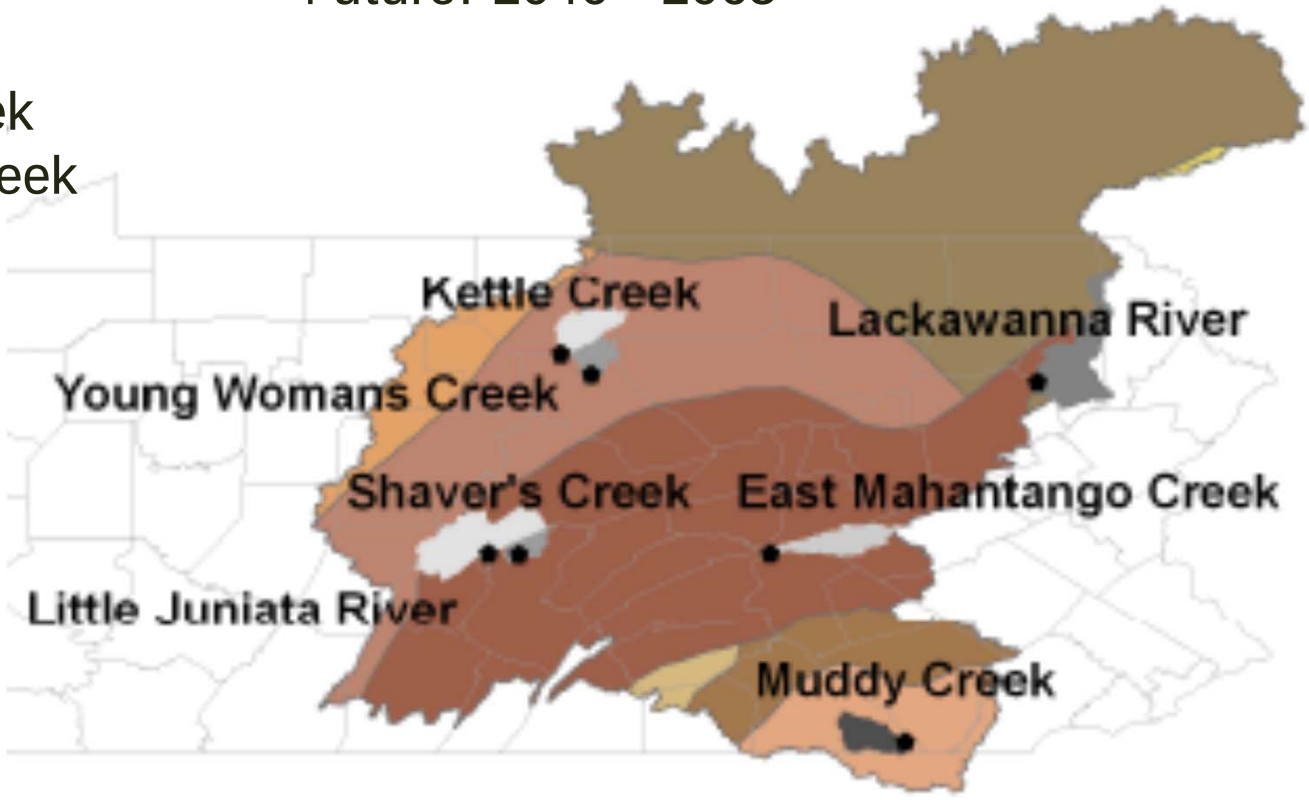
Depression
Slope
Riverine

Study Locations

Watersheds (7)
Muddy Creek
Kettle Creek
Shaver's Creek
Young Womans Creek
East Mahantango Creek
Little Juniata River
Lackawanna River

Ecoregions (4)
Ridge and Valley
Piedmont
Unglaciated Plateau
Glaciated Plateau

20-Year Climate Scenarios (2)
Historical: 1979 - 1998
Future: 2046 - 2065

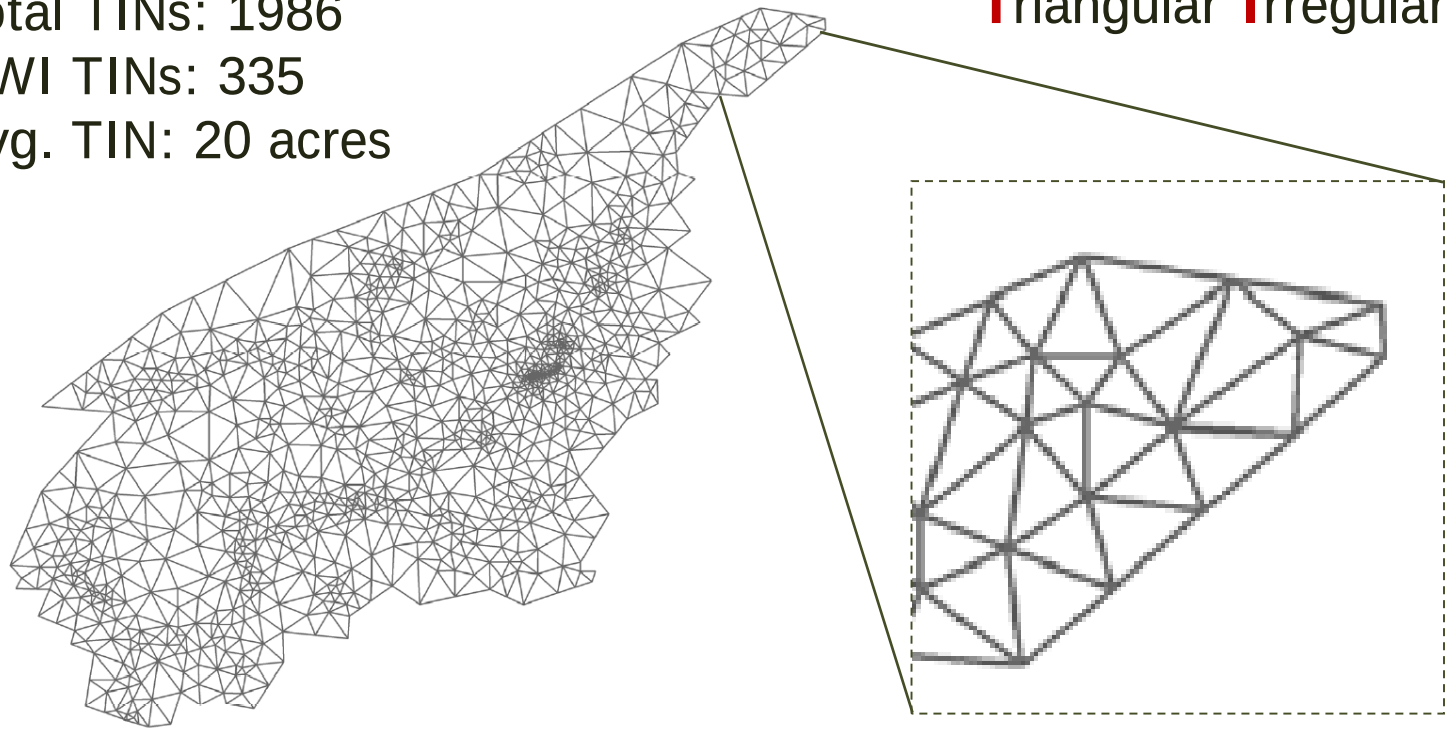


Groundwater from PIHM

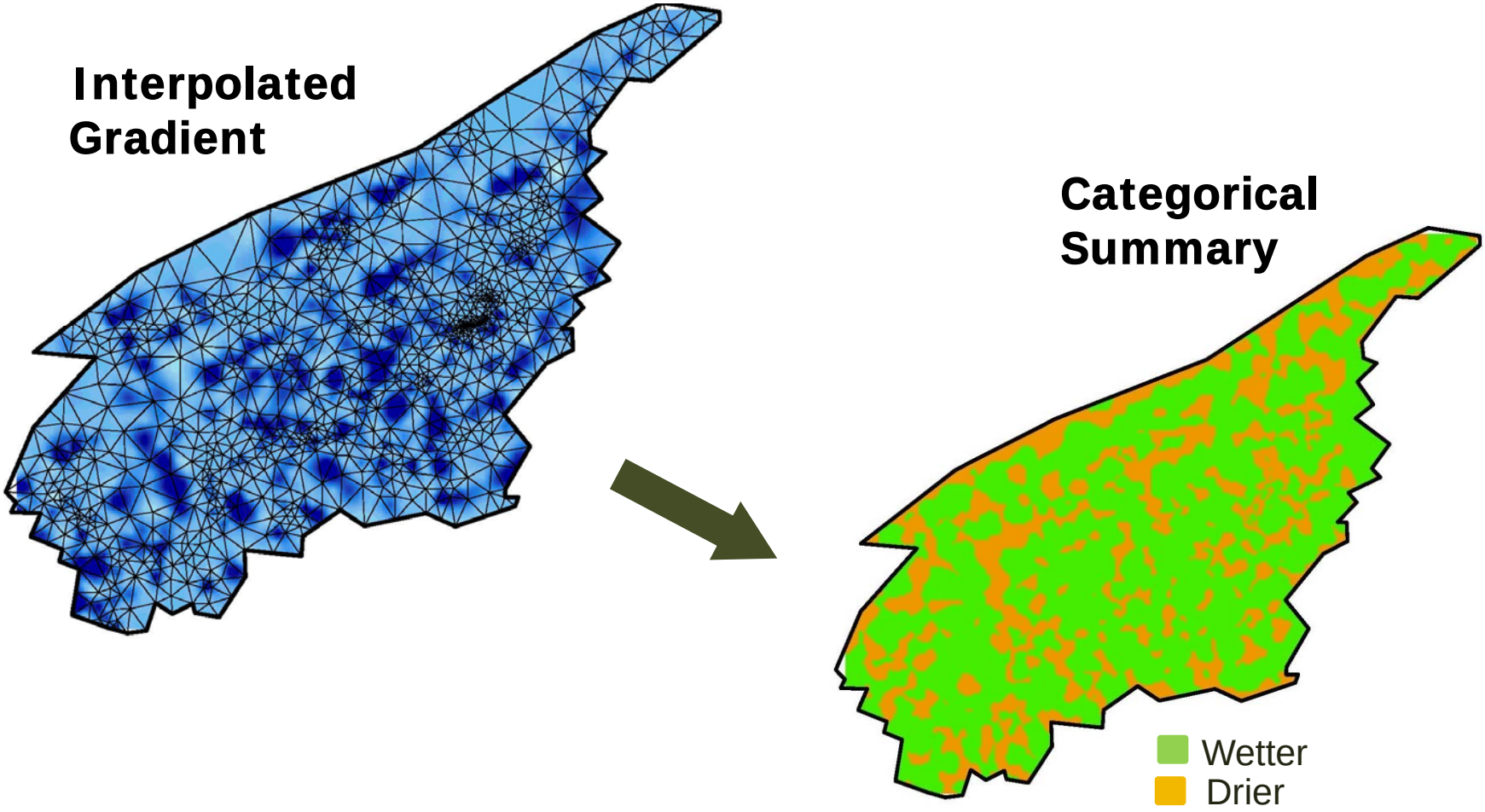
Penn State Integrated Hydrologic Model

Shaver's Creek
163 km^2
Total TINs: 1986
NWI TINs: 335
Avg. TIN: 20 acres

TINs
Triangular **I**rregular **N**etwork

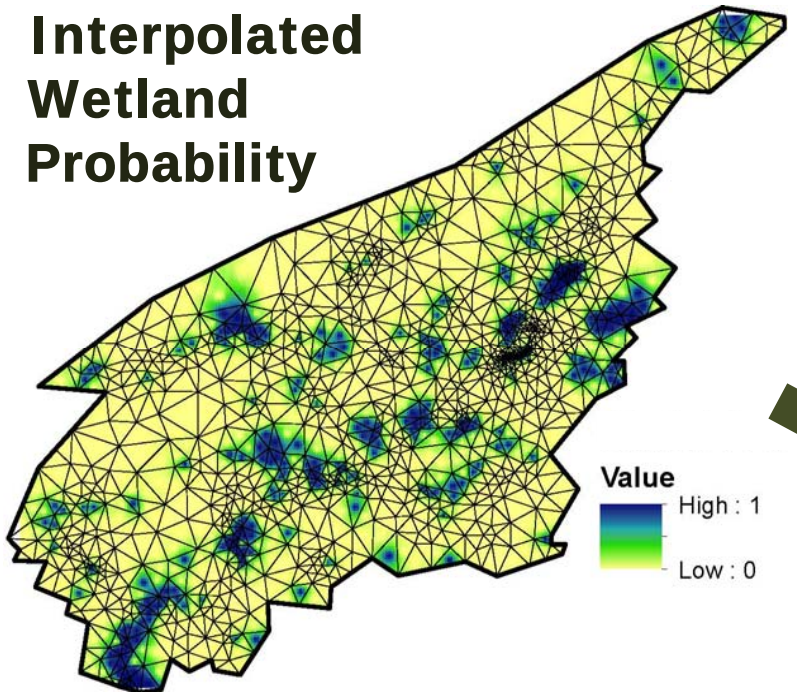


Groundwater Change

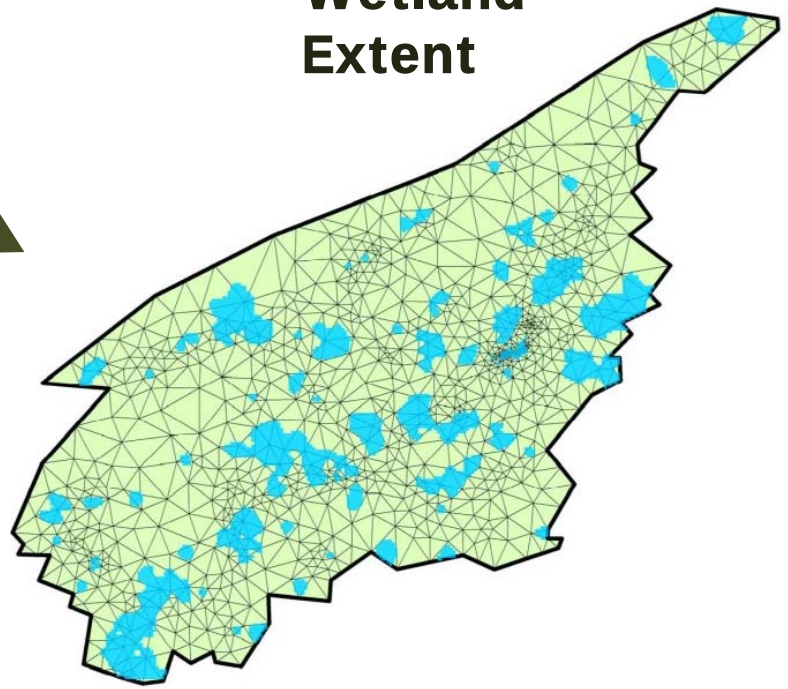


Modeling Wetland Extent

Interpolated Wetland Probability



Modeled Wetland Extent

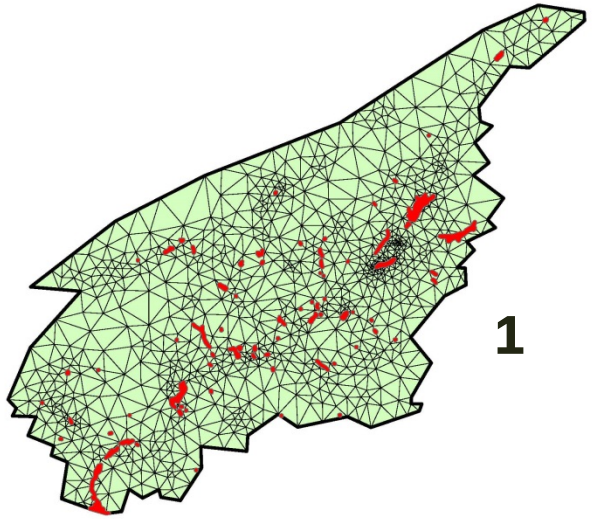


Target Areas

1 - NWI Wetlands

2 - PIHM Modeled Wetlands

3 - Potential HGM-Specific Areas



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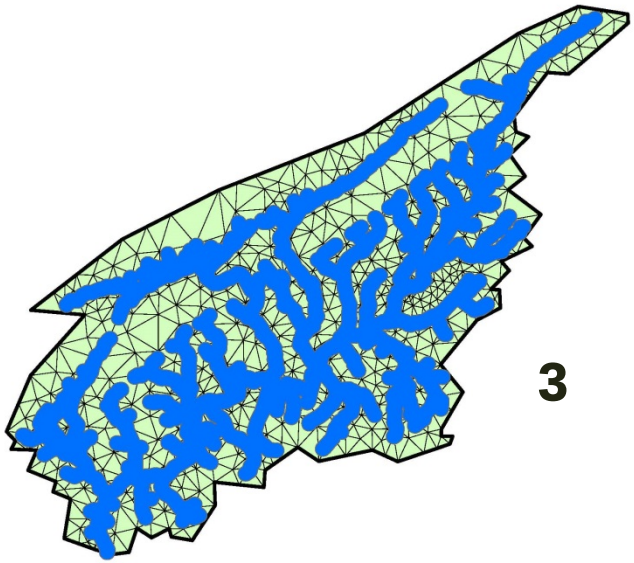

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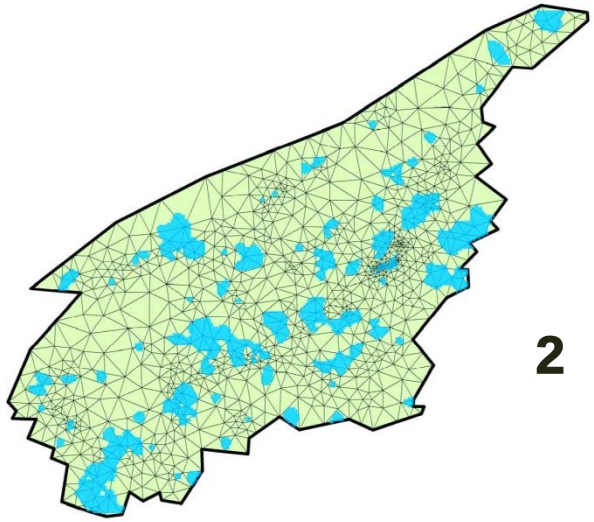

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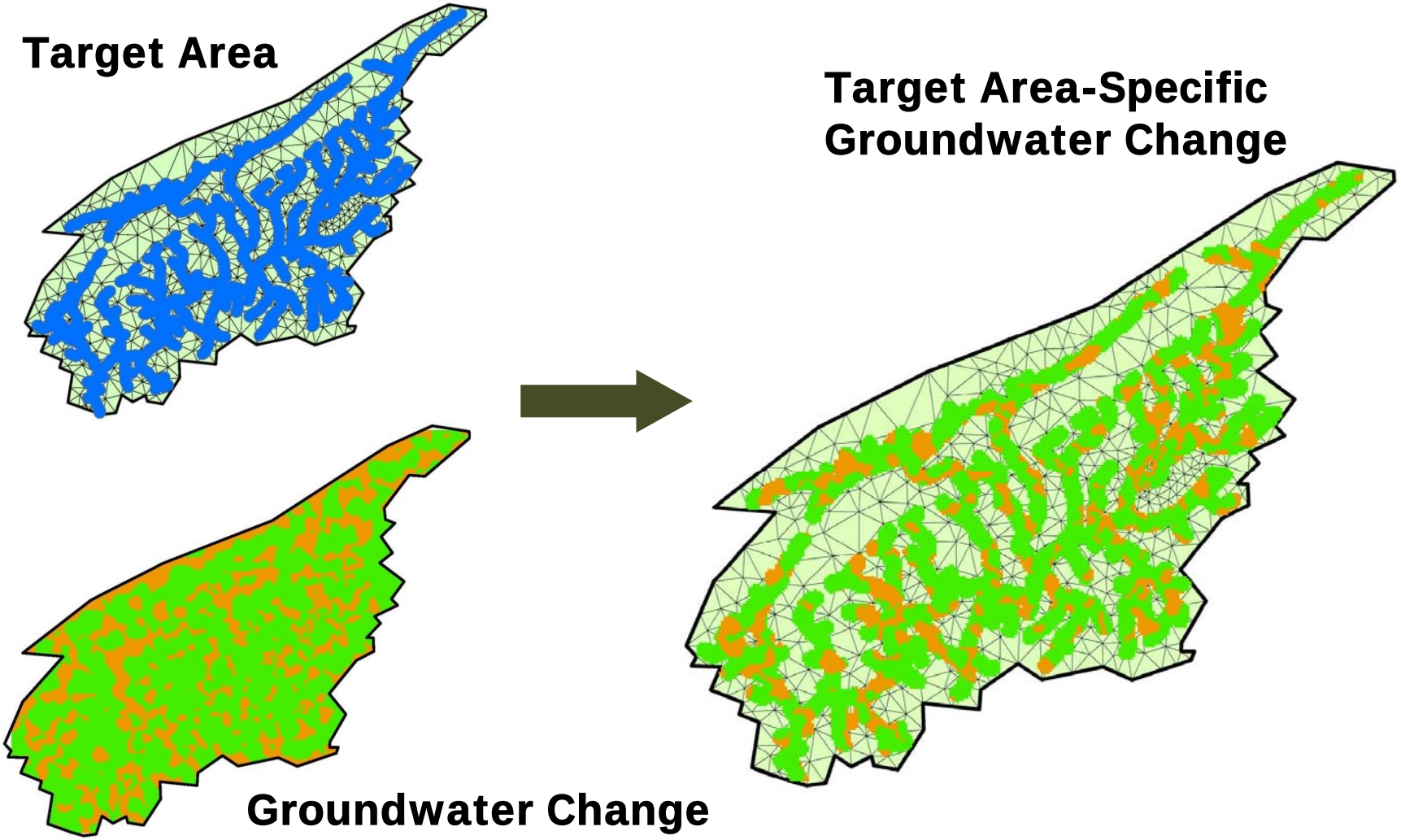
Extracting Groundwater Data



Shaver's Creek Results

Largest Gains:
Riverine Floodplains

Largest Losses:
Isolated Depressions

Potential HGM Areas	Drier	Wetter
HGM-Depression	38%	62%
HGM-Slope	28%	72%
HGM-Riverine	18%	82%

Watershed Overview	Drier	Wetter
Entire Watershed	33%	67%
NWI Wetlands	20%	80%
PIHM Wetlands	25%	75%

PIHM Wetlands (HGM)	Drier	Wetter
PIHM-Depression	27%	73%
PIHM-Slope	25%	75%
PIHM-Riverine	19%	81%

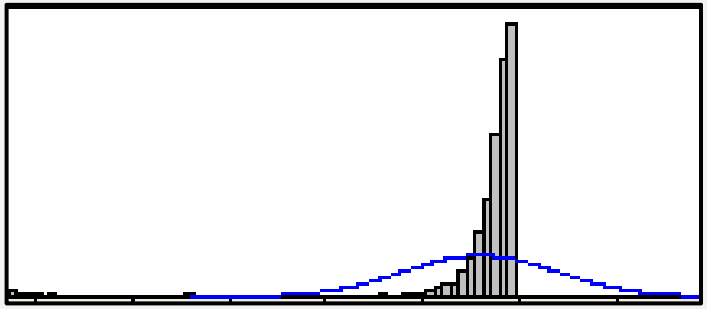
Expanded Results

	NWI Wetlands		PIHM Depression		
	Drier	Wetter	Drier	Wetter	Ecoregion
Lackawanna River	**74%**	**26%**	**71%**	**29%**	**Glaciated Plateau**
Young Womans Creek	62%	38%	63%	37%	Unglaciated Plateau
Kettle Creek	47%	53%	62%	38%	Unglaciated Plateau
East Mahantango Creek	40%	60%	50%	50%	Ridge and Valley
Shaver's Creek	**20%**	**80%**	**27%**	**73%**	**Ridge and Valley**
Little Juniata River	71%	29%	64%	36%	Ridge and Valley
Muddy Creek	35%	65%	35%	65%	Piedmont

Next Steps

1. Seasonal Analysis
2. Future Wetland Extent
3. Site-Specific HGM Tagging
4. Deviation from Mean Groundwater

Wetland TIN “Signature”



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PIHM Modeling

PIHM Workshop Coming Soon

www.hydroterre.psu.edu
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