

# Ecological Assets of PORTS: Enhancing Decision-Making for PORTS Future Use Planning

Voinovich School of Leadership and  
Public Affairs

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# **Role of the Voinovich School and Ohio University in the Demolition and Decontamination of the DOE PORTS Nuclear Enrichment Facility near Piketon, Ohio**

- Tasks support the DOE EM commitment to community engagement and informed decision-making.
- Tasks contribute to efforts to expedite cleanup activities at PORTS in a more cost effective manner.
- Tasks strive to employ innovations to advance the science of cleanup at the site and inform other DOE cleanup activities around the nation.

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# PORTS Site Characteristics – Data Development and Utilization

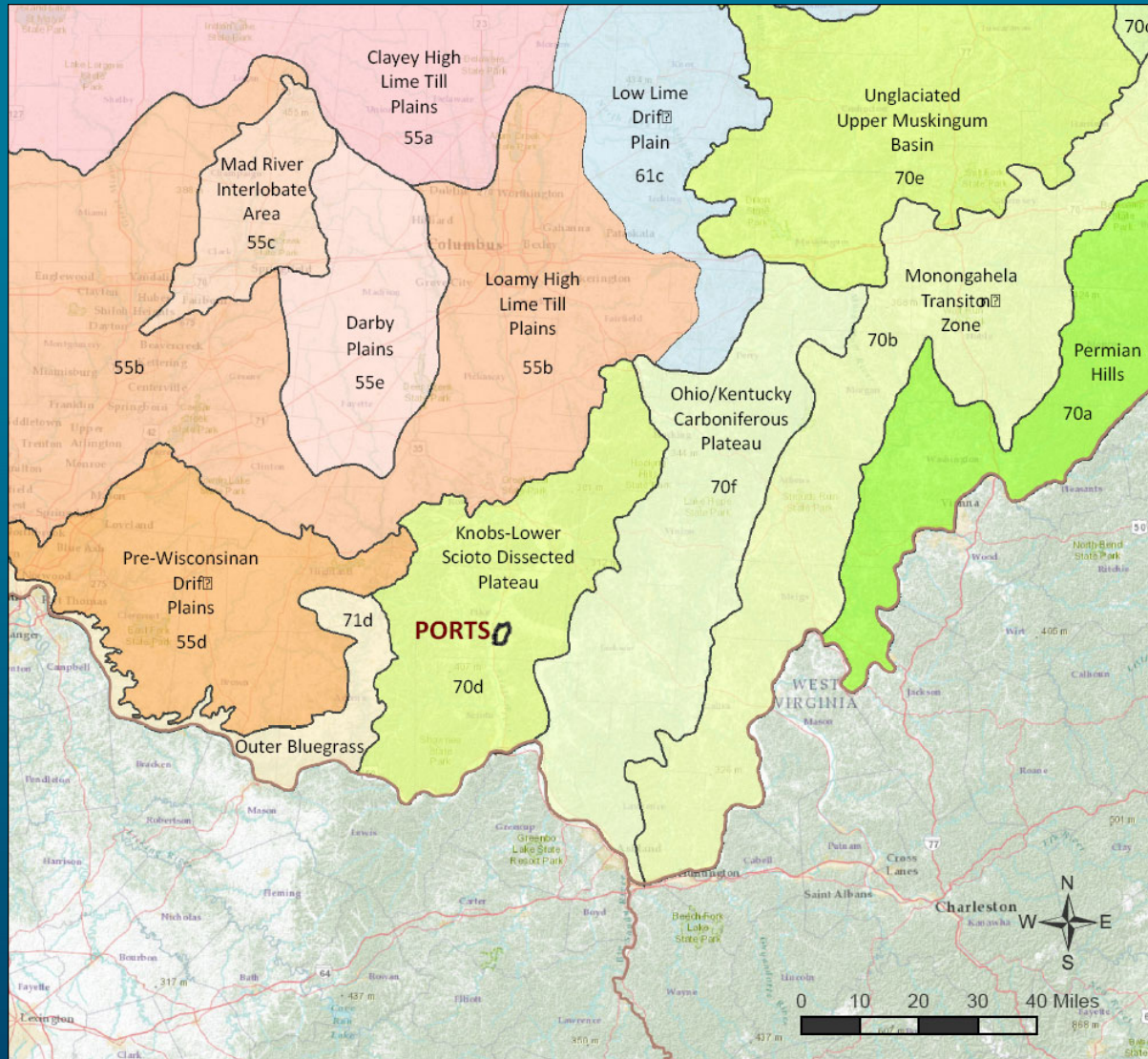
- PORTS Environment
  - Physical and geochemical setting
  - Abiotic and biotic resources
  - Ecological services
- PORTS Future Use
  - Prioritization of development areas
  - Maximizing on-site resources to enhance development
  - Reduction of impact to conserve ecological assets

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# Considering the Regional Character of PORTS to Understand the Potential of the Ecological Assets



## Ecoregion Characteristics

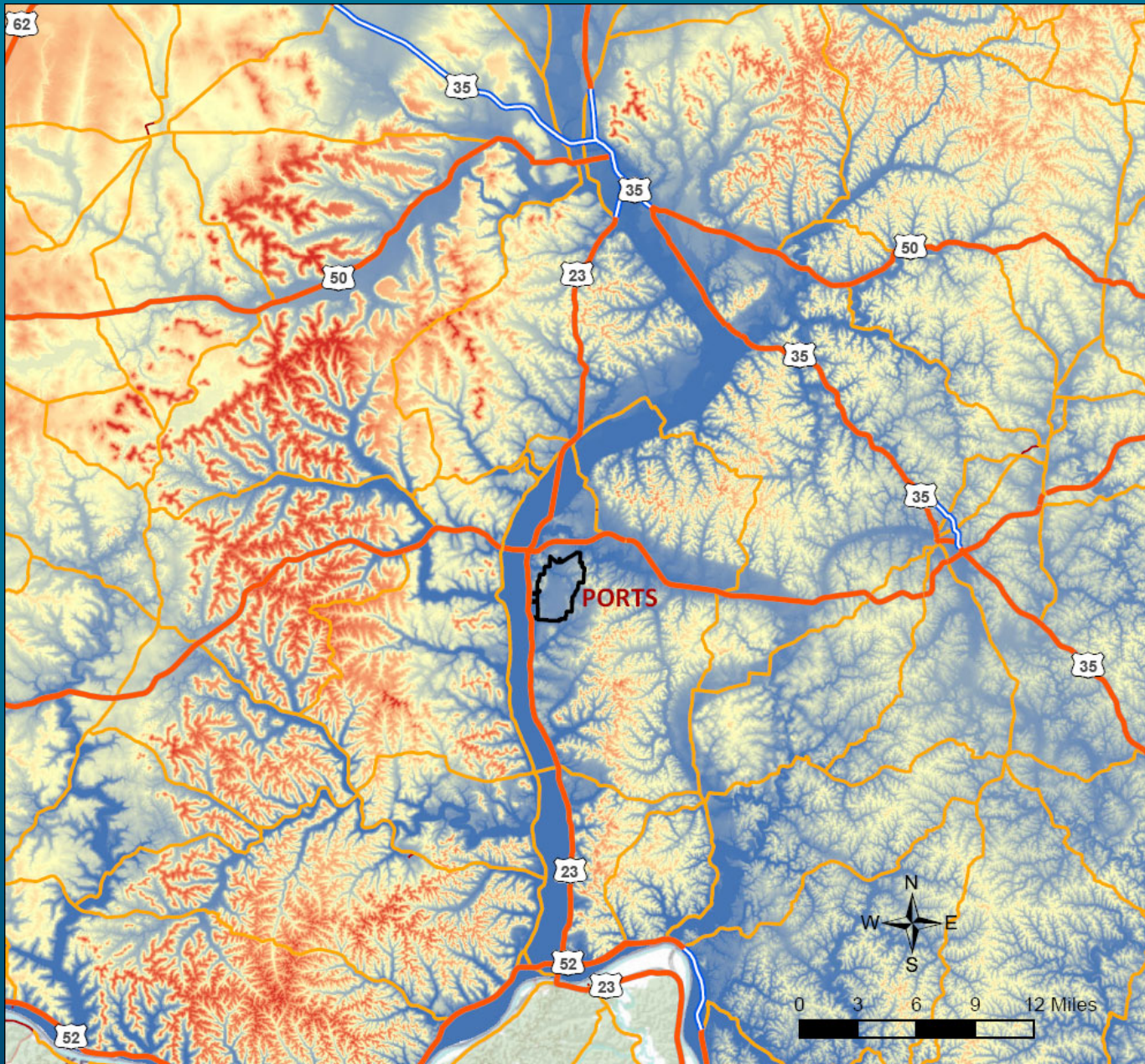
- Level III - Western Allegheny Plateau
- Level IV – Knobs-Lower Scioto Dissected Plateau
- Unglaciaded uplands with mixed oak and mesophytic forests
- Ice age effects evident in floodplains with bottomland hardwood forests and agriculture

USEPA, 2011

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OSIP, 2007

## Regional Elevation Characteristics

- Dissected steep ridges
- High relief topography

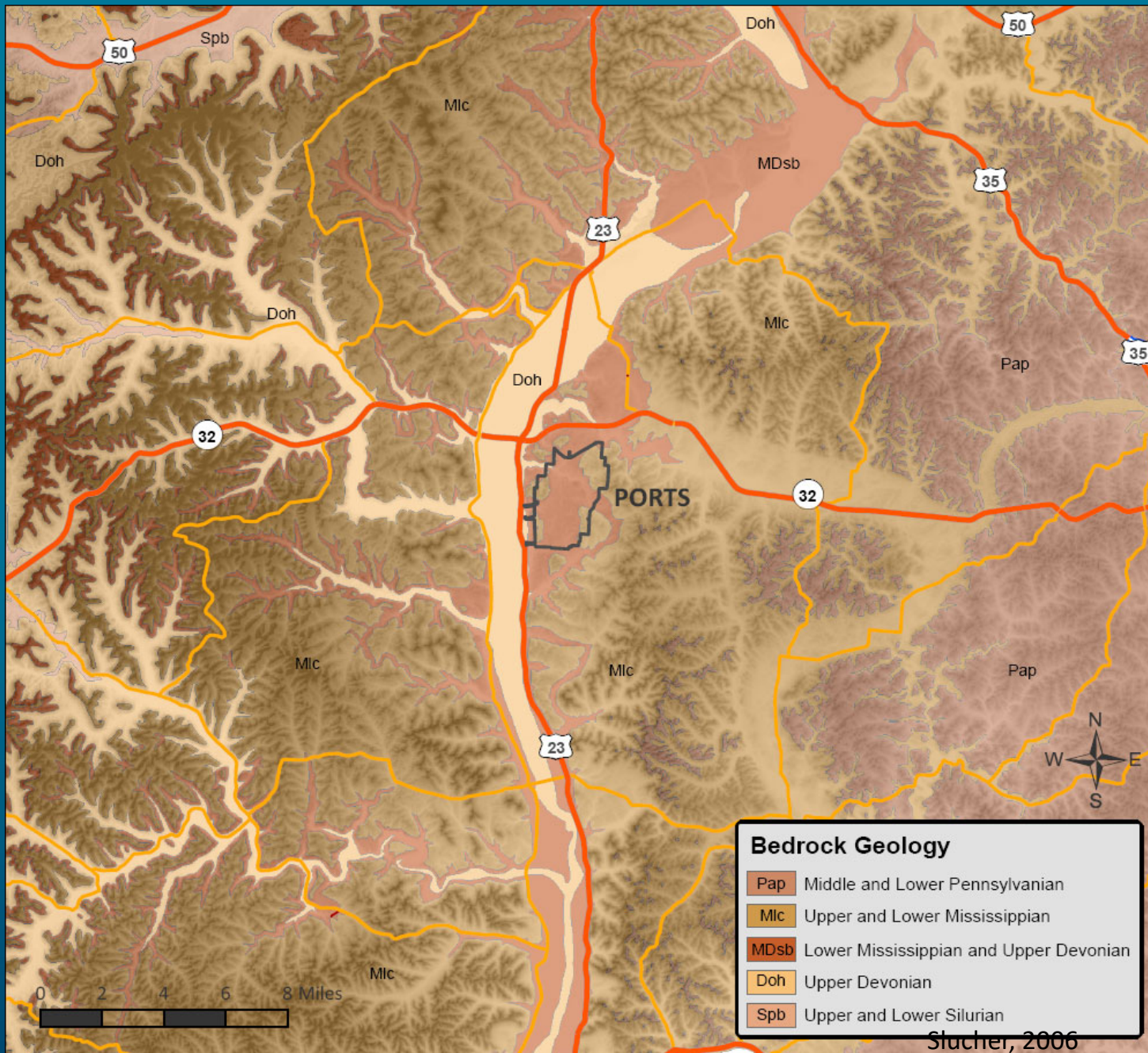
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# Dominant Bedrock Geology

- Underlain mostly by Mississippian-age shale and sandstone
- Regionally varying surface geology



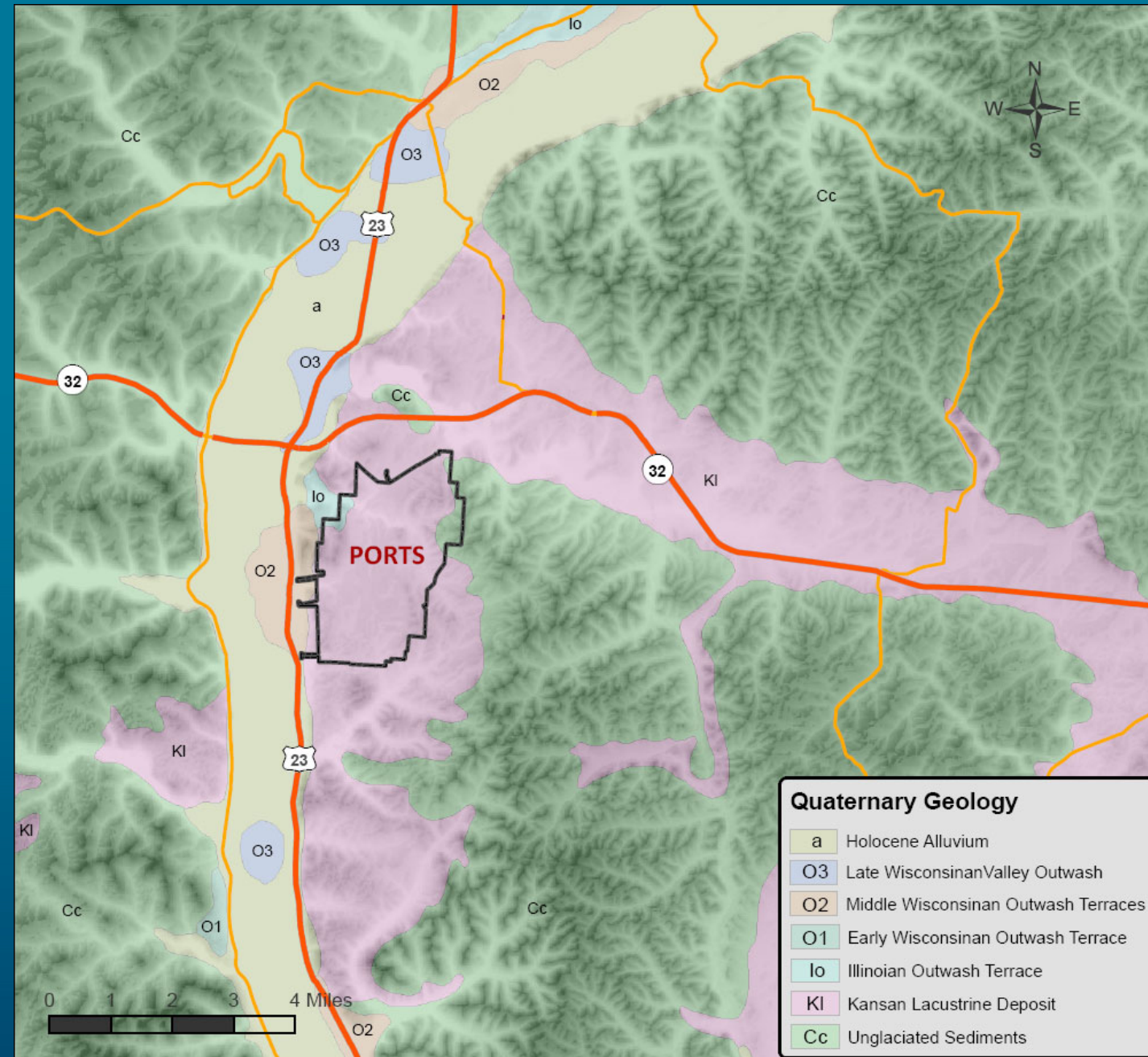
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# Dominant Surface Geology

- Complex history of Quaternary geology due to the procession of continental glaciers
- Relict habitats
- Unique habitats



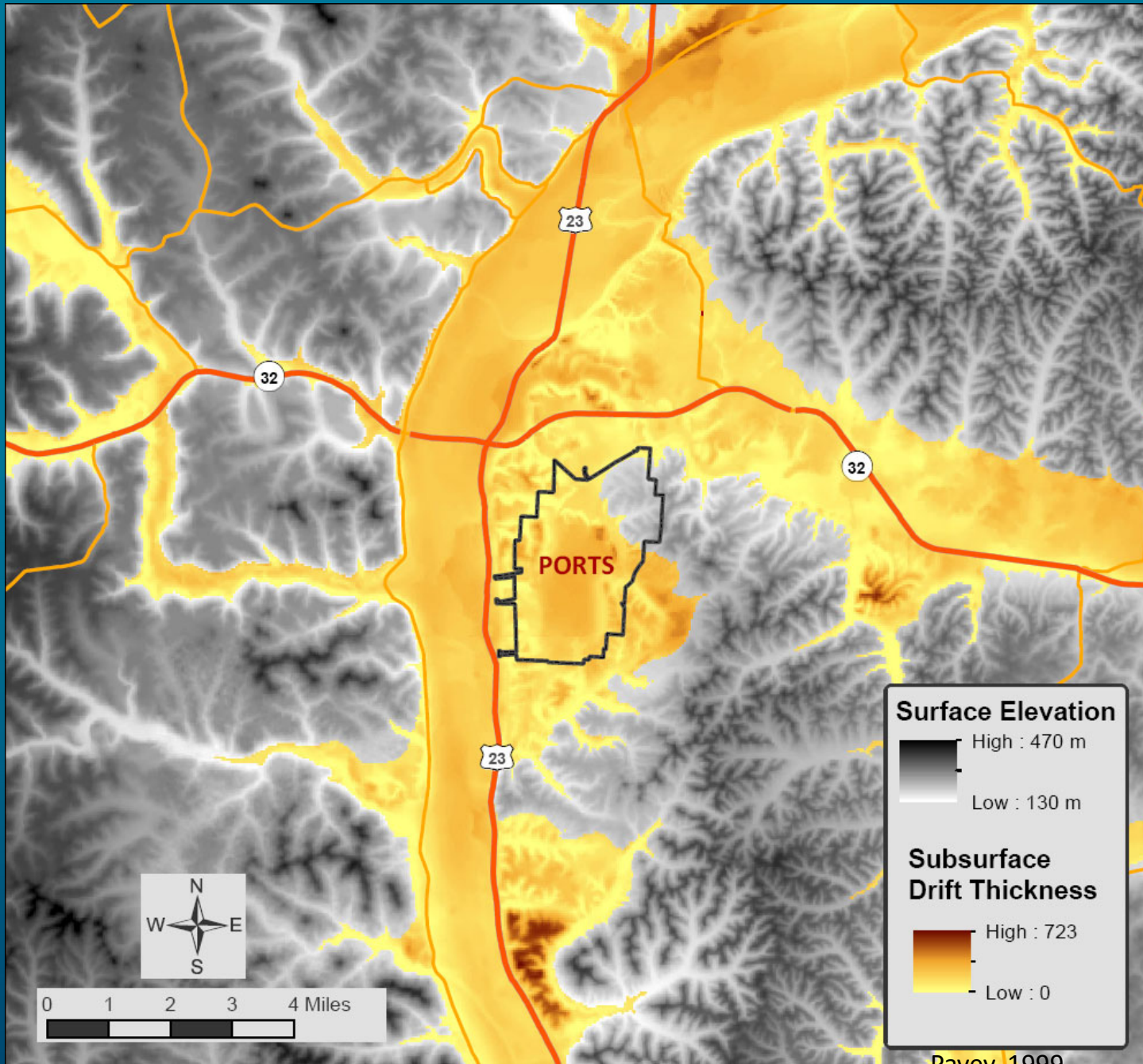
Powers, 2004

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# Regional Subsurface Characteristics

- Thickness of glacial sediments can greatly influence potential vegetational composition

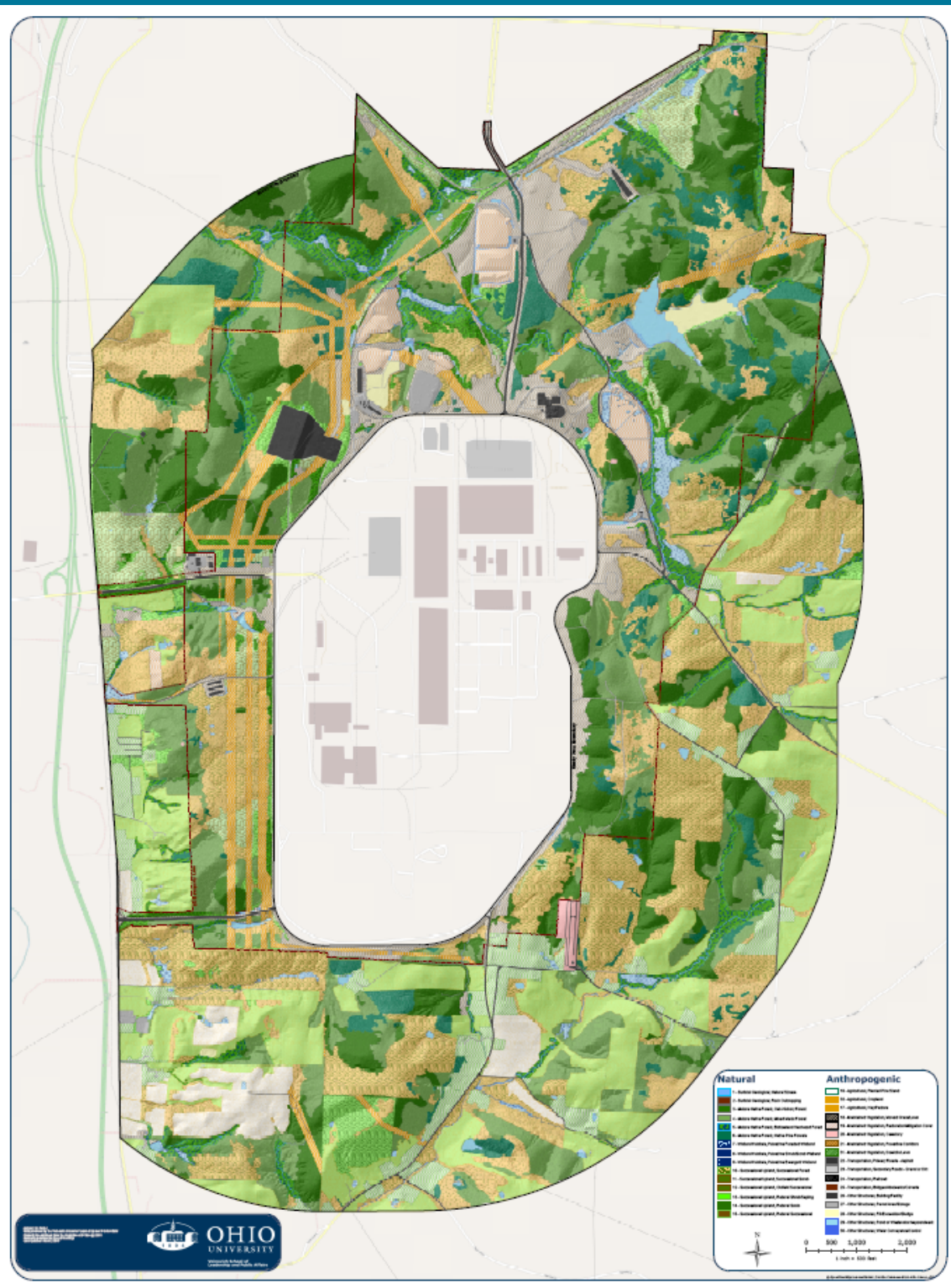


Pavey, 1999

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# PORTS Landscape

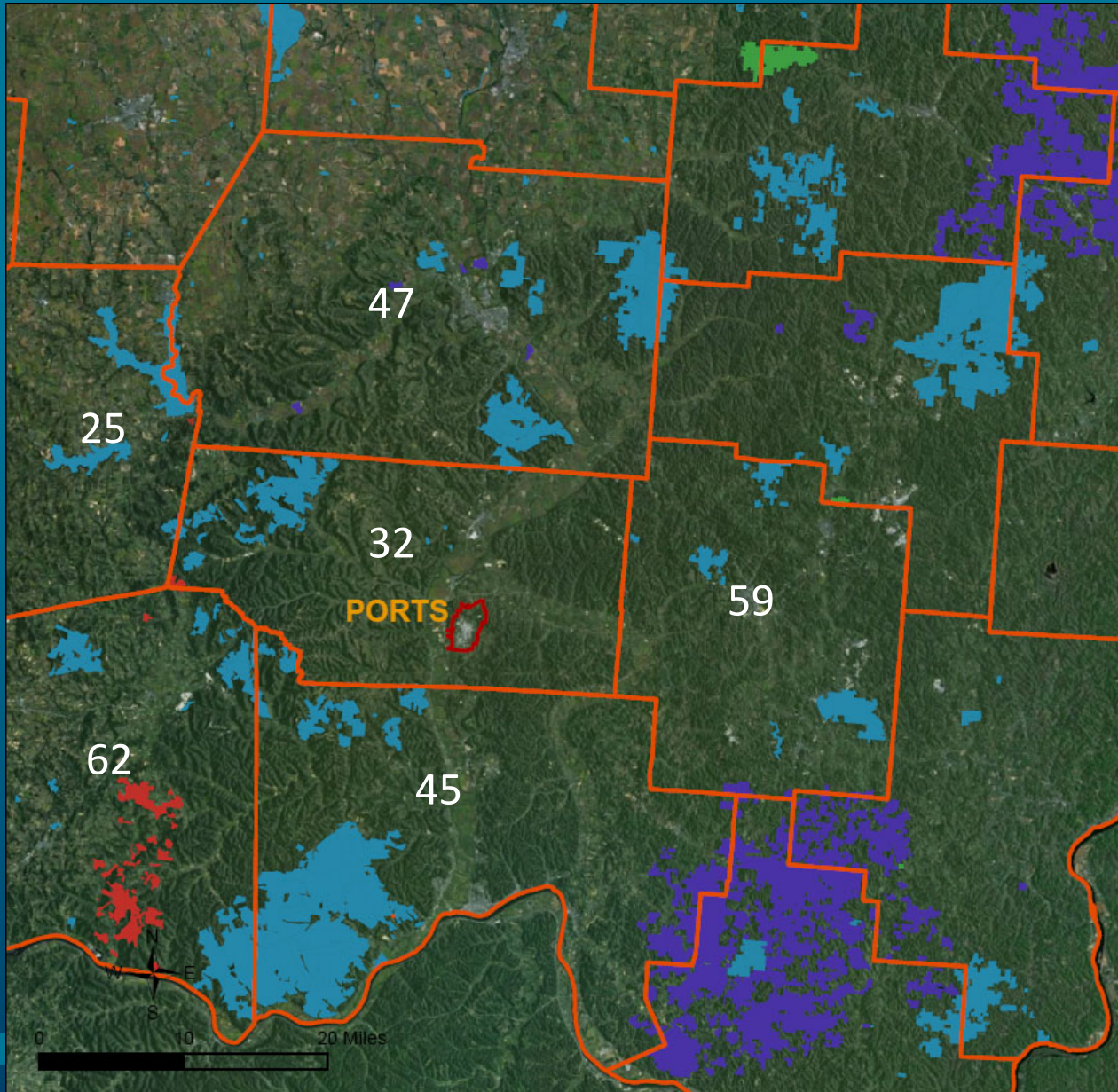
- 46% Mature upland native forest
- Trees in the Oak-Hickory association have a mean age over 85 years
- Bottomland hardwood forests have an average height of nearly 67'
- Ridgetop native pine forests are comprised of 98.6% native species
- 135 of the 588 plant species identified have specific ecological requirements and represent high quality habitats

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# Regional Conservation Effort



- PORTS habitat quality is variable due to the landscape legacy.
- While much of the site is heavily disturbed, portions exhibit high-quality habitat or the potential to become so through conservation efforts.

\* ODNR: 32 listed plants species found in Pike County (2010-11)

\* US FWS: List 117 floral and faunal species as Conservation Priorities in the Ohio River Valley Region (2002)

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# Using on-site data to evaluate ecological resources and model decision-making

- The comprehensive on-site data provides opportunities to evaluate ecological needs and opportunities
- Data and analyses provide the basis for evaluating decisions and model outcomes
- Models provide opportunities to maximize the efficiency and efficacy of projects

# Evaluation of habitats affected by potential OSDC Plan in Study Area D



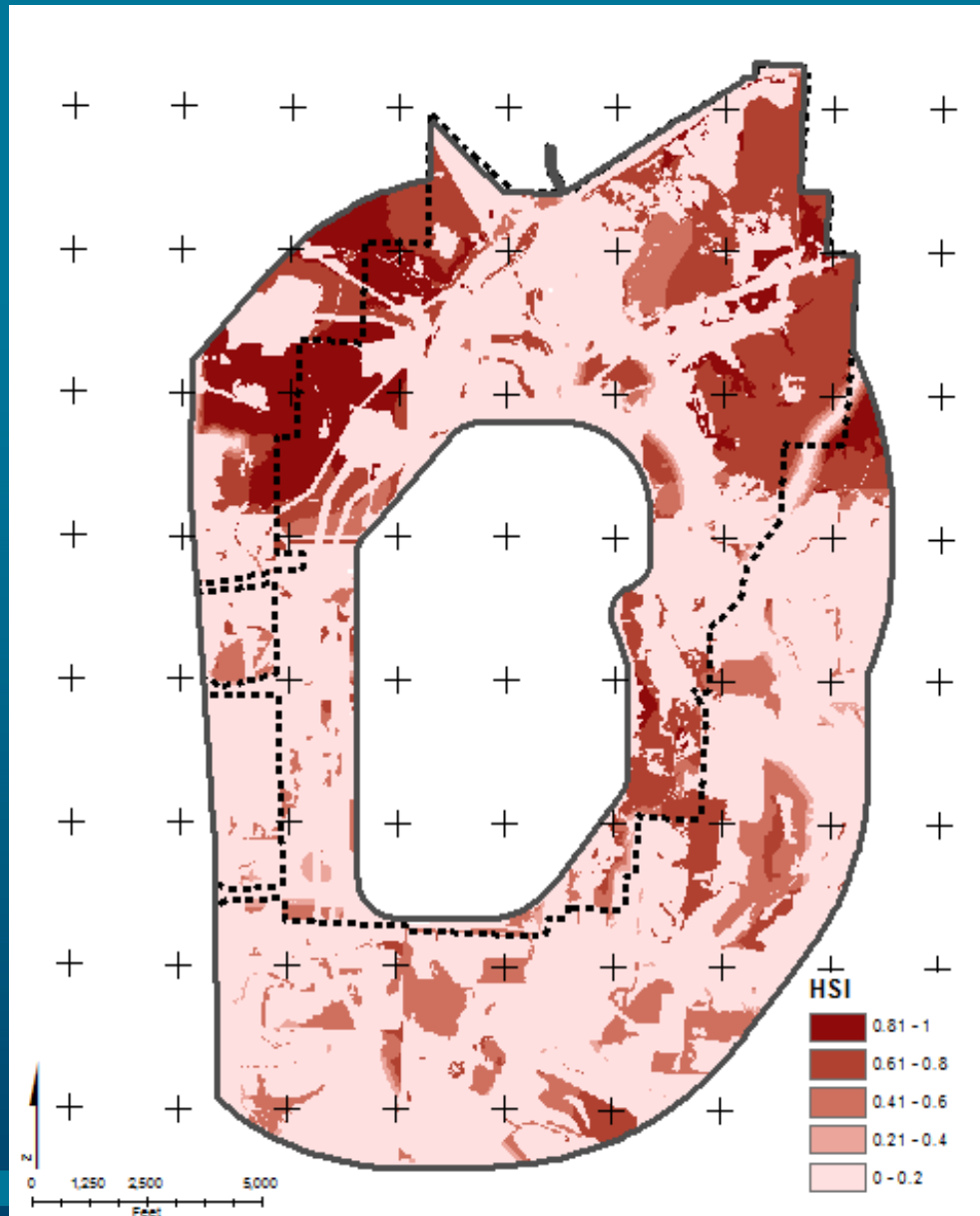
Habitat Feature	Acres
Oak-Hickory Forest	68.38
Mixed Mesic Forest	51.22
Native Pine Forest	34.35
Mowed Grass/Lawn	32.71
Ruderal Successional	18.55
Successional Scrub	16.24
Successional Forest	15.07
Oldfield - Successional	8.61
Bottomland Hardwood Forest	6.86
Ruderal-Scrub	2.24
Secondary Roads	1.60
Buildings/Facility	1.57
Ruderal Shrub-Sapling	1.23
Palustrine Shrub-Scrub Wetland	0.59
Paved Areas/Outdoor Storage	0.55
Primary Roads: Pavement Asphalt	0.47
Natural Streams	0.36
Water Conveyance/Control	0.16
Palustrine Emergent Wetland	0.03

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# Habitat Suitability Index (HSI) Modelling



## HSI Analysis: Timber Rattlesnake *Crotalus horridus* (State Endangered)

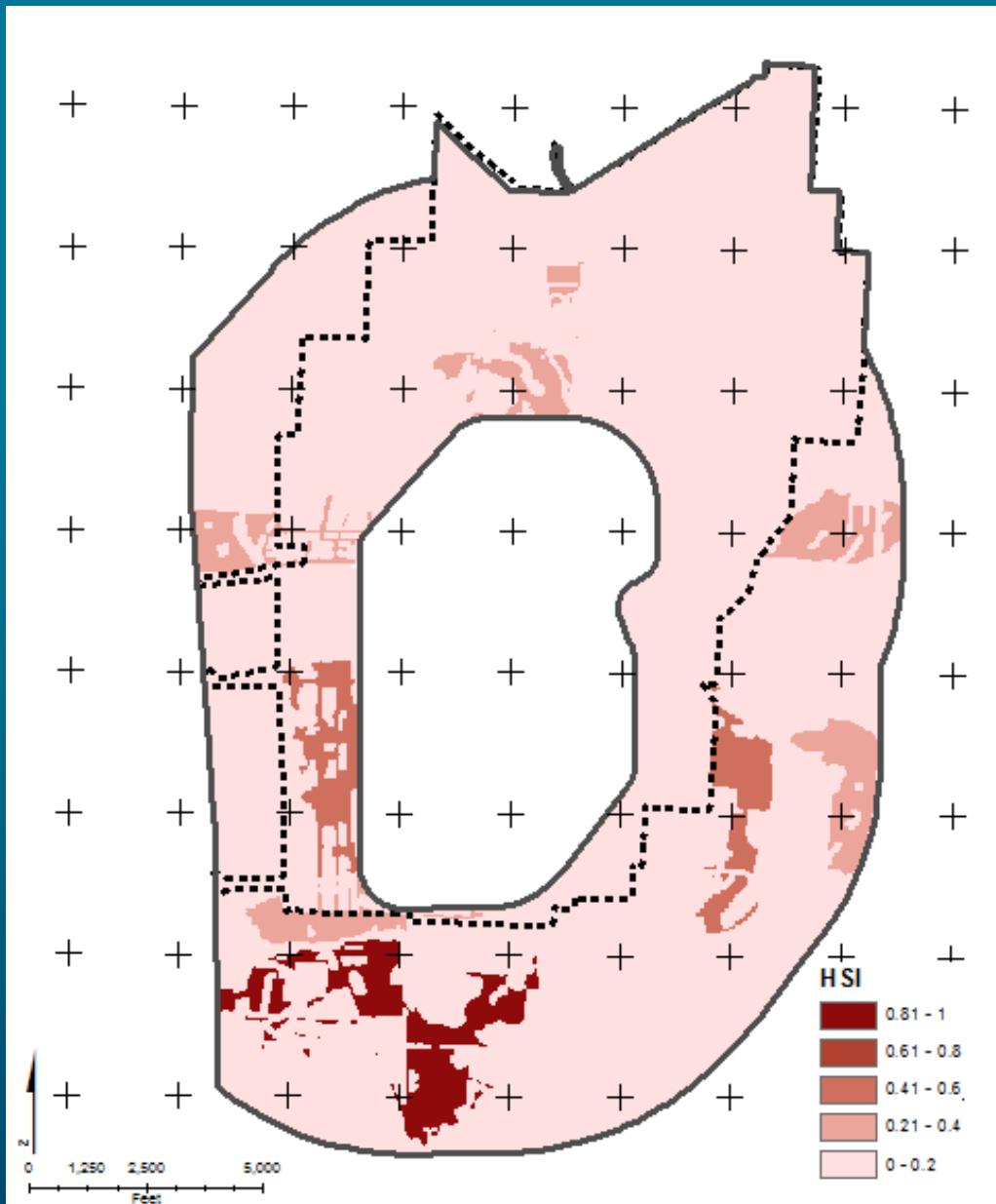


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# HSI Analysis: Henslow's Sparrow *Ammodramus henslowii* (Federal Species of Concern)



© R. & N. Bowers/VIREO

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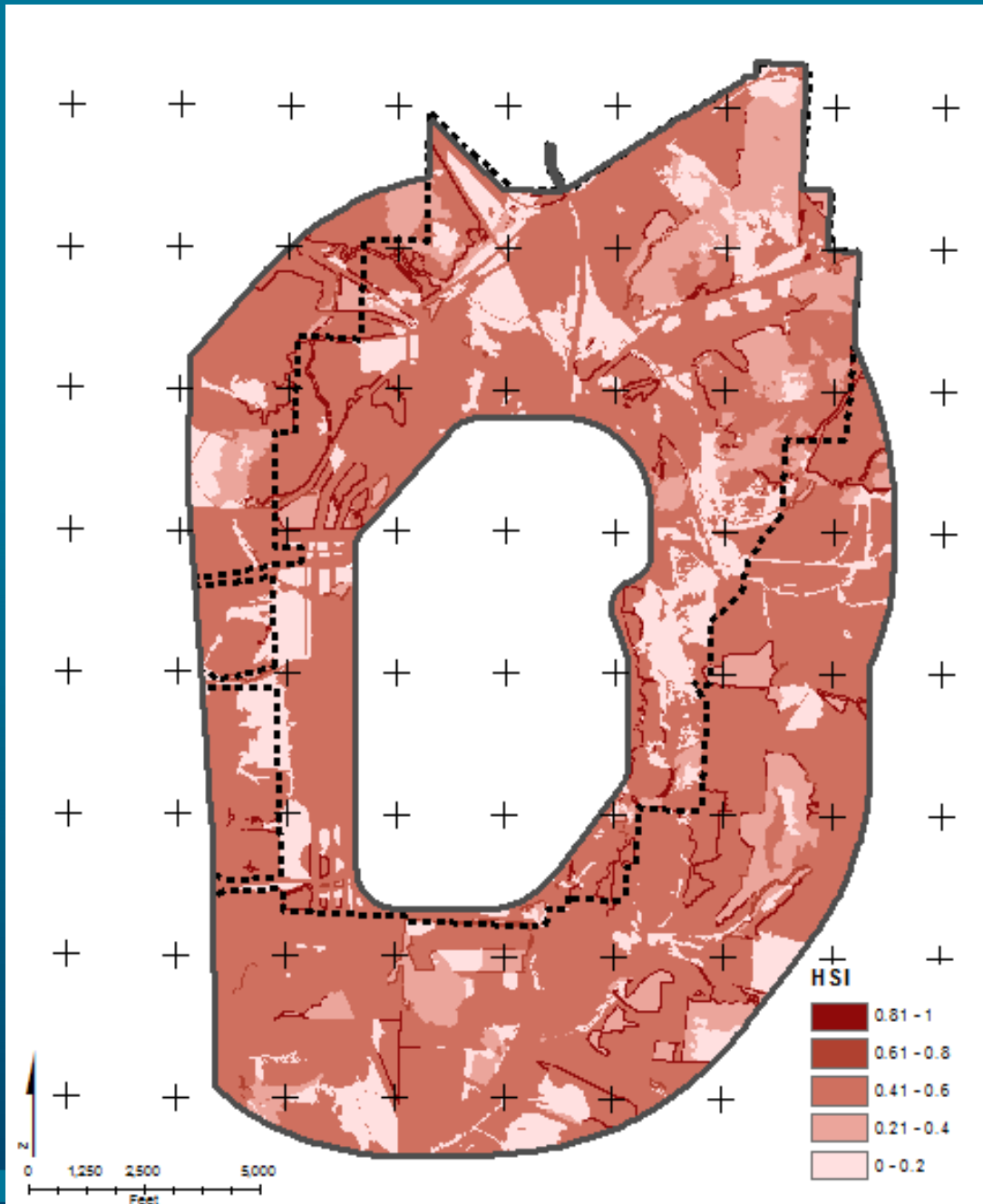




# HSI Analysis: Indiana Bat *Myotis sodalists* (Federal Endangered Species)



Adam Mann, Environmental Solutions and Innovations



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Northern long-eared Bat HSI  
*Myotis septentrionalis*



# HSI Analysis:

## Northern Long-eared Bat

### *Myotis septentrionalis*

(Candidate for Federal Endangered Listing)



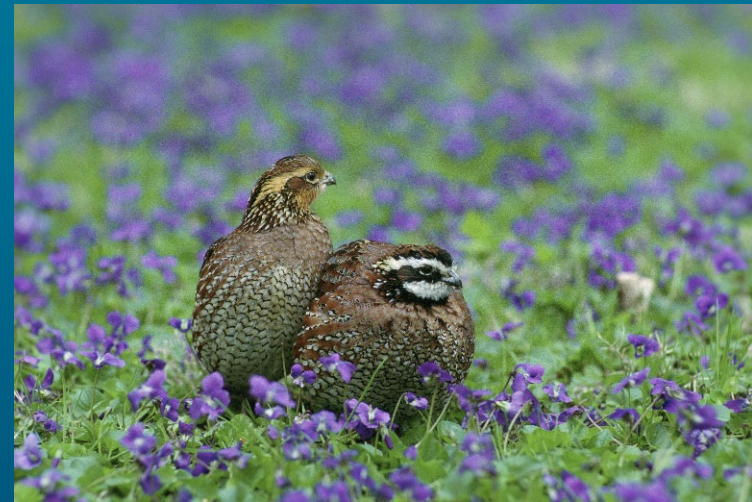
Photo © Dave Redell

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# HSI Analysis: Northern Bobwhite *Colinus virginianus* (State Species of Concern)



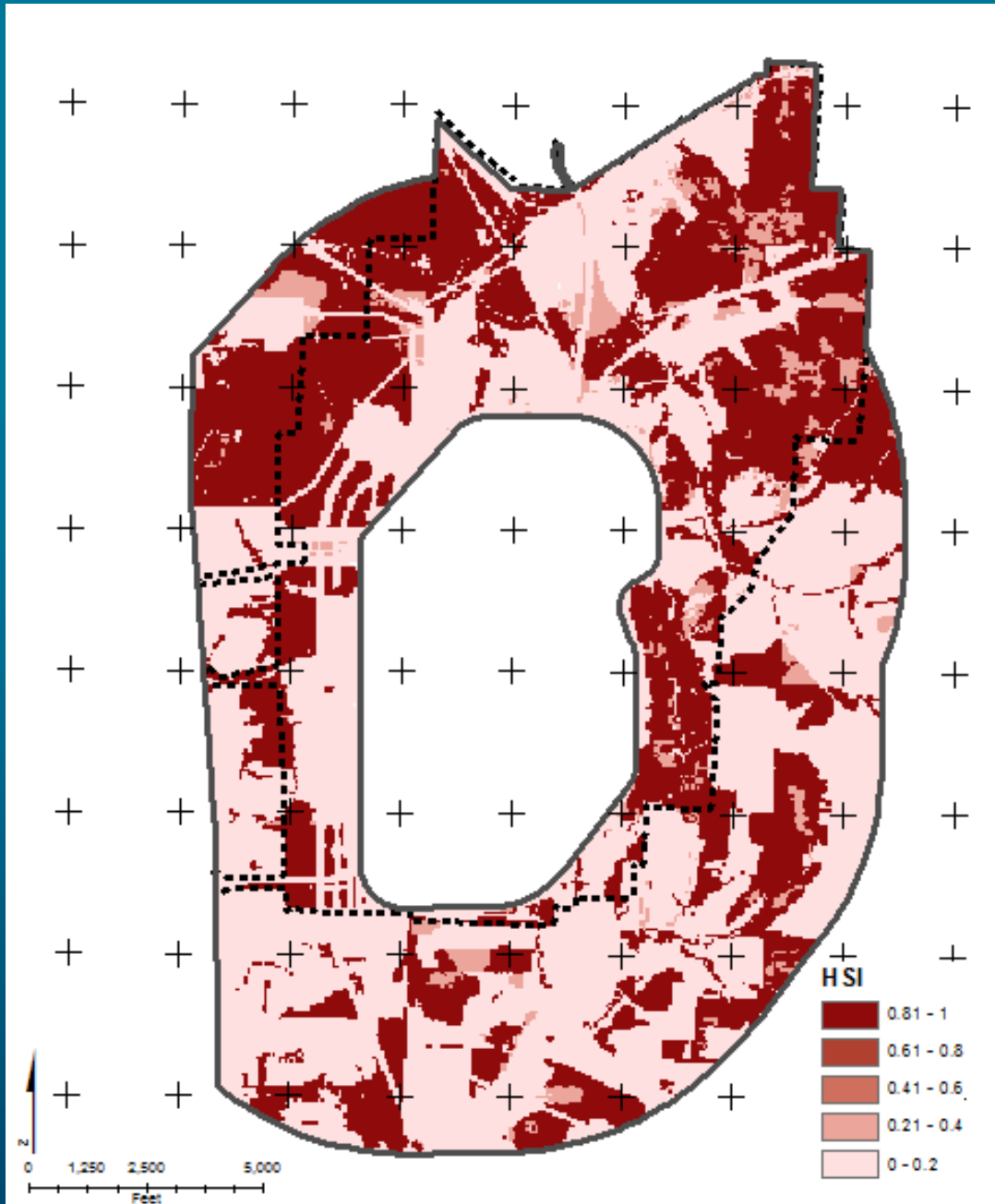
Steve Maslowski/USFWS



# HSI Analysis: Wood Thrush *Hylocichla mustelina* (Common woodland resident)



Brian E. Small

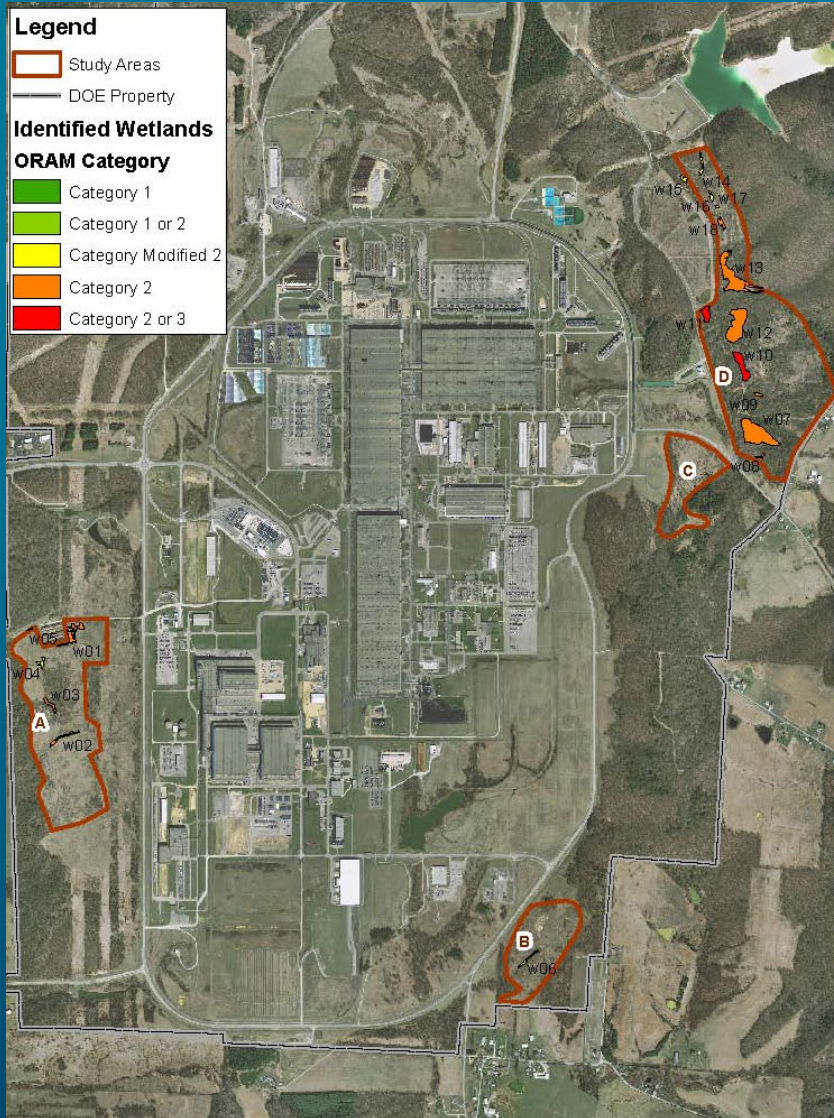


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# On-site Mitigation Potential for: Wetlands and Headwater Streams



PORTS resources include areas for potential on-site mitigation:

Conceptual wetland areas were evaluated based on:

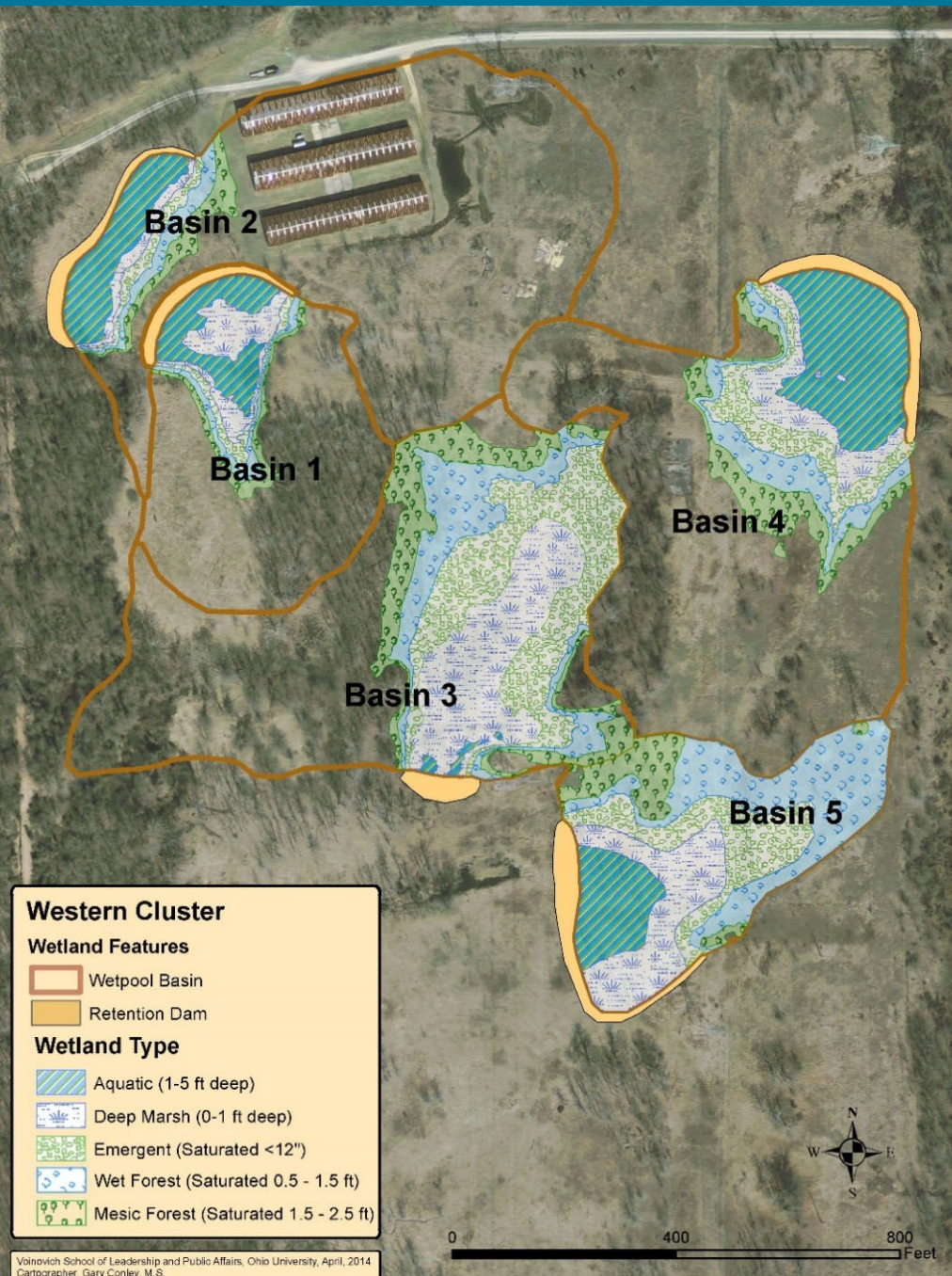
- Soil properties
- Landform characteristics
- Potential hydrologic sources
- Proximity to hydric vegetation
- Existing land use/land cover
- Potential future use and site longevity
- Project feasibility

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## Wetlands could be created using in low quality undeveloped areas



Plant Community	Dominant Vegetation likely supported in this hydrologic regime	Water / Saturation Depth
Aquatic	Submergent rooted and floating leaved herbs; cow lily, lotus, waterweed, etc.	>1 to < 4 feet depth above surface
Deep Marsh	Emergent standing water hydrophytes; cattail, bur-reed, arrowhead, etc.	0-1 foot depth above surface
Emergent	Emergent moist soil to standing water hydrophytes; Sedges, rushes, many low and tall herbs and graminoids, etc.	Saturated soil from within 1.5 feet below the soil surface to 1.5 feet above surface inundation
Bottomland Hardwoods	Wet hydrophytic trees; willow, pin oak, elm, silver maple, green ash, boxelder, sycamore, etc.	0.5 feet above inundated surface to 1.5 feet below soil surface
Riparian Forest	Mesic hydrophytic trees; hackberry, swamp white oak, cottonwood, red maple, bitternut hickory; etc.	1.5 feet above inundated surface to 2.5 feet below soil surface
Upland Forest	Upland oak- hickory, maple-beech, flowering dogwood, Virginia pine forest	>2.5 feet above inundated surface

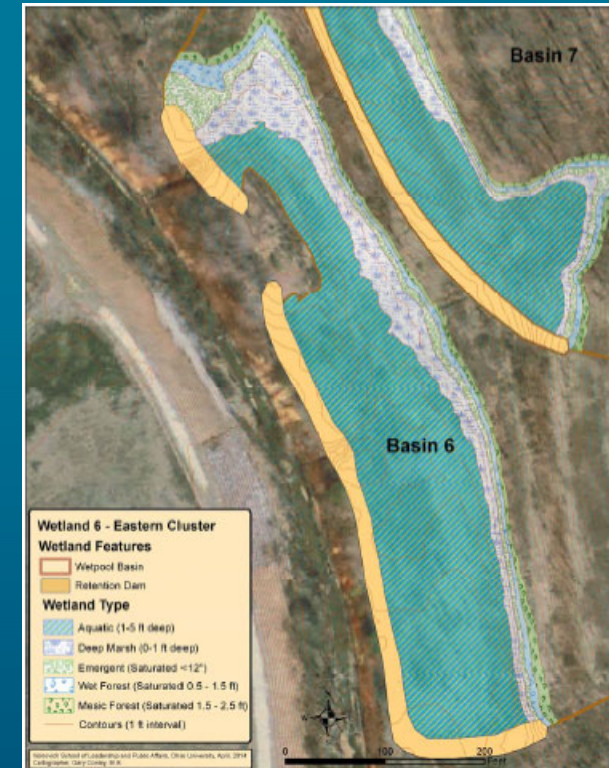
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# Enough potential wetland mitigation exists on-site for all D&D impacts

FEATURE				
SITE	Basin (acres)	Dam (acres)	Wet pool (acres)	Wetland (acres)
Eastern Cluster	22.06	0.78	3.23	15.23
Southern Cluster	8.23	0.30	0.79	1.63
Western Cluster	37.74	1.20	6.18	4.31
Grand Total	68.03	2.28	10.20	21.16



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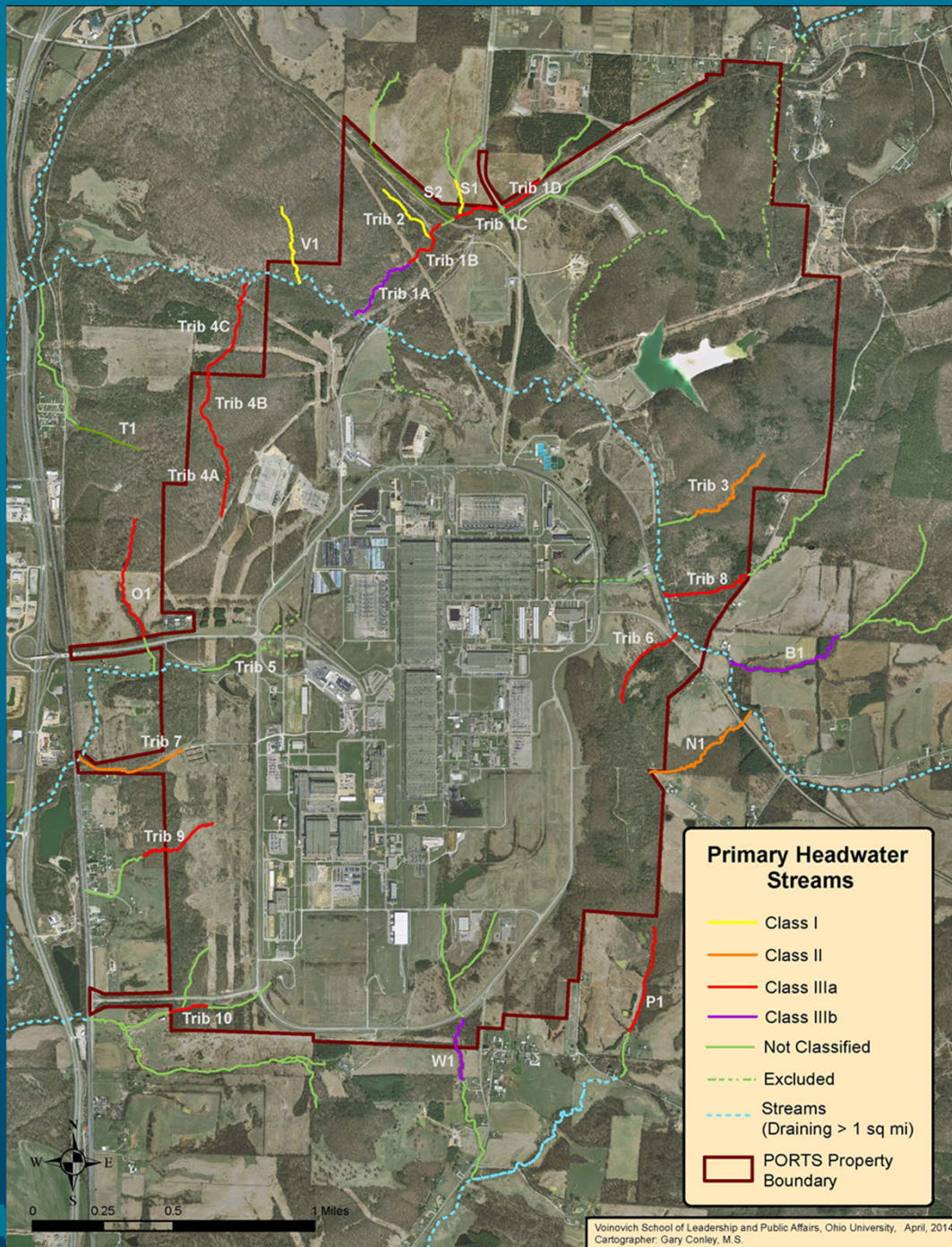


# Many high quality headwater stream reaches exist on-site

Site classifications at each sampling site were extrapolated as a representative “stream reach”.

Based on:  
immediate land cover and habitat,  
physical barriers  
(roads/culverts/crossings), and  
ownership (land use).

Note: green lines = not classified



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Stream reach	Length (ft)	PHWH classification	Ownership
trib 1A-1B	2855	IIIb – IIIa	on-site
trib 1C	965	IIIa	on-site
trib 1D	944	IIIa	on-site
trib 2	1361	I	on-site
S1	791	I	partial
S2	2211	Not classified	partial
V1	1718	I	partial
Trib 4A	1914	IIIa	on-site
Trib 4B-4C	4840	IIIa	partial
T1	1369	Not classified	off-site
O1A	725	IIIa	off-site
Trib 7	2112	II	on-site
Trib 9	1690	IIIa	partial
Trib 10	738	IIIa	on-site
W1	1357	IIIb	partial
P1	2179	IIIa	off-site
N1	2821	II	off-site
B1	2489	IIIb	off-site
Trib 6	1922	IIIa	on-site
Trib 8	1948	IIIa	partial
Trib 3	2371	II	on-site

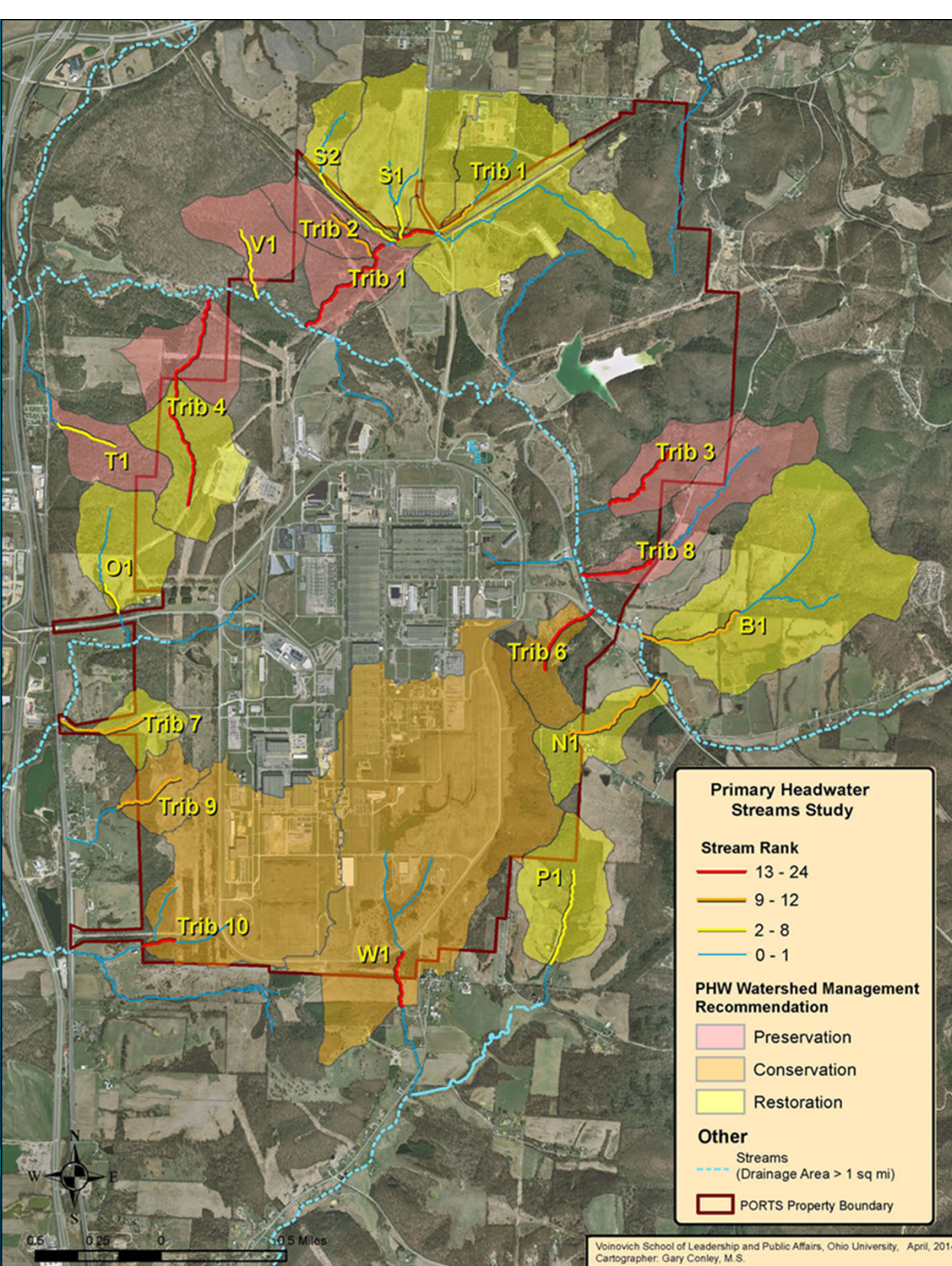
Class I = 3,870 ft of streams

Class II = 7,305 ft of streams

Class III = 24,565 ft of streams

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## Stream Performance

Highest priority = red  
Fair = colored orange  
lower priority = yellow

Desirable attributes include:

- on-site (DOE) ownership,
- high biological and physical stream quality
- continuous length of stream

Catchment basin management preference

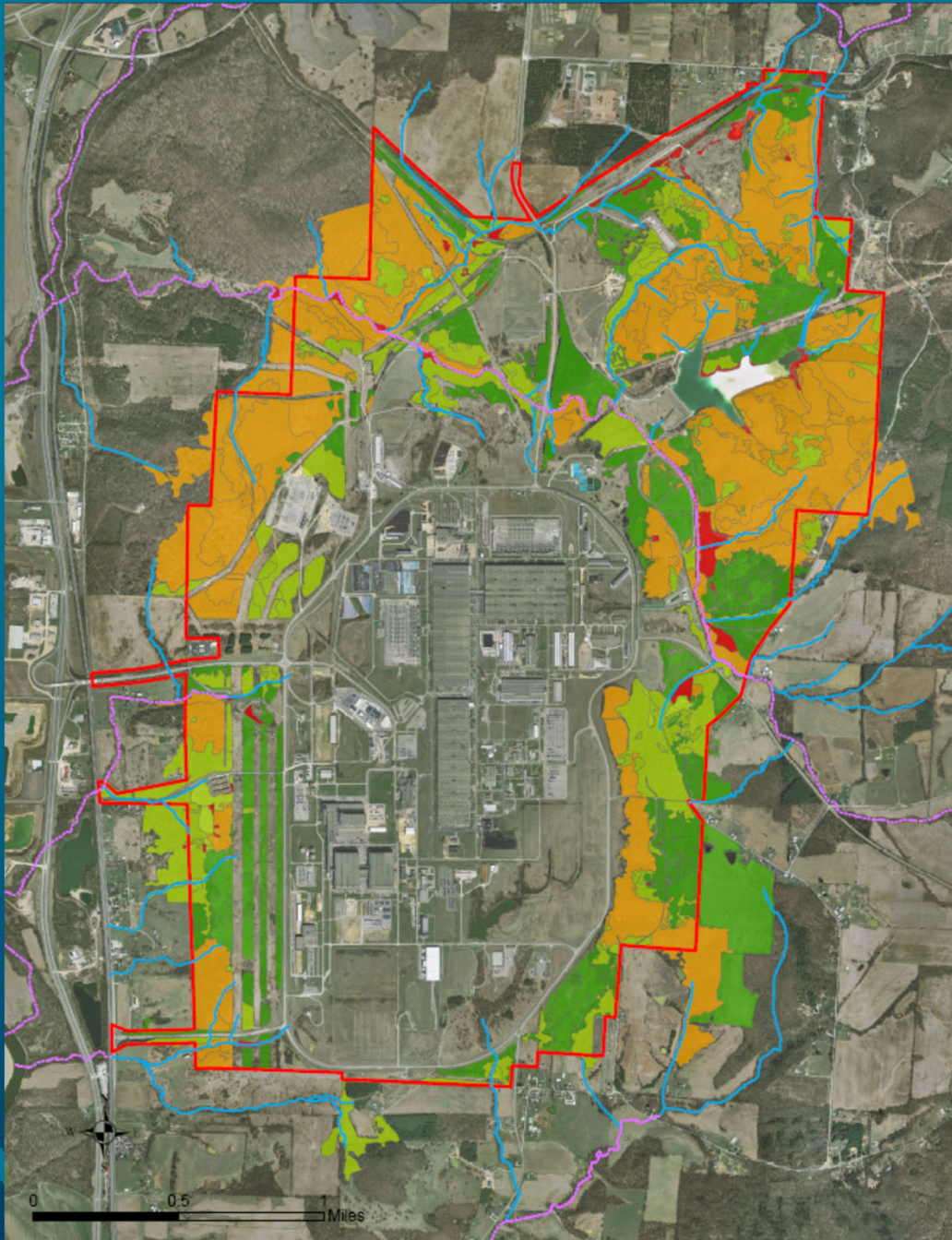
Preservation = red  
Conservation = orange  
Restoration = yellow

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# Capitalizing on the Eco-Assets



- Significant areas of PORTS possess a high degree conservation value
- Sensitive plant communities exist with these areas
- These communities contain sensitive and listed species
- These area become a focal point for developing management strategies
- These conservation resources can be marketed as a goal for future use

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# Connecting Assets for Site-wide Uses



## Site Attributes:

- Abundant forest canopy
- Ecological corridors
- Green space
- Historical and Archeological sites
- Multiple points of access

## Site-wide Uses:

- Recreational opportunities
- Educational opportunities
- Environmental stewardship
- Conservation/Preservation opportunities

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# 7 out of 9 Future-Use Scenarios recommend the incorporation of Green Space

- Therefore...
  - In order to achieve quality land management that meets the diverse needs of the PORTS site future uses, a proposed objective could be:
  - *Planning should include the principles of conservation management to maximize the potential benefits of all natural assets to achieve the greatest success for the ultimate future-use of PORTS*

# Quantifiable Benefits of a Conservation Management Planning

- Air Quality Improvements (USEPA)
- Improvement of Water Quality Management
  - Storm water runoff (USEPA)
  - Pollutant filtration (USACE)
- Affords Recreational Opportunities
  - To Improve Health and Wellness
  - Elevates Site profile and visibility
- Promotes Wildlife Habitat and Other Ecological Services
- Definable Economic Benefits



# Conservation Management Planning

- To identify and evaluate **features** of interest for a site... **Habitat Study** ✓
- To set clear **objectives** for conservation of features of interest... **Habitat Data** ✓
- To identify **issues** (both positive and negative) that might influence the site...  
**Ongoing**
- To set out appropriate strategies/management **actions** to achieve the objectives...  
**Ongoing**
- Objectives could include designation of:
  - Priority Development Areas (PDA)
  - Special Areas of Concern (SAC)
  - Special Protection Areas (SPA)

# Resource Management to Achieve Results



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