



Photo: George Gress



Photo: George Gress



Photo: Nels Johnson



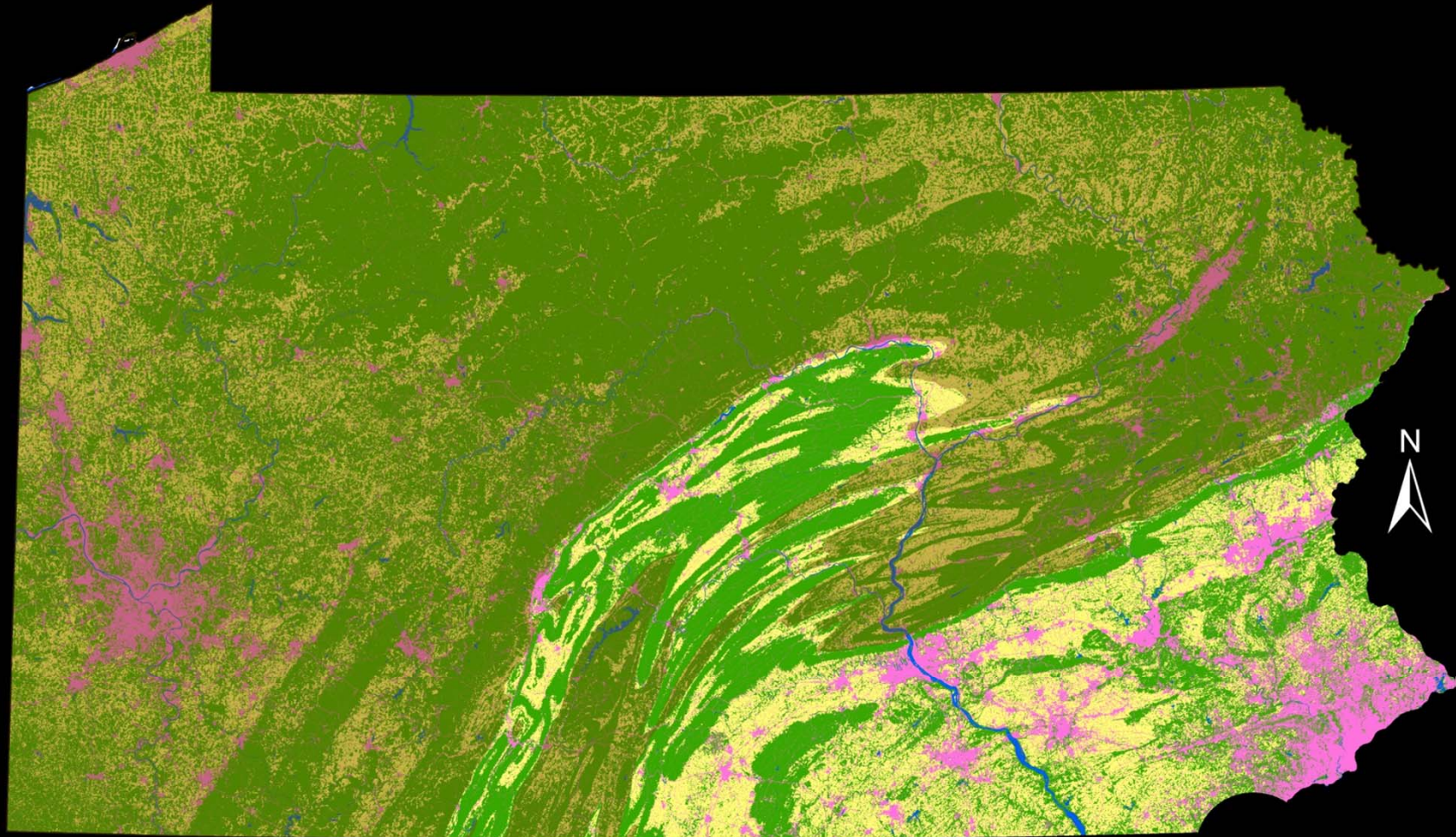
Ecologically Important Areas

Pennsylvania Marcellus Shale Commission
Public Health, Safety and Environmental
Protection Work Group

June 7, 2011

Pennsylvania's Ecological Character

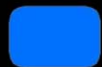
Marcellus Play in Pennsylvania includes over 14 million acres of forest



Forest



Agriculture



Water



Development

0 25 50
Miles

Pennsylvania's Ecological Character

- Pennsylvania is known for its ecological character
 - Pennsylvania's ecological character centers on its forests
 - Pennsylvania forests are home to many wildlife and plant species requiring interior forest conditions only found in large tracts of contiguous habitat and are thus considered ecologically important
 - Additional management and site planning activities are needed to ensure that the ecological character of Ecologically Important Areas is maintained for future generations.
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Development of Ecologically Important Areas

- Goals:
 - To provide a set of Ecologically Important Areas where additional voluntary management or site planning activities are needed to maintain current conditions
 - To recommend pre-planning/Landscape Approach for Marcellus Natural Gas development within Ecologically Important Areas to avoid conflicts
 - To support recommendations for siting and management of Marcellus Shale Natural Gas development included in DCNR Bureau of Forestry's presentation to the Marcellus Shale Commission
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Development of Ecologically Important Areas

- Approach:
 - To define Ecologically Important Areas using concepts understood by planners and developers
 - To use publically available information to identify Ecologically Important Areas

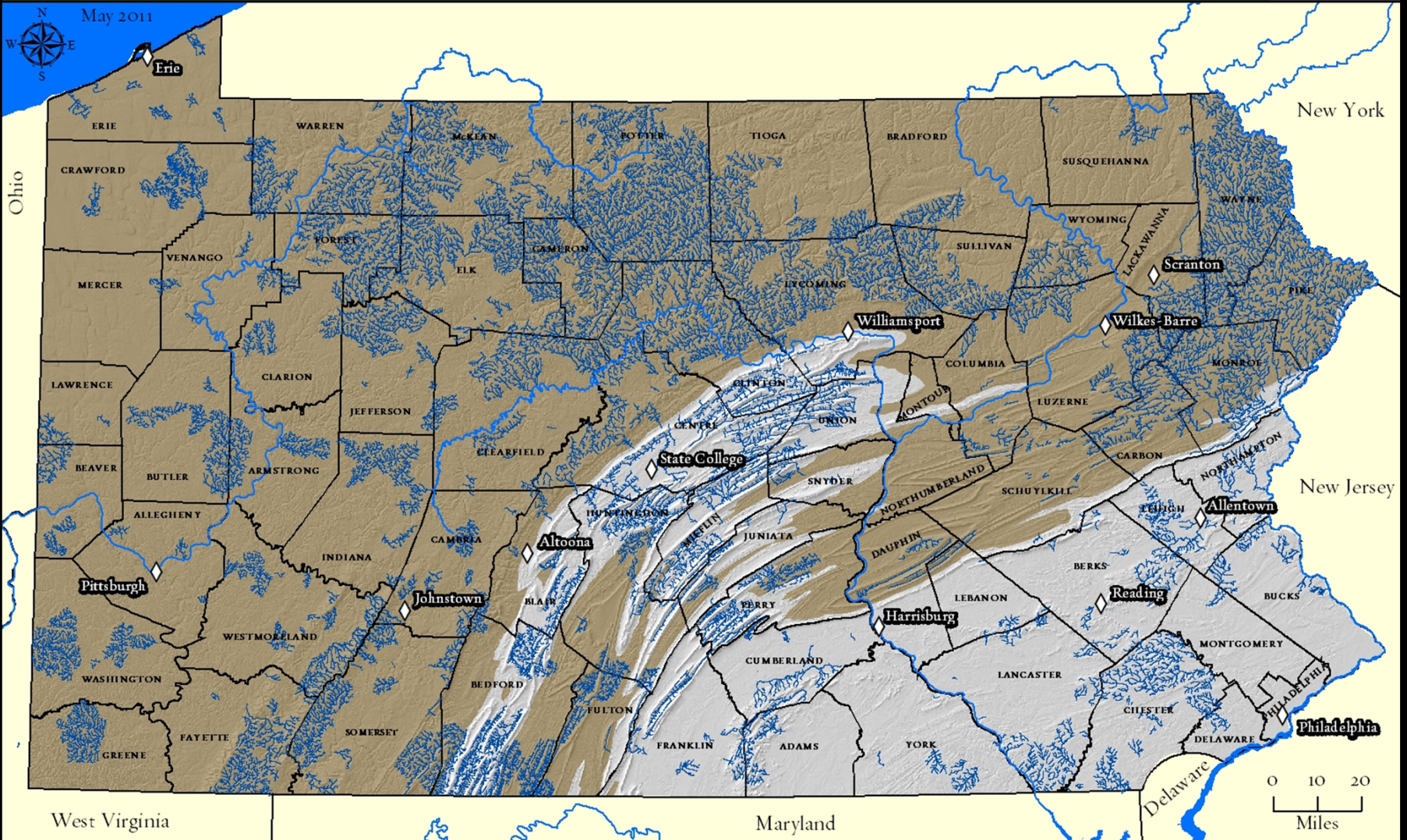
Development of Ecologically Important Areas

- Ecologically Important Areas in Pennsylvania are:
 - Watersheds containing Exceptional Value (EV) and High Quality (HQ) streams
 - Biological Diversity Areas (BDAs) of exceptional and high significance
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Development of Ecologically Important Areas

- Exceptional Value (EV) and High Quality (HQ) streams are recognized as important aquatic resources for their habitat quality, biological condition, and recreational potential
 - BDAs provide context for rare species and unique habitat locations and are represented in PA Natural Heritage Program's County Natural Heritage Inventories
 - Both data sets are available online
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ECOLOGICALLY IMPORTANT AREAS IN PENNSYLVANIA



~ Exceptional Value & High Quality Streams

■ Marcellus Shale in Pennsylvania

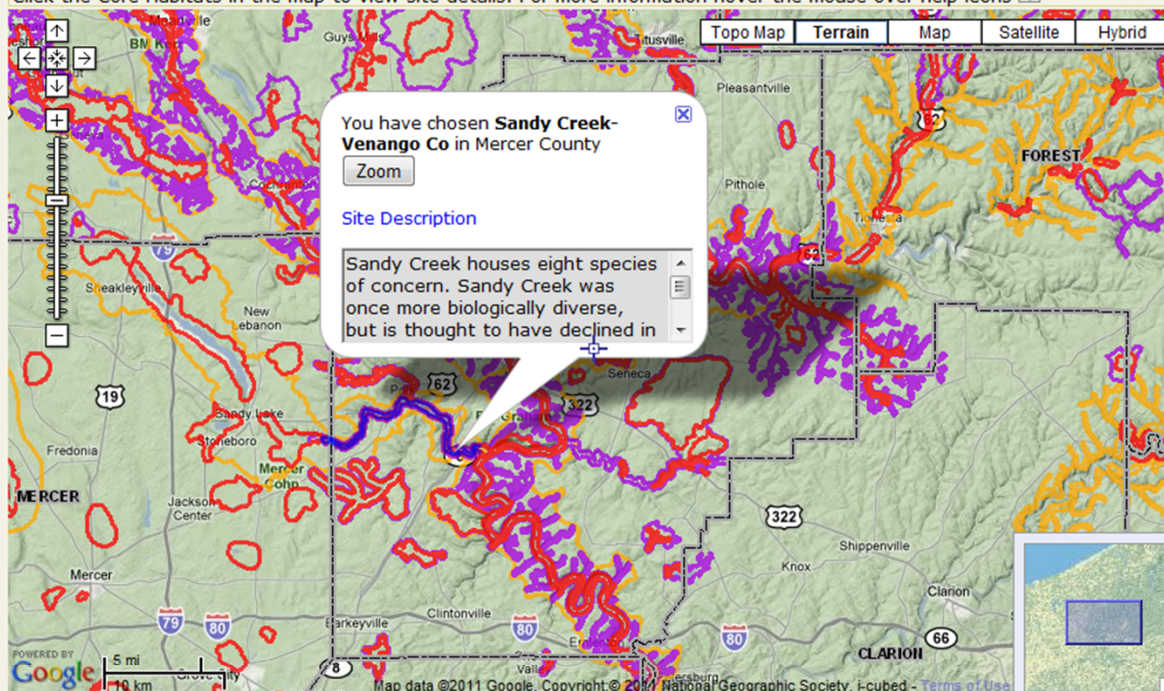
Data Sources: EV/HQ streams are from the PA-DEP; Marcellus Shale boundaries are approximated from bedrock geology types (ages) from USGS data.

Statewide County Natural Heritage Inventory Map

Pennsylvania Natural
Heritage Program

HOME CNHI REPORTS NEWS ABOUT US PNHI ER TOOL

Click the Core Habitats in the map to view site details. For more information hover the mouse over help icons ?



Toggle Crosshair

41.398137

-79.739421

[Move to Lat/Long](#)[Zoom to Lat/Long](#) ?[Reset Map](#)

Decimal Degrees

Degrees Minutes Seconds

UTM Coordinates

About this Map

Search by County or Watershed

Venango [Go](#)[Open CNHI Report](#)Select a Watershed [Go](#)

County Help: ? Watershed Help: ?

Search by Address

Map Help

Map Legend

- ☒ Core Habitat ?
- ☐ Provisional species of concern site ?
- ☒ Supporting Landscape ?
- ☒ Landscape Conservation Area ?
- ☐ Important Bird Areas (IBA) ?
- ☒ Counties ?
- ☐ Municipalities ?
- ☐ HUC8 Watersheds ?

[View the GIS Layers in ArcMap](#) ?[View the GIS Layers in Google Earth](#) ?

Disclaimer: Natural Heritage Inventories and Environmental Review. The results presented in this map represent a snapshot in time, highlighting the sensitive natural areas within Pennsylvania. The existing polygons in this layer were created for specific County Natural Heritage Inventory projects over a 20 year period. Hence, many of the existing polygons represent data that was collected 10-20 years ago. Updating this information is an

Statewide County Natural Heritage Inventory Map

Overview

The County Natural Heritage Inventory effort within the state is another of the cooperative programs undertaken by the Pennsylvania Natural Heritage Program (PNHP) partnership. The County Natural Heritage Inventories (CNHI) have been systematic studies of the critical biological resources of the state, county by county. The primary focus of CNHIs has been on species of concern; those plants

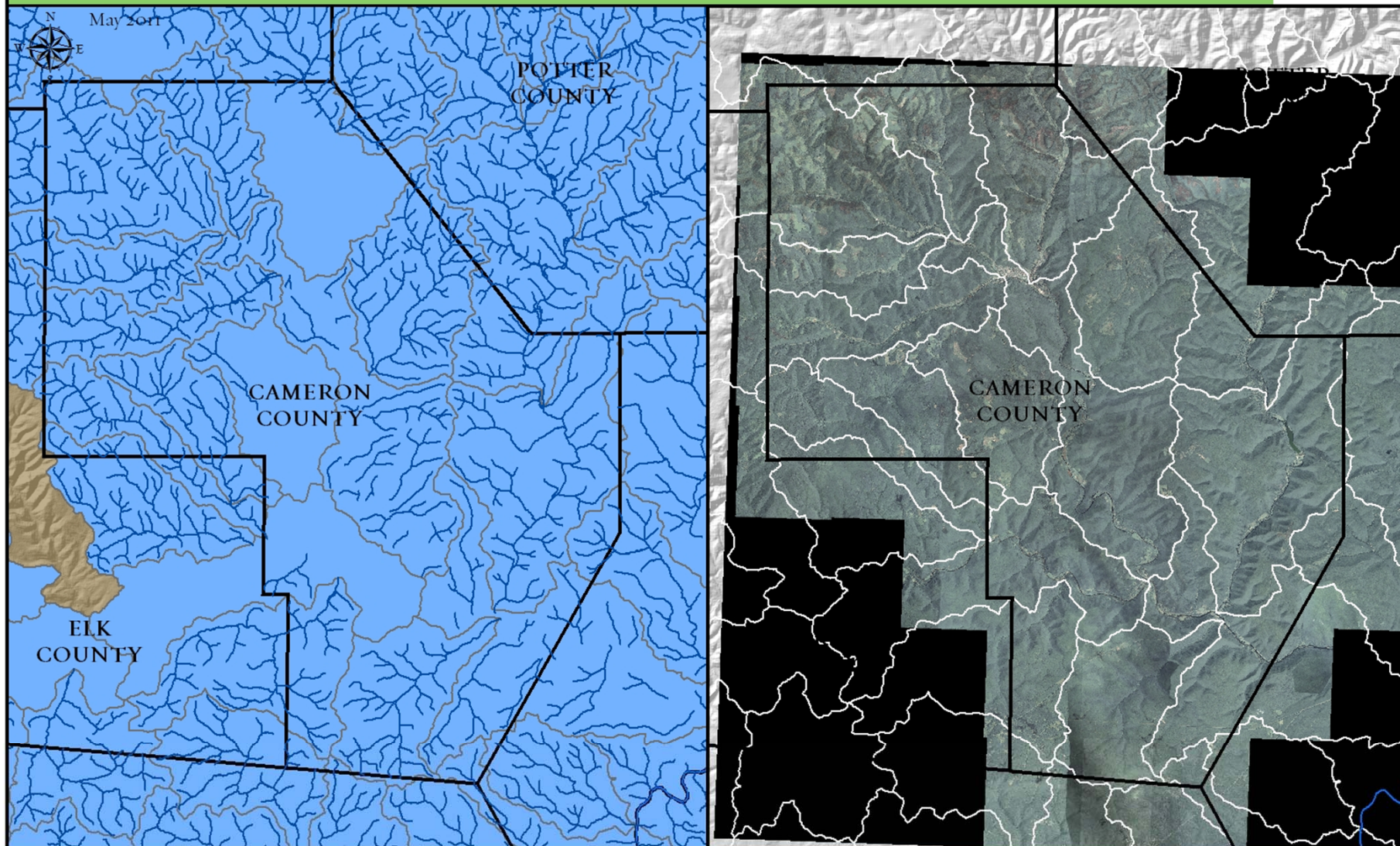
Ecologically Important Areas - Watersheds

- Expanded from EV/HQ streams to provide landscape context for streams and incorporate ecosystem factors that contribute to the quality of the land and water
 - Percent forest cover
 - Amount impervious surface
 - Amount of forest fragmentation
 - others



Old Growth Hemlock Forest
Photo: WPC

ECOLOGICALLY IMPORTANT AREAS IN PENNSYLVANIA



 Exceptional Value (EV) & High Quality (HQ) Streams

 EV & HQ Watersheds (HUC 12)

Data Sources: EV/HQ streams are from the PA Department of Environmental Protection

0 2 4
Miles



Ecologically Important Areas - Watersheds

- Watersheds are convenient units of the landscape that include important land-based habitats as well as water-based habitats
 - Water quality can be linked to the quality of the forests and wetlands in the watershed
 - Watersheds provide context for the ecological values that contribute to the maintenance of the quality of the water
 - High degree of overlap between TNC-WPC Priority Forest and EV/HQ watersheds, as well as other significant conservation areas
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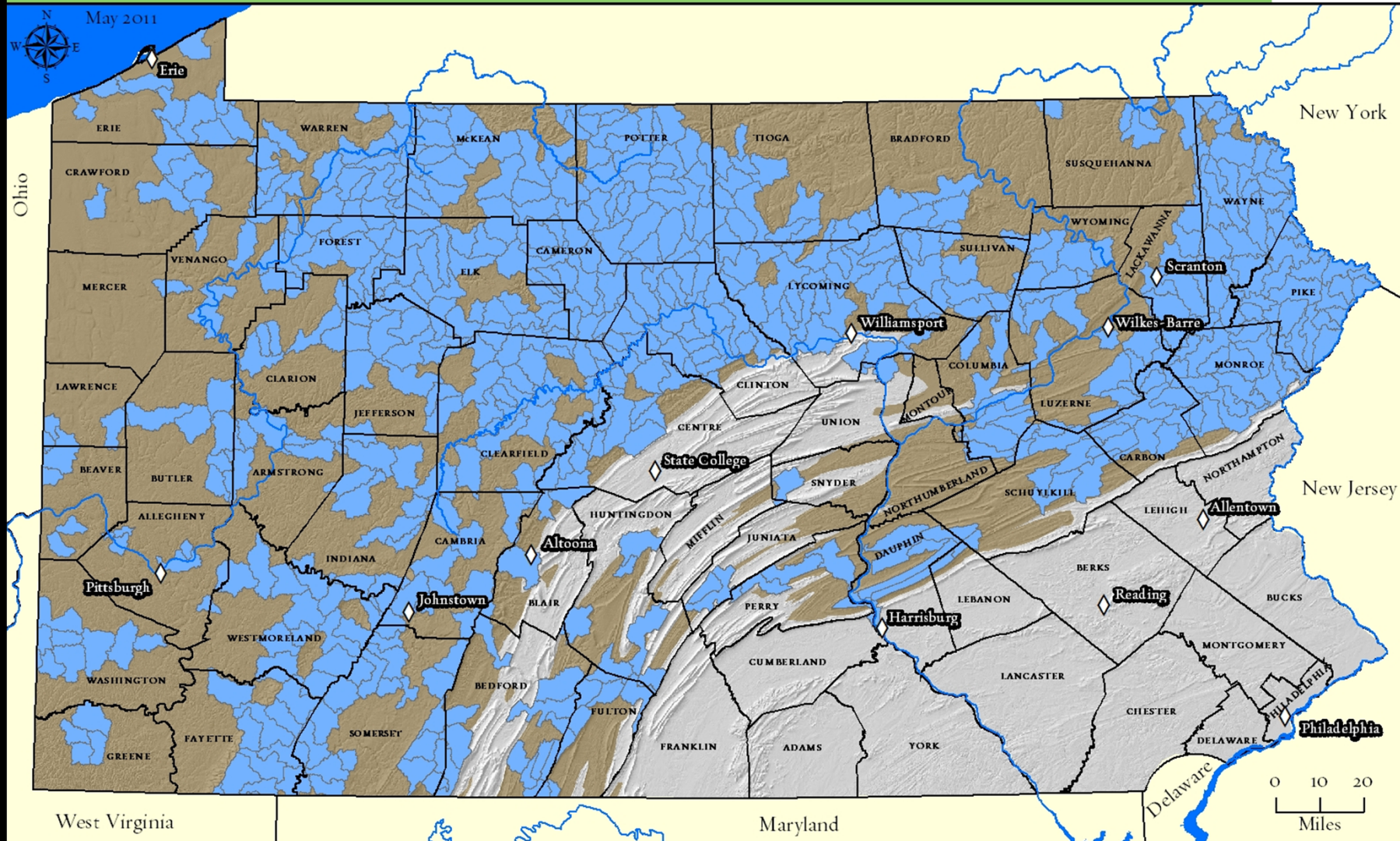
Ecologically Important Areas - Watersheds

- Higher conservation measures in EV/HQ watersheds will protect and maintain the quality of Pennsylvania's:
 - Streams and wetlands
 - Rare plant and animal species
 - Un-fragmented forest habitats
 - State parks and state natural areas
 - Drinking water sources
 - Ecosystem services
 - Hunting and fishing areas
 - Other recreational opportunities



Purple Fringeless Orchid
Photo: Chris Tracey

ECOLOGICALLY IMPORTANT AREAS IN PENNSYLVANIA



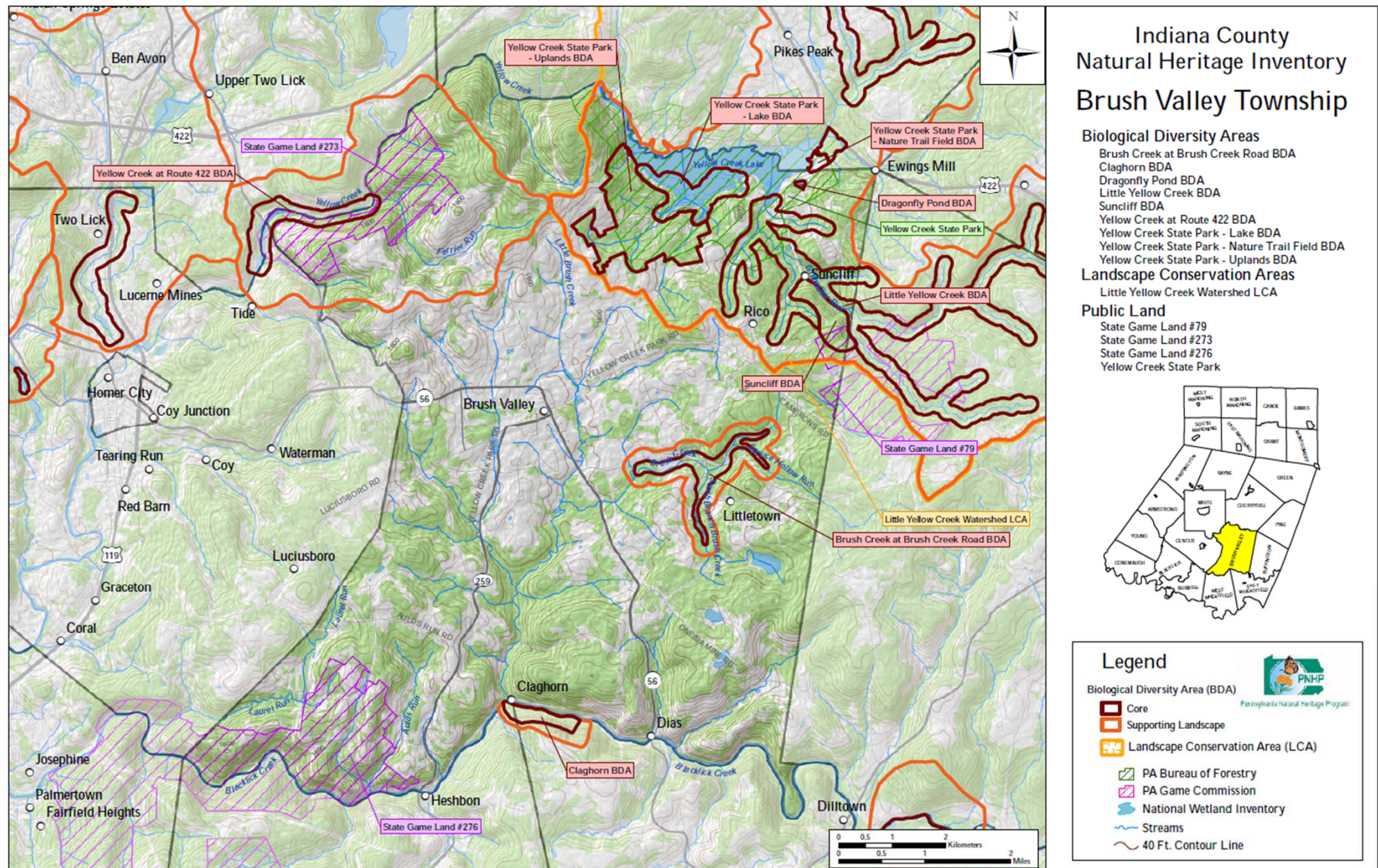
- Exceptional Value & High Quality Watersheds (HUC 12) within Marcellus Play
- Marcellus Shale in Pennsylvania

Data Sources: EV/HQ streams are from the PA-DEP; Marcellus Shale boundaries are approximated from bedrock geology types (ages) from USGS data.

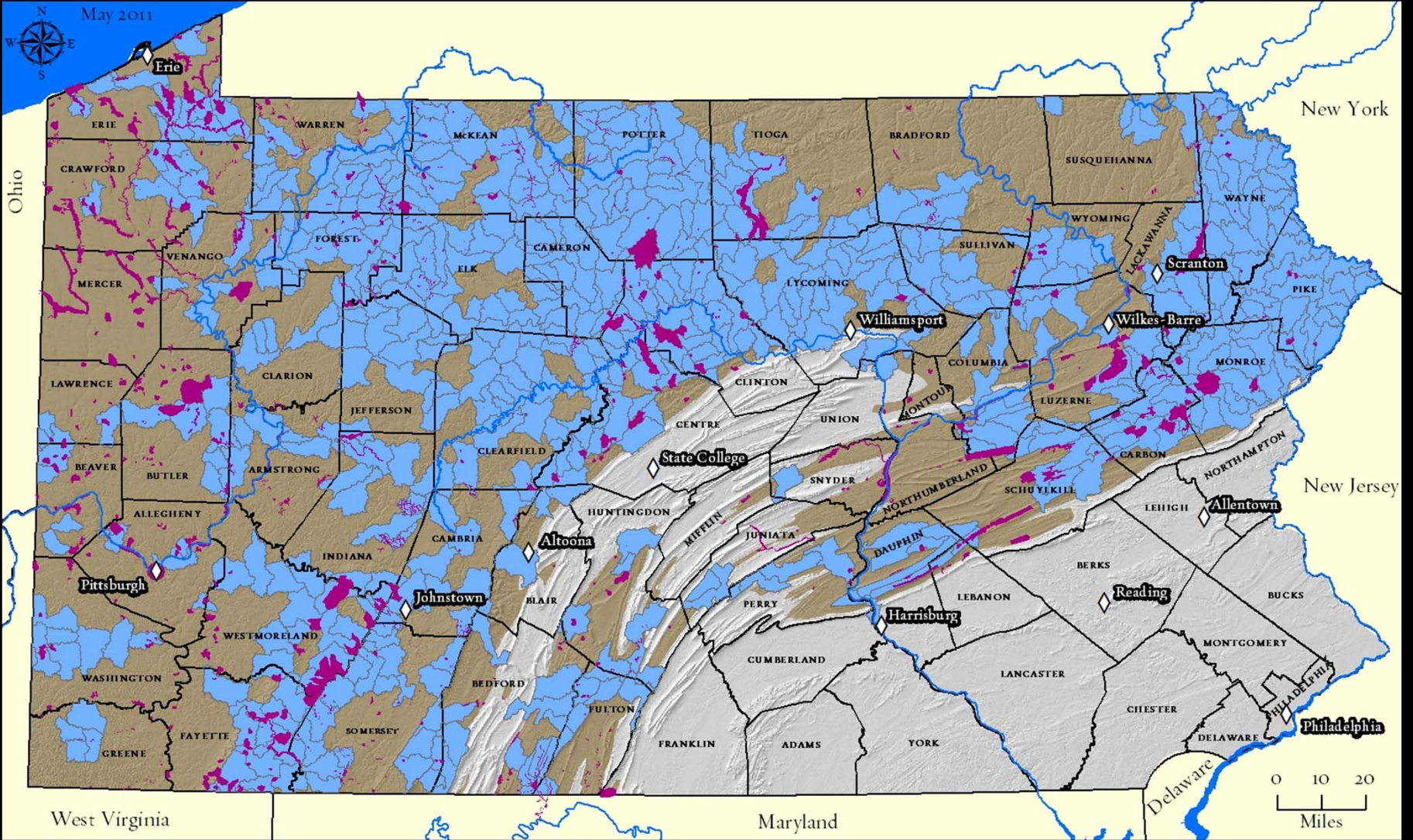
Ecologically Important Areas – Biodiversity

- In addition to EV/HQ watersheds, we have included priority Biological Diversity Areas (BDAs) as ecologically important areas in Pennsylvania
- Including BDAs is necessary as EV/HQ watersheds do not include all known locations of rare plants, animals, and important habitats

Ecologically Important Areas – Biodiversity



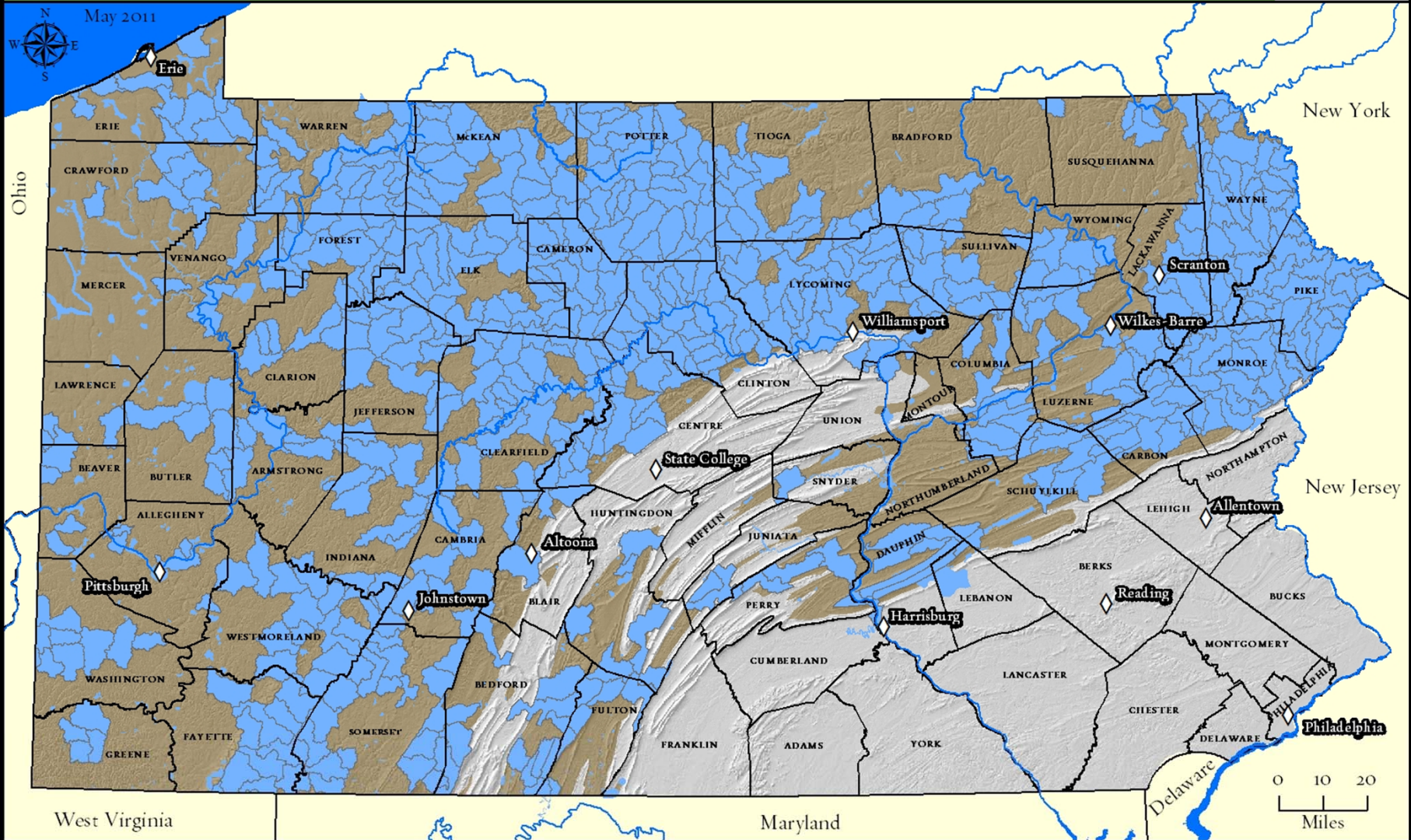
ECOLOGICALLY IMPORTANT AREAS IN PENNSYLVANIA



- Exceptional Value & High Quality Watersheds (HUC 12) within Marcellus Play
- Priority Core Biological Diversity Areas (BDAs) within Marcellus Play
- Marcellus Shale in Pennsylvania

Data Sources: EV/HQ streams are from the PA-DEP; BDAs are from the PA Natural Heritage Program; Marcellus Shale boundaries are from USGS

ECOLOGICALLY IMPORTANT AREAS IN PENNSYLVANIA



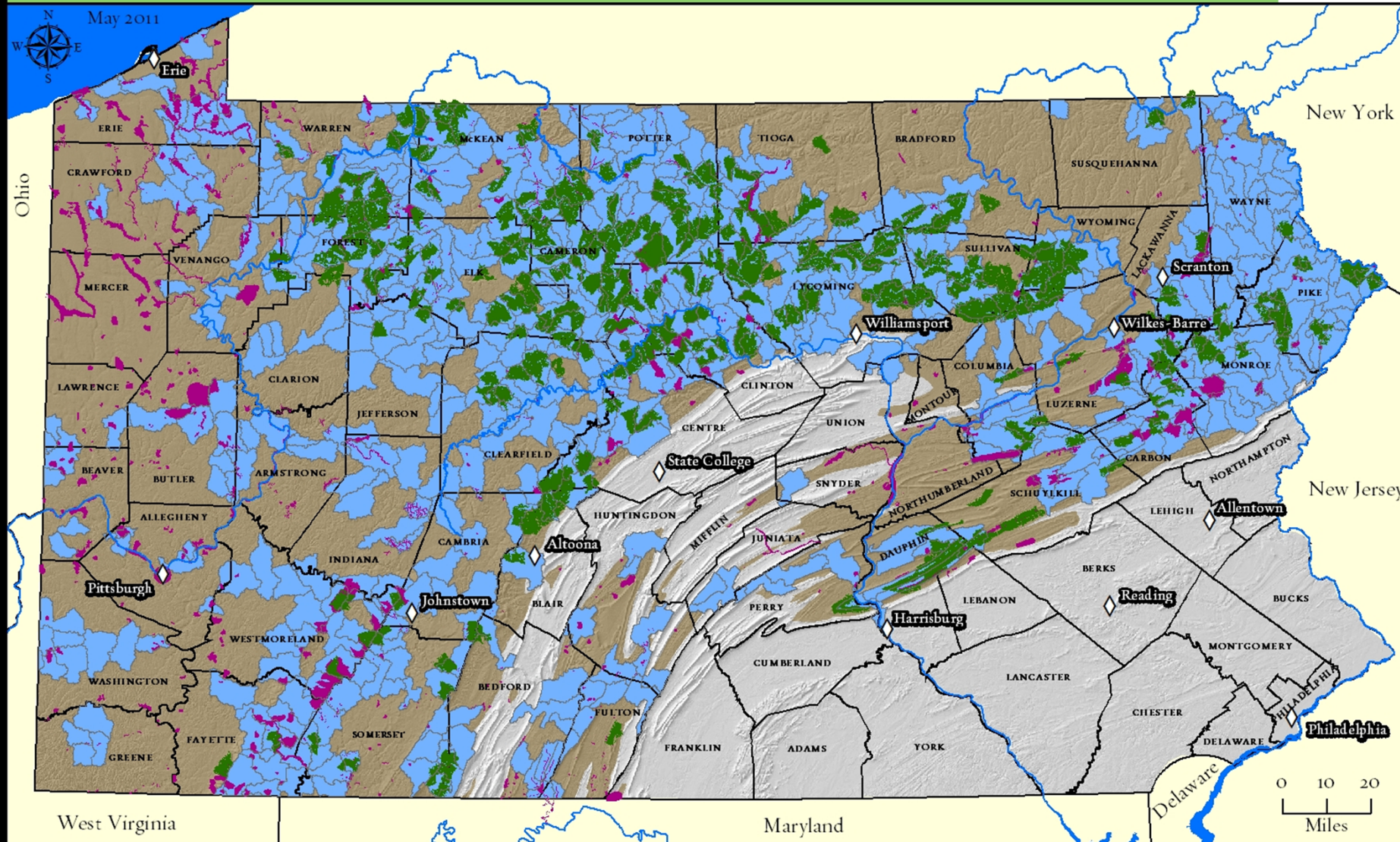
- Ecologically Important Areas (EV/HQ Watersheds & BDAs) within Marcellus Play
- Marcellus Shale in Pennsylvania

Data Sources: EV/HQ streams are from the PA-DEP; BDAs are from the PA Natural Heritage Program; Marcellus Shale boundaries are from USGS.

Ecologically Important Areas - Results

- Ecologically Important Areas Include:
 - Acres = 11.68 million acres
 - Streams = 35,132 miles (EV/HQ = 20,618 miles)
 - Forests = 9.1 million acres
 - Majority of large contiguous forest habitat in PA
 - 1.4 million acres of TNC-WPC Priority Forest Patches
 - 86% of the total acreage of Priority Forest Patches in the Marcellus (66% statewide)
 - Land Cover
 - 78% natural cover
 - 13% agricultural cover
 - 7% developed cover
-

ECOLOGICALLY IMPORTANT AREAS IN PENNSYLVANIA



- Exceptional Value & High Quality Watersheds (HUC 12)
- Core Forest Patches
- Priority Core Biological Diversity Areas
- Marcellus Shale in Pennsylvania

Data Sources: EV/HQ streams are from the PA-DEP; BDAs are from the PA Natural Heritage Program; Marcellus Shale boundaries are from USGS

Ecologically Important Areas - Results

- Ecologically Important Areas Include:
 - 52 counties; ranging from 6.5% to 100% of land area
 - % of Area within Major Basins (within Marcellus Play):
 - Delaware = 1.58 million acres (95% of basin within Marcellus)
 - Chesapeake = 5.25 million acres (57% of basin within Marcellus)
 - Ohio = 4.71 million acres (47% of basin within Marcellus)
 - State Lands:
 - 1.53 million acres of State Forest lands (on 18 State Forest Districts)
 - 927,000 acres of State Game Lands (on 219 State Game Lands)
 - 177,000 acres of State Parks (on 72 State Parks)
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Recommendations

Landscape Level

- Pre-planning process
 - Identifies proposed locations of well pads and all anticipated ancillary infrastructure, pipelines, tailings pits and flowback ponds
 - Identifies key ecological attributes: floodplains, wetlands, streams, rare plants and animals, and other significant habitats
 - Identifies siting or management alternatives to avoid and minimize potential conflicts



Buttermilk Falls
Photo: Greg Funka

Recommendations

Site Level

- Developer should avoid, minimize, and mitigate impacts associated with site development as presented to the Marcellus Shale Commission by the PA Bureau of Forestry



Timber Rattlesnake
Photo: Ryan Miller



Rock Outcrop
Photo: Chris Tracey

Ecologically Important Areas



Baughman Rock
Photo: Paul Wiegman