

# Mapping the Extent of Hemlock Stands in Ohio

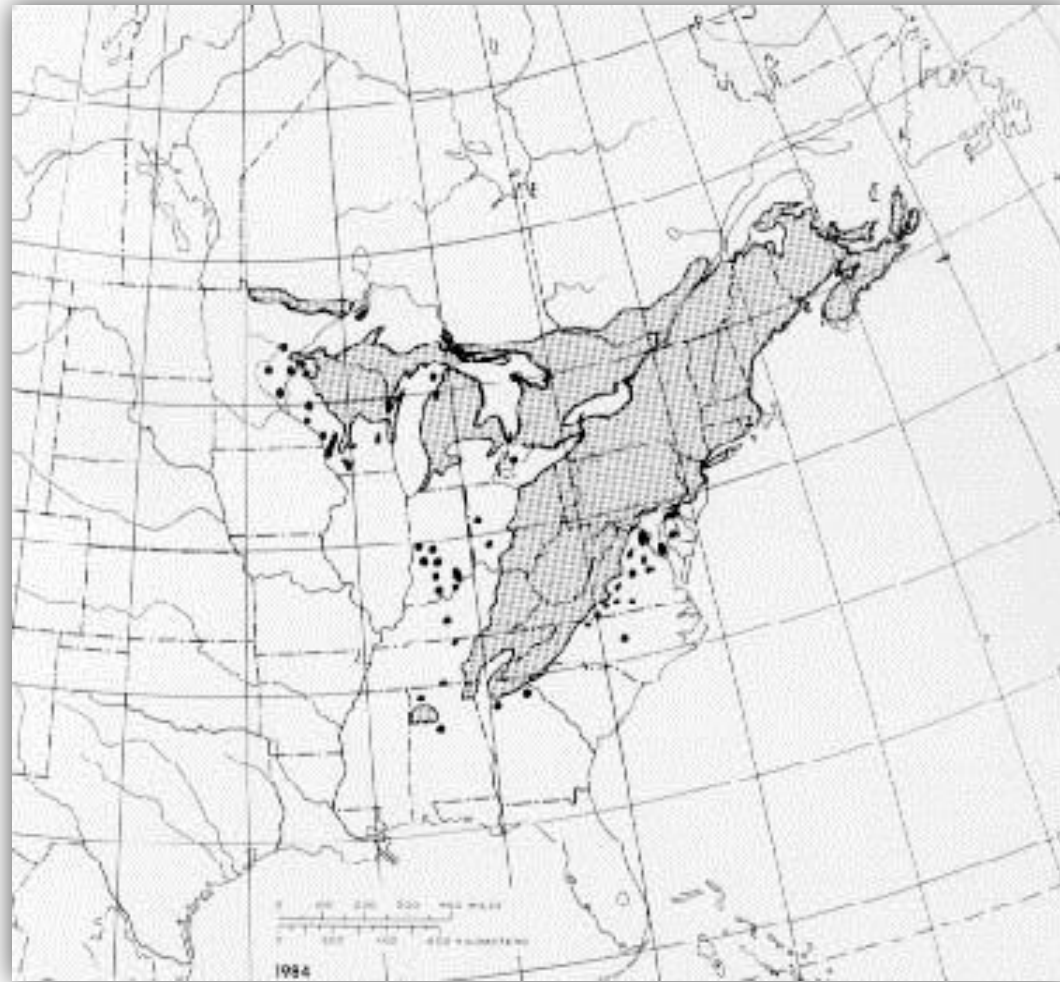
Portion of presentation made at the Hemlock Woolly Adelgid Summit  
by Nicole I. Stump, Natural Resource Specialist, Wayne National Forest

Mansfield, OH, October 8<sup>th</sup> 2009

Sponsored by the US Forest Service, Ohio DNR Division of Forestry, and Greater Mohican Audubon Society



# Range of Eastern Hemlock

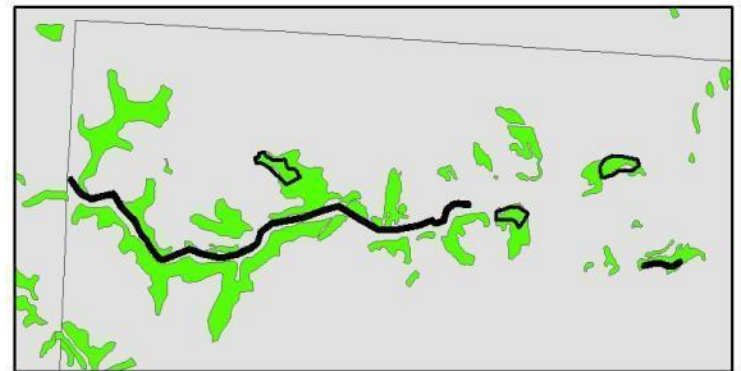
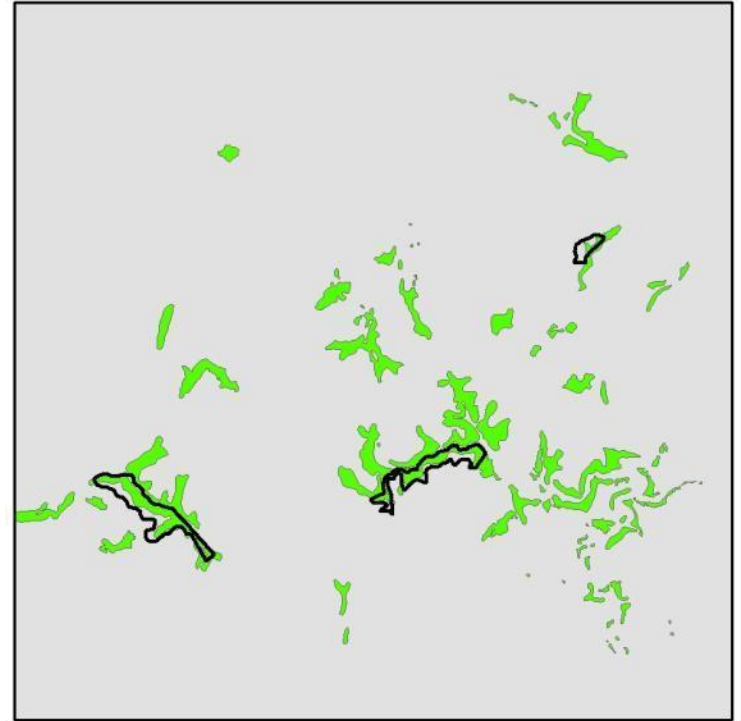
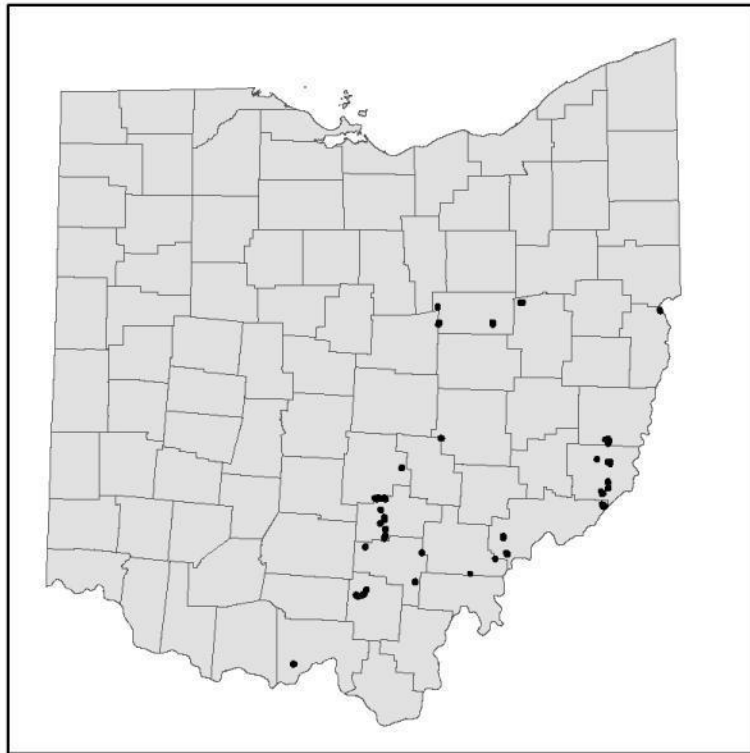


USDA Forest Service Silvics Manual (Little 1971)

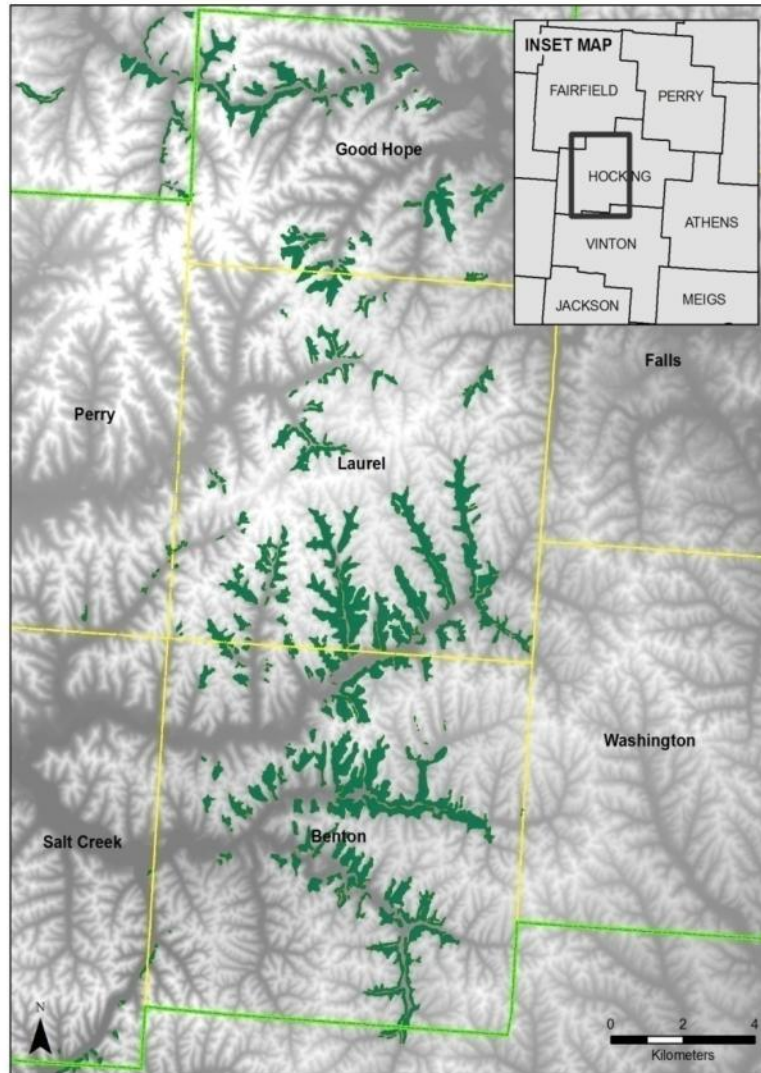


Old Growth Eastern Hemlock  
At Cathedral State Park, WV

# ODNR Natural Heritage Database – Plant Communities



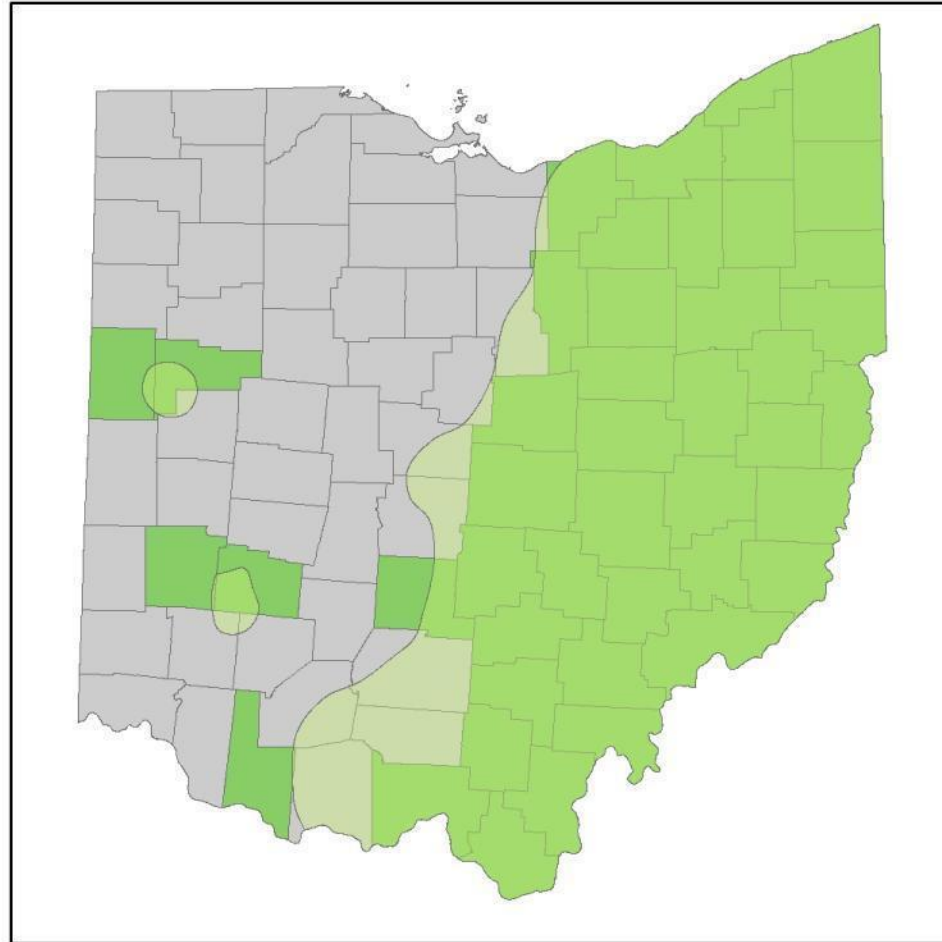
# Original Survey Area – Hocking Hills Region



Ash Cave State Park – Hocking Hills, Ohio



# Expanded Statewide Survey



Counties Selected for Review (47)

# High Resolution Aerial Imagery



True Color Orthoimage (1 FT Resolution)

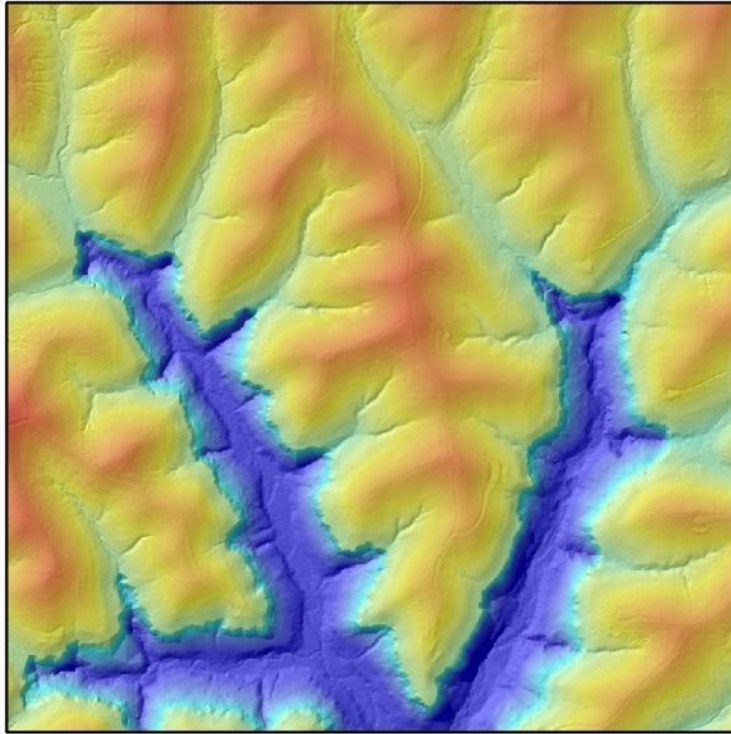


Color Infrared Image (1 M Resolution)

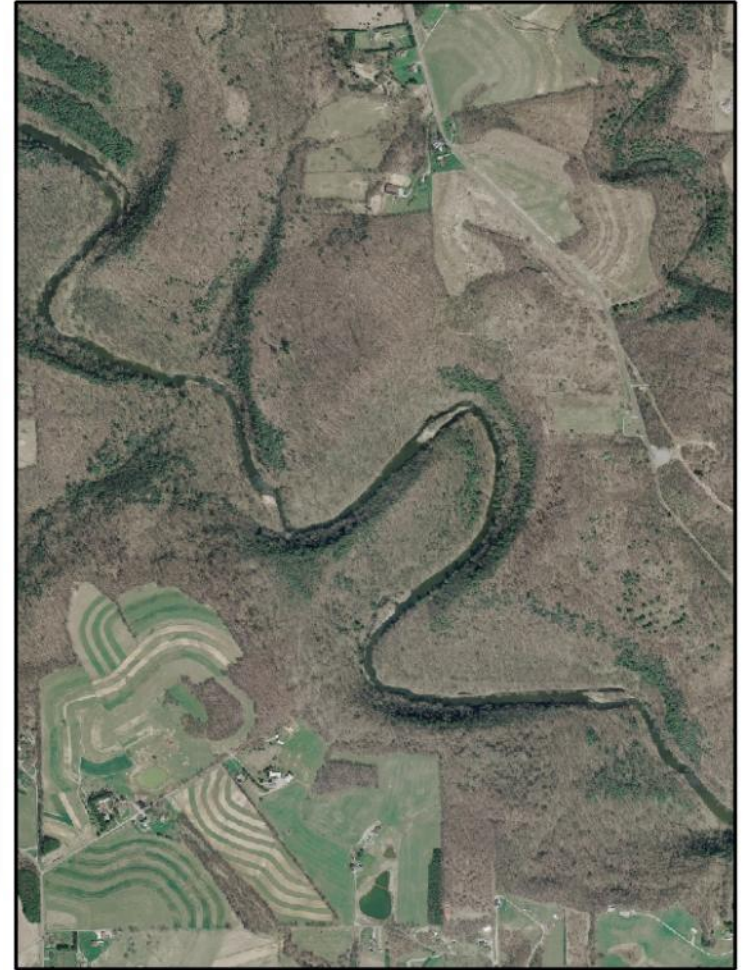
Ohio Statewide Imagery Program

<http://gis1.oit.ohio.gov/geodatadownload/osip.aspx>

# Considering Topography – Ravines & River Courses

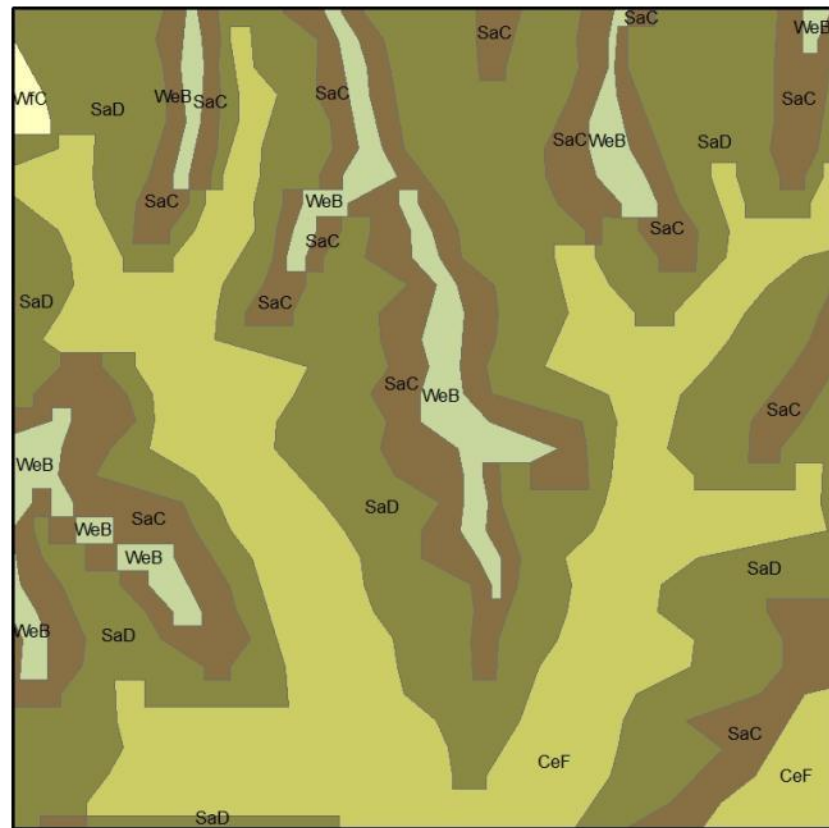


Shaded Relief Map – Hocking Hills Region



Aerial Image – Beaver Creek State Park Area

# USGS Soil Survey Data



Example: CeF Cedarfalls-Rock outcrop complex.

Soils are deep and well-drained with a coarse sandy loam. Slopes are very steep, ranging from 40-70%. (Lemaster & Gilmore 1989).

Online Manuscripts [http://soils.usda.gov/survey/online\\_surveys/ohio](http://soils.usda.gov/survey/online_surveys/ohio)

ODNR GIMS <http://www.dnr.state.oh.us/gims/default/tabid/15402/Default.aspx>

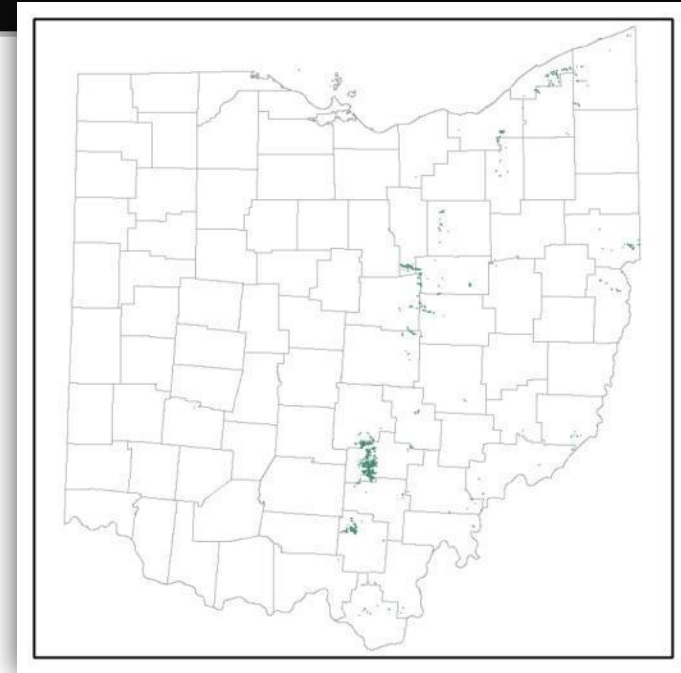


# Avian Breeding Obligates of Hemlock Forests

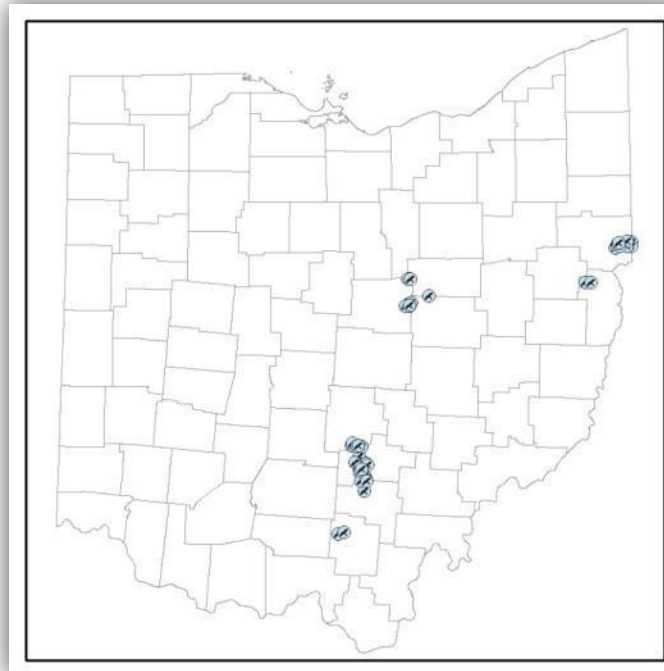
Example: Black-throated Green Warbler



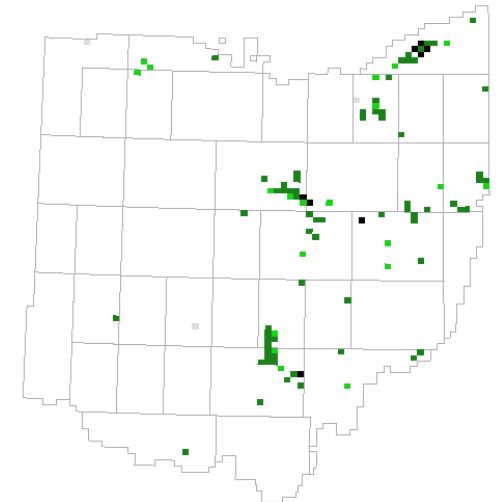
Photo from Flickr.com by Petroglyph



*Distribution of Hemlock in Ohio*

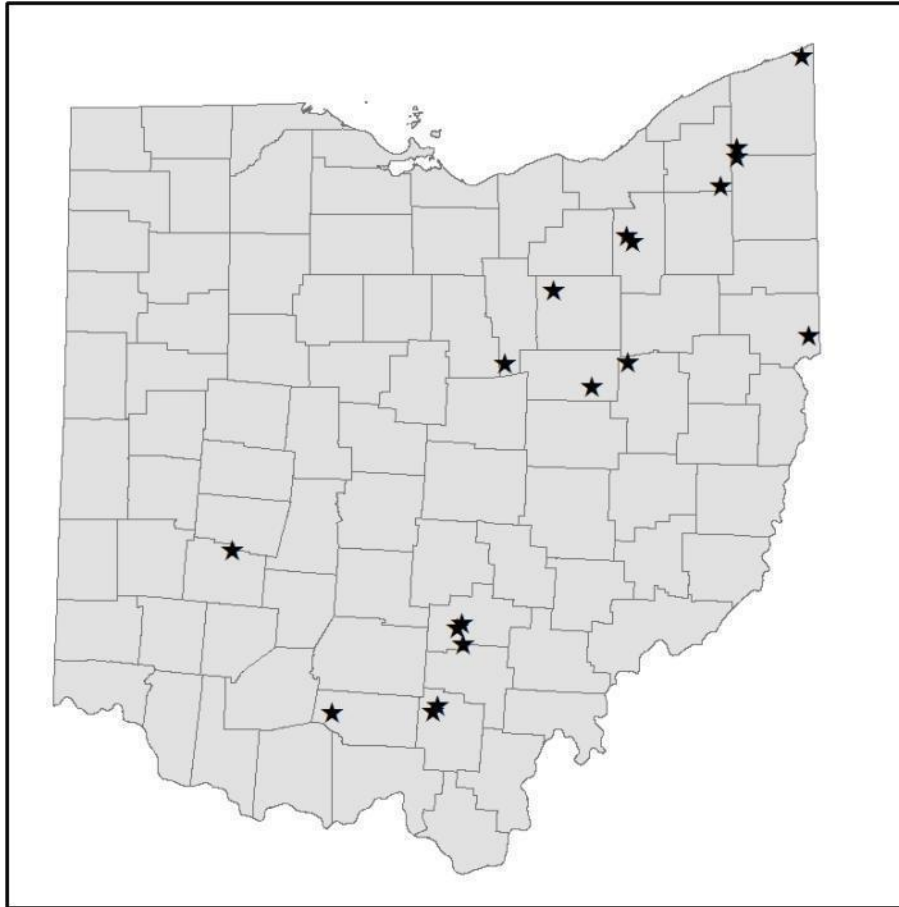


*ODNR Heritage Points*



*Ohio Breeding Bird Atlas II Map*

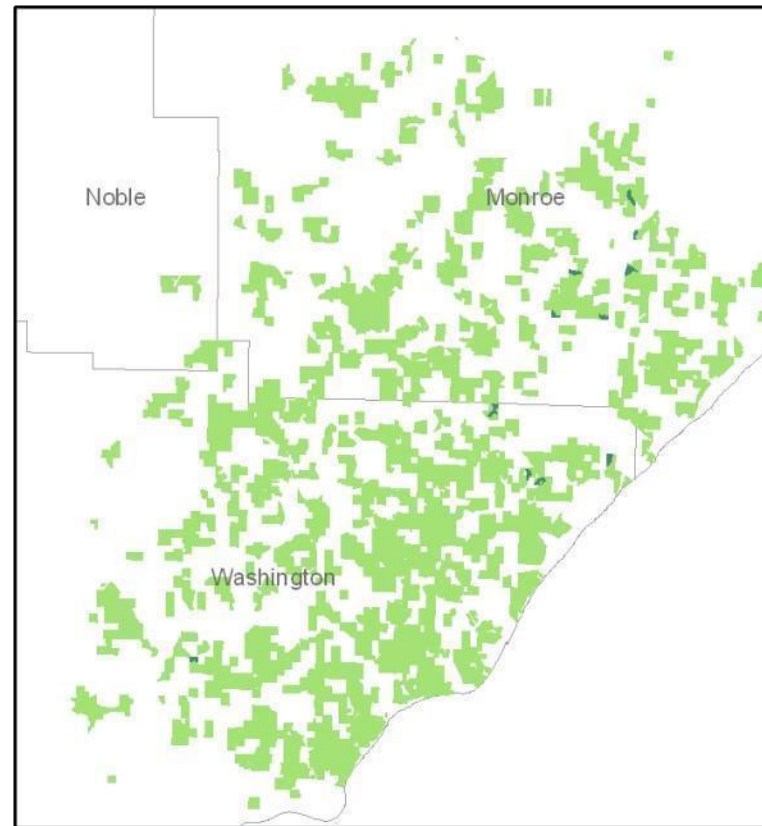
# Previous Research



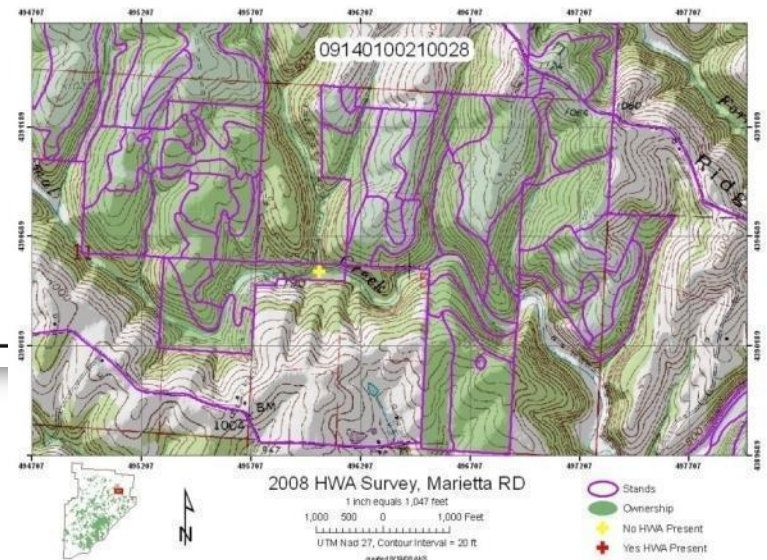
- Assessed 75 sites across Ohio for suitability.
- Selected 16 stands based on certain criteria and recorded the lat/longs for each location.
  - Contained large *Tsuga individuals* and obvious hemlock reproduction
  - Homogeneity of vegetation and environment
  - Relatively little evidence of fire, logging or grazing
  - Minimum stand size is two hectares.

Black, Alan R. and Mack, Richard N. ***Tsuga Canadensis* in Ohio: Synecological and Phytogeographical Relationships.** Vegetatio Vol. 32,1: 11-19, 1976

# Eastern Hemlock on the Wayne National Forest

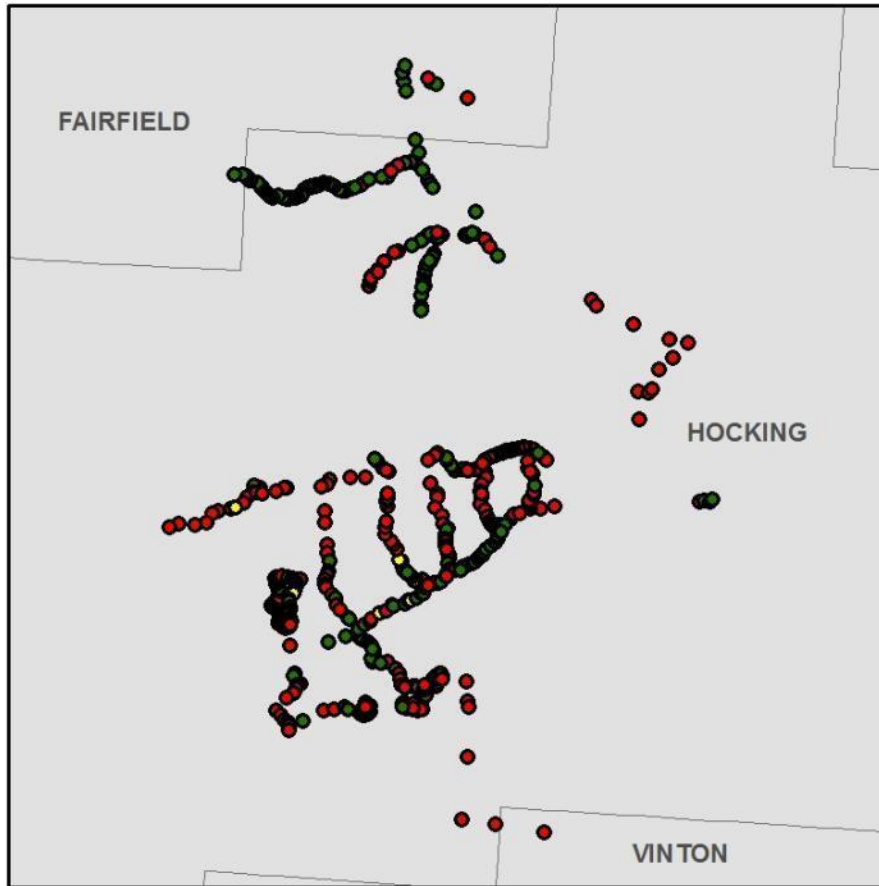


Selected Attributes of WNF_Stands	
	REMARKS
▶	PINE DYING OUT, SOME HEMLOCK.
▶	PUMP HOUSE & OIL WELL;HEMLOCK LOWER SLOPE;LITTLE MUSKINGUM
▶	WHITE PINE AND DEAD HEMLOCK WITHIN STD
▶	ROCK OUTCROPS AND CLIFFS. HEMLOCK ON LOWER WEST ASPECT.
▶	LIGHTLY CUT OVER. SCATTERED HEMLOCK.
▶	CONTAINS YP & HEMLOCK
▶	DEAD HEMLOCK WITHIN STAND
▶	STEEP ADJACENT TO WITTEN FORK HEMLOCK PRESENT
▶	SOME HEMLOCK.
▶	Hemlock in Stand
▶	NATIVE WHITE PINE AND HEMLOCK
▶	DEAD HEMLOCK ROCK OUTCROPS



- Common Stand Exam Information
- 2008 HWA Survey Locations
- Local Knowledge

# Ground-Truthing

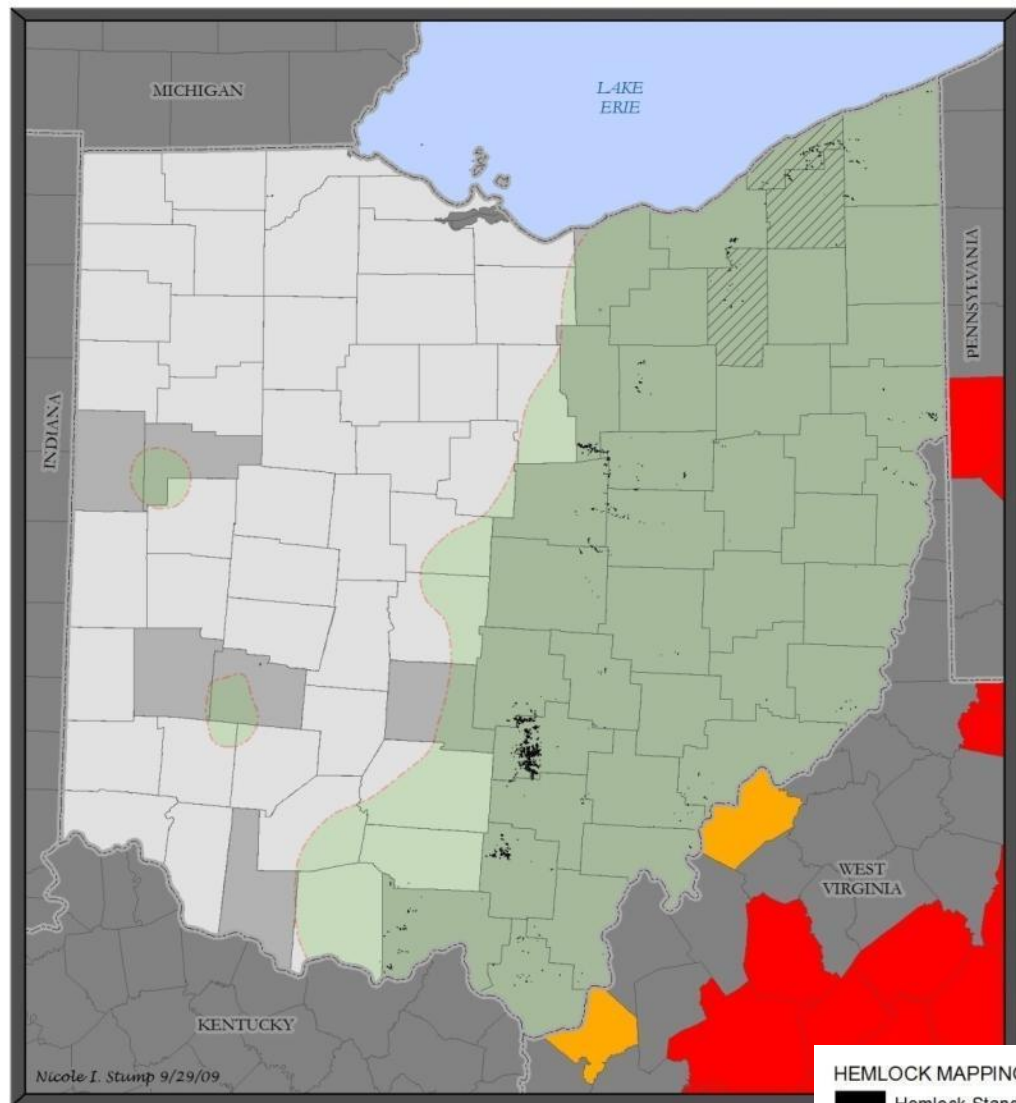


- Hemlock
- Other Evergreen
- Mixed

- Driving Routes
- Hiking Routes
- 697 GPS Points



# Distribution of Eastern Hemlock in Ohio



Nicole I. Stump 9/29/09

