

The Human Disturbance Gradient

Or

The Human-Mediated Alteration Gradient

Or

The Hominid Influence Gradient

Or

Stuff Happens

What are we going to cover?

- Precision in our language
- Issues in the gradient
 - What is reference
 - Elements of the gradient
 - Accounting for ecological suitability
 - Predictability

A Universally Accepted Definition Would...

- Identify the object disturbed
- Distinguish between change that is disturbance and change that is not
- Distinguish between indirect and direct consequences of disturbance

Pickett et al., 1989

Scales, Levels, and Landscapes

- Scale refers to physical dimensions of observed entities and phenomena
- Level refers to level of organization in a hierarchically organized system

Figure 1. Diagram of Ecological and Socioeconomic Scales Relevant to Indicators for Coastal Ecosystems



The Bottom Line

- Decisions get made with varying levels of information
- If we tell them it's broken, we need to be able to tell them how to fix it

INVENTORY

CONDITION

RESTORATION

LEVEL 1

Utilize existing resources
(NWI)

Map landuse in watershed;
calculate preliminary
landscape measures

Synoptic map of restoration
potential (existing wetlands,
landuse, roads & streams)

LEVEL 2

Develop and apply landscape-
based approach to obtain
abundance map

Apply stressor checklist

Map depicting overlay of
wetland abundance zones,
levels of potential threat,
and landuse, roads &
streams

LEVEL 3

Map of abundance zones with
verified inventory

Apply HGM functional
assessment models to
probability based sampling
locations

Map depicting abundance
zones,
verified inventory, and
probable
condition

Performance criteria
matrices
provide restoration
standards

What is Reference?



Ridge and Valley Province

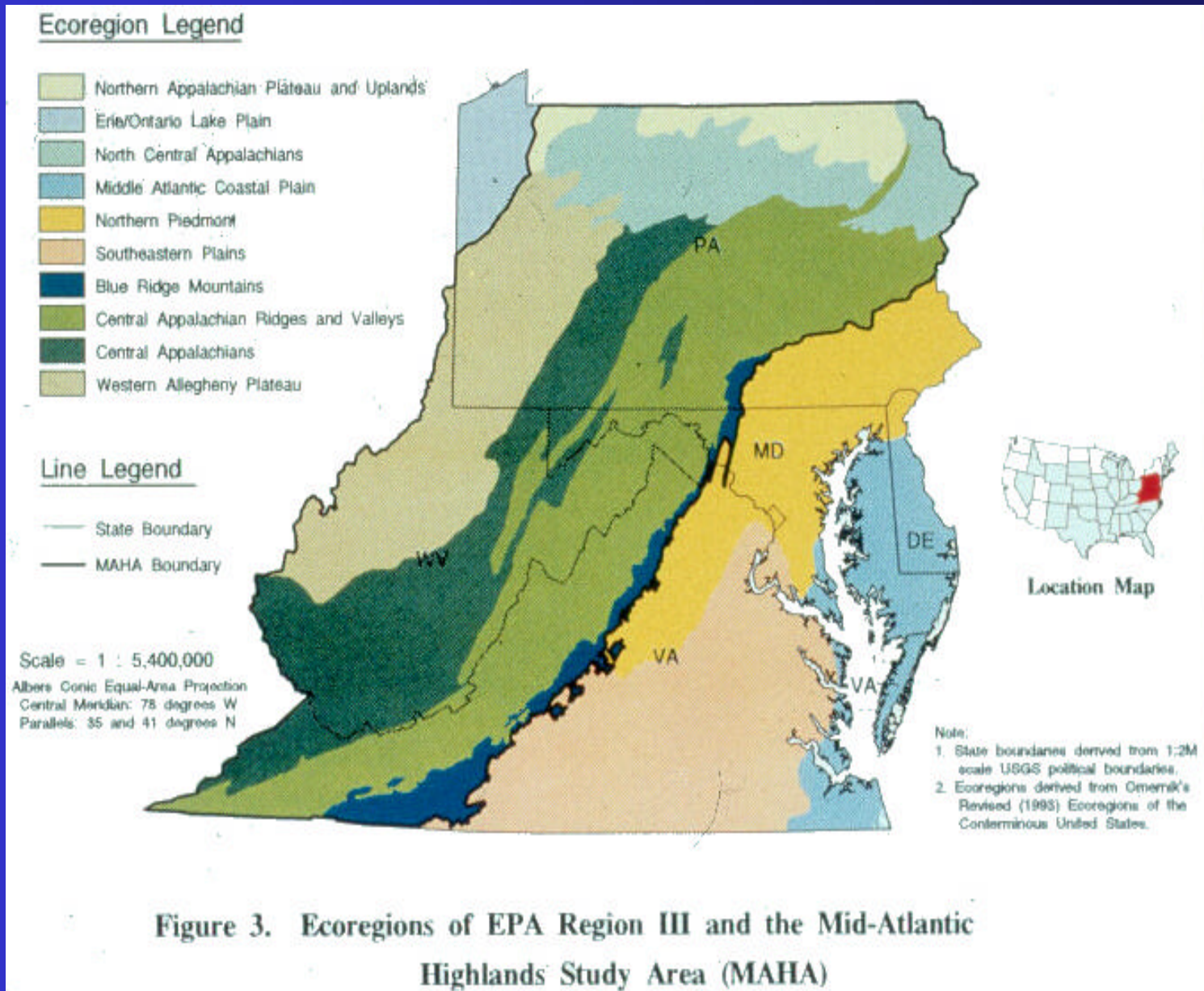


Figure 3. Ecoregions of EPA Region III and the Mid-Atlantic Highlands Study Area (MAHA)



Ridges and Valleys in Central Pennsylvania



Penn State Cooperative Wetlands Center

Agricultural Use is a Major Activity



That Exerts Its Influence to Varying Degrees



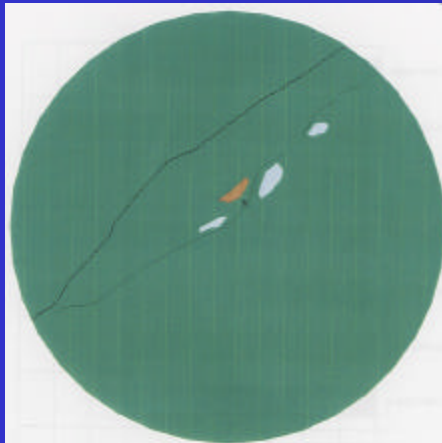
Forested is the Reference Standard!



Departure from Reference

- How do our landscapes evolve?
- What affects wetland condition?
- What information do we have?

Land Use Patterns



Dist=96
MFPS=302
SDI=0.2
RD=8

Dist=25
MFPS=3
SDI=1.1
RD=8

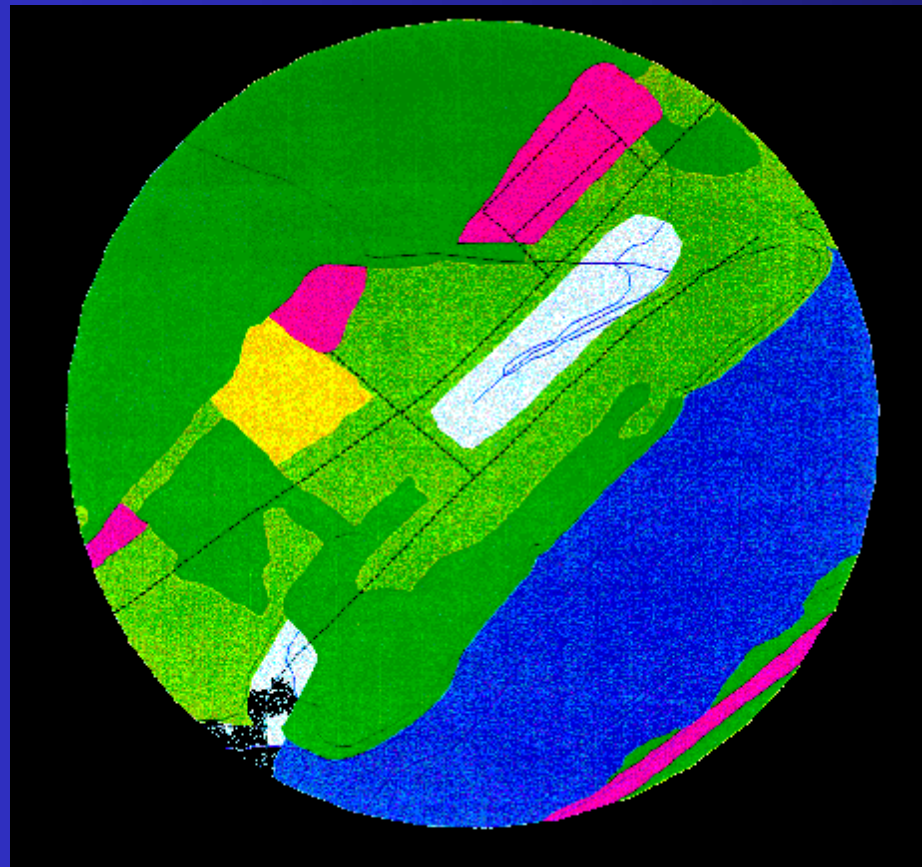


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MFPS=55
SDI=1.6
RD=24

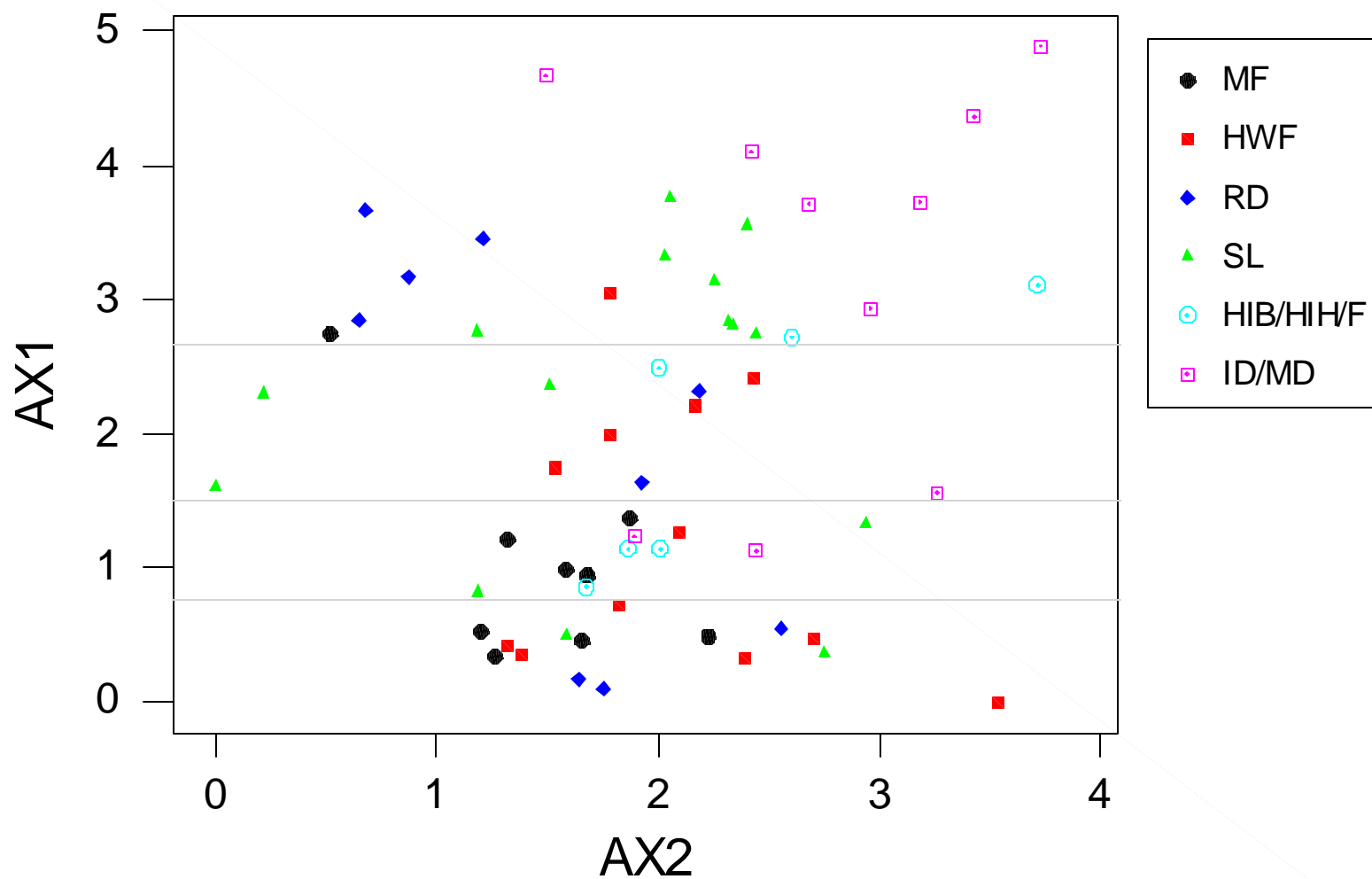
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MFPS=3
SDI=1.7
RD=47

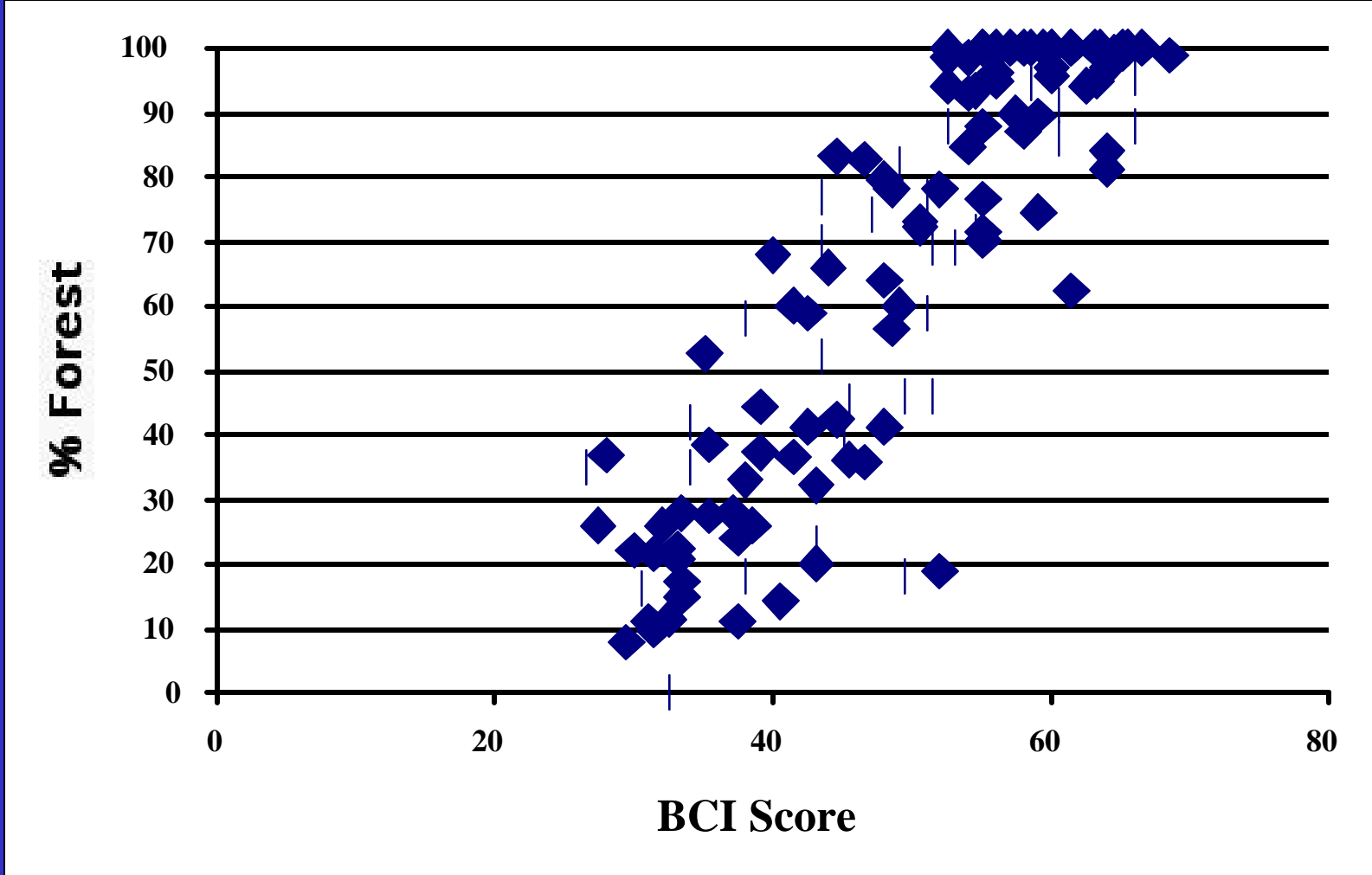


Land use within 1-km radius circle



All HGM Types - Presence/Absence





What Can We Do Now?

- Prioritize watersheds
- Select watersheds for further investigation
- Prepare TMDLs for major land use patterns