Ohio River Basin

FISH HABITAT PARTNERSHIP

Moving the Ohio River Basin Fish Habitat Partnership from "Early Action Sites" to true "Priority Areas"

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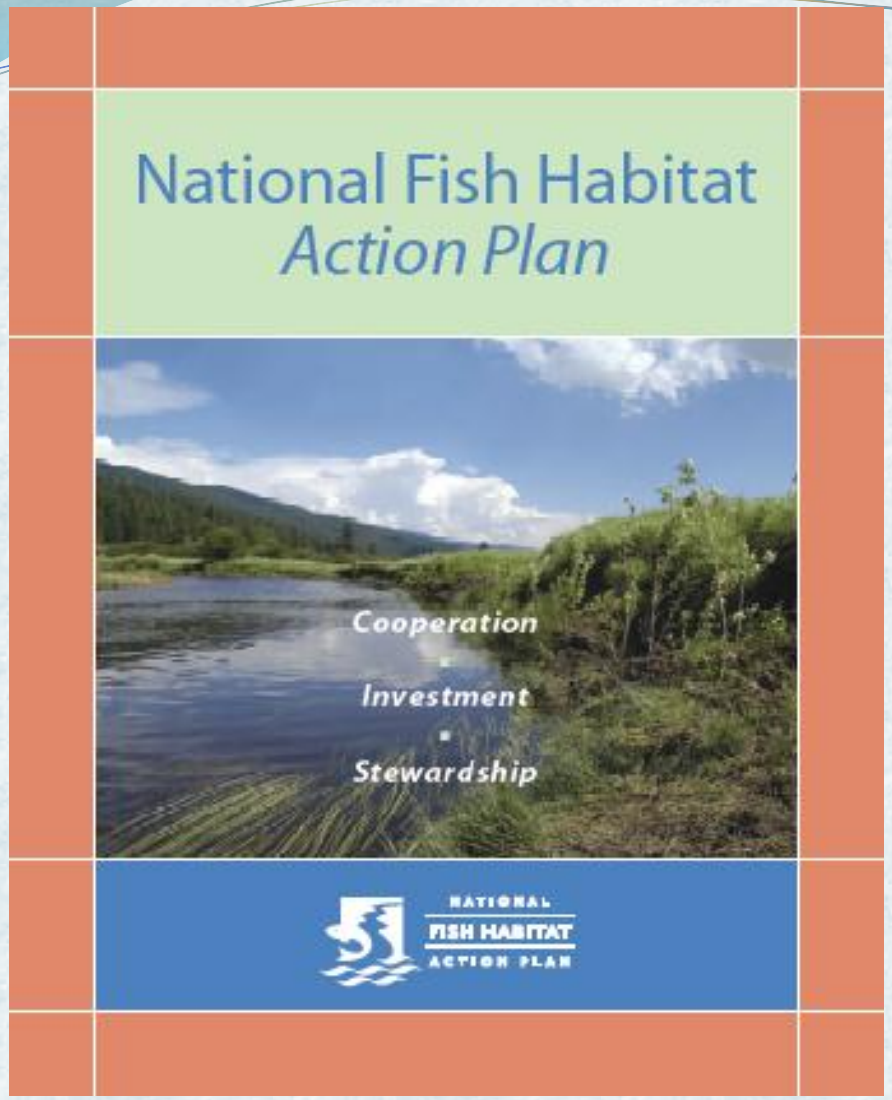
[2] Ohio River Valley Water Sanitation Commission
[3] Downstream Strategies, LLC
[4] West Virginia University

Ohio River Basin
FISH HABITAT PARTNERSHIP

NATIONAL FISH HABITAT ACTION PLAN

SPORT FISH & WILDLIFE RESTORATION

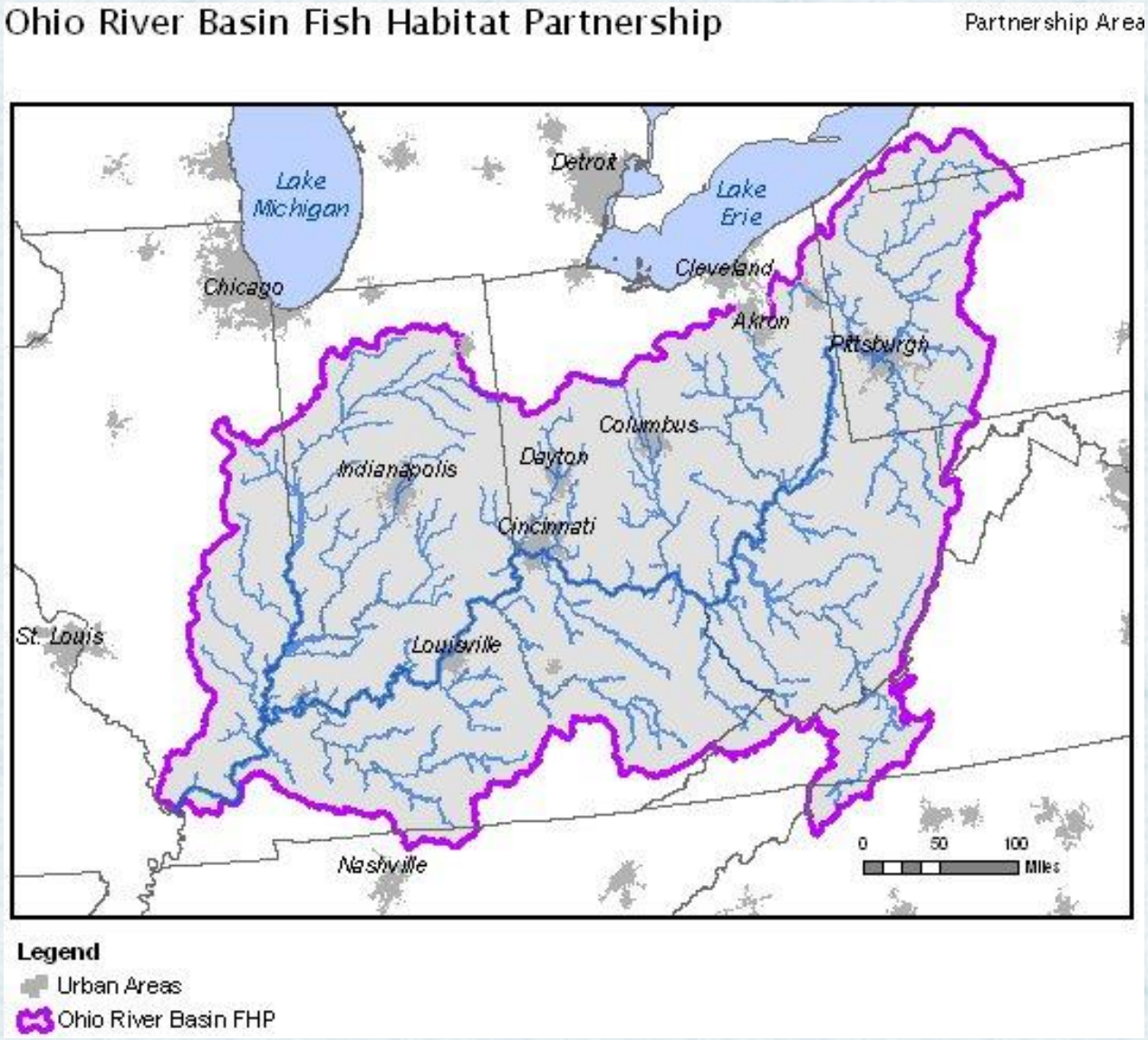


Forged to …

- Protect
- Restore
- Enhance

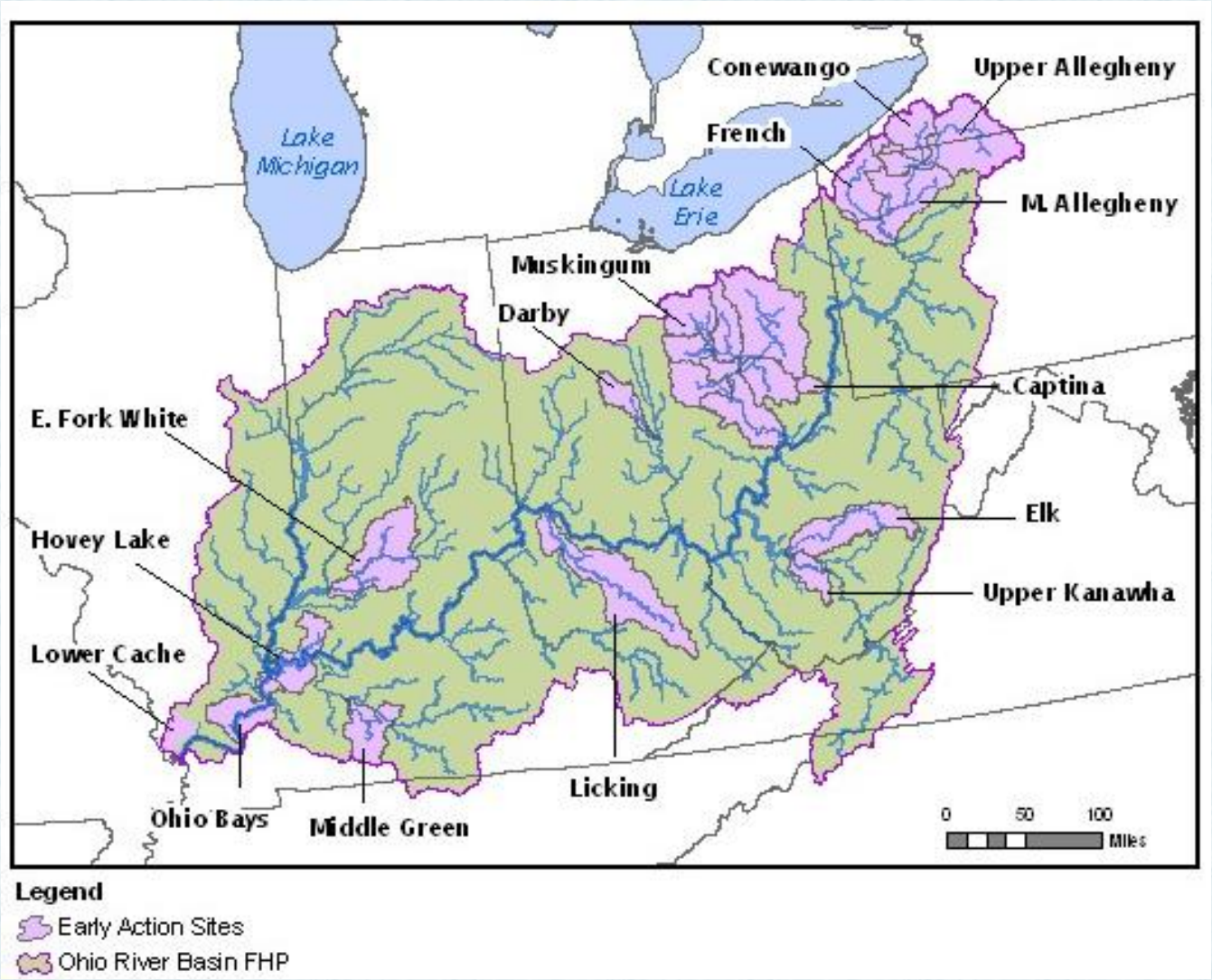
… fish habitat through partnerships

Ohio River Basin



Map Courtesy of August Froehlich, TNC

Ohio River Basin – Early Action Sites



Map Courtesy of August Froehlich, TNC

Courtesy Downstream Strategies

Downstream Strategies & FHPs

- Create spatially-explicit habitat assessment models for each of the Midwestern FHPs, using Boosted Regression
- Create an integrated GIS decision support tool
- Create a regional representation of habitat condition

Boosted Regression Trees

- **Combines**

–*Machine learning*

–*Traditional statistical techniques*

- **Decision Trees**

–partition the predictor space using rules that identify regions having the most homogeneous response

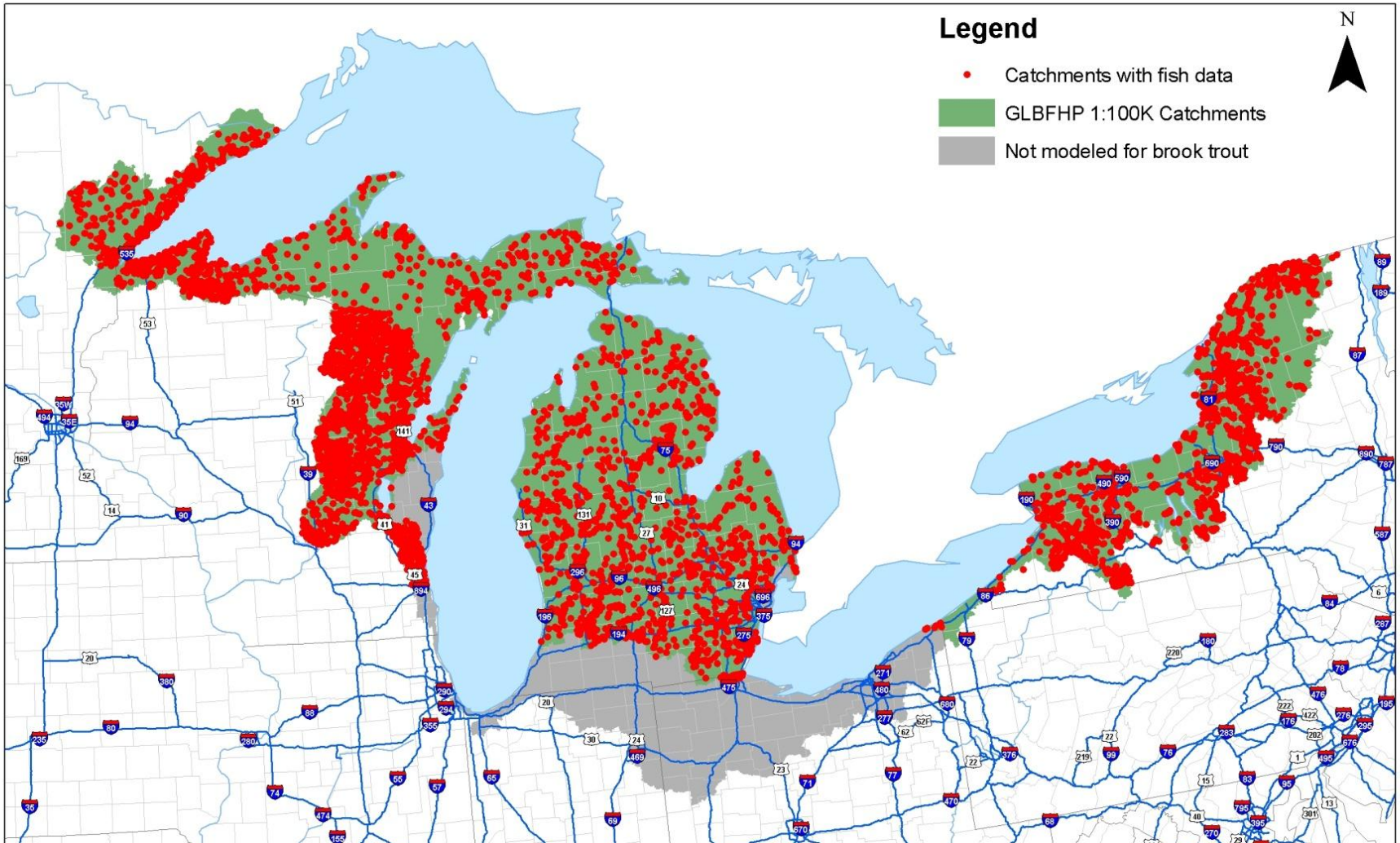
–e.g., CART

- **Boosting**

–Easier to find and average many rough rules than to find a single, highly accurate prediction rule

–Related to model averaging

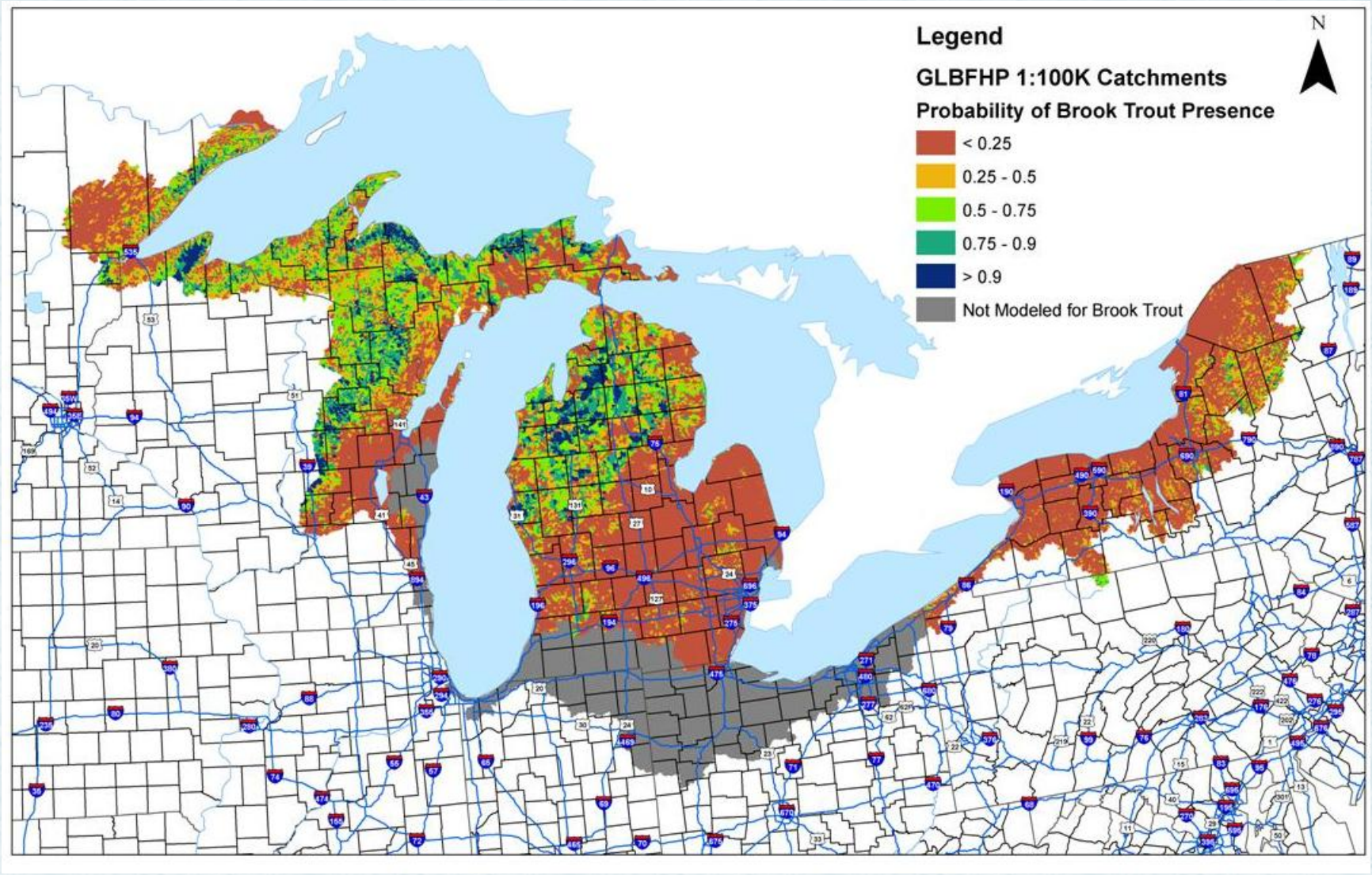
Response Variable: Brook Trout



Predictor Variable Weights

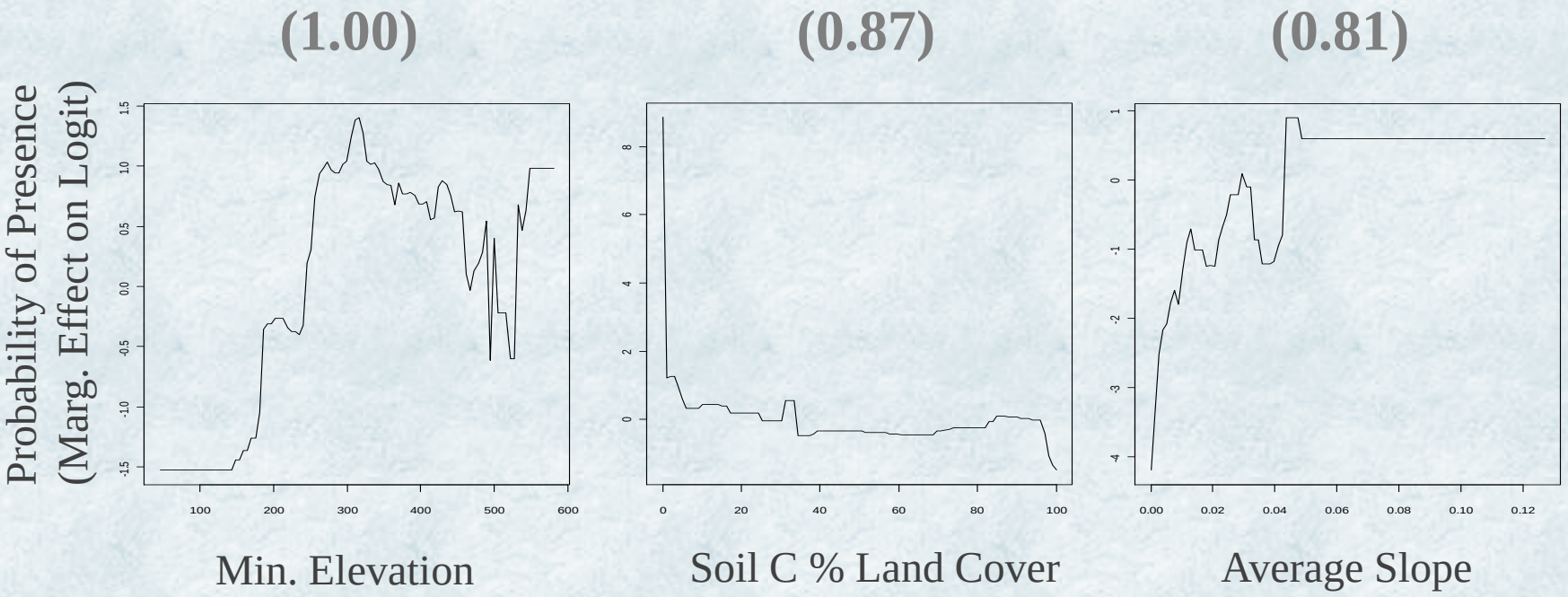
Variable Description	Relative Influence	Cumulative Percent
Local population density	9.044	100
Minimum stream elevation	7.732	91
Network wetland land cover (percent)	6.838	83
Network soil class C land cover (percent)	6.757	76
Watershed slope	6.277	70
Network soil class A land cover (percent)	6.090	63
Network forest land cover (percent)	4.570	57
Network impervious surface cover (percent)	4.097	53
Network density of road crossings	3.601	49
Local forest land cover (percent)	3.192	45
Upstream drainage area	3.187	42
Local density of cattle	3.054	39
Network developed land cover (percent)	2.926	36
Predicted thermal regime (cold, cool, warm)	2.321	33
Local groundwater withdrawal amount	2.222	30

Probability of Brook Trout



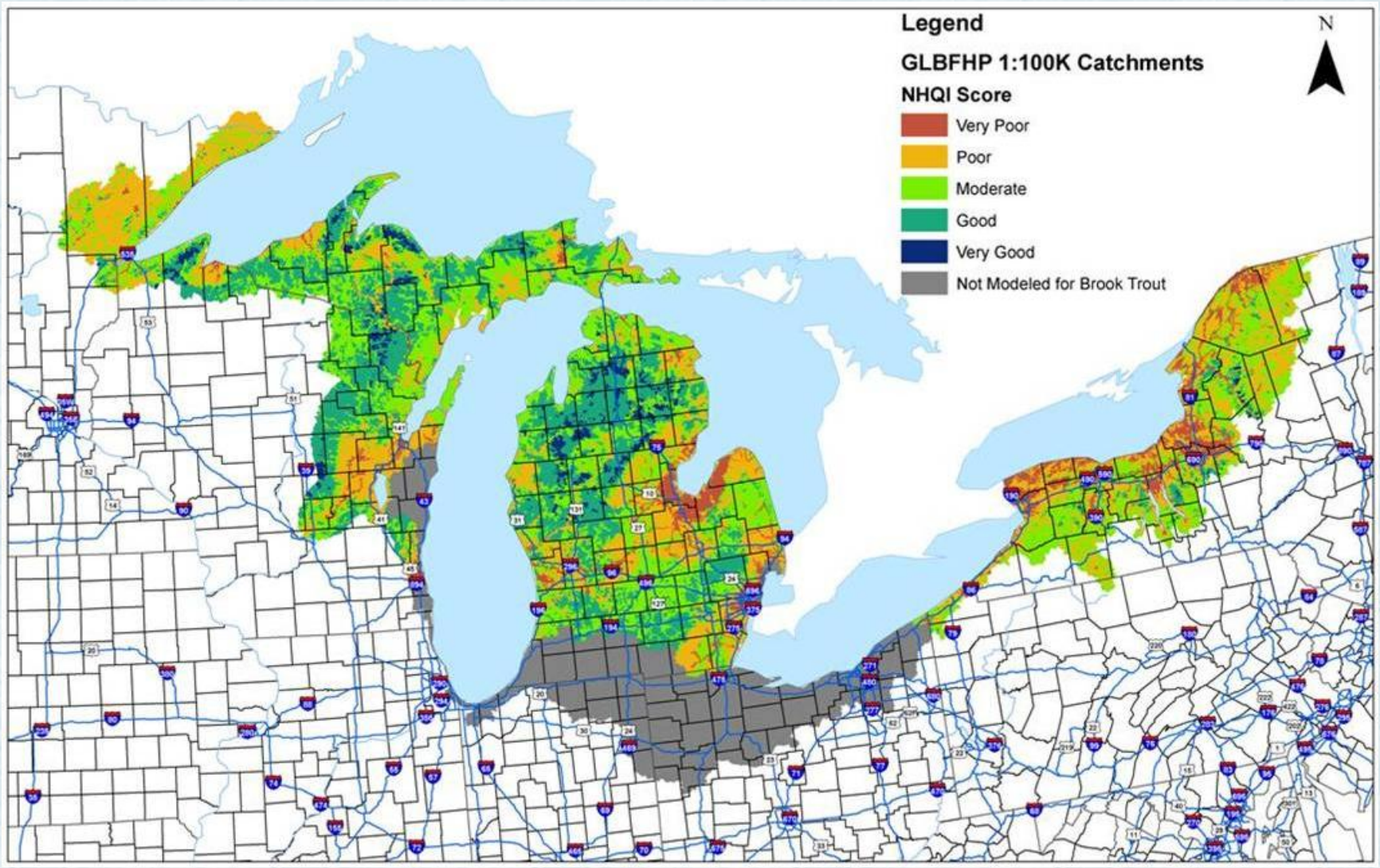
Predictor-Response Functions

Independent functional relationship between the fish response variable and **natural landscape attributes**.

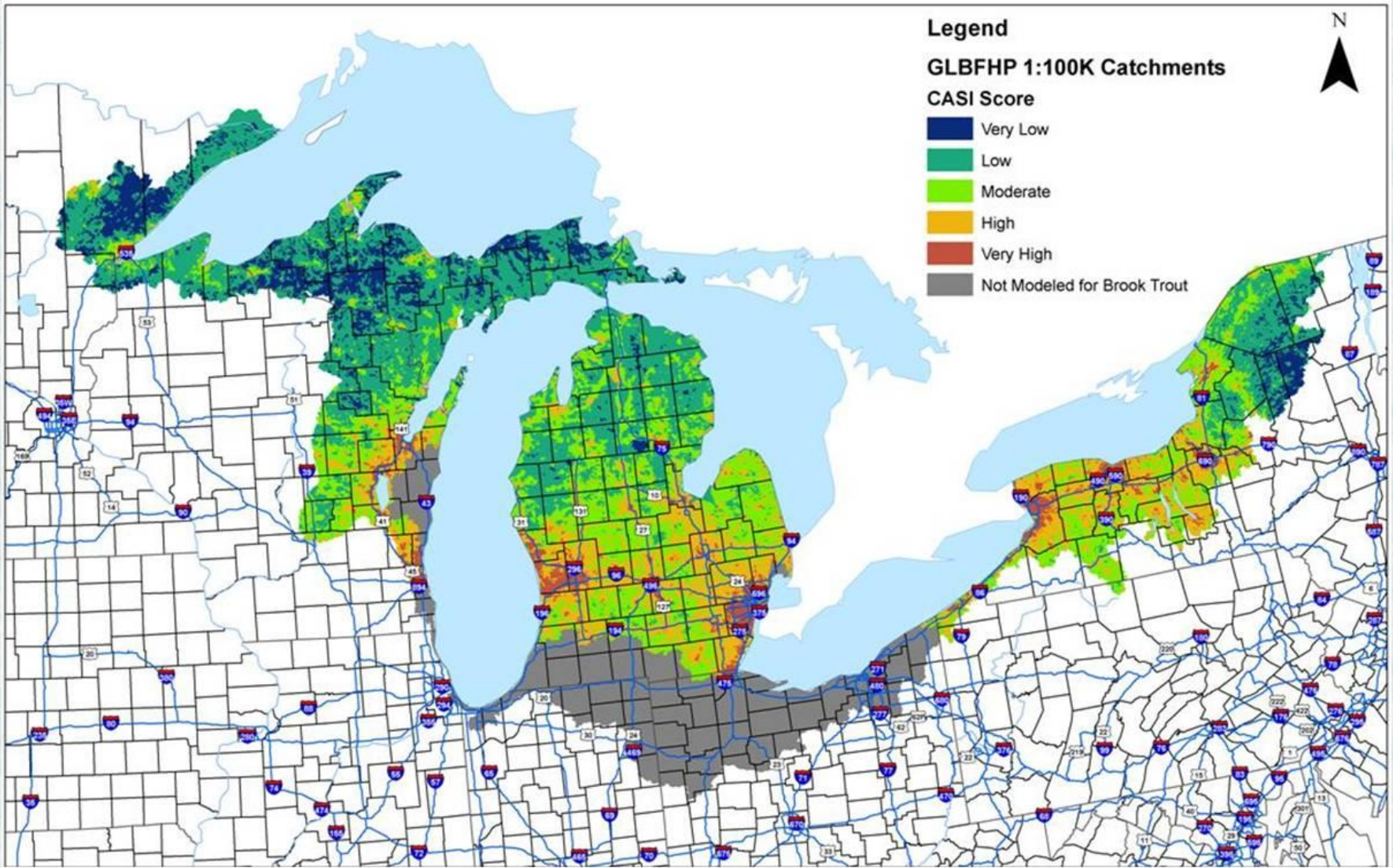


CHQI is calculated for each 1:100K Segment Level Watershed

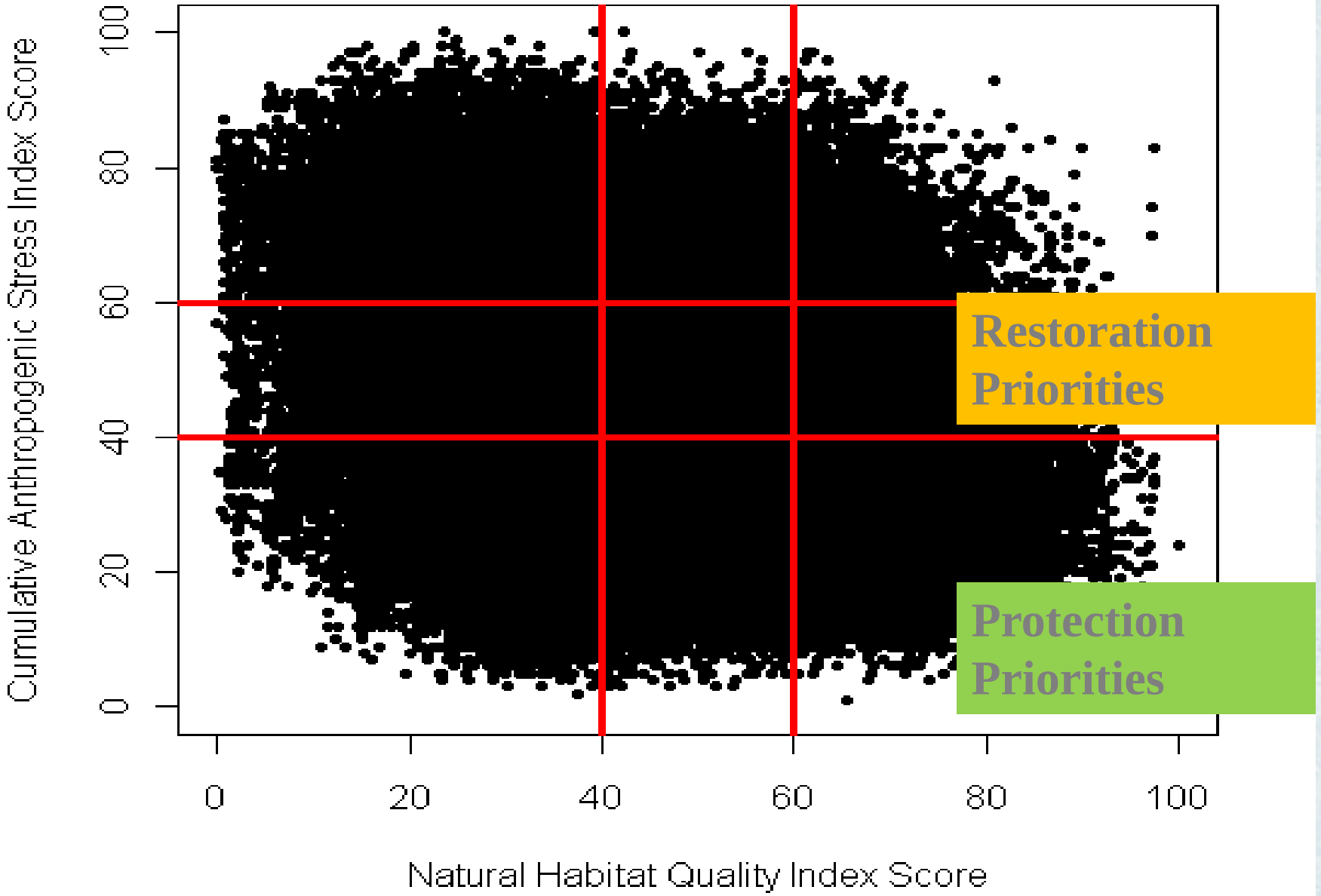
Natural Habitat Quality Index



Anthropogenic Stress Index

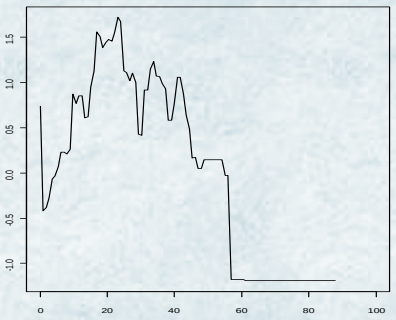


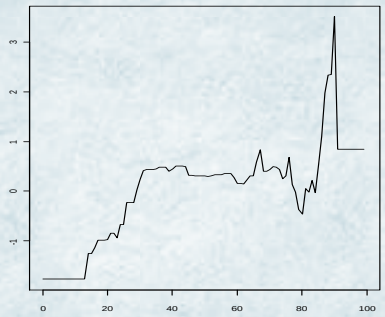
NHQI vs. CASI

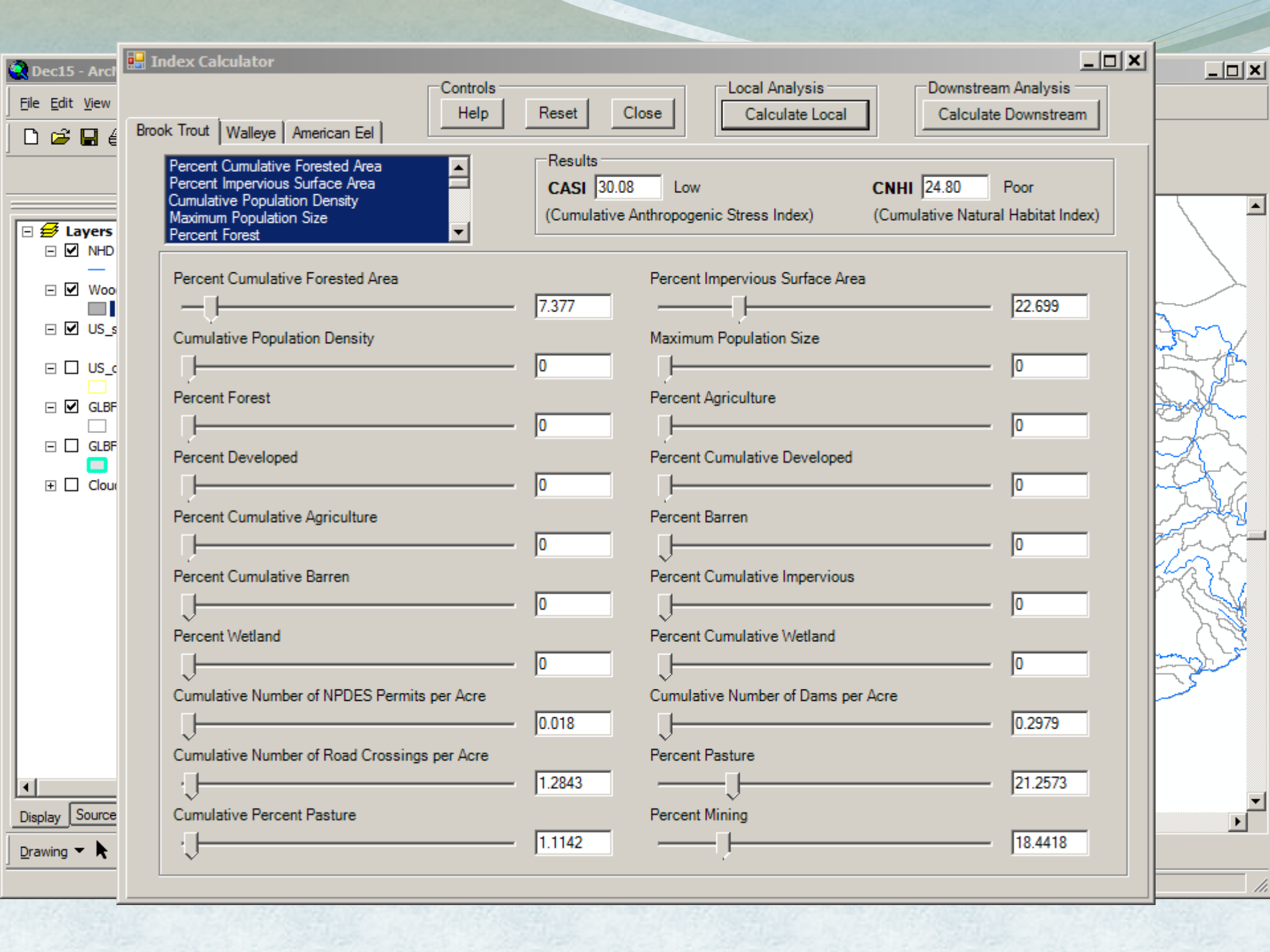

Cumulative Anthropogenic Stress Index Score
0
20
40
60
80
100
0
20
40
60
80
100
Natural Habitat Quality Index Score
Restoration Priorities
Protection Priorities

Decision Support Tool

- Integrated within ArcMap 9.3
- Index calculator
- Downstream future conditions based on user input and model output.



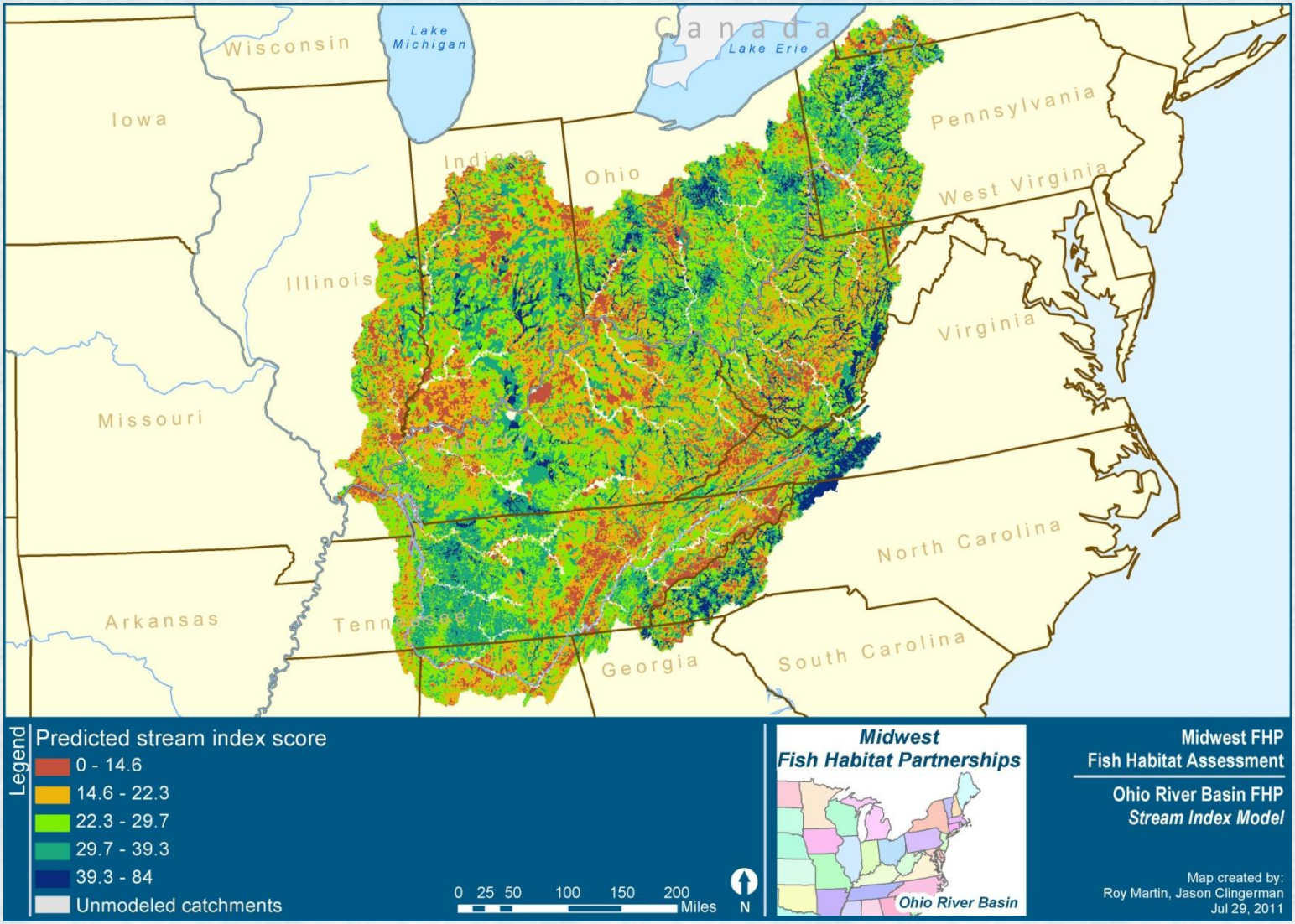



Index Calculator
Controls
Help
Reset
Close
Local Analysis
Calculate Local
Downstream Analysis
Calculate Downstream
Brook Trout
Walleye
American Eel
Percent Cumulative Forested Area
Percent Impervious Surface Area
Cumulative Population Density
Maximum Population Size
Percent Forest
Results
CASI 30.08 Low
(Cumulative Anthropogenic Stress Index)
CNHI 24.80 Poor
(Cumulative Natural Habitat Index)
Percent Cumulative Forested Area 7.377
Percent Impervious Surface Area 22.699
Cumulative Population Density 0
Maximum Population Size 0
Percent Forest 0
Percent Agriculture 0
Percent Developed 0
Percent Cumulative Developed 0
Percent Cumulative Agriculture 0
Percent Barren 0
Percent Cumulative Barren 0
Percent Cumulative Impervious 0
Percent Wetland 0
Percent Cumulative Wetland 0
Cumulative Number of NPDES Permits per Acre 0.018
Cumulative Number of Dams per Acre 0.2979
Cumulative Number of Road Crossings per Acre 1.2843
Percent Pasture 21.2573
Cumulative Percent Pasture 1.1142
Percent Mining 18.4418
Layers
NHD
US_s
GLBF
Display
Source
Drawing

ORBFHP – Example Response Variables

1. Streams Signature Fish Index
2. Smallmouth Bass Abundance
3. Mussel Species Richness
4. Etc…..

Streams Signature Fish Index



Moving Forward

- Days: last response variable data submitted, initial draft models
- Weeks: FHP review of initial draft models, fully developed draft models
- Month(s): FHP review of full models, finalization of models

Healthy habitats, healthy mussels, healthy fish…all good for the American public.

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