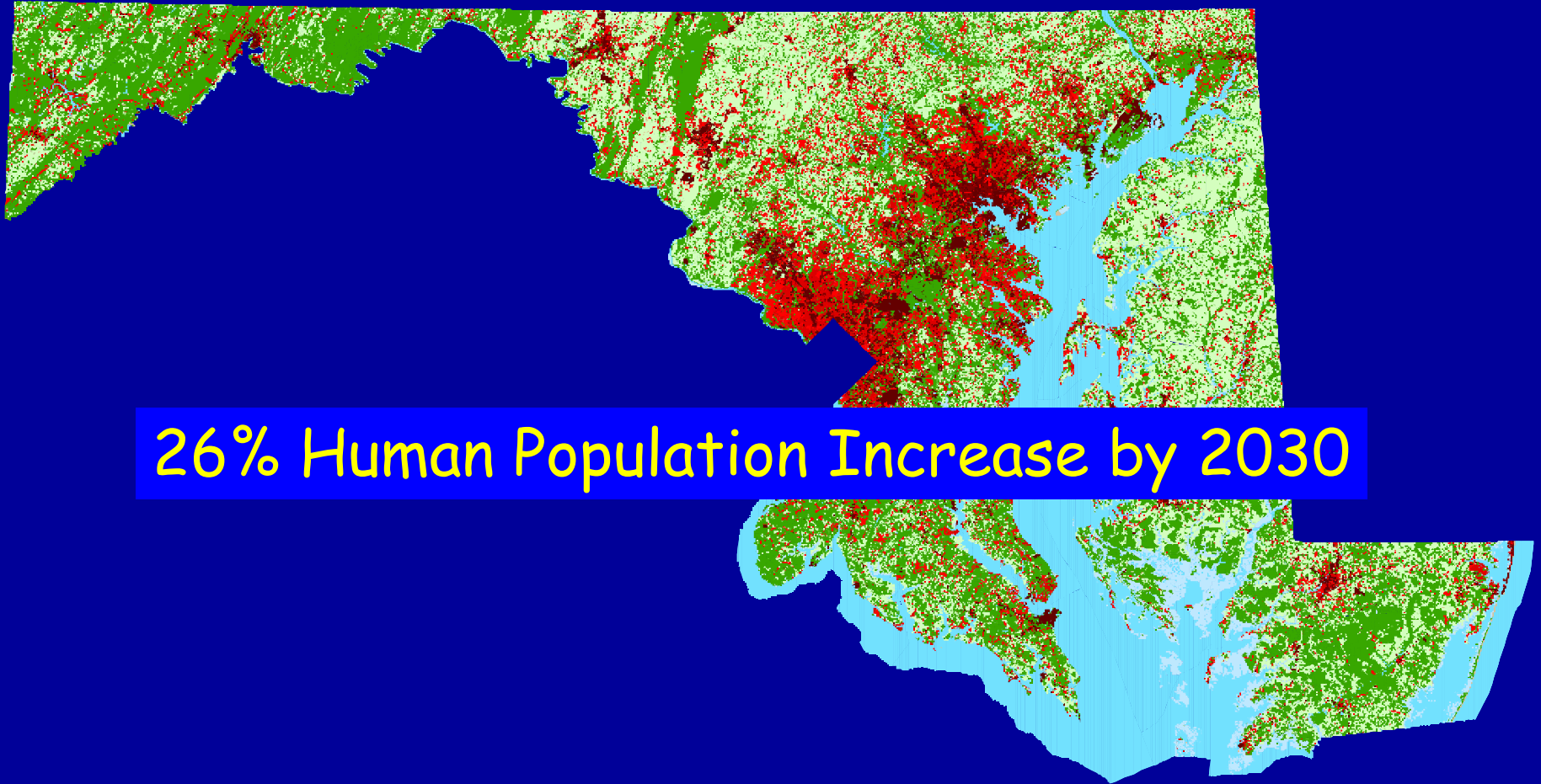


The lack of congruence among different ecological assessments: Implications for prioritizing protection of stream biodiversity



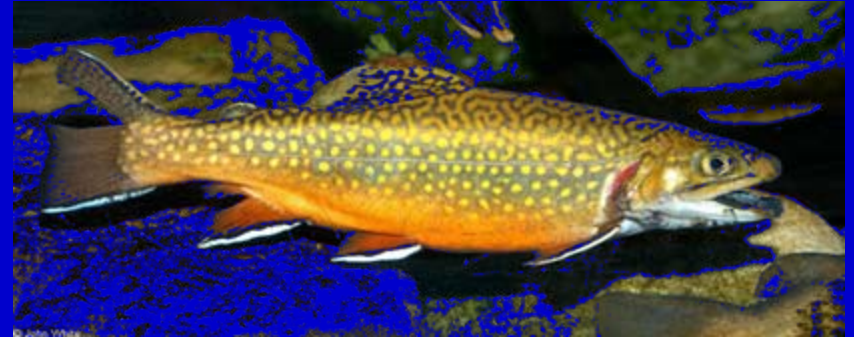
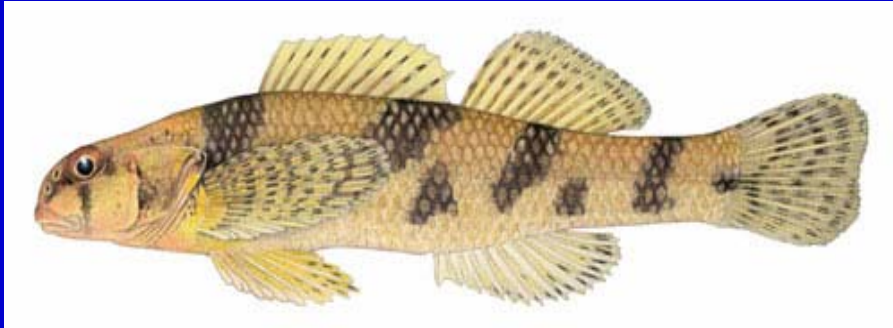
Scott Stranko, Jay Kilian, Andy Becker, Michael Kashiwagi, Matt Ashton, Pat Ciccotto, Ron Klauda, Dan Boward

Urgent Need for Conservation In Maryland



2000 16% urban

Much Stream Taxonomic Diversity Has Been Lost From Urbanized Areas



Example of brook trout decline with impervious land cover increase

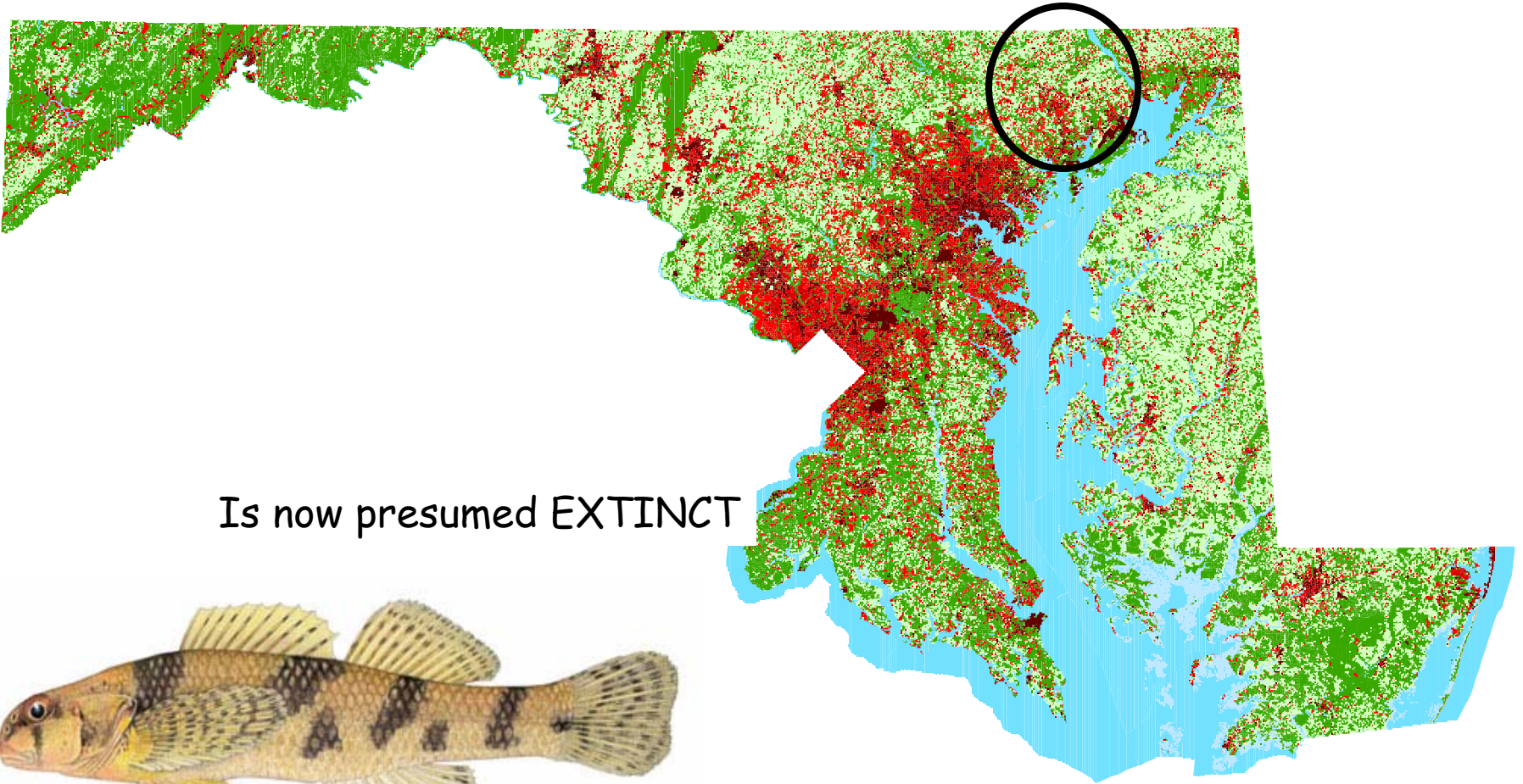
2004



Land cover estimates from aerial photographs

Maryland Darter Example

Maryland Darter (*Etheostoma sellare*) known from only 2 Maryland watersheds



Is now presumed EXTINCT

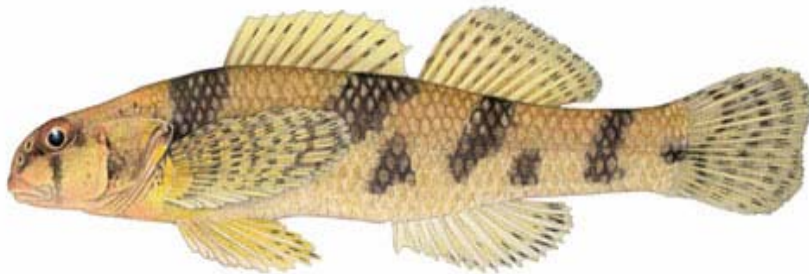


Illustration by: D.A. Neely

Still, Many Good Places And Species Remain



Photo by Wayne Davis



Photo by Matt Ashton

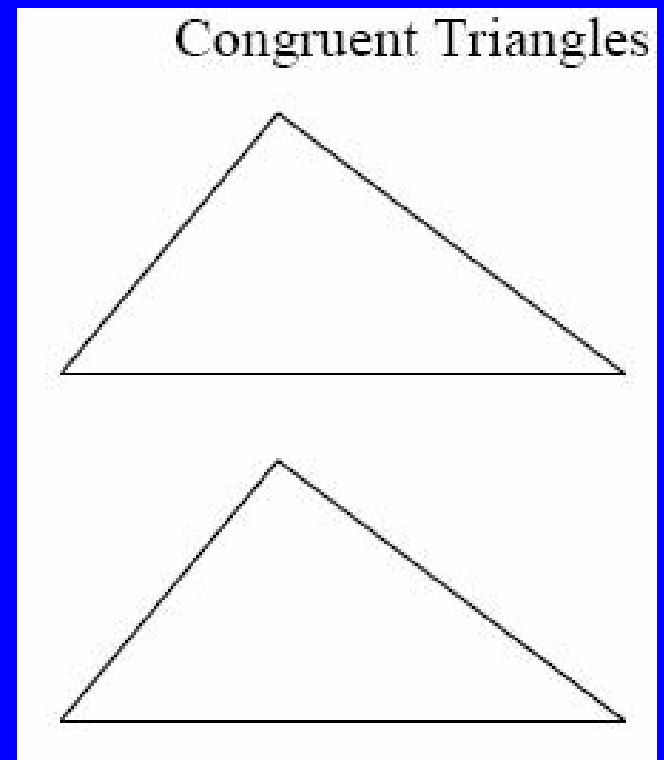
Urgent Need for Conservation



Resources of Time and Money for Conservation
are Severely Limited

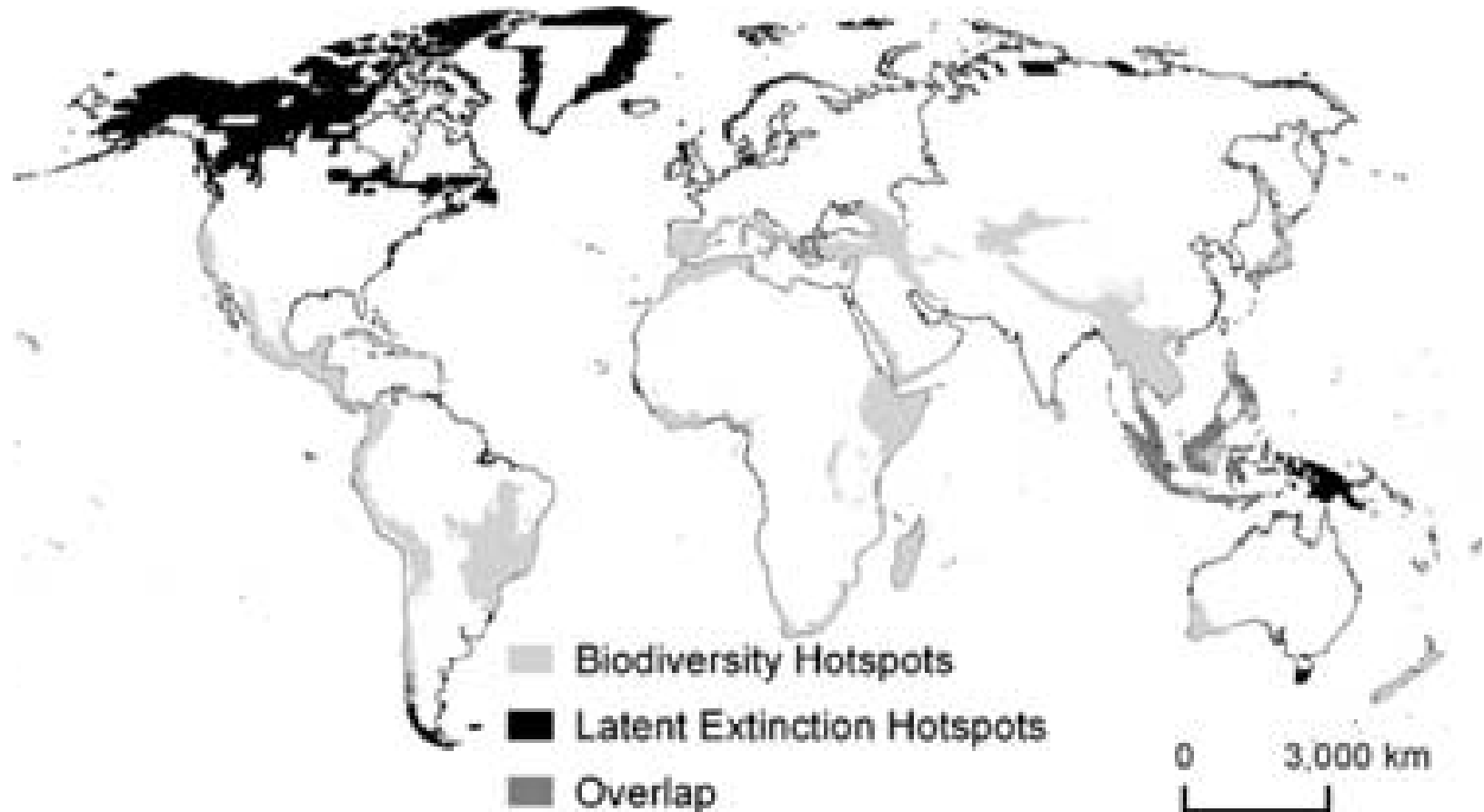
Recent Conservation Research Indicates that:

1. Species Umbrellas do not ensure the conservation of all co-occurring species
2. Different Measures of Biodiversity Priority (Hot Spots) are NOT Congruent (Do Not Agree)



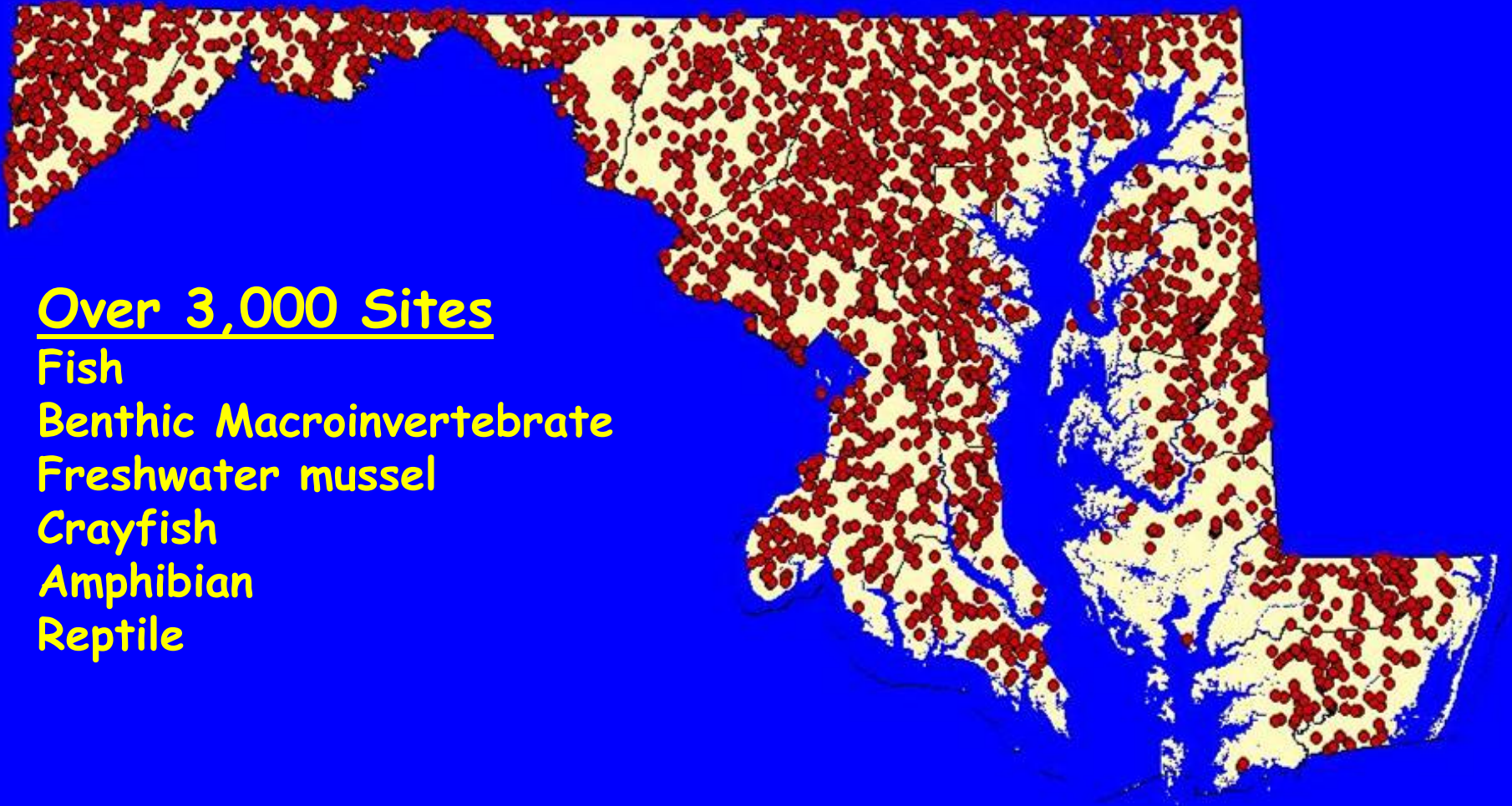
Congruence of 2 Different Hot Spots

(Leroux and Schmiegelow 2007)



Biological Conservation Priorities in Maryland

Maryland Biological Stream Survey Sites 1994-2008



Over 3,000 Sites

Fish

Benthic Macroinvertebrate

Freshwater mussel

Crayfish

Amphibian

Reptile

Calculated Many Measures of Biological Diversity

Biological Indices

Fish IBI

Benthic Macroinvertebrate IBI

Imperiled Species

Total

Fish

Salamanders

Crayfish

Mussels

Many Others

Richness

Total

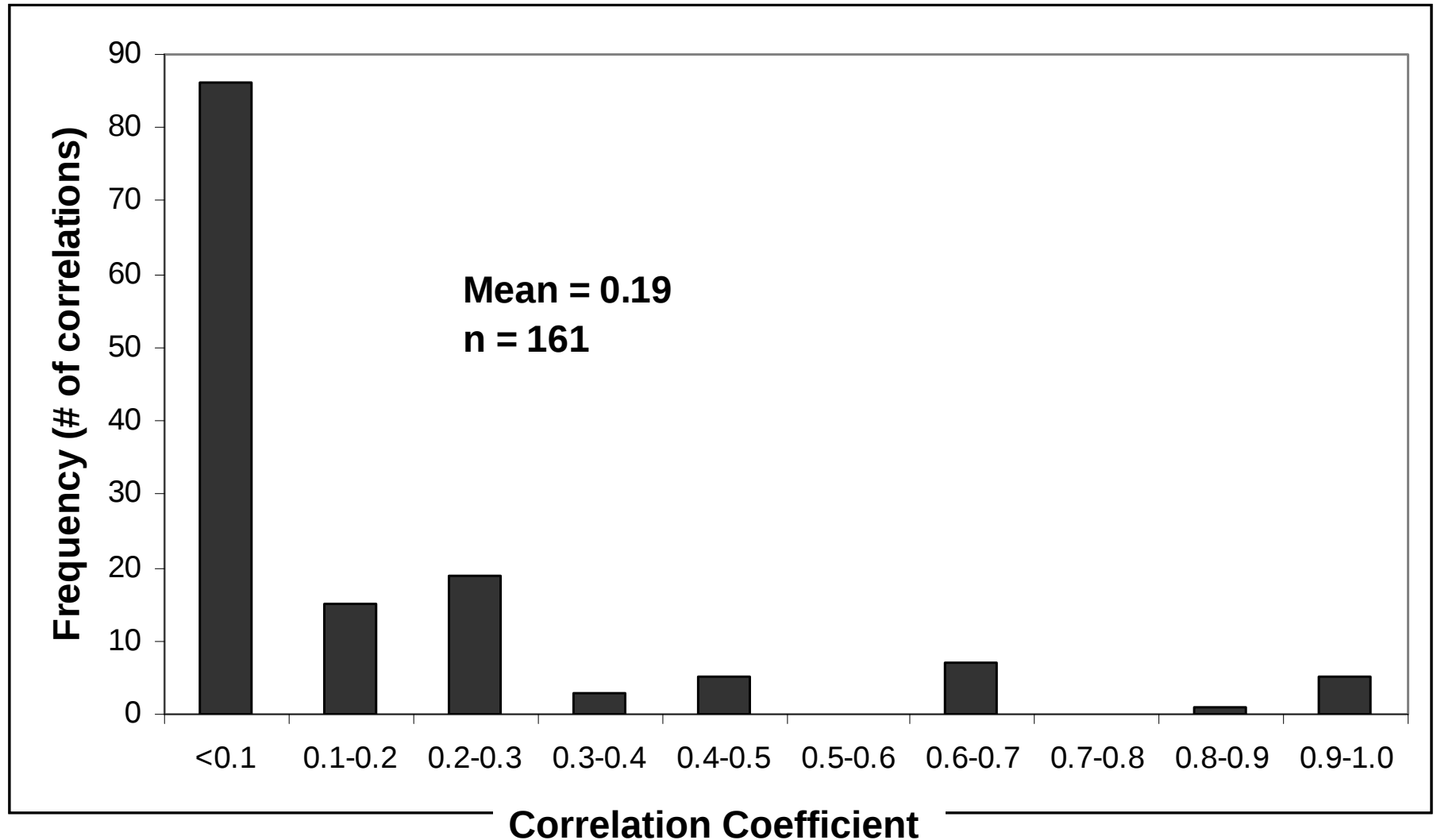
Fish

Salamanders

Crayfish

Mussels

Lack of Correlation Among Most Measures of Biological Diversity



Lack of Congruence Makes Sense When We Consider the Unique Habitat Requirements of Different Taxa Groups and Species



Calculated Many Measures of Biological Diversity

Biological Indices

Fish IBI

Benthic Macroinvertebrate IBI

Imperiled Species

Total

Fish

Salamanders

Crayfish

Mussels

Richness

Total

Fish

Salamanders

Crayfish

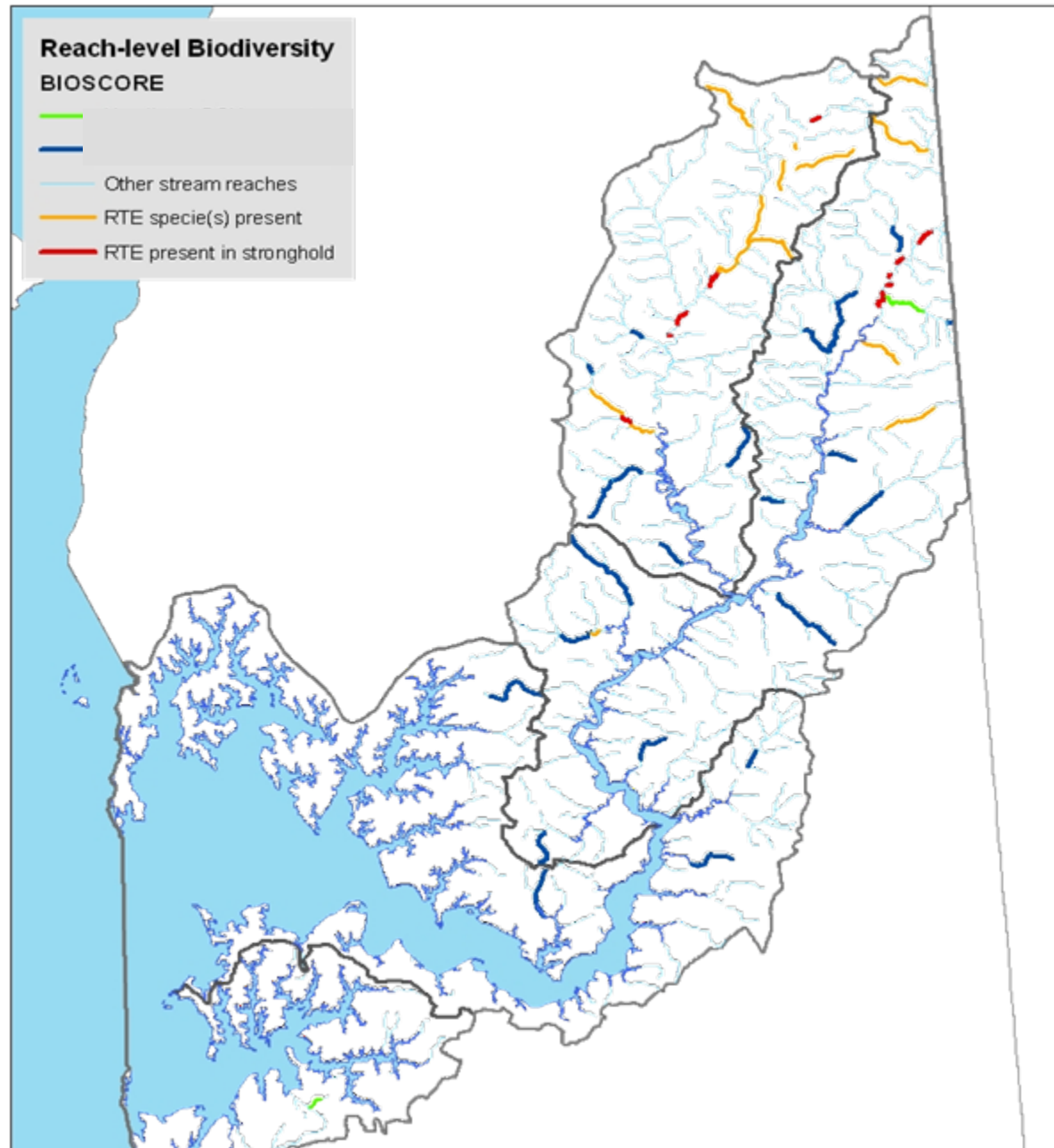
Mussels

Good IBIs and RTE Species Not In The Same Places

Correlation Coefficient

	Fish IBI	Bug IBI
Bug IBI	0.27	
RTE Species Richness	0.21	0.16

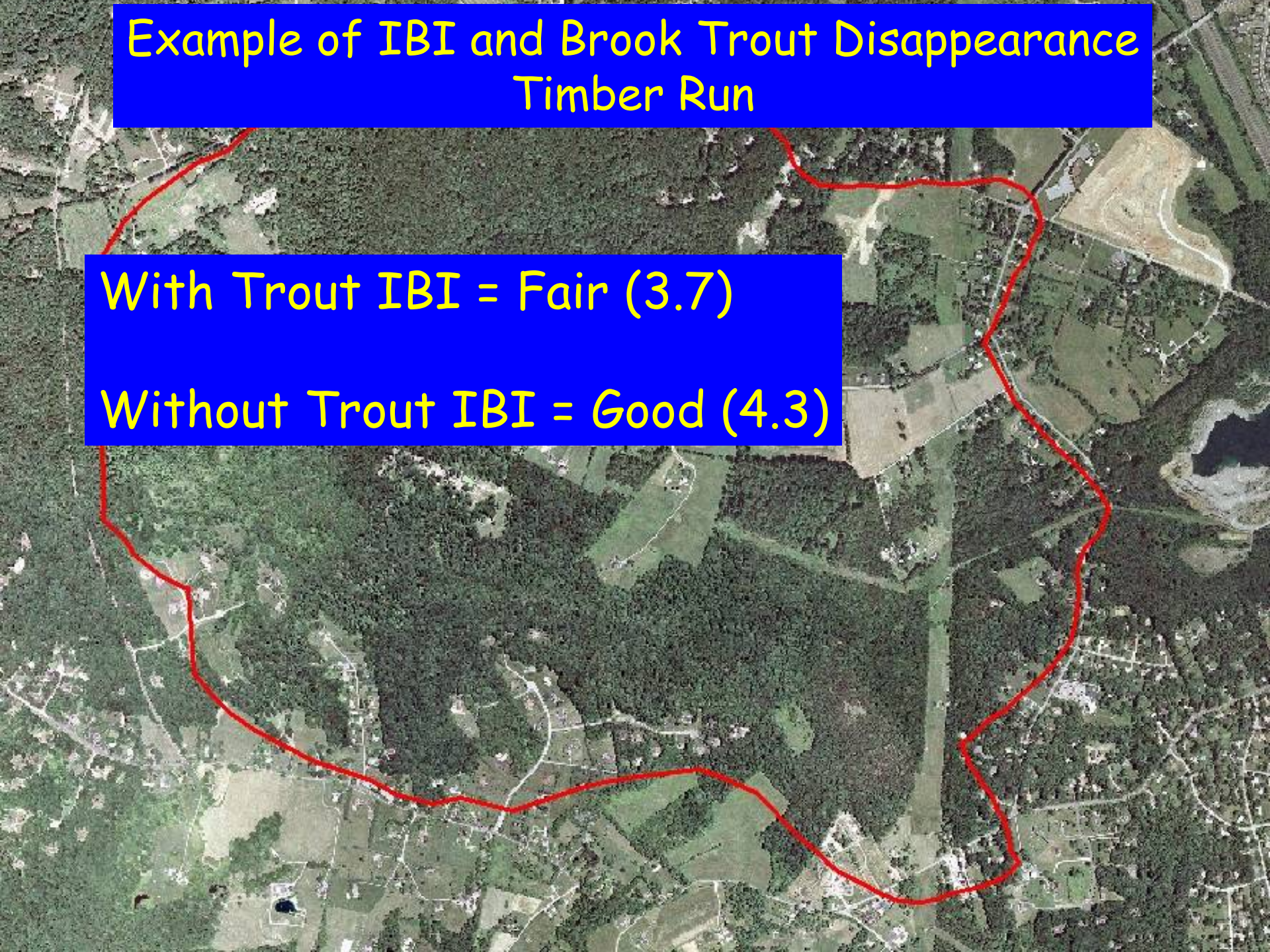
IBI and RTE Species Example Choptank River Watershed



Example of IBI and Brook Trout Disappearance Timber Run

With Trout IBI = Fair (3.7)

Without Trout IBI = Good (4.3)



Example of IBI and Endangered Species Loss:

IBI Score from Historical Maryland Darter Stream = Good (5.0)

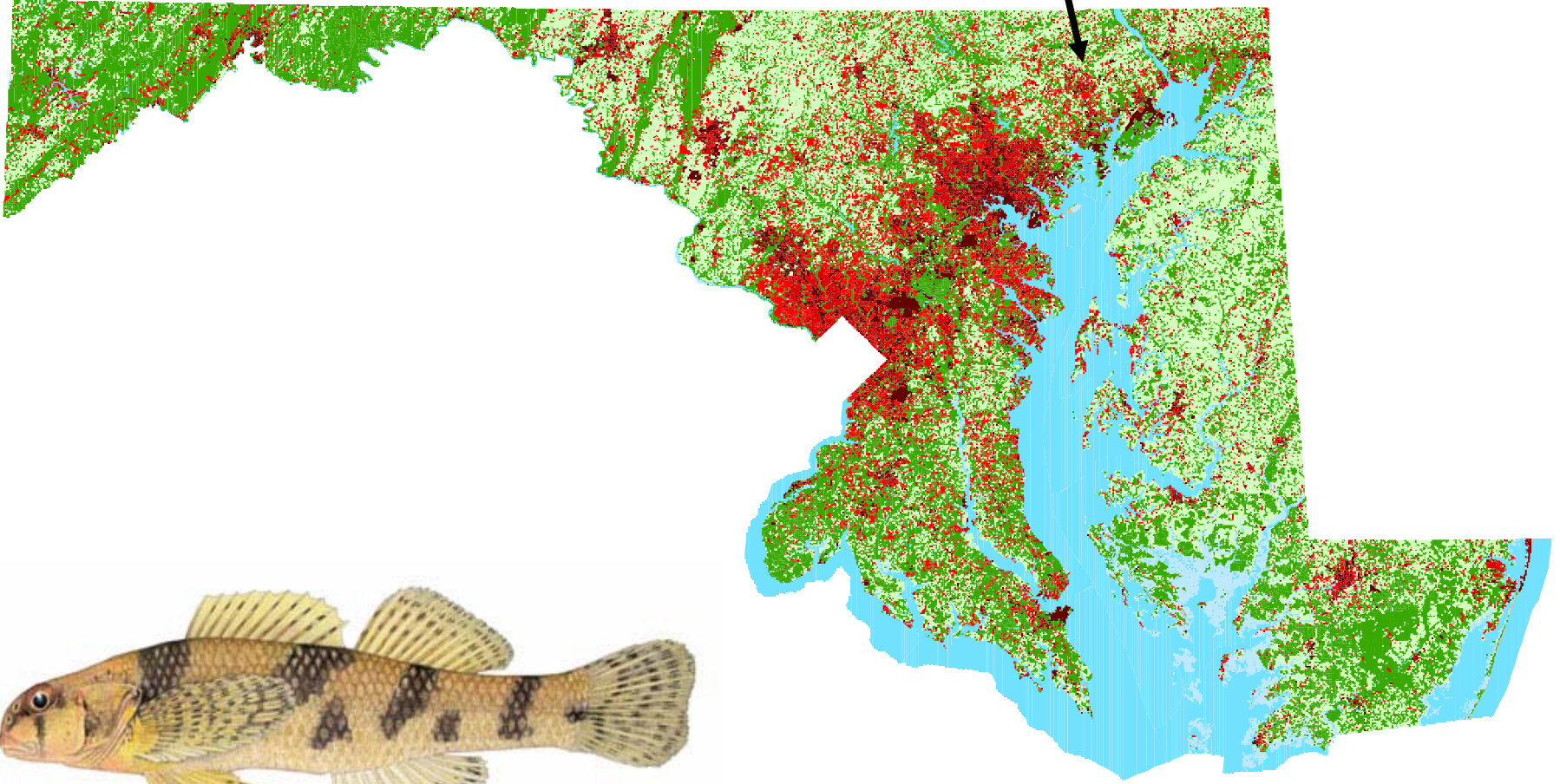


Illustration by: D.A. Neely

RTE species of Mussels, Fish, and Crayfish Occur in Some Streams with Poor IBI Scores



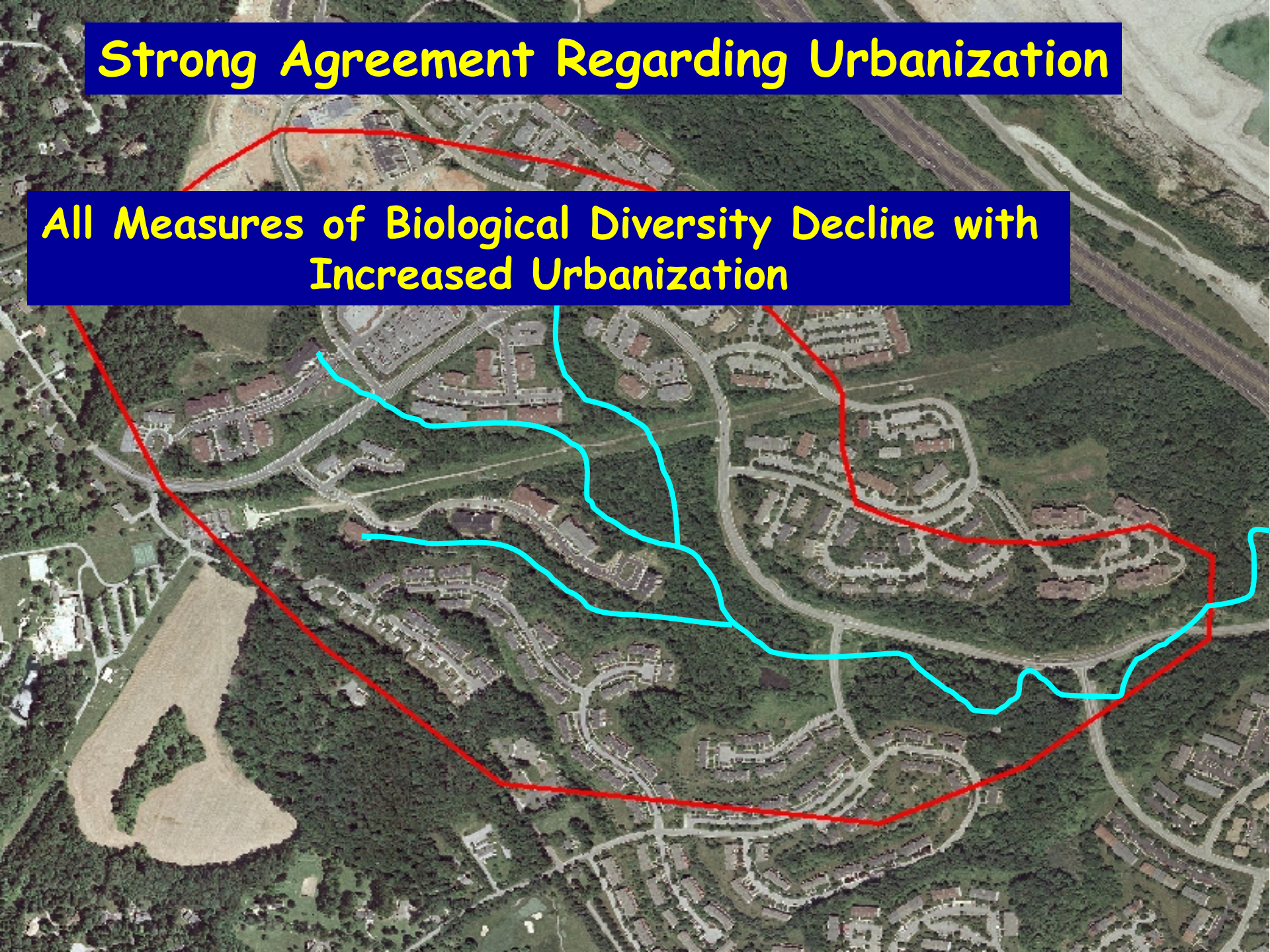
Lack of Congruence Makes Sense When We Consider the Unique Habitat Requirements of Different Taxa Groups and Species

Unique Systems Harbor the Rarest Species

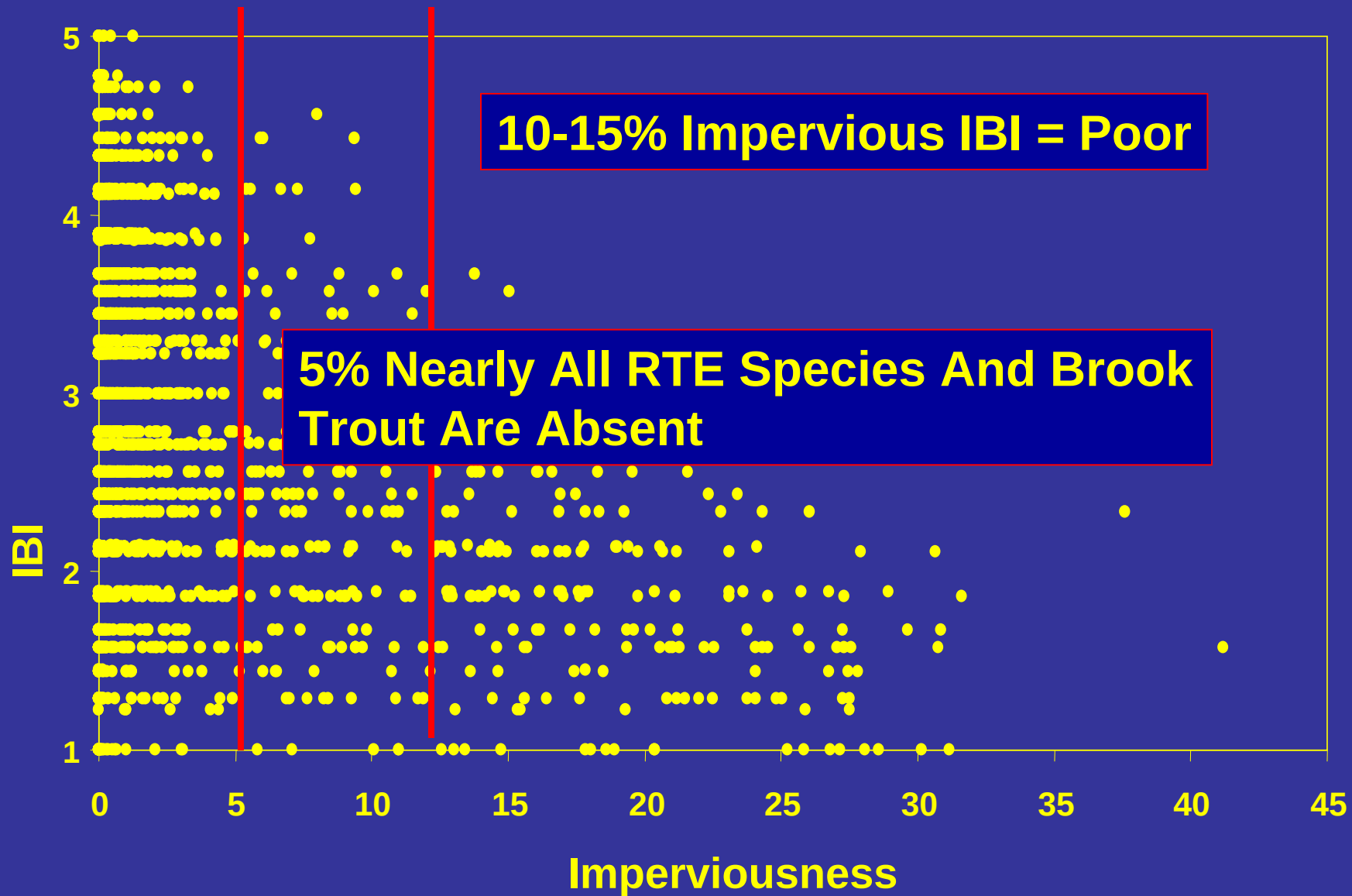


Strong Agreement Regarding Urbanization

All Measures of Biological Diversity Decline with Increased Urbanization



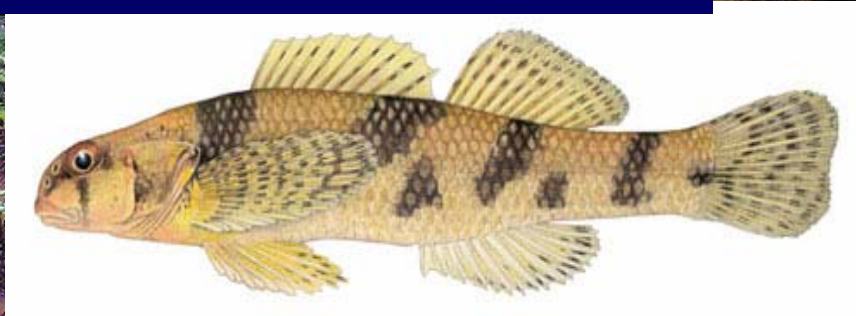
However, Affected at Different Levels



Irreplaceability? - Ferrier et al. 2000



Importance of Endemism



Fortunately - Many Conservation Regulations and organizations in MD

- Use Classes
- Anti-Degradation (Tier II and III)
- Endangered Species Act (Federal and State)
- Land Conservation Organizations

A photograph of a flooded road with cars and utility poles in the background. The water is murky brown and turbulent. In the background, there are several cars stopped or moving slowly, and utility poles with power lines. The sky is overcast.

We Need More to Stop Biodiversity Loss

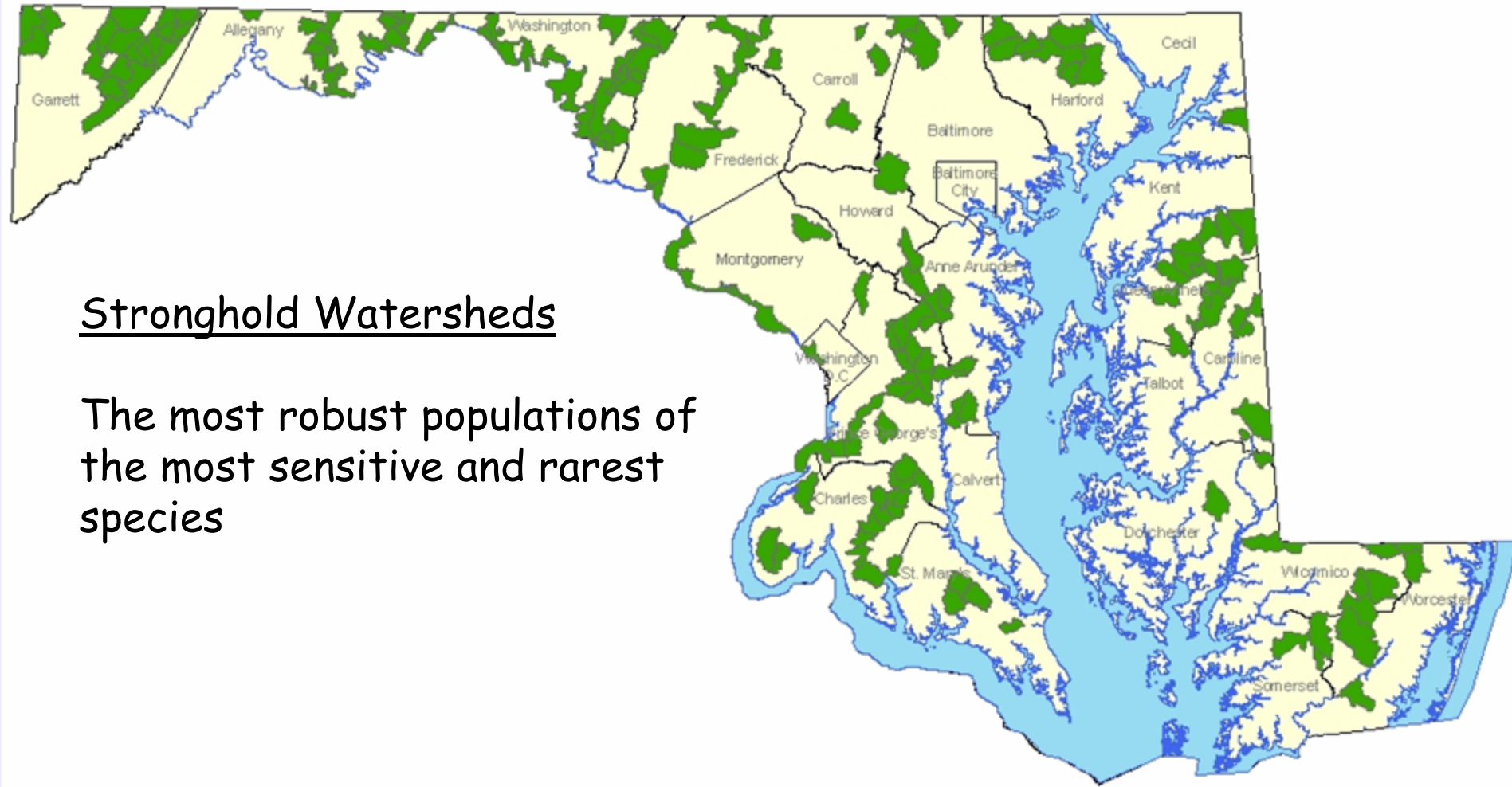
**Planning That Protects Watersheds
And Conserves Natural Lands**

**We Must Strategically Prioritize Our
Limited Conservation Resources**

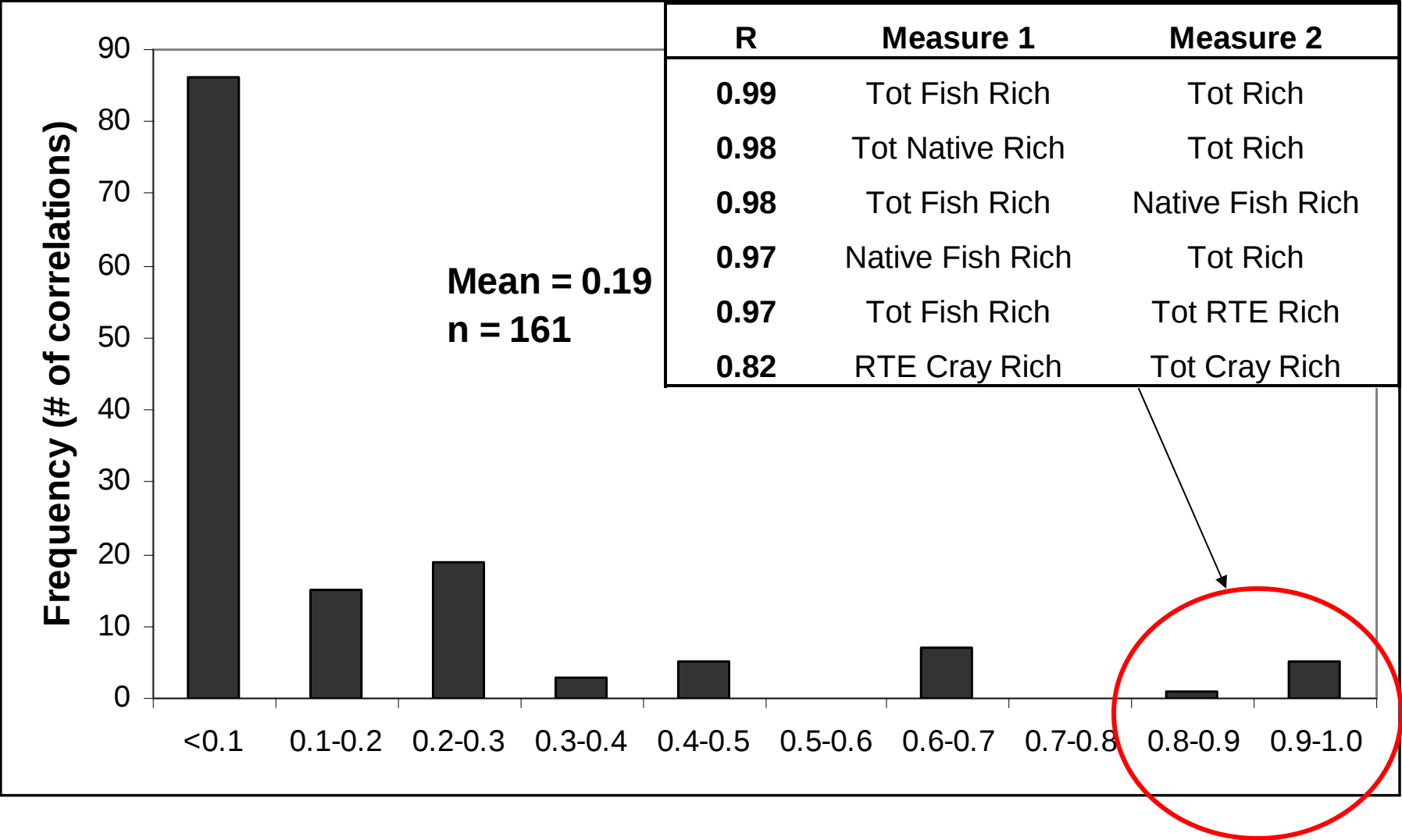
Source Populations of RTE Species?

Stronghold Watersheds

The most robust populations of the most sensitive and rarest species



Lack of Correlation Among Most Measures of Biological Diversity



Maryland Biological Stream Survey 1995-2008

Stream Health Based on Fish and Benthic Index of Biotic Integrity Scores

