

NJ Fish Index of Biotic Integrity

- Using fish assemblages to assess the overall health of a stream ecosystem



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Why Use Fish as Biological Monitors?



- Fish are long-lived and are therefore good indicators of long-term disturbances
- Fish assemblages generally consist of a number of trophic levels
- Fish are at the top of the food chain in aquatic environments
- Fish are easy to collect and identify

What is an IBI?

- An IBI is a scoring system based on multiple attributes (metrics) of a fish assemblage
- Individual metrics are summed and the overall score is used to determine the health of a water body
- Metrics are selected based on how well they indicate anthropogenic stressors

Fish IBI Metrics

I. Species richness and composition metrics

No. Fish Species

No. Benthic Insectivores

No. Trout & Centrarchid Species

No. Intolerant Species

Proportion of White Suckers

II. Trophic composition metrics

Proportion of Generalists

Proportion of Insectivorous Cyprinids

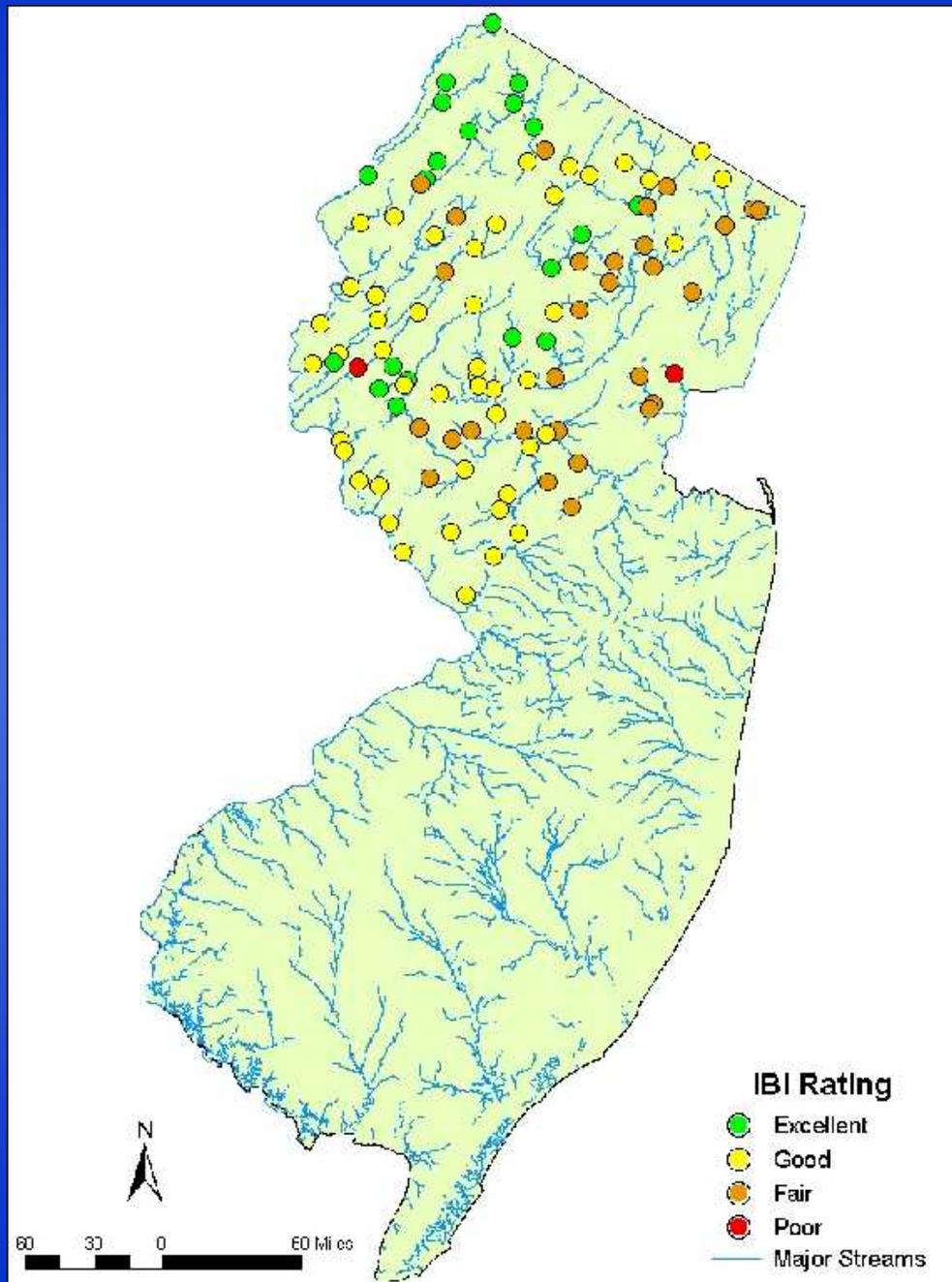
Proportion of Trout or Piscivores

III. Fish abundance and condition metrics

No. Specimens

Proportion with Anomalies

Current IBI Network



Methods



Backpack Electrofishing

Barge Electrofishing



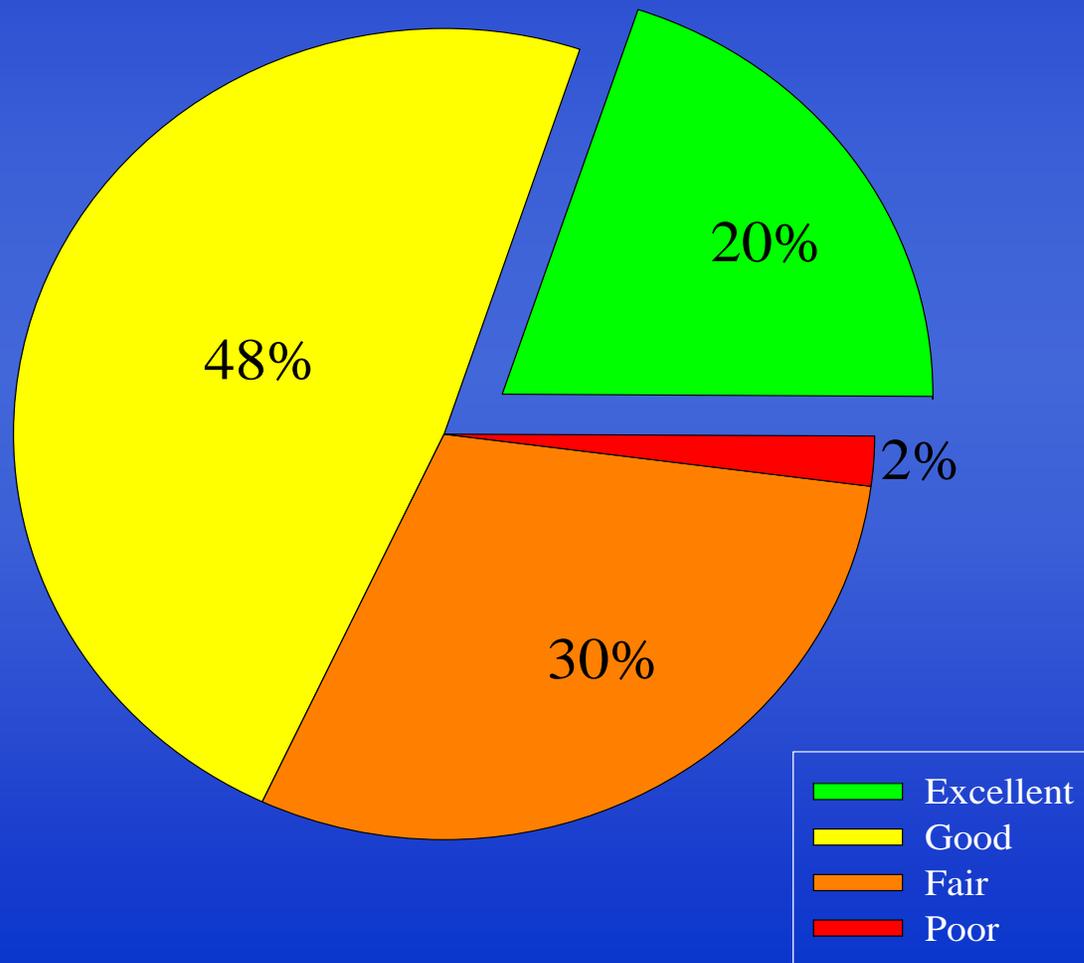
Sampling Criteria

- Sites must be wadeable
- The drainage must be greater than 5 square miles
- Sites must have some combination of riffle/run/pool habitat
- The 150-m sample stretch should be representative of the habitat of the reach
- Barriers (i.e. natural or block net) are necessary to prevent upstream escape

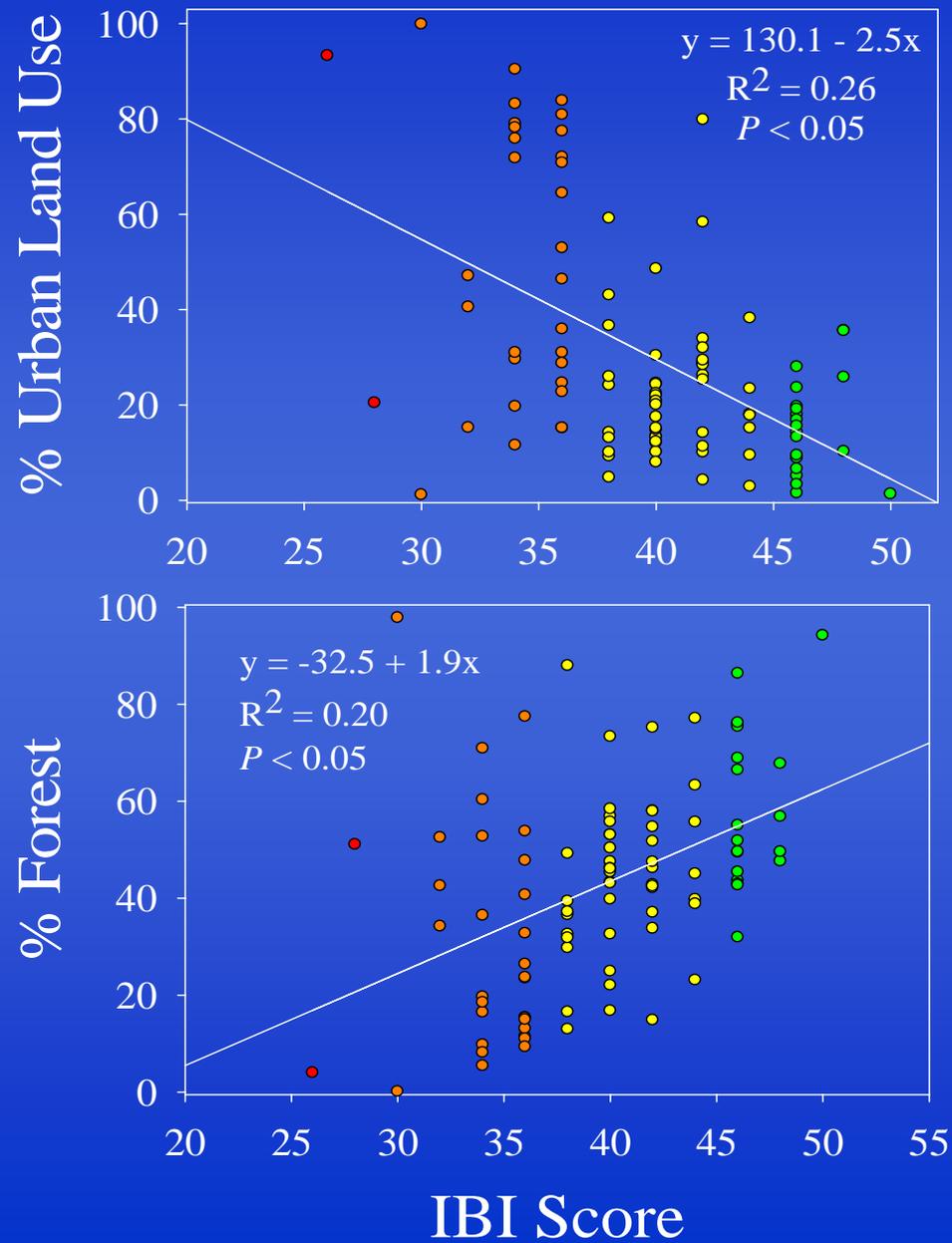
Round 1 (2000-2004) Results

Fish IBI Ratings

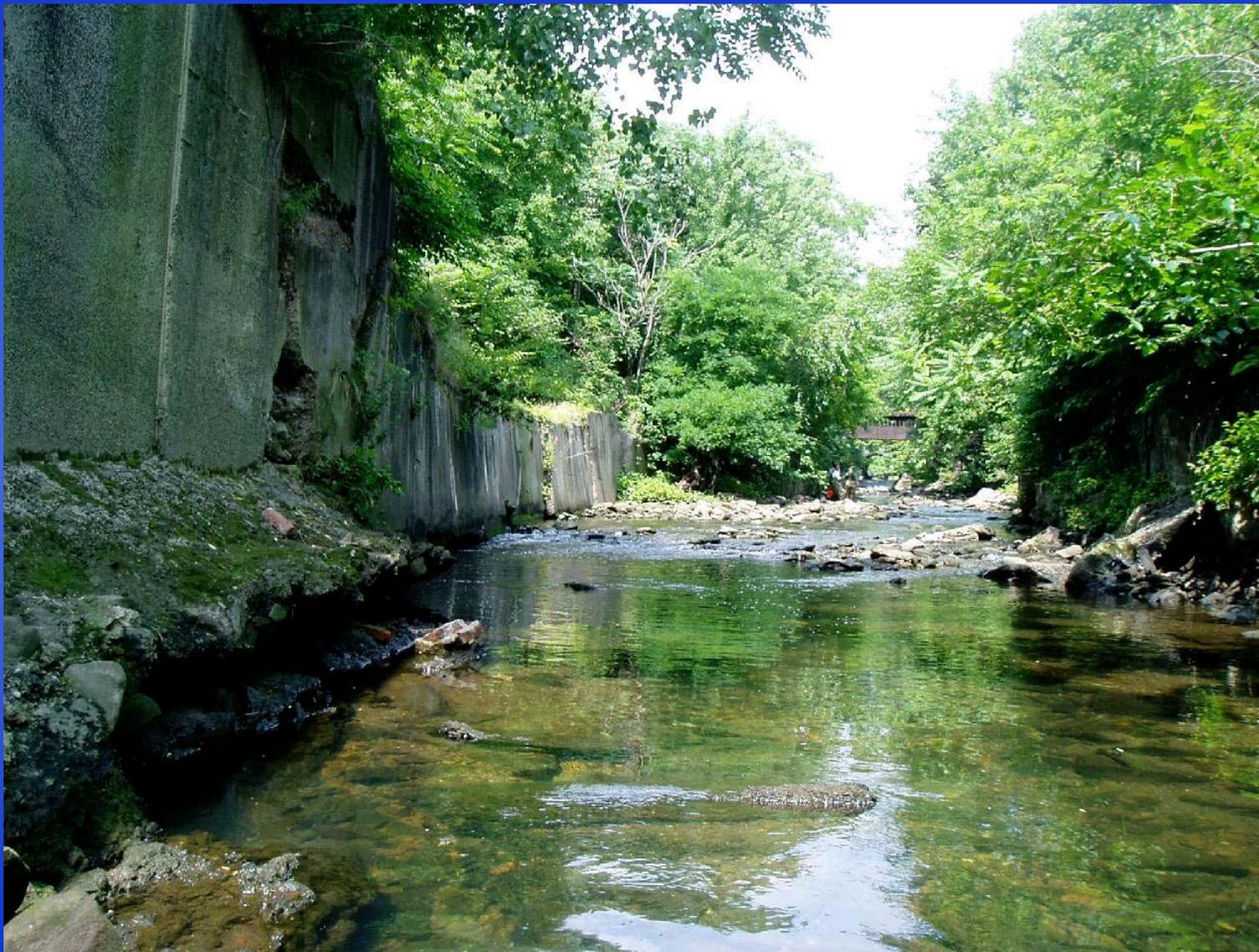
N = 100



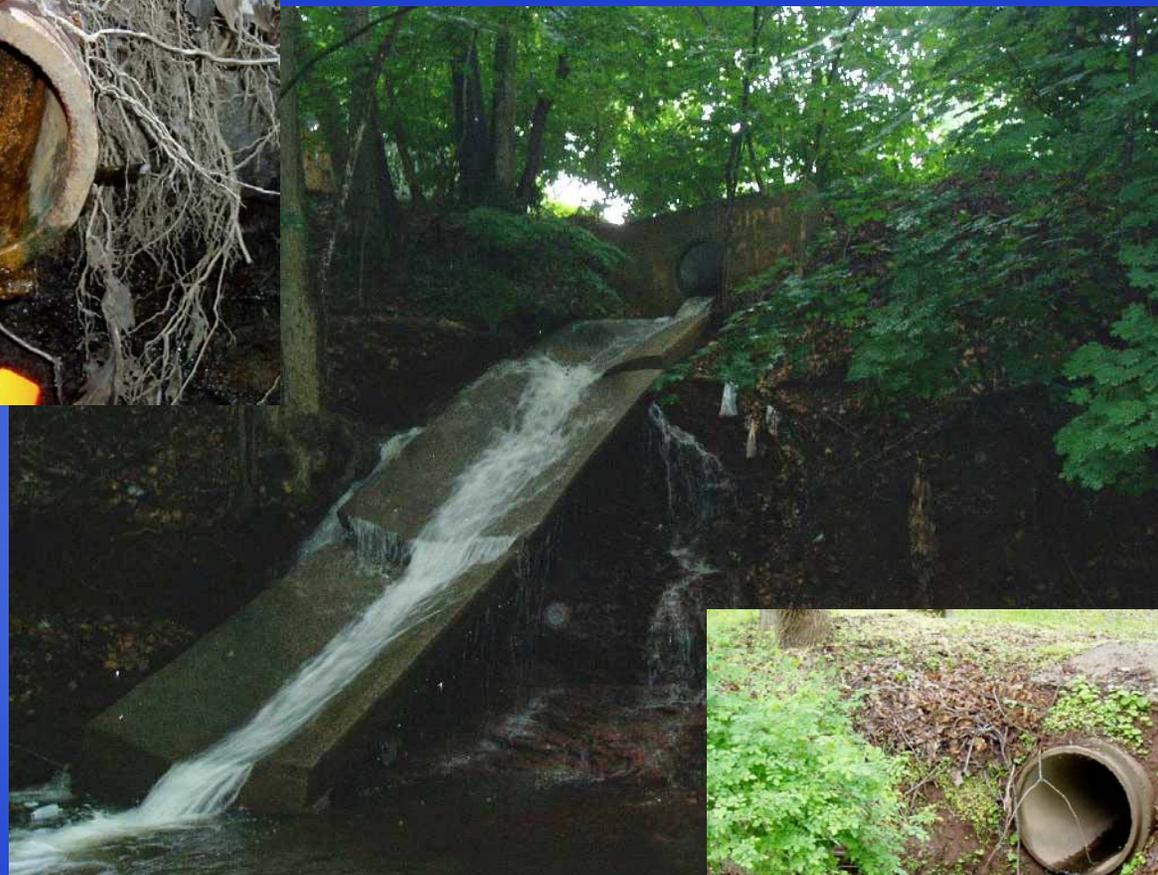
Land Use/Land Cover



Common Urban Impacts



Outfalls



Bank Erosion



Siltation



Habitat Degradation



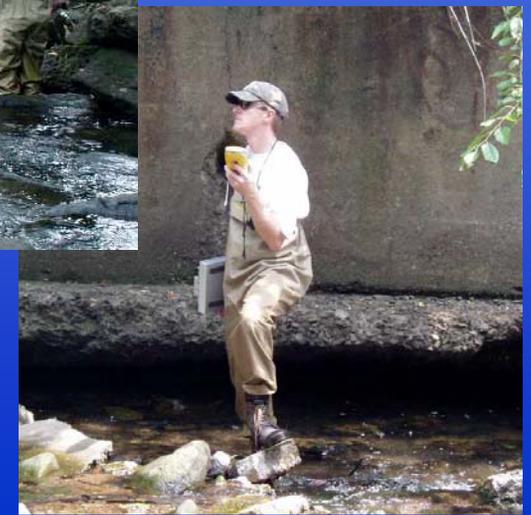
Poor Water Quality



Tools to Evaluate Potential Impacts



Comprehensive Habitat Surveys



GIS



Integration of GIS & Field Observations



Data

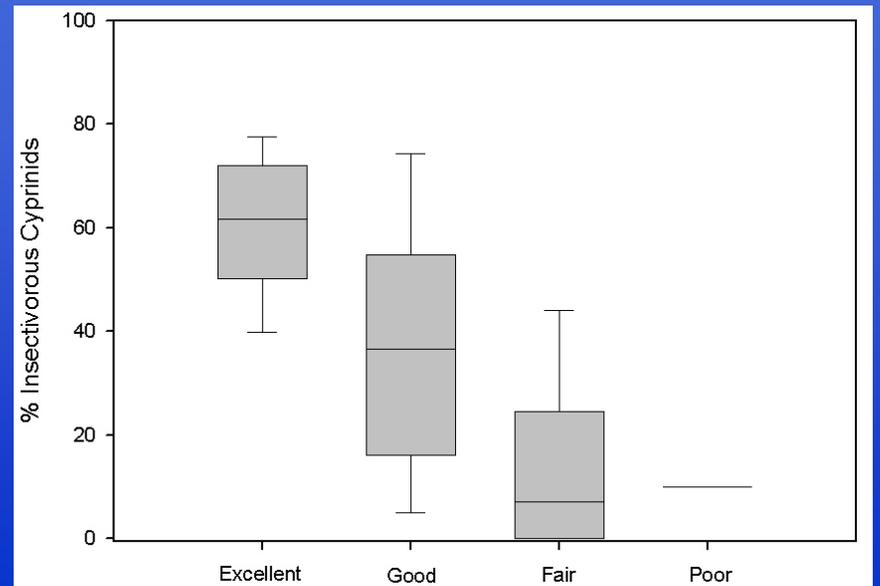
FIBI059 - Pascack River @ Emerson Rd
Date Sampled - 7/30/2003

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, rock chub, banded kill fish, goldfish, largemouth bass, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	36

Stream Rating

45-50 **Excellent**
 37-44 **Good**
 29-36 **Fair**
 10-28 **Poor**



Urban Sites



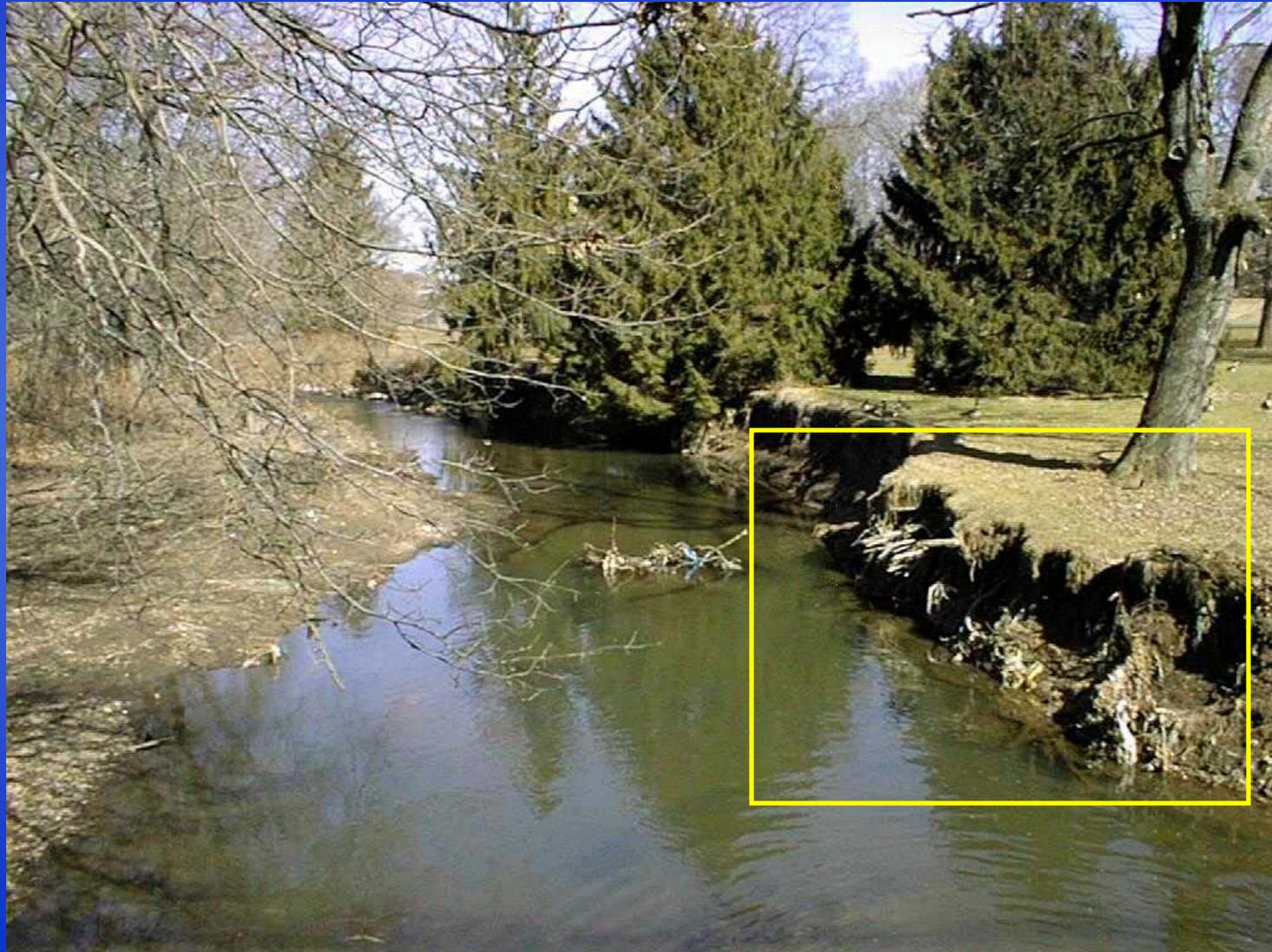
- 18 of the network sites are urban
- 3 new urban sites were added in 2005
- Problems associated with sampling urban streams
 1. Poor access
 2. Lack necessary stream habitat
 3. Non-wadeable

The Future of Fish IBI



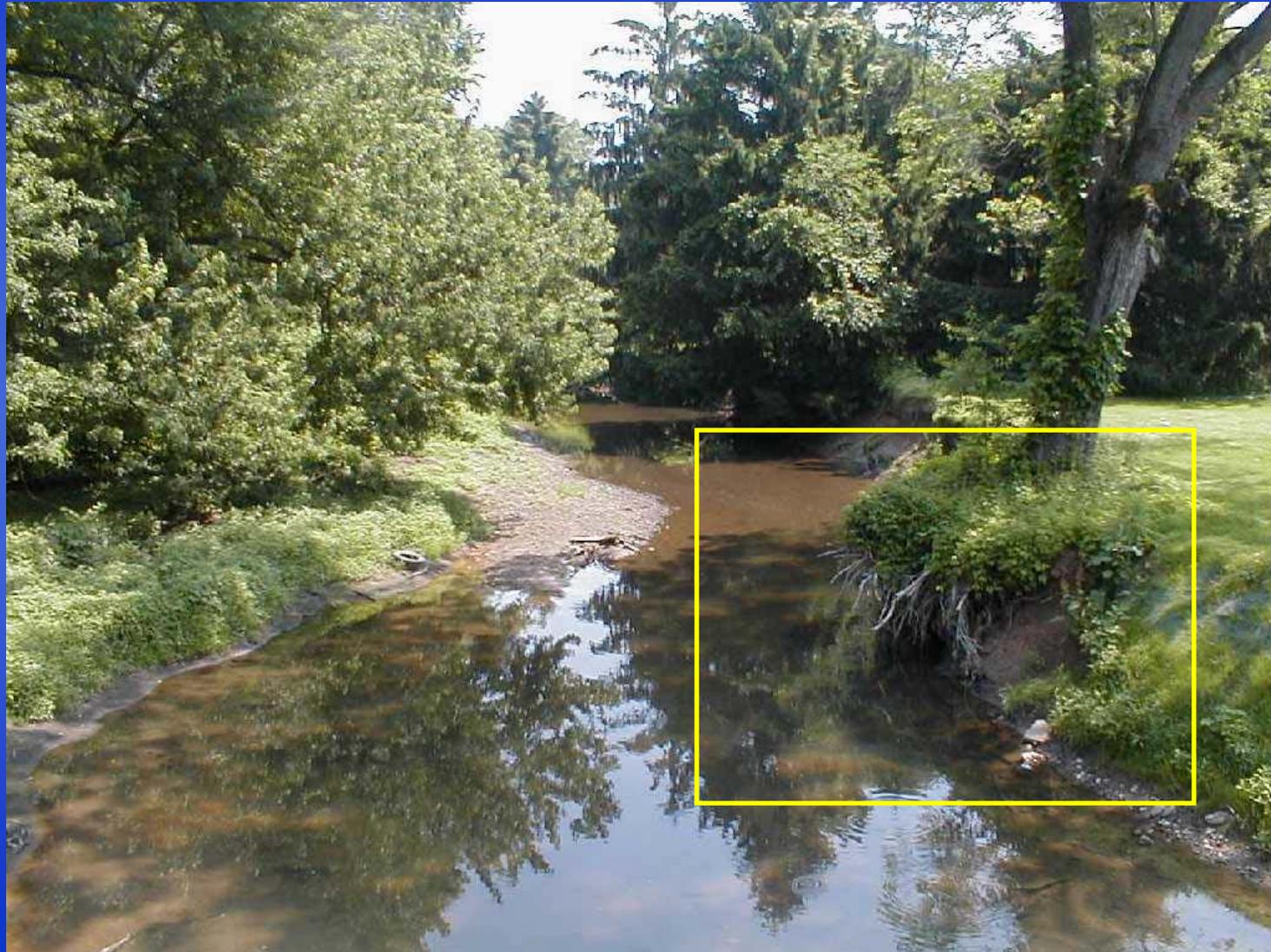
- Add new urban sites
- Recalibrate metrics
- Evaluate appropriateness of metrics
- Monitor trends at individual sites over time

Green Brook 1999



Green Brook

2004



Green Brook 2005

