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of Engineers  
Pittsburgh District

**Mahoning River, Ohio  
Environmental Dredging Project  
Feasibility Study**



# BIOLOGICAL INDICES

## 2003 SAMPLING PRELIMINARY RESULTS

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Biologist  
U.S. Army Corps of Engineers**



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# Mahoning River, Ohio Environmental Dredging Project Feasibility Study



- **Feasibility Study**
  - **Biological and Physical Indices developed by the OEPA will be used to evaluate current and future conditions of Mahoning River**



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- **Biological Indices**
  - **Fish**
    - Index of Biotic Integrity (IBI)
    - Modified Index of Well-Being (MIwb)
  - **Insects/Macroinvertebrates**
    - Invertebrate Community Index (ICI)
- **Physical Habitat Index**
  - **Qualitative Habitat Evaluation Index (QHEI)**



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## Biological Indices

- **Fish**
  - IBI – measures fish species diversity and species populations - score ranges from 12 to 60
  - MIwb – calculation of fish mass and density - score ranges from 0 to 12
- **Macroinvertebrates**
  - ICI – based on measurements of the macroinvertebrate communities living in a stream or river - score ranges from 0 to 60



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## Physical Habitat Index

- QHEI – measures physical features of the area that affect fish and invertebrate communities - score ranges from 0 to 100



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## Two previous OEPA studies on Mahoning River

- **Sampled and calculated IBI, MIwb, ICI, and QHEI**
  - **OEPA 1996 Mahoning River Water Quality Study (1994 sampling)**
    - Over 40 locations from RM 46.1 to RM 12
  - **OEPA 2002 Water Quality Study near CASTLO Property**
    - 3 locations near RM 15



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# **Mahoning River, Ohio Environmental Dredging Project Feasibility Study**

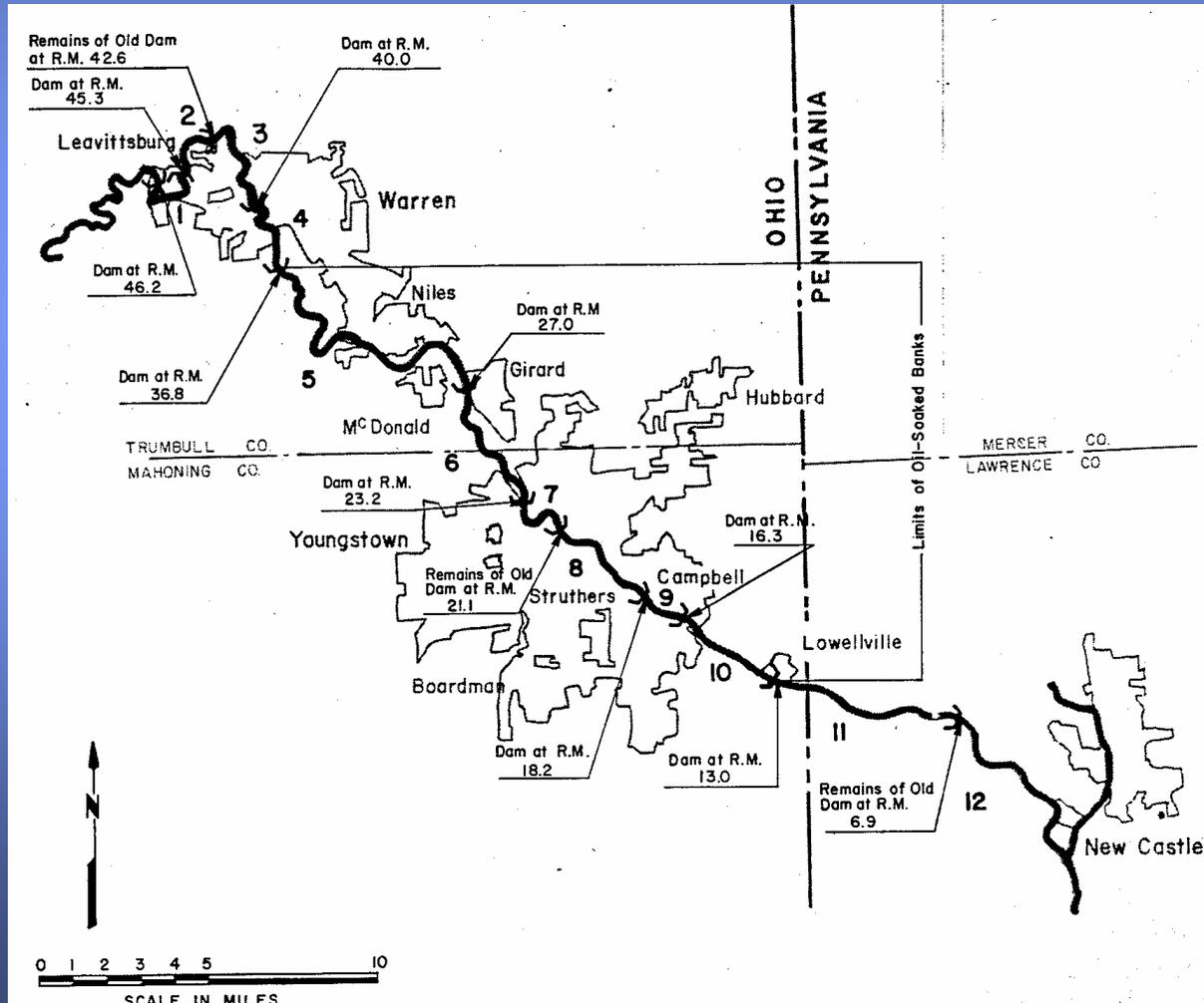


- **2003 Biological Sampling**
- **6 locations**
  - **Chosen to match 6 locations sampled by OEPA in 1994**
  - **Reflect current health of River**
  - **Monitor positive or negative changes in biological communities and physical habitat since 1994 study**



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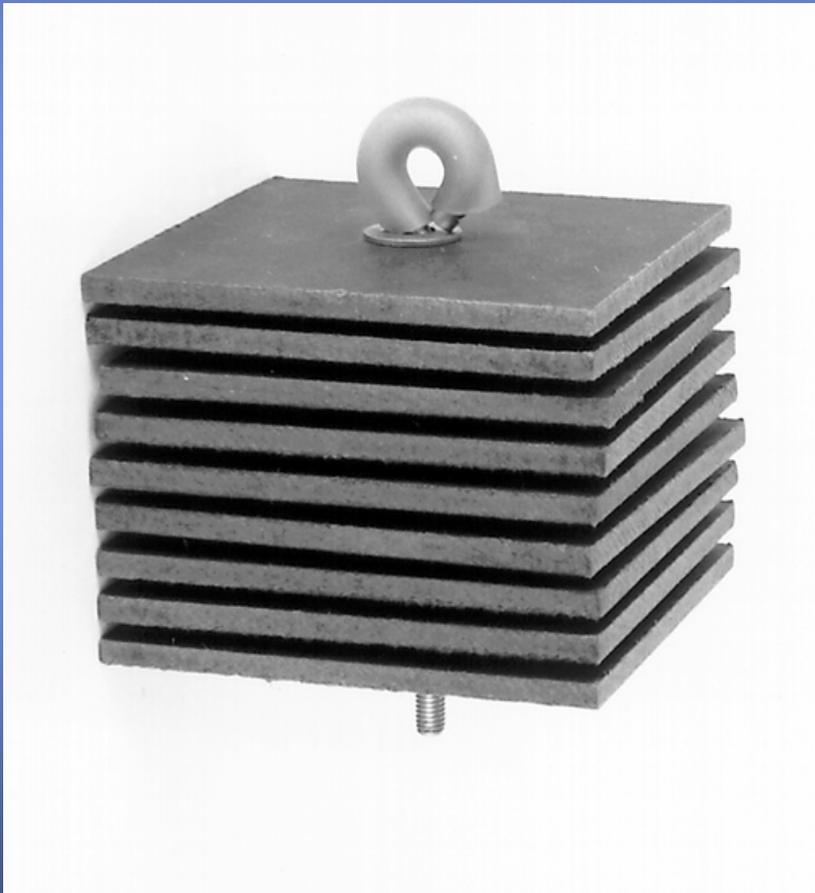
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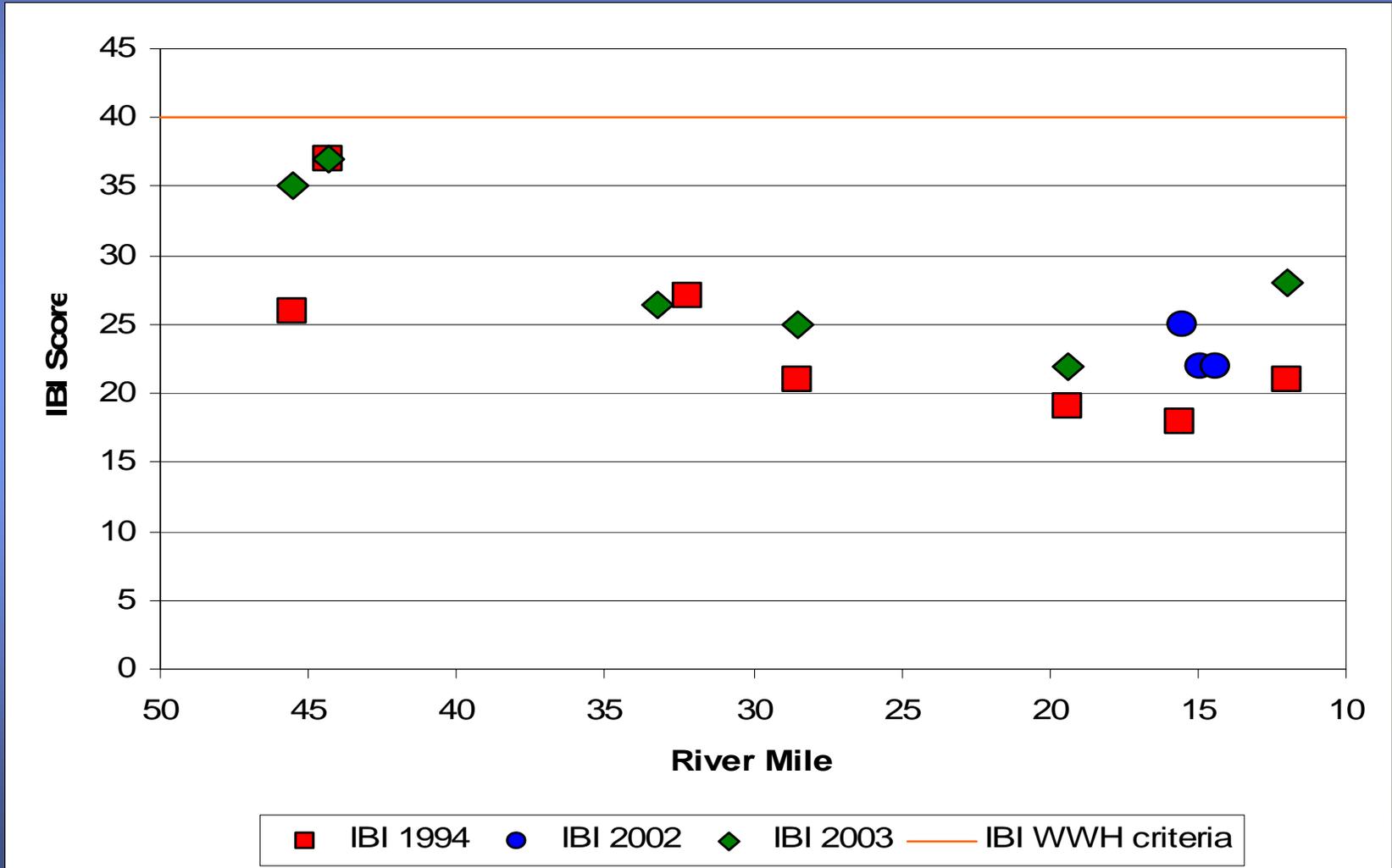


## RESULTS



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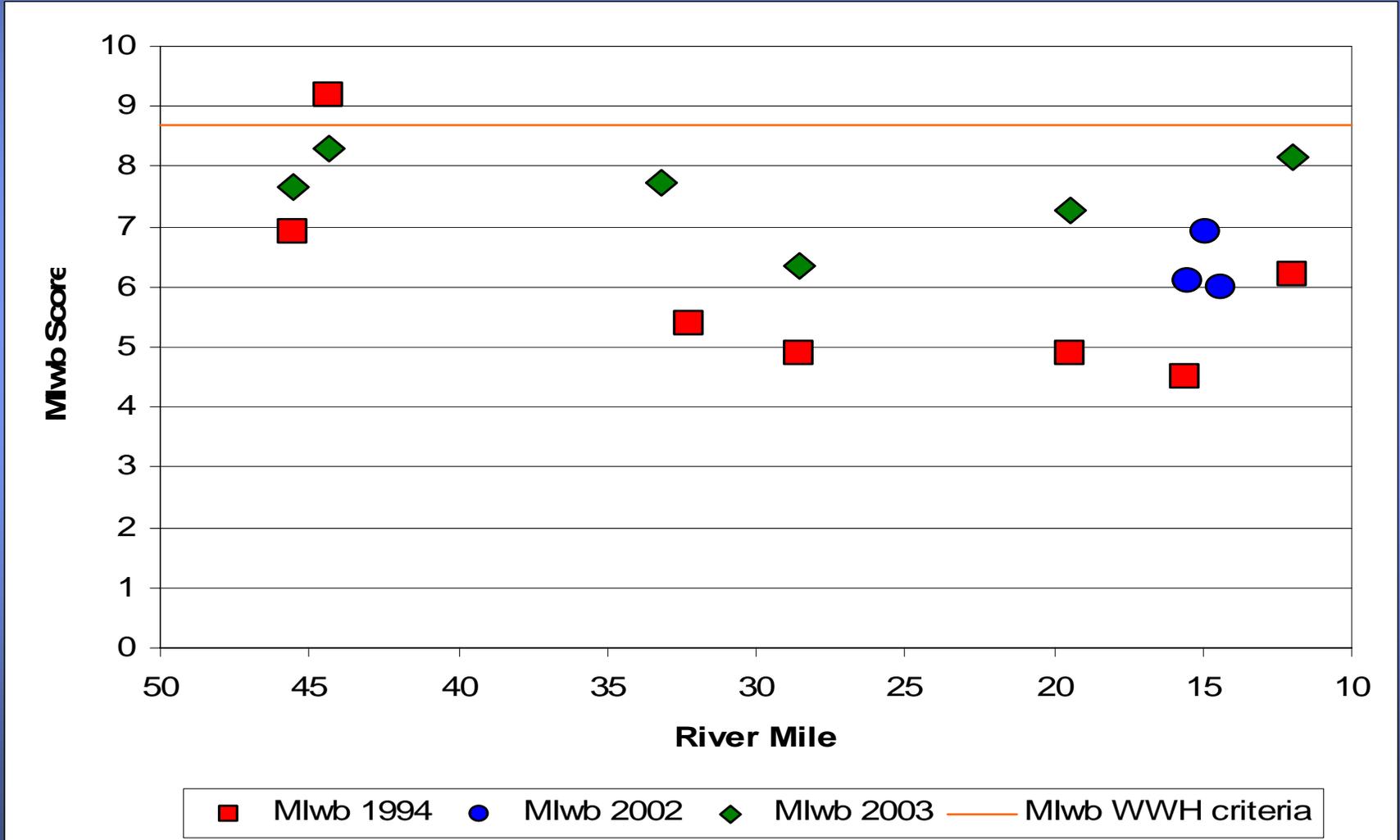
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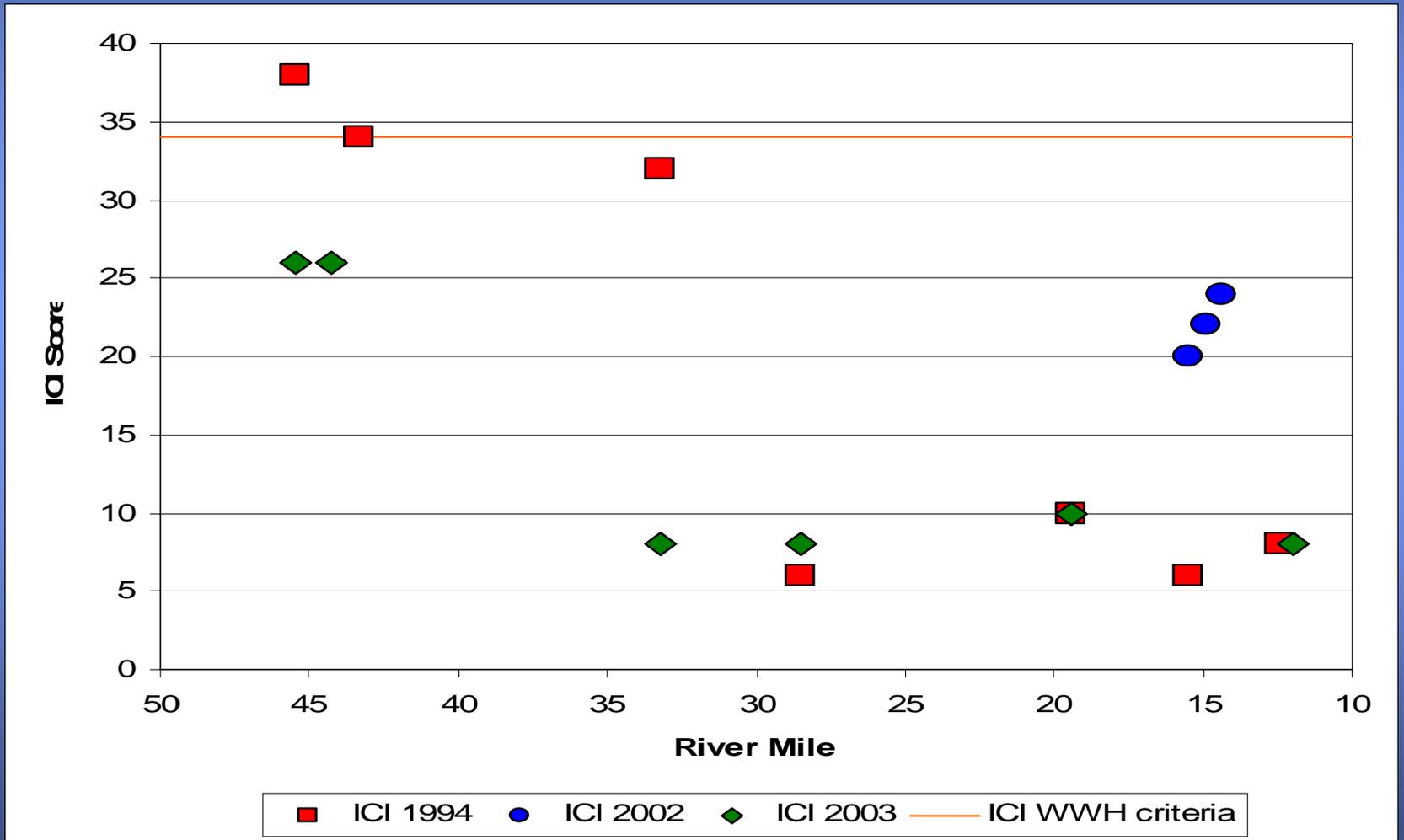


- **IBI and MIwb**
  - 2002 and 2003 scores slightly higher than 1994 scores
  - All 2002 & 2003 scores below WWH criteria



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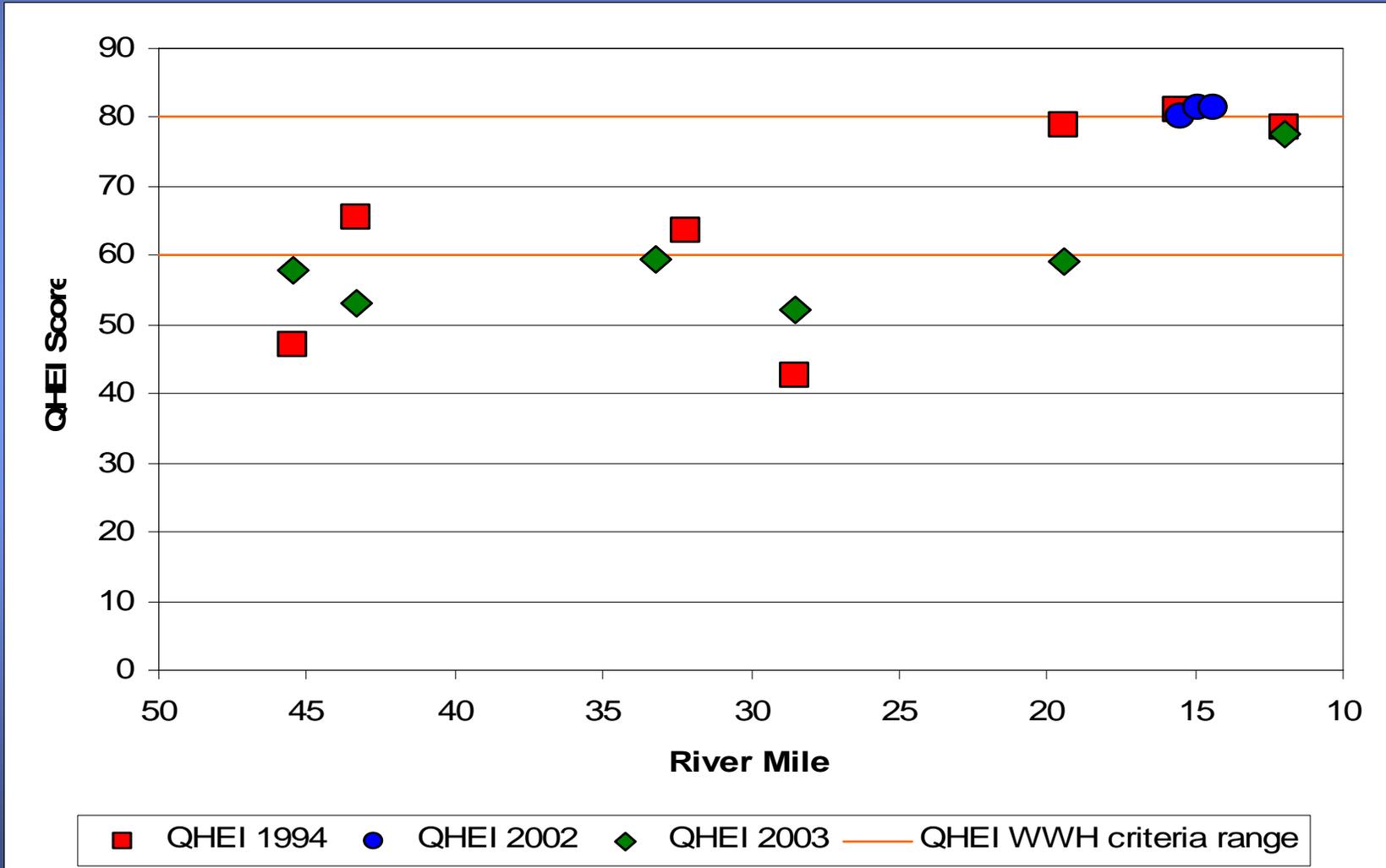


- **ICI**
  - 2003 lower or similar to 1994 scores
  - 2002 scores higher than 1994 score
  - All 2002 & 2003 scores below WWH criteria
  - 2003 Kick net sampling affected by high flows, scouring



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- **QHEI**
  - Scores in 1994 similar to those in 2002 & 2003
    - 2003 RM19.4 – riffles were present in 1994, not present now – lower score
  - Most scores were within WWH criteria range
  - Physical habitat is good on Mahoning River



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# Mahoning River, Ohio Environmental Dredging Project Feasibility Study



- **Conclusions**
  - **Biological Communities changed very little between 1994 and 2003**
  - **Fish and macroinvertebrates are not recovering**
  - **Physical Habitat still good in and along Mahoning River**