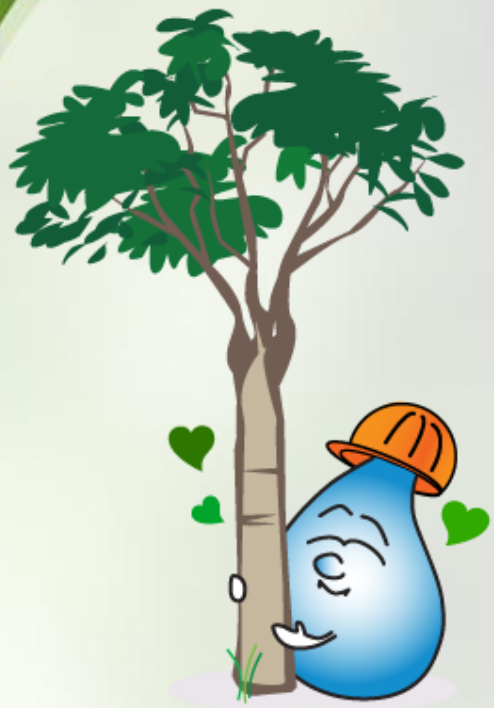
History of NEORSD Water Quality Monitoring in Big Creek



John W. Rhoades
Northeast Ohio Regional Sewer District
September 27, 2012

John Rhoades, NEORSD

- 21 Years with NEORSD, Currently Supervisor of Environmental Assessment
- Supervises Investigators in Water Quality Monitoring of Area Surface Waters Through Biological, Habitat and Water Chemistry Assessments
- Evaluates Ecological and Toxicological Effects of Treatment Plant Effluents on Receiving Waters Relative to Discharge Permits
- Evaluates Surface Water Quality as Relating to Point and Non-Point Discharges
- Develops Procedures To Implement District Water Quality Programs
- OEPA Certified as Level 4 Qualified Data Collector in Fish Community, Benthic Macroinvertebrate, Stream Habitat and Water Chemistry Assessments
- Licensed OEPA Class III Wastewater Operator

Who are we?

- Independent political subdivision of the state, created by court order in 1972
- Serves all or part of 62 communities
- Approximately 650 employees
- Five locations: EMSC, GJM, Easterly, Westerly, Southerly

Northeast Ohio Regional Sewer District

Protecting Your Health and Environment

Water Chemistry Sampling

- Field Parameters
  - Temp, conductivity, pH, DO, turbidity
- Lab Analysis Parameters
  - solids, nutrients (N,P), metals, BOD, COD, alkalinity, chloride, sulfate, E. coli

Qualitative Habitat Evaluation Index

- Evaluates in-stream habitat
- Fish-focused components
  - Substrate
  - In-stream cover
  - Channel morphology
  - Bank erosion/Riparian zone
  - Pool/glide and riffle/run
  - Gradient and drainage area

Fish Community Assessment

- Electrofishing with pulsed DC current
- Longline method
- Index of Biotic Integrity (IBI)
- Modified Index of Well-Being (MIwb)

Benthic Macroinvertebrates

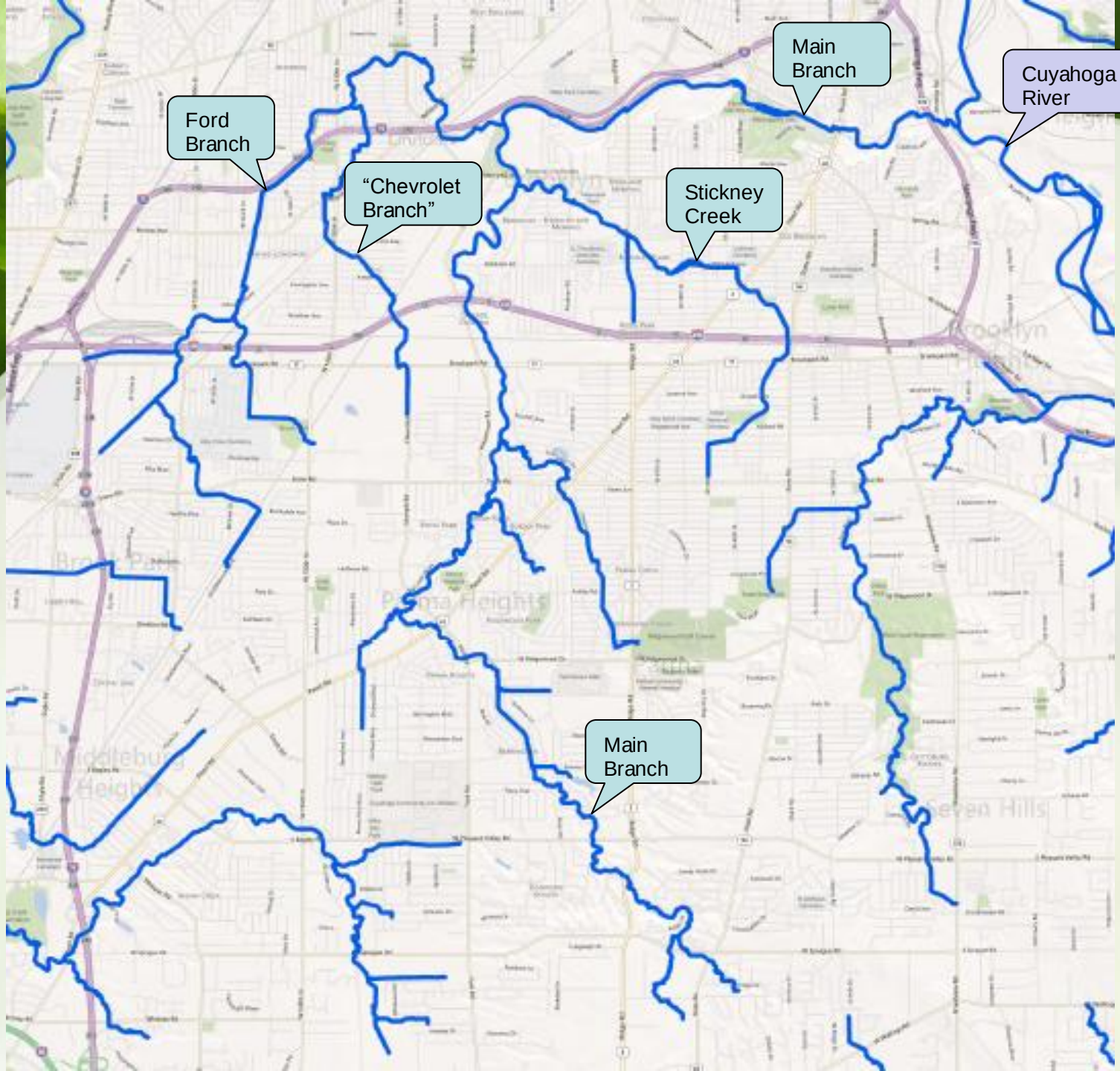
- Modified Hester-Dendy sampler in stream for 6 weeks
- Qual sampling with D-frame dip-net
- Invertebrate Community Index (ICI)

Big Creek

- Tributary to the Cuyahoga River
- Confluence of Ford Branch and Main Branch in Brooklyn near Tiedeman Road
- Drains over 37 square miles of southwestern Cleveland and its suburbs

Big Creek

- Main Branch culverted under Cleveland Metroparks Zoo, and Ford Branch culverted between West 117th and Puritas
- "Chevrolet Branch" is tributary to Ford Branch
- Stickney Creek is tributary to Main Branch upstream of Ford Branch confluence


Main Branch
Cuyahoga River
Ford Branch
“Chevrolet Branch”
Stickney Creek
Main Branch

Big Creek

- Main Branch is designated Warmwater Habitat and State Resource Water (in Metroparks), and Primary Contact Recreation
- Ford Branch is Limited Resource Water and Secondary Contact Recreation
- Ford Branch and Main Branch downstream of confluence historically more polluted

History of NEORSD Monitoring in Big Creek

Yearly monitoring since 1985

- 1985
  - Creek walk and water chemistry sampling to pinpoint pollution sources
- 1986
  - Dry weather monthly water chemistry monitoring of Main and Ford Branch
- 1987
  - Water chemistry, bacteria, and qualitative benthic macroinvertebrate sampling began in 1987 with six sites
  - Known as Sites #25, 26, 27, 28, 29, and 30

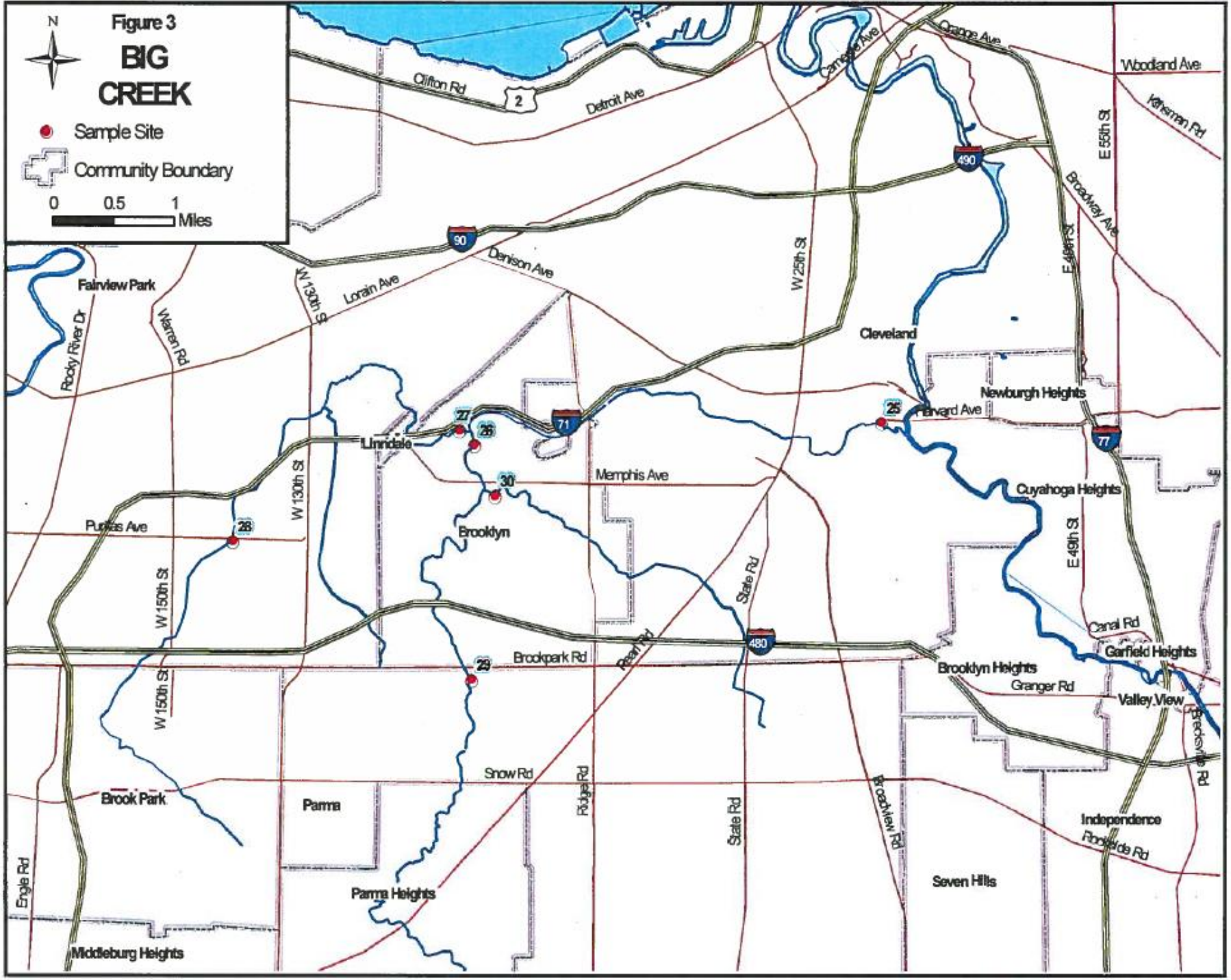


Figure 3
BIG CREEK
Sample Site
Community Boundary
0 0.5 1
Miles
N
Clifton Rd
Detroit Ave
Carnegie Ave
Orange Ave
Woodland Ave
Kinsman Rd
E 55th St
Broadway Ave
E 49th St
W 25th St
Denison Ave
Lorain Ave
W 130th St
Fairview Park
Rocky River Dr
Warren Rd
Cleveland
Newburgh Heights
Harvard Ave
Linndale
Memphis Ave
Cuyahoga Heights
Brooklyn
Pumas Ave
W 130th St
W 150th St
State Rd
Canal Rd
Garfield Heights
Brookpark Rd
Pearl Rd
Brooklyn Heights
Granger Rd
Valley View
Snow Rd
Ridge Rd
Broadview Rd
Brecksville Rd
Brook Park
Parma
Independence
Rockside Rd
Seven Hills
Parma Heights
Engle Rd
Middleburg Heights
90
71
77
480
490
2
25
26
27
28
29
30

History of NEORSD Monitoring in Big Creek

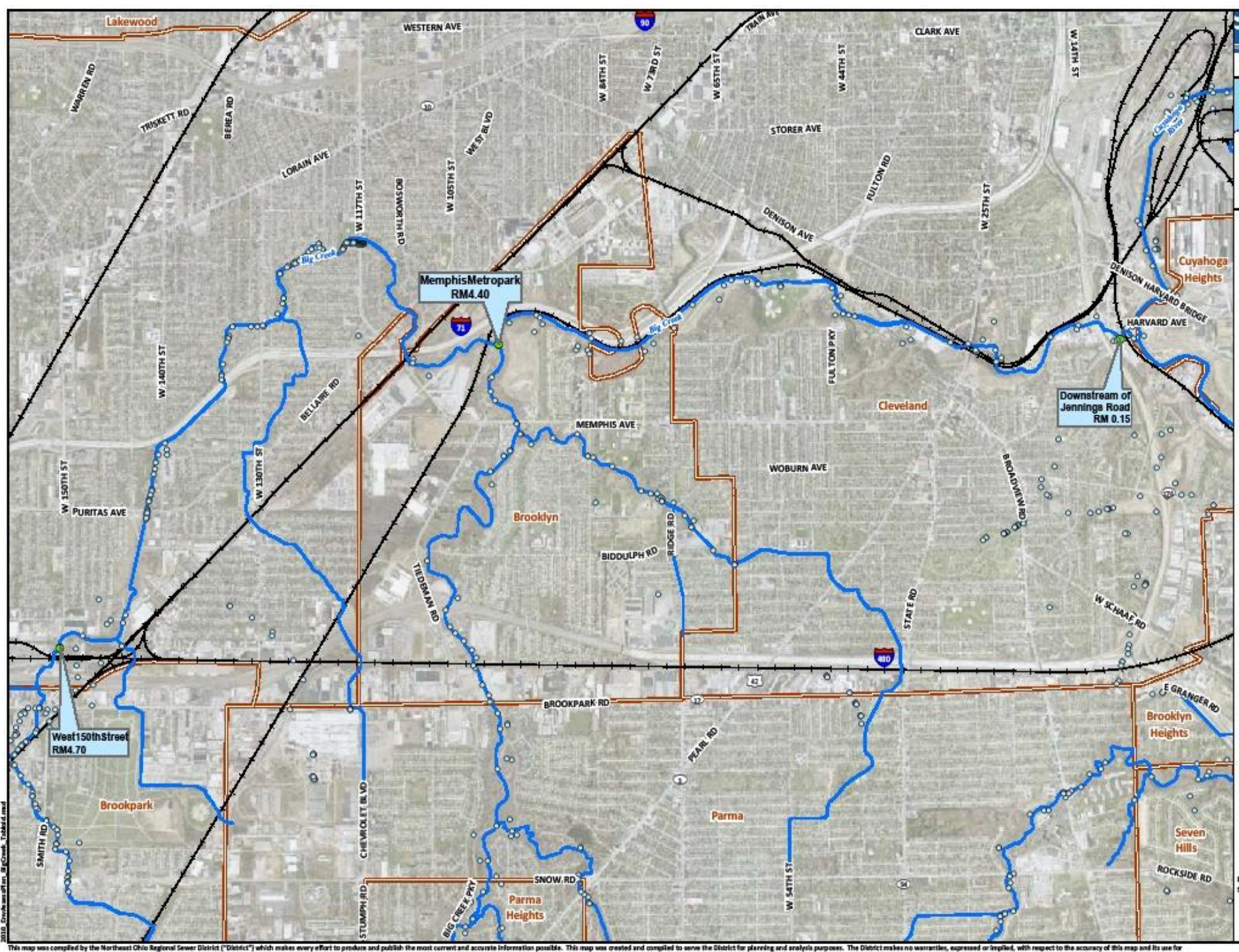
- 1991
  - Semi-qualitative (HBI) benthic macro sampling added
  - QHEIs first conducted
- 1993
  - *E. coli* sampling added (previously sampled for fecal coliform)
- 1995
  - First recorded data for quantitative benthic macro-invertebrate sampling (ICI) in Big Creek

History of NEORSD Monitoring in Big Creek

- 1997
  - NPDES CSO Permit-required monitoring at RM 0.15 (Site #25) for water chemistry and benthic macroinvertebrates added
- 1999
  - Fish electrofishing surveys conducted utilizing IBI and MIwb
  - Expanded list of benthic macro metrics, including the Qualitative Community Tolerance Value (QCTV)
- 1999-2001
  - Benthic macroinvertebrate monitoring only completed for RM 0.15, no longer at six original sites

History of NEORSD Monitoring in Big Creek

- 2002
  - QHEIs and macro sampling conducted at seven sites on Chevy Branch following a stream habitat restoration project
- 2002 - 2006
  - Water chemistry and macro sampling conducted at three sites to evaluate impact of NEORSD CSOs
  - 1987-2004 – water chemistry monitoring conducted at the six original sites



History of NEORSD Monitoring in Big Creek

- 2007
  - Yearly electrofishing and QHEIs added back in
  - Sampling from 2007 onward now includes water chemistry, QHEI, electrofishing, and benthic macros (HD and qual)
- 2010
  - Chlorophyll *a* sampling conducted
- 2011
  - RM 4.70 on the Ford Branch no longer sampled
- 2012
  - RM 4.40 on the Main Branch no longer sampled; only RM 0.15 on Main Branch sampled

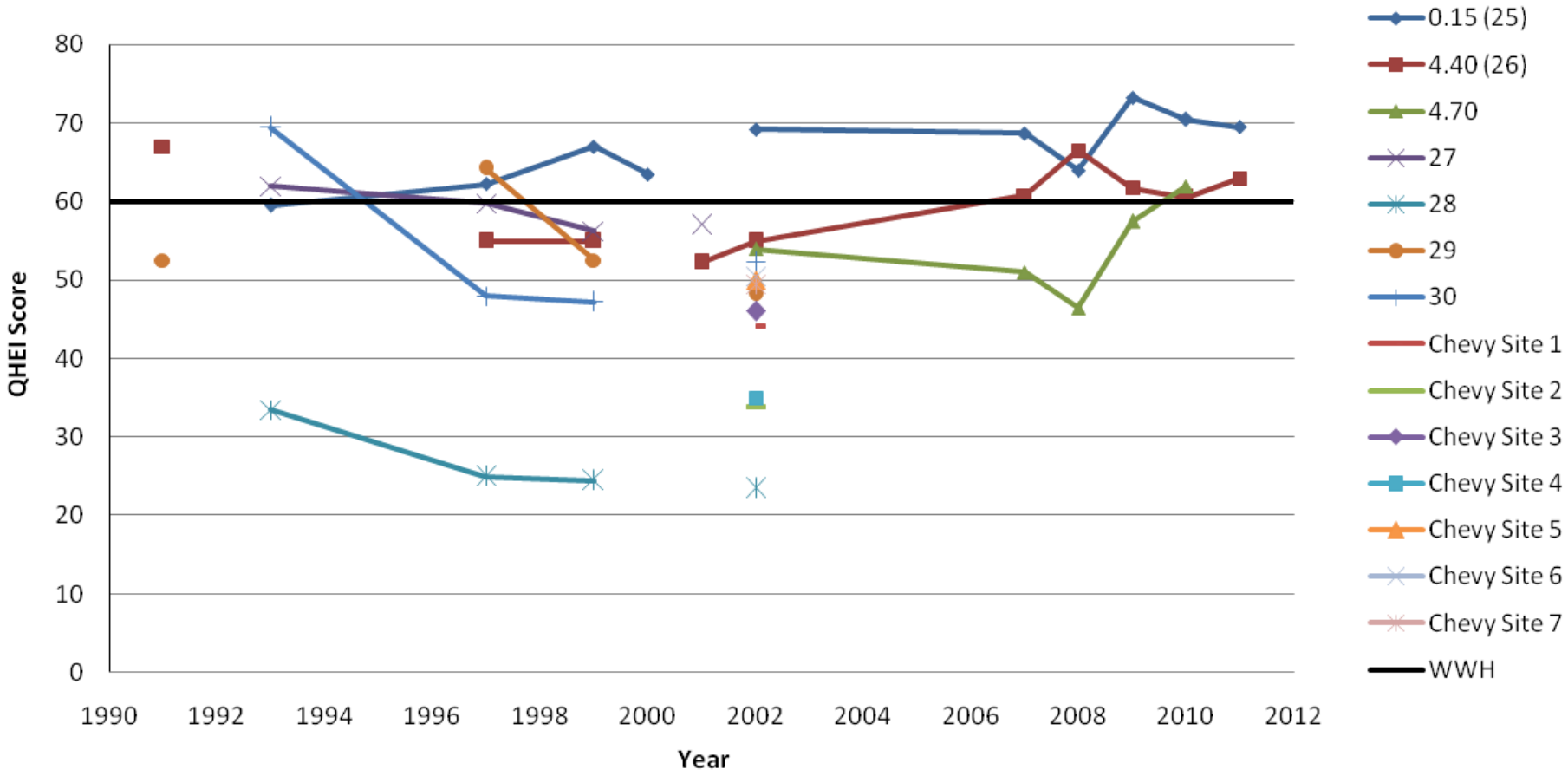
Water Chemistry

- Historical bacteriological contamination
  - Sources included sewer overflows and breaks, improper connections, planned interceptor diversions for repairs
  - Localized improvement from source elimination
  - Gross sanitary pollution of the 1980's greatly diminished
  - Bacteriological contamination continues

- Other occasional exceedences relate to metals such as mercury, iron, copper, zinc, cadmium, and low dissolved oxygen

Historical Big Creek QHEI Scores

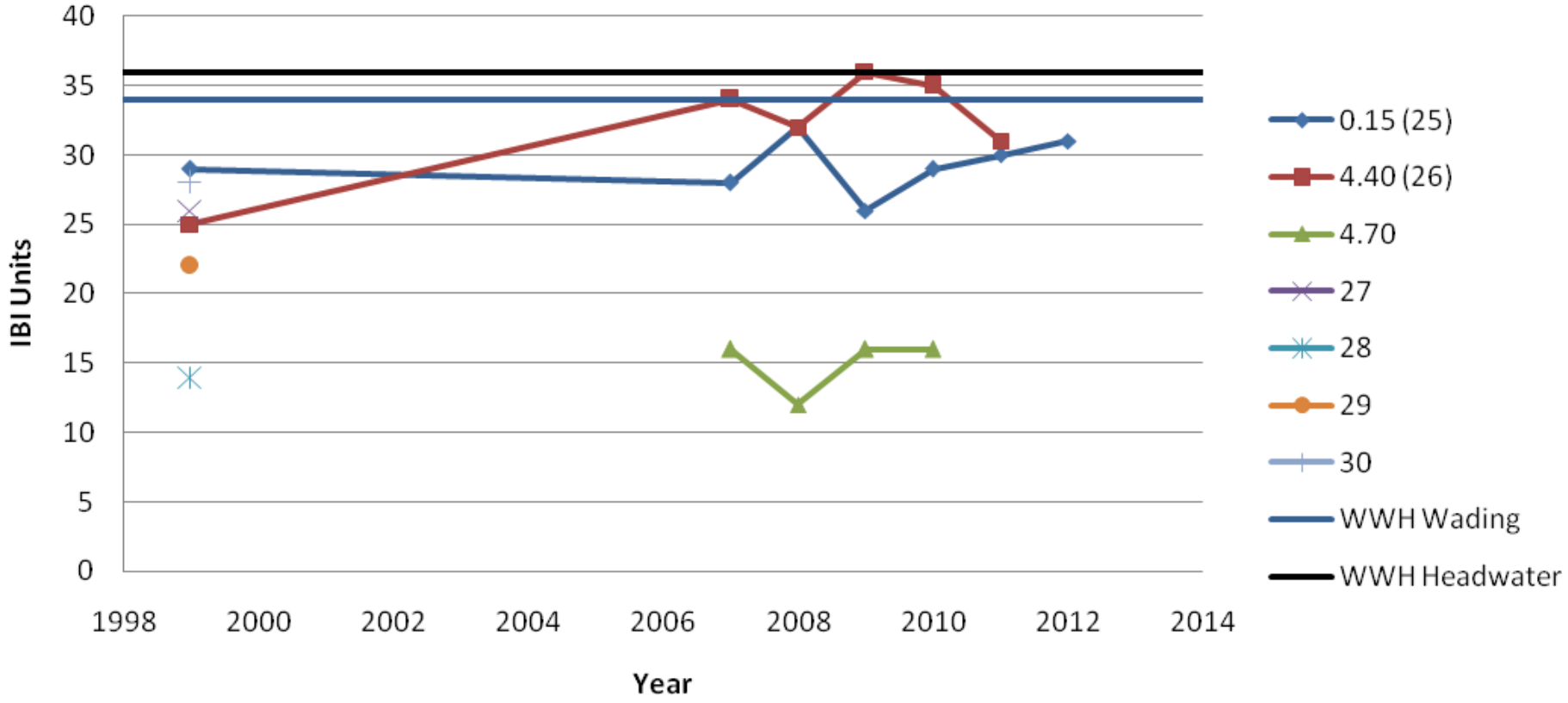
1991-Present



Warmwater Habitat Target Score is 60

Historical Big Creek IBI Scores

1999, 2007-Present

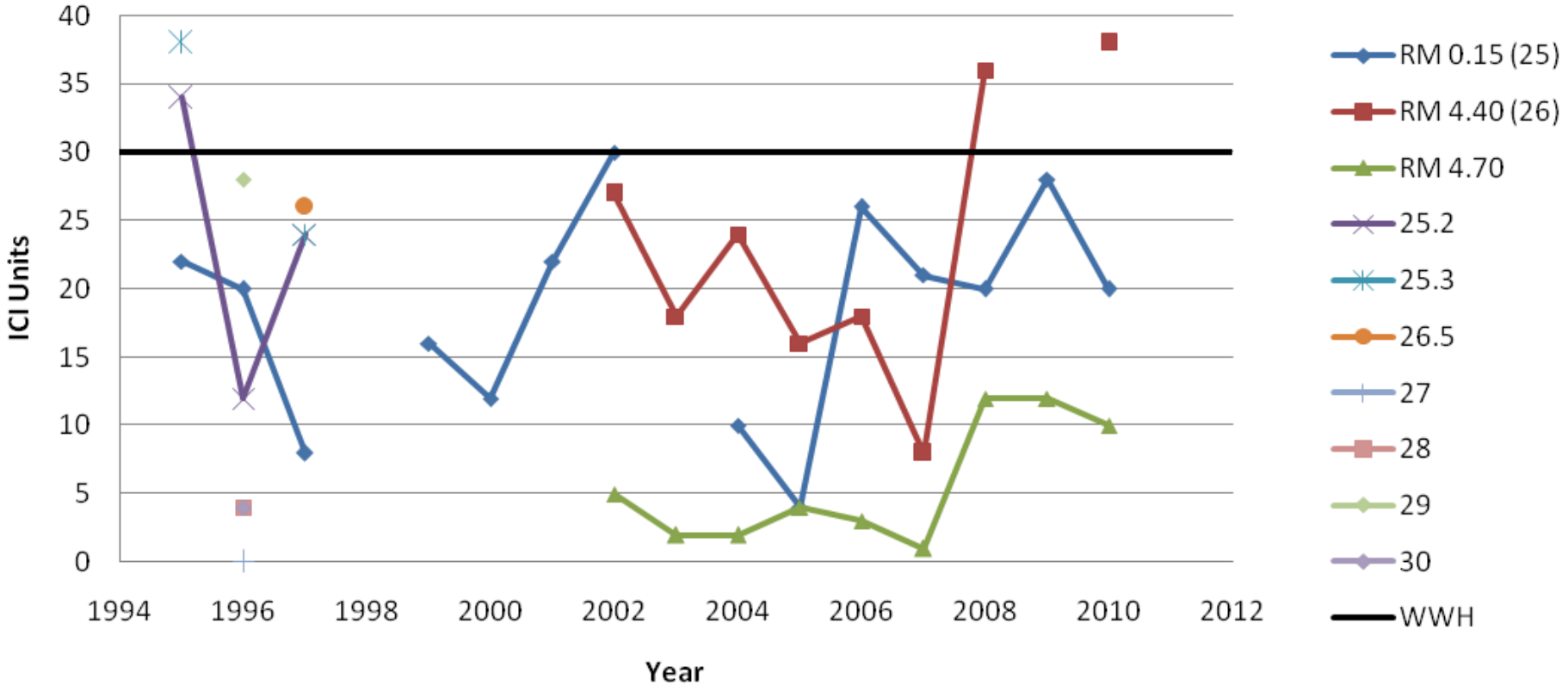


Bigmouth shiner
(*Notropis dorsalis*)

RM 0.15 – an IBI score of 34 indicates non-significant departure (i.e. attainment) of EOLP WWH Wading Biocriterion of 38 IBI Units
RM 4.40 (Site 26), Site 29, Site 30– an IBI score of 36 indicates non-significant departure (i.e. attainment) of EOLP WWH Headwater Biocriterion of 40 IBI Units
RM 4.70, Site27, Site 28 – No applicable biocriterion for LRW

Historical Big Creek ICI Scores

1995-Present



RM 0.15 and RM 4.40 – an ICI score of 30 indicates non-significant departure (i.e. attainment) of EOLP WWH Biocriterion of 34 ICI Units
RM 4.70 – No applicable biocriterion

Questions?