

# Stream Reference Conditions and Biological Assessments

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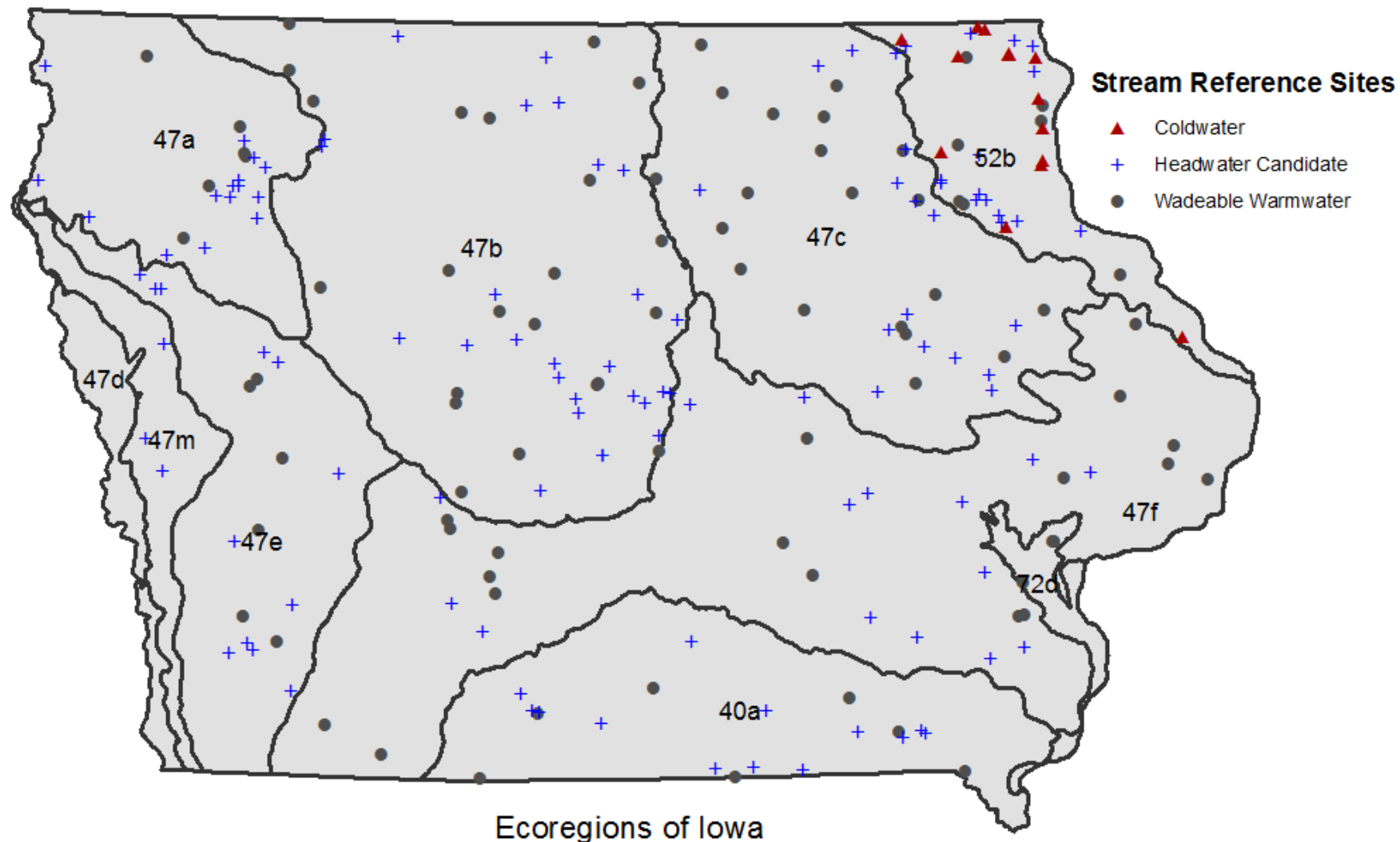
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# Stream Reference Conditions and Biological Assessments

- Reference Conditions
  - Wadeable Warmwater
  - Coldwater
  - Headwater
  - Large Wadeable / Nonwadeable River
- Recent Projects
  - Nutrient Criteria
  - Stressor ID
  - Biological Impairment and Fish Kill Follow-up
- Databases
  - Biological Monitoring and Assessment (BioNet)
  - Water Quality Assessment (ADBNet)



40(a) - Central Irregular Plains (Loess Flats and Till Plains); 47(a) - Western Corn Belt Plains (Northwest Iowa Loess Plains);  
 47(b) - Western Corn Belt Plains (Des Moines Lobe); 47(c) - Western Corn Belt Plains (Iowan Surface);  
 47(d) - Western Corn Belt Plains (Missouri Alluvial Plain); 47(e) - Western Corn Belt Plains (Steeply Rolling Loess Prairies);  
 47(f) - Western Corn Belt Plains (Rolling Loess Prairies); 47(m) - Western Corn Belt Plains (Western Loess Hills)  
 52(b) - Driftless Area (Paleozoic Plateau); 72(d) - Central Interior Lowland (Upper Mississippi Alluvial Plain)

# Wadeable Warmwater Stream Reference Condition

- Initial site selection and sampling began in 1994
- Sites chosen based on watershed/landform characteristics
- ~ 104 WW wadeable reference and candidate reference sites
- Sites are located in 8/10 IA ecoregions – (no 47d/47m)
- Sites now sampled 2X in 5 years based on assessment methodology
- Data used to develop Biological Impairment Criteria (BICs) for each ecoregion
- WW wadeable BICs are used to assess all WW streams in IA – type of assessment depends on resource

# Coldwater Stream Reference Condition

- Initial site selection and sampling began in 1994
- CW reference site list finalized during CBI development (2012)
- CW reference sites selected based on watershed/landform characteristics
- 16 CW reference & CRS in IA – all in 52b ecoregion
- State Hygienic Laboratory (SHL) and IDNR developed a Coldwater Benthic Index (CBI) in 2012
- CBI is a 9 metric IBI that uses multi/single habitat samples
- CW reference sites are sampled 2X in a 5 year period
- CW sampling data used to develop the CBI BIC
- CBI BIC is used to evaluate and assess all CW streams in IA

# Headwater Stream Reference Condition

- Sampled sporadically since 1994 – most samplings occurring in national sampling projects
- HW stream reference condition pilot project started in 2007 using 47b sites
- Program was expanded statewide in recent years
- HW CRS chosen using GIS based on watershed characteristics (HTI)
- ~130 HW CRS (some crossover with small WW Wadeable reference and CRS)
- Sites located in 8/10 IA ecoregions (no 47d/72d)
- All HW CRS have one RBP sample collected
- By end of 2015, all HW CRS will have at least one full bio sample collected

## Large Wadeable / Nonwadeable River Reference Condition

- Very early in the Large Wadeable / Nonwadeable River reference condition development
- No CRS chosen due to accumulation of human disturbances
- Stressor gradient reference condition approach considered
- BM and fish data collected in recent years but going forward with BM development only
- The last several years we have collected BM samples from all of our ambient stream sites (~70 sites)
- Most often floating artificial substrates are used
- Included midge (Chironomidae) in the BM analysis for inclusion in an IBI
- Most difficult resource to develop/assign reference condition in Iowa

# Reference Site Selection

## Core Factors

(Biocriteria Workgroup 2000; Huggins and Dzialowski, 2005)

- Wastewater treatment plants and other point sources
- Animal feeding/grazing operations
- Instream habitat
- Riparian habitat
- Land use and land cover – broad scale
- Land use and land cover – site-specific
- Physical and chemical parameters
- Altered hydrologic regime
- Biological metrics (secondary / confirmatory)
- Biotic assemblages (secondary / confirmatory)
- Representativeness



# Biological Assessment – Recent Projects

- Nutrient Criteria Development
  - 2010-
  - Phase 1 draft criteria recommendations for wadeable streams
  - Ongoing monitoring and data analysis
- Stressor Identification
  - 2001-2014 watershed SI studies
  - Recent budget cuts and program re-direction
- Biological Impairment / Fish Kill Follow-up
  - 2011-
  - Update biological assessments of stream aquatic life impairments
    - Low Biotic Integrity
    - Fish kill

# Databases

- Biological Monitoring and Assessment (BioNet)

<https://programs.iowadnr.gov/bionet/>

- Benthic macroinvertebrate, fish, physical habitat
- Search by map, site & sample attributes
- IBI calculations, species/taxa lists & distributions, land use & habitat summary statistics
- Publicly accessible, downloadable

- Water Quality Assessment (ADBNet)

<https://programs.iowadnr.gov/adbnet/index.aspx>

- Section 305(b) Clean Water Act water quality assessments
- Section 303(d) impaired waters tracking
- Includes stream bioassessment of aquatic life use support status