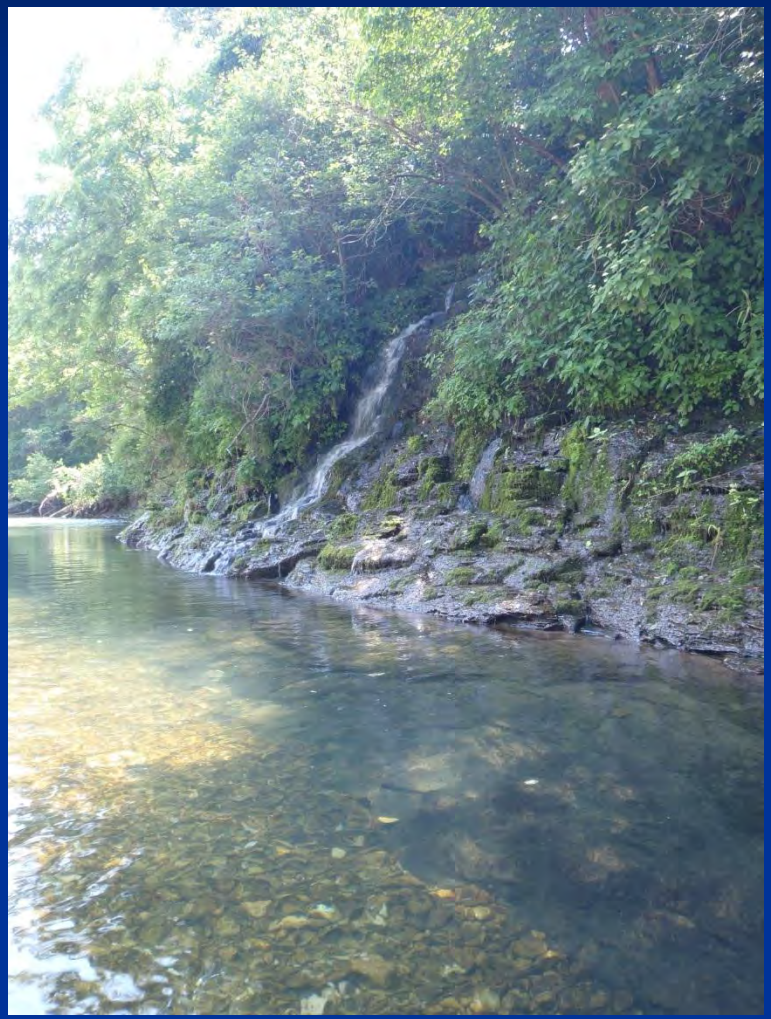
Stream Bioassessment Program Oklahoma Conservation Commission

Brooks Tramell
Oklahoma Conservation Commission
Water Quality Division

Overview

- What does "Bioassessment" mean?
- Historical Overview of Bioassessment – OCC small wadable streams
- Current efforts
- Protocols
  - Fish
  - Macroinvertebrates (bugs)

Oklahoma Conservation Commission



- Technical lead for NPS pollution assessment and identification in OK
- Small to mid-sized, wadeable streams and rivers

OCC Monitoring Purpose

- The OCC implements an extensive and unique monitoring program, conducting several distinct types of activities primarily focused on determining the extent, nature, and probable source(s) of NPS pollution in the state.

MEASURING HUMAN IMPACTS:

- biological indicator: groups or types of biological resources that can be used to assess environmental condition.
- biological monitoring: the study of organisms and their responses to environmental condition
- biological assessment: an evaluation of the biological condition of a water body using biological monitoring data and other direct measurements of resident biota in surface waters

Advantages of Bioassessment

Integrates the effects of water quality over time

Sensitive to multiple aspects of water and habitat quality

Provides the public with a more familiar expression of ecological health

Biological Integrity

"the ability to support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to those of natural habitats within a region" †

†(Karr,1981)

1996 OCC Water Quality Staff

Historical Overview of the OCC Bioassessment Program

- OCC Bioassessment efforts date back to the 1980's
- Methods were developed based on EPA's Rapid Bioassessment Protocols
- Methods include both fish and macroinvertebrate protocols
- Methods have evolved and are in the State's Standard Methods
- Program includes quality assurance measures, including:
  - Comprehensive SOPs
  - Fish crew leader training and rigorous approval prior to leading collection crews
  - Annual fish identification training and testing
  - Replicate collections

Historical Overview of the OCC Bioassessment Program

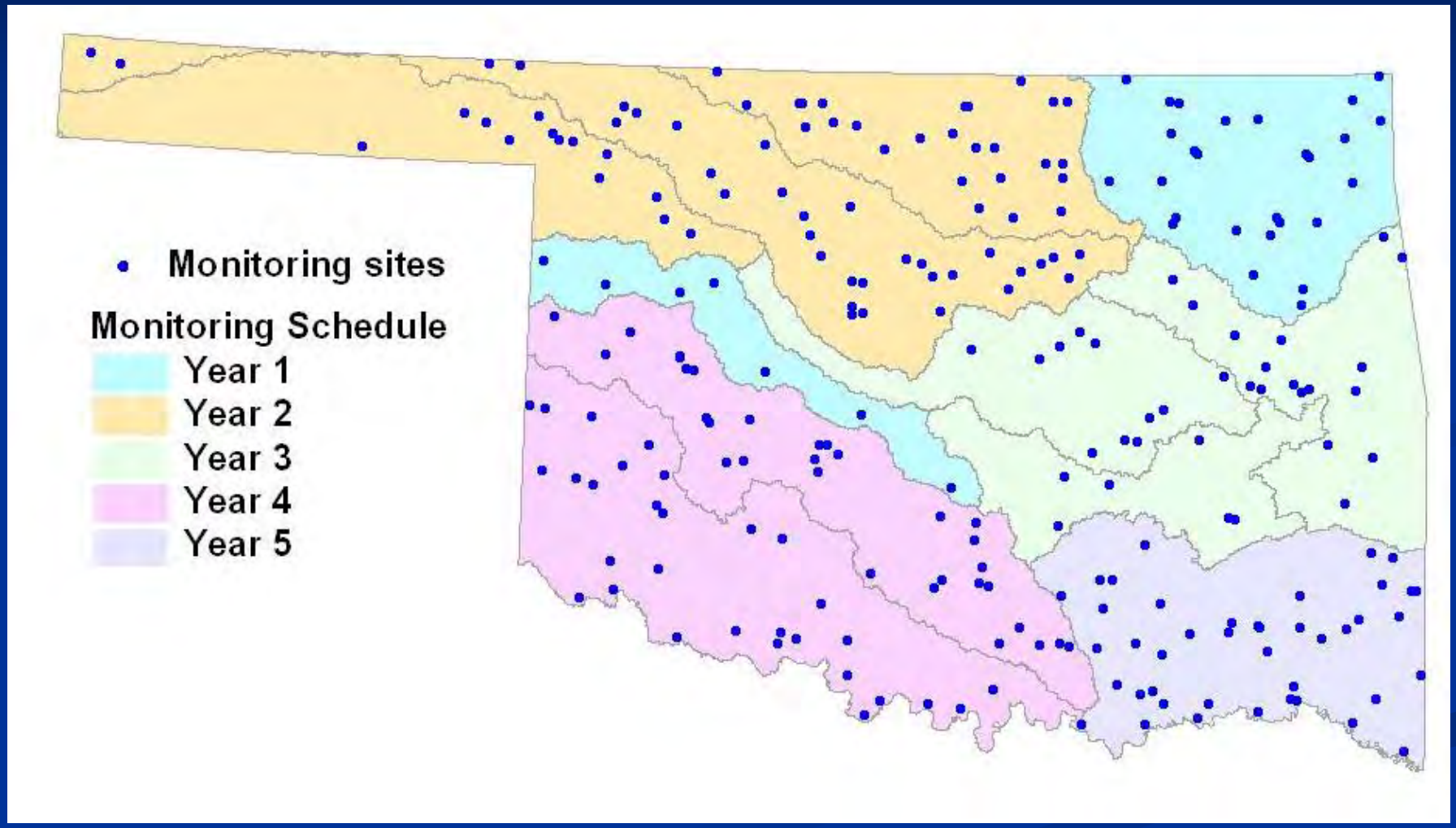
- Replicate sample processing
- Taxonomic review
- Data reviewed by both collectors and independent reviewer

- Taxonomist continuity (both bugs and fish)
- OCC has averaged well over 50 fish collections/sites per year for the last 20+ years
- OCC has averaged over 250 macroinvertebrate collections from over 100 sites/year for the last 20+ years
- Many sites have been repeated every 5 years

Current Efforts

- Rotating Basin Program
  - 245 fixed sites over five years
  - One complete round of probabilistic sites (250) (50/year or basin group) on the same rotational schedule as RB Project
  - Special project/implementation project sites
  - Special studies
    - Carried out under cooperative agreement with various state or federal agencies, NGOs, and tribes.

Rotating Basin Sites



Monitoring Protocol: Biological Parameters

Macroinvertebrates

- Twice a year (once in winter, once in summer)
- All available habitats: riffle, vegetation, woody

BUG COLLECTION

Kicknet sampling (Riffle)

Vegetation sampling

Macroinvertebrate Collections

- Richest targeted habitat
  - Riffle – preferred
  - Vegetation – second richest
  - Wood – last choice
- Collect all 3 habitats if available except in Ozark Ecoregion
  - Habitat varies between similar streams in the same ecoregion

Macroinvertebrate Processing/Picking

- Randomly subsample 100-130 individual specimens
- Subsampled specimens are sent to a taxonomist for identification

Monitoring Protocol: Biological Parameters

Fish / Habitat

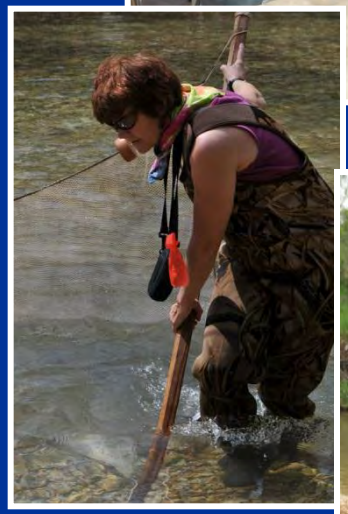
- Electroshock and seine (where possible)
- 400 meters, total in small wadeables
- 20 meter transects for habitat assessment

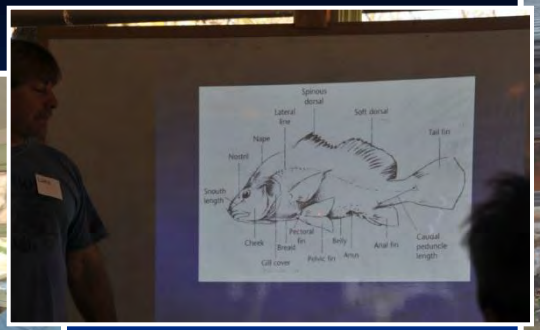
Electrofishing

Fish Seining

- ¼ inch mesh
- Seine size (height X width) is stream dependent

Staff Training





Staff Training

- Fish identification and techniques training
  - includes collection techniques and field identification of fish species
- Training often conducted for various agency, municipal, and tribal program staff

Fish Identification

- Large and common fish identified in the field and released
  - Vouchers (either photo or preserved specimens) retained for each species
- Preserved specimens identified by trained staff in a lab setting
- Annual review of 4 samples minimum
- T&E species reported immediately to USFWS
- Species found out of range confirmed by second taxonomist

Contact Information

brooks.tramell@conservation.ok.gov