# National Rivers and Streams Assessment (NRSA 2013-2014): Criteria for Indicator Selection

**May 3, 2012**

**NWQMC**

# Charge to the Group

- Select indicators to be used for the NRSA to assess the condition of the Nation's flowing water resource
- Select core indicators by May 15 to fit into FY12 FY 13 workplan
- Research indicators that fit within criteria by August 1
- Stick to indicator discussion

# Key Terminology

- **Core Indicator**:
  - Sampled at the national level across every site
  - Known how we will use the data from field
  - Consistent methods for national applicability

- **Research Indicators:**
  - Still in research phase
  - National relevance and applicability unknown
  - Methods not developed
  - Cost shared by partners

# NRSA 2008-2009 Survey Indicators

**Biological indicators** :

- Benthic macroinvertebrates
- Periphyton
- Fish community

**Public health indicators** :

- Fish tissue
- Pathogens (enterococci)

**Key stressors** :

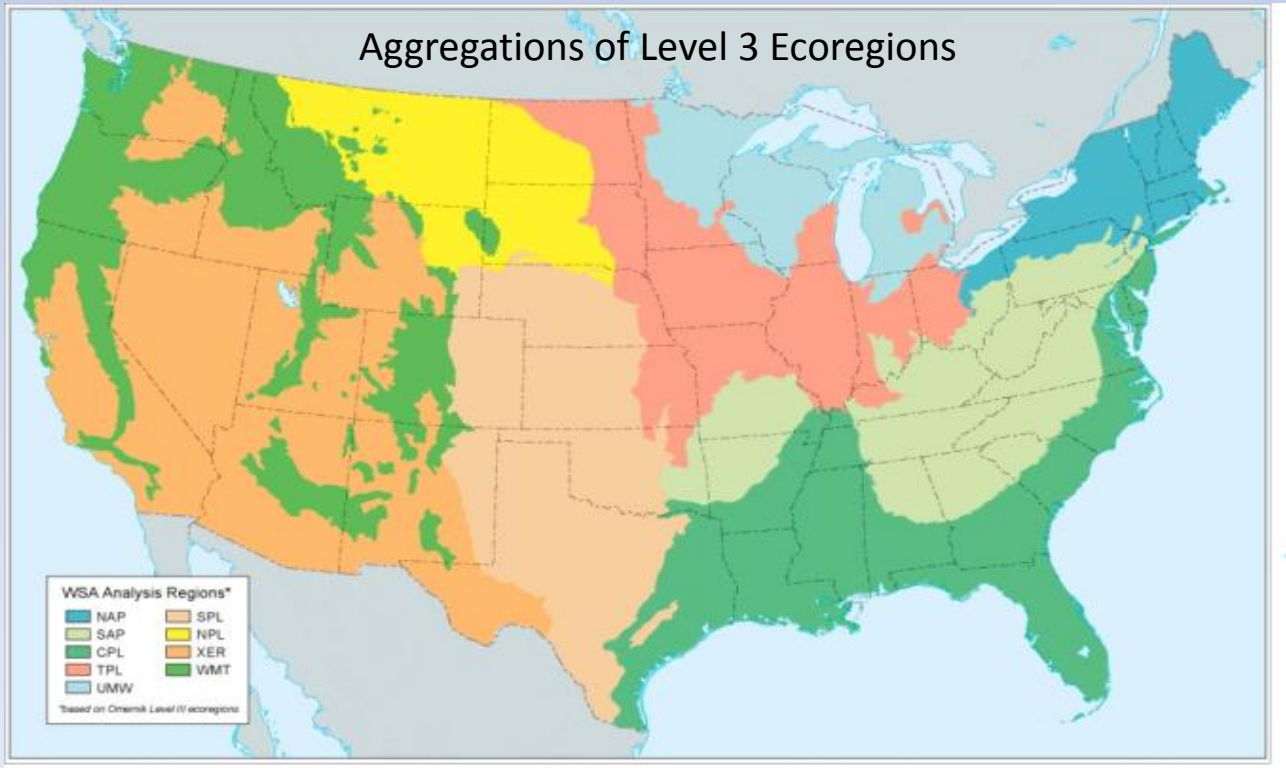
- Nutrient enrichment
- Excess sediment
- Physical habitat characteristics

**Research indicators that were cost covered**:

- Sediment enzymes
- AFDM, APA
- Contaminants of emerging concern in urban areas

## Types of Regional-Scale Assessments Supported by NRSA Data

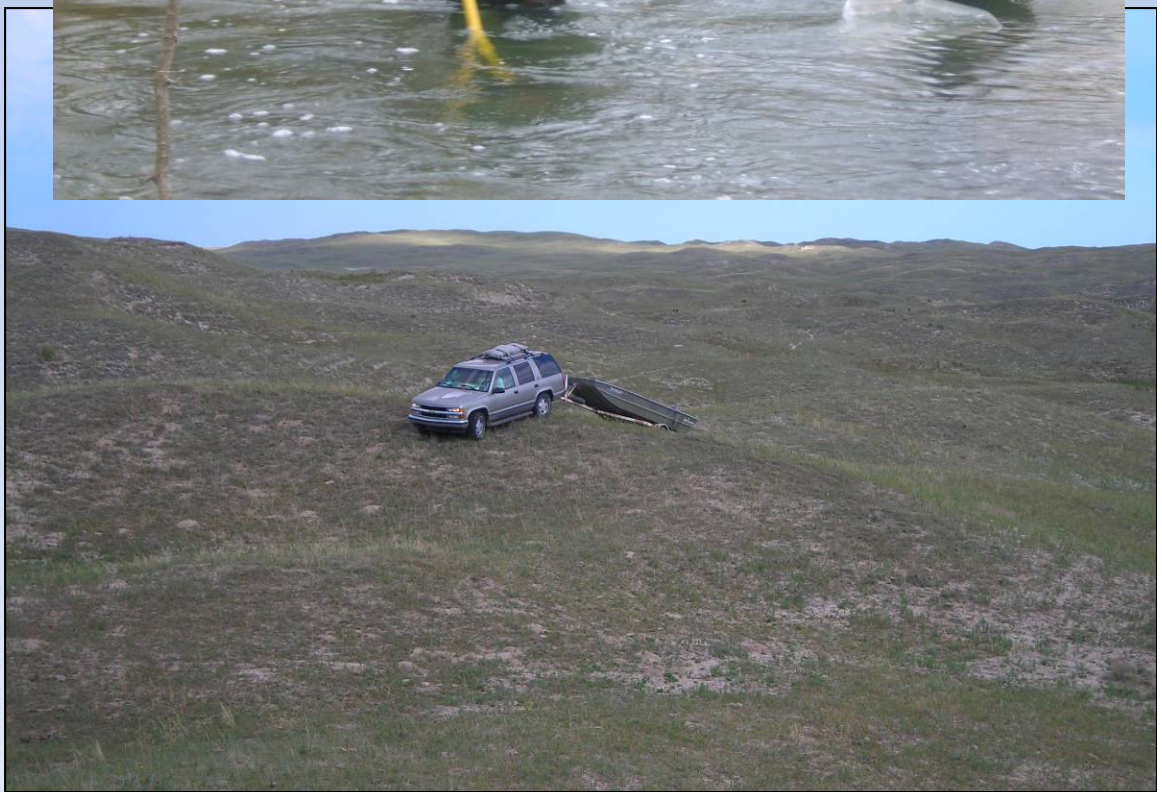
- Sample size drives reporting regions and level of confidence/error bars
  - National Assessment
  - Three major climatic regions
  - Aggregated Level 3 Ecoregions
- Enhancements and State-scale



# Core Indicator Selection Criteria

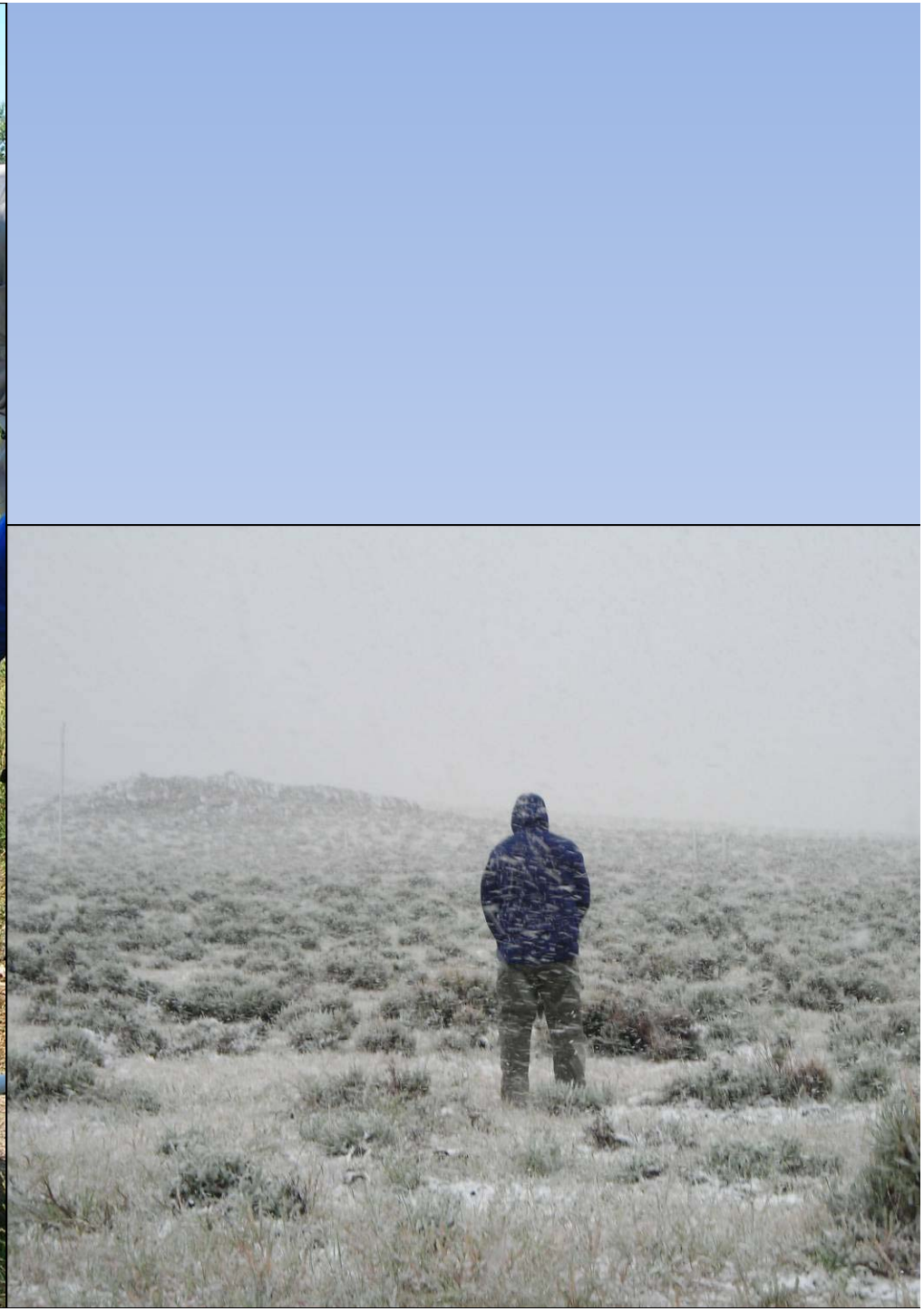
- Technical

- Practical



# Core Indicator Requirements

- Field Constraints:
  - Limited time in the field- single field visit with all samples collected in one day for the majority of sites
  - Standardized methods: All trained field crews must be able to implement methods regardless of experience and region
- Lab Constraints:
  - Capacity for a labs to analysis samples with-in the turn around time
  - Methods must be established



# Technical Criteria for Core Indicators

- Nationally applicable and sampleable
- Sensitive to human disturbance
- Research supported
- Reproducible
- Allows for change analysis from NRSA 2008-2009

# Practical Criteria for Core Indicators

- One day sampling effort ( 10 hour working day)
- 4 person field crew required
- Fit within the budget of the project
  - 6k for field work
  - 2k for lab work
- Indicators will not added after August ( incl. research indicators)

# Proposed Core Indicators for NRSA 13-14

- Water Chemistry
  - Major ions, cations
- Benthic macroinvertebrates
  - Composite sample
- Physical habitat
  - Quantitative physical habitat assessment

# Funding Constraints

- 2200 sites
- 6 k for field work, 2k for lab work

| **Water Chemistry** | **350** |
|---|---|
| Benthic macroinvertebrates | 550 |
| Physical habitat | 0 |
| Total estimated costs | 950 |
| Remaining funds | 1100 |

# Key Questions for Indicator Discussion

- For State and Tribal partners, what are the most important indicators for the national assessment? What would build your programs capacity?
- Are key indicators not represented?
- Should this indicator be included in the NRSA 2013-2014? Are there reasons why this indicator should be dropped?

# Index Site Sampling

- Water Chemistry
- Profile data ( pH, DO, temperature, conductivity)
- Secchi transparency ( boatable only)
- Flow ( wadeables only)
- **Discussion questions**
- Are there  critical indicators that are not captured here?
- Should these be collected in 2013-2014? Alternatives?

# Biological Indicators

- **Benthic Macroinvertebrates**
  - Composite, reach wide sample
  - Used in WSA, NRSA 2008-2009
  - Estimated Cost 550 per sample

- **Discussion Question:**
  - Should this indicator be included in the national survey?

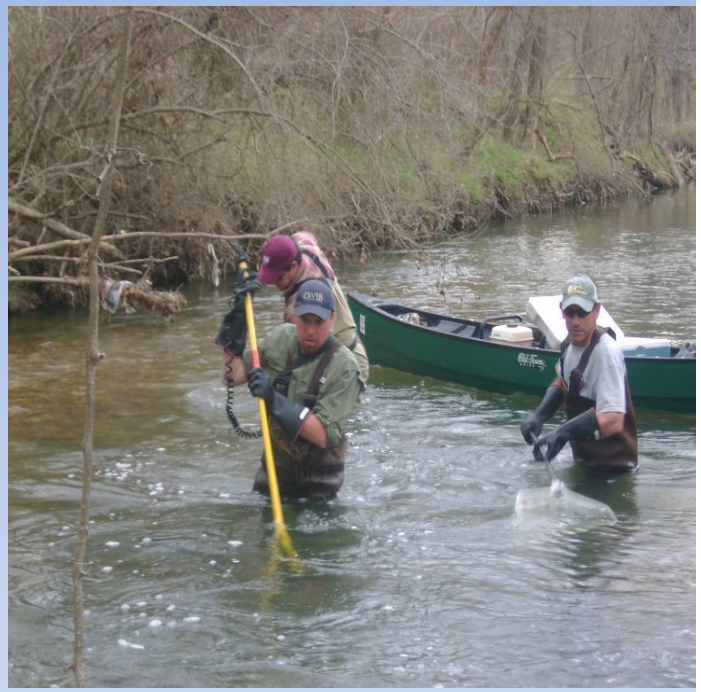
# Biological Indicators

- **Periphyton**
  - Reachwide sample
  - Used in EMAP West; NRSA 2008-2009
  - Estimated costs 400 per sample
  - Field effort approximately 2 hours

- **Discussion Question**:
  - Can this indicator be assessed and applied at a national scale?
  - Is it cost prohibited?
  - Can this data be used in your State and Tribal program?
  - Should this indicator be included in the national assessment?

# Biological Indicators

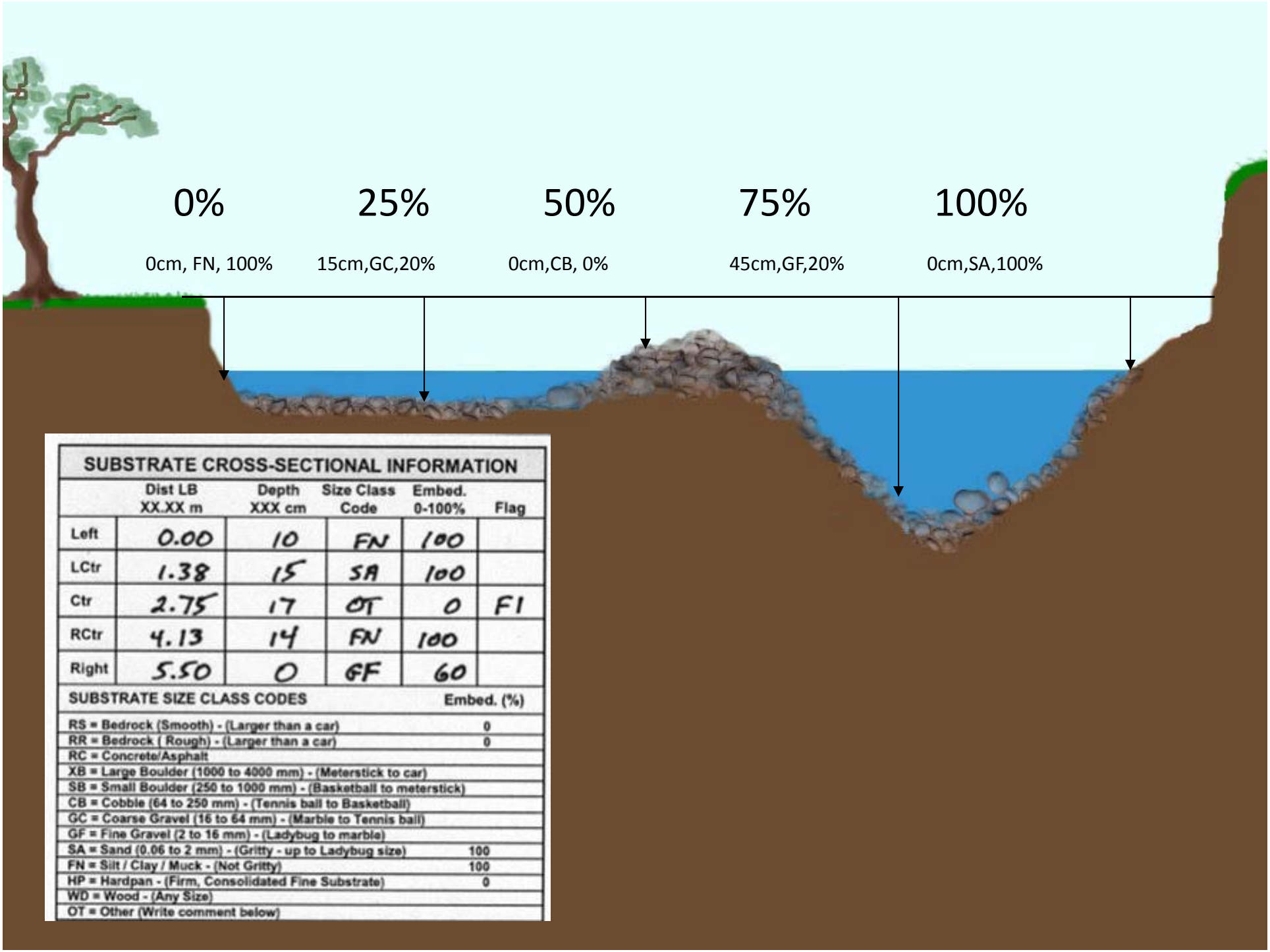
- **Fish Community**
  - Reachwide sample
  - Used in EMAP WEST and NRSA
  - Used in State programs
  - Estimated costs 200 per sample
  - Requires in field experts
  - Field time estimated 3.5 hours



- **Discussion Question:**
  - Is it possible to have consistent field methods?
  - If it is included what needs to be done in this field season to ensure indicator is
  - Should fish be included in the NRSA 2013-2014?

# Physical Habitat

- Quantitative assessment:
  - Excess streambed sediments
  - Riparian disturbance
  - In-stream habitat
  - Human disturbance
- Used in WSA and NRSA
- Estimated field time 6 hours




**SUBSTRATE CROSS-SECTIONAL INFORMATION**

| | Dist LB XX.XX m | Depth XXX cm | Size Class Code | Embed. 0-100% | Flag |
|---|---|---|---|---|---|
| Left | 0.00 | 10 | FN | 100 | |
| LCtr | 1.38 | 15 | SA | 100 | |
| Ctr | 2.75 | 17 | OT | 0 | FI |
| RCtr | 4.13 | 14 | FN | 100 | |
| Right | 5.50 | 0 | GF | 60 | |

| SUBSTRATE SIZE CLASS CODES | Embed. (%) |
|---|---|
| RS = Bedrock (Smooth) - (Larger than a car) | 0 |
| RR = Bedrock ( Rough) - (Larger than a car) | 0 |
| RC = Concrete/Asphalt | |
| XB = Large Boulder (1000 to 4000 mm) - (Meterstick to car) | |
| SB = Small Boulder (250 to 1000 mm) - (Basketball to meterstick) | |
| CB = Cobble (64 to 250 mm) - (Tennis ball to Basketball) | |
| GC = Coarse Gravel (16 to 64 mm) - (Marble to Tennis ball) | |
| GF = Fine Gravel (2 to 16 mm) - (Ladybug to marble) | |
| SA = Sand (0.06 to 2 mm) - (Gritty - up to Ladybug size) | 100 |
| FN = Silt / Clay / Muck - (Not Gritty) | 100 |
| HP = Hardpan - (Firm, Consolidated Fine Substrate) | 0 |
| WD = Wood - (Any Size) | |
| OT = Other (Write comment below) | |

- Rapid Bioassessment Protocol
  - Used in State and Tribal programs
  - Used in EMAP and WSA
- Should it be added to the NRSA?

# Human Health Indicators

- **Fish Tissue**
  - Used in NRSA boatable sites
  - Estimated costs 750 per sample
  - Requires in field experts
  - Field time estimated 2 hours
- **Discussion Question:**
  - Is this cost prohibited?
  - Can this be used in your program?
  - Should fish be included in the NRSA 2013-2014?

# Human Health Indicators

- **Enterococci/Ecoli**
  - Used in NRSA sites via QPCR
  - Estimated costs 100 per sample QPCR, 70 culture
  - Six hour max holding time
  - Extensive post sampling effort
- **Discussion Question:**
  - Should fish be included in the NRSA 2013-2014?

# Other Indicators

- Microcystin
- Pesticides
- Sediment
- Others?

Ellen Tarquinio
Tarquinio.ellen@epa.gov

http://water.epa.gov/type/watersheds/monitoring/nationalsurveys.cfm