



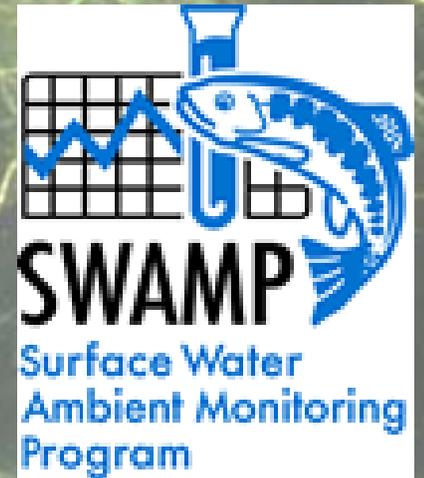
FRESHWATER BIOASSESSMENT WORKSHOP

INTRODUCTION TO 2007 SWAMP PROCEDURES

June 2007

Jim Harrington

WPCL Bioassessment Laboratory

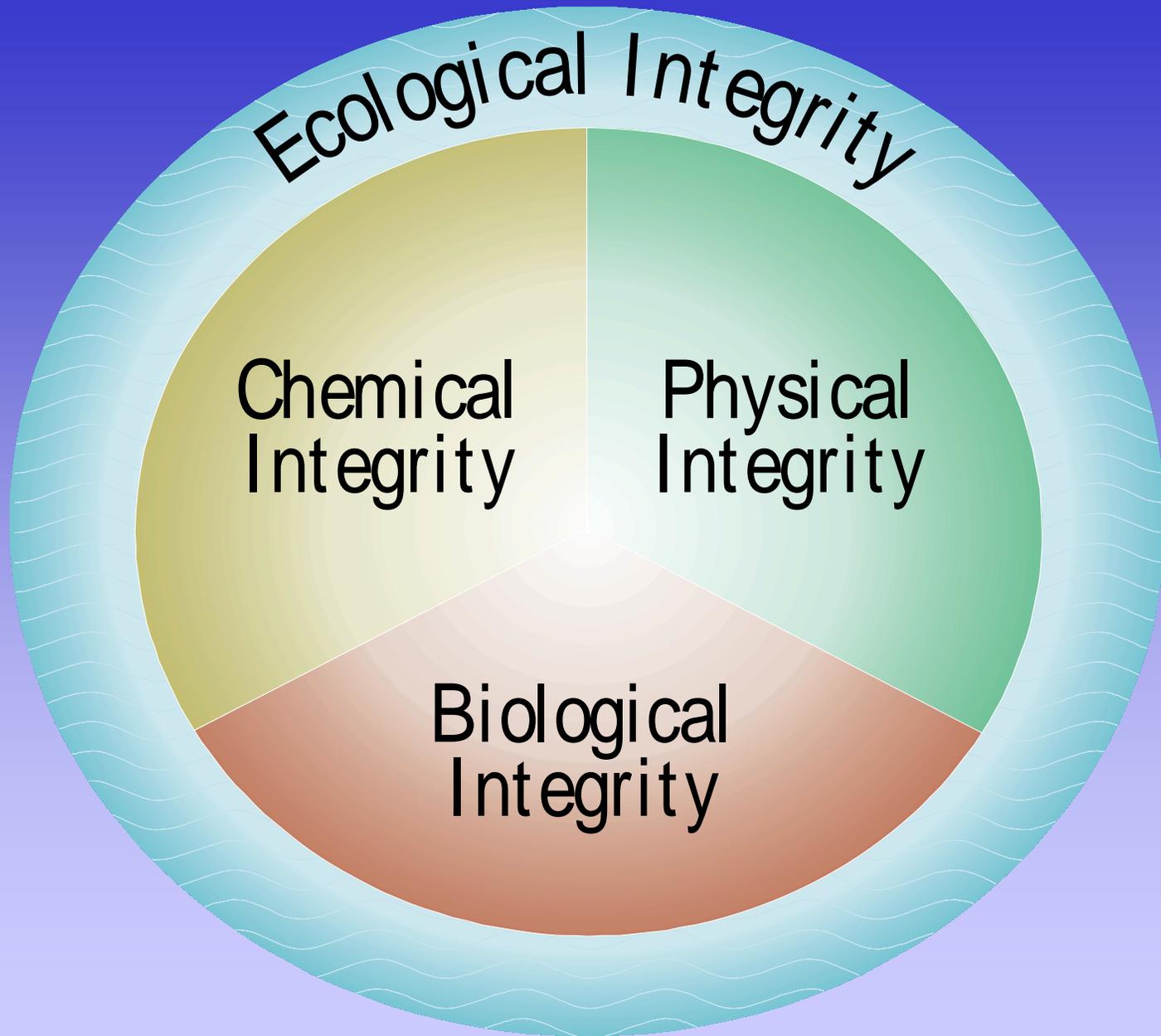




PRESENTATION 1

"BACKGROUND"

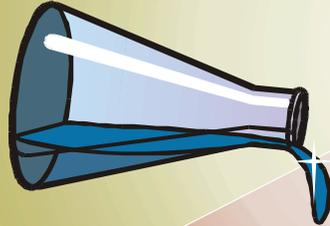




Ecological Integrity

Chemical Integrity

- Nutrients
- Dissolved Oxygen
- Organic Matter Inputs
- Groundwater Quality
- Sediment Quality
- Hardness
- Alkalinity
- Turbidity
- Metals
- pH



Physical Integrity

- Sunlight
- Flow
- Habitat
- Gradient
- Temperature
- Soils
- Precipitation/Runoff
- Channel Morphology
- Local Geology
- Groundwater Input
- Instream Cover
- Bank Stability



Biological Integrity

Function and structure of biological communities



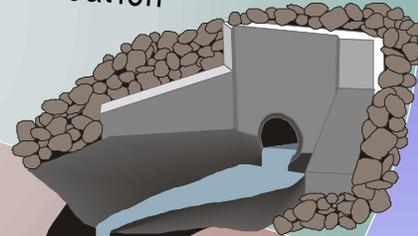
Chemical Contamination

- Toxics
- Low pH
- High Turbidity
- Excess Sediment
- Excess Nutrients/Organics
- Depleted Alkalinity



Physical Degradation

- Soil Erosion
- Damaged Habitat
- High Temperature
- Too Much Sunlight
- Too Little/Too Much Flow
- Stream Bank Erosion
- Loss of Groundwater
- Hydromodification



Altered Biological Condition



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 expressions of ecological health

Advantages of Bioassessment

Adds a more direct assessment of ecological health since it measures the biological communities that live in aquatic systems

Better defines the effects of point source discharges and provides more relevant measures to evaluate discharges of non-chemical substances (e.g. sediment, flow augmentation and habitat alteration)

Statutory Authority

- Clean Water Act Section 101(a) Purpose:
 - *"To restore and maintain the **chemical, physical and biological integrity** of the Nation's waters"*



Rapid Biological Assessment 2007 SWAMP Procedures

Cost effective

“targeted riffle composite”
(TRC)

“multihabitat/reach-wide”
(MH/RW)

Other Protocols for
Historic Projects



Benthic
Macroinvertebrates

Rapid Biological Assessment 2007 SWAMP Procedures

Physical/Habitat
Quality Assessment

"Full"
"Basic"



08 21 2001



6-day Professional Training
sponsored by
American Fisheries Society
SETAC
Sustainable Land Stewardship Institute

Use of Citizen Monitors in Watershed Assessment and Monitoring



SLSI Training

BMI Sampling

SAFIT Level
Taxonomy

SOP QAPP

Working with
Agencies

Scientifically
Sound
Environmental
Activism

How Do We Do Bioassessments In California

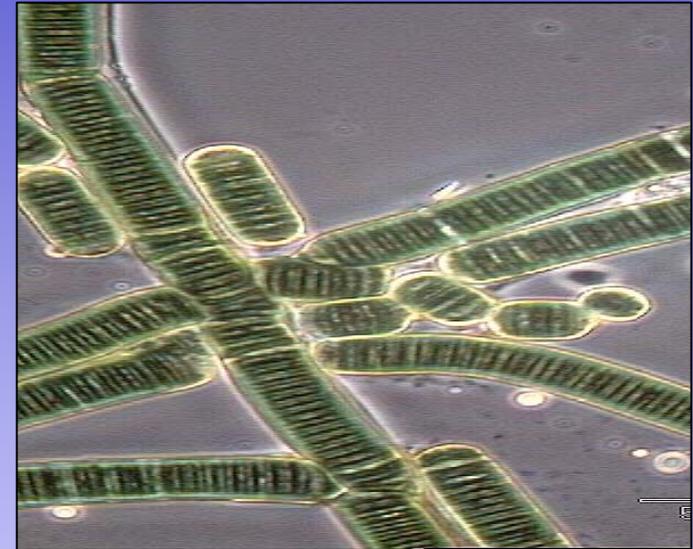


FRESHWATER BIOASSESSMENT - THE USE OF AQUATIC ORGANISM TO MEASURE AQUATIC HEALTH -

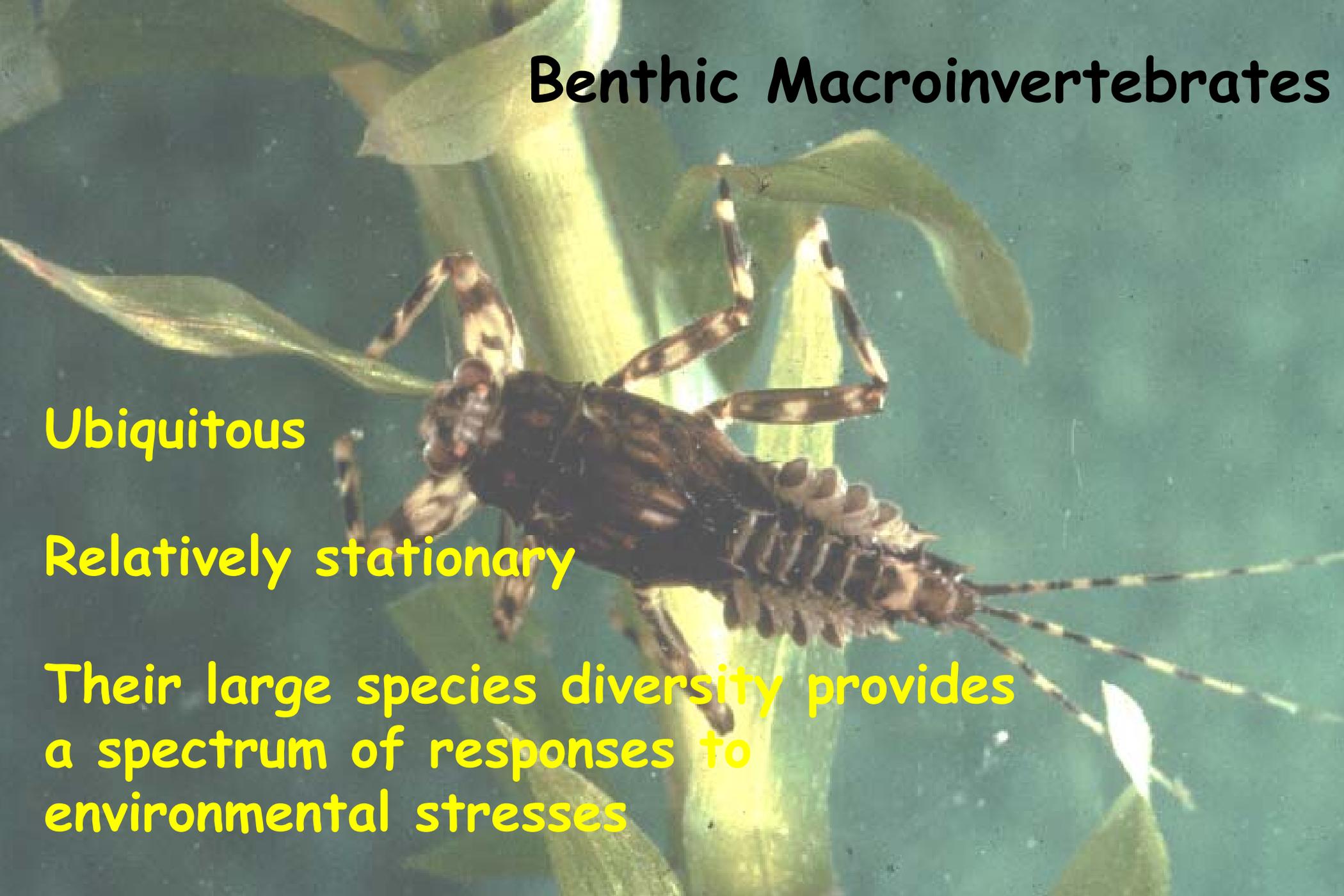
EPA Recommendation:

Multiple Assemblages

Fish, Invertebrates and Algae



Benthic Macroinvertebrates

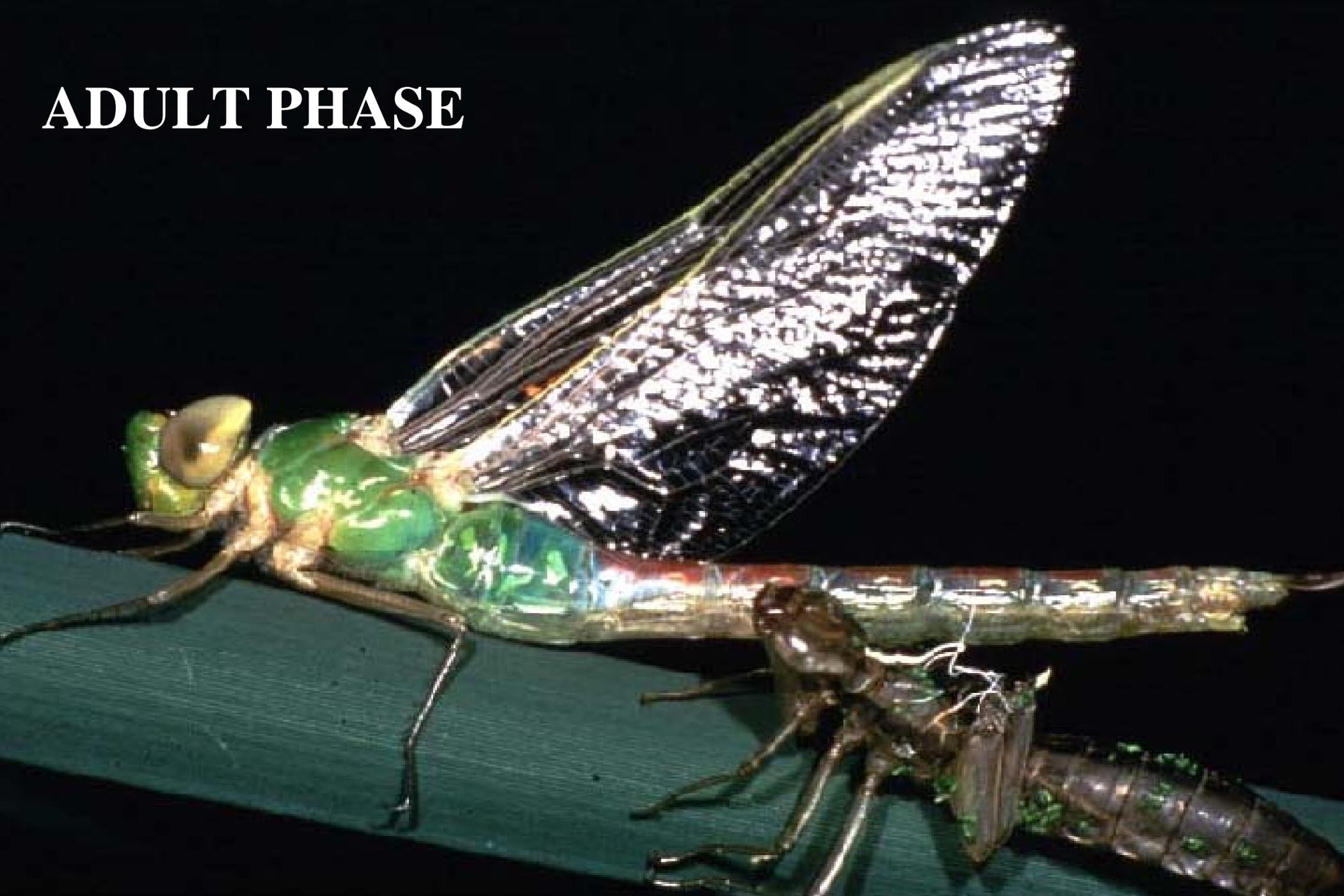
A large stonefly nymph is shown clinging to a green stem underwater. The nymph has a segmented body with dark and light brown patterns, long antennae, and six legs. The background is a clear, blue-green water environment with other green stems and leaves visible.

Ubiquitous

Relatively stationary

Their large species diversity provides a spectrum of responses to environmental stresses

ADULT PHASE



NYMPH OR LARVAE



Benthic Macroinvertebrates (BMI)
are aquatic invertebrates that are at
least 0.5mm in length and live
primarily on the bottom substrate
of streams and rivers



Order: ephemeroptera (mayflies)



Baetidae



Baetidae.avi

Order: plecoptera (stoneflies)



Order: trichoptera (caddisflies)

Glossosomatidae



Order: diptera (aquatic flies)

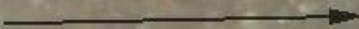


Order: coleoptera (aquatic beetles)

Dytiscidae



Dytiscidae
cerci



Sensitive Organisms in Streams

Dragonflies and Damselflies



Mayflies



Stoneflies



Caddisflies



Expected Response to Stress: ↓ abundance & proportion

Tolerant Organisms in Streams

Scuds



Snails



Leeches

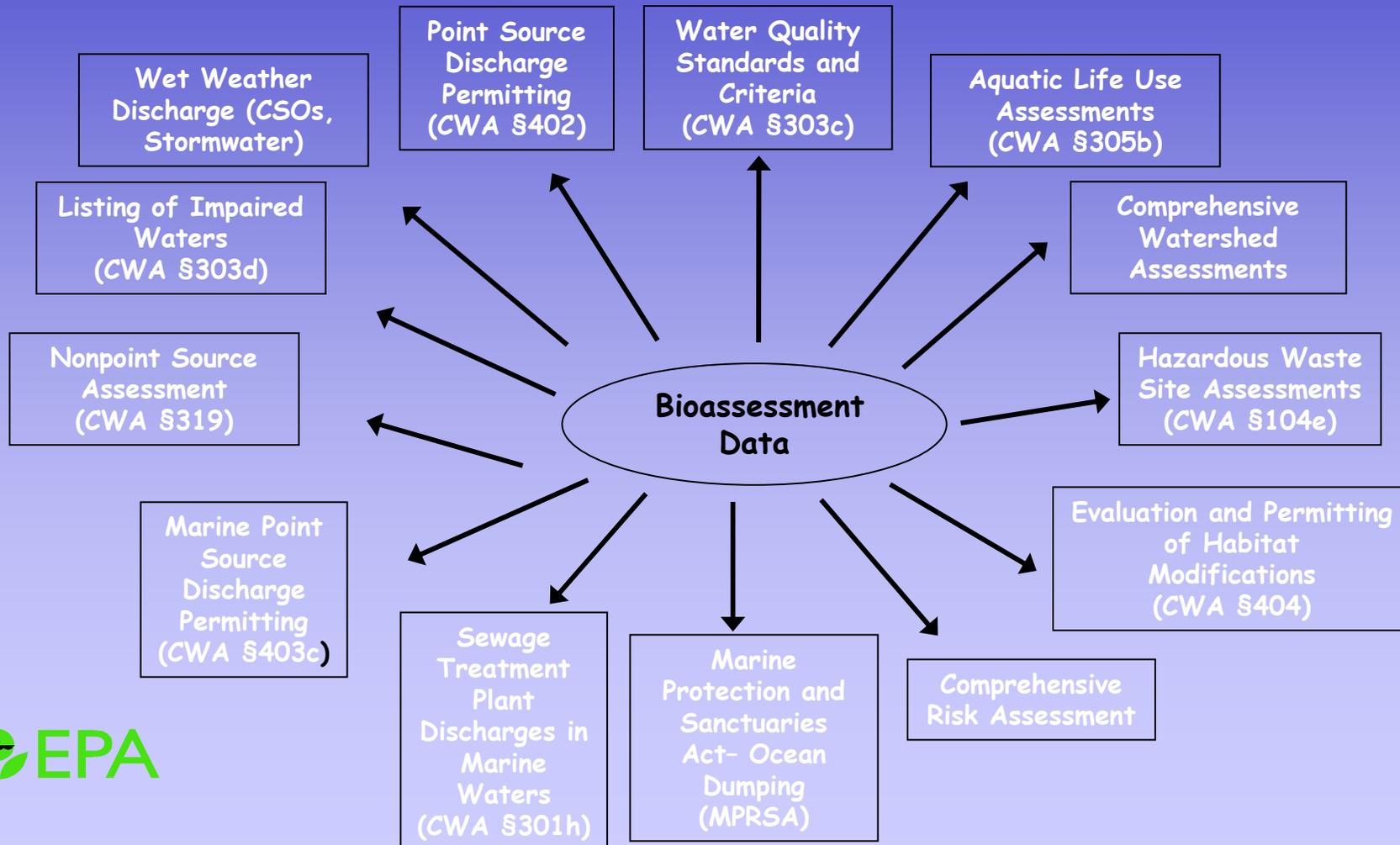


Midges



Expected Response to Stress:  abundance & proportion

Use of Bioassessment in Water Quality Monitoring



National Biological Assessment and Criteria Workshop

Advancing State and Tribal Programs



Coeur d'Alene, Idaho
31 March – 4 April, 2003

Florida's Bioassessment Program

Florida Department of Environmental Protection

Bioassessment Program Elements

no order-simultaneous development

1. Classify environments (e.g., regionalization)
2. Standardize sampling methods
3. Develop assessment approach (IBI)
4. Perform biological surveys
5. Select metrics (positive biological signals)
6. Incorporate Quality Assurance activities
7. Incorporate training and testing (certification)
8. Integrate into programs
9. Report results (Ecosummaries)
10. Revise biocriteria

*Get to Know
Your Mayflies*



And your Beetles

