

Wetland Biological Monitoring



Dan Mosley, Native Environmental Services

Background



Sec. 101(a) CWA. The objective of the Act is to restore and maintain the chemical, physical and Biological integrity of the Nation's waters ...

Sec. 101(a)(2). It is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife and recreation in and on the water...



Wetland Invertebrates

Leeches Class: Hirudinea

Family: Erpobdellidae



Family: Glossiphonidae



Family: Hirudiniidae



Worms

Class:
Oligochaeta



Class: Tricladida

Family: Planariidae



Water Beetles

Order:
Coleoptera

Family: Dytiscidae

Family: Hydrophilidae
Water scavenger



Family: Haliplidae

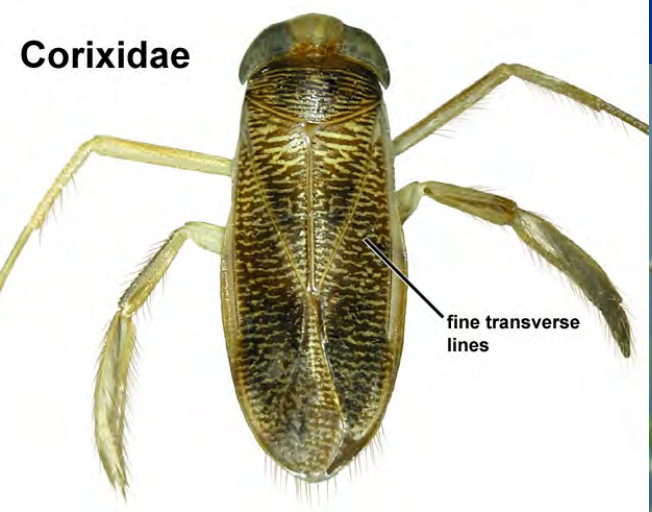


Water Boatman

Order: Hemiptera
Family: Notonectidae
Back swimmer



Corixidae

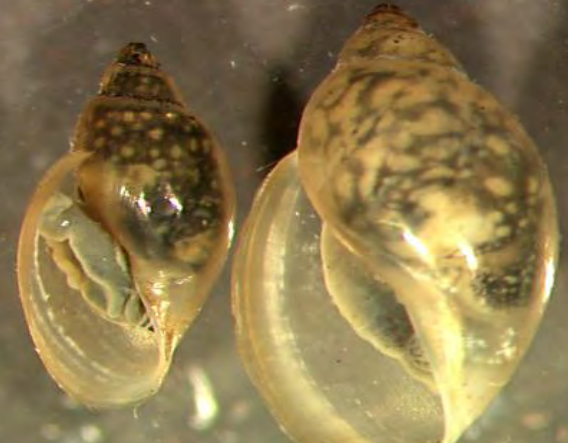


Other Taxa

Amphipoda



Gastropoda
Snail



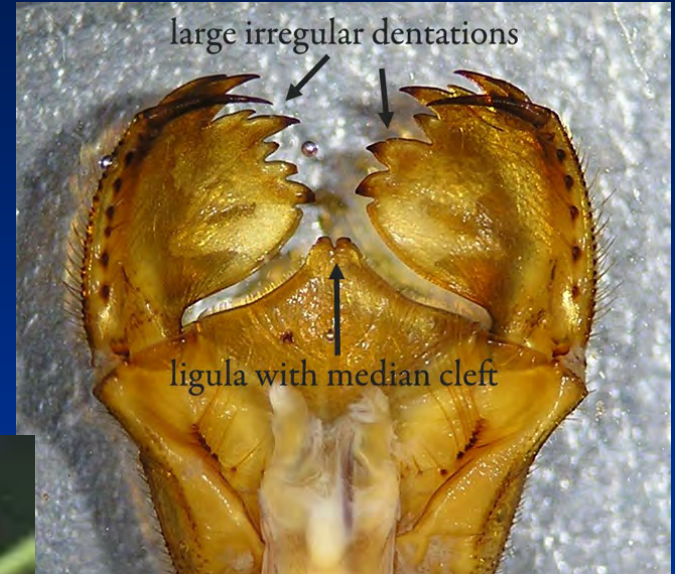


ata

idae

Dragonfly

Family: *Corydulegrastridae*



Family: *Coenagrionidae*

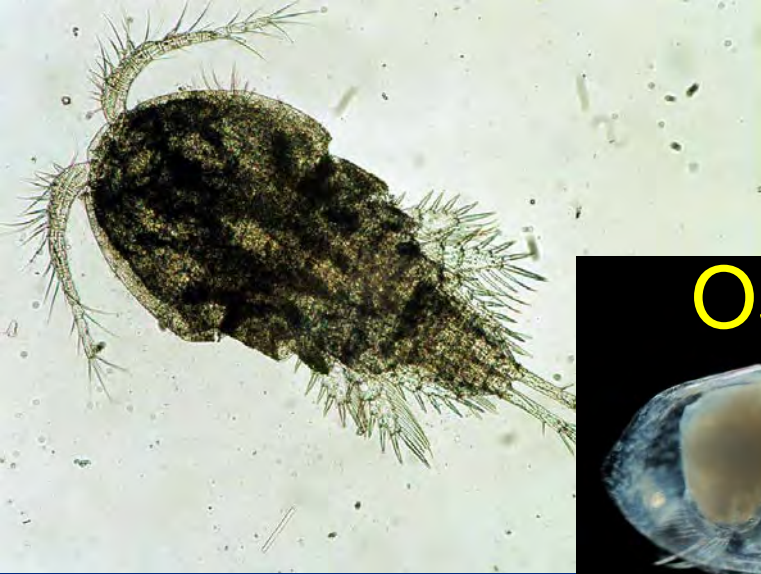
Damselfly



Family: *Lestidae*



Zooplankton



Ostracod

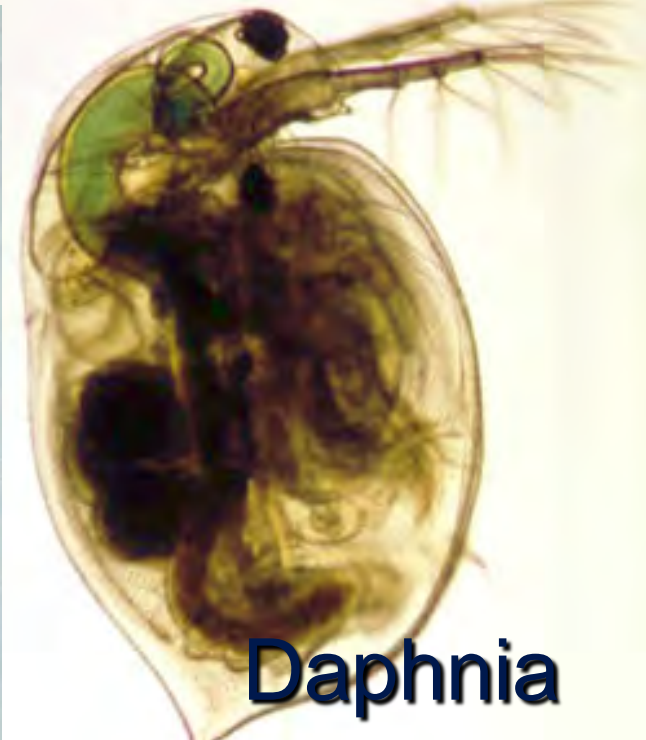
Copepod



SS



Rotifers



Daphnia

Phytoplankton



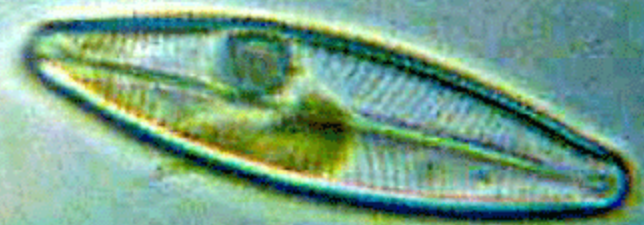
Blue green algae



Algae



Diatoms



Other Species of concern



Sec. 101(a) CWA. The objective of the Act is to restore and maintain the chemical, physical and Biological integrity of the Nation's waters ...

Sec. 101(a)(2). It is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife and recreation in and on the water...



WQCP: Narrative Standards

Species Composition

Communities and populations of aquatic biota, including invertebrate, vertebrate and plant species, shall not be degraded as a result of point source or nonpoint source discharge. This applies to transient as well as cumulative conditions. Short-term variances from these objectives may be allowed for actions that are being taken to fulfill statutory requirements under Tribal law or the federal Endangered Species Act.



RBP Recommended Metrics

Category	Metric	Predicted response to increasing perturbation
Richness measures	Total No. taxa	Decrease
	No. EPT taxa	Decrease
	No. Ephemeroptera Taxa	Decrease
	No. Plecoptera Taxa	Decrease
	No. Trichoptera Taxa	Decrease
Composition measures	% EPT	Decrease
	% Ephemeroptera	Decrease
Tolerance & Intolerance measures	No. of Intolerant Taxa	Decrease
	% Tolerant Organisms	Increase
	% Dominant Taxon	Increase
Feeding measures	% Filterers	Variable
	% Grazers and Scrapers	Decrease
Habit measures	Number of Clinger Taxa	Decrease
	% Clingers	Decrease

Methods for Evaluating Wetland Condition

#6 Developing Metrics and Indices of Biological Integrity

EPA 822-R-02-016

Multimetric indexes, such as Indexes of Biological Integrity (IBIs) are powerful tools for informed management decisions related to wetlands and wetland health. A number of States & Tribes are currently developing wetland bioassessments by adapting bioassessment frameworks originally developed for streams. Although many aspects of stream bioassessment may apply, wetland floral and faunal assemblages are unique, and specific data from those assemblages are required to construct an IBI for wetlands. The information in this module is designed to provide a framework for the development of IBIs using specific examples from wetlands. The module describes a step-by-step process to propose, evaluate, and ultimately select metrics into the IBI that will best reflect the biological condition of wetlands.

Taxa Richness/Diversity can be affected by:

- Fluctuating water levels
- Invasive species
- Habitat, geology, substrate type,...
- Water Quality (temp, D.O, Cond/TDS,...)
- Stream inflow/outflow
- Natural impacts (drought, wildland fire...)
- Other human impacts (PS, NPS, livestock, dewatering, ...)





The Biological Condition Gradient - Levels

Biological Condition

Natural structure & function of biotic community maintained

1

2

Minimal changes in structure & function

3

Evident changes in structure and minimal changes in function

4

Moderate changes in structure & minimal changes in function

5

Major changes in structure & moderate changes in function

6

Severe changes in structure & function

Increasing Levels of Stressors



Cultural Uses

Paiute people (Numa) have used springs and wetland areas within the Pyramid Lake Indian Reservation (PLIR) for thousands of years. Reasons include hunting, recreation, gathering of plants for food, building materials, ceremonial, and medicinal purposes.



Gathering cattail shoots

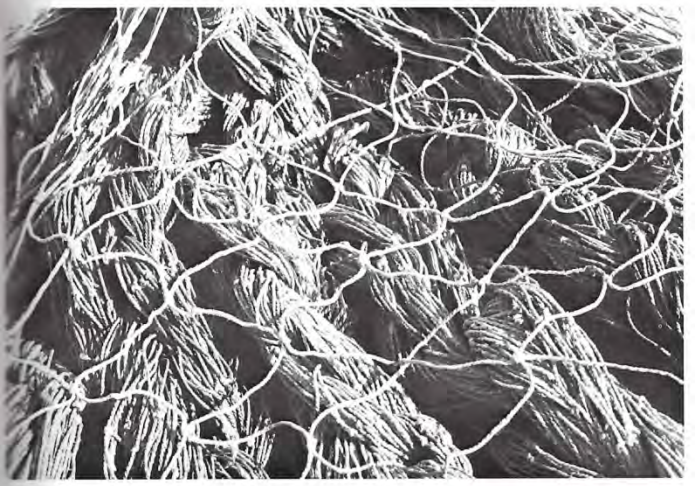




BUILDING HOUSES



3
*When she has split
 beyond her arms' reach,
 she takes a new hold with her teeth
 and continues splitting.*



When the boat was completed, Jimmy stepped in the center to form a deeper hollow. The finished boat was eight-and-a-half feet long but so light that it could easily be lifted with one hand.

The prime use for a boat of this size was to carry game and weapons while the hunter waded or swam, pushing the boat ahead of him. However, it easily held a man's weight, as Jimmy demonstrated by poling



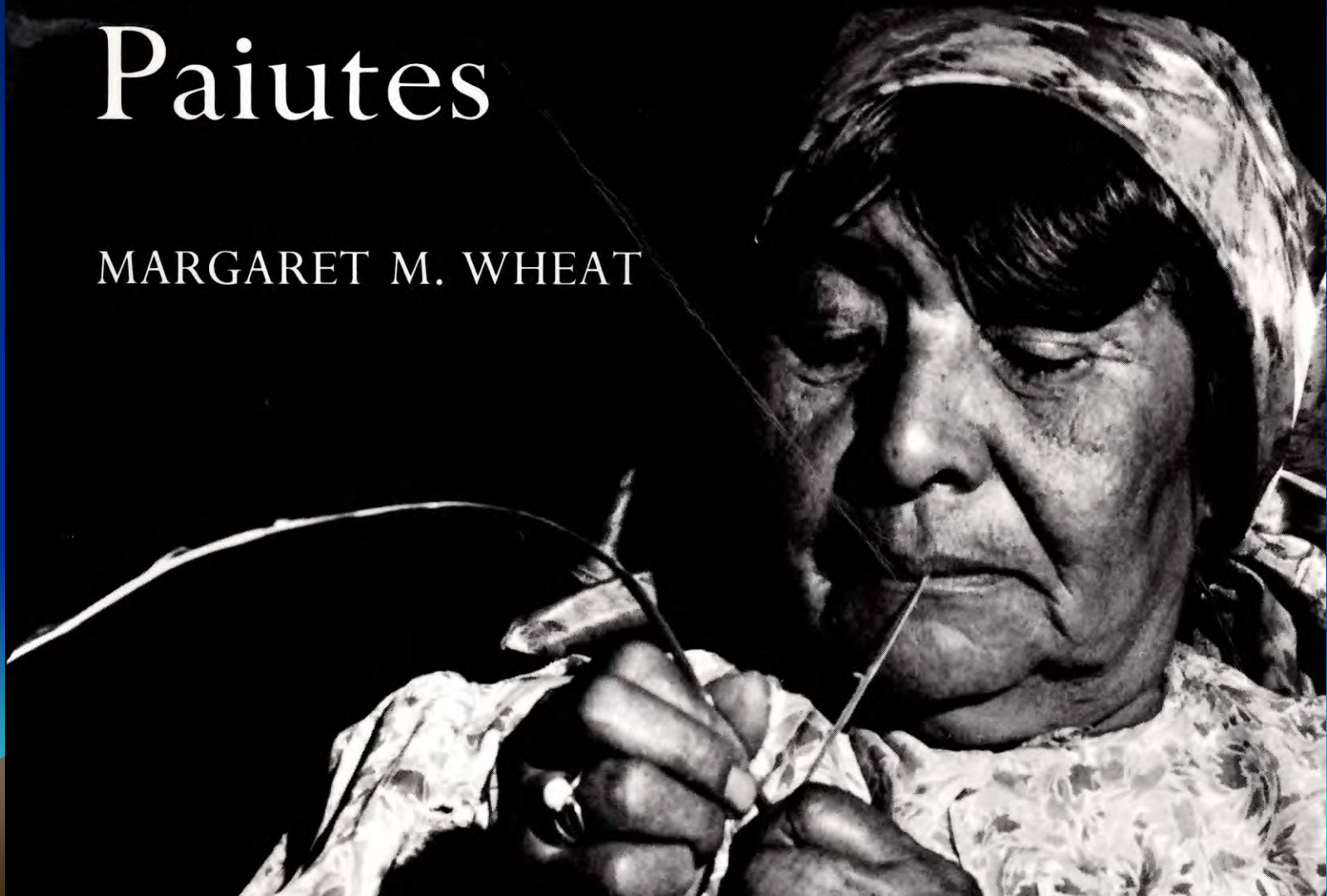
16
*Jimmy deepens the hollow in the boat
 with his foot.*

17
*The completed boat could be lifted
 with one hand.*

*Jimmy poles his tule boat across the marsh
 in the Old West.*

Survival Arts of the Primitive Paiutes

MARGARET M. WHEAT



Anthropogenic impacts (such as PS/ NPS pollution, dewatering, habitat degradation) can affect cultural uses of foods, plant materials...and ceremonial uses.



