# Cascade Creek Stressor Identification

## Presented to Lower Clark Fork Watershed Advisory Group

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# The role of Stressor Identification in various water management programs.

| Program Type/Name | Purpose | Role of Stressor Identification |
|---|---|---|
| 305(b)<br><br>Characterizing the Quality of the Nation's Waters | Under section 305(b) of the Clean Water Act (CWA), states and tribes are required to assess the general status of their waterbodies and identify, in general terms, known or suspected causes of water quality impairments, including biological impairments. | Stressor identification procedures assist states and tribes in accurately identifying the causes of biological impairment. This is a nonregulatory, information reporting effort. A high degree of certainty in identifying the causes of impairment is not always needed for 305(b) reports. |
| 303(d) Listings and TMDLs<br><br>Identifying Waterbodies and Wetlands that Exceed Water Quality Standards | Under section 303(d) of the CWA, states and tribes are required to prepare and submit to EPA lists of specific waterbodies that currently violate, or have the potential to violate, water quality standards, including designated uses and numeric or narrative criteria such as biocriteria. Wetlands assessment programs are also being developed and wetlands may be listed on 303(d) lists. | Accurate, reliable stressor identification procedures are necessary for EPA and the states and tribes to accurately identify the cause(s) of water quality standards violations. A high degree of accuracy and reliability in the SI process is necessary and sources will need to be identified. |

http://cfpub.epa.gov/caddis/index.cfm?chapter=11#7

# What is Stressor Identification and why is it important?

- The Stressor Identification process was develop by the US Environmental Protection Agency to identify the "unknown" impairment.

  – Before an appropriate management action can be formulated the cause of the impairment must be identified.

# How does the Stressor Identification process work?

- Causal Analysis/Diagnosis Decision Information System (CADDIS)

  – CADDIS is based on the US EPA Stressor Identification process.

  – Is a serious of web-based worksheets which aid the assessor in identifying the cause of impairment.
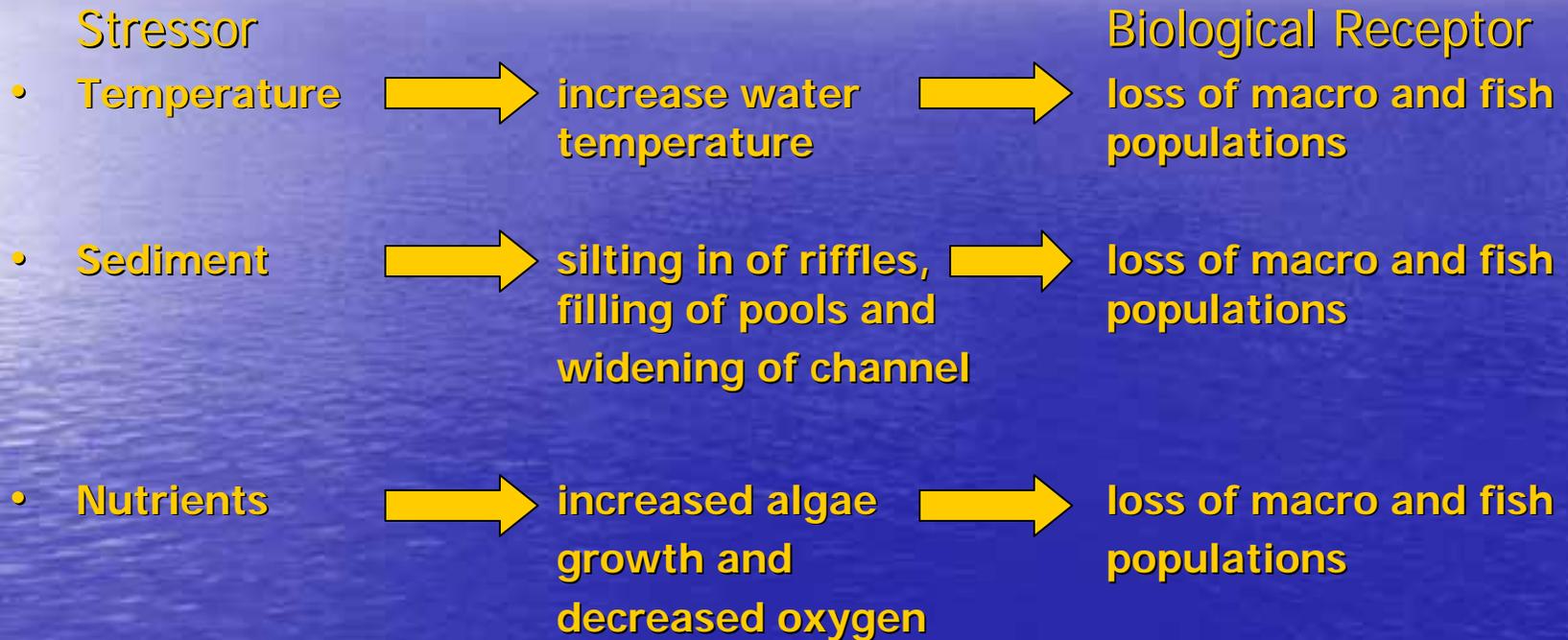
# Data Evaluated

- Temperature
  - CWE classified watershed as high risk

- Sediment
  - Wolman Pebble Count, Embeddedness Scores
    - Used a compared Watershed approach to justify. Compared Wolman Pebble counts to Mosquito Creek (SMI=3).

# Conceptual Model
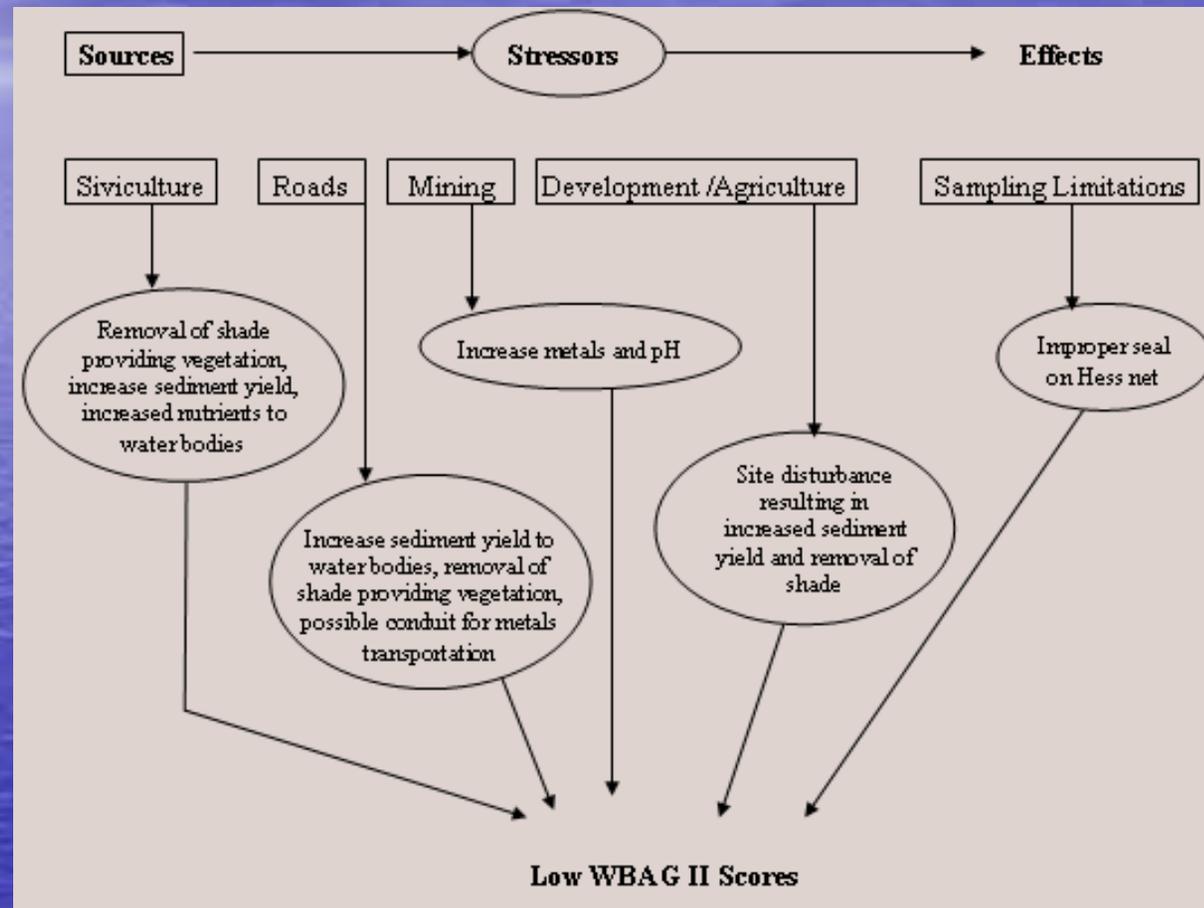


Conceptual model links the candidate cause with potential sources and effects.

# Hypothesized exposure pathways

Stressor                                                                  Biological Receptor

- Temperature → increase water temperature → loss of macro and fish populations

- Sediment → silting in of riffles, filling of pools and widening of channel → loss of macro and fish populations

- Nutrients → increased algae growth and decreased oxygen → loss of macro and fish populations

# The CADDIS Process

- 5 Steps
  - Step 1 Define the Impairment
    - Below Passing WBAG II scores
  - Step 2 List Candidate Causes
    - Temperature, Sediment, pH, Metals, Hydrologic regime changes, Sampling limitations, Nutrient enrichment
  - Step 3 Evaluation of data, resulting in new Candidate Cause List
    - Temperature, Sediment, Nutrients
  - Step 4 Comparison of Strength of Evidence
  - Step 5 Identify Probable Cause
    - Temperature and Sediment

# Findings

- After completion of CADDIS worksheets it was determined that the temperature listing of Cascade Creek is appropriate and in addition sediment impairment should also be a candidate for TMDL development.

- Temperature or Sediment may overshadow one anther, but in order to return Cascade Creek to full support of beneficial uses both need to be reduced.