Our History

• Started in 1996 as Friends of Deer Creek by a group of concerned local citizens and property owners.

• Focused on scientific investigation and methods, to find solutions to Deer Creek's problems.
Sierra Streams Institute Programs

Restoration
- Restoration of salmon habitat
- Remediation of bacterial contamination

Research
- Transport of mercury over dams
- Health impacts of mining contaminants
- Family-level Index of Biotic Integrity
- Aquatic and Terrestrial Bioassessment

Training
- State protocols for watershed groups

Education
- Hands-on science

Laboratory
- Chemical and biological analysis
Community-Based Participatory Research

Sierra Streams Institute is working with local citizens to improve:

- environmental health of ecosystems
- public health of community members
- science education

Citizens participate in all levels of work.
Index of Biotic Integrity

• The composition of the benthic macroinvertebrate assemblages provide a direct measure of the integrity of the stream’s ecological condition

• Family-level IBI
  – Utilizes citizen science data
  – Affordable for non-profit watershed groups
  – Facilitates communication to the public about ecological conditions

• Macroinvertebrate families have varying responses to anthropogenic disturbance gradients
Lake Wildwood Waste Water Treatment Plant (LWW WWTP)

- Recreational dam in lower Deer Creek watershed
- Immediately downstream of dam is WWTP
- Government mandate in 2007
  - Upgrade to fully denitrify wastewater, produce more consistent, contained flows
Indicator Species Analysis

**Before**
Coleoptera, Dytiscidae
“Water Tiger”, Diving Beetle
IV = 20.0, p = 0.0340
Tolerance Value 5, Predator

**After**
Diptera, Tipulidae
Crane Flies
IV = 32.9, p = 0.0382
Tolerance Value 3, Shredder/Collector
Conclusions

• Nitrate load decreased below the WWTP
• Community composition changed downstream of the WWTP
  – IBI showed increase in score between Oct. before and after at site 8.
  – Multivariate analysis did show seasonality, and that site 8 changed the most significantly.
But what does this all mean?

- Citizen-science data can successfully be used for robust bioassessments.
- Multi-metric methods can be amenable to smaller watersheds with varied disturbances conditionally.
- Family level IBI is sensitive enough for analysis.
- The “causal analysis” can also be used as a validation step for the IBI scores when using smaller datasets.