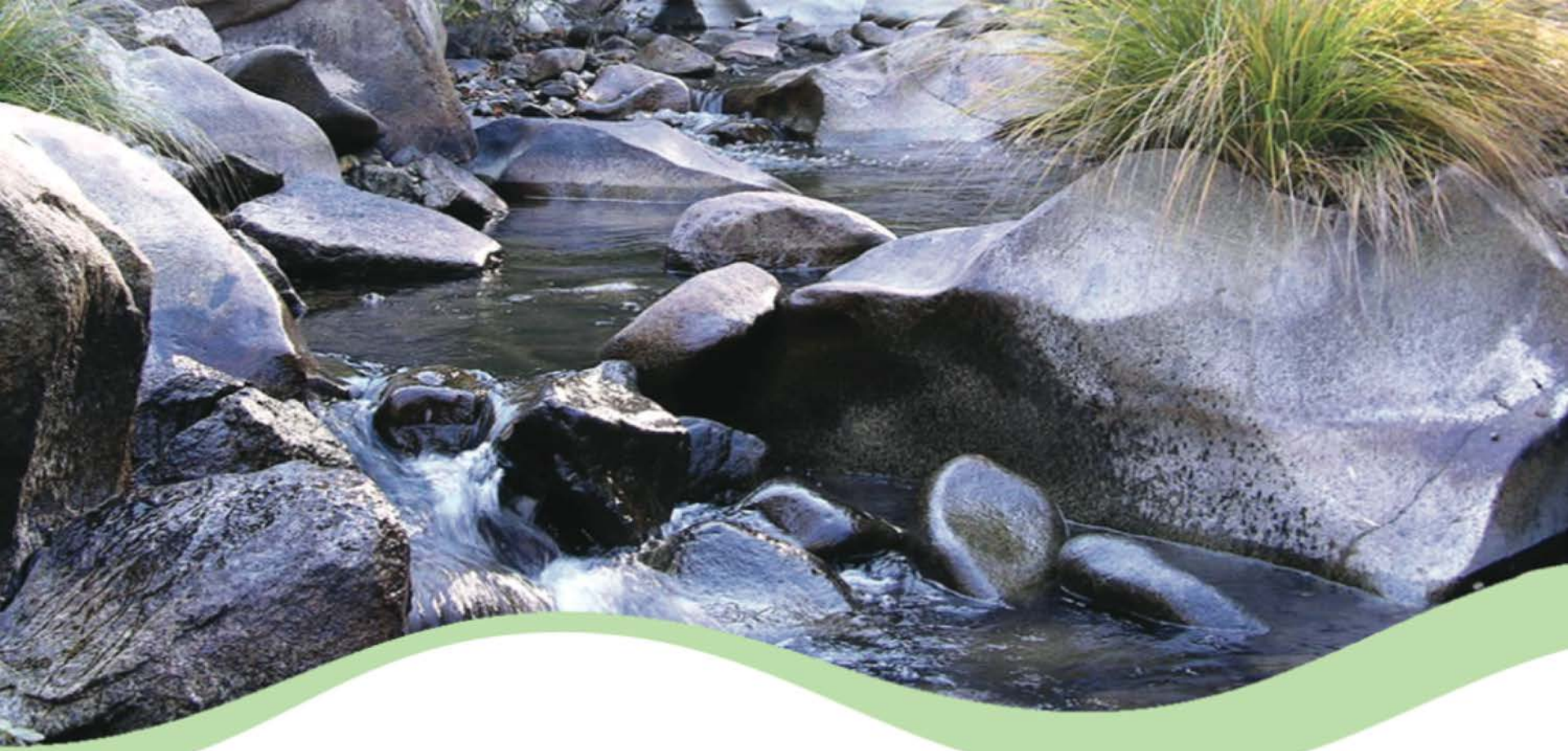


SIERRA

Streams

INSTITUTE

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

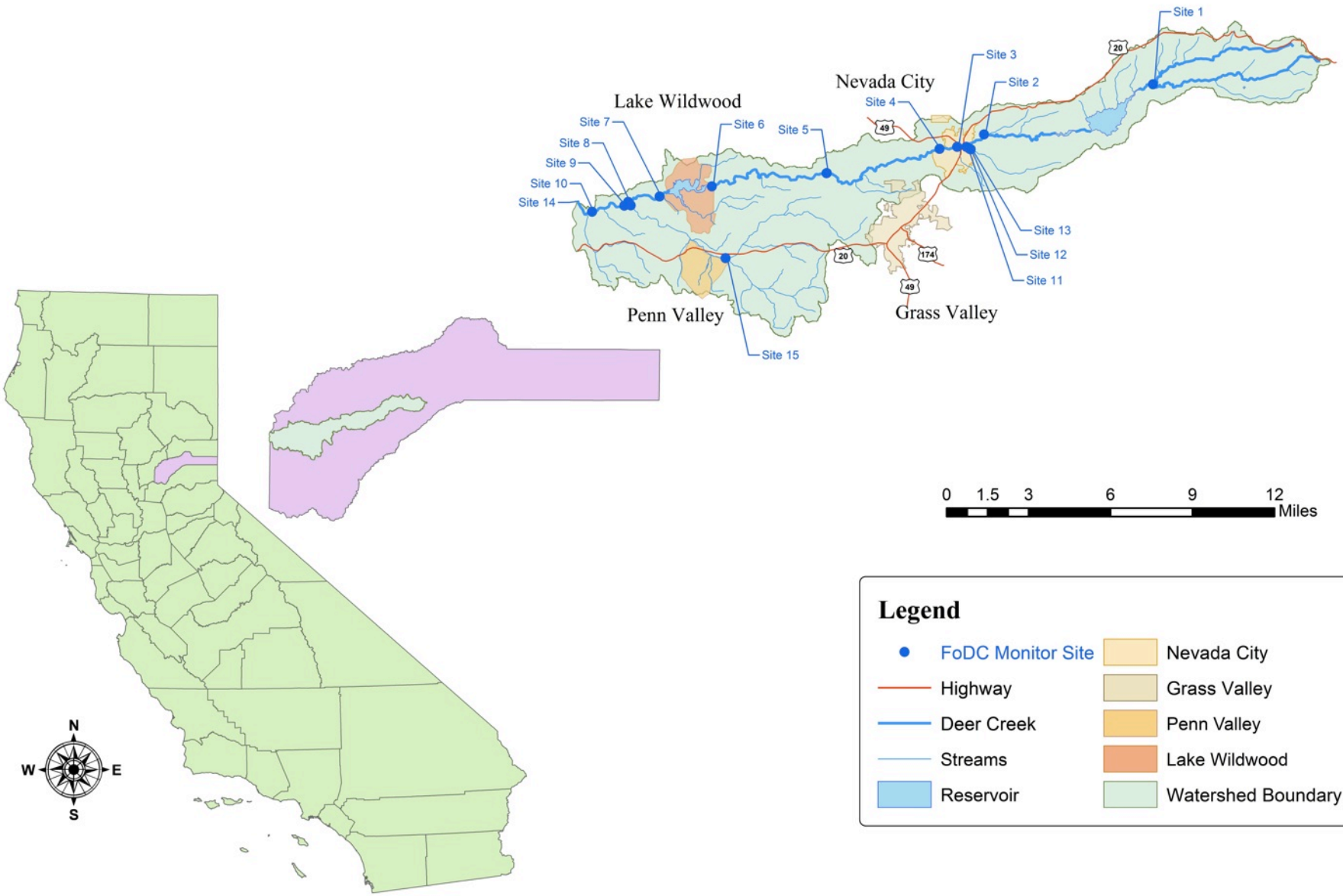
Community-Based Participatory Research

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.

Deer Creek Watershed



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

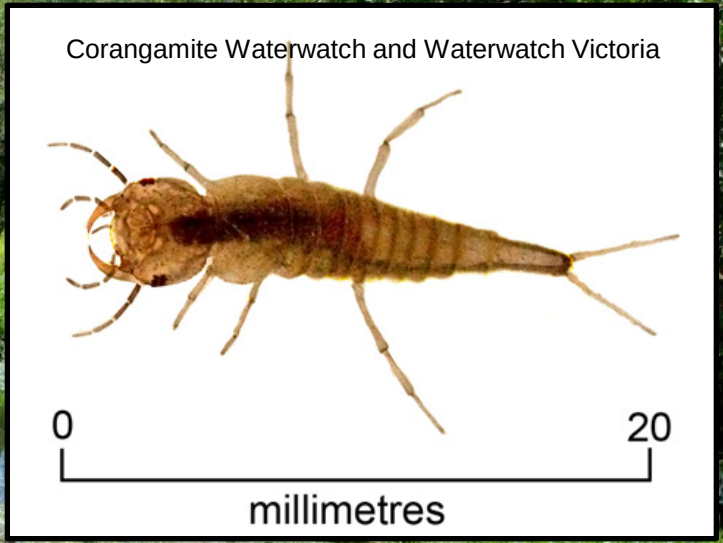
Lake Wildwood Waste Water Treatment Plant (LWW WWTP)

- 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.