

Bioassessment in the Lahontan Region



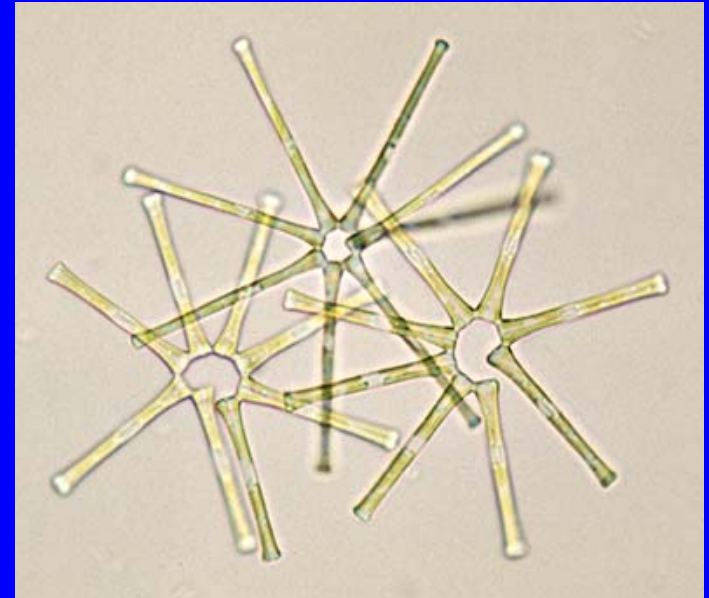
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Outline

- **About the Lahontan Region**
- **Use of bioassessment in various programs**
- **Lessons Learned**



CALIFORNIA

NEVADA

LAKE TAHOE



LAHONTAN RWQCB



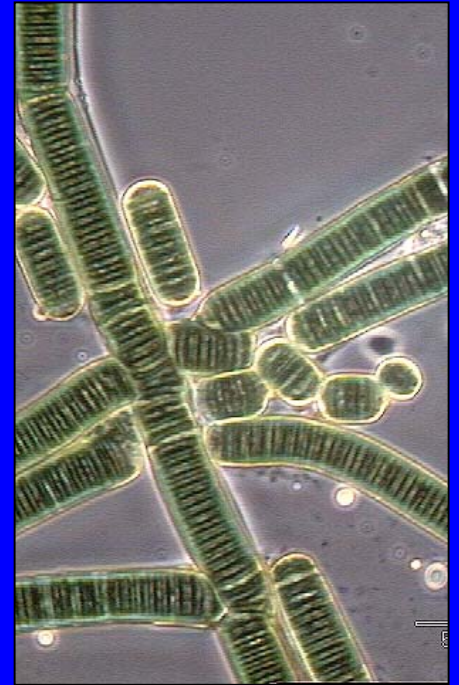
surface water resources

- 700 + lakes
- 3,170 miles of streams
- 2 ONRWs



Programs:

- SWAMP
- WDRs / 401
- NPS
- NPDES
- TMDLs
- other



SWAMP bioassessment

6 watershed basins

Truckee

Tahoe

Carson

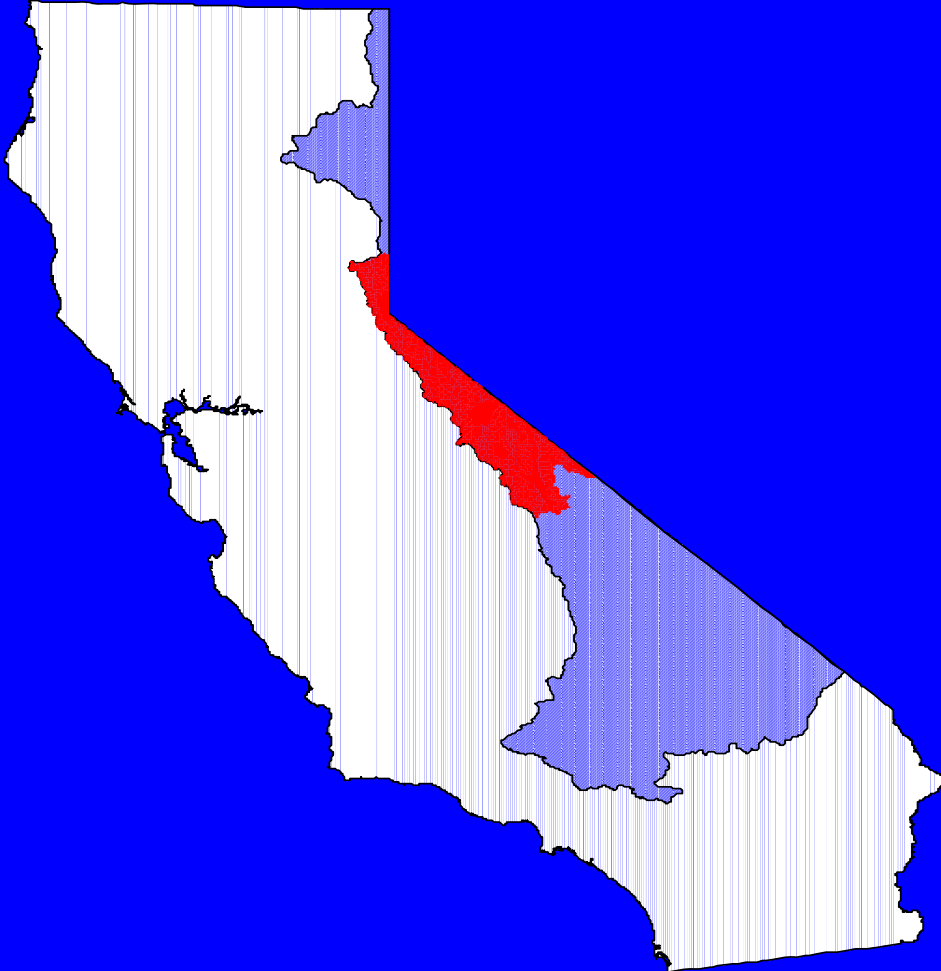
Walker

Mono

Upper Owens

IBIs based on:

- benthic macroinvertebrates
- periphyton



Other SWAMP bioassessment

- Martis Valley
- Amargosa River
- other coordinated efforts

“Core Regulatory”

- Grover Hot Springs
- Bagley Valley Restoration

Grover Hot Springs S.P.



- permitted discharge
- chlorine
bromine
- Require toxicity tests ?



NO SWIMMING
IN THIS AREA
DURING
THE
WINTER
MONTHS





**Policy for Implementation of Toxics
Standards for Inland Surface Waters,
Enclosed Bays, and Estuaries of California**

(Phase 1 of the Inland Surface Waters Plan
and the Enclosed Bays and Estuaries Plan)

2000

STATE WATER RESOURCES CONTROL BOARD
California Environmental Protection Agency

- Chronic toxicity tests
- Toxicity effluent limitations

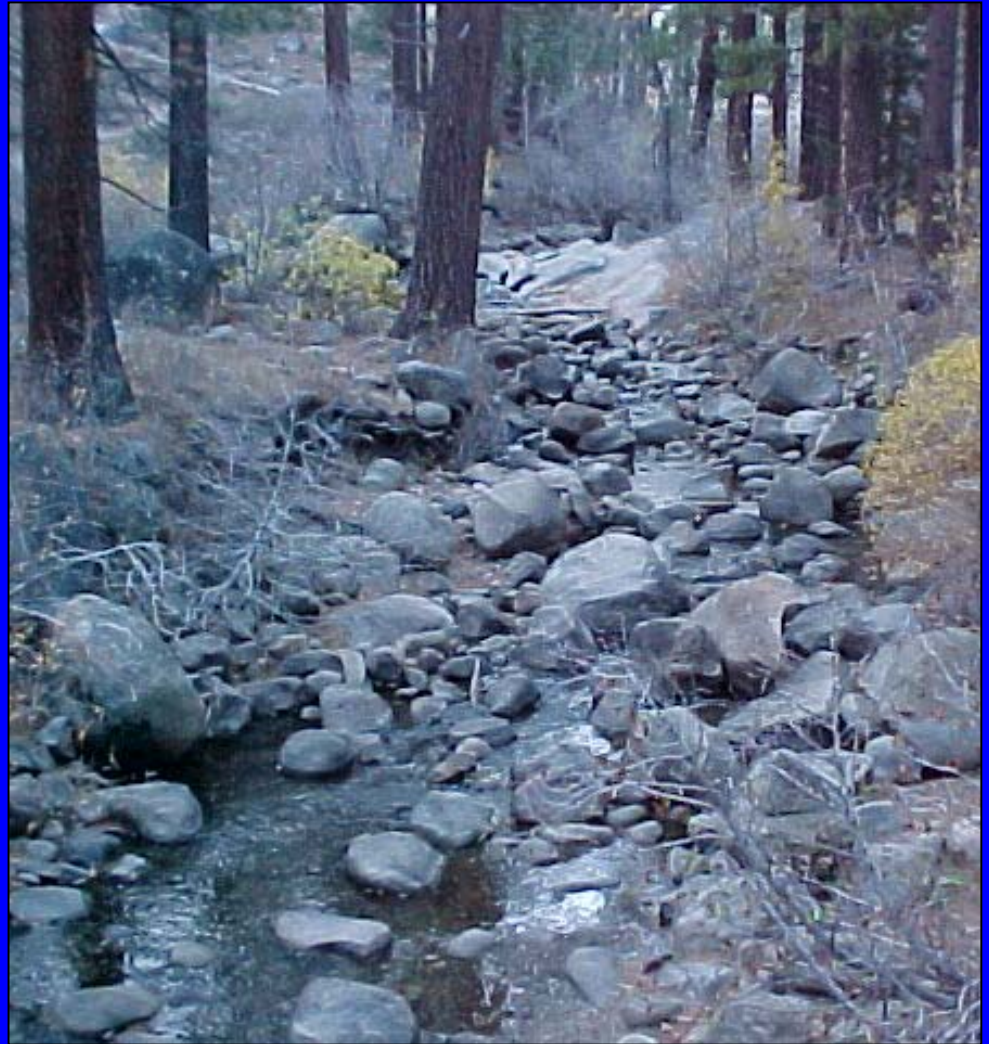
“...for all discharges that will cause, have reasonable potential to cause, or contribute to chronic toxicity in receiving waters.”

GHSSP ~ \$60,000

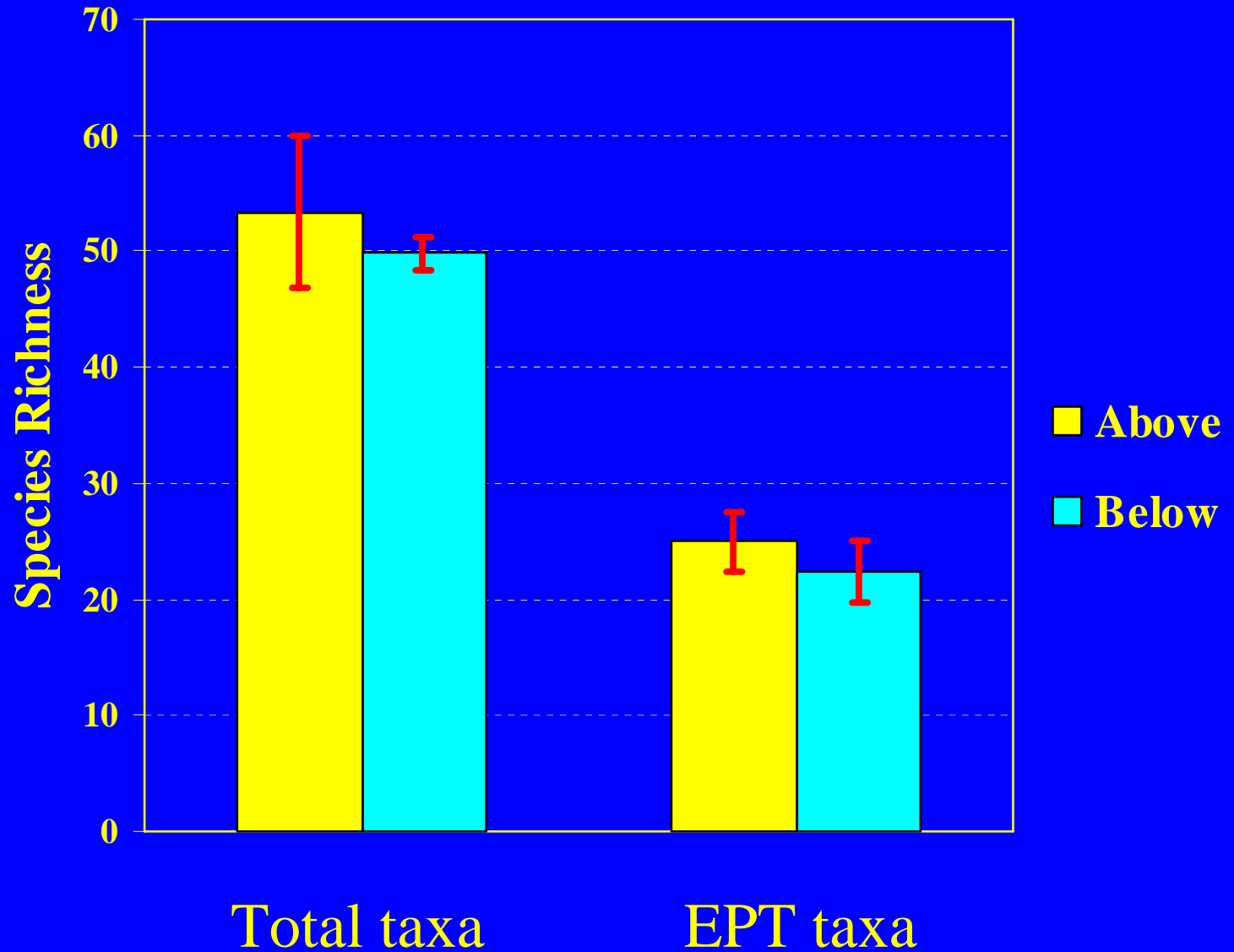
Hot Springs Creek

- Bioassessment sampling
above/below facility
- UC-SNARL method
~ \$3,000

(paid by GHSSP)



Hot Springs Creek



Conclusion: *Grover Hot Springs*

- **High biological integrity both upstream and downstream of State Park discharges**
- **No impairment detected**
- **Savings of more than \$50,000**

Lessons Learned: *Grover H.S.*

- Be creative !!!



Bagley Valley Watershed Restoration Project

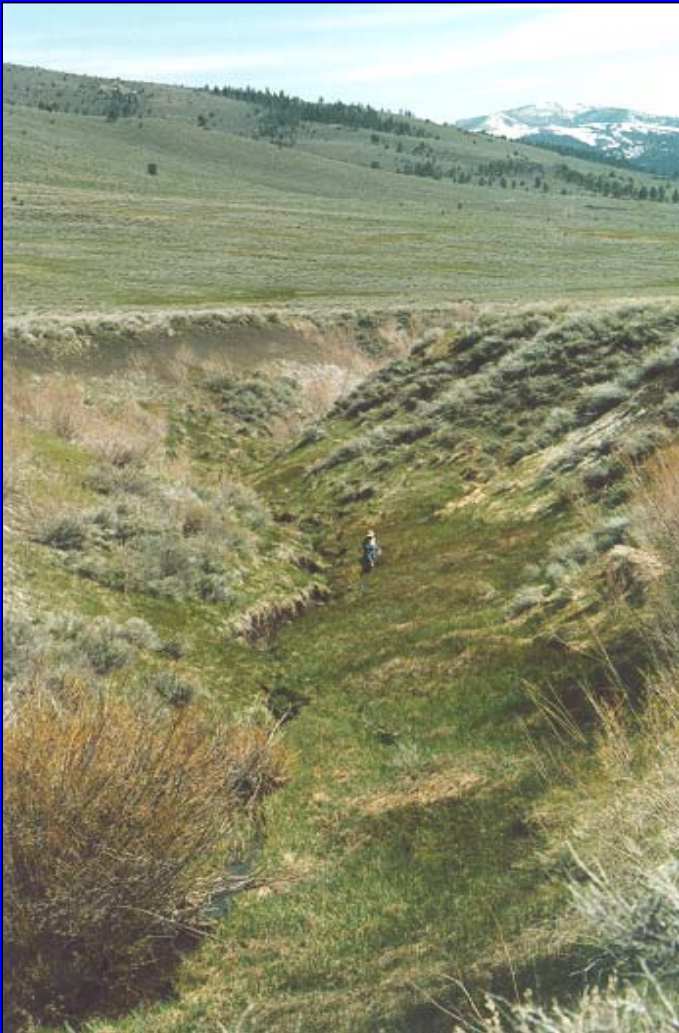








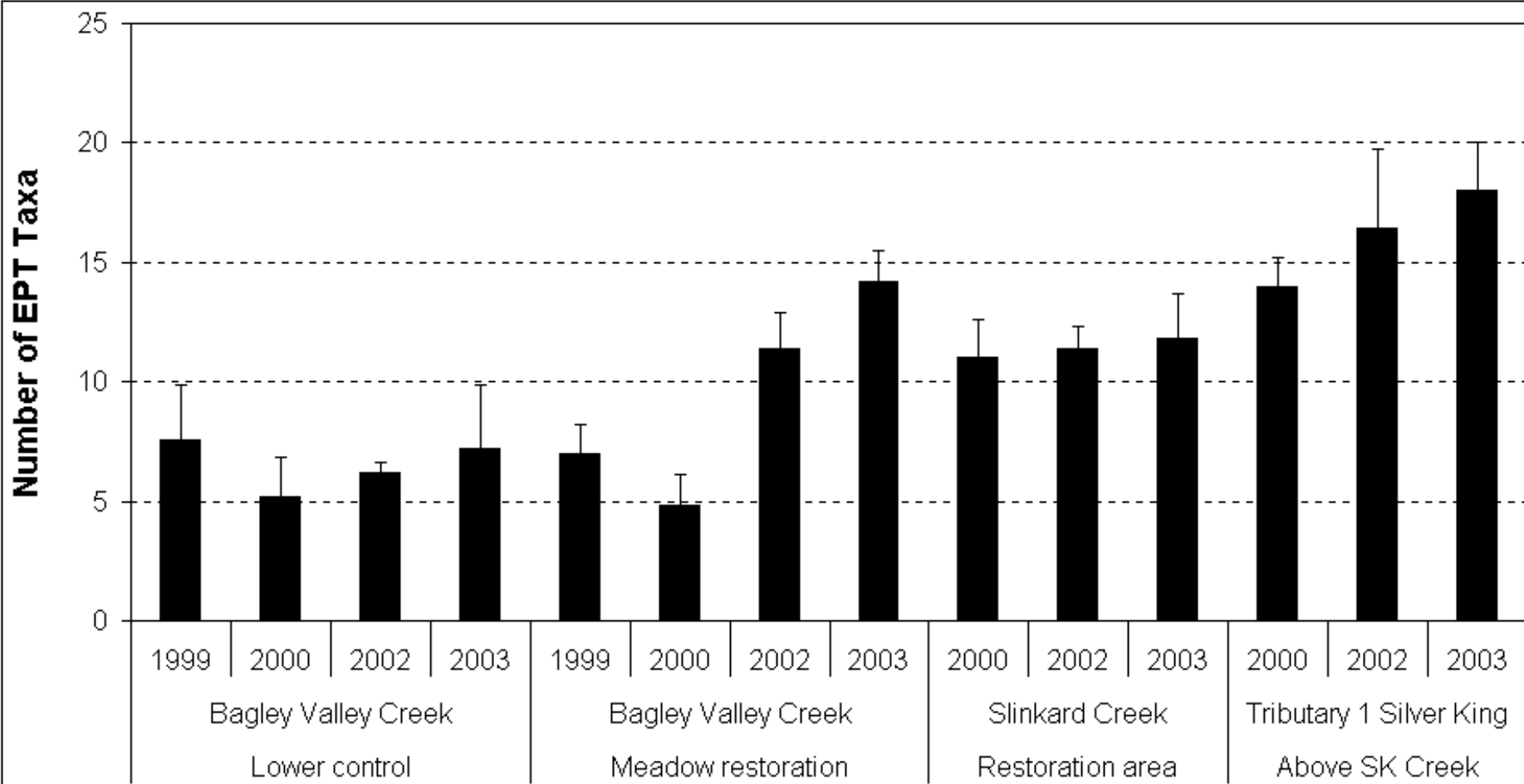
Bioassessment @ Bagley Valley



- Pre-project monitoring
1999 and 2000
- Post-project monitoring
2002 and 2003

Costs shared for:

- treatment sites
- reference sites





Lessons Learned: *Bagley Valley*

- **Rapid re-colonization / recovery is possible after stream channel re-construction**
- **Early establishment of baseline (pre-project) conditions is essential to document success**
- **Post-project evaluation is work, but worth it.**
- **Beware of exotic species introductions & budget for follow-up !!!**

Nonpoint Source (NPS)

- West Walker River
Grazing BMPs



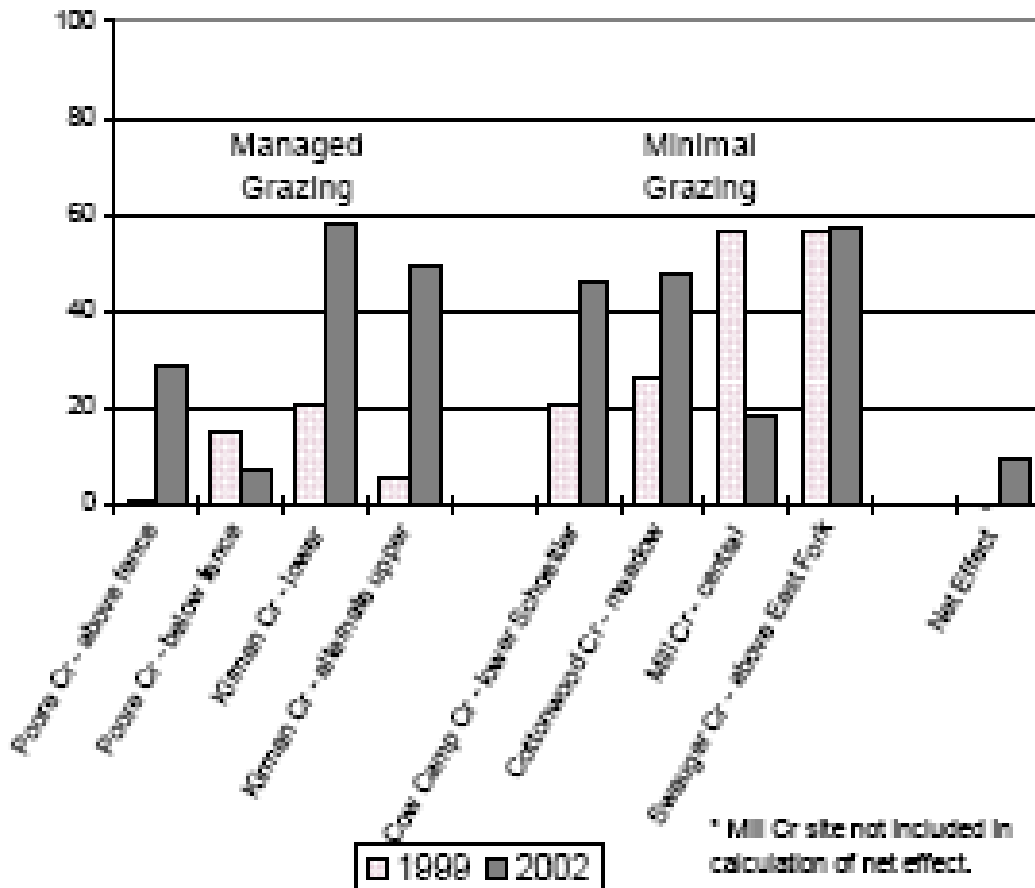
**9 treatment streams (NPS)
9 control streams (SWAMP)**

small, med, large

**phys, chem, bio
1999 - 2002**



Figure 1c: Percent Riparian Cover
Small Sites - 1999 and 2002



Increased at most treatment sites:

- riparian cover
- bank stability

Increased at 3 of 4 small Tx streams:

- D_{50} particle size

Decreased at 50% of small Tx streams:

- percent F+S

Lessons Learned: *NPS*

- **Grazing impacts depend in part on stream size**
- **Stream biota did not respond to reduced grazing pressure over short (3-year) term**
- **Long-term monitoring is needed**
- **To document short-term responses, need variables such as riparian cover, bank stability, substrate (e.g., percent fines + sand, D50 particle size)**

NPDES

- fish hatcheries



Lessons Learned: *fish hatcheries*

- **You can't always trust
your mother**

**(Biota can be impaired when
chemical criteria are met.)**

Total Maximum Daily Loads (TMDLs)

- Heavenly Valley Creek
- Squaw Creek
- Truckee River

Heavenly Valley Creek Sediment TMDL

Narrative target:

“Improving trends in benthic invertebrate community metrics over time, approaching conditions in Hidden Valley Creek”

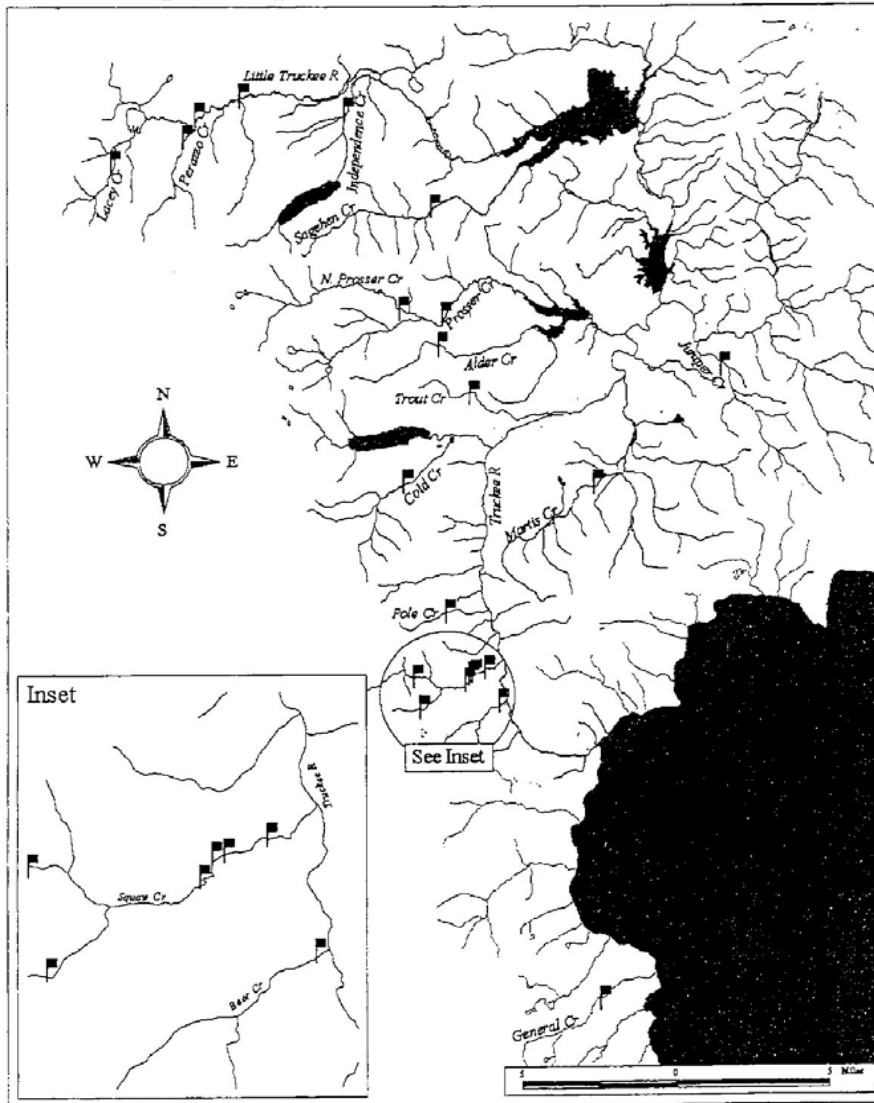


An aerial photograph of a mountain valley. The foreground and middle ground are dominated by dense, dark green coniferous forests. A river or stream flows through the center of the valley, winding between the forested slopes. In the background, rugged, rocky mountain ranges stretch across the horizon under a clear blue sky with a few wispy clouds. The overall scene depicts a natural, mountainous landscape.

Squaw Creek Sediment TMDL

Development of Biological
Water Quality Targets

Map of Squaw Creek TMDL Study Sites



This map shows the stream reaches surveyed in 2000-2001 (flags) for development of water quality targets using benthic invertebrate bioassessment.

Reference sites

Lacey Creek
Perazzo Cr
L. Truckee R (upper)
L. Truckee R (middle)
Independence Cr
Sagehen Cr
N. Prosser Cr
Prosser Cr
Juniper Cr
Cold Cr
Martis Cr
Pole Cr
Bear Cr
General Cr

Sed exposure sites: 2

Alder Cr
Trout Cr

Squaw Cr sites: 6

Linkage to sediment dose

- AGNPS model used to identify sites over a range of potential sediment discharge (for dose-response)
- Model predictions + actual stream survey data



Biotic Index	Taxa Diversity	EPT Taxa	% EPT Taxa	Sensitive Taxa	Tolerant Taxa	R-50 Index	Biological Condition Index
3.09 - 4.22	47.2 - 52.6	20.8 - 24.9	36 - 46%	16.8 - 19.9	0.4 - 1.7%	2.6 - 5.9	≥ 25

Distributed Load (tons/mile/m)	D-50 Size (mm)	%F+S Cover
< 400	> 40	< 25

Truckee River TMDL ??



Lessons Learned: *TMDLs*

Jury is still out, but we believe that bioassessment will prove valuable for:

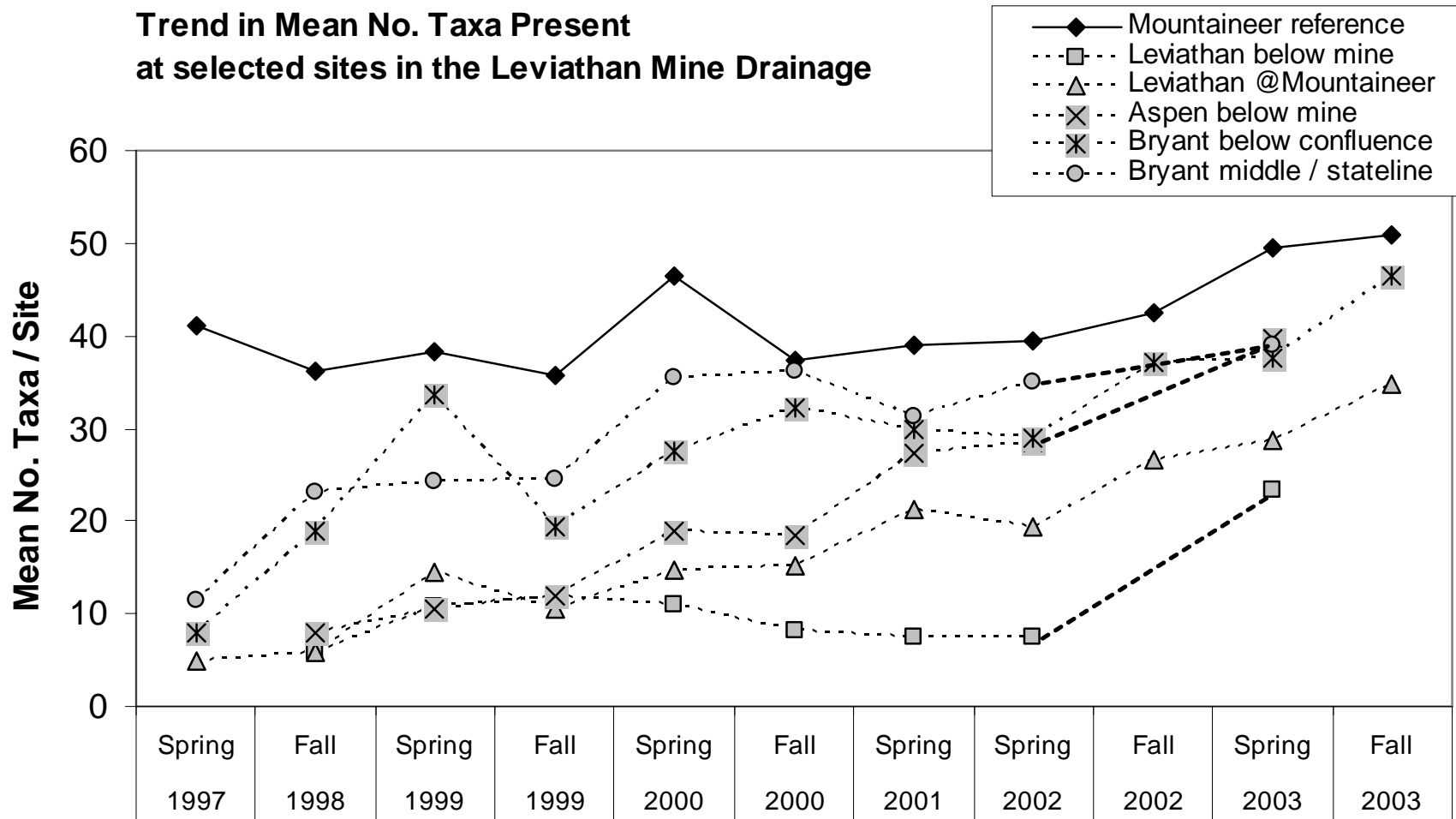
- Establishing endpoints (DFC, numeric targets)
- Monitoring attainment of numeric targets
- De-listing decisions

Leviathan Mine

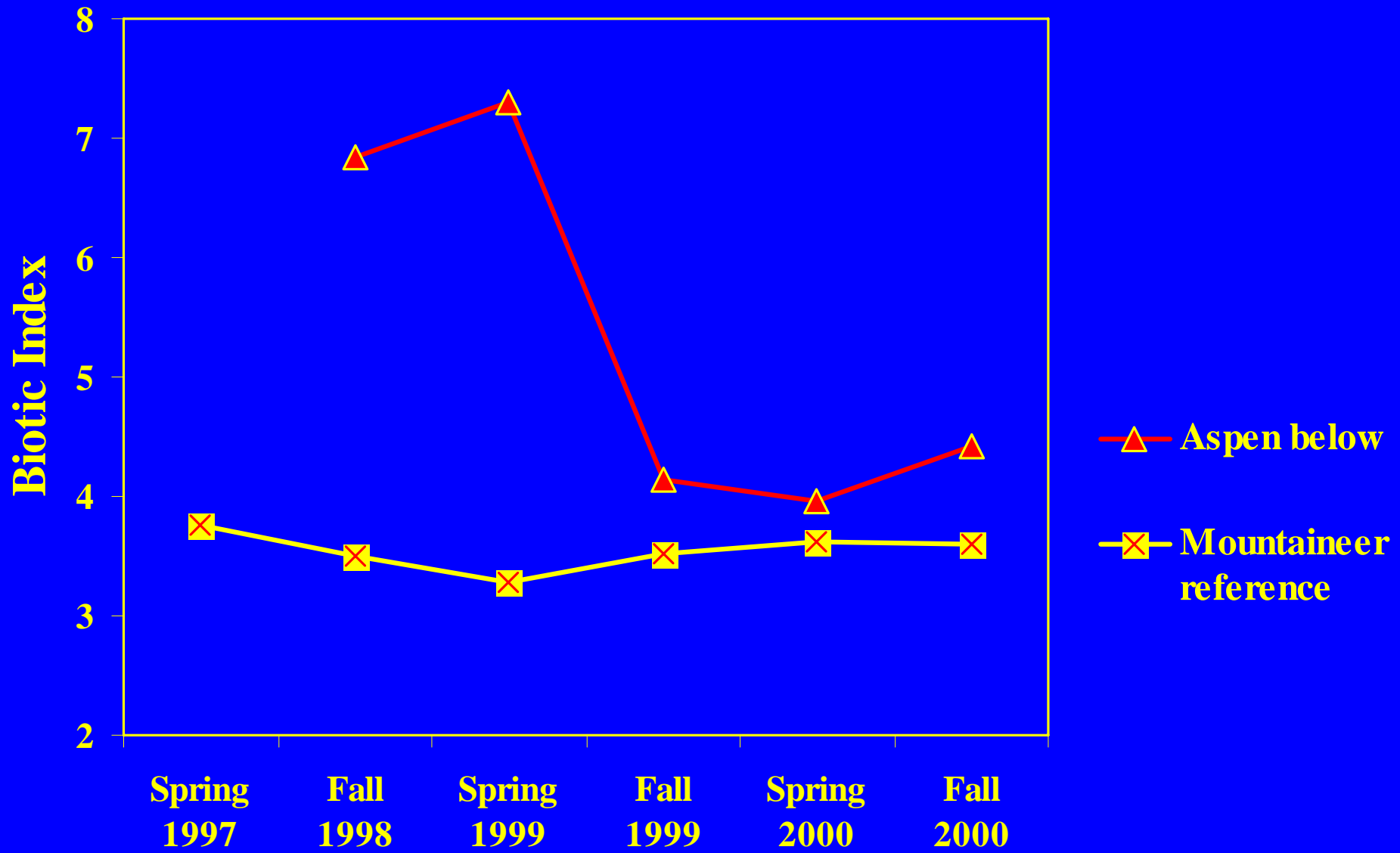




Trend in Mean No. Taxa Present at selected sites in the Leviathan Mine Drainage



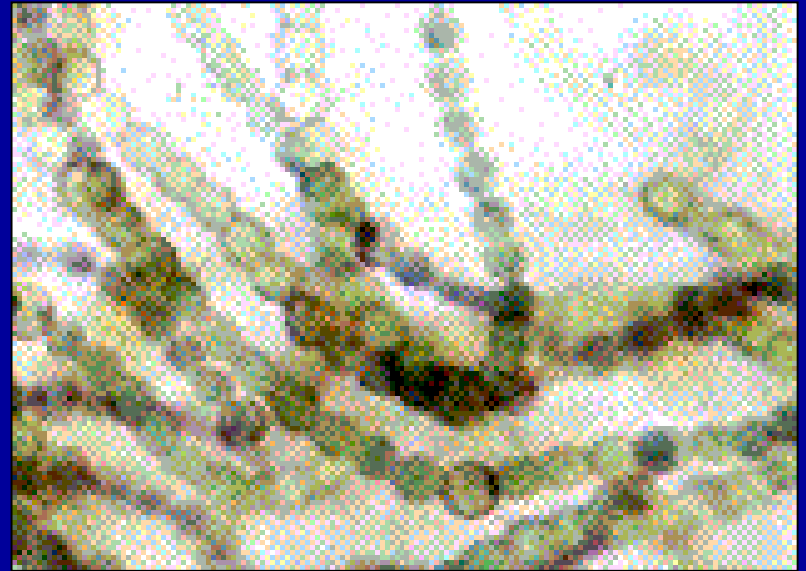




Lessons Learned: *Leviathan Mine*

Bioassessment has been invaluable in documenting biological recovery of receiving waters

Every stakeholder has accepted the bioassessment results



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the end