



Bioassessment in the San Francisco Bay Area

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Bioassessment in Region 2

1. Overview of Activities
2. Analytical Methods
3. Findings
 - Land Use
 - Natural Variation
4. IBI Development

SWAMP Watershed Sampling Design

- Rotating watersheds
- Monitoring to answer questions of water quality impact:
 - Land and water use
 - Beneficial uses
- Sampling at confluences
- “Tier 1” Benthic Sampling

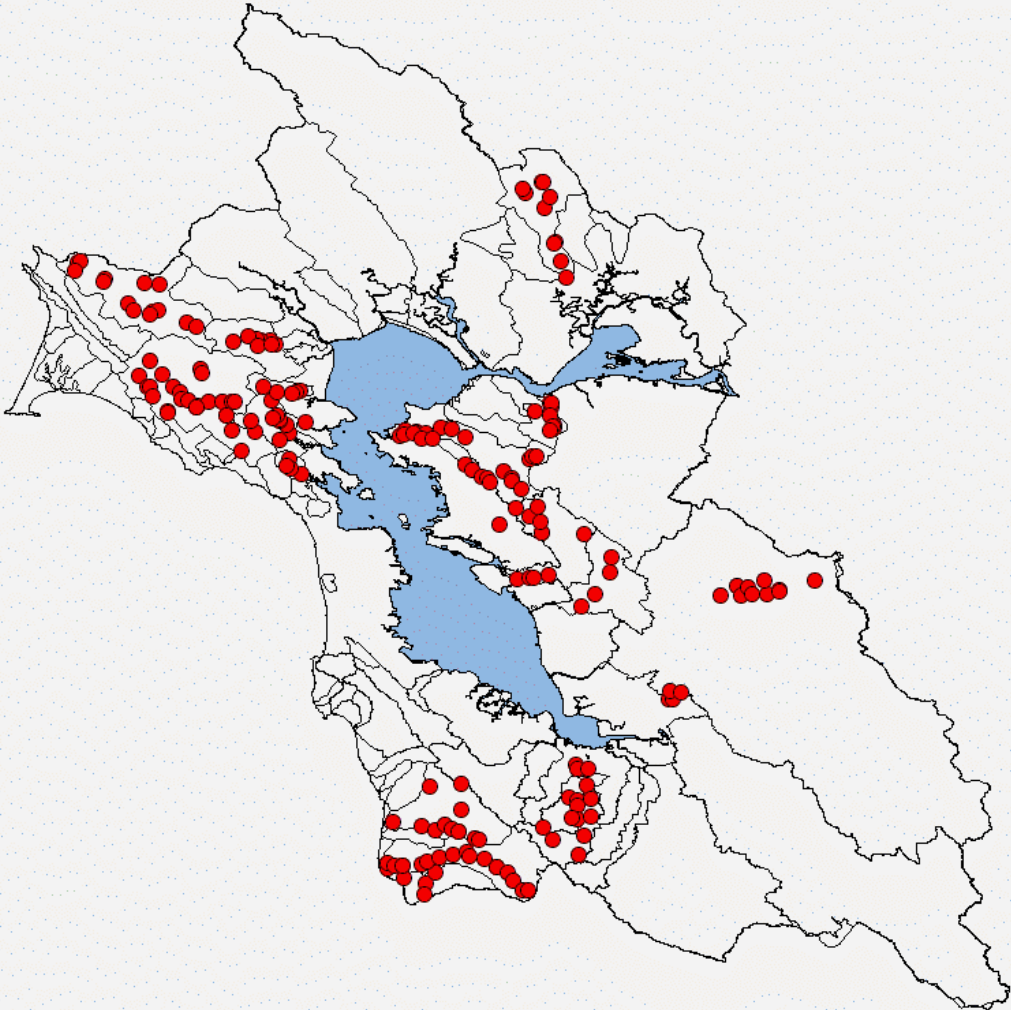


Bay Area Partners

- **Stormwater Pollution Prevention Agencies**
 - Alameda Countywide Clean Water Program
 - Contra Costa County Clean Water Program
 - Marin County Stormwater Pollution Prevention Program
 - San Mateo Countywide Stormwater Pollution Prevention Program
 - Santa Clara Valley Urban Runoff Pollution Prevention Program
 - Vallejo Sanitation and Flood Control District
- **Land Management Agencies**
 - National Park Service
 - San Francisco Public Utilities Commission
 - East Bay Regional Park District
- **Nonprofit Organizations**
 - Friends of the Napa River
 - Sonoma Ecology Center
- **And Others...**

Bioassessment Sites 2000-2002

SWAMP, Alameda, Contra Costa, Marin



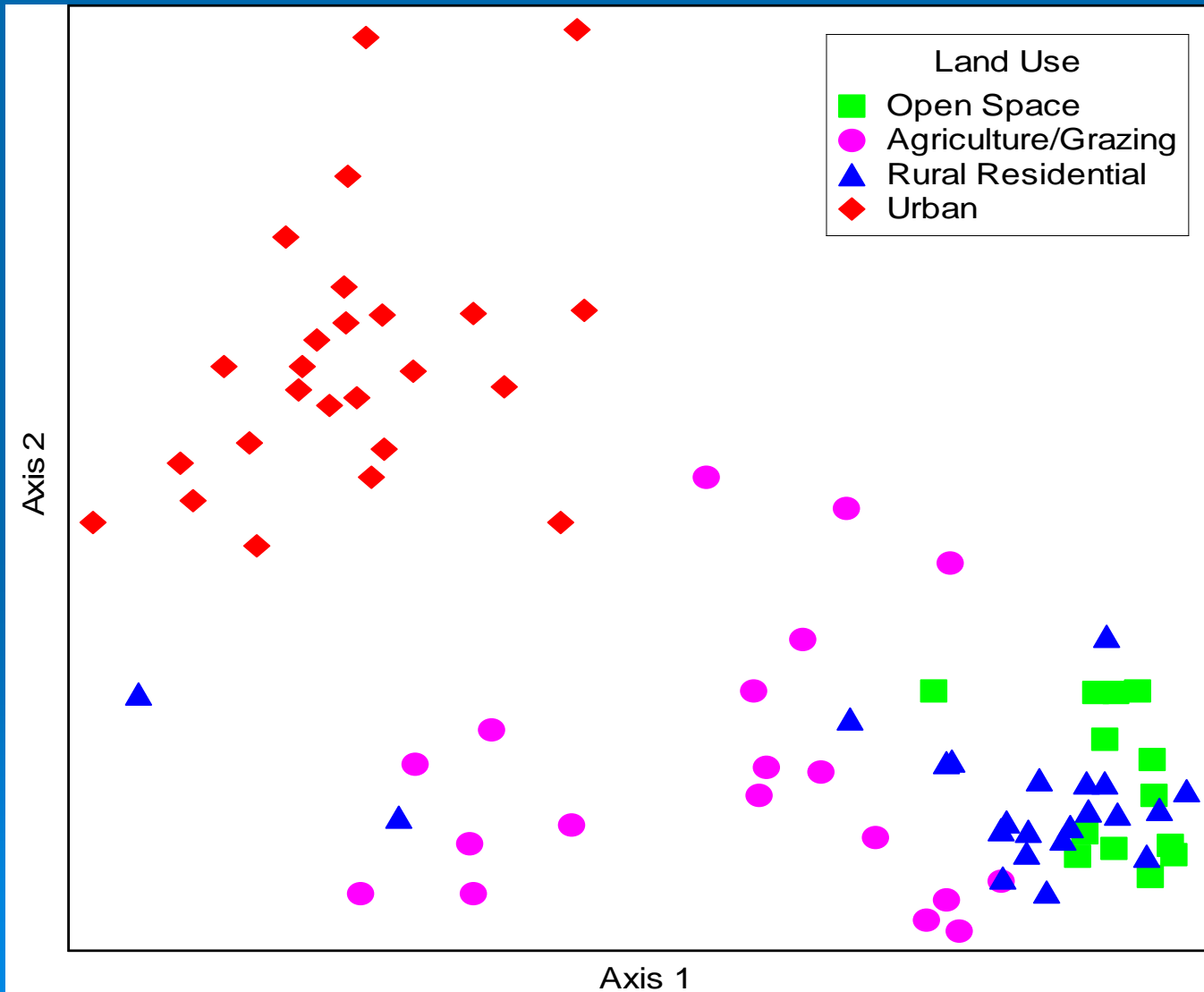
10 0 10 20 30 40 50 Miles



Analytical Methods

- 2003 CAMLNet STE
- Biological Metrics
- Multivariate statistics
 - Non-metric multidimensional scaling (NMS)
 - Cluster analysis

Land Use: Taxa Presence



Land Use: Metrics (Median Values)

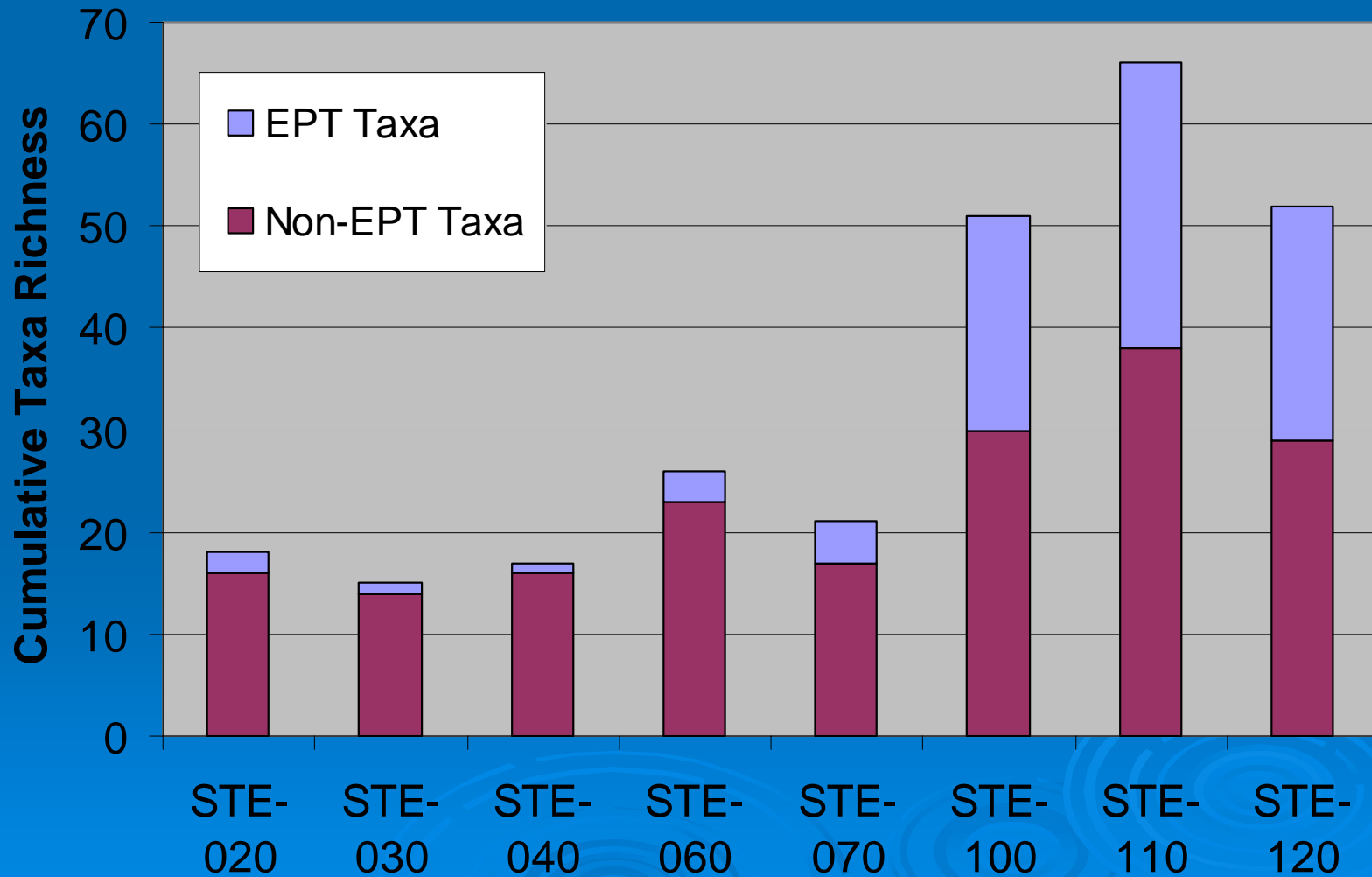
	Open Space	Grazing	Ag	Rural Res.	Urban
Number of Sites	13	10	9	22	25
Taxa Richness	46	28	27	40	13
EPT Taxa	22	14	14	20	2
% Sensitive EPT	35	28	14	36	0
% Oligochaeta	0	3	3	2	21
Tolerance Value	3.6	4.6	5.0	3.8	5.7

Common Tolerant Taxa



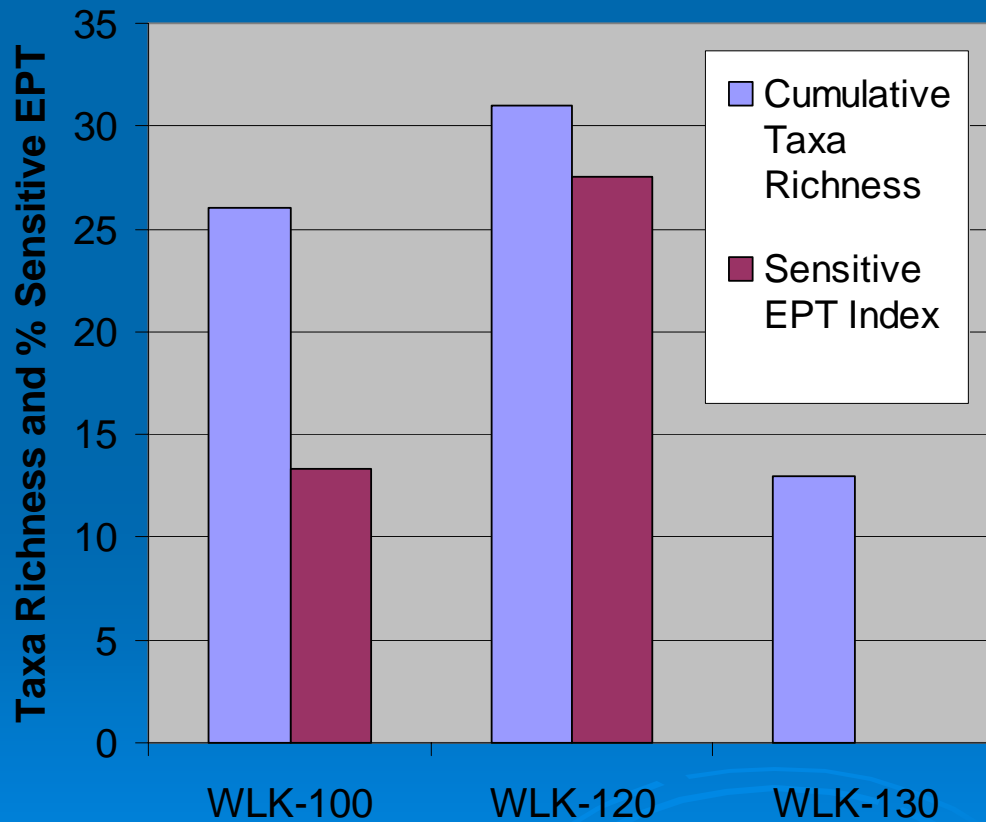
Land Use Effects

Stevens Creek



Restoration Effectiveness

Chileno Creek

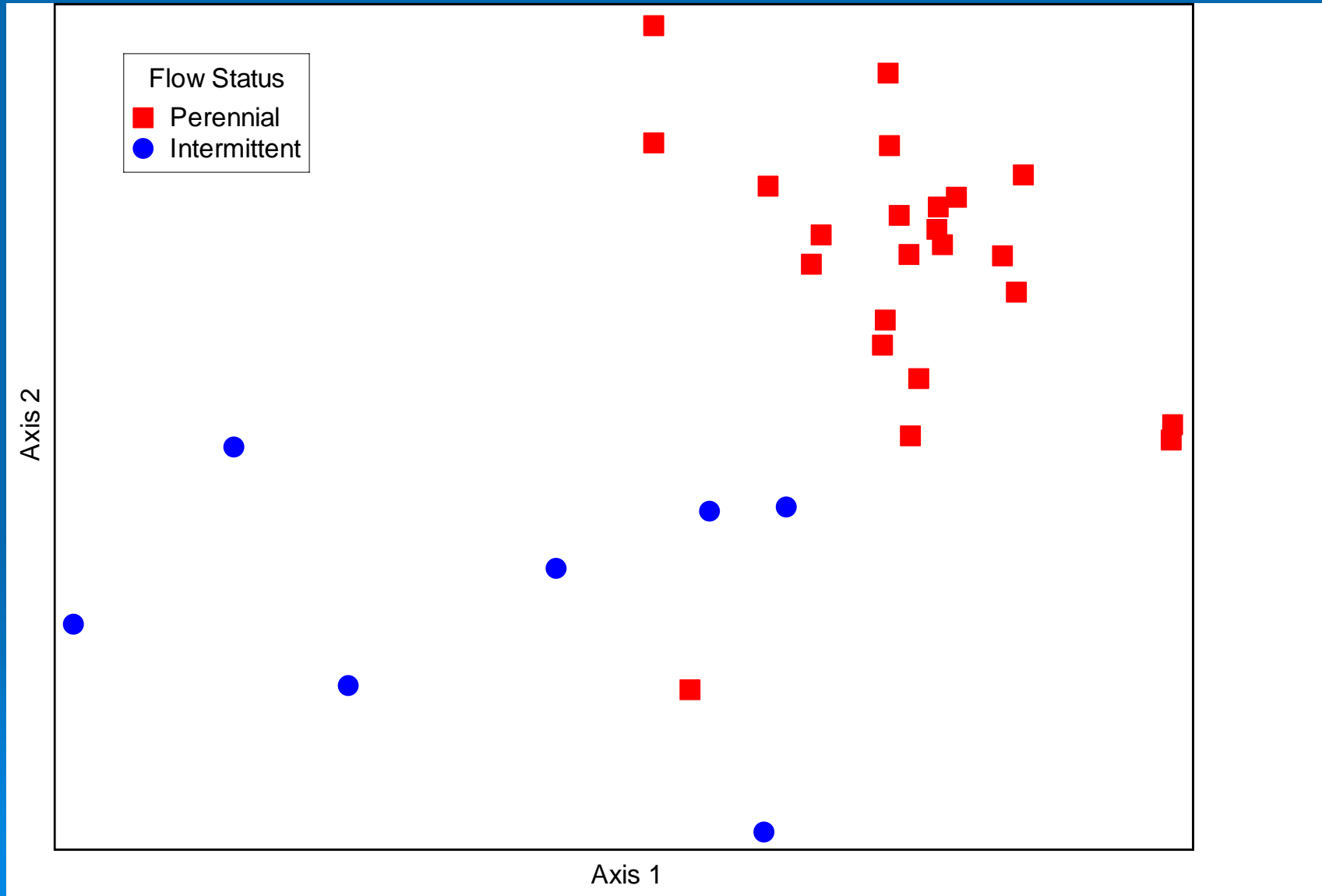


Natural Variability

- Watershed Annual Precipitation
- Stream Gradient
- Drainage Area
- Flow Intermittency



Natural Variability: Intermittency



Taxonomic Differences



Natural Variability

	Mean Intermittent	Mean Perennial	T-test
	n = 6	n = 17	Prob. > t
Taxa Richness	32	46	<0.0001
Trichoptera Taxa	4	9	<0.0001
Coleoptera Taxa	2	7	<0.0001
% Sensitive EPT	33	38	0.2364
% Coleoptera	1	12	0.0071

IBI Development

- Bay Area Macroinvertebrate Bioassessment Information Network (BAMBINet)
 - Since 2001
 - Annual Meetings
 - Collaborative Process