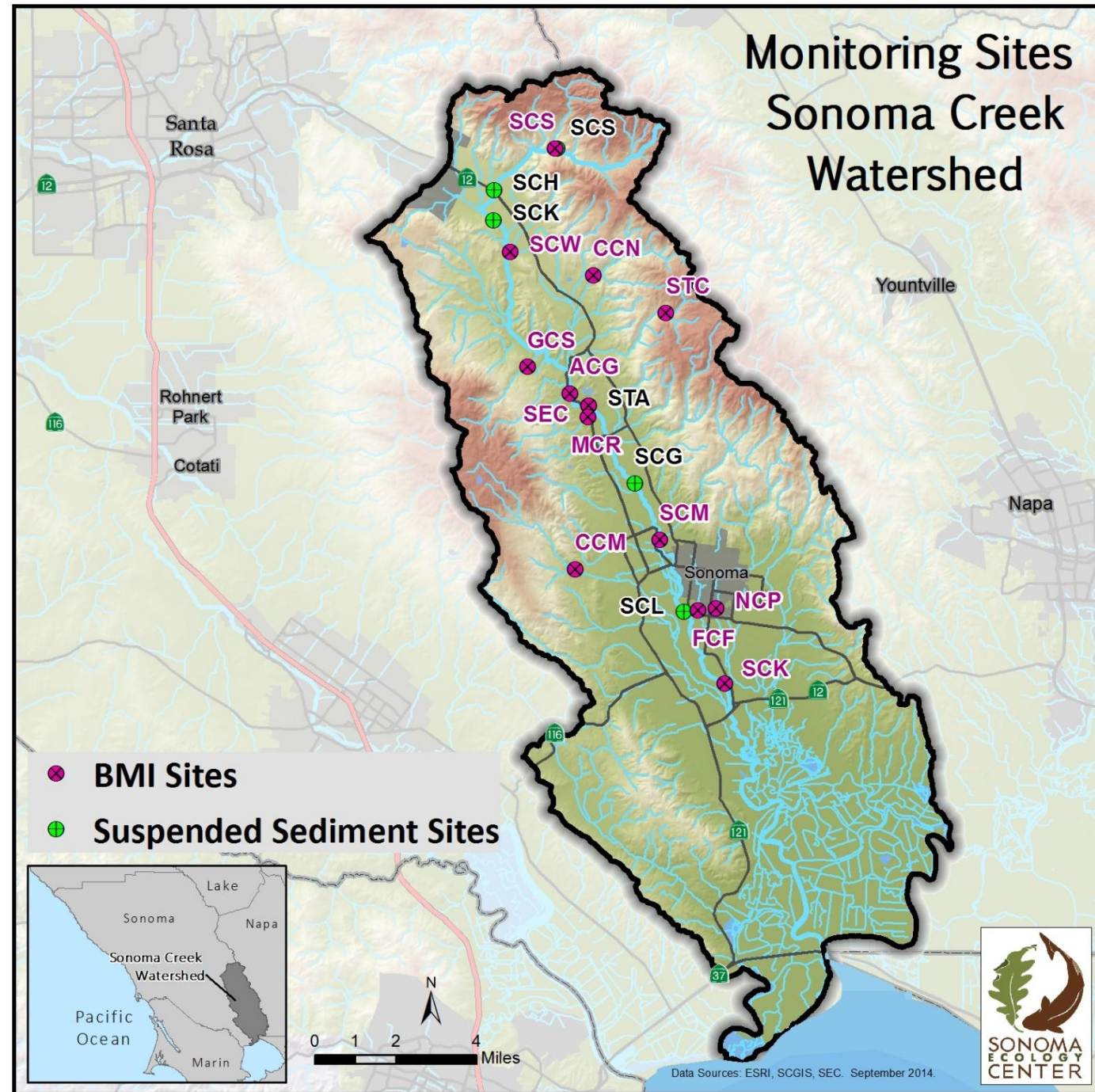


Sonoma Creek Watershed TMDL Implementation Project Update – Monitoring

September 18, 2014

Mark Newhouser
Sonoma Ecology Center

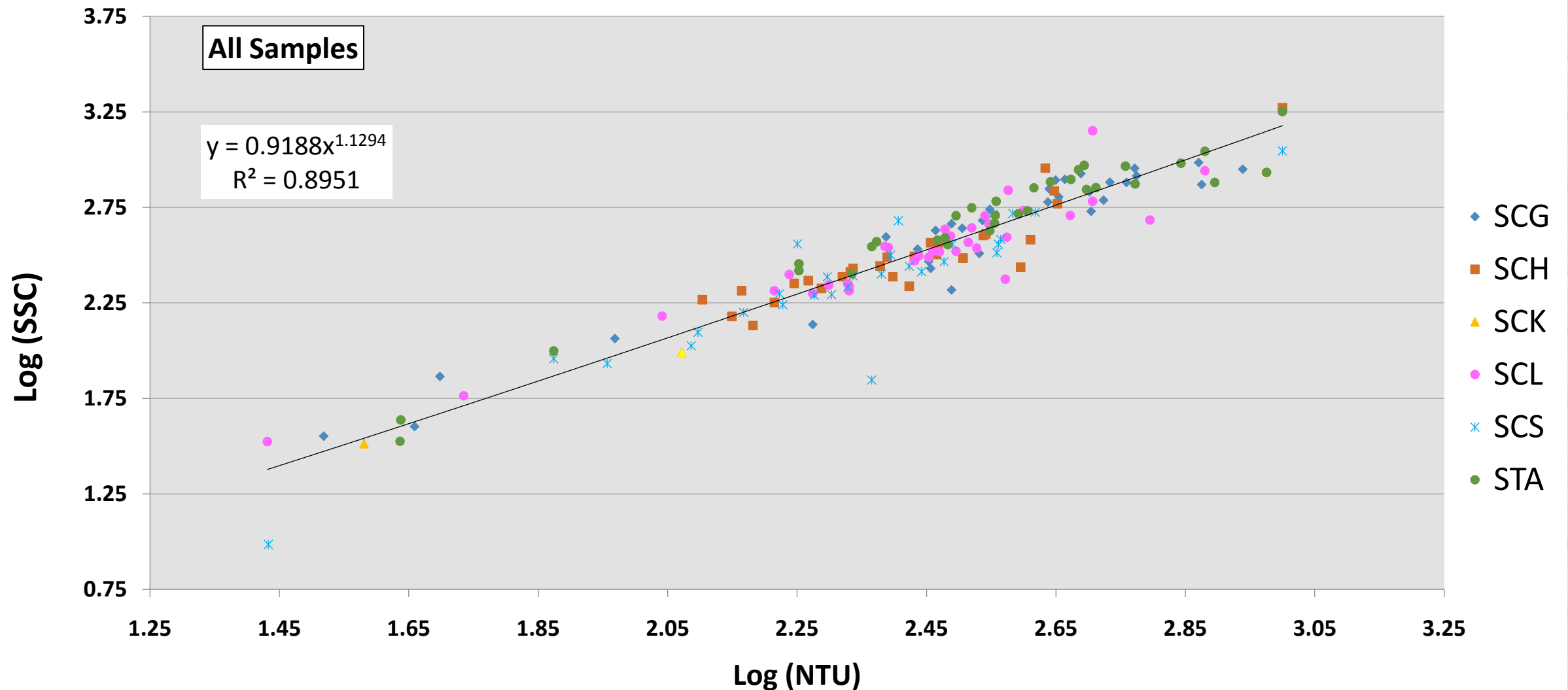
Project funded by the USEPA San Francisco Bay
Water Quality Improvement Fund
Managed by San Francisco Estuary Program,
North Bay Watershed Association, and
Marin Municipal Water District



Stream water quality monitoring in Sonoma Creek watershed

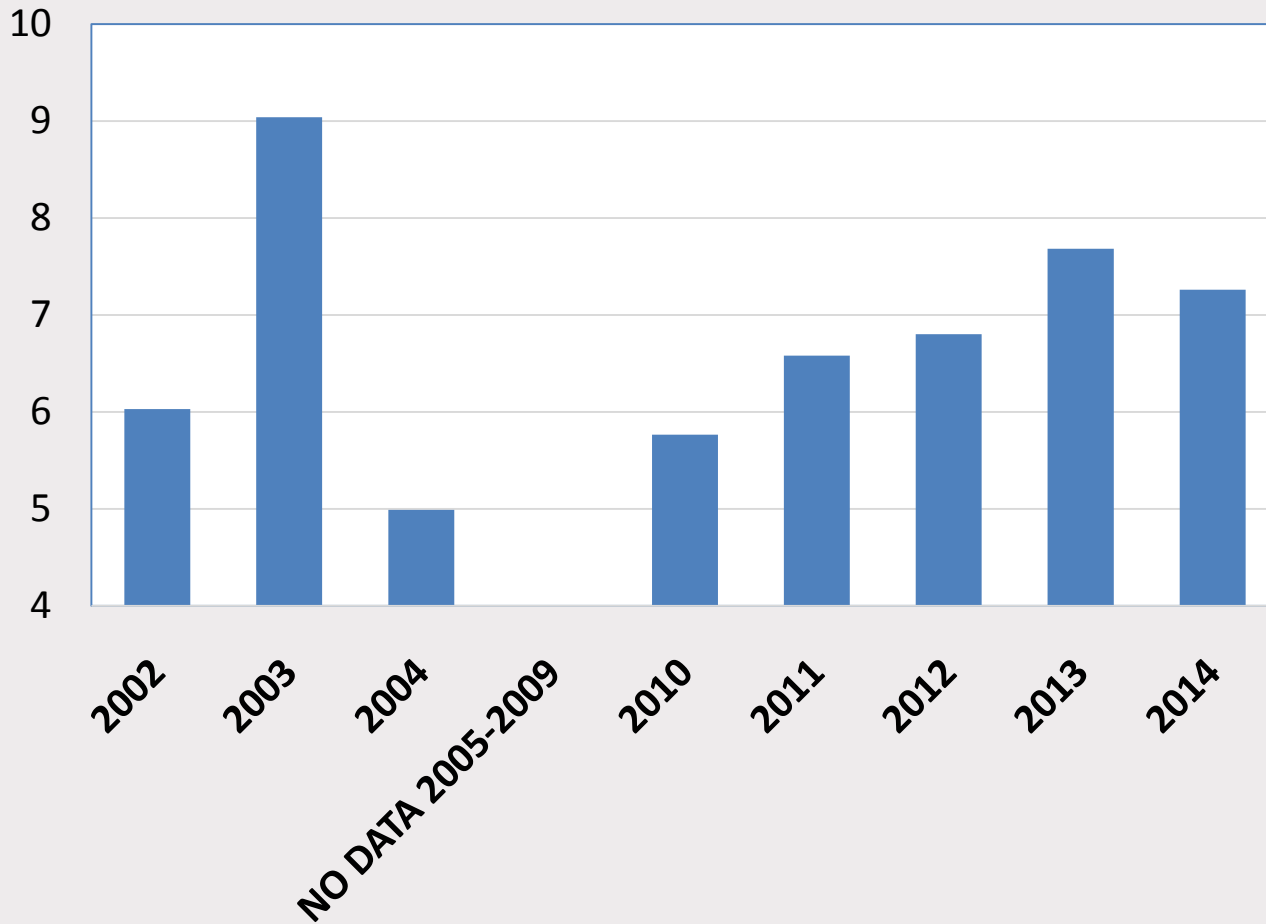
1996-2002	Summer pool temperature monitoring
1998, 2004	Spawning gravel surveys
2001-2013	Occasional benthic macroinvertebrate monitoring
2002-2004, 2010-2014	Install continuous flow monitoring station on Sonoma Creek to supplement USGS gage(s), begin annual monitoring of suspended sediment and turbidity during storms, including first flush
2004-2005	Pool filling and gravel permeability
2006	Sonoma Creek Watershed Limiting Factors Analysis for Steelhead, SEC
2006	Basin Plan Amendment for pathogens TMDL
2006	Sediment Source Analysis, SEC
2007	Basin Plan Amendment for urban pesticide toxicity TMDL
2010	Basin Plan Amendment for sediment TMDL
2014	Streamflow monitoring to determine losing and gaining reaches

Relation between Turbidity and Suspended Sediment, 2014



Severity Index

Maximum Severity Reading During First Flush



Newcombe and Jensen, 1996

Effects on Salmonids From Suspended Sediment

0 = No effect

1 = Alarm reaction

2 = Abandonment of Cover

3 = Avoidance response

4 = Short-term reduction in feeding rates and/or feeding success

5 = Minor physiological stress, increased coughing rate, and/or increased respiration rate

6 = Moderate physiological stress

7 = Moderate habitat degradation and/or impaired homing

8 = Major physiological stress, poor condition, and/or long-term reduction in feeding rates and/or feeding success

9 = Reduced growth rate, delayed hatching, and/or reduced fish density

10 = 0 to 20% mortality, increased predation, and/or moderate to severe habitat degradation

11 = >20 to 40% mortality

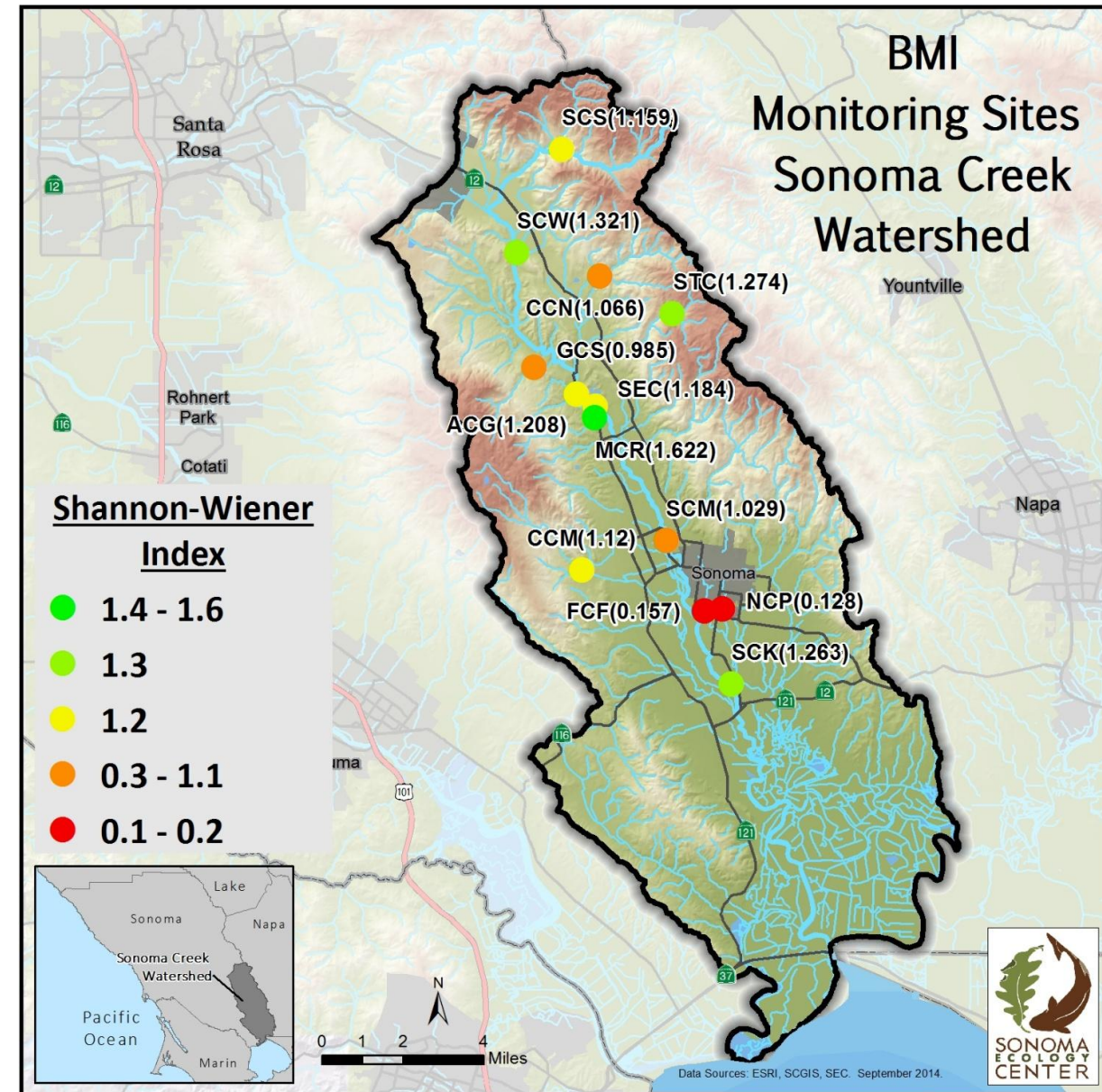
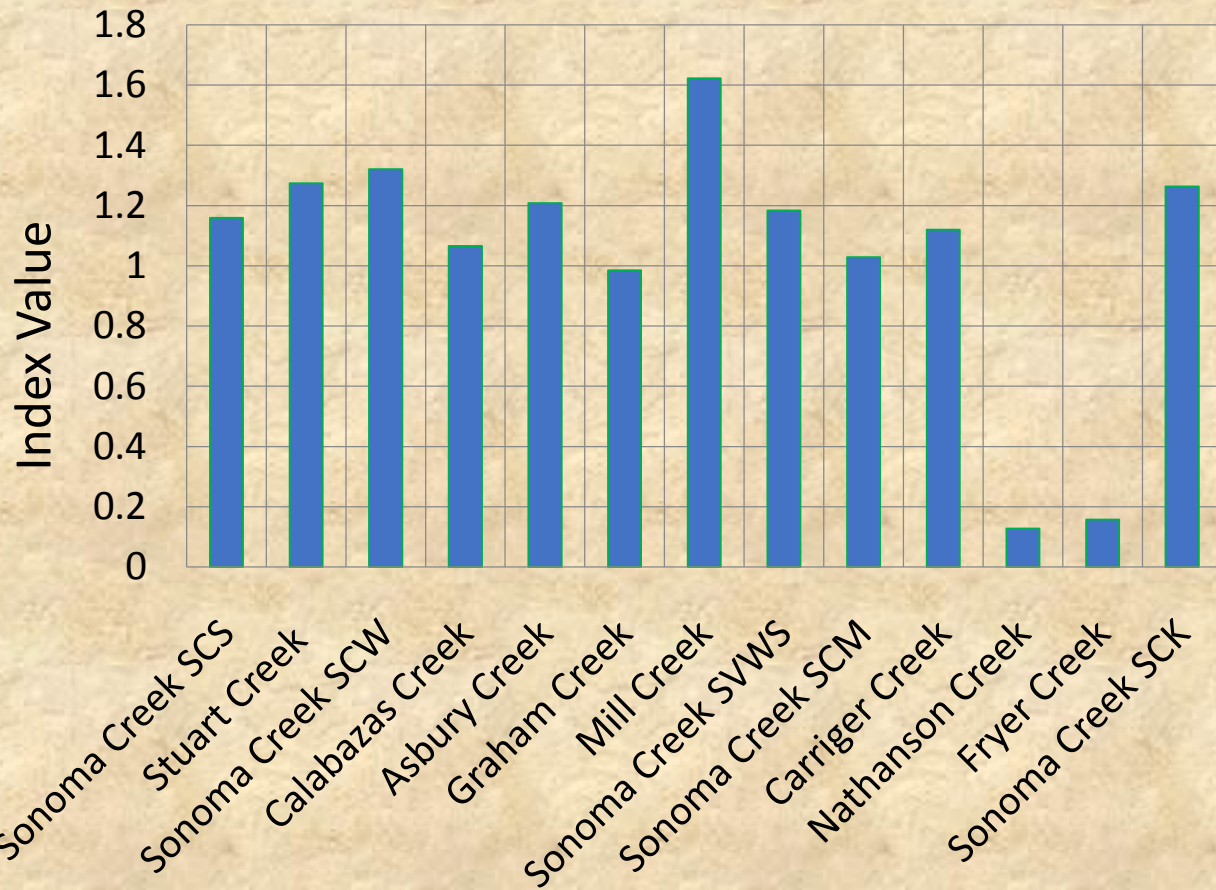
12 = >40 to 60% mortality

13 = >60 to 80% mortality

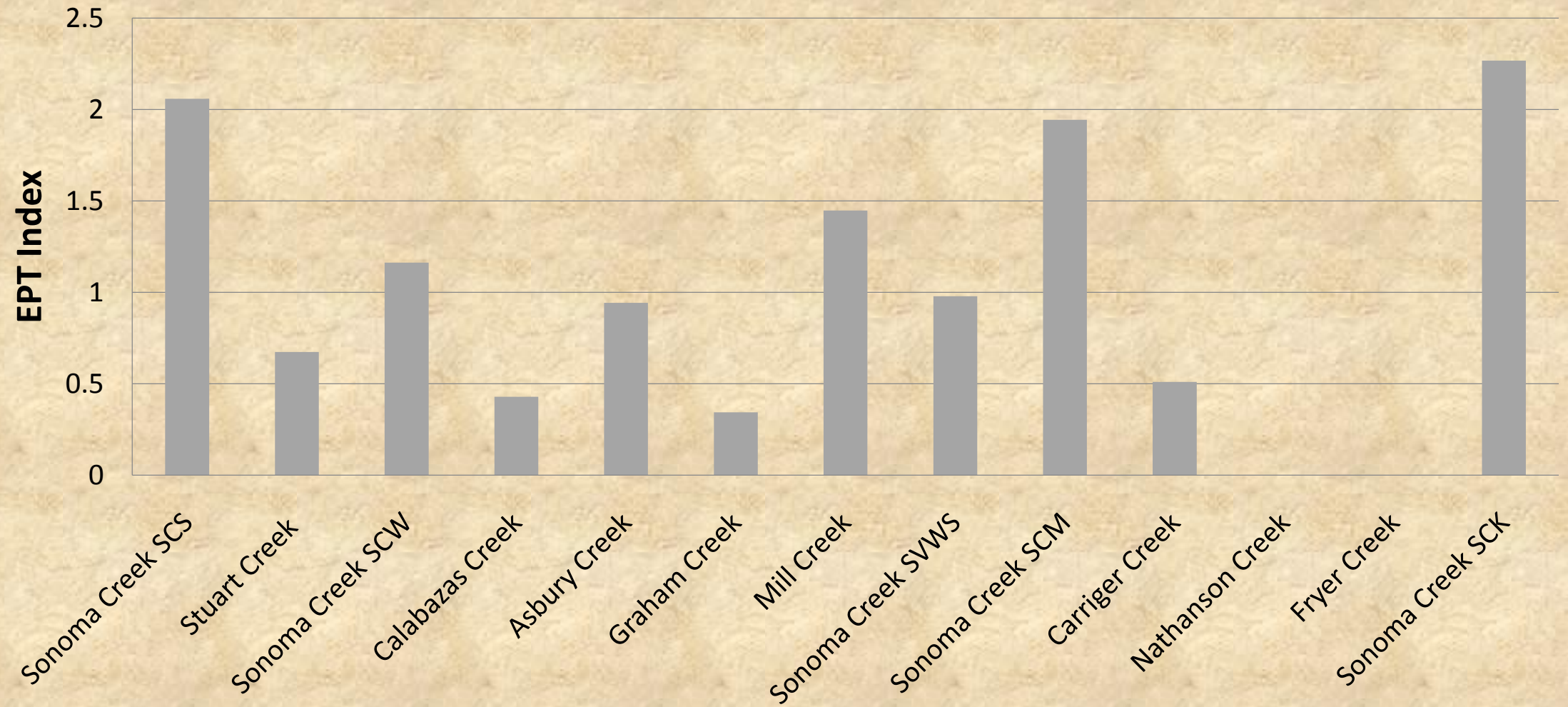
14 = >80 to 100% mortality

2013 Benthic Macroinvertebrates

Shannon-Wiener Diversity Index

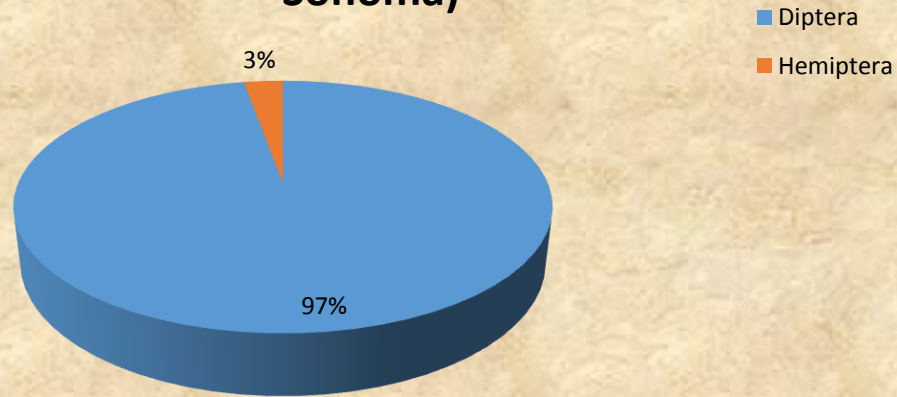


EPT Index

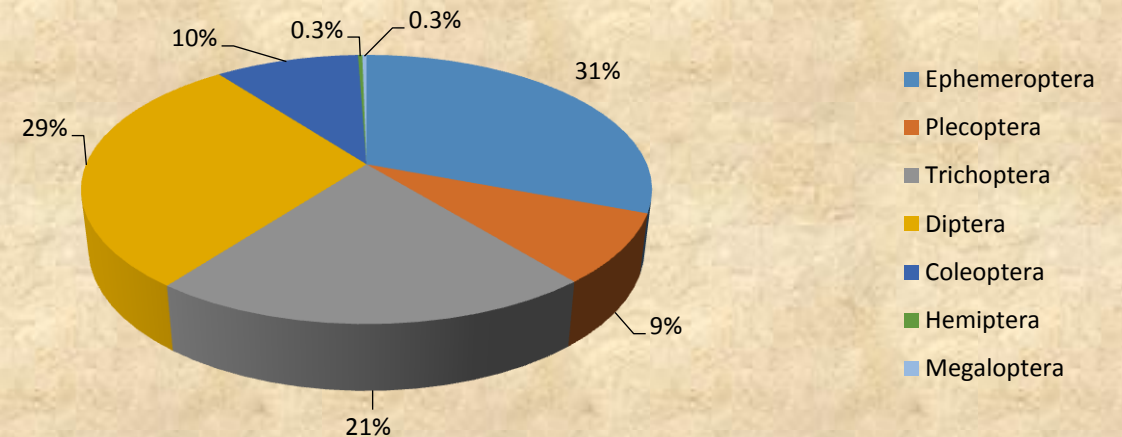


Bad vs. Good Order Richness

BMI Diversity at Nathanson Creek (in City of Sonoma)



BMI Diversity on Sonoma Creek at Sugarloaf Ridge State Park (Headwaters)



Project Next Steps

- Continue maintenance and monitoring of TMDL implementation sites (restoration and stormwater management)
- Complete analysis of monitoring data
- Continue capacity building partnerships with County and local orgs.
- Update priority list of next steps for TMDL monitoring and implementation within the Sonoma Creek watershed
- Identify potential funding sources for further TMDL implementation and monitoring