Nevada's 2014 Bioassessment Program

Marianne Denton, Bioassessment Program Coordinator
Nevada Division of Environmental Protection
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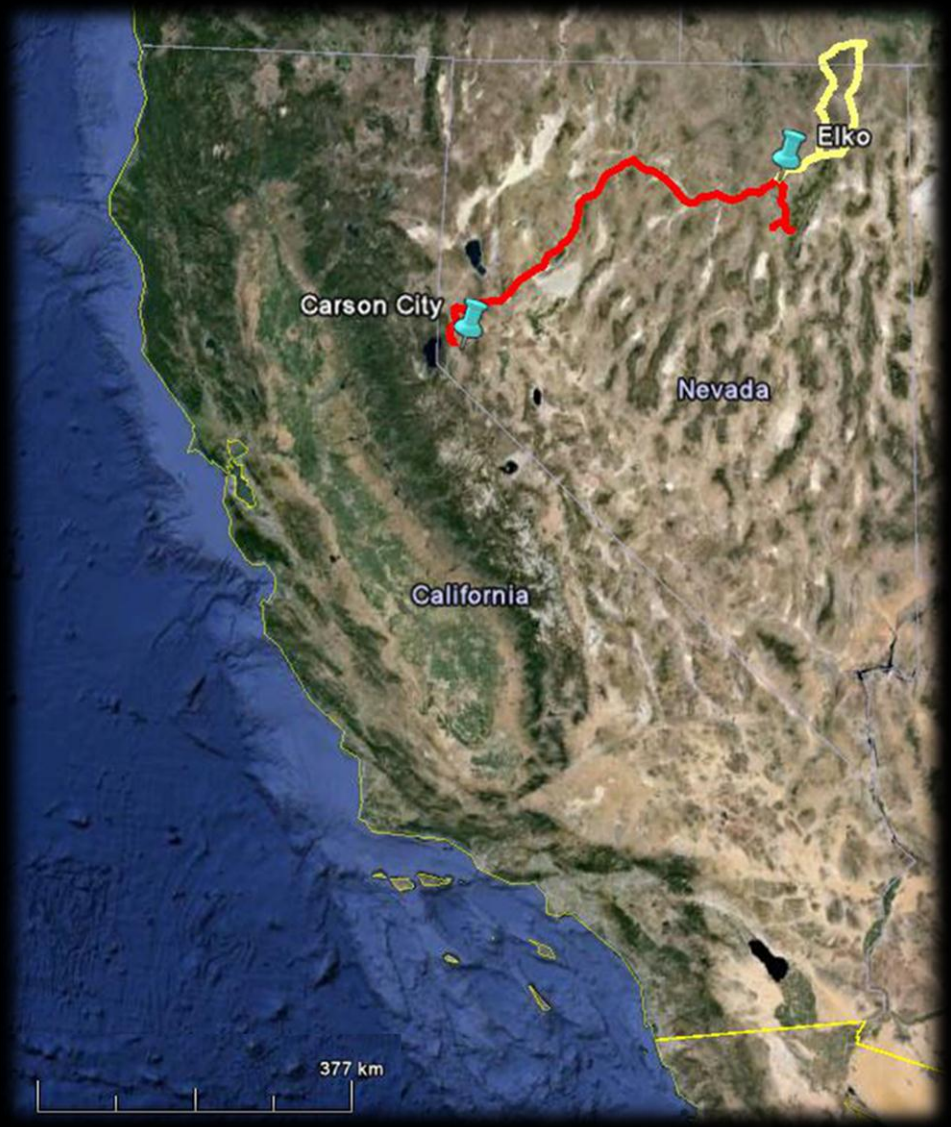
Appreciation To…

- 2014 Summer Interns
- Zack Blumberg
- EPA Region IX
- Jim Harrington and the CABW & COB Programs

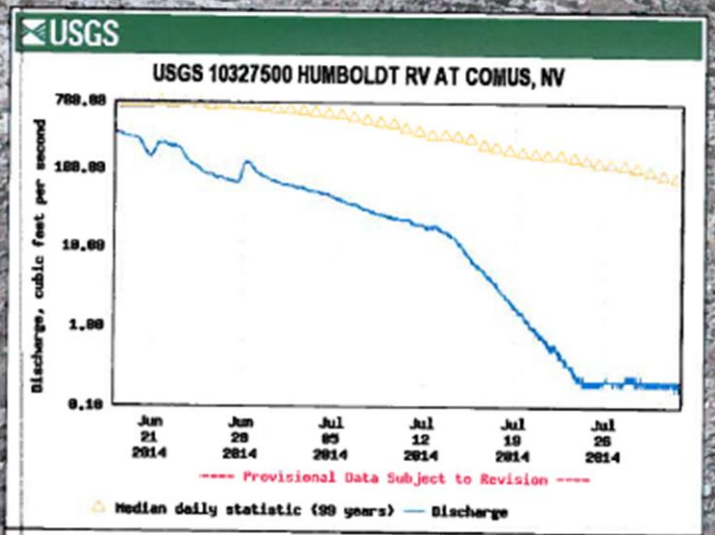
Rough Idea

- Nevada's 2014 Efforts
- Comparison of Stream Indicators
- What's Next

Every Field Season is an Adventure

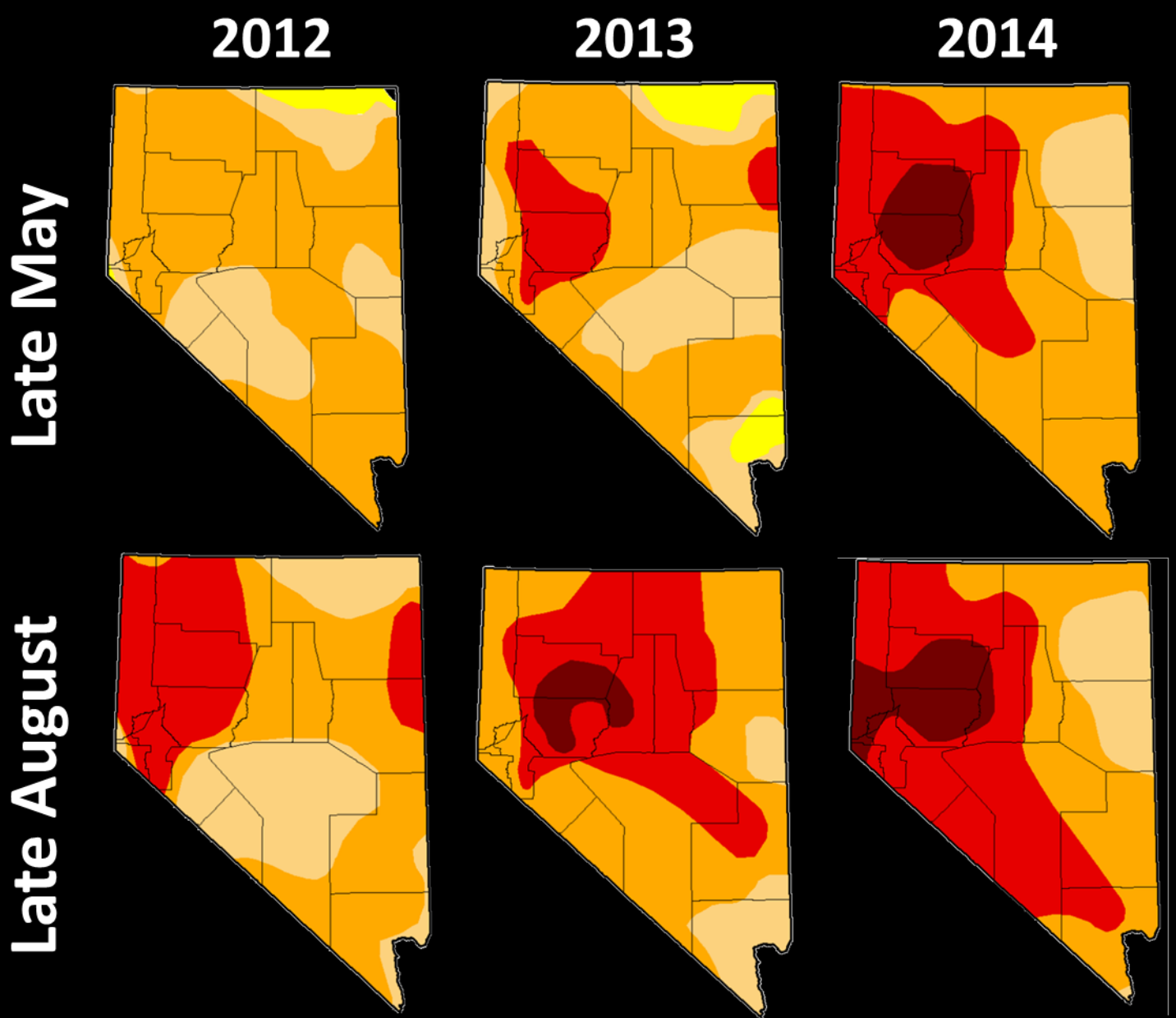


- June 23 = 432 miles
  - 2 un-sampleable
- June 24 = 305 miles
  - 1 un-sampleable, 2 recons
- NRSA 2013/14
  - 10 remaining
  - 11 un-sampleable
  - 6 completed
- Nevada-Specific Program
  - 26 completed
  - 10 un-samplebale



What a difference 5 weeks makes.
June 18, 2014 ~349 cfs
July 31, 2014 ~0.16 cfs

Nevada's Bioassessment Index Period



Three Sites for Comparison

Chiatovich Creek

- Reference Site by EPA ORD Design
- Category 1 – Fully Supporting

Rough Creek

- Historic Mining Drainage
- Category 5 – Not Supported
  - Aquatic Life (Iron, Total-P)
  - Fish Consumption (Mercury)
  - Contact Recreation (Total-P)

Sweetwater Creek

- Reference Site by BPJ
- Category 5 – Not Supported
  - Contact and Non-Contact Recreation (Total-P)

Characteristics ($\bar{x}$ *three assessments)*

	CHI	ROU	SWT
Elevation (m asl)	2191	1928	2566
Wet'd Width (m)	1.59	1.82	2.13
Canopy (%)	94	82	71
Slope (%)	7	2	8

	CHI	ROU	SWT
Channel Morphology (%)			
Rapid	19	7	38
Riffle	45	57	15
Glide	24	31	2
Pool	5	3	18
Cascade/Falls	8	2	26

	CHI	ROU	SWT
Human Influence (%)			
Range	40	65	--
Road	--	33	40
Buildings	4	--	--
Wall, Rip-Rap	--	--	--
Cleared Lot	--	--	--
Pipes	--	--	--
Trash	--	--	--
Park	--	--	--
Crops	--	--	--
Logging	--	--	--
Mining	--	--	--

Elements of Indicators

Substrate

Percent of Reach with Sands and Fines

% Embeddedness

Periphyton

Diatom Bioassessment Index

Total Number of Taxa
Shannon Diversity
Pollution Tolerance Index
Fragilaria Group Richness
Cymbella Group Richness
Siltation Index

NMDS
Percent Similarity

Benthics

Predictive Model Condition Index

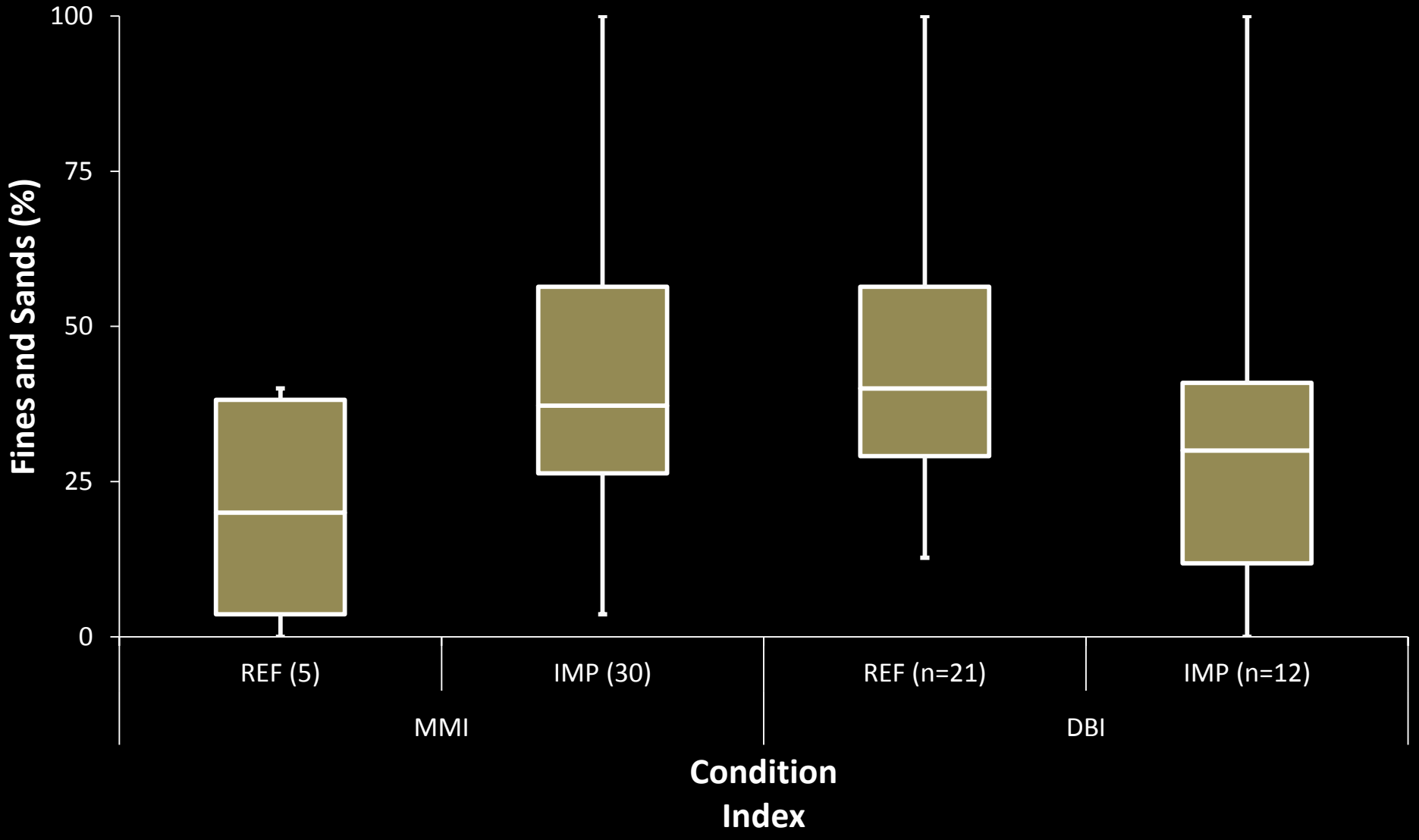
Multimetric Indices

NMDS
Percent Similarity

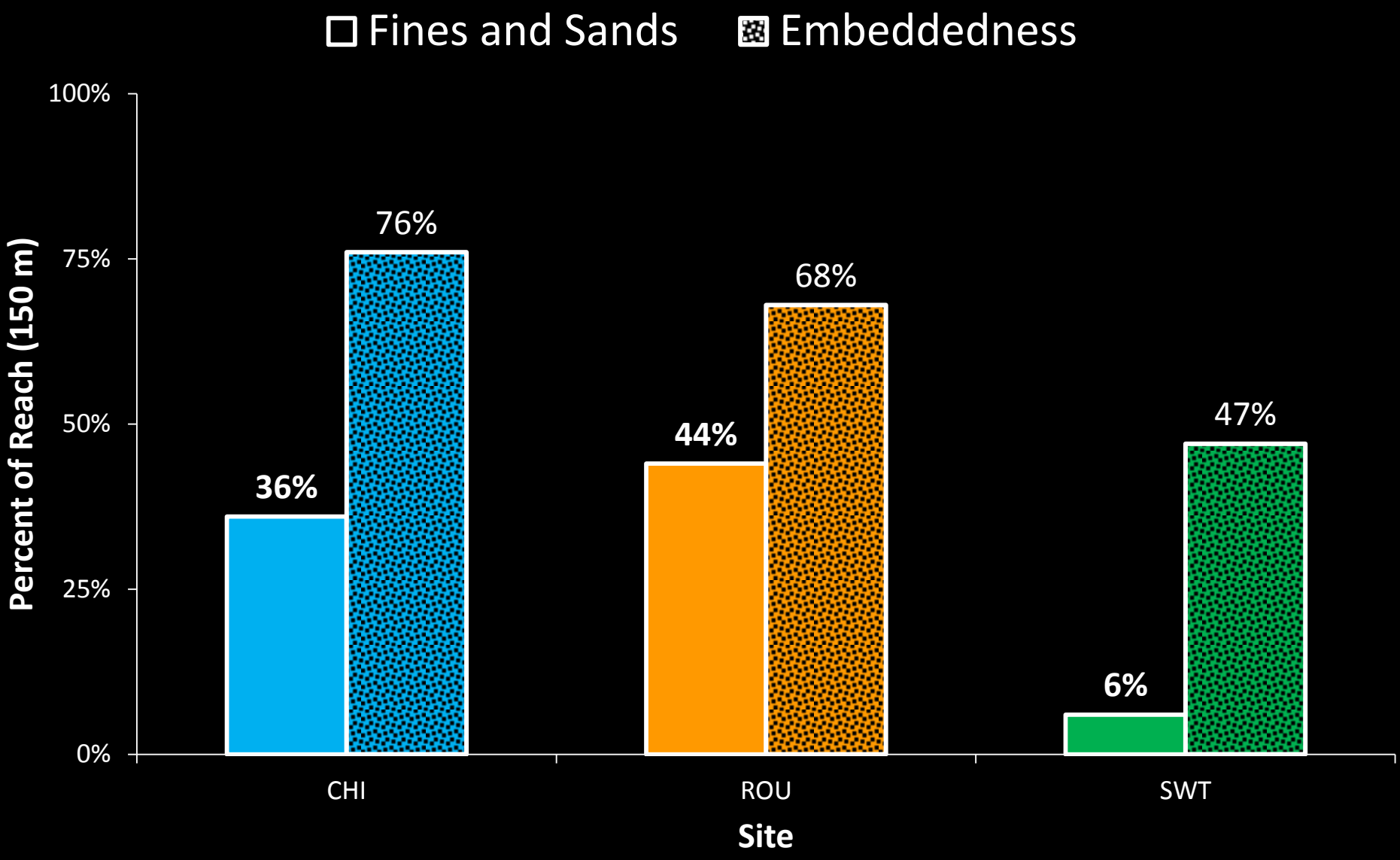
Substrate

Fines and Sands v. Community Indices

(Eastern Sierra Ecoregion Sites)



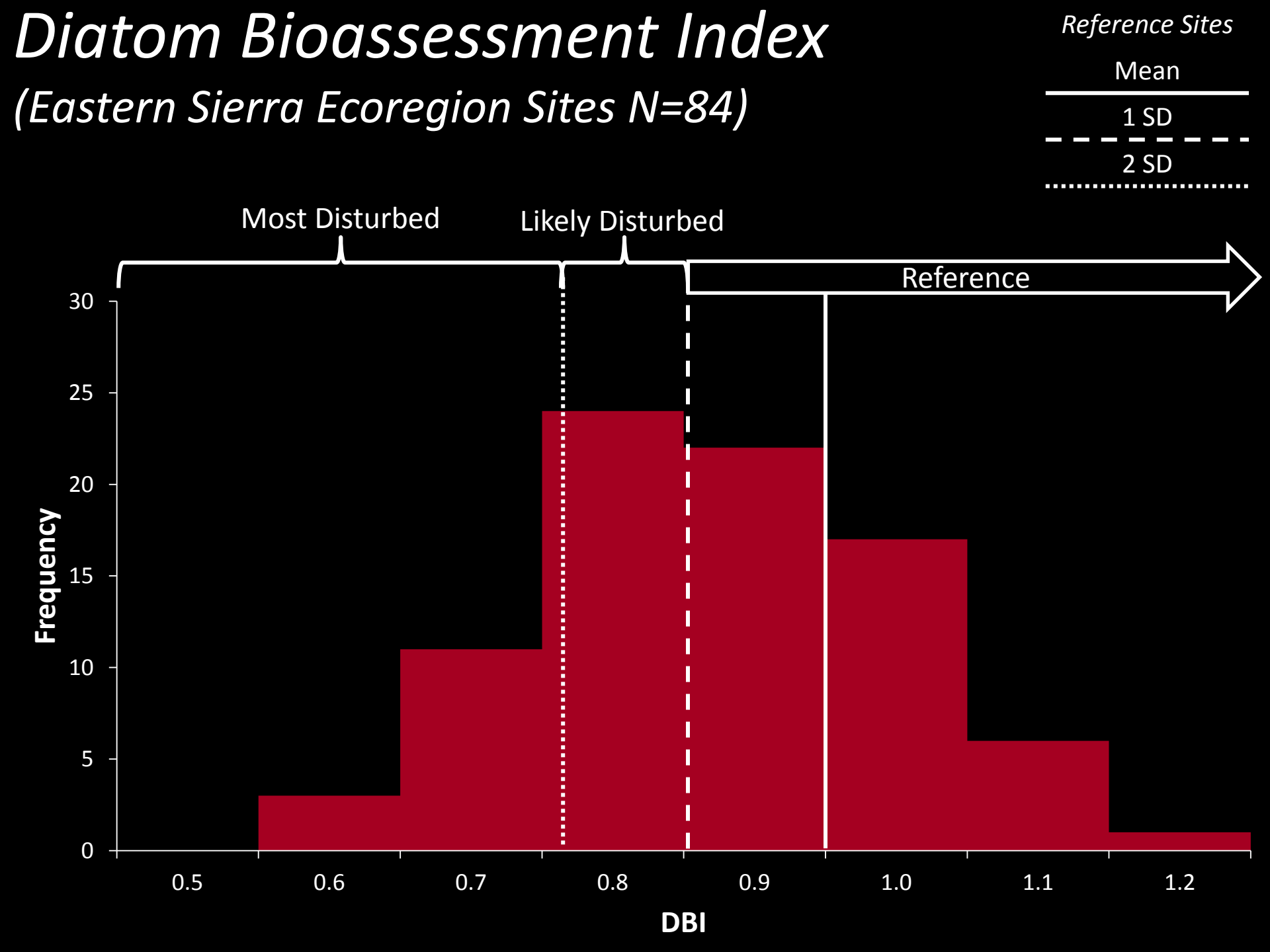
Fines & Sands and Embeddedness



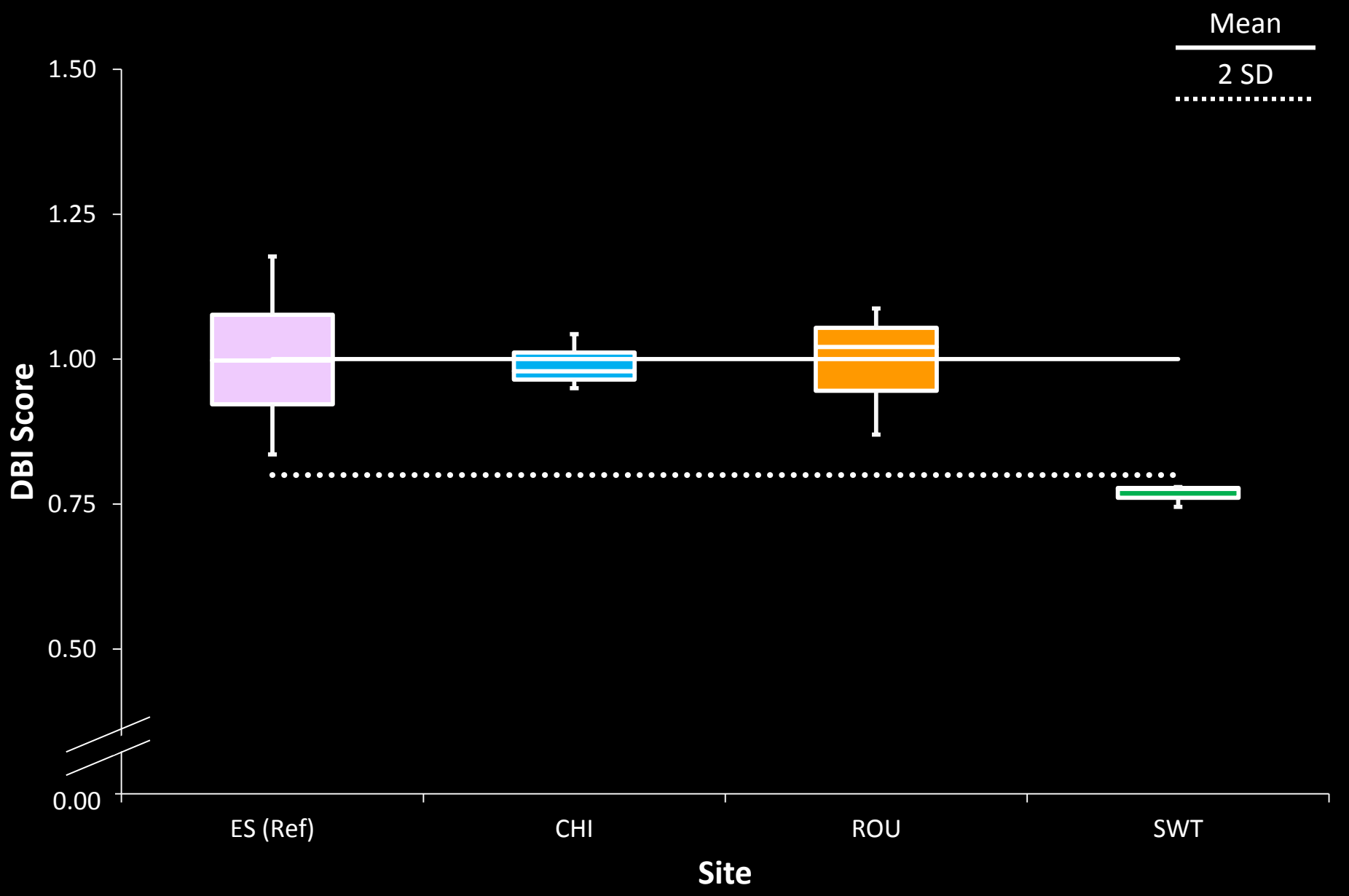
Periphyton

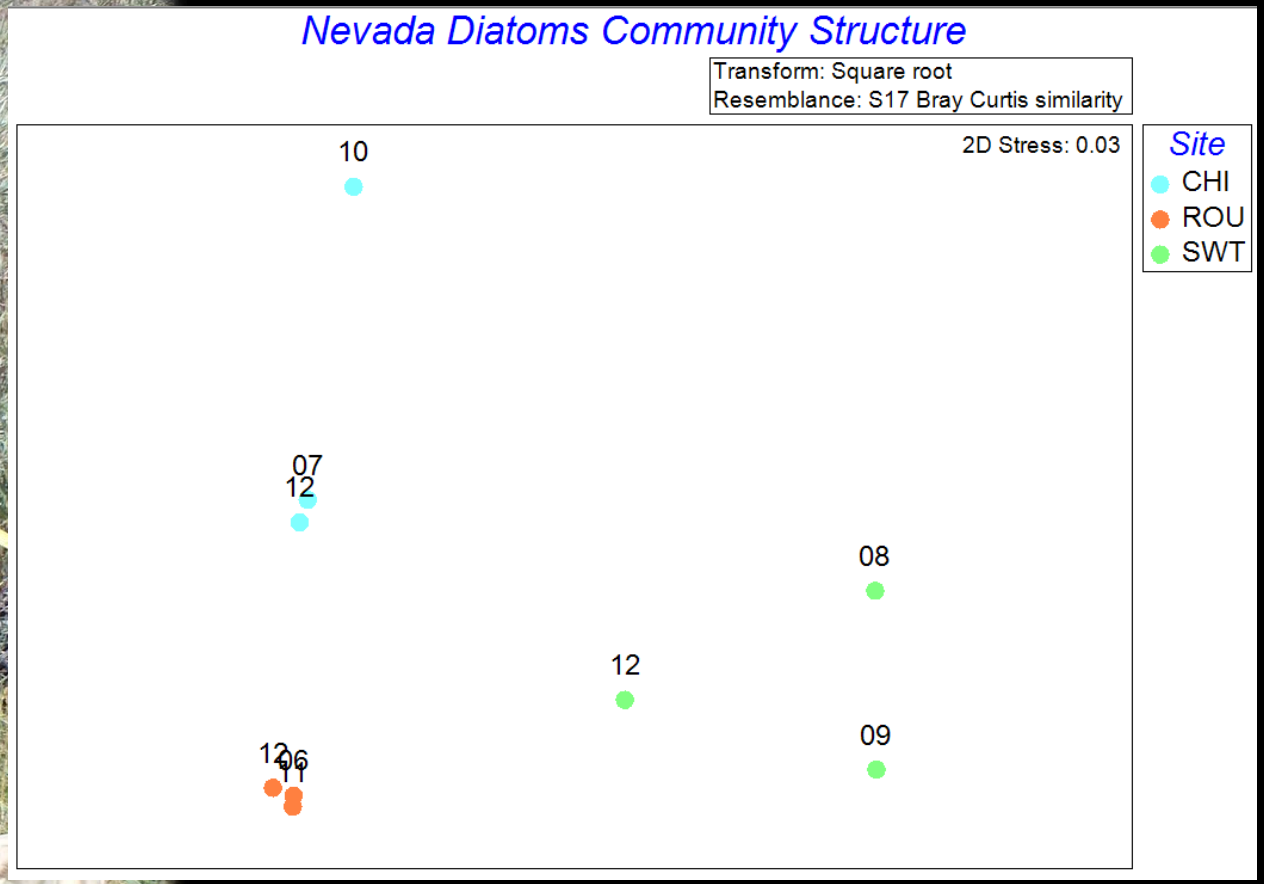
Diatom Bioassessment Index

(Eastern Sierra Ecoregion Sites N=84)



Diatom Bioassessment Index





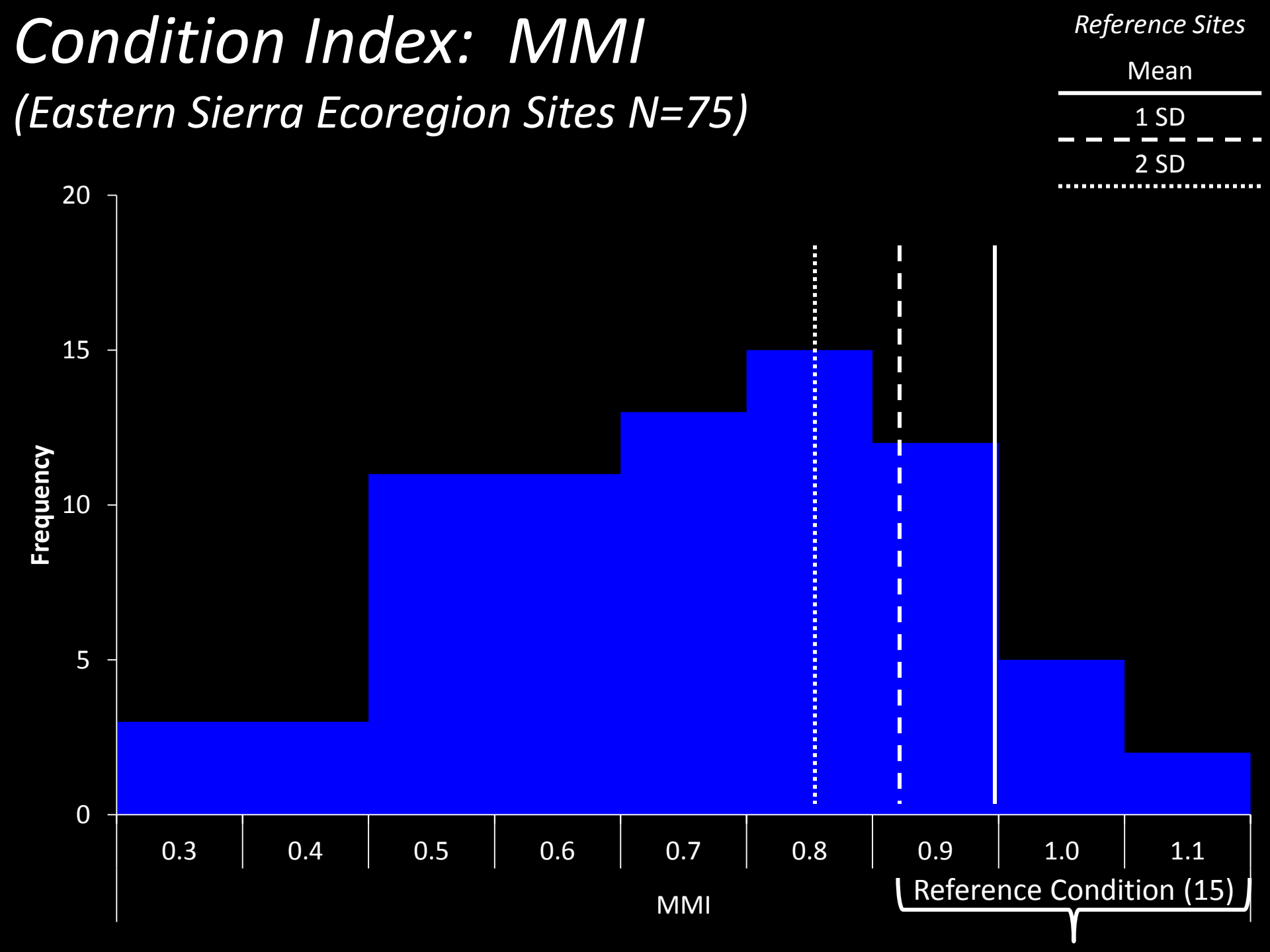
Percent Similarity by Species Between Sites

	CHI	ROU	SWT
CHI	46.23	38.55	31.64
ROU		57.23	33.86
SWT			51.44

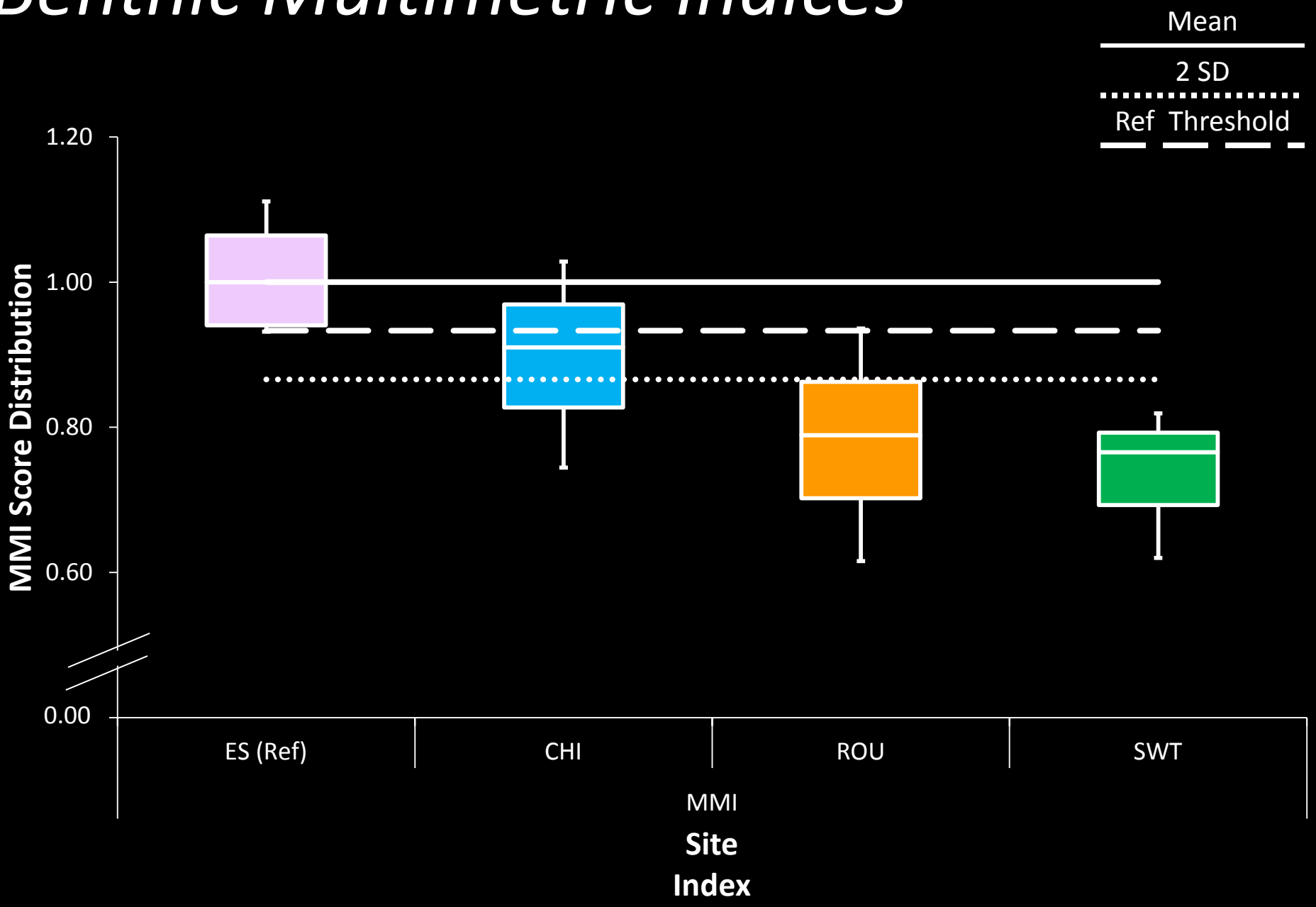
Benthics

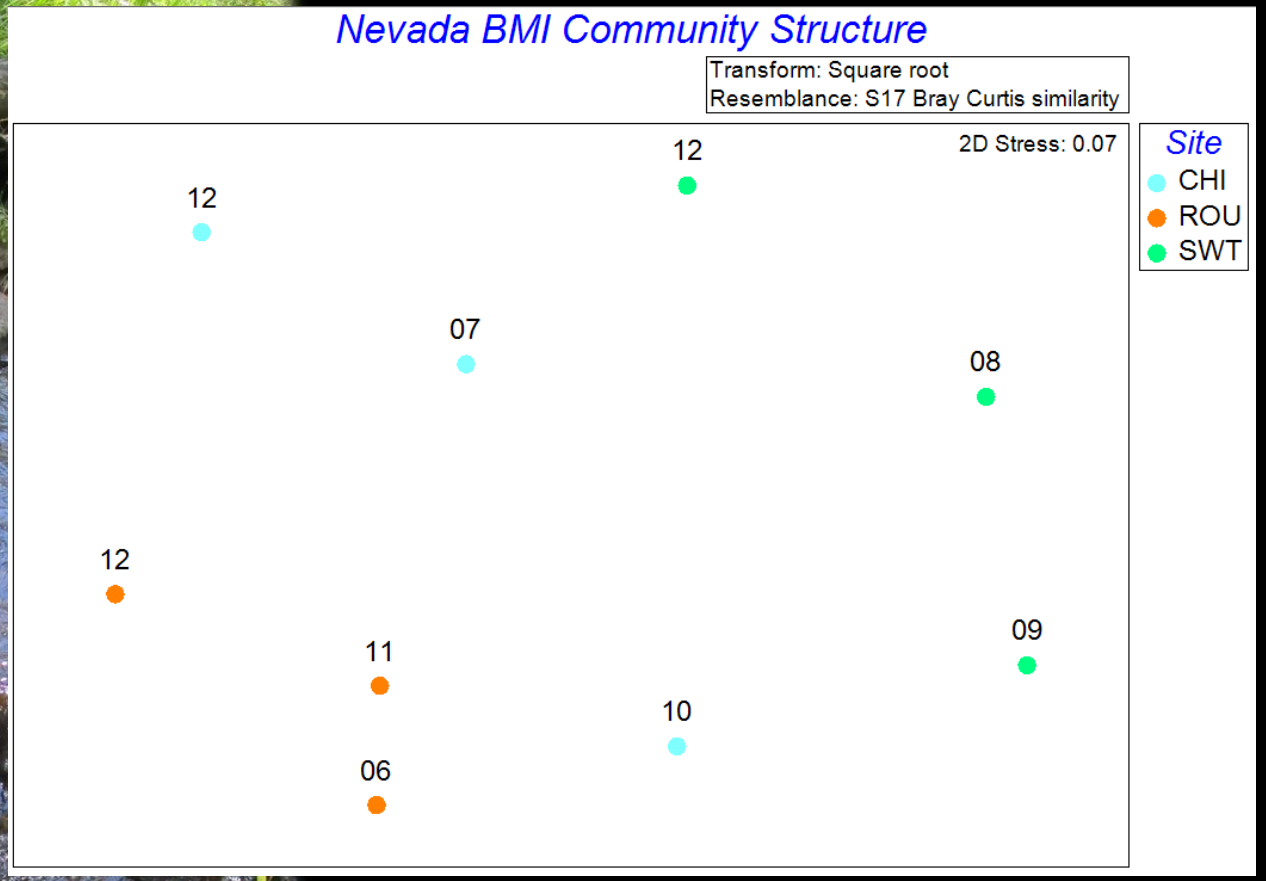
Condition Index: MMI

(Eastern Sierra Ecoregion Sites N=75)



Benthic Multimetric Indices





Percent Similarity by Species Between Sites

	CHI	ROU	SWT
CHI	28.09	24.28	18.04
ROU		38.00	14.59
SWT			32.40

Well, that makes sense…

Chiatovich

- Fully supporting for all beneficial uses
- Low anthropogenic influences
- Consistent biological indices scores trend towards reference

Rough

- Not supporting for 3 beneficial uses
- Biotic condition reflects physical condition
- Variability in BMI scores trending below reference

What's going on with Sweetwater?

- With the exception of Total-P, very limited exposure to stressors.
- Very low overall numbers of diatom taxa and specifically Cymbella richness.
- BMI Pollution Tolerance values *Good* to *Excellent*.
- Percent Insect Taxa >96%
  - BUT, over three samples, no:
    - Odonates or Coleoptera
    - Pisidium or other mollusks
    - Just one oligochete and water mite

IMHO…

- Some streams are just some streams.
- Simplicity is better.
- Stressors can be elusive.

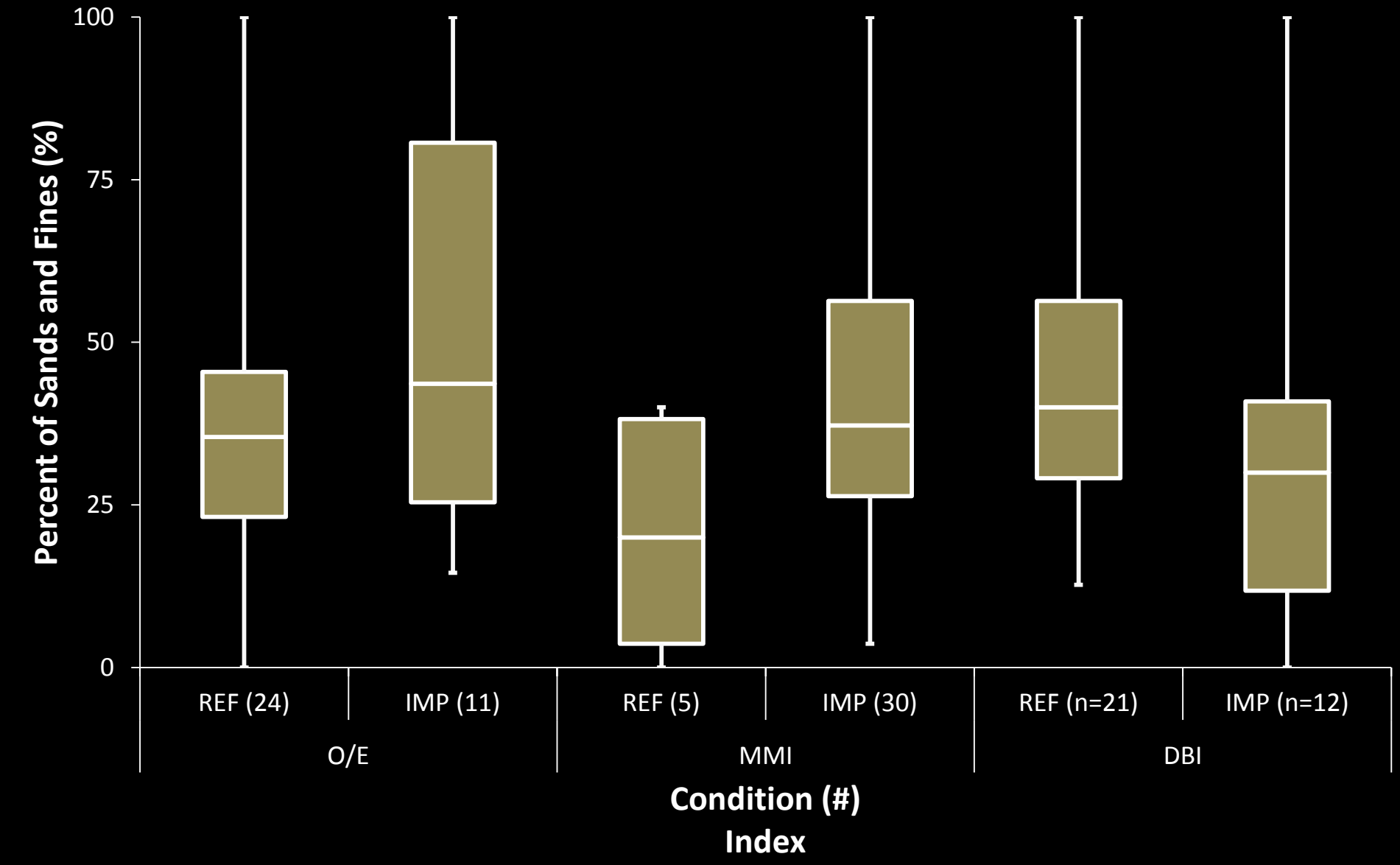
*"So, what **do** you do when it's not field season?"*

Develop a digital on-line reference collection
(an excuse to increase my taxonomic identification skills & daydream about streams).

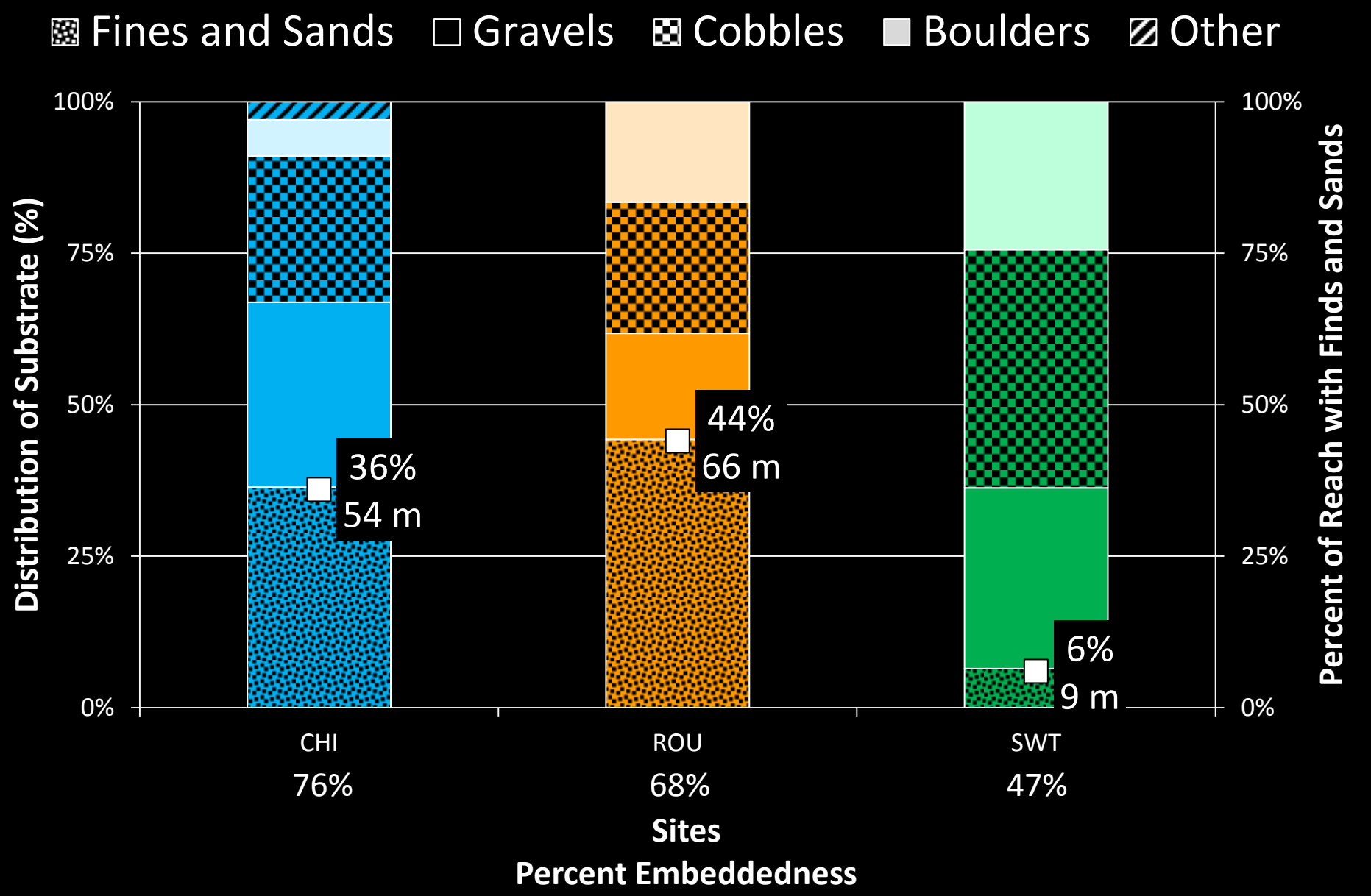

Questions?

Fines and Sands v. *Community Indices*

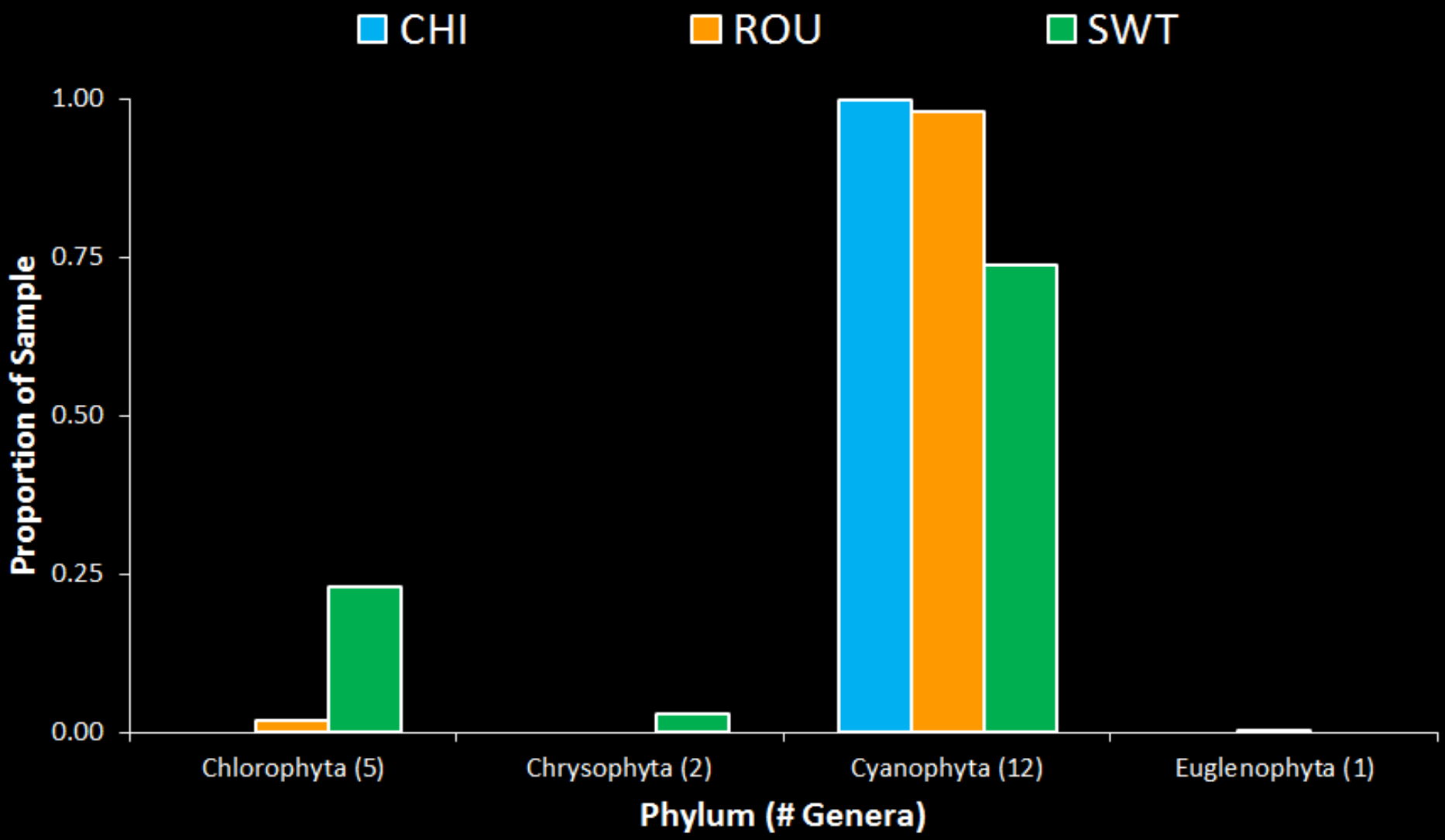
(Eastern Sierra Sites)



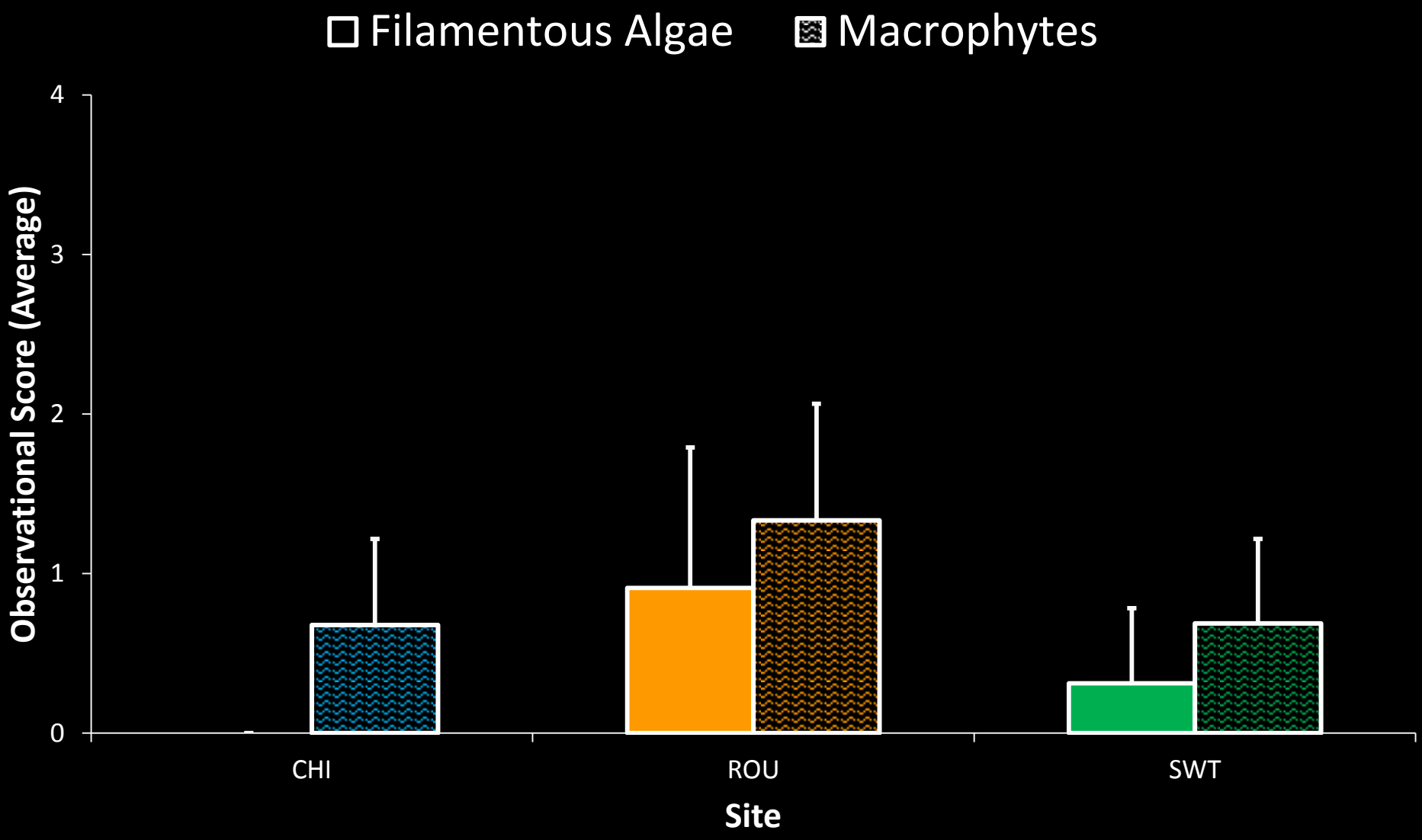
Substrate Distribution



Soft Bodied Algae Abundance

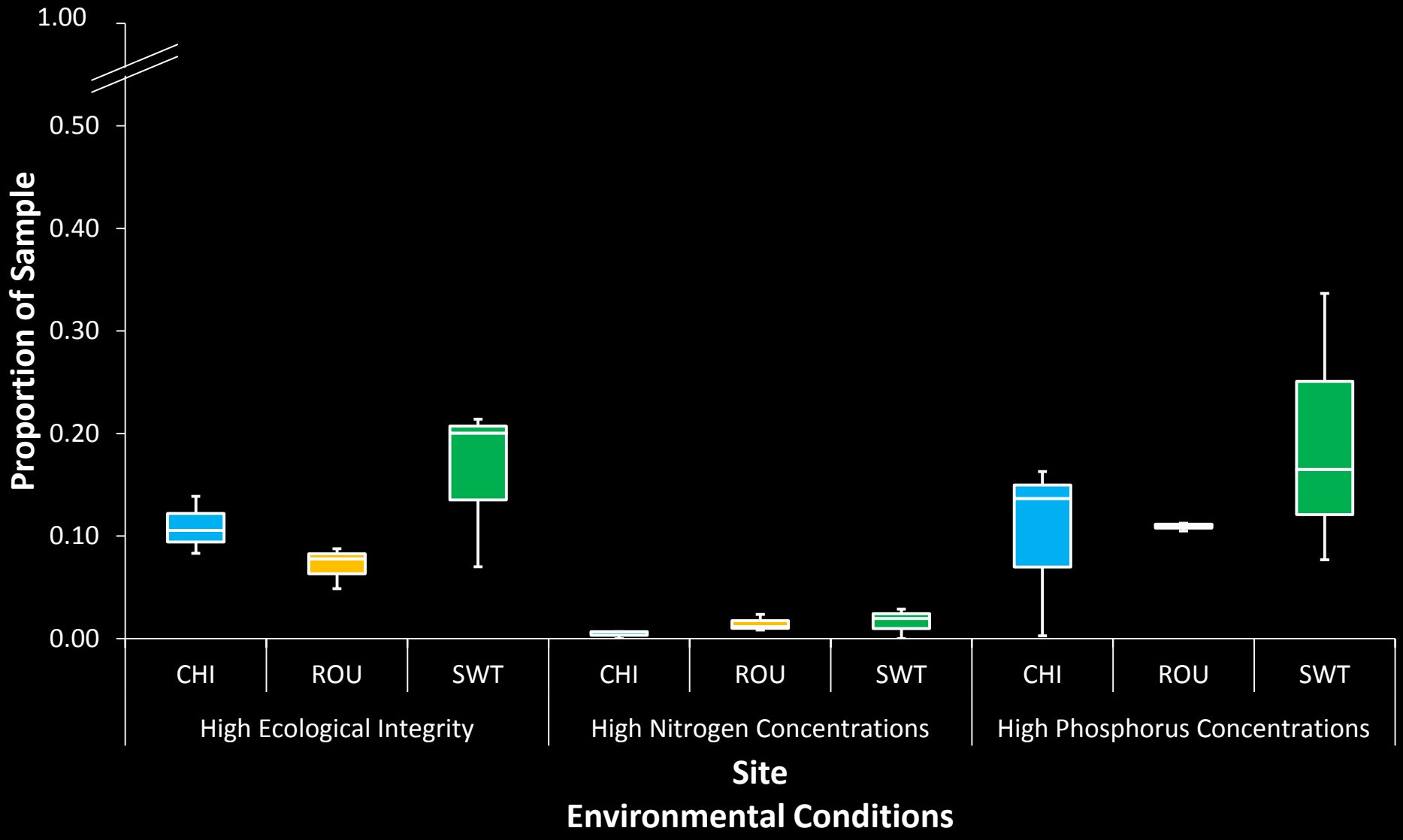


Other "-phyte" Stuff

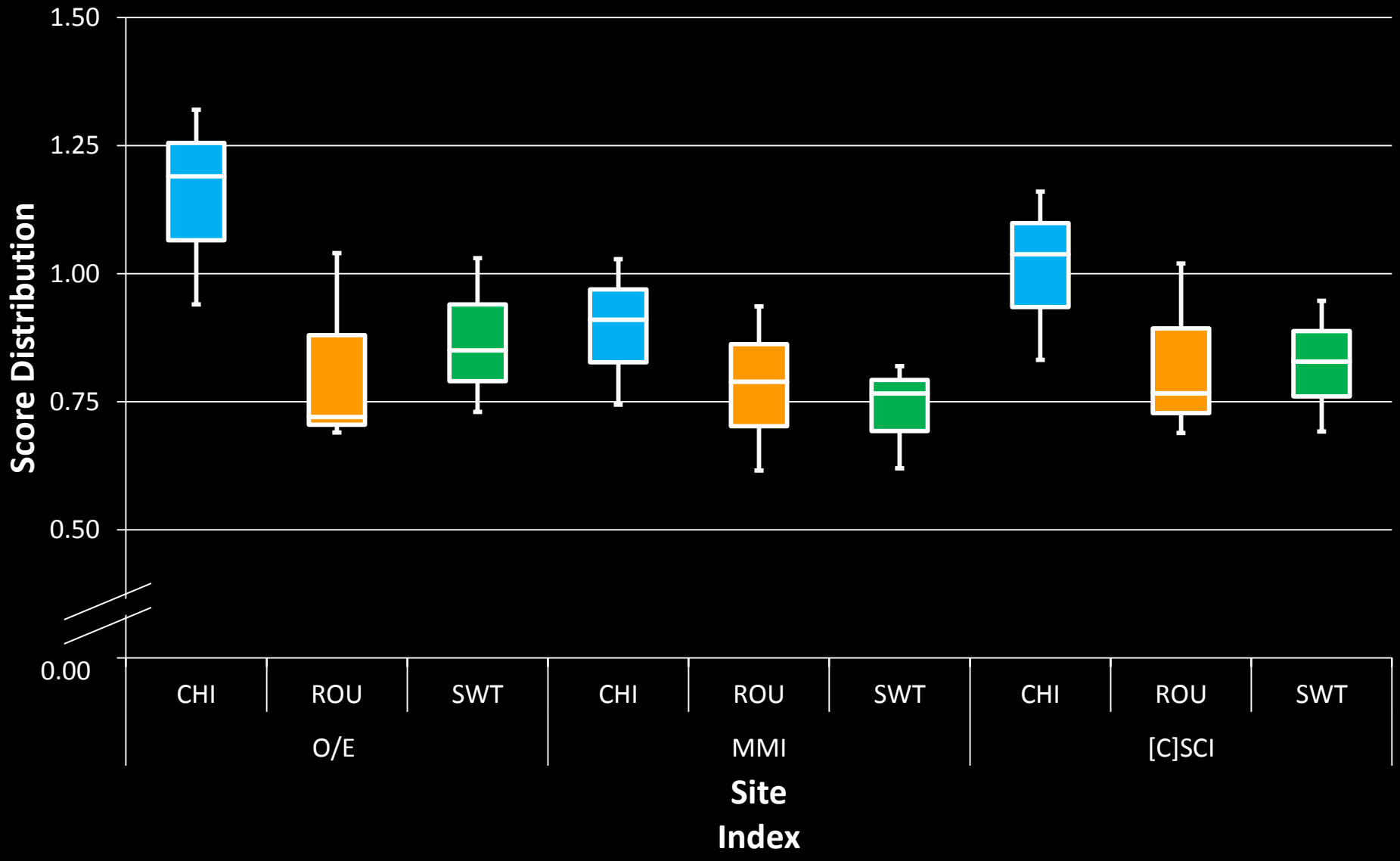


Use of Diatoms and Soft Algae as Indicators of Environmental Determinants in the Lahontan Basin, USA. (Blinn and Herbst. 2003)

TABLE 8



O/E, MMI & [C]SCI


1.50
1.25
1.00
0.75
0.50
0.00
Score Distribution
CHI
ROU
SWT
CHI
ROU
SWT
CHI
ROU
SWT
O/E
MMI
[C]SCI
Site Index

Sweetwater Taxa Attributes

Attribute	2008	2009	2012
Subsampled (%)	93	98	100
Total Taxa Count	644	630	396
Species Richness	52	41	36
O/E	0.73/R	0.85/R	1.03/R
MMI	0.62/I	0.77/I	0.82/I
Shannon-Weaver	2.91	2.09	2.72
Simpson's	0.90	0.74	0.88
Hilsenhoff TV	Excellent	Good	Excellent
Herbst/Silldorff 10 Metric IBI	92/100 Supporting	68/100 Intermediate	88/100 Supporting

Abundance (%)	2008	2009	2012	$\bar{x}$
EPT	59	71	71	
Chironomidae	35	27	18	
Insect	98	99	96	
Non-Insect	2	1	4	
Shredder	8	0	12	7
Scraper	12	5	17	11
Predator	24	11	10	15
Filterer	1	0	1	1
Collector	55	83	57	65
Swimmer	14	54	4	24
Sprawler	16	25	45	29
Clinger	39	17	38	31
Climber	29	2	7	13
Burrower	2	1	4	2