

# INTEGRATING ASSESSMENT TOOLS AND GEOSPATIAL VISUALIZATION: THE BENTHIC CONDITION EXAMPLE



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# BACKGROUND

- Serving up data is easy
- Turning it into useful information is more difficult
- Not easy translating data into visualizations

# PROBLEM

Benthos are a **key part** of our monitoring system



The image shows a screenshot of a Microsoft Excel spreadsheet titled 'Book2 - Microsoft Excel'. The spreadsheet contains a table with three columns: 'StationID', 'Species', and 'Abundance'. The data is organized into rows, with the first row (row 1) serving as the header. The 'StationID' column contains the value '7000' for all rows. The 'Species' column lists various benthic species, and the 'Abundance' column shows their respective counts. The table is displayed in a standard Excel format with a grid background and a status bar at the bottom indicating 'Ready' and '100%' zoom.

StationID	Species	Abundance
7000	Siliqua lucida	2
7000	Mediomastus sp	1
7000	Mooreonuphis sp	3
7000	Nephtys caecoides	3
7000	Nereis sp A	2
7000	Nuculana taphria	1
7000	Photis macinermeyi	1
7000	Photis sp OC1	8
7000	Lamprops quadriplicatus	1
7000	Scoletoma tetraura Cmplx	3
7000	Hemilamprops californicus	2
7000	Spiophanes duplex	4
7000	Spiophanes norrisi	5
7000	Sthenelais sp	1
7000	Tellina modesta	6
7000	Tritella pilimana	3
7000	Veneridae	5
7000	Americhelidium shoemakeri	1
7000	Pinnixa sp	2
7000	Cooperella subdiaphana	2
7000	Ampharete labrops	6
7000	Amphiodia digitata	3
7000	Amphiuridae	1
7000	Apoprionospio pygmaea	4
7000	Aricidea (Acmira) catherinae	1
7000	Astropecten verrilli	1
7000	Bivalvia	1
7000	Caprella mendax	2
7000	Lucinisca nuttalli	1
7000	Chone eiffelturris	1
7000	Cylichna diegensis	1
7000	Diastylopsis tenuis	4

# SOLUTION

1. Create an index
2. Provide a means for calculating the index
3. Create a way of visualizing the results

# BENTHIC RESPONSE INDEX

- Provides an accepted and objective measurement of benthic condition

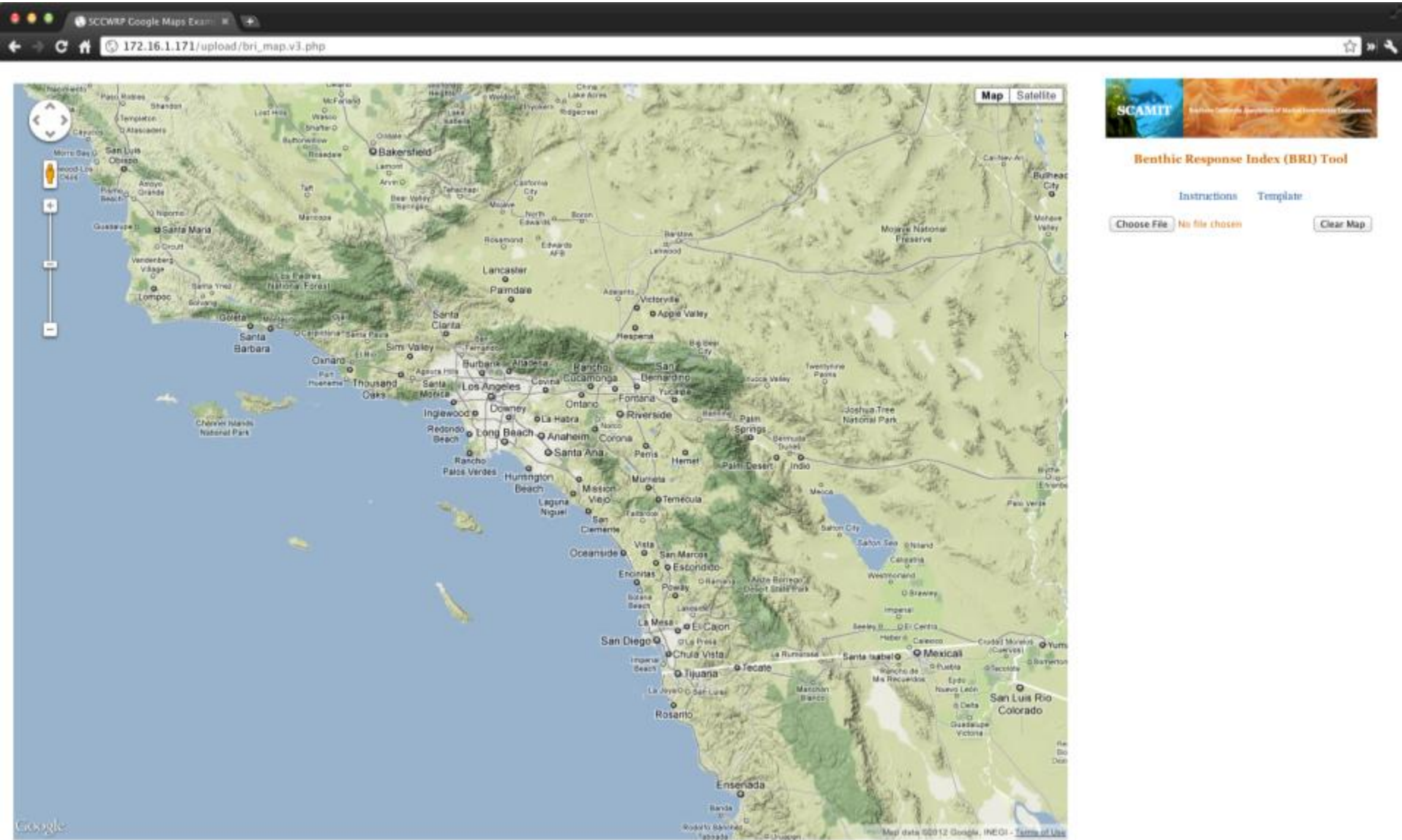
- Abundance weighted average tolerance of species present

$$\frac{\sum (\sqrt[4]{Abundance}) \times P}{\sum \sqrt[4]{Abundance}}$$

- Final score indicates condition:

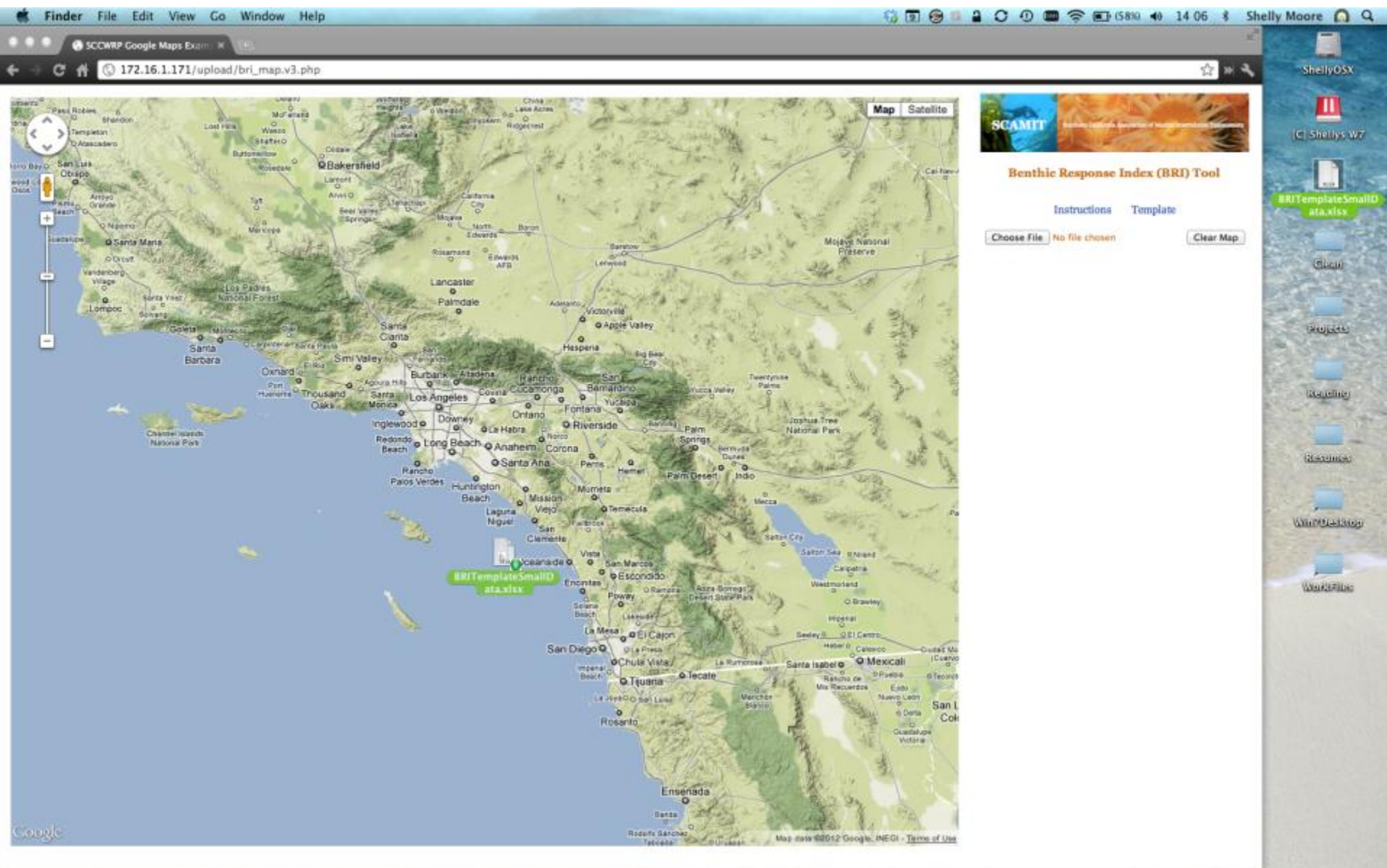
- BRI Score < 25 ➡ 'Reference'
- BRI Score ≤ 34 ➡ 'RL1: Marginal'
- BRI Score ≤ 44 ➡ 'RL2: Biodiversity Loss'
- BRI Score ≤ 72 ➡ 'RL3: Community Function Loss'

# BRI INTERFACE

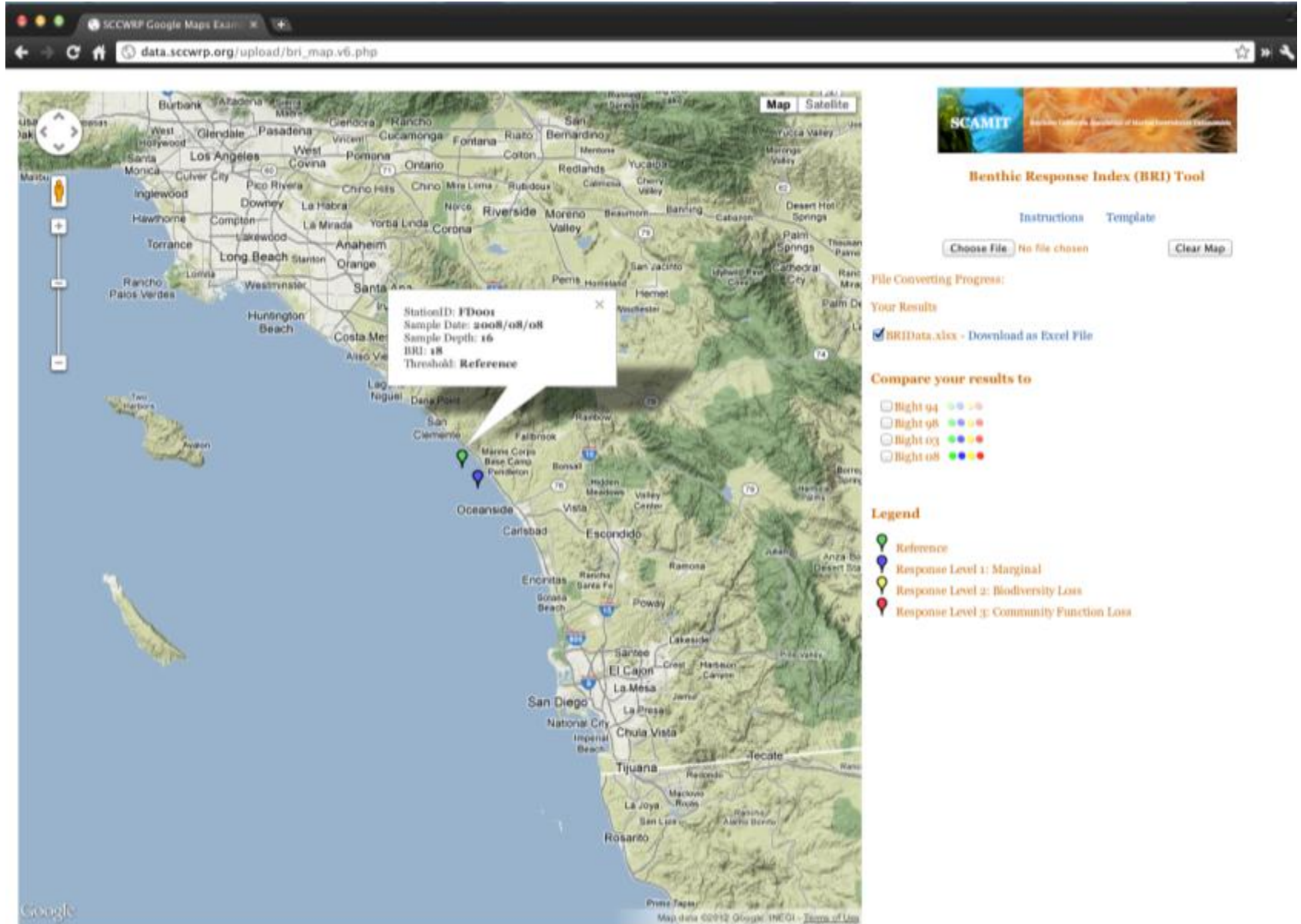




# BRI INTERFACE

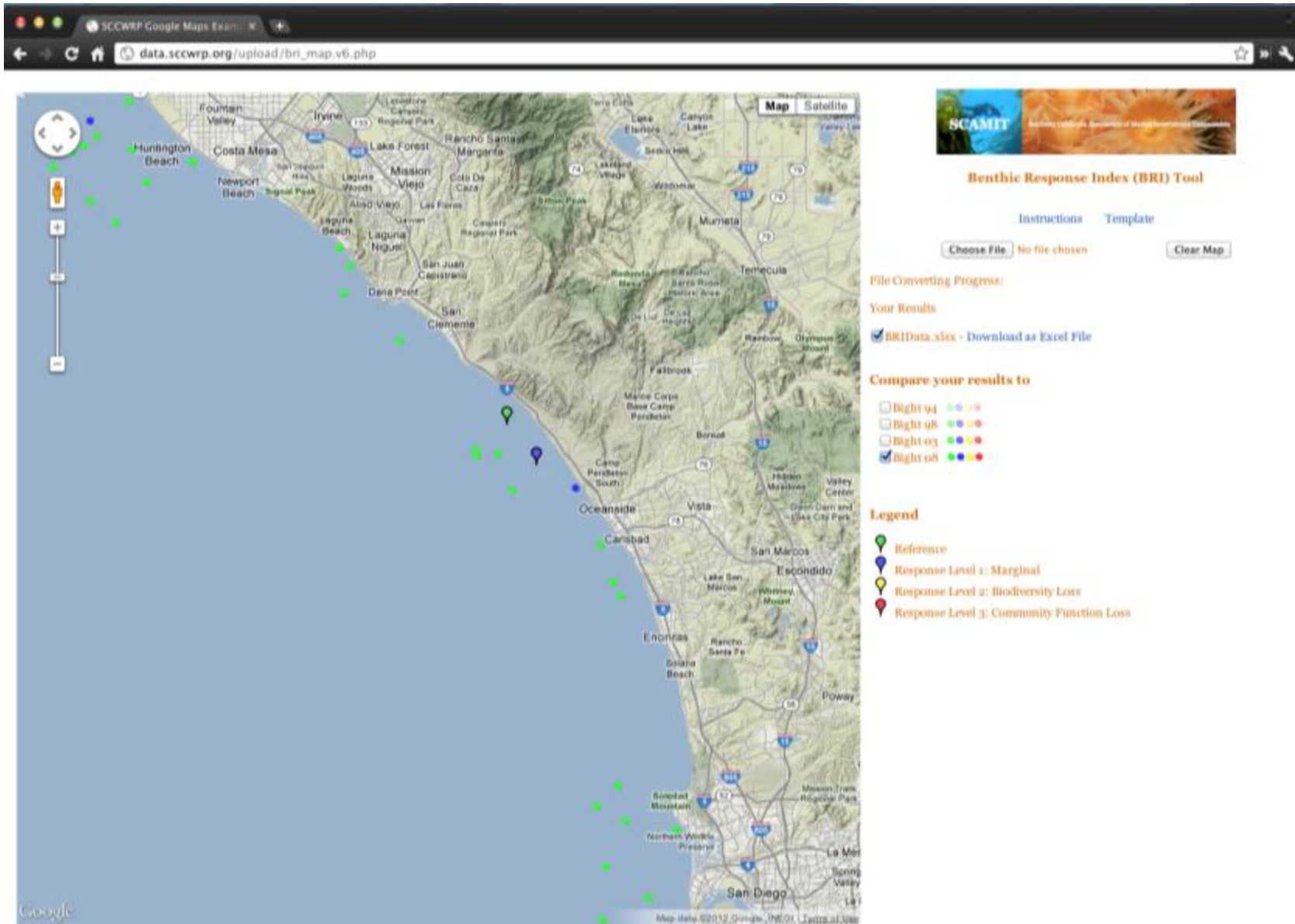


# YOUR BRI





# COMPARE TO OTHERS



# BRI EXCEL TEMPLATE

BRI TemplateSmallData.xlsx - Microsoft Excel									
File Home Insert Page Layout Formulas Data Review View Developer Add-Ins									
O1									
	A	B	C	D	E	F	G	H	I
1	LookUp	UsedforBRI	StationID	SampleDate	SampleDepth(m)	Latitude	Longitude	Species	Abundance
2	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Siliqua lucida	2
3	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Mediomastus sp	1
4	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Mooreonuphis sp	3
5	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Nephtys caecoides	3
6	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Nereis sp A	2
7	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Nuculana taphria	1
8	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Photis macinerneyi	1
9	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Photis sp OC1	8
10	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Lamprops quadriplicatus	1
11	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Scoletoma tetraura Cmplx	3
12	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Hemilamprops californicus	2
13	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Spiophanes duplex	4
14	Wrong	No	FD001	8/8/2008	11	33.22278	-117.41728	Spiophanes norrisi	5
15	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Sthenelais sp	1
16	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Tellina modesta	6
17	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Tritella pilimana	3
18	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Veneridae	5
19	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Americhelidium shoemakeri	1
20	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Pinnixa sp	2
21	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Cooperella subdiaphana	2
22	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Ampharete labrops	6
23	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Amphiodia digitata	3
24	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Amphiuridae	1
25	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Apoprionospio pygmaea	4
26	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Aricidea (Acmira) catherinae	1
27	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Astropecten verrilli	1
28	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Bivalvia	1
29	Correct	No	FD001	8/8/2008	11	33.22278	-117.41728	Caprella mendax	2
30	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Lucinisca nuttalli	1
31	Correct	Yes	FD001	8/8/2008	11	33.22278	-117.41728	Chone eiffelturris	1



# SCAMIT LIST

	A	B	C	D	E	F
	TaxonName	PCode	Phylum	Class	Order	Family
1722	Spinicirrus sp	None	Platyhelminthes	Turbellaria	Polycladida	Gnesiocerotidae
1723	Spinosphaera harrisae	None	Annelida	Polychaeta	Canalipalpata	Terebellidae
1724	Spinosphaera oculata	None	Annelida	Polychaeta	Canalipalpata	Terebellidae
1725	Spinosphaera sp	None	Annelida	Polychaeta	Canalipalpata	Terebellidae
1726	Spinosphaera sp SD2	None	Annelida	Polychaeta	Canalipalpata	Terebellidae
1727	Spio butleri	None	Annelida	Polychaeta	Canalipalpata	Spionidae
1728	Spio filicornis	P475	Annelida	Polychaeta	Canalipalpata	Spionidae
1729	Spio maciolekae	P475	Annelida	Polychaeta	Canalipalpata	Spionidae
1730	Spio maculata	P475	Annelida	Polychaeta	Canalipalpata	Spionidae
1731	Spio sp	P475	Annelida	Polychaeta	Canalipalpata	Spionidae
1732	Spiochaetopterus costarum	P476	Annelida	Polychaeta	Canalipalpata	Chaetopteridae
1733	Spiochaetopterus costarum Cmplx	P476	Annelida	Polychaeta	Canalipalpata	Chaetopteridae
1734	Spionidae	None	Annelida	Polychaeta	Canalipalpata	Spionidae
1735	Spiophanes berkeleyorum	P477	Annelida	Polychaeta	Canalipalpata	Spionidae
1736	Spiophanes bombyx	P478	Annelida	Polychaeta	Canalipalpata	Spionidae
1737	Spiophanes duplex	P480	Annelida	Polychaeta	Canalipalpata	Spionidae
1738	Spiophanes fimbriata	P479	Annelida	Polychaeta	Canalipalpata	Spionidae
1739	Spiophanes kimballi	P479	Annelida	Polychaeta	Canalipalpata	Spionidae
1740	Spiophanes sp	None	Annelida	Polychaeta	Canalipalpata	Spionidae
1741	Spiophanes wigleyi	P481	Annelida	Polychaeta	Canalipalpata	Spionidae
1742	Spiophanicola spinulosus	None	Arthropoda	Maxillopoda	Poecilostomatoida	Spiophanicolidae
1743	Spirontocaris dalli	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1744	Spirontocaris holmesi	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1745	Spirontocaris lamellicornis	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1746	Spirontocaris prionota	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1747	Spirontocaris sica	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1748	Spirontocaris snyderi	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1749	Spirontocaris sp	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1750	Spirontocaris truncata	None	Arthropoda	Malacostraca	Decapoda	Hippolytidae
1751	Spirorbidae	None	Annelida	Polychaeta	Canalipalpata	Spirorbidae

	A	B	C	D
	P_Code	Shallow	Mid_Depth	Deep
476	P475	4.942	-19.957	-18.329
477	P476	36.412	54.492	16.588
478	P477	24.199	33.753	38.763
479	P478	-2.309	12.055	-23.746
480	P479	22.354	-17.45	-2.592
481	P480	6.131	8.546	-1.569
482	P481			8.465
483	P482	9.459	10.044	
484	P483	34.246	-17.301	-1.458
485	P484	12.792	3.433	3.813
486	P485	-7.502	4.954	
487	P486	9.819	-6.649	-3.411
488	P487	40.352	25.378	17.447
489	P488	28.679	34.017	
490	P489		-13.397	-1.391
491	P490	25.438	27.834	
492	P491	5.103	5.754	15.133
493	P492	19.948	9.168	
494	P493	0.037		
495	P494	7.357	14.313	102.725
496	P495	4.292	-11.242	-20.577
497	P496	-6.85	29.831	11.744
498	P497	5.956	13.621	
499	P498			6.095
500	P499	36.785	51.344	49.099
501	P500	16.602	35.487	
502	P501	-2.983	39.485	4.193
503	P502	14.596	44.794	
504	P503	24.927	-6.835	0.33

# LOOKING FORWARD...

- Use technology to develop more data visualizations
- Continue to develop data visualizations based on existing and new tools
- Continue to explore new and innovative ways to look at data