2011 South Puget Sound Marine Sediment Monitoring

Infaunal Community Data Summary

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Results and Statistical Summaries

Benthic infaunal results for the 2011 South Sound survey.

Benthic infaunal species identified in the 2011 South Sound survey.

Statistical Summaries of 9 Benthic Indices

Benthic infaunal indices calculated to characterize the infaunal invertebrate assemblages identified for the 2011 South Sound survey.

Infaunal index	Definition	Calculation
Total Abundance	A measure of density equal to the total number of organisms per sample area	Sum of all organisms counted in each sample
Major Taxa Abundance (5 groups)	A measure of density equal to the total number of organisms in each major taxa group (Annelida, Mollusca, Echinodermata, Arthropoda, Miscellaneous Taxa) per sample area	Sum of all organisms counted in each major taxa group per sample
Taxa Richness	Total number of taxa (taxa = lowest level of identification for each organism) per sample area	Sum of all taxa identified in each sample
Pielou's Evenness (J') (Pielou, 1966, 1974)	Relates the observed diversity in benthic assemblages as a proportion of the maximum possible diversity for the data set (the equitability (evenness) of the distribution of individuals among species)	$J' = H'/\log S$, where $H' = -\sum_{i=1}^{S} p_i \log p_i$, where p_i = the proportion of the assemblage that belongs to the ith species ($p_i = n_i/N$, where n_i=the number of individuals in the ith species and N= total number of individuals) and S = the total number of species (H' is the Shannon-Wiener diversity index)
Swartz Dominance Index (SDI) (Swartz et al., 1985)	The minimum number of taxa whose combined abundance accounted for 75 percent of the total abundance in each sample	Sum of the minimum number of taxa whose combined abundance accounted for 75 percent of the total abundance in each sample

Total abundance, major taxa abundance, and major taxa percent abundance calculated for the 2011 South Sound survey.

Station	Total abundance	Annelida	Annelida % of total abundance	Arthropoda	Arthropoda % of total abundance	Echino-dermata	Echinodermata % of total abundance	Mollusca	Mollusca % of total abundance	Misc. taxa	Misc. taxa % of total abundance
PS00004	35	27	77.1	3	8.6	0	0.0	5	14.3	0	0.00
PS00022	683	117	17.1	340	49.8	13	1.9	143	20.9	70	10.25
PS00030	566	301	53.2	101	17.8	26	4.6	118	20.8	20	3.53
PS00036	113	83	73.5	16	14.2	0	0.0	7	6.2	7	6.19
PS00044	415	348	83.9	40	9.6	1	0.2	21	5.1	5	1.20
PS00046	443	283	63.9	65	14.7	60	13.5	24	5.4	11	2.48
PS00052	653	376	57.6	77	11.8	84	12.9	59	9.0	57	8.73
PS00054	655	384	58.6	80	12.2	14	2.1	138	21.1	39	5.95
PS00076	107	63	58.9	0	0.0	0	0.0	36	33.6	8	7.48
PS00078	194	151	77.8	16	8.2	1	0.5	11	5.7	15	7.73
PS00086	665	514	77.3	35	5.3	61	9.2	48	7.2	7	1.05
PS00102	497	401	80.7	15	3.0	14	2.8	37	7.4	30	6.04
PS00110	132	66	50.0	9	6.8	0	0.0	53	40.2	4	3.03
PS00132	518	324	62.5	51	9.8	9	1.7	115	22.2	19	3.67
PS00142	393	147	37.4	12	3.1	10	2.5	216	55.0	8	2.04
PS00146	309	102	33.0	18	5.8	2	0.6	179	57.9	8	2.59
PS00150	1075	971	90.3	17	1.6	1	0.1	55	5.1	31	2.88
PS00164	321	57	17.8	24	7.5	1	0.3	238	74.1	1	0.31
PS00204	164	93	56.7	36	22.0	11	6.7	21	12.8	3	1.83
PS00206	504	220	43.7	142	28.2	101	20.0	36	7.1	5	0.99
PS00238	815	339	41.6	286	35.1	120	14.7	46	5.6	24	2.94
PS00326	216	142	65.7	19	8.8	0	0.0	35	16.2	20	9.26

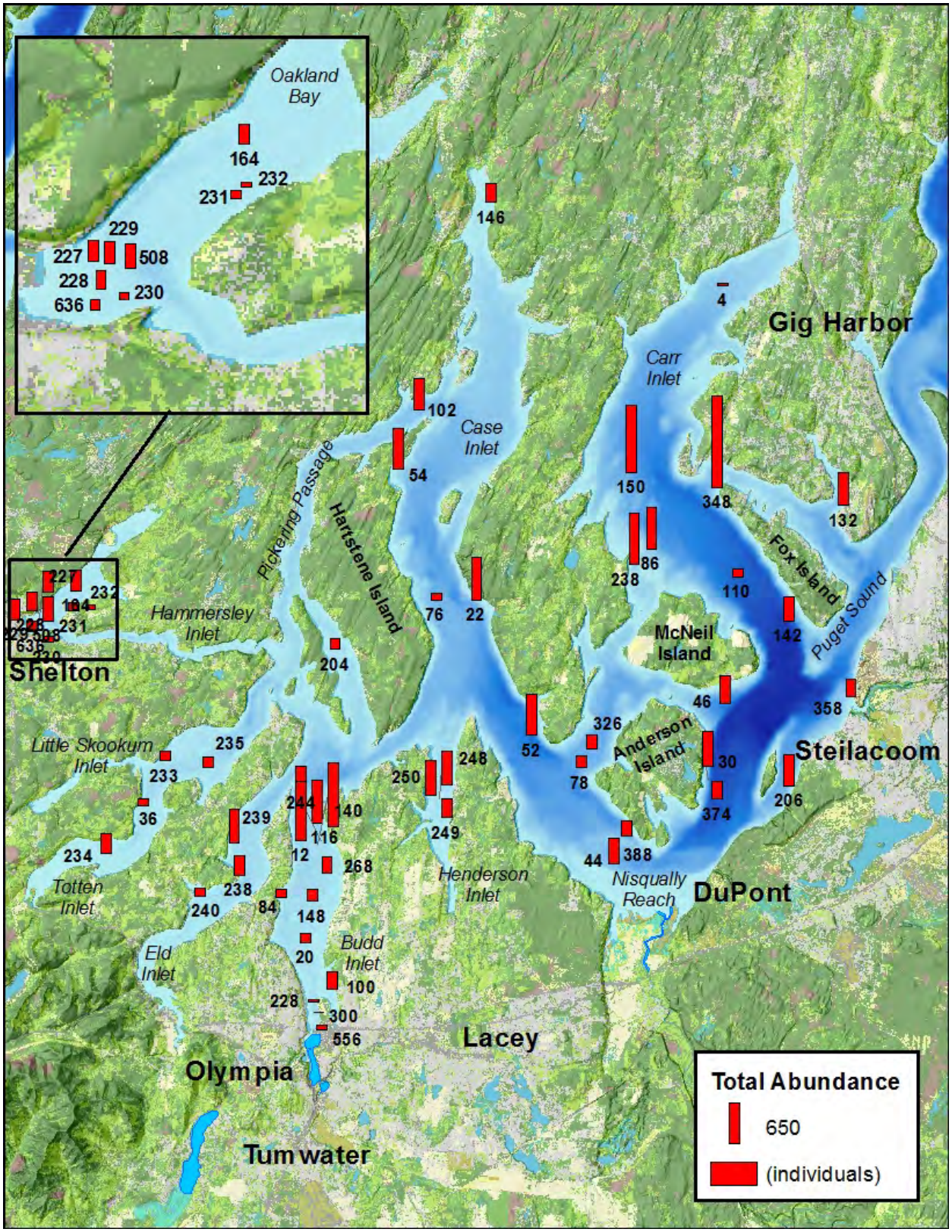
Station	Total abundance	Annelida	Annelida % of total abundance	Arthropoda	Arthropoda % of total abundance	Echino-dermata	Echinodermata % of total abundance	Mollusca	Mollusca % of total abundance	Misc. taxa	Misc. taxa % of total abundance
PS00348	1451	434	29.9	565	38.9	10	0.7	387	26.7	55	3.79
PS00358	275	237	86.2	20	7.3	3	1.1	11	4.0	4	1.45
PS00374	280	183	65.4	26	9.3	0	0.0	64	22.9	7	2.50
PS00388	235	214	91.1	18	7.7	0	0.0	2	0.9	1	0.43
PS00508	388	215	55.4	64	16.5	3	0.8	90	23.2	16	4.12
PS00636	158	122	77.2	27	17.1	3	1.9	6	3.8	0	0.00
PSNO227	335	237	70.7	60	17.9	3	0.9	34	10.1	1	0.30
PSNO228	292	194	66.4	43	14.7	17	5.8	35	12.0	3	1.03
PSNO229	336	269	80.1	20	6.0	3	0.9	41	12.2	3	0.89
PSNO230	95	71	74.7	4	4.2	6	6.3	11	11.6	3	3.16
PSNO231	131	27	20.6	16	12.2	1	0.8	86	65.6	1	0.76
PSNO232	70	27	38.6	17	24.3	2	2.9	23	32.9	1	1.43
PSNO233	148	128	86.5	4	2.7	0	0.0	13	8.8	3	2.03
PSNO234	310	283	91.3	16	5.2	1	0.3	9	2.9	1	0.32
PSNO235	172	55	32.0	61	35.5	19	11.0	37	21.5	0	0.00
PSNO238	299	136	45.5	82	27.4	6	2.0	53	17.7	22	7.36
PSNO239	534	236	44.2	210	39.3	77	14.4	1	0.2	10	1.87
PSNO240	135	71	52.6	37	27.4	0	0.0	24	17.8	3	2.22
PSNO248	544	202	37.1	163	30.0	176	32.4	2	0.4	1	0.18
PSNO249	303	114	37.6	113	37.3	68	22.4	6	2.0	2	0.66
PSNO250	549	180	32.8	179	32.6	174	31.7	13	2.4	3	0.55
PSUW012	948	364	38.4	182	19.2	364	38.4	34	3.6	4	0.42
PSUW020	148	112	75.7	28	18.9	0	0.0	6	4.1	2	1.35

Station	Total abundance	Annelida	Annelida % of total abundance	Arthropoda	Arthropoda % of total abundance	Echino-dermata	Echinodermata % of total abundance	Mollusca	Mollusca % of total abundance	Misc. taxa	Misc. taxa % of total abundance
PSUW084	129	71	55.0	13	10.1	0	0.0	45	34.9	0	0.00
PSUW100	282	199	70.6	32	11.3	15	5.3	23	8.2	13	4.61
PSUW116	687	133	19.4	197	28.7	305	44.4	11	1.6	41	5.97
PSUW140	1021	191	18.7	257	25.2	568	55.6	0	0.0	5	0.49
PSUW148	187	132	70.6	22	11.8	25	13.4	6	3.2	2	1.07
PSUW228	42	33	78.6	3	7.1	0	0.0	0	0.0	6	14.29
PSUW244	336	211	62.8	40	11.9	2	0.6	68	20.2	15	4.46
PSUW268	267	116	43.4	54	20.2	86	32.2	9	3.4	2	0.75
PSUW300	0	0	--	0	--	0	--	0	--	0	--
PSUW556	81	43	53.1	14	17.3	0	0.0	17	21.0	7	8.64
Mean	375.3	195.4	57.0	72.5	16.3	44.8	7.8	51.1	15.8	11.4	3.10
Median	303	151	58.1	32	12.2	3	1.8	34	9.6	5	2.03
Min	0	0	17.1	0	0.0	0	0.0	0	0.0	0	0.00
Max	1451	971	91.3	565	49.8	568	55.6	387	74.1	70	14.29
Range	1451	971	74.2	565	49.8	568	55.6	387	74.1	70	14.29

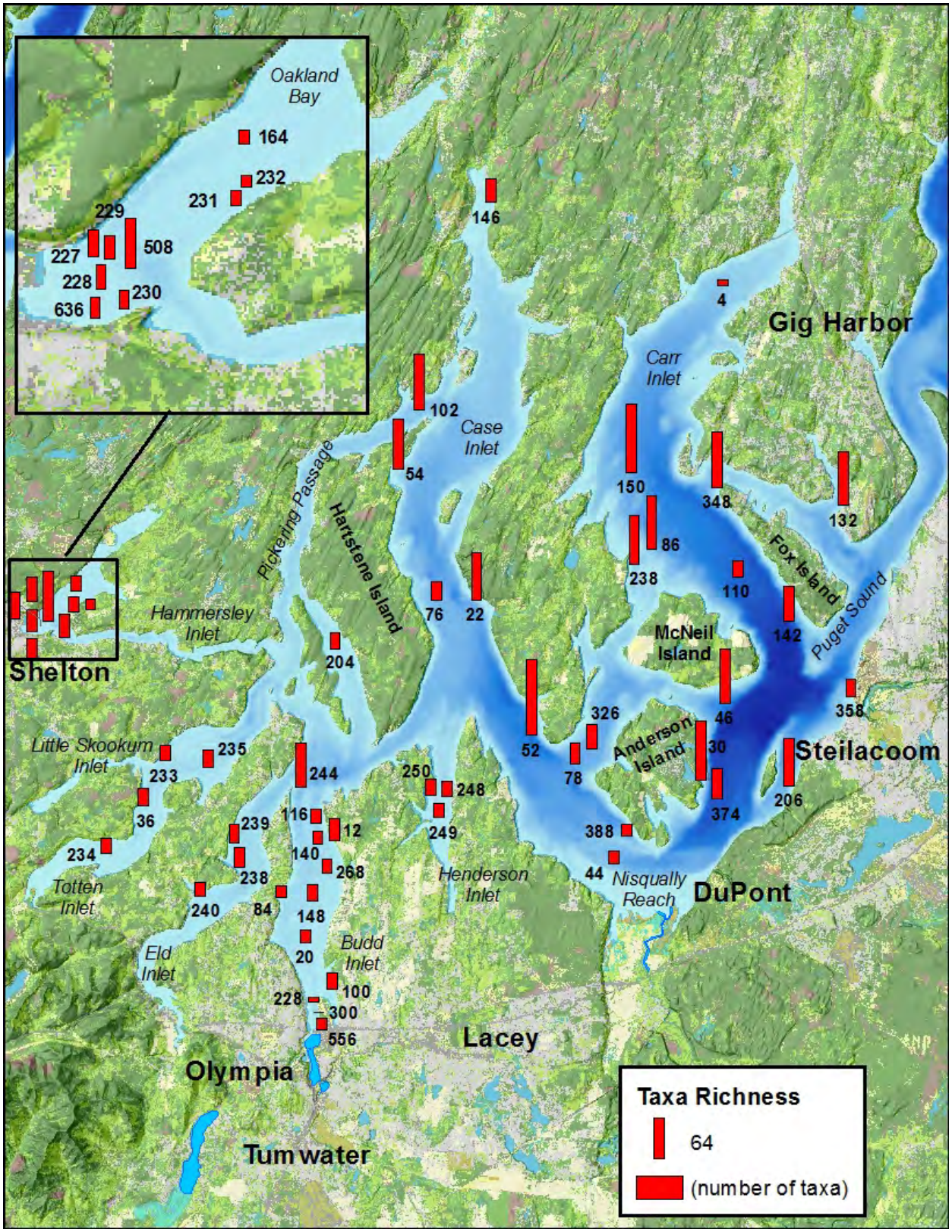
Total abundance, taxa richness, Pielou's evenness, and Swartz Dominance Index calculated for the 2011 South Sound survey.

Station	Total abundance	Taxa richness	Pielou's evenness (J')	Swartz Dominance Index
PS00004	35	9	0.66	3
PS00022	683	73	0.69	13
PS00030	566	92	0.81	23
PS00036	113	26	0.74	7
PS00044	415	21	0.42	2
PS00046	443	84	0.78	18
PS00052	653	119	0.81	30
PS00054	655	77	0.76	17
PS00076	107	29	0.86	11
PS00078	194	32	0.71	7
PS00086	665	83	0.77	17
PS00102	497	86	0.78	19
PS00110	132	25	0.80	7
PS00132	518	84	0.84	24
PS00142	393	54	0.67	11
PS00146	309	37	0.80	11
PS00150	1075	107	0.52	10
PS00164	321	23	0.44	2
PS00204	164	26	0.84	9
PS00206	504	75	0.78	17
PS00238	815	76	0.75	13
PS00326	216	38	0.79	11
PS00348	1451	86	0.69	13
PS00358	275	28	0.66	5
PS00374	280	48	0.77	12
PS00388	235	19	0.52	2
PS00508	388	78	0.82	21
PS00636	158	34	0.84	12
PSNO227	335	43	0.77	10
PSNO228	292	38	0.79	11
PSNO229	336	36	0.76	9
PSNO230	95	30	0.86	12
PSNO231	131	24	0.82	9
PSNO232	70	17	0.89	8

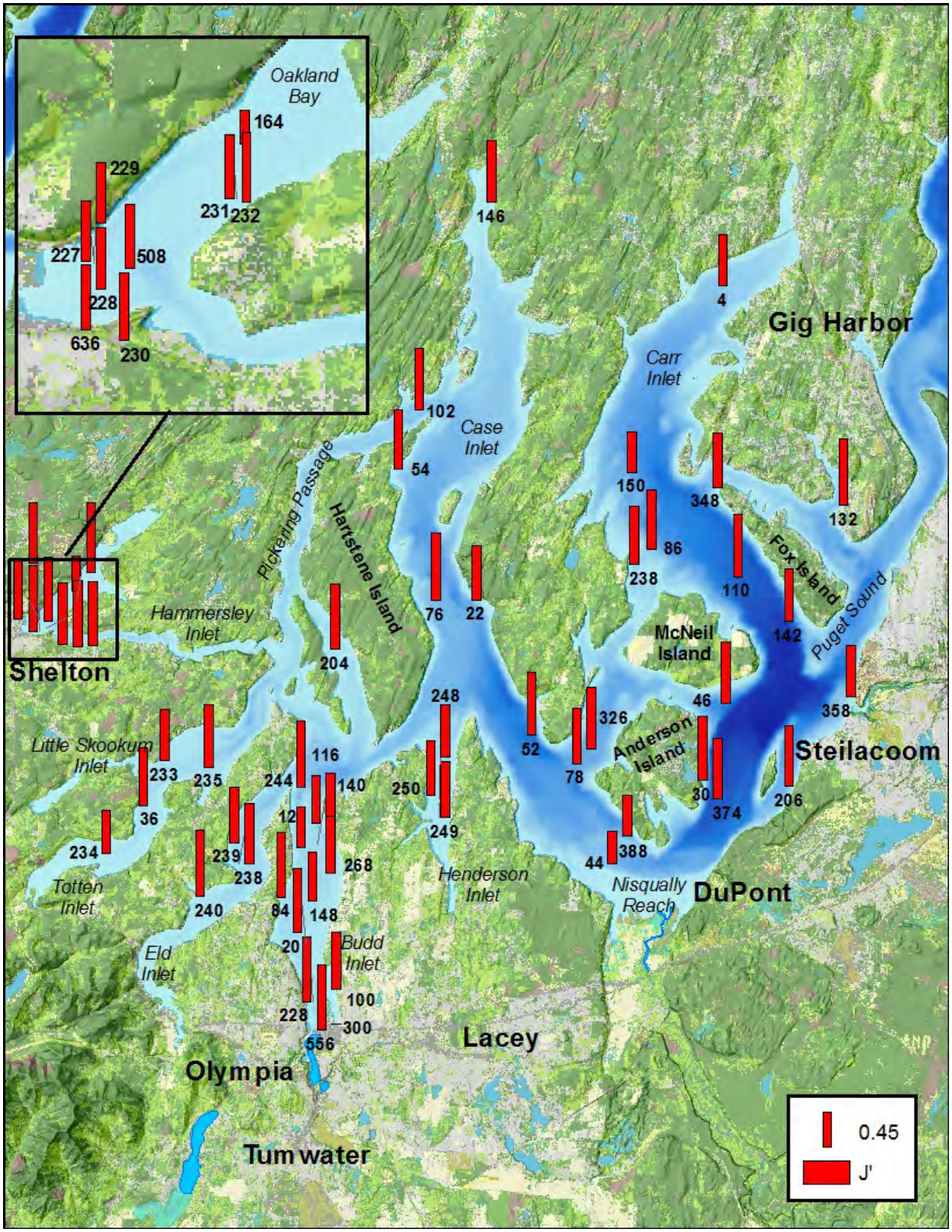
Station	Total abundance	Taxa richness	Pielou's evenness (J')	Swartz Dominance Index
PSNO233	148	25	0.66	5
PSNO234	310	23	0.55	3
PSNO235	172	26	0.80	8
PSNO238	299	31	0.78	9
PSNO239	534	28	0.70	6
PSNO240	135	22	0.84	8
PSNO248	544	24	0.67	5
PSNO249	303	22	0.72	6
PSNO250	549	25	0.69	5
PSUW012	948	35	0.52	3
PSUW020	148	19	0.81	7
PSUW084	129	18	0.82	7
PSUW100	282	25	0.73	6
PSUW116	687	23	0.61	4
PSUW140	1021	21	0.55	3
PSUW148	187	25	0.62	4
PSUW228	42	7	0.83	3
PSUW244	336	69	0.85	20
PSUW268	267	22	0.73	5
PSUW300	0	0	--	--
PSUW556	81	18	0.84	7
Mean	375.3	41.2	0.73	9.8
Median	303	28	0.77	8.5
Min	0	0	0.42	2
Max	1451	119	0.89	30
Range	1451	119	0.47	28



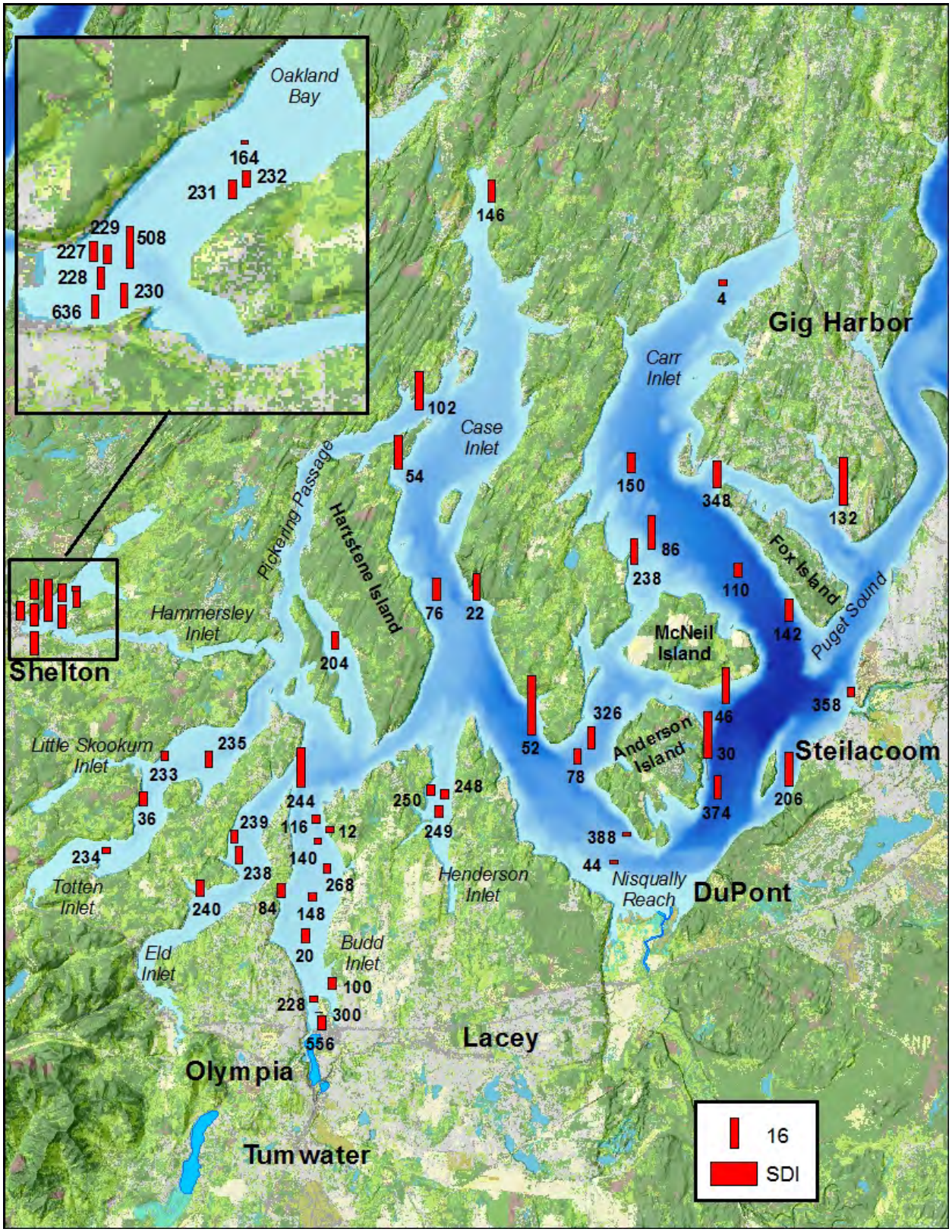
Spatial patterns in total benthic invertebrate abundance in the 2011 South Sound survey. *The numbers on the map are the station identifications.*



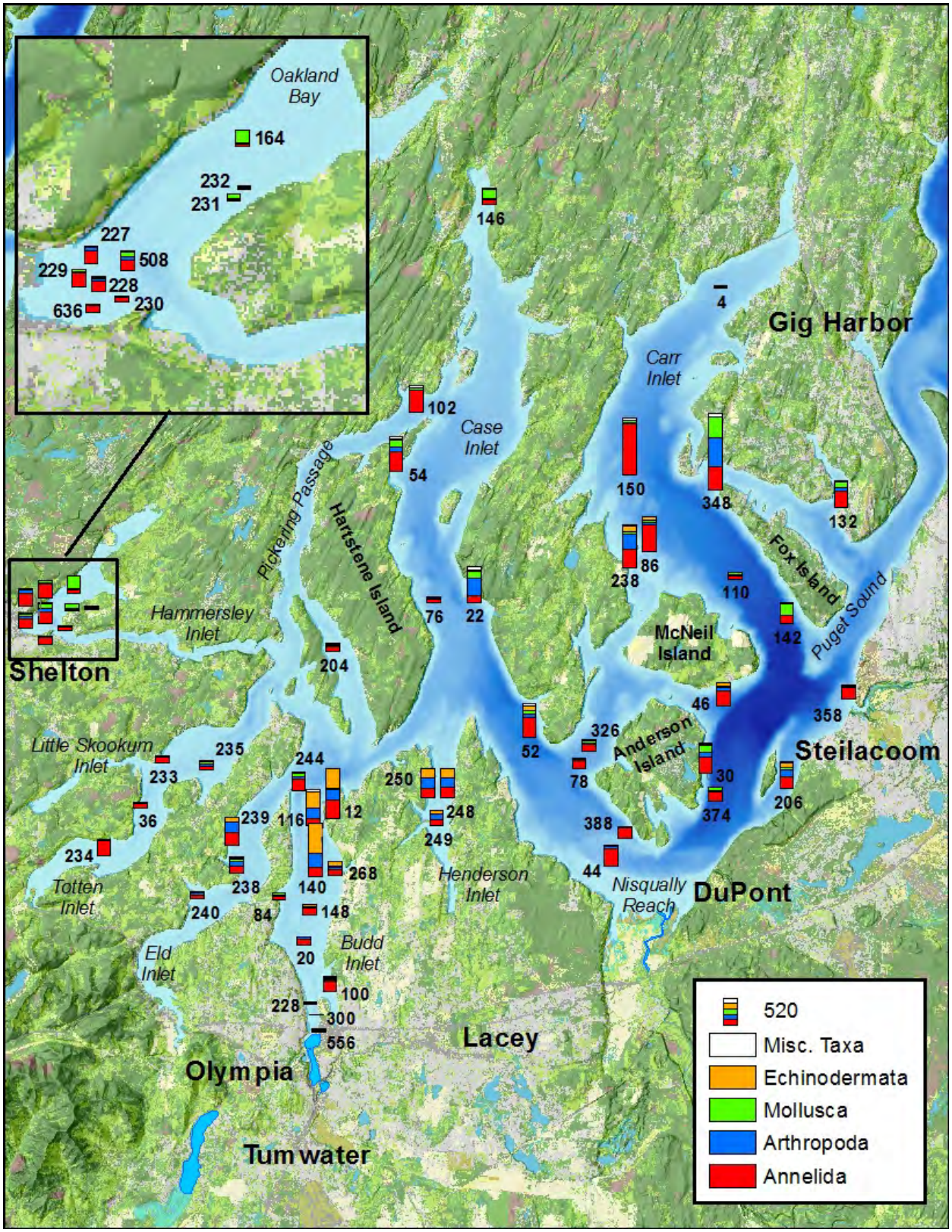
Spatial patterns in taxa richness in the 2011 South Sound survey.
The numbers on the map are the station identifications.



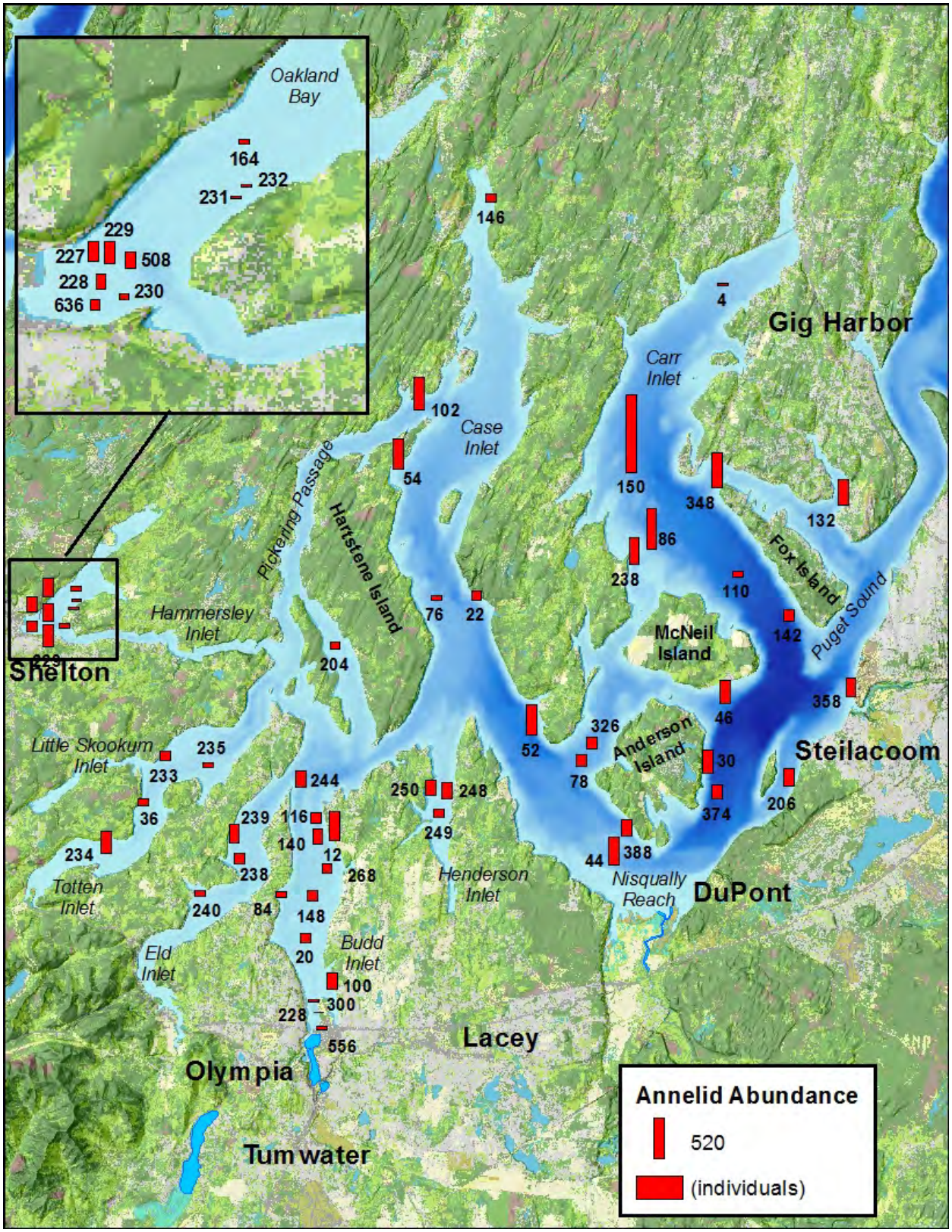
Spatial patterns in Pielou's Evenness (J') in the 2011 South Sound survey.
The numbers on the map are the station identifications.



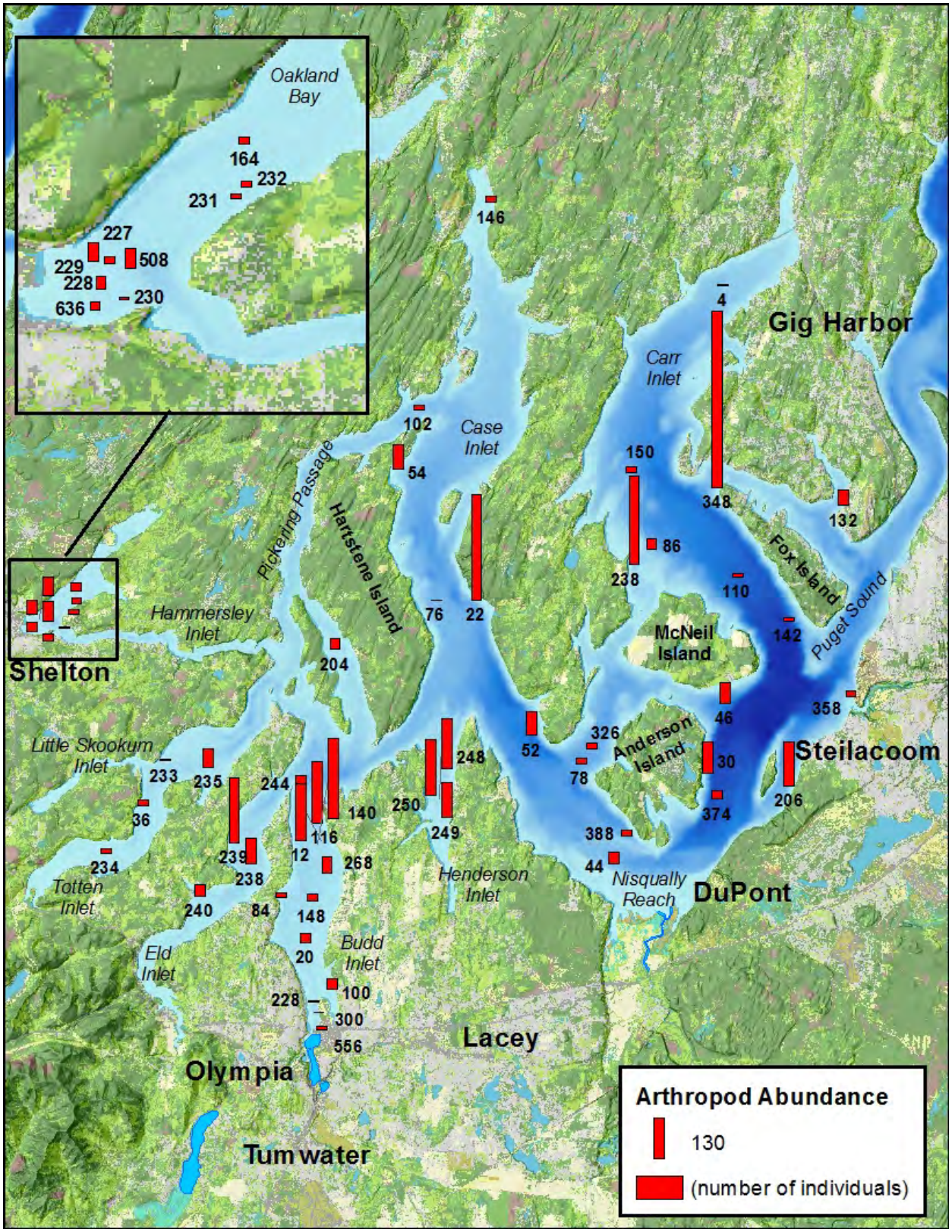
Spatial patterns in Swartz Dominance Index in the 2011 South Sound survey.
The numbers on the map are the station identifications.



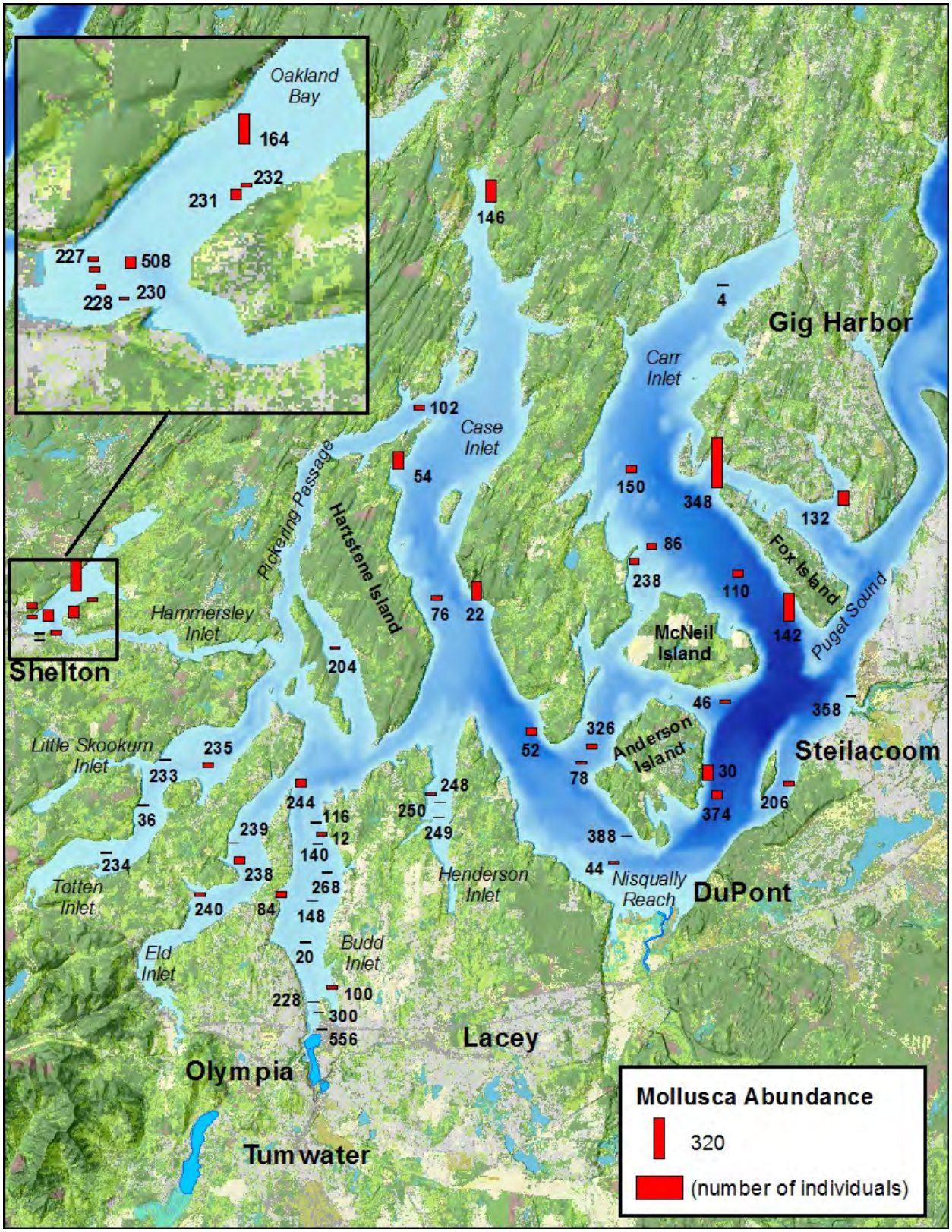
Spatial patterns in major taxa relative abundance (percent) in the 2011 South Sound survey. *The numbers on the map are the station identifications.*



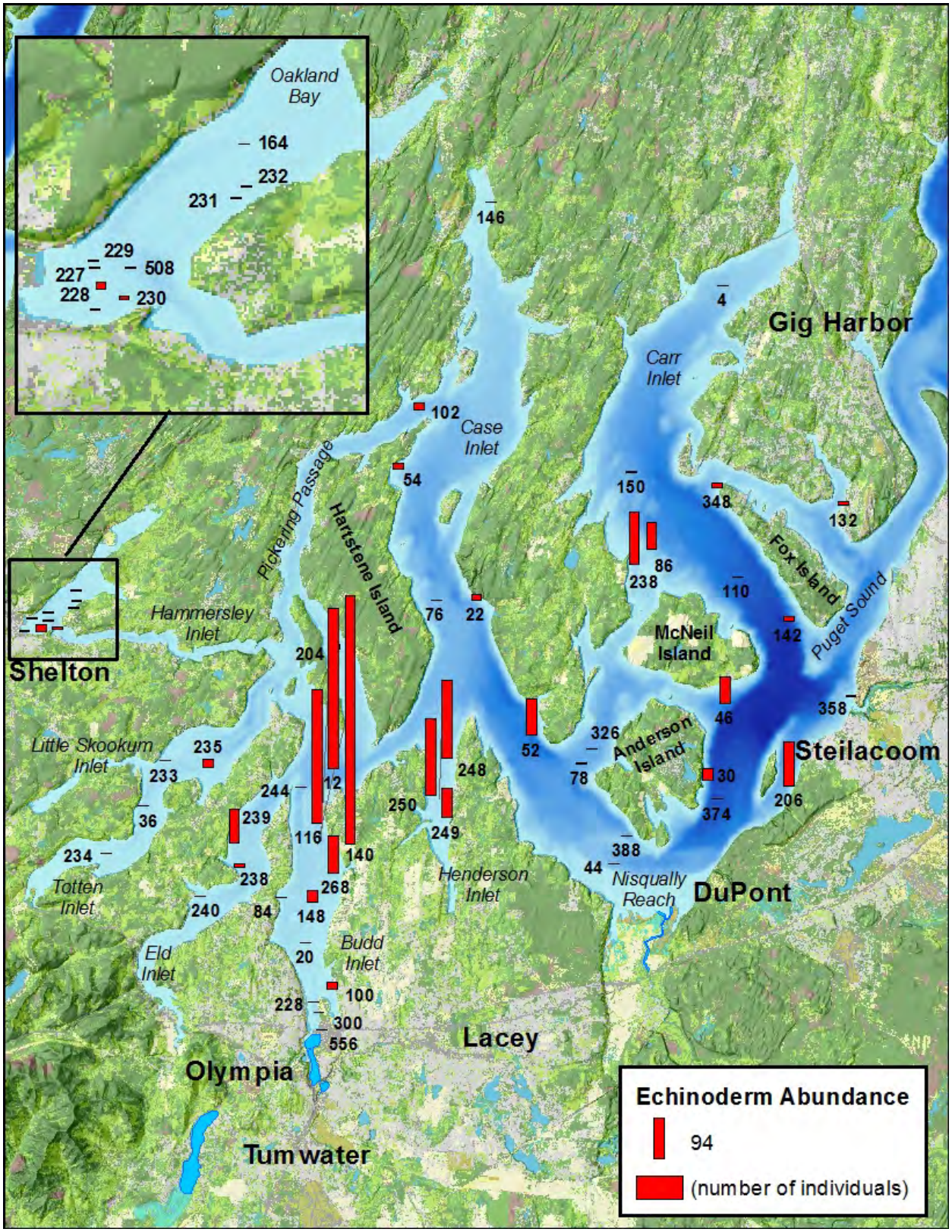
Spatial patterns in annelid abundance in the 2011 South Sound survey.
The numbers on the map are the station identifications.



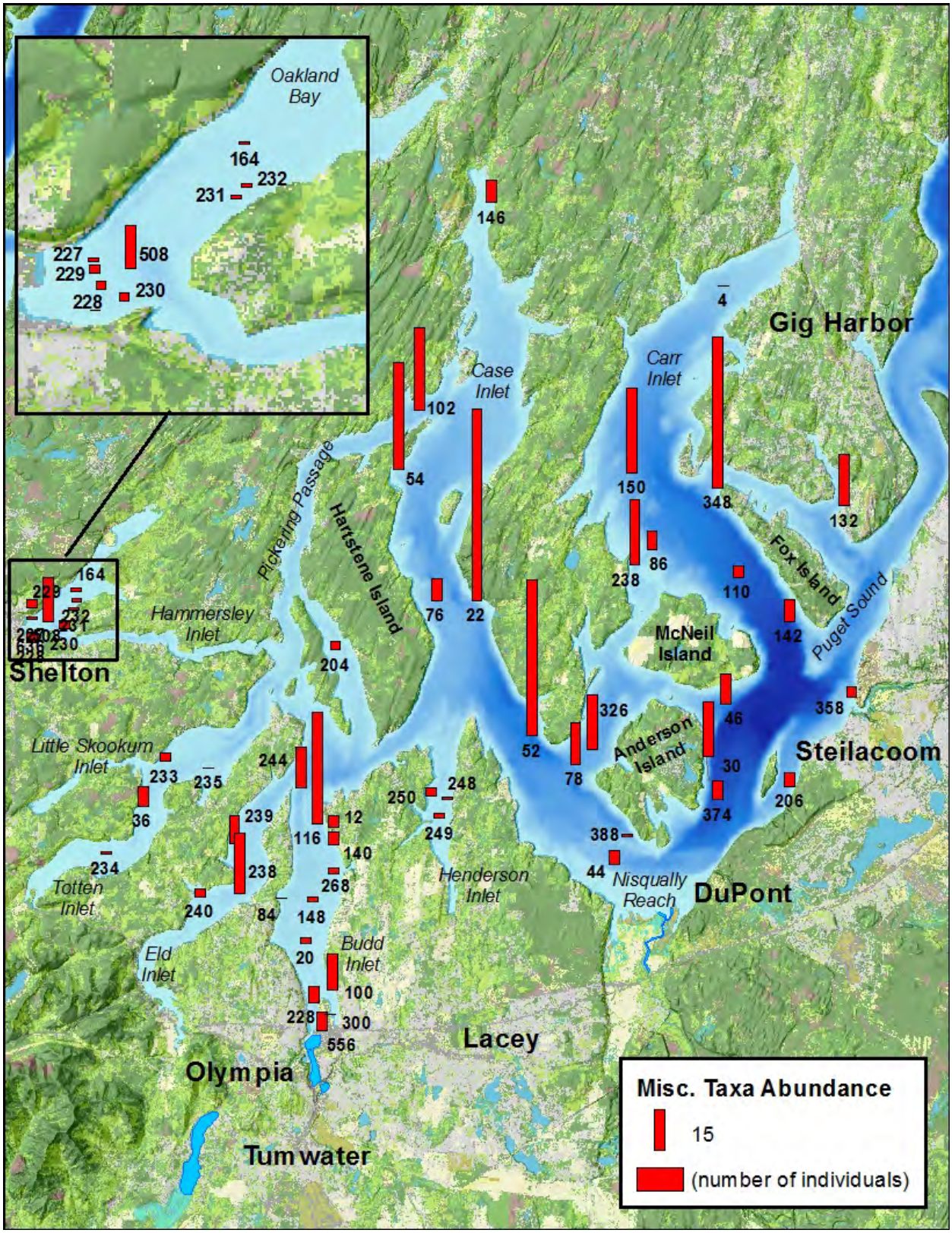
Spatial patterns in arthropod abundance in the 2011 South Sound survey.
The numbers on the map are the station identifications.



Spatial patterns in mollusc abundance in the 2011 South Sound survey.
The numbers on the map are the station identifications.

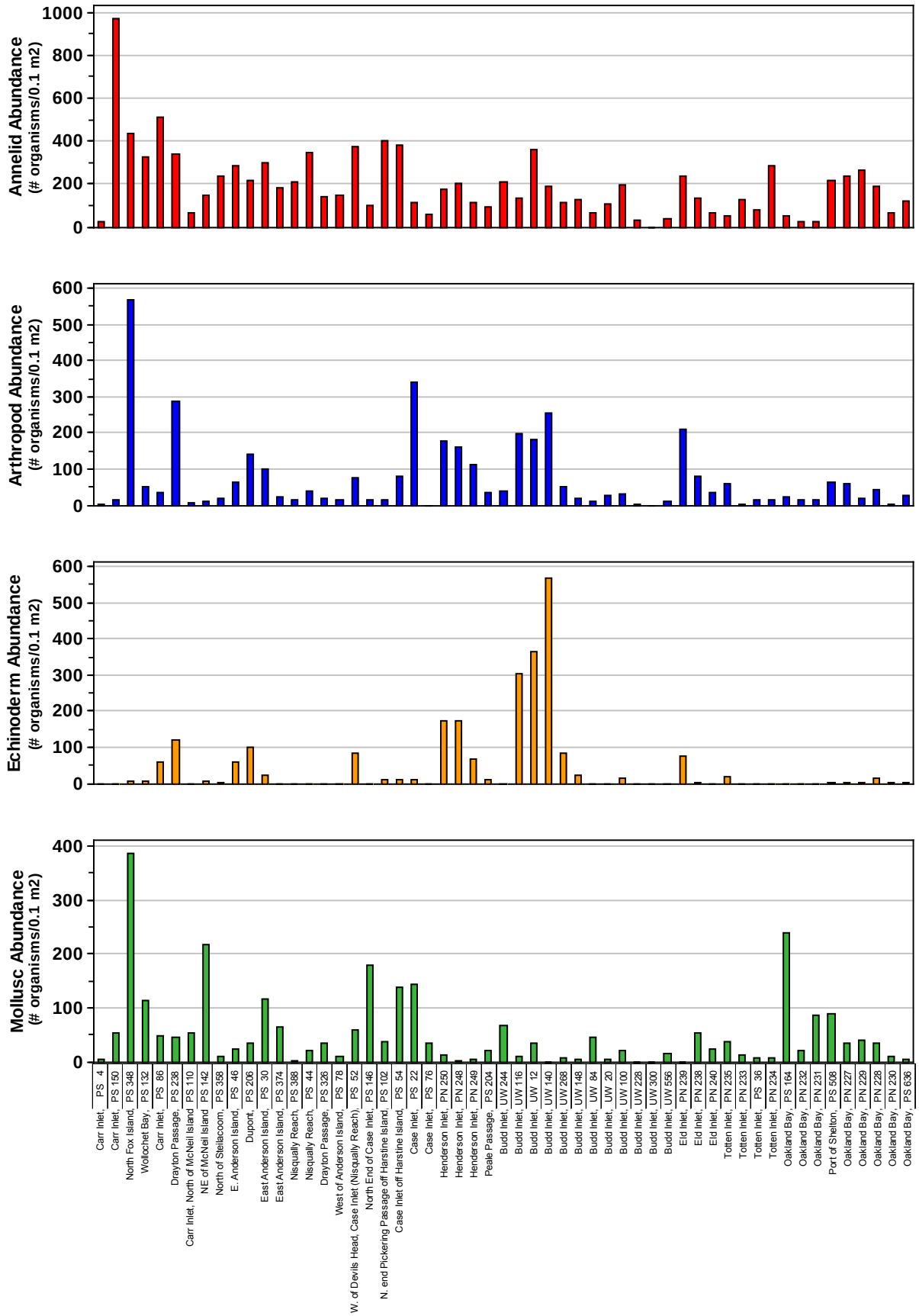


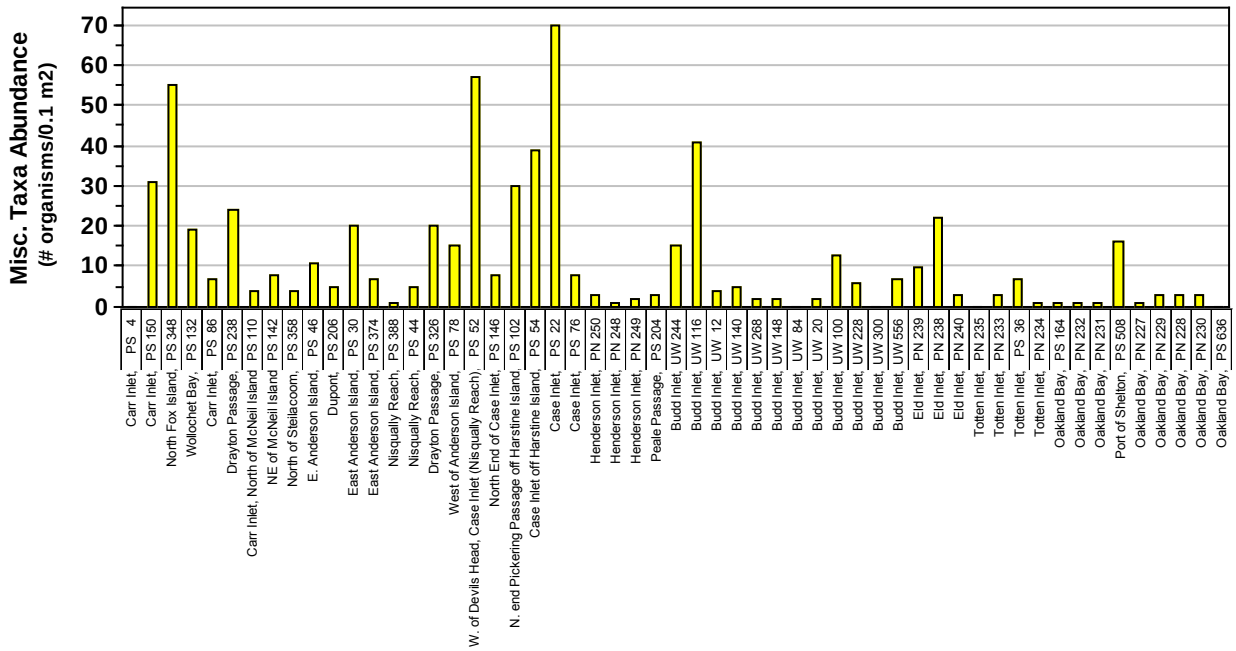
Spatial patterns in echinoderm abundance in the 2011 South Sound survey.
The numbers on the map are the station identifications.



Spatial patterns in miscellaneous taxa abundance in the 2011 South Sound survey.

The numbers on the map are the station identifications.


Annelid Abundance
(# organisms/0.1 m2)
Arthropod Abundance
(# organisms/0.1 m2)
Echinoderm Abundance
(# organisms/0.1 m2)
Mollusc Abundance
(# organisms/0.1 m2)
Carr Inlet, PS 4
Carr Inlet, PS 150
North Fox Island, PS 348
Wollochet Bay, PS 132
Carr Inlet, PS 86
Drayton Passage, PS 238
Carr Inlet, North of McNeil Island PS 110
NE of McNeil Island PS 142
North of Steilacoom, PS 358
E. Anderson Island, PS 46
Dupont, PS 206
East Anderson Island, PS 30
East Anderson Island, PS 374
Nisqually Reach, PS 388
Nisqually Reach, PS 44
Drayton Passage, PS 326
West of Anderson Island, PS 78
W. of Devils Head, Case Inlet (Nisqually Reach) PS 52
North End of Case Inlet, PS 146
N. end Pickering Passage off Harstine Island, PS 102
Case Inlet off Harstine Island, PS 54
Case Inlet, PS 22
Case Inlet, PS 76
Henderson Inlet, PN 250
Henderson Inlet, PN 248
Henderson Inlet, PN 249
Peale Passage, PS 204
Budd Inlet, UW 244
Budd Inlet, UW 116
Budd Inlet, UW 12
Budd Inlet, UW 140
Budd Inlet, UW 268
Budd Inlet, UW 148
Budd Inlet, UW 84
Budd Inlet, UW 20
Budd Inlet, UW 100
Budd Inlet, UW 228
Budd Inlet, UW 300
Budd Inlet, UW 556
Eld Inlet, PN 239
Eld Inlet, PN 238
Eld Inlet, PN 240
Totten Inlet, PN 235
Totten Inlet, PN 233
Totten Inlet, PS 36
Totten Inlet, PN 234
Oakland Bay, PS 164
Oakland Bay, PN 232
Oakland Bay, PN 231
Port of Shelton, PS 508
Oakland Bay, PN 227
Oakland Bay, PN 229
Oakland Bay, PN 228
Oakland Bay, PN 230
Oakland Bay, PS 636


Misc. Taxa Abundance
(# organisms/0.1 m2)
70
60
50
40
30
20
10
0
PS 4 Carr Inlet
PS 150 Carr Inlet
PS 348 North Fox Island
PS 132 Wollochet Bay
PS 86 Carr Inlet
PS 238 Drayton Passage
PS 110 Carr Inlet, North of McNeil Island
PS 142 NE of McNeil Island
PS 358 North of Steilacoom
PS 46 E. Anderson Island
PS 206 Dupont
PS 30 East Anderson Island
PS 374 East Anderson Island
PS 388 Nisqually Reach
PS 44 Nisqually Reach
PS 326 Drayton Passage
PS 78 West of Anderson Island
PS 52 W. of Devils Head, Case Inlet (Nisqually Reach)
PS 146 North End of Case Inlet
PS 102 N. end Pickering Passage off Harstine Island
PS 54 Case Inlet off Harstine Island
PS 22 Case Inlet
PS 76 Case Inlet
PN 250 Henderson Inlet
PN 248 Henderson Inlet
PN 249 Henderson Inlet
PS 204 Peale Passage
UW 244 Budd Inlet
UW 116 Budd Inlet
UW 12 Budd Inlet
UW 140 Budd Inlet
UW 268 Budd Inlet
UW 148 Budd Inlet
UW 84 Budd Inlet
UW 20 Budd Inlet
UW 100 Budd Inlet
UW 228 Budd Inlet
UW 300 Budd Inlet
UW 556 Budd Inlet
PN 239 Eld Inlet
PN 238 Eld Inlet
PN 240 Eld Inlet
PN 235 Totten Inlet
PN 233 Totten Inlet
PS 36 Totten Inlet
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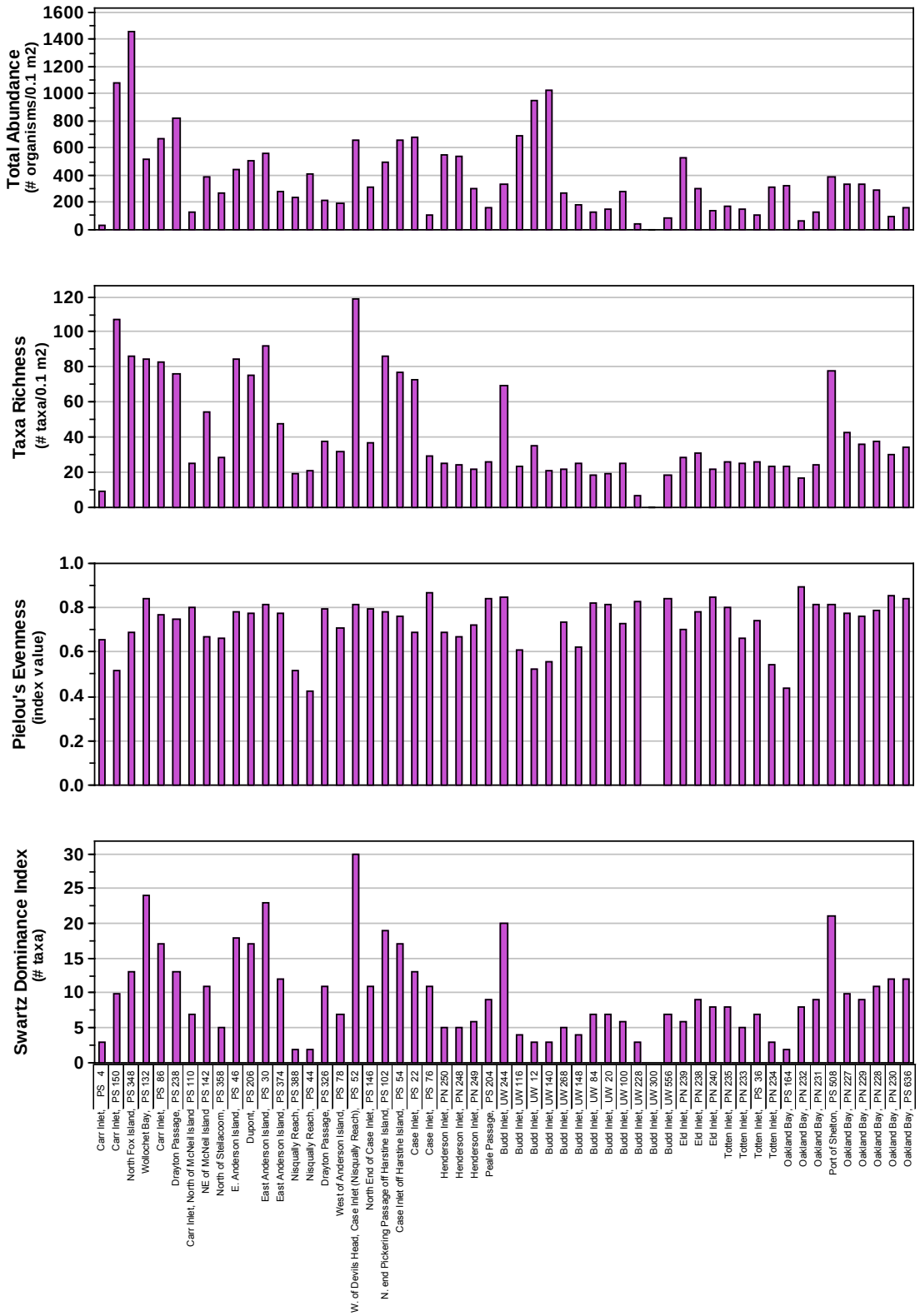
PN 230 Oakland Bay
PS 636 Oakland Bay

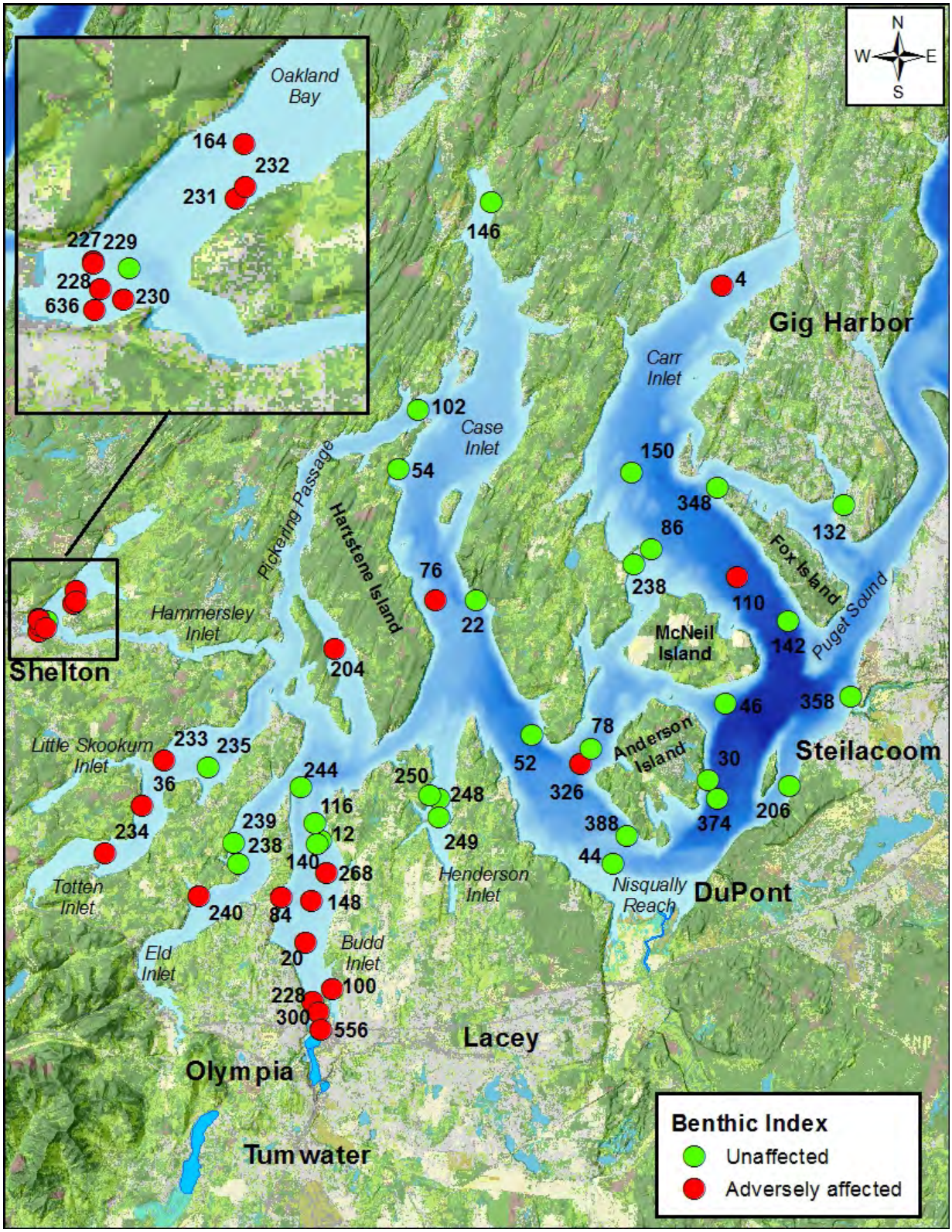


Benthic invertebrate measures calculated for sediment samples collected in the 2011 South Sound survey.

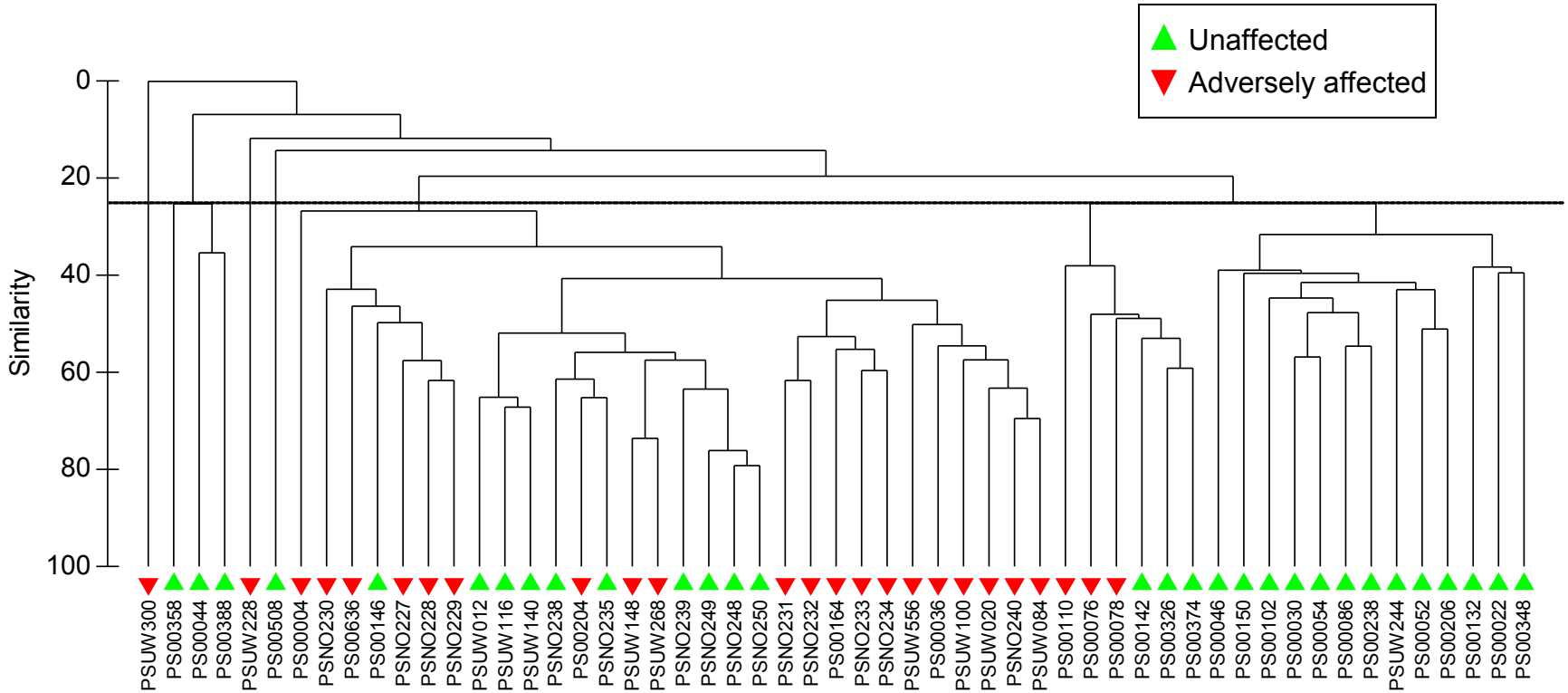
Adversely Affected Benthic Communities

Samples from the 2011 South Sound survey with adversely affected benthos and associated station weights. Total study area is 317.68 km^2.

Station	Location	Sample Weight (km^2)
4	Carr Inlet	7.69
36	Totten Inlet	7.69
76	Case Inlet	7.69
78	West of Anderson Island	6.81
110	Carr Inlet, North of McNeil Island	7.69
164	Oakland Bay	7.69
204	Paele Passage	6.81
636	Oakland Bay	0.13
227	Oakland Bay	0.13
228	Oakland Bay	0.13
229	Oakland Bay	0.13
230	Oakland Bay	7.69
231	Oakland Bay	7.69
232	Oakland Bay	7.69
233	Totten Inlet	7.69
234	Totten Inlet	7.69
240	Eld Inlet	7.69
20	Budd Inlet	2.07
84	Budd Inlet	2.07
100	Budd Inlet	0.13
148	Budd Inlet	2.07
228	Budd Inlet	0.13
268	Budd Inlet	2.07
300	Budd Inlet	0.13
556	Budd Inlet	0.13

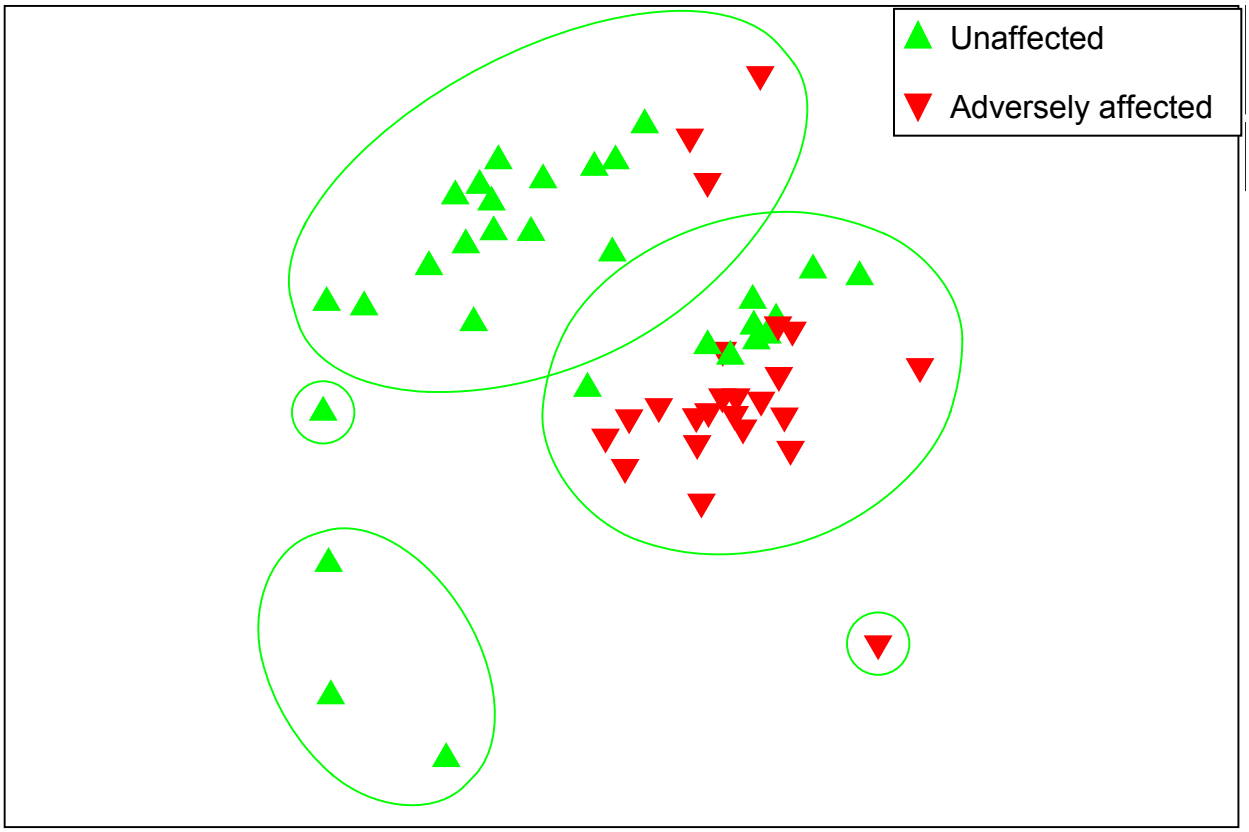


Spatial patterns in adversely affected benthic invertebrate assemblages in the 2011 South Sound survey. *The numbers on the map are the station identifications.*



Cluster dendrogram of benthic invertebrate assemblages in the 2011 South Sound survey (Bray-Curtis similarities of 4th-root-transformed abundances, all species). The dendrogram is sliced at 25% similarity.

Station PSUW300 had no macrobenthos (i.e., benthic invertebrates large enough to be found with a 1-mm mesh sieve).



Nonmetric multidimensional scaling (MDS) diagram indicating relative similarities of adversely affected and unaffected benthic invertebrate assemblages in the 2011 South Puget Sound sediment survey (Bray-Curtis similarities of 4th-root-transformed abundances, all species; 2D stress=0.15). The ellipses indicate assemblages with 25% or greater similarity, from the cluster dendrogram in the previous figure. The closer the symbols are in the diagram, the more similar their assemblages are.

Station PSUW300, which had no macrobenthos, is not shown in this MDS diagram.

Comparison with 1999

Changes in benthic invertebrate measures from 1999 to 2011, PSEMP Sediment Component South Puget Sound.

↑ = increase, ↓ = decrease, -- = no change, ? = significant only at α = 0.10.

Benthic invertebrate measure	Results of Unweighted Comparisons[1]	Results of Weighted (CDF) Comparisons[2]
Total abundance	--	--
Taxa richness	--	--
Pielou's evenness (J')	--	mixed
Swartz Dominance Index (SDI)	--	--
SDI standardized by Richness	--	mixed
Annelid abundance	--	--
Arthropod abundance	--	--
Echinoderm abundance	--	--
Mollusc abundance	--	mixed
Abundance of miscellaneous taxa	--	--
Overall condition of assemblage	**Result of Unweighted Comparison[3]**	**Result of Weighted Comparison[4]**
Adversely affected	--	--
Unaffected	--	--

[1] Kruskal-Wallis test, α = 0.05

[2] Wald F test, α = 0.05

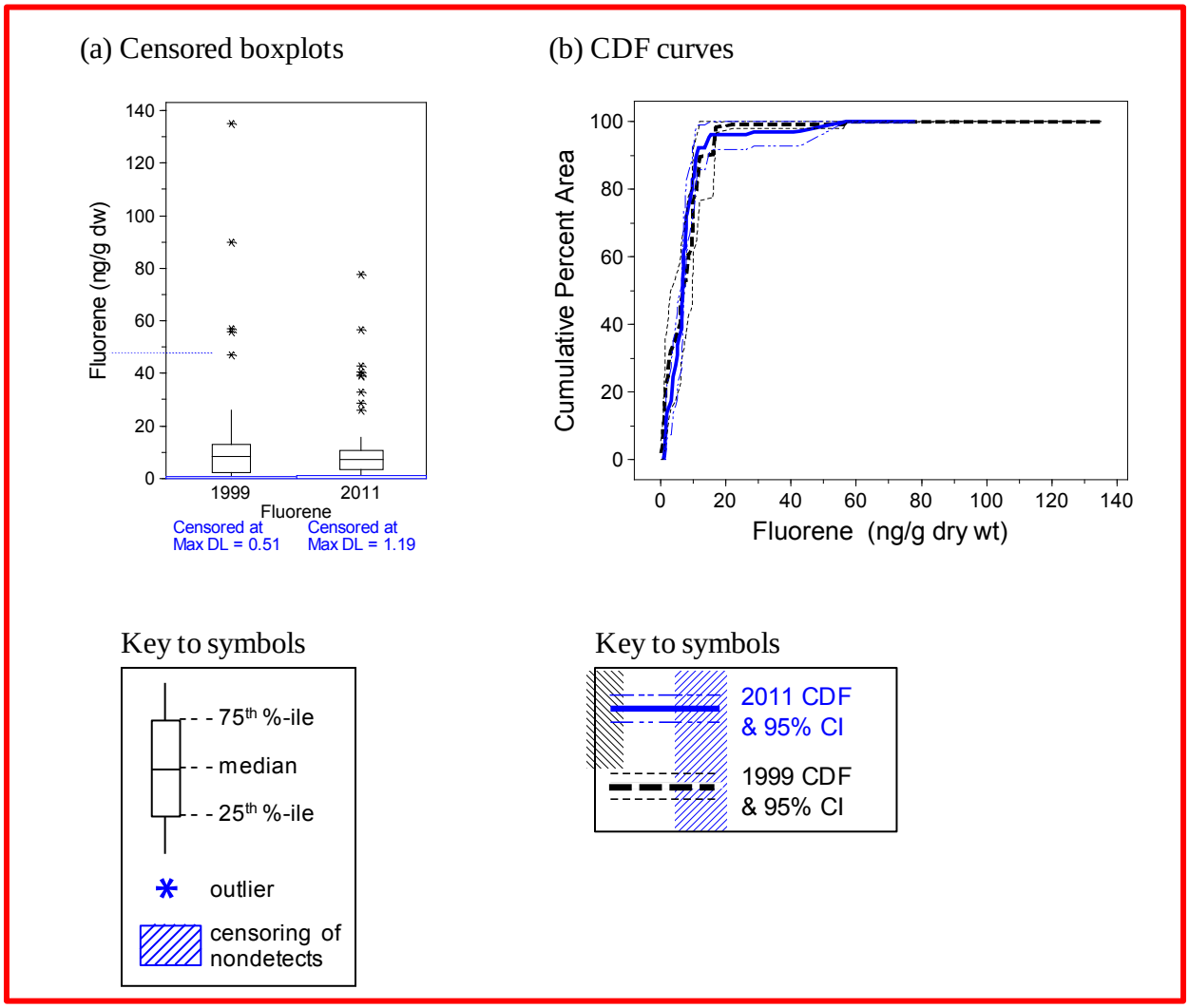
[3] Likelihood ratio test, α = 0.05

[4] Olsen et al. (in prep.), α = 0.05

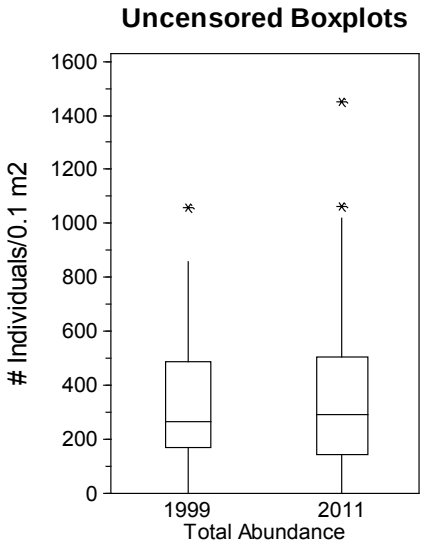
Comparison of infaunal indices calculated for the 1999 and 2011 surveys of the PSEMP South Puget Sound region, for each index.

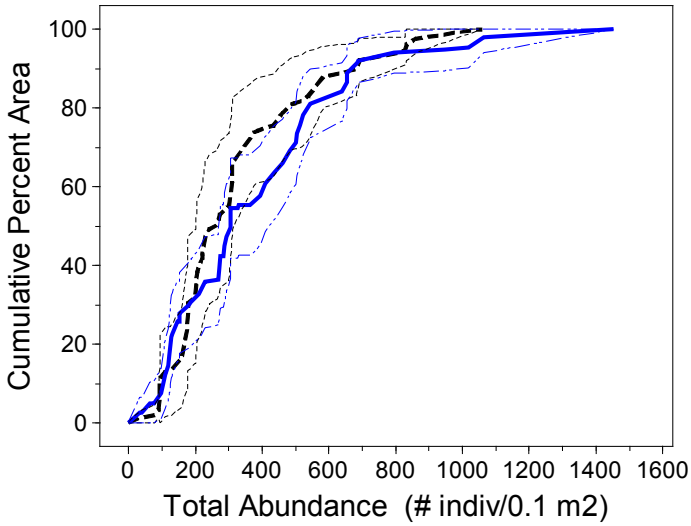
(a) Boxplots display the distributions of the data unweighted by sample area.
(b) Cumulative distribution function (CDF) curves display the cumulative distributions of the data weighted by sample area.

Note: 95% confidence intervals (CI) are shown in both graph types. Nonoverlapping confidence intervals indicate statistically significant differences.

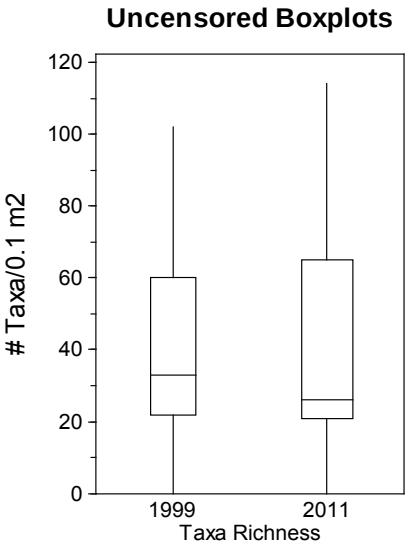


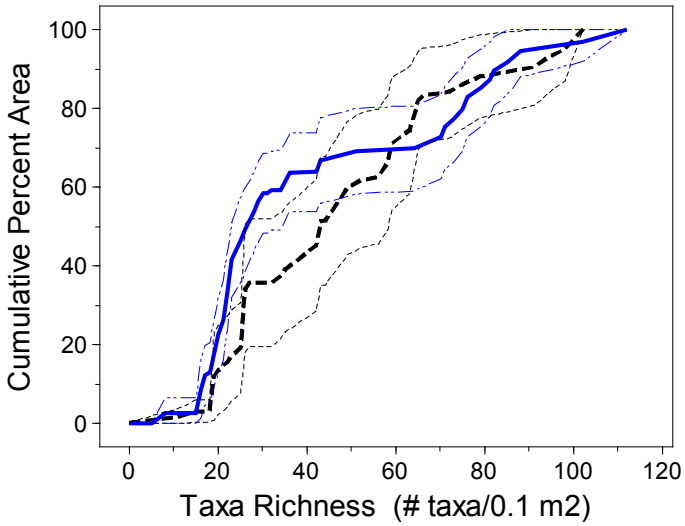
Total Abundance



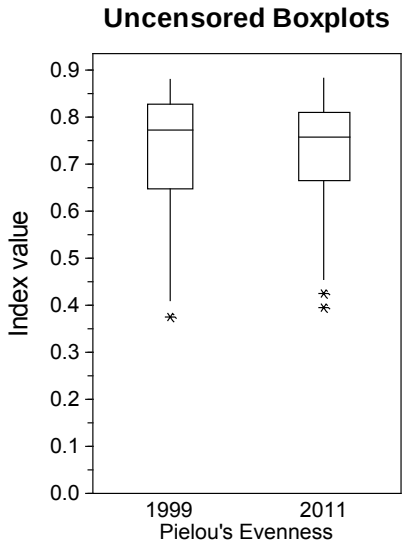


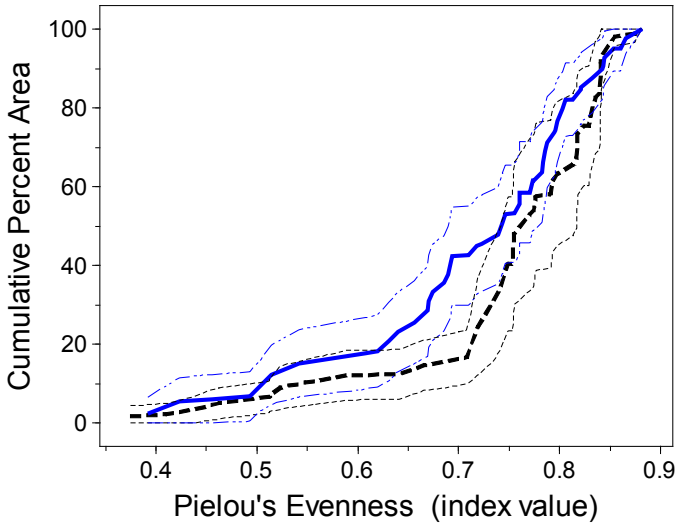
Taxa Richness



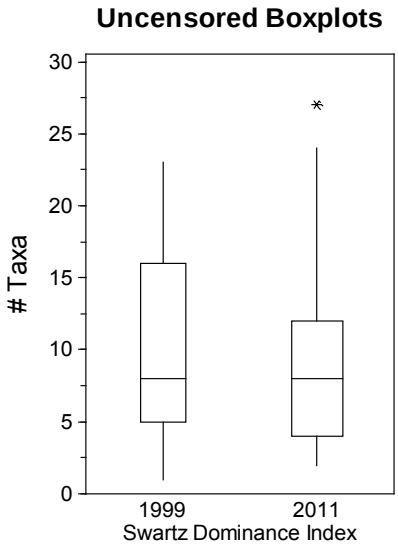


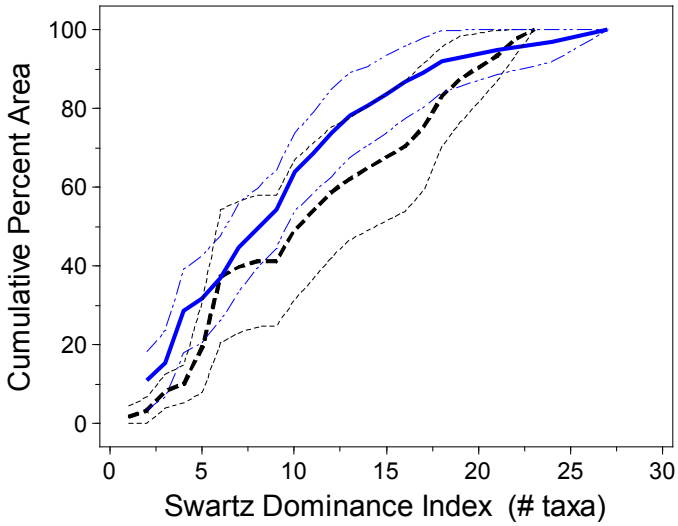
Pielou's Evenness (J')



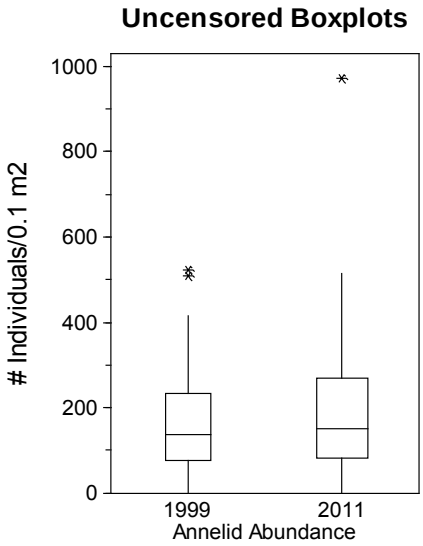


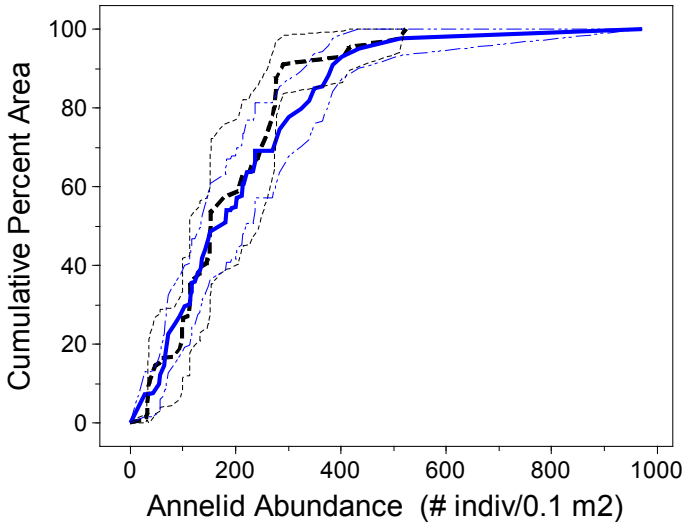
Swartz Dominance Index (SDI)



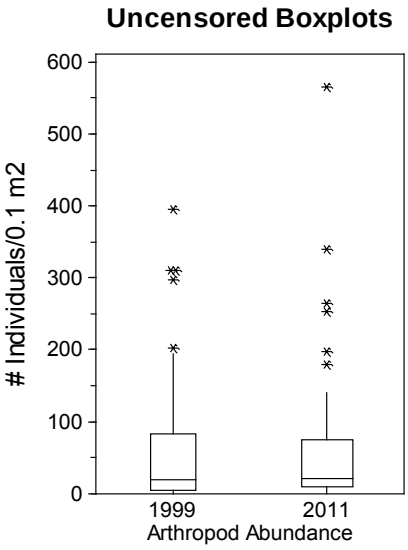


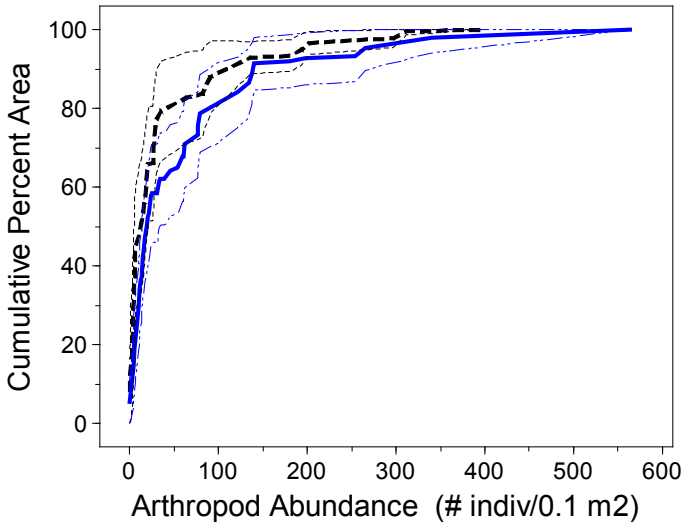
Annelid Abundance



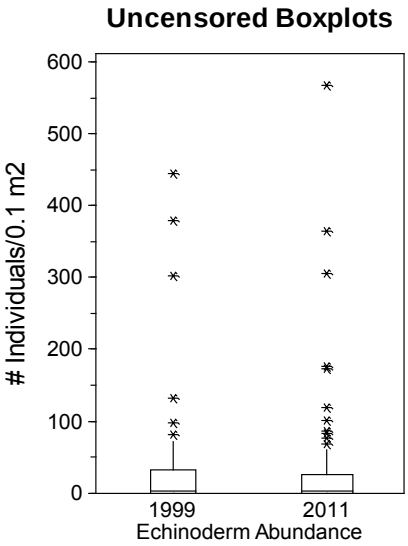


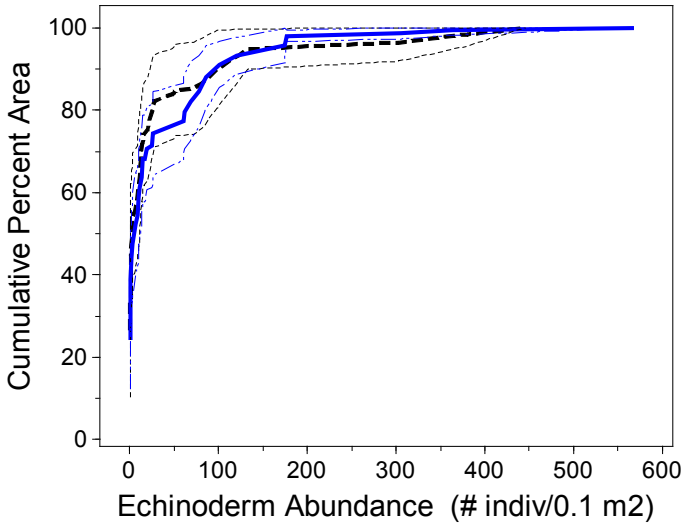
Arthropod Abundance



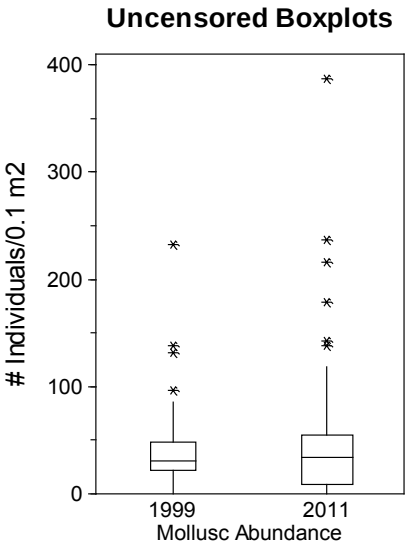


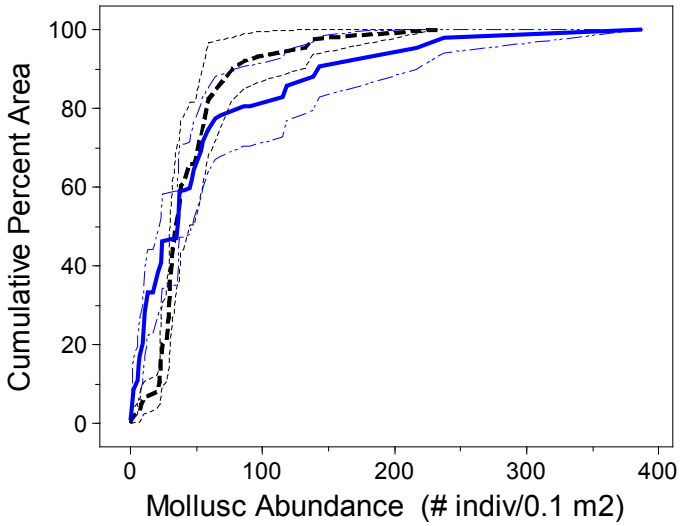
Echinoderm Abundance



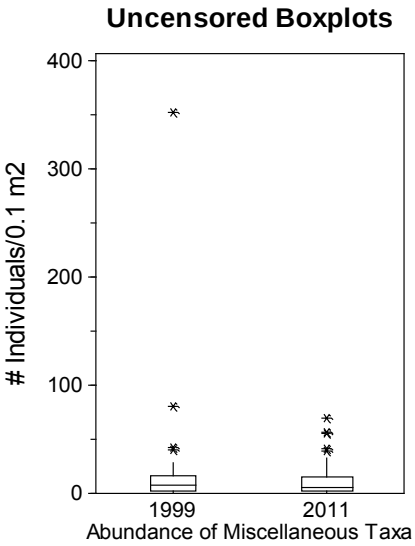


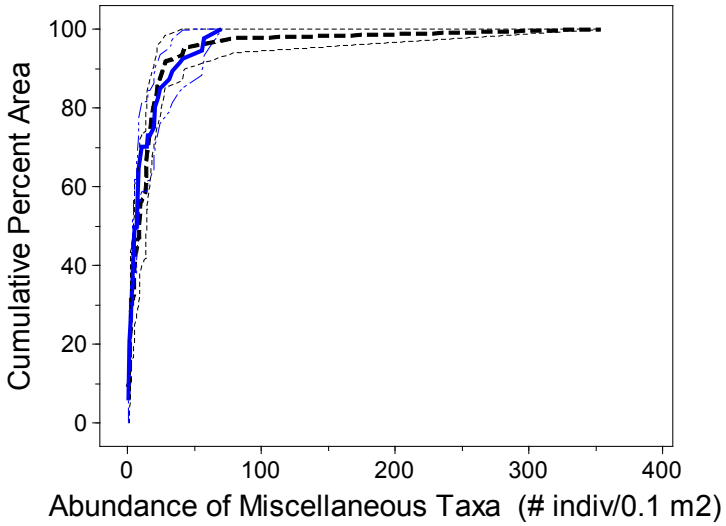
Mollusc Abundance





Abundance of Miscellaneous Taxa



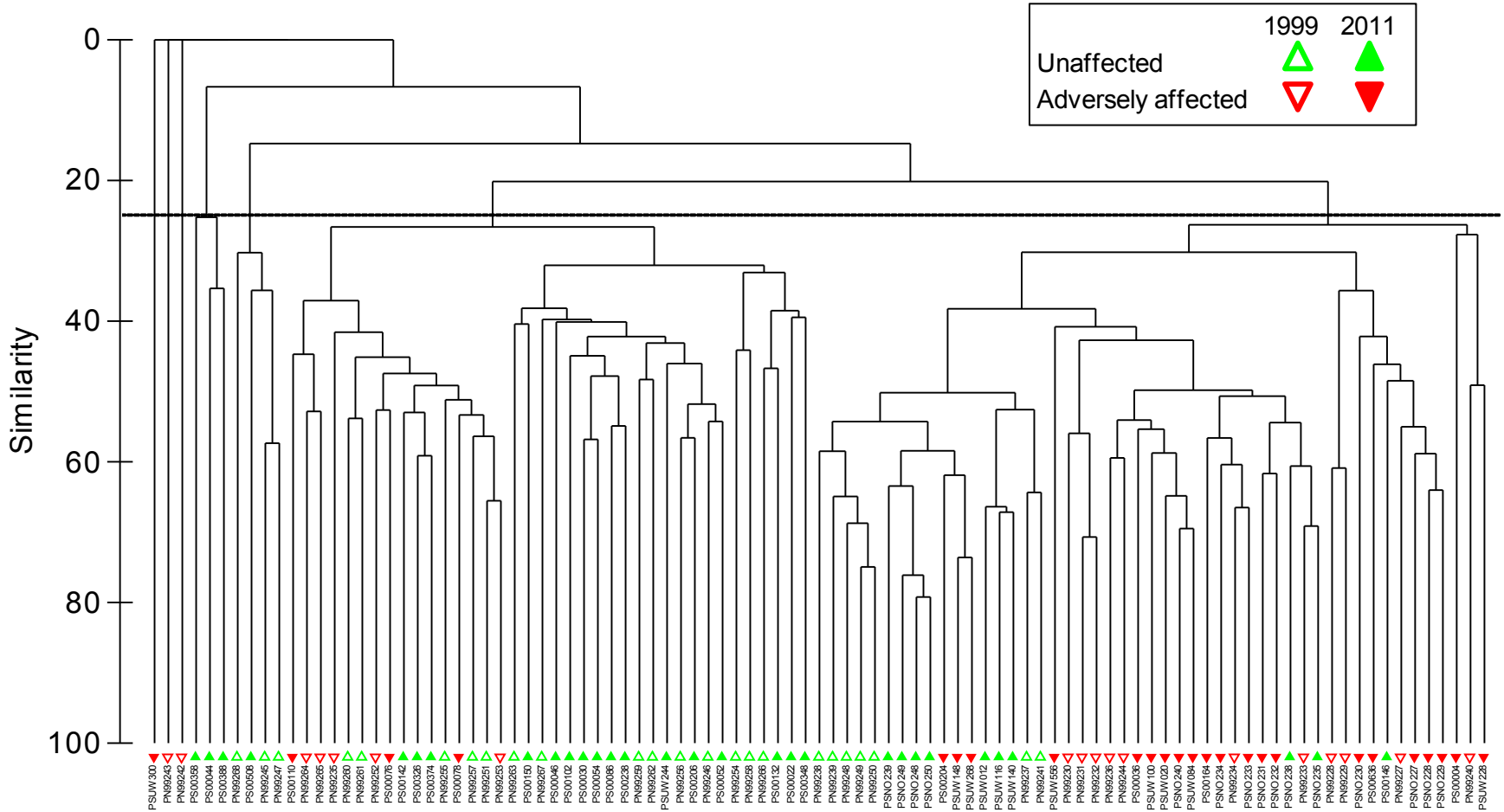


Mean and median benthic indices at stations with adversely affected and unaffected benthos in the 2011 South Puget Sound survey.

Benthic index	Adversely affected benthos		Unaffected benthos	
	Mean	Median	Mean	Median
Number of stations	25		30	
Total abundance (# orgs/0.1 m^2)	168	148	548	511
Taxa richness (# taxa/0.1 m^2)	24	25	56	51
Pielou's Evenness (J')	0.76	0.80	0.71	0.76
Swartz' Dominance Index (# taxa)	7	7	12	11
Annelid abundance	107	83	269	218
Arthropod abundance	21	16	116	71
Mollusc abundance	30	17	68	42
Echinoderm abundance	7	1	76	14
Abundance of misc. taxa	4	3	18	11

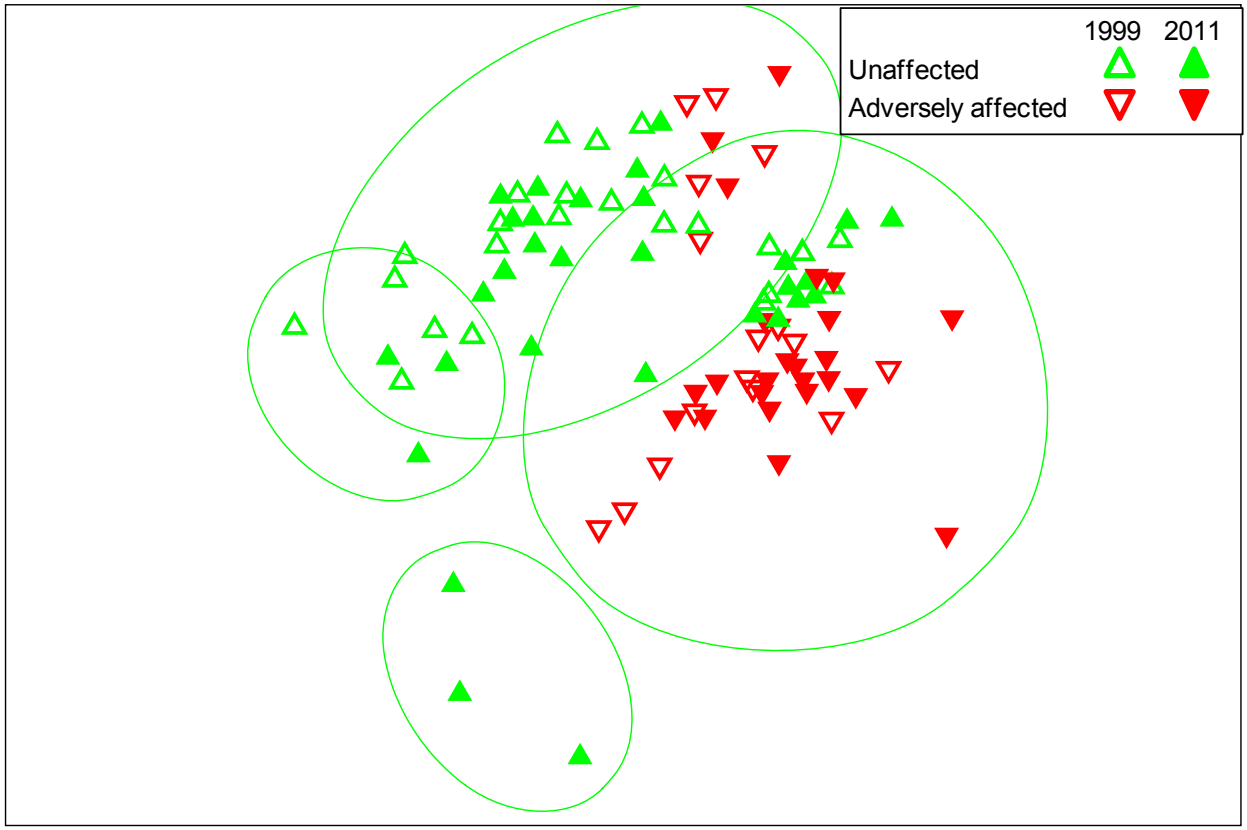
Summary statistics for benthic indices in the 1999 PSAMP/NOAA survey and the 2011 PSEMP Regional survey of the South Puget Sound region.

Benthic index	1999 (N=42)					2011 (N=55)				
	Mean	StDev	Median	Min	Max	Mean	StDev	Median	Min	Max
Total abundance (# orgs/0.1 m^2)	340	255	270	0	1069	375	293	303	0	1451
Taxa richness (# taxa/0.1 m^2)	43	27	36	0	104	41	28	28	0	119
Pielou's Evenness (J')	0.70	0.21	0.78	0.00	0.88	0.73	0.11	0.77	0.42	0.89
Swartz Dominance (SDI) (# taxa)	10	7	8	0	25	10	6	9	2	30
Annelid abundance	166	127	139	0	522	195	160	151	0	971
Arthropod abundance	70	104	22	0	398	73	103	32	0	565
Mollusc abundance	42	43	31	0	232	51	70	34	0	387
Echinoderm abundance	43	99	3	0	445	45	102	3	0	568
Abundance of miscellaneous taxa	20	55	6	0	354	11	16	5	0	70



Cluster dendrogram of benthic invertebrate assemblages in the 1999 and 2011 South Puget Sound surveys, indicating adversely affected and unaffected assemblages (Bray-Curtis similarities of 4th-root-transformed abundances, all species). The dendrogram is sliced at 25% similarity.

Station PSUW300 in 2011 and Stations PN99242 and PN99243 in 1999 had no macrobenthos (i.e., benthic invertebrates large enough to be found with a 1-mm mesh sieve).



Nonmetric multidimensional scaling (MDS) diagram indicating relative similarities of adversely affected and unaffected benthic invertebrate assemblages in the 1999 and 2011 sediment surveys of South Puget Sound (Bray-Curtis similarities of 4th-root-transformed abundances, all species; 2D stress=0.16). The ellipses indicate assemblages with 25% or greater similarity, from the cluster dendrogram in the previous figure. The closer the symbols are in the diagram, the more similar their assemblages are.

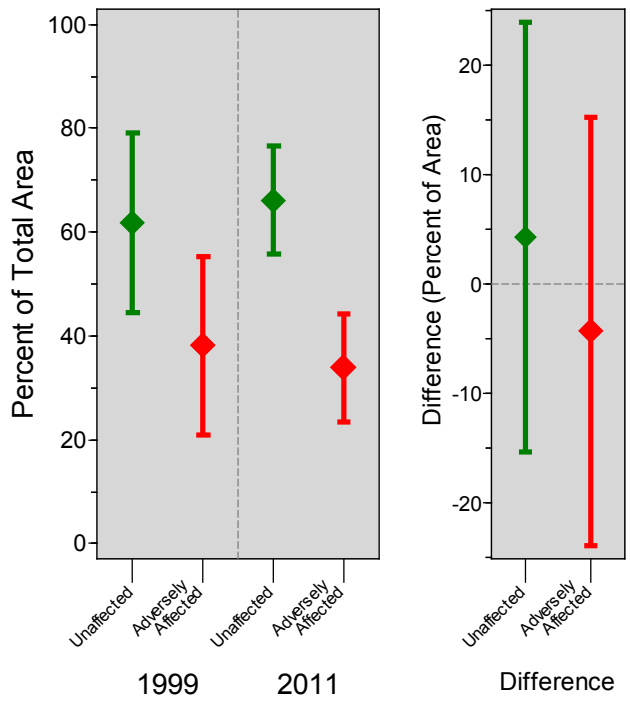
Two samples from 1999 (PN99242 and PN99243) and one sample from 2011 (PSUW300) with no macrobenthos are not shown on this MDS diagram.

Comparison of Interim Sediment Benthic Index Categories by Year

Estimated spatial extent (percent of area) and 95% confidence intervals for each of the Interim SBI categories for the South Sound region in 2011, compared to 1999. The differences between the years are not statistically significant, as indicated by the difference confidence intervals containing the value zero.

Interim Sediment Benthic Index Category	1999			2011			Difference (2011-1999)			* = significantly different (alpha=0.05)
		Confidence Limit			Confidence Limit			Confidence Limit		
	Estimate	Lower	Upper	Estimate	Lower	Upper	Estimate	Lower	Upper	
Unaffected	61.82	44.59	79.04	66.15	55.66	76.65	4.34	-15.31	23.99	
Adversely affected	38.18	20.96	55.41	33.85	23.35	44.34	-4.34	-23.99	15.31	

* Olsen et al. (in prep.), α = 0.05



Comparison to Other Regions

Incidence and spatial extent of adversely affected benthos from eight PSAMP Sediment Component regions and all of Puget Sound.

Monitoring Region	Year(s) sampled	Numbers of Samples	Percent of Stations with Adversely Affected Benthos	Percent of Area with Adversely Affected Benthos
South Puget Sound	1999	42	42.9	38.2
	2011	55	50.0	33.8
Strait of Georgia	1997	61	16.4	15.4
	2006	40	47.5	44.1
Whidbey Basin	1997	39	74.4	69.0
	2007	40	50.0	52.5
Central Puget Sound	1998-1999	128	32.8	6.9
	2008-2009	80	33.8	28.0
Hood Canal	1999	21	66.7	68.0
	2004	30	76.7	78.1
San Juan Islands	2002-2003	30	66.7	66.7
	2012	40	results in preparation	results in preparation
Eastern Strait of Juan de Fuca	2002-2003	30	50.0	63.8
	2013	40	results in preparation	results in preparation
Admiralty Inlet	1998-2003	30	6.7	4.5
	2014	40	not yet sampled	not yet sampled
All of Puget Sound	1997-2003	381	39.4	34.5

Data Quality Control Narrative

Infauna sediment sample sorting quality assurance and quality control for the 2011 South Puget Sound survey.

StationID	Location	Sample Date	Sorted by	QA/QC Sorter	QA/QC Percent sorted	QA/QC Pass/Fail
PS00004	Carr Inlet	6/9/2011	S.Weakland	K. Welch	25%	Pass
PS00022	Case Inlet	6/14/2011	I. Reeber	S. Weakland	25%	Pass
PS00030	East Anderson Island	6/10/2011	S.Weakland	K. Welch	25%	Pass
PS00036	Totten Inlet	6/20/2011	E. Rauschl	S. Weakland	25%	Pass
PS00044	Nisqually Reach	6/13/2011	I. Reeber	S. Weakland	25%	Pass
PS00046	E. Anderson Island	6/9/2011	I. Reeber	S. Weakland	25%	Pass
PS00052	W. of Devils Head, Case Inlet (Nisqually Reach)	6/13/2011	I. Reeber	S. Weakland	25%	Pass
PS00054	Case Inlet off Harstine Island	6/14/2011	S.Weakland	K. Welch	25%	Pass
PS00076	Case Inlet	6/14/2011	E. Rauschl	S. Weakland	25%	Pass
PS00078	West of Anderson Island	6/13/2011	I. Reeber	S. Weakland	25%	Pass
PS00086	Carr Inlet	6/13/2011	S.Weakland	K. Welch	25%	Pass
PS00102	N. end Pickering Passage off Harstine Island	6/14/2011	S.Weakland	K. Welch	100%	Fail/Resort
PS00110	Carr Inlet, North of McNeil Island	6/8/2011	S.Weakland	K. Welch	25%	Pass
PS00132	Wilochette Bay	6/8/2011	I. Reeber	S. Weakland	25%	Pass
PS00142	NE of McNeil Island	6/8/2011	E. Rauschl	S. Weakland	25%	Pass
PS00146	North End of Case Inlet	6/14/2011	S.Weakland	K. Welch	25%	Pass
PS00150	Carr Inlet	6/9/2011	S.Weakland	K. Welch	25%	Pass
PS00164	Oakland Bay	6/15/2011	I. Reeber	S. Weakland	25%	Pass
PS00204	Pale Passage	6/20/2011	S.Weakland	K. Welch	25%	Pass
PS00206	Dupont	6/10/2011	S.Weakland	K. Welch	25%	Pass
PS00238	Drayton Passage	6/9/2011	S.Weakland	S. Weakland	25%	Pass
PS00326	Drayton Passage	6/13/2011	E. Rauschl	S. Weakland	25%	Pass
PS00348	North Fox Island	6/9/2011	S.Weakland	K. Welch	25%	Pass
PS00358	North of Steilacoom	6/8/2011	S.Weakland	K. Welch	25%	Pass
PS00374	East Anderson Island	6/10/2011	S.Weakland	K. Welch	25%	Pass
PS00388	Nisqually Reach	6/13/2011	S.Weakland	K. Welch	25%	Pass
PS00508	Port of Shelton	6/15/2011	S.Weakland	K. Welch	25%	Pass

StationID	Location	Sample Date	Sorted by	QA/QC Sorter	QA/QC Percent sorted	QA/QC Pass/Fail
PS00636	Oakland Bay	6/16/2011	S.Weakland	K. Welch	25%	Pass
PSNO227	Oakland Bay	6/15/2011	S.Weakland	K. Welch	25%	Pass
PSNO228	Oakland Bay	6/16/2011	S.Weakland	K. Welch	25%	Pass
PSNO229	Oakland Bay	6/16/2011	E. Rauschl	S. Weakland	25%	Pass
PSNO230	Oakland Bay	6/16/2011	S.Weakland	K. Welch	25%	Pass
PSNO231	Oakland Bay	6/15/2011	I. Reeber	S. Weakland	25%	Pass
PSNO232	Oakland Bay	6/15/2011	S.Weakland	K. Welch	25%	Pass
PSNO233	Totten Inlet	6/20/2011	S.Weakland	K. Welch	25%	Pass
PSNO234	Totten Inlet	6/20/2011	S.Weakland	K. Welch	25%	Pass
PSNO235	Totten Inlet	6/20/2011	I. Reeber	S. Weakland	25%	Pass
PSNO238	Eld Inlet	6/21/2011	E. Rauschl	S. Weakland	25%	Pass
PSNO239	Eld Inlet	6/21/2011	E. Rauschl	S. Weakland	25%	Pass
PSNO240	Eld Inlet	6/21/2011	S.Weakland	K. Welch	25%	Pass
PSNO248	Henderson Inlet	6/17/2011	I. Reeber	S. Weakland	25%	Pass
PSNO249	Henderson Inlet	6/17/2011	J. Rotermund	K. Welch	25%	Pass
PSNO250	Henderson Inlet	6/17/2011	E. Rauschl	S. Weakland	25%	Pass
PSUW012	Budd Inlet	6/3/2011	S. Weeks	S. Weakland	100%	Fail/Resort
PSUW020	Budd Inlet	6/2/2011	S. Weeks	S. Weakland	25%	Pass
PSUW084	Budd Inlet	6/2/2011	S. Weeks	S. Weakland	25%	Pass
PSUW100	Budd Inlet	6/7/2011	S. Weeks	S. Weakland	25%	Pass
PSUW116	Budd Inlet	6/21/2011	S. Weeks	S. Weakland	100%	Fail/Resort
PSUW140	Budd Inlet	6/3/2011	S. Weeks	S. Weakland	25%	Pass
PSUW148	Budd Inlet	6/7/2011	S. Weeks	S. Weakland	100%	Fail/Resort
PSUW228	Budd Inlet	6/2/2011	S. Weeks	S. Weakland	25%	Pass
PSUW244	Budd Inlet	6/21/2011	S. Weeks	S. Weakland	100%	Fail/Resort
PSUW268	Budd Inlet	6/3/2011	S. Weeks	S. Weakland	25%	Pass
PSUW300	Budd Inlet	6/1/2011	S. Weeks	S. Weakland	25%	Pass
PSUW556	Budd Inlet	6/7/2011	S. Weeks	S. Weakland	25%	Pass

Infauna sediment sample taxonomy quality assurance and quality control for the 2011 South Puget Sound survey.

	Crustacea	Misc. Taxa	Echinodermata	Annelida	Mollusca
Primary Taxonomist	Jeffery Cordell	Steven Hulsman	Steven Hulsman	Kathy Welch	Susan Weeks
QA Taxonomist		Scott McKuen	Scott McKuen	Gene Ruff	Allan Fukuyama
Number of Bulk Samples QAed	0	1	1	1	1
Identifications confirmed	NA	100%	100%	100%	100%
Identifications changed (includes species-level changes)	NA	0	0	0	0
Species-level changes	NA	0	0	0	0
Number of Voucher Specimens QAed	6	0	0	22	1
Voucher Specimens confirmed	NA	NA	NA	22	1