Lake Pend Oreille Littoral Periphyton Community:

An updated Trophic Status Assessment

2003

Final Report

Submitted to the

Tri-State Water Quality Council

FIGURES, TABLES AND PHOTOGRAPHS

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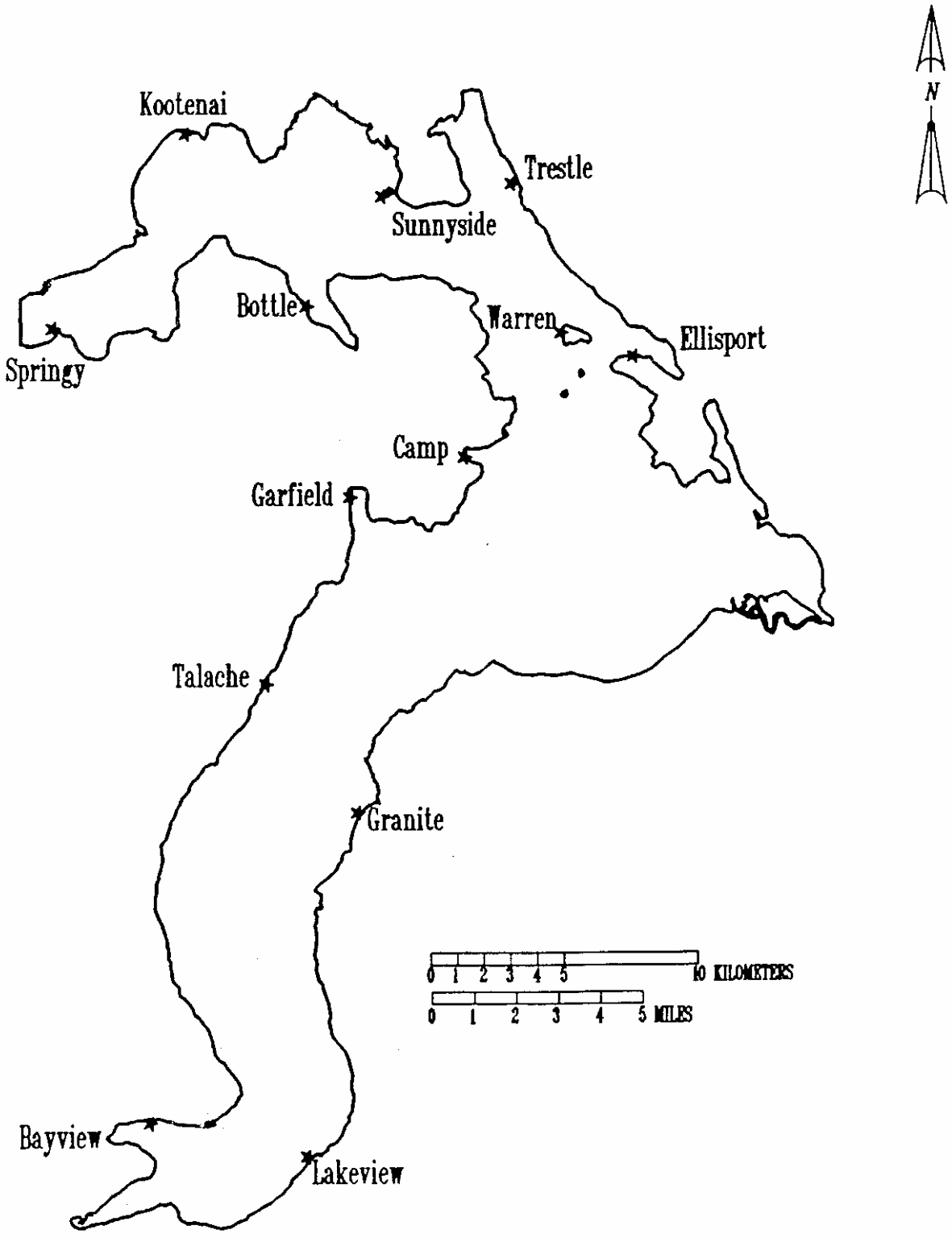


Figure 1. Pend Oreille Lake inshore study site locations

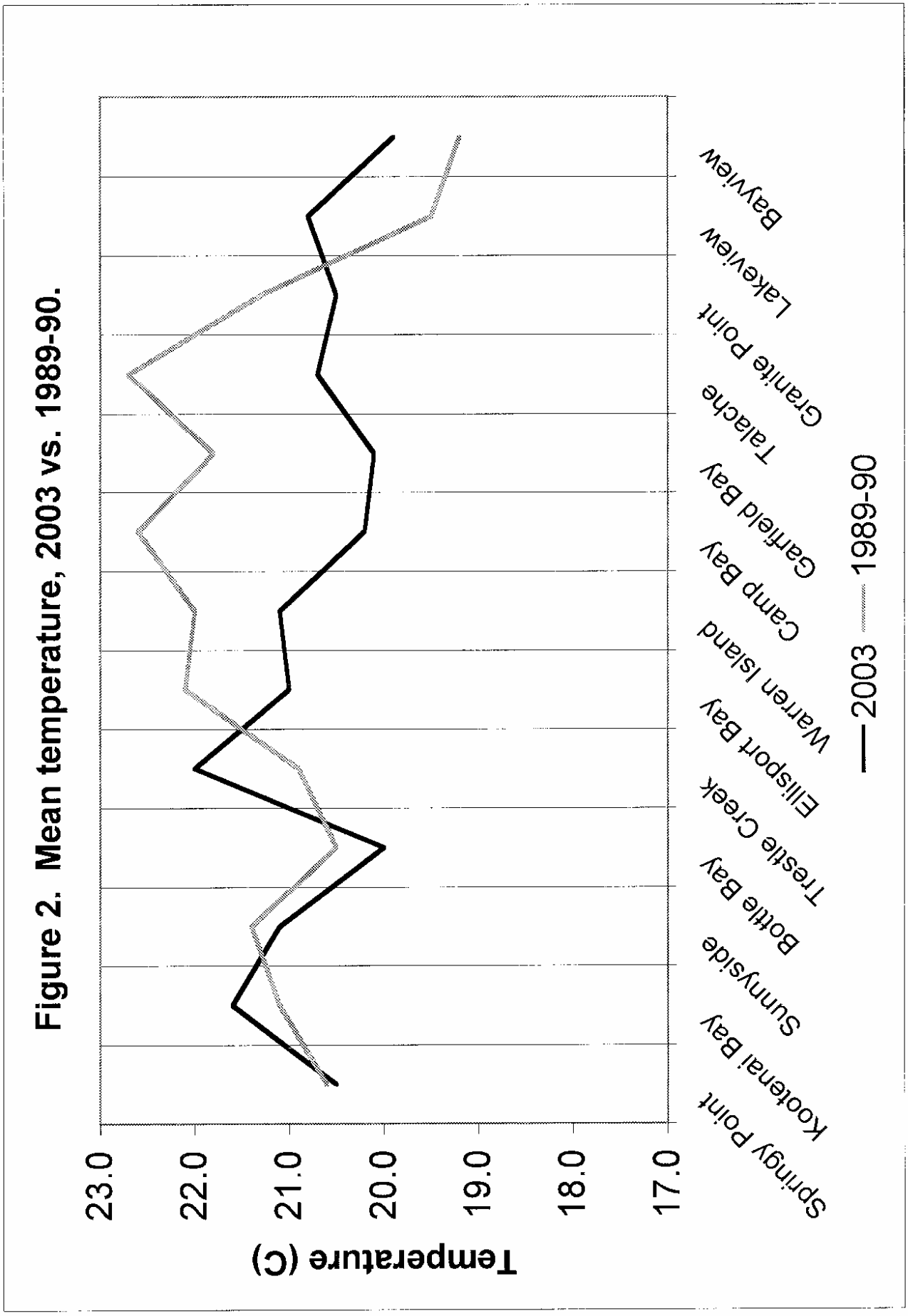


Figure 2. Mean temperature, 2003 vs. 1989-90.
Temperature (C)
23.0
22.0
21.0
20.0
19.0
18.0
17.0
Springy Point
Kootenai Bay
Sunnyside
Bottle Bay
Trestle Creek
Ellisport Bay
Warren Island
Camp Bay
Garfield Bay
Talache
Granite Point
Lakeview
Bayview
2003
1989-90

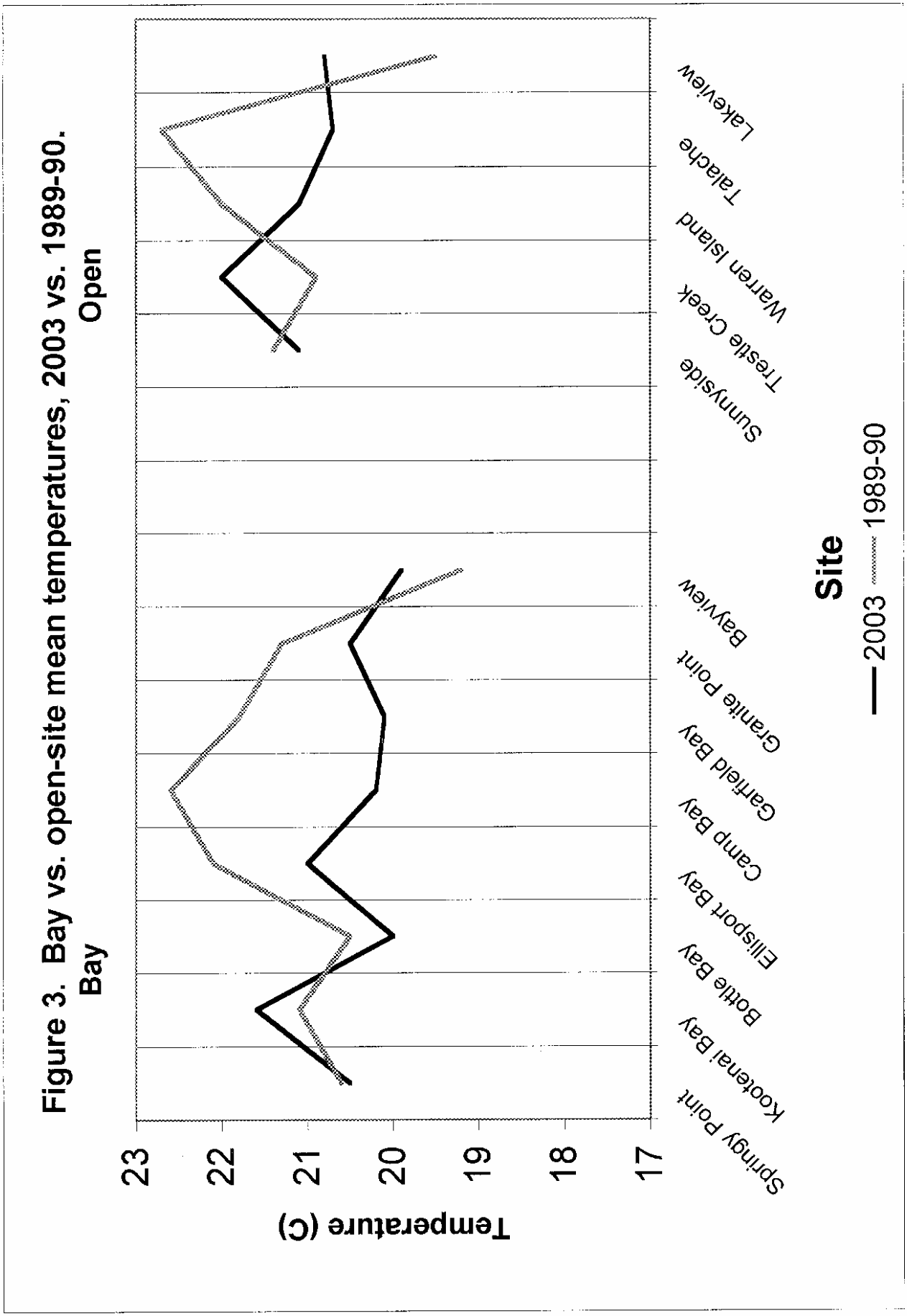
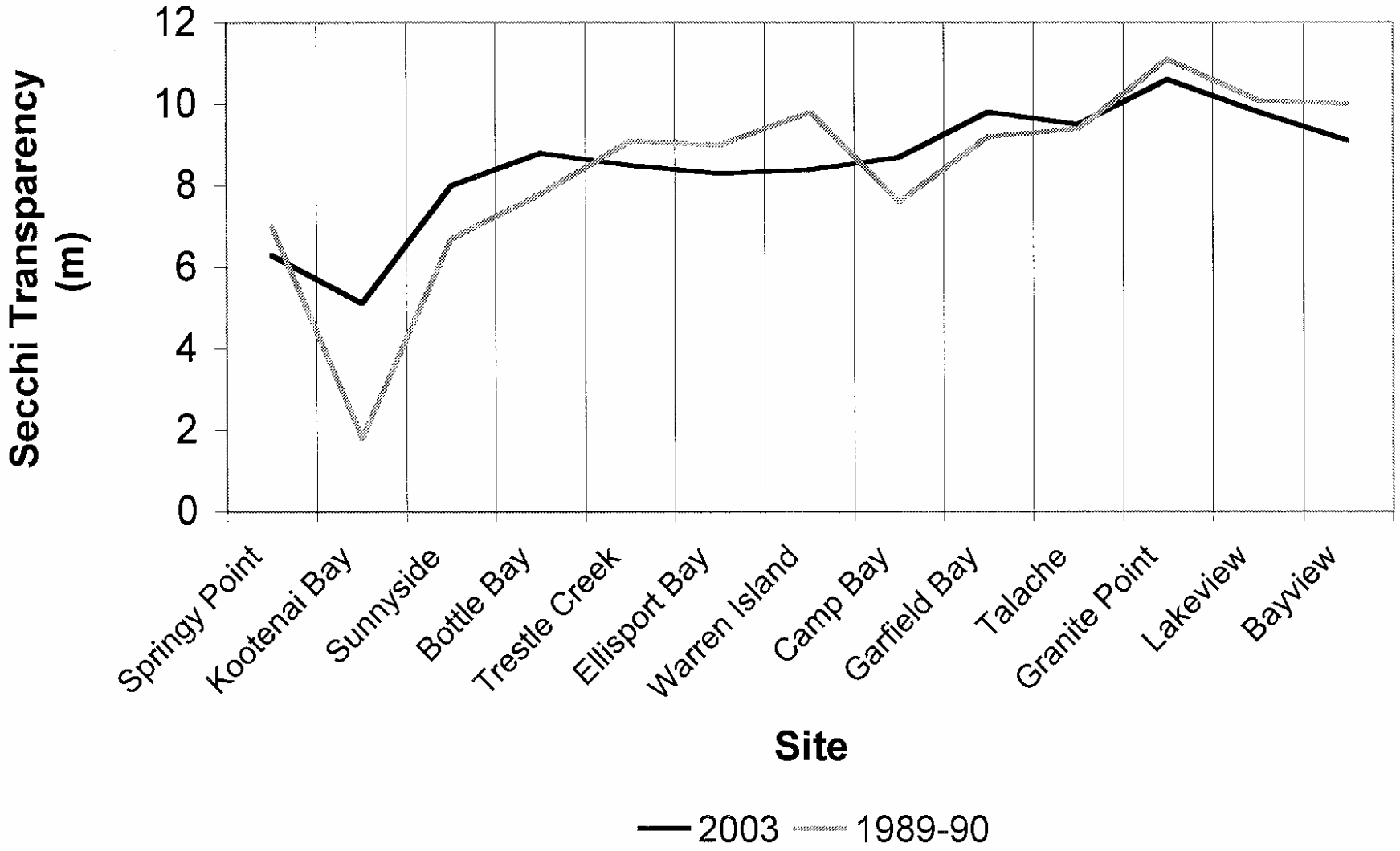


Figure 3. Bay vs. open-site mean temperatures, 2003 vs. 1989-90.
Bay
Open
Temperature (C)
23
22
21
20
19
18
17
Springy Point
Kootenai Bay
Bottle Bay
Ellisport Bay
Camp Bay
Garfield Bay
Granite Point
Bayview
Sunnyside
Testile Creek
Warren Island
Talache
Lakeview
Site
2003
1989-90

Figure 4. Mean transparency, 2003 vs. 1989-90.



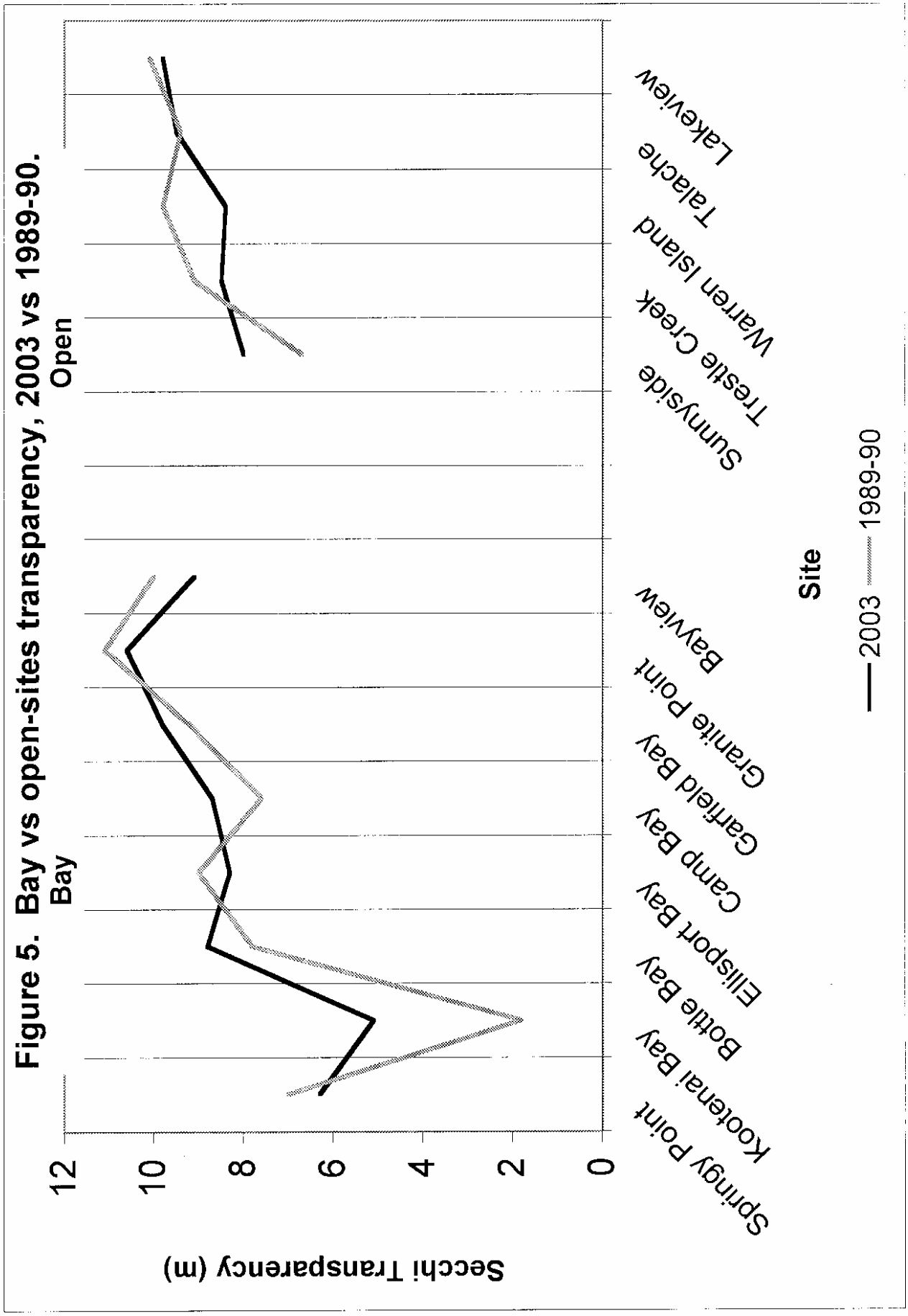


Figure 5. Bay vs open-sites transparency, 2003 vs 1989-90.
Bay
Open
Secchi Transparency (m)
12
10
8
6
4
2
0
Springy Point
Kootenai Bay
Bottle Bay
Ellisport Bay
Camp Bay
Garfield Bay
Granite Point
Bayview
Sunnyside
Treslie Creek
Warren Island
Talache
Lakeview
Site
2003
1989-90

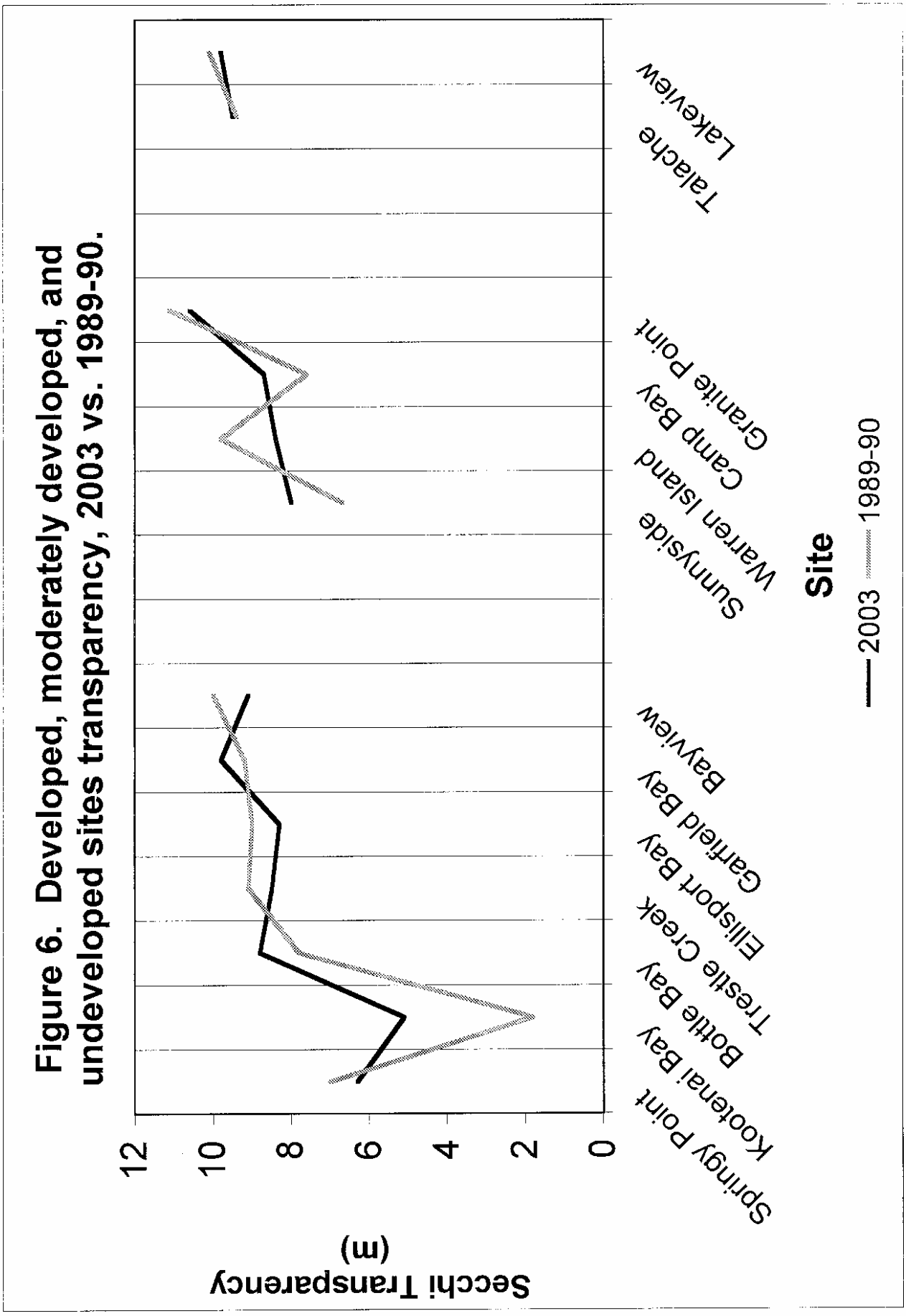


Figure 6. Developed, moderately developed, and undeveloped sites transparency, 2003 vs. 1989-90.
Secchi Transparency (m)
12
10
8
6
4
2
0
Springy Point
Kootenai Bay
Bottle Bay
Trestle Creek
Ellisport Bay
Garfield Bay
Bayview
Sunnyside
Warren Island
Camp Bay
Granite Point
Talache
Lakeview
Site
2003
1989-90

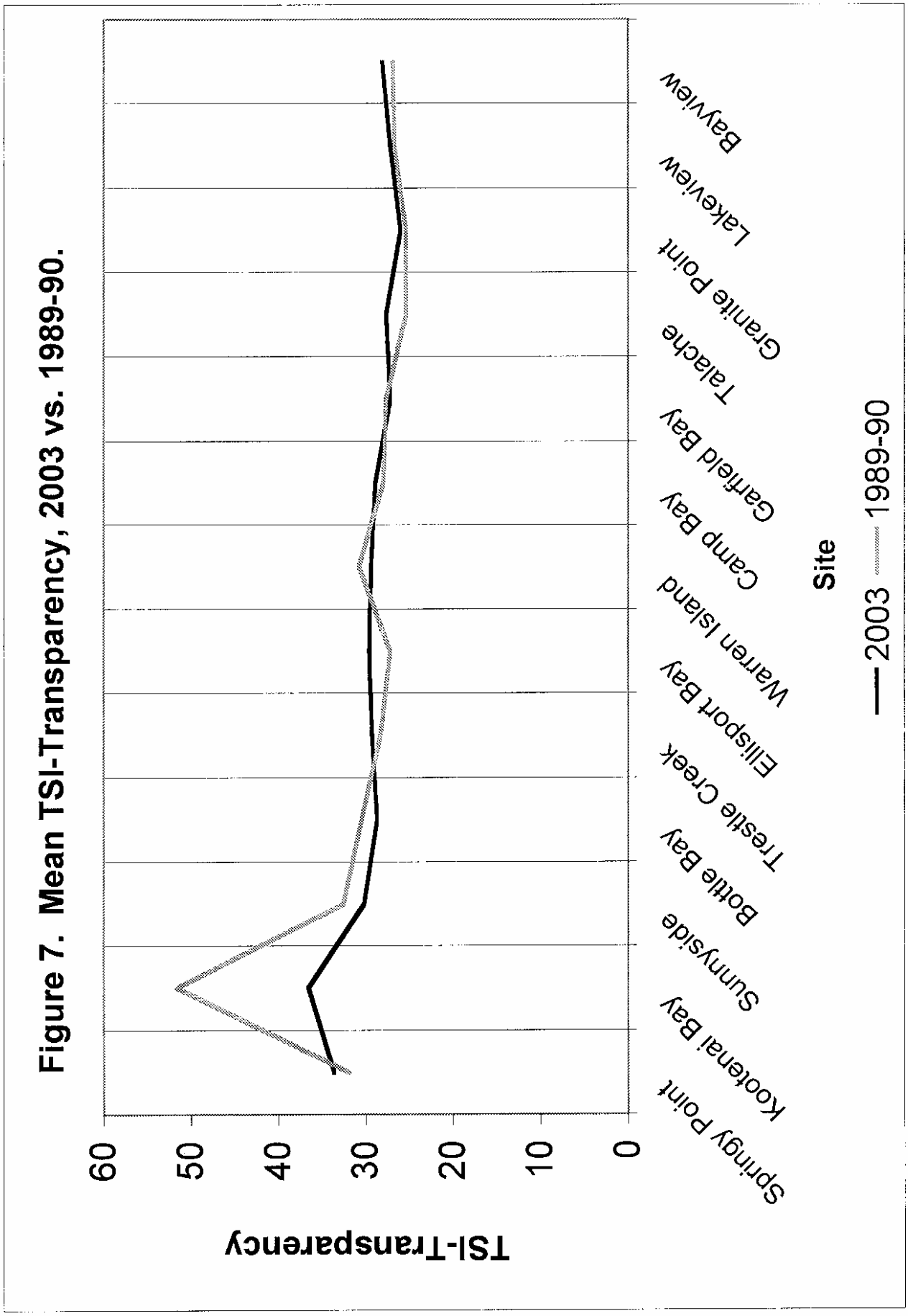


Figure 7. Mean TSI-Transparency, 2003 vs. 1989-90.
TSI-Transparency
60
50
40
30
20
10
0
Springy Point
Kootenai Bay
Sunnyside
Bottle Bay
Tresile Creek
Ellisport Bay
Warren Island
Camp Bay
Garfield Bay
Talache
Granite Point
Lakeview
Bayview
Site
2003
1989-90

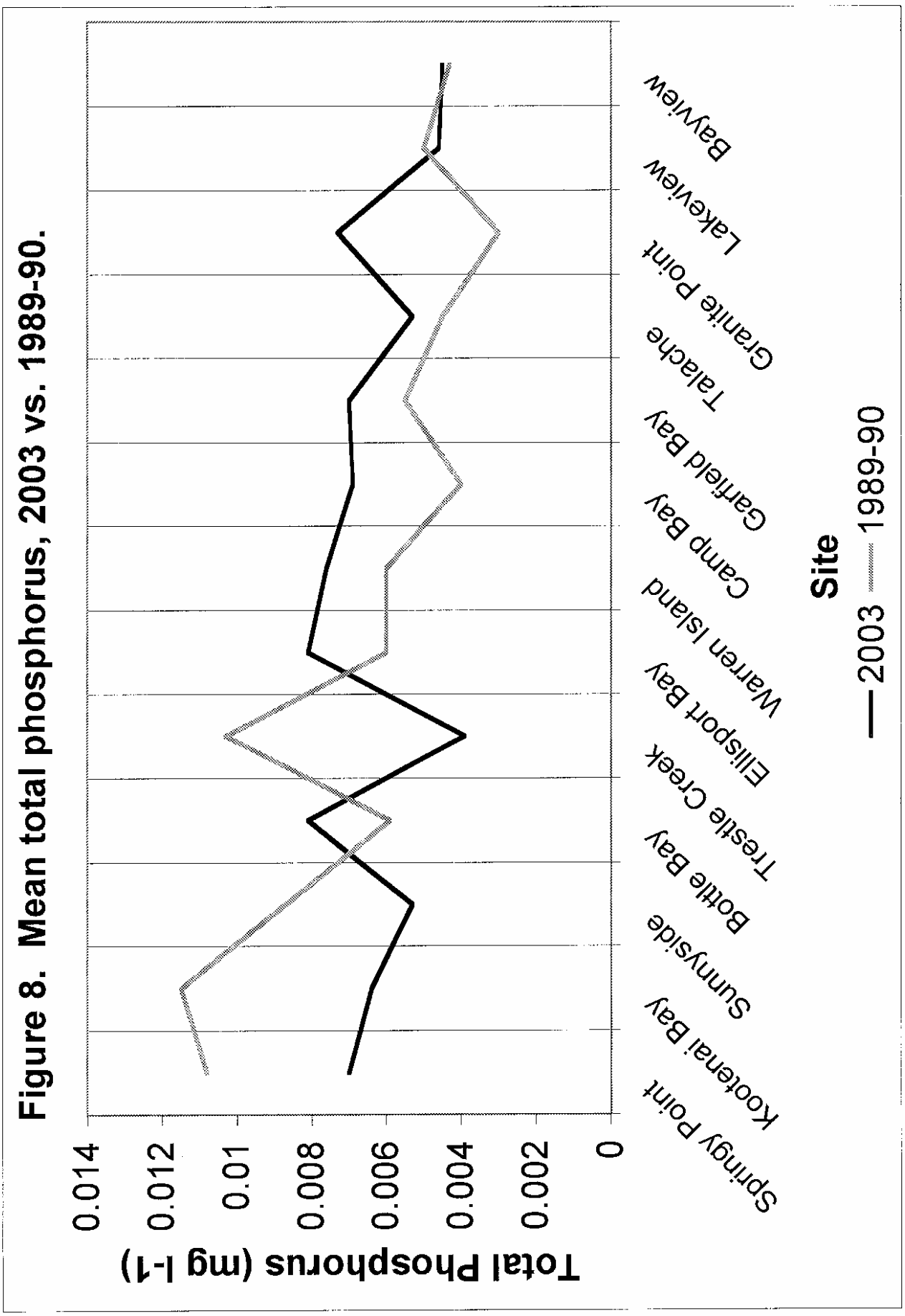


Figure 8. Mean total phosphorus, 2003 vs. 1989-90.

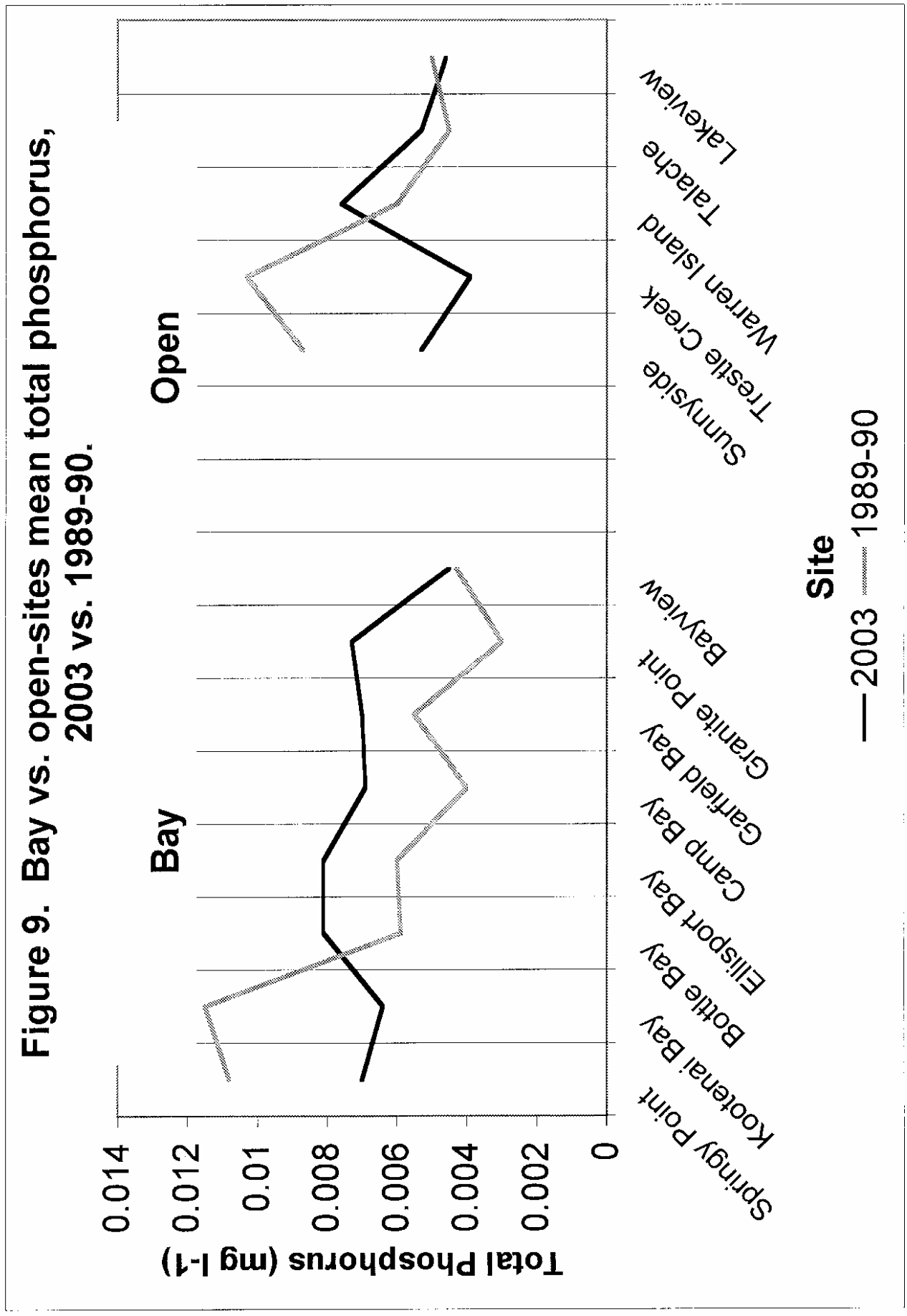
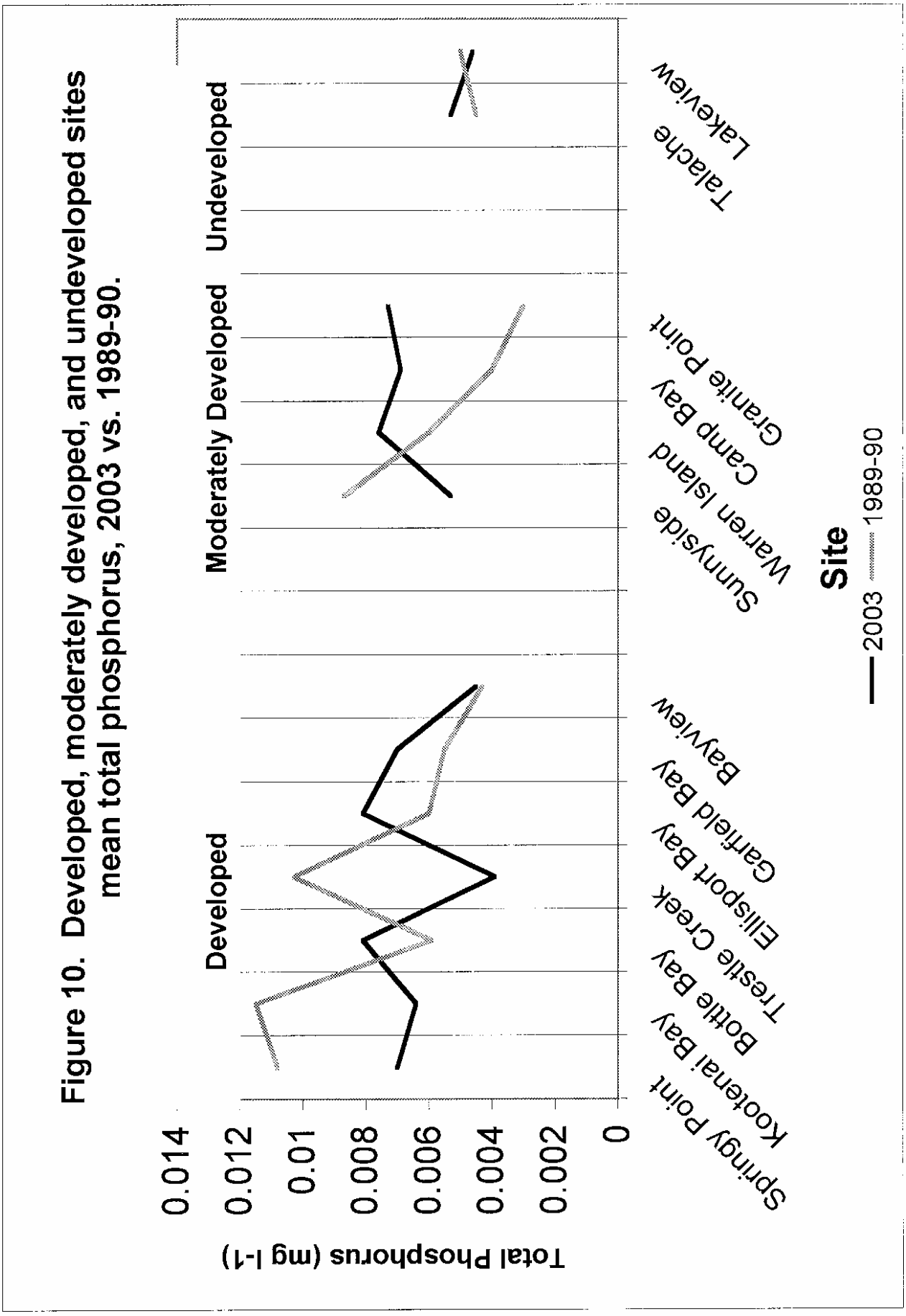


Figure 9. Bay vs. open-sites mean total phosphorus, 2003 vs. 1989-90.
Bay
Open
Total Phosphorus (mg l-1)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Springy Point
Kootenai Bay
Bottle Bay
Ellisport Bay
Camp Bay
Garfield Bay
Granite Point
Bayview
Sunnyside
Tresslle Creek
Warren Island
Talache
Lakeview
Site
2003
1989-90

Figure 10. Developed, moderately developed, and undeveloped sites mean total phosphorus, 2003 vs. 1989-90.



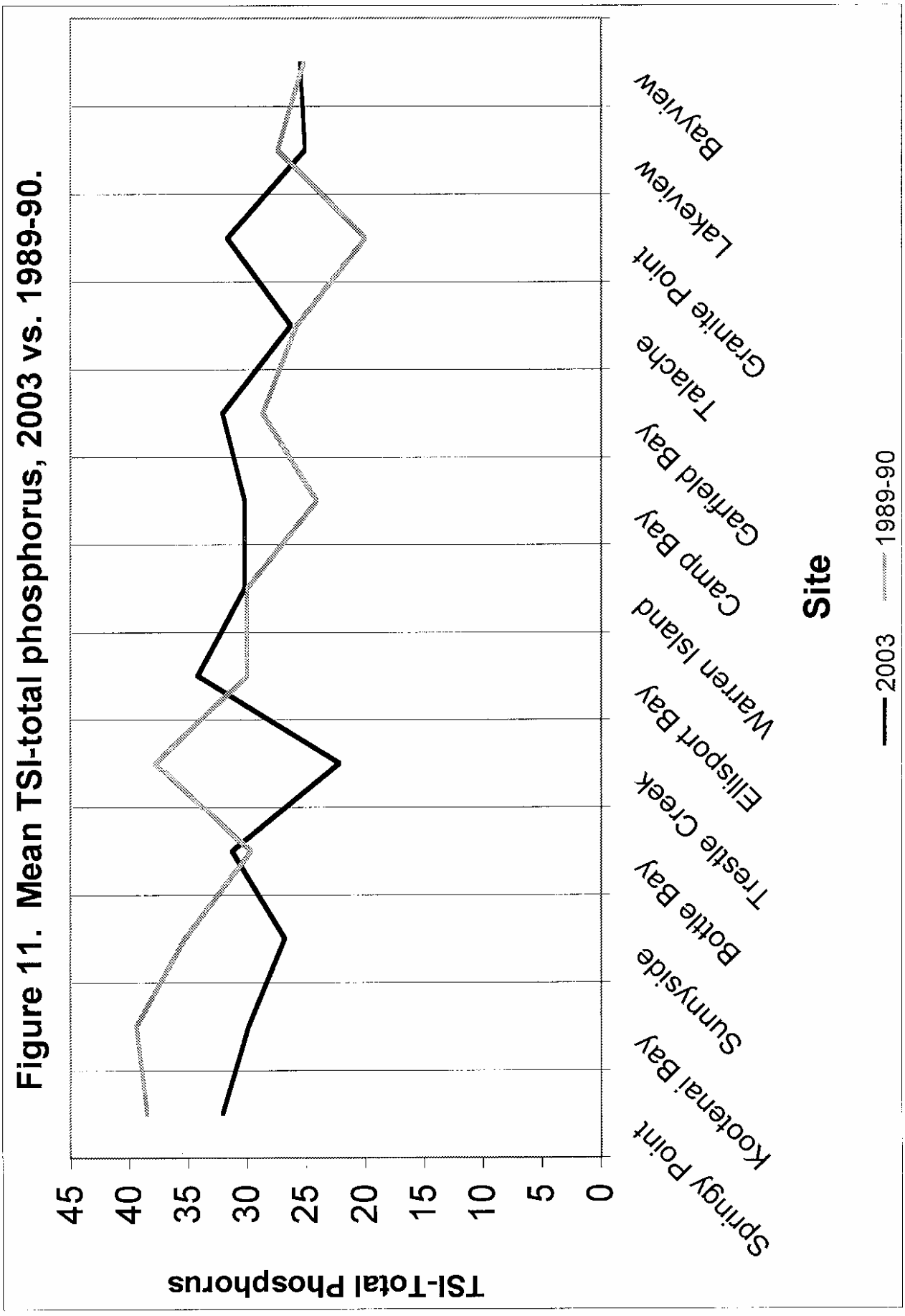


Figure 11. Mean TSI-total phosphorus, 2003 vs. 1989-90.
TSI-Total Phosphorus
45
40
35
30
25
20
15
10
5
0
Springy Point
Kootenai Bay
Sunnyside
Bottle Bay
Trestle Creek
Ellisport Bay
Warren Island
Camp Bay
Garfield Bay
Talache
Granite Point
Lakeview
Bayview
Site
2003
1989-90

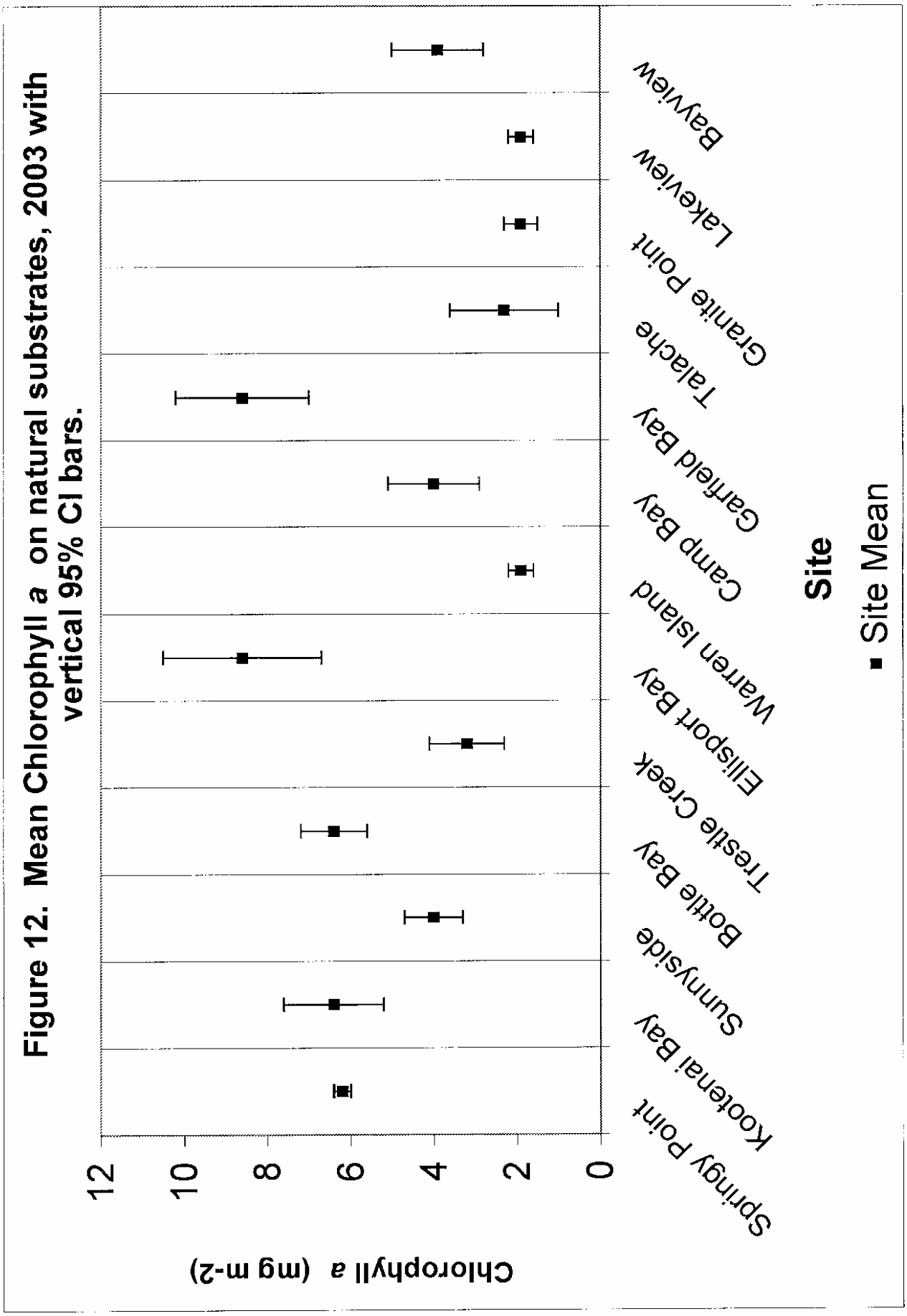


Figure 12. Mean Chlorophyll a on natural substrates, 2003 with vertical 95% CI bars.
Chlorophyll a (mg m-2)
0
2
4
6
8
10
12
Site
Site Mean
Springy Point
Kootenai Bay
Sunnyside
Bottle Bay
Tresslle Creek
Ellisport Bay
Warren Island
Camp Bay
Garfield Bay
Talache
Granite Point
Lakeview
Bayview

Figure 13. Chlorophyll *a* on natural vs. artificial substrates in the littoral of Lake Pend Oreille, Aug.-Sept., 2003.

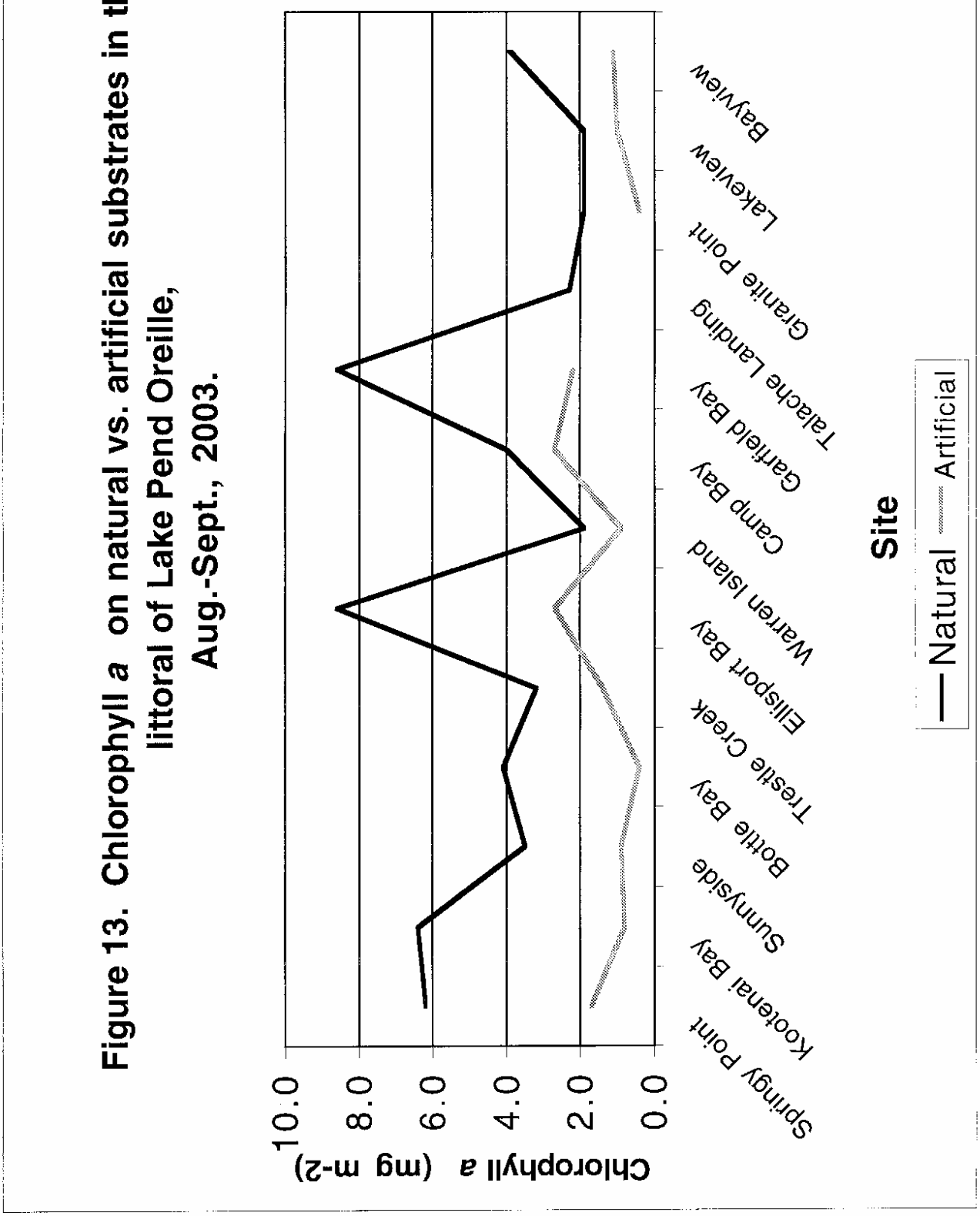
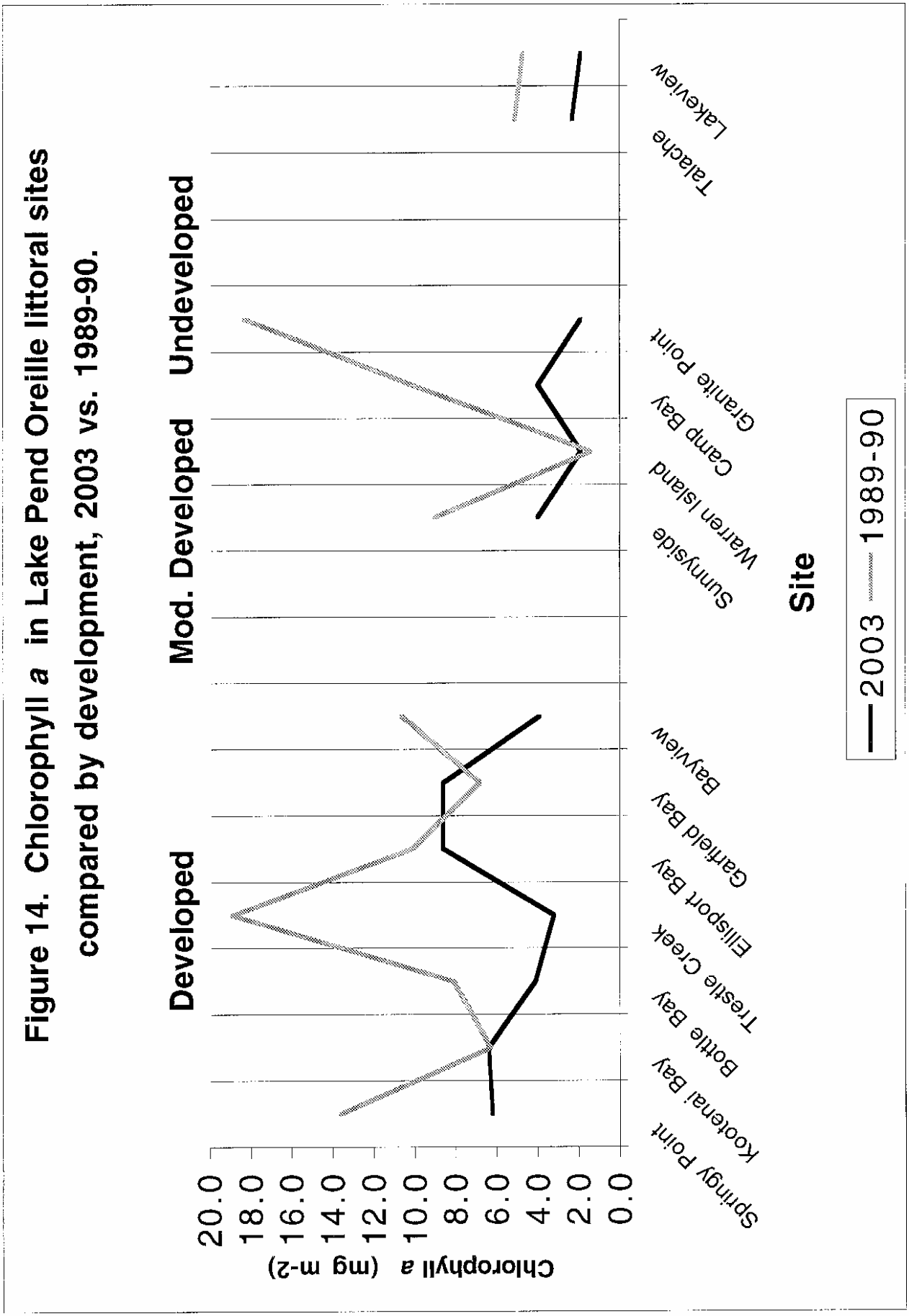


Figure 14. Chlorophyll *a* in Lake Pend Oreille littoral sites compared by development, 2003 vs. 1989-90.



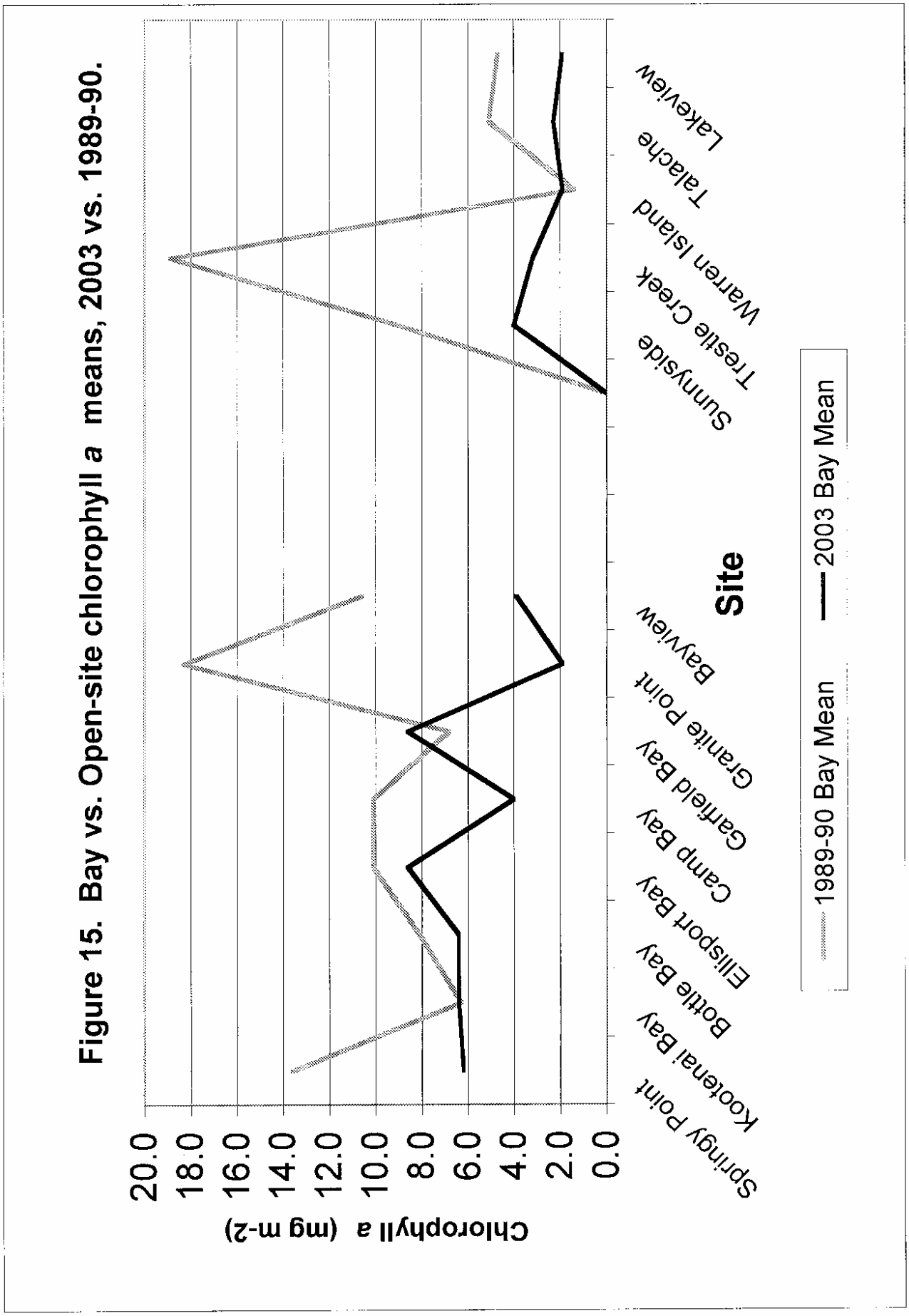


Figure 15. Bay vs. Open-site chlorophyll a means, 2003 vs. 1989-90.
Chlorophyll a (mg m-2)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Site
Springy Point
Kootenai Bay
Bottle Bay
Ellisport Bay
Camp Bay
Garfield Bay
Granite Point
Bayview
Sunnyside
Tresite Creek
Warren Island
Talache
Lakeview
1989-90 Bay Mean
2003 Bay Mean

TABLES

Table 1. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Lake Region	Develop ment	Bay Char-acter	Date	Start TIme	Rep	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3+N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TIN:TIP	TN:TP	TSI (Transp)	TSI (Phosp)
Springy Point	North	Dev	Bay	8/6/03	14:15	A	24.8	8.60	145	8.85	7.0	0	74.5	0.005	0.005	0.500	0.505	0.0023	0.0064	1.6	78.9		
Springy Point						B	24.5	8.60	148	8.95	7.0	0	73.8	0.005	0.005	0.500	0.505	0.0020	0.0067	1.5	75.4		
Springy Point						C	24.4	8.70	147	8.00	7.0	0	72.9	0.005	0.005	0.500	0.505	0.0010	0.0059	1.7	85.6		
Springy Point					Date mean		**24.6**	**8.63**	**146.7**	**8.60**	**7.0**	**0.0**	**73.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0018**	**0.0063**	**1.6**	**80.0**	**32.0**	**30.7**
Springy Point					Date s		0.2	0.1	1.5	0.5	0.0	0.0	0.8	0.000	0.000	0.000	0.000	0.001	0.000	0.1	5.191		
Springy Point				9/3/03	16:20	A	22.1	7.15	147	8.90	6.6	0	76.2	0.005	0.005	0.500	0.505	0.0021	0.0085	1.2	59.4		
Springy Point						B	22.2	6.95	148	8.75	6.8	0	76.6	0.005	0.011	0.500	0.511	0.0010	0.0068	2.4	75.1		
Springy Point						C	22.2	6.80	148	8.80	7.0	0	77.4	0.005	0.005	0.500	0.505	0.0010	0.0074	1.4	68.2		
Springy Point					Date mean		**22.2**	**6.97**	**147.7**	**8.78**	**6.8**	**0.0**	**76.7**	**0.005**	**0.007**	**0.500**	**0.507**	**0.0014**	**0.0076**	**1.6**	**67.6**	**32.4**	**33.4**
Springy Point					Date s		0.1	0.2	0.6	0.0	0.2	0.0	0.6	0.000	0.003	0.000	0.003	0.001	0.001	0.6	7.887		
Springy Point				10/1/03	10:00	A	15.0	9.70	132	8.33	5.3	0	77.8	0.005	0.005	0.500	0.505	0.0010	0.0068	1.5	74.3		
Springy Point						B	14.9	9.70	133	8.34	5.0	0	78.2	0.005	0.005	0.500	0.505	0.0024	0.0071	1.4	71.1		
Springy Point						C	14.8	9.60	133	8.35	5.0	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0071	1.4	71.1		
Springy Point					Date mean		**14.9**	**9.67**	**132.7**	**8.34**	**5.1**	**0.0**	**77.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0015**	**0.0070**	**1.4**	**72.2**	**36.6**	**32.2**
Springy Point					Date s		0.1	0.1	0.6	0.0	0.1	0.0	0.3	0.000	0.000	0.000	0.000	0.001	0.000	0.0	1.812		
Springy Point					Site mean		**20.5**	**8.4**	**142.3**	**8.6**	**6.3**	**0.0**	**76.1**	**0.005**	**0.006**	**0.500**	**0.506**	**0.0015**	**0.0070**	**1.5**	**73.2**	**33.6**	**32.1**
Kootenai Bay	North	Dev	Bay	8/6/03	12:15	A	23.6	9.00	145	8.70	4.5	0	73.5	0.005	0.005	0.500	0.505	0.0010	0.0053	1.9	95.3		
Kootenai Bay						B	23.6	9.20	146	9.00	5.0	0	72.3	0.005	0.005	0.500	0.505	0.0023	0.0025	4.0	202.0		
Kootenai Bay						C	23.6	9.10	146	9.00	4.8	0	72.4	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Kootenai Bay					Date mean		**23.6**	**9.10**	**145.7**	**8.90**	**4.8**	**0.0**	**72.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0014**	**0.0034**	**3.3**	**166.4**	**37.5**	**21.8**
Kootenai Bay					Date s		0.0	0.1	0.6	0.2	0.3	0.0	0.7	0.000	0.000	0.000	0.000	0.001	0.002	1.2	61.613		
Kootenai Bay				9/3/03	14:40	A	23.4	7.55	150	8.80	5.8	0	77.8	0.005	0.005	0.500	0.505	0.0010	0.0085	1.2	59.4		
Kootenai Bay						B	23.4	7.40	151	8.70	6.0	0	78.8	0.005	0.005	0.500	0.505	0.0010	0.0068	1.5	74.3		
Kootenai Bay						C	23.2	7.35	151	8.85	6.0	0	77.4	0.005	0.005	0.500	0.505	0.0010	0.0093	1.1	54.3		
Kootenai Bay					Date mean		**23.3**	**7.43**	**150.7**	**8.78**	**5.9**	**0.0**	**78.0**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0082**	**1.2**	**62.7**	**34.3**	**34.5**
Kootenai Bay					Date s		0.1	0.1	0.6	0.1	0.1	0.0	0.7	0.000	0.000	0.000	0.000	0.000	0.001	0.2	10.370		
Kootenai Bay				10/1/03	17:00	A	18.0	10.00	130	8.84	4.8	0	76.4	0.005	0.005	0.500	0.505	0.0022	0.0087	1.1	58.0		
Kootenai Bay						B	18.0	10.10	130	8.86	4.5	0	76.8	0.005	0.005	0.500	0.505	0.0010	0.0063	1.6	80.2		
Kootenai Bay						C	18.0	10.10	131	8.85	4.5	0	77.2	0.005	0.005	0.500	0.505	0.0024	0.0079	1.3	63.9		
Kootenai Bay					Date mean		**18.0**	**10.07**	**130.3**	**8.85**	**4.6**	**0.0**	**76.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0019**	**0.0076**	**1.3**	**67.4**	**38.1**	**33.4**
Kootenai Bay					Date s		0.0	0.1	0.6	0.0	0.1	0.0	0.4	0.000	0.000	0.000	0.000	0.001	0.001	0.2	11.453		
Kootenai Bay					Site mean		**21.6**	**8.9**	**142.2**	**8.8**	**5.1**	**0.0**	**75.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0014**	**0.0064**	**2.0**	**98.8**	**36.6**	**29.9**
Sunnyside	North	Mod	Open	8/5/03	17:00	A	23.8	9.20	149	8.85	7.8	0	76.3	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Sunnyside						B	23.9	9.30	148	8.89	7.7	0	77.1	0.005	0.005	0.500	0.505	0.0025	0.0025	4.0	202.0		
Sunnyside						C	23.8	9.30	149	8.90	7.5	0	75.9	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Sunnyside					Date mean		**23.8**	**9.27**	**148.7**	**8.88**	**7.7**	**0.0**	**76.4**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0015**	**0.0025**	**4.0**	**202.0**	**30.6**	**17.4**
Sunnyside					Date s		0.1	0.1	0.6	0.0	0.2	0.0	0.6	0.000	0.000	0.000	0.000	0.001	0.000	0.0	0.000		
Sunnyside				9/3/03	12:15	A	21.7	7.80	150	8.70	8.8	0	78.8	0.005	0.005	0.500	0.505	0.0010	0.0071	1.4	71.1		
Sunnyside						B	21.9	7.70	149	8.70	9.0	0	79.0	0.005	0.005	0.500	0.505	0.0021	0.0096	1.0	52.6		
Sunnyside						C	21.8	7.40	149	8.70	9.0	0	78.8	0.005	0.005	0.500	0.505	0.0010	0.0057	1.8	88.6		
Sunnyside					Date mean		**21.8**	**7.63**	**149.3**	**8.70**	**8.9**	**0.0**	**78.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0014**	**0.0075**	**1.4**	**70.8**	**28.4**	**33.2**
Sunnyside					Date s		0.1	0.2	0.6	0.0	0.1	0.0	0.1	0.000	0.000	0.000	0.000	0.001	0.002	0.4	17.999		
Sunnyside				10/1/03	15:15	A	17.6	9.70	137	8.44	7.3	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0128	0.8	39.5		
Sunnyside						B	17.5	9.80	138	8.45	7.3	0	78.0	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Sunnyside						C	17.5	9.70	138	8.45	7.3	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Sunnyside					Date mean		**17.5**	**9.73**	**137.7**	**8.45**	**7.3**	**0.0**	**77.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0059**	**2.9**	**147.8**	**31.5**	**29.7**
Sunnyside					Date s		0.1	0.1	0.6	0.0	0.0	0.0	0.2	0.000	0.000	0.000	0.000	0.000	0.006	1.9	93.846		
Sunnyside					Site mean		21.1	8.9	145.2	8.7	8.0	0.0	77.7	0.005	0.005	0.500	0.505	0.0013	0.0053	2.8	140.2	30.2	26.8

Table 1. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Lake Region	Develop ment	Bay Char- acter	Date	Start Time	Rep	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3+N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TiN:TIP	TN:TP	TSI (Transp)	TSI (Phosp)
Bottle Bay	North	Dev	Bay	8/6/03	11:00	A	23.6	8.40	148	8.60	9.5	0	75.4	0.005	0.005	0.500	0.505	0.0020	0.0025	4.0	202.0		
Bottle Bay						B	23.2	8.70	149	8.70	9.0	0	74.9	0.005	0.005	0.500	0.505	0.0020	0.0025	4.0	202.0		
Bottle Bay						C	23.2	8.70	149	8.50	10.5	0	74.0	0.005	0.005	0.500	0.505	0.0031	0.0025	4.0	202.0		
Bottle Bay					Date mean		**23.3**	**8.60**	**148.7**	**8.60**	**9.7**	**0.0**	**74.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0024**	**0.0025**	**4.0**	**202.0**	**27.3**	**17.4**
Bottle Bay					Date s		0.2	0.2	0.6	0.1	0.8	0.0	0.7	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.0	0.000		
Bottle Bay				9/3/03	10:30	A	21.6	7.65	141	8.60	8.7	0	78.0	0.005	0.005	0.500	0.505	0.0010	0.0115	0.9	43.9		
Bottle Bay						B	21.6	7.60	142	8.55	8.7	0	78.0	0.005	0.005	0.500	0.505	0.0010	0.0074	1.4	68.2		
Bottle Bay						C	21.5	7.55	142	8.40	8.9	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0068	1.5	74.3		
Bottle Bay					Date mean		**21.6**	**7.60**	**141.7**	**8.52**	**8.8**	**0.0**	**77.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0086**	**1.2**	**62.1**	**28.7**	**35.2**
Bottle Bay					Date s		0.1	0.0	0.6	0.1	0.1	0.0	0.2	0.000	0.000	0.000	0.000	0.000	0.003	0.3	16.070		
Bottle Bay				10/1/03	12:00	A	15.0	9.70	131	8.56	7.8	0	75.8	0.005	0.005	0.500	0.505	0.0010	0.0120	0.8	42.1		
Bottle Bay						B	15.0	9.80	130	8.55	8.0	0	76.6	0.005	0.005	0.500	0.505	0.0024	0.0142	0.7	35.6		
Bottle Bay						C	15.0	9.80	130	8.56	8.0	0	77.2	0.005	0.005	0.500	0.505	0.0010	0.0131	0.8	38.5		
Bottle Bay					Date mean		**15.0**	**9.77**	**130.3**	**8.56**	**7.9**	**0.0**	**76.5**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0015**	**0.0131**	**0.8**	**38.7**	**30.2**	**41.2**
Bottle Bay					Date s		0.0	0.1	0.6	0.0	0.1	0.0	0.7	0.000	0.000	0.000	0.000	0.001	0.001	0.1	3.264		
Bottle Bay					Site mean		**20.0**	**8.7**	**140.2**	**8.6**	**8.8**	**0.0**	**76.4**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0016**	**0.0081**	**2.0**	**101.0**	**28.7**	**31.3**
Trestle Creek	North	Dev	Open	8/5/03	15:45	A	23.3	9.10	144	8.90	8.5	0	73.8	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Trestle Creek						B	23.4	9.10	147	8.95	8.8	0	73.0	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Trestle Creek						C	23.3	8.90	147	8.90	8.3	0	74.3	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Trestle Creek					Date mean		**23.3**	**9.03**	**146.0**	**8.9**	**8.5**	**0.0**	**73.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0025**	**4.0**	**202.0**	**29.1**	**17.4**
Trestle Creek					Date s		0.1	0.1	1.7	0.0	0.3	0.0	0.7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.000		
Trestle Creek				9/4/03	14:20	A	23.4	8.60	148	8.45	7.8	0	78.6	0.005	0.005	0.500	0.505	0.0010	0.0063	1.6	80.2		
Trestle Creek						B	23.4	8.50	149	8.46	7.5	0	78.8	0.005	0.005	0.500	0.505	0.0010	0.0066	1.5	76.5		
Trestle Creek						C	23.3	8.60	148	8.46	7.8	0	79.0	0.005	0.005	0.500	0.505	0.0010	0.0074	1.4	68.2		
Trestle Creek					Date mean		**23.4**	**8.57**	**148.3**	**8.5**	**7.7**	**0.0**	**78.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0068**	**1.5**	**75.0**	**30.6**	**31.8**
Trestle Creek					Date s		0.1	0.1	0.6	0.0	0.1	0.0	0.2	0.000	0.000	0.000	0.000	0.000	0.001	0.1	6.106		
Trestle Creek				9/30/03	11:30	A	19.2	8.70	134	8.39	9.0	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Trestle Creek						B	19.4	8.60	135	8.39	9.3	0	78.6	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Trestle Creek						C	19.3	8.70	135	8.38	9.3	0	76.2	0.005	0.013	0.500	0.513	0.0010	0.0025	7.2	205.2		
Trestle Creek					Date mean		**19.3**	**8.67**	**134.7**	**8.4**	**9.2**	**0.0**	**77.5**	**0.005**	**0.008**	**0.500**	**0.508**	**0.0010**	**0.0025**	**5.1**	**203.1**	**28.1**	**17.4**
Trestle Creek					Date s		0.1	0.1	0.6	0.0	0.1	0.0	1.2	0.000	0.005	0.000	0.005	0.000	0.000	1.8	1.848		
Trestle Creek					Site mean		**22.0**	**8.8**	**143.0**	**8.6**	**8.5**		**76.7**	**0.005**	**0.006**	**0.500**	**0.506**	**0.0010**	**0.0039**	**3.5**	**160.0**	**29.3**	**22.2**
Ellisport Bay	North	Dev	Bay	8/5/03	14:00	A	23.6	9.00	151	8.75	8.7	0	75.1	0.005	0.005	0.500	0.505	0.0010	0.0075	1.3	67.3		
Ellisport Bay						B	23.4	9.10	150	8.80	8.8	0	75.9	0.005	0.005	0.500	0.505	0.0010	0.0100	1.0	50.5		
Ellisport Bay						C	23.4	9.30	151	8.80	8.7	0	75.5	0.005	0.005	0.500	0.505	0.0010	0.0078	1.3	64.7		
Ellisport Bay					Date mean		**23.5**	**9.13**	**150.7**	**8.8**	**8.7**	**0.0**	**75.5**	**0.000**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0084**	**1.2**	**60.9**	**28.8**	**34.8**
Ellisport Bay					Date s		0.1	0.2	0.6	0.0	0.1	0.0	0.4	0.000	0.000	0.000	0.000	0.000	0.001	0.2	9.064		
Ellisport Bay				9/4/03	13:30	A	22.8	8.40	147	8.46	7.75	0	79.8	0.005	0.005	0.500	0.505	0.0010	0.0107	0.9	47.2		
Ellisport Bay						B	22.9	8.50	148	8.46	7.75	0	80.0	0.005	0.005	0.500	0.505	0.0010	0.0118	0.8	42.8		
Ellisport Bay						C	22.8	8.50	148	8.47	8	0	79.8	0.005	0.005	0.500	0.505	0.0010	0.0055	1.8	91.8		
Ellisport Bay					Date mean		**22.8**	**8.47**	**147.7**	**8.5**	**7.8**	**0.0**	**79.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0093**	**1.2**	**60.6**	**30.3**	**36.3**
Ellisport Bay					Date s		0.1	0.1	0.6	0.0	0.1	0.0	0.1	0.000	0.000	0.000	0.000	0.000	0.003	0.5	27.122		
Ellisport Bay				9/30/03	15:00	A	16.8	9.60	130	8.40	8.25	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0074	1.4	68.2		
Ellisport Bay						B	16.8	9.60	131	8.41	8.25	0	77.4	0.005	0.005	0.500	0.505	0.0010	0.0068	1.5	74.3		
Ellisport Bay						C	16.8	9.50	131	8.41	8.25	0	78.0	0.005	0.005	0.500	0.505	0.0010	0.0057	1.8	88.6		
Ellisport Bay					Date mean		**16.8**	**9.57**	**130.7**	**8.4**	**8.3**	**0.0**	**77.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0066**	**1.5**	**77.0**	**29.6**	**31.4**
Ellisport Bay					Date s		0.0	0.1	0.6	0.0	0.0	0.0	0.3	0.000	0.000	0.000	0.000	0.000	0.001	0.2	10.456		
Ellisport Bay					Site mean		**21.0**	**9.1**	**143.0**	**8.6**	**8.3**	**0**	**77.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0081**	**1.3**	**66.2**	**29.6**	**34.2**

Table 1. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Lake Region	Develop ment	Bay Char-acter	Date	Start Time	Rep	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3+N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TIN:TIP	TN:TP	TSI (Transp)	TSI (Phosp)
Warren Island	Mid	Mod	Open	8/5/03	12:40	A	22.7	8.70	151	8.85	9.0	0	75.5	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Warren Island						B	22.7	8.50	150	8.75	8.8	0	69.8	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Warren Island						C	22.7	8.50	151	8.70	9.0	0	73.0	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Warren Island					Date mean		**22.7**	**8.57**	**150.7**	**8.8**	**8.9**	**0.0**	**72.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0025**	**4.0**	**202.0**	**26.4**	**17.4**
Warren Island					Date s		0.0	0.1	0.6	0.1	0.1	0.0	2.9	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.000		
Warren Island				9/4/03	15:00	A	23.5	8.00	149	8.45	8.5	0	79.8	0.005	0.005	0.500	0.505	0.0026	0.0057	1.8	88.6		
Warren Island						B	23.3	8.20	148	8.47	5.25	0	80.0	0.005	0.005	0.500	0.505	0.0010	0.0052	1.9	97.1		
Warren Island						C	23.3	8.20	149	8.47	8.25	0	80.2	0.005	0.005	0.500	0.505	0.0010	0.0082	1.2	61.6		
Warren Island					Date mean		**23.4**	**8.13**	**148.7**	**8.5**	**7.3**	**0.0**	**80.0**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0015**	**0.0064**	**1.6**	**82.4**	**31.3**	**30.9**
Warren Island					Date s		0.1	0.1	0.6	0.0	1.8	0.0	0.2	0.000	0.000	0.000	0.000	0.001	0.002	0.4	18.550		
Warren Island				9/30/03	13:40	A	17.4	9.50	133	8.33	9	0	77.0	0.005	0.005	0.500	0.505	0.0221	0.0126	0.8	40.1		
Warren Island						B	17.3	9.60	134	8.34	8.75	0	76.4	0.005	0.005	0.500	0.505	0.0034	0.0216	0.5	23.4		
Warren Island						C	17.4	9.50	134	8.33	9	0	78.4	0.005	0.005	0.500	0.505	0.0010	0.0079	1.3	63.9		
Warren Island					Date mean		**17.4**	**9.53**	**133.7**	**8.3**	**8.9**	**0.0**	**77.3**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0088**	**0.0140**	**0.8**	**42.5**	**28.5**	**42.2**
Warren Island					Date s		0.1	0.1	0.6	0.0	0.1	0.0	1.0	0.000	0.000	0.000	0.000	0.012	0.007	0.4	20.377		
Warren Island					Site mean		**21.1**	**8.7**	**144.3**	**8.5**	**8.4**	**0**	**76.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0038**	**0.0076**	**2.2**	**109.0**	**29.4**	**30.2**
Camp Bay	Mid	Mod	Bay	8/5/03	11:30	A	22.4	7.90	150	8.35	9.8	0	75.5	0.005	0.005	0.500	0.505	0.0010	0.0058	1.7	87.1		
Camp Bay						B	22.2	8.40	150	8.51	10.3	0	71.4	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Camp Bay						C	22.2	8.10	150	8.70	9.5	0	73.0	0.005	0.005	0.500	0.505	0.0010	0.0086	1.2	58.7		
Camp Bay					Date mean		**22.3**	**8.13**	**150.0**	**8.5**	**9.9**	**0.0**	**73.3**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0056**	**2.3**	**115.9**	**27.0**	**29.0**
Camp Bay					Date s		0.1	0.3	0.0	0.2	0.4	0.0	2.1	0.000	0.000	0.000	0.000	0.000	0.003	1.5	75.875		
Camp Bay				9/4/03	11:35	A	20.9	8.80	142	8.44	7.75	0	81.0	0.005	0.005	0.500	0.505	0.0010	0.0088	1.1	57.4		
Camp Bay						B	20.8	8.70	143	8.45	7.5	0	81.4	0.005	0.012	0.500	0.512	0.0010	0.0140	1.2	36.6		
Camp Bay						C	20.9	8.70	143	8.44	7.75	0	81.2	0.005	0.005	0.500	0.505	0.0010	0.0118	0.8	42.8		
Camp Bay					Date mean		**20.9**	**8.73**	**142.7**	**8.4**	**7.7**	**0.0**	**81.2**	**0.005**	**0.007**	**0.500**	**0.507**	**0.0010**	**0.0115**	**1.1**	**45.6**	**30.6**	**39.4**
Camp Bay					Date s		0.1	0.1	0.6	0.0	0.1	0.0	0.2	0.000	0.004	0.000	0.004	0.000	0.003	0.2	10.684		
Camp Bay				10/1/03	14:00	A	17.6	9.70	134	8.31	8.5	0	78.8	0.005	0.005	0.500	0.505	0.0043	0.0025	4.0	202.0		
Camp Bay						B	17.6	9.60	134	8.32	8.5	0	77.2	0.005	0.005	0.500	0.505	0.0040	0.0054	1.9	93.5		
Camp Bay						C	17.5	9.60	134	8.32	8.5	0	78.4	0.005	0.005	0.500	0.505	0.0022	0.0025	4.0	202.0		
Camp Bay					Date mean		**17.6**	**9.63**	**134.0**	**8.3**	**8.5**	**0.0**	**78.1**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0035**	**0.0035**	**3.3**	**165.8**	**29.2**	**22.2**
Camp Bay					Date s		0.1	0.1	0.0	0.0	0.0	0.0	0.8	0.000	0.000	0.000	0.000	0.001	0.002	1.2	62.632		
Camp Bay					Site mean		**20.2**	**8.8**	**142.2**	**8.4**	**8.7**	**0**	**77.5**	**0.005**	**0.006**	**0.500**	**0.506**	**0.0018**	**0.0069**	**2.2**	**109.1**	**28.9**	**30.2**
Garfield Bay	Mid	Dev	Bay	8/4/03	13:45	A	23.0	8.35	159	8.70	9.8	0	77.6	0.005	0.005	0.500	0.505	0.0028	0.0053	1.9	95.3		
Garfield Bay						B	23.3	8.20	160	8.85	10.3	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0066	1.5	76.5		
Garfield Bay						C	23.2	8.05	154	8.80	10.0	0	78.6	0.005	0.005	0.500	0.505	0.0010	0.0056	1.8	90.2		
Garfield Bay					Date mean		**23.2**	**8.20**	**157.7**	**8.8**	**10.0**	**0.0**	**77.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0016**	**0.0058**	**1.7**	**87.3**	**26.8**	**29.5**
Garfield Bay					Date s		0.2	0.2	3.2	0.1	0.3	0.0	0.6	0.000	0.000	0.000	0.000	0.001	0.001	0.2	9.704		
Garfield Bay				9/1/03	10:46	A	20.8	7.40	144	8.55	10.2	0	78.8	0.005	0.005	0.500	0.505	0.0010	0.0074	1.4	68.2		
Garfield Bay						B	20.8	7.45	146	8.45	10	0	79.0	0.005	0.005	0.500	0.505	0.0010	0.0066	1.5	76.5		
Garfield Bay						C	20.9	7.35	145	8.55	10.2	0	76.4	0.005	0.005	0.500	0.505	0.0010	0.0101	1.0	50.0		
Garfield Bay					Date mean		**20.8**	**7.40**	**145.0**	**8.5**	**10.1**	**0.0**	**78.1**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0080**	**1.3**	**64.9**	**26.6**	**34.1**
Garfield Bay					Date s		0.1	0.0	1.0	0.1	0.1	0.0	1.4	0.000	0.000	0.000	0.000	0.000	0.002	0.3	13.566		
Garfield Bay				10/3/03	12:15	A	16.2	9.70	136	8.41	9	0	81.2	0.005	0.005	0.500	0.505	0.0010	0.0060	1.7	84.2		
Garfield Bay						B	16.2	9.80	136	8.42	9.25	0	80.8	0.005	0.005	0.500	0.505	0.0038	0.0071	1.4	71.1		
Garfield Bay						C	16.2	9.70	137	8.42	9.25	0	63.8	0.005	0.005	0.500	0.505	0.0010	0.0087	1.1	58.0		
Garfield Bay					Date mean		**16.2**	**9.73**	**136.3**	**8.4**	**9.2**	**0.0**	**75.3**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0019**	**0.0073**	**1.4**	**71.1**	**28.1**	**32.8**
Garfield Bay					Date s		0.0	0.1	0.6	0.0	0.1	0.0	9.9	0.000	0.000	0.000	0.000	0.002	0.001	0.3	13.060		
Garfield Bay					Site mean		**20.1**	**8.4**	**146.3**	**8.6**	**9.8**	**0**	**77.1**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0015**	**0.0070**	**1.5**	**74.5**	**27.2**	**32.1**

Table 1. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Lake Region	Develop ment	Bay Char- acter	Date	Start Time	Rep	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3+N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TIN:TIP	TN:TP	TSI (Transp)	TSI (Phosp)
Talache	Mid	Undev	Open	8/4/03	15:30	A	24.5	7.60	157	8.75	9.3	0	77.2	0.005	0.005	0.500	0.505	0.0021	0.0025	4.0	202.0		
Talache						B	24.6	7.65	153	8.80	9.5	0	76.6	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Talache						C	24.7	7.65	154	8.75	9.3	0	76.4	0.005	0.005	0.500	0.505	0.0010	0.0050	2.0	101.0		
Talache					Date mean		**24.6**	**7.63**	**154.7**	**8.8**	**9.4**	**0.0**	**76.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0014**	**0.0033**	**3.3**	**168.3**	**27.8**	**21.4**
Talache					Date s		0.1	0.0	2.1	0.0	0.1	0.0	0.4	0.000	0.000	0.000	0.000	0.001	0.001	1.2	58.312		
Talache				9/1/03	13:30	A	21.8	8.25	148	8.65	10.2	0	79.2	0.005	0.005	0.500	0.505	0.0010	0.0096	1.0	52.6		
Talache						B	20.9	8.10	149	8.7	10.2	0	78.0	0.005	0.005	0.500	0.505	0.0010	0.0090	1.1	56.1		
Talache						C	20.9	8.15	149	8.65	10.3	0	79.4	0.005	0.005	0.500	0.505	0.0010	0.0085	1.2	59.4		
Talache					Date mean		**21.2**	**8.17**	**148.7**	**8.7**	**10.2**	**0.0**	**78.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0090**	**1.1**	**56.0**	**26.5**	**35.8**
Talache					Date s		0.5	0.1	0.6	0.0	0.1	0.0	0.8	0.000	0.000	0.000	0.000	0.000	0.001	0.1	3.404		
Talache				10/3/03	13:20	A	16.4	8.60	137	8.4	8.75	0	79.8	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Talache						B	16.4	8.50	138	8.4	8.75	0	81.8	0.005	0.005	0.500	0.505	0.0010	0.0052	1.9	97.1		
Talache						C	16.4	8.50	137	8.4	8.75	0	82.0	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Talache					Date mean		**16.4**	**8.53**	**137.3**	**8.4**	**8.8**	**0.0**	**81.2**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0034**	**3.3**	**167.0**	**28.7**	**21.8**
Talache					Date s		0.0	0.1	0.6	0.0	0.0	0.0	1.2	0.000	0.000	0.000	0.000	0.000	0.002	1.2	60.555		
Talache					Site mean		**20.7**	**8.1**	**146.9**	**8.6**	**9.5**	**0**	**78.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.001**	**0.0053**	**2.6**	**130.5**	**27.7**	**26.3**
Granite Point	Mid	Mod	Bay	8/4/03	10:30	A	21.0	7.65	148	8.71	11.3	0	75.8	0.005	0.005	0.500	0.505	0.0026	0.0025	4.0	202.0		
Granite Point						B	23.0	7.50	149	8.71	11.5	0	76.4	0.005	0.005	0.500	0.505	0.0021	0.0061	1.6	82.8		
Granite Point						C	23.2	7.70	144	8.80	11.0	0	76.2	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Granite Point					Date mean		**22.4**	**7.62**	**147.0**	**8.7**	**11.3**	**0.0**	**76.1**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0019**	**0.0037**	**3.2**	**162.3**	**25.1**	**23.0**
Granite Point					Date s		1.2	0.1	2.6	0.1	0.3	0.0	0.3	0.000	0.000	0.000	0.000	0.001	0.002	1.4	68.828		
Granite Point				9/1/03	14:50	A	22.9	6.80	154	8.55	11	0	78.6	0.005	0.005	0.500	0.505	0.0010	0.0088	1.1	57.4		
Granite Point						B	22.8	6.90	153	8.6	11	0	78.4	0.005	0.005	0.500	0.505	0.0010	0.0090	1.1	56.1		
Granite Point						C	22.9	6.90	153	8.6	11.2	0	79.2	0.005	0.005	0.500	0.505	0.0010	0.0110	0.9	45.9		
Granite Point					Date mean		**22.9**	**6.87**	**153.3**	**8.6**	**11.1**	**0.0**	**78.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0096**	**1.1**	**53.1**	**25.4**	**36.8**
Granite Point					Date s		0.1	0.1	0.6	0.0	0.1	0.0	0.4	0.000	0.000	0.000	0.000	0.000	0.001	0.1	6.291		
Granite Point				10/3/03	14:30	A	16.3	9.10	133	8.35	9	0	80.6	0.005	0.005	0.500	0.505	0.0010	0.0158	0.6	32.0		
Granite Point						B	16.2	9.20	136	8.4	9.75	0	81.4	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Granite Point						C	16	9.00	136	8.4	9.75	0	82.2	0.005	0.005	0.500	0.505	0.0010	0.0079	1.3	63.9		
Granite Point					Date mean		**16.2**	**9.10**	**135.0**	**8.4**	**9.5**	**0.0**	**81.4**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0087**	**2.0**	**99.3**	**27.6**	**35.3**
Granite Point					Date s		0.2	0.1	1.7	0.0	0.4	0.0	0.8	0.000	0.000	0.000	0.000	0.000	0.007	1.8	90.369		
Granite Point					Site mean		**20.5**	**7.9**	**145.1**	**8.6**	**10.6**	**0**	**78.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0013**	**0.0073**	**2.1**	**104.9**	**26.0**	**31.7**
Lakeview	South	Undev	Open	8/4/03	17:00	A	24.9	9.50	153	8.75	10.3	0	75.8	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Lakeview						B	24.8	9.60	156	8.85	10.5	0	75.4	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Lakeview						C	24.8	9.60	156	8.85	10.0	0	75.4	0.005	0.005	0.500	0.505	0.0033	0.0025	4.0	202.0		
Lakeview					Date mean		**24.8**	**9.57**	**155.0**	**8.8**	**10.3**	**0.0**	**75.5**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0018**	**0.0025**	**4.0**	**202.0**	**26.4**	**17.4**
Lakeview					Date s		0.1	0.1	1.7	0.1	0.3	0.0	0.2	0.000	0.000	0.000	0.000	0.001	0.000	0.0	0.000		
Lakeview				9/1/03	17:15	A	21.3	7.70	146	8.7	10.3	0	77.4	0.005	0.005	0.500	0.505	0.0010	0.0082	1.2	61.6		
Lakeview						B	21.2	7.70	144	8.75	10.3	0	78.0	0.005	0.005	0.500	0.505	0.0037	0.0055	1.8	91.8		
Lakeview						C	21.3	7.75	146	8.65	10.2	0	77.8	0.005	0.005	0.500	0.505	0.0010	0.0055	1.8	91.8		
Lakeview					Date mean		**21.3**	**7.72**	**145.3**	**8.7**	**10.3**	**0.0**	**77.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0019**	**0.0064**	**1.6**	**81.7**	**26.4**	**30.9**
Lakeview					Date s		0.1	0.0	1.2	0.0	0.1	0.0	0.3	0.000	0.000	0.000	0.000	0.002	0.002	0.3	17.455		
Lakeview				10/3/03	15:30	A	16.2	8.60	133	8.37	8.5	0	79.6	0.005	0.005	0.500	0.505	0.0010	0.0054	1.9	93.5		
Lakeview						B	16.2	8.80	134	8.37	9	0	78.8	0.005	0.005	0.500	0.505	0.0010	0.0068	1.5	74.3		
Lakeview						C	16.2	8.90	133	8.37	9	0	79.2	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Lakeview					Date mean		**16.2**	**8.77**	**133.3**	**8.4**	**8.8**	**0.0**	**79.2**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0049**	**2.4**	**123.3**	**28.6**	**27.1**
Lakeview					Date s		0.0	0.2	0.6	0.0	0.3	0.0	0.4	0.000	0.000	0.000	0.000	0.000	0.002	1.4	68.866		
Lakeview					Site mean		**20.8**	**8.7**	**144.6**	**8.6**	**9.8**	**0**	**77.5**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0016**	**0.0046**	**2.7**	**135.7**	**27.2**	**25.1**

Table 1. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Lake Region	Development	Bay Character	Date	Start Time	Rep	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3-N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TIN:TIP	TN:TP	TSI (Transp)	TSI (Phosp)
Bayview	South	Dev	Bay	8/4/03	18:15	A	23.1	9.40	151	8.82	9.5	0	75.8	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Bayview						B	23.0	9.50	151	8.91	9.5	0	75.0	0.005	0.005	0.500	0.505	0.0023	0.0025	4.0	202.0		
Bayview						C	23.0	9.20	151	8.90	9.5	0	75.2	0.005	0.005	0.500	0.505	0.0023	0.0066	1.5	76.5		
Bayview					Date mean		**23.0**	**9.37**	**151.0**	**8.9**	**9.5**	**0.0**	**75.3**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0019**	**0.0039**	**3.2**	**160.2**	**27.6**	**23.8**
Bayview					Date s		0.1	0.2	0.0	0.0	0.0	0.0	0.4	0.000	0.000	0.000	0.000	0.001	0.002	1.4	72.449		
Bayview				9/1/03	10:00	A	20.3	7.90	142	8.7	9.5	0	77.6	0.005	0.005	0.500	0.505	0.0010	0.0052	1.9	97.1		
Bayview						B	20.4	7.80	141	8.65	9.5	0	78.0	0.005	0.005	0.500	0.505	0.0010	0.0071	1.4	71.1		
Bayview						C	20.4	7.95	142	8.6	9.5	0	78.2	0.005	0.005	0.500	0.505	0.0010	0.0063	1.6	80.2		
Bayview					Date mean		**20.4**	**7.88**	**141.7**	**8.7**	**9.5**	**0.0**	**77.9**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0062**	**1.6**	**82.8**	**27.6**	**30.5**
Bayview					Date s		0.1	0.1	0.6	0.0	0.0	0.0	0.3	0.000	0.000	0.000	0.000	0.000	0.001	0.3	13.194		
Bayview				10/3/03	10:00	A	16.2	9.50	134	8.25	8.5	0	80.6	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Bayview						B	16.3	9.70	131	8.26	8.5	0	79.6	0.005	0.005	0.500	0.505	0.0010	0.0025	4.0	202.0		
Bayview						C	16.3	9.70	131	8.26	8.25	0	79.0	0.005	0.005	0.500	0.505	0.0010	0.0054	1.9	93.5		
Bayview					Date mean		**16.3**	**9.63**	**132.0**	**8.3**	**8.4**	**0.0**	**79.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0010**	**0.0035**	**3.3**	**165.8**	**29.3**	**22.2**
Bayview					Date s		0.1	0.1	1.7	0.0	0.1	0.0	0.8	0.000	0.000	0.000	0.000	0.000	0.002	1.2	62.632		
Bayview					Site mean		**19.9**	**9.0**	**141.6**	**8.6**	**9.1**	**0**	**77.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0013**	**0.0045**	**2.7**	**136.3**	**28.1**	**25.5**
					North Lake Mean		**21.0**	**8.8**	**142.7**	**8.6**	**7.5**	**0**	**76.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0013**	**0.0065**	**2.2**	**106.6**	**31.3**	**29.4**
					95% CI		0.2	0.1	0.4	0.03	0.4		0.2					0.0001	0.0004	0.2	9.9	0.8	1.1
					s		0.7	0.2	1.6	0.1	1.5		0.8					0.0003	0.0016	0.8	36.9	3.1	4.3
					Mid Lake Mean		**20.5**	**8.4**	**145.0**	**8.5**	**9.4**	**0**	**77.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0019**	**0.0068**	**2.1**	**105.6**	**27.8**	**30.1**
					95% CI		0.1	0.1	0.5	0.02	0.3		0.3					0.0003	0.0003	0.1	5.9	0.4	0.7
					s		0.4	0.4	1.8	0.1	0.9		1.0					0.0011	0.0009	0.4	20.1	1.4	2.3
					South Lake Mean		**20.3**	**8.8**	**143.1**	**8.6**	**9.5**	**0**	**77.6**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0014**	**0.0046**	**2.7**	**136.0**	**27.7**	**25.3**
					95% CI		0.3	0.1	1.0	0.01	0.2		0.1					0.0001	0.0000	0.004	0.2	0.3	0.1
					s		0.6	0.2	2.1	0.02	0.5		0.1					0.0002	0.0001	0.01	0.4	0.7	0.3
					Embayment Mean		**20.5**	**8.6**	**142.9**	**8.3**	**8.3**	**0**	**77.1**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0014**	**0.0069**	**1.9**	**95.5**	**29.9**	**30.9**
					95% CI		0.1	0.1	0.5	0.03	0.4		0.2					0.0001	0.0004	0.1	5.4	0.8	0.6
					s		0.6	0.4	2.0	0.1	1.8		1.0					0.0002	0.0016	0.5	23.2	3.5	2.5
					Open Lake Mean		**21.1**	**8.6**	**144.8**	**8.8**	**8.8**	**0**	**77.5**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0018**	**0.0053**	**2.7**	**135.1**	**28.7**	**26.1**
					95% CI		0.1	0.1	0.4	0.02	0.2		0.3					0.0003	0.0004	0.1	5.4	0.4	0.8
					s		0.5	0.3	1.4	0.1	0.8		0.9					0.0012	0.0014	0.5	18.4	1.3	2.9
					Developed Sites Mean		**20.7**	**8.7**	**142.7**	**7.9**	**8.0**	**0**	**76.8**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0013**	**0.0064**	**2.1**	**101.4**	**30.4**	**29.6**
					95% CI		0.2	0.2	0.5	0.03	0.4		0.2					0.0001	0.0004	0.2	8.7	0.8	1.1
					s		0.8	0.8	1.9	0.1	1.7		0.7					0.0003	0.0016	0.8	35.2	3.4	4.3
					Moderately Developed Sites Mean		**20.7**	**8.6**	**144.2**	**8.5**	**8.9**	**0**	**77.7**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0021**	**0.0068**	**2.3**	**115.8**	**28.6**	**29.7**
					95% CI		0.1	0.2	0.5	0.03	0.4		0.3					0.0004	0.0003	0.1	5.4	0.6	0.7
					s		0.4	0.5	1.4	0.1	1.2		0.9					0.0012	0.0010	0.3	16.4	1.8	2.1
					Undeveloped Sites Mean		**20.8**	**8.4**	**145.7**	**8.6**	**9.6**	**0**	**78.2**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0013**	**0.0049**	**2.6**	**133.1**	**27.4**	**25.7**
					95% CI		0.01	0.2	0.8	0.01	0.1		0.5					0.0001	0.0002	0.03	1.7	0.2	0.4
					s		0.02	0.4	1.6	0.01	0.2		1.0					0.0003	0.0005	0.1	3.7	0.4	0.9
					2003 Overall Lake Mean		**20.7**	**8.6**	**143.6**	**8.6**	**9.0**	**0**	**77.3**	**0.005**	**0.005**	**0.500**	**0.505**	**0.0016**	**0.0063**	**2.2**	**110.7**	**29.4**	**29.0**
					95% CI		0.1	0.1	0.4	0.02	0.3		0.2					0.0001	0.0003	0.1	5.2	0.5	0.6
					s		0.6	0.3	2.0	0.1	1.5		0.9					0.0007	0.0014	0.6	28.8	2.9	3.5
					1990 Overall Lake Mean		**21.2**	**8.3**	**139**	**8.3**	**8.3**	**1.5**	**77.2**	**0.039**	**0.017**	**0.065**	**0.091**	**0.0010**	**0.0066**	-	**18.1**	**30.5**	**30.1**

Table 2. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August - September, 1989-90.

Site	Lake Region	Development	Bay Character	Date	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH -	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3+N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TN:TP	TSI (Transp)	TSI (Phosp)
Springy Point	North	Dev	Bay	Aug-89	19.8	8.6	127	8.1	-	0.5	71.0	0.024	0.003	0.080	0.083	0.0000	0.0080	10.4		
Springy Point				Sep-89	17.0	9.3	159	8.4	5.5	5.0	81.0	0.003	0.014	0.100	0.114	0.0010	0.0100	11.4		
Springy Point				Aug-90	26.5	8.8	156	8.4	8.5	0.0	76.0	0.034	0.003	0.100	0.103	0.0010	0.0200	5.2		
Springy Point				Sep-90	19.1	8.8	139	8.4	7.1	-	77.0	0.002	0.030	0.050	0.080	0.0010	0.0050	16.0		
Springy Point				**Site mean**	**20.6**	**8.9**	**145**	**8.3**	**7.0**	**1.8**	**76.3**	**0.016**	**0.013**	**0.083**	**0.095**	**0.0008**	**0.0108**	**10.7**	**31.9**	**38.5**
Kootenai Bay	North	Dev	Bay	Aug-89	21.5	7.6	127	8.2	1.1	0.0	72.0	0.015	0.005	0.050	0.550	0.0010	0.0120	45.8		
Kootenai Bay				Sep-89	18.3	8.7	129	8.4	0.5	5.0	83.0	0.013	0.036	0.140	0.176	0.0040	0.0190	9.3		
Kootenai Bay				Aug-90	24.1	8.4	150	8.4	4.0	0.0	76.0	0.022	0.003	0.030	0.033	0.0010	0.0070	4.7		
Kootenai Bay				Sep-90	20.5	8.7	141	8.2	1.5	-	78.0	0.018	0.030	0.070	0.100	0.0010	0.0080	12.5		
Kootenai Bay				**Site mean**	**21.1**	**8.4**	**137**	**8.3**	**1.8**	**1.7**	**77.3**	**0.017**	**0.019**	**0.073**	**0.215**	**0.0018**	**0.0115**	**18.1**	**51.7**	**39.4**
Sunnyside	North	Mod	Open	Aug-89	21.5	7.8	126	8.3	7.2	0.0	73.0	0.020	0.005	0.030	0.035	0.0010	0.0070	5.0		
Sunnyside				Sep-89	17.9	8.4	160	8.4	6.0	3.0	81.0	0.015	0.007	0.120	0.127	0.0000	0.0110	11.5		
Sunnyside				Aug-90	23.2	9.3	148	8.5	6.9	0.0	78.0	0.045	0.003	0.050	0.053	0.0010	0.0080	6.6		
Sunnyside				Sep-90	23.0	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sunnyside				**Site mean**	**21.4**	**8.5**	**145**	**8.4**	**6.7**	**1.0**	**77.3**	**0.027**	**0.005**	**0.067**	**0.072**	**0.0007**	**0.0087**	**7.7**	**32.6**	**35.3**
Bottle Bay	North	Dev	Bay	Aug-89	22.0	7.7	124	8.3	7.7	0.5	77.0	0.061	0.057	0.050	0.107	0.0010	0.0070	15.3		
Bottle Bay				Sep-89	17.0	8.8	123	8.3	7.5	5.0	82.0	0.013	0.014	0.110	0.124	0.0000	0.0060	20.7		
Bottle Bay				Aug-90	22.1	8.5	140	8.1	8.5	0.0	76.0	0.079	0.011	0.070	0.081	0.0010	0.0040	20.3		
Bottle Bay				Sep-90	20.9	8.1	140	8.4	8.4	-	71.0	0.019	0.030	0.070	0.100	0.0010	0.0040	25.0		
Bottle Bay				**Site mean**	**20.5**	**8.3**	**132**	**8.3**	**8.0**	**1.8**	**76.5**	**0.043**	**0.028**	**0.075**	**0.103**	**0.0008**	**0.0053**	**20.3**	**30.0**	**29.7**
Trestle Creek	North	Dev	Open	Aug-89	21.5	7.6	126	8.2	10.1	0.5	77.0	0.044	0.008	0.230	0.238	0.0010	0.0140	17.0		
Trestle Creek				Sep-89	17.5	8.1	138	8.2	8.5	6.0	80.0	0.022	0.012	0.150	0.162	0.0010	0.0140	11.6		
Trestle Creek				Aug-90	23.5	11.2	138	8.7	8.8	0.0	73.0	0.018	0.010	0.050	0.060	0.0010	0.0050	12.0		
Trestle Creek				Sep-90	20.9	8.8	139	9.1	8.8	0.0	58.0	0.019	0.030	0.080	0.110	0.0010	0.0080	13.8		
Trestle Creek				**Site mean**	**20.9**	**8.9**	**135**	**8.6**	**9.1**	**1.6**	**72.0**	**0.026**	**0.015**	**0.128**	**0.143**	**0.0010**	**0.0103**	**13.6**	**28.3**	**37.8**
Ellisport Bay	North	Dev	Bay	Aug-89	21.0	7.8	135	8.2	8.5	2.0	80.0	0.047	0.004	0.090	0.094	0.0010	0.0060	15.7		
Ellisport Bay				Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Ellisport Bay				Aug-90	23.2	8.7	152	8.6	9.5	0.0	78.0	0.038	0.030	0.030	0.060	0.0010	0.0060	10.0		
Ellisport Bay				Sep-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Ellisport Bay				**Site mean**	**22.1**	**8.3**	**144**	**8.4**	**9.0**	**1.0**	**79.0**	**0.043**	**0.017**	**0.060**	**0.077**	**0.0010**	**0.0060**	**12.8**	**28.3**	**30.0**
Warren Island	Mid	Mod	Open	Aug-89	22.0	8.4	136	8.1	10.0	2.5	78.0	0.054	0.015	0.010	0.025	0.0010	0.0090	2.8		
Warren Island				Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Warren Island				Aug-90	22.0	8.2	147	8.4	9.5	0.0	79.0	0.029	0.030	0.060	0.090	0.0010	0.0030	30.0		
Warren Island				Sep-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Warren Island				**Site mean**	**22.0**	**8.3**	**142**	**8.3**	**9.8**	**1.3**	**78.5**	**0.042**	**0.023**	**0.035**	**0.058**	**0.0010**	**0.0060**	**16.4**	**27.2**	**30.0**
Camp Bay	Mid	Mod	Bay	Aug-89	21.3	7.7	128	8.1	8.2	2.0	80.0	0.068	0.012	0.120	0.132	0.0000	0.0070	18.9		
Camp Bay				Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Camp Bay				Aug-90	23.9	7.7	152	8.3	7.0	1.4	79.0	0.021	0.006	0.030	0.036	0.0010	0.0010	36.0		
Camp Bay				Sep-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Camp Bay				**Site mean**	**22.6**	**7.7**	**140**	**8.2**	**7.6**	**1.7**	**159.0**	**0.045**	**0.009**	**0.075**	**0.084**	**0.0005**	**0.0040**	**27.4**	**30.8**	**24.1**

Table 2. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August - September, 1989-90.

Site	Lake Region	Development	Bay Character	Date	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH -	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3•N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TN:TP	TSI (Transp)	TSI (Phosp)
Garfield Bay	Mid	Dev	Bay	Aug-89	20.8	7.9	134	8.1	8.4	2.0	75.0	0.089	0.014	0.010	0.024	0.0010	0.0070	3.4		
Garfield Bay				Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Garfield Bay				Aug-90	22.8	8.0	144	8.4	10.0	0.0	78.0	0.040	0.030	0.030	0.060	0.0010	0.0040	15.0		
Garfield Bay				Sep-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Garfield Bay				**Site mean**	**21.8**	**8.0**	**139**	**8.3**	**9.2**	**1.0**	**76.5**	**0.065**	**0.022**	**0.020**	**0.042**	**0.0010**	**0.0055**	**9.2**	**28.0**	**28.7**
Talache	Mid	Undev	Open	Aug-89	21.1	8.1	131	8.4	9.6	2.0	74.0	0.046	0.003	0.080	0.083	0.0010	0.0050	16.6		
Talache				Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Talache				Aug-90	24.2	7.5	153	8.3	9.2	0.0	80.0	0.021	0.030	0.030	0.060	0.0010	0.0040	15.0		
Talache				Sep-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Talache				**Site mean**	**22.7**	**7.8**	**142**	**8.4**	**9.4**	**1.0**	**77.0**	**0.034**	**0.017**	**0.055**	**0.072**	**0.0010**	**0.0045**	**15.8**	**27.7**	**25.8**
Granite Point	Mid	Mod	Bay	Aug-89	21.0	8.2	134	8.2	11.1	4.0	78.0	0.042	0.003	0.090	0.093	0.0000	0.0050	18.6		
Granite Point				Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Granite Point				Aug-90	21.6	8.6	141	8.4	11.0	0.0	78.0	0.040	0.030	0.030	0.060	0.0010	0.0010	60.0		
Granite Point				Sep-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Granite Point				**Site mean**	**21.3**	**8.4**	**138**	**8.3**	**11.1**	**2.0**	**78.0**	**0.041**	**0.017**	**0.060**	**0.077**	**0.0005**	**0.0030**	**39.3**	**25.4**	**20.0**
Lakeview	South	Undev	Open	Aug-89	20.1	7.8	130	8.4	9.5	1.5	77.0	0.044	0.006	0.060	0.066	0.0010	0.0060	11.0		
Lakeview				Sep-89	16.7	8.9	129	8.4	10.5	5.0	77.0	0.044	0.006	0.080	0.086	0.0010	0.0060	14.3		
Lakeview				Aug-90	22.6	8.1	149	8.4	10.8	0.0	77.0	0.088	0.030	0.030	0.060	0.0040	0.0040	15.0		
Lakeview				Sep-90	18.5	9.0	138	8.1	9.5	-	81.0	0.007	0.030	0.050	0.080	0.0010	0.0040	20.0		
Lakeview				**Site mean**	**19.5**	**8.5**	**137**	**8.3**	**10.1**	**2.2**	**78.0**	**0.046**	**0.018**	**0.055**	**0.073**	**0.0018**	**0.0050**	**15.1**	**26.7**	**27.4**
Bayview	South	Dev	Bay	Aug-89	19.5	7.8	127	7.9	8.0	1.0	75.0	0.070	0.005	0.060	0.065	0.0010	0.0060	10.8		
Bayview				Sep-89	16.5	8.6	121	8.3	10.5	4.0	81.0	0.152	0.014	0.090	0.104	0.0000	0.0060	17.3		
Bayview				Aug-90	22.1	8.5	141	8.2	11.5	0.0	77.0	0.044	0.030	0.030	0.060	0.0040	0.0010	60.0		
Bayview				Sep-90	18.5	8.7	132	8.7	9.9	-	79.0	0.015	0.030	0.070	0.100	0.0010	0.0040	25.0		
Bayview				**Site mean**	**19.2**	**8.4**	**130**	**8.3**	**10.0**	**1.7**	**78.0**	**0.070**	**0.020**	**0.063**	**0.082**	**0.0015**	**0.0043**	**28.3**	**26.9**	**25.2**

Table 2. Littoral zone physical/chemistry at 13 sites around the Lake Pend Oreille shoreline, August - September, 1989-90.

Site	Lake Region	Develop ment	Bay Char- acter	Date	Temp. °C	Oxygen mg l^{-1}	Conduc µs cm^{-1}	pH -	Secchi m	CO_2 mg l^{-1}	Tot. Alk. mg l^{-1}	NH_3+N mg l^{-1}	NO_3+NO_2 mg l^{-1}	TKN mg l^{-1}	TN mg l^{-1}	Ortho P mg l^{-1}	T P mg l^{-1}	TN:TP	TSI (Transp)	TSI (Phosp)
North Lake Mean					21.1	8.5	140	8.4	6.9	1.5	76.4	0.028	0.016	0.081	0.117	0.0010	0.0087	13.9	33.8	35.1
95% CI					0.2	0.1	2	0.04	1.2	0.2	1.0	0.005	0.003	0.010	0.023	0.0002	0.0011	2.1	7.2	3.4
s					0.6	0.3	6	0.1	2.7	0.4	2.4	0.012	0.008	0.024	0.054	0.0004	0.0026	4.6	9.0	4.3
Mid Lake Mean					22.1	8.0	140	8.3	9.4	1.4	93.8	0.045	0.017	0.049	0.066	0.0008	0.0046	21.6	27.8	25.7
95% CI					0.4	0.2	1	0.04	0.8	0.3	22.6	0.007	0.003	0.013	0.010	0.0002	0.0007	7.3	1.7	1.7
s					0.6	0.3	2	0.1	1.2	0.4	36.5	0.012	0.005	0.022	0.017	0.0003	0.0012	11.8	1.9	1.9
South Lake Mean					19.3	8.4	133	8.3	10.0	1.9	78.0	0.058	0.019	0.059	0.078	0.0016	0.0046	21.7	26.8	26.3
95% CI					0.2	0.02	3	0.02	0.01	0.3	-	0.012	0.001	0.004	0.005	0.0001	0.0004	6.5	0.1	2.1
s					0.2	0.04	4	0.04	0.02	0.4	0.0	0.017	0.001	0.005	0.007	0.0002	0.0005	9.3	0.1	1.5
Embayment Mean					21.1	8.3	138	8.3	8.0	1.6	87.6	0.042	0.018	0.063	0.097	0.0010	0.0063	20.8	31.6	29.5
95% CI					0.3	0.1	2	0.02	1.2	0.2	11.6	0.008	0.002	0.008	0.020	0.0002	0.0013	4.1	5.8	4.7
s					1.1	0.3	5	0.1	2.8	0.4	28.9	0.019	0.005	0.019	0.051	0.0005	0.0031	10.3	8.4	6.7
Open Lake Mean					21.3	8.4	140	8.4	9.0	1.4	76.6	0.035	0.015	0.068	0.083	0.0011	0.0069	13.7	28.5	31.3
95% CI					0.6	0.2	2	0.04	0.7	0.3	1.3	0.004	0.003	0.018	0.017	0.0002	0.0013	1.8	2.1	4.5
s					1.2	0.4	4	0.1	1.3	0.5	2.6	0.009	0.006	0.035	0.034	0.0004	0.0025	3.6	2.4	5.1
Developed Sites Mean					19.3	8.4	137	8.3	7.7	1.5	76.5	0.040	0.019	0.071	0.108	0.0011	0.0076	16.1	32.2	32.8
95% CI					0.4	0.1	2	0.04	1.1	0.2	0.9	0.009	0.002	0.013	0.022	0.0002	0.0012	2.7	6.5	4.2
s					1.0	0.4	6	0.1	2.8	0.4	2.2	0.022	0.005	0.032	0.056	0.0004	0.0031	6.6	8.8	5.7
Moderately Developed Sites Mean					21.8	8.2	141	8.3	8.8	1.5	98.2	0.038	0.013	0.059	0.072	0.0007	0.0054	22.7	29.0	27.4
95% CI					10.0	0.2	2	0.1	1.3	0.3	26.5	0.005	0.005	0.011	0.007	0.0002	0.0016	8.9	3.2	6.6
s					0.6	0.4	3	0.1	2.0	0.4	40.5	0.008	0.008	0.017	0.011	0.0002	0.0025	13.7	3.3	6.7
Undeveloped Sites Mean					21.1	8.1	139	8.3	9.7	1.6	77.5	0.040	0.017	0.055	0.072	0.0014	0.0048	15.4	27.2	26.6
95% CI					1.8	0.4	3	0.01	0.4	0.7	0.6	0.007	0.001	-	0.001	0.0004	0.0003	0.4	1.0	1.5
s					2.2	0.5	4	0.02	0.5	0.8	0.7	0.009	0.001	0.000	0.001	0.0005	0.0004	0.5	0.7	1.1
2003 Overall Lake Mean					20.7	8.6	143.6	8.6	9.0	0.0	77.3	0.005	0.005	0.500	0.505	0.0016	0.0063	110.7	29.4	29.0
1989-90 Overall Lake Mean					21.2	8.3	139	8.3	8.4	1.5	83.3	0.039	0.017	0.065	0.092	0.0010	0.0065	18.1	30.4	30.1
95% CI					0.3	0.1	1	0.03	0.7	0.1	7.2	0.005	0.002	0.008	0.014	0.0001	0.0009	2.8	3.7	3.3
s					1.1	0.4	5	0.1	2.3	0.4	22.8	0.016	0.006	0.025	0.044	0.0004	0.0028	8.9	6.7	6.0

Table 3. Periphyton composition frequency and percent biovolume on natural substrates, Lake Pend Oreille littoral, August, 2003.

Site	Genus Biovolume	Spr	Spr	Spr	Spr Mean	Spr Mean	Koo	Koo	Koo	Koo Mean	Koo Mean	Sun	Sun	Sun	Sun Mean	Sun Mean	Bot	Bot	Bot	Bot Mean	Bot Mean
Sample	cu microns	2 C	2E	2A	Count	Biovol	2E	2D	2F	Count	Biovol	2B	2A	2G	Count	Biovol	2B	2C	2A	Count	Biovol
Achnanthes	1200											34			34	40800	6	9	1	5	6400
Amphora	700																				
Anabaena	50																				
Anacystis	30																				
Asterionella	900		2		2	1800															
Cladophora	100000												8		8	800000					
Coconeis	1400																				
Cosmarium	80																				
Cymatopleura	3000	1			1	3000												1		1	3000
Cymbella	22000	4	1	4	3	66000	5	1	3	3	66000	37	17	61	38	843333	47	18		33	715000
Desmidium	2500																				
Diatoma	560	11	5	9	8	4667	14	14	8	12	6720	46	12	41	33	18480					
Epithemia	6000																	5		5	30000
Eunotia	5000	3	4	37	15	73333	40	37	66	48	238333							23	3	13	65000
Fragilaria	880		14		14	12320	30	22		26	22880							8		8	7040
Gomontia	700																				
Gyrosigma	3000																				
Gomphonema	2500	2	3	3	3	6667	5	4	7	5	13333	120		10	65	162500	2	18		10	25000
Lyngbya	30																				
Melosira	3000																	20		20	60000
Merideon	8000																				
Microspora	2500																				
Mougeotia	195000		10	29	20	3802500		7		7	1365000		11		11	2145000					
Navicula	1200	4	14	1	6	7600	2		2	2	2400	17	26	31	25	29600	27	51	61	46	55600
Nitschia	1500																				
Nostoc	60																				
Oedegonium	140000		30	37	34	4690000	13		29	21	2940000										
Oscillatoria	20																270	80		175	3500
Pediastrum	2000								8	8	16000										
Pinnularia	60000	12	47	28	29	1740000	21	10	19	17	60000	4	11	14	10	580000		39	2	21	1230000
Rhicosphenia	60000																				
Rhizonclonium	140000							7		7	980000		130	26	78	10920000					
Rhopalodia	3000						1		2	2	4500	4	21	43	23	68000	21	37		29	87000
Rivularia	20	70	180	50	100	2000	400	300	165	288	5767	4000	4000		4000	80000			1800	1800	36000
Spirogyra	150000		2		2	300000						12			12	1800000					
Stauroneis	7000																				
Surirella	12000																				
Synedra	1100	7	3		5	5500	2	4	4	3	3667	15	14	24	18	19433	9	4		7	7150
Tabellaria	3000																				
Ulothirx	140000																				
Zygnema	62000											22			22	1364000					
Total Count		**114**	**315**	**198**	**209**		**533**	**406**	**313**	**417**		**4311**	**4250**	**250**	**2937**		**382**	**313**	**1867**	**854**	
Total Biovolume						**10715387**					**5724600**					**18871147**					**2330690**

Table 3. Periphyton composition frequency and percent biovolume on natural substrates, Lake Pend Oreille littoral, August, 2003.

Site	Genus Biovolume	Tre	Tre	Tre	Tre Mean	Tre Mean	Ell	Ell	Ell	Ell Mean	Ell Mean	War	War	War	War Mean	War Mean	Cam	Cam	Cam	Cam Mean	Cam Mean
Sample	cu microns	2B	2E	2G	Count	Biovol	2D	2G	2H	Count	Biovol	2C	2H	2E	Count	Biovol	2G	2H	2A	Count	Biovol
Achnanthes	1200	3	12	21	12	14400															
Amphora	700		4		4	2800															
Anabaena	50																				
Anacystis	30																				
Asterionella	900						1			1	900						1	2		2	1350
Cladophora	100000																8			8	800000
Coconeis	1400																				
Cosmarium	80																				
Cymatopleura	3000																				
Cymbella	22000	68	67	48	61	1342000	37	52	35	41	909333	45	6	14	22	476667	59	153	4	72	1584000
Desmidium	2500																				
Diatoma	560						2			2	1120	42	8	10	20	11200					
Epithemia	6000																	2		2	12000
Eunotia	5000	3	3		3	15000											39	60	19	39	196667
Fragilaria	880		25		25	22000							9	9	9	7920					
Gomontia	700																				
Gyrosigma	3000						1			1	3000										
Gomphonema	2500						2			2	5000	6			6	15000		11		11	27500
Lyngbya	30																				
Melosira	3000		8		8	24000															
Merideon	8000																				
Microspora	2500																				
Mougeotia	195000	44	48	42	45	8710000		10	10	10	1950000	68	111	109	96	18720000	107	63	115	95	18525000
Navicula	1200		23	11	17	20400	58	14	68	47	56000						13	3		8	9600
Nitschia	1500																	2		2	3000
Nostoc	60	12			12	720															
Oedegonium	140000	8			8	1120000							51	45	48	6720000					
Oscillatoria	20	77			77	1540		220		220	4400										
Pediastrum	2000		40		40	80000															
Pinnularia	60000		10	11	11	630000	7	8	7	7	440000							2		2	120000
Rhicosphenia	60000						2			2	120000										
Rhizonclonium	140000																16	2		9	1260000
Rhopalodia	3000		15	17	16	48000	12		21	17	49500						9	14	5	9	28000
Rivularia	20			120	120	2400	54		800	427	8540										
Spirogyra	150000		24		24	3600000			10	10	1500000	39	53	31	41	6150000	154	12	149	105	15750000
Stauroneis	7000																				
Surirella	12000																				
Synedra	1100	5			5	5500	5	3	5	4	4767							12		12	13200
Tabellaria	3000																				
Ulothirx	140000																55	6	37	33	4573333
Zygnema	62000	15			15	930000							17	25	21	1302000	6			6	372000
Total Count		**235**	**279**	**270**	**261**		**181**	**307**	**956**	**481**		**200**	**255**	**243**	**233**		**467**	**344**	**329**	**380**	
Total Biovolum						**16568760**					**5052560**					**33402787**					**43275650**

Table 3. Periphyton composition frequency and percent biovolume on natural substrates, Lake Pend Oreille littoral, August, 2003.

Site	Genus Biovolume	Gar	Gar	Gar	Gar Mean	Gar Mean	Tal	Tal	Tal	Tal Mean	Tal Mean	Gra	Gra	Gra	Gra Mean	Gra Mean	Lak	Lak	Lak	Lak Mean	Lak Mean
Sample	cu microns	2D	2E	2B	Count	Biovol	2D	2E	2B	Count	Biovol	2G	2B	2D	Count	Biovol	2A	2I	2C	Count	Biovol
Achnanthes	1200			5	5	6000			2	2	2400	7	1		4	4800					
Amphora	700																				
Anabaena	50																				
Anacystis	30																				
Asterionella	900			3	3	2700												3		3	2700
Cladophora	100000																				
Coconeis	1400							1		1	1400										
Cosmarium	80												5		5	400					
Cymatopleura	3000													1	1	3000					
Cymbella	22000	6	9	7	7	161333	5	2	1	3	58667	31	9		20	440000	1	4	9	5	102667
Desmidium	2500																				
Diatoma	560		8		8	4480		3	2	3	1400			19	19	10640		31	23	27	15120
Epithemia	6000																				
Eunotia	5000		14	6	10	50000						2	3		3	12500	4	21	41	22	110000
Fragilaria	880																16		10	13	11440
Gomontia	700																				
Gyrosigma	3000																				
Gomphonema	2500						1			1	2500						1	5	16	7	18333
Lyngbya	30											54			54	1620					
Melosira	3000																				
Merideon	8000											3			3	24000					
Microspora	2500																				
Mougeotia	195000		4	14	9	1755000	6	10	6	7	1430000	106		25	66	12772500	133	73	93	100	19435000
Navicula	1200	23	36	12	24	28400	2	4	45	17	20400		3		3	3600	5	2	7	5	5600
Nitschia	1500							4	17	11	15750										
Nostoc	60		2400		2400	144000															
Oedegonium	140000								5	5	700000	7			7	980000	42	68	15	42	5833333
Oscillatoria	20																				
Pediastrum	2000			80	80	160000						18			18	36000					
Pinnularia	60000	5	5	4	5	280000							1	25	13	780000		1	9	5	300000
Rhicosphenia	60000																				
Rhizonclonium	140000													8	8	1120000					
Rhopalodia	3000	1			1	3000						1	2	3	2	6000			1	1	3000
Rivularia	20	1100	2500	5100	2900	58000							1600	3000	2300	46000	60		100	80	1600
Spirogyra	150000											31	3		17	2550000					
Stauroneis	7000																				
Surirella	12000		1		1	12000		1		1	12000										
Synedra	1100		6	11	9	9350	3		15	9	9900							5	6	6	6050
Tabellaria	3000							2		2	6000										
Ulothirx	140000																				
Zygnema	62000						60		98	79	4898000	99		13	56	3472000	48	38	29	38	2376667
Total Count		**1135**	**4983**	**5242**	**3787**		**77**	**27**	**191**	**98**		**359**	**1627**	**3094**	**1693**		310	251	359	307	
Total Biovolum						**2674263**					**7158417**					**22263060**					**28221510**

Table 3. Periphyton composition frequency and percent biovolume on natural substrates, Lake Pend Oreille littoral, August, 2003.

Site / Sample	Genus Biovolume cu microns	Bay 2E	Bay 2H	Bay 2C	Bay Mean Count	Bay Mean Biovol	Lakewide Mean Count	Lakewide Mean Biovol
Achnanthes	1200						10	12467
Amphora	700						4	2800
Anabaena	50							
Anacystis	30							
Asterionella	900			1	1	900	2	1491
Cladophora	100000						8	800000
Coconeis	1400						1	1400
Cosmarium	80						5	400
Cymatopleura	3000						1	3000
Cymbella	22000	7	11	6	8	176000	23	495786
Desmidium	2500							
Diatoma	560	14	21	9	15	8213	15	7458
Epithemia	6000						4	14000
Eunotia	5000	58	41	39	46	230000	22	110093
Fragilaria	880	1	3	5	3	2640	12	12320
Gomontia	700							
Gyrosigma	3000						1	3000
Gomphonema	2500	12	9	4	8	20833	13	29667
Lyngbya	30						54	1620
Melosira	3000						14	42000
Merideon	8000						3	24000
Microspora	2500							
Mougeotia	195000	14	18	16	16	3120000	40	7810833
Navicula	1200	13	9	15	12	14800	18	21167
Nitschia	1500						6	9375
Nostoc	60						6	72360
Oedegonium	140000		3		3	420000	21	2600370
Oscillatoria	20						157	3147
Pediastrum	2000						37	73000
Pinnularia	60000	2	4	3	3	180000	11	576364
Rhicosphenia	60000							
Rhizonclonium	140000						26	3570000
Rhopalodia	3000	3	3	5	4	11000	10	30800
Rivularia	20	1400	900	140	813	16267	1283	25657
Spirogyra	150000						30	4521429
Stauroneis	7000							
Surirella	12000						1	12000
Synedra	1100	2	1		2	1650	7	7833
Tabellaria	3000						2	6000
Ulothirx	140000						33	4573333
Zygnema	62000						34	2102095
Total Count		1526	1023	243	**931**		**1913**	
Total Biovolum						**4202303**		**27577265**

Table 4. Periphyton composition frequency and percent biovolume on artificial substrates, Lake Pend Oreille littoral, August, 2003.

Site	Genus Biovolume	Spr	Spr	Spr	Spr Mean	Spr Mean	Koo	Koo	Koo	Koo Mean	Koo Mean	Sun	Sun	Sun	Sun Mean	Sun Mean	Bot	Bot	Bot	Bot Mean	Bot Mean
Sample	cubic microns	2D	2E	2F	Count	Biovol	2A	2G	2D	Count	Biovol	2F	2E	2C	Count	Biovol	2E	2F	2D	Count	Biovol
Achnanthes	1200																				
Amphora	700						4	9	3	5	3733										
Anabaena	50																	8		8	400
Anacystis	30																				
Asterionella	900		2	1	2	1350															
Cladophora	100000																				
Coconeis	1400																				
Cosmarium	80																				
Cymatopleura	3000																		1	1	3000
Cymbella	22000		3	1	2	44000	2	6	13	7	154000	20	14	19	18	388667	11	19	12	14	308000
Desmidium	2500							44	41	43	106250								10	10	25000
Diatoma	560	2		1	2	840	3	5	9	6	3173	8	18	6	11	5973	5			5	2800
Epithemia	6000																				
Eunotia	5000	9	17	15	14	68333			6	6	30000	4	21	12	12	61667					
Fragilaria	880	9		20	15	12760			3	3	2640	25		13	19	16720					
Gomontia	700																				
Gomphonema	2500	19	4	4	9	22500		1	2	2	3750	3	10	16	10	24167	1			1	2500
Gyrosigma	3000																				
Melosira	3000																				
Merideon	8000																				
Microspora	2500																				
Mougeotia	195000						15		2	9	1657500	12	19	22	18	3445000	1			1	195000
Navicula	1200	37	29	30	32	38400	2	9		6	6600	10	5	13	9	11200	6		5	6	6600
Nitschia	1500																				
Nostoc	60																				
Oedegonium	140000	18	21	10	16	2286667						33	25	54	37	5226667					
Oscillatoria	20																				
Pediastrum	2000																				
Pinnularia	60000	50	38	59	49	2940000		1	4	3	150000	7	11	12	10	600000	1			1	60000
Rhicosphenia	60000								1	1	60000						2			2	120000
Rhizonclonium	140000																		12	12	1680000
Rhopalodia	3000	2		2	2	6000	3	19	9	10	31000	1	5		3	9000	7	6	6	6	19000
Rivularia	20	220	210	250	227	4533							420	220	320	6400					
Spirogyra	150000											35	37	20	31	4600000					
Stauroneis	7000																1			1	7000
Surirella	12000																				
Synedra	1100	15	4	5	8	8800						31	12	18	20	22367	1			1	1100
Tabellaria	3000																2	2		2	6000
Ulothirx	140000																				
Zygnema	62000											17	50	30	32	2004667					
Total Count		381	328	398	369		29	94	93	72		206	647	455	436		38	35	46	40	
Total Biovolume						5434183					2208647					16422493					2436400

Table 4. Periphyton composition frequency and percent biovolume on artificial substrates, Lake Pend Oreille littoral, August, 2003.

Site	Genus Biovolume	Tre	Tre	Tre	Tre Mean	Tre Mean	Ell	Ell	Ell	Ell Mean	Ell Mean	War	War	War	War Mean	War Mean	Cam	Cam	Cam	Cam Mean	Cam Mean
Sample	cubic microns	2D	2F	2A	Count	Biovol	2D	2H	2A	Count	Biovol	2B	2G	2D	Count	Biovol	2C	2D	2B	Count	Biovol
Achnanthes	1200																				
Amphora	700																				
Anabaena	50																				
Anacystis	30																				
Asterionella	900																				
Cladophora	100000																				
Coconeis	1400																1	1	1	1	1400
Cosmarium	80																				
Cymatopleura	3000																				
Cymbella	22000	21	230	75	109	2390667	20	37	17	25	542667	8	5	4	6	124667	9	3	4	5	117333
Desmidium	2500		68	4	36	90000															
Diatoma	560						5	12	6	8	4293	8	4	3	5	2800		2	8	5	2800
Epithemia	6000																				
Eunotia	5000		1	2	2	7500											3	3	4	3	16667
Fragilaria	880	13	3		8	7040															
Gomontia	700																				
Gomphonema	2500						2	7	2	4	9167	1			1	2500	2	1	1	1	3333
Gyrosigma	3000																				
Melosira	3000		15		15	45000															
Merideon	8000						5	12	2	6	50667										
Microspora	2500		15	48	32	78750															
Mougeotia	195000	45	13		29	5655000						72	108	142	107	20930000	302	247	315	288	56160000
Navicula	1200	17	15	12	15	17600	7	60	20	29	34800	2			2	2400					
Nitschia	1500																				
Nostoc	60																				
Oedegonium	140000																				
Oscillatoria	20																				
Pediastrum	2000																				
Pinnularia	60000	5	10	4	6	380000	12	33	2	16	940000										
Rhicosphenia	60000																				
Rhizonclonium	140000		60	98	79	11060000						6	12		9	1260000	5		15	10	1400000
Rhopalodia	3000	24	45	35	35	104000	9	24	15	16	48000							2		2	6000
Rivularia	20																				
Spirogyra	150000	23	4	4	10	1550000						6	4	72	27	218667	21	30	110	54	8050000
Stauroneis	7000																				
Surirella	12000											2		2	2	24000					
Synedra	1100	5	12	3	7	7333	1	5		3	3300	14	40	105	53	58300	8	11	19	13	13933
Tabellaria	3000	2			2	6000											2			2	6000
Ulothirx	140000																				
Zygnema	62000	58	16	65	46	2872667		3		3	186000	91	162	92	115	7130000	12			12	744000
Total Count		**213**	**507**	**350**	**357**		**61**	**193**	**64**	**106**		**210**	**335**	**420**	**322**		**365**	**300**	**477**	**381**	
Total Biovolume						**24271557**					**1818893**					**29753333**					**66521467**

Table 4. Periphyton composition frequency and percent biovolume on artificial substrates, Lake Pend Oreille littoral, August, 2003.

Site	Genus	Gar	Gar	Gar	Gar	Gar	Tal	Tal	Tal	Tal	Tal	Gra	Gra	Gra	Gra	Gra	Lak	Lak	Lak	Lak	Lak
Sample	Biovolume cubic microns	2D	2H	2A	Mean Count	Mean Biovol				Mean Count	Mean Biovol	2F	2C	2H	Mean Count	Mean Biovol	2H	2G	2D	Mean Count	Mean Biovol
Achnanthes	1200	28	6		17	20400															
Amphora	700											1			1	700					
Anabaena	50																				
Anacystis	30																				
Asterionella	900																				
Cladophora	100000	15	10	40	22	2166667															
Coconeis	1400																				
Cosmarium	80																				
Cymatopleura	3000											1			1	3000					
Cymbella	22000	7	3	1	4	80667						3	20		12	253000	3	1		2	44000
Desmidium	2500																				
Diatoma	560	7	10	1	6	3360						2			2	1120		1		1	560
Epithemia	6000																				
Eunotia	5000	2			2	10000															
Fragilaria	880	4			4	3520							13		13	11440					
Gomontia	700																				
Gomphonema	2500	1	2		2	3750															
Gyrosigma	3000																				
Melosira	3000	4	18		11	33000															
Merideon	8000	2			2	16000															
Microspora	2500																				
Mougeotia	195000	535	117	81	244	47645000						3	22		13	2437500	235	155	155	182	35425000
Navicula	1200	60	90	3	51	61200												2	2	2	2400
Nitschia	1500																				
Nostoc	60																				
Oedegonium	140000	28	10		19	2660000											25	12		19	2660000
Oscillatoria	20																				
Pediastrum	2000																				
Pinnularia	60000											3			3	180000	2	2	9	4	260000
Rhicosphenia	60000																				
Rhizonclonium	140000																				
Rhopalodia	3000	41	50	1	31	92000						1			1	3000					
Rivularia	20																				
Spirogyra	150000	180	24		102	15300000							20		20	3000000	240	27		134	20025000
Stauroneis	7000																				
Surirella	12000																				
Synedra	1100	20	2	1	8	8433							8		8	8800	14	12	18	15	16133
Tabellaria	3000	14			14	42000															
Ulothirx	140000	30	30		30	4200000															
Zygnema	62000	518	52	30	200	12400000						45	42		44	2697000	340	268	160	256	15872000
Total Count		**1496**	**424**	**158**	**693**							**59**	**125**		**92**		859	480	344	561	
Total Biovolume						**84745997**										**8595560**					**74305093**

Table 4. Periphyton composition frequency and percent biovolume on artificial substrates, Lake Pend Oreille littoral, August, 2003.

Site / Sample	Genus Biovolume cubic microns	Bay 2C	Bay 2B	Bay 2F	Bay Mean Count	Bay Mean Biovol	Lakewide Mean Count	Lakewide Mean Biovol
Achnanthes	1200						17	20400
Amphora	700	3	2	14	6	4433	4	2956
Anabaena	50						8	400
Anacystis	30			40	40	1200	40	1200
Asterionella	900	4			4	3600	3	2475
Cladophora	100000						22	2166667
Coconeis	1400	1		2	2	2100	1	1750
Cosmarium	80							
Cymatopleura	3000						1	3000
Cymbella	22000	4	22	17	14	315333	18	396917
Desmidium	2500	31			31	77500	30	74688
Diatoma	560	2	4	10	5	2987	5	2792
Epithemia	6000							
Eunotia	5000	14			14	70000	8	37738
Fragilaria	880	10	8	21	13	11440	11	10340
Gomontia	700							
Gomphonema	2500	2			2	5000	3	8519
Gyrosigma	3000							
Melosira	3000						13	39000
Merideon	8000	1			1	8000	3	24889
Microspora	2500						32	78750
Mougeotia	195000	38	21		30	5752500	84	17930250
Navicula	1200	39	56	55	50	60000	20	24120
Nitschia	1500							
Nostoc	60							
Oedegonium	140000						23	3208333
Oscillatoria	20	2	10		6	120	6	120
Pediastrum	2000			30	30	60000	30	60000
Pinnularia	60000	20	8	14	14	840000	12	705556
Rhicosphenia	60000		6	5	6	330000	3	170000
Rhizonclonium	140000						28	3850000
Rhopalodia	3000	44	49	42	45	135000	17	45300
Rivularia	20						273	5467
Spirogyra	150000						54	7534810
Stauroneis	7000		1	2	2	10500	1	8750
Surirella	12000							
Synedra	1100	15	7	7	10	918	13	13583
Tabellaria	3000						5	15000
Ulothirx	140000						30	4200000
Zygnema	62000	12			12	744000	80	4961148
Total Count		242	194	259	**232**		**897**	
Total Biovolume						**8434632**		**45604915**

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Springy Point	SPR	North	Dev	Bay	8/6/03	1415	mean	6.8	1.2	4.3	632
Springy Point							s	4.6			
Springy Point							RSD%	67.0			
Springy Point							se	1.6			
Springy Point							n	8.0			
Springy Point							se/mean	0.2			
Springy Point					9/3/03	1620	mean	5.9	1.1	7.9	1342
Springy Point							s	2.6			
Springy Point							RSD%	44.0			
Springy Point							se	0.9			
Springy Point							n	8.0			
Springy Point							se/mean	0.2			
Springy Point					######	1000	mean	5.9	1.9	11.3	1915
Springy Point							s	3.3			
Springy Point							RSD%	56.0			
Springy Point							se	1.2			
Springy Point							n	8.0			
Springy Point							se/mean	0.2			
Springy Point							+/- 95% CL	0.2	0.2	1.4	257
Springy Point							s	0.5	0.4	3.5	643
Springy Point							Site mean	6.2	1.4	7.8	1297
Kootenai Bay	KOO	North	Dev	Bay	8/6/03	1215	mean	9.1	2.6	6.9	758
Kootenai Bay							s	8.6			
Kootenai Bay							RSD%	94.0			
Kootenai Bay							se	2.9			
Kootenai Bay							n	9.0			
Kootenai Bay							se/mean	0.3			
Kootenai Bay					9/3/03	1440	mean	6.7	4.5	7.6	1139
Kootenai Bay							s	3.2			
Kootenai Bay							RSD%	49.0			
Kootenai Bay							se	1.2			
Kootenai Bay							n	8.0			
Kootenai Bay							se/mean	0.2			
Kootenai Bay					######	1700	mean	3.4	2.9	10.1	2968
Kootenai Bay							s	1.6			
Kootenai Bay							RSD%	45.0			
Kootenai Bay							se	0.7			
Kootenai Bay							n	5.0			
Kootenai Bay							se/mean	0.2			
Kootenai Bay							+/- 95% CL	1.2	0.4	0.7	494
Kootenai Bay							s	2.9	1.0	1.7	1181
Kootenai Bay							Site mean	6.4	3.3	8.2	1622

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Sunnyside	SUN	North	Mod	Open	8/5/03	1700	mean	3.3	1.1	3.9	1182
Sunnyside							s	3.5			
Sunnyside							RSD%	107.0			
Sunnyside							se	1.3			
Sunnyside							n	7.0			
Sunnyside							se/mean	0.4			
Sunnyside					9/3/03	1215	mean	5.2	1.3	5.4	1031
Sunnyside							s	3.2			
Sunnyside							RSD%	61.0			
Sunnyside							se	1.1			
Sunnyside							n	8.0			
Sunnyside							se/mean	0.2			
Sunnyside					######	1515	mean	2.1	2.4	8.4	3981
Sunnyside							s	2.2			
Sunnyside							RSD%	100.0			
Sunnyside							se	0.8			
Sunnyside							n	7.0			
Sunnyside							se/mean	0.4			
Sunnyside							+/- 95% CL	0.7	0.3	1.0	694
Sunnyside							s	1.6	0.7	2.3	1661
Sunnyside							Site mean	3.5	1.6	5.9	2065
Bottle Bay	BOT	North	Dev	Bay	8/6/03	1100	mean	4.7	0.5	4.7	1000
Bottle Bay							s	4.6			
Bottle Bay							RSD%	100.0			
Bottle Bay							se	1.6			
Bottle Bay							n	8.0			
Bottle Bay							se/mean	0.4			
Bottle Bay					9/3/03	1030	mean	5.7	1.4	5.0	884
Bottle Bay							s	4.1			
Bottle Bay							RSD%	73.0			
Bottle Bay							se	1.5			
Bottle Bay							n	8.0			
Bottle Bay							se/mean	0.3			
Bottle Bay					######	1200	mean	1.8	1.0	5.1	2806
Bottle Bay							s	1.1			
Bottle Bay							RSD%	62.0			
Bottle Bay							se	0.4			
Bottle Bay							n	8.0			
Bottle Bay							se/mean	0.2			
Bottle Bay							+/- 95% CL	0.8	0.2	0.1	431
Bottle Bay							s	2.0	0.5	0.2	1077
Bottle Bay							Site mean	4.1	1.0	4.9	1563

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Trestle Creek	TRE	North	Dev	Open	8/5/03	1545	mean	1.5	0.6	2.1	1400
Trestle Creek							s	1.4			
Trestle Creek							RSD%	94.0			
Trestle Creek							se	0.5			
Trestle Creek							n	8.0			
Trestle Creek							se/mean	0.3			
Trestle Creek					9/4/03	1420	mean	2.5	1.3	1.2	484
Trestle Creek							s	3.1			
Trestle Creek							RSD%	125.0			
Trestle Creek							se	1.1			
Trestle Creek							n	8.0			
Trestle Creek							se/mean	0.4			
Trestle Creek					######	1130	mean	5.6	17.2	3.3	596
Trestle Creek							s	3.9			
Trestle Creek							RSD%	71.0			
Trestle Creek							se	1.5			
Trestle Creek							n	7.0			
Trestle Creek							se/mean	0.3			
Trestle Creek							+/- 95% CL	0.9	3.8	0.4	204
Trestle Creek							s	2.1	9.4	1.1	500
Trestle Creek							Site mean	3.2	6.4	2.2	827
Ellisport Bay	ELL	North	Dev	Bay	8/5/03	1400	mean	14.2	3.2	19.4	1366
Ellisport Bay							s	8.6			
Ellisport Bay							RSD%	60.0			
Ellisport Bay							se	3.0			
Ellisport Bay							n	8.0			
Ellisport Bay							se/mean	0.2			
Ellisport Bay					9/4/03	1330	mean	5.6	1.5	5.4	975
Ellisport Bay							s	2.1			
Ellisport Bay							RSD%	39.0			
Ellisport Bay							se	0.8			
Ellisport Bay							n	8.0			
Ellisport Bay							se/mean	0.1			
Ellisport Bay					######	1500	mean	6.1	1.7	4.9	808
Ellisport Bay							s	2.9			
Ellisport Bay							RSD%	48.0			
Ellisport Bay							se	1.0			
Ellisport Bay							n	8.0			
Ellisport Bay							se/mean	0.2			
Ellisport Bay							+/- 95% CL	1.9	0.4	3.3	115
Ellisport Bay							s	4.8	0.9	8.2	286
Ellisport Bay							Site mean	8.6	2.1	9.9	1050

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Warren Island	WAR	Mid	Mod	Open	8/5/03	1240	mean	2.9	1.2	1.6	552
Warren Island							s	1.4			
Warren Island							RSD%	49.0			
Warren Island							se	0.5			
Warren Island							n	8.0			
Warren Island							se/mean	0.2			
Warren Island					9/4/03	1500	mean	1.3	1.0	1.1	877
Warren Island							s	1.1			
Warren Island							RSD%	81.0			
Warren Island							se	0.4			
Warren Island							n	7.0			
Warren Island							se/mean	0.3			
Warren Island					######	1340	mean	1.6	1.4	0.6	375
Warren Island							s	0.9			
Warren Island							RSD%	54.0			
Warren Island							se	0.3			
Warren Island							n	8.0			
Warren Island							se/mean	0.2			
Warren Island							+/- 95% CL	0.3	0.1	0.2	104
Warren Island							s	0.9	0.2	0.5	255
Warren Island							Site mean	1.9	1.2	1.1	601
Camp Bay	CAM	Mid	Mod	Bay	8/5/03	1130	mean	6.8	2.3	5.1	750
Camp Bay							s	2.8			
Camp Bay							RSD%	41.0			
Camp Bay							se	1.1			
Camp Bay							n	7.0			
Camp Bay							se/mean	0.2			
Camp Bay					9/4/03	1135	mean	1.7	1.2	1.2	688
Camp Bay							s	1.0			
Camp Bay							RSD%	55.0			
Camp Bay							se	0.3			
Camp Bay							n	8.0			
Camp Bay							se/mean	0.2			
Camp Bay					######	1400	mean	3.6	5.4	4.4	1211
Camp Bay							s	2.5			
Camp Bay							RSD%	70.0			
Camp Bay							se	0.9			
Camp Bay							n	8.0			
Camp Bay							se/mean	0.3			
Camp Bay							+/- 95% CL	1.1	0.9	0.9	117
Camp Bay							s	2.6	2.2	2.1	286
Camp Bay							Site mean	4.0	3.0	3.5	883

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Garfield Bay	GAR	Mid	Dev	Bay	8/4/03	1345	mean	4.1	1.8	5.3	1293
Garfield Bay							s	2.9			
Garfield Bay							RSD%	70.0			
Garfield Bay							se	1.1			
Garfield Bay							n	7.0			
Garfield Bay							se/mean	0.3			
Garfield Bay					9/1/03	1045	mean	11.4	3.9	14.1	1238
Garfield Bay							s	7.6			
Garfield Bay							RSD%	67.0			
Garfield Bay							se	2.7			
Garfield Bay							n	8.0			
Garfield Bay							se/mean	0.2			
Garfield Bay					######	1215	mean	10.3	4.6	15.1	1470
Garfield Bay							s	4.7			
Garfield Bay							RSD%	45.0			
Garfield Bay							se	1.6			
Garfield Bay							n	8.0			
Garfield Bay							se/mean	0.2			
Garfield Bay							+/- 95% CL	1.6	0.6	2.2	50
Garfield Bay							s	3.9	1.5	5.4	121
Garfield Bay							Site mean	8.6	3.4	11.5	1333
Talache	TAL	Mid	Undev	Open	8/4/03	1530	mean	0.7	0.2	0.8	1143
Talache							s	0.4			
Talache							RSD%	66.0			
Talache							se	0.2			
Talache							n	6.0			
Talache							se/mean	0.3			
Talache					9/1/03	1330	mean	0.4	0.3	0.2	410
Talache							s	0.3			
Talache							RSD%	68.0			
Talache							se	0.1			
Talache							n	8.0			
Talache							se/mean	0.2			
Talache					######	1320	mean	5.9	1.5	5.1	871
Talache							s	2.2			
Talache							RSD%	36.0			
Talache							se	0.8			
Talache							n	8.0			
Talache							se/mean	0.1			
Talache							+/- 95% CL	1.3	0.3	1.1	155
Talache							s	3.1	0.7	2.7	370
Talache							Site mean	2.3	0.67	2.0	808

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Granite Point	GRA	Mid	Mod	Bay	8/4/03	1030	mean	1.0	0.6	1.2	1200
Granite Point							s	0.9			
Granite Point							RSD	82.0			
Granite Point							se	0.3			
Granite Point							n	8.0			
Granite Point							se/mean	0.3			
Granite Point					9/1/03	1450	mean	2.9	2.1	2.7	934
Granite Point							s	3.7			
Granite Point							RSD	127.0			
Granite Point							se	1.3			
Granite Point							n	8.0			
Granite Point							se/mean	0.5			
Granite Point					######	1430	mean	1.7	1.4	2.6	1524
Granite Point							s	1.8			
Granite Point							RSD	106.0			
Granite Point							se	0.6			
Granite Point							n	8.0			
Granite Point							se/mean	0.4			
Granite Point							+/- 95% CL	0.4	0.3	0.3	118
Granite Point							s	1.0	0.8	0.8	295
Granite Point							Site mean	1.9	1.4	2.2	1219
Lakeview	LAK	South	Undev	Open	8/4/03	1700	mean	1.0	0.5	1.2	1200
Lakeview							s	0.5			
Lakeview							RSD	53.0			
Lakeview							se	0.2			
Lakeview							n	7.0			
Lakeview							se/mean	20.0			
Lakeview					9/1/03	1715	mean	2.3	1.0	1.7	730
Lakeview							s	0.6			
Lakeview							RSD	25.0			
Lakeview							se	0.2			
Lakeview							n	8.0			
Lakeview							se/mean	0.1			
Lakeview					######	1530	mean	2.3	0.6	1.3	583
Lakeview							s	0.8			
Lakeview							RSD	35.0			
Lakeview							se	0.3			
Lakeview							n	8.0			
Lakeview							se/mean	0.1			
Lakeview							+/- 95% CL	0.3	0.1	0.1	132
Lakeview							s	0.8	0.3	0.2	322
Lakeview							Site mean	1.9	0.69	1.4	838

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Bayview	BAY	South	Dev	Bay	8/4/03	1815	mean	2.8	2.1	3.9	1393
Bayview							s	2.3			
Bayview							RSD%	83.0			
Bayview							se	0.8			
Bayview							n	8.0			
Bayview							se/mean	0.3			
Bayview					9/1/03	1000	mean	6.9	2.4	10.1	1465
Bayview							s	4.7			
Bayview							RSD%	68.0			
Bayview							se	1.8			
Bayview							n	7.0			
Bayview							se/mean	0.3			
Bayview					######	1000	mean	2.0	2.3	3.0	1510
Bayview							s	1.4			
Bayview							RSD%	68.0			
Bayview							se	0.5			
Bayview							n	7.0			
Bayview							se/mean	0.3			
Bayview							+/- 95% CL	1.1	0.1	1.6	25
Bayview							s	2.6	0.2	3.9	59
Bayview							Site mean	3.9	2.3	5.7	1456

Table 5. Littoral zone periphyton on natural substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Date	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
							North Lake Mean	5.3	2.6	6.5	1404
							+/- 95% CL	0.3	0.3	0.5	74
							s	2.1	2.0	2.7	443
							Mid Lake Mean	3.8	1.9	4.1	969
							+/- 95% CL	0.5	0.2	0.8	55
							s	2.8	1.2	4.2	302
							South Lake Mean	2.9	1.5	3.5	1147
							+/- 95% CL	0.4	0.3	0.9	128
							s	1.4	1.1	3.0	437
							Embayment Mean	5.5	2.2	6.7	1303
							+/- 95% CL	0.3	0.1	0.5	36
							s	2.4	0.9	3.2	251
							Open Lake Mean	2.6	2.1	2.5	1028
							+/- 95% CL	0.1	0.4	0.4	108
							s	0.8	2.4	1.9	588
							Developed Sites Mean	5.9	2.8	7.2	1307
							+/- 95% CL	0.3	0.3	0.5	44
							s	2.2	1.8	3.2	284
							Moderately Developed Sites Mean	2.8	1.8	3.2	1192
							+/- 95% CL	0.2	0.2	0.4	130
							s	1.1	0.8	2.1	634
							Undeveloped Sites Mean	2.1	0.7	1.7	823
							+/- 95% CL	0.1	0.005	0.1	6
							s	0.3	0.016	0.4	21
					2003	Overall	Lake Mean	4.3	2.2	5.1	1197
							+/- 95% CL	1.3	0.9	1.9	225
							s	2.4	1.6	3.4	414
					August, 1986	Overall	Lake Mean	18.3			
					August-Sept. 1989	Overall	Lake Mean	15.2			
					August-Sept. 1990	Overall	Lake Mean	3.7			
					2003	Overall	Lake Mean	4.3			

Table 6. Littoral zone periphyton on artificial substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Sample Date / Period	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Springy Point	SPR	North	Dev	Bay	**9/3/03**	**1620**	**mean**	**1.4**	**0.4**	**1.32**	**943**
Springy Point					(August)		s	0.6			
Springy Point							RSD%	43.0			
Springy Point							se	0.2			
Springy Point							n	8.0			
Springy Point							se/mean	0.2			
Springy Point					**10/1/03**	**1000**	**mean**	**1.9**	**0.5**	**2.75**	**1447**
Springy Point					(September)		s	0.9			
Springy Point							RSD%	47.0			
Springy Point							se	0.3			
Springy Point							n	8.0			
Springy Point							se/mean	0.2			
Springy Point							+/- 95% CL	0.2	0.03	0.50	175
Springy Point							s	0.4	0.07	1.01	357
Springy Point						**Site**	**mean**	**1.7**	**0.5**	**2.04**	**1195**
Kootenai Bay	KOO	North	Dev	Bay	**9/3/03**	**1440**	**mean**	**0.5**	**0.3**	**0.73**	**1460**
Kootenai Bay					(August)		s	0.3			
Kootenai Bay							RSD%	72.0			
Kootenai Bay							se	0.2			
Kootenai Bay							n	4.0			
Kootenai Bay							se/mean	0.4			
Kootenai Bay					**10/1/03**	**1700**	**mean**	**1.0**	**0.5**	**1.82**	**1820**
Kootenai Bay					(September)		s	0.3			
Kootenai Bay							RSD%	30.0			
Kootenai Bay							se	0.1			
Kootenai Bay							n	8.0			
Kootenai Bay							se/mean	0.1			
Kootenai Bay							+/- 95% CL	0.2	0.1	0.44	144
Kootenai Bay							s	0.4	0.1	0.77	255
Kootenai Bay						**Site**	**mean**	**0.8**	**0.4**	**1.28**	**1640**
Sunnyside	SUN	North	Mod	Open	**9/3/03**	**1215**	**mean**	**0.8**	**0.1**	**0.71**	**888**
Sunnyside					(August)		s	0.4			
Sunnyside							RSD%	55.0			
Sunnyside							se	0.2			
Sunnyside							n	8.0			
Sunnyside							se/mean	0.2			
Sunnyside					**10/1/03**	**1515**	**mean**	**1.0**	**0.5**	**1.62**	**1620**
Sunnyside					(September)		s	0.9			
Sunnyside							RSD%	87.0			
Sunnyside							se	0.3			
Sunnyside							n	8.0			
Sunnyside							se/mean	0.3			
Sunnyside							+/- 95% CL	0.1	0.1	0.32	254
Sunnyside							s	0.1	0.3	0.64	518
Sunnyside						**Site**	**mean**	**0.9**	**0.3**	**1.17**	**1254**

Table 6. Littoral zone periphyton on artificial substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Sample Date / Period	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Bottle Bay	BOT	North	Dev	Bay	**9/3/03**	**1030**	**mean**	**0.5**	**0.1**	**0.46**	**920**
Bottle Bay					(August)		s	0.5			
Bottle Bay							RSD%	103.0			
Bottle Bay							se	0.2			
Bottle Bay							n	6.0			
Bottle Bay							se/mean	0.4			
Bottle Bay					**10/1/03**	**1200**	**mean**	**0.3**	**0.1**	**0.60**	**2000**
Bottle Bay					(September)		s	0.1			
Bottle Bay							RSD%	33.0			
Bottle Bay							se	0.0			
Bottle Bay							n	8.0			
Bottle Bay							se/mean	0.1			
Bottle Bay							+/- 95% CL	0.1	-	0.05	400
Bottle Bay							s	0.1	0.0	0.10	764
Bottle Bay						**Site**	**mean**	**0.4**	**0.1**	**0.53**	**1460**
Trestle Creek	TRE	**North**	Dev	**Open**	**9/4/03**	**1420**	**mean**	**0.5**	**0.2**	**0.55**	**1100**
Trestle Creek					(August)		s	0.3			
Trestle Creek							RSD%	64.0			
Trestle Creek							se	0.1			
Trestle Creek							n	8.0			
Trestle Creek							se/mean	0.2			
Trestle Creek					**9/30/03**	**1130**	**mean**	**2.3**	**1.3**	**1.72**	**748**
Trestle Creek					(September)		s	1.7			
Trestle Creek							RSD%	72.0			
Trestle Creek							se	0.6			
Trestle Creek							n	8.0			
Trestle Creek							se/mean	0.3			
Trestle Creek							+/- 95% CL	0.6	0.4	0.41	122
Trestle Creek							s	1.3	0.8	0.83	249
Trestle Creek						**Site**	**mean**	**1.4**	**0.8**	**1.14**	**924**
Ellisport Bay	ELL	**North**	Dev	**Bay**	**9/4/03**	**1330**	**mean**	**2.0**	**0.7**	**2.80**	**1400**
Ellisport Bay					(August)		s	0.9			
Ellisport Bay							RSD%	46.0			
Ellisport Bay							se	0.3			
Ellisport Bay							n	8.0			
Ellisport Bay							se/mean	0.2			
Ellisport Bay					**9/30/03**	**1500**	**mean**	**3.4**	**3.1**	**4.78**	**1406**
Ellisport Bay					(September)		s	2.1			
Ellisport Bay							RSD%	64.0			
Ellisport Bay							se	0.8			
Ellisport Bay							n	8.0			
Ellisport Bay							se/mean	0.2			
Ellisport Bay							+/- 95% CL	0.5	0.8	0.69	2
Ellisport Bay							s	1.0	1.7	1.40	4
Ellisport Bay						**Site**	**mean**	**2.7**	**1.9**	**3.79**	**1403**

Table 6. Littoral zone periphyton on artificial substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Sample Date / Period	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Warren Island	WAR	Mid	Mod	Open	9/4/03	1500	mean	1.0	0.2	0.89	890
Warren Island					(August)		s	1.0			
Warren Island							RSD%	102.0			
Warren Island							se	0.4			
Warren Island							n	7.0			
Warren Island							se/mean	0.4			
Warren Island					9/30/03	1340	mean	0.8	1.4	0.38	475
Warren Island					(September)		s	0.5			
Warren Island							RSD%	60.0			
Warren Island							se	0.2			
Warren Island							n	8.0			
Warren Island							se/mean	0.2			
Warren Island							+/- 95% CL	0.1	0.4	0.18	149
Warren Island							s	0.1	0.8	0.36	293
Warren Island						Site	mean	0.9	0.8	0.64	683
Camp Bay	CAM	Mid	Mod	Bay	9/4/03	1135	mean	1.1	2.3	1.05	955
Camp Bay					(August)		s	0.3			
Camp Bay							RSD%	32.0			
Camp Bay							se	0.1			
Camp Bay							n	8.0			
Camp Bay							se/mean	0.1			
Camp Bay					10/1/03	1400	mean	4.2	7.2	2.94	700
Camp Bay					(September)		s	1.0			
Camp Bay							RSD%	23.0			
Camp Bay							se	0.3			
Camp Bay							n	8.0			
Camp Bay							se/mean	0.1			
Camp Bay							+/- 95% CL	1.1	1.7	0.65	88
Camp Bay							s	2.2	3.5	1.34	180
Camp Bay						Site	mean	2.7	4.8	2.00	827
Garfield Bay	GAR	Mid	Dev	Bay	9/1/03	1045	mean	1.3	0.5	1.90	1462
Garfield Bay					(August)		s	0.4			
Garfield Bay							RSD%	29.0			
Garfield Bay							se	0.1			
Garfield Bay							n	8.0			
Garfield Bay							se/mean	0.1			
Garfield Bay					10/3/03	1215	mean	3.1	0.8	3.56	1148
Garfield Bay					(September)		s	1.6			
Garfield Bay							RSD%	54.0			
Garfield Bay							se	0.6			
Garfield Bay							n	8.0			
Garfield Bay							se/mean	0.2			
Garfield Bay							+/- 95% CL	0.6	0.1	0.58	108
Garfield Bay							s	1.3	0.2	1.17	221
Garfield Bay						Site	mean	2.2	0.7	2.73	1305

Table 6. Littoral zone periphyton on artificial substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Sample Date / Period	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Talache	TAL	Mid	Undev	Open	9/1/03	1330	mean	-	-	-	-
Talache					(August)		s	-			
Talache							RSD%	-			
Talache							se	-			
Talache							n	-			
Talache							se/mean	-			
Talache					10/3/03	1320	mean	-	-	-	-
Talache					(September)		s	-			
Talache							RSD%	-			
Talache							se	-			
Talache							n	-			
Talache							se/mean	-			
Talache						Site	mean	-	-	-	-
Granite Point	GRA	Mid	Mod	Bay	9/1/03	1450	mean	0.3	0.2	0.41	1367
Granite Point					(August)		s	0.2			
Granite Point							RSD	67.0			
Granite Point							se	0.1			
Granite Point							n	8.0			
Granite Point							se/mean	0.2			
Granite Point					10/3/03	1430	mean	0.4	0.1	0.44	1100
Granite Point					(September)		s	0.3			
Granite Point							RSD	61.0			
Granite Point							se	0.1			
Granite Point							n	8.0			
Granite Point							se/mean	0.2			
Granite Point							+/- 95% CL	0.03	0.03	0.01	92
Granite Point							s	0.07	0.07	0.02	189
Granite Point						Site	mean	0.4	0.2	0.43	1233
Lakeview	LAK	South	Undev	Open	9/1/03	1715	mean	1.2	1.1	1.00	833
Lakeview					(August)		s	0.5			
Lakeview							RSD	47.0			
Lakeview							se	0.2			
Lakeview							n	8.0			
Lakeview							se/mean	0.2			
Lakeview					10/3/03	1530	mean	0.8	0.2	0.15	188
Lakeview					(September)		s	0.2			
Lakeview							RSD	22.0			
Lakeview							se	0.1			
Lakeview							n	6.0			
Lakeview							se/mean	0.1			
Lakeview							+/- 95% CL	0.1	0.3	0.31	239
Lakeview							s	0.3	0.6	0.60	457
Lakeview						Site	mean	1.0	0.7	0.58	510

Table 6. Littoral zone periphyton on artificial substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Sample Date / Period	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
Bayview	**BAY**	**South**	**Dev**	**Bay**	**9/1/03**	**1000**	**mean**	**1.0**	**0.2**	**2.21**	**2167**
Bayview					(August)		s	0.5			
Bayview							RSD%	48.0			
Bayview							se	0.2			
Bayview							n	8.0			
Bayview							se/mean	0.2			
Bayview					**10/3/03**	**1000**	**mean**	**1.2**	**0.4**	**1.67**	**1392**
Bayview					(September)		s	0.5			
Bayview							RSD%	45.0			
Bayview							se	0.2			
Bayview							n	7.0			
Bayview							se/mean	0.2			
Bayview							+/- 95% CL	0.1	0.1	0.19	277
Bayview							s	0.1	0.1	0.38	548
Bayview						**Site**	**mean**	**1.1**	**0.3**	**1.94**	**1779**

Table 6. Littoral zone periphyton on artificial substrates at 13 sites around the Lake Pend Oreille shoreline, August 4 - October 3, 2003.

Site	Sym	Lake Region	Development	Bay Character	Sample Date / Period	Start Time	Stat	Mono Chl a mg m^{-2}	Pheophytin mg m^{-2}	AFODW g m^{-2}	Autotrophic Index AFODW / Mono Chl a
							North Lake Mean	1.30	0.65	1.66	1313
							+/- 95% CL	0.17	0.13	0.24	51
							s	0.82	0.65	1.15	247
							Mid Lake Mean	1.53	1.59	1.45	1012
							+/- 95% CL	0.27	0.53	0.27	75
							s	1.08	2.13	1.10	304
							South Lake Mean	1.06	0.48	1.26	1145
							+/- 95% CL	0.03	0.09	0.35	327
							s	0.08	0.25	0.97	897
							Embayment Mean	1.48	1.15	1.84	1355
							+/- 95% CL	0.17	0.28	0.20	52
							s	0.96	1.59	1.12	292
							Open Lake Mean	1.05	0.63	0.88	843
							+/- 95% CL	0.06	0.06	0.08	81
							s	0.24	0.23	0.32	322
							Developed Sites Mean	1.46	0.65	1.92	1387
							+/- 95% CL	0.15	0.11	0.21	54
							s	0.80	0.59	1.09	283
							Moderately Developed Sites Mean	1.20	1.50	1.06	999
							+/- 95% CL	0.25	0.54	0.17	71
							s	1.00	2.18	0.70	288
							Undeveloped Sites Mean	1.00	0.65	0.58	510
							+/- 95% CL	0.15	0.33	0.31	239
							s	0.28	0.64	0.60	457
							2003 Overall Lake Mean	1.33	0.93	1.52	1184
							+/- 95% CL	0.44	0.70	0.56	208
							s	0.81	1.29	1.02	382
							August, 1986 Overall Lake Mean	3.66 /30 d = 0.122 mg m-2 d-1			
							August-Sept. 1989 Overall Lake Mean	3.28 /30 d = 0.109 mg m-2 d-1			
							August-Sept. 1990 Overall Lake Mean	2.16 /30 d = 0.072 mg m-2 d-1			
							2003 Overall Lake Mean	1.33 /28 d = 0.048 mg m-2 d-1			

Table 7. Chlorophyll a, AFODW, and Autotrophic Index values from Lake Pend Oreille, 1989-90.

Site	Chl *a* Aug-89	Chl *a* Sep-89	1989 Mean	Chl *a* Aug-90	Chl *a* Sep-90	1990 Mean	Chl *a* 89-90 Mean
SPR	27.8	17.0	**22.4**	1.8	7.8	**4.8**	**13.6**
KOO	10.9	6.9	**8.9**	4.5	3.0	**3.8**	**6.3**
SUN	7.7	16.9	**15.7**	2.4	-	**2.4**	**9.0**
BOT	5.8	13.1	**9.5**	4.1	9.3	**6.7**	**8.1**
TRE	18.9	43.6	**31.3**	4.7	8.4	**6.6**	**18.9**
ELL	18.4	-	**18.4**	1.8	-	**1.8**	**10.1**
WAR	1.2	-	**1.2**	1.5	-	**1.5**	**1.4**
CAM	17.6	-	**17.6**	2.5	-	**2.5**	**10.1**
GAR	10.6	-	**10.6**	3.0	-	**3.0**	**6.8**
TAL	7.8	-	**7.8**	2.3	-	**2.3**	**5.1**
GRA	30.7	-	**30.7**	5.8	-	**5.8**	**18.3**
LAK	5.7	3.2	**4.5**	2.3	7.7	**5.0**	**4.7**
BAY	13.7	24.1	**18.9**	2.5	1.9	**2.2**	**10.6**
			15.2			**3.7**	**9.4**

Site	AFODW Aug-89	AFODW Sep-89	1989 Mean	AFODW Aug-90	AFODW Sep-90	1990 Mean	AFODW 89-90 Mean
SPR	124.4	79.1	**101.8**	10.8	35.5	**6.8**	**54.3**
KOO	100.4	147.4	**123.9**	106.1	138.0	**122.1**	**123.0**
SUN	50.0	53.9	**52.0**	9.8	-	**9.6**	**30.8**
BOT	14.4	48.2	**31.3**	5.6	13.5	**9.6**	**20.4**
TRE	48.5	72.3	**60.4**	12.8	24.7	**18.8**	**39.6**
ELL	90.9	-	**90.9**	14.7	-	**14.7**	**52.8**
WAR	9.2	-	**9.2**	5.2	-	**5.2**	**7.2**
CAM	70.6	-	**70.6**	8.4	-	**8.4**	**39.5**
GAR	46.5	-	**46.5**	6.9	-	**6.9**	**26.7**
TAL	27.7	-	**27.7**	27.0	-	**27.0**	**27.4**
GRA	25.6	-	**25.6**	9.7	-	**9.7**	**17.7**
LAK	23.1	12.2	**17.7**	9.3	18.6	**14.0**	**15.8**
BAY	28.5	44.6	**36.6**	5.5	11.1	**8.3**	**22.4**
			53.4			**20.1**	**36.7**

Site	AI Aug-89	AI Sep-89	1989 Mean	AI Aug-90	AI Sep-90	1990 Mean	AI 89-90 Mean
SPR	4198	4645	**4422**	5912	4540	**5226**	**4824**
KOO	9221	21299	**15260**	23535	45595	**34565**	**24913**
SUN	8643	3194	**5919**	4173	-	**4173**	**5046**
BOT	1884	3694	**2789**	1355	1458	**1407**	**2098**
TRE	2560	1659	**2110**	2704	2947	**2826**	**2468**
ELL	5011	-	**5011**	8263	-	**8263**	**6637**
WAR	7925	-	**7925**	3339	-	**3339**	**5632**
CAM	1695	-	**1695**	3345	-	**3345**	**2520**
GAR	4384	-	**4384**	2348	-	**2348**	**3366**
TAL	3577	-	**3577**	11800	-	**11800**	**7689**
GRA	833	-	**833**	1656	-	**1656**	**1245**
LAK	2448	3816	**3132**	4007	2415	**3211**	**3172**
BAY	2078	1852	**1965**	2175	5810	**3993**	**2979**
			4540			**6627**	**5584**

Table 8. Mean Chlorophyll *a* , AFODW, Autotrophic Index, TSI-Transparency, and TSI-Total Phosphorus values in the Lake Pend Oreille littoral, 1989-90 and 2003.

	1989-90	2003	1989-90	2003	1989-90	2003	1989-90	2003	1989-90	2003
Site	Chl a	Chl a	AFODW	AFODW	AI	AI	TSI-SD	TSI-SD	TSI-Tot P	TSI-Tot P
	mg m-2	mg m-2	g m-2	g m-2						
SPR	13.6	6.2	54.3	7.8	4824	1297	31.9	33.6	38.5	32.1
KOO	6.3	6.4	123.0	8.2	24913	1622	51.7	36.6	39.4	29.9
SUN	9	3.5	30.8	5.9	5046	2065	32.6	30.2	35.3	26.8
BOT	8.1	4.1	20.4	4.9	2098	1563	30.5	28.7	29.7	31.3
TRE	18.9	3.2	39.6	2.2	2468	827	28.3	29.3	37.8	22.2
ELL	10.1	8.6	52.8	9.9	6637	1050	28.3	29.6	30.0	34.2
WAR	1.4	1.9	7.2	1.1	5632	601	27.2	29.4	30.0	30.2
CAM	10.1	4.0	39.5	3.5	2520	883	30.8	28.9	24.1	30.2
GAR	6.8	8.6	26.7	11.5	3366	1333	28.0	27.2	28.7	32.1
TAL	5.1	2.3	27.4	2.0	7689	808	27.7	27.7	25.8	26.3
GRA	18.3	1.9	17.7	2.2	1245	1219	25.4	26.0	20.0	31.7
LAK	4.7	1.9	15.8	1.4	3172	838	26.7	27.2	27.4	25.1
BAY	10.6	3.9	22.4	5.7	2979	1456	26.9	28.1	25.2	25.5
Lakewide										
Means	**9.5**	**4.3**	**36.7**	**5.1**	**5584**	**1197**	**30.5**	**29.4**	**30.1**	**29.0**

Table 9. Sorting of Lake Pend Oreille littoral stations by periphyton chlorophyll *a* , TSI-transparency, and TSI-total phosphorus, 1989-90 and 2003.

Chlorophyll *a* ranked from high to low 1989-90 value

	1989-90	2003
TRE	18.9	3.2
GRA	18.3	1.9
SPR	13.6	6.2
BAY	10.6	3.9
ELL	10.1	8.6
CAM	10.1	4.0
SUN	9.0	4.0
BOT	8.1	6.4
GAR	6.8	8.6
KOO	6.3	6.4
TAL	5.1	2.3
LAK	4.7	1.9
WAR	1.4	1.9

Chlorophyll *a* ranked from high to low 2003 value

	1989-90	2003
ELL	10.1	8.6
GAR	6.8	8.6
KOO	6.3	6.4
BOT	8.1	6.4
SPR	13.6	6.2
SUN	9.0	4.0
CAM	10.1	4.0
BAY	10.6	3.9
TRE	18.9	3.2
TAL	5.1	2.3
WAR	1.4	1.9
GRA	18.3	1.9
LAK	4.7	1.9

TSI-Transparency ranked from high to low 1989-90 value

	1989-90	2003
KOO	51.7	36.6
SUN	32.6	30.2
SPR	31.9	33.6
CAM	30.8	28.9
BOT	30.0	28.7
TRE	28.3	29.3
ELL	28.3	29.6
GAR	28.0	27.2
TAL	27.7	27.7
WAR	27.2	29.4
BAY	26.9	28.1
LAK	26.7	27.2
GRA	25.4	26.0

TSI-Transparency ranked from high to low 2003 value

	1989-90	2003
KOO	51.7	36.6
SPR	31.9	33.6
SUN	32.6	30.2
ELL	28.3	29.6
WAR	27.2	29.4
TRE	28.3	29.3
CAM	30.8	28.9
BOT	30.0	28.7
BAY	26.9	28.1
TAL	27.7	27.7
GAR	28.0	27.2
LAK	26.7	27.2
GRA	25.4	26.0

TSI-Total Phosphorus ranked from high to low 1989-90 values

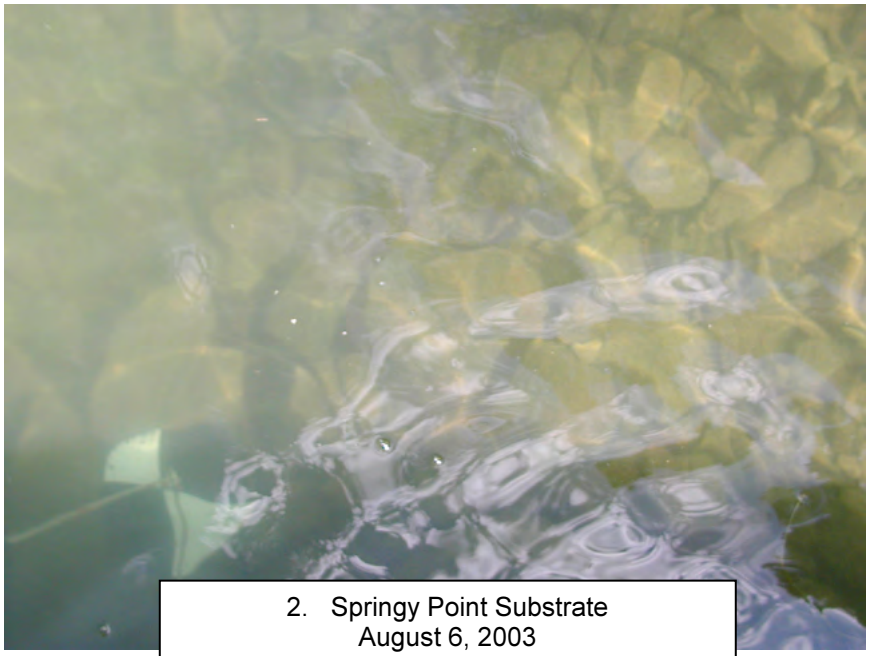
	1989-90	2003
KOO	39.4	29.9
SPR	38.5	32.1
TRE	37.8	22.2
SUN	35.3	26.8
ELL	30.0	34.2
WAR	30.0	30.2
BOT	29.7	31.3
GAR	28.7	32.1
LAK	27.4	25.1
TAL	25.8	26.3
BAY	25.2	25.5
CAM	24.1	30.2
GRA	20.0	31.7

TSI-Total Phosphorus ranked from high to low 2003 value

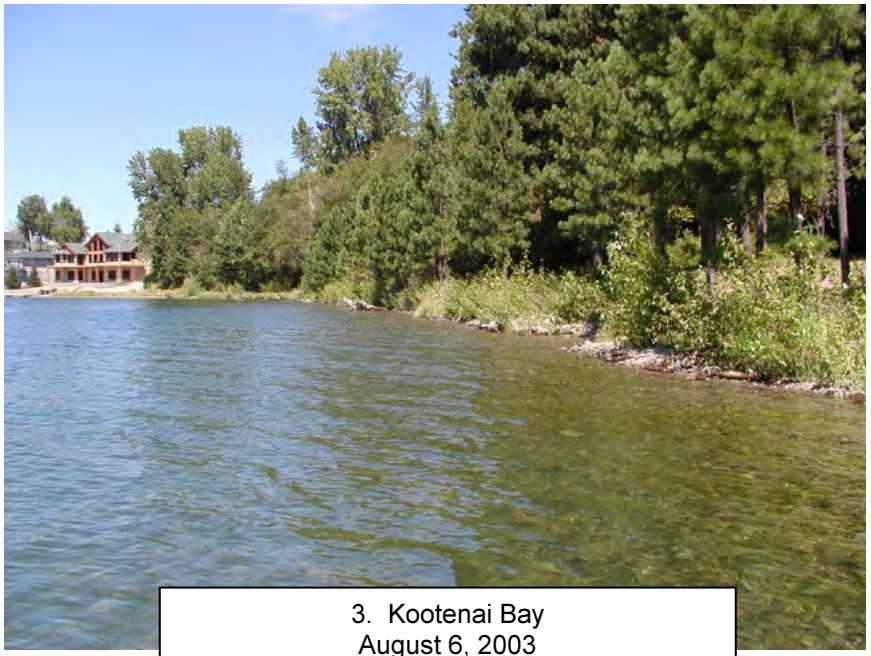
	1989-90	2003
ELL	30.0	34.2
SPR	38.5	32.1
GAR	28.7	32.1
GRA	20.0	31.7
BOT	29.7	31.3
WAR	30.0	30.2
CAM	24.1	30.2
KOO	39.4	29.9
SUN	35.3	26.8
TAL	25.8	26.3
BAY	25.2	25.5
LAK	27.4	25.1
TRE	37.8	22.2

PHOTOGRAPHS

1. Springy Point
August 6, 2003



2. Springy Point Substrate
August 6, 2003



3. Kootenai Bay
August 6, 2003

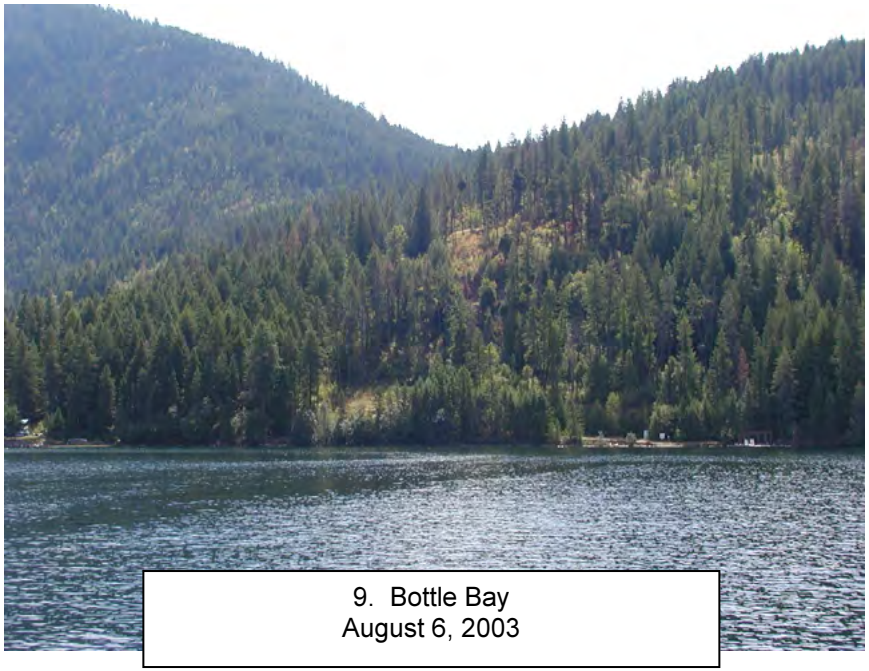
4. Kootenai Bay natural substrate
August 6, 2003

5. Sunnyside
August 6, 2003

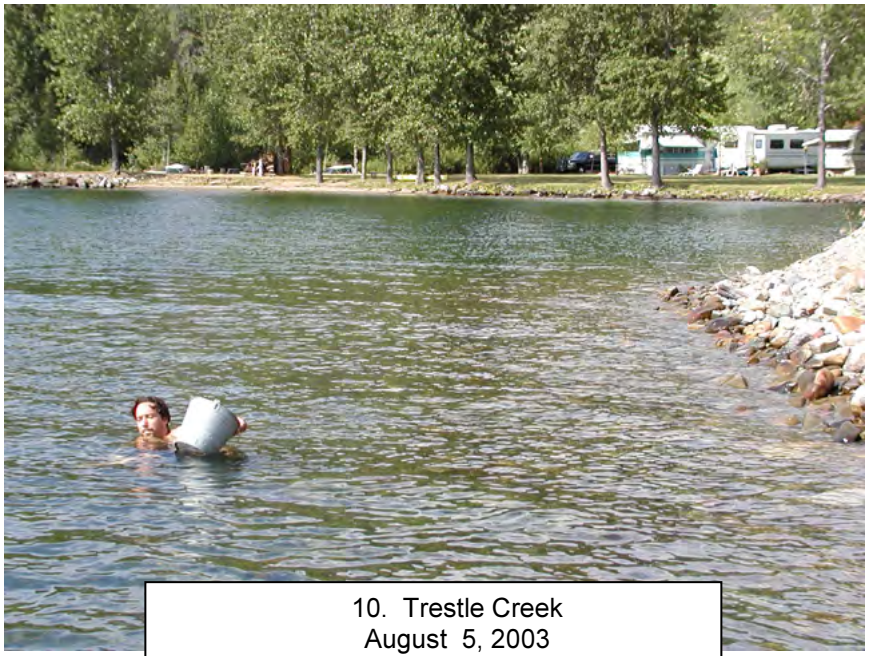
6. Sunnyside substrate
August 6, 2003

7. Sunnyside substrate
August 6, 2003

8. Eurasian watermilfoil from Sunnyside
August 6, 2003

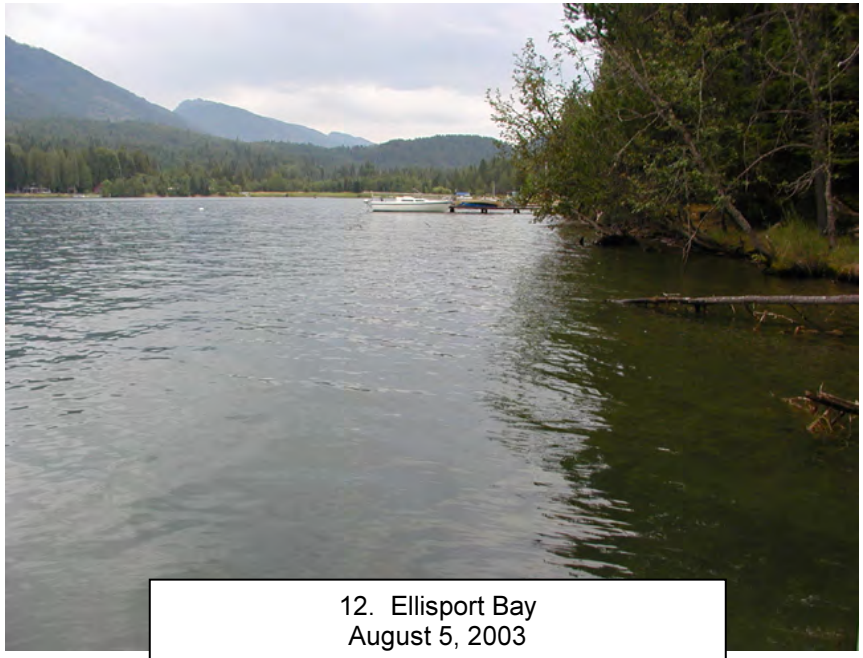


9. Bottle Bay
August 6, 2003

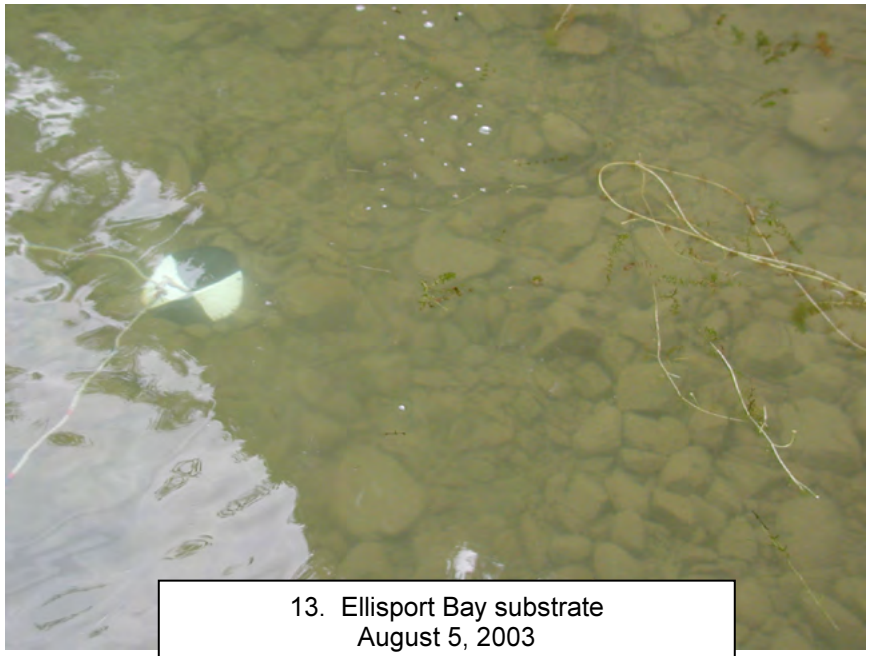


10. Trestle Creek
August 5, 2003

11. Trestle Creek Substrate
August 5, 2003



12. Ellisport Bay
August 5, 2003

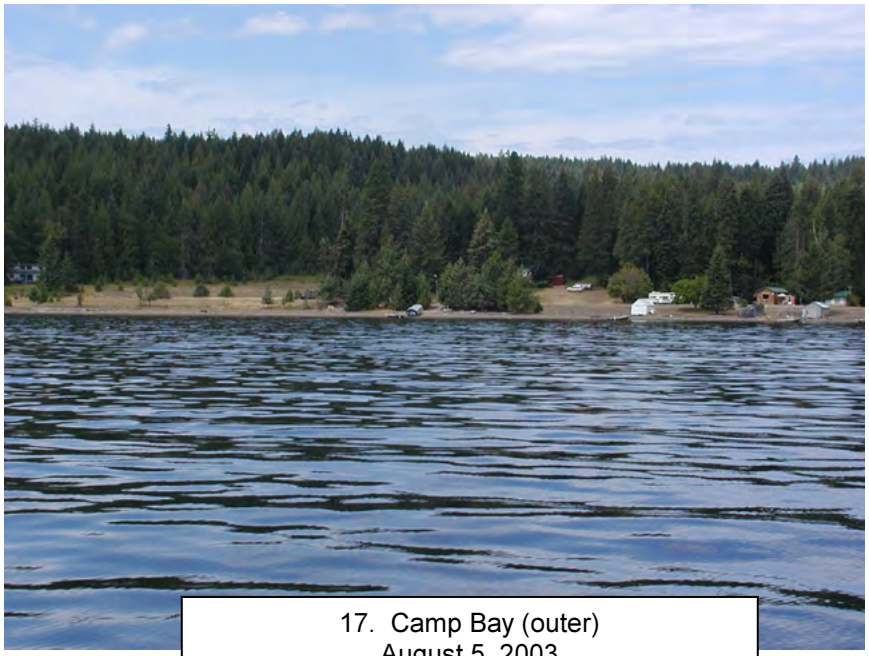


13. Ellisport Bay substrate
August 5, 2003

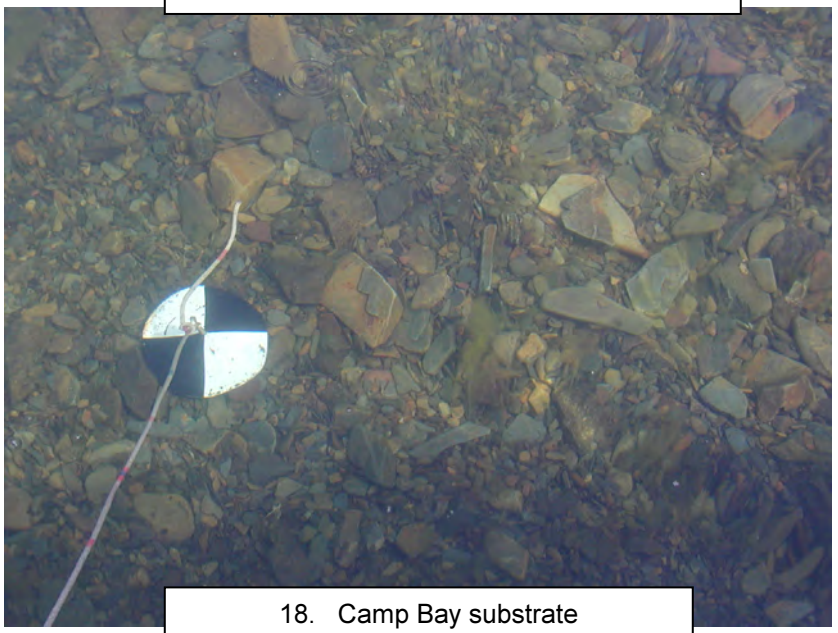
14. Ellisport Bay natural substrate
August 5, 2003

15. South over Lake Pend Oreille
August 5, 2003

16. Warren Island substrate
August 5, 2003

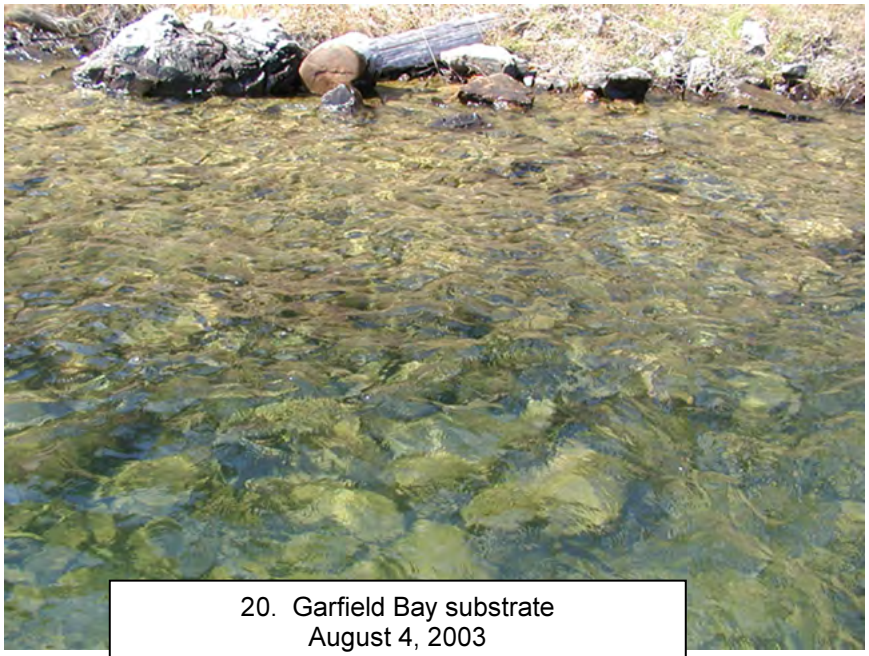


17. Camp Bay (outer)
August 5, 2003

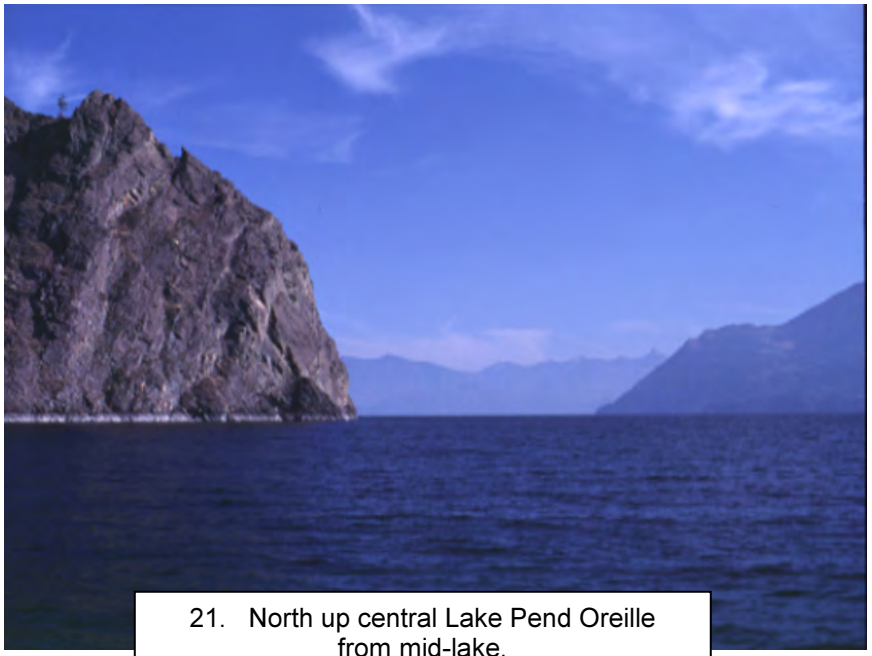


18. Camp Bay substrate
August 5, 2003

19. Garfield Bay
August 4, 2003

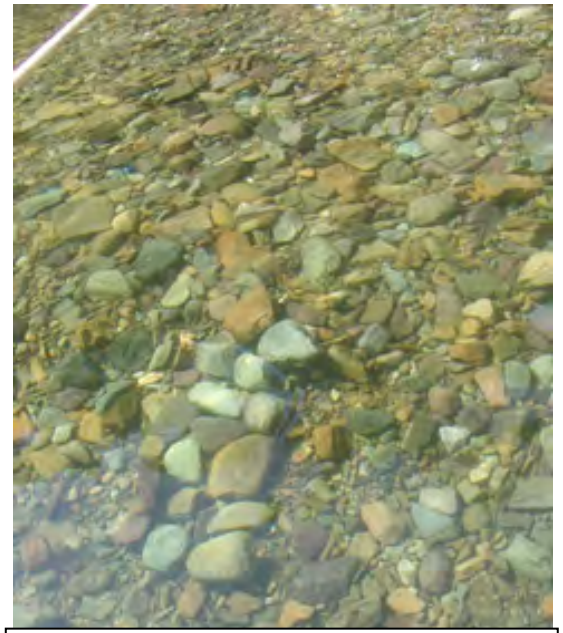


20. Garfield Bay substrate
August 4, 2003



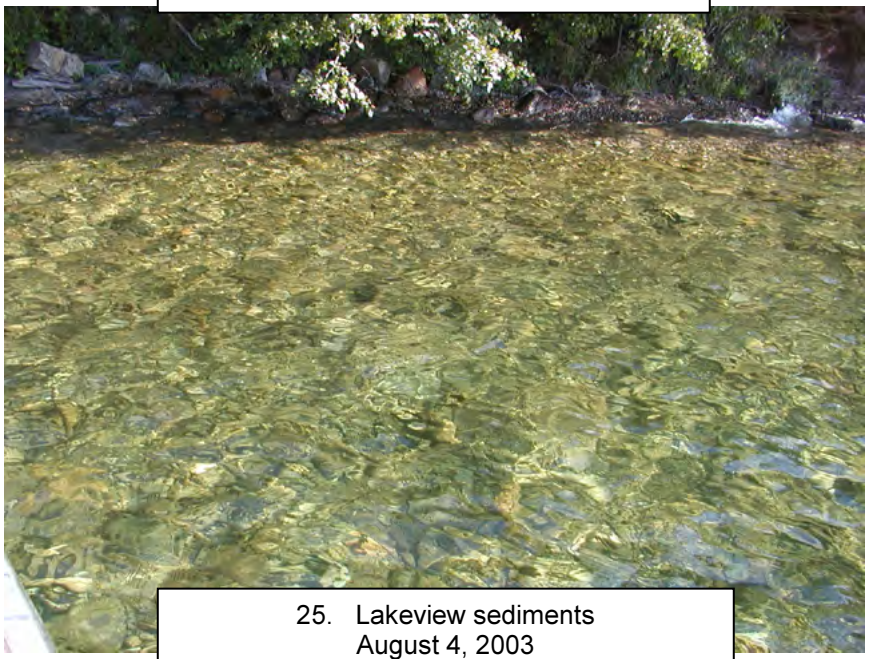
21. North up central Lake Pend Oreille
from mid-lake,

22. Talache Landing
August 4, 2003



23. Talache substrate
August 4, 2003

24. Lakeview
August 4, 2003



25. Lakeview sediments
August 4, 2003

26. Lakeview natural substrate
August 4, 2003