Table 3-1. Marsh and Riparian Areal Cover by Polygon at Mowitch.

Vegetation Polygon	Percent Cover	Dominant Species
MA	50	*Aster subspicatus, Distichlis spicata, Triglochin maritimum, Eleocharis* sp., *Atriplex patula, Cotula coronopifolia, Spergularia marina*
MB	65	*Atriplex patula, Aster subspicatus*
MC	55	*Aster subspicatus*
MD	50	*Aster subspicatus, Atriplex patula*
ME	50	*Eleocharis* sp., *Cotula coronopifolia*
MF	40	*Eleocharis* sp.
MG	40	*Eleocharis* sp.
MH	45	*Eleocharis* sp., *Cotula coronopifolia*
MI	50	*Cotula coronopifolia, Eleocharis* sp.
MJ	25	*Eleocharis* sp.
MK	25	*Eleocharis* sp.
ML	35	*Eleocharis* sp.
MM	70	*Triglochin maritimum, Atriplex patula*
RA	70	*Alnus rubra, Cornus stolonifera, Rosa* spp., *Lupinus albicaulis,* weedy herbaceous spp.

Note: In "Vegetation Polygon" column, M=Marsh polygon and R=Riparian polygon. The second letter is assigned in sequential order.

Table 3-2. Quadrat Locations Along Marsh and Riparian Transects at Mowitch.

Marsh Transect 1-1		Marsh Transect 1-2		Riparian Transect 1-1	
Quadrat	Distance Along Transect (ft)	Quadrat	Distance Along Transect (ft)	Quadrat	Distance Along Transect (ft)
1	3	1	16	1	3
2	7	2	18	2	23
3	17	3	63	3	62
4	38	4	77	4	77
5	41	5	104	5	101
6	51	6	217	6	122
7	86	7	242	7	130
8	89	8	259	8	166
9	122	9	274	9	183
10	142	10	311	10	205
11	158	11	317	11	289
12	232	12	348	12	306
13	240	13	358	13	310
14	287	14	393	14	331
15	289	15	417	15	341
16	317	16	452	16	341
17	354	17	465	17	348
18	364	18	477	18	363
19	372	19	484	19	383
20	374	20	505	20	394
21	405	21	519	21	417
22	451	22	521	22	448
23	462	23	529	23	473
24	519			24	480
25	525			25	520
26	528			26	525
27	537			27	529
28	540			28	538
29	543			29	575
30	547			30	582
31	552			31	586
32	554			32	606
33	570			33	650
34	581			34	710
35	588			35	725
36	603			36	732
37	668			37	776
38	719			38	806
39	727			39	864
40	754			40	797
41	757			41	845
42	761			42	868
43	804			43	882
44	812			44	887
45	835			45	892
46	874			46	896

Table 3-3a. Marsh Development at Mowitch, Transect 1-1 - Percent Cover

Common Name	Scientific Name	Average % Cover	Average % Where Found	Quadrats, Transect 1-1																																													
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Percent of quadrat situated within herbivory exclusion device				100	100	100	100	100	100	100	100	0	0	0	0	0	100	100	100	100	100	100	100	100	0	0	0	0	0	0	0	0	0	0	0	60	0	0	50	15	0	0	0	0	0	0	0	0	0
Native																																																	
Douglas aster	*Aster subspicatus*	1.2	13.3	3	20	10						20																																					
fleshy jaumea	*Jaumea carnosa*	0.6	9.0										5									20		2																									
Lyngby's sedge	*Carex lyngbyei*	2.4	18.7														50	50		3		2	3	4																									
orache, fat-hen saltbush	*Atriplex patula*	3.0	9.3	2	30	5					2	30	3				2		T		15	5											1			20			5								5		15
seashore saltgrass	*Distichlis spicata*	7.5	38.2	95	20	75		35			2	5					10		100																					2									
seaside arrow-grass	*Triglochin maritimum*	4.7	14.4		15	10	25	10	5	25	25		3				10			25	5	35	15						5											3									
seaside plantain	*Plantago maritima*	3.7	15.6					20	10	15	15	3					10	40		2	15		40	2																									
spike-rush	*Eleocharis sp.*	3.5	16.1							15	10					3								40	25													10	20				20	15	3				
tufted hairgrass	*Deschampsia cespitosa*	0.2	4.0																			5	3																											
Non-Native or Invasive[1]																																																	
brass buttons	*Cotula coronopifolia*	5.3	9.9				20	2	10	10	15	25	20	20		T	30	5		2	T	1	T	1			15	5	5				5				T	15	30	10								T	
common plantain	*Plantago major*	0.2	8.0														8																																
redtop	*Agrostis alba*	T	T	T																																													
saltmarsh sandspurry	*Spergularia marina*	4.9	37.5																	50	65	15	40	40											15														

Table 3-3b. Marsh Development at Mowitch, Transect 1-2 - Percent Cover

Common Name	Scientific Name	Average % Cover	Average % Where Found	Quadrats, Transect 1-2																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Percent of quadrat situated within herbivory exclusion device				100	0	0	0	0	0	0	100	100	0	0	0	100	100	0	0	100	0	0	80	100	0	0
Native																										
pickleweed	*Salicornia virginica*	0.0	1.0																			1				
Lyngby's sedge	*Carex lyngbyei*	0.0	1.0									1														
orache, fat-hen saltbush	*Atriplex patula*	1.3	7.3											T		1		3				25				
seashore saltgrass	*Distichlis spicata*	0.4	5.0	7	3																					
seaside arrow-grass	*Triglochin maritimum*	0.8	6.0							5								10				3				
seaside plantain	*Plantago maritima*	0.3	2.3		4													1				2				
spike-rush	*Eleocharis sp.*	11.3	23.6	60	60	25	20	50		1	10	25				4	2		3							
Non-Native or Invasive[1]																										
brass buttons	*Cotula coronopifolia*	5.1	9.1	2	1	15		2	T	3	15	55	T					20	1			3		1		
saltmarsh sandspurry	*Spergularia marina*	6.1	23.3	35	25					55	10	5						10								
unclassified-herb	*unclassified-herb*	1.2	3.4	2	2					2	T	T						20	T			1				

Notes:
1: Unknown species are assumed to be weeds or invasives.
Blank indicates species was not observed in the quadrat
"T" = Trace

Table 3-4a. Marsh Development at Mowitch, Transect 1-1 - Cover (Daubenmire Method)

Common Name	Scientific Name	Transect 1-1			
		Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition (%)
Native					
Douglas aster	*Aster subspicatus*	47.5	1.0	8.7	0.06
fleshy jaumea	*Jaumea carnosa*	20.0	0.4	6.5	0.03
Lyngby's sedge	*Carex lyngbyei*	122.5	2.7	13.0	0.16
orache, fat-hen saltbush	*Atriplex patula*	127.5	2.8	32.6	0.17
seashore saltgrass	*Distichlis spicata*	320.0	7.0	19.6	0.43
seaside arrow-grass	*Triglochin maritimum*	185.0	4.0	32.6	0.25
seaside plantain	*Plantago maritima*	172.5	3.8	23.9	0.23
spike-rush	*Eleocharis sp.*	147.5	3.2	21.7	0.20
tufted hairgrass	*Deschampsia cespitosa*	5.0	0.1	4.3	0.01
Subtotal		*1147.5*	*24.9*		*1.54*
Non-Native or Invasive[1]					
brass buttons	*Cotula coronopifolia*	255.0	5.5	54.3	0.34
common plantain	*Plantago major*	15.0	0.3	2.2	0.02
redtop	*Agrostis alba*	2.5	0.1	2.2	0.00
saltmarsh sandspurry	*Spergularia marina*	205.0	4.5	13.0	0.27
Subtotal		*477.5*	*10.4*		*0.64*
TOTAL		**1625**	**35.3**		**2.17**
Proportion of non-native or invasive plants (%):			**29.4%**		

Table 3-4b. Marsh Development at Mowitch, Transect 1-2 - Cover (Daubenmire Method)

Common Name	Scientific Name	Transect 1-2			
		Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition (%)
Native					
pickleweed	*Salicornia virginica*	2.5	0.1	4.3	0.02
Lyngby's sedge	*Carex lyngbyei*	2.5	0.1	4.3	0.02
orache, fat-hen saltbush	*Atriplex patula*	20.0	0.9	13.0	0.14
seashore saltgrass	*Distichlis spicata*	17.5	0.8	8.7	0.12
seaside arrow-grass	*Triglochin maritimum*	20.0	0.9	13.0	0.14
seaside plantain	*Plantago maritima*	7.5	0.3	13.0	0.05
spike-rush	*Eleocharis sp.*	232.5	10.1	47.8	1.65
Subtotal		*302.5*	*13.2*		*2.15*
Non-Native or Invasive[1]					
brass buttons	*Cotula coronopifolia*	130.0	5.7	56.5	0.92
saltmarsh sandspurry	*Spergularia marina*	147.5	6.4	26.1	1.05
unclassified-herb	*unclassified-herb*	32.5	1.4	34.8	0.23
Subtotal		*310*	*13.5*		*2.20*
TOTAL		**612.5**	**26.6**		**4.35**
Proportion of non-native or invasive plants (%):			**50.6%**		

Notes:
1: Unknown species are assumed to be weeds or invasives.

Total canopy: Obtained by counting the number of quadrats in each of six cover classes (by species), multiplying this value times the midpoint of the appropriate cover class, and totalling the products for all cover classes by species.
Canopy cover: Obtained by dividing the total canopy by the total number of quadrats sampled on the transect.

Frequency: Obtained by dividing the number of occurrences of a plant species (the number of quadrats in which a plant species was observed) by the total number of quadrats sampled along the transect.

Species composition: Obtained by dividing the percent canopy cover of each plant species by the total canopy cover of all plant species.

See Appendix C for a complete description of the Daubenmire method.

Table 3-5. Marsh Development at Mowitch - Stem Height

Common Name	Scientific Name	Average Stem Height (in.)	Quadrats, Transect 1-1																																													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Lyngby's sedge	*Carex lyngbyei*	11.6														21	23		4		8	9	6																									

Notes:
Stem height in inches
Blank indicates no vegetation was observed in the quadrat

Table 3-6. Marsh Development at Mowitch - Shoot Density

Common Name	Scientific Name	Average Shoot Density	Quadrats, Transect 1-1																																													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Lyngby's sedge	*Carex lyngbyei*	15.7														38	34		9		1	9	3																									

Notes:
Shoot density in shoots per quadrat. Quadrats are 0.25 m^2 in area.
Blank indicates no vegetation was observed in the quadrat

Table 3-7. Riparian Coverage at Mowitch - Percent Cover

Common Name	Scientific Name	No. of Quadrats Found [1]	No. of Quadrats Surviving	Percent Cover (range)	Percent Cover (mean)
Herbs, Forbs and Grasses					
aster	*Aster sp.*	1	1	3	3.0
barnyardgrass	*Echinochloa crus-galli*	3	3	1 to 3	2.0
bentgrass	*Agrostis sp.*	6	6	2 to 55	13.6
birds-foot trefoil	*Lotus corniculatus*	43	43	1 to 65	18.6
black medick	*Medicago lupulina*	2	2	2	2.0
bluegrass	*Poa sp.*	4	4	4 to 10	6.3
brass buttons	*Cotula coronopifolia*	1	1	3	3.0
brome	*Bromus sp.*	1	1	2	2.0
bull thistle	*Cirsium vulgare*	11	11	1 to 15	8.2
Canada thistle	*Cirsium arvense*	5	5	1 to 3	2.0
common dandelion	*Taraxacum officinale*	6	6	1 to 2	1.3
common plantain	*Plantago major*	18	18	1 to 5	1.7
common rush	*Juncus effusus*	6	6	1 to 20	6.5
common St. John's-wort	*Hypericum perforatum*	2	2	1 to 10	5.5
common tansy	*Tanacetum vulgare*	1	1	1	1.0
common velvet-grass	*Holcus lanatus*	20	20	1 to 7	3.3
creeping buttercup	*Ranunculus repens*	9	9	1 to 5	3.4
Douglas aster	***Aster subspicatus***	1	1	5	5.0
English plantain	*Plantago lanceolata*	25	25	1 to 10	3.6
foxtail	*Alopecurus sp.*	1	1	4	4.0
geranium	*Geranium sp.*	1	1	3	3.0
hairy catsear	*Hypochaeris radicata*	6	6	1 to 5	2.2
knotweed	*Polygonum sp.*	10	10	1 to 15	6.3
oxeye daisy	*Chrysanthemum leucanthemum*	5	5	1 to 5	3.4
perennial ryegrass	*Lolium perenne*	17	17	1 to 10	5.8
quackgrass	*Agropyron repens*	1	1	2	2.0
Queen Anne's lace	*Daucus carota*	5	3	2 to 10	4.8
rabbitfoot clover	*Trifolium arvense*	1	1	4	4.0
red clover	*Trifolium pratense*	16	16	1 to 5	3.6
red fescue	***Festuca rubra***	2	2	2 to 5	3.5
redtop	*Agrostis alba*	16	16	3 to 35	12.4
rush	*Juncus sp.*	5	4	1 to 5	2.6
sickle-keeled lupine	***Lupinus albicaulis***	26	25	2 to 45	10.3
smooth crabgrass	*Digitaria ischaemum*	2	2	3 to 5	4.0
softstem bullrush	*Scirpus tabernaemontani*	1	1	3	3.0
speedwell	*Veronica sp.*	1	1	5	5.0
spike-rush	*Eleocharis sp.*	1	1	3	3.0
tall fescue	*Festuca arundinacea*	2	2	4 to 10	7.0
tapertip rush	*Juncus acuminatus*	1	1	2	2.0
thistle	*Cirsium sp.*	14	13	1 to 10	3.6
toad rush	*Juncus bufonius*	2	2	2	2.0
western pearly everlasting	***Anaphalis margaritacea***	7	7	1 to 15	3.8
white clover	*Trifolium repens*	10	10	1 to 7	3.5
white sweet-clover	*Melilotus alba*	23	19	2 to 25	7.4
willowherb	*Epilobium sp.*	35	34	1 to 30	5.6

Table 3-7. Riparian Coverage at Mowitch - Percent Cover

Common Name	Scientific Name	No. of Quadrats Found [1]	No. of Quadrats Surviving	Percent Cover (range)	Percent Cover (mean)
yarrow	***Achillea millefolium***	39	39	1 to 25	5.8
unclassified-composite	unclassified-composite	19	19	1 to 10	2.4
unclassified-grass	unclassified-grass	25	24	2 to 30	8.7
unclassified-herb	unclassified-herb	13	13	1 to 20	4.0
Shrubs					
beaked hazelnut	***Corylus cornuta***	3	3	1 to 7	4.3
common snowberry	***Symphoricarpos albus***	8	8	2 to 8	4.3
currant	***Ribes sp.***	1	1	5	5.0
Himalayan blackberry	*Rubus discolor*	14	14	1 to 10	4.1
Indian plum	***Oemleria cerasiformis***	1	1	5	5.0
oceanspray	***Holodiscus discolor***	3	2	2 to 10	5.7
Oregon crabapple	***Malus fusca***	1	1	5	5.0
Pacific ninebark	***Physocarpus capitatus***	1	0	10	10.0
red-flowering currant	***Ribes sanguineum***	1	1	5	5.0
red-osier dogwood	***Cornus stolonifera***	6	6	5 to 25	13.8
rose	***Rosa sp.***	25	24	1 to 35	10.7
Scot's broom	*Cytisus scoparius*	4	4	1 to 3	2.0
stink currant	***Ribes bracteosum***	1	1	5	5.0
twinberry honeysuckle	***Lonicera involucrata***	1	1	2	2.0
vine maple	***Acer circinatum***	1	0	15	15.0
unclassified-shrub	unclassified-shrub	2	0	1 to 4	2.5
Trees					
Douglas fir	***Pseudotsuga menziesii***	8	1	2 to 40	14.4
Hooker's willow	***Salix hookeriana***	2	2	15	15.0
Oregon ash	***Fraxinus latifolia***	8	6	2 to 15	5.8
Pacific willow	***Salix lasiandra***	1	1	2	2.0
red alder	***Alnus rubra***	20	20	2 to 35	11.7
Sitka spruce	***Picea sitchensis***	1	1	7	7.0
western red cedar	***Thuja plicata***	6	1	1 to 45	18.5

Notes: There were a total of 46 quadrats

1: No. of Quadrats Found = Number of quadrats in which the species was observed

Bold are native species. All other entries are non-native or invasive.

Mean percent cover is calculated for the number of quadrats where the plant was observed.

Table 3-8. Riparian Coverage at Mowitch - Cover (Daubenmire Method)

Common Name	Scientific Name	Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition
Herbs, Forbs and Grasses					
aster	*Aster sp.*	2.5	0.1	1.0	0.00%
barnyardgrass	*Echinochloa crus-galli*	7.5	0.2	3.0	0.00%
bentgrass	*Agrostis sp.*	72.5	1.6	5.0	0.04%
birds-foot trefoil	*Lotus corniculatus*	677.5	14.7	42.0	0.36%
black medick	*Medicago lupulina*	5.0	0.1	2.0	0.00%
bluegrass	*Poa sp.*	20.0	0.4	3.0	0.01%
brass buttons	*Cotula coronopifolia*	2.5	0.1	1.0	0.00%
brome	*Bromus sp.*	2.5	0.1	1.0	0.00%
bull thistle	*Cirsium vulgare*	102.5	2.2	11.0	0.05%
Canada thistle	*Cirsium arvense*	12.5	0.3	5.0	0.01%
common dandelion	*Taraxacum officinale*	15.0	0.3	6.0	0.01%
common plantain	*Plantago major*	45.0	1.0	18.0	0.02%
common rush	*Juncus effusus*	40.0	0.9	6.0	0.02%
common St. John's-wort	*Hypericum perforatum*	17.5	0.4	2.0	0.01%
common tansy	*Tanacetum vulgare*	2.5	0.1	1.0	0.00%
common velvet-grass	*Holcus lanatus*	60.0	1.3	19.0	0.03%
creeping buttercup	*Ranunculus repens*	22.5	0.5	9.0	0.01%
Douglas aster	***Aster subspicatus***	2.5	0.1	1.0	0.00%
English plantain	*Plantago lanceolata*	72.5	1.6	24.0	0.04%
foxtail	*Alopecurus sp.*	2.5	0.1	1.0	0.00%
geranium	*Geranium sp.*	2.5	0.1	1.0	0.00%
hairy catsear	*Hypochaeris radicata*	15.0	0.3	6.0	0.01%
knotweed	*Polygonum sp.*	60.0	1.3	9.0	0.03%
oxeye daisy	*Chrysanthemum leucanthemum*	12.5	0.3	5.0	0.01%
perennial ryegrass	*Lolium perenne*	127.5	2.8	16.0	0.07%
quackgrass	*Agropyron repens*	2.5	0.1	1.0	0.00%
Queen Anne's lace	*Daucus carota*	25.0	0.5	5.0	0.01%
rabbitfoot clover	*Trifolium arvense*	2.5	0.1	1.0	0.00%
red clover	*Trifolium pratense*	40.0	0.9	16.0	0.02%
red fescue	***Festuca rubra***	5.0	0.1	2.0	0.00%
redtop	*Agrostis alba*	210.0	4.6	16.0	0.11%
rush	*Juncus sp.*	12.5	0.3	5.0	0.01%
sickle-keeled lupine	***Lupinus albicaulis***	285.0	6.2	26.0	0.15%
smooth crabgrass	*Digitaria ischaemum*	5.0	0.1	2.0	0.00%
softstem bullrush	*Scirpus tabernaemontani*	2.5	0.1	1.0	0.00%
speedwell	*Veronica sp.*	2.5	0.1	1.0	0.00%
spike-rush	*Eleocharis sp.*	2.5	0.1	1.0	0.00%
tall fescue	*Lolium arundinaceum*	17.5	0.4	2.0	0.01%
tapertip rush	*Juncus acuminatus*	2.5	0.1	1.0	0.00%
thistle	*Cirsium sp.*	72.5	1.6	14.0	0.04%
toad rush	*Juncus bufonius*	5.0	0.1	2.0	0.00%
western pearly everlasting	***Anaphalis margaritacea***	27.5	0.6	6.0	0.01%
white clover	*Trifolium repens*	37.5	0.8	10.0	0.02%
white sweet-clover	*Melilotus alba*	180.0	3.9	22.0	0.10%
willowherb	*Epilobium sp.*	195.0	4.2	34.0	0.10%
yarrow	***Achillea millefolium***	220.0	4.8	38.0	0.12%
unclassified-composite	unclassified-composite	57.5	1.3	18.0	0.03%
unclassified-grass	unclassified-grass	215.0	4.7	23.0	0.11%

Table 3-8. Riparian Coverage at Mowitch - Cover (Daubenmire Method)

Common Name	Scientific Name	Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition
unclassified-herb	unclassified-herb	37.5	0.8	10.0	0.02%
	Subtotal	*3065*	*66.6*		*1.63%*
Shrubs					
beaked hazelnut	***Corylus cornuta***	20.0	0.4	3.0	0.01%
common snowberry	***Symphoricarpos albus***	32.5	0.7	8.0	0.02%
currant	*Ribes sp.*	2.5	0.1	1.0	0.00%
Himalayan blackberry	*Rubus discolor*	60.0	1.3	14.0	0.03%
Indian plum	***Oemleria cerasiformis***	2.5	0.1	1.0	0.00%
oceanspray	***Holodiscus discolor***	20.0	0.4	3.0	0.01%
Oregon crabapple	***Malus fusca***	2.5	0.1	1.0	0.00%
Pacific ninebark	***Physocarpus capitatus***	15.0	0.3	1.0	0.01%
red-flowering current	***Ribes sanguineum***	2.5	0.1	1.0	0.00%
red-osier dogwood	***Cornus stolonifera***	77.5	1.7	6.0	0.04%
rose	***Rosa sp.***	302.5	6.6	24.0	0.16%
Scot's broom	*Cytisus scoparius*	10.0	0.2	4.0	0.01%
stink currant	***Ribes bracteosum***	2.5	0.1	1.0	0.00%
twinberry honeysuckle	***Lonicera involucrata***	2.5	0.1	1.0	0.00%
vine maple	***Acer circinatum***	15.0	0.3	1.0	0.01%
unclassified-shrub	unclassified-shrub	5.0	0.1	2.0	0.00%
	Subtotal	*457.5*	*9.9*		*0.24%*
Trees					
Douglas fir	***Pseudotsuga menziesii***	105.0	2.3	8.0	0.06%
Hooker's willow	***Salix hookeriana***	30.0	0.7	2.0	0.02%
Oregon ash	***Fraxinus latifolia***	57.5	1.3	8.0	0.03%
Pacific willow	***Salix lasiandra***	2.5	0.1	1.0	0.00%
red alder	***Alnus rubra***	247.5	5.4	20.0	0.13%
Sitka spruce	***Picea sitchensis***	15.0	0.3	1.0	0.01%
western redcedar	***Thuja plicata***	100.0	2.2	6.0	0.05%
	Subtotal	*557.5*	*12.1*		*0.30%*
	TOTAL	**4080**	**88.7**		

Notes:
Bold are native species. All other entries are non-native or invasive.
Total canopy: Obtained by counting the number of quadrats in each of six cover classes (by species), multiplying this value times the midpoint of the appropriate cover class, and totalling the products for all cover classes by species.

Canopy cover: Obtained by dividing the total canopy by the total number of quadrats sampled on the transect.

Frequency: Obtained by dividing the number of occurrences of a plant species (the number of quadrats in which a plant species was observed) by the total number of quadrats sampled along the transect.

Species composition: Obtained by dividing the percent canopy cover of each plant species by the total canopy cover of all plant species.

See Appendix C for a complete description of the Daubenmire method.

Table 3-9. Fish Monitoring Site Data 2003 – Mowitch Site

Site Name	Date	High Tide	Low Tide	Time	Gear	Temp - Surface (°C)	Temp - Bottom (°C)	Salinity - Surface (ppt)	Salinity - Bottom (ppt)	Weather
Mowitch Site 1	4/21/2003	8:07 H 10.9	15:29 L -1.7'	9:05	block net	11.4	10.5	18.5	27.5	partly cloudy
Mowitch Site 2	4/21/2003	8:07 H 10.9	15:29 L -1.7'	9:10	block net	11.6	10.5	14.3	27.4	partly cloudy
Mowitch Site 3	4/21/2003	8:07 H 10.9	15:29 L -1.7'	9:15	block net	11.3	10.6	6.4	27	partly cloudy
Mowitch Site 4	4/21/2003	8:07 H 10.9	15:29 L -1.7'	9:20	block net	11.7	10.5	20.5	27.3	partly cloudy
Mowitch Site 1	5/6/2003	7:26 H 9.5'	15:01 L -0.7'	8:43	block net	11.4	11.2	22.7	26.5	partly cloudy
Mowitch Site 4	5/6/2003	7:26 H 9.5'	15:01 L -0.7'	8:35	block net	11.7	10.9	16.6	27.1	partly cloudy
Mowitch Site 1	5/21/2003	8:40 H 9.2'	16:00 L -0.8'	8:45	block net	13.3	12.6	23.9	25.9	cloudy
Mowitch Site 2	5/21/2003	8:40 H 9.2'	16:00 L -0.8'	8:50	block net	13.3	12.3	24.8	26.4	cloudy
Mowitch Site 3	5/21/2003	8:40 H 9.2'	16:00 L -0.8'	8:55	block net	13.1	12.4	23.1	26.4	cloudy
Mowitch Site 4	5/21/2003	8:40 H 9.2'	16:00 L -0.8'	9:00	block net	12.9	12.4	17.2	26.4	cloudy
Mowitch Site 1	6/5/2003	7:51 H 9.0'	15:20 L -0.8'	8:40	block net	15.3	13.3	22.7	25.2	sunny
Mowitch Site 2	6/5/2003	7:51 H 9.0'	15:20 L -0.8'	8:50	block net	15.7	13.6	23.3	25.3	sunny
Mowitch Site 3	6/5/2003	7:51 H 9.0'	15:20 L -0.8'	9:00	block net	15.9	13.1	22.8	26.1	sunny
Mowitch Site 4	6/5/2003	7:51 H 9.0	15:20 L -0.8'	9:10	block net	15.3	13.1	23.9	25.9	sunny
Mowitch Site 1	6/19/2003	8:30 H 9.0'	15:29 L -0.3'	8:55	block net	15.5	14.3	21.2	23.3	partly cloudy
Mowitch Site 2	6/19/2003	8:30 H 9.0'	15:29 L -0.3'	9:00	block net	16.2	14.3	20.4	23.3	partly cloudy
Mowitch Site 3	6/19/2003	8:30 H 9.0'	15:29 L -0.3'	9:05	block net	16.1	14.3	20.9	23.2	partly cloudy
Mowitch Site 4	6/19/2003	8:30 H 9.0'	15:29 L -0.3'	9:08	block net	15.9	14.5	21.04	23.09	partly cloudy
Mowitch Site 1	7/2/2003	6:07 H 10'	13:33 L -2	7:30	beach seine	16.6	15.1	20.3	25.1	sunny
Mowitch Site 2	7/2/2003	6:07 H 10'	13:33 L -2	7:27	beach seine	15.8	17	16.2	22.4	sunny
Mowitch Site 3	7/2/2003	6:07 H 10'	13:33 L -2	7:25	beach seine	16.7	16.3	18.7	23.7	sunny
Mowitch Site 4	7/2/2003	6:07 H 10'	13:33 L -2	7:20	beach seine	16.8	14.6	20.9	25.7	sunny
Mowitch Site 1	7/18/2003	8:24 H 8.9	14:57 L 0.6	9:11	beach seine	18	15.9	21.5	24.2	sunny
Mowitch Site 2	7/18/2003	8:24 H 8.9	14:57 L 0.6	9:08	beach seine	18.1	16	21.4	24.1	sunny
Mowitch Site 3	7/18/2003	8:24 H 8.9	14:57 L 0.6	9:04	beach seine	17.9	16.1	21.7	24.1	sunny
Mowitch Site 4	7/18/2003	8:24 H 8.9	14:57 L 0.6	9:00	beach seine	17.8	16.8	20.3	23.6	sunny
Mowitch Site 1	8/1/2003	7:05 H 10	13:51 L -0.7	7:20	block net	20		27		overcast
Mowitch Site 2	8/1/2003	7:05 H 10	13:51 L -0.7	7:30	block net	20		24		overcast
Mowitch Site 3	8/1/2003	7:05 H 10	13:51 L -0.7	7:40	block net	19		23		overcast
Mowitch Site 4	8/1/2003	7:05 H 10	13:51 L -0.7	7:50	block net	19		18.5		overcast

Table 3-9. Fish Monitoring Site Data 2003 – Mowitch Site

Site Name	Date	High Tide	Low Tide	Time	Gear	Temp - Surface (˚C)	Temp - Bottom (˚C)	Salinity - Surface (ppt)	Salinity - Bottom (ppt)	Weather
Mowitch Site 1	8/15/2003	7:23 H 9.8'	13:50 L 0.6'	8:27	block net	17.9	17.2	17.2	25	partly cloudy
Mowitch Site 2	8/15/2003	7:23 H 9.8'	13:50 L 0.6'	8:20	block net	18.2	17.2	22.9	24.9	partly cloudy
Mowitch Site 3	8/15/2003	7:23 H 9.8'	13:50 L 0.6'	8:10	block net	17.8	17	19.4	25.2	partly cloudy
Mowitch Site 4	8/15/2003	7:23 H 9.8'	13:50 L 0.6'	8:00	block net	18.1	17	22.5	25.1	partly cloudy

˚C = degree Celcius
ppt = parts per thousand

Table 3-10. Total Fish Catch 2003 – Mowitch Site

Site Name	Date	Time	Chinook	Coho	Chum	Pink	Cutthroat	Starry Flounder	Staghorn Sculpin	Buffalo Sculpin	Cabezon Sculpin	Unknown Sculpin	Tidepool Sculpin	Sailfin Sculpin	Surf Smelt	Shiner Perch	Striped Perch	Pile Perch	Penpoint Gunnel	Crescent Gunnel	Saddleback Gunnel	Pipefish	Stickleback	Snake Prickleback	Herring	TOTALS
Mowitch 1	4/21/2003	9:20	3		13		1	1	8			1											3			**30**
Mowitch 2	4/21/2003	9:20	3		30				3														13			**49**
Mowitch 3	4/21/2003	9:20	2		4	1			1														1			**9**
Mowitch 4	4/21/2003	9:20			1				1			3											9			**14**
Mowitch 1	5/6/2003	8:10							2																	**2**
Mowitch 2	5/6/2003	8:15	1						1	1			2										6			**11**
Mowitch 3	5/6/2003	8:20						1	8				1		1	7							23			**41**
Mowitch 4	5/6/2003	8:25						4	2														4			**10**
Mowitch 1	5/21/2003	8:45						3	15			10				82	1							1	3	**115**
Mowitch 2	5/21/2003	8:50					1	7	5	1		1				4,835			1					3		**4,854**
Mowitch 3	5/21/2003	8:55						2	40							400										**442**
Mowitch 4	5/21/2003	9:00						12	25							351							8		1	**397**
Mowitch 1	6/5/2003	8:40						14	10		1					578		3								**606**
Mowitch 2	6/5/2003	8:50						6	5							2,100										**2,111**
Mowitch 3	6/5/2003	9:00						1	76			1				18							5			**101**
Mowitch 4	6/5/2003	9:10						12	43							80										**135**
Mowitch 1	6/19/2003	13:10						14	24			5	5						1	1	1		1			**52**
Mowitch 2	6/19/2003	13:20						5	15			2	2			5,600							2	5		**5,631**
Mowitch 3	6/19/2003	13:40						11	58				37	1	1	600			4							**712**
Mowitch 4	6/19/2003	13:50		1				3	6			1	7			80					1		4			**103**
Mowitch 1	7/2/2003	10:38							5							411						2				**418**
Mowitch 2	7/2/2003	11:02														8							1			**9**
Mowitch 3	7/2/2003	11:05							3							131								50 (juvenile)		**184**
Mowitch 4	7/2/2003	11:15						9	31			9				170								13 (juvenile)		**232**
Mowitch 1	7/18/2003	13:10							27			4	5			1,225							1	2		**1,264**
Mowitch 2	7/18/2003	13:25						4	25			1				550					1		2			**583**
Mowitch 3	7/18/2003	13:35						2	8				2			1,020					3					**1,035**
Mowitch 4	7/18/2003	13:45						28	7			34			1	2,500					1		9	1		**2,581**
Mowitch 1	8/1/2003	12:20						8	17			2	3			1,123					1	1	7			**1,162**
Mowitch 2	8/1/2003	12:35						5	18							273							61			**357**
Mowitch 3	8/1/2003	12:50																								**0**
Mowitch 4	8/1/2003	13:05						13	5				2			345					1		70			**436**
Mowitch 1	8/15/2003	12:30														21					1					**22**
Mowitch 2	8/15/2003	12:45						1	9														10			**20**
Mowitch 3	8/15/2003	13:00							4			4	1		5	264										**278**
Mowitch 4	8/15/2003	13:15						9	3			31	2			80										**125**
TOTALS			**9**	**1**	**48**	**1**	**2**	**175**	**510**	**2**	**1**	**109**	**69**	**1**	**8**	**22,852**	**1**	**3**	**6**	**1**	**10**	**3**	**303**	**12**	**4**	**24,131**

Table 3-11. Seasonal Bird Counts at Mowitch

Common Name	Scientific Name	Total Count	Spring	Summer	Fall
American crow	*Corvus brachyrhynchos*	4		2	2
American goldfinch	*Carduelis tristis*	13	5	6	2
American robin	*Turdus migratorius*	11	4	7	
American wigeon	*Anas americana*	6	4		2
barn swallow	*Hirundo rustica*	20	10	10	
belted kingfisher	*Ceryle alcyon*	13	3	3	7
Brewer's blackbird	*Euphagus cyanocephalus*	6	6		
Canada goose	*Branta canadensis*	146	66	57	23
cliff swallow	*Petrochelidon pyrrhonota*	44	39	5	
crow	*Corvus sp.*	3			3
double-crested cormorant	*Phalacrocorax auritus*	2	2		
European starling	*Sturnus vulgaris*	100	14	69	17
glaucous-winged gull	*Larus glaucescens*	28	4	5	19
great blue heron	*Ardea herodias*	7	2	2	3
house finch	*Carpodacus mexicanus*	83	14	44	25
house sparrow	*Passer domesticus*	3	3		
killdeer	*Charadrius vociferus*	39	17	12	10
mallard	*Anas platyrhynchos*	64	21	15	28
mourning dove	*Zenaida macroura*	16	10	6	
Northern shoveler	*Anas clypeata*	3			3
Northwestern crow	*Corvus caurinus*	1	1		
osprey	*Pandion haliaetus*	1	1		
pied-bill grebe	*Podilymbus podiceps*	1			1
red-tailed hawk	*Buteo jamaicensis*	1	1		
sandpiper	*Calidris sp.*	1			1
savannah sparrow	*Passerculus sandwichensis*	13	10		3
semipalmated sandpiper	*Calidris pusilla*	14	14		
song sparrow	*Melospiza melodia*	8	6	1	1
spotted sandpiper	*Actitis macularia*	16	6	9	1
violet-green swallow	*Tachycineta thalassina*	27	19	8	
western sandpiper	*Calidris mauri*	4		4	
white-crowned sparrow	*Zonotrichia leucophrys*	7	7		
	Total Number of Species:	**32**	**26**	**18**	**18**
	Total Number of Birds:	**705**	**289**	**265**	**151**

Notes:
Blank indicates no bird was observed.

Spring = March to May
Summer = June to August
Fall = September to November

Table 3-12. Bird Use at Mowitch

Date	Common Name	Scientific Name	Gender	Count	Tide	Seen	Heard	Tracks	FlyOver	Pier/Pilings	Riparian	Marsh	Intertidal	MudFlats	OpenWater	Comments
4/29/2003	American robin	*Turdus migratorius*	U	1	M	X	X				X					singing
4/29/2003	American wigeon	*Anas americana*	U	3	M										X	
4/29/2003	barn swallow	*Hirundo rustica*	U	2	M											
4/29/2003	belted kingfisher	*Ceryle alcyon*	U	1	M				X							
4/29/2003	Canada goose	*Branta canadensis*	U	4	M					X					X	resting
4/29/2003	cliff swallow	*Petrochelidon pyrrhonota*	U	4	M											
4/29/2003	double-crested cormorant	*Phalacrocorax auritus*	U	1	M											juvenile; foraging
4/29/2003	European starling	*Sturnus vulgaris*	U	5	M				X			X				3 flyover, 2 in marsh
4/29/2003	house finch	*Carpodacus mexicanus*	U		M								X			
4/29/2003	killdeer	*Charadrius vociferus*	U	4	M	X	X				X	X				
4/29/2003	mallard	*Anas platyrhynchos*	U	4	M											
4/29/2003	mourning dove	*Zenaida macroura*	U	2	M	X					X					
4/29/2003	savannah sparrow	*Passerculus sandwichensis*	U	8	M	X	X									
4/29/2003	semipalmated sandpiper	*Calidris pusilla*	U	5	M											
4/29/2003	song sparrow	*Melospiza melodia*	U	2	M		X				X					1 singing
4/29/2003	violet-green swallow	*Tachycineta thalassina*	U	4	M				X							foraging
4/29/2003	white-crowned sparrow	*Zonotrichia leucophrys*	U	1	M	X	X				X					singing
4/30/2003	American wigeon	*Anas americana*	F	1	M	X									X	
4/30/2003	barn swallow	*Hirundo rustica*	M	2	M	X			X							
4/30/2003	Brewer's blackbird	*Euphagus cyanocephalus*	M	3	M	X			X							
4/30/2003	Canada goose	*Branta canadensis*	U	25	M	X						X	X			2 family groups 6+8 goslings
4/30/2003	cliff swallow	*Petrochelidon pyrrhonota*	U	15	M	X			X							gathering mud from far bank
4/30/2003	European starling	*Sturnus vulgaris*	U	3	M	X			X							
4/30/2003	house finch	*Carpodacus mexicanus*	M	2	M	X					X	X				on fence
4/30/2003	house finch	*Carpodacus mexicanus*	U	1	M	X			X							
4/30/2003	killdeer	*Charadrius vociferus*	U	3	M	X	X				X	X	X			broken wing behavior x 1
4/30/2003	mallard	*Anas platyrhynchos*	M	6	M	X							X		X	
4/30/2003	mallard	*Anas platyrhynchos*	F	1	M	X									X	
4/30/2003	mourning dove	*Zenaida macroura*	U	3	M	X			X							using trees in opposite bank riparian
4/30/2003	savannah sparrow	*Passerculus sandwichensis*	M	1	M	X					X					on fence
4/30/2003	semipalmated sandpiper	*Calidris pusilla*	U	9	M	X							X			
4/30/2003	spotted sandpiper	*Actitis macularia*	U	1	M	X							X			

Table 3-12. Bird Use at Mowitch

Date	Common Name	Scientific Name	Gender	Count	Tide	Seen	Heard	Tracks	FlyOver	Pier/Pilings	Riparian	Marsh	Intertidal	MudFlats	OpenWater	Comments
4/30/2003	violet-green swallow	*Tachycineta thalassina*	U	5	M	X			X							also using fence
4/30/2003	white-crowned sparrow	*Zonotrichia leucophrys*	M	1	M	X	X				X					
5/15/2003	American goldfinch	*Carduelis tristis*	U	1	M		X									
5/15/2003	American robin	*Turdus migratorius*	U	1	M	X					X					fence
5/15/2003	barn swallow	*Hirundo rustica*	U	4	M	X			X		X					
5/15/2003	belted kingfisher	*Ceryle alcyon*	F	1	M	X			X							
5/15/2003	Brewer's blackbird	*Euphagus cyanocephalus*	U	3	M	X					X					displaying
5/15/2003	Canada goose	*Branta canadensis*	U	21	M	X			X				X			all adults
5/15/2003	cliff swallow	*Petrochelidon pyrrhonota*	U	20	M	X			X							flying over and gathering mud
5/15/2003	double-crested cormorant	*Phalacrocorax auritus*	U	1	M	X				X						
5/15/2003	European starling	*Sturnus vulgaris*	U	1	M	X			X							
5/15/2003	house finch	*Carpodacus mexicanus*	U	5	M	X						X				
5/15/2003	house sparrow	*Passer domesticus*	U	3	M	X						X				fence
5/15/2003	killdeer	*Charadrius vociferus*	U	5	M	X							X			1 flew to nest on railroad tracks adjacent to site
5/15/2003	mallard	*Anas platyrhynchos*	M	4	M	X									X	
5/15/2003	mallard	*Anas platyrhynchos*	F	1	M	X									X	
5/15/2003	mourning dove	*Zenaida macroura*	U	2	M	X						X				
5/15/2003	red-tailed hawk	*Buteo jamaicensis*	U	1	M	X			X							
5/15/2003	savannah sparrow	*Passerculus sandwichensis*	U	1	M	X						X				
5/15/2003	song sparrow	*Melospiza melodia*	U	1	M		X									
5/15/2003	spotted sandpiper	*Actitis macularia*	U	2	M	X							X			
5/15/2003	violet-green swallow	*Tachycineta thalassina*	U	7	M	X			X		X					
5/15/2003	white-crowned sparrow	*Zonotrichia leucophrys*	U	3	M		X									
5/29/2003	American goldfinch	*Carduelis tristis*	U	4	L	X	X		X				X			
5/29/2003	American robin	*Turdus migratorius*	U	2	L	X					X					
5/29/2003	barn swallow	*Hirundo rustica*	U	2	L				X							
5/29/2003	belted kingfisher	*Ceryle alcyon*	F	1	L											
5/29/2003	Canada goose	*Branta canadensis*	U	16	L	X					X				X	2 pairs w/ 7 total goslings riparian->open water
5/29/2003	cliff swallow	*Petrochelidon pyrrhonota*	U		L	X			X				X			landing at high tide line
5/29/2003	European starling	*Sturnus vulgaris*	U	5	L				X							

Table 3-12. Bird Use at Mowitch

Date	Common Name	Scientific Name	Gender	Count	Tide	Seen	Heard	Tracks	FlyOver	Pier/Pilings	Riparian	Marsh	Intertidal	MudFlats	OpenWater	Comments
5/29/2003	glaucous-winged gull	*Larus glaucescens*	U	4	L				X							
5/29/2003	great blue heron	*Ardea herodias*	U	2	L	X			X				X			
5/29/2003	house finch	*Carpodacus mexicanus*	U	6	L	X	X				X					
5/29/2003	killdeer	*Charadrius vociferus*	U	5	L	X	X				X	X	X			2 pairs; territorial (possibly 3 pairs)
5/29/2003	mallard	*Anas platyrhynchos*	U	5	L	X									X	
5/29/2003	mourning dove	*Zenaida macroura*	U	3	L	X			X		X					
5/29/2003	Northwestern crow	*Corvus caurinus*	U	1	L								X			
5/29/2003	osprey	*Pandion haliaetus*	U	1	L				X							
5/29/2003	song sparrow	*Melospiza melodia*	U	3	L		X				X					fence
5/29/2003	spotted sandpiper	*Actitis macularia*	U	3	L	X	X				X		X	X		
5/29/2003	violet-green swallow	*Tachycineta thalassina*	U	3	L	X			X							
5/29/2003	white-crowned sparrow	*Zonotrichia leucophrys*	U	2	L											1 pair; territorial, mid-size
6/13/2003	American crow	*Corvus brachyrhynchos*	U	1	M	X			X							
6/13/2003	American goldfinch	*Carduelis tristis*	U	1	M	X			X							
6/13/2003	barn swallow	*Hirundo rustica*	U	2	M	X			X							
6/13/2003	Canada goose	*Branta canadensis*	U	19	M	X									X	2 goslings (2 age classes)
6/13/2003	cliff swallow	*Petrochelidon pyrrhonota*	U	5	M	X			X							
6/13/2003	glaucous-winged gull	*Larus glaucescens*	U	4	M											
6/13/2003	killdeer	*Charadrius vociferus*	U	3	M	X						X				
6/13/2003	song sparrow	*Melospiza melodia*	U	1	M								X			
6/13/2003	spotted sandpiper	*Actitis macularia*	U	3	M						X		X			1 displaying, 1 flew up out of riparian (twice from same vicinity; nest?)
6/18/2003	American crow	*Corvus brachyrhynchos*	U	1	H	X			X							
6/18/2003	American goldfinch	*Carduelis tristis*	U	3	H	X						X				
6/18/2003	American robin	*Turdus migratorius*	U	4	H	X			X		X					
6/18/2003	barn swallow	*Hirundo rustica*	U	5	H	X			X							
6/18/2003	belted kingfisher	*Ceryle alcyon*	U	1	H	X			X							flew back with fish
6/18/2003	Canada goose	*Branta canadensis*	U	38	H	X			X		X	X	X		X	5 adults and --- (very young) goslings (foraging in marsh)
6/18/2003	European starling	*Sturnus vulgaris*	U	9	H	X			X				X			
6/18/2003	glaucous-winged gull	*Larus glaucescens*	U	1	H	X			X							

Table 3-12. Bird Use at Mowitch

Date	Common Name	Scientific Name	Gender	Count	Tide	Seen	Heard	Tracks	FlyOver	Pier/Pilings	Riparian	Marsh	Intertidal	MudFlats	OpenWater	Comments
6/18/2003	great blue heron	*Ardea herodias*	U	2	H	X			X				X			high tide has filled top intertidal and heron is -- and then flew to use 2nd filled intertidal
6/18/2003	house finch	*Carpodacus mexicanus*	U	6	H	X			X							
6/18/2003	house finch	*Carpodacus mexicanus*	U	8	H	X				X		X	X			
6/18/2003	killdeer	*Charadrius vociferus*	U	5	H		X				X		X			
6/18/2003	mallard	*Anas platyrhynchos*	U	9	H	X									X	4 adults, 2 juvenille males, 2 females
6/18/2003	mourning dove	*Zenaida macroura*	U	1	H	X										
6/18/2003	spotted sandpiper	*Actitis macularia*	U	5	H		X						X			mating display, chase, bathing
6/18/2003	violet-green swallow	*Tachycineta thalassina*	U	8	H	X										
8/30/2003	American goldfinch	*Carduelis tristis*	F	2	H	X	X				X					
8/30/2003	American robin	*Turdus migratorius*	U	3	H	X	X				X					
8/30/2003	barn swallow	*Hirundo rustica*	U	3	H				X							
8/30/2003	belted kingfisher	*Ceryle alcyon*	M	1	H	X	X		X							
8/30/2003	belted kingfisher	*Ceryle alcyon*	F	1	H	X	X		X							
8/30/2003	European starling	*Sturnus vulgaris*	U	60	H	X			X			X				
8/30/2003	house finch	*Carpodacus mexicanus*	U	30	H	X	X		X			X	X			feeding in marsh
8/30/2003	killdeer	*Charadrius vociferus*	U	4	H	X							X			
8/30/2003	mallard	*Anas platyrhynchos*	U		H	X			X			X				
8/30/2003	mallard	*Anas platyrhynchos*	U	6	H				X							
8/30/2003	mourning dove	*Zenaida macroura*	U	5	H	X					X					
8/30/2003	spotted sandpiper	*Actitis macularia*	U	1	H		X						X			
8/30/2003	western sandpiper	*Calidris mauri*	U	4	H	X			X			X				preening, loafing on downed wood
9/17/2003	American crow	*Corvus brachyrhynchos*	U	2	M	X	X		X		X					loafing
9/17/2003	belted kingfisher	*Ceryle alcyon*	M	2	M	X	X		X							sat in trees on south side
9/17/2003	belted kingfisher	*Ceryle alcyon*	F	1	M	X	X		X							
9/17/2003	European starling	*Sturnus vulgaris*	U	5	M	X	X		X							flyover
9/17/2003	glaucous-winged gull	*Larus glaucescens*	U	2	M	X			X	X						resting on piling
9/17/2003	great blue heron	*Ardea herodias*	U	2	M	X			X							
9/17/2003	house finch	*Carpodacus mexicanus*	U	17	M	X	X		X		X	X				some foraging in marsh
9/17/2003	killdeer	*Charadrius vociferus*	U	5	M	X	X					X	X			feeding, preening, loafing
9/17/2003	mallard	*Anas platyrhynchos*	M	2	M	X							X		X	loafing

Table 3-12. Bird Use at Mowitch

Date	Common Name	Scientific Name	Gender	Count	Tide	Seen	Heard	Tracks	FlyOver	Pier/Pilings	Riparian	Marsh	Intertidal	MudFlats	OpenWater	Comments
9/17/2003	mallard	*Anas platyrhynchos*	F	5	M	X							X		X	2 loafing on fl logs
9/26/2003	American goldfinch	*Carduelis tristis*	U	2	L		X		X		X					
9/26/2003	belted kingfisher	*Ceryle alcyon*	U	3	L				X							
9/26/2003	Canada goose	*Branta canadensis*	U	23	L	X										
9/26/2003	European starling	*Sturnus vulgaris*	U	12	L				X							
9/26/2003	glaucous-winged gull	*Larus glaucescens*	U	10	L											
9/26/2003	great blue heron	*Ardea herodias*	U	1	L					X						
9/26/2003	house finch	*Carpodacus mexicanus*	U	6	L	X	X		X		X					
9/26/2003	killdeer	*Charadrius vociferus*	U	5	L	X	X									
9/26/2003	mallard	*Anas platyrhynchos*	U	12	L	X										
9/26/2003	savannah sparrow	*Passerculus sandwichensis*	U	3	L	X	X									
9/26/2003	song sparrow	*Melospiza melodia*	U	1	L	X	X									
9/26/2003	spotted sandpiper	*Actitis macularia*	U	1	L	X							X			
9/26/2003	Northern shoveler	*Anas clypeata*	U	3	L											
9/26/2003	sandpiper	*Calidris sp.*	U	1	L	X							X			
11/7/2003	American wigeon	*Anas americana*	U	2	L										X	male and female
11/7/2003	belted kingfisher	*Ceryle alcyon*	U	1	L	X			X	X						
11/7/2003	crow	*Corvus sp.*	U	3	L	X					X		X			
11/7/2003	glaucous-winged gull	*Larus glaucescens*	U	7	L								X			foraging
11/7/2003	house finch	*Carpodacus mexicanus*	U	2	L	X					X					
11/7/2003	mallard	*Anas platyrhynchos*	F	5	L								X		X	
11/7/2003	mallard	*Anas platyrhynchos*	M	4	L								X		X	
11/7/2003	pied-bill grebe	*Podilymbus podiceps*	U	1	L										X	

Notes:
Gender: "F" = female, "M" = male, "U" = unknown
Tide: "L" = low, "M" = medium, "H" = high

Table 3-13. Marsh and Riparian Areal Cover by Polygon at Squally Beach.

Vegetation Polygon	Percent Cover	Dominant Species
MA	85	*Carex lyngbyei*
MB	70	*Eleocharis* sp.
MC	70	*Distichlis spicata, Atriplex patula, Carex lyngbyei*
MD	60	*Atriplex patula, Distichlis spicata, Grindelia integrifolia, Salicornia virginica, Jaumea carnosa, Cotula coronopifolia*
ME	70	*Distichlis spicata, Atriplex patula*
MF	50	*Salicornia virginica, Cotula coronopifolia*
MG	25	*Salicornia virginica, Atriplex patula*
MH	35	*Distichlis spicata, Atriplex patula*
MI	70	*Atriplex patula*
MJ	90	*Atriplex patula*
MK	35	*Atriplex patula, Scirpus americanus, Salicornia viriginica*
ML	60	*Atriplex patula, Distichlis spicata*
MM	70	*Atriplex patula, Jaumea carnosa, Distichlis spicata*
MN	80	*Atriplex patula*
MO	85	*Atriplex patula, Grindelia integrifolia*
MP	95	*Jaumea carnosa, Salicornia virginica, Glaux maritima*
MQ	50	*Eleocharis* sp.
RA	95	*Salix hookeriana, Alnus rubra, Rosa* spp., weedy herbaceous spp.
RB	90	*Lepidium* sp., *Lotus corniculatus, Atriplex patula, Rosa* spp.
RC	45	*Lotus corniculatus, Lepidium* sp., *Atriplex patula*

Note: In "Vegetation Polygon" column, M=Marsh polygon and R=Riparian polygon. The second letter is assigned in sequential order.

Table 3-14. Quadrat Locations Along Marsh and Riparian Transects at Squally Beach.

Marsh Transect 1-1		Marsh Transect 1-2		Marsh Transect 1-3		Riparian Transect 1-1	
Quadrat	**Distance Along Transect (ft)**	**Quadrat**	**Distance Along Transect (ft)**	**Quadrat**	**Distance Along Transect (ft)**	**Quadrat**	**Distance Along Transect (ft)**
1	22	1	3	1	3	1	2
2	38	2	37	2	7	2	16
3	51	3	41	3	9	3	20
4	57	4	86	4	17	4	38
5	72	5	108	5	53	5	57
6	84	6	111	6	68	6	80
7	87	7	116	7	75	7	124
8	99	8	137	8	94	8	135
9	105	9	142	9	96	9	151
10	112	10	156	10	103	10	164
11	120	11	173	11	108	11	167
12	122	12	175	12	115	12	175
13	135	13	177	13	120	13	184
14	183	14	272	14	132	14	194
15	207	15	277	15	153	15	235
16	214			16	192	16	242
17	224					17	246
18	240					18	259
19	243					19	269
20	246					20	292
21	253					21	327
22	292					22	344
23	**324**					23	348
24	**326**					24	352
25	**331**					25	372
26	**334**						

Notes:
Bold indicates quadrats where pre-restoration natural plant communities exist.

Table 3-15a. Marsh Development at Squally Beach, Transect 1-1 - Percent Cover

Common Name	Scientific Name	Average % Cover	Average % Where Found	Quadrats, Transect 1-1																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Percent of quadrat situated within herbivory exclusion device				0	50	25	25	50	50	33	75	100	100	100	100	100	100	100	100	100	100	100	100	100	0
Native																									
pickleweed	*Salicornia virginica*	4.9	14.2				10		5	5		10					3				35	15	30		15
entire-leaved gumweed	*Grindelia integrifolia*	0.5	4.7					5								4		5							
fleshy jaumea	*Jaumea carnosa*	11.0	28.6		25		1	35				40				2	3	15			45	70	50		
orache, fat-hen saltbush	*Atriplex patula*	8.9	21.0		5	10		10	5			3	40				30	70			15	3			40
seashore saltgrass	*Distichlis spicata*	5.3	17.1		30	5	15	15	2												30	20	20		
seaside plantain	*Plantago maritima*	0.1	1.5					1				2													
Non-Native or Invasive[1]																									
brass buttons	*Cotula coronopifolia*	0.1	2.0						2																

Notes:
Quadrat locations were determined randomly, and four (quadrats 23 through 26) were thus located in areas where pre-restoration natural plant communities exist.
These are presented separately in Table 3-15b.
1: Unknown species are assumed to be weeds or invasives.
Blank indicates species was not observed in the quadrat

Table 3-15b. Marsh Development at Squally Beach, Transect 1-1, Native Vegetation - Percent Cover

Common Name	Scientific Name	Average % Cover	Average % Where Found	Quadrats, Transect 1-1			
				23	24	25	26
Percent of quadrat situated within herbivory exclusion device				0	0	0	0
Native							
pickleweed	*Salicornia virginica*	1.3	17.5	15	20		
fleshy jaumea	*Jaumea carnosa*	4.8	41.7	25	50		50
orache, fat-hen saltbush	*Atriplex patula*	1.6	20.5	1			40
sea milkwort	*Glaux maritima*	2.7	35.0	45	25		
seashore saltgrass	*Distichlis spicata*	1.2	10.0	10	5		15
seaside plantain	*Plantago maritima*	0.0	1.0				1

Notes:
Blank indicates species was not observed in the quadrat

Table 3-15c. Marsh Development at Squally Beach, Transect 1-2 - Percent Cover

Common Name	Scientific Name	Average % Cover	Average % Where Found	Quadrats, Transect 1-2														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Percent of quadrat situated within herbivory exclusion device				0	100	100	100	0	25	75	100	100	100	100	100	100	100	100
Native																		
American bulrush	*Scirpus americanus*	11.9	44.5				30	70	75	3								
pickleweed	*Salicornia virginica*	2.7	13.3			20					10			10				
seacoast bulrush	*Scirpus maritimus*	4.7	23.3							30	15	25						
Hooker's willow	*Salix hookeriana*	15.7	39.2				35	5	30					50	55	60		
entire-leaved gumweed	*Grindelia integrifolia*	2.7	20.0		20	20												
fleshy jaumea	*Jaumea carnosa*	1.0	7.5										5					10
Lyngby's sedge	*Carex lyngbyei*	8.7	65.0	90							40							
orache, fat-hen saltbush	*Atriplex patula*	22.3	25.8		15	15		15	10	40	20	5	10	40	30	35	50	50
red alder	*Alnus rubra*	2.7	20.0						25	15								
seashore saltgrass	*Distichlis spicata*	5.3	20.0	15	10	35								20				
seaside plantain	*Plantago maritima*	1.1	5.7			10						2				5		
tufted hairgrass	*Deschampsia cespitosa*	0.7	5.5		10			1										
Non-Native or Invasive[1]																		
brass buttons	*Cotula coronopifolia*	1.4	7.0		5	15											1	
brome	*Bromus sp.*	0.1	1.0							1								
hedge mustard	*Sisymbrium officinale*	2.0	30.0														30	
perennial ryegrass	*Lolium perenne*	1.0	15.0		15													
unclassified-composite	*unclassified-composite*	0.1	1.0	1														

Notes:
1: Unknown species are assumed to be weeds or invasives.
Blank indicates species was not observed in the quadrat

Table 3-15d. Marsh Development at Squally Beach, Transect 1-3 - Percent Cover

Common Name	Scientific Name	Average % Cover	Average % Where Found	Quadrats, Transect 1-3															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Percent of quadrat situated within herbivory exclusion device				100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Native																			
pickleweed	*Salicornia virginica*	1.4	7.3	20		1	1												
fleshy jaumea	*Jaumea carnosa*	0.2	3.0			3													
orache, fat-hen saltbush	*Atriplex patula*	6.3	33.3			20	30												50
seashore saltgrass	*Distichlis spicata*	0.9	15.0			15													
spike-rush	*Eleocharis sp.*	0.3	2.5					4		1									
Non-Native or Invasive[1]																			
brass buttons	*Cotula coronopifolia*	0.4	2.0	3							1	2							

Notes:
1: Unknown species are assumed to be weeds or invasives.
Blank indicates species was not observed in the quadrat

Table 3-16a. Marsh Development at Squally Beach, Transect 1-1 - Cover (Daubenmire Method)

Common Name	Scientific Name	Transect 1-1 Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition
Native					
pickleweed	Salicornia virginica	142.5	6.5	9.0	0.83
entire-leaved gumweed	Grindelia integrifolia	7.5	0.3	3.0	0.04
fleshy jaumea	Jaumea carnosa	250	11.4	10.0	1.46
orache, fat-hen saltbush	Atriplex patula	230	10.5	11.0	1.34
seashore saltgrass	Distichlis spicata	140	6.4	8.0	0.82
seaside plantain	Plantago maritima	5	0.2	2.0	0.03
Subtotal		*775*	*35.2*		*4.53*
Non-Native or Invasive					
brass buttons	*Cotula coronopifolia*	2.5	0.1	1.0	0.01
Subtotal		*2.5*	*0.1*		*0.01*
TOTAL		**777.5**	**35.3**		**4.55**
Proportion of non-native or invasive plants (%):			**0.3%**		

Notes:
Four quadrats (23 through 26) were located in areas where pre-restoration natural plant communities exist. These are not included in the Daubenmire calculations.

Table 3-16b. Marsh Development at Squally Beach, Transect 1-2 - Cover (Daubenmire Method)

Common Name	Scientific Name	Transect 1-2 Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition
Native					
American bulrush	*Scirpus americanus*	165	11.0	26.7	0.89
pickleweed	*Salicornia virginica*	45	3.0	20.0	0.24
seacoast bulrush	*Scirpus maritimus*	67.5	4.5	20.0	0.37
Hooker's willow	*Salix hookeriana*	240	16.0	40.0	1.30
entire-leaved gumweed	*Grindelia integrifolia*	30	2.0	13.3	0.16
fleshy jaumea	*Jaumea carnosa*	17.5	1.2	13.3	0.09
Lyngby's sedge	*Carex lyngbyei*	122.5	8.2	13.3	0.66
orache, fat-hen saltbush	*Atriplex patula*	317.5	21.2	86.7	1.72
red alder	*Alnus rubra*	30	2.0	13.3	0.16
seashore saltgrass	*Distichlis spicata*	82.5	5.5	26.7	0.45
seaside plantain	*Plantago maritima*	20	1.3	20.0	0.11
tufted hairgrass	*Deschampsia cespitosa*	17.5	1.2	13.3	0.09
Subtotal		*1155*	*77.0*		*6.25*
Non-Native or Invasive[1]					
brass buttons	*Cotula coronopifolia*	20	1.3	20.0	0.11
brome	*Bromus sp.*	2.5	0.2	6.7	0.01
hedge mustard	*Sisymbrium officinale*	37.5	2.5	6.7	0.20
perennial ryegrass	*Lolium perenne*	15	1.0	6.7	0.08
unclassified-composite	*unclassified-composite*	2.5	0.2	6.7	0.01
Subtotal		*77.5*	*5.2*		*0.42*
TOTAL		**1232.5**	**82.2**		**6.67**
Proportion of non-native or invasive plants (%):			**6.3%**		

Table 3-16c. Marsh Development at Squally Beach, Transect 1-3 - Cover (Daubenmire Method)

Common Name	Scientific Name	Transect 1-3			
		Total Canopy	Canopy Cover (%)	Frequency (%)	Species Composition
Native					
pickleweed	*Salicornia virginica*	20	1.3	18.8	0.89
fleshy jaumea	*Jaumea carnosa*	2.5	0.2	6.3	0.11
orache, fat-hen saltbush	*Atriplex patula*	90	5.6	18.8	4.02
seashore saltgrass	*Distichlis spicata*	15	0.9	6.3	0.67
spike-rush	*Eleocharis sp.*	5	0.3	12.5	0.22
Subtotal		*132.5*	*8.3*		*5.92*
Non-Native or Invasive					
brass buttons	*Cotula coronopifolia*	7.5	0.5	18.8	0.33
Subtotal		*7.5*	*0.5*		*0.33*
TOTAL		**140**	**8.8**		**6.25**
Proportion of non-native or invasive plants (%):			**5.4%**		

Notes:
1: Unknown species are assumed to be weeds or invasives.

Total canopy: Obtained by counting the number of quadrats in each of six cover classes (by species), multiplying this value times the midpoint of the appropriate cover class, and totalling the products for all cover classes by species.
Canopy cover: Obtained by dividing the total canopy by the total number of quadrats sampled on the transect.

Frequency: Obtained by dividing the number of occurrences of a plant species (the number of quadrats in which a plant species was observed) by the total number of quadrats sampled along the transect.

Species composition: Obtained by dividing the percent canopy cover of each plant species by the total canopy cover of all plant species.

See Appendix C for a complete description of the Daubenmire method.

Table 3-17. Marsh Development at Squally Beach - Stem Height

Common Name	Scientific Name	Average Stem Height (in.)	Quadrats, Transect 1-2														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
American bulrush	*Scirpus americanus*	33.0				48	36	36	12								
seacoast bulrush	*Scirpus maritimus*	19.0							24	18	15						
Lyngby's sedge	*Carex lyngbyei*	14.3	17							12							

Notes:
Stem height in inches
Blank indicates no vegetation was observed in the quadrat

Table 3-18. Marsh Development at Squally Beach - Shoot Density

Common Name	Scientific Name	Average Shoot Density	Quadrats, Transect 1-2														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
American bulrush	*Scirpus americanus*	86.8				61	152	132	2								
seacoast bulrush	*Scirpus maritimus*	8.3							12	5	8						
Lyngby's sedge	*Carex lyngbyei*	105.5	173							38							

Notes:
Shoot density in shoots per quadrat. Quadrats are 0.25 m^2 in area.
Blank indicates no vegetation was observed in the quadrat

Table 3-19. Riparian Coverage at Squally Beach - Percent Cover

Common Name	Scientific Name	No. of Quadrats Found [1]	No. of Quadrats Surviving	Percent Cover (range)	Percent Cover (mean)
Herbs, Forbs and Grasses					
bentgrass	*Agrostis sp.*	9	9	3 to 40	14.8
birds-foot trefoil	*Lotus corniculatus*	14	13	2 to 40	11.6
black medick	*Medicago lupulina*	1	1	3	3.0
brome	*Bromus sp.*	4	4	3 to 5	4.0
bull thistle	*Cirsium vulgare*	1	1	10	10.0
bulrush	*Scirpus sp.*	1	1	20	20.0
buttercup	*Ranunculus sp.*	2	2	3	3.0
common dandelion	*Taraxacum officinale*	4	4	3 to 10	5.3
common horsetail	*Equisetum arvense*	2	2	3 to 6	4.5
common mullein	*Verbascum thapsus*	1	1	15	15.0
common rush	*Juncus effusus*	6	6	2 to 20	8.3
common St. John's-wort	*Hypericum perforatum*	1	1	1	1.0
common velvet-grass	*Holcus lanatus*	22	22	1 to 30	11.6
creeping buttercup	*Ranunculus repens*	5	5	3 to 15	9.6
curly dock	*Rumex crispus*	1	1	2	2.0
dovefoot geranium	*Geranium molle*	1	1	1	1.0
English plantain	*Plantago lanceolata*	6	6	2 to 5	4.0
field bindweed	*Convolvulus arvensis*	1	1	5	5.0
geranium	*Geranium sp.*	1	1	3	3.0
giant horsetail	*Equisetum telmateia*	3	3	30 to 40	35.0
hairy catsear	*Hypochaeris radicata*	2	2	2 to 5	3.5
hedge mustard	*Sisymbrium officinale*	6	4	2 to 50	22.8
horsetail	*Equisetum sp.*	2	2	5 to 8	6.5
Japanese knotweed	*Polygonum cuspidatum*	1	1	3	3.0
Lyngby's sedge	***Carex lyngbyei***	1	1	10	10.0
orache, fat-hen saltbush	***Atriplex patula***	3	3	3 to 5	3.7
pea vine	*Lathyrus sp.*	1	1	1	1.0
perennial ryegrass	*Lolium perenne*	11	11	3 to 40	13.5
purple-leaved willowherb	***Epilobium ciliatum***	8	8	3 to 7	4.4
red clover	*Trifolium pratense*	6	6	1 to 5	3.2
red fescue	***Festuca rubra***	13	13	5 to 40	15.9
redtop	*Agrostis alba*	13	13	5 to 60	28.5
reed canarygrass	*Phalaris arundinacea*	4	4	2 to 25	8.3
rush	*Juncus sp.*	2	2	2 to 3	2.5
sickle-keeled lupine	***Lupinus albicaulis***	4	3	20 to 30	25.0
cleavers	*Galium aparine*	3	1	3 to 5	4.0
thistle	*Cirsium sp.*	1	1	3	3.0
vetch	*Vicia sp.*	2	2	1	1.0
white clover	*Trifolium repens*	4	4	1 to 5	2.5
white sweet-clover	*Melilotus alba*	1	1	2	2.0
willowherb	*Epilobium sp.*	12	12	2 to 20	10.3
unclassified-composite	unclassified-composite	3	2	1 to 3	2.3
unclassified-grass	unclassified-grass	4	4	1 to 5	2.5
unclassified-herb	unclassified-herb	3	3	2 to 8	4.0

Table 3-19. Riparian Coverage at Squally Beach - Percent Cover

Common Name	Scientific Name	No. of Quadrats Found [1]	No. of Quadrats Surviving	Percent Cover (range)	Percent Cover (mean)
Shrubs					
beaked hazelnut	***Corylus cornuta***	1	1	5	5.0
common snowberry	***Symphoricarpos albus***	3	3	5 to 15	9.0
cutleaf blackberry	*Rubus laciniatus*	1	1	1	1.0
dull Oregon-grape	***Mahonia nervosa***	1	1	6	6.0
Himalayan blackberry	*Rubus discolor*	19	19	2 to 35	15.1
Indian plum	***Oemleria cerasiformis***	1	1	1	1.0
oceanspray	***Holodiscus discolor***	5	5	5 to 15	9.4
red elderberry	***Sambucus racemosa***	2	0	1 to 3	2.0
red-flowering current	***Ribes sanguineum***	7	7	1 to 25	9.7
red-osier dogwood	***Cornus stolonifera***	8	8	3 to 25	16.0
rose	***Rosa sp.***	8	8	1 to 45	22.6
Scot's broom	*Cytisus scoparius*	2	2	2 to 10	6.0
twinberry honeysuckle	***Lonicera involucrata***	2	2	15 to 20	17.5
Trees					
Douglas fir	***Pseudotsuga menziesii***	3	3	7 to 25	15.7
Hooker's willow	***Salix hookeriana***	19	19	5 to 95	41.5
lodgepole pine	***Pinus contorta***	1	1	5	5.0
Pacific willow	***Salix lasiandra***	1	0	10	10.0
red alder	***Alnus rubra***	20	20	7 to 95	40.4
western hemlock	***Tsuga heterophylla***	1	1	5	5.0

Notes: There were a total of 25 quadrats

1: No. of Quadrats Found = Number of quadrats in which the species was observed

Bold are native species. All other entries are non-native or invasive.

Mean percent cover is calculated for the number of quadrats where the plant was observed.