$Biodiversity_Sampling_Final_Group_Submission$

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Table 1: Biodiversity of invertebrates on various substrates

vertical_	_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	1	1	1	B. glandula	9	cobble	NA
	1	1	1	C. dalli	2	cobble	NA
	1	1	2	NA	NA	sand	NA
	1	1	3	B. glandula	2	cobble	NA
	1	1	4	NA	NA	sand	NA
	1	1	5	B. glandula	5	cobble	NA
	1	1	5	C. dalli	10	cobble	NA
	1	1	6	NA	NA	sand	NA
	1	1	7	B. glandula	4	cobble	NA
	1	1	8	NA	NA	cobble	NA
	1	1	9	NA	NA	sand	NA
	1	1	10	B. glandula	40	cobble	NA
	1	1	10	C. dalli	10	cobble	NA
	1	1	10	Littorina spp.	5	cobble	NA
	1	2	1	NA	NA	cobble	NA
	1	2	2	NA	NA	sand	NA
	1	2	3	NA	NA	sand	NA
	1	2	4	NA	NA	sand	NA
	1	2	5	NA	NA	cobble	NA
	1	2	6	NA	NA	sand	NA
	1	2	7	NA	NA	sand	NA
	1	2	8	B. glandula	1	cobble	NA
	1	2	9	B. glandula	8	cobble	NA
	1	2	9	C. dalli	4	cobble	NA
	1	2	10	B. glandula	5	cobble	NA
	3	3	1	B. glandula	27	cobble	upright algae
	3	3	1	C. dalli	32	cobble	upright algae
	3	3	1	Littorina spp.	16	cobble	upright algae
	3	3	1	Littorina spp.	1	cobble	upright algae
	3	3	2	B. glandula	35	cobble	crust
	3	3	2	Littorina spp.	12	cobble	crust
	3	3	3	B. glandula	13	cobble	NA
	3	3	3	Littorina spp.	35	cobble	crust
	3	3	4	B. glandula	13	cobble	NA
	3	3	4	Littorina spp.	26	cobble	crust
	3	3	5	B. glandula	28	cobble	upright algae, crust
	3	3	5	Littorina spp.	13	cobble	upright algae, crust
	3	3	6	B. glandula	22	cobble	upright algae, crust
	3	3	6	Littorina spp.	10	cobble	upright algae, crust
	3	3	7	B. glandula	42	cobble	upright algae, crust
	3	3	7	Littorina spp.	53	cobble	upright algae, crust
	3	3	8	B. glandula	2	cobble	NA
	3	3	9	B. glandula	11	pebble	upright algae
	3	3	9	Littorina spp.	27	pebble	upright algae
	3	3	10	B. glandula	27	cobble	upright algae, crust
	3	3	10	Littorina spp.	5	cobble	upright algae, crust
	5	1	1	Littorina spp.	3	boulder	NA
	5	1	2	Littorina spp.	20	cobble	upright_algae

5 5 5 5 5 5 5 5	1 1 1 1	3 4 5	NA Littorina spp.	NA	cobble	barnacles
5 5 5 5	1 1		Littorina spp.	00		
5 5 5	1	5		20	cobble	NA
5 5			NA	NA	pebble	barnacles
5	1	6	NA	NA	cobble	NA
	_	7	Littorina spp.	2	boulder	barnacles
5	1	7	Littorina spp.	1	boulder	barnacles
	1	8	Littorina spp.	7	cobble	NA
5	1	9	NA	NA	cobble	NA
5	1	10	NA	NA	pebble	barnacles
5	2	1	Littorina spp.	30	cobble	barnacles
5	2	2	NA	NA	pebble	barnacles
5	2	3	Littorina spp.	2	cobble	barnacles
5	2	4	Littorina spp.	10	cobble	barnacles
5	2	5	NA	NA	pebble	barnacles
5	$\overline{2}$	6	Littorina spp.	20	boulder	barnacles
5	$\frac{1}{2}$	7	NA	NA	pebble	barnacles
5	2	8	Littorina spp.	64	boulder	barnacles
5	$\frac{2}{2}$	9	Littorina spp.	13	cobble	barnacles
5	$\frac{2}{2}$	10	NA	NA	cobble	NA
5	3	10	NA	NA	cobble	barnacles
5	3	2	Littorina spp.	3	cobble	barnacles
	3	3	NA	NA	cobble	barnacles
5 5	3	3 4	NA NA	NA	cobble	barnacles
5						
5	3	5	NA	NA	cobble	barnacles
5	3	6	NA	NA	pebble	barnacles
5	3	7	NA	NA	pebble	barnacles
5	3	8	NA	NA	cobble	barnacles
5	3	9	NA	NA	pebble	NA
5	3	10	NA	NA	cobble	barnacles
5	4	1	NA	NA	pebble	barnacles
5	4	2	Littorina spp.	22	cobble	barnacles
5	4	3	NA	NA	cobble	barnacles
5	4	4	Littorina spp.	9	cobble	barnacles
5	4	5	Littorina spp.	3	boulder	NA
5	4	6	Littorina spp.	24	boulder	barnacles
5	4	7	NA	NA	cobble	NA
5	4	8	NA	NA	cobble	barnacles
5	4	9	Littorina spp.	10	pebble	barnacles
5	4	10	Littorina spp.	6	cobble	barnacles
4	3	1	Littorina spp.	2	cobble	NA
4	3	1	Littorina spp.	8	cobble	NA
$\overline{4}$	3	1	B. glandula	16	cobble	NA
4	3	1	C. dalli	4	cobble	NA
4	3	2	T. funebralis	15	cobble	NA
4	3	$\frac{2}{2}$	B. glandula	78	cobble	NA
4	3	3	T. funebralis	15	cobble	NA
4	3	3	B. glandula	36	cobble	NA
4	3	3 4	B. glandula	30 79	cobble	NA NA
	3		C. dalli	13	cobble	NA NA
4	3	5 6				
4			T. funebralis	2	cobble	NA NA
4	3 3	6 7	B. glandula B. glandula	8 48	cobble cobble	NA NA

$vertical_{_}$	_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	4	3	7	P. samuelis	1	cobble	NA
	4	3	8	B. glandula	16	cobble	NA
	4	3	8	T. funebralis	5	cobble	NA
	4	3	9	T. funebralis	2	cobble	NA
	4	3	10	B. glandula	27	cobble	NA
	4	3	10	T. funebralis	13	cobble	NA
	4	1	1	B. glandula	61	cobble	NA
	4	1	1	C. dalli	0	cobble	NA
	4	1	2	B. glandula	11	cobble	NA
	4	1	2	C. dalli	46	cobble	NA
	4	1	3	Littorina spp.	1	pebble	NA
	4	1	4	T. funebralis	1	pebble	NA
	4	1	4	B. glandula	31	pebble	NA
	4	1	4	H. oregonensis	1	pebble	NA
	4	1	4	Littorina spp.	1	pebble	NA
	4	1	5	Littorina spp.	34	pebble	NA
	4	1	5	T. funebralis	3	pebble	NA
	4	1	5	Littorina spp.	1	pebble	NA
	4	1	6	H. oregonensis	1	cobble	NA
	4	1	6	C. dalli	5	cobble	NA
	4	1	6	T. funebralis	1	cobble	NA
	4	1	7	B. glandula	32	cobble	NA
	4	1	7	T. funebralis	10	cobble	NA
	4	1	8	Littorina spp.	1	cobble	NA
	4	1	8	T. funebralis	16	cobble	NA
	4	1	9	Littorina spp.	1	cobble	NA
	4	1	9	C. dalli	44	cobble	NA
	4	1	9	B. glandula	9	cobble	NA
	4	1	10	B. glandula	23	pebble	NA
	4	1	10	C. dalli	5	pebble	NA
	4	2	1	B. glandula	28	cobble	NA
	4	2	1	T. funebralis	1	cobble	NA
	$\overline{4}$	$\frac{1}{2}$	1	Littorina spp.	1	cobble	NA
	$\overline{4}$	$\overline{2}$	$\stackrel{-}{2}$	B. glandula	23	cobble	NA
	4	2	$\frac{1}{2}$	T. funebralis	12	cobble	NA
	4	2	3	P. samuelis	3	cobble	NA
	4	2	3	C. dalli	13	cobble	NA
	4	2	3	B. glandula	10	cobble	NA
	4	2	4	B. glandula	61	cobble	NA
	4	2	4	T. funebralis	20	cobble	NA
	4	2	5	B. glandula	13	cobble	NA
	4	$\frac{2}{2}$	5	P. samuelis	10	cobble	NA
	4	$\frac{2}{2}$	5	H. oregonensis	1	cobble	NA
	4	$\frac{2}{2}$	6	B. glandula	31	cobble	NA
	4	$\frac{2}{2}$	6	T. funebralis	28	cobble	NA NA
	4	$\frac{2}{2}$	6	Littorina spp.	20	cobble	NA NA
	4	$\frac{2}{2}$	6	H. oregonensis	$\frac{2}{2}$	cobble	NA
	4	$\frac{2}{2}$	7	B. glandula	48	cobble	NA NA
	4	$\frac{2}{2}$	7	T. funebralis	46 9	cobble	NA NA
	4	$\frac{2}{2}$	8	C. dalli	9	cobble	NA NA
		$\frac{2}{2}$	9	P. samuelis	$\frac{9}{2}$	cobble	NA NA
	4	$\frac{2}{2}$					
	4	2	9	H. oregonensis	1	cobble	NA

vertical_	_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	4	2	9	B. glandula	22	cobble	NA
	4	2	10	T. funebralis	3	cobble	NA
	4	2	10	Littorina spp.	1	cobble	NA
	4	2	10	B. glandula	15	cobble	NA
	6	1	1	Littorina spp.	5	cobble	NA
	6	1	1	C. dalli	0	cobble	NA
	6	1	2	NA	NA	cobble	NA
	6	1	3	NA	NA	pebble	NA
	6	1	4	B. glandula	16	cobble	NA
	6	1	4	C. dalli	36	cobble	NA
	6	1	5	Littorina spp.	1	cobble	NA
	6	1	5	C. dalli	7	cobble	NA
	6	1	6	Littorina spp.	17	cobble	NA
	6	1	6	B. glandula	17	cobble	NA
	6	1	6	C. dalli	24	cobble	NA
	6	1	6	Littorina spp.	2	cobble	NA
	6	1	7	NA	NA	cobble	NA
	6	1	8	Littorina spp.	2	pebble	NA
	6	1	8	B. glandula	28	pebble	NA
	6	1	8	C. dalli	17	pebble	NA
	6	1	9	Littorina spp.	18	cobble	NA
	6	1	9	B. glandula	30	cobble	NA
	6	1	9	C. dalli	29	cobble	NA
	6	1	10	Littorina spp.	1	cobble	NA
	6	2	1	Littorina spp.	10	cobble	NA
	6	2	1	B. glandula	2	cobble	NA
	6	2	2	Littorina spp.	4	pebble	NA
	6	2	2	B. glandula	13	pebble	NA
	6	2	2	C. dalli	14	pebble	NA
	6	2	3	Littorina spp.	3	cobble	NA
	6	2	3	B. glandula	2	cobble	NA
	6	2	4	C. dalli	3	cobble	NA
	6	2	5	Littorina spp.	13	cobble	NA
	6	2	5	B. glandula	5	cobble	NA
	6	2	5	C. dalli	1	cobble	NA
	6	2	6	C. dalli	18	cobble	NA
	6	2	7	Littorina spp.	3	cobble	NA
	6	2	8	NA	NA	cobble	NA
	6	2	9	Littorina spp.	2	cobble	NA
	6	2	9	B. glandula	2	cobble	NA
	6	2	10	C. dalli	6	cobble	NA
	6	3	1	Littorina spp.	31	cobble	NA
	6	3	1	B. glandula	28	cobble	NA
	6	3	1	C. dalli	2	cobble	NA
	6	3	$\overline{2}$	Littorina spp.	$\overline{4}$	cobble	Mastocarpus spp.
	6	3	2	B. glandula	11	cobble	Mastocarpus spp.
	6	3	2	C. dalli	12	cobble	Mastocarpus spp.
	6	3	3	Littorina spp.	2	boulder	NA
	6	3	3	B. glandula	10	boulder	NA
	6	3	3	C. dalli	27	boulder	NA
	6	3	4	Littorina spp.	11	cobble	NA
	6	3	4	B. glandula	2	cobble	NA

vertical_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
6	3	4	C. dalli	10	cobble	NA
6	3	5	Littorina spp.	12	boulder	NA
6	3	5	B. glandula	27	boulder	NA
6	3	5	C. dalli	32	boulder	NA
6	3	5	Littorina spp.	1	boulder	NA
6	3	5	Littorina spp.	1	boulder	NA
6	3	6	Littorina spp.	3	cobble	NA
6	3	6	B. glandula	12	cobble	NA
6	3	6	C. dalli	19	cobble	NA
6	3	7	Littorina spp.	7	pebble	NA
6	3	7	B. glandula	4	pebble	NA
6	3	7	O. maculosus	1	pebble	NA
6	3	8	Littorina spp.	4	cobble	NA
6	3	8	B. glandula	7	cobble	NA
6	3	8	C. dalli	12	cobble	NA
6	3	9	Littorina spp.	5	cobble	NA
6	3	9	B. glandula	24	cobble	NA
6	3	9	C. dalli	9	cobble	NA
6	3	10	Littorina spp.	7	cobble	NA
6	3	10	B. glandula	15	cobble	NA
6	3	10	C. dalli	19	cobble	NA
2	1	1	C. dalli	25	boulder	NA
2	1	1	B. glandula	5	boulder	NA
2	1	1	Littorina spp.	19	boulder	NA
2	1	2	C. dalli	50	boulder	NA
2	1	2	B. glandula	7	boulder	NA
2	1	2	Littorina spp.	5	boulder	NA
2	1	3	B. glandula	5	pebble	NA
$\frac{2}{2}$	1	4	C. dalli	5	cobble cobble	NA barnacles
$\frac{2}{2}$	1 1	$\frac{4}{5}$	Littorina spp. C. dalli	94 33	bedrock	NA
$\frac{2}{2}$	1	5 5	Littorina spp.	34	bedrock	NA NA
$\frac{2}{2}$	1	5 5	B. glandula	54 6	bedrock	NA NA
$\frac{2}{2}$	1	6	C. dalli	12	bedrock	NA
$\frac{2}{2}$	1	6	Littorina spp.	15	bedrock	NA
$\frac{2}{2}$	1	6	B. glandula	$\frac{15}{25}$	bedrock	NA
$\frac{2}{2}$	1	7	C. dalli	$\frac{23}{38}$	pebble	NA
$\frac{2}{2}$	1	7	Littorina spp.	9	pebble	NA
$\frac{2}{2}$	1	7	B. glandula	12	pebble	NA
$\frac{2}{2}$	1	8	C. dalli	35	boulder	NA
2	1	8	Littorina spp.	6	boulder	NA
2	1	8	B. glandula	2	boulder	NA
2	1	9	C. dalli	50	boulder	NA
2	1	9	Littorina spp.	40	boulder	NA
2	1	9	B. glandula	31	boulder	NA
2	1	10	Littorina spp.	30	boulder	barnacles
2	2	1	B. glandula	20	boulder	NA
$\frac{1}{2}$	$\overline{2}$	1	Littorina spp.	1	boulder	NA
$\frac{1}{2}$	$\frac{1}{2}$	1	Littorina spp.	$2\overline{5}$	boulder	NA
2	2	2	C. dalli	22	boulder	NA
2	2	2	Littorina spp.	40	boulder	NA
2	2	2	B. glandula	30	boulder	NA
			~			

vertical_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
2	2	3	NA	NA	boulder	NA
2	2	4	C. dalli	10	boulder	NA
2	2	4	Littorina spp.	1	boulder	NA
2	2	4	B. glandula	25	boulder	NA
2	2	5	C. dalli	7	boulder	NA
2	2	5	Littorina spp.	16	boulder	NA
2	2	5	B. glandula	25	boulder	NA
2	2	6	C. dalli	5	pebble	NA
2	2	6	B. glandula	12	pebble	NA
2	2	7	C. dalli	4	boulder	NA
2	2	8	B. glandula	7	boulder	NA
2	2	8	Littorina spp.	12	boulder	NA
2	2	9	B. glandula	5	cobble	NA
2	2	9	C. dalli	23	cobble	NA
2	2	10	B. glandula	2	pebble	NA
2	3	1	C. dalli	32	boulder	NA
2	3	1	Littorina spp.	30	boulder	NA
2	3	2	B. glandula	12	pebble	NA
2	3	3	B. glandula	5	pebble	NA
2	3	4	NA	0	pebble	NA
2	3	5	B. glandula	1	pebble	NA
2	3	6	C. dalli	70	boulder	NA
2	3	6	Littorina spp.	3	boulder	NA
2	3	7	B. glandula	11	pebble	NA
2	3	8	C. dalli	4	pebble	NA
2	3	8	B. glandula	3	pebble	NA NA
$\frac{2}{2}$	3	9	NA	0	pebble	NA
$\frac{2}{2}$	$\frac{3}{3}$	10 10	B. glandula C. dalli	15 10	boulder boulder	Upright.algae
1	3	10	B. glandula	4	boulder	Upright.algae NA
1	3	NA	C. dalli	4	boulder	NA NA
1	3	$\frac{NA}{2}$	NA	0	sand	NA NA
1	3	3	B. glandula	7	boulder	NA
1	3	NA	C. dalli	42	boulder	NA
1	3	4	B. glandula	47	cobble	NA
1	3	NA	C. dalli	42	cobble	NA
1	3	NA	Littorina spp.	18	cobble	NA
1	3	5	NA	NA	sand	NA
1	3	6	NA	NA	sand	NA
1	3	7	B. glandula	18	boulder	NA
1	3	NA	C. dalli	64	boulder	NA
1	3	NA	Littorina spp.	24	boulder	NA
1	3	8	B. glandula	13	boulder	NA
1	3	9	C. dalli	1	boulder	NA
1	3	10	NA	NA	sand	NA
1	4	1	B. glandula	8	boulder	NA
1	4	2	B. glandula	6	boulder	NA
1	4	3	NA	0	sand	NA
1	4	4	NA	0	sand	NA
1	4	5	NA	0	sand	NA
1	4	6	NA	0	sand	NA
1	4	7	NA	0	sand	NA

$\underline{\text{vertical}}_{}$	_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	1	4	8	B. glandula	16	cobble	NA
	1	4	9	NA	0	cobble	NA
	1	4	10	NA	0	sand	NA
	3	1	1	B. glandula	22	cobble	NA
	3	1	1	C. dalli	43	cobble	NA
	3	1	1	Littorina spp.	9	cobble	B. glandula, Upright algae
	3	1	2	Littorina spp.	38	cobble	B. glandula, Upright algae
	3	1	2	B. glandula	26	cobble	NA
	3	1	2	C. dalli	24	cobble	NA
	3	1	3	B. glandula	8	pebble	NA
	3	1	3	C. dalli	3	pebble	NA
	3	1	3	Littorina spp.	1	pebble	NA
	3	1	4	B. glandula	3	cobble	NA
	3	1	4	C. dalli	11	cobble	NA
	3	1	5	B. glandula	14	cobble	NA
	3	1	5	Littorina spp.	16	cobble	NA
	3	1	6	H. nudus	2	pebble	NA
	3	1	6	B. glandula	34	pebble	NA
	3	1	6	C. dalli	17	pebble	NA
	3	1	6	Littorina spp.	30	pebble	NA
	3	1	6	P. samuelis	1	pebble	NA
	3	1	7	C. dalli	15	cobble	NA
	3	1	7	B. glandula	3	cobble	NA
	3	1	7	H. nudus	1	cobble	NA
	3	1	8	NA	0	cobble	NA
	3	1	9	Littorina spp.	25	cobble	B. glandula
	3	1	9	B. glandula	20	cobble	NA
	3	1	9	C. dalli	11	cobble	NA
	3	1	10	H. cinctipes	1	cobble	NA
	3	1	10	Littorina spp.	2	cobble	NA
	3	1	10	Littorina spp.	7	cobble	NA
	3	2	1	C. dalli	2	pebble	NA
	3	2	1	Littorina spp.	1	pebble	NA
	3	2	2	C. dalli	1	cobble	NA
	3	2	2	B. glandula	2	cobble	NA
	3	2	2	Littorina spp.	18	cobble	NA
	3	2	3	C. dalli	70	cobble	NA
	3	2	3	B. glandula	7	cobble	NA
	3	2	4	Littorina spp.	8	cobble	NA
	3	2	4	B. glandula	2	cobble	NA
	3	2	5	Littorina spp.	1	cobble	NA
	3	2	6	Littorina spp.	15	cobble	NA
	3	$\frac{1}{2}$	6	B. glandula	25	cobble	NA
	3	2	7	Littorina spp.	3	cobble	NA
	3	2	7	C. dalli	2	cobble	NA
	3	2	8	B. glandula	8	cobble	NA
	3	2	8	C. dalli	40	boulder	NA
	3	2	8	Littorina spp.	8	boulder	NA
	3	2	9	Littorina spp.	1	boulder	NA
	3	2	10	NA	0	cobble	NA

Table 2: Cover data

vertical_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
1	1	1	B. glandula	9	cobble	NA
1	1	1	C. dalli	2	cobble	NA NA
1	1	2	NA	\overline{NA}	sand	NA
1	1	3	B. glandula	2	cobble	NA
1	1	4	NA	$\stackrel{\scriptstyle Z}{NA}$	sand	NA NA
1	1	5	B. glandula	5	cobble	NA
1	1	5	C. dalli	10	cobble	NA
1	1	6	NA	NA	sand	NA
1	1	7	B. glandula	4	cobble	NA
1	1	8	NA	NA	cobble	NA
1	1	9	NA	NA	sand	NA
1	1	10	B. glandula	40	cobble	NA
1	1	10	C. dalli	10	cobble	NA
1	1	10	Littorina spp.	5	cobble	NA
1	$\overset{1}{2}$	10	NA	$^{ m NA}$	cobble	NA
1	$\frac{2}{2}$	$\overset{1}{2}$	NA NA	NA	sand	NA NA
1	$\frac{2}{2}$	3	NA NA	NA	sand	NA NA
1	$\frac{2}{2}$	4	NA	NA	sand	NA
1	$\frac{2}{2}$	5	NA	NA	cobble	NA
1	$\frac{2}{2}$	6	NA	NA	sand	NA
1	$\frac{2}{2}$	7	NA	NA	sand	NA
1	$\frac{2}{2}$	8	B. glandula	1	cobble	NA
1	$\frac{2}{2}$	9	B. glandula	8	cobble	NA
1	$\frac{2}{2}$	9	C. dalli	4	cobble	NA
1	$\frac{2}{2}$	10	B. glandula	5	cobble	NA
3	3	10	B. glandula	27	cobble	upright algae
3	3	1	C. dalli	32	cobble	upright algae upright algae
3	3	1	Littorina spp.	$\frac{32}{16}$	cobble	upright algae
3	3	1	Littorina spp.	1	cobble	upright algae
3	3	2	B. glandula	35	cobble	crust
3	3	$\frac{2}{2}$	Littorina spp.	12	cobble	crust
3	3	3	B. glandula	13	cobble	NA
3	3	3	Littorina spp.	$\frac{15}{35}$	cobble	crust
3	3	4	B. glandula	13	cobble	NA
3	3	4	Littorina spp.	26	cobble	crust
3	3	5	B. glandula	28	cobble	upright algae, crust
3	3	5	Littorina spp.	13	cobble	upright algae, crust
3	3	6	B. glandula	22	cobble	upright algae, crust
3	3	6	Littorina spp.	10	cobble	upright algae, crust
3	3	7	B. glandula	42	cobble	upright algae, crust
3	3	7	Littorina spp.	53	cobble	upright algae, crust
3	3	8	B. glandula	2	cobble	NA
3	3	9	B. glandula	11	pebble	upright algae
3	3	9	Littorina spp.	27	pebble	upright algae
3	3	10	B. glandula	27	cobble	upright algae, crust
3	3	10	Littorina spp.	5	cobble	upright algae, crust
5	1	1	Littorina spp.	3	boulder	NA
5	1	2	Littorina spp.	20	cobble	upright_algae
5	1	3	NA	NA	cobble	barnacles
5	1	4	Littorina spp.	20	cobble	NA
5	1	5	NA	NA	pebble	barnacles
	=	-				

vertical_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
5	1	6	NA	NA	cobble	NA
5	1	7	Littorina spp.	2	boulder	barnacles
5	1	7	Littorina spp.	1	boulder	barnacles
5	1	8	Littorina spp.	7	cobble	NA
5	1	9	NA	ΝÁ	cobble	NA
5	1	10	NA	NA	pebble	barnacles
5	2	1	Littorina spp.	30	cobble	barnacles
5	$\overline{2}$	$\stackrel{-}{2}$	NA	NA	pebble	barnacles
5	$\overline{2}$	3	Littorina spp.	2	cobble	barnacles
5	2	4	Littorina spp.	10	cobble	barnacles
5	2	5	NA	NA	pebble	barnacles
5	2	6	Littorina spp.	20	boulder	barnacles
5	2	7	NA	NA	pebble	barnacles
5	2	8	Littorina spp.	64	boulder	barnacles
5	2	9	Littorina spp.	13	cobble	barnacles
5	2	10	NA	NA	cobble	NA
5	3	1	NA	NA	cobble	barnacles
5	3	2	Littorina spp.	3	cobble	barnacles
5	3	3	NA	NA	cobble	barnacles
5	3	4	NA	NA	cobble	barnacles
5	3	5	NA	NA	cobble	barnacles
5	3	6	NA	NA	pebble	barnacles
5	3	7	NA	NA	pebble	barnacles
5	3	8	NA	NA	cobble	barnacles
5	3	9	NA	NA	pebble	NA
5	3	10	NA	NA	cobble	barnacles
5	4	1	NA	NA	pebble	barnacles
5	4	2	Littorina spp.	22	cobble	barnacles
5	4	3	NA	NA	cobble	barnacles
5	4	4	Littorina spp.	9	cobble	barnacles
5	4	5	Littorina spp.	3	boulder	NA
5	4	6	Littorina spp.	24	boulder	barnacles
5	4	7	NA	NA	cobble	NA
5	4	8	NA	NA	cobble	barnacles
5	4	9	Littorina spp.	10	pebble	barnacles
5	4	10	Littorina spp.	6	cobble	barnacles
4	3	1	Littorina spp.	2	cobble	NA NA
4	3 3	1	Littorina spp.	8 16	cobble	NA NA
$\frac{4}{4}$	3 3	1 1	B. glandula C. dalli	$\begin{array}{c} 16 \\ 4 \end{array}$	cobble cobble	NA NA
4	3 3	$\frac{1}{2}$	T. funebralis	$\frac{4}{15}$	cobble	NA NA
4	3 3	$\frac{2}{2}$	B. glandula	15 78	cobble	NA NA
4	3	3	T. funebralis	18 15	cobble	NA NA
4	3	3	B. glandula	$\frac{15}{36}$	cobble	NA NA
4	3	3 4	B. glandula	30 79	cobble	NA NA
4	3	4 5	C. dalli	19 13	cobble	NA NA
4	3	5 6	T. funebralis	2	cobble	NA NA
4	3	6	B. glandula	8	cobble	NA NA
4	3	7	B. glandula	48	cobble	NA
4	3	7	P. samuelis	1	cobble	NA NA
4	3	8	B. glandula	16	cobble	NA
4	3	8	T. funebralis	5	cobble	NA
4	J	G	1. Idiicorans	9	CODDIC	1111

vertical_ti	ransect	quadrat	square	species	n	abiotic_l	hab	biotic_	_hab
	4	3	9	T. funebralis	2	cobble		NA	
	4	3	10	B. glandula	$\frac{2}{27}$	cobble		NA	
	4	3	10	T. funebralis	13	cobble		NA	
	4	1	1	B. glandula	61	cobble		NA	
	4	1	1	C. dalli	0	cobble		NA	
	4	1	$\overset{1}{2}$	B. glandula	11	cobble		NA	
	4	1	2	C. dalli	46	cobble		NA	
	$\overline{4}$	1	3	Littorina spp.	1	pebble		NA	
	$\overline{4}$	1	4	T. funebralis	1	pebble		NA	
	4	1	4	B. glandula	31	pebble		NA	
	4	1	4	H. oregonensis	1	pebble		NA	
	4	1	4	Littorina spp.	1	pebble		NA	
	4	1	5	Littorina spp.	34	pebble		NA	
	4	1	5	T. funebralis	3	pebble		NA	
	4	1	5	Littorina spp.	1	pebble		NA	
	4	1	6	H. oregonensis	1	cobble		NA	
	4	1	6	C. dalli	5	cobble		NA	
	4	1	6	T. funebralis	1	cobble		NA	
	4	1	7	B. glandula	32	cobble		NA	
	4	1	7	T. funebralis	10	cobble		NA	
	4	1	8	Littorina spp.	1	cobble		NA	
	4	1	8	T. funebralis	16	cobble		NA	
	4	1	9	Littorina spp.	1	cobble		NA	
	4	1	9	C. dalli	44	cobble		NA	
	4	1	9	B. glandula	9	cobble		NA	
	4	1	10	B. glandula	23	pebble		NA	
	4	1	10	C. dalli	5	pebble		NA	
	4	2	1	B. glandula	28	cobble		NA	
	4	2	1	T. funebralis	1	cobble		NA	
	4	2	1	Littorina spp.	1	cobble		NA	
	4	2	2	B. glandula	23	cobble		NA	
	4	2	2	T. funebralis	12	cobble		NA	
	4	2	3	P. samuelis	3	cobble		NA	
	4	2	3	C. dalli	13	cobble		NA	
	4	2	3	B. glandula	10	cobble		NA	
	4	2	4	B. glandula	61	cobble		NA	
	4	2	4	T. funebralis	20	cobble		NA	
	4	2	5	B. glandula	13	cobble		NA	
	4	2	5	P. samuelis	1	cobble		NA	
	4	2	5	H. oregonensis	1	cobble		NA	
	4	2	6	B. glandula	31	cobble		NA	
	4	2	6	T. funebralis	28	cobble		NA	
	4	2	6	Littorina spp.	2	cobble		NA	
	4	2	6	H. oregonensis	2	cobble		NA	
	4	2	7	B. glandula	48	cobble		NA	
	4	2	7	T. funebralis	9	cobble		NA	
	4	2	8	C. dalli	9	cobble		NA	
	4	2	9	P. samuelis	2	cobble		NA NA	
	4	2	9	H. oregonensis	1	cobble		NA NA	
	4	$\frac{2}{2}$	9	B. glandula T. funebralis	$\frac{22}{3}$	cobble cobble		NA NA	
	4 4	$\frac{2}{2}$	10			cobble		NA NA	
	4	2	10	Littorina spp.	1	copple		INA	

4	vertical_t	ransect	quadrat	square	species	n	abiotic_	hab	biotic_hab
6		4	2	10	B. glandula	15	cobble		NA
6 1 2 NA NA cobble NA 6 1 2 NA NA cobble NA 6 1 3 NA NA pebble NA 6 1 4 B. glandula 16 cobble NA 6 1 4 C. dalli 36 cobble NA 6 1 4 C. dalli 37 cobble NA 6 1 5 Littorina spp. 1 cobble NA 6 1 5 Littorina spp. 1 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 B. glandula 17 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 7 NA NA cobble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 Littorina spp. 1 pebble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 19 cobble NA 6 1 9 Littorina spp. 10 cobble NA 6 1 9 Littorina spp. 10 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 10 Littorina spp. 10 cobble NA 6 1 2 Littorina spp. 10 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 2 Littorina spp. 10 cobble NA 6 2 2 Littorina spp. 10 cobble NA 6 2 2 B. glandula 2 cobble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 20 cobble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 19 cobble NA 6 2 C. dalli 10 cobble NA 6 2 C. dalli 11 cobble NA 6 2 C. dalli 12 cobble NA 6 C. dalli 10 cobble NA 6 C. dalli 10 cobble NA 6 C. dalli 10 co					~				
6									
6 1 4 B. glandula 16 cobble NA 6 1 4 C. dalli 36 cobble NA 6 1 5 C. dalli 76 cobble NA 6 1 5 C. dalli 77 cobble NA 6 1 5 C. dalli 77 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 7 NA 8 NA cobble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 C. dalli 17 pebble NA 6 1 9 C. dalli 29 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 10 Littorina spp. 10 cobble NA 6 1 10 Littorina spp. 10 cobble NA 6 1 2 Littorina spp. 10 cobble NA 6 2 1 Littorina spp. 10 cobble NA 6 2 1 Littorina spp. 10 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 2 B. glandula 13 pebble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 2 B. glandula 2 cobble NA 6 2 C. dalli 1 pebble NA 6 2 D. C. dalli 1 pebble NA 6 2 D. C. dalli 1 cobble NA 6 2 D. Littorina spp. 13 cobble NA 6 2 D. Littorina spp. 10 cobble NA 6 2 D. Littorina spp. 10 cobble NA 6 2 D. Littorina spp. 10 cobble NA 6 D. C. dalli 1 cobble NA 6 D. C. dalli 2 cobble NA 6 D. C. dalli 2 cobble NA 6 D. C. dalli 1 cobble NA 6 D. C. dalli 1 cobble NA 6 D. C. dalli 2 cobble NA 6 D. C. dalli 2 cobble NA 6 D. C. dalli 1 cobb			1						NA
6 1 4 6 C. dalli 36 cobble NA 6 1 4 C. dalli 36 cobble NA 6 1 5 Littorina spp. 1 cobble NA 6 1 5 C. dalli 7 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 B. glandula 17 cobble NA 6 1 6 B. glandula 17 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 7 NA NA cobble NA 6 1 8 Littorina spp. 2 cobble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 B. glandula 28 pebble NA 6 1 9 B. glandula 30 cobble NA 6 1 9 B. glandula 30 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 1 2 Littorina spp. 1 cobble NA 6 1 2 C. dalli 29 cobble NA 6 2 C. dalli 29 cobble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 13 cobble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 19 cobble NA 6 2 C. dalli 14 pebble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 18 cobble NA 6 2 C. dalli 19 cobble NA 6 2 C. dalli 10 cobble NA 6 2 C. dalli 11 cobble NA 6 2 C. dalli 11 cobble NA 6 2 C. dalli 10 cobble NA 6 2 C. dalli 11 cobble NA 6 3 Littorina spp. 12 cobble NA 6 3 Littorina spp. 10 cobble			1		NA	NA			NA
6 1 4 C. dalli 36 cobble NA 6 1 5 Littorina spp. 1 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 Littorina spp. 17 cobble NA 6 1 6 B. glandula 17 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 7 NA NA cobble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 S. glandula 28 pebble NA 6 1 8 C. dalli 17 pebble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 10 cobble NA 6 1 9 Littorina spp. 10 cobble NA 6 1 9 Littorina spp. 1 cobble NA 6 1 9 Littorina spp. 1 cobble NA 6 1 9 Littorina spp. 1 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 1 1 10 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 2 Littorina spp. 4 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 3 Littorina spp. 3 cobble NA 6 2 4 C. dalli 3 cobble NA 6 2 5 Littorina spp. 3 cobble NA 6 2 5 C. dalli 1 cobble NA 6 2 6 C. dalli 1 cobble NA 6 2 7 Littorina spp. 3 cobble NA 6 2 8 NA NA cobble NA 6 2 9 Littorina spp. 3 cobble NA 6 2 6 C. dalli 1 cobble NA 6 2 7 Littorina spp. 3 cobble NA 6 2 8 NA NA Cobble NA 6 2 9 Littorina spp. 3 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 2 Littorina spp. 3 cobble NA 6 2 2 Littorina spp. 4 cobble NA 6 2 3 Littorina spp. 4 cobble NA 6 3 1 Littorina spp. 4 cobble NA 6 3 1 Littorina spp. 4 cobble NA 6 3 2 Littorina spp. 4 cobble NA 6 3 2 Littorina spp. 4 cobble NA 6 3 1 Littorina spp. 4 cobble NA 6 3 1 Littorina spp. 4 cobble NA 6 3 2 Littorina spp. 4 cobble NA 6 3 3 Littorina spp. 4 cobble NA 6 3 4 Littorina spp. 10 cobble NA 6 3 5 Littorina spp. 10 cobble NA 6 3 6 Littorina spp. 10 cobble NA 6 3 6 Littorina spp. 10 cobble NA 6 7 C. dalli 10 cobble NA 6 8 1 C. dalli 10 cobble NA 6 9 Littorina spp. 11 cobble NA 6 9 Littorina spp. 11 cobble NA 6 9 Littorina spp. 11 cobble NA			1		B. glandula		-		
6 1 6 1 6 Littorina spp. 17 cobble NA 6 1 6 B. glandula 17 cobble NA 6 1 6 B. glandula 17 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 7 NA NA cobble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 C. dalli 17 pebble NA 6 1 8 C. dalli 17 pebble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 S. glandula 30 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 1 0 Littorina spp. 1 cobble NA 6 1 1 0 Littorina spp. 1 cobble NA 6 1 1 10 Littorina spp. 1 cobble NA 6 1 2 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 1 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 1 B. glandula 13 cobble NA 6 2 2 Littorina spp. 10 cobble NA 6 2 2 D. c. dalli 14 pebble NA 6 2 2 D. c. dalli 14 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 2 D. c. dalli 14 pebble NA 6 2 2 D. c. dalli 14 pebble NA 6 2 2 D. c. dalli 14 pebble NA 6 2 D.		6	1	4	~	36	cobble		NA
6		6	1	5	Littorina spp.	1	cobble		NA
6 1 6 B. glandula 17 cobble NA 6 1 6 C. dalli 24 cobble NA 6 1 6 Littorina spp. 2 cobble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 B. glandula 20 cobble NA 6 1 9 B. glandula 30 cobble NA 6 1 9 B. glandula 20 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 1 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 2 B. glandula 3 cobble NA		6	1	5	C. dalli	7	cobble		NA
6		6	1	6	Littorina spp.	17	cobble		NA
6		6	1	6	B. glandula	17	cobble		NA
6 1 7 NA NA cobble NA 6 1 8 Littorina spp. 2 pebble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 C. dalli 17 pebble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 1 1 10 Littorina spp. 1 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 1 B. glandula 13 pebble NA 6 2 2 Littorina spp. 4 pebble NA 6 2 2 Littorina spp. 4 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 2 Littorina spp. 3 cobble NA 6 2 2 C. dalli 14 pebble NA 6 2 2 Littorina spp. 13 cobble NA 6 2 D. Littorina spp. 13 cobble NA 6 2 D. Littorina spp. 13 cobble NA 6 D. Littorina spp. 13 cobble NA 6 D. Littorina spp. 13 cobble NA 6 D. Littorina spp. 3 cobble NA 6 D. Littorina spp. 2 cobble NA 6 D. Littorina spp. 3 cobble NA 6 D. Littorina spp. 4 cobble NA 6 D. Littorina spp. 2 cobble NA 6 D. Littorina spp. 2 cobble NA 6 D. Littorina spp. 2 cobble NA 6 D. Littorina spp. 3 cobble NA 6 D. Littorina spp. 2 cobble		6	1	6	C. dalli	24	cobble		NA
6 1 8 Littorina spp. 2 pebble NA 6 1 8 B. glandula 28 pebble NA 6 1 8 B. dalli 17 pebble NA 6 1 9 Littorina spp. 18 cobble NA 6 1 9 B. glandula 30 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 10 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 2 1 Littorina spp. 3 cobble NA 6 2 2 3 B. glandula 2 cobble NA 6 2 3 3 cobble NA <td< td=""><td></td><td>6</td><td>1</td><td>6</td><td>Littorina spp.</td><td>2</td><td>cobble</td><td></td><td>NA</td></td<>		6	1	6	Littorina spp.	2	cobble		NA
6		6	1	7	NA	NA	cobble		NA
6		6	1	8	Littorina spp.	2	pebble		NA
6		6	1	8	B. glandula	28	pebble		NA
6 1 9 B. glandula 30 cobble NA 6 1 9 C. dalli 29 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 2 Littorina spp. 3 cobble NA 6 2 2 C. dalli 14 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 3 Littorina spp. 3 cobble NA 6 2 3 B. glandula 2 cobble NA 6 2 4 C. dalli 1 cobble NA 6 2 5 B. glandula 5 cobble NA 6 <td></td> <td>6</td> <td>1</td> <td>8</td> <td>C. dalli</td> <td>17</td> <td>pebble</td> <td></td> <td>NA</td>		6	1	8	C. dalli	17	pebble		NA
6 1 9 C. dalli 29 cobble NA 6 1 10 Littorina spp. 1 cobble NA 6 2 1 Littorina spp. 10 cobble NA 6 2 1 B. glandula 2 cobble NA 6 2 2 Littorina spp. 4 pebble NA 6 2 2 Littorina spp. 4 pebble NA 6 2 2 E. dalli 13 pebble NA 6 2 2 C. dalli 14 pebble NA 6 2 3 Littorina spp. 3 cobble NA 6 2 3 Littorina spp. 3 cobble NA 6 2 3 B. glandula 2 cobble NA 6 2 1 S. Littorina spp. 3 cobble NA 6 2 1 S. Littorina spp. 13 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 1 Littorina spp. 3 cobble NA 6 2 2 Littorina spp. 2 cobble NA 6 2 2 Littorina spp. 2 cobble NA 6 2 2 Littorina spp. 2 cobble NA 6 3 Littorina spp. 3 cobble NA 6 3 Littorina spp. 4 cobble Na 6 3 Littorina spp. 11 cobble NA 6 3 Littorina spp. 1 cobble NA		6	1	9	Littorina spp.	18	cobble		NA
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6 2 6 C. dalli 18 cobble NA 6 2 7 Littorina spp. 3 cobble NA 6 2 8 NA NA cobble NA 6 2 9 Littorina spp. 2 cobble NA 6 2 9 B. glandula 2 cobble NA 6 2 10 C. dalli 6 cobble NA 6 3 1 Littorina spp. 31 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble NA 6 3 3 Littorina spp. 2 boulder NA		6		5	B. glandula	5	cobble		NA
6 2 7 Littorina spp. 3 cobble NA 6 2 8 NA NA cobble NA 6 2 9 Littorina spp. 2 cobble NA 6 2 9 B. glandula 2 cobble NA 6 2 10 C. dalli 6 cobble NA 6 3 1 Littorina spp. 31 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble NA 6 3 3 Littorina spp. 2 boulder NA 6 3 3 C. dalli 27 boulder NA 6 3 4 Littorina spp. 11 cobble NA		6		5	C. dalli	1	cobble		NA
6 2 8 NA NA cobble NA 6 2 9 Littorina spp. 2 cobble NA 6 2 9 B. glandula 2 cobble NA 6 2 10 C. dalli 6 cobble NA 6 3 1 Littorina spp. 31 cobble NA 6 3 1 B. glandula 28 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 B. glandula 11 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble Mastocarpus spp. 6 3 3 Littorina spp. 2 boulder NA 6 3 3 B. glandula 10 boulder NA 6 3 3 C. dalli 27 boulder NA 6 3 4 Littorina spp. 11 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 5 Littorina spp. 12 boulder NA		6	2	6	C. dalli	18	cobble		NA
6 2 9 Littorina spp. 2 cobble NA 6 2 9 B. glandula 2 cobble NA 6 2 10 C. dalli 6 cobble NA 6 3 1 Littorina spp. 31 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble NA 6 3 3 Littorina spp. 2 boulder NA 6 3 3 C. dalli 27 boulder NA 6 3 4 Littorina spp. 11 cobble NA 6 3 4 B. glandula 2 cobble NA 6 3 4 B. glandula 2 cobble NA </td <td></td> <td>6</td> <td></td> <td>7</td> <td>Littorina spp.</td> <td>3</td> <td>cobble</td> <td></td> <td>NA</td>		6		7	Littorina spp.	3	cobble		NA
6 2 9 B. glandula 2 cobble NA 6 2 10 C. dalli 6 cobble NA 6 3 1 Littorina spp. 31 cobble NA 6 3 1 B. glandula 28 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 B. glandula 11 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble Mastocarpus spp. 6 3 3 Littorina spp. 2 boulder NA 6 3 3 B. glandula 10 boulder NA 6 3 4 Littorina spp. 11 cobble NA 6 3 4 B. glandula 2 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3<		6	2	8					
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6 3 1 Littorina spp. 31 cobble NA 6 3 1 B. glandula 28 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 B. glandula 11 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble Mastocarpus spp. 6 3 3 Littorina spp. 2 boulder NA 6 3 3 B. glandula 10 boulder NA 6 3 3 C. dalli 27 boulder NA 6 3 4 Littorina spp. 11 cobble NA 6 3 4 B. glandula 2 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 5 Littorina spp. 12 boulder NA		6		9		2	cobble		NA
6 3 1 B. glandula 28 cobble NA 6 3 1 C. dalli 2 cobble NA 6 3 2 Littorina spp. 4 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble Mastocarpus spp. 6 3 2 C. dalli 12 cobble NA 6 3 3 Littorina spp. 2 boulder NA 6 3 3 C. dalli 27 boulder NA 6 3 4 Littorina spp. 11 cobble NA 6 3 4 B. glandula 2 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 4 C. dalli 10 cobble NA 6 3 5 Littorina spp. 12 boulder NA				10					
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6 3 4 C. dalli 10 cobble NA 6 3 5 Littorina spp. 12 boulder NA									
6 3 5 Littorina spp. 12 boulder NA									
6 3 5 B. glandula 27 boulder NA									
		6	3	5	B. glandula	27	boulder		NA

vertical transect	quadrat	square	species	n	abiotic_hab	biotic_hab
6	3	5	C. dalli	32	boulder	NA
6	3	5	Littorina spp.	1	boulder	NA
6	3	5	Littorina spp.	1	boulder	NA
6	3	6	Littorina spp.	3	cobble	NA
6	3	6	B. glandula	12	cobble	NA
6	3	6	C. dalli	19	cobble	NA
6	3	7	Littorina spp.	7	pebble	NA
6	3	7	B. glandula	4	pebble	NA
6	3	7	O. maculosus	1	pebble	NA
6	3	8	Littorina spp.	4	cobble	NA
6	3	8	B. glandula	7	cobble	NA
6	3	8	C. dalli	12	cobble	NA
6	3	9	Littorina spp.	5	cobble	NA
6	3	9	B. glandula	24	cobble	NA
6	3	9	C. dalli	9	cobble	NA
6	3	10	Littorina spp.	7	cobble	NA
6	3	10	B. glandula	15	cobble	NA
6	3	10	C. dalli	19	cobble	NA
2	1	1	C. dalli	25	boulder	NA
2	1	1	B. glandula	5	boulder	NA
2	1	1	Littorina spp.	19	boulder	NA NA
2	1	2	C. dalli	50	boulder	NA NA
$\frac{2}{2}$	1	$\frac{2}{2}$	B. glandula	7	boulder	NA NA
$\frac{2}{2}$	1	$\frac{2}{3}$	Littorina spp.	5 5	boulder pebble	NA NA
$\frac{2}{2}$	$\frac{1}{1}$	3 4	B. glandula C. dalli	5 5	cobble	NA NA
$\frac{2}{2}$	1	$\frac{4}{4}$	Littorina spp.	94	cobble	barnacles
$\frac{2}{2}$	1	5	C. dalli	33	bedrock	NA
$\frac{2}{2}$	1	5	Littorina spp.	34	bedrock	NA NA
$\frac{2}{2}$	1	5	B. glandula	6	bedrock	NA
$\frac{2}{2}$	1	6	C. dalli	12	bedrock	NA
2	1	6	Littorina spp.	15	bedrock	NA
$\frac{1}{2}$	1	6	B. glandula	25	bedrock	NA
2	1	7	C. dalli	38	pebble	NA
2	1	7	Littorina spp.	9	pebble	NA
2	1	7	B. glandula	12	pebble	NA
2	1	8	C. dalli	35	boulder	NA
2	1	8	Littorina spp.	6	boulder	NA
2	1	8	B. glandula	2	boulder	NA
2	1	9	C. dalli	50	boulder	NA
2	1	9	Littorina spp.	40	boulder	NA
2	1	9	B. glandula	31	boulder	NA
2	1	10	Littorina spp.	30	boulder	barnacles
2	2	1	B. glandula	20	boulder	NA
2	2	1	Littorina spp.	1	boulder	NA
2	2	1	Littorina spp.	25	boulder	NA
2	2	2	C. dalli	22	boulder	NA
2	2	2	Littorina spp.	40	boulder	NA
2	2	2	B. glandula	30	boulder	NA NA
2	2	3	NA	NA 10	boulder	NA NA
$\frac{2}{2}$	2	4	C. dalli	10	boulder	NA NA
2	2	4	Littorina spp.	1	boulder	NA

vertical	transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	2	2	4	B. glandula	25	boulder	NA
	$\frac{2}{2}$	$\frac{2}{2}$	5	C. dalli	7	boulder	NA
	$\frac{2}{2}$	$\frac{2}{2}$	5	Littorina spp.	16	boulder	NA
	$\frac{2}{2}$	$\frac{2}{2}$	5	B. glandula	25	boulder	NA
	2	2	6	C. dalli	5	pebble	NA
	2	2	6	B. glandula	$1\overline{2}$	pebble	NA
	2	2	7	C. dalli	4	boulder	NA
	2	2	8	B. glandula	7	boulder	NA
	2	2	8	Littorina spp.	12	boulder	NA
	2	2	9	B. glandula	5	cobble	NA
	2	2	9	C. dalli	23	cobble	NA
	2	2	10	B. glandula	2	pebble	NA
	2	3	1	C. dalli	32	boulder	NA
	2	3	1	Littorina spp.	30	boulder	NA
	2	3	2	B. glandula	12	pebble	NA
	2	3	3	B. glandula	5	pebble	NA
	2	3	4	NA	0	pebble	NA
	2	3	5	B. glandula	1	pebble	NA
	2	3	6	C. dalli	70	boulder	NA
	2	3	6	Littorina spp.	3	boulder	NA
	2	3	7	B. glandula	11	pebble	NA
	2	3	8	C. dalli	4	pebble	NA NA
	2	3	8	B. glandula	3	pebble	NA NA
	$\frac{2}{2}$	3 3	9 10	NA B. glandula	0 15	pebble	NA Upright algae
	$\frac{2}{2}$	3 3	10 10	B. glandula C. dalli	15 10	boulder boulder	Upright algae
	1	3 3	10	C. dam B. glandula	$\frac{10}{4}$	boulder	Upright.algae NA
	1	3 3	NA	C. dalli	$\frac{4}{4}$	boulder	NA NA
	1	3	2	NA	0	sand	NA NA
	1	3	3	B. glandula	7	boulder	NA NA
	1	3	NA	C. dalli	42	boulder	NA
	1	3	4	B. glandula	47	cobble	NA
	1	3	NA	C. dalli	42	cobble	NA
	1	3	NA	Littorina spp.	18	cobble	NA
	1	3	5	NA	NA	sand	NA
	1	3	6	NA	NA	sand	NA
	1	3	7	B. glandula	18	boulder	NA
	1	3	NA	C. dalli	64	boulder	NA
	1	3	NA	Littorina spp.	24	boulder	NA
	1	3	8	B. glandula	13	boulder	NA
	1	3	9	C. dalli	1	boulder	NA
	1	3	10	NA	NA	sand	NA
	1	4	1	B. glandula	8	boulder	NA
	1	4	2	B. glandula	6	boulder	NA
	1	4	3	NA	0	sand	NA
	1	4	4	NA	0	sand	NA
	1	4	5	NA	0	sand	NA
	1	4	6	NA	0	sand	NA
	1	4	7	NA	0	sand	NA
	1	4	8	B. glandula	16	cobble	NA
	1	4	9	NA	0	cobble	NA
	1	4	10	NA	0	sand	NA

vertical_	_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	3	1	1	B. glandula	22	cobble	NA
	3	1	1	C. dalli	43	cobble	NA
	3	1	1	Littorina spp.	9	cobble	B. glandula, Upright algae
	3	1	2	Littorina spp.	38	cobble	B. glandula, Upright algae
	3	1	2	B. glandula	26	cobble	NA
	3	1	2	C. dalli	24	cobble	NA
	3	1	3	B. glandula	8	pebble	NA
	3	1	3	C. dalli	3	pebble	NA
	3	1	3	Littorina spp.	1	pebble	NA
	3	1	4	B. glandula	3	cobble	NA
	3	1	4	C. dalli	11	cobble	NA
	3	1	5	B. glandula	14	cobble	NA
	3	1	5	Littorina spp.	16	cobble	NA
	3	1	6	H. nudus	2	pebble	NA
	3	1	6	B. glandula	34	pebble	NA
	3	1	6	C. dalli	17	pebble	NA
	3	1	6	Littorina spp.	30	pebble	NA
	3	1	6	P. samuelis	1	pebble	NA
	3	1	7	C. dalli	15	cobble	NA
	3	1	7	B. glandula	3	cobble	NA
	3	1	7	H. nudus	1	cobble	NA
	3	1	8	NA	0	cobble	NA
	3	1	9	Littorina spp.	25	cobble	B. glandula
	3	1	9	B. glandula	20	cobble	NA
	3	1	9	C. dalli	11	cobble	NA
	3	1	10	H. cinctipes	1	cobble	NA
	3	1	10	Littorina spp.	2	cobble	NA
	3	1	10	Littorina spp.	7	cobble	NA
	3	2	1	C. dalli	2	pebble	NA
	3	2	1	Littorina spp.	1	pebble	NA
	3	2	2	C. dalli	1	cobble	NA
	3	2	2	B. glandula	2	cobble	NA
	3	2	2	Littorina spp.	18	cobble	NA
	3	2	3	C. dalli	70	cobble	NA
	3	2	3	B. glandula	7	cobble	NA
	3	2	4	Littorina spp.	8	cobble	NA
	3	2	4	B. glandula	2	cobble	NA
	3	2	5	Littorina spp.	1	cobble	NA
	3	$\frac{1}{2}$	6	Littorina spp.	15	cobble	NA
	3	$\frac{1}{2}$	6	B. glandula	25	cobble	NA
	3	2	7	Littorina spp.	3	cobble	NA
	3	2	7	C. dalli	2	cobble	NA
	3	2	8	B. glandula	8	cobble	NA
	3	2	8	C. dalli	40	boulder	NA
	3	2	8	Littorina spp.	8	boulder	NA
	3	2	9	Littorina spp.	1	boulder	NA
	3	2	10	NA	0	cobble	NA

Table 3: Quadrat data

vertical_transect quadrat square species n abiotic_hab biotic_hab 1 1 1 1 B. glandula 9 cobble NA 1 1 1 C. dalli 2 cobble NA 1 1 3 B. glandula 2 cobble NA 1 1 4 NA NA sand NA 1 1 5 B. glandula 5 cobble NA 1 1 6 NA NA sand NA 1 1 6 NA NA sand NA 1 1 6 NA NA sand NA 1 1 7 8 glandula 4 cobble NA 1 1 9 NA NA sand NA NA 1 1 10 C. dalli 10 cobble NA							
1 1 1 C. dalli 2 cobble NA 1 1 2 NA NA sand NA 1 1 3 B. glandula 2 cobble NA 1 1 4 NA NA sand NA 1 1 5 B. glandula 5 cobble NA 1 1 6 NA NA sand NA 1 1 6 NA NA sand NA 1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA sobble NA 1 1 10 B. glandula 40 cobble NA NA 1 1 10 B. glandula 40 cobble NA NA 1 1 10 C. dalli 10 cobble NA NA 1 2 1 </td <td>_transect</td> <td>quadrat squa</td> <td>are</td> <td>species</td> <td>n</td> <td>abiotic_hab</td> <td>biotic_hab</td>	_transect	quadrat squa	are	species	n	abiotic_hab	biotic_hab
1 1 2 NA NA sand NA 1 1 3 B. glandula 2 cobble NA 1 1 4 NA NA sand NA 1 1 5 B. glandula 5 cobble NA 1 1 5 C. dalli 10 cobble NA 1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA sand NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 2 1 <td< td=""><td>1</td><td>1</td><td>1</td><td>B. glandula</td><td></td><td>cobble</td><td></td></td<>	1	1	1	B. glandula		cobble	
1 1 3 B. glandula 2 cobble NA 1 1 4 NA NA sand NA 1 1 5 B. glandula 5 cobble NA 1 1 5 C. dalli 10 cobble NA 1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA cobble NA 1 1 9 NA NA sand NA 1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA sand NA 1 2 1 NA NA sand NA 1 2 1 NA NA sand NA 1 2 4 NA NA	1	1	1	C. dalli	2	cobble	NA
1 1 4 NA NA sand NA 1 1 5 B. glandula 5 cobble NA 1 1 5 C. dalli 10 cobble NA 1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA sand NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 L. dalli 10 cobble NA 1 2 1 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA </td <td>1</td> <td>1</td> <td>2</td> <td>NA</td> <td>NA</td> <td>sand</td> <td>NA</td>	1	1	2	NA	NA	sand	NA
1 1 5 B. glandula 5 cobble NA 1 1 5 C. dalli 10 cobble NA 1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA sand NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 C. dalli 10 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 1 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA	1	1	3	B. glandula	2	cobble	NA
1 1 5 C. dalli 10 cobble NA 1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA cobble NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 C. dalli 10 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 6 NA NA sand	1	1	4	NA	NA	sand	NA
1 1 6 NA NA sand NA 1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA cobble NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 4 NA NA sand NA 1 2 6 NA NA <t< td=""><td>1</td><td>1</td><td>5</td><td>B. glandula</td><td>5</td><td>cobble</td><td>NA</td></t<>	1	1	5	B. glandula	5	cobble	NA
1 1 7 B. glandula 4 cobble NA 1 1 8 NA NA cobble NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA sand NA 1 2 6 NA NA sand NA 1 2 6 NA NA sand <td>1</td> <td>1</td> <td>5</td> <td>C. dalli</td> <td>10</td> <td>cobble</td> <td>NA</td>	1	1	5	C. dalli	10	cobble	NA
1 1 8 NA NA cobble NA 1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA sand NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble <td>1</td> <td>1</td> <td>6</td> <td>NA</td> <td>NA</td> <td>sand</td> <td>NA</td>	1	1	6	NA	NA	sand	NA
1 1 9 NA NA sand NA 1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA sand NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 8 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 3 <td< td=""><td>1</td><td>1</td><td>7</td><td>B. glandula</td><td>4</td><td>cobble</td><td>NA</td></td<>	1	1	7	B. glandula	4	cobble	NA
1 1 10 B. glandula 40 cobble NA 1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA sand NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 1 cobble Upright algae	1	1	8	NA	NA	cobble	NA
1 1 10 C. dalli 10 cobble NA 1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 1 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA sand NA 1 2 6 NA NA sand NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5	1	1	9	NA	NA	sand	NA
1 1 10 Littorina spp. 5 cobble NA 1 2 1 NA NA cobble NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA cobble NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	1	10	B. glandula	40	cobble	NA
1 2 1 NA NA cobble NA 1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA cobble NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	1	10	C. dalli	10	cobble	NA
1 2 2 NA NA sand NA 1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA cobble NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	1	10	Littorina spp.	5	cobble	NA
1 2 3 NA NA sand NA 1 2 4 NA NA sand NA 1 2 5 NA NA cobble NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1		1		NA	cobble	NA
1 2 4 NA NA sand NA 1 2 5 NA NA cobble NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1		2	NA	NA	sand	NA
1 2 5 NA NA cobble NA 1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	3	NA	NA	sand	NA
1 2 6 NA NA sand NA 1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	4	NA	NA	sand	NA
1 2 7 NA NA sand NA 1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	5	NA	NA	cobble	NA
1 2 8 B. glandula 1 cobble NA 1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	6	NA	NA	sand	NA
1 2 9 B. glandula 8 cobble NA 1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	7	NA	NA	sand	NA
1 2 9 C. dalli 4 cobble NA 1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	8	B. glandula	1	cobble	NA
1 2 10 B. glandula 5 cobble NA 3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	9	B. glandula	8	cobble	NA
3 3 1 B. glandula 27 cobble upright algae 3 3 1 C. dalli 32 cobble upright algae	1	2	9	C. dalli	4	cobble	NA
3 3 1 C. dalli 32 cobble upright algae	1		10	B. glandula	5	cobble	NA
	3	3	1	B. glandula	27	cobble	upright algae
3 3 1 Littorina spp. 16 cobble upright algae	3	3	1	C. dalli	32	cobble	upright algae
T O S O	3	3	1	Littorina spp.	16	cobble	upright algae
3 1 Littorina spp. 1 cobble upright algae	3	3	1	Littorina spp.	1	cobble	upright algae
3 3 2 B. glandula 35 cobble crust	3	3	2	B. glandula	35	cobble	crust
3 2 Littorina spp. 12 cobble crust	3	3	2	Littorina spp.	12	cobble	crust
3 3 B. glandula 13 cobble NA	3	3	3	B. glandula	13	cobble	NA
3 3 Littorina spp. 35 cobble crust	3	3	3	Littorina spp.	35	cobble	crust
3 3 4 B. glandula 13 cobble NA		3	4	B. glandula	13	cobble	NA
3 4 Littorina spp. 26 cobble crust	3	3	4		26	cobble	crust
3 3 5 B. glandula 28 cobble upright algae, crust	3	3	5	B. glandula	28	cobble	upright algae, crust
3 5 Littorina spp. 13 cobble upright algae, crust	3	3	5	Littorina spp.	13	cobble	upright algae, crust
3 6 B. glandula 22 cobble upright algae, crust			6	B. glandula	22	cobble	upright algae, crust
3 6 Littorina spp. 10 cobble upright algae, crust	3	3	6	Littorina spp.	10	cobble	upright algae, crust
3 7 B. glandula 42 cobble upright algae, crust	3	3	7	B. glandula	42	cobble	upright algae, crust
3 7 Littorina spp. 53 cobble upright algae, crust	3		7	Littorina spp.	53	cobble	upright algae, crust
3 3 8 B. glandula 2 cobble NA			8		2	cobble	NA
3 9 B. glandula 11 pebble upright algae				~			
3 9 Littorina spp. 27 pebble upright algae			9				
3 3 10 B. glandula 27 cobble upright algae, crust			10		27	cobble	upright algae, crust
3 3 10 Littorina spp. 5 cobble upright algae, crust		3	10	Littorina spp.	5	cobble	upright algae, crust
5 1 1 Littorina spp. 3 boulder NA		1	1		3	boulder	NA
5 1 2 Littorina spp. 20 cobble upright_algae		1	2		20	cobble	upright_algae
5 1 3 NA NA cobble barnacles		1	3	NA	NA	cobble	
5 1 4 Littorina spp. 20 cobble NA		1	4	Littorina spp.	20	cobble	NA

vertical_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
5	1	5	NA	NA	pebble	barnacles
5	1	6	NA	NA	cobble	NA
5	1	7	Littorina spp.	2	boulder	barnacles
5	1	7	Littorina spp.	1	boulder	barnacles
5	1	8	Littorina spp.	7	cobble	NA
5	1	9	NA	NA	cobble	NA
5	1	10	NA	NA	pebble	barnacles
5	2	1	Littorina spp.	30	cobble	barnacles
5	2	2	NA	NA	pebble	barnacles
5	2	3	Littorina spp.	2	cobble	barnacles
5	2	4	Littorina spp.	10	cobble	barnacles
5	2	5	NA	NA	pebble	barnacles
5	2	6	Littorina spp.	20	boulder	barnacles
5	2	7	NA	NA	pebble	barnacles
5	2	8	Littorina spp.	64	boulder	barnacles
5	2	9	Littorina spp.	13	cobble	barnacles
5	2	10	NA	NA	cobble	NA
5	3	1	NA	NA	cobble	barnacles
5	3	2	Littorina spp.	3	cobble	barnacles
5	3	3	NA	NA	cobble	barnacles
5	3	4	NA	NA	cobble	barnacles
5	3	5	NA	NA	cobble	barnacles
5	3	6	NA	NA	pebble	barnacles
5	3	7	NA	NA	pebble	barnacles
5	3	8	NA	NA	cobble	barnacles
5	3	9	NA	NA	pebble	NA
5	3	10	NA	NA	cobble	barnacles
5	4	1	NA	NA	pebble	barnacles
5	4	2	Littorina spp.	22	cobble	barnacles
5	4	3	NA	NA	cobble	barnacles
5	4	4	Littorina spp.	9	cobble	barnacles
5	4	5	Littorina spp.	3	boulder	NA
5	4	6	Littorina spp.	24	boulder	barnacles
5	4	7	NA	NA	cobble	NA
5	4	8	NA	NA	cobble	barnacles
5	4	9	Littorina spp.	10	pebble	barnacles
5	$\frac{4}{3}$	10	Littorina spp.	6	cobble	barnacles
4	3	1	Littorina spp.	2	cobble	NA NA
$\frac{4}{4}$	ა 3	1 1	Littorina spp.	8 16	cobble cobble	NA NA
$\frac{4}{4}$	ა 3	1	B. glandula C. dalli	$\begin{array}{c} 16 \\ 4 \end{array}$	cobble	NA NA
$\frac{4}{4}$	ა 3	$\frac{1}{2}$	T. funebralis	$\frac{4}{15}$	cobble	NA NA
4	ა 3	$\frac{2}{2}$	B. glandula	13 78	cobble	NA NA
4	ა 3	3	T. funebralis	16 15	cobble	NA NA
4	ა 3	3	B. glandula	36	cobble	NA NA
4	3	3 4	B. glandula	30 79	cobble	NA NA
4	3	5	C. dalli	13	cobble	NA NA
$\frac{4}{4}$	ა 3	6	T. funebralis	$\frac{13}{2}$	cobble	NA NA
4	3	6	B. glandula	8	cobble	NA NA
4	3	7	B. glandula	48	cobble	NA NA
4	3	7	P. samuelis	1	cobble	NA NA
4	3	8	B. glandula	16	cobble	NA
4	3	G	ى. ₈ ىمىتىرسى	10	CODDIC	1111

vertical ti	ransect	quadrat	square	species	n	abiotic	hab	biotic_	hab
	4	3	8	T. funebralis	5	cobble		NA	
	4	3	9	T. funebralis	$\frac{3}{2}$	cobble		NA	
	4	3	10	B. glandula	$\frac{2}{27}$	cobble		NA	
	4	3	10	T. funebralis	13	cobble		NA	
	4	1	1	B. glandula	61	cobble		NA	
	4	1	1	C. dalli	0	cobble		NA	
	4	1	2	B. glandula	11	cobble		NA	
	$\overline{4}$	1	$\overline{2}$	C. dalli	46	cobble		NA	
	4	1	3	Littorina spp.	1	pebble		NA	
	4	1	4	T. funebralis	1	pebble		NA	
	4	1	4	B. glandula	31	pebble		NA	
	4	1	4	H. oregonensis	1	pebble		NA	
	4	1	4	Littorina spp.	1	pebble		NA	
	4	1	5	Littorina spp.	34	pebble		NA	
	4	1	5	T. funebralis	3	pebble		NA	
	4	1	5	Littorina spp.	1	pebble		NA	
	4	1	6	H. oregonensis	1	cobble		NA	
	4	1	6	C. dalli	5	cobble		NA	
	4	1	6	T. funebralis	1	cobble		NA	
	4	1	7	B. glandula	32	cobble		NA	
	4	1	7	T. funebralis	10	cobble		NA	
	4	1	8	Littorina spp.	1	cobble		NA	
	4	1	8	T. funebralis	16	cobble		NA	
	4	1	9	Littorina spp.	1	cobble		NA	
	4	1	9	C. dalli	44	cobble		NA	
	4	1	9	B. glandula	9	cobble		NA	
	4	1	10	B. glandula	23	pebble		NA	
	4	1	10	C. dalli	5	pebble		NA	
	4	2	1	B. glandula	28	cobble		NA	
	4	2	1	T. funebralis	1	cobble		NA	
	4	2	1	Littorina spp.	1	cobble		NA	
	4	2	2	B. glandula	23	cobble		NA	
	4	2	2	T. funebralis	12	cobble		NA	
	4	$\frac{2}{2}$	3	P. samuelis C. dalli	3	cobble		NA	
	4	$\frac{2}{2}$	3	B. glandula	13 10	cobble cobble		NA NA	
	4	$\frac{2}{2}$	3 4	B. glandula	61	cobble		NA NA	
	4	$\frac{2}{2}$	4	T. funebralis	20	cobble		NA	
	4	$\frac{2}{2}$	5	B. glandula	13	cobble		NA	
	4	$\frac{2}{2}$	5	P. samuelis	13	cobble		NA	
	4	$\frac{2}{2}$	5	H. oregonensis	1	cobble		NA	
	4	$\frac{2}{2}$	6	B. glandula	31	cobble		NA	
	4	$\frac{2}{2}$	6	T. funebralis	28	cobble		NA	
	4	$\frac{2}{2}$	6	Littorina spp.	2	cobble		NA	
	4	$\frac{2}{2}$	6	H. oregonensis	$\frac{2}{2}$	cobble		NA	
	4	2	7	B. glandula	48	cobble		NA	
	4	2	7	T. funebralis	9	cobble		NA	
	4	2	8	C. dalli	9	cobble		NA	
	$\overline{4}$	$\overline{2}$	9	P. samuelis	2	cobble		NA	
	4	2	9	H. oregonensis	1	cobble		NA	
	4	2	9	B. glandula	22	cobble		NA	
	4	2	10	T. funebralis	3	cobble		NA	

vertical_transec	t quadrat	square	species	n	abiotic_	hab	biotic_hab
	4 2	10	Littorina spp.	1	cobble		NA
	4 2	10	B. glandula	15	cobble		NA
	6 1	1	Littorina spp.	5	cobble		NA
	6 1	1	C. dalli	0	cobble		NA
	6 1	2	NA	NA	cobble		NA
(6 1	3	NA	NA	pebble		NA
(6 1	4	B. glandula	16	cobble		NA
(6 1	4	C. dalli	36	cobble		NA
(6 1	5	Littorina spp.	1	cobble		NA
	6 1	5	C. dalli	7	cobble		NA
	6 1	6	Littorina spp.	17	cobble		NA
	6 1	6	B. glandula	17	cobble		NA
	6 1	6	C. dalli	24	cobble		NA
	6 1	6	Littorina spp.	2	cobble		NA
	6 1	7	NA	NA	cobble		NA
	6 1	8	Littorina spp.	2	pebble		NA
	6 1	8	B. glandula	28	pebble		NA
	6 1	8	C. dalli	17	pebble		NA
	6 1	9	Littorina spp.	18	cobble		NA
	6 1	9	B. glandula	30	cobble		NA
	6 1	9	C. dalli	29	cobble		NA
	6 1	10	Littorina spp.	1	cobble		NA
	6 2	1	Littorina spp.	10	cobble		NA
	6 2	1	B. glandula	2	cobble		NA
	6 2	2	Littorina spp.	4	pebble		NA
	6 2	2	B. glandula	13	pebble		NA
	6 2	2	C. dalli	14	pebble		NA
	6 2	3	Littorina spp.	3	cobble		NA
	6 2	3	B. glandula	2	cobble		NA
	6 2	4	C. dalli	3	cobble		NA
	6 2	5	Littorina spp.	13	cobble		NA
	6 2	5	B. glandula	5	cobble		NA
	6 2	5	C. dalli	1	cobble		NA
	6 2	6	C. dalli	18	cobble		NA
	6 2	7	Littorina spp.	3	cobble		NA
	6 2	8	NA	NA	cobble		NA
	6 2	9	Littorina spp.	2	cobble		NA
	6 2	9	B. glandula	2	cobble		NA
	6 2	10	C. dalli	6	cobble		NA
	6 3	1	Littorina spp.	31	cobble		NA
	6 3	1	B. glandula	28	cobble		NA
	6 3	1	C. dalli	2	cobble		NA
	6 3	2	Littorina spp.	4	cobble		Mastocarpus spp.
	6 3	2	B. glandula	11	cobble		Mastocarpus spp.
	6 3	2	C. dalli	12	cobble		Mastocarpus spp.
	6 3	3	Littorina spp.	2	boulder		NA NA
	6 3	3	B. glandula	10	boulder		NA NA
	6 3	3	C. dalli	27 11	boulder		NA NA
	6 3 6 3	4	Littorina spp.	11	cobble		NA NA
	6 3 6 3	$\frac{4}{4}$	B. glandula C. dalli	2 10	cobble cobble		NA NA
	6 3	4 5	Littorina spp.	$\frac{10}{12}$	boulder		NA NA
	0 3	Э	ънионна spp.	12	boulder		INA

vertical_	_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	6	3	5	B. glandula	27	boulder	NA
	6	3	5	C. dalli	32	boulder	NA
	6	3	5	Littorina spp.	1	boulder	NA
	6	3	5	Littorina spp.	1	boulder	NA
	6	3	6	Littorina spp.	3	cobble	NA
	6	3	6	B. glandula	12	cobble	NA
	6	3	6	C. dalli	19	cobble	NA
	6	3	7	Littorina spp.	7	pebble	NA
	6	3	7	B. glandula	4	pebble	NA
	6	3	7	O. maculosus	1	pebble	NA
	6	3	8	Littorina spp.	4	cobble	NA
	6	3	8	B. glandula	7	cobble	NA
	6	3	8	C. dalli	12	cobble	NA
	6	3	9	Littorina spp.	5	cobble	NA
	6	3	9	B. glandula	24	cobble	NA
	6	3	9	C. dalli	9	cobble	NA
	6	3	10	Littorina spp.	7	cobble	NA
	6	3	10	B. glandula	15	cobble	NA
	6	3	10	C. dalli	19	cobble	NA
	2	1	1	C. dalli	25	boulder	NA
	2	1	1	B. glandula	5	boulder	NA
	2	1	1	Littorina spp.	19	boulder	NA
	$\overline{2}$	1	$\overset{-}{2}$	C. dalli	50	boulder	NA
	$\overline{2}$	1	$\overline{2}$	B. glandula	7	boulder	NA
	2	1	$\frac{1}{2}$	Littorina spp.	5	boulder	NA
	2	1	3	B. glandula	5	pebble	NA
	$\frac{2}{2}$	1	4	C. dalli	5	cobble	NA
	$\frac{2}{2}$	1	4	Littorina spp.	94	cobble	barnacles
	$\frac{2}{2}$	1	5	C. dalli	33	bedrock	NA
	$\frac{2}{2}$	1	5	Littorina spp.	34	bedrock	NA
	$\frac{2}{2}$	1	5	B. glandula	6	bedrock	NA NA
	$\overset{2}{2}$	1	6	C. dalli	12	bedrock	NA NA
	$\frac{2}{2}$	1	6	Littorina spp.	15	bedrock	NA NA
	$\frac{2}{2}$	1	6		$\frac{15}{25}$	bedrock	NA NA
	$\frac{2}{2}$		7	B. glandula C. dalli	$\frac{25}{38}$		NA NA
		1				pebble	
	2	1	7	Littorina spp.	9	pebble	NA
	2	1	7	B. glandula	12	pebble	NA
	2	1	8	C. dalli	35	boulder	NA
	2	1	8	Littorina spp.	6	boulder	NA
	2	1	8	B. glandula	2	boulder	NA
	2	1	9	C. dalli	50	boulder	NA
	2	1	9	Littorina spp.	40	boulder	NA
	2	1	9	B. glandula	31	boulder	NA
	2	1	10	Littorina spp.	30	boulder	barnacles
	2	2	1	B. glandula	20	boulder	NA
	2	2	1	Littorina spp.	1	boulder	NA
	2	2	1	Littorina spp.	25	boulder	NA
	2	2	2	C. dalli	22	boulder	NA
	2	2	2	Littorina spp.	40	boulder	NA
	2	2	2	B. glandula	30	boulder	NA
	2	2	3	NA	NA	boulder	NA
	2	2	4	C. dalli	10	boulder	NA

vertical	transect	quadrat	square	species	n	abiotic_hab	biotic_hab
	2	2	4	Littorina spp.	1	boulder	NA
	2	2	4	B. glandula	25	boulder	NA
	2	2	5	C. dalli	7	boulder	NA
	$\overline{2}$	$\frac{1}{2}$	5	Littorina spp.	16	boulder	NA
	2	2	5	B. glandula	25	boulder	NA
	2	2	6	C. dalli	5	pebble	NA
	2	2	6	B. glandula	12	pebble	NA
	2	2	7	C. dalli	4	boulder	NA
	2	2	8	B. glandula	7	boulder	NA
	2	2	8	Littorina spp.	12	boulder	NA
	2	2	9	B. glandula	5	cobble	NA
	2	2	9	C. dalli	23	cobble	NA
	2	2	10	B. glandula	2	pebble	NA
	2	3	1	C. dalli	32	boulder	NA
	2	3	1	Littorina spp.	30	boulder	NA
	2	3	2	B. glandula	12	pebble	NA
	2	3	3	B. glandula	5	pebble	NA
	2	3	4	NA	0	pebble	NA
	2	3	5	B. glandula	1	pebble	NA
	2	3	6	C. dalli	70	boulder	NA
	2	3	6	Littorina spp.	3	boulder	NA
	2	3	7	B. glandula	11	pebble	NA
	2	3	8	C. dalli	4	pebble	NA
	2	3	8	B. glandula	3	pebble	NA
	2	3	9	NA	0	pebble	NA
	2	3	10	B. glandula	15	boulder	Upright.algae
	2	3	10	C. dalli	10	boulder	Upright.algae
	1	3	1	B. glandula	4	boulder	NA
	1	3	NA	C. dalli	4	boulder	NA
	1	3	2	NA	0	sand	NA
	1	3	3	B. glandula	7	boulder	NA NA
	1	3	NA	C. dalli	42	boulder	NA NA
	1	3	4 N A	B. glandula	47	cobble	NA NA
	1	3	NA	C. dalli	42	cobble	NA NA
	1	3	NA	Littorina spp.	18 N.A	cobble	NA NA
	1	3	5 6	NA NA	NA NA	sand	NA NA
	1	3	6	NA P. glandula	NA 10	sand	NA NA
	1	3 3	7 N A	B. glandula C. dalli	18	boulder boulder	NA NA
	1 1	3 3	NA NA	C. dalli Littorina spp.	$\frac{64}{24}$	boulder boulder	NA NA
	1	3 3	NA 8	B. glandula	24 13	boulder	NA NA
	1	3 3	9	C. dalli	13	boulder	NA NA
	1	3 3	10	NA	$\stackrel{1}{\mathrm{NA}}$	sand	NA NA
	1	3 4	10	B. glandula	NA 8	sand boulder	NA NA
	1	4	$\frac{1}{2}$	B. glandula	6	boulder	NA NA
	1	4	3	NA	0	sand	NA NA
	1	4	3 4	NA NA	0	sand	NA NA
	1	4	4 5	NA NA	0	sand	NA NA
	1	4	6	NA NA	0	sand	NA NA
	1	4	7	NA NA	0	sand	NA NA
	1	4	8	B. glandula	16	cobble	NA NA
	1	4	9	NA	0	cobble	NA
	1	4	Э	1117	U	CODDIC	1111

vertical_transect	quadrat	square	species	n	abiotic_hab	biotic_hab
1	4	10	NA	0	sand	NA
3	1	1	B. glandula	22	cobble	NA
3	1	1	C. dalli	43	cobble	NA
3	1	1	Littorina spp.	9	cobble	B. glandula, Upright algae
3	1	2	Littorina spp.	38	cobble	B. glandula, Upright algae
3	1	2	B. glandula	26	cobble	NA
3	1	2	C. dalli	24	cobble	NA
3	1	3	B. glandula	8	pebble	NA
3	1	3	C. dalli	3	pebble	NA
3	1	3	Littorina spp.	1	pebble	NA
3	1	4	B. glandula	3	cobble	NA
3	1	4	C. dalli	11	cobble	NA
3	1	5	B. glandula	14	cobble	NA
3	1	5	Littorina spp.	16	cobble	NA
3	1	6	H. nudus	2	pebble	NA
3	1	6	B. glandula	34	pebble	NA
3	1	6	C. dalli	17	pebble	NA
3	1	6	Littorina spp.	30	pebble	NA
3	1	6	P. samuelis	1	pebble	NA
3	1	7	C. dalli	15	cobble	NA
3	1	7	B. glandula	3	cobble	NA
3	1	7	H. nudus	1	cobble	NA
3	1	8	NA	0	cobble	NA
3	1	9	Littorina spp.	25	cobble	B. glandula
3	1	9	B. glandula	20	cobble	NA
3	1	9	C. dalli	11	cobble	NA
3	1	10	H. cinctipes	1	cobble	NA
3	1	10	Littorina spp.	2	cobble	NA
3	1	10	Littorina spp.	7	cobble	NA
3	2	1	C. dalli	2	pebble	NA
3	2	1	Littorina spp.	1	pebble	NA
3	2	2	C. dalli	1	cobble	NA
3	2	2	B. glandula	2	cobble	NA
3	2	2	Littorina spp.	18	cobble	NA
3	2	3	C. dalli	70	cobble	NA
3	2	3	B. glandula	7	cobble	NA
3	2	4	Littorina spp.	8	cobble	NA
3	2	4	B. glandula	2	cobble	NA
3	2	5	Littorina spp.	1	cobble	NA
3	2	6	Littorina spp.	15	cobble	NA
3	2	6	B. glandula	25	cobble	NA
3	2	7	Littorina spp.	3	cobble	NA
3	2	7	C. dalli	2	cobble	NA
3	2	8	B. glandula	8	cobble	NA
3	2	8	C. dalli	40	boulder	NA
3	2	8	Littorina spp.	8	boulder	NA
3	2	9	Littorina spp.	1	boulder	NA
3	2	10	NA	0	cobble	NA

#Organizing data & making new columns:

vertical_transect quadrat square species n abiotic_hab biotic_hab

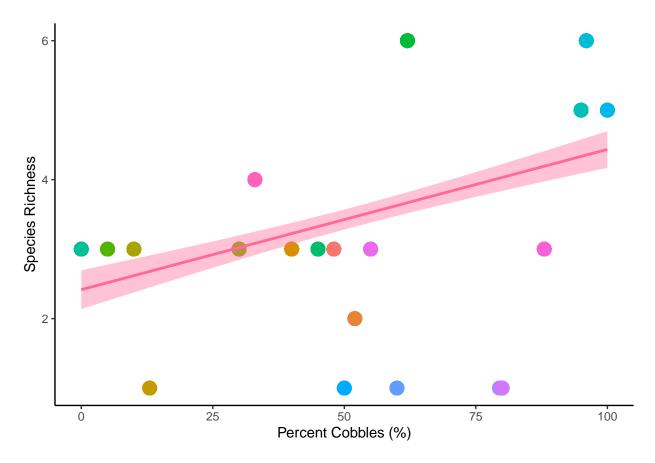
```
## 1
                                       1 B. glandula 9
                                                                              <NA>
                       1
                               1
                                                               cobble
## 2
                                             C. dalli 2
                       1
                                1
                                       1
                                                                cobble
                                                                              <NA>
## 3
                                                                              <NA>
                       1
                               1
                                       2
                                                 <NA> NA
                                                                  sand
## 4
                               1
                                       3 B. glandula 2
                                                                cobble
                                                                              <NA>
                       1
## 5
                               1
                                       4
                                                 <NA> NA
                                                                  sand
                                                                              <NA>
## 6
                               1
                                       5 B. glandula 5
                                                                cobble
                                                                              <NA>
                       1
     per_sand per_pebble per_cobble per_boulder per_bedrock per_mussel
## 1
            52
                         0
                                    48
                                                  0
                                                                0
## 2
            52
                         0
                                    48
                                                  0
                                                                0
                                                                            0
## 3
            52
                         0
                                    48
                                                  0
                                                                0
                                                                            0
## 4
            52
                         0
                                    48
                                                  0
                                                                0
                                                                            0
## 5
            52
                         0
                                    48
                                                  0
                                                                0
                                                                            0
## 6
            52
                         0
                                    48
                                                  0
                                                                0
     per_barnacle per_upright per_crust num_snail num_crab
## 1
                11
                          0.005
                                         0
                                                    0
                                                              0
## 2
                11
                          0.005
                                         0
                                                    0
                                                              0
## 3
                11
                          0.005
                                         0
                                                    0
                                                              0
                          0.005
                                                    0
                                                              0
## 4
                11
                                         0
                                                              0
## 5
                11
                          0.005
                                         0
                                                    0
## 6
                11
                          0.005
                                         0
                                                    0
                                                              0
```

#Then we organize the final dataset by merging the above

```
figure_data = final_merged_data %>%
  mutate(transect_quad = as.factor(transect_quad))
species_rich <- ggplot(figure_data, aes(x = per_cobble, y = species_per_quad, fill = transect_quad)) +
  geom_point(aes(colour = transect_quad, size = 2)) +
    stat_smooth(method = "lm", aes(fill = "transect_quad", colour = "black")) +
    xlab("Percent Cobbles (%)") +
    ylab("Species Richness") +
    theme_classic() +
    theme(legend.position = "none")

species_rich</pre>
```

```
## 'geom_smooth()' using formula 'y ~ x'
```



ggsave(here("./images/species_richness_cobble.png"), species_rich)

Saving 6.5 x 4.5 in image
'geom_smooth()' using formula 'y ~ x'

species.mod <- lm(per_cobble ~ species_per_quad, data = figure_data)
summary(species.mod)

##

Call:
lm(formula = per_cobble ~ species_per_quad, data = figure_data)</pre>

```
##
## Residuals:
##
       Min
                1Q Median
                                ЗQ
                                       Max
   -48.029 -23.614 -3.029 27.410
##
## Coefficients:
##
                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)
                     22.2748
                                 3.7617
                                          5.921 7.52e-09 ***
## species_per_quad
                      8.5847
                                 0.9938
                                          8.638 < 2e-16 ***
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' ' 1
## Residual standard error: 28.58 on 356 degrees of freedom
```

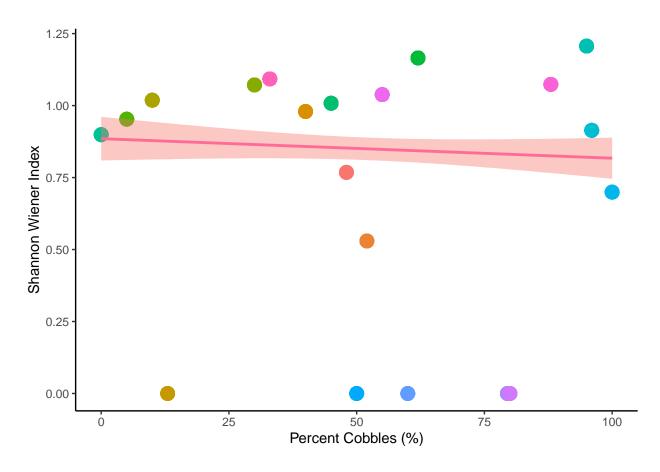
```
## Multiple R-squared: 0.1733, Adjusted R-squared: 0.171 ## F-statistic: 74.61 on 1 and 356 DF, p-value: < 2.2e-16
```

#p = 2e-16, significant

```
shannon_plot_cobble <- ggplot(figure_data, aes(x = per_cobble, y = H)) +
  geom_point(aes(colour = transect_quad, size = 2)) +
  theme_classic() +
  xlab("Percent Cobbles (%)") +
  ylab("Shannon Wiener Index") +
  stat_smooth(method = "lm", aes(fill = "transect_quad", colour = "black")) +
  theme(legend.position = "none")

shannon_plot_cobble</pre>
```

'geom_smooth()' using formula 'y ~ x'

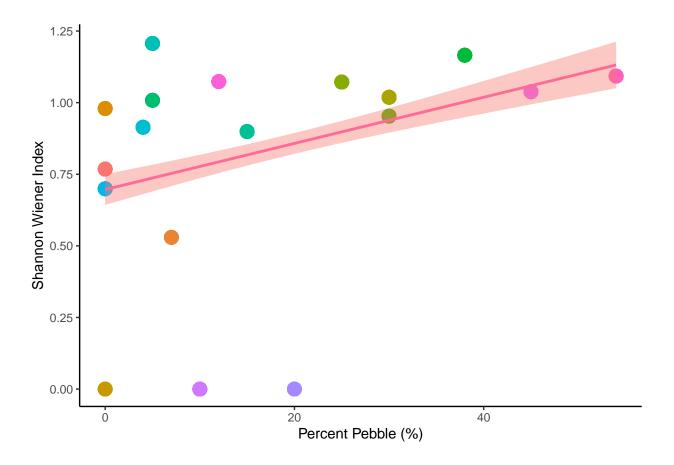


ggsave(here("./images/shannon_plot_cobble.png"), shannon_plot_cobble)

```
## Saving 6.5 x 4.5 in image
## 'geom_smooth()' using formula 'y ~ x'
```

```
Hcobble.mod <- lm(per_cobble ~ H, data = figure_data)</pre>
summary(Hcobble.mod)
##
## Call:
## lm(formula = per_cobble ~ H, data = figure_data)
## Residuals:
      Min
                1Q Median
                                3Q
                                       Max
## -51.801 -20.985 -4.419 23.954 47.256
##
## Coefficients:
              Estimate Std. Error t value Pr(>|t|)
                             4.101
                                     13.67
                                             <2e-16 ***
## (Intercept)
                56.046
                                              0.285
## H
                 -4.721
                             4.413
                                    -1.07
## ---
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' 1
## Residual standard error: 31.38 on 356 degrees of freedom
## Multiple R-squared: 0.003205, Adjusted R-squared: 0.0004052
## F-statistic: 1.145 on 1 and 356 DF, p-value: 0.2854
\#p = 0.285, not significant
shannon_plot_pebble <- ggplot(figure_data, aes(x = per_pebble, y = H)) +
  geom_point(aes(colour = transect_quad, size = 2)) +
 theme_classic() +
  xlab("Percent Pebble (%)") +
 ylab("Shannon Wiener Index") +
  stat_smooth(method = "lm", aes(fill = "transect_quad", colour = "black")) +
  theme(legend.position = "none")
shannon_plot_pebble
```

```
## 'geom_smooth()' using formula 'y ~ x'
```



ggsave(here("./images/shannon_plot_pebble.png"), shannon_plot_pebble)

```
## Saving 6.5 x 4.5 in image
## 'geom_smooth()' using formula 'y ~ x'

Hpebble.mod <- lm(per_pebble ~ H, data = figure_data)
summary(Hpebble.mod)</pre>
```

```
##
## Call:
## lm(formula = per_pebble ~ H, data = figure_data)
##
## Residuals:
##
       Min
                1Q Median
                                ЗQ
                                       Max
  -21.283 -16.412
                     2.113 12.408
##
## Coefficients:
##
               Estimate Std. Error t value Pr(>|t|)
## (Intercept)
                  4.255
                             2.122
                                     2.006
                                             0.0457 *
## H
                 17.384
                             2.283
                                     7.614 2.42e-13 ***
##
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' ' 1
## Residual standard error: 16.24 on 356 degrees of freedom
```

```
## Multiple R-squared: 0.14, Adjusted R-squared: 0.1376
## F-statistic: 57.97 on 1 and 356 DF, p-value: 2.42e-13
```

#p-value = 2.42e-13, significant

##Question## Does substrate type impact sessile invertebrate biodiversity in the intertidal zone?

Specifically, how does percent cobble cover impact species richness in each quadrat?, how does percent cobble cover impact the Shannon Wiener Index in each quadrat?, and how does percent pebble cover impact the shannon Wiender index in each quadrat?

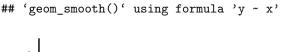
##Data Collection## We sampled our data at Scott's Bay, BC using transect tapes parallel to the shoreline and quadrats that were placed haphazardly along six vertical transects. Measurements were taken during a high low tide at two different elevations across exposed and sheltered sides of the bay, and species counts and percent biotic and abiotic cover was recorded for randomly selected squares in each quadrat.

##Summary of Analysis## We manipulated and organized our csv datasets in R studio to create a csv that included all data needed to create our figures. To answer our question we calculated species richness and Shannon Wiener Index for each quadrat, and then performed linear regression models to test the significance of our findings.

Parameters	p-value	Adjusted R-squared
Percent cobble vs Species Richness Percent cobble vs Shannon Weiner Index Percent pebble vs Shannon Weiner Index		0.171 0.0004052 0.1376

##Results & Conclusions##0.2854 We first plotted the species richness versus percent boulder cover in each quadrat, finding that boulder cover did significantly impact species richness in a positive correlation.

species_rich



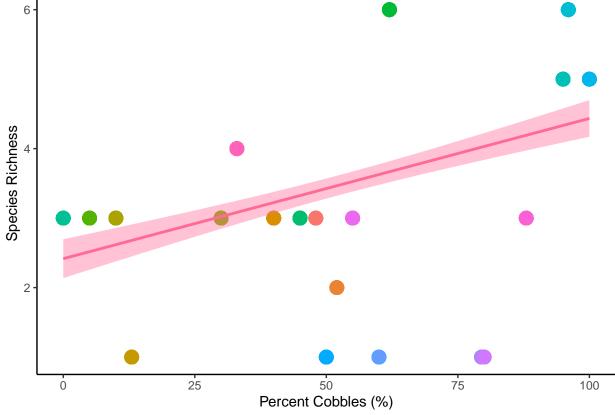


Figure 1: Species richness is the response variable plotted against percent cobbles, which serves as the explanatory variable. The colours represent different quadrats along our transects. The linear trendline was added and we found an adjusted R^2 of 0.171 and a p-value of < 2.2e-16.

Then we plotted two figures for biodiversity (Shannon Wiener index) versus percent boulder and percent pebble cover, respectively, finding that cobble cover did not significantly impact biodiversity but pebble cover did have a significant positive correlation.

#for percent cobble shannon_plot_cobble

'geom_smooth()' using formula 'y ~ x'

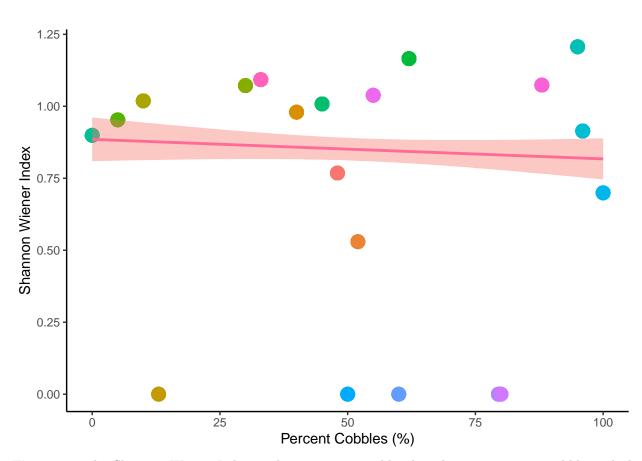


Figure 2: The Shannon Weiner Index is the response variable plotted against percent cobbles, which serves as the explanatory variable. The colours represent different quadrats along our transects. The linear trendline was added and we found an adjusted R^2 of 0.0004052 and a p-value of 0.2854.

```
#for percent pebble
shannon_plot_pebble
```

'geom_smooth()' using formula 'y ~ x'

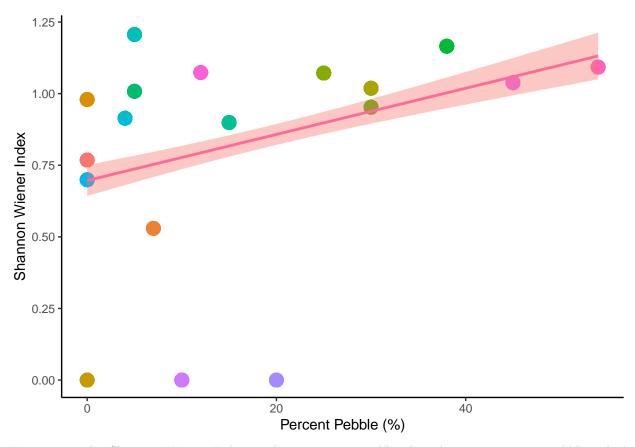


Figure 3: The Shannon Weiner Index is the response variable plotted against percent pebble, which serves as the explanatory variable. The colours represent different quadrats along our transects. The linear trendline was added and we found an adjusted R^2 of 0.1376 and a p-value of 2.42e-13.