



Otago Regional Council
SOE Monitoring 2010:
Periphyton Summary

EOS Ecology Report No. 09024-ORC01-02 | June 2010

AQUATIC RESEARCH
CONSULTANTS



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REPORT

Prepared for
Otago Regional Council

Prepared by
Alex James

Reviewed by
Shelley McMurtrie





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1 INTRODUCTION

Between the 3rd and 10th of February 2010, EOS Ecology conducted the field component of Otago Regional Council's (ORC) 2010 State of the Environment monitoring (SOE) at 30 sites throughout the Otago region; from Oamaru west to Wanaka and south to the Catlins. This involved a habitat assessment and collection of periphyton and macroinvertebrate samples and subsequent laboratory analysis and processing. This report summarises the methodology and results of the periphyton sampling component. EOS Ecology was not asked to analyse the results but only to present a summary of the methods used and tabulate the raw data.

2 METHODS

2.1 Fieldwork

At each site a single composite sample was collected by randomly selecting three representative rocks (taken at one quarter, one half, and three quarters of the stream width) and pooling the scrapings of a 5 cm × 5 cm area from each rock. This is the methodology outlined in the tender document and is similar to the “quantitative method 1b (QM-1b)” outlined in Biggs & Kilroy (2000): Section 6.5.5. Periphyton samples were then chilled and frozen as soon as possible to preserve them.

2.2 Analysis

Periphyton sample processing was carried out by NIWA following the “relative abundance assessments using an inverted light microscope” protocol outlined in Sections 8.2 and 8.3 of Biggs & Kilroy (2000). This method is used for rapid evaluation of algal community composition and identification of the main taxa comprising biomass. Each taxon is assigned a relative abundance score on an eight-point scale (Table 1).

3 RESULTS

All sites (Table 2) were surveyed between February 3rd and 10th, 2010. A full tabulation of the raw data is provided in the Appendix. The only difficulties encountered during periphyton sampling were at Site 14—Waipori River @ Falls Reserve which has very variable flow due to a hydro dam upstream. We were informed by a TrustPower employee that the water level in this river changes rapidly without warning (depending on power demand). There was too much flow to safely enter the water thus the periphyton sample was taken from the accessible edges, not from one quarter, one half, and three quarters of the stream width. Given the variability in flow the amount of time the sampled area remains inundated is unknown, thus the periphyton data from this site should be treated with caution.

TABLE 1 Algal taxa relative abundance score interpretation descriptions (from Biggs & Kilroy, 2000).

Score	Description	Score	Description
8	Dominant	4	Occasional – common
7	Abundant	3	Occasional
6	Common – abundant	2	Rare – occasional
5	Common	1	Rare

TABLE 2 The 30 Otago Regional Council State of the Environment biomonitoring sites surveyed between February 3rd and 10th, 2010. Note that the site codes were assigned by EOS Ecology.

Site code	Site name	Site code	Site name
1	Kakanui River @ Clifton Falls	16	Ida Burn @ SH85
2	Kakanui River @ McCones	17	Fraser River @ Marshall Rd
3	Kauru @ Ewings	18	Cardrona River @ Mt Barker
4	Shag River @ Craig Rd	19	Lindis River @ Ardour Rd
5	Shag River @ Goodwood Pump	20	Luggate Ck @ SH6 bridge
6	Trotters Ck @ Mathesons	21	Mill Ck @ Fish Trap
7	Waianakarua @ Browns Pump	22	Heriot Burn @ Park Hill Rd
8	Waiareka Ck @ Taipo Rd	23	Waipahi River @ Waipahi
9	Waikouaiti River @ Orbell's Crossing	24	Waitahuna @ Tweeds Bridge
10	Kaikorai Stm @ Brighton Rd	25	Waiwera River 1km US of Clutha
11	Lindsay Ck @ North Bar Rd	26	Crookston Burn @ Kelso-Tapanui Rd
12	Water of Leith @ Dundas Street	27	Waikoikoi Ck @ Bailey Bridge
13	Silver Stm @ Riccarton Rd	28	Waipahi River @ Cairns
14	Waipori River @ Falls Reserve	29	Tokomairiro @ West Branch Bridge
15	Dunstan Ck @ Beattie Rd	30	Catlins River @ Houipapa

Periphyton diversity was greatest at Site 20—Luggate Ck @ SH6 Bridge (32 taxa) and least at Site 7—Waianakarua @ Browns Pump (11 taxa). The periphyton communities of 16 of the 30 sites were dominated by filamentous green algae. The potentially toxic alga *Phormidium* spp. was present at 17 sites and classed as dominant at five sites. The invasive alga *Didymosphenia geminata* was present at eight sites but only classed as dominant at Site 18—Cardrona River @ Mt Barker. Full periphyton abundance results are shown in Section 5.

4 REFERENCES

Biggs, B.J.F. & Kilroy, C. 2000. Stream Periphyton Monitoring Manual. NIWA, Christchurch, New Zealand. 246 p.

5 APPENDICES

5.1 Periphyton relative abundance results

TABLE 5.1 Periphyton relative abundance results from samples collected from 30 sites in the Otago region as part of Otago Regional Council's 2010 State of the Environment monitoring. Samples were collected between February 3rd and 10th, 2010.

NIWA Lab ID	WD01	WD02	WD03	WD04	WD05	WD06	WD07	WD08	WD09	WD10
EOS ID number	P10001	P10002	P10003	P10004	P10005	P10006	P10007	P10008	P10009	P10010
Site number	1	2	3	4	5	6	7	8	9	10
Site name	Kakanui River @ Clifton Falls	Kakanui River @ McCones	Kauru @ Ewings	Shag River @ Craig Rd	Shag River @ Goodwood Pump	Trotters Ck @ Mathesons	Waihanakarua @ Browns Pump	Waiareka Ck @ Taipo Rd	Waikouaiti River @ Orbells Crossing	Kaikorai Strm @ Brighton Rd
<i>Bulbochaete</i> spp.	4	6								
<i>Cladophora</i> sp.				6				6		8
cf. <i>Klebsomidium</i> spp.			4							
<i>Microspora</i> spp.				3						
<i>Mougeotia</i> spp.						3			8	
<i>Oedogonium</i> spp.	4	8	7	6		8			3	
<i>Oedogonium</i> spp. (Skinny)	3									
<i>Spirogyra</i> spp.		3	4	4	5			8	3	
<i>Stigeoclonium</i> spp.										
cf. <i>Tribonema</i> spp.										
<i>Ankistrodesmus</i> spp	1	2	2							2
<i>Closterium</i> spp.								3		
<i>Cosmarium</i> spp.							2		2	
<i>Gleocystis</i> spp.	2	4	3	2						
<i>Pediastrum</i> spp.	1			1					3	
<i>Scenedesmus</i> spp.	2	2	3	3		2	4		3	
<i>Staurastrum</i> spp.	2			1		1				
Little Green Balls			3							
<i>Audouinella/Batrachospermum</i>										
cf. <i>Chroodactylon</i> spp.	2									
<i>Achnanthyrium</i> spp. (small)				2						
<i>Achnanthyrium</i> cf. <i>laevis</i>		1								
<i>Achnanthyrium minutissimum</i>		5		1						
<i>Brachysira</i> spp.						2				
<i>Cocconeis pediculus</i>	2	4		5	4			8		
<i>Cocconeis placentula</i>	2	2	3	3	3	2		2	3	4
<i>Cyclotella</i> spp.									2	
<i>Cymbella aspera</i>	2		2						3	
<i>Cymbella</i> cf. <i>cuspidata</i>						3				
<i>Cymbella kappii</i>	4		5	5	6	3	8		6	
<i>Cymbella</i> cf. <i>tumida</i>		4					4		5	
<i>Cymbella</i> spp. (small)			3				5			
<i>Diatoma hiemale</i>										2
<i>Diatoma</i> cf. <i>tenuis</i>	4	2			2					
<i>Diatoma</i> cf. <i>vulgaris</i>	3	3		4	8			7	5	
<i>Didymosphenia geminata</i>	5	6			1					
<i>Diploneis elliptica</i>			1							
<i>Encyonema</i> cf. <i>minutum</i>	5	4	4	7	3	4	4		7	4
<i>Encyonema prostratum</i>				6						4
<i>Epithemia adnata</i>	3		3							
<i>Epithemia sores</i>	5	2	3	2					3	
<i>Eunotia</i> spp. (Chains)										
<i>Fragilaria</i> spp. (small. cf. <i>vaucheriae</i>)			3							
<i>Fragilaria</i> spp. (small, chains)				3						
<i>Fragilaria</i> cf. <i>crotonensis</i> ?										

NIWA Lab ID	WD01	WD02	WD03	WD04	WD05	WD06	WD07	WD08	WD09	WD10
EOS ID number	P10001	P10002	P10003	P10004	P10005	P10006	P10007	P10008	P10009	P10010
Site number	1	2	3	4	5	6	7	8	9	10
Site name	Kakanui River @ Clifton Falls	Kakanui River @ McCones	Kauru @ Ewings	Shag River @ Craig Rd	Shag River @ Goodwood Pump	Trotters Ck @ Mathesons	Waiānakarua @ Browns Pump	Waiareka Ck @ Taipo Rd	Waikouaiti River @ Orbells Crossing	Kaikōrali Stm @ Brighton Rd
<i>Frustulia cf. rhomboides</i>										
<i>Frustulia cf. rhomboides</i> var. <i>crassinerva</i>										
<i>Frustulia cf. rhomboides</i> var. <i>saxonica</i>										
<i>Frustulia vulgaris</i>										2
<i>Gomphonopsis minuta</i> var. <i>cassieae</i>	2	3	5	2	5		4		4	4
<i>Gomphonema acuminatum</i>	3	4	3	4	3	3			3	
<i>Gomphonema cf. minutum</i> (15 µm)		4	4			4		3		4
<i>Gomphonema cf. parvulum</i>				4			3	4	5	4
<i>Gomphonema cf. truncatum</i>	4	4	3	4	3				4	
<i>Gomphonema cf. berggrenii?</i>	3									1
<i>Gomphonema</i> spp. (small)										3
<i>Melosira varians</i>				4		4				6
<i>Meridion circulare</i>										
<i>Navicula cf. lanceolata</i>			4						5	7
<i>Navicula</i> spp. (25-30 µm)	2		4							
<i>Navicula cf. margilithi</i>						3				
<i>Navicula cf. capitatoradiata</i>										
<i>Navicula cf. cryptocephala</i>										
<i>Navicula cf. gregaria</i>	3		4	3		3		3	4	4
<i>Navicula radiosa</i>										
<i>Navicula cf. rhychocephala</i>						4				
<i>Nitzschia acicularis</i>										
<i>Nitzschia</i> spp. (small)				3					3	
<i>Nitzschia</i> (skinny) 20-30x5µm	3	3	3	3	3	4	4	2	4	
<i>Nitzschia cf. dissipata</i>										
<i>Nitzschia cf. linearis</i>										1
<i>Nitzschia</i> spp. (Long Skinny)										
<i>Pinnularia cf. gibba</i>						4				
<i>Pinnularia cf. viridis</i>									1	
<i>Pinnularia cf. subcapitata</i>										
<i>Planothidium lanceolata</i>										
<i>Reimeria</i> spp.									2	
<i>Rhoicosphenia curvata</i>				1			1	5	4	4
<i>Rhopalodia novae-zealandiae</i>	3									
<i>Rossithidium linearis</i>	5	4				5				5
<i>Stauroneis</i> spp.										
<i>Surirella cf. angusta</i> (70µm)						4				
<i>Surirella cf. ovata</i>									3	3
<i>Surirella tenera</i>						1				
<i>Synedra cf. acus</i>	8	6			4					
<i>Synedra ulna</i>				2	3	3		4		
<i>Synedra ulna</i> var. <i>biceps</i>		4								
<i>Synedra ulna</i> cf. var. <i>contracta</i>										
<i>Synedra ulna</i> cf. <i>ramesi</i>										
<i>Synedra</i> spp. cf. <i>rumpens</i>				2					2	
<i>Tabellaria flocculosa</i>	3					3				3
cf. <i>Phormidium</i> spp.		4	8		5		8		3	
Fine cf. <i>Leptolyngbya</i> spp.										
<i>Merismopedia</i> spp.										
<i>Nostoc</i> (clump)			5							
cf. <i>Oscillatoria</i> spp.				2						
Bryophyte										

NIWA Lab ID	WD11	WD12	WD13	WD14	WD15	WD16	WD18	WD19	WD20	WD21
EOS ID number	P10011	P10012	P10013	P10014	P10015	P10016	P10018	P10019	P10020	P10021
Site code	11	12	13	14	15	16	17	18	19	20
Site name	Lindsay Ck @ North Bar Rd	Water of Leith @ Dundas Street	Silver Strm @ Riccarton Rd	Waipori River @ Falls Reserve*	Dunstan Ck @ Beattie Rd	Ida Burn @ SH85	Fraser River @ Marshall Rd	Cardrona River @ Mt Barker	Lindis River @ Ardour Rd	Luggate Ck @ SH6 bridge
<i>Bulbochaete</i> spp.						3				
<i>Cladophora</i> sp.		4								
cf. <i>Klebsomidium</i> spp.				8						8
<i>Microspora</i> spp.			3		8	7				
<i>Mougeotia</i> spp.						3			8	4
<i>Oedogonium</i> sp.			5	2		3	2	8		
<i>Oedogonium</i> sp. (Skinny)										
<i>Spirogyra</i> spp.		5				3			4	4
<i>Stigeoclonium</i> spp.										
cf. <i>Tribonema</i> spp.										
<i>Ankistrodesmus</i> spp.					2	2		2		1
<i>Closterium</i> spp.										
<i>Cosmarium</i> spp.					2	2				3
<i>Gleocystis</i> spp.	3			2					3	
<i>Pediastrum</i> spp.						2				
<i>Scenedesmus</i> spp.		2	4		2			3		2
<i>Staurastrum</i> spp.									1	2
Little Green Balls				4			2			
<i>Audouinella/Batrachospermum</i>										
cf. <i>Chroodactylon</i> spp.										
<i>Achnanthyidium</i> spp. (small)	3	3			3	4	3			2
<i>Achnanthyidium</i> cf. <i>laevis</i>										
<i>Achnanthyidium</i> <i>minutissimum</i>			6						5	
<i>Brachysira</i> spp.					2					
<i>Cocconeis pediculus</i>										
<i>Cocconeis placentula</i>	5	3	3	2	5	1	4	2	2	4
<i>Cyclotella</i> spp.							2			
<i>Cymbella aspera</i>					1	1				
<i>Cymbella</i> cf. <i>cuspidata</i>										
<i>Cymbella kappii</i>			8	5		6				
<i>Cymbella</i> cf. <i>tumida</i>					1					
<i>Cymbella</i> spp. (small)										
<i>Diatoma hiemale</i>	3			2	2			1	2	3
<i>Diatoma</i> cf. <i>tenuis</i>			2				2			
<i>Diatoma</i> cf. <i>vulgaris</i>			4							
<i>Didymosphenia geminata</i>					3		7	8	5	5
<i>Diploneis elliptica</i>							1			3
<i>Encyonema</i> cf. <i>minutum</i>		3	7	4	5	4	5	5	7	6
<i>Encyonema prostratum</i>	4	3								
<i>Epithemia adnata</i>		1					1			4
<i>Epithemia sorex</i>						4	5			5
<i>Eunotia</i> spp. (Chains)										
<i>Fragilaria</i> spp. (small, cf. <i>vaucheriae</i>)		3	3		5	4	3		4	5
<i>Fragilaria</i> spp. (small, chains)		5								
<i>Fragilaria</i> cf. <i>crotonensis</i> ?										
<i>Frustulia</i> cf. <i>rhomboides</i>										3
<i>Frustulia</i> cf. <i>rhomboides</i> var. <i>crassinerva</i>										
<i>Frustulia</i> cf. <i>rhomboides</i> var. <i>saxonica</i>								3		
<i>Frustulia vulgaris</i>				2		2	3			
<i>Gomphonema minuta</i> var. <i>cassiae</i>	4	3			3	4	3	4	4	5
<i>Gomphonema acuminatum</i>				1			2			
<i>Gomphonema</i> cf. <i>minutum</i> (15 µm)		5	3		4	4		5	3	6

*NOTE: not wadeable thus samples taken from edges.

NIWA Lab ID	WD11	WD12	WD13	WD14	WD15	WD16	WD18	WD19	WD20	WD21
EOS ID number	P10011	P10012	P10013	P10014	P10015	P10016	P10018	P10019	P10020	P10021
Site code	11	12	13	14	15	16	17	18	19	20
Site name	Lindsay Ck @ North Bar Rd	Water of Leith @ Dundas Street	Silver Strm @ Riccarton Rd	Waipori River @ Falls Reserve*	Dunstan Ck @ Beattie Rd	Ida Burn @ SH85	Fraser River @ Marshall Rd	Cardrona River @ Mt Barker	Lindis River @ Ardgour Rd	Luggate Ck @ SH6 bridge
<i>Gomphonema cf. parvulum</i>	4	4	4		6		3			
<i>Gomphonema cf. truncatum</i>	2	3	5							
<i>Gomphonema cf. berggrenii?</i>						4				4
<i>Gomphonema</i> spp. (small)				3	2		3			
<i>Melosira varians</i>	8	8	4	2	4		8	4		6
<i>Meridion circulare</i>			1		1		1			
<i>Navicula cf. lanceolata</i>	6									2
<i>Navicula</i> spp. (25-30 µm)			3				3			
<i>Navicula cf. margilithi</i>					3		2	3	2	5
<i>Navicula cf. capitatoradiata</i>										
<i>Navicula cf. cryptocephala</i>									2	
<i>Navicula cf. gregaria</i>		5		2		3				3
<i>Navicula radiosa</i>										
<i>Navicula cf. rhynchocephala</i>				2						
<i>Nitzschia acicularis</i>				2	1					2
<i>Nitzschia</i> spp. (small)	4	3	2		3			3		4
<i>Nitzschia</i> (skinny) 20-30x5µm	4			7		4	4	3	4	5
<i>Nitzschia cf. dissipata</i>	3									
<i>Nitzschia cf. linearis</i>	4	2				1				
<i>Nitzschia</i> spp. (Long Skinny)										
<i>Pinnularia cf. gibba</i>										
<i>Pinnularia cf. viridis</i>						3				
<i>Pinnularia cf. subcapitata</i>						1				
<i>Planothidium lanceolata</i>										
<i>Reimeria</i> spp.			1					2		
<i>Rhoicosphenia curvata</i>	6	6					1		1	1
<i>Rhopalodia novae-zealandiae</i>						2	3			5
<i>Rossithidium linearis</i>		4	3	2		3		3	4	
<i>Stauroneis</i> spp.										
<i>Surirella cf. angusta</i> (70µm)										
<i>Surirella cf. ovata</i>	4	3		1						
<i>Surirella tenera</i>		2								
<i>Synedra cf. acus</i>			5						3	
<i>Synedra ulna</i>										
<i>Synedra ulna</i> var. <i>biceps</i>			2							
<i>Synedra ulna</i> cf. var. <i>contracta</i>				1						
<i>Synedra ulna</i> cf. <i>ramesi</i>			3		6			2	2	
<i>Synedra</i> spp. cf. <i>rumpens</i>		4		3		2		2		2
<i>Tabellaria flocculosa</i>				4	1	4				2
cf. <i>Phormidium</i> spp.			3	2	4	8			5	1
Fine cf. <i>Leptolyngbya</i> spp.				2						
<i>Merismopedia</i> spp.										
<i>Nostoc</i> (clump)										
cf. <i>Oscillatoria</i> spp.									3	
Bryophyte										

*NOTE: not wadeable thus samples taken from edges.

NIWA Lab ID	WD22	WD23	WD24	WD25	WD26	WD27	WD28	WD29	WD30	WD31
EOS ID number	P10022	P10023	P10024	P10025	P10026	P10027	P10028	P10029	P10030	P10031
Site number	21	22	23	24	25	26	27	28	29	30
Site name	Mill Ck @ Fish Trap	Heriot Burn @ Park Hill Rd	Waipahi River @ Waipahi	Waitahuna @ Tweeds Bridge	Waiwera River 1km US of Clutha	Crookston Burn @ Kelson-Tapanui Rd	Waikoiko Ck @ Bailey Bridge	Waipahi River @ Cairns	Tokomairiro @ West Branch Bridge	Catlins River @ Houipapa
<i>Bulbochaete</i> spp.										
<i>Cladophora</i> sp.										
cf. <i>Klebsomidium</i> spp.										
<i>Microspora</i> spp.										
<i>Mougeotia</i> spp.										
<i>Oedogonium</i> sp.	3			8	7				3	8
<i>Oedogonium</i> sp. (Skinny)										
<i>Spirogyra</i> spp.							3			
<i>Stigeoclonium</i> spp.			2				8			
cf. <i>Tribonema</i> spp.										3
<i>Ankistrodesmus</i> spp.		1			1	1		1		
<i>Closterium</i> spp.						1	1	2		1
<i>Cosmarium</i> spp.										
<i>Gleocystis</i> spp.										3
<i>Pediastrum</i> spp.										
<i>Scenedesmus</i> spp.	3		1	2	3		4			
<i>Staurastrum</i> spp.										
Little Green Balls										
<i>Audouinella/Batrachospermum</i>		4							3	
cf. <i>Chroodactylon</i> spp.										
<i>Achnanthyrium</i> spp. (small)	1			3						3
<i>Achnanthyrium</i> cf. <i>laevis</i>							2	2		
<i>Achnanthyrium minutissimum</i>										
<i>Brachysira</i> spp.				1			2			
<i>Cocconeis pediculus</i>					2					2
<i>Cocconeis placentula</i>	3	4	4	4	3	6	5	3	6	2
<i>Cyclotella</i> spp.										
<i>Cymbella aspera</i>										
<i>Cymbella</i> cf. <i>cuspidata</i>										
<i>Cymbella kappii</i>				3			3			
<i>Cymbella</i> cf. <i>tumida</i>										
<i>Cymbella</i> spp. (small)										
<i>Diatoma hiemale</i>	3									2
<i>Diatoma</i> cf. <i>tenuis</i>	2									
<i>Diatoma</i> cf. <i>vulgaris</i>			1		4					
<i>Didymosphenia geminata</i>										
<i>Diploneis elliptica</i>								1		
<i>Encyonema</i> cf. <i>minutum</i>	6	2		4	3	3	4		3	3
<i>Encyonema prostratum</i>	1									
<i>Epithemia adnata</i>			1							
<i>Epithemia sorex</i>			1							
<i>Eunotia</i> spp. (Chains)										
<i>Fragilaria</i> spp. (small. cf. <i>vaucheriae</i>)						2			1	2
<i>Fragilaria</i> spp. (small, chains)										
<i>Fragilaria</i> cf. <i>crotonensis</i> ?										
<i>Frustulia</i> cf. <i>rhomboides</i>										
<i>Frustulia</i> cf. <i>rhomboides</i> var. <i>crassinerva</i>	2									
<i>Frustulia</i> cf. <i>rhomboides</i> var. <i>saxonica</i>	2									
<i>Frustulia vulgaris</i>									3	
<i>Gomphonema minuta</i> var. <i>cassieae</i>	4	2	4	4	4		2		1	3
<i>Gomphonema acuminatum</i>				3						

NIWA Lab ID	WD22	WD23	WD24	WD25	WD26	WD27	WD28	WD29	WD30	WD31
EOS ID number	P10022	P10023	P10024	P10025	P10026	P10027	P10028	P10029	P10030	P10031
Site number	21	22	23	24	25	26	27	28	29	30
Site name	Mill Ck @ Fish Trap	Heriot Burn @ Park Hill Rd	Waipahi River @ Waipahi	Waiahuna @ Tweeds Bridge	Waiwera River 1km US of Clutha	Crookston Burn @ Kelson-Tapanui Rd	Waikoiko Ck @ Bailey Bridge	Waipahi River @ Cairns	Tokomairiro @ West Branch Bridge	Catlins River @ Houipapa
<i>Gomphonema</i> cf. <i>minutum</i> (15 µm)	4	8	3		4	3			3	4
<i>Gomphonema</i> cf. <i>parvulum</i>	4	5	4	4	3	3	5	4		3
<i>Gomphonema</i> cf. <i>truncatum</i>	3			3					1	
<i>Gomphonema</i> cf. <i>berggrenii?</i>				4			4			
<i>Gomphonema</i> spp. (small)								1		
<i>Melosira</i> <i>varians</i>	4	2	4	8	8		8	3	3	7
<i>Meridion</i> <i>circulare</i>										
<i>Navicula</i> cf. <i>lanceolata</i>		3	4	4	6	8	5	2	4	7
<i>Navicula</i> spp. (25-30 µm)	3									
<i>Navicula</i> cf. <i>marginilithi</i>	5		1							
<i>Navicula</i> cf. <i>capitatoradiata</i>					3					
<i>Navicula</i> cf. <i>cryptocephala</i>			2			5		8		
<i>Navicula</i> cf. <i>gregaria</i>		4	3	4	4				4	4
<i>Navicula</i> <i>radiosa</i>										
<i>Navicula</i> cf. <i>rhynchocephala</i>										
<i>Nitzschia</i> <i>acicularis</i>										1
<i>Nitzschia</i> spp. (small)	4	4		5	4		3	2	3	3
<i>Nitzschia</i> (skinny) 20-30x5µm		2	2	4	4	3	4	2	3	4
<i>Nitzschia</i> cf. <i>dissipata</i>				3			2		2	
<i>Nitzschia</i> cf. <i>linearis</i>		1				1		2	2	
<i>Nitzschia</i> spp. (Long Skinny)										
<i>Pinnularia</i> cf. <i>gibba</i>								2		
<i>Pinnularia</i> cf. <i>viridis</i>								1		
<i>Pinnularia</i> cf. <i>subcapitata</i>										
<i>Pleurothidium</i> <i>lanceolata</i>	2								1	
<i>Reimeria</i> spp.	4		2							
<i>Rhoicosphenia</i> <i>curvata</i>	3	3	3		4		3		2	2
<i>Rhopalodia</i> <i>novae-zealandiae</i>										
<i>Rossetidium</i> <i>linearis</i>	4	2	2	3		3	3		2	4
<i>Stauroneis</i> spp.								1		
<i>Surirella</i> cf. <i>angusta</i> (70µm)		1	1			1	1	2		
<i>Surirella</i> cf. <i>ovata</i>										1
<i>Surirella</i> <i>tenera</i>									1	
<i>Synedra</i> cf. <i>acus</i>										
<i>Synedra</i> <i>ulna</i>				3		2				3
<i>Synedra</i> <i>ulna</i> var. <i>biceps</i>										
<i>Synedra</i> <i>ulna</i> cf. var. <i>contracta</i>							1			
<i>Synedra</i> <i>ulna</i> cf. <i>ramesi</i>										
<i>Synedra</i> spp. cf. <i>rumpens</i>	1									3
<i>Tabellaria</i> <i>flocculosa</i>										
cf. <i>Phormidium</i> spp.	8		8	2			4		4	3
Fine cf. <i>Leptolyngbya</i> spp.										
<i>Merismopedia</i> spp.				1						
<i>Nostoc</i> (clump)										
cf. <i>Oscillatoria</i> spp.										
Bryophyte										8



EOS ECOLOGY | AQUATIC RESEARCH CONSULTANTS

P: 03 389 0538 | F: 03 389 8576 | info@eosecology.co.nz | www.eosecology.co.nz | PO Box 4262, Christchurch 8140, New Zealand