

## Spatial and temporal variation in algal-assemblage structure in isolated dryland river waterholes, Cooper Creek and Warrego River, Australia

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The scale at which algal biodiversity is partitioned across the landscape, and the biophysical processes and biotic interactions which shape these communities in dryland river refugia was studied on two occasions from 30 sites in two Australian dryland rivers. Despite the waterholes studied having characteristically high levels of abiogenic turbidity, a total of 186 planktonic microalgae, 253 benthic diatom and 62 macroalgal species were recorded. The phytoplankton communities were dominated by flagellated cryptophytes, euglenophytes and chlorophytes, the diatom communities by cosmopolitan taxa known to tolerate wide environmental conditions, and the macroalgal communities by filamentous cyanobacteria. All algal communities showed significant differences between catchments and sampling times, with a suite of between 5 and 12 taxa responsible for ~ 50% of the observed change. In general, algal assemblage patterns were poorly correlated with the measured environmental variables. Phytoplankton and diatom assemblage patterns were weakly correlated with several waterhole geomorphic measures, whereas macroalgal assemblage patterns showed some association with variability in ionic concentration.

Table 1. Phytoplankton species recorded from Cooper Creek and Warrego River waterholes

Species	Cooper Creek		Warrego River	
	April 2001	September 2001	October 2001	April 2002
<b>Cyanobacteria</b>				
<i>Anabaena circinalis</i> Rabenhorst				+
<i>Anabaena flos-aquae</i> (Lyngbye) Komárek				+
<i>Anabaena spiroides</i> Klebahn	+	+		
<i>Anabaenopsis elenkinii</i> Miller	+			
<i>Aphanocapsa elachista</i> W. & G.S. West		+		
<i>Aphanocapsa holsatica</i> (Lemmermann) Cronberg & Komárek	+	+		
<i>Cyanodictyon planktonicum</i> Meyer		+		
<i>Geitlerinema amphibium</i> (Ag. ex Gom.) Anagnostidis		+		
<i>Geitlerinema unigranulatum</i> (R.N.Singh) Komarek & Azevedo			+	+
<i>Merismopedia warmingiana</i> Lagerheim	+			
<i>Pseudanabaena galeata</i> Böcher	+	+		
<i>Spirulina laxissima</i> G.S. West	+			

## Chlorophyta

<i>Ankistrodesmus fusiformis</i> Corda			+		
<i>Ankyra judayi</i> (G.M. Smith) Fott	+		+	+	+
<i>Ankyra lanceolata</i> Korsikov	+				
<i>Atractomorpha</i> sp.					+
<i>Chlamydomonas</i> sp.				+	+
<i>Chlamydomonas bicocca</i> Pascher	+		+		
<i>Closterium acutum</i> var. <i>variabile</i> (Lemmermann) Krieger			+		+
<i>Closterium diana</i> Ehrenberg	+				
<i>Cosmarium contractum</i> Kirchner	+				
<i>Cosmarium quadrifarium</i> Lundell					+
<i>Crucigenia lauterbornii</i> (Schmidle) Schmidle			+		
<i>Crucigenia quadrata</i> Morren	+				
<i>Crucigenia tetrapedia</i> (Kirchner) W. & G.S. West	+			+	+
<i>Crucigeniella rectangularis</i> (Nägeli) Komárek	+		+		
<i>Crucigeniella secta</i> (Playfair) Ling	+			+	+
<i>Dictyosphaerium pulchellum</i> Wood	+		+		
<i>Didymocystis bicellularis</i> (Chodat) Komárek	+		+	+	+
<i>Eudorina elegans</i> Ehrenberg					+
<i>Fusola viridis</i> Snow	+			+	+
<i>Gonium sociale</i> (Dujardin) Warming					+
<i>Kirchneriella contorta</i> var. <i>elongata</i> (G. M. Smith) Komárek				+	+
<i>Monoraphidium arcuatum</i> (Korsikov) Hindák	+		+	+	+
<i>Monoraphidium contortum</i> (Thur.) Komárková-Legnerova	+		+	+	+
<i>Monoraphidium mirabile</i> (W. & G.S. West) Pankow	+				
<i>Monoraphidium nanum</i> (Ettl) Hindák	+				
<i>Monoraphidium subclavatum</i> Nygaard			+	+	+
<i>Nephrocystium limneticum</i> (G. M. Smith) G. M. Smith	+				
<i>Oocystis borgei</i> Snow			+		
<i>Oocystis irregularis</i> (Petkoff) Printz				+	+
<i>Pandorina cylindricum</i> Iyengar					+
<i>Pediastrum duplex</i> Meyen	+				
<i>Pediastrum tetras</i> (Ehrenberg) Ralfs	+				
<i>Penium margaritaceum</i> (Ehrenberg) Brébisson	+				
<i>Pteromonas cruciata</i> Playfair				+	+
<i>Scenedesmus acutus</i> Meyen	+				
<i>Scenedesmus alternans</i> Hortobagyi	+		+	+	+
<i>Scenedesmus dimorphus</i> (Turpin) Kützing	+		+		
<i>Scenedesmus obliquus</i> (Turpin) Kützing					+
<i>Scenedesmus opoloiensis</i> Richter	+		+	+	+
<i>Scenedesmus quadricauda</i> (Turpin) Brébisson	+		+		
<i>Scenedesmus quadrispina</i> Chodat	+				+
<i>Schroederia spiralis</i> (Printz) Koršikov	+		+	+	+
<i>Staurastrum playfairi</i> Scott & Prescott	+				
<i>Staurodesmus</i>			+		
<i>Tetrastrum hetercanthum</i> (Nordstedt) Chodat	+		+		
<i>Treubaria triappendiculata</i> Bernard	+				
<i>Wislouchiella planktonica</i> Skvortzow			+		+
<b>Cryptophyta</b>					
<i>Campylomonas reflexa</i> (Skuja) Hill	+		+	+	+
<i>Chroomonas acuta</i> Utermöhl	+			+	+

## Dinophyta

<i>Peridinium</i> cf. <i>lomnickii</i> Woloszynska	+	+		+
Euglenophyta				
<i>Euglena ascus</i> Ehrenberg	+	+	+	+
<i>Euglena caudata</i> Hübner	+			
<i>Euglena oxyuris</i> Schmarda	+			
<i>Euglena</i> sp. 1	+	+	+	+
<i>Lepocinclis fusiformis</i> (Carter) Lemmermann				+
<i>Lepocinclis glabra</i> Drezepolski	+			
<i>Phacus curvicauda</i> Swirenko	+			+
<i>Phacus longicauda</i> (Ehrenberg) Dujardin	+	+		
<i>Phacus raciborskii</i> Drezepolski				+
<i>Strombomonas girardiana</i> (Playfair) Deflandre				+
<i>Strombomonas napiformis</i> (Playfair) Deflandre	+	+	+	+
<i>Trachelomonas bernardinensis</i> Vischer emend. Deflandre		+	+	+
<i>Trachelomonas hispida</i> (Perty) Stein	+	+	+	+
<i>Trachelomonas oblonga</i> var. <i>australica</i> Playfair	+	+	+	+
<i>Trachelomonas similis</i> Stokes	+	+	+	+
<i>Trachelomonas</i> sp. 1	+			
<i>Trachelomonas</i> sp. 2		+		
<i>Trachelomonas splendida</i> Playfair	+	+	+	+
<i>Trachelomonas volvocina</i> Ehrenberg	+			
Heterokontophyta, Bacillariophyceae				
<i>Amphora</i>	+			
<i>Aulacosiera granulata</i> (Ehrenberg) Simonsen				+
<i>Aulacosiera subartica</i> (Müller) Haworth			+	+
<i>Craticula</i>	+			
<i>Cyclotella meneghiana</i> Kützing	+			
<i>Cyclotella stelligera</i> (Cleve & Grun. in Cleve) Van Heurck	+			
<i>Fragilaria</i>				+
<i>Navicula</i>		+	+	
<i>Nitzschia</i>			+	+
<i>Pinnularia</i>				+
<i>Rhopalodia</i>	+		+	
<i>Stauroneis</i>		+		
<i>Surirella minuta</i> Brébisson in Kützing				+
<i>Tetraedriella regularis</i> (Kützing) Fott	+			+
<i>Tetraedriella spinigera</i> Skuja				+
Heterokontophyta, Chrysophyceae				
<i>Mallomonas</i> sp.				+
Heterokontophyta, Raphidophyceae				
<i>Gonyostomum latum</i> Iwanoff	+			+
Heterokontophyta, Xanthophyceae				
<i>Isthmochloron lobatum</i> (Nägeli) Skuja	+			

Table 2. Epixylic and epipellic diatom species recorded from Cooper Creek and Warrego River waterholes

Species	Cooper Creek		Warrego River	
	Epixylic	Epipellic	Epixylic	Epipellic
<i>Achnanthes exigua</i> Grunow				+
<i>Achnanthes hungarica</i> Grunow				+
<i>Achnanthes saccula</i> Carter & Watts			+	+
<i>Achnanthes ventralis</i> (Krasske) Lange-Bertalot		+		
<i>Achnanthidium minutissimum</i> (Kützing) Czarnecki	+		+	+
<i>Actinocyclus normanii</i> (Gregory) Hustedt				+
<i>Adlafia bryophila</i> (Petersen) Moser, Lange-Bertalot & Metzeltin			+	+
<i>Amphora aequalis</i> Krammer				+
<i>Amphora coffeaeformis</i> (Agardh) Kützing	+			+
<i>Amphora libyca</i> Ehrenberg	+	+		+
<i>Amphora ovalis</i> Kützing			+	+
<i>Amphora pediculus</i> (Kützing) Grunow	+	+		
<i>Amphora veneta</i> Kützing	+	+	+	+
<i>Amphora veneta</i> var. <i>capitata</i> Haworth	+			
<i>Anomoneis sphaeaphora</i> (Ehrenberg) Pfitz.	+		+	
<i>Asterionella formosa</i> Hassall			+	+
<i>Aulacoseira ambigua</i> (Grunow) Simonsen		+		+
<i>Aulacoseira crenulata</i> (Ehrenberg) Thwaites			+	+
<i>Aulacoseira granulata</i> (Ehrenberg) Simonsen	+	+	+	+
<i>Aulacoseira italica</i> (Ehrenberg) Simonsen				+
<i>Aulacoseira subarctica</i> (Müller) Haworth				+
<i>Aulacoseira subarctica</i> f. <i>subborealis</i> (Nygaard) Haworth				+
<i>Bacillaria paxillifer</i> (Müller) Hendey			+	+
<i>Brachysira neoexilis</i> Lange-Bertalot			+	
<i>Caloneis</i> aff. <i>schumanniana</i> (Grunow) Cleve		+		
<i>Caloneis</i> aff. <i>silicula</i> (Ehrenberg) Eleve		+		
<i>Caloneis bacillum</i> (Grunow) Mereschkowsky	+	+	+	+
<i>Caloneis leptosoma</i> (Grunow) Krammer	+			
<i>Caloneis salicula</i> (Ehrenberg) Cleve			+	+
<i>Craticula accomoda</i> (Hustedt) Mann	+	+	+	+
<i>Craticula ambigua</i> (Ehrenberg) Mann			+	+
<i>Craticula buderi</i> (Hustedt) Lange-Bertalot			+	+
<i>Craticula cuspidate</i> (Kützing) Mann	+	+	+	+
<i>Craticula halophila</i> (Grunow ex Van Heurck) Mann	+	+	+	+
<i>Craticula halophiloides</i> (Grunow ex Van Heurck) Mann			+	+
<i>Craticula molestiformis</i> (Hustedt) Nayama			+	+
<i>Craticula riparia</i> (Hustedt) Lange-Bertalot			+	+
<i>Craticula submolesta</i> (Hustedt) Lange-Bertalot			+	+
<i>Craticula vixnegligenda</i> Lange-Bertalot				+
<i>Cyclostephanos tholiformis</i> Stoermer, Håk. & Theriot			+	
<i>Cyclotella meneghiniana</i> Kützing	+	+	+	+
<i>Cyclotella pseudostelligera</i> Hustedt			+	
<i>Cyclotella stelligera</i> (Cleve & Grunow) Van Heurck	+	+	+	
<i>Cymbella affinis</i> Kützing				+
<i>Cymbella aspera</i> (Ehrenberg) Cleve			+	+
<i>Cymbella cistula</i> (Ehrenberg) Kirchner			+	
<i>Cymbella tumida</i> (Brébisson) Van Heurck	+		+	+

<i>Diademesmis confervaceae</i> Kützing	+	+	+	+
<i>Diatoma tenuis</i> Agardh			+	
<i>Diploneis elliptica</i> (Kützing) Cleve			+	+
<i>Encyonema mesiana</i> (Cholnoky) Mann			+	+
<i>Encyonema minutum</i> (Hilse) Mann	+	+	+	
<i>Encyonema silesiacum</i> (Bleisch) Mann	+	+	+	+
<i>Encyonopsis</i> aff. <i>subruttneri</i> Krammer		+		
<i>Encyonopsis</i> Cooper sp. 1		+		
<i>Encyonopsis perborealis</i> Krammer			+	
<i>Entomoneis costata</i> (Hustedt) Patrick			+	
<i>Eolimna minima</i> (Grunow) Lange-Bertalot	+	+	+	
<i>Eolimna subminuscula</i> (Grunow) Lange-Bertalot		+	+	+
<i>Epithemia adnata</i> Brébisson	+		+	+
<i>Epithemia cistula</i> (Ehrenberg) Ralfs			+	
<i>Epithemia sorex</i> Kützing	+		+	
<i>Eunotia serpentina</i> Ehrenberg			+	+
<i>Eunotia</i> sp. 1				+
<i>Fallacia</i> aff. <i>zonata</i> (Hustedt) Mann	+	+		
<i>Fallacia tenera</i> (Hustedt) Mann			+	
<i>Fragilaria biceps</i> (Kützing) Lange-Bertalot				+
<i>Fragilaria bidens</i> Heiberg				+
<i>Fragilaria capucina</i> Desmazières		+		
<i>Fragilaria capucina</i> var. <i>capucina</i> Desmazières			+	+
<i>Fragilaria capucina</i> var. <i>gracilis</i> (Oestrup) Hustedt			+	
<i>Fragilaria capucina</i> var. <i>mesolepta</i> Rabenhorst			+	
<i>Fragilaria capucina</i> var. <i>rumpens</i> (Kützing) Lange-Bertalot			+	
<i>Fragilaria capucina</i> var. <i>vaucheriae</i> (Kützing) Lange-Bertalot			+	
<i>Frustulia rhomboides</i> var. <i>saxonica</i> (Rabenhorst) De Toni			+	
<i>Frustulia vulgaris</i> Thwaites	+		+	
<i>Geissleria clementis</i> Grunow				+
<i>Gomphonema acuminatum</i> Ehrenberg				+
<i>Gomphonema affine</i> Kützing	+		+	+
<i>Gomphonema augur</i> Ehrenberg				+
<i>Gomphonema clavatum</i> Ehrenberg	+	+	+	+
<i>Gomphonema gracile</i> Ehrenberg	+		+	+
<i>Gomphonema insigne</i> Gregory			+	
<i>Gomphonema lagenula</i> Kützing	+	+	+	+
<i>Gomphonema neosutum</i> Lange-Bertalot & Reichardt			+	+
<i>Gomphonema olivacaeum</i> (Horneman) Brébisson			+	
<i>Gomphonema parvulum</i> Kützing		+	+	+
<i>Gomphonema truncatum</i> Ehrenberg			+	
<i>Gyrosigma acuminatum</i> (Kützing) Rabenhorst	+		+	+
<i>Gyrosigma spencerii</i> (Bailey ex Quekett) Griffith & Henfrey	+	+		+
<i>Hantzschia amphioxys</i> (Ehrenberg) Grunow	+	+	+	+
<i>Hantzschia elongata</i> (Hantzsch) Grunow				+
<i>Hippodonta capitata</i> (Ehrenberg) Lange-Bertalot, Metzeltin & Witkowski	+	+	+	
<i>Luticola goerppetianna</i> (Bleisch) Mann in Round, Crawford & Mann	+	+	+	
<i>Luticola pseudokotschy</i>			+	
<i>Mastogloia elliptica</i> Agardh				+
<i>Mayamaea agrestis</i> (Hustedt) Lange-Bertalot			+	+
<i>Mayamaea atomus</i> (Kützing) Lange-Bertalot	+	+	+	+
<i>Mayamaea atomus</i> var. <i>atomus</i> (Kützing) Lange-Bertalot			+	+

<i>Mayamaea atomus</i> var. <i>permitis</i> (Hustedt) H. Lange-Bertalot			+	+
<i>Mayamaea atomus</i> var. <i>recondite</i> (Hustedt) Lange-Bertalot			+	+
<i>Mayamaea elongata</i>				+
<i>Melosira varians</i> Agardh		+	+	+
<i>Navicula</i> aff. <i>agrestis</i> Hustedt	+		+	+
<i>Navicula</i> aff. <i>arvensis</i> Hustedt				+
<i>Navicula</i> aff. <i>capitoradiata</i> Germain		+		
<i>Navicula</i> aff. <i>difficilima</i> Hustedt	+	+	+	
<i>Navicula</i> aff. <i>gallica</i> (W. Smith) Lagerst.	+		+	+
<i>Navicula</i> aff. <i>kuelbsi</i> Lange-Bertalot			+	
<i>Navicula</i> aff. <i>ricardae</i> Lange-Bertalot	+			
<i>Navicula</i> aff. <i>tripunctata</i> (Müller) Bory			+	
<i>Navicula agrestis</i> Hustedt	+	+		
<i>Navicula bryophila</i> Petersen		+	+	+
<i>Navicula cincta</i> var. <i>minuta</i> Grunow	+	+		
<i>Navicula constans</i> Hustedt			+	
<i>Navicula</i> Cooper sp. 1		+		
<i>Navicula</i> Cooper sp. 2	+	+		
<i>Navicula cryptocephala</i> Kützing	+	+	+	+
<i>Navicula cryptotenella</i> Lange-Bertalot			+	+
<i>Navicula difficillima</i> Hustedt	+		+	
<i>Navicula elginensis</i> (W. Gregory) Ralfs	+	+	+	+
<i>Navicula erifuga</i> Lange-Bertalot	+	+		+
<i>Navicula gastrum</i> (Ehrenberg) Kützing		+		
<i>Navicula gerloffii</i> Schimanski	+			
<i>Navicula germainii</i> Wallace			+	+
<i>Navicula gregaria</i> Donkin	+	+	+	
<i>Navicula heimansioides</i> Lange-Bertalot	+		+	+
<i>Navicula hintzii</i> Lange-Bertalot			+	
<i>Navicula incertata</i> Lange-Bertalot	+		+	+
<i>Navicula indifferens</i> Hustedt			+	+
<i>Navicula ingenua</i> Hustedt	+			
<i>Navicula lanceolata</i> (Agardh) Kützing	+	+	+	
<i>Navicula leptostriata</i> Jørgensen			+	
<i>Navicula libonensis</i> Schoeman			+	
<i>Navicula menisculus</i> Schumann				+
<i>Navicula menisculus</i> var. <i>upsalinensis</i> Grunow in Cleve & Grunow	+		+	
<i>Navicula molestiformis</i> Hustedt	+	+	+	
<i>Navicula notha</i> Wallace				+
<i>Navicula perminuta</i> Grunow in Van Heurck	+	+	+	
<i>Navicula placentula</i> (Ehrenberg) Grunow	+	+	+	+
<i>Navicula pseudoanglica</i> Lange-Bertalot			+	
<i>Navicula pseudoventralis</i> Hustedt			+	
<i>Navicula radiosa</i> Kützing	+		+	
<i>Navicula recens</i> (Lange-Bertalot) Lange-Bertalot	+	+	+	
<i>Navicula rhyncocephala</i> Kützing			+	
<i>Navicula rostellata</i> Schmidt				+
<i>Navicula saprophila</i> Lange-Bertalot & Bonik	+	+	+	+
<i>Navicula schadei</i> Krasske				+
<i>Navicula schroeterii</i> Meister	+	+	+	+
<i>Navicula</i> sp.1			+	+
<i>Navicula tennelloides</i> Hustedt	+		+	+

<i>Navicula tridentula</i> Krasske	+		+	+
<i>Navicula vandamii</i> Schoeman & Archibald	+		+	+
<i>Navicula veneta</i> Kützing		+	+	+
<i>Navicula ventralis</i> Krasske			+	
<i>Navicula viridula</i> (Kützing) Ehrenberg		+	+	+
<i>Navicula viridula</i> var. <i>linearis</i> Hustedt				+
<i>Neidium</i> aff. <i>bisulcatum</i> (Lagerstedt) Cleve				+
<i>Neidium ampliatum</i> (Ehrenberg) Krammer			+	+
<i>Neidium dubium</i> (Ehrenberg) Cleve		+	+	+
<i>Nitzschia acicularis</i> (Kützing) W. Smith	+		+	+
<i>Nitzschia acicularoides</i> Archibald			+	+
<i>Nitzschia acidoclinata</i> Lange-Bertalot			+	+
<i>Nitzschia acula</i> Hantzsch ex Cleve & Grunow			+	
<i>Nitzschia acuminata</i> (W. Smith) Grunow			+	+
<i>Nitzschia aequorea</i> Hustedt	+		+	+
<i>Nitzschia agnita</i> Hustedt	+	+	+	+
<i>Nitzschia amphibia</i> Grunow		+	+	+
<i>Nitzschia angustata</i> (W. Smith) Grunow			+	
<i>Nitzschia archibaldii</i> Lange-Bertalot			+	+
<i>Nitzschia capitellata</i> Hustedt			+	+
<i>Nitzschia clausii</i> Hantzsch	+		+	+
<i>Nitzschia constricta</i> Hustedt				+
<i>Nitzschia desertorum</i> Hustedt	+		+	
<i>Nitzschia dissipata</i> (Kützing) Grunow	+	+	+	+
<i>Nitzschia filiformis</i> (W. Smith) Van Heurck	+	+	+	+
<i>Nitzschia flexa</i> Schumann			+	+
<i>Nitzschia fonticola</i> Grunow	+		+	
<i>Nitzschia fossilis</i> (Grunow) Grunow in Van Heurck			+	
<i>Nitzschia frustulum</i> (Kützing) Grunow in Cleve & Grunow	+	+	+	+
<i>Nitzschia gracilis</i> Hantzsch	+	+	+	+
<i>Nitzschia hantzschiana</i> Rabenhorst			+	+
<i>Nitzschia inconspicua</i> Grunow	+		+	+
<i>Nitzschia intermedia</i> Hantzsch			+	+
<i>Nitzschia lacuum</i> Lange-Bertalot	+	+	+	+
<i>Nitzschia liebetruthii</i> Rabenhorst	+	+	+	+
<i>Nitzschia linearis</i> (Agardh) W. Smith	+	+	+	+
<i>Nitzschia lorenziana</i> Grunow			+	+
<i>Nitzschia microcephala</i> Grunow	+			
<i>Nitzschia nana</i> Grunow			+	+
<i>Nitzschia normanii</i> Grunow & Van			+	+
<i>Nitzschia palea</i> (Kützing) W. Smith	+	+	+	+
<i>Nitzschia paleaceae</i> Grunow	+	+	+	+
<i>Nitzschia paleaformis</i> Hustedt			+	+
<i>Nitzschia perminuta</i> (Grunow) Peragallo	+	+		
<i>Nitzschia pumilla</i> Hustedt			+	+
<i>Nitzschia pusilla</i> Grunow	+		+	
<i>Nitzschia radricula</i> Hustedt			+	
<i>Nitzschia recta</i> Hantzsch in Rabenhorst			+	+
<i>Nitzschia rosenstockii</i> Lange-Bertalot	+		+	+
<i>Nitzschia scalpelliformis</i> (Grunow) Grunow			+	
<i>Nitzschia sigma</i> (Kützing) W. Smith	+	+	+	+
<i>Nitzschia sigmoidea</i> (Ehrenberg) W. Smith			+	+

<i>Nitzschia sociabilis</i> Hustedt			+	+
<i>Nitzschia solita</i> Hustedt			+	+
<i>Nitzschia subacicularis</i> Hustedt & Schmidt		+	+	+
<i>Nitzschia supralitorea</i> Lange-Bertalot				+
<i>Nitzschia tropica</i> Hustedt	+		+	
<i>Nitzschia tubicola</i> Grunow			+	
<i>Nitzschia umbonata</i> (Ehrenberg) Lange-Bertalot	+		+	+
<i>Nitzschia valdecostata</i> Lange-Bertalot & Simonsen			+	+
<i>Nitzschia vermicularis</i> (Kützing) Grunow			+	
<i>Pinnularia acrosphaeria</i> Brébisson	+			+
<i>Pinnularia</i> aff. <i>parvulissima</i> Krammer				+
<i>Pinnularia</i> aff. <i>subruprestis</i> Krammer				+
<i>Pinnularia braunii</i> (Grunow) Cleve				+
<i>Pinnularia divergens</i> W. Smith				+
<i>Pinnularia lundii</i> Hustedt	+			
<i>Pinnularia microstauron</i> (Ehrenberg) Cleve		+	+	
<i>Pinnularia subcapitata</i> Gregory	+	+	+	+
<i>Pinnularia viridiformis</i> Krammer			+	
<i>Placoneis exigua</i> (Gregory) Mereschkovsky				+
<i>Planothidium frequentissimum</i> (Lange-Bertalot) Round & Bukhtiyarova		+		
<i>Pseudostaurosira brevistriata</i> (Grunow Van Heurck) Williams			+	
<i>Rhopalodia brebissonii</i> Krammer	+		+	
<i>Rhopalodia gibba</i> (Ehrenberg) Müller	+	+	+	+
<i>Rhopalodia musculus</i> (Kützing) Müller	+		+	+
<i>Sellaphora pupula</i> (Kützing) Mereschkovsky	+	+	+	+
<i>Sellaphora seminulum</i> (Grunow) Mann	+	+	+	+
<i>Stauroneis anceps</i> Ehrenberg				+
<i>Stauroneis gracilis</i> Ehrenberg				+
<i>Stauroneis phoenicenteron</i> Ehrenberg		+		+
<i>Staurophora wislouchii</i> (Poretzky & Anisimowa) Mann	+			
<i>Staurosira construens</i> aff. <i>binodis</i> (Ehrenberg) Hamilton				+
<i>Staurosira construens</i> aff. <i>construens</i> (Ehrenberg) Williams & Round				+
<i>Staurosirella pinnata</i> (Ehrenberg) Williams & Round			+	
<i>Stephanodiscus parvus</i> Stoermer & Håk.	+			
<i>Surirella</i> aff. <i>elegans</i> Ehrenberg			+	+
<i>Surirella angusta</i> Kützing	+	+	+	
<i>Surirella brebissonii</i> Kramer & Lange-Bertalot		+		
<i>Surirella splendida</i> Kützing	+		+	
<i>Surirella tenera</i> Gregory	+	+	+	+
<i>Synedra acus</i> Kützing			+	+
<i>Synedra ulna</i> (Nitzsch)	+	+	+	+
<i>Tabularia fasciculata</i> (Agardh) Williams & Round	+			
<i>Tryblionella apiculata</i> Gregory	+	+		
<i>Tryblionella calida</i> (Grunow Cleve & Grunow) Mann			+	+
<i>Tryblionella hungarica</i> (Grunow) Mann			+	+
<i>Tryblionella levidensis</i> W. Smith			+	+



Table 3. Species recorded as constituents of macroalgal assemblages from Cooper Creek waterholes

Species	April	September
<b>Cyanobacteria</b>		
<i>Anabaena</i> cf. <i>ambigua</i> Rao		
<i>Anabaena</i> cf. <i>spiroides</i> Klebahn	+	
<i>Anabaena</i> sp.	+	
<i>Aphanocapsa</i> sp. 1	+	
<i>Aphanocapsa</i> sp. 2	+	
<i>Calothrix</i> sp.		+
<i>Cylindrospermum licheniforme</i> (Bory) Kützing ex Bornet & Flahault		+
<i>Geitlerinema unigranulatum</i> (R.N.Singh) Komárek & Azevedo	+	
<i>Leptolyngbya</i> cf. <i>tenuis</i> (Gomont) Anagnostidis & Komárek	+	+
<i>Leptolyngbya fragilis</i> (Gomont) Anagnostidis & Komárek		+
<i>Leptolyngbya frigida</i> (F.E. Fritsch) Anagnostidis & Komárek		+
<i>Leptolyngbya</i> sp.		+
<i>Lyngbya</i> sp.	+	
<i>Merismopedia punctata</i> Meyen	+	
<i>Microcoleus lacustris</i> (Rabenhorst) Farlow ex Gomont	+	+
<i>Microcoleus paludosus</i> (Kützing) Gomont	+	
<i>Microcoleus</i> sp.	+	
<i>Oscillatoria princeps</i> Vaucher ex Gomont	+	
<i>Phormidium aerugineo-caeruleum</i> (Gomont) Anagnostidis & Komárek	+	
<i>Phormidium cebennense</i> Gomont	+	+
<i>Phormidium formosum</i> (Bory de Saint-Vincent) Anagnostidis & Komárek		+
<i>Phormidium irriguum</i> (Kützing ex Gomont) Anagnostidis & Komárek	+	+
<i>Phormidium jadinianum</i> Gomont		+
<i>Phormidium retzii</i> (Agardh) Gomont	+	+
<i>Phormidium</i> sp. 1	+	
<i>Phormidium</i> sp. 2	+	
<i>Phormidium</i> sp. 3		+
<i>Phormidium uncinatum</i> (Agardh) Gomont	+	
<i>Phormidium willei</i> (N.L. Gardner) Anagnostidis & Komárek		+
<i>Pseudanabaena galeata</i> Böcher	+	+
<i>Pseudanabaena</i> sp.	+	+
<i>Schizothrix friesii</i> (Agardh) Gomont		+
<i>Schizothrix vaginata</i> (Kützing) Gomont		+
<i>Spirulina laxissima</i> G.S. West	+	
<b>Chlorophyta</b>		
<i>Closterium</i> cf. <i>acerosum</i> (Schrank) Ehrenberg ex Ralfs	+	
<i>Closterium closteriodes</i> var. <i>intermedium</i> (Roy & Biss.) Ruzicka	+	
<i>Cosmarium granulatum</i> W. West	+	
<i>Cosmarium magnificum</i> Nordstedt	+	
<i>Cosmarium sportella</i> Brébisson	+	
<i>Cosmarium subtumidum</i> Nordstedt	+	
<i>Oedogonium</i> sp. 1	+	+
<i>Oedogonium</i> sp. 2	+	+
<i>Penium</i> sp.	+	
<i>Spirogyra</i> sp.		+
<i>Stigeoclonium tenue</i> Kützing	+	

Euglenophyta		
<i>Trachelomonas hispida</i> (Perty) Stein	+	
Heterokontophyta, Bacillariophyceae		
<i>Amphora</i>	+	
<i>Craticula</i>	+	
<i>Cymbella tumida</i> (Brébisson) Van Heurck	+	
<i>Encyonema minutum</i> (Hilse) Mann	+	
<i>Fragilaria</i> sp. 1	+	
<i>Fragilaria</i> sp. 2	+	
<i>Gomphonema</i>	+	+
<i>Gyrosigma acuminatum</i> (Kützing) Rabenhorst	+	
<i>Mastogloia</i>	+	
<i>Melosira varians</i> Agardh		+
<i>Mougeotia</i>		+
<i>Nitzschia</i>	+	
<i>Rhopalodia</i>	+	
<i>Staurophora</i>	+	
<i>Surirella tenera</i> W. Gregory	+	+
<i>Synedra ulna</i> (Nitzsch) Ehrenberg	+	

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