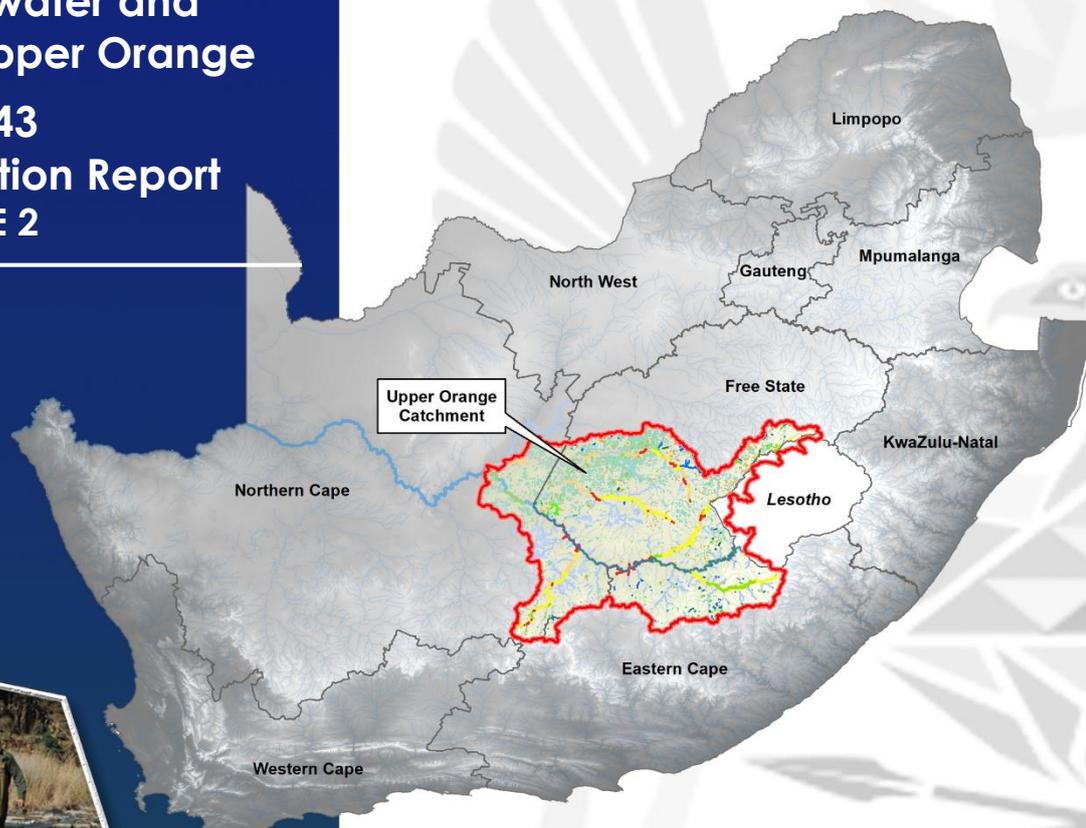


# DEPARTMENT OF WATER AND SANITATION

## A High Confidence Reserve Determination Study for Surface Water, Groundwater and Wetlands in the Upper Orange

WP11343

Eco-Categorisation Report  
VOLUME 2



REPORT NO.:  
RDM/WMA13/00/CON/COMP/1223  
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**Bold** type indicates this report

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## 1. INTRODUCTION

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The Eco-Categorisation phase of the study forms part of Step 3 of the integrated steps for the determination of the Reserve.

Please note that this Report must be read in conjunction with Report number *RDM/WMA13/00/CON/COMP/1223 (a): Eco-Categorisation Report – Volume 1*. This Volume 2 includes all summaries of models and results/data for all EWR sites for the various components as follows:

- Appendix A: Diatom summary results;
- Appendix B: Fish inventory for all EWR sites and FRAI models;
- Appendix C: SASS5 Datasheets for macroinvertebrates for all EWR sites and MIRAI models;
- Appendix D: Riparian vegetation inventory for all Intermediate EWR sites and VEGRAI models;
- Appendix E: Summary of IHI Models;
- Appendix F: Ecstatus Level 4 models for all EWR sites;
- Appendix G: Summary of revised EI-ES;
- Appendix H: GAI models; and
- Appendix I: HAI models.

Please note, that all completed electronic models (MIRAI, FRAI, VEGRAI, GAI and HAI) have been packaged and submitted to DWS for their records within a folder.

## **APPENDICES**

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## 2. Appendix A: Diatom summary results

Site	EWR site	Count	No. spec.	SPI	Category	Quality	%incl. in SPI	BDI	%incl. in BDI	%PTV	% Deformed cells	Dominant species	Preference
<b>May/June 2023 Results</b>													
Middle Caledon	UO_EWR01_I	400	58	8.6	D	Poor	98	8.8	85	24.9	2.25	Some evidence of organic pollution. <i>Achnanthydium sp.</i> <i>Craticula molestiformis (Hustedt) Lange-Bertalot</i> <i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i> <i>Navicula symmetrica Patrick</i> <i>Nitzschia sp.</i>	Moderate to good quality waters A cosmopolitan species generally found in electrolyte rich and often heavily polluted water (including sewage effluent). Tolerant of strong pollution, indicator of industrial organic pollution A cosmopolitan sp. in eutrophic and electrolyte-rich water. Tolerant of strongly organically polluted water. Generally, siltation and moderate pollution
Sterkspruit at EWR site	UO_EWR02_I	400	33	11.8	C	Moderate	97	12.2	82	22.0	1.25	Some evidence of organic pollution. <i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i> <i>Navicula amphiceropsis Lange-Bertalot &amp; Rumrich</i>	Nutrient and salinity increases (eutrophication) Associated with anthropogenic pollution such as nutrients and electrolytes, largely related to cattle ranching near the studied water bodies.
Sterkspruit d/s of evaporation pond	-	400	29	13.9	C	Moderate	96	13.4	79	13.3	1.75	Site free from organic pollution. <i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i>	Nutrient and salinity increases (eutrophication)
Upper Orange	UO_EWR03_I	200	30	10.9	C	Moderate	100	11.0	86	36.5	0	Some evidence of organic pollution. <i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i>	Tolerant of strong pollution, indicator of industrial organic pollution
Lower Caledon	UO_EWR04_I	400	16	6.4	D	Poor	100	4.3	81	91.4	1.5	Site is heavily contaminated with organic pollution. <i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i> <i>Fistulifera saphophila (Lange-Bertalot &amp; Bonik) Lange-Bertalot</i>	Tolerant of strong pollution, indicator of industrial organic pollution Some of the most pollution tolerant diatoms - indicate organic pollution (sewage) or are associated with organic detritus.
Seekoei	UO_EWR05_I	400	40	10.3	C	Moderate	98	11.0	75	14.6	0.75	Site free from organic pollution. <i>Cocconeis pediculus Ehrenberg</i> <i>Nitzschia frustulum (Kützing) Grunow</i> <i>Pseudostaurosiraopsis geocollegarum (Witkowski &amp; Lange-Bertalot) Morales</i> <i>Staurosirella pinnata (Ehrenberg) Williams &amp; Round</i>	A cosmopolitan epiphytic species occurring in waters of a moderate to high electrolyte content, including brackish conditions High conductivity, heavy agriculture, very tolerant of pollution Indicators of high sodium chloride salinity and especially irrigation return flow Often occurs attached to sand grains, Found in clean waters (mild pollution and only slight organic pollution), with moderate to high electrolyte content. pH>7
Upper Riet	UO_EWR06_I	400	20	6.2	D	Poor	100	4.1	90	94.0	0.5	Site is heavily contaminated with organic pollution. <i>Nitzschia frustulum (Kützing) Grunow</i>	High conductivity, heavy agriculture, very tolerant of pollution
Upper Modder (Sannaspos)	UO_EWR07_I	100	30	6.3	D	Poor	100	8.9	87	39.0	0	Some evidence of organic pollution. <i>Gomphonema parvulum (Kützing) Kützing</i> <i>Navicula veneta Kützing</i> <i>Nitzschia palea (Kützing) W.Smith</i>	Very high load of fine sediment, diatom cells present, mostly broken Cosmopolitan, common in heavily eutrophied, electrolyte-rich to brackish water. Very pollution tolerant, often the dominant species in industrially impacted waters. A cosmopolitan and very commonly occurring species found in eutrophic and very heavily polluted to extremely polluted waters with moderate to high electrolyte content
LowerKraai	UO_EWR08_I	400	31	9.8	C	Moderate	100	8.3	90	62.2	1.75	Site is heavily contaminated with organic pollution. <i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i>	Tolerant of strong pollution, indicator of industrial organic pollution
Lower Orange	UO_EWR10_I	400	29	7.8	D	Poor	97	8.1	93	80.3	0	Site is heavily contaminated with organic pollution. <i>Nitzschia liebetruithii Rabenhorst</i>	Cosmopolitan species found in very electrolyte-rich to brackish water.

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Site	EWR site	Count	No. spec.	SPI	Category	Quality	%incl. in SPI	BDI	%incl. in BDI	%PTV	% Deformed cells	Dominant species	Preference
<b>July 2022 Results</b>													
Middle Caledon	UO_EWR01_I	400	26	10.3	C	Moderate	96	7.7	89	72	0.75	<i>Eolimna subminuscula</i> (Manguin) Moser, Lange-Bertalot & Metzeltin	Tolerant of strong pollution, indicator of industrial organic pollution
Sterkspruit	UO_EWR02_I	390	17	12.1	C	Moderate	100	13.3	82	19.8	0.75	<i>Cocconeis placentula</i> var. <i>euglypta</i> (Ehrenberg) Grunow	Nutrient and salinity increases (eutrophication)
Upper Orange	UO_EWR03_I	400	16	9.2	C	Moderate	100	6.1	81	83.1	0.5	<i>Eolimna subminuscula</i> (Manguin) Moser, Lange-Bertalot & Metzeltin <i>Mayamaea atomus</i> var. <i>permitis</i> (Hustedt) Lange-Bertalot	Tolerant of strong pollution, indicator of industrial organic pollution Very pollution tolerant - organic pollution
Lower Caledon	UO_EWR04_I	400	23	7.9	D	Poor	100	6.3	83	67.2	2.25	<i>Eolimna subminuscula</i> (Manguin) Moser, Lange-Bertalot & Metzeltin	Tolerant of strong pollution, indicator of industrial organic pollution
Seekoei	UO_EWR05_I	400	44	12.4	C	Moderate	100	12.9	86	11.2	0.25	<i>Cocconeis pediculus</i> Ehrenberg  <i>Nitzschia dissipata</i> (Kützing) Grunow	Epiphytic species in waters of moderate to high electrolyte content, including brackish conditions. A cosmopolitan species found in waters of moderate to high electrolyte content, not present in waters of low electrolyte content. Highly motile - siltation
Upper Riet	UO_EWR06_I	400	31	9.3	C	Moderate	100	10.4	94	16.6	1	<i>Cyclostephanos invisitatus</i> (Hohn & Hellerman) Theriot, Stoermer & Hakans  <i>Fragilaria biceps</i> (Kützing) Lange-Bertalot	species is of wide-spread occurrence and is common in the summer plankton nutrient-rich of midwestern streams Cosmopolitan taxon. Often found in mesotrophic to eutrophic waters. Living cells are usually apically attached to a substratum by a mucilage pad or free living
Upper Modder (Sannaspos)	UO_EWR07_I	400	34	5.6	D	Poor	100	4.8	94	73.1	8.75	<i>Eolimna subminuscula</i> (Manguin) Moser, Lange-Bertalot & Metzeltin	Tolerant of strong pollution, indicator of industrial organic pollution
Little Caledon	UO_EWR01_R	400	16	10.5	C	Moderate	100	6.2	88	66.8	2.5	<i>Mayamaea atomus</i> var. <i>permitis</i> (Hustedt) Lange-Bertalot	Very pollution tolerant - organic pollution
Brandwater (Groot)	UO_EWR02_R	400	23	9	C	Moderate	100	10.4	87	23.2	5.75	<i>Eolimna subminuscula</i> (Manguin) Moser, Lange-Bertalot & Metzeltin <i>Fragilaria capucina</i> var. <i>vaucheriae</i> (Kützing) Lange-Bertalot <i>Nitzschia</i> sp.	Tolerant of strong pollution, indicator of industrial organic pollution Wide ecological range, not clearly defined Generally, siltation and moderate pollution
Mopeli	UO_EWR03_R	400	23	10.7	C	Moderate	100	8.8	83	56.9	1.5	<i>Eolimna subminuscula</i> (Manguin) Moser, Lange-Bertalot & Metzeltin  <i>Nitzschia dissipata</i> (Kützing) Grunow	Tolerant of strong pollution, indicator of industrial organic pollution A cosmopolitan species found in waters of moderate to high electrolyte content, not present in waters of low electrolyte content. Highly motile - siltation
Upper Kraai	UO_EWR04_R	400	19	16.2	B	Good	100	13.2	84	2.7	2.25	<i>Achnanidium</i> sp.	Moderate to good quality waters

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Site	EWR site	Count	No. spec.	SPI	Category	Quality	%incl. in SPI	BDI	%incl. in BDI	%PTV	% Deformed cells	Dominant species	Preference	
Upper Kraai	UO_EWR04_R	400	19	16.2	B	Good	100	13.2	84	2.7	Site free from organic pollution.	2.25	<i>Achnanthydium sp.</i>	Moderate to good quality waters
Kromellenboog	UO_EWR21_FV	400	41	8	D	Poor	100	9.2	90	27.2	There is some evidence of organic pollution.	1	<i>Nitzschia frustulum (Kützing) Grunow</i>  <i>Nitzschia sp.</i>	High conductivity, heavy agriculture, very tolerant of pollution Generally, siltation and moderate pollution
Modder (Soetdoring)	UO_EWR06_R	400	31	6.8	D	Poor	100	5.7	97	59.9	Organic pollution likely to contribute significantly to eutrophication.	1.5	<i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i>	Tolerant of strong pollution, indicator of industrial organic pollution
Witspruit	UO_EWR02_FV	400	31	6.7	D	Poor	100	8.2	87	48.8	Organic pollution likely to contribute significantly to eutrophication.	1.5	<i>Mayamaea atomus var. permitis (Hustedt) Lange-Bertalot</i>  <i>Nitzschia sp.</i>	Very pollution tolerant - organic pollution Generally, siltation and moderate pollution
Gryskopspruit	UO_EWR03_FV	400	28	2.5	E	Critical	100	8	89	12	Site free from organic pollution.	1.75	<i>Nitzschia sp.</i>	Generally, siltation and moderate pollution
Karringmelkspruit	UO_EWR04_FV	400	20	15.2	B	Good	95	13.8	70	2.9	Site free from organic pollution.	1.75	<i>Achnanthydium sp.</i> <i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i> <i>Reimeria sinuata (Gregory) Kociolek &amp; Stoermer</i>	Moderate to good quality waters Nutrient and salinity increases (eutrophication) A cosmopolitan aerophilic species found in montane biotopes, mosses, springs and streams. Tolerant of high levels of Eutrophication.
Bokspruit	UO_EWR05_FV	400	23	10.2	C	Moderate	91	13.7	70	0.9	Site free from organic pollution.	5.5	<i>Achnanthydium sp.</i> <i>Diatoma vulgaris Bory</i>  <i>Nitzschia sp.</i>	Moderate to good quality waters Found in mesotrophic to eutrophic waters with average electrolyte content. The cells are joined at the corners forming zig-zag colonies. Generally, siltation and moderate pollution
Holspruit	UO_EWR06_FV	200	26	9.7	C	Moderate	100	12.6	88	14.9	Site free from organic pollution.	1	<i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i>	Nutrient and salinity increases (eutrophication)
Sterkspruit (trib of Kraai/Bell)	UO_EWR07_FV	400	22	12	C	Moderate	95	15.5	85	7.1	Site free from organic pollution.	1.75	<i>Achnanthydium sp.</i>  <i>Nitzschia sp.</i>	Moderate to good quality waters Generally, siltation and moderate pollution
Bell	UO_EWR08_FV	400	10	17.3	A	High	100	15.5	80	3.2	Site free from organic pollution.	0.5	<i>Achnanthydium sp.</i> <i>Reimeria sinuata (Gregory) Kociolek &amp; Stoermer</i>	Moderate to good quality waters A cosmopolitan aerophilic species found in montane biotopes, mosses, springs and streams. Tolerant of high levels of Eutrophication.
Groenspruit	UO_EWR09_FV	400	30	7.3	D	Poor	97	6.2	90	74.6	Site is heavily contaminated with organic pollution.	0.5	<i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i>	Tolerant of strong pollution, indicator of industrial organic pollution
Skulpspruit	UO_EWR10_FV	400	36	10.7	C	Moderate	97	13.8	83	5.4	Site free from organic pollution.	1.75	<i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i> <i>Nitzschia sp.</i>	Nutrient and salinity increases (eutrophication) Generally, siltation and moderate pollution
Fouriespruit	UO_EWR11_FV	400	35	11.2	C	Moderate	100	10.7	94	16.6	Site free from organic pollution.	0.75	<i>Cyclostephanos invisitatus (Hohn &amp; Hellerman) Theriot, Stoermer &amp; Hakans</i>	species is of wide-spread occurrence and is common in the summer plankton nutrient-rich of midwestern streams
Meulspruit	UO_EWR01_FV	400	22	9.3	C	Moderate	100	9.8	91	40.3	Organic pollution likely to contribute significantly to eutrophication.	0	<i>Achnanthydium eutrophilum (Lange-Bertalot) Lange-Bertalot</i>  <i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i>	Found in well-oxygenated eutrophic fresh water. Tolerant only to slight or moderate pollution Tolerant of strong pollution, indicator of industrial organic pollution

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Site	EWR site	Count	No. spec.	SPI	Category	Quality	%incl. in SPI	BDI	%incl. in BDI	%PTV	% Deformed cells	Dominant species	Preference
<b>October 2021 Results</b>													
Renoster	UO_EWR12_FV	10	4.2	E	Critical	100	3.8	70	93.1	Site is heavily contaminated with organic pollution.	1.5	<i>Eolimna subminuscula (Manguin) Moser, Lange-Bertalot &amp; Metzeltin</i>	Tolerant of strong pollution, indicator of industrial organic pollution
Os-Spruit	UO_EWR13_FV	33	12.8	C	Moderate	97	12	88	4.5	Site free from organic pollution.	0.25	<i>Epithemia sorex Kützing</i>	species of fresh and brackish water environments, generally present in polytrophic waters and characterized by a high pH
Modder	UO_EWR19_FV	25.66	22	12	C	Moderate	100	10.8	96	3.8	0	<i>Stephanodiscus minutulus (Kützing) Cleve &amp; Moller</i>	alkaline, eutrophic water
Hondeblaf	UO_EWR14_FV	21	4.6	E	Critical	95	3.9	86	71	Site is heavily contaminated with organic pollution.	0	<i>Nitzschia frustulum (Kützing) Grunow</i>	High conductivity, heavy agriculture, very tolerant of pollution
Kromlleenboog	UO_EWR20_FV	25.68	34	9.1	C	Moderate	97	11.6	79	9.7	1	<i>Navicula zanoni Hustedt</i>	A tropical to sub-tropical species, found commonly in alkaline waters in South Africa.
Trib van Zyl	UO_EWR15_FV	22	10.5	C	Moderate	100	11.2	91	4.8	Site free from organic pollution.	0	<i>Nitzschia sp.</i>	Generally, siltation and moderate pollution
Slykspruit	UO_EWR16_FV	28	14.9	B	Good	96	11.3	68	2.3	Site free from organic pollution.	0	<i>Planothidium frequentissimum (Lange-Bertalot) Lange-Bertalot</i>	A common species in standing and flowing, circumneutral to alkaline waters with a moderate to high electrolyte content. Capable of tolerating critically polluted conditions.
<b>Sterkspruit</b>													
Tele													
Langkloofspruit	UO_EWR17_FV	24	14.1	B	Good	100	14.3	96	9.5	Site free from organic pollution.	2.75	<i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i> <i>Reimeria sinuata (Gregory) Kociolek &amp; Stoermer</i>	Nutrient and salinity increases (eutrophication) A cosmopolitan aerophilic species found in montane biotopes, mosses, springs and streams. Tolerant of high levels of Eutrophication.
Wasbankspruit	UO_EWR18_FV	30	12.4	C	Moderate	100	14.1	80	0.7	Site free from organic pollution.	0.5	<i>Achnanidium sp.</i> <i>Cocconeis placentula var. euglypta (Ehrenberg) Grunow</i> <i>Nitzschia dissipata var. media (Hantzsch) Grunow</i>	Moderate to good quality waters Nutrient and salinity increases (eutrophication) A cosmopolitan species found in waters of moderate to high electrolyte content, not present in waters of low electrolyte content.
												<i>Nitzschia sp.</i>	Generally, siltation and moderate pollution

### 3. Appendix B: Fish species inventory for all EWR sites and FRAI models

**Fish Datasheet: Intermediate EWR Sites**

Species	Site	UO_EWR01_I: Middle Caledon		UO_EWR02_I: Sterkspruit		UO_EWR03_I: Upper Orange		UO_EWR04_I: Lower Caledon		UO_EWR05_I: Seekoei		UO_EWR06_I: Upper Riet		UO_EWR07_I: Upper Modder		UO_EWR08_I: Lower Kraai		UO_EWR09_I: Lower Orange		
		Survey	July 2022	May 2023	July 2022	May 2023	July 2022	May 2023	July 2022	May 2023	July 2022	May 2023	July 2022	May 2023	July 2022	May 2023	October 2021 (JBS3)	July 2022	October 2021 (JBS3)	May 2023
<b>Indigenous</b>	<b>Abbreviation</b>																			
<i>Austroglanis sclateri</i>	ASCL																			
<i>Clarias gariepinus</i>	CGAR			1						2	2	2	1		x					
<i>Enteromius oraniensis</i>	BANO									3	22	6	12	3	4					
<i>Enteromius paludinosus</i>	BPAU																		x	
<i>Enteromius trimaculatus</i>	BTRI																		x	
<i>Labeo capensis</i>	LCAP		4 (cf - fry)			1			2	9	4	7	27	5		20	1	x	1	
<i>Labeo umbratus</i>	LUMB									75	2								x	
<i>Labeobarbus aeneus</i>	BAEN			3	2	1		1	31		6		34	1	1	50			x	4
<i>Labeobarbus kimberleyensis</i>	BKIM															2			x	
<i>Pseudocrenilabrus philander</i>	PPHI																		x	2
<i>Tilapia sparrmanii</i>	TSPA																		x	1
<b>Non-native</b>																				
<i>Cyprinus carpio</i>	CCAR									15	2					x				
<i>Gambusia affinis</i>	GAFF																			
<i>Micropterus salmoides</i>	MSAL																			
<i>Oncorhynchus mykiss</i>	OMYK																			
<b>No of Fish</b>		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>33</b>	<b>99</b>	<b>19</b>	<b>31</b>	<b>69</b>	<b>19</b>	<b>4</b>	<b>76</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>8</b>
<b>No. of Species</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>4</b>	<b>4</b>

**Rapid 3 EWR Sites**

	Site	UO_EWR01_R: Little Caledon	UO_EWR02_R: Brandwater	UO_EWR03_R: Mopeli	UO_EWR04_R: Upper Kraai	UO_EWR05_R: Wonderboomspruit	UO_EWR06_R: Modder (Soetdoring)	UO_EWR22_FV: Lower Kromellenboog
	Survey	July 2022	July 2022	July 2022	July 2022	July 2022	July 2022	July 2022
Species	Abbreviation							
<b>Indigenous</b>								
<i>Austroglanis sclateri</i>	ASCL							
<i>Clarias gariepinus</i>	CGAR					5		
<i>Enteromius oraniensis</i>	BANO					2		25
<i>Enteromius paludinosus</i>	BPAU							
<i>Enteromius trimaculatus</i>	BTRI							
<i>Labeo capensis</i>	LCAP						15	18
<i>Labeo umbratus</i>	LUMB			3		2		
<i>Labeobarbus aeneus</i>	BAEN				3			
<i>Labeobarbus kimberleyensis</i>	BKIM							
<i>Pseudocrenilabrus philander</i>	PPHI							
<i>Tilapia sparrmanii</i>	TSPA							
<b>Non-native</b>								
<i>Cyprinus carpio</i>	CCAR					1		
<i>Gambusia affinis</i>	GAFF						1	
<i>Micropterus salmoides</i>	MSAL							
<i>Oncorhynchus mykiss</i>	OMYK				1			
<b>No of Fish</b>		<b>0</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>10</b>	<b>16</b>	<b>43</b>
<b>No. of Species</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>2</b>

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## ***4. Appendix C: SASS5 Datasheets for macroinvertebrates for all EWR sites and MIRAI models***

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**SASS5 Datasheet: Intermediate EWR Sites for July 2022**

UO\_EWR02\_I: Sterkspruit (July 2022)

Date (dd-mm-yr): July 2022		Grid reference (dd mm ss.s) Lat: S -30.517906°		Biotope Score (%) 53		Rating (1-5)		Time (min)										
Site Code: UO_EWR02_I		Long: E 27.369058°		Stones Out Of Current (SOOC) 5														
Collector/Sampler: Kylie Farrell		Datum (WGS84/Cape):		Bedrock 4														
River: Sterkspruit		Altitude (m):		Aquatic Veg 0														
Level 1 Ecoregion: 15: EASTERN ESCARPMENT MOUNTAIN		Zonation:		MargVeg In Current 2														
Quaternary Catchment: D12B		Routine or Project? (circle one)		MargVeg Out Of Current 2														
Site Description: 52		Project Name: WFP11343		Gravel 4														
Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		Flow		Sand 3														
Temp (°C):		Clarity (cm):		Mud 4														
pH:		Turbidity:		Hand picking/Visual observation x														
DO (mg/L):		Colour:																
Conductivity:																		
Riparian Disturbance:																		
Instream Disturbance:																		
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	
<b>PORIFERA (Sponge)</b>						<b>HEMiptera (Bugs)</b>						<b>DIPTERA (Flies)</b>						
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10					
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3		A		A	Blepharoceridae (Mountain midges)	15					
<b>ANNELIDA</b>						<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						<b>GASTROPODA (Snails)</b>						
Oligochaeta (Earthworms)	1				1	Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5	A		1	A	
Hirudinea (Leeches)	3					Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	B		A	B	
<b>CRUSTACEA</b>						<b>TRICHOPTERA (Caddisflies)</b>						<b>PELECYPODA (Bivalves)</b>						
Amphipoda (Scuds)	13					Naucoridae* (Creeping water bugs)	7					Simuliidae (Blackflies)	5				1	B
Potamonautidae* (Crabs)	3					Nepidae* (Water scorpions)	3					Syrphidae* (Rat tailed maggots)	1					
Atyidae (Freshwater Shrimps)	8					Notonectidae* (Backswimmers)	3					Tabanidae (Horse flies)	5					
Palaemonidae (Freshwater Prawns)	10					Pleidae* (Pygmy backswimmers)	4					Tipulidae (Crane flies)	5					
<b>HYDRACARINA (Mites)</b>						<b>CASED caddis:</b>						<b>SASS Score</b>						
PLECOPTERA (Stoneflies)						Velidae/M...velidae* (Ripple bugs)	5					Barbarochthonidae SWC	13					
Notonemouridae	14					MEGALOPTERA (Fishflies, Dobsonflies & Alderflies)						Calamoceratidae ST	11					
Perlidae	12	A			A	Corydalidae (Fishflies & Dobsonflies)	8					Glossosomatidae SWC	11					
<b>EPHEMEROPTERA (Mayflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>No. of Taxa</b>						
Baetidae 1sp	4					Sialidae (Alderflies)	6					Dytiscidae/Noteridae* (Diving beetles)	5					
Baetidae 2 sp	6				B	TRICHOPTERA (Caddisflies)						Eimidae/Dryopidae* (Riffle beetles)	8					
Baetidae > 2 sp	12	B	B	B	B	Dipseuopsidae	10					Gyrinidae* (Whirligig beetles)	5	A		A	A	
Caenidae (Squaregills/Cairnflies)	6	A	B	B	A	Ecnomidae	8					Halplidae* (Crawling water beetles)	5					
Ephemeridae	15					Hydropsychidae 1 sp	4		1			Helodidae (Marsh beetles)	12					
Heptageniidae (Flatheaded mayflies)	13					Hydropsychidae 2 sp	6	B		B		Hydraenidae* (Minute moss beetles)	8					
Leptophlebiidae (Pronghills)	9					Hydropsychidae > 2 sp	12					Hydrophilidae* (Water scavenger beetles)	5					
Oligoneuridae (Brushlegged mayflies)	15					Philopotamidae	10					Limnichidae (Marsh-Loving Beetles)	10					
Polymitarcidae (Pale Burrowers)	10					Polycentropodidae	12					Psephenidae (Water Pennies)	10					
Prosoptomatidae (Water specs)	15					Psychomyiidae/Xiphocentronidae	8					<b>ASPT</b>						
Teloganodidae SWC (Spiny Crawlers)	12					Cased caddis:						<b>5.7</b>						
Tricorythidae (Stout Crawlers)	9				1	Barbarochthonidae SWC	13					<b>Other biota:</b>						
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>Comments/Observations:</b>						
Calopterygidae ST,I (Demoselles)	10					Lepidostomatidae	10											
Chlorocyphidae (Jewels)	10					Leptoceridae	6											
Synlestidae (Chorolestidae)(Sylphs)	8					Petrohrincidae SWC	11											
Coenagrionidae (Sprites and blues)	4		A		A	Pisulidae	10											
Lestidae (Emerald Damselflies/Spreadwings)	8					Sericostomatidae SWC	13											
Platycnemidae (Stream Damselflies)	10					COLEOPTERA (Beetles)												
Protonuridae (Threadwings)	8					Dytiscidae/Noteridae* (Diving beetles)	5											
Aeshnidae (Hawkers & Emperors)	8	1			1	Eimidae/Dryopidae* (Riffle beetles)	8											
Cordulidae (Cruisers)	8					Gyrinidae* (Whirligig beetles)	5	A		A	A							
Gomphidae (Clubtails)	6	1	A		A	Halplidae* (Crawling water beetles)	5											
Libellulidae (Darters/Skimmers)	4					Helodidae (Marsh beetles)	12											
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						<b>COLEOPTERA (Beetles)</b>						<b>ASPT</b>						
Crambidae (Pyralidae)	12					Hydraenidae* (Minute moss beetles)	8					<b>5.7</b>						

UO\_EWR03\_I: Upper Orange

<b>Date (dd-mm-yr):</b> July 2022		<b>Grid reference (dd mm ss.s) Lat: S</b> (dd.ddddd)		<b>Biotopes Sampled (tick &amp; rate)</b>		<b>Rating (1-5)</b>		<b>Time (min)</b>										
<b>Site Code:</b> UO_EWR03_I		<b>Long: E</b> -30.652793°		Stones Out Of Current (SOOC)		0												
<b>Collector/Sampler:</b> Kylie Farrell		<b>Datum (WGS84/Cape):</b>		Bedrock		0												
<b>River:</b> Upper Orange		<b>Altitude (m):</b>		Aquatic Veg		0												
<b>Level 1 Ecoregion:</b> 26: NAMA KAROO		<b>Zonation:</b>		MargVeg In Current		2												
<b>Quaternary Catchment:</b> D12F		<b>Routine or Project? (circle one)</b> Flow		MargVeg Out Of Current		0												
<b>Site Description: 52</b>		<b>Project Name:</b>		Gravel		0												
Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		WP11343		Sand		4												
<b>pH:</b>		<b>Clarity (cm):</b>		Mud		5												
<b>DO (mg/L):</b>		<b>Turbidity:</b>		<b>Hand picking/Visual observation</b>		x												
<b>Conductivity:</b>		<b>Colour:</b>		<b>Biotope Score (%)</b>		24												
<b>Riparian Disturbance:</b>																		
<b>Instream Disturbance:</b>																		
<b>Taxon</b>	<b>QV</b>	<b>S</b>	<b>Veg</b>	<b>GSM</b>	<b>TOT</b>	<b>Taxon</b>	<b>QV</b>	<b>S</b>	<b>Veg</b>	<b>GSM</b>	<b>TOT</b>	<b>Taxon</b>	<b>QV</b>	<b>S</b>	<b>Veg</b>	<b>GSM</b>	<b>TOT</b>	
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>						
<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Sneeze flies)	10					
<b>TURBELLARIA (Flatworms)</b>	3					Corixidae* (Water boatmen)	3			1	1	Blepharoceridae (Mountain midges)	15					
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5			1		1
Oligochaeta (Earthworms)	1					Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	A				A
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1					
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10					
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6					
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3					
Atyidae (Freshwater Shrimps)	8					Velidae/M...vellidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1					
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1					
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5					
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1					
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5					
Perlidae	12					Dipseuopsidae	10					Tipulidae (Crane flies)	5			A		A
<b>EPHEMEROPTERA (Mayflies)</b>						Ecnomidae	8					<b>GASTROPODA (Snails)</b>						
Baetidae 1sp	4					Hydropsychidae 1 sp	4					Ancylidae (Limpets)	6					
Baetidae 2 sp	6		A		A	Hydropsychidae 2 sp	6		B		B	Bulininae*	3					
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3					
Caenidae (Squaregills/Cairnflies)	6			A	A	Philoptamidae	10					Lymnaeidae* (Pond snails)	3					
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3					
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3					
Leptophlebiidae (Pronghills)	9					<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3					
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5					
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>						
Prosimulidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5					
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3					
Tricorythidae (Stout Crawlers)	9					Hydroalpingidae SWC	15					Unionidae (Perly mussels)	6					
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>						46
Catopterygidae ST,T (Demoiselles)	10					Leptoceridae	6			1	1	<b>No. of Taxa</b>						10
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					<b>ASPT</b>						4.6
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisulidae	10					<b>Other biota:</b>						
Coenagrionidae (Sprites and blues)	4		A		A	Sericostomatidae SWC	13											
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>												
Platychemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5											
Protonuridae (Threadwings)	8					Elmidae/Dryopidae* (Rifle beetles)	8											
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5			A	A	<b>Comments/Observations:</b>						
Corduliidae (Cruisers)	8					Halpilidae* (Crawling water beetles)	5											
Gompidae (Clubtails)	6					Helodidae (Marsh beetles)	12											
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8											
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5											
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10											
						Psephenidae (Water Pennies)	10											



UO\_EWR04\_I: Lower Caledon

Date (dd-mm-yr):		11 July 2022		Grid reference (dd mm ss.s) Lat: S		-30.436136°		(dd.ddddd)		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)			
Site Code:		UO_EWR04_I		Long: E		26.299258°				Stones Out Of Current (SOOC)		4					
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):						Bedrock		0					
River:		Lower Caledon		Altitude (m):						Aquatic Veg		0					
Level 1 Ecoregion:		26: NAMA KAROO		Zonation:						MargVeg In Current		0					
Quaternary Catchment:		D24G		Routine or Project? (circle one)		Flow				MargVeg Out Of Current		0					
Site Description: 52		Temp (°C):		Project Name:		Clarity (cm):				Gravel		3					
Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		pH:		WP11343		Turbidity:				Sand		3					
		Conductivity:				Colour:				Mud		3					
		Riparian Disturbance:								Hand picking/Visual observation		x					
		Instream Disturbance:								Biotope Score (%)		36					
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>						<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3		A		A	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						<b>GASTROPODA (Snails)</b>					
Oligochaeta (Earthworms)	1	A			A	Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5				
Hirudinea (Leeches)	3					Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	B		A	B
<b>CRUSTACEA</b>						<b>TRICHOPTERA (Caddisflies)</b>						<b>GASTROPODA (Snails)</b>					
Amphipoda (Scuds)	13					Nepidae* (Water scorpions)	3					Muscidae (House flies, Stable flies)	1				
Potamonautidae* (Crabs)	3					Notonectidae* (Backswimmers)	3					Psychodidae (Moth flies)	1				
Atyidae (Freshwater Shrimps)	8					Pleidae* (Pygmy backswimmers)	4					Simuliidae (Blackflies)	5	B		A	B
Palaemonidae (Freshwater Prawns)	10					Velidae/M...velidae* (Ripple bugs)	5					Syrphidae* (Rat tailed maggots)	1				
<b>HYDRACARINA (Mites)</b>						<b>Caseid caddis:</b>						<b>PELECYPODA (Bivalves)</b>					
PLECOPTERA (Stoneflies)						Sialidae (Alderflies)	6					Tabanidae (Horse flies)	5				
Notonemouridae	14					Dipseudopsidae	10					Tipulidae (Crane flies)	5				
Perlidae	12					Ecnomidae	8					Ancylidae (Limpets)	6				
<b>EPHEMEROPTERA (Mayflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>SASS Score</b>					
Baetidae 1sp	4					Hydropsychidae 1 sp	4					Limniscidae (Limpets)	3				28
Baetidae 2 sp	6	B			B	Hydropsychidae 2 sp	6	B			B	Bulininae*	3				7
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3				4.0
Caenidae (Squaregills/Cainflies)	6					Philopotamidae	10					Lymnaeidae* (Pond snails)	3				
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3				
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3				
Leptophlebiidae (Pronghills)	9					<b>Caseid caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>					
Prosopistomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9					Hydrosalpingidae SWC	15					Unionidae (Pearly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>ASPT</b>					
Calopterygidae ST,T (Demoselles)	10					Lepidostomatidae	10					<b>Other biota:</b>					
Chlorocyphidae (Jewels)	10					Leptoceridae	6										
Synlestidae (Chlorolestidae)(Sylphs)	8					Petrohrichidae SWC	11										
Coenagrionidae (Sprites and blues)	4					Pisuliidae	10										
Lestidae (Emerald Damselflies/Spreadwings)	8					Sericostomatidae SWC	13										
Platycnemidae (Stream Damselflies)	10					<b>COLEOPTERA (Beetles)</b>						<b>Comments/Observations:</b>					
Protonemuridae (Threadwings)	8					Dytiscidae/Noteridae* (Diving beetles)	5										
Aeshnidae (Hawkers & Emperors)	8					Elmidae/Dryopidae* (Rifle beetles)	8										
Corduliidae (Cruisers)	8					Gyrinidae* (Whirligig beetles)	5	A									
Gomphidae (Clubtails)	6					Halplidae* (Crawling water beetles)	5										
Libellulidae (Darters/Skimmers)	4					Helodidae (Marsh beetles)	12										
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						<b>COLEOPTERA (Beetles)</b>											
Crambidae (Pyralidae)	12					Hydraenidae* (Minute moss beetles)	8										
						Hydrophilidae* (Water scavenger beetles)	5										
						Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



UO\_EWR05\_I: Seekoei

Date (dd-mm-yr):		12 July 2022	Grid reference (dd mm ss.s) Lat: S (dd.ddddd)					Biotopes Sampled (tick & rate)					Rating (1-5)		Time (min)						
Site Code:		UO_EWR05_I	Long: E		-30.534359°		Stones Out Of Current (SOOC)		2												
Collector/Sampler:		Kylie Farrell	Datum (WGS84/Cape):		24.962895°		Bedrock		4												
River:		seekoei	Altitude (m):				Aquatic Veg		2												
Level 1 Ecoregion:		26: NAMA KAROO	Zonation:				MargVeg In Current		3												
Quaternary Catchment:		D32J	Routine or Project? (circle one)		Flow		MargVeg Out Of Current		3												
Site Description: 52			Project Name:		Clarity (cm):		Gravel		2												
Refer to Report Number:		RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality	WP11343 <td>Turbidity:</td> <td></td> <td colspan="2">Sand</td> <td colspan="2">2</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td>		Turbidity:		Sand		2												
Riparian Disturbance:			<td>Colour:</td> <td></td> <td colspan="2">Mud</td> <td colspan="2">3</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td>		Colour:		Mud		3												
Instream Disturbance:			<td></td> <td></td> <td colspan="2">Hand picking/Visual observation</td> <td colspan="2">x</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td>				Hand picking/Visual observation		x												
							Biotope Score (%)		51												
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT				
<b>PORIFERA (Sponge)</b>																					
COELENTERATA (Cnidaria)	1					<b>HEMIPTERA (Bugs)</b>												<b>DIPTERA (Flies)</b>			
TURBELLARIA (Flatworms)	3					Belostomatidae* (Giant water bugs)	3		A		A	Athericidae (Sripe flies)	10								
ANNELIDA						Corixidae* (Water boatmen)	3	A	B		B	Blepharoceridae (Mountain midges)	15								
Oligochaeta (Earthworms)	1					Gerridae* (Pond skaters/Water striders)	5		B		B	Ceratopogonidae (Biting midges)	5	1	A		A				
Hirudinea (Leeches)	3					Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	C	B		C				
CRUSTACEA						Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1		A		A				
Amphipoda (Scuds)	13					Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10								
Potamonautidae* (Crabs)	3	A			A	Notonectidae* (Backswimmers)	3		A		A	Empididae (Dance flies)	6								
Atyidae (Freshwater Shrimps)	8					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3								
Palaeomonidae (Freshwater Prawns)	10					Veliidae/M...velliidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1								
HYDRACARINA (Mites)	8		1		1	<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>												<b>PSYCHODIDA (Moth flies)</b>			
PLECOPTERA (Stoneflies)						Corydidae (Fishflies & Dobsonflies)	8					Psychodidae (Moth flies)	1								
Notonemouridae	14					Sialidae (Alderflies)	6					Simuliidae (Blackflies)	5	C	B		C				
Perlidae	12					<b>TRICHOPTERA (Caddisflies)</b>												<b>Syrphidae* (Rat tailed maggots)</b>			
EPHEMEROPTERA (Mayflies)						Dipseuopsidae	10					Tabanidae (Horse flies)	5								
Baetidae 1sp	4					Ecnomidae	8					Tipulidae (Crane flies)	5								
Baetidae 2 sp	6		B			<b>GASTROPODA (Snails)</b>												<b>GASTROPODA (Snails)</b>			
Baetidae > 2 sp	12	C			C	Hydropsychidae 1 sp	4	A			A	Ancylidae (Limpets)	6	A	A		A				
Caenidae (Squaregills/Cairnflies)	6	A			A	Hydropsychidae 2 sp	6					Bulininae*	3		A		A				
Ephemeraeidae	15					Hydropsychidae > 2 sp	12					Hydrobiidae*	3								
Heptageniidae (Flatheaded mayflies)	13					Philopotamidae	10					Lymnaeidae* (Pond snails)	3		A		A				
Leptophlebiidae (Pronghills)	9					Polycentropodidae	12					Physidae* (Pouch snails)	3		A		A				
Oligoneuridae (Brushlegged mayflies)	15					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3								
Polymitarcyidae (Pale Burrowers)	10					<b>Cased caddis:</b>												<b>Thiaridae* (=Melanidae)</b>			
Prosoptomatidae (Water specs)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5								
Teloganodidae SWC (Spiny Crawlers)	12					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>									
Tricorythidae (Stout Crawlers)	9					Glossosomatidae SWC	11					Corbiculidae (Clams)	5								
ODONATA (Dragonflies & Damselflies)						Hydroptilidae	6					Sphaeriidae (Pill clams)	3								
Catopterygidae ST,T (Demoiselles)	10					Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6								
Chlorocyphidae (Jewels)	10					Lepidostomatidae	10					<b>SASS Score</b>									
Synlestidae (Chlorolestidae)(Sylphs)	8					Leptoceridae	6					<b>No. of Taxa</b>									
Coenagrionidae (Sprites and blues)	4		B		B	Petrothrincidae SWC	11					<b>ASPT</b>									
Lestidae (Emerald Damselflies/Spreadwings)	8					Pisulidae	10					<b>Other biota:</b>									
Platycnemidae (Stream Damselflies)	10					Sericostomatidae SWC	13					<b>Comments/Observations:</b>									
Protonuridae (Threadwings)	8					<b>COLEOPTERA (Beetles)</b>															
Aeshnidae (Hawkers & Emperors)	8					Dytiscidae/Noteridae* (Diving beetles)	5		A		A										
Corduliidae (Cruisers)	8					Elmidae/Dryopidae* (Rifle beetles)	8														
Gomphidae (Clubtails)	6					Gyrinidae* (Whirligig beetles)	5	A	A		A										
Libellulidae (Darters/Skimmers)	4					Halplidae* (Crawling water beetles)	5														
LEPIDOPTERA (Aquatic Caterpillars/Moths)						Helodidae (Marsh beetles)	12														
Crambidae (Pyralidae)	12					Hydraenidae* (Minute moss beetles)	8		1		1										
						Hydrophilidae* (Water scavenger beetles)	5														
						Limnichidae (Marsh-Loving Beetles)	10														
						Psephenidae (Water Pennies)	10														



UO\_EWR06\_I: Upper Riet

<b>Date (dd-mm-yr):</b> 13 July 2022 <b>Site Code:</b> UO_EWR06_I <b>Collector/Sampler:</b> Kylie Farrell <b>River:</b> Riet (Upper) <b>Level 1 Ecoregion:</b> 26: NAMA KAROO <b>Quaternary Catchment:</b> C51F		<b>Grid reference (dd mm ss.s) Lat: S</b> (dd.ddddd) -29.535065° <b>Long: E</b> 25.524570° <b>Datum (WGS84/Cape):</b> <b>Altitude (m):</b> <b>Zonation:</b>		<b>Biotopes Sampled (tick &amp; rate)</b> Rating (1-5) Time (min) Stones Out Of Current (SOOC) 4 Bedrock 1 Aquatic Veg 4 MargVeg In Current 2 MargVeg Out Of Current 2 Gravel 4 Sand 3 Mud 3 Hand picking/Visual observation x Biotope Score (%) 60	
<b>Site Description: 52</b> Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		<b>Routine or Project? (circle one)</b> Flow <b>Project Name:</b> WP11343 <b>Clarity (cm):</b> <b>Turbidity:</b> <b>Colour:</b>			
<b>Temp (°C):</b> <b>pH:</b> <b>DO (mg/L):</b> <b>Conductivity:</b> <b>Riparian Disturbance:</b> <b>Instream Disturbance:</b>		<b>QV S Veg GSM TOT</b>		<b>QV S Veg GSM TOT</b>	
<b>Taxon</b>		<b>Taxon</b>		<b>Taxon</b>	
<b>PORIFERA (Sponge)</b> 5		<b>HEMIPTERA (Bugs)</b>		<b>DIPTERA (Flies)</b>	
<b>COELENTERATA (Cnidaria)</b> 1		Belostomatidae* (Giant water bugs) 3		Athericidae (Sripe flies) 10	
<b>TURBELLARIA (Flatworms)</b> 3 A		Corixidae* (Water boatmen) 3		Blepharoceridae (Mountain midges) 15	
<b>ANNELIDA</b>		Gerridae* (Pond skaters/Water striders) 5		Ceratopogonidae (Biting midges) 5 A	
Oligochaeta (Earthworms) 1 A		Hydrometridae* (Water measurers) 6		Chironomidae (Midges) 2 B B B B	
Hirudinea (Leeches) 3		Naucoridae* (Creeping water bugs) 7		Culicidae* (Mosquitoes) 1	
<b>CRUSTACEA</b>		Nepidae* (Water scorpions) 3		Dixidae* (Dixid midge) 10	
Amphipoda (Scuds) 13		Notonectidae* (Backswimmers) 3		Empididae (Dance flies) 6	
Potamonautidae* (Crabs) 3		Pleidae* (Pygmy backswimmers) 4		Ephydriidae (Shore flies) 3	
Atyidae (Freshwater Shrimps) 8		Veliidae/M...velliidae* (Ripple bugs) 5		Muscidae (House flies, Stable flies) 1	
Palaemonidae (Freshwater Prawns) 10		<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>		Psychodidae (Moth flies) 1	
<b>HYDRACARINA (Mites)</b> 8		Corydalidae (Fishflies & Dobsonflies) 8		Simuliidae (Blackflies) 5 C B B C	
<b>PLECOPTERA (Stoneflies)</b>		Sialidae (Alderflies) 6		Syrphidae* (Rat tailed maggots) 1	
Notonemouridae 14		<b>TRICHOPTERA (Caddisflies)</b>		Tabanidae (Horse flies) 5	
Perlidae 12		Dipseuropsidae 10		Tipulidae (Crane flies) 5	
<b>EPHEMEROPTERA (Mayflies)</b>		Ecnomidae 8		<b>GASTROPODA (Snails)</b>	
Baetidae 1sp 4		Hydropsychidae 1 sp 4 A		Ancyliidae (Limpets) 6 A	
Baetidae 2 sp 6 B B B		Hydropsychidae 2 sp 6		Buliniinae* 3	
Baetidae > 2 sp 12		Hydropsychidae > 2 sp 12		Hydrobiidae* 3	
Caenidae (Squaregills/Cairnflies) 6		Philopotamidae 10		Lymnaeidae* (Pond snails) 3	
Ephemeridae 15		Polycentropodidae 12		Physidae* (Pouch snails) 3	
Heptageniidae (Flatheaded mayflies) 13		Psychomyiidae/Xiphocentronidae 8		Planorbinae* (Orb snails) 3	
Leptophlebiidae (Pronghills) 9		<b>Cased caddis:</b>		Thiariidae* (=Melanidae) 3	
Oligoneuridae (Brushlegged mayflies) 15		Barbarochthonidae SWC 13		Viviparidae* ST 5	
Polymitarcyidae (Pale Burrowers) 10		Calamoceratidae ST 11		<b>PELECYPODA (Bivalves)</b>	
Prosoptomatidae (Water specs) 15		Glososomatidae SWC 11		Corbiculidae (Clams) 5	
Teloganodidae SWC (Spiny Crawlers) 12		Hydroptilidae 6		Sphaeriidae (Pill clams) 3	
Tricorythidae (Stout Crawlers) 9		Hydrosalpingidae SWC 15		Unionidae (Perly mussels) 6	
<b>ODONATA (Dragonflies &amp; Damselflies)</b>		Lepidostomatidae 10		<b>SASS Score</b> 65	
Calopterygidae ST,T (Demoiselles) 10		Leptoceridae 6		<b>No. of Taxa</b> 14	
Chlorocyphidae (Jewels) 10		Petrothrincidae SWC 11		<b>ASPT</b> 4.6	
Synlestidae (Chlorolestidae)(Sylphs) 8		Pisuilidae 10		<b>Other biota:</b>	
Coenagrionidae (Sprites and blues) 4 B		Sericostomatidae SWC 13			
Lestidae (Emerald Damselflies/Spreadwings) 8		<b>COLEOPTERA (Beetles)</b>			
Platycnemidae (Stream Damselflies) 10		Dytiscidae/Noteridae* (Diving beetles) 5			
Protoneuridae (Threadwings) 8		Elmidae/Dryopidae* (Riffle beetles) 8			
Aeshnidae (Hawkers & Emperors) 8		Gyrinidae* (Whirligig beetles) 5 A A B B		<b>Comments/Observations:</b>	
Corduliidae (Cruisers) 8		Halpidae* (Crawling water beetles) 5			
Gomphidae (Clubtails) 6		Helodidae (Marsh beetles) 12			
Libellulidae (Darters/Skimmers) 4		Hydraenidae* (Minute moss beetles) 8			
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>		Hydrophilidae* (Water scavenger beetles) 5			
Crambidae (Pyralidae) 12		Limmichidae (Marsh-Loving Beetles) 10			
		Psephenidae (Water Pennies) 10			

UO\_EWR07\_I: Upper Modder

<b>Date (dd-mm-yr):</b> 14 July 2022 <b>Site Code:</b> UO_EWR07_I <b>Collector/Sampler:</b> Kylie Farrell <b>River:</b> Modder <b>Level 1 Ecoregion:</b> 11: HIGHVELD <b>Quaternary Catchment:</b> C52B		<b>Grid reference (dd mm ss.s) Lat: S</b> -29.160017° <b>Long: E</b> 26.572492° <b>Datum (WGS84/Cape):</b> <b>Altitude (m):</b> <b>Zonation:</b>		<b>Biotopes Sampled (tick &amp; rate)</b> <table border="1"> <tr><td>Stones Out Of Current (SOOC)</td><td>2</td></tr> <tr><td>Bedrock</td><td>4</td></tr> <tr><td>Aquatic Veg</td><td>0</td></tr> <tr><td>MargVeg In Current</td><td>0</td></tr> <tr><td>MargVeg Out Of Current</td><td>3</td></tr> <tr><td>Gravel</td><td>1</td></tr> <tr><td>Sand</td><td>2</td></tr> <tr><td>Mud</td><td>3</td></tr> <tr><td>Hand picking/Visual observation</td><td>x</td></tr> <tr><td><b>Biotope Score (%)</b></td><td><b>36</b></td></tr> </table>		Stones Out Of Current (SOOC)	2	Bedrock	4	Aquatic Veg	0	MargVeg In Current	0	MargVeg Out Of Current	3	Gravel	1	Sand	2	Mud	3	Hand picking/Visual observation	x	<b>Biotope Score (%)</b>	<b>36</b>	<b>Rating (1-5)</b> Time (min)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Shrimps)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Palaemonidae (Freshwater Prawns)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>HYDRACARINA (Mites)</b></td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>PLECOPTERA (Stoneflies)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Notonemouridae</td><td>14</td><td></td><td></td><td></td><td></td></tr> <tr><td>Perlidae</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>EPHEMEROPTERA (Mayflies)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Baetidae 1sp</td><td>4</td><td>C</td><td></td><td></td><td></td></tr> <tr><td>Baetidae 2 sp</td><td>6</td><td></td><td></td><td>B</td><td>C</td></tr> <tr><td>Baetidae &gt; 2 sp</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>Caenidae (Squaregills/Cainflies)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Ephemeridae</td><td>15</td><td></td><td></td><td></td><td></td></tr> <tr><td>Heptageniidae (Flatheaded mayflies)</td><td>13</td><td></td><td></td><td></td><td></td></tr> <tr><td>Leptophlebiidae (Pronghills)</td><td>9</td><td></td><td></td><td></td><td></td></tr> <tr><td>Oligoneuridae (Brushlegged mayflies)</td><td>15</td><td></td><td></td><td></td><td></td></tr> <tr><td>Polymitarcyidae (Pale Burrowers)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Prosopistomatidae (Water specs)</td><td>15</td><td></td><td></td><td></td><td></td></tr> <tr><td>Teloganodidae SWC (Spiny Crawlers)</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>Tricorythidae (Stout Crawlers)</td><td>9</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>ODONATA (Dragonflies &amp; Damselflies)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Calopterygidae ST,T (Demoiselles)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Chlorocyphidae (Jewels)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Synlestidae (Chlorolestidae)(Sylphs)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Coenagrionidae (Sprites and blues)</td><td>4</td><td></td><td></td><td></td><td></td></tr> <tr><td>Lestidae (Emerald Damselflies/Spreadwings)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Platycnemidae (Stream Damselflies)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Protonuridae (Threadwings)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Aeshnidae (Hawkers &amp; Emperors)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Corduliidae (Cruisers)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Gomphidae (Clubtails)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Libellulidae (Darters/Skimmers)</td><td>4</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Crambidae (Pyralidae)</td><td>12</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		Taxon	QV	S	Veg	GSM	TOT	<b>PORIFERA (Sponge)</b>	5					<b>COELENTERATA (Cnidaria)</b>	1					<b>TURBELLARIA (Flatworms)</b>	3					<b>ANNELIDA</b>						Oligochaeta (Earthworms)	1	A		B	B	Hirudinea (Leeches)	3	A		1		<b>CRUSTACEA</b>						Amphipoda (Scuds)	13					Potamonautidae* (Crabs)	3	A		A		Atyidae (Freshwater Shrimps)	8					Palaemonidae (Freshwater Prawns)	10					<b>HYDRACARINA (Mites)</b>	8					<b>PLECOPTERA (Stoneflies)</b>						Notonemouridae	14					Perlidae	12					<b>EPHEMEROPTERA (Mayflies)</b>						Baetidae 1sp	4	C				Baetidae 2 sp	6			B	C	Baetidae > 2 sp	12					Caenidae (Squaregills/Cainflies)	6					Ephemeridae	15					Heptageniidae (Flatheaded mayflies)	13					Leptophlebiidae (Pronghills)	9					Oligoneuridae (Brushlegged mayflies)	15					Polymitarcyidae (Pale Burrowers)	10					Prosopistomatidae (Water specs)	15					Teloganodidae SWC (Spiny Crawlers)	12					Tricorythidae (Stout Crawlers)	9					<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Calopterygidae ST,T (Demoiselles)	10					Chlorocyphidae (Jewels)	10					Synlestidae (Chlorolestidae)(Sylphs)	8					Coenagrionidae (Sprites and blues)	4					Lestidae (Emerald Damselflies/Spreadwings)	8					Platycnemidae (Stream Damselflies)	10					Protonuridae (Threadwings)	8					Aeshnidae (Hawkers & Emperors)	8					Corduliidae (Cruisers)	8					Gomphidae (Clubtails)	6					Libellulidae (Darters/Skimmers)	4					<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Crambidae (Pyralidae)	12					<table border="1"> <thead> <tr> <th>Taxon</th> <th>QV</th> <th>S</th> <th>Veg</th> <th>GSM</th> <th>TOT</th> </tr> </thead> <tbody> <tr><td><b>HEMIPTERA (Bugs)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Belostomatidae* (Giant water bugs)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Corixidae* (Water boatmen)</td><td>3</td><td>1</td><td></td><td></td><td>1</td></tr> <tr><td>Gerridae* (Pond skaters/Water striders)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Hydrometridae* (Water measurers)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Naucoridae* (Creeping water bugs)</td><td>7</td><td></td><td></td><td></td><td></td></tr> <tr><td>Nepidae* (Water scorpions)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Notonectidae* (Backswimmers)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Pleidae* (Pygmy backswimmers)</td><td>4</td><td></td><td></td><td></td><td></td></tr> <tr><td>Veliidae/M...velliidae* (Ripple bugs)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Corydalidae (Fishflies &amp; Dobsonflies)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Sialidae (Alderflies)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>TRICHOPTERA (Caddisflies)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Dipseuopsidae</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Ecnomidae</td><td>8</td><td></td><td></td><td>1</td><td>1</td></tr> <tr><td>Hydropsychidae 1 sp</td><td>4</td><td>B</td><td></td><td></td><td>B</td></tr> <tr><td>Hydropsychidae 2 sp</td><td>6</td><td></td><td></td><td>A</td><td>B</td></tr> <tr><td>Hydropsychidae &gt; 2 sp</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>Philopotamidae</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Polycentropodidae</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>Psychomyiidae/Xiphocentronidae</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>Cased caddis:</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Barbarochthonidae SWC</td><td>13</td><td></td><td></td><td></td><td></td></tr> <tr><td>Calamoceratidae ST</td><td>11</td><td></td><td></td><td></td><td></td></tr> <tr><td>Glossosomatidae SWC</td><td>11</td><td></td><td></td><td></td><td></td></tr> <tr><td>Hydroptilidae</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Hydrosalpingidae SWC</td><td>15</td><td></td><td></td><td></td><td></td></tr> <tr><td>Leptostomatidae</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Leptoceridae</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Petrothrincidae SWC</td><td>11</td><td></td><td></td><td></td><td></td></tr> <tr><td>Pisulidae</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Sericostomatidae SWC</td><td>13</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>COLEOPTERA (Beetles)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Dytiscidae/Noteridae* (Diving beetles)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Elmidae/Dryopidae* (Rifle beetles)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Gyrinidae* (Whirligig beetles)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Halplidae* (Crawling water beetles)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Helodidae (Marsh beetles)</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>Hydraenidae* (Minute moss beetles)</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>Hydrophilidae* (Water scavenger beetles)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Limnichidae (Marsh-Loving Beetles)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Psephenidae (Water Pennies)</td><td>10</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		Taxon	QV	S	Veg	GSM	TOT	<b>HEMIPTERA (Bugs)</b>						Belostomatidae* (Giant water bugs)	3					Corixidae* (Water boatmen)	3	1			1	Gerridae* (Pond skaters/Water striders)	5					Hydrometridae* (Water measurers)	6					Naucoridae* (Creeping water bugs)	7					Nepidae* (Water scorpions)	3					Notonectidae* (Backswimmers)	3					Pleidae* (Pygmy backswimmers)	4					Veliidae/M...velliidae* (Ripple bugs)	5					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Corydalidae (Fishflies & Dobsonflies)	8					Sialidae (Alderflies)	6					<b>TRICHOPTERA (Caddisflies)</b>						Dipseuopsidae	10					Ecnomidae	8			1	1	Hydropsychidae 1 sp	4	B			B	Hydropsychidae 2 sp	6			A	B	Hydropsychidae > 2 sp	12					Philopotamidae	10					Polycentropodidae	12					Psychomyiidae/Xiphocentronidae	8					<b>Cased caddis:</b>						Barbarochthonidae SWC	13					Calamoceratidae ST	11					Glossosomatidae SWC	11					Hydroptilidae	6					Hydrosalpingidae SWC	15					Leptostomatidae	10					Leptoceridae	6					Petrothrincidae SWC	11					Pisulidae	10					Sericostomatidae SWC	13					<b>COLEOPTERA (Beetles)</b>						Dytiscidae/Noteridae* (Diving beetles)	5					Elmidae/Dryopidae* (Rifle beetles)	8					Gyrinidae* (Whirligig beetles)	5					Halplidae* (Crawling water beetles)	5					Helodidae (Marsh beetles)	12					Hydraenidae* (Minute moss beetles)	8					Hydrophilidae* (Water scavenger beetles)	5					Limnichidae (Marsh-Loving Beetles)	10					Psephenidae (Water Pennies)	10					<table border="1"> <thead> <tr> <th>Taxon</th> <th>QV</th> <th>S</th> <th>Veg</th> <th>GSM</th> <th>TOT</th> </tr> </thead> <tbody> <tr><td><b>DIPTERA (Flies)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Athericidae (Snipe flies)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Blepharoceridae (Mountain midges)</td><td>15</td><td></td><td></td><td></td><td></td></tr> <tr><td>Ceratopogonidae (Biting midges)</td><td>5</td><td>1</td><td></td><td>A</td><td>A</td></tr> <tr><td>Chironomidae (Midges)</td><td>2</td><td>1</td><td></td><td>B</td><td>B</td></tr> <tr><td>Culicidae* (Mosquitoes)</td><td>1</td><td></td><td></td><td></td><td></td></tr> <tr><td>Dixidae* (Dixid midge)</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>Empididae (Dance flies)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Ephydriidae (Shore flies)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Muscidae (House flies, Stable flies)</td><td>1</td><td></td><td></td><td></td><td></td></tr> <tr><td>Psychodidae (Moth flies)</td><td>1</td><td></td><td></td><td></td><td></td></tr> <tr><td>Simuliidae (Blackflies)</td><td>5</td><td>B</td><td></td><td>B</td><td>B</td></tr> <tr><td>Syrphidae* (Rat tailed maggots)</td><td>1</td><td></td><td></td><td></td><td></td></tr> <tr><td>Tabanidae (Horse flies)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Tipulidae (Crane flies)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>GASTROPODA (Snails)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Ancylidae (Limpets)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td>Bulininae*</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Hydrobiidae*</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Lymnaeidae* (Pond snails)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Physidae* (Pouch snails)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Planorbinae* (Orb snails)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Thiaridae* (=Melanidae)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Viviparidae* ST</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>PELECYPODA (Bivalves)</b></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Corbiculidae (Clams)</td><td>5</td><td></td><td></td><td></td><td></td></tr> <tr><td>Sphaeriidae (Pill clams)</td><td>3</td><td></td><td></td><td></td><td></td></tr> <tr><td>Unionidae (Perly mussels)</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td><b>SASS 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Muscidae (House flies, Stable flies)	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Psychodidae (Moth flies)	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Simuliidae (Blackflies)	5	B		B	B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Syrphidae* (Rat tailed maggots)	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Tipulidae (Crane flies)	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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<b>Comments/Observations:</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

UO\_EWR08\_I: Lower Kraal

<b>Date (dd-mm-yr):</b> 7 July 2022 <b>Site Code:</b> UO_EWR08_I <b>Collector/Sampler:</b> Kylie Farrell <b>River:</b> Lower Kraal <b>Level 1 Ecoregion:</b> 26: NAMA KAROO <b>Quaternary Catchment:</b> D13M		<b>Grid reference (dd mm ss.s) Lat: S</b> -30.69007* <b>Long: E</b> 26.74157* <b>Datum (WGS84/Cape):</b> <b>Altitude (m):</b> <b>Zonation:</b>		<b>Biotopes Sampled (tick &amp; rate)</b> Stones Out Of Current (SOOC) 5 Bedrock 2 Aquatic Veg 0 MargVeg In Current 2 MargVeg Out Of Current 0 Gravel 3 Sand 3 Mud 4 Hand picking/Visual observation x Biotope Score (%) 53		<b>Rating (1-5)</b> 5 5 2 0 2 0 3 3 4 x 53		<b>Time (min)</b> _____ _____ _____									
<b>Site Description: 52</b> Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		<b>Routine or Project? (circle one)</b> Flow <b>Project Name:</b> WP11343 <b>Clarity (cm):</b> <b>Turbidity:</b> <b>Colour:</b>		pH: DO (mg/L): Conductivity: Riparian Disturbance: Instream Disturbance:		The River Health Programme 											
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>						<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3			B	B	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						<b>GASTROPODA (Snails)</b>					
Oligochaeta (Earthworms)	1	A			A	Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5				
Hirudinea (Leeches)	3					Hydrometridae* (Water measurers)	6			A	A	Chironomidae (Midges)	2			B	B
<b>CRUSTACEA</b>						<b>TRICHOPTERA (Caddisflies)</b>						<b>PELECYPODA (Bivalves)</b>					
Amphipoda (Scuds)	13					Nepidae* (Water scorpions)	3					Simuliidae (Blackflies)	5	B		A	B
Potamonautidae* (Crabs)	3					Notonectidae* (Backswimmers)	3					Syrphidae* (Rat tailed maggots)	1				
Atyidae (Freshwater Shrimps)	8					Pleidae* (Pygmy backswimmers)	4					Tabanidae (Horse flies)	5				
Palaemonidae (Freshwater Prawns)	10					Veliidae/M...velidae* (Ripple bugs)	5					Tipulidae (Crane flies)	5				
<b>HYDRACARINA (Mites)</b>						<b>CASED caddis:</b>						<b>Other biota:</b>					
PLECOPTERA (Stoneflies)	8					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Notonemouridae	14					Calamoceratidae ST	11					PELECYPODA (Bivalves)					
Perlidae	12	A			A	Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>ASPT</b> #DIV/0!					
Baetidae 1sp	4					Hydropsychidae 1 sp	4					Hydrophilidae* (Water scavenger beetles)	5	↑			
Baetidae 2 sp	6					Hydropsychidae 2 sp	6			A		Limnichidae (Marsh-Loving Beetles)	10				
Baetidae > 2 sp	12	B			B	Hydropsychidae > 2 sp	12	A			A	Psephenidae (Water Pennies)	10				
Caenidae (Squagills/Cainflies)	6	A			A	Phlotomidae	10										
Ephemeridae	15					Psychomyiidae/Xiphocentronidae	8										
Heptageniidae (Flatheaded mayflies)	13					<b>Comments/Observations:</b>											
Leptophlebiidae (Pronghills)	9	B			A												
Oligoneuridae (Brushlegged mayflies)	15																
Polytmidae (Pale Burrowers)	10																
Prosopistomatidae (Water specs)	15																
Teloganonidae SWC (Spiny Crawlers)	12																
Tricorythidae (Stout Crawlers)	9																
<b>ODONATA (Dragonflies &amp; Damselflies)</b>																	
Catopterygidae ST,T (Damoiselles)	10																
Chlorocyphidae (Jewels)	10																
Synlestidae (Chlorolestidae)(Sylphs)	8																
Coenagrionidae (Sprites and blues)	4																
Lestidae (Emerald Damselflies/Spreadwings)	8																
Platycnemidae (Stream Damselflies)	10																
Protoneuridae (Threadwings)	8																
Aeshnidae (Hawkers & Emperors)	8				↑	↑											
Cordulidae (Cruisers)	8																
Gomphidae (Clubtails)	6				A	A											
Libellulidae (Darters/Skimmers)	4																
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>																	
Crambidae (Pyralidae)	12																



UO\_EWR02\_I: Sterkspruit

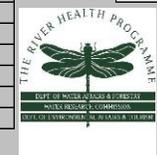
<b>Date (dd-mm-yr):</b> 30-May-23 <b>Site Code:</b> UO_EWR02_I <b>Collector/Sampler:</b> Kylie Farrell <b>River:</b> Sterkspruit <b>Level 1 Ecoregion:</b> 15: EASTERN ESCARPMENT MOUNTAIN <b>Quaternary Catchment:</b> D12B		<b>Grid reference (dd mm ss.s) Lat: S</b> -30.517806* <b>Long: E</b> 27.369058* <b>Datum (WGS84/Cape):</b> <b>Altitude (m):</b> <b>Zonation:</b>		<b>Biotopes Sampled (tick &amp; rate)</b> Stones Out Of Current (SOOC) 3 Bedrock 4 Aquatic Veg 0 MargVeg In Current 2 MargVeg Out Of Current 2 Gravel 1 Sand 4 Mud 4 Hand picking/Visual observation x Biotope Score (%) 51		<b>Rating (1-5)</b> 3 4 0 2 2 1 4 4 x 51		<b>Time (min)</b> 									
<b>Site Description: 52</b> Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		<b>Temp (°C):</b> <b>pH:</b> <b>DO (mg/L):</b> <b>Conductivity:</b> <b>Riparian Disturbance:</b> <b>Instream Disturbance:</b>		<b>Routine or Project? (circle one)</b> Flow <b>Project Name:</b> WP11343 <b>Clarity (cm):</b> <b>Turbidity:</b> <b>Colour:</b>		SASS Score 71 No. of Taxa 14 ASPT 5.1		<b>Other biota:</b> Comments/Observations:									
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>						<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3		1		1	Athericidae (Snipe flies)	10	1			1
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3		1		1	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						<b>GASTROPODA (Snails)</b>					
Oligochaeta (Earthworms)	1					Gerridae* (Pond skaters/Water striders)	5					Psychodidae (Moth flies)	1				
Hirudinea (Leeches)	3					Hydrometridae* (Water measurers)	6					Simuliidae (Blackflies)	5				
<b>CRUSTACEA</b>						<b>TRICHOPTERA (Caddisflies)</b>						<b>PELECYPODA (Bivalves)</b>					
Amphipoda (Scuds)	13					Nepidae* (Water scorpions)	3					Dipseudopsidae	10				
Potamonautidae* (Crabs)	3					Notonectidae* (Backswimmers)	3					Ecnomidae	8				
Atyidae (Freshwater Shrimps)	8					Pleidae* (Pygmy backswimmers)	4		1		1	Hydropsychidae 1 sp	4				
Palaeomonidae (Freshwater Prawns)	10					Velidae/M...velidae* (Ripple bugs)	5					Hydropsychidae 2 sp	6	B			B
<b>HYDRACARINA (Mites)</b>						<b>Cased caddis:</b>						<b>SASS Score</b>					
PLECOPTERA (Stoneflies)	8					Corydalidae (Fishflies & Dobsonflies)	8					Barbarochthonidae SWC	13				
Notonemouridae	14					Sialidae (Alderflies)	6					Calamoceratidae ST	11				
Perlidae	12					<b>COLEOPTERA (Beetles)</b>						<b>No. of Taxa</b>					
<b>EPHEMEROPTERA (Mayflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>ASPT</b>					
Baetidae 1sp	4			1		Dytiscidae/Noteridae* (Diving beetles)	5					Elmidae/Dryopidae* (Riffle beetles)	8				
Baetidae 2 sp	6	B	B		B	Limniscidae/Noteridae* (Diving beetles)	5	A	B			Gyrinidae* (Whirligig beetles)	5				B
Baetidae > 2 sp	12					Elmidae/Dryopidae* (Riffle beetles)	8					Halipidae* (Crawling water beetles)	5				
Caenidae (Squaregills/Cainflies)	6	A	B		A	Limniscidae/Noteridae* (Diving beetles)	5	A	B			Helodidae (Marsh beetles)	12				
Ephemeridae	15					Hydrophilidae* (Water scavenger beetles)	5					Hydraenidae* (Minute moss beetles)	8				
Heptageniidae (Flatheaded mayflies)	13					Limniscidae (Marsh-Loving Beetles)	10					Hydrophilidae* (Water scavenger beetles)	5				
Leptophlebiidae (Prongills)	9					Psephenidae (Water Pennies)	10					Limniscidae (Marsh-Loving Beetles)	10				
Oligoneuridae (Brushlegged mayflies)	15											Psephenidae (Water Pennies)	10				
Polymitarcyidae (Pale Burrowers)	10																
Prosoptomatidae (Water specs)	15																
Teloganodidae SWC (Spiny Crawlers)	12																
Tricorythidae (Stout Crawlers)	9																
<b>ODONATA (Dragonflies &amp; Damselflies)</b>																	
Calopterygidae ST,T (Demoselles)	10																
Chlorocyphidae (Jewels)	10																
Synlestidae (Chlorolestidae)(Sylphs)	8																
Coenagrionidae (Sprites and blues)	4		A		A												
Lestidae (Emerald Damselflies/Spreadwings)	8																
Platycnemidae (Stream Damselflies)	10																
Protoneridae (Threadwings)	8																
Aeshnidae (Hawkers & Emperors)	8	A	1		A												
Corduliidae (Cruisers)	8																
Gomphidae (Clubtails)	6		1	1	A												
Libellulidae (Darters/Skimmers)	4																
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>																	
Crambidae (Pyralidae)	12																

UO\_EWR03\_I: Upper Orange

*Not sampled due to rainfall and lightning events at the time of the survey*

UO\_EWR04\_I: Lower Caledon

Date (dd-mm-yr):		31-May-23		Grid reference (dd mm ss.s) Lat: S (dd.ddddd)		-30.436136°		Biotope Score (%)		Rating (1-5) <td colspan="2">Time (min)</td>		Time (min)						
Site Code:		UO_EWR04_I		Long: E		26.299258°		Stones Out Of Current (SOOC)		5								
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):				Bedrock		1								
River:		Lower Caledon		Altitude (m):				Aquatic Veg		0								
Level 1 Ecoregion:		26: NAMA KAROO		Zonation:				MargVeg In Current		0								
Quaternary Catchment:		D24G		Flow				MargVeg Out Of Current		0								
Site Description: 52		Temp (°C):		Project Name: <td colspan="2">WP11343</td> <th colspan="2">Clarity (cm):</th> <td colspan="2">2</td> <td colspan="2"></td>		WP11343		Clarity (cm):		2								
Refer to Report Number:		pH:		Riparian Disturbance:				Turbidity:		4								
RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		DO (mg/L):		Instream Disturbance:				Colour:		4								
		Conductivity:						Hand picking/Visual observation		x								
		Riparian Disturbance:						Biotope Score (%)		40								
		Instream Disturbance:																
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>						
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10					
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3					Blepharoceridae (Mountain midges)	15					
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5					
Oligochaeta (Earthworms)	1	1		A	A	Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2			A	A	
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1					
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10					
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6					
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3					
Atyidae (Freshwater Shrimps)	8					Velidae/M...velidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1					
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1					
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5	B		A	B	
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1					
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5					
Perlidae	12					Dipseudopsidae	10					Tipulidae (Crane flies)	5					
<b>EPHEMEROPTERA (Mayflies)</b>						Ecnomidae	8					<b>GASTROPODA (Snails)</b>						
Baetidae 1sp	4					Hydropsychidae 1 sp	4	B		A	B	Ancyliidae (Limpets)	6					
Baetidae 2 sp	6	B			B	Hydropsychidae 2 sp	6					Bulininae*	3					
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3					
Caenidae (Squaregills/Cainflies)	6					Philopotamidae	10					Lymnaeidae* (Pond snails)	3					
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3					
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3					
Leptophlebiidae (Pronghills)	9					<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3					
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5					
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>						
Prosopistomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5					
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3					
Tricorythidae (Stout Crawlers)	9	A		A	B	Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6					
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>						41
Calopterygidae ST.T (Demiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>						9
Chlorocyphidae (Jewels)	10					Petrohrinidae SWC	11					<b>ASPT</b>						4.6
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisulidae	10					<b>Other biota:</b>						
Coenagrionidae (Sprites and blues)	4					Sericostomatidae SWC	13											
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>												
Platycnemididae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5											
Protoneuridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8											
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5	B			B	<b>Comments/Observations:</b>						
Corduliidae (Cruisers)	8					Halipidae* (Crawling water beetles)	5											
Gomphidae (Clubtails)	6			1	1	Helodidae (Marsh beetles)	12											
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8											
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5											
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10											
						Psephenidae (Water Pennies)	10											



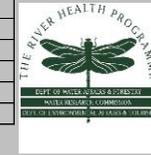
UO\_EWR05\_I: Seekoei

Date (dd-mm-yr):		31-May-23		Grid reference (dd mm ss.s) Lat: S		(dd.ddddd)		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)					
Site Code:		UO_EWR05_I		Long: E		-30.534359°		Stones Out Of Current (SOOC)		1							
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):		24.962895°		Bedrock		5							
River:		seekoei		Altitude (m):				Aquatic Veg		5							
Level 1 Ecoregion:		26: NAMA KAROO		Zonation:				MargVeg In Current		4							
Quaternary Catchment:		D32J		Routine or Project? (circle one)		Flow		MargVeg Out Of Current		4							
Site Description: 52		Temp (°C):		Project Name:		Clarity (cm):		Gravel		2							
Refer to Report Number:		pH:		WP11343		Turbidity:		Sand		2							
RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		DO (mg/L):		Colour:				Mud		3							
Riparian Disturbance:				Hand picking/Visual observation				Biotope Picking (%)		x							
Instream Disturbance:										60							
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
<b>TURBELLARIA (Flatworms)</b>	3		A		A	Corixidae* (Water boatmen)	3		B	B	B	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5	B	A	1	B
Oligochaeta (Earthworms)	1			A	A	Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2		A	A	B
Hirudinea (Leeches)	3		A		A	Naucoridae* (Creeping water bugs)	7		A		A	Culicidae* (Mosquitoes)	1		A		A
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dividae* (Divid midge)	10				
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6				
Potamonautidae* (Crabs)	3	A	1	A	B	Pletidae* (Pygmy backswimmers)	4		A	1	A	Ephydriidae (Shore flies)	3				
Atyidae (Freshwater Shrimps)	8					Velidae/M...velidae* (Ripple bugs)	5		A		A	Muscidae (House flies, Stable flies)	1				
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1				
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5	A		A	B
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1				
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5				
Perlidae	12					Dipseudopsidae	10					Tipulidae (Crane flies)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						Ecnomidae	8					<b>GASTROPODA (Snails)</b>					
Baetidae 1sp	4					Hydropsychidae 1 sp	4					Ancylidae (Limpets)	6				
Baetidae 2 sp	6	B	A			Hydropsychidae 2 sp	6	A		B	B	Bulininae*	3				
Baetidae > 2 sp	12			B	B	Hydropsychidae > 2 sp	12					Hydrobiidae*	3				
Caenidae (Squaregills/Cainflies)	6	A	1	A	B	Philotomidae	10					Lymnaeidae* (Pond snails)	3		A		A
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3				
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3				
Leptophlebiidae (Pronghills)	9					<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>					
Prosoptomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6			A	A	Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9					Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>					89
Calopterygidae ST,T (Demoiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>					20
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					<b>ASPT</b>					4.5
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisuliidae	10					<b>Other biota:</b>					
Coenagrionidae (Sprites and blues)	4		A	1	A	Sericostomatidae SWC	13										
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>											
Platycnemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5										
Protonuridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8										
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5			B	B	<b>Comments/Observations:</b>					
Corduliidae (Cruisers)	8					Halipidae* (Crawling water beetles)	5										
Gomphidae (Clubtails)	6					Helodidae (Marsh beetles)	12										
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8										
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5		1		1						
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



UO\_EWR06\_I: Upper Riet

Date (dd-mm-yr):		1 June 023		Grid reference (dd mm ss.s) Lat: S		-29.535065°		Grid reference (dd.mm.ssss) Lat: S		-29.535065°		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)	
Site Code:		UO_EWR06_I		Grid reference (dd mm ss.s) Long: E		25.524570°		Grid reference (dd.mm.ssss) Long: E		25.524570°		Stones Out Of Current (SOOC)		3			
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):				Datum (WGS84/Cape):				Bedrock		1			
River:		Riet (Upper)		Altitude (m):				Altitude (m):				Aquatic Veg		5			
Level 1 Ecoregion:		26: NAMA KAROO		Zonation:				Zonation:				MargVeg In Current		5			
Quaternary Catchment:		C51F		Routine or Project? (circle one)		Flow		Routine or Project? (circle one)		Flow		MargVeg Out Of Current		3			
Site Description: 52		Temp (°C):		Project Name: <td colspan="2">Clarity (cm):</td> <td colspan="2">Project Name: <td colspan="2">Clarity (cm):</td> <th colspan="2">Gravel</th> <td colspan="2">5</td> <th colspan="2"></th> </td>		Clarity (cm):		Project Name: <td colspan="2">Clarity (cm):</td> <th colspan="2">Gravel</th> <td colspan="2">5</td> <th colspan="2"></th>		Clarity (cm):		Gravel		5			
Refer to Report Number:		pH:		WP11343		Turbidity:		WP11343		Turbidity:		Sand		5			
RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		DO (mg/L):				Colour:				Colour:		Mud		3			
		Conductivity:										Hand picking/Visual observation		x			
		Riparian Disturbance:										Biotope Score (%)		69			
		Instream Disturbance:															
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
<b>TURBELLARIA (Flatworms)</b>	3					Corixidae* (Water boatmen)	3		A		A	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5		B		B	Ceratopogonidae (Biting midges)	5	1		A	A
Oligochaeta (Earthworms)	1					Hydrometridae* (Water measurers)	6				A	Chironomidae (Midges)	2			A	A
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1				
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3		1		1	Dixidae* (Dixid midge)	10				
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3		A		A	Empididae (Dance flies)	6				
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3				
Atyidae (Freshwater Shrimps)	8		A		A	Velidae/M...velidae* (Ripple bugs)	5		1		1	Muscidae (House flies, Stable flies)	1				
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1				
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5				
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1				
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5				
Perlidae	12					Dipseudopsidae	10					Tipulidae (Crane flies)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						Ecmonidae	8					<b>GASTROPODA (Snails)</b>					
Baetidae 1sp	4	1	A			Hydropsychidae 1 sp	4		1		1	Ancylidae (Limpets)	6		1		1
Baetidae 2 sp	6			A	B	Hydropsychidae 2 sp	6					Bulininae*	3				
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3				
Caenidae (Squaregills/Cainflies)	6			B	B	Philopotamidae	10					Lymnaeidae* (Pond snails)	3				
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3				
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3		1		1
Leptophlebiidae (Pronghills)	9			A	A	<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Vvparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalvles)</b>					
Prosopistomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiry Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9					Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>					102
Calopterygidae ST,T (Demoiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>					19
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					<b>ASPT</b>					5.4
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisuliidae	10					<b>Other biota:</b>					
Coenagrionidae (Sprites and blues)	4					Sericostomatidae SWC	13										
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>											
Platycnemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5				A	A					
Protoneuridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8										
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5										
Corduliidae (Cruisers)	8					Halipidae* (Crawling water beetles)	5										
Gomphidae (Clubtails)	6			A	A	Helodidae (Marsh beetles)	12										
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8				1	1					
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5										
Crambidae (Pyralidae)	12		1		1	Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



UO\_EWR07\_I: Upper Modder

Date (dd-mm-yr):		02-Jun-23		Grid reference (dd mm ss.s) Lat: S (dd.ddddd)		-29.160017°		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)					
Site Code:		UO_EWR07_I		Long: E		26.572492°		Stones Out Of Current (SOOC)		0							
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):				Bedrock		0							
River:		Modder		Altitude (m):				Aquatic Veg		3							
Level 1 Ecoregion:		11: HIGHVELD		Zonation:				MargVeg In Current		3							
Quaternary Catchment:		C52B		Routine or Project? (circle one)		Flow		MargVeg Out Of Current		0							
Site Description: 52		Temp (°C):		Project Name:		Clarity (cm):		Gravel		2							
Refer to Report Number:		pH:		WP11343		Turbidity:		Sand		2							
RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		DO (mg/L):		Colour: <td colspan="2"></td> <th colspan="2">Mud</th> <td colspan="2">4</td> <td colspan="2"></td>				Mud		4							
		Conductivity:						Hand picking/Visual observation		x							
		Riparian Disturbance:						Biotope Score (%)		31							
		Instream Disturbance:															
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3		A		A	Athericidae (Snipe flies)	10				
<b>TURBELLARIA (Flatworms)</b>	3					Corixidae* (Water boatmen)	3		A	A	B	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5				
Oligochaeta (Earthworms)	1			A	A	Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2			A	A
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1				
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10				
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6				
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3				
Atyidae (Freshwater Shrimps)	8					Veliidae/M...velidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1				
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1				
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5	A		1	A
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1				
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5				
Perlidae	12					Dipseudopsidae	10					Tipulidae (Crane flies)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						Ecnomidae	8					<b>GASTROPODA (Snails)</b>					
Baetidae 1sp	4					Hydropsychidae 1 sp	4		A	A	A	Ancylidae (Limpets)	6				
Baetidae 2 sp	6		A	A	A	Hydropsychidae 2 sp	6					Bulininae*	3				
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3				
Caenidae (Squaregills/Cairnflies)	6					Philopotamidae	10					Lymnaeidae* (Pond snails)	3				
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3				
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Pianorbinae* (Orb snails)	3				
Leptophlebiidae (Pronghills)	9					<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>					
Prosopistomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiry Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9					Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>					38
Calopterygidae ST,T (Demoiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>					10
Chlorocyphidae (Jewels)	10					Petrohrincidae SWC	11					<b>ASPT</b>					3.8
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisuliidae	10					<b>Other biota:</b>					
Coenagrionidae (Sprites and blues)	4		A	1	A	Sericostomatidae SWC	13										
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>											
Platynemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5										
Protonuridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8										
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5		A		A	<b>Comments/Observations:</b>					
Cordulidae (Cruisers)	8					Haliplidae* (Crawling water beetles)	5					Stones biotope not accessible due to flows					
Gomphidae (Clubtails)	6					Helodidae (Marsh beetles)	12										
Libellulidae (Darters/Skimmers)	4					Helodidae (Marsh beetles)	8										
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydraenidae* (Minute moss beetles)	5				1						
Crambidae (Pyralidae)	12					Hydrophilidae* (Water scavenger beetles)	10										
						Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



UO\_EWR010\_I: Lower Orange

Date (dd-mm-yr):		03-Jun-23		Grid reference (dd mm ss.s) Lat: S		(dd.ddd)		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)						
Site Code:		UO_EWR0_R		Long: E				Stones Out Of Current (SOOC)		3								
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):				Bedrock		1								
River:		Upper Orange		Altitude (m):				Aquatic Veg		0								
Level 1 Ecoregion:				Zonation:				MargVeg In Current		0								
Quaternary Catchment:				Routine or Project? (circle one)		Flow		MargVeg Out Of Current		0								
Site Description: 52		Temp (°C):		Project Name:		Clarity (cm):		Gravel		3								
Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		pH:		WP11343		Turbidity:		Sand		4								
		DO (mg/L):		Colour:				Mud		4								
		Conductivity:		Riparian Disturbance:				Hand picking/Visual observation		x								
		Instream Disturbance:		Biotope Score (%)		40												
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>						
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10					
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3					Blepharoceridae (Mountain midges)	15					
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5					
Oligochaeta (Earthworms)	1					Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2					
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1					
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10					
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6					
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3					
Atyidae (Freshwater Shrimps)	8			1	A	Velidae/M...velidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1					
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1					
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5					
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1					
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5					
Perlidae	12					Dipseudopsidae	10					Tipulidae (Crane flies)	5					
<b>EPHEMEROPTERA (Mayflies)</b>						Ecnomidae	8					<b>GASTROPODA (Snails)</b>						
Baetidae 1sp	4	A		1	A	Hydropsychidae 1 sp	4					Ancylidae (Limpets)	6					A
Baetidae 2 sp	6					Hydropsychidae 2 sp	6					Bulininae*	3					
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3					
Caenidae (Squaregills/Cainflies)	6				A	Philopotamidae	10					Lymnaeidae* (Pond snails)	3					
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3					
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3					
Leptophlebiidae (Prongills)	9	A			A	<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3					
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5					
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>						
Prosoptomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5					1
Teloganodidae SWC (Spiry Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3					
Tricorythidae (Stout Crawlers)	9					Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6					
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>						51
Calopterygidae ST,T (Demiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>						8
Chlorocyphidae (Jewels)	10					Petrothricidae SWC	11					<b>ASPT</b>						6.4
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisulidae	10					<b>Other biota:</b>						
Coenagrionidae (Sprites and blues)	4					Sericostomatidae SWC	13											
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>												
Platycnemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5											
Protoneridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8											
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5		A		B	<b>Comments/Observations:</b>						
Corduliidae (Cruisers)	8					Halipidae* (Crawling water beetles)	5											
Gomphidae (Clubtails)	6					Helodidae (Marsh beetles)	12											
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8											
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5											
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10											
						Psephenidae (Water Pennies)	10											



**SASS5 Datasheet: Rapid 3 EWR Sites for July 2022**

**UO\_EWR01\_R: Little Caledon**

<b>Date (dd-mm-yr):</b> 4 July 2022 <b>Site Code:</b> UO_EWR01_R <b>Collector/Sampler:</b> Kylie Farrell <b>River:</b> Little Caledon <b>Level 1 Ecoregion:</b> 15: EASTERN ESCARPMENT MOUNTAIN <b>Quaternary Catchment:</b> Dd21d		<b>Grid reference (dd mm ss.s) Lat: S</b> -28.557796° <b>Long: E</b> 28.405789° <b>Datum (WGS84/Cape):</b> <b>Altitude (m):</b> <b>Zonation:</b>		<b>Biotope Score (tick &amp; rate)</b> Rating (1-5) Time (min)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
<b>Site Description: 52</b> Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		<b>Routine or Project? (circle one)</b> Flow <b>Project Name:</b> WP11343 <b>Clarity (cm):</b> <b>Turbidity:</b> <b>Colour:</b>		4 4 0 0 1 1 3 3 4 x 44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
<b>Temp (°C):</b> <b>pH:</b> <b>DO (mg/L):</b> <b>Conductivity:</b>		<b>Riparian Disturbance:</b> <b>Instream Disturbance:</b>		44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Alderflies)</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>HYDRACARINA (Mites)</b></td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td>Corydalidae (Fishflies &amp; Dobsonflies)</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>PLECOPTERA (Stoneflies)</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Sialidae (Alderflies)</td> <td>6</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Notonemouridae</td> <td>14</td> <td></td> <td></td> <td></td> <td></td> <td><b>TRICHOPTERA (Caddisflies)</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Perlidae</td> <td>12</td> <td></td> <td></td> <td></td> <td></td> <td>Dipseudopsidae</td> <td>10</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>EPHEMEROPTERA (Mayflies)</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Enomidae</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Baetidae 1sp</td> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td>Hydropsychidae 1 sp</td> <td>4</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Baetidae 2 sp</td> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td>Hydropsychidae 2 sp</td> <td>6</td> <td>B</td> <td></td> <td></td> <td>B</td> </tr> <tr> <td>Baetidae &gt; 2 sp</td> <td>12</td> <td>C</td> <td>B</td> <td>B</td> <td>C</td> <td>Hydropsychidae &gt; 2 sp</td> <td>12</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Caenidae (Squaregills/Cairnflies)</td> <td>6</td> <td>A</td> <td>A</td> <td>B</td> <td>B</td> <td>Phlebotamidae</td> <td>10</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Ephemeridae</td> <td>15</td> <td></td> <td></td> <td></td> <td></td> <td>Polycentropodidae</td> <td>12</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Heptageniidae (Flatheaded mayflies)</td> <td>13</td> <td></td> <td></td> <td></td> <td>A</td> <td>Psychomyiidae/Xiphocentronidae</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Leptophlebiidae (Pronghills)</td> <td>9</td> <td>B</td> <td></td> <td>A</td> <td>B</td> <td><b>Cased caddis:</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Oligoneuridae (Brushlegged mayflies)</td> <td>15</td> <td></td> <td></td> <td></td> <td></td> <td>Barbarochthonidae SWC</td> <td>13</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Polymitarcyidae (Pale Burrowers)</td> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td>Calamoceratidae ST</td> <td>11</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Prosimptomatidae (Water specs)</td> <td>15</td> <td></td> <td></td> <td></td> <td></td> <td>Glossosomatidae SWC</td> <td>11</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Teloganonidae SWC (Spiny Crawlers)</td> <td>12</td> <td></td> <td></td> <td></td> <td></td> <td>Hydroptilidae</td> <td>6</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Tricorythidae (Stout Crawlers)</td> <td>9</td> <td>B</td> <td></td> <td></td> <td>B</td> <td>Hydropsalpingidae SWC</td> <td>15</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>ODONATA (Dragonflies &amp; 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Emperors)</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td>Gyrinidae* (Whirligig beetles)</td> <td>5</td> <td></td> <td>A</td> <td></td> <td>A</td> </tr> <tr> <td>Cordulidae (Cruisers)</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td>Halplidae* (Crawling water beetles)</td> <td>5</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gomphidae (Clubtails)</td> <td>6</td> <td></td> <td></td> <td>A</td> <td>A</td> <td>Helodidae (Marsh beetles)</td> <td>12</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Libellulidae (Darters/Skimmers)</td> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td>Hydraenidae* (Minute moss beetles)</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Hydrophilidae* (Water scavenger beetles)</td> <td>5</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Crambidae (Pyralidae)</td> <td>12</td> <td></td> <td></td> <td></td> <td></td> <td>Limnichidae (Marsh-Loving Beetles)</td> <td>10</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Psephenidae (Water Pennies)</td> <td>10</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	<b>PORIFERA (Sponge)</b>	5				1	<b>HEMIPTERA (Bugs)</b>						<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3					<b>TURBELLARIA (Flatworms)</b>	3			A	A	Corixidae* (Water boatmen)	3					<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Oligochaeta (Earthworms)	1			A	A	Hydrometridae* (Water measurers)	6					Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Atyidae (Freshwater Shrimps)	8					Velidae/M...velidae* (Ripple bugs)	5					Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Perlidae	12					Dipseudopsidae	10					<b>EPHEMEROPTERA (Mayflies)</b>						Enomidae	8					Baetidae 1sp	4					Hydropsychidae 1 sp	4					Baetidae 2 sp	6					Hydropsychidae 2 sp	6	B			B	Baetidae > 2 sp	12	C	B	B	C	Hydropsychidae > 2 sp	12					Caenidae (Squaregills/Cairnflies)	6	A	A	B	B	Phlebotamidae	10					Ephemeridae	15					Polycentropodidae	12					Heptageniidae (Flatheaded mayflies)	13				A	Psychomyiidae/Xiphocentronidae	8					Leptophlebiidae (Pronghills)	9	B		A	B	<b>Cased caddis:</b>						Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					Prosimptomatidae (Water specs)	15					Glossosomatidae SWC	11					Teloganonidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Tricorythidae (Stout Crawlers)	9	B			B	Hydropsalpingidae SWC	15					<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					Calopterygidae ST, I (Demoiselles)	10					Leptoceridae	6					Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					Synlestidae (Chlorolestidae)(Sylphs)	8					Pisulidae	10					Coenagrionidae (Sprites and blues)	4					Sericostomatidae SWC	13					Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>						Platycnemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5					Protonuridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8					Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5		A		A	Cordulidae (Cruisers)	8					Halplidae* (Crawling water beetles)	5					Gomphidae (Clubtails)	6			A	A	Helodidae (Marsh beetles)	12					Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8					<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5					Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10											Psephenidae (Water Pennies)	10				
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
<b>PORIFERA (Sponge)</b>	5				1	<b>HEMIPTERA (Bugs)</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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<b>TURBELLARIA (Flatworms)</b>	3			A	A	Corixidae* (Water boatmen)	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Oligochaeta (Earthworms)	1			A	A	Hydrometridae* (Water measurers)	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Caenidae (Squaregills/Cairnflies)	6	A	A	B	B	Phlebotamidae	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Ephemeridae	15					Polycentropodidae	12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Heptageniidae (Flatheaded mayflies)	13				A	Psychomyiidae/Xiphocentronidae	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Leptophlebiidae (Pronghills)	9	B		A	B	<b>Cased caddis:</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Prosimptomatidae (Water specs)	15					Glossosomatidae SWC	11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Teloganonidae SWC (Spiny Crawlers)	12					Hydroptilidae	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Tricorythidae (Stout Crawlers)	9	B			B	Hydropsalpingidae SWC	15																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Calopterygidae ST, I (Demoiselles)	10					Leptoceridae	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisulidae	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Coenagrionidae (Sprites and blues)	4					Sericostomatidae SWC	13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Platycnemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Protonuridae (Threadwings)	8					Elmidae/Dryopidae* (Riffle beetles)	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5		A		A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Cordulidae (Cruisers)	8					Halplidae* (Crawling water beetles)	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Gomphidae (Clubtails)	6			A	A	Helodidae (Marsh beetles)	12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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<b>Other biota:</b> SASS Score: 86 No. of Taxa: 14 ASPT: 6.1 Comments/Observations:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					



UO\_EWR02\_R: Brandwater

Date (dd-mm-yr):		4 July 2022		Grid reference (dd mm ss.s) Lat: S		-28.680340°		Grid reference (dd mm ss.s) Long: E		28.139926°		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)	
Site Code:		UO_EWR02_R		Datum (WGS84/Cape):				Altitude (m):				Stones Out Of Current (SOOC)		3			
Collector/Sampler:		Kylie Farrell		Zonation:				Flow				Bedrock		0			
River:		Groot/Brandwater		Routine or Project? (circle one)		Project Name:		Clarity (cm):				Aquatic Veg		0			
Level 1 Ecoregion:		15: EASTERN ESCARPMENT MOUNTAIN		Project Name:		WP11343		Turbidity:				MargVeg In Current		0			
Quaternary Catchment:		D21G		Colour:				Mud		5		MargVeg Out Of Current		0			
Site Description: 52		Temp (°C):		Riparian Disturbance:				Hand picking/Visual observation		x		Gravel		3			
Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		DO (mg/L):		Instream Disturbance:				Biotope Score (%)		38		Sand		3			
		Conductivity:										Mud		5			
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>						<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3					Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						<b>NEURPTERA (Water scorpions)</b>						<b>PSYCHODIDA (Moth flies)</b>					
Oligochaeta (Earthworms)	1			A	A	Gerridae* (Pond skaters/Water striders)	5				A	Ceratopogonidae (Biting midges)	5				
Hirudinea (Leeches)	3					Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	B		A	B
<b>CRUSTACEA</b>						<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						<b>TRICHOPTERA (Caddisflies)</b>					
Amphipoda (Scuds)	13					Corydalidae (Fishflies & Dobsonflies)	8					Dipseudopsidae	10				
Potamonautidae* (Crabs)	3	f			1	Sialidae (Alderflies)	6					Ecnomidae	8				
Atyidae (Freshwater Shrimps)	8					<b>TRICHOPTERA (Caddisflies)</b>						<b>GASTROPODA (Snails)</b>					
Palaemonidae (Freshwater Prawns)	10					Dipseudopsidae	10					Ecnomidae	8				
<b>HYDRACARINA (Mites)</b>						<b>TRICHOPTERA (Caddisflies)</b>						<b>GASTROPODA (Snails)</b>					
PLECOPTERA (Stoneflies)	14					Hydropsychidae 1 sp	4					Hydropsychidae 2 sp	6	B		A	B
Notonemouridae	14					Hydropsychidae > 2 sp	12					Hydropsychidae > 2 sp	12				
Perlidae	12					Phlebotomidae	10					Phlebotomidae	10				
<b>EPHEMEROPTERA (Mayflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>Other biota:</b>					
Baetidae 1sp	4					<b>Cased caddis:</b>											
Baetidae 2 sp	6			A		Barbarochthonidae SWC	13					Calamoceratidae ST	11				
Baetidae > 2 sp	12	B			B	Calamoceratidae ST	11					Glossosomatidae SWC	11				
Caenidae (Squagills/Cainflies)	6					Hydroptilidae	6					Hydroptilidae	6				
Ephemeridae	15					Hydrosalpingidae SWC	15					Hydrosalpingidae SWC	15				
Heptageniidae (Flatheaded mayflies)	13					Lepidostomatidae	10					Lepidostomatidae	10				
Leptophlebiidae (Pronghills)	9					Leptoceridae	6					Leptoceridae	6				
Oligoneuridae (Brushlegged mayflies)	15					Petrothrincidae SWC	11					Petrothrincidae SWC	11				
Polymitarcidae (Pale Burrowers)	10					Pisuliidae	10					Pisuliidae	10				
Prosopistomatidae (Water specs)	15					Sericostomatidae SWC	13					Sericostomatidae SWC	13				
Teloganonidae SWC (Spiny Crawlers)	12					<b>COLEOPTERA (Beetles)</b>						<b>ASPT</b>					
Tricorythidae (Stout Crawlers)	9					Dytiscidae/Noteridae* (Diving beetles)	5					Dytiscidae/Noteridae* (Diving beetles)	5				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						<b>COLEOPTERA (Beetles)</b>						<b>ASPT</b>					
Calopterygidae ST,T (Damoiselles)	10					Elmidae/Dryopidae* (Riffle beetles)	8					Elmidae/Dryopidae* (Riffle beetles)	8				
Chlorocyphidae (Jewels)	10					Gyrinidae* (Whirligig beetles)	5					Gyrinidae* (Whirligig beetles)	5				
Synlestidae (Chlorolestidae)(Sylphs)	8					Halipilidae* (Crawling water beetles)	5					Halipilidae* (Crawling water beetles)	5				
Coenagrionidae (Sprites and blues)	4					Helodidae (Marsh beetles)	12					Helodidae (Marsh beetles)	12				
Lestidae (Emerald Damselflies/Spreadwings)	8					Hydraenidae* (Minute moss beetles)	8					Hydraenidae* (Minute moss beetles)	8				
Platycnemidae (Stream Damselflies)	10					Hydrophilidae* (Water scavenger beetles)	5					Hydrophilidae* (Water scavenger beetles)	5				
Protoneuridae (Threadwings)	8					Limnichidae (Marsh-Loving Beetles)	10					Limnichidae (Marsh-Loving Beetles)	10				
Aeshnidae (Hawkers & Emperors)	8					Psephenidae (Water Pennies)	10					Psephenidae (Water Pennies)	10				
Cordulidae (Cruisers)	8					<b>Other biota:</b>											
Gomphidae (Clubtails)	6					<b>Comments/Observations:</b>											
Libellulidae (Darters/Skimmers)	4																
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>																	
Crambidae (Pyralidae)	12																





UO\_EWR04\_R: Upper Kraai

Date (dd-mm-yr):		9 July 2022		Grid reference (dd mm ss.s) Lat: S		(dd.ddd)		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)					
Site Code:		UO_EWR04_R		Long: E		-30.85179°		Stones Out Of Current (SOOC)		5							
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):				Bedrock		0							
River:		Upper Kraai		Altitude (m):				Aquatic Veg		0							
Level 1 Ecoregion:		15: EASTERN ESCARPMENT MOUNTAIN		Zonation:				MargVeg In Current		3							
Quaternary Catchment:		D13E		Routine or Project? (circle one)		Flow		MargVeg Out Of Current		3							
Site Description: 52		Temp (°C):		Project Name:		Clarity (cm):		Gravel		4							
Refer to Report Number:		DO (mg/L):		WP11343		Turbidity:		Sand		4							
RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		Conductivity:				Colour:		Mud		3							
Riparian Disturbance:								Hand picking/Visual observation		x							
Instream Disturbance:								Biotope Score (%)		60							
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
<b>TURBELLARIA (Flatworms)</b>	3	A			A	Corixidae* (Water boatmen)	3					Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5		1		1
Oligochaeta (Earthworms)	1		A		A	Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	B	B	B	B
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1				
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10				
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6				
Potamonautidae* (Crabs)	3	f			1	Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3				
Atyidae (Freshwater Shrimps)	8					Veliidae/M...veliidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1	A			A
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1				
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5	C	B	B	D
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1				
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5				
Perlidae	12					Dipseuopsidae	10					Tipulidae (Crane flies)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						Ecmonidae	8					<b>GASTROPODA (Snails)</b>					
Baetidae 1sp	4					Hydropsychidae 1 sp	4	A			A	Ancylidae (Limpets)	6	A			A
Baetidae 2 sp	6					Hydropsychidae 2 sp	6					Bulininae*	3				
Baetidae > 2 sp	12	B	B	B	C	Hydropsychidae > 2 sp	12					Hydrobiidae*	3				
Caenidae (Squaregills/Cairnflies)	6	B		A	B	Philoctamidae	10					Lymnaeidae* (Pond snails)	3				
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3				
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3				
Leptophlebiidae (Pronghills)	9	A			A	<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>					
Prosopistomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9	A			A	Hydrosalpingidae SWC	15					Unionidae (Perly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>					82
Calopterygidae ST,T (Demoiselles)	10					Leptoceridae	6		1		1	<b>No. of Taxa</b>					16
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					<b>ASPT</b>					5.1
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisuliidae	10					<b>Other biota:</b>					
Coenagrionidae (Sprites and blues)	4		A		A	Sericostomatidae SWC	13										
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>											
Platynemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5										
Proteuridae (Threadwings)	8					Elmidae/Dryopidae* (Rifle beetles)	8										
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5										
Corduliidae (Cruisers)	8					Halplidae* (Crawling water beetles)	5										
Gomphidae (Clubtails)	6			A	A	Helodidae (Marsh beetles)	12										
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8										
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5										
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



UO\_EWR05\_R: Wonderboomspruit

Date (dd-mm-yr):		July 2022		Grid reference (dd mm ss.s) Lat: S (dd.ddddd)		-31.005262°		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)					
Site Code:		UO_EWR05_R		Long: E		26.341938°		Stones Out Of Current (SOOC)		4							
Collector/Sampler:		Kylie Farrell		Datum (WGS84/Cape):				Bedrock		0							
River:		Wonderboomspruit		Altitude (m):				Aquatic Veg		0							
Level 1 Ecoregion:		26: NAMA KAROO		Zonation:				MargVeg In Current		3							
Quaternary Catchment:		D14E		Routine or Project? (circle one)		Flow		MargVeg Out Of Current		3							
Site Description: 52		Temp (°C):		Project Name: <td colspan="2">Clarity (cm):</td> <td colspan="2">Gravel</td> <td colspan="2">3</td> <td colspan="2"></td>		Clarity (cm):		Gravel		3							
Refer to Report Number:		pH:		WP11343		Turbidity:		Sand		3							
RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality		DO (mg/L):		Colour:				Mud		3							
		Conductivity:						Hand picking/Visual observation		x							
		Riparian Disturbance:						Biotope Score (%)		49							
		Instream Disturbance:															
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>	5					<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
<b>COELENTERATA (Cnidaria)</b>	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
<b>TURBELLARIA (Flatworms)</b>	3					Corixidae* (Water boatmen)	3		A		A	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5				
Oligochaeta (Earthworms)	1			A	A	Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2		B	B	B
Hirudinea (Leeches)	3		A		C	Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1				
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dixidae* (Dixid midge)	10				
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6				
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3				
Atyidae (Freshwater Shrimps)	8					Veliidae/M...velliidae* (Ripple bugs)	5					Muscidae (House flies, Stable flies)	1				
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1				
<b>HYDRACARINA (Mites)</b>	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5	B	B		B
<b>PLECOPTERA (Stoneflies)</b>						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1				
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5				
Perlidae	12					Dipseuopsidae	10					Tipulidae (Crane flies)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						Ecnomidae	8					<b>GASTROPODA (Snails)</b>					
Baetidae 1sp	4					Hydropsychidae 1 sp	4	B	A		B	B	Ancylidae (Limpets)	6			
Baetidae 2 sp	6		B		B	Hydropsychidae 2 sp	6					Bulininae*	3				
Baetidae > 2 sp	12	B			B	Hydropsychidae > 2 sp	12					Hydrobiidae*	3				
Caenidae (Squaregills/Cairnflies)	6	1	A		A	Phlebotomidae	10					Lymnaeidae* (Pond snails)	3				
Ephemeraeidae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3		1		1
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3				
Leptophlebiidae (Pronghills)	9					<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>					
Prosoptomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9					Hydroalpingidae SWC	15					Unionidae (Perly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>					48
Catopterygidae ST,T (Demoiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>					11
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					<b>ASPT</b>					4.4
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisulidae	10					<b>Other biota:</b>					
Coenagrionidae (Sprites and blues)	4	A	A		A	Sericostomatidae SWC	13										
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>											
Platycnemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5										
Protoneuridae (Threadwings)	8					Elmidae/Dryopidae* (Rifle beetles)	8										
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5		B	B	B	<b>Comments/Observations:</b>					
Corduliidae (Cruisers)	8					Halplidae* (Crawling water beetles)	5										
Gompidae (Clubtails)	6					Helodidae (Marsh beetles)	12										
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8										
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5										
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



UO\_EWR06\_R: Modder (Soetdoring)

Date (dd-mm-yr):		14 July 2022		Grid reference (dd mm ss.s) Lat: S		-28.807191°		Grid reference (dd mm ss.s) Long: E		26.109695°		Biotopes Sampled (tick & rate)		Rating (1-5)		Time (min)	
Site Code:		UO_EWR7_R		Datum (WGS84/Cape):				Altitude (m):				Stones Out Of Current (SOOC)		1			
Collector/Sampler:		Kylie Farrell		Zonation:				Flow				Bedrock		4			
River:		Modder		Routine or Project? (circle one)		Flow		Clarity (cm):				Aquatic Veg		1			
Level 1 Ecoregion:		11: HIGHVELD		Project Name:		WP11343		Turbidity:				MargVeg In Current		1			
Quaternary Catchment:		C52G		Colour:				Mud				MargVeg Out Of Current		1			
Temp (°C):				Riparian Disturbance:				Hand picking/Visual observation		x		Gravel		1			
pH:				Instream Disturbance:				Biotope Score (%)		31		Sand		1			
DO (mg/L):												Mud		2			
Conductivity:																	
Site Description: 52																	
Refer to Report Number: RDM/WMA13/00/CON/COMP/0722 and for all other site information, including in situ water quality																	
Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT	Taxon	QV	S	Veg	GSM	TOT
<b>PORIFERA (Sponge)</b>						<b>HEMIPTERA (Bugs)</b>						<b>DIPTERA (Flies)</b>					
COELENTERATA (Cnidaria)	1					Belostomatidae* (Giant water bugs)	3					Athericidae (Snipe flies)	10				
TURBELLARIA (Flatworms)	3					Corixidae* (Water boatmen)	3	B	B		B	Blepharoceridae (Mountain midges)	15				
<b>ANNELIDA</b>						Gerridae* (Pond skaters/Water striders)	5					Ceratopogonidae (Biting midges)	5				
Oligochaeta (Earthworms)	1	1		A	A	Hydrometridae* (Water measurers)	6					Chironomidae (Midges)	2	A	B	B	B
Hirudinea (Leeches)	3					Naucoridae* (Creeping water bugs)	7					Culicidae* (Mosquitoes)	1				
<b>CRUSTACEA</b>						Nepidae* (Water scorpions)	3					Dididae* (Didid midge)	10				
Amphipoda (Scuds)	13					Notonectidae* (Backswimmers)	3					Empididae (Dance flies)	6				
Potamonautidae* (Crabs)	3					Pleidae* (Pygmy backswimmers)	4					Ephydriidae (Shore flies)	3				
Atyidae (Freshwater Shrimps)	8					Velidae/M...vellidae* (Ripple bugs)	5				A	Muscidae (House flies, Stable flies)	1				
Palaemonidae (Freshwater Prawns)	10					<b>MEGALOPTERA (Fishflies, Dobsonflies &amp; Alderflies)</b>						Psychodidae (Moth flies)	1				
HYDRACARINA (Mites)	8					Corydalidae (Fishflies & Dobsonflies)	8					Simuliidae (Blackflies)	5	B		A	B
PLECOPTERA (Stoneflies)						Sialidae (Alderflies)	6					Syrphidae* (Rat tailed maggots)	1				
Notonemouridae	14					<b>TRICHOPTERA (Caddisflies)</b>						Tabanidae (Horse flies)	5				
Perlidae	12					Dipseuopsidae	10					Tipulidae (Crane flies)	5				
<b>EPHEMEROPTERA (Mayflies)</b>						Ecmonidae	8		1	1	A	<b>GASTROPODA (Snails)</b>					
Baetidae 1sp	4					Hydropsychidae 1 sp	4					Ancylidae (Limpets)	6				
Baetidae 2 sp	6	B	1	B	B	Hydropsychidae 2 sp	6	B			B	Bulininae*	3				
Baetidae > 2 sp	12					Hydropsychidae > 2 sp	12					Hydrobiidae*	3				
Caenidae (Squaregills/Cairnflies)	6					Philopotamidae	10					Lymnaeidae* (Pond snails)	3				
Ephemeridae	15					Polycentropodidae	12					Physidae* (Pouch snails)	3		A		A
Heptageniidae (Flatheaded mayflies)	13					Psychomyiidae/Xiphocentronidae	8					Planorbinae* (Orb snails)	3				
Leptophlebiidae (Prongills)	9					<b>Cased caddis:</b>						Thiaridae* (=Melanidae)	3				
Oligoneuridae (Brushlegged mayflies)	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
Polymitarcyidae (Pale Burrowers)	10					Calamoceratidae ST	11					<b>PELECYPODA (Bivalves)</b>					
Prosoptomatidae (Water specs)	15					Glossosomatidae SWC	11					Corbiculidae (Clams)	5				
Teloganodidae SWC (Spiny Crawlers)	12					Hydroptilidae	6					Sphaeriidae (Pill clams)	3				
Tricorythidae (Stout Crawlers)	9					Hydroalpingidae SWC	15					Unionidae (Perly mussels)	6				
<b>ODONATA (Dragonflies &amp; Damselflies)</b>						Lepidostomatidae	10					<b>SASS Score</b>					
Calopterygidae ST,T (Demoiselles)	10					Leptoceridae	6					<b>No. of Taxa</b>					
Chlorocyphidae (Jewels)	10					Petrothrincidae SWC	11					<b>ASPT</b>					
Synlestidae (Chlorolestidae)(Sylphs)	8					Pisuliidae	10					<b>Other biota:</b>					
Coenagrionidae (Sprites and blues)	4					Sericostomatidae SWC	13										
Lestidae (Emerald Damselflies/Spreadwings)	8					<b>COLEOPTERA (Beetles)</b>											
Platynemidae (Stream Damselflies)	10					Dytiscidae/Noteridae* (Diving beetles)	5										
Protoneuridae (Threadwings)	8					Elmidae/Dryopidae* (Rifle beetles)	8										
Aeshnidae (Hawkers & Emperors)	8					Gyrinidae* (Whirligig beetles)	5										
Cordulidae (Cruisers)	8					Halipidae* (Crawling water beetles)	5										
Gompidae (Clubtails)	6			1	1	Helodidae (Marsh beetles)	12										
Libellulidae (Darters/Skimmers)	4					Hydraenidae* (Minute moss beetles)	8										
<b>LEPIDOPTERA (Aquatic Caterpillars/Moths)</b>						Hydrophilidae* (Water scavenger beetles)	5										
Crambidae (Pyralidae)	12					Limnichidae (Marsh-Loving Beetles)	10										
						Psephenidae (Water Pennies)	10										



## 5. Appendix D: Riparian vegetation species inventory for all Intermediate EWR sites and VEGRAI models

### Intermediate EWR Sites

Species	Family	Common Name/s	Alien	EWR01_J	EWR02_J	EWR03_J	EWR04_J	EWR05_J	EWR06_J	EWR07_J	EWR08_J	EWR010_J
<i>Acacia dealbata</i>	FABACEAE	Silver Wattle	*	y		y						
<i>Arctotheca calendula</i>	ASTERACEAE	Cape Weed										y
<i>Argemone mexicana</i>	PAPAVERACEAE	Yellow Mexican Poppy	*									y
<i>Argemone ochroleuca</i>	PAPAVERACEAE	Mexican Poppy	*				y	y		y		
<i>Aristida cf adscensionis</i>	POACEAE	Annual Bristle Grass						y	y	y		
<i>Asparagus suaveolens</i>	ASPARAGACEAE					y	y	y	y	y	y	y
<i>Aster squamatus</i>	ASTERACEAE		*									y
<i>Azolla filiculoides</i>	SALVINIACEAE	Red Water-fern	*					y				
<i>Berula erecta</i>	APIACEAE	Toothache Root						y				
<i>Bidens pilosa</i>	ASTERACEAE	Black Jack	*		y	y	y	y		y	y	
<i>Bromus catharticus</i>	POACEAE		*							y	y	
<i>Bulbostylis cf hispidula</i>	CYPERACEAE									y		
<i>Celtis africana</i>	CELTIDACEAE	White Stinkwood				y					y	
<i>Cestrum laevigatum</i>	SOLANACEAE	Ink Berry	*							y		

Species	Family	Common Name/s	Alien	EW01_J	EW02_J	EW03_J	EW04_J	EW05_J	EW06_J	EW07_J	EW08_J	EW010_J
<i>Chenopodium carinatum</i>	AMARANTHACEAE	Green Goosefoot	*									y
<i>Chrysocoma ciliata</i>	ASTERACEAE	Bitterbos			y						y	
<i>Cineraria lobata</i>	ASTERACEAE	Smooth Cineraria				y						
<i>Cirsium vulgare</i>	ASTERACEAE	Scotch Thistle	*		y			y	y			
<i>Clematis brachiata</i>	RANUNCULACEAE					y		y		y		
<i>Conyza bonariensis</i>	ASTERACEAE	Horseweed	*			y			y			y
<i>Conyza sumatrensis</i>	ASTERACEAE	Tall Fleabane	*			y	y		y	y		y
<i>Cymbopogon cf pospischilii</i>	POACEAE									y		
<i>Cynodon dactylon</i>	POACEAE	Coach grass		y	y	y	y	y	y	y	y	y
<i>Cyperus esculentus</i>	CYPERACEAE	Yellow Nutsedge									y	
<i>Cyperus eragrostis</i>	CYPERACEAE		*				y			y		y
<i>Cyperus longus var. tenuiflorus</i>	CYPERACEAE	Sweet Cyperus									y	
<i>Cyperus marginatus</i>	CYPERACEAE			y	y	y	y		y		y	
<i>Cyperus sp.</i>	CYPERACEAE									y		
<i>Cirsium vulgare</i>	ASTERACEAE	Scotch Thistle	*		y							
<i>Datura ferox</i>	SOLANACEAE	Large Thorn-apple	*		y							
<i>Datura stramonium</i>	SOLANACEAE		*							y		
<i>Diclis petiolaris</i>	SCROPHULARIACEAE	Vlei Snapdragon										y

Species	Family	Common Name/s	Alien	EW01_J	EW02_J	EW03_J	EW04_J	EW05_J	EW06_J	EW07_J	EW08_J	EW010_J
<i>Diospyros lycioides subsp. lycioides</i>	EBENACEAE	Bluebush			y	y			y	y	y	y
<i>Echinochloa sp.</i>	POACEAE									y		
<i>Equisetum ramosissimum</i>	EQUISETACEAE			y	y		y					y
<i>Eragrostis capensis</i>	POACEAE									y		
<i>Eragrostis lehmanniana</i>	POACEAE							y	y		y	
<i>Eragrostis gummiflua</i>	POACEAE									y		y
<i>Eragrostis sp.</i>	POACEAE						y			y		
<i>Eucalyptus sp.</i>	MYRTACEAE		*						y	y		y
<i>Euclea undulata</i>	EBENACEAE											y
<i>Felicia filifolia</i>	ASTERACEAE	Fine-leaved Felicia			y							
<i>Felicia cf muricata</i>	ASTERACEAE										y	
<i>Gleditsia triacanthos</i>	FABACEAE	Honeylocust	*		y	y	y			y		
<i>Gomphocarpus fruticosus</i>	APOCYNACEAE	Milkweed						y	y	y		
<i>Gomphostigma virgatum</i>	SCROPHULARIACEAE	River Stars			y				y		y	
<i>Gomphrena celosioides</i>	AMARANTHACEAE	Globe Amaranth	*									y
<i>Grewia flava</i>	MALVACEAE											y
<i>Grewia sp.</i>	MALVACEAE					y						
<i>Gymnosporia glaucophylla</i>	CELASTRACEAE									y		

Species	Family	Common Name/s	Alien	EWR01_J	EWR02_J	EWR03_J	EWR04_J	EWR05_J	EWR06_J	EWR07_J	EWR08_J	EWR010_J
<i>Helichrysum argyrosphaerum</i>	ASTERACEAE											y
<i>Hemarthria altissima</i>	POACEAE	Red Swamp Grass		y		y				y		
<i>Heteromorpha arborescens</i>	APIACEAE	Parsley Tree						y				
<i>Heteropogon contortus</i>	POACEAE								y			
<i>Hypochaeris radicata</i>	ASTERACEAE	Hairy Wild Lettuce	*		y							
<i>Imperata cylindrica</i>	POACEAE								y			
<i>Isolepis costata</i>	CYPERACEAE											y
<i>Juncus effusus</i>	JUNCACEAE			y			y					
<i>Juncus exsertus</i>	JUNCACEAE									y		
<i>Juncus rigidus</i>	JUNCACEAE							y				
<i>Leucosidea sericea</i>	ROSACEAE	Ouhout			y							
<i>Limosella sp.</i>												y
<i>Lycium cinereum</i>	SOLANACEAE							y				y
<i>Lycium hirsutum</i>	SOLANACEAE					y	y	y	y			y
<i>Lycium horridum</i>	SOLANACEAE										y	
<i>Melilotus albus</i>	FABACEAE	White Sweet Clover	*						y			
<i>Melolobium microphyllum</i>	FABACEAE								y		y	
<i>Mentha aquatica</i>	LAMIACEAE	Water Mint			y							

Species	Family	Common Name/s	Alien	EW01_J	EW02_J	EW03_J	EW04_J	EW05_J	EW06_J	EW07_J	EW08_J	EW010_J
<i>Miscanthus junceus</i>	POACEAE	Wireleaf daba grass						y	y	y	y	
<i>Monopsis sp</i>												y
<i>Nicotiana glauca</i>	SOLANACEAE		*			y	y			y		y
<i>Oenothera rosea</i>	ONAGRACEAE	Rose Evening Primrose	*			y						
<i>Olea europaea subsp. africana</i>	OLEACEAE	Wild Olive				y						y
<i>Opuntia ficus-indica</i>	CACTACEAE	Sweet Prickly Pear	*							y		
<i>Opuntia imbricata</i>	CACTACEAE	Imbricate Prickly Pear	*							y		
<i>Paspalum dilatatum</i>	POACEAE	Dallis Grass			y		y					
<i>Paspalum distichum</i>	POACEAE							y		y		
<i>Pennisetum clandestinum</i>	POACEAE	Kikuyu	*		y		y			y		
<i>Pentzia sp.</i>	ASTERACEAE							y				
<i>Persicaria lapathifolia</i>	POLYGONACEAE	Spotted Knotweed	*				y		y	y		
<i>Phragmites australis</i>	POACEAE	Common Reed					y	y		y	y	y
<i>Plantago lanceolata</i>	PLANTAGINACEAE	English Plantain			y			y				
<i>Pollichia campestris</i>									y			
<i>Polypogon monspeliensis</i>	POACEAE	Beardgrass	*									y
<i>Populus alba</i>	SALICACEAE	White Poplar	*							y		
<i>Populus canescens</i>	SALICACEAE	Grey Poplar	*	y	y	y	y		y		y	

Species	Family	Common Name/s	Alien	EW01_J	EW02_J	EW03_J	EW04_J	EW05_J	EW06_J	EW07_J	EW08_J	EW010_J
<i>Populus nigra</i>	SALICACEAE	Black Poplar	*				y					
<i>Pseudognaphalium luteo-album</i>	ASTERACEAE	Cudweed										y
<i>Phyla nodiflora</i>	VERBENACEAE	Cape Weed	*									y
<i>Pyracantha angustifolia</i>	ROSACEAE	Firethorn	*	y	y					y		
<i>Ranunculus multifidus</i>	RANUNCULACEAE	Buttercup	*					y				
<i>Robinia pseudoacacia</i>	FABACEAE	Black Locust	*	y							y	
<i>Rosa rubiginosa</i>	ROSACEAE	Eglantine	*		y						y	
<i>Rubus sp.</i>	ROSACEAE	Bramble	*	y								
<i>Rumex crispus</i>	POLYGONACEAE	Curly Dock	*							y	y	
<i>Rumex lanceo</i>	POLYGONACEAE								y			
<i>Salix babylonica</i>	SALICACEAE	Weeping Willow	*	y		y	y				y	
<i>Salix mucronata subsp. mucronata</i>	SALICACEAE	Cape Willow		y		y	y		y	y	y	y
<i>Salvia stenophylla</i>	LAMIACEAE				y							
<i>Salsola cf calluna</i>	CHENOPODIACEAE							y				
<i>Schoenoplectus brachyceras</i>	CYPERACEAE								y			
<i>Schoenoplectus sp.</i>	CYPERACEAE									y		
<i>Schinus molle</i>	ANACARDIACEAE	Pepper Tree	*							y		
<i>Scirpoides dioecus</i>	CYPERACEAE	Biesie						y				

Species	Family	Common Name/s	Alien	EW01_J	EW02_J	EW03_J	EW04_J	EW05_J	EW06_J	EW07_J	EW08_J	EW010_J
<i>Searsia lancea</i>	ANACARDIACEAE							y		y		y
<i>Searsia pyroides</i>	ANACARDIACEAE				y	y		y		y	y	
<i>Sebaea sp.</i>												y
<i>Selago sp.</i>	SCROPHULARIACEAE					y						
<i>Sesbania punicea</i>	FABACEAE	Red Sesbania	*						y			
<i>Setaria sphacelata</i>	POACEAE	Bristle Grass							y	y		
<i>Solanum incanum</i>	SOLANACEAE		*					y				
<i>Solanum pseudocapsicum</i>	SOLANACEAE	Jerusalem Cherry	*						y			
<i>Solanum nigrum</i>	SOLANACEAE	Nightshade	*				y					
<i>Sonchus oleraceus</i>	ASTERACEAE	Sowthistle	*							y		
<i>Sonchus asper</i>	ASTERACEAE		*				y					
<i>Sporobolus africanus</i>	POACEAE	Ratstail Dropseed					y		y	y		
<i>Sporobolus pyramidalis</i>	POACEAE	Catstail Dropseed			y				y			
<i>Stipagrostis cf obtusa</i>	POACEAE											y
<i>Tagetes minuta</i>	ASTERACEAE	Khaki Weed	*		y	y	y			y		
<i>Themeda triandra</i>	POACEAE	Red Grass							y	y		
<i>Typha capensis</i>								y				
<i>Ulmus parvifolia</i>	ULMACEAE	Chinese Elm	*	y						y		

Species	Family	Common Name/s	Alien	EW01_J	EW02_J	EW03_J	EW04_J	EW05_J	EW06_J	EW07_J	EW08_J	EW010_J
<i>Vachellia karroo</i>	FABACEAE	Sweet Thorn						y		y		y
<i>Verbena bonariensis</i>	VERBENACEAE	Purple Top	*					y	y	y		
<i>Verbena officinalis</i>	VERBENACEAE	Common Vervain	*				y			y		
<i>Verbesina encelioides</i>	ASTERACEAE	Wild Sunflower	*									y
<i>Veronica anagallis-aquatica</i>	PLANTAGINACEAE	Water Speedwell						y				y
<i>Xanthium spinosum</i>	ASTERACEAE	Spiny Cocklebur	*									y
<i>Xanthium strumarium</i>	ASTERACEAE	Large Cocklebur	*		y	y	y	y	y	y		y
<i>Ziziphus mucronata</i>	RHAMNACEAE	Buffalo thorn										y
<b>Total</b>			64	13	26	25	27	31	32	51	24	39

## 6. Appendix E: Summary of IHI Models

### Rapid 3 EWR Sites

UO\_EWR01\_R: Little Caledon

Instream		
Criteria	Score	Rationale
Water abstraction	7	Irrigation, Clarens
Flow modification	4	
Bed modification	5	Some road/ cattle crossings in the reach
Channel modification	6	Site: Bridge and crossing bank modifications Reach: Limited impacts due to crossings
Physical-chemical modification	6	Algae, silt
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	1	Possibly trout and large-mouth bass, not habitat modifying
Rubbish dumping	0	
<b>Instream PES</b>	<b>85</b>	<b>B</b>
Riparian		
Vegetation removal	10	Trampling, wood harvesting
Exotic vegetation	6	Salix, low cover. Possible encroachment of wattle from upstream
Bank erosion	7	Trampling
Channel modification	6	Limited, due to crossings
Water abstraction	1	
Inundation	0	
Flow modification	1	
Physical-chemical modification	10	Upstream WWTW Clarens golf course
<b>Riparian PES</b>	<b>79</b>	<b>B/C</b>

UO\_EWR02\_R: Brandwater

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	6	Irrigation
Flow modification	6	Dams in upper catchment and tributaries
Bed modification	10	Road/ cattle crossing, algae, high silt loads
Channel modification	10	Site: Cattle, bridge
Physical-chemical modification	10	Algae, possibly WWTW effluent, silt
Inundation	1	
Alien macrophytes	0	
Introduced aquatic fauna	3	Possibly carp (habitat modifying) and trout
Rubbish dumping	3	Localised
<b>Instream PES</b>	<b>75</b>	<b>C</b>
<b>Riparian</b>		
Vegetation removal	3	
Exotic vegetation	10	Salix spp.
Bank erosion	10	Localised at site very high Reach trampling, grazing
Channel modification	9	Road crossings, bridges, cattle trampling
Water abstraction	1	
Inundation	0	
Flow modification	2	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>80</b>	<b>B/C</b>

## UO\_EWR03\_R: Mopeli

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	7	Irrigation in mainstem and tributaries
Flow modification	6	Small dams in upper catchments
Bed modification	5	Bedrock dominated – bridges, broken weir, causeway, wood-blocked bridge
Channel modification	10	Wood-blocked bridge and scouring of river downstream bridge, broken down weir – divert flows around the weir
Physical-chemical modification	13	Eutrophication, algal growth
Inundation	2	Localised
Alien macrophytes	0	
Introduced aquatic fauna	5	Carp present
Rubbish dumping	1	
<b>Instream PES</b>	<b>71</b>	<b>C</b>
<b>Riparian</b>		
Vegetation removal	3	
Exotic vegetation	13	Honey locust, willows
Bank erosion	10	Scouring of banks
Channel modification	9	Bridges, weirs
Water abstraction	1	
Inundation	0	
Flow modification	3	Localised
Physical-chemical modification	0	
<b>Riparian PES</b>	<b>72</b>	<b>C</b>

## UO\_EWR04\_R: Upper Kraai

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	6	Irrigation on tributaries
Flow modification	1	
Bed modification	3	Weirs and bridges
Channel modification	3	Weirs, crossings, cattle trampling
Physical-chemical modification	4	Some algae
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	3	Trout
Rubbish dumping	1	
<b>Instream PES</b>	<b>90</b>	<b>A/B</b>
<b>Riparian</b>		
Vegetation removal	2	Trampling
Exotic vegetation	5	Poplars, Salix
Bank erosion	5	Localised on left bank
Channel modification	4	Bridge, river access points
Water abstraction	1	
Inundation	0	
Flow modification	0	
Physical-chemical modification	2	
<b>Riparian PES</b>	<b>90</b>	<b>A/B</b>

## UO\_EWR05\_R: Wonderboomspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	5	Irrigation on some tributaries
Flow modification	3	Small dams in upper catchment
Bed modification	8	Bridges, weirs, low water crossings
Channel modification	7	Brick making, bridge and low water crossings, trampling
Physical-chemical modification	15	Upstream WWTW, evidence of sewage and high algae content
Inundation	4	Downstream weir
Alien macrophytes	2	Limited
Introduced aquatic fauna	4	Carp
Rubbish dumping	7	Some instream litter
<b>Instream PES</b>	<b>70</b>	<b>C</b>
<b>Riparian</b>		
Vegetation removal	11	Cattle grazing and trampling, wood harvesting, developments within buffer zone
Exotic vegetation	9	<i>Eucalyptus globulus</i> (Blue Gums), <i>Salix sp.</i> and Poplar trees on both banks.
Bank erosion	4	Trampling, crossings
Channel modification	7	Brick making, bridge and low water crossings, trampling
Water abstraction	1	
Inundation	0	
Flow modification	1	
Physical-chemical modification	13	Upstream WWTW within riparian zone infrastructure unmaintained and failing, macroplastics
<b>Riparian PES</b>	<b>61</b>	<b>C/D</b>

## UO\_EWR06\_R: Modder (Soetdoring)

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	12	Extensive irrigation in upstream catchments
Flow modification	15	Return flows from numerous WWTW, Rustfontein Dam in upper catchment
Bed modification	13	Armouring along riffle, siltation along inundated zones, weirs, dam, bridge
Channel modification	8	Bridge and weirs altering flow pathways and erosional patterns
Physical-chemical modification		High algae, nutrients
Inundation	15	At reach scale – several weirs and downstream dam
Alien macrophytes	2	
Introduced aquatic fauna	4	Carp and <i>Gambusia affinis</i>
Rubbish dumping	3	
<b>Instream PES</b>	<b>54</b>	<b>D</b>
<b>Riparian</b>		
Vegetation removal	10	Cattle grazing/trampling, cultivation, pivots
Exotic vegetation	11	<i>Salix sp. Eucalyptus sp.</i> , Black Wattle <i>Pyracantha spp.</i> cultivation
Bank erosion	4	Localised erosion near bridge, weirs river access areas
Channel modification	12	Weirs, bridge approach, pump stations
Water abstraction	7	Reduced flows due to weirs for irrigation, exotic vegetation within riparian zone
Inundation	1	
Flow modification	6	Upstream weirs for irrigation
Physical-chemical modification	6	Cultivation, pivots
<b>Riparian PES</b>	<b>58</b>	<b>D</b>

**Field Verification Sites**

UO\_EWR01\_FV: Meulspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	5	Irrigation upstream
Flow modification	15	Loss of baseflows, freshets
Bed modification	9	River crossings, un-natural material – introduced aggregate materials
Channel modification	6	Livestock, railway and road crossings
Physical-chemical modification	10	Algae, sedimentation
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	10	Carp present (habitat modifying)
Rubbish dumping	6	Localised around the roads and at site
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	5	Grazing, firewood harvesting
Exotic vegetation	12	Poplars, willows, honey locust
Bank erosion	12	Downstream of dam – sediment starvation
Channel modification	10	Trampling, river crossings, road approaches to the bridges – cutting and filling
Water abstraction	1	
Inundation	0	
Flow modification	4	Drying out of banks due to long periods of low/ no flows
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>C/D</b>	

## UO\_EWR02\_FV: Witspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	12	Some abstraction for irrigation, domestic use
Flow modification	6	Upstream dam at Van Stadensrus and in tributaries
Bed modification	6	Low water bridge and weirs upstream and downstream
Channel modification	7	Large number of weirs and crossings
Physical-chemical modification	4	Some irrigation return flows, town upstream
Inundation	6	Low water bridge at site
Alien macrophytes	0	
Introduced aquatic fauna	3	Carp present
Rubbish dumping	0	
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	2	
Exotic vegetation	6	Poplars on both banks
Bank erosion	3	
Channel modification	6	Weirs and road crossings
Water abstraction	1	
Inundation	5	Due to number of weirs
Flow modification	2	
Physical-chemical modification	3	
<b>Riparian PES</b>	<b>B</b>	

## UO\_EWR03\_FV: Grysopspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	5	Irrigation in smaller tributaries
Flow modification	8	Number of small dams in tributaries
Bed modification	3	Low water bridge at site
Channel modification	3	
Physical-chemical modification	12	WWTW at Zastron
Inundation	5	During floods due to low water bridge
Alien macrophytes	0	
Introduced aquatic fauna	7	Carp
Rubbish dumping	1	
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	8	Grazing, clearing
Exotic vegetation	4	
Bank erosion	10	Localised trampling, bank collapse, berms and canals
Channel modification	10	
Water abstraction	1	
Inundation	1	
Flow modification	0	
Physical-chemical modification	6	Increased nutrients
<b>Riparian PES</b>	<b>C</b>	

## UO\_EWR04\_FV: Karringmelkspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	1	
Flow modification	1	
Bed modification	2	
Channel modification	2	
Physical-chemical modification	1	
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	14	Trout being introduced
Rubbish dumping	0	
<b>Instream PES</b>	<b>A/B</b>	
<b>Riparian</b>		
Vegetation removal	5	Cattle grazing
Exotic vegetation	3	
Bank erosion	4	Related to very wet period
Channel modification	3	
Water abstraction	0	
Inundation	0	
Flow modification	0	
Physical-chemical modification	0	
<b>Riparian PES</b>	<b>A</b>	

## UO\_EWR05\_FV: Bokspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	8	Irrigation
Flow modification	1	
Bed modification	5	Low water bridges, crossings
Channel modification	7	Cattle drinking and crossings
Physical-chemical modification	3	
Inundation	1	
Alien macrophytes	0	
Introduced aquatic fauna	2	Trout
Rubbish dumping	1	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	3	Trampling
Exotic vegetation	7	Poplar, Salix
Bank erosion	6	Cattle trampling, crossings, sediment input from bank erosion
Channel modification	6	Cattle crossings, low water bridges, berms around irrigated fields
Water abstraction	1	
Inundation	0	
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B</b>	

## UO\_EWR06\_FV: Holspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	12	Irrigation
Flow modification	14	Small dams, large weir upstream with no releases
Bed modification	6	Weirs, crossings
Channel modification	6	Weirs, cattle drinking and crossing, poplars in the channel
Physical-chemical modification	8	Algae
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	5	Carp
Rubbish dumping	0	
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	2	Trampling
Exotic vegetation	15	Poplars, eucalyptus
Bank erosion	7	Cattle trampling, crossings
Channel modification	5	Cattle crossings, weir, low water bridges, exotic vegetation
Water abstraction	5	Weir upstream
Inundation	3	Number of weirs upstream
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>C</b>	

UO\_EWR07\_FV: Sterkspruit (Tributary of the Kraai/Bell)

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	10	Irrigation in upper reaches
Flow modification	2	
Bed modification	5	Weirs, crossings, gabions
Channel modification	7	Weirs, cattle drinking and crossing
Physical-chemical modification	7	Irrigation
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	2	Trout
Rubbish dumping	1	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	5	Trampling, irrigation close to banks
Exotic vegetation	9	Poplar, Salix
Bank erosion	10	Cattle trampling, crossings, destabilisation of banks due to alien vegetation
Channel modification	9	Cattle crossings, low water bridges, berms around irrigated fields, straightening of river
Water abstraction	2	
Inundation	0	
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B/C</b>	

UO\_EWR08\_FV: Bell

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	12	Extensive irrigation in lower reaches
Flow modification	1	
Bed modification	6	Weirs, crossings,
Channel modification	4	Weirs, cattle drinking and crossing
Physical-chemical modification	3	
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	2	Trout
Rubbish dumping	0	
<b>Instream PES</b>	<b>B/C</b>	
<b>Riparian</b>		
Vegetation removal	5	Trampling, Clearing closer to town
Exotic vegetation	7	Poplar, Salix
Bank erosion	9	Cattle trampling, crossings, destabilisation of banks due to alien vegetation
Channel modification	7	Cattle crossings, low water bridges, straightening of river channel due to irrigation
Water abstraction	1	
Inundation	1	
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B</b>	

UO\_EWR09\_FV: Groenspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	4	Irrigation
Flow modification	10	Large dam upstream, small dams on tributaries
Bed modification	7	Weirs, crossings
Channel modification	6	Weirs, cattle drinking and crossings
Physical-chemical modification	10	WWTW at Smithfield
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	4	Carp
Rubbish dumping	3	
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	6	Trampling, over grazing
Exotic vegetation	10	Poplars, eucalyptus
Bank erosion	8	Cattle trampling, crossings
Channel modification	7	Cattle crossings, weir, low water bridges, exotic vegetation
Water abstraction	1	
Inundation	1	
Flow modification	3	
Physical-chemical modification	10	WWTW on banks of river
<b>Riparian PES</b>	<b>C</b>	

## UO\_EWR10\_FV: Skulpspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	7	Irrigation
Flow modification	5	Small dams on tributaries
Bed modification	7	Weirs, crossings, algae, some inundation from downstream weir
Channel modification	3	Weirs, cattle drinking and crossings
Physical-chemical modification	8	Irrigation and dry land cultivation upstream
Inundation	6	Downstream weir
Alien macrophytes	0	
Introduced aquatic fauna	4	Carp
Rubbish dumping	2	
<b>Instream PES</b>	<b>B/C</b>	
<b>Riparian</b>		
Vegetation removal	5	Trampling, cultivation
Exotic vegetation	8	Poplars
Bank erosion	7	Cattle trampling, crossings, gulleys
Channel modification	5	Cattle crossings, weir, low water bridges, weirs
Water abstraction	2	
Inundation	4	Weir downstream
Flow modification	3	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B</b>	

## UO\_EWR11\_FV: Fouriespruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	9	Irrigation, town of Reddersburg
Flow modification	7	Dam and weirs
Bed modification	9	Weirs, crossings
Channel modification	6	Weirs, cattle drinking and crossings
Physical-chemical modification	7	Irrigation and dry land cultivation upstream
Inundation	6	Downstream weir
Alien macrophytes	0	
Introduced aquatic fauna	4	Carp
Rubbish dumping	2	
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	5	Trampling, cultivation
Exotic vegetation	5	Limited along reach
Bank erosion	7	Cattle trampling, crossings, gulleys
Channel modification	7	Cattle crossings, weirs, low water bridges, weirs
Water abstraction	2	
Inundation	8	Weir downstream and in upper reaches
Flow modification	5	Dam and weirs
Physical-chemical modification	3	
<b>Riparian PES</b>	<b>B/C</b>	

UO\_EWR12\_FV: Renoster

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	6	Limited irrigation upstream
Flow modification	10	WWTW return flows
Bed modification	12	Bridges, river access, weirs
Channel modification	6	
Physical-chemical modification	18	WWTW return flows Clear signs of raw sewage input (see photos of foam in Volume 1 report)
Inundation	7	
Alien macrophytes	0	
Introduced aquatic fauna	4	Carp
Rubbish dumping	12	Large amount of rubbish dumping in-stream – plastics, rubble, debris
<b>Instream PES</b>	<b>D</b>	
<b>Riparian</b>		
Vegetation removal	10	
Exotic vegetation	12	Willows, gums, salix, poplar, reeds
Bank erosion	6	
Channel modification	12	Bridges, weirs, river access, trampling, erosion around infrastructure and alien trees
Water abstraction	5	
Inundation	4	
Flow modification	4	
Physical-chemical modification	10	Clear signs of raw sewage input (see photos of foam in Volume 1 report) spreading along the banks
<b>Riparian PES</b>	<b>D</b>	

## UO\_EWR13\_FV: Os-spruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	6	
Flow modification	5	
Bed modification	5	
Channel modification	6	
Physical-chemical modification	7	
Inundation	2	
Alien macrophytes	0	
Introduced aquatic fauna	4	Carp
Rubbish dumping	1	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	3	
Exotic vegetation	8	Honey locust
Bank erosion	7	River crossings, trampling, erosion around bridges
Channel modification	4	
Water abstraction	4	
Inundation	3	
Flow modification	3	
Physical-chemical modification	5	
<b>Riparian PES</b>	<b>B/C</b>	

## UO\_EWR14\_FV: Hondeblaf

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	7	Limited irrigation, abstraction from weir pools and ground water
Flow modification	1	
Bed modification	7	Localised scour around bridges
Channel modification	6	Bridges and localised weirs
Physical-chemical modification	2	Diatoms=B
Inundation	3	Localised weirs
Alien macrophytes	1	
Introduced aquatic fauna	3	Carp
Rubbish dumping	1	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	7	Livestock grazing and trampling, localised firewood collection
Exotic vegetation	3	
Bank erosion	7	Trampling
Channel modification	7	Bridge approaches, livestock crossing points
Water abstraction	1	
Inundation	0	
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B</b>	

UO\_EWR15\_FV: Tributary of Van Zylspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	5	Town and some irrigation
Flow modification	4	
Bed modification	5	Bridge and weir infrastructure and associated siltation and erosion
Channel modification	6	Bridge and weir infrastructure and livestock trampling driving erosion of benches
Physical-chemical modification	8	Close to Trompsburg, WWTW
Inundation	1	
Alien macrophytes	1	
Introduced aquatic fauna	1	Possibly Carp when wet for longer periods
Rubbish dumping	12	Large range of dumping – building material, car tyres and domestic rubbish
<b>Instream PES</b>	<b>B/C</b>	
<b>Riparian</b>		
Vegetation removal	14	Continuous grazing and firewood collection
Exotic vegetation	4	
Bank erosion	10	Erosion around bridges and weirs, trampling, crossing points
Channel modification	7	Bridge and weir infrastructure and livestock trampling
Water abstraction	1	
Inundation	0	
Flow modification	0	
Physical-chemical modification	2	
<b>Riparian PES</b>	<b>C</b>	

UO\_EWR16\_FV: Slykspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	7	Some irrigation in lower reaches
Flow modification	4	
Bed modification	8	Localised gravel mining, river crossings, weirs
Channel modification	6	Gravel mining, erosion at river crossings and weirs
Physical-chemical modification	4	Diatoms=B
Inundation	4	
Alien macrophytes	1	
Introduced aquatic fauna	3	Carp and bass
Rubbish dumping	1	
<b>Instream PES</b>	<b>B/C</b>	
<b>Riparian</b>		
Vegetation removal	9	Grazing, river crossings and gravel mining
Exotic vegetation	8	Salix and Eucalypt species
Bank erosion	4	Livestock trampling
Channel modification	9	Localised changes due to gravel mining, weir construction and river crossings, channel straightening
Water abstraction	2	
Inundation	3	Several weirs downstream
Flow modification	1	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B/C</b>	

## UO\_EWR17\_FV: Langkloofspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	7	Irrigation in upper catchment
Flow modification	1	
Bed modification	3	Localised scour around bridge piers
Channel modification	2	River access
Physical-chemical modification	6	Barkly East WWTW upstream of site
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	1	Trout
Rubbish dumping	9	Car parts, hydro carbons and nappies
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	7	Continuous grazing
Exotic vegetation	1	
Bank erosion	2	
Channel modification	12	Sand mining on flood benches, bridge approach and river access, berms around fields
Water abstraction	0	
Inundation	0	
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B/C</b>	

## UO\_EWR18\_FV: Wasbankspruit

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	8	Irrigation
Flow modification	7	Dams in tributaries
Bed modification	4	Bridge infrastructure and associated changes in erosion and deposition
Channel modification	4	Bridge infrastructure and trampling along lower margin
Physical-chemical modification	5	Irrigation return flows (fields close to river)
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	1	Trout
Rubbish dumping	2	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	9	Grazing and firewood collection
Exotic vegetation	6	Salix species
Bank erosion	15	Trampling, scour related to bridge infrastructure
Channel modification	2	River access, bridge approach
Water abstraction	3	
Inundation	0	
Flow modification	4	
Physical-chemical modification	0	
<b>Riparian PES</b>	<b>C</b>	

UO\_EWR19\_FV: Lower Modder

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	14	Extensive irrigation, dam and many weirs
Flow modification	15	Krugersdrift Dam upstream with releases for irrigation abstraction
Bed modification	10	Numerous weirs, crossings, inundation and siltation
Channel modification	10	Bridges, weirs, pump infrastructure
Physical-chemical modification	11	Irrigation return flows (Diatoms=C)
Inundation	9	Not at site, but numerous weirs in reach inundates the habitats
Alien macrophytes	0	
Introduced aquatic fauna	3	Carp
Rubbish dumping	2	
<b>Instream PES</b>	<b>D</b>	
<b>Riparian</b>		
Vegetation removal	8	Grazing, firewood collection, clearing for pump stations and roads
Exotic vegetation	4	
Bank erosion	10	Trampling, weirs and bridges changing local hydraulics
Channel modification	9	River access, weirs and pump infrastructure
Water abstraction	3	
Inundation	8	Riparian zones inundated due to numerous weirs
Flow modification	6	Not adequate flows, drying/ narrowing of channel
Physical-chemical modification	2	Return flows, moderate Diatom score
<b>Riparian PES</b>	<b>C</b>	

## UO\_EWR20\_FV: Kromellenboog

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	5	Localised irrigation in upper catchment
Flow modification	1	
Bed modification	6	Localised bridge and weirs
Channel modification	3	Localised bridge and weirs
Physical-chemical modification	8	Diatoms=C
Inundation	1	
Alien macrophytes	1	
Introduced aquatic fauna	3	Carp
Rubbish dumping	3	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	8	Grazing
Exotic vegetation	4	Willow trees
Bank erosion	6	Livestock trampling
Channel modification	4	Bridge approaches, and localised weirs
Water abstraction	3	
Inundation	0	
Flow modification	0	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B</b>	

## UO\_EWR21\_FV: Kromellenboog

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	1	Irrigation on upstream tributaries
Flow modification	1	
Bed modification	7	Weirs, bridges, crossings, siltation
Channel modification	6	Bridge approach and cuttings, trampling, flow diversion at weir
Physical-chemical modification	5	Game farming, upstream town and mining
Inundation	4	Weirs along the reach
Alien macrophytes	6	Azolla filiculoides (Red water fern)
Introduced aquatic fauna	4	Expected Carp
Rubbish dumping	0	
<b>Instream PES</b>	<b>B</b>	
<b>Riparian</b>		
Vegetation removal	4	Cattle/wild animal trampling,
Exotic vegetation	3	
Bank erosion	7	Flow diversion at weir and bridge, trampling
Channel modification	4	Bridge and river crossing cuttings
Water abstraction	1	
Inundation	1	
Flow modification	3	
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>B</b>	

UO\_EWR22\_FV: Tele

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	2	
Flow modification	1	
Bed modification	14	Siltation due to catchment degradation
Channel modification	7	Bridge and trampling along river edge
Physical-chemical modification	7	High silt load
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	3	Carp and trout
Rubbish dumping	3	
<b>Instream PES</b>	<b>B/C</b>	
<b>Riparian</b>		
Vegetation removal	12	Continuous grazing and firewood collection
Exotic vegetation	4	Shrubs and weeds
Bank erosion	14	Trampling and gully erosion
Channel modification	4	Berms around fields
Water abstraction	0	
Inundation	0	
Flow modification	0	
Physical-chemical modification	0	
<b>Riparian PES</b>	<b>C</b>	

UO\_EWR23\_FV: Orange River

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	6	Limited in SA
Flow modification	12	Dams in Lesotho impacts on all flow components
Bed modification	15	Sand mining and siltation due to catchment degradation
Channel modification	12	Sand mining
Physical-chemical modification	10	High sediment loads
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	3	Carp
Rubbish dumping	6	Plastics from upstream and littering associated with sand mining
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	11	Continuous grazing and firewood collection
Exotic vegetation	8	Salix species, largely along right bank
Bank erosion	15	Trampling, gully erosion, sand mining
Channel modification	10	Sand mining and road cuttings for mining access
Water abstraction	5	
Inundation	1	
Flow modification	7	Long periods of low flows due to dams upstream
Physical-chemical modification	1	
<b>Riparian PES</b>	<b>D</b>	

## UO\_EWR24\_FV: Maghaleng River

<b>Instream</b>		
<b>Criteria</b>	<b>Score</b>	<b>Rationale</b>
Water abstraction	3	
Flow modification	1	
Bed modification	18	Siltation due to catchment degradation
Channel modification	3	Bridge infrastructure, trampling along lower margin
Physical-chemical modification	10	High suspended load
Inundation	0	
Alien macrophytes	0	
Introduced aquatic fauna	3	Carp
Rubbish dumping	6	Dumping locally and from upstream
<b>Instream PES</b>	<b>C</b>	
<b>Riparian</b>		
Vegetation removal	11	Continuous grazing and firewood collection
Exotic vegetation	12	Salix species and weeds
Bank erosion	12	Trampling, channel widening to accommodate sediment load
Channel modification	9	Erosion associated with river access and bridge approaches
Water abstraction	0	
Inundation	0	
Flow modification	0	
Physical-chemical modification	0	
<b>Riparian PES</b>	<b>D</b>	

## **7. Appendix F: Ecstatus Level 4 models for all EWR sites**

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**Intermediate EWR Sites**

UO\_EWR01\_I: Middle Caledon

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	60.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	3.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	1.00	40.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>9.00</b>	<b>300.00</b>	<b>44.10</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	1.00	40.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	2.00	60.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	3.00	100.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>6.00</b>	<b>200.00</b>	<b>64.60</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>500.00</b>	<b>55.33</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
		<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>		
Confidence rating for <b>fish</b> information	1.00			
Confidence rating for <b>macro-invertebrate</b> information	2.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>3.00</b>	<b>56.55</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
		<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>	
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>		<b>22.60</b>	<b>F</b>	
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
		<b>CONFIDENCE RATING</b>		
Confidence rating for instream biological information	1.61			
Confidence rating for riparian vegetation zone information	3.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>4.61</b>	<b>34.44</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>E</b>		

UO\_EWR02\_I: Sterkspruit

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCON %	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	70.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	3.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	1.00	40.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>9.00</b>	<b>310.00</b>	<b>39.50</b>	<b>D/E</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	3.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	2.00	80.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	1.00	70.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>6.00</b>	<b>250.00</b>	<b>49.41</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>560.00</b>	<b>44.74</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
		<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>		
Confidence rating for <b>fish</b> information	3.00			
Confidence rating for <b>macro-invertebrate</b> information	3.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>6.00</b>	<b>44.60</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
		<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>	
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>		<b>49.90</b>	<b>D</b>	
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
		<b>CONFIDENCE RATING</b>		
Confidence rating for instream biological information	3.00			
Confidence rating for riparian vegetation zone information	3.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>6.00</b>	<b>47.25</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>D</b>		

UO\_EWR03\_I: Upper Orange

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	60.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	4.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	60.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>12.00</b>	<b>320.00</b>	<b>54.00</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	2.00	60.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	80.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	4.00	100.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>9.00</b>	<b>240.00</b>	<b>60.55</b>	<b>C/D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>560.00</b>	<b>57.70</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
		<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>		
Confidence rating for <b>fish</b> information	1.00			
Confidence rating for <b>macro-invertebrate</b> information	2.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>3.00</b>	<b>58.03</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>C/D</b>		
<b>RIPARIAN VEGETATION</b>				
		<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>	
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>45.00</b>		<b>D</b>	
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
		<b>CONFIDENCE RATING</b>		
Confidence rating for instream biological information	1.62			
Confidence rating for riparian vegetation zone information	1.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>2.62</b>	<b>53.05</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>D</b>		

UO\_EWR04\_I: Lower Caledon

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	3.00	65.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	4.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	55.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>13.00</b>	<b>320.00</b>	<b>46.30</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	1.00	70.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	2.00	80.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	3.00	100.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>6.00</b>	<b>250.00</b>	<b>46.00</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>570.00</b>	<b>46.16</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>				
Confidence rating for <b>fish</b> information	2.00			
Confidence rating for <b>macro-invertebrate</b> information	2.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>4.00</b>	<b>46.16</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>50.90</b>	<b>D</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
<b>CONFIDENCE RATING</b>				
Confidence rating for instream biological information	2.00			
Confidence rating for riparian vegetation zone information	2.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>4.00</b>	<b>48.53</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>D</b>		

UO\_EWR05\_I: Seekoei

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	70.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	3.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	1.00	50.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>9.00</b>	<b>320.00</b>	<b>77.40</b>	<b>C</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	2.00	70.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	85.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	4.00	100.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>9.00</b>	<b>255.00</b>	<b>67.20</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>575.00</b>	<b>71.00</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>				
Confidence rating for <b>fish</b> information	3.00			
Confidence rating for <b>macro-invertebrate</b> information	3.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>6.00</b>	<b>71.65</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>C</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>77.70</b>	<b>C</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
<b>CONFIDENCE RATING</b>				
Confidence rating for instream biological information	3.00			
Confidence rating for riparian vegetation zone information	3.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>6.00</b>	<b>74.68</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C</b>		

UO\_EWR06\_I: Upper Riet

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	3.00	65.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	4.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	55.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>13.00</b>	<b>320.00</b>	<b>68.10</b>	<b>C</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	4.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	2.00	70.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	3.00	85.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>9.00</b>	<b>255.00</b>	<b>62.62</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>575.00</b>	<b>65.11</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>				
Confidence rating for <b>fish</b> information	3.00			
Confidence rating for <b>macro-invertebrate</b> information	3.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>6.00</b>	<b>65.23</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>C</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>		<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>	
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>62.30</b>		<b>C</b>	
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
<b>CONFIDENCE RATING</b>				
Confidence rating for instream biological information	3.00			
Confidence rating for riparian vegetation zone information	3.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>6.00</b>	<b>63.77</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C</b>		

UO\_EWR07\_I: Upper Modder

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCON EC %	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	65.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	3.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	1.00	40.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>9.00</b>	<b>305.00</b>	<b>68.60</b>	<b>C</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	3.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	100.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	2.00	60.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>	<b>8.00</b>	<b>260.00</b>	<b>50.03</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>565.00</b>	<b>57.57</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>				
Confidence rating for <b>fish</b> information	3.00			
Confidence rating for <b>macro-invertebrate</b> information	4.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>7.00</b>	<b>57.78</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>				
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>46.40</b>		<b>D</b>	
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
<b>CONFIDENCE RATING</b>				
Confidence rating for instream biological information	3.58			
Confidence rating for riparian vegetation zone information	4.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>7.58</b>	<b>51.78</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>D</b>		

UO\_EWR08\_I: Lower Kraai

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	4.00	70.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	3.00	60.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>73.70</b>	<b>C</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	5.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	85.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	4.00	90.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>			<b>65.37</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>68.65</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	5.00			
Confidence rating for <b>macro-invertebrate</b> information	5.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>			<b>69.09</b>	
<b>INSTREAM ECOLOGICAL CATEOGORY</b>			<b>C</b>	
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>40.60</b>	<b>D/E</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	5.00			
Confidence rating for riparian vegetation zone information	1.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>			<b>64.34</b>	
<b>INTEGRATED ECOSTATUS CATEGORY</b>			<b>C</b>	

UO\_EWR09\_I: Lower Orange

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	3.00	60.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	5.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	5.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	3.00	60.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>	<b>16.00</b>	<b>320.00</b>	<b>80.10</b>	<b>C/B</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	4.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	80.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	2.00	60.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON % )</b>	<b>9.00</b>	<b>240.00</b>	<b>50.35</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>		<b>560.00</b>	<b>65.27</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>				
Confidence rating for <b>fish</b> information	5.00			
Confidence rating for <b>macro-invertebrate</b> information	4.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>	<b>9.00</b>	<b>66.08</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>C</b>		
<b>RIPARIAN VEGETATION</b>				
<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>		<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>77.70</b>	<b>C</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
<b>CONFIDENCE RATING</b>				
Confidence rating for instream biological information	4.53			
Confidence rating for riparian vegetation zone information	4.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>	<b>8.53</b>	<b>71.53</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C</b>		

**Rapid 3 EWR Sites**

UO\_EWR01\_R: Little Caledon

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	100.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	2.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	1.00	60.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	1.00	30.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>50.40</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	5.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	4.00	90.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	3.00	50.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON % )</b>			<b>57.74</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>56.04</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	2.00			
Confidence rating for <b>macro-invertebrate</b> information	4.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>		<b>55.67</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>79.00</b>	<b>C/B</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	3.44			
Confidence rating for riparian vegetation zone information	2.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>		<b>64.25</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C</b>		

UO\_EWR02\_R: Brandwater

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	5.00	100.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	5.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	60.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	30.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>52.80</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	2.00	60.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	80.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	4.00	80.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>			<b>57.12</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>54.92</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	1.00			
Confidence rating for <b>macro-invertebrate</b> information	5.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>		<b>55.66</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>80.00</b>	<b>C/B</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	3.65			
Confidence rating for riparian vegetation zone information	2.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>		<b>64.28</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C</b>		

## UO\_EWR03\_R: Mopeli

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCO	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	4.00	100.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	75.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	40.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>43.00</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	2.00	40.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	70.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	4.00	70.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON % )</b>			<b>55.35</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>49.75</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	1.00			
Confidence rating for <b>macro-invertebrate</b> information	3.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>		<b>51.00</b>		
<b>INSTREAM ECOLOGICAL CATEGOR Y</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>72.00</b>	<b>C</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	2.30			
Confidence rating for riparian vegetation zone information	2.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>		<b>60.78</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C/D</b>		

UO\_EWR04\_R: Upper Kraai

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCON EC %	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	2.00	80.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	3.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	100.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	1.00	50.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>52.80</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	5.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	4.00	90.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	4.00	85.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>			<b>71.56</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>65.99</b>	<b>C</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	2.00			
Confidence rating for <b>macro-invertebrate</b> information	2.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>		<b>64.09</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>C</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	90.00	<b>A/B</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	2.00			
Confidence rating for riparian vegetation zone information	2.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>		<b>77.04</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>C</b>		

UO\_EWR05\_R: Wonderboomspruit

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCON %	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	4.00	100.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	3.00	70.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	40.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>48.70</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	5.00	100.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	3.00	80.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	2.00	50.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>			<b>56.86</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>53.44</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	2.00			
Confidence rating for <b>macro-invertebrate</b> information	2.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>		<b>53.11</b>		
<b>INSTREAM ECOLOGICAL CATEGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	61.00	C/D		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	2.00			
Confidence rating for riparian vegetation zone information	2.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>		<b>57.05</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>D</b>		

UO\_EWR06\_R: Modder (Soetdoring)

INSTREAM BIOTA	IMPORTANCE SCORE	WEIGHT	FRAI/FISHCON & MIRAI/INCON EC %	FRAI/FISHCON & MIRAI/INCON EC
<b>FISH</b>				
1.What is the natural diversity of <b>fish</b> species with different flow requirements	3.00	100.00		
2.What is the natural diversity of <b>fish</b> species with a preference for different cover types	4.00	100.00		
3.What is the natural diversity of <b>fish</b> species with a preference for different flow depth classes	2.00	60.00		
4. What is the natural diversity of <b>fish</b> species with various tolerances to modified water quality	2.00	60.00		
<b>FISH ECOLOGICAL CATEGORY (FRAI/FISHCON %)</b>			<b>57.00</b>	<b>D</b>
<b>AQUATIC INVERTEBRATES</b>				
1. What is the natural diversity of <b>invertebrate</b> biotopes	2.00	50.00		
2. What is the natural diversity of <b>invertebrate</b> taxa with different velocity requirements	4.00	100.00		
3. What is the natural diversity of <b>invertebrate</b> taxa with different tolerances to modified water quality	3.00	80.00		
<b>AQUATIC INVERTEBRATE ECOLOGICAL CATEGORY (MIRAI/INCON %)</b>			<b>55.89</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY (EC AND %): NOT CONFIDENCE RATED, ONLY FISH IN INVERTEBRATE INDICATOR RATINGS FOR WEIGHTING OF FRAI/FISHCON AND MIRAI/INCON CONSIDERED</b>			<b>56.34</b>	<b>D</b>
<b>INSTREAM ECOLOGICAL CATEGORY: CONFIDENCE RATED</b>				
	<b>FRAI/FISHCON &amp; MIRAI/INCON CONFIDENCE RATINGS</b>			
Confidence rating for <b>fish</b> information	3.00			
Confidence rating for <b>macro-invertebrate</b> information	5.00			
<b>INSTREAM ECOLOGICAL CATEGORY (%)</b>		<b>56.32</b>		
<b>INSTREAM ECOLOGICAL CATEOGORY</b>		<b>D</b>		
<b>RIPARIAN VEGETATION</b>				
	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC %</b>	<b>RIPARIAN VEGETATION (VEGRAI/VEGCON) EC</b>		
<b>RIPARIAN VEGETATION ECOLOGICAL CATEGORY</b>	<b>58.00</b>	<b>D</b>		
<b>INTEGRATED (INSTREAM &amp; RIPARIAN VEGETATION) ECOSTATUS</b>				
	<b>CONFIDENCE RATING</b>			
Confidence rating for instream biological information	4.22			
Confidence rating for riparian vegetation zone information	4.00			
<b>INTEGRATED ECOLOGICAL CATEGORY (%)</b>		<b>57.14</b>		
<b>INTEGRATED ECOSTATUS CATEGORY</b>		<b>D</b>		

## 8. Appendix G: Summary of EI-ES re-evaluation

Important to note all areas under the Rapid/Intermediate column (this Study) which are not highlighted in green reflect that criteria whereby there was no available information or obtained data collected to re-evaluate this criterion. Consequently, it was retained as per the DWS (2014).

### Intermediate EWR Sites

UO\_EWR01\_I: Middle Caledon

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	High	Using updated land cover and vegetation layers
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Moderate	High	recruitment/services to a largely infested riparian zone
HABITAT DIVERSITY CLASS	Low	Low	<ul style="list-style-type: none"> <li>Limited biotopes</li> <li>Excessive sediment deposition and erosion</li> <li>Steep banks and uniform channel</li> <li>Limited marginal vegetation</li> <li>Undercut banks</li> <li>Extensive exotic riparian vegetation</li> </ul>
HABITAT SIZE (LENGTH) CLASS	Moderate	Moderate	
INSTREAM MIGRATION LINK CLASS	Very high	Moderate	from mainstem Orange River Some upstream movement from dam refuge areas
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Low	<ul style="list-style-type: none"> <li>Excessive exotic vegetation encroachment</li> <li>Cattle trampling and grazing</li> <li>Excessive erosion</li> <li>Macroplastics along riparian zone</li> </ul>
INSTREAM HABITAT INTEGRITY CLASS	High	Moderate	<ul style="list-style-type: none"> <li>Limited biotopes (natural for reach)</li> <li>Localised gravel mining</li> <li>Abstraction (irrigation)</li> </ul>
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>	assessed (rarity & representivity)
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>INTERMEDIATE</b>	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate	
FISH NO-FLOW SENSITIVITY	High	Moderate	tolerant to no-flow conditions, but will move upstream for breeding purposes during high-flow
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	High	Moderate	unmodified physico-chemical conditions Notonemouridae absent 0/4 taxa recorded with a moderate requirement for
INVERTS VELOCITY SENSITIVITY	High	Low	<ul style="list-style-type: none"> <li>2/5 taxa recorded with a preference for very fast with Trichorythidae, Notonemouridae and Elmidae absent</li> <li>1/3 taxa with a preference for moderately fast</li> </ul>
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Low	Few indigenous species, with limited marginal vegetation
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Low	
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>	

UO\_EWR02\_I: Sterkspruit

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	Low	Low	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	Low	<ul style="list-style-type: none"> <li>• High transformation from surrounding Sterkspruit town, intensive sand mining, cultivation, livestock, exotic vegetation, WWTWs, etc</li> </ul>
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Moderate	Relatively good grassy vegetation improving buffering capacity of the riparian system in context of surrounding land use
HABITAT DIVERSITY CLASS	Low	Moderate	<ul style="list-style-type: none"> <li>• Diversity of instream biotopes, although bedrock driven and limited marginal vegetation</li> <li>• Alien invasive vegetation encroachment (upstream)</li> <li>• Relatively good grassy vegetation improving buffering capacity of the riparian system</li> </ul>
HABITAT SIZE (LENGTH) CLASS	Low	Low	
INSTREAM MIGRATION LINK CLASS	Very high	Moderate	<ul style="list-style-type: none"> <li>• Water quality (including sediment runoff) likely to impact importance of reach as a migratory link</li> </ul>
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Moderate	Patches of good marginal vegetation with some reasonable herbaceous vegetation at the site, with increased infestations upstream
INSTREAM HABITAT INTEGRITY CLASS	High	Moderate	<ul style="list-style-type: none"> <li>• High turbidity (recent rainfall events)</li> <li>• Algae smothering stonese biotope (nutrients WWTW, Sterkfontein town)</li> <li>• Strong bedrock component</li> </ul>
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>	
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>INTERMEDIATE</b>	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate	
FISH NO-FLOW SENSITIVITY	High	Moderate	<ul style="list-style-type: none"> <li>• Seasonal movement of BAEN, LCAP and CGAR expected (limited due to water quality impairment), but ASCL absent</li> </ul>
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	Moderate	<ul style="list-style-type: none"> <li>• 2/5 taxa recorded with high requirement for unmodified physico-chemical conditions with Hydropsychidae &gt;2spp (froc5), Heptageniidae, Helolidae (froc3) absent.</li> <li>• 3/13 taxa recorded with moderate requirements for unmodified physico-chemical conditions, and with most absent taxon with froc 3,4.</li> </ul>
INVERTS VELOCITY SENSITIVITY	Very high	Moderate	<ul style="list-style-type: none"> <li>• 3/5 taxa recorded with preference for very fast flowing water with Hydropsychidae 2spp recorded not &gt;2spp (froc 5), Elmidae and Hydraenidae (froc 3,4) absent</li> <li>• 2/9 taxa recorded with preference for moderately fast flowing water, with absent taxa either having a froc 3,4, 5 (Leptophlebiidae).</li> </ul>
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Very Low	Moderate	<ul style="list-style-type: none"> <li>• Sedges along marginal zone and herbaceous lower banks require seasonal inundation to be sustained.</li> </ul>
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	High	High	
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>Moderate</b>	<ul style="list-style-type: none"> <li>• System driven by poor water quality, thus eliminating those physico-chemical sensitive biota.</li> <li>• In-stream sand mining impacting instream biotopes - knock on effect on sensitive biota</li> </ul>

UO\_EWR03\_I: Upper Orange

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	Moderate	• Fair amount of croplands and pivots along the river reach with high infestation in the riparian zones
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Low	
HABITAT DIVERSITY CLASS	Moderate	Low	• Poor habitat availability - wide, deep homogenous alluvial system
HABITAT SIZE (LENGTH) CLASS	Moderate	Moderate	
INSTREAM MIGRATION LINK CLASS	Very high	Very high	for fish from lower elevations (Gariep Dam) into Lesotho
RIPARIAN-WETLAND ZONE MIGRATION LINK	Very high	Very high	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Low	Banks are infested by exotic trees
INSTREAM HABITAT INTEGRITY CLASS	Moderate	Low	<ul style="list-style-type: none"> <li>• High sediment loads</li> <li>• Steep highly erodable banks - removal of inset benches</li> <li>• Sand mining</li> <li>• Water quality modification as it is located downstream of Lesotho border with the class</li> </ul>
FINAL ECOLOGICAL IMPORTANCE FOR SITE	High	Moderate	Limited riparian and instream habitat
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>INTERMEDIATE</b>	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	High	Moderate	<ul style="list-style-type: none"> <li>• Low FROC of sensitive BKIM</li> <li>• Majority of species present only moderately sensitive to water quality impairment</li> </ul>
FISH NO-FLOW SENSITIVITY	High	High	
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	Moderate	<ul style="list-style-type: none"> <li>• no taxa recorded with high requirement for unmodified physico-chemical conditions</li> <li>• no taxa recorded with moderate requirements for unmodified physico-</li> </ul>
INVERTS VELOCITY SENSITIVITY	Very high	Moderate	<ul style="list-style-type: none"> <li>• 1/3 taxa recorded with preference for very fast flowing water with Hydropsychidae 2 spp, Elmidae, Hydraenidae absent.</li> <li>• no taxa recorded with preference for</li> </ul>
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Low	marginal vegetation and steep banks directly down into a wide active channel
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Low	
FINAL ECOLOGICAL SENSITIVITY FOR SITE	High	Moderate	limited habitat availability <ul style="list-style-type: none"> <li>• Riparian vegetation intolerance to water level changes</li> </ul>

UO\_EWR04\_I: Lower Caledon

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Moderate	Low	<ul style="list-style-type: none"> <li>Intensive agriculture upstream and downstream of the site</li> </ul>
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Very Low	Low	<ul style="list-style-type: none"> <li>Provides some buffering to the river from surrounding land uses as well as bank stabilisation</li> </ul>
HABITAT DIVERSITY CLASS	Low	Moderate	<ul style="list-style-type: none"> <li>Moderate habitat availability, although limited marginal vegetation and the stones biotope is artificial from the historical construction of the bridge (isolated to this site - thus not representative of the reach)</li> <li>Various flow depth velocity fish classes</li> </ul>
HABITAT SIZE (LENGTH) CLASS	Low	Low	
INSTREAM MIGRATION LINK CLASS	High	Moderate	located between Welbedacht Dam (upstream) and Gariep Dam (downstream). Fish will nevertheless still move upstream during high flow periods.
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	Very high	High	Good indigenous cover with some exotics and bank erosion
INSTREAM HABITAT INTEGRITY CLASS	High	Moderate	<ul style="list-style-type: none"> <li>Impacts of upstream water use (irrigation, domestic)</li> <li>Excessive sedimentation - channel modification</li> <li>Welbedacht Dam upstream of the site and the transfer from Caledon to Modder system at Knellpoort Dam</li> </ul>
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>High</b>	<b>Moderate</b>	
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>INTERMEDIATE</b>	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	High	Moderate	<ul style="list-style-type: none"> <li>Low FROC (if any) of sensitive BKIM</li> <li>Majority of species present only moderately sensitive to water quality impairment</li> </ul>
FISH NO-FLOW SENSITIVITY	High	High	<ul style="list-style-type: none"> <li>BAEN and LCAP present at high FROC</li> </ul>
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High	<ul style="list-style-type: none"> <li>no taxa recorded with high requirement for unmodified physico-chemical conditions</li> <li>1/8 taxa recorded with moderate requirements for unmodified physico-chemical conditions. although Trichorythidae that was recorded is not part of the</li> </ul>
INVERTS VELOCITY SENSITIVITY	Very high	High	<ul style="list-style-type: none"> <li>3/4 taxa recorded with preference for very fast flowing water with Trichorythidae (not part of the reference conditions, owing to artificial SIC biotope - positive impact)</li> <li>no taxa recorded with preference for moderately fast</li> </ul>
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	High	Moderate	<ul style="list-style-type: none"> <li>Incised system - marginal vegetation may be affected by changes in flow/water levels</li> </ul>
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Low	
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>Moderate</b>	<ul style="list-style-type: none"> <li>Riparian vegetation intolerance to water level changes</li> </ul>

UO\_EWR05\_I: Seekoei

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Very high	High	<ul style="list-style-type: none"> <li>• Generally high, but with some dryland agriculture at the site</li> </ul>
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Moderate	<ul style="list-style-type: none"> <li>• Reasonable diversity of riparian plants and provides important supporting functions</li> </ul>
HABITAT DIVERSITY CLASS	Very Low	Low	<ul style="list-style-type: none"> <li>• Moderate habitat availability. Although instream habitat is dominated by bedrock (not a good biotope for macroinvertebrates), GSM and marginal vegetation and aquatic macrophytes. All flow-depth velocity fish classes were present</li> </ul>
HABITAT SIZE (LENGTH) CLASS	Very Low	Very Low	
INSTREAM MIGRATION LINK CLASS	Moderate	Low	<ul style="list-style-type: none"> <li>• Many movement barriers (weirs) present throughout the reach</li> <li>• Water abstraction limits flow cues within lower reaches</li> </ul>
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	High	
INSTREAM HABITAT INTEGRITY CLASS	High	Low	<ul style="list-style-type: none"> <li>• Large weirs just upstream of the site - flow and channel modification</li> <li>• Several weirs downstream - inundation - flow-bed modification</li> <li>• Nutrients entering system - high volumes of filamentous algae smothering bedrock, aquatic macrophytes</li> </ul>
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>	
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>INTERMEDIATE</b>	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate	
FISH NO-FLOW SENSITIVITY	High	Moderate	<ul style="list-style-type: none"> <li>• BAEN &amp; LCAP present</li> <li>• System flows already severely impacted, with no-flow conditions common (fish take refuge in pooled water behind weirs)</li> </ul>
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High	<ul style="list-style-type: none"> <li>• Only Baetidae &gt; 2 spp recorded with high requirement for unmodified physico-chemical conditions</li> <li>• 2/9 taxa recorded with moderate requirements for unmodified physico-chemical conditions - Absent taxa with froc 3,4.</li> </ul>
INVERTS VELOCITY SENSITIVITY	Very high	Very high	<ul style="list-style-type: none"> <li>• 3/5 taxa recorded with preference for very fast flowing water with Trichorythidae and Elmidae absent.</li> <li>• 3/6 taxa recorded with preference for moderately fast flowing water Ashnidae, Libellulidae, Leptophlebiidae absent.</li> </ul>
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	Very Low	Very Low	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate	
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Low	
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>	

UO\_EWR06\_I: Upper Riet

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Very high	High	• Generally high, but with some pivots and degraded veld with dongas
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Moderate	Moderate	
HABITAT DIVERSITY CLASS	Low	High	• A diversity of biotopes present for macroinvertebrates (although SIC are highly embedded) and flow-depth velocity classes for fish
HABITAT SIZE (LENGTH) CLASS	Low	Low	
INSTREAM MIGRATION LINK CLASS	High	Low	• Weir upstream and downstream of site limits upstream movement of fish species • Some fish species present still requiring local migration during times of flow
RIPARIAN-WETLAND ZONE MIGRATION LINK	Very high	Very high	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	High	
INSTREAM HABITAT INTEGRITY CLASS	Very high	Moderate	• Extensive water use (cultivation, irrigation) resulting in water quality impairments, flow modification • Small dams in upper reaches - channel and flow modification • Weirs up and downstream of site - flow modification & inundation
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>High</b>	<b>High</b>	
ES METRIC	DESKTOP	INTERMEDIATE	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate	
FISH NO-FLOW SENSITIVITY	High	Moderate	• BAEN & LCAP present • System flows already severely impacted, with no-flow conditions common (fish take refuge in pooled water behind weirs)
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High	• 1/4 taxa recorded - Baetidae >2spp and Hydropsychidae >2spp absent • 3/9 taxa recorded with moderate requirements for unmodified physico-chemical conditions - Hydracarina, Trichorythidae, Ashnidae, Elmidae absent
INVERTS VELOCITY SENSITIVITY	Very high	High	• 3/5 taxa recorded with preference for very fast flowing water with Hydropsychidae >2spp, Trichorythidae, Elmidae absent. • 3/7 taxa recorded with preference for moderately fast flowing water Libellulidae, Ashnidae absent (froc 3)
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate	
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Moderate	
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>	• Small system thus sensitive to flow/water level changes

UO\_EWR07\_I: Upper Modder

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Very high	High	• Old croplands with degraded veld with dongas, and the N8 national road
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Very Low	Low	• Provides some buffering to the river from surrounding degraded lands
HABITAT DIVERSITY CLASS	Very Low	Low	• Moderate habitat availability, although limited marginal vegetation, bedrock driven and the stones biotope is artificial from the historical construction of the bridge/railways. All flow-depth velocity fish habitat classes available • Scoured and undercut banks, armoured
HABITAT SIZE (LENGTH) CLASS	Very Low	Very Low	
INSTREAM MIGRATION LINK CLASS	High	Low	• Large weir just upstream of the site present that severely limits fish movement within the reach • Water quality (raw sewage) also limits suitability of reach for migration
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	Moderate	Moderate	
INSTREAM HABITAT INTEGRITY CLASS	Moderate	Low	• Large weir just upstream of the site resulting in inundation upstream and a plunge pool before flowing into a narrow channel • Extensive water use - flow modification and water quality impacts • Dams on mainstem • Raw sewage inputs (Klein Modder - trib of main stem Modder River) • WWTWs from Bloemfontein and surrounding areas discharges into upstream tributaries - very poor water quality
FINAL ECOLOGICAL IMPORTANCE FOR SITE	Moderate	Low	• Instream habitat integrity class, habitat diversity low owing to bedrock driven, overall poor water quality (raw sewage)
ES METRIC	DESKTOP	INTERMEDIATE	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	High	Moderate	• All species present moderately tolerant or tolerant to water quality impairment
FISH NO-FLOW SENSITIVITY	High	Moderate	• BAEN & LCAP present in reduced FROC
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High	• 1/2 taxa recorded - Hydropsychidae >2spp (froc5) absent. • 1/ taxa recorded with moderate requirements for unmodified physico-chemical conditions - Ecnomidae recorded although not part of reference list. Atyidae, Hydracarina (froc4). Trichorythidae, Ashnidae, Elmidae (froc3) all absent.
INVERTS VELOCITY SENSITIVITY	Very high	High	• 2/5 taxa recorded with preference for very fast flowing water with Hydropsychidae >2spp (Froc5), Trichorythidae and elmidae (froc 3) absent. AND 0/5 taxa recorded with preference for moderately fast flowing water Turbellaria (froc5), Ashnidae (foc3), Libellulidae and Ancyliidae (Froc4) absent.
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Very Low	Moderate	• Flood bench requires inundation to sustain herbaceous plant communities
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Moderate	• Small system thus sensitive to flow/water level changes
FINAL ECOLOGICAL SENSITIVITY FOR SITE	High	Moderate	• Major water quality impairment - reduced biota (sensitive to water quality)

UO\_EWR08\_I: Lower Kraai

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	Moderate	Surrounding grasslands with extensive dongas, croplands and pivots along the river
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Moderate	Riparian areas largely indigenous and provides some buffering from surrounding land use and land degradation impacts
HABITAT DIVERSITY CLASS	Low	Moderate	<ul style="list-style-type: none"> <li>Overall good diversity of instream biotopes for biota, upstream of the low water bridge there was good marginal vegetation (but instream habitats inundated), downstream of the weir, limited marginal vegetation owing to undercut banks and vegetation die back/erosion, alluvial mounds with grasses/sedges</li> </ul>
HABITAT SIZE (LENGTH) CLASS	Low	Low	
INSTREAM MIGRATION LINK CLASS	High	Very high	<ul style="list-style-type: none"> <li>Important migratory link (listed as migratory corridor in NFEPA). Despite presence of weir, fish still able to migrate during high flows</li> </ul>
RIPARIAN-WETLAND ZONE MIGRATION LINK	Very high	Very high	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Moderate	<ul style="list-style-type: none"> <li>Reasonable riparian habitat with exotic trees and exposed banks understorey, but otherwise good herbaceous vegetation</li> </ul>
INSTREAM HABITAT INTEGRITY CLASS	High	Moderate	<ul style="list-style-type: none"> <li>Inundation along the reach</li> <li>Nutrient input - algae smothering of stones biotope</li> </ul>
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>High</b>	<b>High</b>	
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>INTERMEDIATE</b>	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	High	High	
FISH NO-FLOW SENSITIVITY	High	High	<ul style="list-style-type: none"> <li>four species considered moderately intolerant to no-flow present/likely present, with flow important for migration to upstream reaches</li> </ul>
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High	<ul style="list-style-type: none"> <li>2/5 taxa recorded with high requirement for unmodified physico-chemical conditions Hydropsychidae &gt;2spp (froc5) and Oligoneuridae (froc3) absent.</li> <li>6 out of 11 taxa recorded with moderate requirements for unmodified physico-chemical conditions, Lestidae, Cordullidae (froc5), Atyidae (froc4) and Hydraenidae, Elmidae, Chlorocyphidae (froc3) absent.</li> </ul>
INVERTS VELOCITY SENSITIVITY	Very high	Very high	<ul style="list-style-type: none"> <li>4/6 taxa recorded with preference for very fast flowing water with Hydropsychidae &gt;2spp (froc4)a absent, although 2spp only were recorded. Oligoneuridae and Hydraenidae (froc3) absent.</li> <li>4/7 taxa recorded with preference for moderately fast flowing water, Ancylidae (froc4) and Turbellaria (froc3) absent.</li> </ul>
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate	
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	High	High	<ul style="list-style-type: none"> <li>Sensitive system to changes. i.e. The Kraai River is bringing good water quality downstream to the ORange (dilution effect), compared to the impaired water quality in the upper reaches of the Orange.</li> <li>Critical habitat (although isolated at this site) just downstream of the the water bridge - should avoid drying up as this critical habitat is colonised by flow and habitat sensitive biota</li> <li>Water levels critical for a fish migratory perspective during high-flow periods.</li> </ul>
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>High</b>	

UO\_EWR09\_I: Lower Orange

EI METRIC	DESKTOP (2014)	INTERMEDIATE	Motivation
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	Very Low	Very Low	
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	Moderate	• Large areas of extensive cropland and pivots
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	High	Moderate	• No known species of conservation concern, but provides important functions to support river health
HABITAT DIVERSITY CLASS	Moderate	Moderate	
HABITAT SIZE (LENGTH) CLASS	Low	Low	
INSTREAM MIGRATION LINK CLASS	High	Low	• Weir at Marksdrift creates movement barrier to fish migrating upstream from below the Orange-Vaall confluence.
RIPARIAN-WETLAND ZONE MIGRATION LINK	Moderate	Moderate	
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	High	
INSTREAM HABITAT INTEGRITY CLASS	High	High	• Retained at high although this site has been modified substantially owing to the past 2 years of very high flows and flooding event (positive impact and re-setting the system)
FINAL ECOLOGICAL IMPORTANCE FOR SITE	High	Moderate	• Instream migration link class has reduced owing to Marksdrift weir - impacting on migratory routes which is NB along this lower reach. Loss in connectivity.
ES METRIC	DESKTOP	INTERMEDIATE	
<b>FISH</b>			
FISH PHYS-CHEMICAL SENSITIVITY	High	High	• BKIM present at site • Majority of assemblage regarded as tolerant or moderately tolerant to water quality impairment
FISH NO-FLOW SENSITIVITY	High	High	• BKIM, BAEN & LCAP confirmed present, with ASCL having a reduced FROC
<b>INVERTS</b>			
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High	• Recent hydropeaks and high flows - 0 taxa recorded - Both Baetidae >2spp and Hydropsychidae >2spp (froc5) and Heptageniidae (froc4) absent. • 3/11 taxa recorded with moderate requirements for unmodified physico-chemical conditions - taxa present with froc 3 absent.
INVERTS VELOCITY SENSITIVITY	Very high	High	• 1/8 taxa recorded with preference for very fast flowing water with Trichorythidae (roc3), Simuliidae (froc5) (owing to the system being re-set from the floods - positive), Hydropsychidae >2spp (Froc5) absent • 2/7 taxa recorded with preference for moderately fast flowing water Turbellaria, Ashnidae, Libellulidae (froc3), Heptageniidae (froc4) absent.
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>			
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	Very Low	Very Low	
<b>RIPARIAN-WETLAND VEGETATION</b>			
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Low	Moderate	• Flood benches need some inundation and floods to maintain riparian communities
<b>STREAM SIZE</b>			
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Low	• Large system and thus not sensitive to flow/water level changes
FINAL ECOLOGICAL SENSITIVITY FOR SITE	Moderate	Moderate	

**Rapid 3 EWR Sites**

UO\_EWR01\_R: Little Caledon

<b>EI METRIC</b>	<b>DESKTOP (2014)</b>	<b>RAPID</b>
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Very high	Very high
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	High	High
HABITAT DIVERSITY CLASS	Moderate	High
HABITAT SIZE (LENGTH) CLASS	High	High
INSTREAM MIGRATION LINK CLASS	High	Moderate
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Moderate
INSTREAM HABITAT INTEGRITY CLASS	Very high	High
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>High</b>	<b>High</b>
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>RAPID</b>
<b>FISH</b>		
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Low
FISH NO-FLOW SENSITIVITY	High	Moderate
<b>INVERTS</b>		
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	Low
INVERTS VELOCITY SENSITIVITY	Very high	High
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>		
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High
<b>RIPARIAN-WETLAND VEGETATION</b>		
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate
<b>STREAM SIZE</b>		
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	High	High
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>High</b>

UO\_EWR02\_R: Brandwater

<b>EI METRIC</b>	<b>DESKTOP (2014)</b>	<b>RAPID</b>
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Very high	Very high
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Moderate	Moderate
HABITAT DIVERSITY CLASS	Low	Low
HABITAT SIZE (LENGTH) CLASS	High	High
INSTREAM MIGRATION LINK CLASS	High	Moderate
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	High
INSTREAM HABITAT INTEGRITY CLASS	Very high	Moderate
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>High</b>	<b>High</b>
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>RAPID</b>
<b>FISH</b>		
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate
FISH NO-FLOW SENSITIVITY	High	Moderate
<b>INVERTS</b>		
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	Low
INVERTS VELOCITY SENSITIVITY	Very high	Moderate
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>		
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High
<b>RIPARIAN-WETLAND VEGETATION</b>		
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate
<b>STREAM SIZE</b>		
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	High	Moderate
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>Moderate</b>

UO\_EWR03\_R: Mopeli

<b>EI METRIC</b>	<b>DESKTOP (2014)</b>	<b>RAPID</b>
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	High
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Low
HABITAT DIVERSITY CLASS	Low	Low
HABITAT SIZE (LENGTH) CLASS	Low	Low
INSTREAM MIGRATION LINK CLASS	High	Moderate
RIPARIAN-WETLAND ZONE MIGRATION LINK	Moderate	Moderate
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Moderate
INSTREAM HABITAT INTEGRITY CLASS	High	Moderate
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>RAPID</b>
<b>FISH</b>		
FISH PHYS-CHEMICAL SENSITIVITY	High	Moderate
FISH NO-FLOW SENSITIVITY	High	Moderate
<b>INVERTS</b>		
INVERT PHYS-CHEMICAL SENSITIVITY	Moderate	Low
INVERTS VELOCITY SENSITIVITY	High	Moderate
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>		
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High
<b>RIPARIAN-WETLAND VEGETATION</b>		
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Low	Low
<b>STREAM SIZE</b>		
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Low
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>

UO\_EWR04\_R: Upper Kraai

<b>EI METRIC</b>	<b>DESKTOP (2014)</b>	<b>RAPID</b>
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	Very high	Very high
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Moderate	Moderate
HABITAT DIVERSITY CLASS	Very Low	Low
HABITAT SIZE (LENGTH) CLASS	Very Low	Very Low
INSTREAM MIGRATION LINK CLASS	Very high	Very high
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Very high
INSTREAM HABITAT INTEGRITY CLASS	High	Very high
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>Moderate</b>	<b>High</b>
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>RAPID</b>
<b>FISH</b>		
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate
FISH NO-FLOW SENSITIVITY	High	High
<b>INVERTS</b>		
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	High
INVERTS VELOCITY SENSITIVITY	Very high	High
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>		
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High
<b>RIPARIAN-WETLAND VEGETATION</b>		
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate
<b>STREAM SIZE</b>		
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	High	High
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>High</b>

UO\_EWR05\_R: Wonderboomspruit

<b>EI METRIC</b>	<b>DESKTOP (2014)</b>	<b>RAPID</b>
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	Low	Low
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	High
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Low
HABITAT DIVERSITY CLASS	Very Low	High
HABITAT SIZE (LENGTH) CLASS	Very Low	Very Low
INSTREAM MIGRATION LINK CLASS	Very high	Low
RIPARIAN-WETLAND ZONE MIGRATION LINK	High	High
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	High	Moderate
INSTREAM HABITAT INTEGRITY CLASS	High	Moderate
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>RAPID</b>
<b>FISH</b>		
FISH PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate
FISH NO-FLOW SENSITIVITY	High	Moderate
<b>INVERTS</b>		
INVERT PHYS-CHEMICAL SENSITIVITY	Moderate	Moderate
INVERTS VELOCITY SENSITIVITY	High	Moderate
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>		
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	Low	Low
<b>RIPARIAN-WETLAND VEGETATION</b>		
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate
<b>STREAM SIZE</b>		
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Moderate
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>Moderate</b>	<b>Moderate</b>

UO\_EWR06\_R: Modder (Soetdoring)

<b>EI METRIC</b>	<b>DESKTOP (2014)</b>	<b>RAPID</b>
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH)	High	High
RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	High	High
RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	Low	Low
HABITAT DIVERSITY CLASS	Very Low	Very Low
HABITAT SIZE (LENGTH) CLASS	Moderate	Moderate
INSTREAM MIGRATION LINK CLASS	Low	Low
RIPARIAN-WETLAND ZONE MIGRATION LINK	Moderate	Moderate
RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	Very high	Moderate
INSTREAM HABITAT INTEGRITY CLASS	Moderate	Low
<b>FINAL ECOLOGICAL IMPORTANCE FOR SITE</b>	<b>High</b>	<b>Moderate</b>
<b>ES METRIC</b>	<b>DESKTOP</b>	<b>RAPID</b>
<b>FISH</b>		
FISH PHYS-CHEMICAL SENSITIVITY	High	Moderate
FISH NO-FLOW SENSITIVITY	High	Low
<b>INVERTS</b>		
INVERT PHYS-CHEMICAL SENSITIVITY	Very high	Moderate
INVERTS VELOCITY SENSITIVITY	Very high	Low
<b>RIPARIAN-WETLAND VERTEBRATES (NON-FISH)</b>		
RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE TO WATER LEVEL/FLOW CHANGES	High	High
<b>RIPARIAN-WETLAND VEGETATION</b>		
RIPARIAN-WETLAND VEGETATION INTOLERANCE TO WATER LEVEL CHANGES	Moderate	Moderate
<b>STREAM SIZE</b>		
STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES	Low	Moderate
<b>FINAL ECOLOGICAL SENSITIVITY FOR SITE</b>	<b>High</b>	<b>Moderate</b>

## 9. Appendix H: GAI models

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*Please refer to the excel spreadsheets as per Chapter 1.*

## 10. Appendix I: HAI models

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*Please refer to the excel spreadsheets as per Chapter 1.*