



**Environmental Forensics Report of Analysis**  
**Project 20230105**

**Report #:** 1594  
**Date Issued:** 06-Apr-2023  
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**Client Project Reference: Menindee Fish Kill 4**

Customer: External Companies

Attention: [REDACTED]

Report Date: 06 April 2023

Project Received: 30 March 2023

EF Project Contact: [REDACTED]



The following samples were analysed:

Sample ID	Client ID	Sample Type	Client Sampled Date/Time	Aliquot
232068	DO SITE 2	Liquid	30/03/2023 7:20AM	
232073	DO SITE 2	Liquid	30/03/2023 7:20AM	Field Aliquot
232074	DO SITE 2	Liquid	30/03/2023 7:20AM	Field Aliquot
232075	DO SITE 2	Liquid	30/03/2023 7:20AM	Laboratory Aliquot
232076	DO SITE 2	Liquid	30/03/2023 7:20AM	Field Aliquot
232069	DO SITE 3	Liquid	30/03/2023 8:12AM	
232077	DO SITE 3	Liquid	30/03/2023 8:12AM	Field Aliquot
232078	DO SITE 3	Liquid	30/03/2023 8:12AM	Field Aliquot
232079	DO SITE 3	Liquid	30/03/2023 8:12AM	Laboratory Aliquot
232080	DO SITE 3	Liquid	30/03/2023 8:12AM	Field Aliquot
232070	DO SITE 4	Liquid	30/03/2023 8:35AM	
232081	DO SITE 4	Liquid	30/03/2023 8:35AM	Field Aliquot
232082	DO SITE 4	Liquid	30/03/2023 8:35AM	Field Aliquot
232083	DO SITE 4	Liquid	30/03/2023 8:35AM	Laboratory Aliquot
232084	DO SITE 4	Liquid	30/03/2023 8:35AM	Field Aliquot
232071	DO SITE 6	Liquid	30/03/2023 8:58AM	
232085	DO SITE 6	Liquid	30/03/2023 8:58AM	Field Aliquot
232086	DO SITE 6	Liquid	30/03/2023 8:58AM	Field Aliquot
232087	DO SITE 6	Liquid	30/03/2023 8:58AM	Laboratory Aliquot
232088	DO SITE 6	Liquid	30/03/2023 8:58AM	Field Aliquot
232072	DO SITE 7	Liquid	30/03/2023 9:17AM	
232089	DO SITE 7	Liquid	30/03/2023 9:17AM	Field Aliquot
232090	DO SITE 7	Liquid	30/03/2023 9:17AM	Field Aliquot
232091	DO SITE 7	Liquid	30/03/2023 9:17AM	Laboratory Aliquot
232092	DO SITE 7	Liquid	30/03/2023 9:17AM	Field Aliquot

Tests not covered by NATA accreditation 3040 are denoted with \*

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



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## Report Notes

- This document has been authorised by the person whose name appears in this report.
- This report shall not be reproduced except in full. Samples analysed as received from the client.
- Results reported as 'less than' (<) indicates a result below the practical quantitation limit for the sample matrix and method used.
- Solid samples are reported on a dry weight basis and biota samples are reported on an as received basis unless specified otherwise.

## Project Comments

·Samples 232079, 232083, 232087, 232091, 232075 were sent to Sydney Water Corporation (NATA Accreditation no: 63) for the analysis of MA70CENTI (Algal Cell Count) MA70CENTI (Algal Enumeration) MA70CENTI (Algal Identification). Samples 232073, 232077, 232081, 232085, 232089 were sent to Sydney Water Corporation (NATA Accreditation no: 610) for the analysis of TC0061DWI (ASP DSP Lipophilic Shellfish Toxin) TC0049DWI (Algal Toxins). This report summarises data from the attached external report: 282169, dated 03/04/2023.

·Samples 232074, 232078, 232082, 232086, 232090 were sent to ALS Environmental Laboratory (NATA Accreditation no: 825) for the analysis of EK055G: Ammonia as N by Discrete Analyser, EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser, EK061G: Total Kjeldahl Nitrogen By Discrete Analyser, EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser, EK067G: Total Phosphorus as P by Discrete Analyser, EK071G: Reactive Phosphorus as P by discrete analyser. This report summarises data from the attached external report: ES2310773, dated 04-Apr-2023.



Analysis Results - External Methods*		Sample ID	232075	232079	232083	232087	232091
Area - EXTERNAL		Start Date	3/04/2023	3/04/2023	3/04/2023	3/04/2023	3/04/2023
		Client ID	DO SITE 2	DO SITE 3	DO SITE 4	DO SITE 6	DO SITE 7
Analyte							
Algal Cell Count	-		RC	RC	RC	RC	RC
Algal Enumeration	-		RC	RC	RC	RC	RC
Algal Identification	-		RC	RC	RC	RC	RC

Analysis Results - External Methods*		Sample ID	232074	232078	232082	232086	232090
Area - EXTERNAL		Start Date	31/03/2023	31/03/2023	31/03/2023	31/03/2023	31/03/2023
		Client ID	DO SITE 2	DO SITE 3	DO SITE 4	DO SITE 6	DO SITE 7
Analyte							
Ammonia as N	mg/L		<0.01	0.07	0.10	0.04	0.04
Nitrite+Nitrate as N	mg/L		0.01	0.04	0.08	0.11	0.14
Reactive Phosphorus as P	mg/L		0.02	0.02	0.03	0.14	0.14
Total Kjeldahl Nitrogen as N	mg/L		1.4	2.0	2.3	1.8	1.7
Total Nitrogen as N	mg/L		1.4	2.0	2.4	1.9	1.8
Total Phosphorus as P	mg/L		0.15	0.22	0.26	0.34	0.34

Analysis Results - External Methods*		Sample ID	232073	232077	232081	232085	232089
Area - EXTERNAL		Start Date	3/04/2023	3/04/2023	3/04/2023	3/04/2023	3/04/2023
		Client ID	DO SITE 2	DO SITE 3	DO SITE 4	DO SITE 6	DO SITE 7
Analyte							
Algal Toxins	-		RC	RC	RC	RC	RC
ASP DSP Lipophilic Shellfish Toxin	-		RC	RC	RC	RC	RC

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**Analysis Results - ICVAASW**  
**Area - INORGANIC**

		Sample ID	232076	232080	232084	232088	232092
		Start Date	4/04/2023	4/04/2023	4/04/2023	4/04/2023	4/04/2023
		Client ID	DO SITE 2	DO SITE 3	DO SITE 4	DO SITE 6	DO SITE 7
Analyte							
Mercury	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

**Analysis Results - ICPAES**  
**Area - INORGANIC**

		Sample ID	232076	232080	232084	232088	232092
		Start Date	30/03/2023	30/03/2023	30/03/2023	30/03/2023	30/03/2023
		Client ID	DO SITE 2	DO SITE 3	DO SITE 4	DO SITE 6	DO SITE 7
Analyte							
Aluminium (Lab. filtered)	mg/L		<0.04	<0.04	<0.04	<0.04	<0.04
Barium (Lab. filtered)	mg/L		0.12	0.12	0.11	0.10	0.10
Boron (Lab. filtered)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Calcium (Lab. filtered)	mg/L		35	34	33	31	30
Iron (Lab. filtered)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium (Lab. filtered)	mg/L		16	16	15	14	13
Potassium (Lab. filtered)	mg/L		12	12	12	11	11
Sodium (Lab. filtered)	mg/L		43	44	42	37	37
Strontium (Lab. filtered)	mg/L		0.39	0.39	0.38	0.33	0.33
Sulfur (Lab. filtered)	mg/L		3.1	3.1	2.9	3.2	3.1
Titanium (Lab. filtered)	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

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**Analysis Results - ICPMS**  
**Area - INORGANIC**

Analyte	Sample ID Start Date Client ID	232076	232080	232084	232088	232092
		31/03/2023 DO SITE 2	31/03/2023 DO SITE 3	31/03/2023 DO SITE 4	31/03/2023 DO SITE 6	31/03/2023 DO SITE 7
Antimony (Lab. filtered)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (Lab. filtered)	mg/L	0.003	0.003	0.003	0.005	0.005
Beryllium (Lab. filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium (Lab. filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (Lab. filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Lab. filtered)	mg/L	0.0002	0.0003	0.0002	0.0002	0.0002
Copper (Lab. filtered)	mg/L	0.0011	0.0007	0.0009	0.0018	0.0018
Lead (Lab. filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium (Lab. filtered)	mg/L	0.0019	0.0020	0.0019	0.0017	0.0017
Manganese (Lab. filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Lab. filtered)	mg/L	0.0006	0.0007	0.0007	0.0006	0.0006
Nickel (Lab. filtered)	mg/L	0.0031	0.0032	0.0035	0.0028	0.0029
Selenium (Lab. filtered)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Silver (Lab. filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium (Lab. filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin (Lab. filtered)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Vanadium (Lab. filtered)	mg/L	0.0058	0.0049	0.0070	0.014	0.014
Zinc (Lab. filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

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**Analysis Results - ICPAES**  
**Area - INORGANIC**

Sample ID	232076	232080	232084	232088	232092
Start Date	30/03/2023	30/03/2023	30/03/2023	30/03/2023	30/03/2023
Client ID	DO SITE 2	DO SITE 3	DO SITE 4	DO SITE 6	DO SITE 7

Analyte		232076	232080	232084	232088	232092
Aluminium (acid extractable)	mg/L	2.0	2.2	2.7	3.9	4.1
Barium (acid extractable)	mg/L	0.14	0.15	0.15	0.13	0.13
Boron (acid extractable)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Calcium (acid extractable)	mg/L	35	35	35	32	32
Iron (acid extractable)	mg/L	2.0	2.2	2.7	3.9	4.1
Magnesium (acid extractable)	mg/L	17	17	17	15	15
Manganese (acid extractable)	mg/L	0.17	0.16	0.12	0.10	0.11
Potassium (acid extractable)	mg/L	12	13	13	12	12
Sodium (acid extractable)	mg/L	43	45	43	37	37
Strontium (acid extractable)	mg/L	0.40	0.41	0.40	0.35	0.35
Sulfur (acid extractable)	mg/L	3.1	3.1	3.0	3.2	3.2
Titanium (acid extractable)	mg/L	0.03	0.04	0.04	0.05	0.05

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Analysis Results - ICPMS  
Area - INORGANIC

Analyte	Sample ID Start Date Client ID	232076	232080	232084	232088	232092
		31/03/2023 DO SITE 2	31/03/2023 DO SITE 3	31/03/2023 DO SITE 4	31/03/2023 DO SITE 6	31/03/2023 DO SITE 7
Antimony (acid extractable)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (acid extractable)	mg/L	0.003	0.003	0.004	0.005	0.005
Beryllium (acid extractable)	mg/L	0.0001	0.0001	0.0001	0.0002	0.0002
Cadmium (acid extractable)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (acid extractable)	mg/L	0.003	0.003	0.003	0.005	0.005
Cobalt (acid extractable)	mg/L	0.0019	0.0020	0.0018	0.0019	0.0019
Copper (acid extractable)	mg/L	0.0031	0.0030	0.0033	0.0049	0.0050
Lead (acid extractable)	mg/L	0.0012	0.0014	0.0015	0.0016	0.0018
Lithium (acid extractable)	mg/L	0.0025	0.0027	0.0029	0.0031	0.0032
Molybdenum (acid extractable)	mg/L	0.0015	0.0016	0.0015	0.0013	0.0012
Nickel (acid extractable)	mg/L	0.0054	0.0055	0.0059	0.0062	0.0065
Selenium (acid extractable)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Silver (acid extractable)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium (acid extractable)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin (acid extractable)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Vanadium (acid extractable)	mg/L	0.012	0.013	0.016	0.022	0.023
Zinc (acid extractable)	mg/L	0.005	0.005	0.007	0.008	0.009

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**Analysis Results - QQPEST**  
**Area - ORGANIC**

Analyte	Sample ID Start Date Client ID	232068	232069	232070	232071	232072
		31/03/2023 DO SITE 2	31/03/2023 DO SITE 3	31/03/2023 DO SITE 4	31/03/2023 DO SITE 6	31/03/2023 DO SITE 7
Aldrin	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Allethrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Alpha-Chlordane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
alpha-HCH	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Ametryn	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Atraton	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Atrazine	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-HCH	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bifenthrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bioresmethrin	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Carbophenothion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Cis-permethrin	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Crotoxypfos	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Cyfluthrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Cypermethrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
delta-HCH	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Deltamethrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorvos	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Dieldrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan II	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan I	µg/L	<0.9	<0.9	<0.9	<0.9	<0.9
Endosulfan Sulfate	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Endrin Aldehyde	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin Ketone	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4

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**Analysis Results - QQPEST**

**Area - ORGANIC**

Analyte	Sample ID Start Date Client ID	232068	232069	232070	232071	232072
		31/03/2023 DO SITE 2	31/03/2023 DO SITE 3	31/03/2023 DO SITE 4	31/03/2023 DO SITE 6	31/03/2023 DO SITE 7
Fenvalerate	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Gamma-Chlordane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
gamma-HCH	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Heptachlor Epoxide	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Hexachlorobenzene	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Hexazinone	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
L-cyhalothrin	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Malathion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methidathion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Azinphos	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Methyl Chlorpyrifos	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Methyl Parathion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Mevinphos	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Oxyfluorfen	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Phorate	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Profenofos	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Prometon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Prometryn	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Propargite	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Propazine	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Propetamphos	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Simazine	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Simetryn	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Sulprofos	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Tebuconazole	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Tebuthiuron	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Terbutylazine	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Terbutryn	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachlorvinphos	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-permethrin	µg/L	<0.7	<0.7	<0.7	<0.7	<0.7

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**Area - ORGANIC**

Sample ID	Client ID	Method	Start Date	Result
232068	DO SITE 2	OLCSCAN* - LC/MS Scan	31/03/2023	LC/MS scan for approximately 600 pesticides was negative. A list of analysed compounds can be provided on request. Note the list doesn't include glyphosate and quaternary ammonium herbicides (e.g. Paraquat and Diquat).
232069	DO SITE 3	OLCSCAN* - LC/MS Scan	31/03/2023	LC/MS scan for approximately 600 pesticides was negative. A list of analysed compounds can be provided on request. Note the list doesn't include glyphosate and quaternary ammonium herbicides (e.g. Paraquat and Diquat).
232070	DO SITE 4	OLCSCAN* - LC/MS Scan	31/03/2023	LC/MS scan for approximately 600 pesticides was negative. A list of analysed compounds can be provided on request. Note the list doesn't include glyphosate and quaternary ammonium herbicides (e.g. Paraquat and Diquat).
232071	DO SITE 6	OLCSCAN* - LC/MS Scan	31/03/2023	LC/MS scan for approximately 600 pesticides was negative. A list of analysed compounds can be provided on request. Note the list doesn't include glyphosate and quaternary ammonium herbicides (e.g. Paraquat and Diquat).
232072	DO SITE 7	OLCSCAN* - LC/MS Scan	31/03/2023	LC/MS scan for approximately 600 pesticides was negative. A list of analysed compounds can be provided on request. Note the list doesn't include glyphosate and quaternary ammonium herbicides (e.g. Paraquat and Diquat).

**The sample(s) referred to in this report were analysed by the following method(s):**

Method code	Method description	Area
External Methods*	External Methods - Analysis completed externally	EXTERNAL
External Methods*	External Methods - Analysis completed externally	EXTERNAL
External Methods*	External Methods - Analysis completed externally	EXTERNAL
ICVAASW	Mercury by Cold Vapour Atomic Absorption Spectroscopy	INORGANIC
ICPAES	Dissolved element analysis by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICPAES)	INORGANIC
ICPMS	Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	INORGANIC
ICPAES	Acid extractable element analysis by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICPAES)	INORGANIC
ICPMS	Acid extractable Metals by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	INORGANIC
QQQPEST	Determination of Multiresidue Pesticides by GCMSMS	ORGANIC
OLCSCAN*	Qualitative LC/MS scan	ORGANIC

**The results in this report were authorised by:**

Name	Title	Area
	Senior Scientist	EXTERNAL
	Scientist	INORGANIC
	Scientist	ORGANIC

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