



Environmental Forensics Report of Analysis
Project 20230102

Report #: 1593
Date Issued: 06-Apr-2023
Page 1 of 10

Client Project Reference: Menindee Fish Kill 2

Customer: Department of Primary Industries

Attention: [REDACTED]

Report Date: 06 April 2023

Project Received: 29 March 2023

EF Project Contact: [REDACTED]
[REDACTED]
[REDACTED]



The following samples were analysed:

Sample ID	Client ID	Sample Type	Client Sampled Date/Time	Aliquot	Client Description	Sample Note
232012	1	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232013	2	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232014	3	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232015	4	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232016	5	Biota	28/03/2023 1:04PM		Location: Pooncarie Cafe	
232093	GI Tract - Sample 1	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir GI Tract	
232094	Liver - Sample 1	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir Liver	
232095	Gills - Sample 1	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232096	GI Tract - Sample 2	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir GI Tract	
232097	Liver - Sample 2	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir (no liver sample)	
232098	Gills - Sample 2	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232099	GI Tract - Sample 3	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir GI Tract	
232100	Liver - Sample 3	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir Liver	
232101	Gills - Sample 3	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232102	GI Tract - Sample 4	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir GI Tract	
232103	Liver - Sample 4	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir Liver	
232104	Gills - Sample 4	Biota	28/03/2023 12:40PM		Location: 100m downstream of Pooncarie Weir	
232105	GI Tract - Sample 5	Biota	28/03/2023 12:40PM		Location: Pooncarie Cafe GI Tract	
232106	Liver - Sample 5	Biota	28/03/2023 12:40PM		Location: Pooncarie Cafe Liver	
232107	Gills - Sample 5	Biota	28/03/2023 12:40PM		Location: Pooncarie Cafe	
232110	Composite - Gills samples 2, 3	Biota	28/03/2023 12:40PM		232098, 232101	

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



Project: 20230102
Report #: 1593
Date Issued: 06-Apr-2023
Page 3 of 10

232111 Composite - GI Tract Biota 28/03/2023 12:40PM 232096, 232099
samples 2, 3

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.

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: **SN** = Sample Note

RN = Result Note

RC = Project Comment



Analysis Results - ICVAASW

Area - INORGANIC

Analyte	Sample ID	Start Date	Client ID	232093	232095	232102	232104	232105	232107	232110	232111
				GI Tract - Sample 1	Gills - Sample 1	GI Tract - Sample 4	Gills - Sample 4	GI Tract - Sample 5	Gills - Sample 5	Composite - Gills	Composite - GI Tract
Mercury	µg/kg (as received)	44	23	51	27	44	36	32	55		

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



Analysis Results - ICPAES
Area - INORGANIC

Analyte	Sample ID Start Date Client ID	232093	232095	232102	232104	232105	232107	232110	232111
		31/03/2023 GI Tract - Sample 1	31/03/2023 Gills - Sample 1	31/03/2023 GI Tract - Sample 4	31/03/2023 Gills - Sample 4	31/03/2023 GI Tract - Sample 5	31/03/2023 Gills - Sample 5	31/03/2023 Composite - Gills	31/03/2023 Composite - GI Tract
Aluminium (acid extractable)*	mg/kg (as received)	<4	120	16	1700	<4	110	490	10
Antimony (acid extractable)*	mg/kg (as received)	<2	<2	<2	<2	<2	<2	<2	<1
Arsenic (acid extractable)*	mg/kg (as received)	<3	<3	<3	<3	<3	<3	<3	<3
Barium (acid extractable)*	mg/kg (as received)	<1	10	<1	18	<1	10	13	<1
Beryllium (acid extractable)*	mg/kg (as received)	<1	<1	<1	<1	<1	<1	<1	<1
Boron (acid extractable)*	mg/kg (as received)	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium (acid extractable)*	mg/kg (as received)	<1	<1	<1	<1	<1	<1	<1	<1
Calcium (acid extractable)*	mg/kg (as received)	100	29000	100	27000	73	27000	25000	510
Chromium (acid extractable)*	mg/kg (as received)	<1	<1	<1	3	<1	<1	<1	<1
Cobalt (acid extractable)*	mg/kg (as received)	<1	<1	<1	<1	<1	<1	<1	<1
Copper (acid extractable)*	mg/kg (as received)	<3	<3	<3	<3	<3	<3	<3	<3
Iron (acid extractable)*	mg/kg (as received)	36	120	37	1800	20	120	510	31
Lead (acid extractable)*	mg/kg (as received)	<2	<2	<2	<2	<2	<2	<2	<2
Lithium (acid extractable)*	mg/kg (as received)	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium (acid extractable)*	mg/kg (as received)	110	630	110	970	79	640	670	150
Manganese (acid extractable)*	mg/kg (as received)	<2	5	<2	38	<2	7	28	<2
Molybdenum (acid extractable)*	mg/kg (as received)	<1	<1	<1	<1	<1	<1	<1	<1
Nickel (acid extractable)*	mg/kg (as received)	<2	<2	<2	<2	<2	<2	<2	<2
Phosphorus (acid extractable)*	mg/kg (as received)	1500	14000	1200	13000	1100	14000	13000	1200
Potassium (acid extractable)*	mg/kg (as received)	2100	1400	1800	1800	1400	1500	1200	1200
Selenium (acid extractable)*	mg/kg (as received)	<4	<4	<4	<4	<4	<4	<4	<4
Silver (acid extractable)*	mg/kg (as received)	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Sodium (acid extractable)*	mg/kg (as received)	1200	1500	940	990	780	1500	950	590
Strontium (acid extractable)*	mg/kg (as received)	<3	110	<3	110	<3	92	92	<3
Sulfur (acid extractable)*	mg/kg (as received)	1700	1500	1600	1500	1100	1500	1400	1600
Thallium (acid extractable)*	mg/kg (as received)	<2	<2	<2	<2	<2	<2	<2	<2
Tin (acid extractable)*	mg/kg (as received)	<2	<2	<2	<2	<2	<2	<2	<2
Titanium (acid extractable)*	mg/kg (as received)	<1	2	<1	22	<1	2	8	<1
Vanadium (acid extractable)*	mg/kg (as received)	<1	<1	<1	5	<1	<1	2	<1
Zinc (acid extractable)*	mg/kg (as received)	15	23	14	28	10	21	28	15

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



Analysis Results - QQPEST
Area - ORGANIC

Analyte	Sample ID Start Date Client ID	232093	232095	232102	232104	232105	232107	232110	232111
		31/03/2022 GI Tract - Sample 1	31/03/2022 Gills - Sample 1	31/03/2022 GI Tract - Sample 4	31/03/2022 Gills - Sample 4	31/03/2022 GI Tract - Sample 5	31/03/2022 Gills - Sample 5	31/03/2022 Composite - Gills	31/03/2022 Composite - GI Tract
Aldrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Allethrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Alpha-Chlordane	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
alpha-HCH	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Ametryn	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Atraton	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Atrazine	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
beta-HCH	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Bifenthrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Carbophenothion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Chlorpyrifos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Cis-permethrin*	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Crotoxyphos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Cyfluthrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Cypermethrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
DDD-p,p'	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
DDE-p,p'	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
DDT-p,p'	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
delta-HCH	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Deltamethrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Diazinon	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Dichlorvos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Dieldrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Dimethoate	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Endosulfan II	µg/kg	<100	<100	<100	<110	<100	<100	<100	<100
Endosulfan I	µg/kg	<100	<100	<100	<110	<100	<100	<100	<100
Endosulfan Sulfate	µg/kg	<100	<100	<100	<110	<100	<100	<100	<100
Endrin Ketone	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Endrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Enthion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Fenamiphos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Fenitrothion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



Analysis Results - QQPEST
Area - ORGANIC

Analyte	Sample ID Start Date Client ID	232093	232095	232102	232104	232105	232107	232110	232111
		31/03/2022 GI Tract - Sample 1	31/03/2022 Gills - Sample 1	31/03/2022 GI Tract - Sample 4	31/03/2022 Gills - Sample 4	31/03/2022 GI Tract - Sample 5	31/03/2022 Gills - Sample 5	31/03/2022 Composite - Gills	31/03/2022 Composite - GI Tract
Fenthion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Fenvalerate	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Gamma-Chlordane	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
gamma-HCH	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Heptachlor Epoxide	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Heptachlor	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Hexachlorobenzene	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Hexazinone	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
L-cyhalothrin	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Malathion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Methodathion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Methoxychlor, p,p'	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Methyl Chlorpyrifos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Methyl Parathion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Mevinphos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Oxyfluorfen	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Parathion	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Phorate	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Profenofos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Prometon	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Prometryn	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Propargite	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Propazine	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Propetamphos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Simazine	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Simetryn	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Tebuconazole	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Terbutylazine	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Terbutryn	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Tetrachlorvinphos	µg/kg	<50	<50	<50	<55	<50	<50	<50	<50
Trans-permethrin	µg/kg	<100	<100	<100	<110	<100	<100	<100	<100

Sample ID Client ID Method Start Date Result

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



Area - ORGANIC

232093	GI Tract - Sample 1	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).
232095	Gills - Sample 1	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).
232102	GI Tract - Sample 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).
232104	Gills - Sample 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).
232105	GI Tract - Sample 5	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).
232107	Gills - Sample 5	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).
232110	Composite - Gills samples 2, 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).
232111	Composite - GI Tract samples 2, 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).

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



Area - OTHER

Sample ID	Client ID	Method	Start Date	Result
232096	GI Tract - Sample 2	COMPOSITE* - Composite	31/03/2023	Sample 232096 was combined with sample 232099 to form the composite sample 232111.
232098	Gills - Sample 2	COMPOSITE* - Composite	31/03/2023	Sample 232098 was combined with sample 232101 to form the composite sample 232110.
232099	GI Tract - Sample 3	COMPOSITE* - Composite	31/03/2023	Sample 232099 was combined with sample 232096 to form the composite sample 232111.
232101	Gills - Sample 3	COMPOSITE* - Composite	31/03/2023	Sample 232101 was combined with sample 232098 to form the composite sample 232110.
232012	1	Dissection* - Dissection	31/03/2023	Sample 232012 was dissected and the organs isolated. The GIT, liver and gills were assigned sample numbers 232093, 232094 and 232095 respectively.
232013	2	Dissection* - Dissection	31/03/2023	Sample 232013 was dissected and the organs isolated. The GIT, liver and gills were assigned sample numbers 232096, 232097 and 232098 respectively.
232014	3	Dissection* - Dissection	31/03/2023	Sample 232014 was dissected and the organs isolated. The GIT, liver and gills were assigned sample numbers 232099, 232100 and 232101 respectively.
232015	4	Dissection* - Dissection	31/03/2023	Sample 232015 was dissected and the organs isolated. The GIT, liver and gills were assigned sample numbers 232102, 232103 and 232104 respectively.
232016	5	Dissection* - Dissection	31/03/2023	Sample 232016 was dissected and the organs isolated. The GIT, liver and gills were assigned sample numbers 232105, 232106 and 232107 respectively.
232094	Liver - Sample 1	Hold* - Hold	30/03/2023	Sample is on hold for analysis if required.
232097	Liver - Sample 2	Hold* - Hold	30/03/2023	Sample is on hold for analysis if required.
232100	Liver - Sample 3	Hold* - Hold	30/03/2023	Sample is on hold for analysis if required.
232103	Liver - Sample 4	Hold* - Hold	30/03/2023	Sample is on hold for analysis if required.
232106	Liver - Sample 5	Hold* - Hold	30/03/2023	Sample is on hold for analysis if required.

Tests not covered by NATA accreditation 3040 are denoted with *

Codes: SN = Sample Note

RN = Result Note

RC = Project Comment



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

<i>Method code</i>	<i>Method description</i>	<i>Area</i>
ICVAASW	Mercury by Cold Vapour Atomic Absorption Spectroscopy	INORGANIC
ICPAES	Acid extractable element analysis by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICPAES)	INORGANIC
QQQPEST	Determination of Multiresidue Pesticides by GCMSMS	ORGANIC
OLSCAN*	Qualitative LC/MS scan	ORGANIC
COMPOSITE*	Composite samples	OTHER
Dissection*	Dissection	OTHER
Hold*	Sample held pending further requests for analysis	OTHER

The results in this report were authorised by:

<i>Name</i>	<i>Title</i>	<i>Area</i>
	Scientist	INORGANIC
	Scientist	ORGANIC
	Senior Scientist	OTHER