

Regulatory Statement

Water Quality Investigation Elsy Creek



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Acknowledgement of country

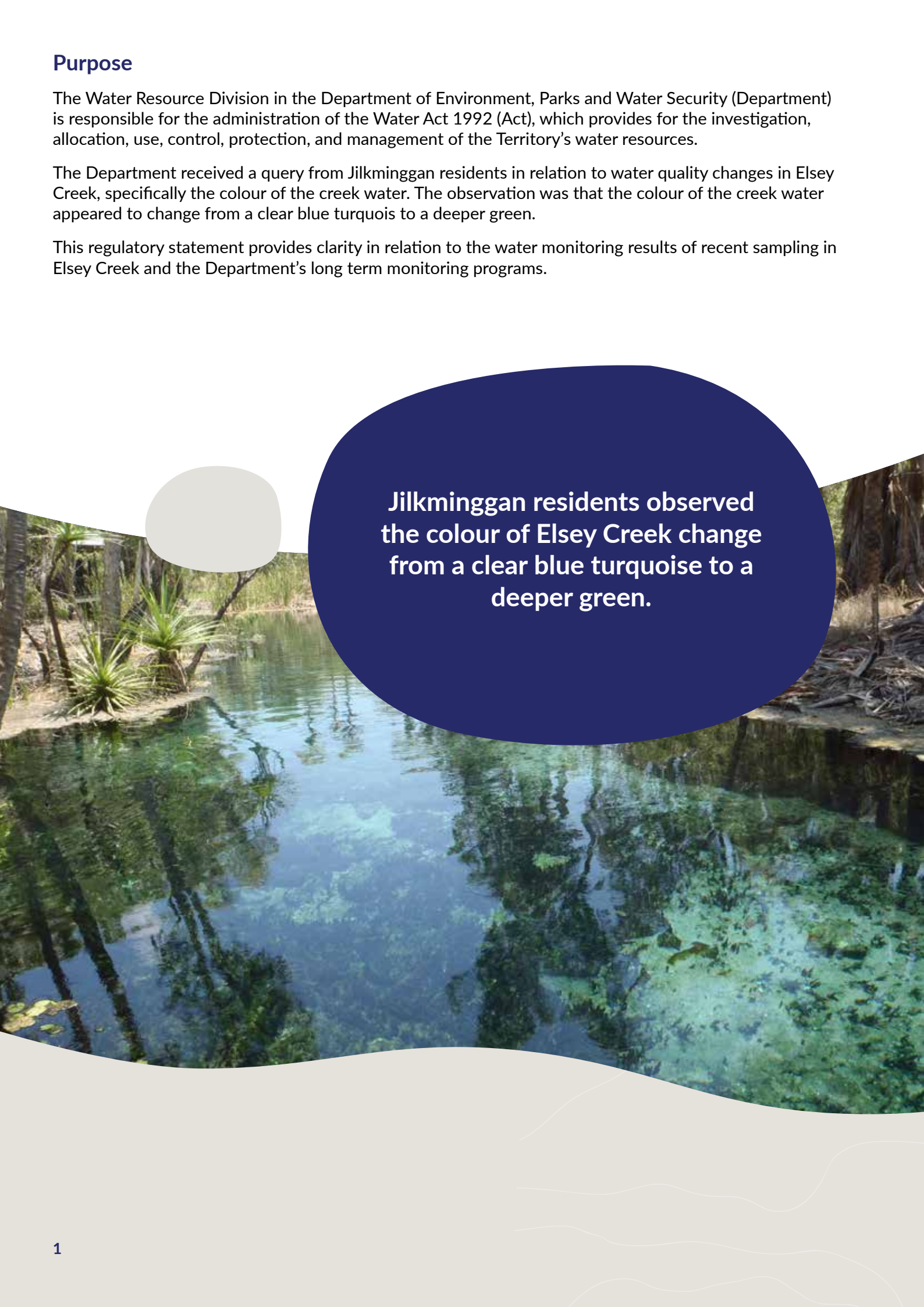
The Northern Territory Government respectfully acknowledges the First Nations people of this country and recognises their continuing connection to their lands, waters and communities. We pay our respect to Aboriginal and Torres Strait Islander cultures, and to their leaders past, present and emerging.

Purpose

The Water Resource Division in the Department of Environment, Parks and Water Security (Department) is responsible for the administration of the Water Act 1992 (Act), which provides for the investigation, allocation, use, control, protection, and management of the Territory's water resources.

The Department received a query from Jilkminggan residents in relation to water quality changes in Eley Creek, specifically the colour of the creek water. The observation was that the colour of the creek water appeared to change from a clear blue turquoise to a deeper green.

This regulatory statement provides clarity in relation to the water monitoring results of recent sampling in Eley Creek and the Department's long term monitoring programs.



Jilkminggan residents observed the colour of Eley Creek change from a clear blue turquoise to a deeper green.

Water quality monitoring

The Department delivers a continuous monitoring program to manage the water resources in the Mataranka area, including Elsey Creek.

The monitoring includes both discrete and time-series data from 31 groundwater monitoring bores and 22 surface water gauging sites across the Roper River catchment. In addition to groundwater levels and river flows, annual water quality monitoring is undertaken during the dry season at selected sites across the monitoring network.

The Department attended Elsey Creek with Jilkminggan residents on the 19 June 2024 to investigate the changes and collect water quality samples. Routine water monitoring is undertaken at the Elsey Creek investigation site (G9035193), which is upstream the confluence with the Roper River and water quality monitoring commenced in 2018.

As part of the investigation, four surface water sites were sampled a (refer to figure 1):

- Elsey Creek upstream of Roper River confluence: the investigation site.
- Elsey Creek upstream of Roper Highway (Punchbowl): approximately 9 km upstream of the investigation site.
- Buffalo Creek upstream of Roper Highway: Buffalo Creek is a small wetland area situated on the Roper Highway adjacent to the Punchbowl, and sampled at the request of residents.
- Rainbow Springs: sampled for comparative purposes.

Water quality sampling was undertaken in accordance with the Division's standard operating procedures with in-situ measurements recorded on the day. Water samples collected were sent to various laboratories to provide a comprehensive analysis of the microbiological, algal, chemistry, nutrients, total metals, and pesticides.

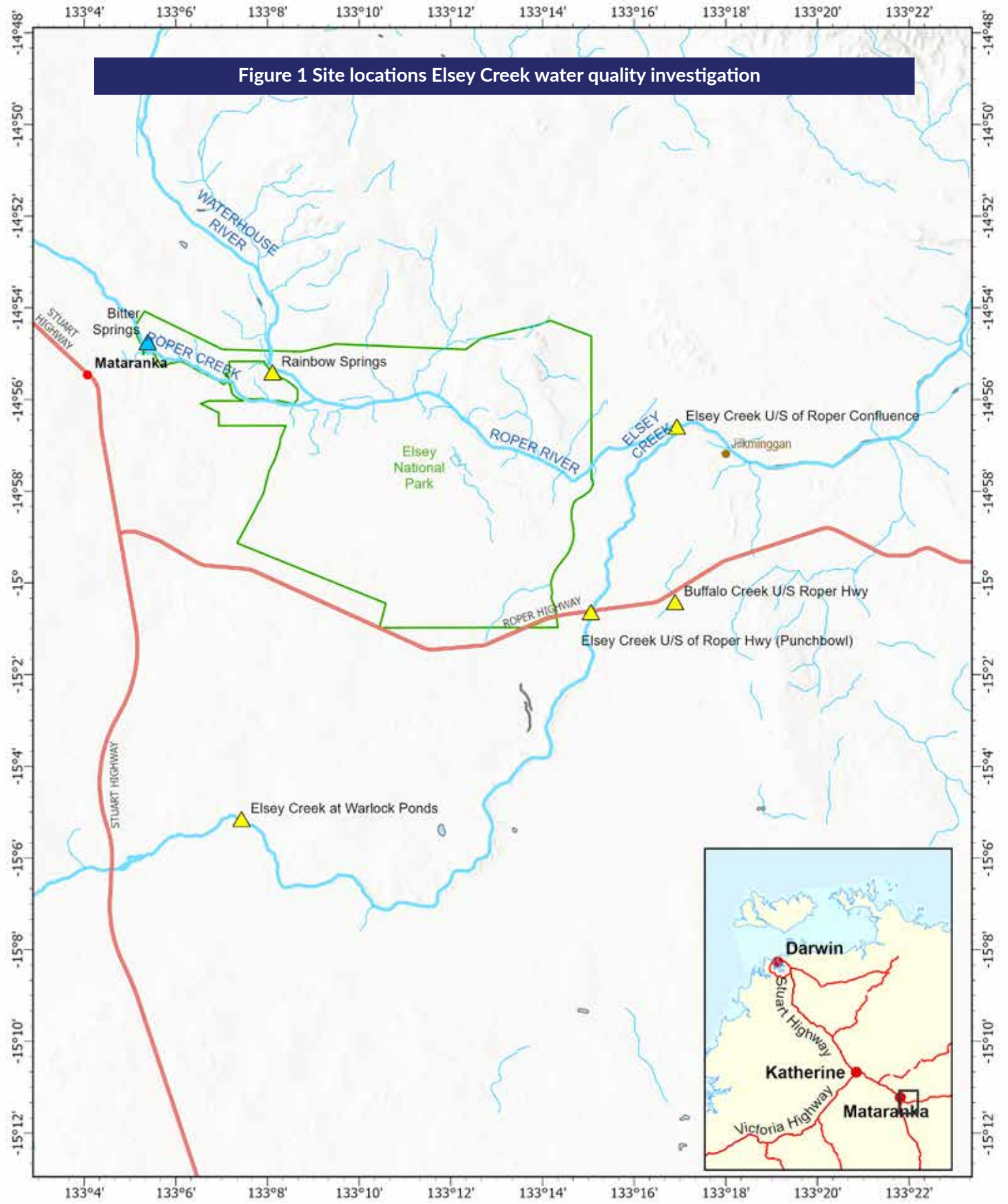
Routine water monitoring is undertaken at the Elsey Creek investigation site.



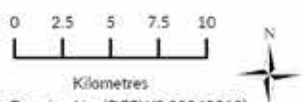
Table 1 Overview of water quality samples per site

Location ID	Site	In-situ	Micro/Bacto	Chemistry	Pesticides	Metals	Nutrients	Algal	Organic Carbon
G9035193	Elsey Crk u/s Roper River	✓	✓	✓	✓	✓	✓	✓	✓
G9035200	Elsey Crk u/s Punchbowl	✓	✓	✓	✓	✓	✓	✓	
No ID #	Buffalo Crk u/s Roper Hwy	✓	✓	✓	✓	✓	✓	✓	
G9035092	Rainbow Springs		✓	✓	✓	✓	✓	✓	

Figure 1 Site locations Elsey Creek water quality investigation



**Elsey Creek
Water Quality Investigation**



Drawing No: [DEPWS 20240813]
 Map compiled: 14/08/2024
 Data Source:
 [NAME of data: DIVISION NAME/Data Provider]
 Parks/Weeds/Natural resources: Department Environment, Parks and Water Security
 Cadastre/Roads/Place names: Department Infrastructure, Planning and Logistics
 Drainage: Geofabric 3.2 © Commonwealth of Australia (Bureau of Meteorology) 2020

Legend

- ▲ Monitoring Site
- ▲ Springs in the Northern Territory
- Minor Community
- Major Roads
- Streams
- NT Parks and Reserves
- Waterbody

Geographic: Geographic Coordinate System (GCS)
 Horizontal Datum: Geocentric Datum of Australia (GDA94)

NTG Security Classification for the map and data: PUBLIC

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Water quality results

The water quality results from the investigation on 19 June 2024 do not indicate any significant change in water quality compared with previous years:

- Microbiological (Micro/bacto) results are typical of surface water systems and do not indicate a contamination event.
- The pesticide results were all less than detectable limits at all sites.
- Total metals were less than detectable limits except for Barium, Boron and Uranium, which are representative of natural groundwater levels in the area.
- Chemistry and nutrient results were consistent with previous years monitoring.

The results of analyses undertaken at each site is shown in Schedule 1, including the water quality results from previous years sampling at Elsey Creek. The results of pesticides can be provided on request.



Results from testing indicated there is no significant change in the water quality compared with previous years.

Water levels and flow

Elsey Creek catchment, including its main tributaries Western Creek and Birdum Creek, covers an area of 17,230km² and drains the south western portion of the Roper River Catchment. Surface flows are highly influenced by localised rainfall and runoff. Wet season flows within the Elsey Creek catchment vary significantly from year to year, depending on wet season duration and intensity and duration of individual rainfall events (Waugh, 2024). Historic monitoring data show that Western Creek, Birdum Creek and most of Elsey Creek are ephemeral, with flows typically commencing in December and ceasing by June.

Elsey Creek at Warlock Ponds (G9030001) captures total flows discharging from most of the Elsey Creek catchment. While flows generally cease early in the dry season, the ponds themselves are perennial in most years as they receive flows from the Tindal Limestone Aquifer. During the 2023-2024 wet season, while peak flows at Warlock Ponds were not exceptional, the period of high flows was much longer than average. The total wet season flow was 270 gegalitres (GL), compared to 12 GL last year or the long-term median annual flow (1967 to 2022) of 48 GL.

Additionally, the high flows continued far later into the year. Flow on 1 April 2024 was approximately 50m³ per second, in contrast to most years when flow is typically less than 5m³ per second. Higher flows later in the year is a result of ongoing surface water contribution through the Elsey Creek catchment, which may impact the observed colour of the water.

Ongoing investigations

The Department will continue to monitor water quality during the next few months. The intention is to monitor when the surface water flow ceases and groundwater flow dominates the lower reaches of Elsey Creek. It is anticipated that the colour of the creek will return to normal conditions as observed previously during the dry season.

Schedule 1:

Table 2 In Situ field parameters on 19 June 2024

Location	Time	Temp (°C)	pH	EC (µS/cm)	DO (mg/L)	DO (%)
G9035193 Elsey Crk u/s Roper River	12:30	23.7	7.01	1740	6.02	71.4
G9035200 Elsey Crk u/s Punchbowl	14:00	23.1	8.14	1837	13.95	163.7
Buffalo Crk u/s Roper Hwy	13:30	21.6	7.55	1937	8.9	101.5

Table 3 Microbiological results

Location	Units	Total coliforms	<i>E. coli</i>
G9035193 Elsey Crk u/s Roper River	MPN/100mL	>201	8
G9035200 Elsey Crk u/s Punchbowl	MPN/100mL	>201	6
Buffalo Crk u/s Roper Hwy	MPN/100mL	32	<1
G9035092 Rainbow Springs	MPN/100mL	>201	<1

Table 4 Algae results

Organism/s	Unit	G9035193 Elsey Crk u/s Roper River	G9035200 Elsey Crk u/s Punchbowl	Buffalo Crk u/s Roper Hwy	G9035092 Rainbow Springs
Total BACILLARIOPHYTA (diatoms)	cells/mL	not sighted	150	260	not sighted
Total CHLOROPHYTA (green algae)	cells/mL	not sighted	57	4100	not sighted
Total CRYPTOPHYTA	cells/mL	not sighted	not sighted	130	not sighted
Total CYANOBACTERIA (blue-green algae)	cells/mL	not sighted	150	13000	not sighted
Total MYZOOZOA (dinoflagellates)	cells/mL	not sighted	not sighted	40	not sighted
Total (other)	cells/mL	not sighted	120	500	not sighted
TOTAL	cells/mL	not sighted	470	18000	not sighted
TOTAL CYANOBACTERIA BIOVOLUME	mm ³ /L	not sighted	0.01	0.09	not sighted

Table 5 Chemistry results

Location	pH	EC µS/cm	Alkalinity mg/L	CO3 mg/L	HCO3 mg/L	OH mg/L	Turbidity NTU	True Colour PCU	TSS mg/L	TDS mg/L	Cl mg/L	F mg/L	DOC mg/L	TOC mg/L	Hardness mg/L	Ca_F mg/L	K_F mg/L	Mg_F mg/L	Na_F mg/L	SiO2 mg/L	SO4_F mg/L
G9035193 Elsey Crk u/s Roper River	7.6	1740	408	<1	408	<1	<1	5	10	1050	254	0.4	2	5	517	102	22.9	63.6	179	40.6	182
G9035200 Elsey Crk u/s Punchbowl	8.3	1870	424	<1	424	<1	<1	10	<10	1130	286	0.5	N.A.	N.A.	520	92.6	29.5	70	212	47.4	198
Buffalo Crk u/s Roper Hwy	7.8	1990	562	<1	562	<1	<1	10	<10	1260	252	0.7	N.A.	N.A.	676	123	28.2	89.5	194	57.6	218
G9035092 Rainbow Springs	7.3	853	377	<1	377	<1	<1	<5	<10	490	44	0.3	N.A.	N.A.	378	92.5	8.2	35.8	40.7	34.6	30.8

Table 6 Nutrient results

Location	NO2_N mg/L	NO2 mg/L	NO3_N mg/L	NO3 mg/L	NH3_N mg/L	Total N mg/L	PO4_P mg/L	Total P mg/L
G9035193 Elsey Crk u/s Roper River	<0.005	<0.02	0.03	0.14	<0.005	0.12	<0.005	<0.005
G9035200 Elsey Crk u/s Punchbowl	<0.005	<0.02	<0.005	<0.02	<0.005	0.16	<0.005	0.005
Buffalo Crk u/s Roper Hwy	<0.005	<0.02	<0.005	<0.02	0.005	0.15	<0.005	0.005
G9035092 Rainbow Springs	<0.005	<0.02	0.145	0.64	<0.005	0.17	0.005	0.005

Table 7 Total metals results

Location	Ag_T µg/L	Al_T µg/L	As_T µg/L	B_T µg/L	Ba_T µg/L	Be_T µg/L	Cd_T µg/L	Cr_T µg/L	Cu_T µg/L	Fe_T µg/L	Min_T µg/L	Mo_T µg/L	Ni_T µg/L	Pb_T µg/L	Sb_T µg/L	Se_T µg/L	Sn_T µg/L	U_T µg/L	Zn_T µg/L
G9035193 Elsey Crk u/s Roper River	<10	<20	<0.5	300	50	<1	<0.2	<5	<10	<20	<5	<5	<2	<1	<0.2	<1	<10	6.38	<10
G9035200 Elsey Crk u/s Punchbowl	<10	<20	0.5	440	50	<1	<0.2	<5	<10	<20	<5	<5	<2	<1	<0.2	<1	<10	6.47	<10
Buffalo Crk u/s Roper Hwy	<10	<20	<0.5	480	50	<1	<0.2	<5	<10	<20	<5	<5	<2	<1	<0.2	<1	<10	3.12	<10
G9035092 Rainbow Springs	<10	<20	<0.5	100	100	<1	<0.2	<5	<10	<20	<5	<5	<2	<1	<0.2	<1	<10	1.11	<10

Table 8 (a) Comparison of annual water quality monitoring results at G9035193: Elsey Creek upstream Roper River confluence - Lab analysis

Date sampled	Alkalinity mg/L	CO3 mg/L	HCO3 mg/L	OH mg/L	TSS	VSS	NO2_N mg/L	NO3_N mg/L	NH3_N mg/L	T N mg/L	T P mg/L	PO4_P mg/L	DOC mg/L	TOC mg/L	Chlorophyll a cells/mL	Pesticides
19/06/2024	408	<1	408	<1	10	NA	<0.005	0.030	<0.005	0.12	<0.005	<0.005	2	5	NA	ND
19/07/2023	449	9	441	<1	<10	<10	<0.001	0.064	0.003	0.20	<0.005	0.003	2	2	0.36	ND
16/09/2022	520	<1	520	<1	NA	NA	<0.001	0.124	<0.001	0.005	0.005	0.004	2	2	0.28	ND
1/09/2021	NA	NA	NA	NA	NA	NA	0.004	0.096	0.006	0.11	NA	0.004	NA	NA	0.15	ND
1/09/2020	NA	NA	NA	NA	NA	NA	0.005	0.113	0.001	0.12	0.040	0.042	2	2	0.08	ND
29/08/2019	530	NA	NA	NA	2.5	2.5	0.001	0.121	0.001	0.18	0.001	0.008	8	30	0.10	ND
22/08/2018	460	NA	NA	NA	1.5	1.5	0.001	0.134	0.134	0.16	0.005	0.006	2	7	0.19	No sample

ND - No Detection; NA Not Available

Table 8 (b) Comparison of annual water quality monitoring results at G9035193: Elsey Creek upstream Roper River confluence - Field Parameters

Date sampled	EC μS/cm	Turbidity NTU	Temp C °	pH pH units	DO mg/L	DO %
19/06/2024	1740	NA	23.7	7.01	6.02	71.4
19/07/2023	1860	NA	25.8	7.06	5.28	65.1
16/09/2022	1786	0.4	30.9	6.85	4.67	63.9
1/09/2021	1570	1.24	28.5	6.77	NA	NA
1/09/2020	1760	0.51	29.9	6.52	4.44	59.1
29/08/2019	1740	1.19	29.1	7.26	4.17	54.9
22/08/2018	1760	1.06	25.9	7.18	6.37	80.8



Department of
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