Northern Pipeline Interconnector 2 (NPI2)

Annual Compliance Report 2023

Distribution list

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Contents

Executive Summary

This annual compliance report is the thirteenth compliance report on Matters of National Environmental Significance (MNES) for the Northern Pipeline Interconnector Stage 2 (NPI2) and addresses the requirements of conditions applied to the project under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). This report addresses compliance with the conditions of approval between the 15 February 2022 and 15 February 2023.

As the NPI2 project has transitioned from the construction and commissioning phases to the operational phase many conditions of approval have been closed out and some conditions of approval remain active. During this reporting period (2022–2023) 12 conditions for the controlled action were active, whilst three remained inactive (EPBC 13, 14 and 17).

The conditions active during this reporting period (2022–2023) have been assessed for compliance. A summary of the results is presented in Table 1 and more detailed descriptions of the compliance assessment are presented in Sections 2.1 - 2.13.

The outcomes of the compliance assessment indicate no instances of any significant impact on EPBC Act listed species. Further, no incidents requiring notification to the DCCEEW have occurred during this reporting period (2022–2023). All ongoing active EPBC conditions of approval will continue to be implemented during the operational phases of the NPI2.

1. Introduction

The Northern Pipeline Interconnector Stage 2 (NPI2) project was classified as a controlled action under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*. The controlled action was assessed under the Bilateral Agreement and was approved subject to conditions on 12 February 2010 (EPBC 2007/3686) by the Minister for the former Department of the Environment, Water, Heritage and the Arts (DEWHA). The department has been subsequently renamed and is herein referred to as the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

This report is the thirteenth annual compliance report and demonstrates the NPI2 project's progress and compliance to the conditions within the 12 months (15 February 2022 - 15 February 2023) following the previous annual compliance reporting period (15 February 2021 - 15 February 2022).

The Southern Regional Water Pipeline Company Pty Ltd (trading as LinkWater Projects) was initially listed as the proponent for the controlled action. LinkWater Projects was established to be the Queensland Government's special purpose vehicle for the design and construction of bulk water pipelines and related infrastructure in South East Queensland. As of 30 June 2012, as part of a water sector reform by the Queensland government, LinkWater Projects ceased trading and its functions were taken over by the Queensland Bulk Water Transport Authority (trading as LinkWater). LinkWater assumed operational control over ongoing and new projects managed by LinkWater Projects. The NPI2 project infrastructure was handed over to LinkWater to operate and maintain following the completion of construction and commissioning activities in July 2012.

On 1 January 2013, with further reforms to the water sector by the Queensland government, the previously established Queensland Bulk Water Supply Authority (trading as Seqwater) merged with the former water entities: LinkWater and the SEQ Water Grid Manager. The trading name of Seqwater was retained and it is the primary Statutory Authority responsible for ensuring a safe, secure and reliable water supply across South East Queensland (SEQ). Seqwater also assumed ownership and operation of the NPI2 project that was owned and managed previously by LinkWater. Having assumed the functions and powers of LinkWater, Seqwater is therefore the proponent for NPI2 project.

1.1. NPI2 Project overview

The NPI2 forms part of the SEQ Water Grid and is a critical link in the bulk potable water delivery infrastructure for a reliable SEQ water supply. The NPI (Stages 1 and 2) can transport up to 65 Megalitres (ML) per day of treated potable water between reservoirs located in the Sunshine Coast and the Brisbane metropolitan area.

The SEQ water grid comprises the connection of key regional water supply sources by a series of bulk water transmission pipelines. These pipelines provide a framework to allow water to be transferred to where it is most needed and ultimately assist in providing long-term water security for the region.

As outlined in the NPI2 Environmental Impact Statement (EIS), the NPI2 project links the Noosa Water Treatment Plant (WTP) to the northern end of the previously completed Stage 1 pipeline at Eudlo. The project involved the construction of approximately 44 km of mainline pipeline plus approximately 4.3 km for the Noosa branch main. The NPI Stage 1 and 2 is designed to be a bi-directional flow pipeline allowing potable water to be transported in both a southern and northern direction between the North Pine WTP and Noosa WTP.

NPI2 was delivered by the Northern Network Alliance (NNA), an alliance consisting of KBR, Abigroup, McConnell Dowell and LinkWater Projects as the owner-participant. Following completion of construction, NPI2 was transferred to LinkWater on 30 June 2012.

1.2. NPI2 Project Progress

A brief overview of the Projects milestones completed to date is provided below:

- Construction started on the NPI2 project from 15 February 2010.
- Construction was completed on 17 November 2011.
- Commissioning works were completed and the NPI2 was handed over to LinkWater on 4 July 2012.
- The operational phase of the NPI2 began on 8 July 2012 and is ongoing.

2. Compliance Status

To demonstrate compliance with the individual EPBC Act conditions of approval, Table 1 includes each condition number as per the controlled action approval notice of 12 February 2010. Conditions listed as not active have not been addressed in this report. A summary of the status and compliance assessment of the current active approval conditions have been provided in Column 3 and Column 4 of Table 1. Please note that in some instances the conditions presented in Table 1 have been separated into lettered bullet points for ease of reference and the visual presentation of the conditions may differ to the determination notice.

Table 1 Summary of the EPBC Act Controlled Action conditions and compliance status Feb 2022 – Feb 2023

Condition	Condition/Requirement	Status	Compliance assessment
EPBC Condition 1	The person taking the action must undertake the action in accordance with the conditions of this approval and, to the extent that it relates to protection of EPBC Act listed threatened species and communities and EPBC Act listed migratory species, as described in the EIS. Where the EIS and these conditions are contradictory, these conditions will prevail to the extent of the contradiction.	Noted – general obligation condition.	Compliant, with the exception of a partial data gap from Coles Crossing, due to previous instrument failure. Further detail is provided in Section 2.1 and 2.6, including actions implemented by Seqwater.
EPBC Condition 2	Conditions 24 to 32 of the Queensland Coordinator General's (CG) Report are hereby incorporated into these conditions of approval. Subject to Condition 3, the person taking the action must comply with Conditions 24 to 32 of the CG's Report.	Noted – general obligation condition. Conditions 24, 25, 26, 27, 29, 30 and 31 have been closed.	Compliant.
Coordinator General Condition 28	LinkWater Projects is to develop a riparian monitoring program for the construction and operational phases of the project as detailed in the EIS. The monitoring program is to: a) establish performance indicators within the EMPs against which environmental performance is measured/assessed b) provide credible mechanisms (e.g. response levels) that trigger modification of mitigation measures or suspension of project-related activities (including altering the volume and timing of abstraction of water from the Mary River under existing allocations) c) assist in the continuous improvement of the project's environmental management	Construction phase - Closed out in 2011-12 reporting period. Operational phase closed out after November 2015. Further detail on the Riparian Habitat Monitoring Program (RHMP) is provided below. The RHMP was submitted to DCCEEW on 15/05/14 for ministerial approval and was approved via letter on 12/08/14.	Compliant. The Operational Environmental Management Plan (OEMP) is active (approved by DCCEEW on 12/08/14).

	d) provide sufficient data for analyses and discussion – to be presented in regular reports e) provide additional information on local distribution, abundance and/or condition of protected species and important habitats and to inform species' databases kept by the Queensland Herbarium, the Queensland Museum and the DERM.	Closed out as per RHMP Section 6.1.	
Coordinator General Condition 32	LinkWater Projects is to develop an aquatic habitat monitoring program (AHMP) for the construction and operational phases of the project as detailed in the EIS. The program is to monitor aquatic (instream) habitat features for the Mary River Turtle, Mary River Cod and the Australian Lungfish in the Mary River (downstream of the Coles Crossing offtake) and in Six Mile Creek. The monitoring program is to: a) establish performance indicators within the EMPs against which environmental performance is measured/assessed b) provide credible mechanisms (e.g. response levels) that trigger modification of mitigation measures or suspension of project-related activities (including altering the volume and timing of abstraction of water from the Mary River under existing allocations) c) assist in the continuous improvement of the project's environmental management d) provide sufficient data for analyses and discussion – to be presented in regular reports e) provide additional information on local distribution, abundance and/or condition of protected species and important habitats and to inform species' databases kept by the Queensland Herbarium, the Queensland Museum and the DERM.	Construction phase - Closed out in 2011-12 reporting period. Operational phase ongoing - An update on the AHMP is provided below. Refer to Section 2.4 for further details. The AHMP was submitted to DCCEEW on 15/05/2014 for ministerial approval and was approved via letter on 12/08/2014.	Compliant, The annual AHMP survey was conducted in November 2022. The AHMP report has been submitted as Appendix A.
EPBC Condition 3	For the purpose of this approval, Conditions 24 to 32 of the QCG's Report are subject to the following requirements: a) Condition 24 must include EPBC Act listed threatened species and communities and listed migratory species	EPBC Condition 3 items a) – g) and i) were closed out in 2011-12 reporting period. EPBC Condition 3 item h) and j) are	Compliant. Refer to Conditions 28 and 32 of CG's Report (outlined in the rows above and detailed further in sections 2.3 and 2.4 below).

	b) the final version of the Sensitive Area Plans (SAP) imposed by Condition 24 must be submitted to the Department prior to the commencement of construction at any place where there are likely to be impacts on EPBC Act listed threatened species and/or communities and/or listed migratory species c) in relation to Condition 26, the person taking the action must inform the Department at least 14 days prior to the commencement of the action of the preferred crossing method (including providing reasons for the selection) d) the SAP's imposed by Conditions 26 and 27 must be provided to the Department at least 14 days prior to the commencement of construction of the waterway crossing(s). Construction of the waterway crossing(s) must not commence until the Minister has approved the SAP in writing e) the SAP's referred to in Condition 3d must be implemented f) the minutes required by Condition 27 must be provided to the Department at least 14 days prior to the commencement of construction of the waterway crossing(s) g) details of the appropriate scheduling of the construction of the waterway crossings referred to in Part B of Condition 27 must be submitted to the Department at least 14 business days prior to the commencement of construction of the waterway crossing(s) h) the riparian monitoring program imposed by Condition 28 must be submitted to the Department for the Minister's approval prior to the commencement of any construction that may result in impacts on any riparian vegetation community on the site of the action. Construction that may result in impacts on any riparian vegetation community on the site of the action must not commence until the Minister has approved the riparian monitoring program in writing. The approved program must be implemented i) the detailed surveys required by Condition 31 must be submitted to the Department at least 14 business days prior to the commencement	ongoing for operational phase. Item h) is closed out as –per RHMP Section 6.1 NPI2 – Operational Environmental Management Plan (OEMP) approved by DAWE on 12/08/2014.	

	of any construction at or in reasonable proximity to the proposed waterway crossings of Six Mile Creek j) the aquatic habitat monitoring program imposed by Condition 32 must be submitted to the Department for the Minister's approval prior to the commencement of any construction that may result in impacts on any aquatic area on the site of the action. Construction that may result in impacts on any aquatic area on the site of the proposed action must not commence until the Minister has approved the aquatic habitat monitoring program in writing. The approved program must be implemented.		
EPBC Condition 4	Within 3 months from the date of this approval the person taking the action must submit to the Minister for approval an EMP. The EMP must include, but not be limited to, procedures for: (a) minimising impacts on all EPBC Act listed threatened species and communities and listed migratory species on the pipeline route, including, but not limited to, all waterway crossings (b) post construction revegetation of disturbed areas to minimise ongoing erosion (c) the obtaining and keeping of accurate data that measures and records on both a daily and yearly basis the: (i) amount of water extracted from Coles Crossing offtake (ii) flow volume and levels at both Coles Crossing pump station and Home Park gauging station (iii) amount of water transported through the NPI2.	4a) and b) were closed out in the 2011-12 reporting period 4c) is ongoing for the operational phase. An updated OEMP was submitted to DCCEEW on 15/05/2014 for ministerial approval and was approved via letter on 12/08/2014	Compliant, with the exception of Condition 4c (ii), where there was a partial data gap in Coles Crossing monitoring data, due to previous instrument failure. Further detail is provided in Section 2.6, including actions implemented by Seqwater to address this.
EPBC Condition 5	The data obtained and kept by the person taking the action in accordance with Condition 4.c must be submitted to the Department within three months of every 12 month anniversary of the commencement of the action.	Ongoing.	Compliant. This annual compliance report has been prepared and submitted to fulfil the requirement for the 2022-2023 reporting period.

EPBC Condition 7	If the person taking the action wishes to carry out any activity otherwise than in accordance with these conditions, the person taking the action must immediately submit for the Minister's written approval a revised version of any such plan/program. If the Minister approved any such revised plan/program, that plan/program must be implemented in place of the plan/program originally approved.	Ongoing.	Compliant.
EPBC Condition 9	Should water be required to be extracted from the Coles Crossing offtake pursuant to the action, the person taking the action must transport water strictly in order of the following preferences: (a) 1st preference - (run of river) water harvested from the Mary River main channel at the Coles Crossing offtake when flow at the pump station is at or above 90 ML/day and flow at Home Park gauging station is at above 20 ML/day; or otherwise (b) 2nd preference - (controlled release from Borumba Dam) taking high priority allocation released made from existing allocations from Borumba Dam (at the Coles Crossing offtake) of no more than 20 ML/day up to a total of 6500 ML/annum, when flow at the pump station is below 90 ML/day and flow at Home Park gauging station is below 20 ML/day	Ongoing.	Compliant.
EPBC Condition 10	Subject to Condition 9, the person taking the action must not transport more than 20 ML/day (or 6500 ML/annum) from Coles Crossing offtake for the southern transfer of water through the pipeline.	Ongoing.	Compliant.
EPBC Condition 11	The person taking the action must comply with all relevant state water licenses, permits and authorities in relation to the construction and operation of the action. To the extent that any state water licence, permit or authority is, or becomes, inconsistent with these conditions, these conditions will prevail.	Ongoing.	Compliant.
EPBC Condition 12	Within 3 months of every 12-month anniversary of the commencement of the action, the person taking the action must submit to the Department a report addressing compliance with each of the relevant state water licences, permits and	Ongoing.	Compliant.

	authorities in relation to the construction and operation of the action, as referred to in Condition 11.		
EPBC Condition 13	If the Minister believes that it is reasonably necessary or desirable for the better protection of listed threatened species and communities and/or listed migratory species to do so, the Minister may request that the person taking the action make specified revisions to the plans/programs referred to in these conditions and submit the revised plan/program for the Ministers approval. The person taking the action must comply with any such request. The revised approved plan/program must be implemented in place of the plan/program originally approved.	Ongoing.	Compliant.
EPBC Condition 14	If, at any time after 5 years from the date of this approval, the Minister notifies the person taking the action in writing that the Minister is not satisfied that there has been substantial commencement of the works, the action must not thereafter be commenced without the written agreement of the Minister.	Ongoing.	Compliant.
EPBC Condition 15	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to these conditions of approval, including, but not limited to, measures taken to implement the management plans required by this approval (including the EMP), and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of the audits will be posted on the Department's website. The results of the audits may also be publicised through the general media.	Ongoing.	Compliant. An updated EMP was submitted to DCCEEW on 15/05/14 for ministerial approval and was approved on 18/08/14.
EPBC Condition 16	Within 3 months of every 12-month anniversary of the commencement of the action, the person taking the action must submit to the Department a report addressing compliance (including demonstrating how compliance has been achieved) with each and every condition of this approval (including Conditions 24 to 32 of the QCG's Report) over the previous 12 months. Annual reports must be provided until the Minister	Ongoing.	Compliant. This annual compliance report has been prepared and submitted to fulfil the requirement for the 2022-2023 reporting period.

	is satisfied the proponent has complied with all conditions of the approval.		
EPBC Condition 17	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Not activated by Minister.	N/A

2.1. EPBC Condition 1

EPBC Condition 1 requirements are noted in Table 1. Evidence of compliance with this condition has been provided to DCCEEW within previous annual compliance reports. As reported in the previous 2021-2022 annual compliance report, due to the failure of the in-stream instrument (flow doppler) flow volume data and level data was unable to be collected via the in-stream instrument from Coles Crossing for the entire duration of the reporting period.

Refer to Section 2.5 for further details on this matter.

EPBC Condition 1 Compliance Status – Compliant, with the exception of the partial data gap for flow volume and level data from Coles Crossing due to previous instrument failure. Refer to Section 2.6 for further details on this matter.

2.2. EPBC Condition 2

EPBC Condition 2 Compliance Status – Compliance with the remaining active conditions (28 and 32) is described in Sections 2.3 to 2.4 below.

2.3. CG Condition 28

Although it is not anticipated the operation of the NPI2 will impact upon riparian habitats or EPBC Act listed species that utilise the riparian habitat, Seqwater commissioned the development of an operational Riparian Habitat Monitoring Program (RHMP) to establish the existing condition of riparian habitat along the Mary River at the Coles Crossing offtake and provide recommendations on future monitoring requirements.

The development of the operational RHMP consisted of a review of the construction based RHMP in order to identify previous commitments and requirements, a summary of which are;

- Document and analysis of previously collected data,
- Performance criteria,
- Mitigation measure response levels,
- Appropriate mitigation measures, and
- Riparian monitoring requirements.

After a comprehensive review it was determined that operation of NPI2 will have no impacts on the riparian habitats at sites where Giant Barred Frog have been recorded and hence no impacts on individuals. However, it was recommended that monitoring of the Giant Barred Frog and its habitat was to continue yearly for two years (November 2014 and November 2015) and the Operational Environmental Management Plan (OEMP) was subsequently approved by DAWE in August 2014.

EPBC Condition 28 Compliance Status – Construction phase closed out in the reporting period (2011-2012). Requirements under the OEMP are complaint for this reporting period (2022–2023).

2.4. CG Condition 32

The development of the operational AHMP consisted of a review of the construction based AHMP in order to identify previous commitments and requirements which were;

- Baseline ecological monitoring to establish performance indicators and response levels;
- Document and analysis of baseline data;
- Performance criteria;
- Mitigation measure response levels;
- Appropriate mitigation measures; and
- Aquatic habitat monitoring requirements.

Based on the previously endorsed framework as outlined in the AHMP (construction), the program recommended for ongoing monitoring included five of the nine sites assessed in the baseline survey, and a rationalised survey method compared to that used initially. The recommended frequency of habitat monitoring is once each year, in October during low flow conditions.

One performance indicator is recommended for the operational phase of the NPI2 Project:

- Maximum extraction rate of 20 ML/day from the Coles Crossing off-take.

An assessment of the potential impacts to MNES species undertaken as part of the EIS (Linkwater Projects, Northern Pipeline Interconnector – Stage 2 Environmental Impact Statement, December 2008), which was based on extraction levels of up to 40 ML/day, found there would be no significant change to the frequency or duration of flows predicted for seasonally high and low flow periods for the Mary River. Currently, the Coles Crossing pump station infrastructure is only designed to take a maximum of 20 ML/day which is half of what was assessed for the EIS. If there are ever plans to increase the water extraction rate beyond 20 ML/day, via upgrading the pumping station infrastructure, the aquatic habitat monitoring program will need to be revised, noting that additional environmental approvals may be triggered by such an upgrade.

Annual assessment of aquatic habitat for the MNES species at the five sites will provide data against which the performance of this indicator in maintaining suitable aquatic habitat in the survey area can be assessed. The AHMP was approved by DCCEEW in August 2014.

EPBC Condition 32 Compliance Status – Construction phase closed out in reporting period 2011-2012. Operational phase is ongoing and compliant. Refer to Appendix A for a copy of the detailed AHMP monitoring report for the 2022 monitoring survey.

2.5. EPBC Condition 4

EPBC Condition 4(a) and (b) were closed out in the 2011-12 reporting period. The updated OEMP, outlining a procedure for recording the flow volumes and levels at the Coles Crossing pump station (referred to as the Coles Crossing offtake) and Home Park gauging station, was approved by the Department in August 2014.

EPBC 4(c) is ongoing for the operational phase. The following sections detail Seqwater's compliance status with Condition 4c.

2.5.1. Water Extracted from Coles Crossing Pump Station (Condition 4c Item i)

EPBC Condition 4c requires the obtaining and keeping accurate records for the amount of water extracted from the Coles Crossing offtake, specifically:

- *Condition 4c item i) requires the keeping of accurate records for the amount of water extracted from the Coles Crossing offtake.*

During the reporting period (15 February 2022 - 15 February 2023) 2,619 ML of water was extracted from Coles Crossing offtake under the existing water extraction entitlement. This volume equates to approximately 40.1% of the annual extraction entitlement being 6,500 ML. A summary of the monthly raw water extraction from Coles Crossing offtake is provided in Table 2. Daily extraction volumes can be provided to DCCEEW upon request.

Table 2 Raw water extraction volumes from Coles Crossing offtake (Mary River)

Month	Monthly extraction volume (ML)	Percentage of total allocation (65,000 ML/year)
February 2022[1]	57	0.9 %
March 2022	145	2.2 %
April 2022	107	1.6 %
May 2022	136	2.1 %
June 2022	365	5.6 %
July 2022	426	6.5 %
August 2022	449	6.9 %
September 2022	248	3.8 %
October 2022	195	3.0 %
November 2022	0	0 %
December 2022	140	2.2 %
January 2023	243	3.7 %
February 2023[1]	108	1.7 %
TOTAL	**2,619**	**40.1**

[1]Extraction volumes are calculated from 15 February 2022 to 15 February 2023 to align with the reporting period.

EPBC Condition 5 (Condition 4c item i) Compliance Status – Compliant (all records have been maintained and summarised in this report).

2.5.2. Flow Volumes and levels at Coles Crossing and Home Park (Condition 4c Item ii)

EPBC Condition 4 requires that data is obtained in accordance with Condition 4c and submitted to DCCEEW on an annual basis. This includes:

- *Condition 4c item ii) requires the keeping of accurate records for the instream flow volumes and levels at Coles Crossing offtake and Home Park gauging station.*

2.5.2.1. Water Levels at Coles Crossing Offtake

In accordance with Condition 4c item (ii) water levels must be obtained daily at Mary River at Coles Crossing pump station and Home Park gauging station. The AHMP requires that water level is recorded at Coles Crossing with an Acoustic Doppler (in-situ monitoring instrument). Water levels at Home Park (station number 138014A) are recorded daily by the Department of Regional Development, Manufacturing and Water (DRDMW) and all records are available publicly via the DRDMW water quality website.

As reported in the previous annual compliance reports, the Acoustic Doppler at Coles Crossing failed in 2020 and Seqwater subsequently initiated a project to reinstate and relocate the Doppler to a more suitable location to improve data reliability and accessibility for data download and maintenance of the instrument. In the interim, a temporary in-situ water quality instrumentation (Exo Sonde) was installed to continually measure (hourly) water level data from Coles Crossing. Although data collected using the Exo Sonde is not as accurate as data collected through a hydrometric instrument, the data can be analysed and adjusted based on historical bathymetric survey data.

The scope of the project also included the installation of a connection to a temporary telemetry station to enable remote data monitoring. The delivery of this project was initially delayed due to reprioritisation of Seqwater's capital expenditure. In March 2021 the project was delivered by a Contractor engaged by Seqwater, however the commissioning was deemed as unsatisfactory due to unsuitable location (potential interference from nearby stormwater inflow), inadequate protection against high flows and incomplete installation.

Seqwater initiated another project to reinstate the equipment after further investigation on the most appropriate location and methodology to secure the equipment. The scope of this project was expanded to include the installation of a permanent telemetry station and a level differential pressure sensor (bubbler). The level differential pressure sensor will provide both flood warning and backup water level data, should it be required. This project mobilised mid-December 2021 and the initial phase of the project was completed including the installation of solar panels, switchboards and instrument cabinets and associated data cables, flood marker posts and footing for the instrument mounting. The second phase of the project (which included the installation of instream infrastructure) was remobilised on 14 February 2022. The temporary water quality monitoring instrument (Exo Sonde) was removed in February 2022 to enable commissioning of the new equipment.

In late-February the Gympie region experienced significant rainfall with a total of 827.8mm of rain from 23 February 2022 to 27 February 2022. Floodwaters inundated the project area and the nearby monitoring station indicated that the area was approximately ten metres underwater during this event (Figure 1). This flooding event and subsequent high flows in the catchment caused significant erosion and damage from debris and fallen vegetation which prevented safe access to site. The site remained submerged / partially submerged until late-March 2022. The majority of equipment from the initial phase of the project remained onsite and undamaged with the exception of the specialised data cables. Seqwater engaged a contractor to conduct a geotechnical assessment on 28 April 2022 due to local landslips and site safety concerns. Flooding occurred again on 7 May 2022 and the site was partially inundated again (Figure 2). Site cleanup was completed, and the access track was restored on 8 May 2022.

Following several delays, level differential pressure sensor (bubbler) was commissioned in August 2022 and the Doppler was successfully installed in December 2022 and commissioned in January 2023.

Figure 1 and Figure 2: Mary River flooding 23 February 2022 (left) and flooding on 8 May 2022 (right)

As mentioned above, the data collected using the Exo Sonde is not as accurate as data collected through a hydrometric instrument, the data has been analysed and adjusted based on historical bathymetric survey data. Figure 3 below demonstrates the comparison of the adjusted water level data from the Coles Crossing Exo Sonde and data from the closest hydrometric station which is Dagun Pocket Alert Station (8.5km downstream of Coles Crossing). This comparison supports the close statistical alignment between the adjusted Exo Sonde and Dagun Pocket – although it should be noted that the Mary River at Dagun Pocket is much wider than at Coles Crossing. Figure 3 also includes new data from the Coles Crossing bubbler. Due to the aforementioned flooding and subsequent project delays, there is a data gap for water level data at Coles Crossing from 15 February 2022, until 30 August 2022 when the level differential pressure sensor (bubbler) was commissioned.

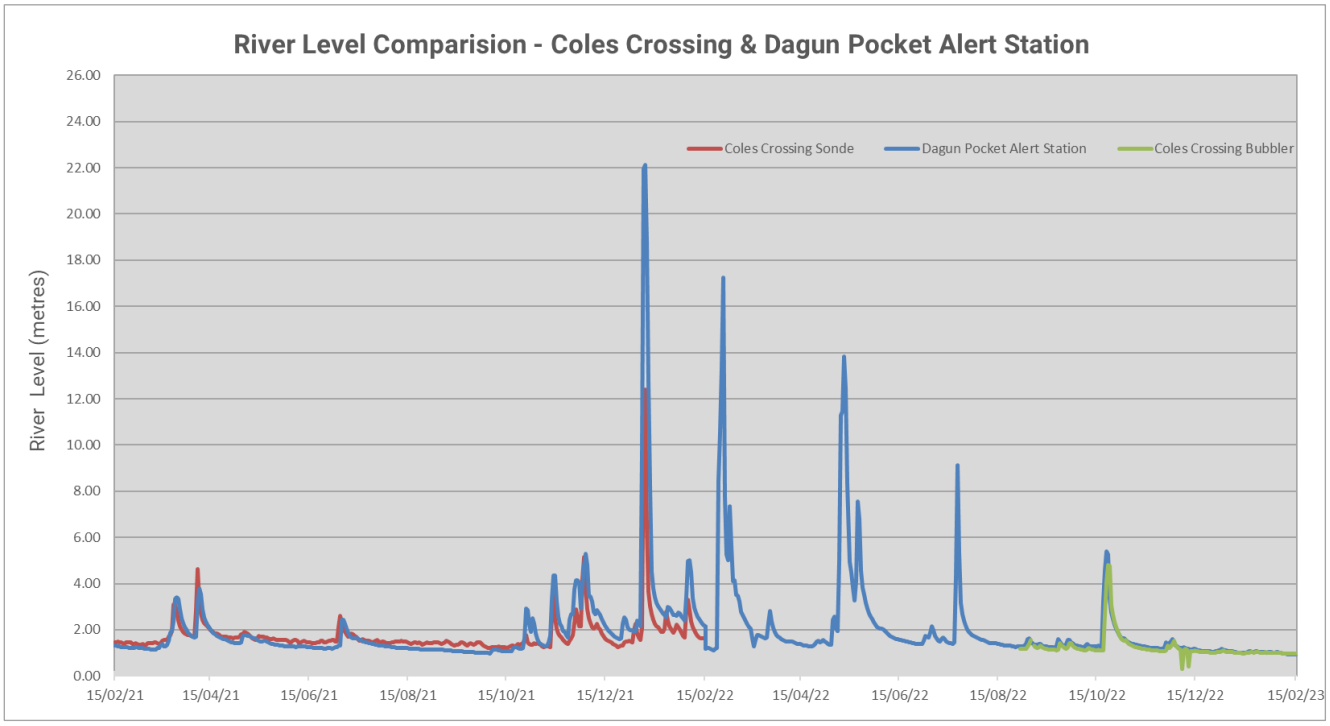

Figure 1 - Two-year comparison of river level data between Coles Crossing and Dagun Pocket 15/02/2021 – 15/02/2023

2.5.2.2. Flow Volumes at Coles Crossing Offtake (Condition 4c Item ii)

Due to the failure of the Doppler, flow volume data is not available from Coles Crossing between 15 February 2022 and 29 August 2022. The Coles Crossing level differential pressure sensor (bubbler) was commissioned in August 2022 and the Doppler was commissioned in January 2023.

Although the Doppler has been successfully commissioned, it is not the preferred method of calculating volumes under low flow conditions and the Bubbler (which is the typical method of deriving flow) will provide more accurate flow data during low flows. Seqwater intends to initiate a review of the OMEP to reflect current best practice flow monitoring techniques.

Data from the Dagun Pocket Alert Station has been used to provide indicative flow volumes for the Mary River. The section of the Mary River between Coles Crossing and Dagun Pocket receives input from Kandanga Creek and several non-perennial waterways. It is likely that there are abstractions from this section of the river given adjacent land uses (e.g. small-scale mining, forestry, horticulture). There are notable differences in stream profile between the two localities which may contribute to variations in flow data. Therefore, flow data from Dagun Pocket has been provided as indicative only. Average monthly flows recorded at Dagun Pocket and Coles Crossing have been provided in Table 3. Daily flow volumes can be provided to DCCEEW upon request.

Table 3 monthly flows past Dagun Pocket Alert Station

Month	Average daily flows at Dagun Pocket (ML/d)	Average daily flows at Coles Crossing (bubbler) (ML/d)	Average daily flows at Coles Crossing (Acoustic Doppler) (ML/d)
February 2022[1]	113,199		
March 2022	13,233		
April 2022	1,026		
May 2022	22,166		
June 2022	1,608		
July 2022	3,910		
August 2022	954		
September 2022	821	357	
October 2022	3,302	2,026	
November 2022	773	330	
December 2022	529	206	
January 2023	342	116	64[2]
February 2023[1]	273	90	60

[1]Flow volumes are calculated from 15 February 2021 to 15 February 2022 to align with the reporting period.
[2]Average data is based on partial monitoring period from 8/01/2023 – 31/01/2023

Daily flow data obtained from the Dagun Pocket Alert Station and the Coles Crossing bubbler have been illustrated in Figure 2 below. Flood events in late-February and April-May resulted in peaks flows of 432,178 ML/day and 167,942 ML/day respectively.

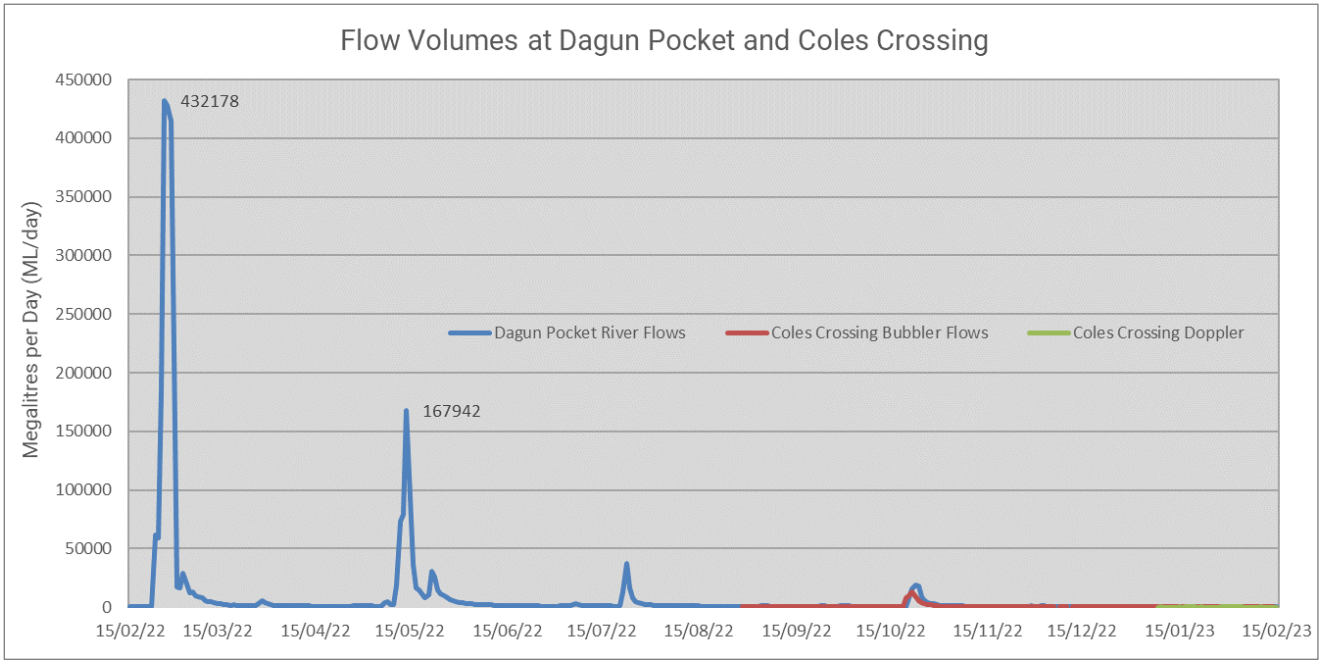

Figure 2 - River flow data between Coles Crossing and Dagun Pocket

2.5.2.3. Mary River Home Park Gauging Station (Condition 4c Item ii)

Flow volumes and levels at the Home Park gauging station (station number 138014A) are recorded daily by the Department of Regional Development, Manufacturing and Water (DRDMW). Home Park gauging station data is publicly available on the DRDMW Water Monitoring Website. Average flows and river levels recorded at Home Park gauging station have been summarised in Table 3 and graphically illustrated in Figure 3. Daily flow volumes can be provided to DCCEEW upon request.

Table 3 monthly flows past Dagun Pocket Alert Station

Month	Average daily flows at Home Park (ML/d)	Average River Level at Home Park (metres)
February 2022[1]	122,738	6.62
March 2022	37,325	4.41
April 2022	2,097	2.19
May 2022	40,053	4.82
June 2022	4,694	2.57
July 2022	11,125	3.09
August 2022	2,233	2.23
September 2022	2,477	2.23
October 2022	9,276	2.78
November 2022	1,943	2.10
December 2022	2,194	2.03
January 2023	610	1.63

February 2023[1]	386	1.51

[1]Flow volumes are calculated from 15 February 2021 to 15 February 2022 to align with the reporting period.

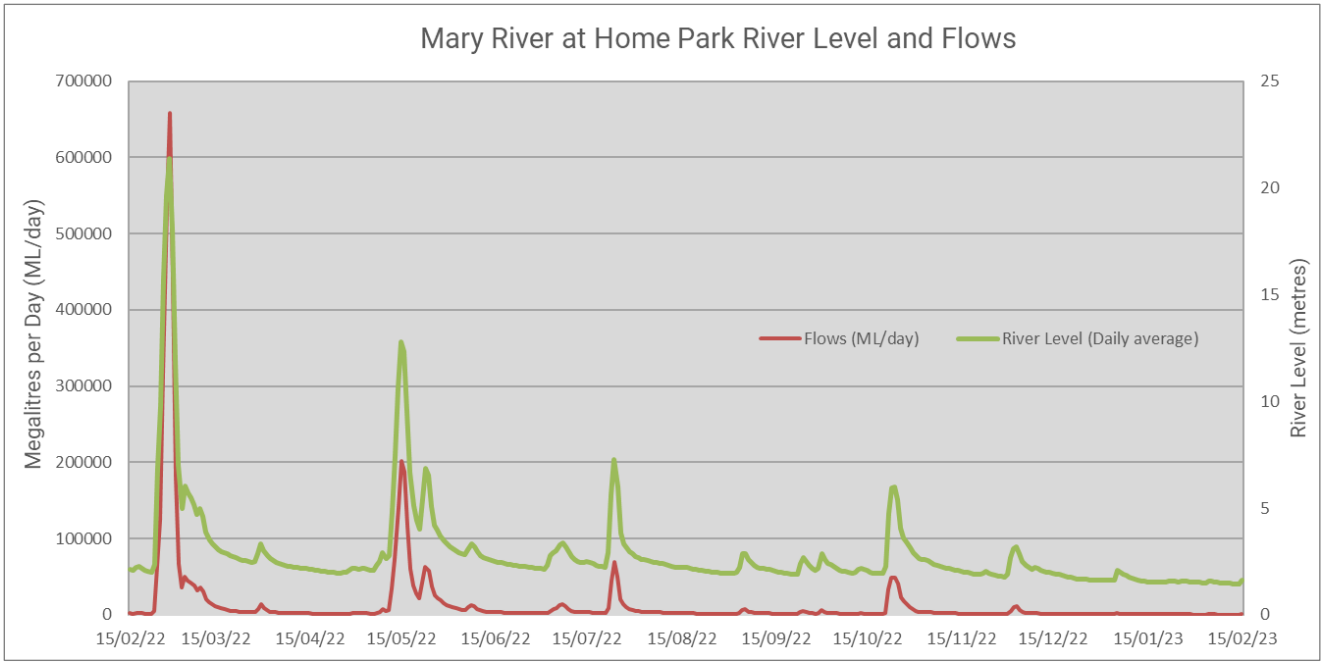

Figure 3 – Daily river flow volumes and height data at Home Park gauging station

EPBC Condition 4 (Condition 4c item ii) Compliance Status – Non-compliant due to partial data gaps at Coles Crossing during the monitoring period from 15 February 2022 and 29 August 2022. Interim monitoring data and indicative flows from Dagun Pocket have analysed to enable an evaluation of operations to achieve the intent of the monitoring program.

The Coles Crossing level differential pressure sensor (bubbler) was commissioned in August 2022 and the Doppler was commissioned in January 2023.

2.5.3. Water transported through NPI2 (Condition 4c Item iii)

EPBC Condition 5 requires that data is kept in accordance with Condition 4c and submitted to DCCEEW on an annual basis. This includes:

- *Condition 4c item iii) requires the amount of water transported through the NPI2 to be reported*

In accordance with Condition 4c (ii) the amount of water transported through the NPI2 must be obtained and accurately recorded. Table 4 provides a summary of water transport volumes via the NPI2. During this reporting period Seqwater transported approximately 923 ML of potable water from the Noosa WTP through the NPI2 and 1781 ML of potable water was supplied to the Noosa Zone via NPI2 from other grid connected assets not related to extraction from the Coles Crossing offtake. Daily transfer volumes can be provided to DCCEEW upon request.

Table 3 monthly flows past Dagun Pocket Alert Station

Month	Northern Flow "Import to Noosa Zone" (ML)	Southern Flow[1] "Export from Noosa Zone" (ML)

February 2022[2]	102	0
March 2022	101	0
April 2022	283	0
May 2022	205	0
June 2022	33	174
July 2022	17	250
August 2022	0	271
September 2022	101	124
October 2022	94	98
November 2022	305	0
December 2022	254	0
January 2023	183	6
February 2023[2]	103	0
TOTAL	**1781**	**932**

[1]Note "Southern Flow" is the southern transport from the Noosa WTP into NPI2

[2]Flow volumes are calculated from 15 February 2021 to 15 February 2022 to align with the reporting period.

EPBC Condition 4 (Condition 4c item iii) Compliance Status – Compliant (all records have been maintained and summarised in this report).

2.6. EPBC Condition 5

EPBC Condition 5 requires that data is kept in accordance with Condition 4c and submitted to DCCEEW on an annual basis.

EPBC Condition 5 (Condition 4c item iii) Compliance Status – Compliant (all records have been maintained and summarised in this report).

2.7. EPBC Condition 7

EPBC Condition 7 requires revised plans or programs to be approved by the Minister prior to implementation of the new plan or program.

EPBC Condition 7 Compliance Status – This condition has been complied with and requires no further action.

2.8. EPBC Condition 9

EPBC Condition 9 requires the transport of water through the NPI2 to be carried out in the following order of preference:

- *1st preference: (run of river) water harvested from the Mary River main channel at the Coles Crossing offtake when flow at the pump station is at or above 90 ML/day and flow at Home Park gauging station is above 20 ML/day; or otherwise*

- *2nd preference (controlled release from Borumba Dam) taking high priority allocation releases made from existing allocations from Borumba Dam (at the Coles Crossing offtake) of no more than 20 ML/day up to a total of 6,500 ML/annum, when flow at the pump station is below 90 ML/day and flow at Home Park gauging station is below 20 ML/day.*

During this monitoring period, the 1st Preference (run of river) water harvesting from the Mary River at the Coles Crossing offtake was initiated for raw water supply to Noosa WTP as flows at Home Park remained above 20 ML/day for the entire monitoring period (as per Table 3 and Figure 3).

Due to flooding and consistent catchment inflows, Borumba Dam overtopped (spilled) for the entire 2022 calendar year. Borumba Dam ceased spilling for the first time on the 27 December 2023. Controlled releases from Borumba Dam were conducted between 26 December 2022 - 15 February 2023 for the primary purposes of supply of water to high priority users downstream including irrigation customers and Gympie Regional Council. The controlled releases of water made from Borumba Dam throughout the current reporting period totalled approximately 293 ML, compared to the last monitoring period (2021-2022) where 3,743 ML was released. Table 4 provides a monthly summary of the Borumba Dam releases. Daily release volumes can be provided to DCCEEW upon request.

Table 4 Borumba Dam Controlled Releases

Month	Controlled Releases from Borumba (ML)
February 2022[2]	0
March 2022	0
April 2022	0
May 2022	0
June 2022	0
July 2022	0
August 2022	0
September 2022	0
October 2022	0
November 2022	0
December 2022	34
January 2023	178
February 2023[2]	81
TOTAL	**293**

EPBC Condition 9 Compliance Status – Compliant with approval conditions.

2.9. EPBC Condition 10

During the reporting period 2,619 ML of water was extracted from Coles Crossing offtake under the existing water extraction entitlement. This volume equates to approximately 40.1% of the annual extraction entitlement of 6,500

ML. Refer to Table 2 for monthly extraction volumes. Furthermore, the current extraction and transportation capacity of the Coles Crossing pump station is 20 ML per day, therefore physically limiting daily extraction volumes to 20 ML.

EPBC Condition 10 Compliance Status – Compliant with approval condition.

2.10. EPBC Condition 11

There were no State water licences issued for the purposes of operation of NPI2.

EPBC Condition 11 Compliance Status – Compliant with approval condition.

2.11. EPBC Condition 12

As this report meets the need for lodgement of a statement of compliance under EPBC Condition 11 it also meets the requirements for EPBC Condition 12.

EPBC Condition 12 Compliance Status – Compliant with approval condition.

2.12. EPBC Condition 15

Seqwater is committed to maintaining accurate records required under the active conditions of approval pertaining to the operation of NPI2. Records of activities associated or relevant to the conditions of approval, beyond what has been presented within this report can be made available to the Department upon request. Records of all activities associated or relevant to the EPBC Conditions of approval have been maintained with the exception of the data gap for flow volume records from Coles Crossing (refer to Section 2.5 for further details).

EPBC Condition 15 Compliance Status – Compliant with approval conditions.

2.13. EPBC Condition 16

This report meets the need for lodgement of annual compliance reports for the NPI2 project and therefore meets the requirements for EPBC Condition 16.

EPBC Condition 16 Compliance Status – Compliant with approval condition.

3. Conclusion

The pipeline and associated facilities for the NPI2 have been operational during this reporting period. During this monitoring period the Coles Crossing level differential pressure sensor (bubbler) was commissioned in August 2022 and the Doppler was commissioned in January 2023. Routine maintenance of the Doppler has been scheduled to ensure the integrity of the equipment and associated monitoring data. In addition, the successful installation of the permanent telemetry station will improve data reliability and minimise the risk of data gaps due to external factors. The remote monitoring software will be configured to provide alerts to notify of anomalies in telemeted data which will trigger investigation and maintenance (where required). The level differential pressure sensor (bubbler) will provide flood warning as well as backup water level data, should it be required. Flow data from Dagun Pocket Alert Station, Bubbler and Doppler have been presented in this report to enable an evaluation of operations to achieve the intent of the monitoring program and the EPBC Act conditions of approval.

In accordance with CG Condition 32 the annual Aquatic Habitat Monitoring Program (AHMP) survey was conducted in November 2022. The AHMP survey efforts focus on in-stream aquatic features that provide habitat for the Mary River Cod, Australian Lungfish, Mary River turtle and White-Throated Snapping turtle in the Mary River and in Six Mile Creek. The 2022 survey was the ninth survey undertaken during the operational phase of the NPI2 and despite significant flood damage to the Mary River the overall suitability of habitat for MNES species was largely unchanged compared to the survey in October 2021. A copy of the AHMP annual survey has been included in Appendix A.

Seqwater is not aware of any events that have occurred during this reporting period that had the potential to significantly impact EPBC Act listed species or MNES. No incidents required notification to DCCEEW during this reporting period. Seqwater will continue to submit annual compliance reports to DCCEEW for the remaining active EPBC Conditions. Seqwater is committed to continuous improvement and to preventing and minimising potential impact to the environmental values on and surrounding Seqwater's facilities and assets.

Appendix A – Aquatic Habitat Monitoring Program (AHMP)

Northern Pipeline Interconnector Stage 2 Project

Aquatic Habitat Monitoring Program Operational Phase 2022 Survey

Prepared for:

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freshwater estuarine marine

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Summary

The Northern Pipeline Interconnector Stage 2 (NPI Stage 2) is a 48 km, bi-directional potable water pipeline that, together with Stage 1 of the pipeline, can transport up to 65 megalitres per day (ML/day) of potable water from the Sunshine Coast to Brisbane, and vice versa. The NPI Stage 2 is currently operated by Seqwater and connects to the Noosa Water Treatment Plant (WTP) which can transport a maximum of 20 ML/day of potable water to NPI Stage 2.

In accordance with condition 32 of the Queensland Coordinator General's approval of the Environmental Impact Statement, an Aquatic Habitat Monitoring Program (AHMP) was developed for the operational phase of NPI Stage 2. In the AHMP, in-stream aquatic features that provide habitat for the Mary River cod (*Maccullochella peeli mariensis*), Australian Lungfish (*Neoceratodus forsteri*), Mary River turtle (*Elusor macrurus*) and White-Throated Snapping turtle (*Elseya albagula*) (i.e. Matters of National Environmental Significance) in the Mary River and in Six Mile Creek are monitored.

This report presents the results of the ninth survey during operation of the NPI Stage 2 (November 2022), and compares them to results from the baseline survey in October 2013, and subsequent annual surveys in November 2014, November 2015, October 2016, November 2017, November 2018, October 2019, October 2020, and October 2021. In particular, the following issues are addressed:

- if there have been any changes to the aquatic habitat of species that are Matters of National Environmental Significance (MNES), and
- whether any identified changes are likely to be due to the operation of NPI Stage 2.

In November 2022, as in previous surveys, there was suitable habitat for Mary River cod, Australian Lungfish, White-Throated Snapping turtle and Mary River turtle (i.e. the MNES species) at all of the sites on the Mary River. While Australian Lungfish are occasionally recorded from Six Mile Creek, the habitat in Six Mile Creek is not their preferred habitat, and thus an important population of Australian Lungfish is very unlikely to occur in Six Mile Creek (frc environmental 2018). Similarly, while there are favourable habitat elements for Mary River turtle and White-Throated Snapping turtle, these species have not been recorded from Six Mile Creek, and these species would occur only in low abundance, if at all, in Six Mile Creek (frc environmental 2018). The presence of mainly shallow pools in Six Mile Creek suggested that deeper habitat preferred by adult Mary River cod was limited, although the shallower pools likely support juvenile and intermediate sized cod. However, gauging station data indicated a relatively stable depth of approximately 2.0 – 2.5 m at the gauging station site in 2022 suggesting other reaches of Six Mile Creek likely support

habitat suitable for adult Mary River cod. The gauging station data indicates that the dominant water depth has constantly been in the range of 1.5 – 2.0 m since 2013. The overall suitability of habitat for MNES species in the Mary River and Six Mile Creek is largely unchanged compared to the survey in October 2021.

1 Introduction

1.1 Project Background

The Northern Pipeline Interconnector Stage 2 (NPI Stage 2) is a 48 km, bi-directional potable water pipeline that, together with Stage 1 of the pipeline, can transport up to 65 megalitres per day (ML/day) of potable water from the Sunshine Coast to Brisbane, and vice versa. The NPI Stage 2 is currently operated by Seqwater and connects to the Noosa Water Treatment Plant (WTP), which can transport a maximum of 20 ML/day of potable water to NPI Stage 2.

The Noosa WTP has a maximum design capacity of 45 ML/day. It can extract water from the off-take at Coles Crossing and directly from Lake Macdonald. The Coles Crossing off-take has a maximum design capacity of 20 ML/day (with suitable raw water quality), which is the same as the existing entitlement held by the SEQ Grid Manager (now merged with Seqwater) within the upper Mary River Water Supply Scheme under the *Water Resource (Mary Basin) Plan 2006* (Queensland Government, 2006).

The Environmental Impact Statement (EIS) and associated approvals for the Project were based on the total daily transport volume being no greater than 20 ML/day. Any future increases in water extraction will require additional impact assessments, and an upgrade of the Coles Crossing off-take infrastructure.

In accordance with condition 32 of the Queensland Coordinator General's approval decision, an Aquatic Habitat Monitoring Program (AHMP) was developed for the operational phase of the project, as detailed in the EIS. This operational phase AHMP was based on the AHMP for the construction phase of this project, which was endorsed by the Department of Sustainability, Environment, Population and Communities (DSEWPaC). The AHMP comprised the monitoring of in-stream aquatic features that provide habitat for the Mary River cod (*Maccullochella peeli mariensis*), the Australian Lungfish (*Neoceratodus forsteri*), the Mary River turtle (*Elusor macrurus*) and White-Throated Snapping turtle (*Elseya albagula*) in the Mary River and in Six Mile Creek. These species are threatened species, listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and are collectively referred to as the aquatic Matters of National Environmental Significance species (i.e. the MNES species).

1.2 Scope and Aims

This report presents the results of the ninth survey during operation of the NPI Stage 2 (November 2022), and compares them to results from the baseline survey in October 2013, and subsequent annual surveys in November 2014, November 2015, October 2016, November 2017, November 2018, October 2019, October 2020, and October 2021. In particular, the following issues are addressed:

- if there have been any changes to the preferred aquatic habitat for species that are Matters of National Environmental Significance (MNES), and
- whether any identified changes are likely to be due to the operation of NPI Stage 2.

1.3 Description of the Survey Area

The Mary River and Six Mile Creek are in the Mary River Basin. The source of the Mary River is in the Sunshine Coast Hinterland near the township of Conondale. The river flows north from the source, for approximately 290 km, past the towns of Kenilworth, Gympie, Tiaro and Maryborough before flowing to the Great Sandy Strait near Hervey Bay (Map 1). The Coles Crossing off-take is on the Mary River upstream of the confluence with Six Mile Creek.

The predominant land use in the Mary River Basin is grazing on cleared land; however, there are also several forestry reserves, national parks, and rural and urban areas throughout the basin (Johnson 1997). There are numerous weirs and dams along the Mary River and its tributaries, including Borumba Dam, Lake Baroon, Tallegalla Weir, Teddington Weir and the Mary River Barrage.

Six Mile Creek is a tributary of the Mary River, originating inland from Noosa Heads and flowing for approximately 60 km north-west to join the Mary River approximately 4.5 km south of Gympie (Map 1). Lake Macdonald is in the upper reaches of Six Mile Creek.

Map 1.1 Survey area within the Upper Mary River Sub-basin.

2 Methods

2.1 Survey Timing

The survey was completed on 17 and 18 November 2022.

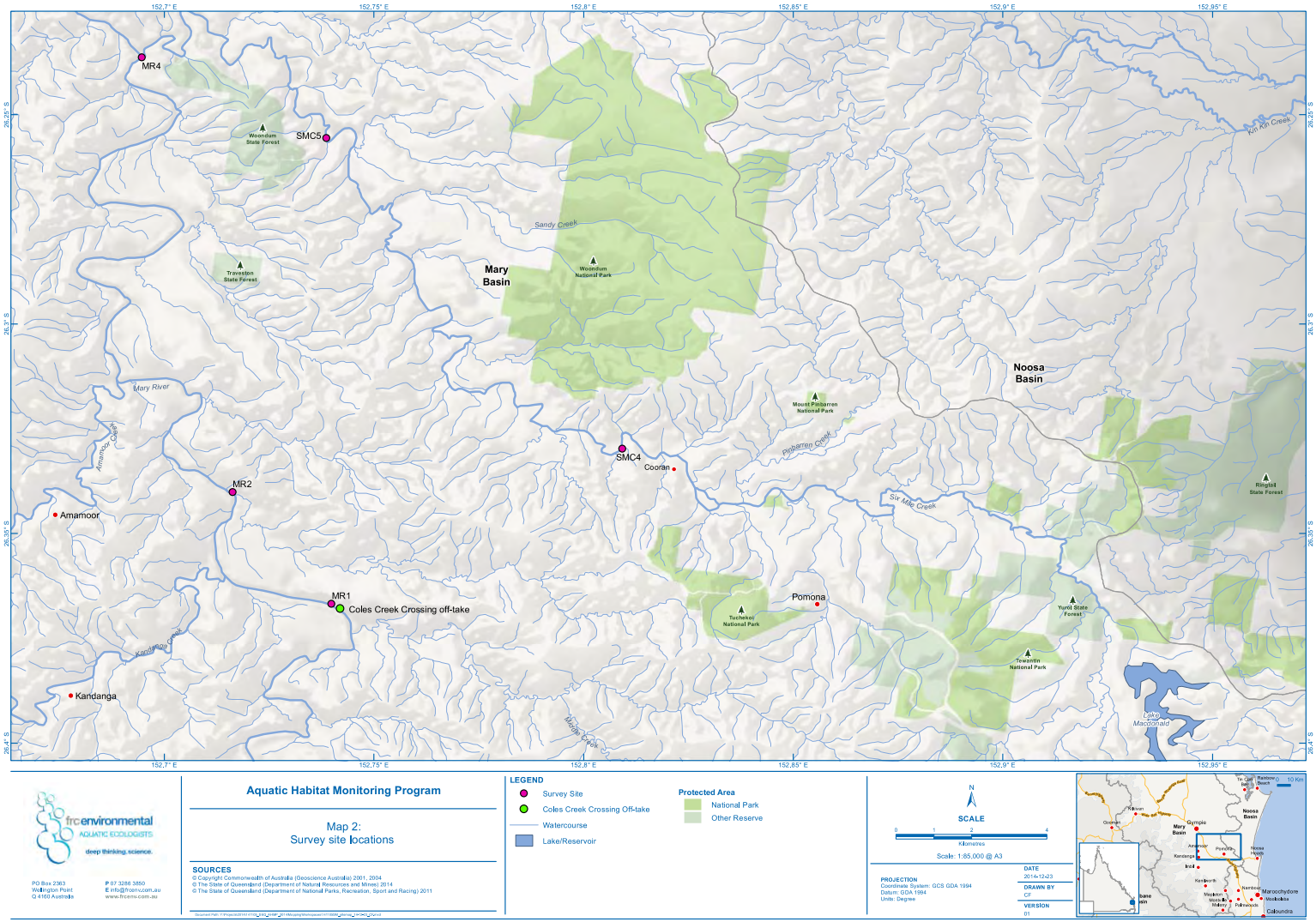
2.2 Site Details

Five sites were surveyed: three sites on the Mary River and two sites on Six Mile Creek (Table 2.1).

Each site was 100 m in length, extending 50 m upstream and 50 m downstream of the mid-site point.

Table 2.1 Mid-point of survey sites.

Site	Description	WGS84 (Zone 56J)	
		Easting	Northing
Mary River			
MR1	250 m downstream of the Coles Creek Crossing off-take.	474050	7083669
MR2	5 km downstream of the Coles Creek Crossing off-take.	471688	7086616
MR4	27 km downstream of the Coles Creek Crossing off-take; at the confluence of Six Mile Creek and the Mary River.	469503	7098101
Six Mile Creek			
SMC4	Main channel of Six Mile Creek; 28 km upstream of the confluence of Six Mile Creek and the Mary River.	480965	7087785
SMC5	Main channel of Six Mile Creek; 11 km upstream of the confluence of Six Mile Creek and the Mary River.	473906	7095982



Map 2.1 Survey Site Locations.

2.3 Survey Methods

Antecedent Rainfall and Flow Assessment

Rainfall and flow data for the 12 months prior to the survey were obtained to assess temporal variation in flow leading up to the survey.

Rainfall data from the following weather stations were collated and reviewed:

- Gympie (within the survey area); station number 40093, and
- Kenilworth (upper catchment region); station number 40106.

Stream flow data from the following stream flow monitoring stations were collated and reviewed:

- Six Mile Creek at Cooran (within survey area); station number 138107B
- Mary River at Moy Pocket (upper catchment region); station number 138111A
- Mary River at Fisherman's Pocket (downstream of survey area); station number 138007A.

Water Quality

All water quality measurements were taken 30 cm below the surface of the water at the mid-point of each site. A calibrated Insitu Inc. Smartroll Multiparameter water quality meter was used to measure:

- water temperature (ºC)
- pH
- dissolved oxygen (% saturation and mg/L), and
- electrical conductivity (µS/cm).

Turbidity was measured using a calibrated HACH 2100Q portable turbidity meter.

Flow Conditions and Flow Habitats

The presence / absence of the following flow habitats was noted at each site:

- isolated in-channel pool
- connected in-channel pool
- riffle, and
- run.

The flow velocity of water was measured using a flow meter. Flow velocity was measured in the middle of the channel, at three locations at each site:

- downstream end of site (50 m downstream from mid-point)
- mid-point of site, and
- upstream end of site (50 m upstream from mid-point).

Three cross-sectional depth profiles were completed at each site at the:

- downstream end of site (50 m downstream from mid-point)
- mid-point of site, and
- upstream end of site (50 m upstream from mid-point).

For each profile, the water depth was measured at 0.5 m intervals along transects from the left bank to the right bank across the watercourse, with a waypoint recorded on a GPS where the depth profile was recorded (Appendix A). On the Mary River, channel depth profiles were recorded from a boat using a Hondex Portable Handheld Depth Sounder, while on Six Mile Creek, they were recorded on-foot using a weight rope marked at 0.5 m intervals.

Adjacent Land Uses and Riparian Zone Disturbances

At each site, the land use adjacent to each bank was recorded, and the following were visually assessed:

- riparian vegetation cover and condition, and
- stream bank stability, noting slope, composition (i.e. silt, sand, gravel, etc.), stability, and any notable areas and likely causes of erosion.

Photo-point Monitoring

To maintain a visual record of each site, nine photographs were taken at each site:

- 3 photographs at the downstream end of the site (50 m downstream from mid-point) – upstream mid-channel, upstream left bank and upstream right bank
- 3 photographs at the mid-point of the site – upstream mid-channel, upstream left bank and upstream right bank, and
- 3 photographs at the upstream end of the site (50 m upstream from mid-point) – upstream mid-channel, upstream left bank and upstream right bank.

MNES Habitat Assessment

At each site, the presence / absence of the following habitat features were noted to assess the suitability of the site for the MNES species (i.e. Mary River cod, Mary River turtle, White-Throated Snapping turtle and Australian Lungfish):

- flow habitats (as described above)
  - isolated pool in channel (noting pool depths from channel depth profiles)
  - connected pool in channel (noting pool depths from channel depth profiles)
  - riffle
  - run
- submerged woody debris
  - leaves and twigs (also noting whether cover was sparse or dense)
  - branches < 300 mm diameter (noting whether branches are individual branches or branch piles (or both))
  - branches > 300 mm diameter (also noting whether branches are individual branches or branch piles (or both))
- submerged boulders and rocky crevices
- submerged aquatic plants (also noting whether they were isolated, and whether cover was sparse or dense)
- emergent logs, boulders or other habitat features that allow for turtle basking, and
- sandy banks with sparse vegetation that would allow for turtle nesting.

3 Results

3.1 Antecedent Rainfall and Flow

There was no notable rainfall in early to mid-November 2022, prior to the survey, and limited rainfall immediately before the survey (Figure 3.1). There were seven relatively large rainfall events (i.e. > 30 mm) in the upper catchment in the 12 months prior to the survey: November 2021, January 2022, February 2022, March 2022, two in May 2022, and July 2022. The late February rainfall events were very high. Rainfall over the past 12 months was above the long-term average recorded at both Kenilworth and Gympie (Figure 3.2), with the exception of December 2021, and March, April, June, August and November 2022 at both Kenilworth and Gympie.

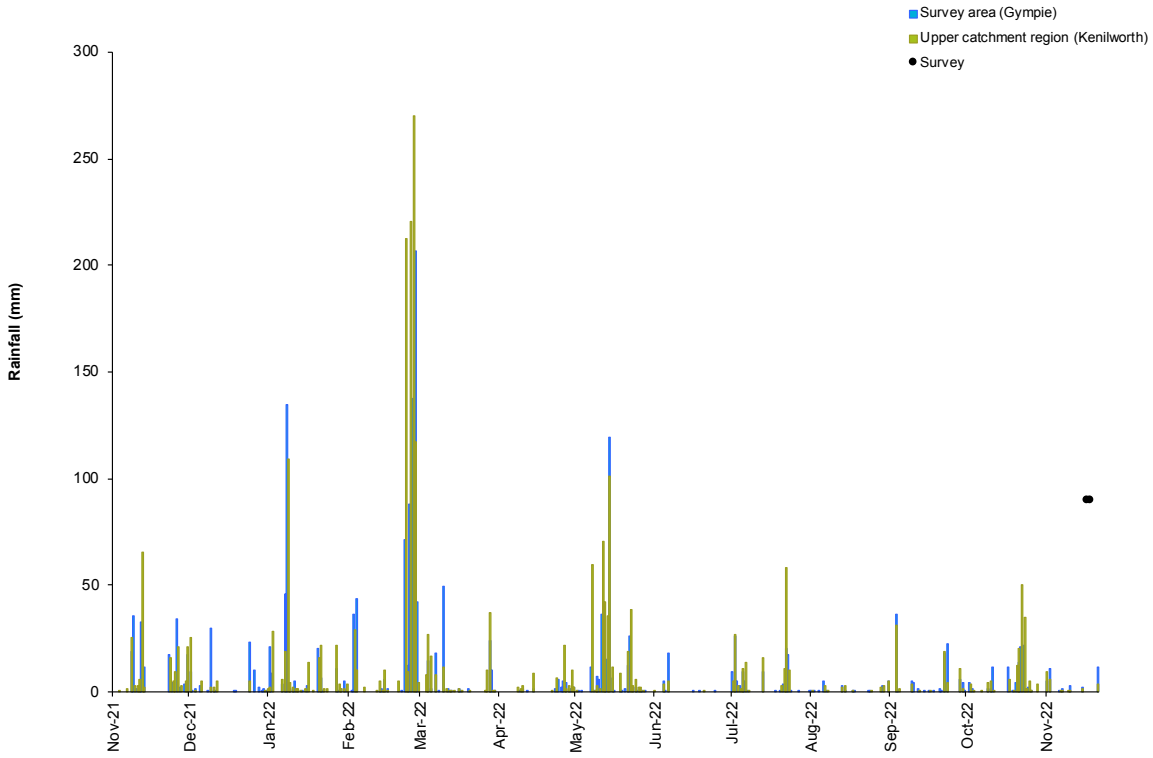


Figure 3.1 Total daily rainfall twelve months prior to the November 2022 survey in the survey area (Gympie) and upper catchment (Kenilworth) (BOM 2022).

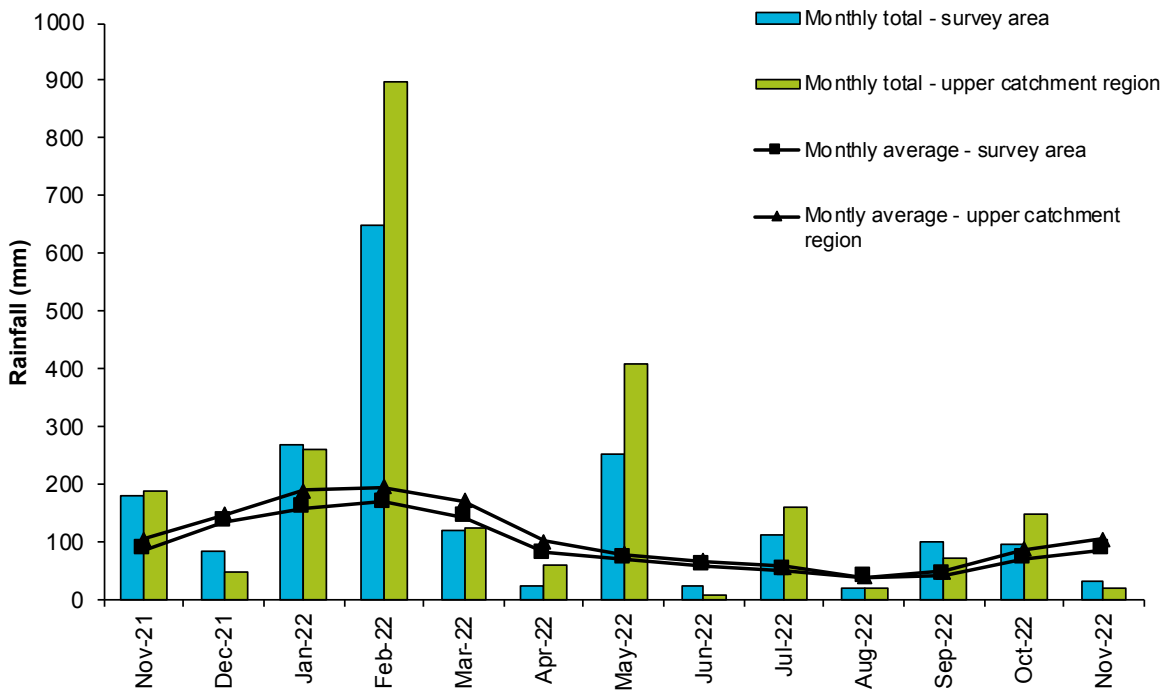


Figure 3.2 Total monthly rainfall for twelve months prior to the 2022 survey and long term mean rainfall for each month in the survey area (Gympie) and the upper catchment region (Kenilworth) (BOM 2022).

Flow and water levels in the Mary River and Six Mile Creek were generally moderate, except in January, February, May and July 2022 where there were brief high to very high flow events (Figure 3.3 and Figure 3.4). In the Mary River in 2022, the maximum recorded high flow event (i.e. 615,862 ML/day) was recorded in February. This event (on 27 February), and the second and third highest events (on 26 and 28 February respectively) were the three highest recorded Mary River flow events since surveys commenced in 2013. Of the ten highest Mary River Flow events recorded since surveys commenced in 2013, nine of them occurred in 2022.

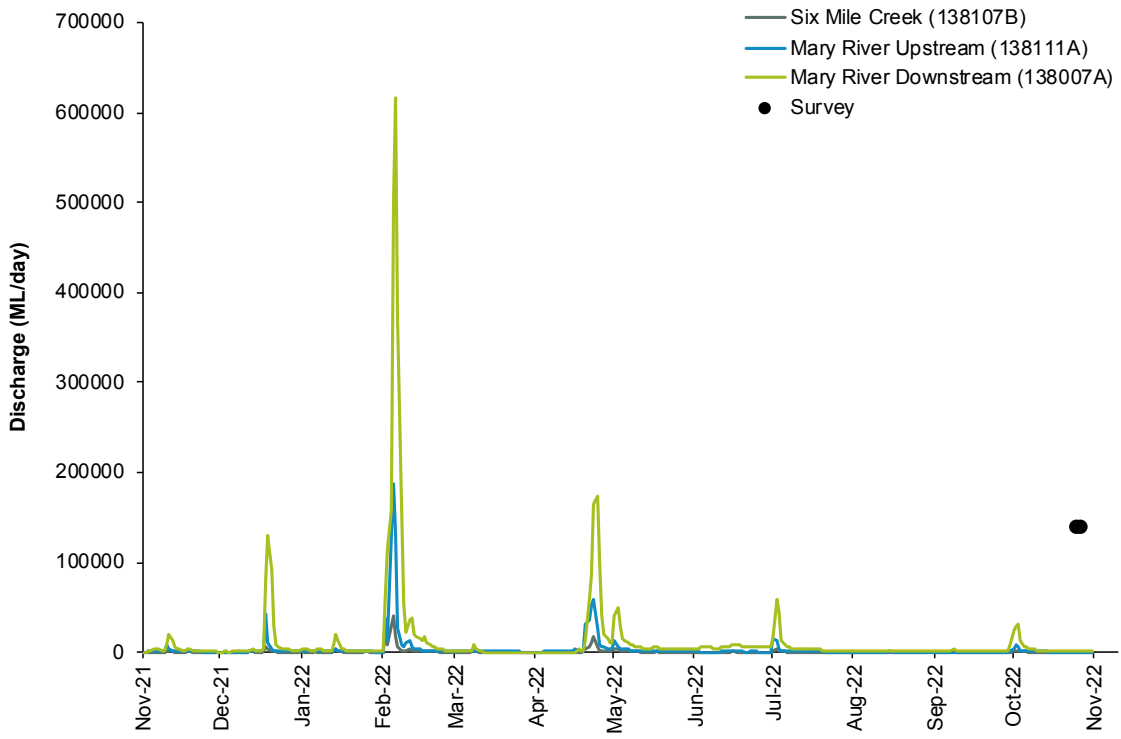


Figure 3.3 Mean daily discharge recorded at stream flow monitoring stations on Six Mile Creek and Mary River (Queensland Government 2022).

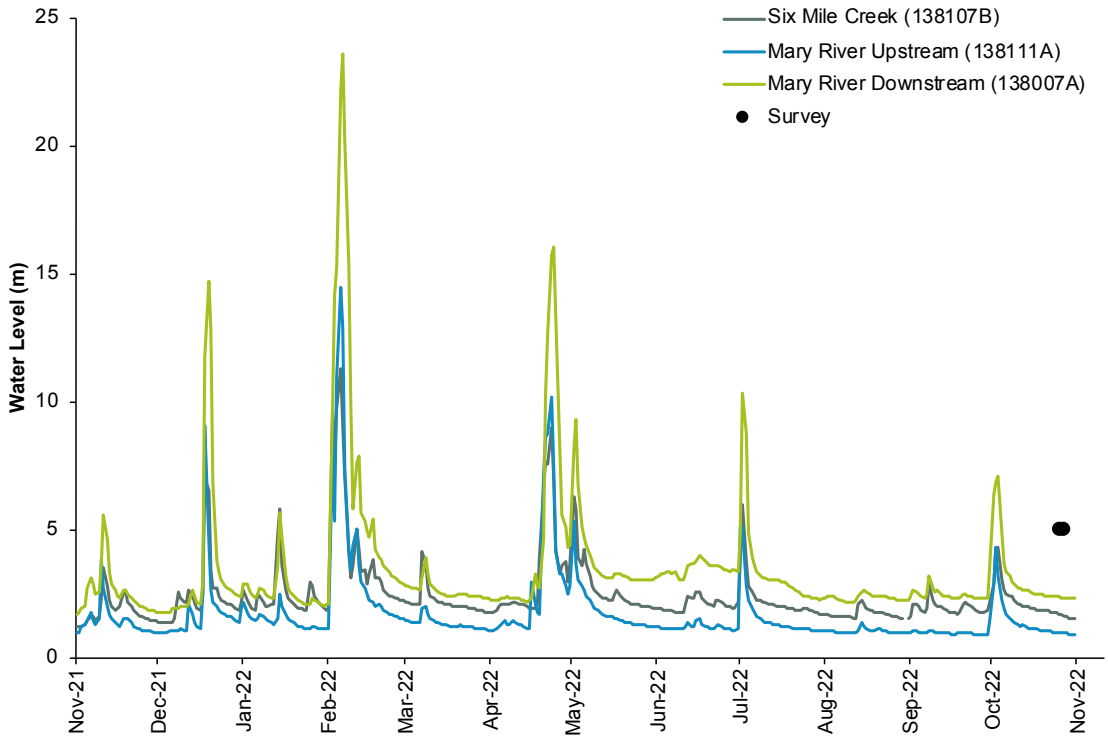


Figure 3.4 Mean daily water level recorded at stream flow monitoring stations on Six Mile Creek and Mary River (Queensland Government 2022).

3.2 Reach-scale Assessment, Photographic Monitoring and MNES Habitat Assessment

The full results, including the photographic monitoring and the MNES habitat assessment, are presented in Appendix B.

In general, sites on the Mary River had:

- moderate to good water quality, although turbidity was slightly higher across the sites than in 2021
- moderate to very high levels of disturbance in adjacent catchment and riparian areas, and
- a range of habitat features, including:
  - deep connected pools
  - slow flow

  - large woody debris and
  - boulders.

In general, sites on Six Mile Creek had:

- moderate to good water quality, although turbidity was slightly higher across the sites than in 2021
- moderate to high levels of disturbance in adjacent catchment and riparian areas, and
- a range of habitat features, including:
  - shallow pools
  - riffles and runs
  - rock crevices
  - sandy banks, and
  - submerged and emergent large woody debris.

Preferred habitat features of the MNES species (i.e. Mary River cod, Australian Lungfish, White-Throated Snapping turtle and Mary River turtle) were recorded at all sites on the Mary River (Table 3.1). Australian Lungfish were not observed during the survey. Habitat in Six Mile Creek was generally considered suitable for juvenile Mary River cod, and potentially suitable for adult Mary River cod, White-Throated Snapping turtles and Mary River turtles.

There was little change in habitat conditions in the Mary River between the October 2013, November 2014, November 2015, October 2016, November 2017, November 2018, October 2019, October 2020, October 2021 and November 2022 surveys. However, February's high flow events lead to some erosion and loss of aquatic vegetation. In Six Mile Creek, the water levels were similar to the 2021 survey. Some erosion and loss of aquatic vegetation was also observed at these sites.

Table 3.1 Results of habitat assessment for the MNES species in October 2013, November 2014, November 2015, October 2016, November 2017, November 2018, October 2019, October 2020, October 2021 and November 2022.

Species	Location	Mary River			Six Mile Creek	
	Survey	MR1	MR2	MR4	SMC4	SMC5
Mary River cod	Oct-13	suitable	suitable	suitable	suitable	suitable
	Nov-14	suitable	suitable	suitable	unsuitable	unsuitable
	Nov-15	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-16	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-17	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-18	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-19	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-20	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-21	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-22	potentially suitable	potentially suitable	suitable	potentially suitable	potentially suitable
Australian Lungfish	Oct-13	potentially suitable	suitable	potentially suitable	potentially suitable	potentially suitable
	Nov-14	potentially suitable	suitable	potentially suitable	unsuitable	unsuitable
	Nov-15	potentially suitable	suitable	potentially suitable	unsuitable	unsuitable
	Oct-16	suitable	suitable	suitable	unsuitable	unsuitable
	Nov-17	suitable	suitable	suitable	unsuitable	unsuitable
	Nov-18	suitable	suitable	suitable	unsuitable	unsuitable
	Oct-19	suitable	suitable	suitable	unsuitable	unsuitable
	Oct-20	suitable	suitable	suitable	unsuitable	unsuitable

Species	Location	Mary River			Six Mile Creek	
	Survey	MR1	MR2	MR4	SMC4	SMC5
	Oct-21	suitable	suitable	suitable	unsuitable	unsuitable
	Nov-22	potentially suitable	potentially suitable	suitable	unsuitable	unsuitable
White-Throated Snapping turtle	Oct-13	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-14	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-15	suitable	suitable	suitable	potentially suitable	suitable
	Oct-16	suitable	suitable	suitable	suitable	suitable
	Nov-17	suitable	suitable	suitable	suitable	suitable
	Nov-18	suitable	suitable	suitable	suitable	suitable
	Oct-19	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-20	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-21	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-22	potentially suitable	potentially suitable	suitable	potentially suitable	potentially suitable
Mary River turtle	Oct-13	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-14	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-15	suitable	suitable	suitable	potentially suitable	suitable
	Oct-16	suitable	suitable	suitable	suitable	suitable
	Nov-17	suitable	suitable	suitable	suitable	suitable
	Nov-18	suitable	suitable	suitable	suitable	suitable
	Oct-19	suitable	suitable	suitable	potentially suitable	potentially suitable

Species	Location	Mary River			Six Mile Creek	
	Survey	MR1	MR2	MR4	SMC4	SMC5
	Oct-20	suitable	suitable	suitable	potentially suitable	potentially suitable
	Oct-21	suitable	suitable	suitable	potentially suitable	potentially suitable
	Nov-22	potentially suitable	potentially suitable	suitable	potentially suitable	potentially suitable

4 Summary

In November 2022, as in previous surveys, there was suitable or potentially suitable habitat for Mary River cod, Australian Lungfish, White-Throated Snapping turtle and Mary River turtle (i.e. the MNES species) at all of the sites on the Mary River. No Australian Lungfish were observed at any sites in the Mary River in this survey. While Australian Lungfish are occasionally recorded from Six Mile Creek, the habitat in Six Mile Creek is not their preferred habitat, and thus an important population of Australian Lungfish is very unlikely to occur in Six Mile Creek (frc environmental 2018). Similarly, while there are favourable habitat elements for Mary River turtle and White-Throated Snapping turtle, these species have not been recorded from Six Mile Creek, and these species would occur only in low abundance, if at all, in Six Mile Creek (frc environmental 2018). The presence of mainly shallow pools in Six Mile Creek suggested that deeper habitat preferred by adult Mary River cod was limited at the assessed sites, although the shallower pools likely support juvenile and intermediate sized cod. However, gauging station data indicated a relatively stable depth of approximately 2.0 – 2.5 m at the gauging station site in 2022, suggesting other reaches of Six Mile creek likely support habitat suitable for adult Mary River cod. The gauging station data indicates that the dominant water depth has constantly been in the range 1.5 – 2.0 m since 2013. The overall suitability of habitat for MNES species in the Mary River and Six Mile Creek is largely unchanged compared to the survey in October 2021.

5 References

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Appendix A Geographic Coordinates for Channel Depth Profile Transects

Table A1 Location of depth profile transects at each site.

Site	Location	Description	WGS84 (Zone 56J)	
			Easting	Northing
Mary River				
MR1	Upstream	50 m upstream of the mid-site point	474102	7083677
	Mid	mid-site point	474059	7083702
	Downstream	50 m downstream of the mid-site point	474013	7083711
MR2	Upstream	50 m upstream of the mid-site point	471712	7086605
	Mid	mid-site point	471662	7086657
	Downstream	50 m downstream of the mid-site point	471621	7086696
MR4	Upstream	50 m upstream of the mid-site point	469466	7098056
	Mid	mid-site point	469494	7098096
	Downstream	50 m downstream of the mid-site point	469493	7098147
Six Mile Creek				
SMC4	Upstream	50 m upstream of mid-site point	481028	7087821
	Mid	mid-site point	480990	7087778
	Downstream	50 m downstream of mid-site point	480936	7087759
SMC5	Upstream	50 m upstream of mid-site point	473898	7095948
	Mid	mid-site point	473913	7095972
	Downstream	50 m downstream of mid-site point	473909	7095994

Appendix B Detailed Survey Results

B.1 Site MR1

Results for site MR1 are presented in Table B.1 – B.3, and Figure B.1. Site MR1 had potentially suitable habitat to support all MNES species including Mary River cod, Australian Lungfish, White-Throated Snapping turtles and Mary River turtles.

Table B.1 Site MR1 – water quality, flow, land use, and bed and bank assessment.

Site MR1

Right bank at mid-site

Upstream at mid-site

Left bank at mid-site

Water Quality	
Temperature (°C)	25.7
Conductivity (µS/cm)	315.6
Turbidity (NTU)	7.78
Dissolved oxygen (mg/L)	7.83
Dissolved oxygen (% sat)	96.5
pH	6.43

Flow Conditions			
Flow habitats present	Connected in-channel pool		
Water level	Moderate (at watermark)		
Recent high flow	Yes		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	3.3	2.7	1.8
Width (m)	39	41	35
Velocity (m/s)	0.07	0.091	0.149

Land Use	Grazing		
Left bank:	Pump station	Right bank:	Grazing
Overall disturbance:	Moderate		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Sand, clay	Bank material:	Sand, clay
Bank height:	5 m	Bank height:	5 m
Bank slope:	Steep	Bank slope:	Steep
Bank shape:	Concave	Bank shape:	Concave
Vegetation cover:	Moderate	Vegetation cover:	Moderate
Vegetation type:	Grass, shrubs and trees	Vegetation type:	Grass, shrubs and trees
Shading of river:	5%	Shading of river:	5%
Trailing bank vegetation:	5%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Moderate	Erosion:	Moderate
Stability:	Moderate	Stability:	Moderate
Disturbances:	Weeds, cleared vegetation	Disturbances:	Weeds, cleared vegetation, access tracks
Bed Assessment			
Substrate material:	Gravel, sand and silt/clay		
Bed stability rating:	Bed stable	Sediment deposits:	Silt

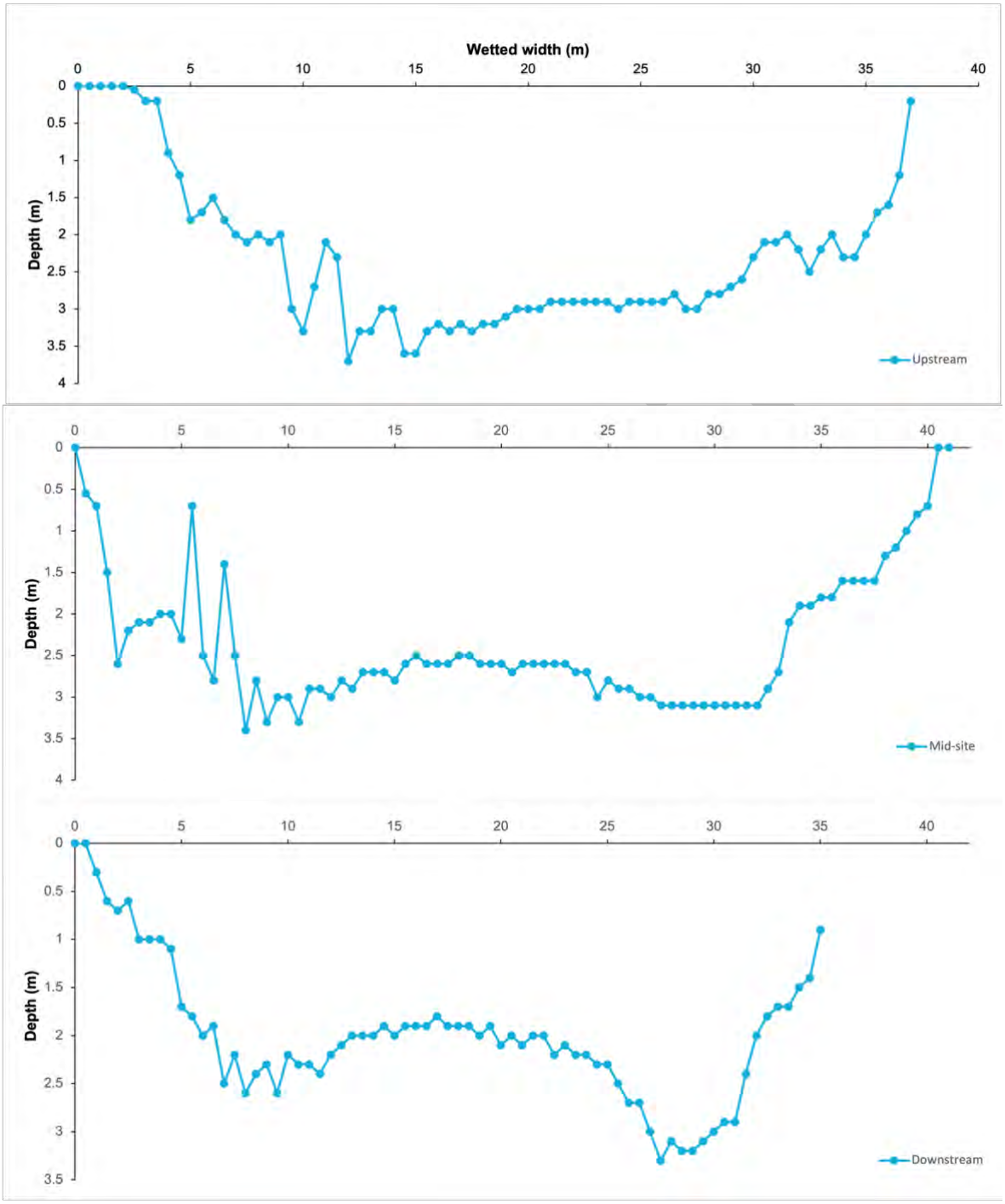

Figure B.1 Site MR1 – channel depth profiles.

Table B.2 Site MR1 – habitat assessment for MNES species

MNES Species Habitat

Connected pool with slow flow

Logs suitable for basking

Erosion of sandy nesting banks

Habitat	Present / Absent	Habitat	Present / Absent
Isolated pools	Absent	Individual log (diameter >250mm)	Present
Connected pools	Present	Individual branch (diameter <300mm)	Present
Riffle	Absent	Branch pile <50% dense (diameter <300mm)	Present
Run	Absent	Branch pile >50% dense (diameter <300mm)	Present
Aquatic vegetation	Absent	Log jam <50% dense (diameter >300mm)	Present
Turtle basking spots	Present	Log jam >50% dense (diameter >300mm)	Absent
Turtle nesting habitat	Absent	Terrestrial leaves and twigs	Present – sparse
Submerged boulders / rock crevices	Absent		

MNES Species Habitat	
Overall suitability	Suitable
Comments:	Patches of potentially suitable habitat for Mary River cod, White-Throated Snapping turtles, Mary River turtles and Australian Lungfish were scattered throughout the site. Pools were deep to 3 m. Some banks were moderately shaded and contained large woody debris. Turtle basking spots were present in limited numbers, while turtle nesting habitat and submerged boulders and rock crevices were absent at MR1. Aquatic vegetation was absent.

Table B.3 Site MR1 – Photographic Monitoring.

Site MR1

Upstream right bank at upstream site

Upstream at upstream site

Upstream left bank at upstream site

Upstream right bank at mid-site

Upstream at mid-site

Upstream left bank at mid-site

Upstream right bank at downstream site

Upstream at downstream site

Upstream left bank at downstream site

B.2 Site MR2

Results for site MR2 are presented in Table B.4 – B.6. Site MR2 had potentially suitable habitat to support the MNES species (Mary River cod, Australian Lungfish, White-Throated Snapping turtle and Mary River turtle).

Table B.4 Site MR2 – water quality, flow, land use, and bed and bank assessment.

Site MR2

Right bank at mid-site

Upstream at mid-site

Left bank at mid-site

Water Quality	
Temperature (°C)	25.96
Conductivity (µS/cm)	338.5
Turbidity (NTU)	11.1
Dissolved oxygen (mg/L)	8.94
Dissolved oxygen (% sat)	110.7
pH	7.72

Flow Conditions			
Flow habitats present	Connected in-channel pool		
Water level	Moderate (at watermark)		
Recent high flow	Yes		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	3.4	5	3
Width (m)	57	33	60
Velocity (m/s)	0.06	0.085	0.072

Land Use	Grazing land		
Left bank:	Grazing	Right bank:	Grazing
Overall disturbance:	High		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Boulder, cobble, sand	Bank material:	Cobble, sand, silt/clay
Bank height:	8 m	Bank height:	10 m
Bank slope:	Steep	Bank slope:	Steep
Bank shape:	Convex	Bank shape:	Convex
Vegetation cover:	Moderate	Vegetation cover:	Moderate
Vegetation type:	Grass, shrubs, trees	Vegetation type:	Grass
Shading of river:	5%	Shading of river:	10%
Trailing bank vegetation:	5%	Trailing bank vegetation:	25%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Moderate	Erosion:	Moderate
Stability:	Moderate	Stability:	Moderate
Disturbances:	Erosion	Disturbances:	Erosion, weeds, cleared vegetation
Bed Assessment			
Substrate material:	Pebble, gravel, sand and silt/clay		
Bed stability rating:	Bed stable	Sediment deposits:	Sand

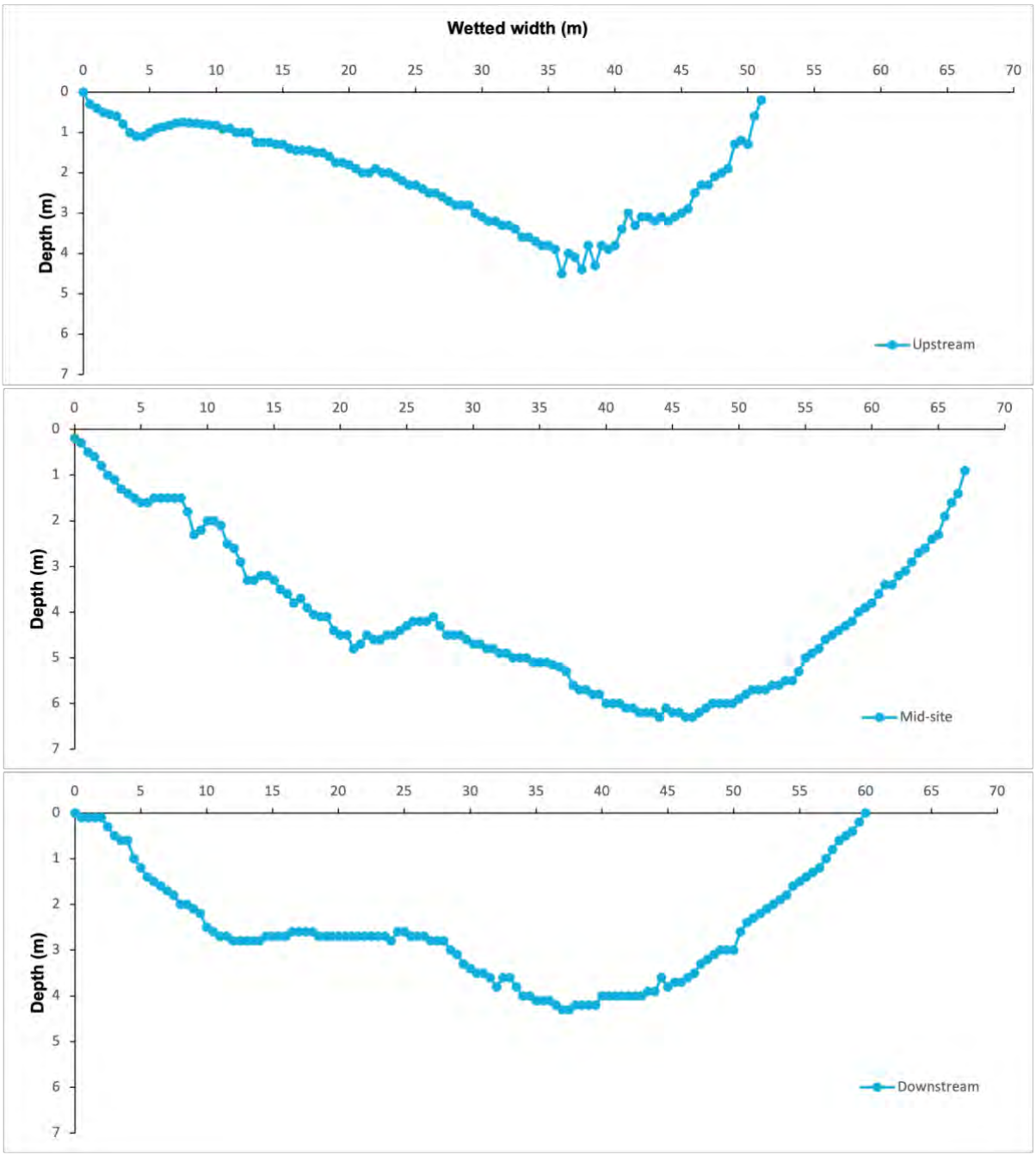

Figure B.2 Site MR2 – channel depth profile

Table B.5 MR2 – habitat assessment for MNES species.

MNES Species Habitat.

Eroded sandy/pebble banks

Connected pool with slow flow

Rocky banks

Habitat	Present / Absent	Habitat	Present / Absent
Isolated pools	Absent	Individual log (diameter >250mm)	Present
Connected pools	Present	Individual branch (diameter <300mm)	Present
Riffle	Absent	Branch pile <50% dense (diameter <300mm)	Absent
Run	Absent	Branch pile >50% dense (diameter <300mm)	Absent
Aquatic vegetation	Absent	Log jam <50% dense (diameter >300mm)	Absent
Turtle basking spots	Absent	Log jam >50% dense (diameter >300mm)	Absent
Turtle nesting habitat	Present	Terrestrial leaves and twigs	Present – sparse
Submerged boulders / rock crevices	Present		

MNES Species Habitat.	
Overall suitability	Suitable
Comments:	Patches of potentially suitable habitat for Mary River turtles and White-Throated Snapping turtles were observed, however basking locations were largely absent and turtle nesting habitats were eroded. Deep pools (>4 m) throughout the site provide good habitat for both Australian Lungfish and Mary River cod. Submerged large woody debris provide habitat and shelter. Aquatic plants were not observed at site MR2.

Table B.6 Site MR2 – Photographic Monitoring.

Site MR2

Upstream right bank at upstream site

Upstream at upstream site

Upstream left bank at upstream site

Upstream right bank at mid-site

Upstream at mid-site

Upstream left bank at mid-site

Upstream right bank at downstream site

Upstream at downstream site

Upstream left bank at downstream site

B.3 Site MR4

Results for site MR4 are presented in Table B.7 – B.9. Site MR4 had potentially suitable habitat to support all MNES species (Mary River cod, Australian Lungfish, White Throated Snapping turtle and Mary River turtle).

Table B.7 Site MR4 – water quality, flow, land use, and bed and bank assessment.

Site MR4

Right bank at mid-site

Upstream at mid-site

Left bank at mid-site

Water Quality	
Temperature (°C)	23.95
Conductivity (µS/cm)	360.1
Turbidity (NTU)	12.4
Dissolved oxygen (mg/L)	7.87
Dissolved oxygen (% sat)	93.8
pH	7.81

Flow Conditions			
Flow habitats present	Connected in-channel pool		
Water level	Moderate (at watermark)		
Recent high flow	Yes		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	2.3	4	0.7
Width (m)	26	65	47
Velocity (m/s)	0.333	0.19	0.19

Land Use	Grazing		
Left bank:	Grazing	Right bank:	Grazing
Overall disturbance:	Very high		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Silt/clay	Bank material:	Silt/clay
Bank height:	5 m	Bank height:	7 m
Bank slope:	Steep	Bank slope:	Steep
Bank shape:	Convex	Bank shape:	Convex
Vegetation cover:	Some	Vegetation cover:	Moderate
Vegetation type:	Grass, shrubs and trees	Vegetation type:	Grass, shrubs and trees
Shading of river:	5%	Shading of river:	5%
Trailing bank vegetation:	5%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Some	Erosion:	Moderate
Stability:	Moderate	Stability:	Moderate
Disturbances:	Weeds, cattle and cleared vegetation	Disturbances:	Weeds, erosion and cleared vegetation
Bed Assessment			
Substrate material:	Pebble, gravel, sand and silt/clay		
Bed stability rating:	Bed stable	Sediment deposits:	Sand and silt

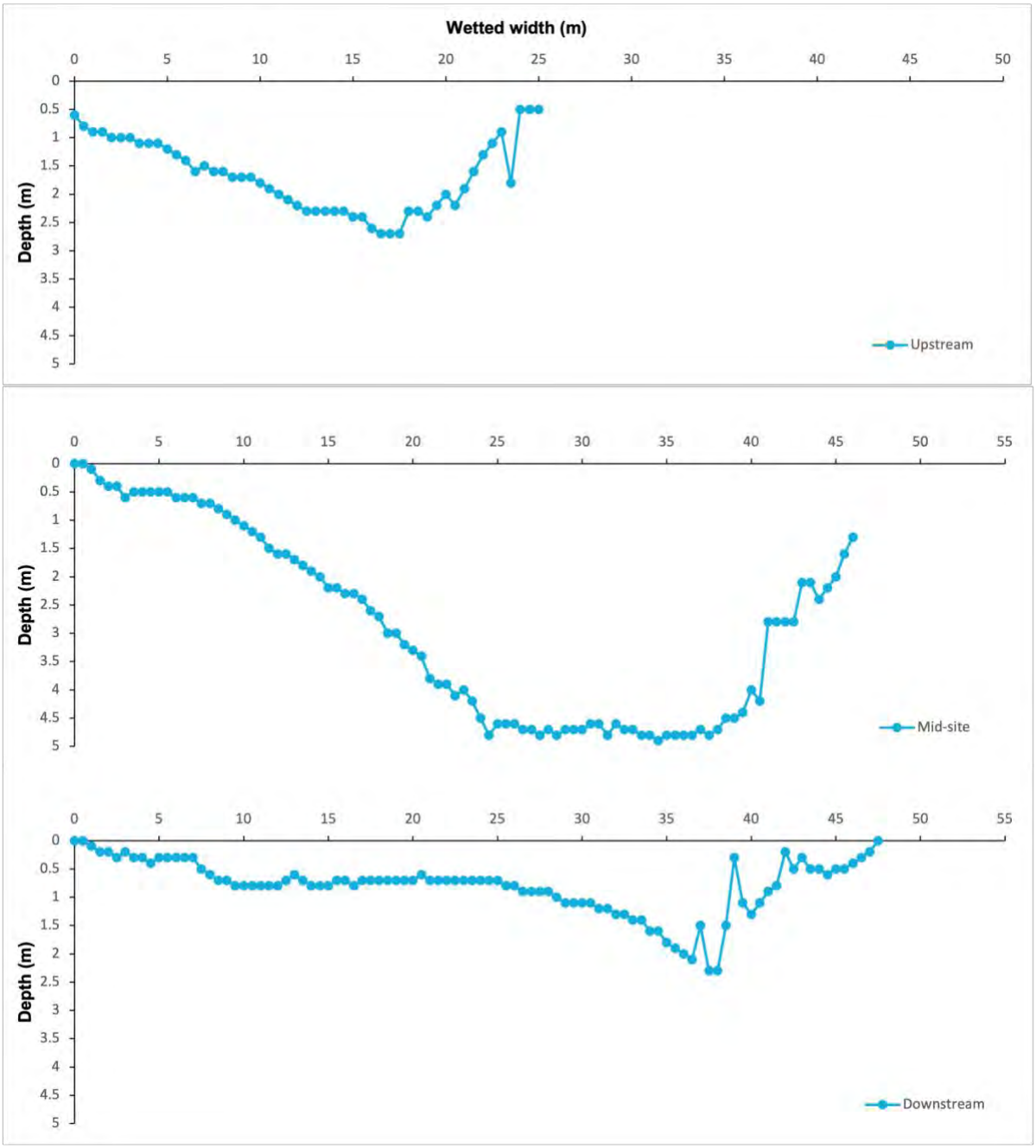

Figure B.3 Site MR4 – channel depth profiles.

Table B.8 Habitat assessment for MNES species at site MR4.

MNES Species Habitat

Logs and woody debris suitable for basking

Sandy bank suitable for nesting

Undercut banks provide habitat

Habitat	Present / Absent	Habitat	Present / Absent
Isolated pools	Absent	Individual log (diameter >250mm)	Present
Connected pools	Present	Individual branch (diameter <300mm)	Present
Riffle	Absent	Branch pile <50% dense (diameter <300mm)	Present
Run	Absent	Branch pile >50% dense (diameter <300mm)	Present
Aquatic vegetation	Absent	Log jam <50% dense (diameter >300mm)	Present
Turtle basking spots	Present	Log jam >50% dense (diameter >300mm)	Absent
Turtle nesting habitat	Present	Terrestrial leaves and twigs	Present – sparse
Submerged boulders / rock crevices	Present		

MNES Species Habitat	
Overall suitability	Suitable
	Suitable habitat for Mary River cod, Australian Lungfish, White-Throated Snapping turtles and Mary River turtles was scattered through the site. Deep pools (>4 m) were present throughout the site during the 2022 survey. Most deep pools contained large woody debris. Turtle basking spots were present in the form of exposed logs. Sandy banks suitable for nesting habitat were present. No aquatic vegetation was observed at site.

Table B.9 MR4 – Photographic monitoring.

Site MR4

Upstream right bank at upstream site

Upstream at upstream site

Upstream left bank at upstream site

Upstream right bank at mid-site

Upstream at mid-site

Upstream left bank at mid-site

Upstream right bank at downstream site

Upstream at downstream site

Upstream left bank at downstream site

B.5 Site SMC4

Results for site SMC4 are presented in Table B.10 – B.15 and Figure B.4. Site SMC4 had potentially suitable habitat to support White-Throated Snapping turtles and Mary River turtles and juvenile Mary River cod. This site did not have the potential to support Australian Lungfish.

Table B.10 Site SMC4 – water quality, flow, land use, and bed and bank assessment.

Site SMC4

Right bank at mid-site

Upstream at mid-site

Left bank at mid-site

Water Quality	
Temperature (°C)	20.69
Conductivity (µS/cm)	170.2
Turbidity (NTU)	11
Dissolved oxygen (mg/L)	5.95
Dissolved oxygen (% sat)	67
pH	6.98

Flow Conditions			
Flow habitats present	Connected in-channel pool, riffle, run		
Water level	Moderate (at watermark)		
Recent high flow	Yes		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	0.5	0.8	0.6
Width (m)	8.5	9.5	10
Velocity (m/s)	0.165	0.291	0.125

Land Use	Grazing		
Left bank:	Grazing	Right bank:	Grazing
Overall disturbance:	High		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Sand and silt/clay	Bank material:	Sand and silt/clay
Bank height:	3 m	Bank height:	3 m
Bank slope:	Steep	Bank slope:	Moderate - steep
Bank shape:	Concave	Bank shape:	Convex
Vegetation cover:	Moderate	Vegetation cover:	Extensive
Vegetation type:	Shrubs (*Lomandra* sp.*)* and trees	Vegetation type:	Shrubs (*Lomandra* sp.) and trees
Shading of river:	25%	Shading of river:	25%
Trailing bank vegetation:	5%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Some	Erosion:	Moderate
Stability:	Moderate	Stability:	Moderate
Disturbances:	Roads (bridge)	Disturbances:	Roads (bridge)
Bed Assessment			
Substrate material:	Gravel, sand, silt/clay		
Bed stability rating:	Bed stable	Sediment deposits:	Sand and silt

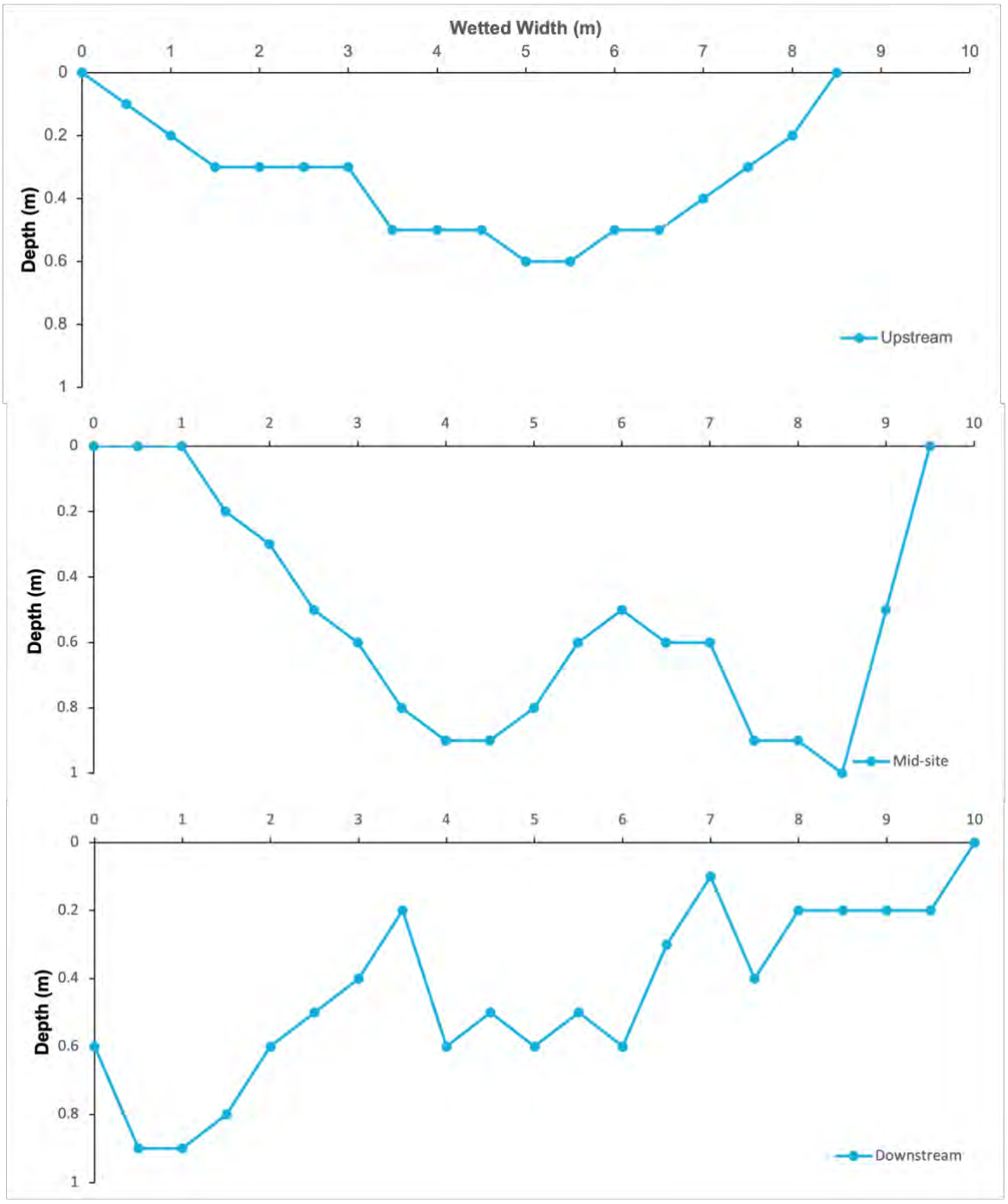

Figure B.3 Site SMC4 – channel depth profiles.

Table B.11 Site SMC4 – habitat assessment for MNES species.

MNES Species Habitat

Woody debris provides basking spot

Undercut banks provide habitat

Sandy bank provides nesting habitat

Habitat	Present / Absent	Habitat	Present / Absent
Isolated pools	Absent	Individual log (diameter >250mm)	Present
Connected pools	Present	Individual branch (diameter <300mm)	Present
Riffle	Present	Branch pile <50% dense (diameter <300mm)	Present
Run	Present	Branch pile >50% dense (diameter <300mm)	Present
Aquatic vegetation	Absent (none in-stream)	Log jam <50% dense (diameter >300mm)	Present
Turtle basking spots	Present	Log jam >50% dense (diameter >300mm)	Present
Turtle nesting habitat	Present	Terrestrial leaves and twigs	Present – dense
Submerged boulders / rock crevices	Absent		

MNES Species Habitat	
Overall suitability	Suitable for White-Throated Snapping turtles and Mary River turtles, potentially suitable for juvenile Mary River cod, not suitable for Australian Lungfish.
Comments:	Moderately shaded, shallow pools (<1 m) throughout the majority of the reach. Submerged woody debris was present across the site, providing potential habitat for juvenile Mary River cod. No suitable habitat for the Australian Lungfish was present. The presence of flowing water in shallow riffles and a sandy substrate provide habitat that is suitable for White-Throated Snapping turtles and Mary River turtles, in addition to sandy nesting habitat on the banks. Woody debris provided turtle basking spots.

Table B.12 Site SMC4 – Photographic monitoring.

Site SMC4

Upstream right bank at upstream site

Upstream at upstream site

Upstream left bank at upstream site

Upstream right bank at mid-site

Upstream at mid-site

Upstream left bank at mid-site

Upstream right bank at downstream site

Upstream at downstream site

Upstream left bank at downstream site

B.4 Site SMC5

Results for site SMC5 are presented in Table B.13 – B.12 and Figure B.4. Site SMC5 had potentially suitable habitat for juvenile Mary River cod, White-Throated Snapping turtle and Mary River turtle, but did not have suitable habitat for Australian Lungfish.

Table B.13 Site SMC5 – water quality, flow, landuse, and bed and bank assessment.

Site SMC5

Right bank at mid-site

Upstream at mid-site

Left bank at mid-site

Water Quality		**Flow Conditions**			
Temperature (°C)	22.8	Flow habitats present	Connected in-channel pool, riffle, run		
Conductivity (µS/cm)	189.3	Water level	Moderate (at watermark)		
Turbidity (NTU)	11.1	Recent high flow	Yes		
Dissolved oxygen (mg/L)	5.9	**Flow**	**Upstream**	**Mid-site**	**Downstream**
Dissolved oxygen (% sat)	69.2	Depth (m)	0.9	0.5	0.5
pH	8.1	Width (m)	8	9	13.5
		Velocity (m/s)	0.174	0.145	0.326

Land Use	Grazing		
Left bank:	Grazing	Right bank:	Grazing
Overall disturbance:	Moderate to low		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Sand and silt/clay	Bank material:	Sand
Bank height:	6 m	Bank height:	6 m
Bank slope:	Steep	Bank slope:	Steep
Bank shape:	Stepped	Bank shape:	Stepped
Vegetation cover:	Moderate	Vegetation cover:	Moderate
Vegetation type:	Trees, shrubs (*Lomandra* sp.), grasses	Vegetation type:	Trees, shrubs (*Lomandra* sp.), grasses
Shading of river:	50%	Shading of river:	50%
Trailing bank vegetation:	5%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Some	Erosion:	Some
Stability:	Moderate	Stability:	Moderate
Disturbances:	Access tracks, erosion, road	Disturbances:	Access tracks, erosion, road
Bed Assessment			
Substrate material:	Cobble, pebble, gravel, sand, silt/clay		
Bed stability rating:	Bed stable	Sediment deposits:	Sand

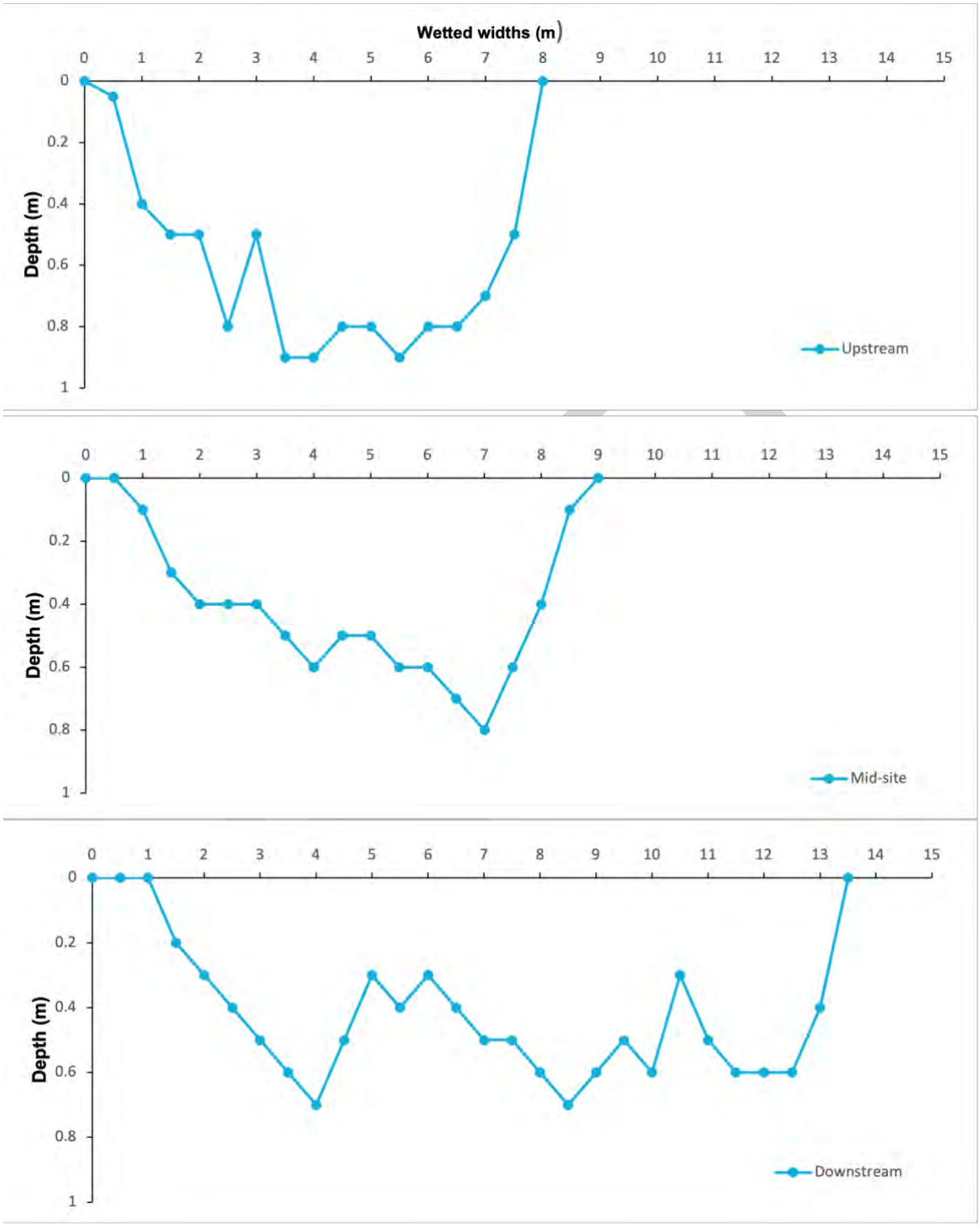

Figure B.4 Site SMC5 – channel depth profiles.

Table B.14 Site SMC5 – habitat assessment for MNES species.

MNES Species Habitat

Logs provide basking habitat

Sandy banks provide nesting habitat

Undercut banks provide habitat

Habitat	**Present / Absent**	**Habitat**	**Present / Absent**
Isolated pools	Absent	Individual log (diameter >250mm)	Present
Connected pools	Present	Individual branch (diameter <300mm)	Present
Riffle	Present	Branch pile <50% dense (diameter <300mm)	Present
Run	Present	Branch pile >50% dense (diameter <300mm)	Present
Aquatic vegetation	Absent	Log jam <50% dense (diameter >300mm)	Present
Turtle basking spots	Present	Log jam >50% dense (diameter >300mm)	Present
Turtle nesting habitat	Present	Terrestrial leaves and twigs	Present – Dense
Submerged boulders / rock crevices	Present		
Overall suitability	Potential for Mary River cod, White-Throated Snapping turtle and Mary River turtle, unsuitable for Australian Lungfish.		

MNES Species Habitat	
Comments:	Shallow (<1 m) pools with submerged woody debris and rock faces and crevices were present that may provide some suitable habitat for juvenile Mary River cod, White-Throated Snapping turtle and Mary River turtle. Australian Lungfish habitat was not present. Some suitable foraging habitat for White-Throated Snapping turtles or Mary River turtles in fast flowing riffles but no deep foraging pools were present. However, protruding logs and woody debris were present providing suitable basking spots for turtles.

Table B.15 Site SMC5 – Photographic monitoring.

Site SMC5

Upstream right bank at upstream site

Upstream at upstream site

Upstream left bank at upstream site

Upstream right bank at mid-site

Upstream at mid-site

Upstream left bank at mid-site

Upstream right bank at downstream site

Upstream at downstream site

Upstream left bank at downstream site