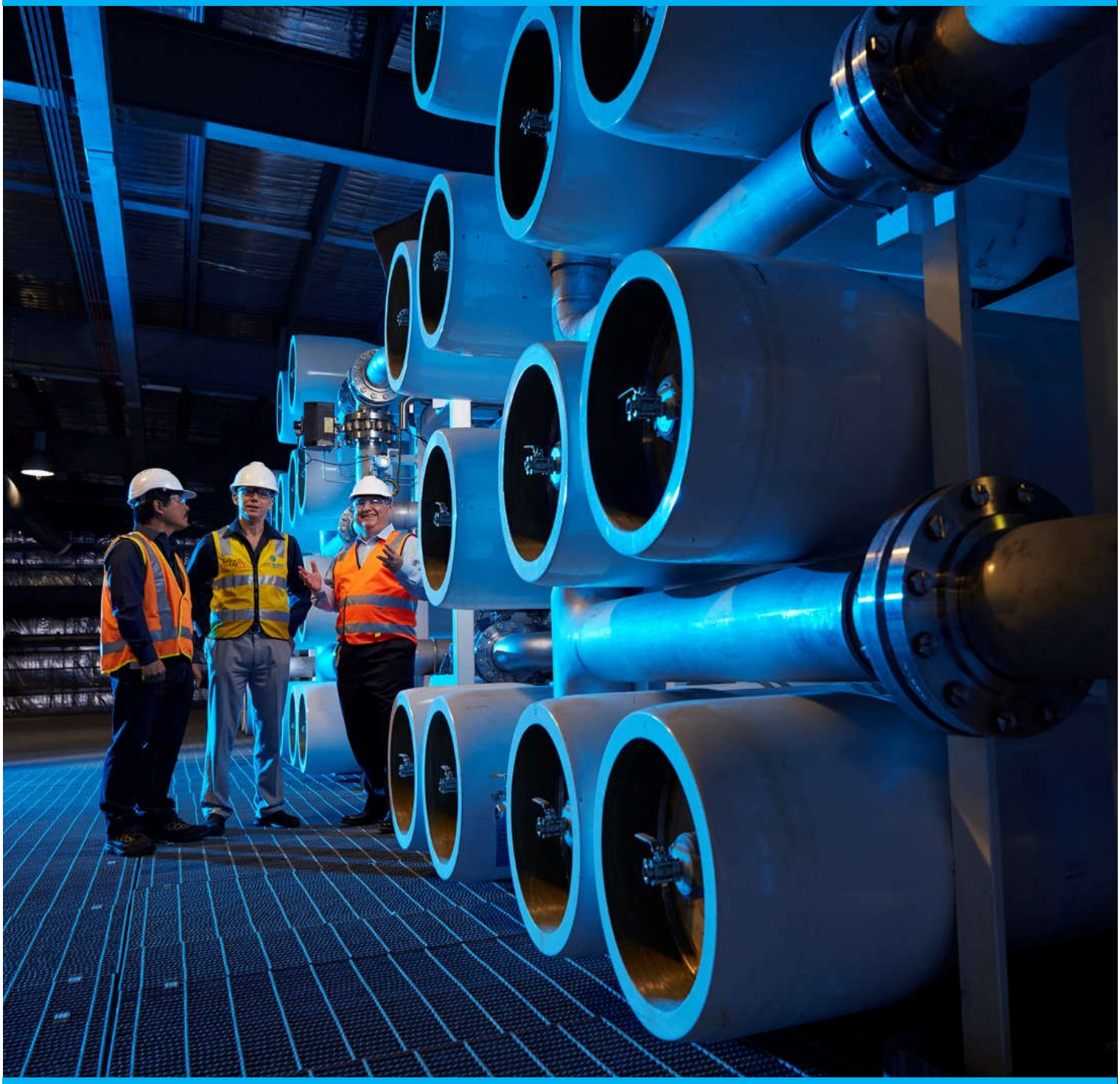
Annual Compliance Report
Northern Pipeline Interconnector 2
2019 - 2020



15 May 2020

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Department of Environment and Energy	

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Executive Summary

This annual compliance report is the tenth compliance report on Matters of National Environmental Significance (MNES) for the Northern Pipeline Interconnector Stage 2 (NPI Stage 2) 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 2019 and 15 February 2020 .

As the NPI Stage 2 project has transitioned from the construction and commissioning phases to the operational phase many conditions of approval have been closed out and new conditions of approval activated. During this reporting period (2019–2020) 12 conditions for the controlled action were active, whilst three remained inactive (EPBC 13, 14 and 17).

The conditions active during this reporting period (2019–2020) 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 Department of Environment and Energy (DoEE) have occurred during this reporting period (2019–2020). All ongoing active EPBC conditions of approval will continue to be implemented and audited during the operational phases of the NPI Stage 2.

Introduction

The NPI Stage 2 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 Environment and Energy (DoEE).

This report is the tenth annual compliance report and demonstrates the NPI Stage 2 project's progress and compliance to the conditions within the 12 months (15 February 2019 - 15 February 2020) following the previous annual compliance reporting period (15 February 2018 - 15 February 2019).

The Southern Regional Water Pipeline Company Pty Ltd (trading as LinkWater Projects), was 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 NPI Stage 2 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 NPI Stage 2 project that was owned and managed previously by LinkWater. Having assumed the functions and powers of LinkWater, Seqwater is therefore the proponent for NPI Stage 2 project and DoEE has been previously notified of this change to the proponent.

1.1 Project Overview

The Northern Pipeline Interconnector Stage 2 (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 completed NPI (Stages 1 and 2) can transport a volume of up to 65 ML/d of treated potable water between reservoirs located in the Sunshine Coast (Noosa Shire) 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 NPI Stage 2 Environmental Impact Statement (EIS), the NPI Stage 2 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.

NPI Stage 2 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, NPI Stage 2 was transferred to LinkWater on 30 June 2012. On 1 January 2013, following restructure of water providers in South East Queensland, Seqwater became the owner of NPI Stage 2.

1.2 Project Progress

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

- Construction started on the NPI Stage 2 project from 15 February 2010
- Construction was completed on the 17 November 2011
- Commissioning works were completed and the NPI Stage 2 was handed over to LinkWater on the 4 July 2012
- The operational phase of the NPI Stage 2 began on the 8 July 2012 and is ongoing.

Conditions of Compliance

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 activated have not been addressed in this report. The status of the condition compliance is provided in Column 3, while Column 4 provides a summary of condition compliance with MNES. Further details of compliance status have been provided below this table. 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: Reference Table for EPBC Act Controlled Action Conditions (February 2019– February 2020)

Column 1	Column 2	Column 3	Column 4
Condition Number	**Condition/Requirement**	**Status**	**Compliance assessment**
EPBC 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 Documentation. Where the EIS Documentation and these conditions are contradictory, these conditions will prevail to the extent of the contradiction.	Noted – general obligation condition.	Compliant.
EPBC 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. Note: Conditions 24, 25, 26, 27, 29, 30 and 31 were closed out in previous reporting periods.	Compliant.

CG 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 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 closed out after November 2015. Further detail on the Riparian Habitat Monitoring Program (RHMP) is provided below.	Compliant. The RHMP was submitted to DoEE on 15/05/14 for ministerial approval and was approved via letter on 12/08/14. Closed out as per RHMP Section 6.1 NPI2 – Operational Environmental Management Plan (OEMP) approved by DoEE 12/08/14.
CG 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.	Compliant. AHMP was submitted to DoEE on 15/05/2014 for ministerial approval and was approved via letter on 12/08/2014.

EPBC 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 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 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 3 items a) – g) and i) were closed out in 2011-12 reporting period. EPBC Condition 3 item h) and j) are ongoing for operational phase. Item h) is closed out as – per RHMP Section 6.1 NPI2 – Operational Environmental Management Plan (OEMP) approved by DoEE 12/08/2014.	Compliant. Refer to Conditions 28 and 32 of CG's Report

EPBC 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 NPI Stage 2.	4a) and b) were closed out in the 2011-12 reporting period 4c) is ongoing for operational phase.	Compliant. An updated EMP was submitted to DoEE on 15/05/2014 for ministerial approval and was approved via letter on 12/08/2014.
EPBC 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, except for condition 4c(ii) of the condition. Further detail is provided in Section 2.6 including actions currently being implemented by Seqwater to address this.
EPBC 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 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 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 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 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 authorities in relation to the construction and operation of the action, as referred to in Condition 11.	Ongoing.	Compliant.
EPBC 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.	Not activated.	N/A
EPBC 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.	Not activated.	N/A

EPBC 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.	Partially compliant. Valid flow volume and level data was unable to be collected from Coles crossing for the duration of the reporting period. Further detail is provided in Section 2.12 below. An updated EMP was submitted to DoEE on 15/05/14 for ministerial approval and was approved on 18/08/14.
EPBC 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 is satisfied the proponent has complied with all conditions of the approval.	Ongoing.	Compliant. This Annual Compliance Report has been prepared and submitted to fulfil the requirement for the 2019-2020 reporting period.
EPBC 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.	N/A

2.1 EPBC Condition 1

The condition requirement is noted. Evidence of compliance with this condition is provided within the annual compliance reports previously submitted to DoEE.

2.2 EPBC Condition 2

Compliance with the remaining activated CG's conditions is described in Sections 2.3 to 2.4 below.

2.3 QCG Condition 28

Although it is not anticipated the operation of the NPI Stage 2 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 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 RHMP was subsequently approved by DoEE in August 2014.

Status – Construction phase closed out in the reporting period (2011-2012). Operational phase is closed out for this reporting period (2019–2020).

2.4 QCG 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 NPI 2 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 would 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 DoEE in August 2014.

Status – Construction phase closed out in reporting period 2011-2012. Operational phase is ongoing and compliant.

2.5 EPBC Condition 4

An updated Operational Environmental Management Plan (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 developed and submitted. The updated OEMP was approved in August 2014.

Status – Compliant. Operational phase ongoing.

2.6 EPBC Condition 5

Condition 5 requires the data kept in accordance with Condition 4c be submitted to DoEE on an annual basis. This includes:

- *Condition 4c item i) requires the keeping of accurate records for the amount of water extracted from the Coles Crossing offtake.*
- *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.*
- *Condition 4c item iii) requires the amount of water transported through the NPI Stage 2 to be reported*

Coles Crossing Offtake

Water Extracted from Coles Crossing Pump Station

Since operation between the 15 February 2019 and the end of the current reporting period (15 February 2020), 2,260 ML of water was extracted from Coles Crossing offtake under the existing water extraction entitlement. This volume equates to approximately 34.8% of the annual extraction entitlement (6,500 ML). A monthly breakdown of the raw water extraction from Coles Crossing offtake is provided in Table 2. Daily extraction volumes can be provided to DoEE upon request.

Table 2: Raw water extraction at Coles Crossing offtake

Month	Extraction Volume (ML)	Percentage of Total Allocation
February 2019	56	0.9
March 2019	118	1.8
April 2019	107	1.6
May 2019	107	1.6
June 2019	326	5.0
July 2019	194	3.0
August 2019	123	1.9
September 2019	164	2.5
October 2019	350	5.4
November 2019	221	3.4
December 2019	244	3.8
January 2020	202	3.1
February 2020	48	0.7
Total	2,260	34.8

**Note Annual Allocation is 6500ML/year*

Flow Volume and Levels at Coles Crossing Offtake

Due to failure of the acoustic Doppler (the *in-situ* instrument that measures flow volume and water level) at Coles Crossing, flow volume and water level data is not available from this site, for the duration of the reporting period. The failure was identified at the close of the current reporting period, and in order to meet compliance obligations, Seqwater has prioritized project work to upgrade the instrumentation at this site, with implementation estimated for July/August 2020. The project will involve relocation of the Doppler to a more suitable location which is expected to improve reliability in data collection, in addition to allowing improved accessibility for maintenance of the instrument. Additionally, a level differential pressure sensor will be installed in the same location as the Doppler, to provide both flood warning and backup water level data, should it be required.

As river flow and level data from Coles Crossing was not available for the current reporting period, data from the Dagun Pocket alert station, located on the Mary River approximately 8.5km downstream of the Coles Crossing offtake, has been used to provide indicative flow volumes and water levels in the Mary River. As the section of the Mary River between Coles Crossing and Dagun Pocket alert station receives input from Kandanga Creek and a number of non-perennial waterways, with abstractions also likely given current land uses adjacent to the river along this reach (incl. small scale mining, forestry, horticulture) data from Dagun Pocket alert station is provided as indicative only.

A monthly breakdown of the raw water flows past Dagun Pocket alert station and releases from Borumba Dam are provided in Table 3, with comparative daily flows at these locations indicated in Figure 1. Figure 2 shows the controlled release volumes from Borumba Dam for the duration of the reporting period, at a finer scale.

Since operation between the 15th of February 2019 and the end of the current reporting period (15 February 2020), 161,304 ML of water has flowed past the Dagun Pocket station. Controlled releases of water made from Borumba Dam throughout the current reporting period totaled approximately 14,242 ML, with releases made in all months except from April to July, due to either Borumba Dam spilling or sufficient run of river flows (Figure 2).

Daily flow volumes can be provided to DoEE upon request.

Table 3: Monthly flows past the Dagun Pocket alert station

Month	Monthly Flows Past Dagun Pocket (ML)	Average Flow / day for Month at Dagun Pocket (ML/d)	Monthly Controlled Releases from Borumba Dam (ML)
February 2019	800	57	230
March 2019	10,891	351	599
April 2019	40,206	1,340	0
May 2019	11,048	356	0
June 2019	10,393	346	0
July 2019	10,739	346	0
August 2019	1,415	46	372
September 2019	458	15	1,662
October 2019	681	22	1,877
November 2019	463	15	2,561
December 2019	1,452	47	3,853
January 2020	2,220	72	2,640
February 2020	70,538	4,703	447
Total	161,304		14,242

*Note 0 ML equates to Borumba Dam Overflowing Spillway or no releases due to sufficient flows from run of river

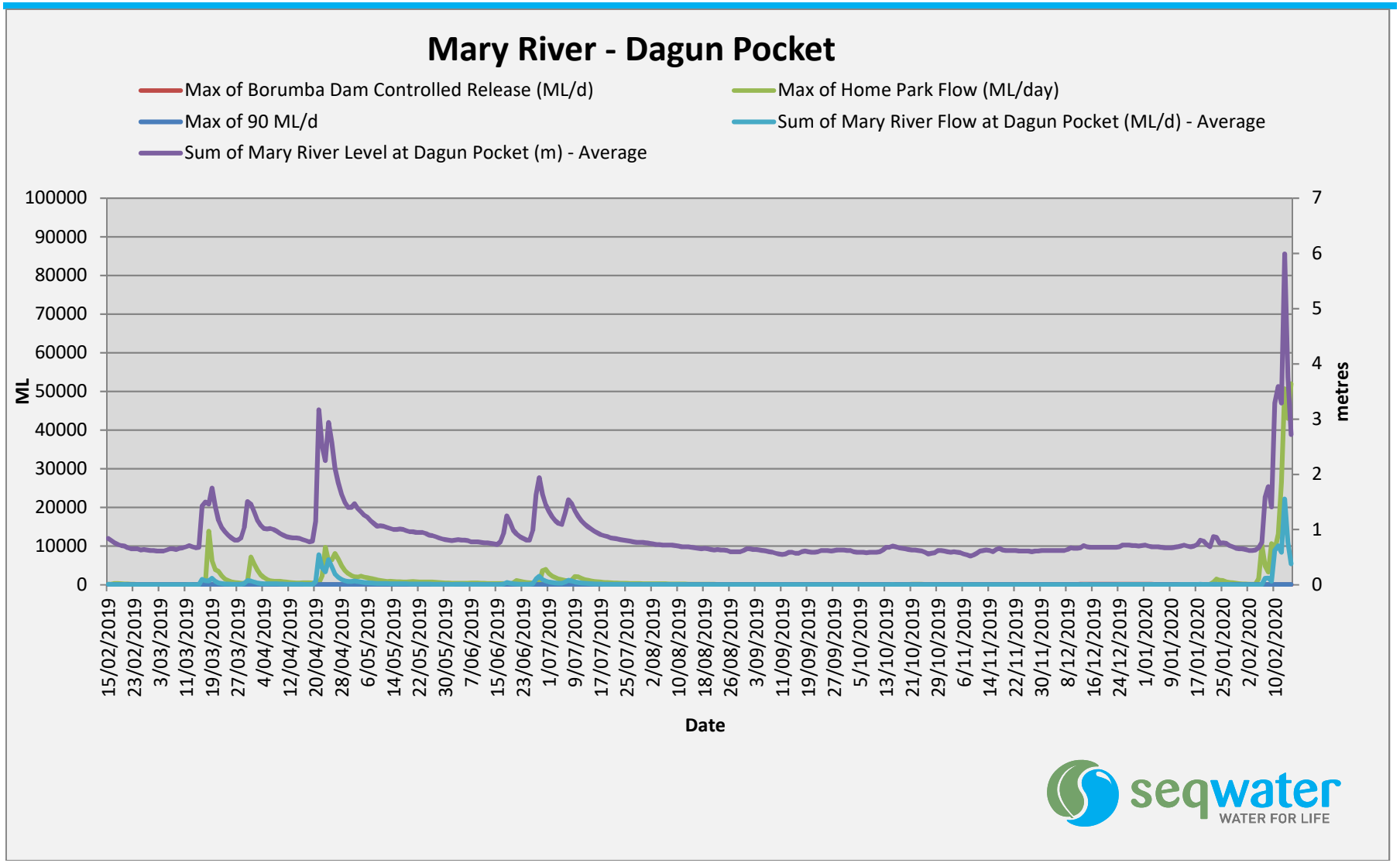

Figure 1: Mary River – Coles Crossing Offtake (Mary River flow and level data from Dagun Pocket alert station).

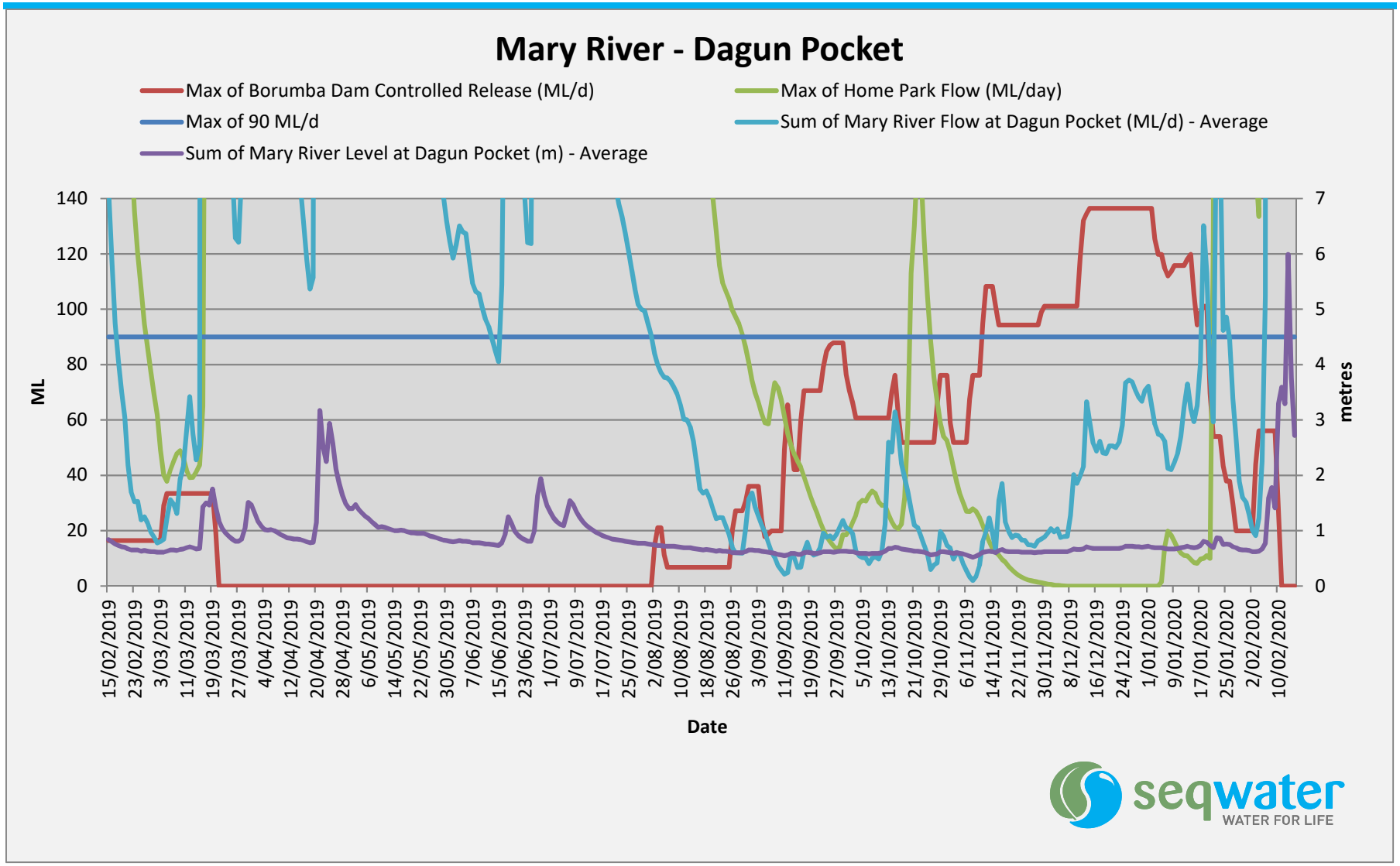

Figure 2: Mary River – Borumba Dam Controlled release

Home Park Gauging Station

Flow Volumes and Levels at Home Park Gauging Station

Flow volumes and levels at the Home Park gauging station (station number 138014A), are recorded on a daily basis by the Queensland Department of Natural Resources and Mines and Energy (DNRME) and summarised for the current reporting period in Table 4. Figure 3 provides a graphical representation of the flow volumes and levels at the Home Park gauging station, throughout the current reporting period. This is publicly available data sourced from the DNRME water monitoring website (http://watermonitoring.dnrm.qld.gov.au/host.htm).

Table 4 : Monthly flows past the Home Park Gauging Station

Month	Monthly Flows at Home Park Gauging Station (ML)	Average Flow / day for Month at Home Park Gauging Station (ML/d)
February 2019	2,585	185
March 2019	44,365	1,431
April 2019	76,156	2,539
May 2019	33,542	1,082
June 2019	20,813	694
July 2019	30,887	996
August 2019	5,351	173
September 2019	1,293	43
October 2019	1,728	56
November 2019	474	16
December 2019	2	0
January 2020	7,701	248
February 2020	225,729	15,049
Total	450,627	22,511

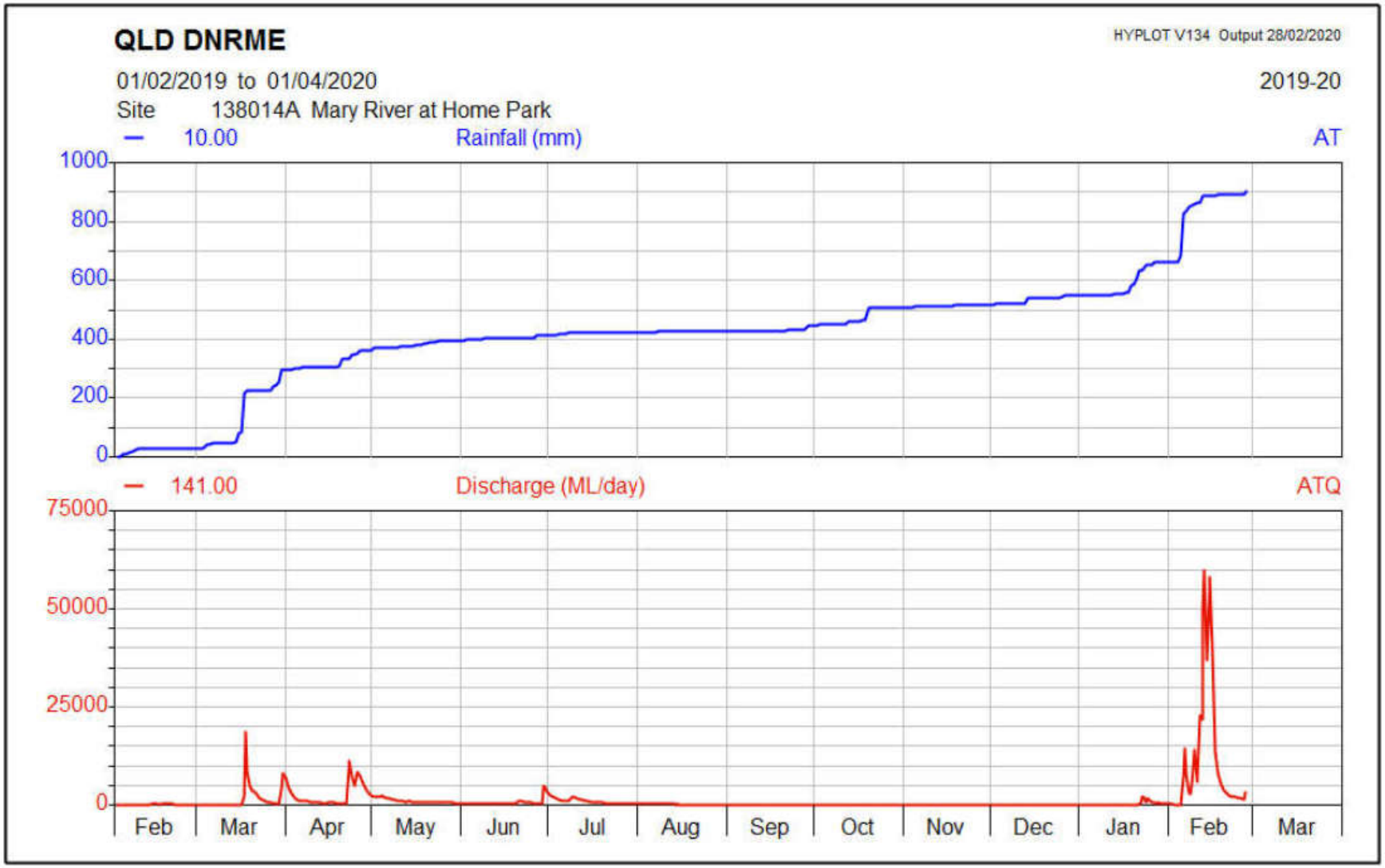

Figure 3: Flow volumes and levels at the Home Park gauging station

NPI2

Amount of Water Transported through NPI2

The amount of water transported through the NPI Stage 2 from the Noosa WTP during this reporting period was approximately 448 ML (Table 5). Approximately 2,677 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 DoEE upon request.

Table 5: Amount of water transport through the NPI Stage 2

NPI Noosa Flowmeter (M159-BT)		
Month	Northern Flow "Import to Noosa Zone" (ML)	Southern Flow "Export from Noosa Zone" (ML)
February 2019	166	0
March 2019	344	0
April 2019	300	0
May 2019	253	0
June 2019	77	173
July 2019	211	26
August 2019	327	0
September 2019	199	36
October 2019	103	187
November 2019	203	26
December 2019	259	0
January 2020	237	0
February 2020	0	0
Total	2,677	448

**Note "Southern Flow" is the southern transport from the Noosa WTP into NPI2*

Status – Operation remained compliant with items 4c(i) and 4c(iii) of the condition, for the reporting period. Due to failure of the in-stream instrument, operation was non-compliant with item 4c(ii) of the condition. As detailed above, Seqwater has prioritised project work to relocate and reinstate the instrument as soon as possible and has provided indicative data for the reporting period from an alternate location (Dagun Pocket alert station), downstream on the Mary river.

2.7 EPBC Condition 7

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

Status - This condition has been complied with and requires no further action.

2.8 EPBC Condition 9

Condition 9 requires the transport of water through the NPI Stage 2 to be carried out in accordance 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 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 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.*

1st Preference

Between the periods of the 21/03/2019 – 01/08/2019 and 11/02/2020 – 15/02/2020 high flow events occurred which ceased controlled releases from Borumba Dam as the dam was spilling or there was sufficient flow with run of river. Therefore during these periods the 1st Preference extraction was initiated for raw water supply to Noosa WTP (Refer Figure 2).

2nd Preference

Between the periods of the 15/02/2019 - 20/03/2019 and 02/08/2019 –10/02/2020 the 2nd preference was initiated for raw water supply to the Noosa WTP. Controlled releases from Borumba Dam were active, whilst flow at Coles Crossing (indicated by flows past Dagun Pocket alert station for the current reporting period) and Home Park gauging stations were below 90ML/d and 20ML/d respectively (Refer Figure 2). For the period between 13/06/19 and 15/06/19 flows past Dagun Pocket alert station were below 90ML/d however no extractions took place via Coles Crossing offtake during this time.

Status - Ongoing. Compliant.

2.9 EPBC Condition 10

Water extraction data from Coles Crossing pump station, presented in Table 2, demonstrates that less than 6,500 ML of water was transported from the Coles Crossing offtake. 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.

Status - This condition has been complied with and requires on going compliance.

2.10 EPBC Condition 11

There were no State water licences issued for the purposes of operation of NPI Stage 2.

Status - This condition has been complied with and requires ongoing compliance.

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.

Status - This condition has been complied with and requires ongoing compliance.

2.12 EPBC Condition 15

Seqwater is committed to maintaining accurate records required under the active conditions of approval pertaining to the operation of NPI Stage 2. These records will be made available to the Department upon request. Currently records of all activities associated or relevant to these conditions of approval have been maintained, except for valid flow volume and level data from Coles Crossing, which was unable to be collected for the duration of the reporting period due to instrument failure, as outlined in Section 2.6. Substitute data was obtained from an alternate location (Dagun Pocket alert station), downstream on the Mary river.

Records of activities associated or relevant to the conditions of approval, beyond what has been presented within this report, will be made available to the Department upon request.

Status - This condition has been complied with and requires ongoing compliance.

2.13 EPBC Condition 16

This report meets the need for lodgement of annual compliance reports for the NPI Stage 2 project and therefore meets the requirements for EPBC Condition 16.

Status - This condition has been complied with and requires ongoing compliance.

Conclusion

The pipeline and associated facilities for the NPI Stage 2 project have been operational during this reporting period. No instances occurred during this reporting period that had the potential to significantly impact EPBC Act listed species or matters of national significance and there were no incidents requiring notification to DoEE.

Annual compliance reports will continue to be submitted to DoEE for the remaining active conditions. The required monitoring of aquatic MNES species associated with the AHMP will continue whilst the monitoring of MNES species associated with the RHMP is closed out for the operational phase of the project. The collection of data on instream flow volumes and levels from Coles Crossing will resume as soon as possible with the prioritisation of the project to relocate and reinstate the in-stream instrumentation. However as an interim measure, a water quality instrument (Exo sonde) capable of measuring water level was re-installed at the site to address this issue in the short-term, with water level data collection commencing via this instrument on 7th April 2020. The project work, which has been fast-tracked for delivery in July/August 2020, involves the permanent relocation of the Doppler to a more suitable location, with the expected outcomes of the project to be improved reliability in data collection and improved accessibility for maintenance of the Doppler. Routine maintenance of the Doppler will be scheduled monthly. To minimise the risk of data gaps, processes will be put in place to increase the regularity of data downloads from the Doppler, in addition to configuring software alerts to notify of anomalies in telemeted data, triggering investigation, and maintenance where required. During the project a level differential pressure sensor will also be installed, in the same location as the Doppler. This sensor will provide flood warning however will also provide backup water level data, should it be required.

In the interim, whilst the project work to relocate the Doppler and associated instrumentation is underway, data from Dagun Pocket alert station, in conjunction with water level data from the Coles Crossing sonde will be used to demonstrate continued compliance with the EPBC Act conditions of approval. An initial comparison of the Coles Crossing sonde data with the Dagun Pocket water level data indicates that there is some consistency between sites during the current low flow conditions. However due to the short timeframe of instrument crossover and the current limited variation in flow conditions, at this stage the Dagun Pocket data is considered indicative only.

Appendix A – Aquatic Habitat Monitoring Program (AHMP)

Northern Pipeline Interconnector Stage 2 Project

Aquatic Habitat Monitoring Program Operational Phase 2019 Survey

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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 the 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 18 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, aquatic (in-stream) features that provide habitat for the Mary River cod (*Maccullochella peeli mariensis*), the 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 sixth survey during operation of the NPI stage 2 (October 2019), and compares them to results from the baseline survey in October 2013, the first survey in November 2014, the second survey in November 2015, the third survey in October 2016, the fourth survey in November 2017 and the fifth survey in November 2018. 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 October 2019, 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 1.5 – 2.0 m at the gauging station site in 2019, 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 unchanged compared to the survey in November 2018.

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 the 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 18 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 18 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.*

The Environmental Impact Statement (EIS) and associated approvals for the Project were based on the total daily transport volume being no greater than 18 ML/day. 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 aquatic (in-stream) 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 (i.e. the MNES species).

1.2 Scope and Aims

This report presents the results of the sixth survey during operation of the NPI stage 2 (October 2019), and compares them to results from the baseline survey in October 2013,

the first survey in November 2014, the second survey in November 2015, the third survey in October 2016, the fourth survey in November 2017 and the fifth survey in November 2018. 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.

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 Survey area within the Upper Mary River Sub-basin.

2 Methods

2.1 Survey Timing

The survey was completed on 30 and 31 October 2019.

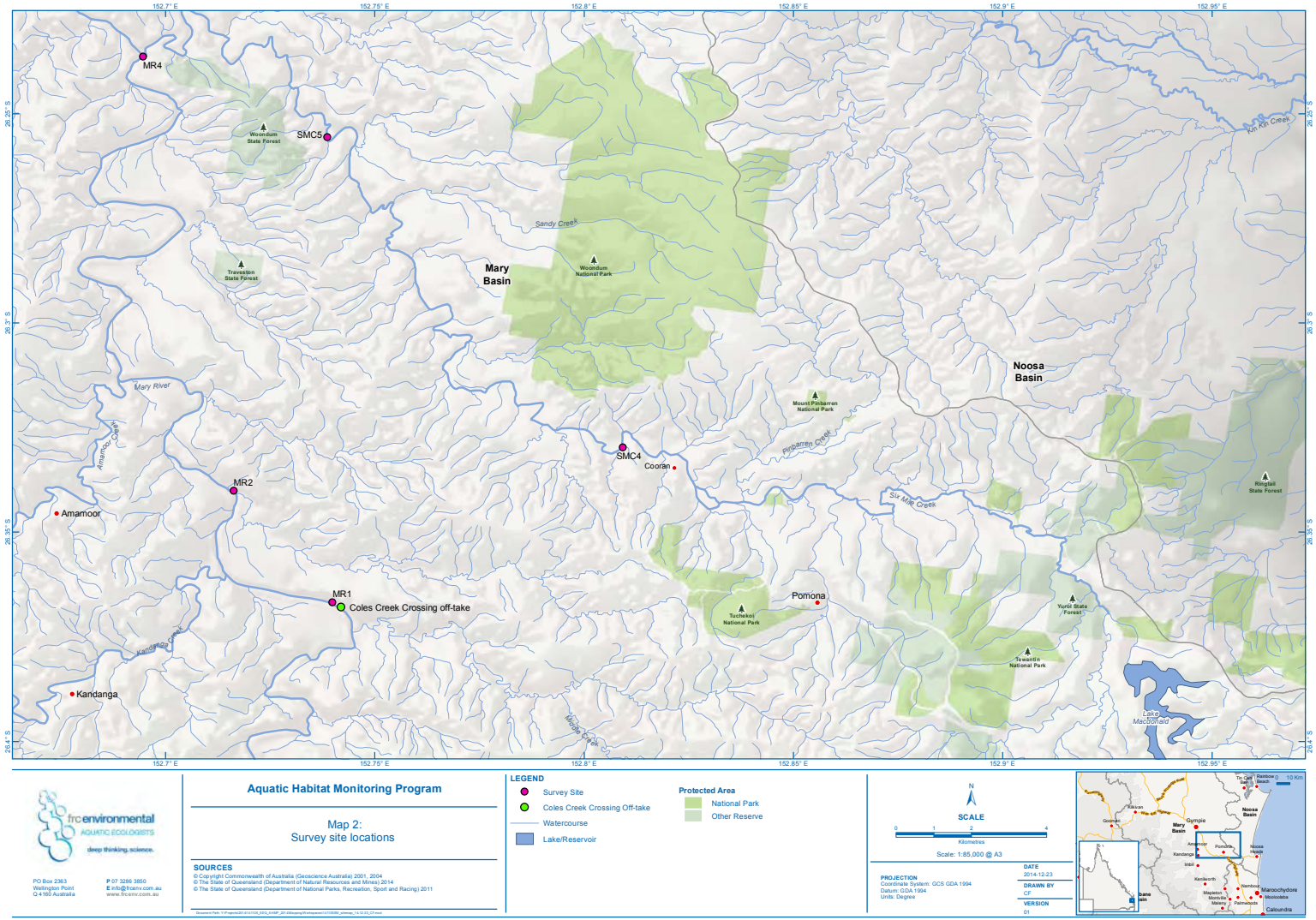
2.2 Site Details

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 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 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 Coles Crossing off-take (within survey area) (once gauging station has been installed)
- 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 Speedtech 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), 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 notable rainfall in early to mid-October 2019, prior to the survey, but no rainfall immediately before or during the survey (Figure 3.1). There were four relatively large rainfall events in the upper catchment in the 12 months leading up to the survey: December 2018, February 2019, April 2019 and October 2019. However, rainfall over the past 12 months was below the long term average recorded at both Kenilworth and Gympie (Figure 3.2), with the exception of:

- December 2018, and April and June 2019, at Kenilworth, and
- March, April, June and October 2019 at Gympie.

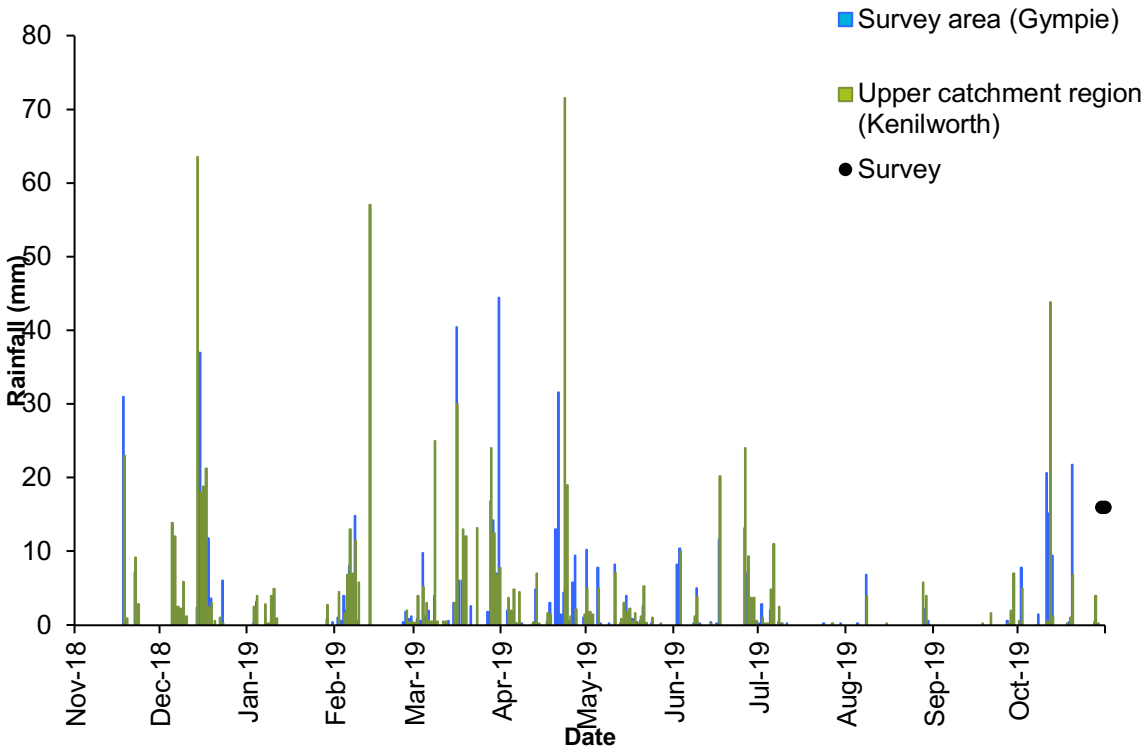


Figure 3.1 Total daily rainfall twelve months prior to the October 2019 survey in the survey area (Gympie) and upper catchment (Kenilworth).

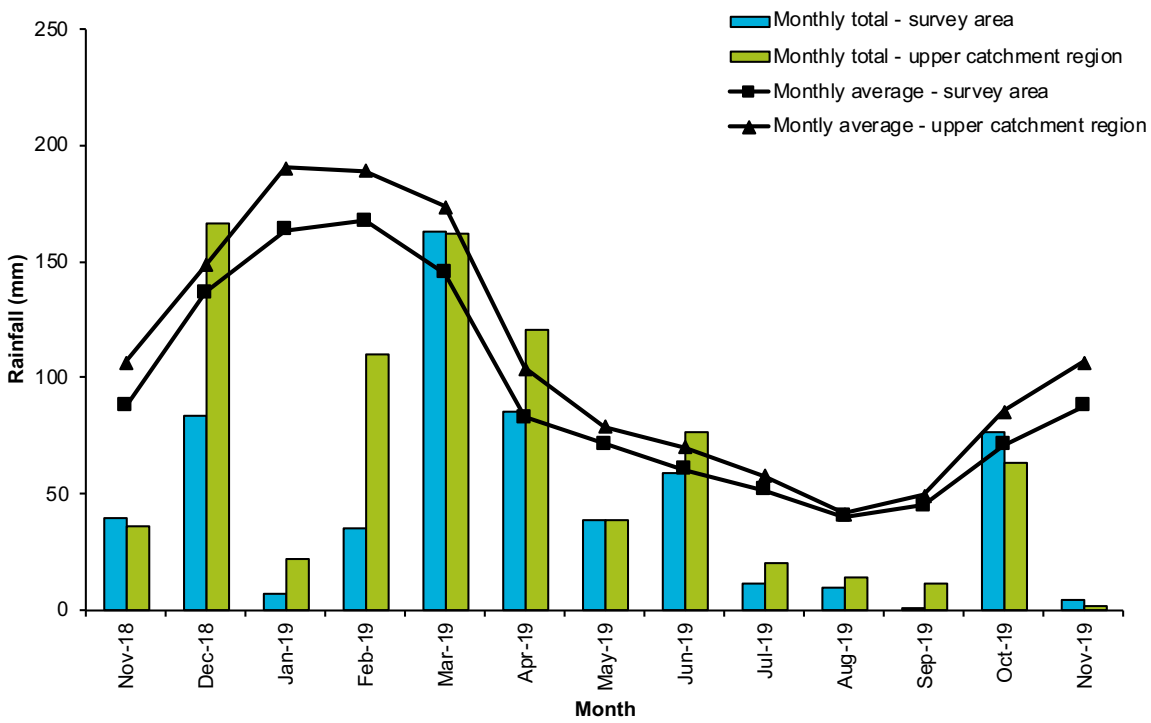


Figure 3.2 Total monthly rainfall for twelve months prior to the 2019 survey and long term mean rainfall for each month in the survey area (Gympie) and the upper catchment region (Kenilworth).

Flow and water levels in the Mary River and Six Mile Creek were generally low, except in December 2018, March through to mid-May 2019, and July 2019 where there were brief high flow events (Figure 3.3 and Figure 3.4). In the Mary River in 2019, the maximum recorded high flow event was of lower magnitude than recorded since 2013. Maximum flow events of a similar magnitude occurred in 2016 (i.e. ~ 14 000 ML/day), with maximum flows of a much higher magnitude recorded in 2014, 2017 and 2018 (i.e. 50 000 to 60 000 Ml/day), with maximum flows recorded in 2013 and 2015 being significantly larger again (i.e. ~ 380 000 ML/day in 2013; and ~ 200 000 ML/day in 2015 in the Mary River).

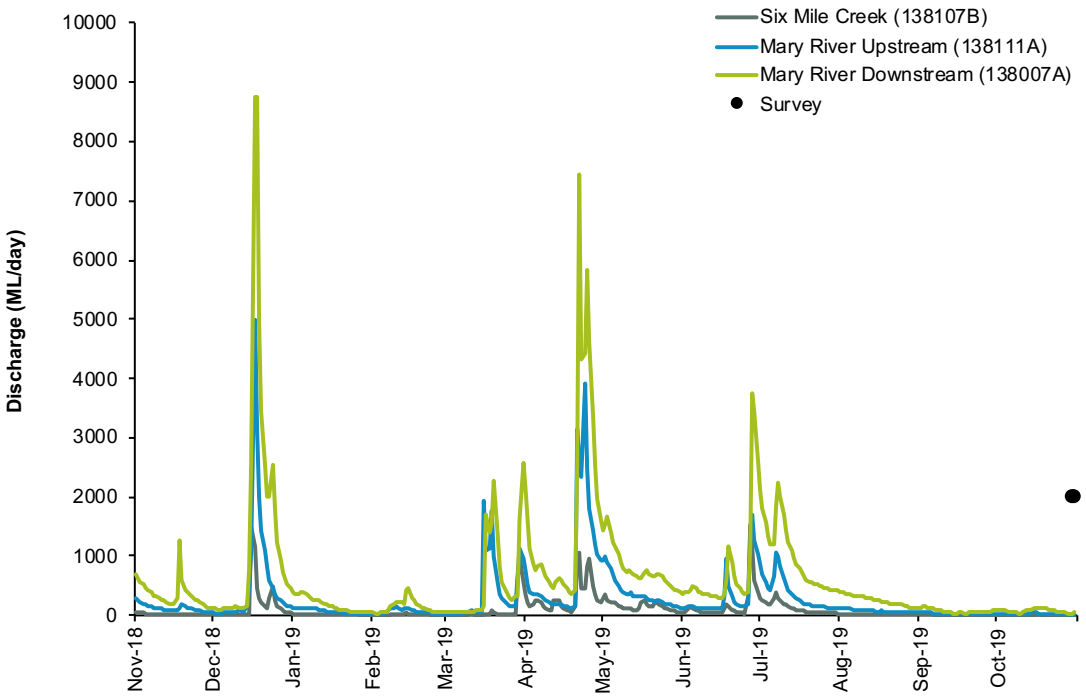


Figure 3.3 Mean daily discharge recorded at stream flow monitoring stations on Six Mile Creek and Mary River.

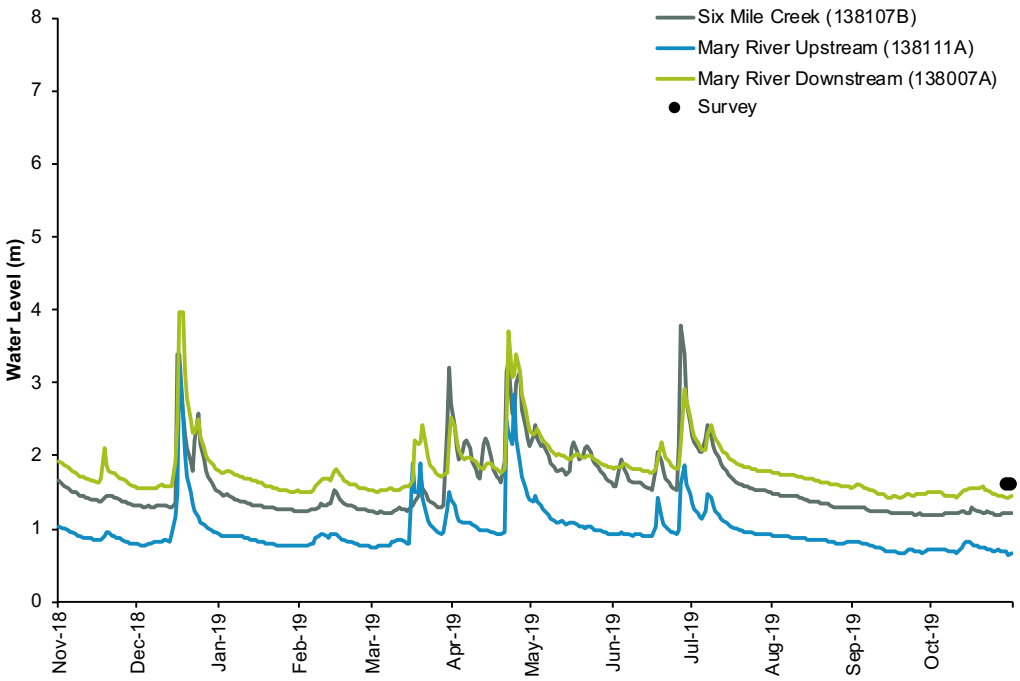


Figure 3.4 Mean daily water level recorded at stream flow monitoring stations on Six Mile Creek and Mary River.

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
- moderate to high levels of disturbance in adjacent catchment and riparian areas, and
- a range of habitat features, including:
  - deep and shallow pools
  - slow flow
  - large woody debris and sandy banks, and
  - boulders and / or crevices in bed rock.

In general, sites on Six Mile Creek had:

- moderate water quality
- low 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). 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 and

October 2019 surveys. In Six Mile Creek, the water levels were similar to the 2016 survey but slightly lower than the 2017 and 2018 surveys.

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

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
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
white-throated snapping turtle	Oct-13	suitable	suitable	suitable	potentially suitable	potentially suitable

Species	Location	Mary River			Six Mile Creek	
	Survey	MR1	MR2	MR4	SMC4	SMC5
Mary River turtle	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-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

4 Summary

In October 2019, 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 1.5 – 2.0 m at the gauging station site in 2019, 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 unchanged compared to the survey in November 2018.

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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	NR	NR
	Mid	mid-site point	NR	NR
	Downstream	50 m downstream of the mid-site point	NR	NR
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 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

Leftt bank at mid-site

Water Quality	
Temperature (°C)	25.92
Conductivity (µS/cm)	396.8
Turbidity (NTU)	5.17
Dissolved oxygen (mg/L)	9.67
Dissolved oxygen (% sat)	117.6
pH	6.71

Flow Conditions			
Flow habitats present	Connected in-channel pool		
Water level	Moderate (at watermark)		
Recent high flow	No		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	1.9	1.7	0.7
Width (m)	30	35	30
Velocity (m/s)	0.00	0.02	0.00

Land Use	Grazing land with native forest remnants throughout entire reach		
Left bank:	Grazing; cropping	Right bank:	Grazing; cropping
Overall disturbance:	low		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Silt / sand	Bank material:	Silt /sand
Bank height:	6 m	Bank height:	10 m
Bank slope:	steep	Bank slope:	Steep
Bank shape:	Convex/concave	Bank shape:	Convex
Vegetation cover:	Moderate	Vegetation cover:	Moderate
Vegetation type:	trees	Vegetation type:	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:	Some
Stability:	Moderate	Stability:	moderate
Disturbances:	Weeds	Disturbances:	Weeds
Bed Assessment			
Substrate material:	Silt/clay with some sand and pebbles		
Bed stability rating:	Bed stable	Sediment deposits:	Sand

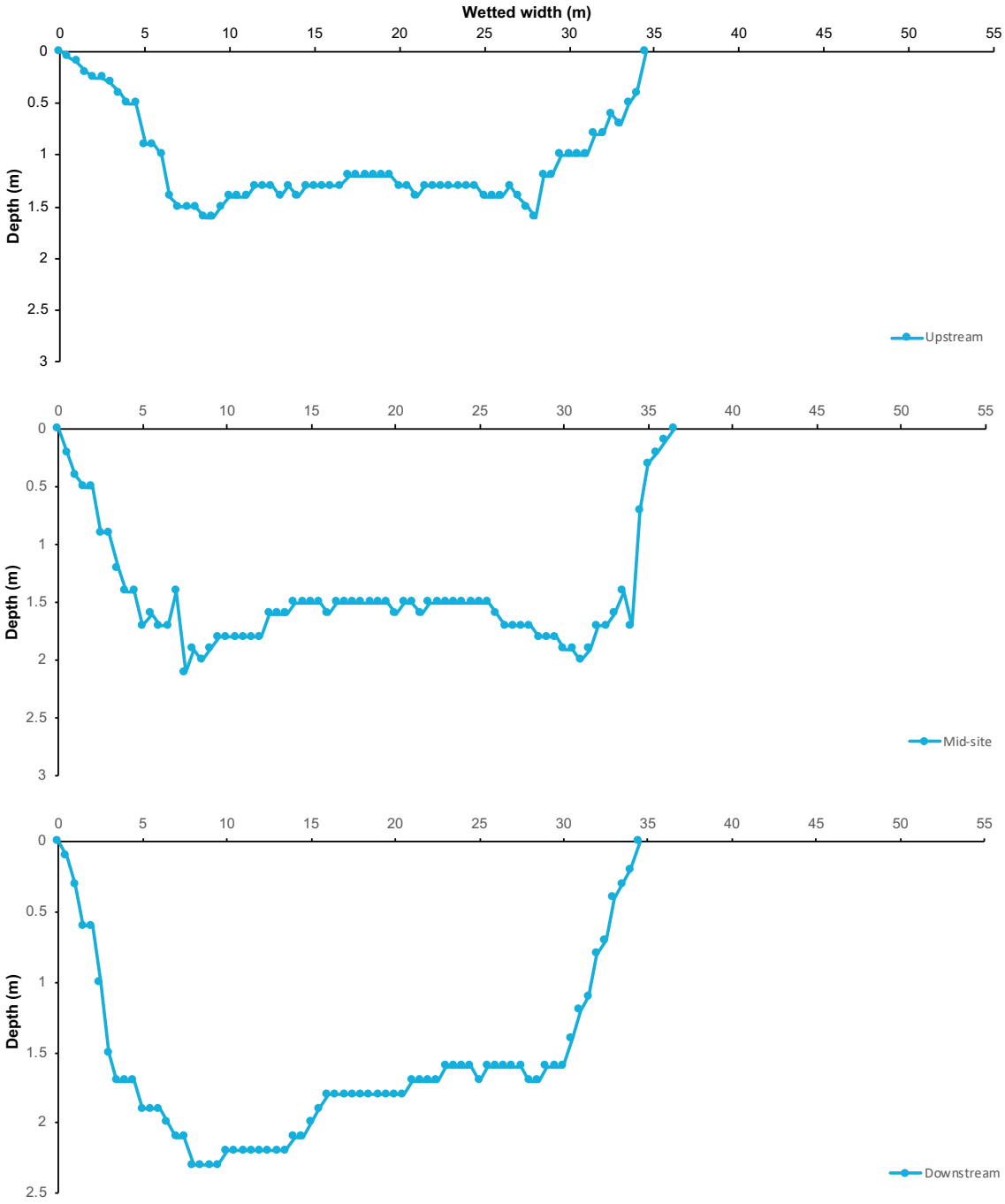

Figure B.1 Site MR1 – channel depth profiles.

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

MNES Species Habitat

Connected pool with slow flow

Rocks and logs suitable for basking

Woody debris, suitable for basking

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	Present – dense	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	Present		

MNES Species Habitat	
Overall suitability	Suitable
Comments:	Patches of suitable habitat for Mary River cod, white-throated snapping turtles and Mary River turtles, and potentially suitable habitat for lungfish, were scattered throughout the site. Pools were deeper than 2 m. Most banks and pools were shaded and contained large woody debris. Turtle basking spots and submerged habitat features were present. Potential nesting habitat was not present at MR1. Aquatic vegetation comprised *Juncus* sp. (emergent), *Cyperus* sp. (emergent), *Persicaria* sp. (emergent) and *Hydrilla* sp. (submerged).

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 and Figure B.2. Site MR2 had 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		**Flow Conditions**			
Temperature (°C)	26.97	Flow habitats present	Connected in-channel pool		
Conductivity (µS/cm)	427	Water level	Moderate (at watermark)		
Turbidity (NTU)	5.48	Recent high flow	No		
Dissolved oxygen (mg/L)	8.8	**Flow**	**Upstream**	**Mid-site**	**Downstream**
Dissolved oxygen (% sat)	110.8	Depth (m)	3.1	0.5	0.8
pH	7.63	Width (m)	40	45	35
		Velocity (m/s)	0.02	0.004	0

Land Use	Grazing land with native forest remnants		
Left bank:	Grazing	Right bank:	Grazing
Overall disturbance:	Moderate		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Sand with silt	Bank material:	Bedrock, sand and silt
Bank height:	8 m	Bank height:	10 m
Bank slope:	Moderate	Bank slope:	Moderate - steep
Bank shape:	Stepped	Bank shape:	Convex
Vegetation cover:	Moderate	Vegetation cover:	Some
Vegetation type:	Grass, shrubs, trees	Vegetation type:	Grass, shrubs, trees
Shading of river:	5%	Shading of river:	0%
Trailing bank vegetation:	5%	Trailing bank vegetation:	0%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Moderate	Erosion:	Some
Stability:	Moderate	Stability:	Moderate - high
Disturbances:	Erosion, weeds, veg. clearing, cattle and access tracks	Disturbances:	Weeds, high erosion ~10m from water and cattle
Bed Assessment			
Substrate material:	Bedrock, sand and silt/clay		
Bed stability rating:	Bed stable	Sediment deposits:	Silt and sand

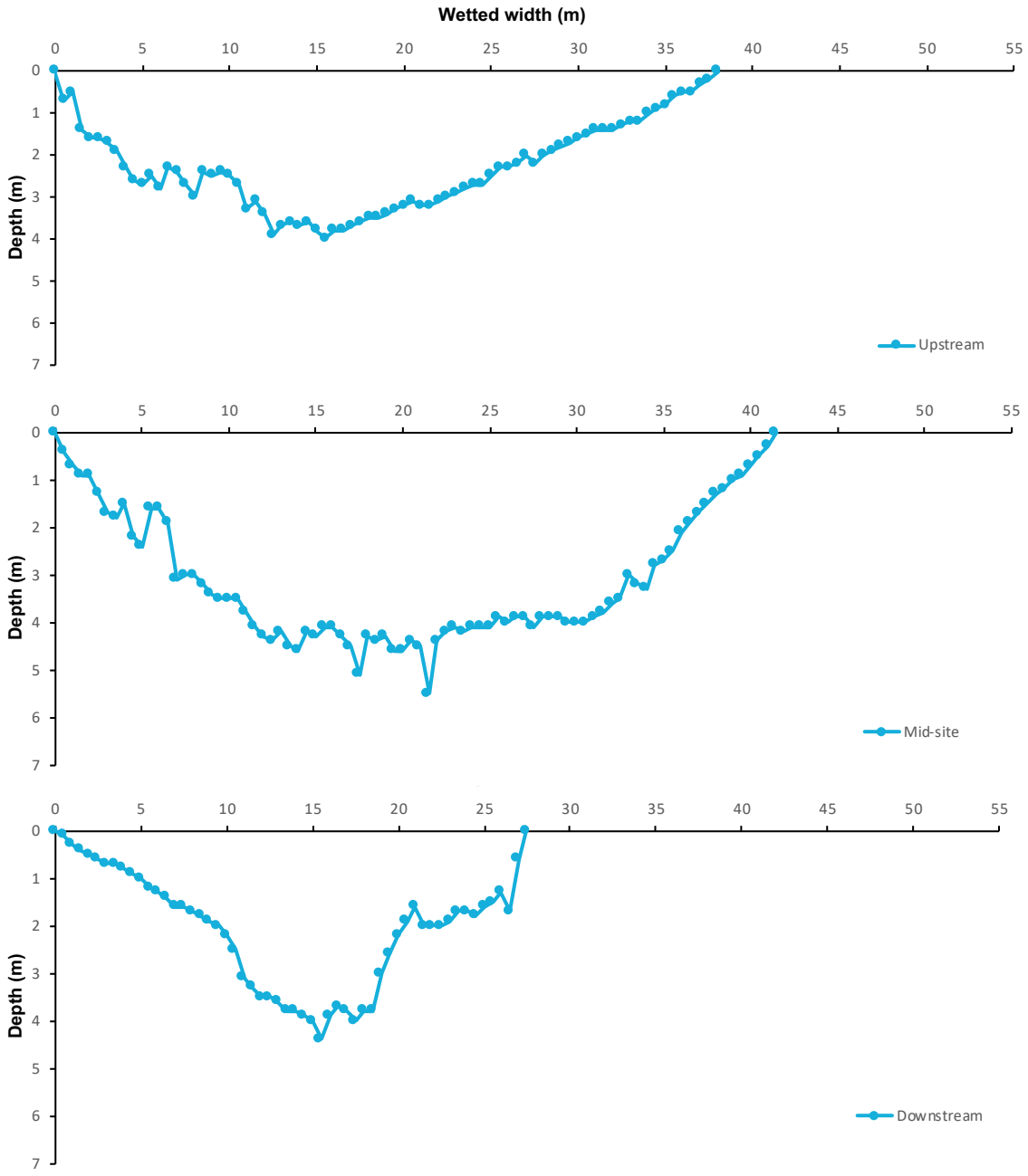

Figure B.2 Site MR2 – channel depth profiles.

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

MNES Species Habitat			
			
Deep continuous pools with slow flow		Exposed bedrock suitable for basking	
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	Present – scattered	Log jam <50% dense (diameter >300mm)	Absent
Turtle basking spots	Present	Log jam >50% dense (diameter >300mm)	Absent
Turtle nesting habitat	Absent	Terrestrial leaves and twigs	Present – scattered
Submerged boulders / rock crevices	Present		

MNES Species Habitat	
Overall suitability	Suitable
Comments:	Patches of suitable habitat for Mary River turtles and white-throated snapping turtles, with basking spots and nesting habitat present on left bank. Deep pools (>4 m) throughout the site provide good habitat for both lungfish and Mary River Cod. The pools were characterized by low flow at the time of the survey. Submerged boulders and large woody debris provide habitat and shelter. Some turtle basking spots were present, *Persicaria* sp., *Juncus* sp. and *Cyperus* sp. (emergent aquatic plants), was scattered in shallow water throughout the site.

Table B.6 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 suitable habitat to support Mary River cod and lungfish, white-throated snapping turtle and Mary River turtle. Site MR4 had 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)	23.27
Conductivity (µS/cm)	420.1
Turbidity (NTU)	5.51
Dissolved oxygen (mg/L)	6.99
Dissolved oxygen (% sat)	81.9
pH	7.34

Flow Conditions			
Flow habitats present	Connected in-channel pool		
Water level	Moderate (at watermark)		
Recent high flow	No		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	2.4	3.9	2.1
Width (m)	20	30	30
Velocity (m/s)	0.01	0	0

Land Use	Grazing		
Left bank:	Grazing	Right bank:	Grazing
Overall disturbance:	Moderate		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Silt, sand	Bank material:	Sand, silt, bedrock
Bank height:	5 m	Bank height:	7 m
Bank slope:	Steep/moderate	Bank slope:	Steep/moderate
Bank shape:	Convex/concave/stepped	Bank shape:	Convex/concave/stepped
Vegetation cover:	Moderate	Vegetation cover:	Some
Vegetation type:	Grass, trees, shrubs	Vegetation type:	Grass, shrubs, trees
Shading of river:	5%	Shading of river:	5%
Trailing bank vegetation:	0%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Some	Erosion:	Heavy
Stability:	Moderate	Stability:	Low
Disturbances:	Cattle, erosion, weeds	Disturbances:	Cattle, weeds, erosion (heavily eroded)
Bed Assessment			
Substrate material:	Bedrock, sand and silt / clay (cobbles in shallow areas Downstream)		
Bed stability rating:	Bed stable	Sediment deposits:	Silt / sand

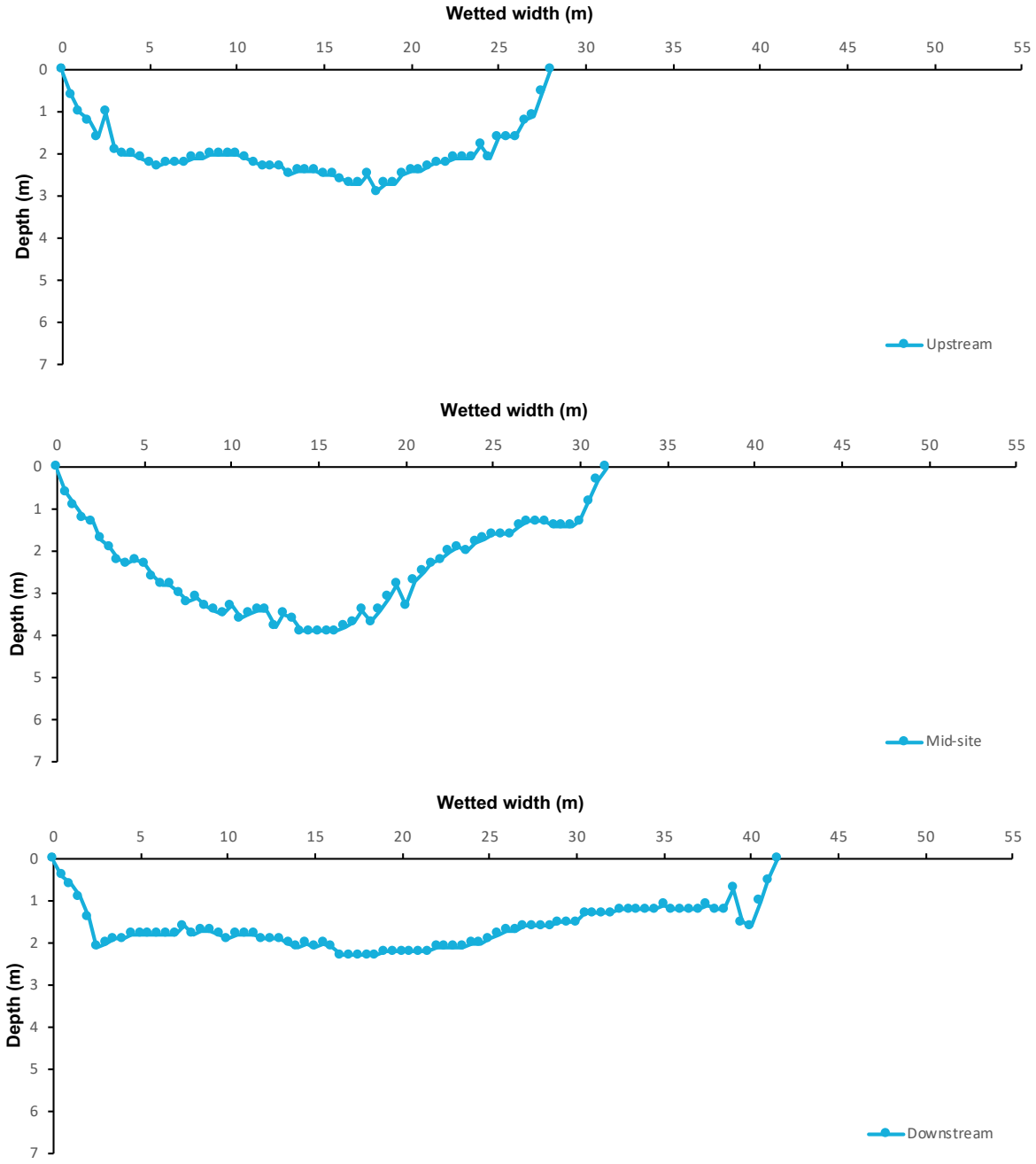

Figure B.3 Site MR4 – channel depth profiles.

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

MNES Species Habitat

Connected pool with slow flow

Bank erosion present

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)	Absent
Aquatic vegetation	Present	Log jam <50% dense (diameter >300mm)	Absent
Turtle basking spots	Present	Log jam >50% dense (diameter >300mm)	Absent
Turtle nesting habitat	Absent	Terrestrial leaves and twigs	Present – scattered
Submerged boulders / rock crevices	Present		
Overall suitability	Suitable		

MNES Species Habitat	
	Suitable habitat for Mary River cod, lungfish, white-throated snapping turtles and Mary River turtles was scattered through the site. Deep pools (>3 m) were present throughout the site during the 2019 survey. Most deep pools contained large woody debris, with some shading from overhanging vegetation. Turtle basking spots were present in the form of exposed logs that were scattered throughout the site. Aquatic vegetation in emergent form was observed on the banks with *Juncus* sp. and *Lomandra* sp. present.

Table B.9 MR4 – Photographic monitoring.

Site MR4

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

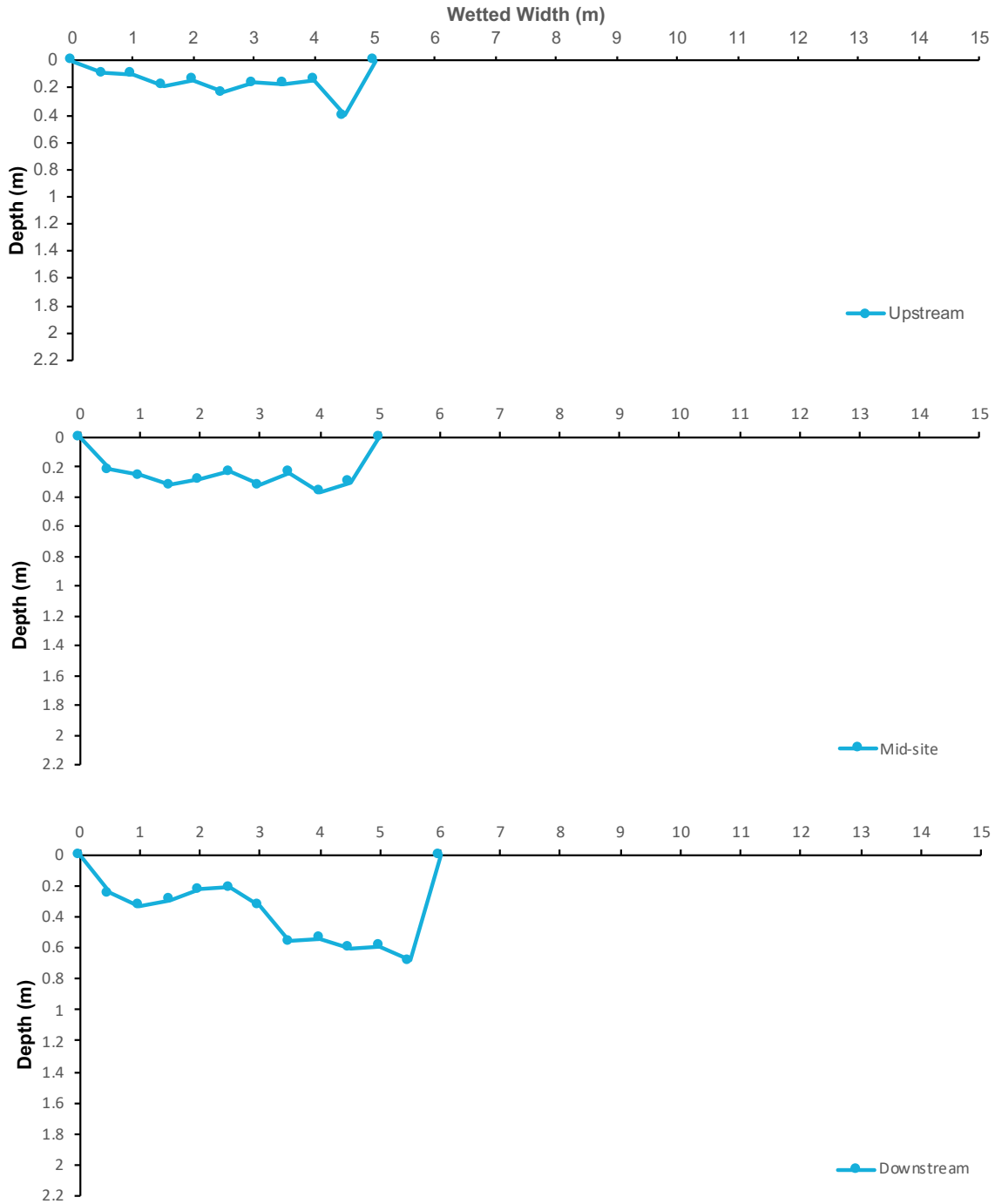

Figure B.3. Site SMC4 had potentially suitable habitat to support white-throated snapping turtles and Mary River turtles and Mary River cod. This site did not have the potential to support Australian Lungfish.

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

Site SMC5

Right bank at mid-site

Upstream at mid-site

Left bank at mid-site

Water Quality	
Temperature (°C)	21.84
Conductivity (µS/cm)	201.6
Turbidity (NTU)	5.42
Dissolved oxygen (mg/L)	3.94
Dissolved oxygen (% sat)	45.1
pH	7.65

Flow Conditions			
Flow habitats present	Connected in-channel pool, riffle		
Water level	Low (below watermark)		
Recent high flow	No		
Flow	**Upstream**	**Mid-site**	**Downstream**
Depth (m)	0.11	0.3	0.14
Width (m)	1.5	6	6
Velocity (m/s)	0.3	0.089	0.00

Land Use	Native forest		
Left bank:	Native forest	Right bank:	Native forest
Overall disturbance:	Moderate		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Sand	Bank material:	Sand
Bank height:	3 m	Bank height:	3 m
Bank slope:	Moderate - steep	Bank slope:	Moderate - steep
Bank shape:	Convex, concave	Bank shape:	Convex, concave
Vegetation cover:	Moderate	Vegetation cover:	Moderate
Vegetation type:	Shrubs, tress	Vegetation type:	Shrubs, trees
Shading of river:	25-50%	Shading of river:	25-50%
Trailing bank vegetation:	5%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Some	Erosion:	Some
Stability:	Moderate	Stability:	Moderate
Disturbances:	Erosion, roads	Disturbances:	Erosion, roads
Bed Assessment			
Substrate material:	Sand, silt / clay and gravel		
Bed stability rating:	Bed stable	Sediment deposits:	Sand

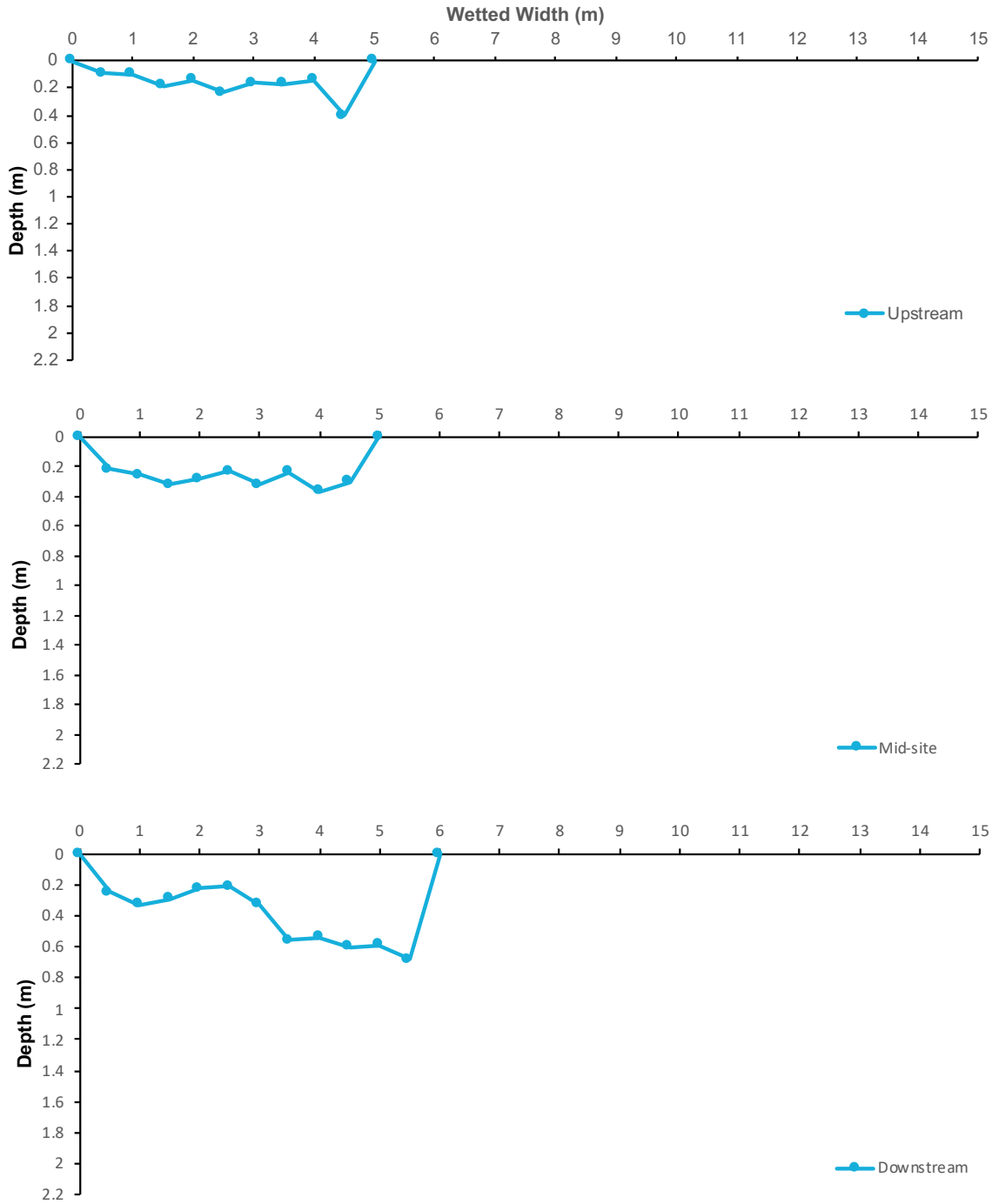

Figure B.3 Site SMC4 – channel depth profiles.

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

MNES Species Habitat

Woody debris provides basking spot

Bedrock on bank provides basking spot

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	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)	Present
Turtle nesting habitat	Present – about 10m suitable	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 Mary River cod
Comments:	A well shaded, shallow pool (<1 m) through out 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, land use, 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)	20.97	Flow habitats present	Connected in-channel pool, riffle		
Conductivity (µS/cm)	212.7	Water level	Low (below watermark)		
Turbidity (NTU)	4.74	Recent high flow	No		
Dissolved oxygen (mg/L)	3.74	**Flow**	**Upstream**	**Mid-site**	**Downstream**
Dissolved oxygen (% sat)	42	Depth (m)	-	0.3	-
pH	7.45	Width (m)	-	7	-
		Velocity (m/s)	-	0.062	-

Land Use	Native forest		
Left bank:	Native forest	Right bank:	Native forest
Overall disturbance:	Low		
Bank Assessment			
Left Bank		**Right Bank**	
Bank material:	Sand	Bank material:	Sand
Bank height:	6 m	Bank height:	6 m
Bank slope:	Steep	Bank slope:	Moderate - steep
Bank shape:	Stepped	Bank shape:	Stepped
Vegetation cover:	Moderate	Vegetation cover:	Moderate
Vegetation type:	Shrubs, trees	Vegetation type:	Grass, shrubs
Shading of river:	15%	Shading of river:	5%
Trailing bank vegetation:	5%	Trailing bank vegetation:	5%
Erosion Assessment			
Left Bank		**Right Bank**	
Erosion:	Some	Erosion:	None
Stability:	High	Stability:	High
Disturbances:	Erosion, roads	Disturbances:	Weeds, roads, cleared vegetation
Bed Assessment			
Substrate material:	Sand, silt / clay, boulder, cobble, pebble, gravel		
Bed stability rating:	Bed stable	Sediment deposits:	Sand

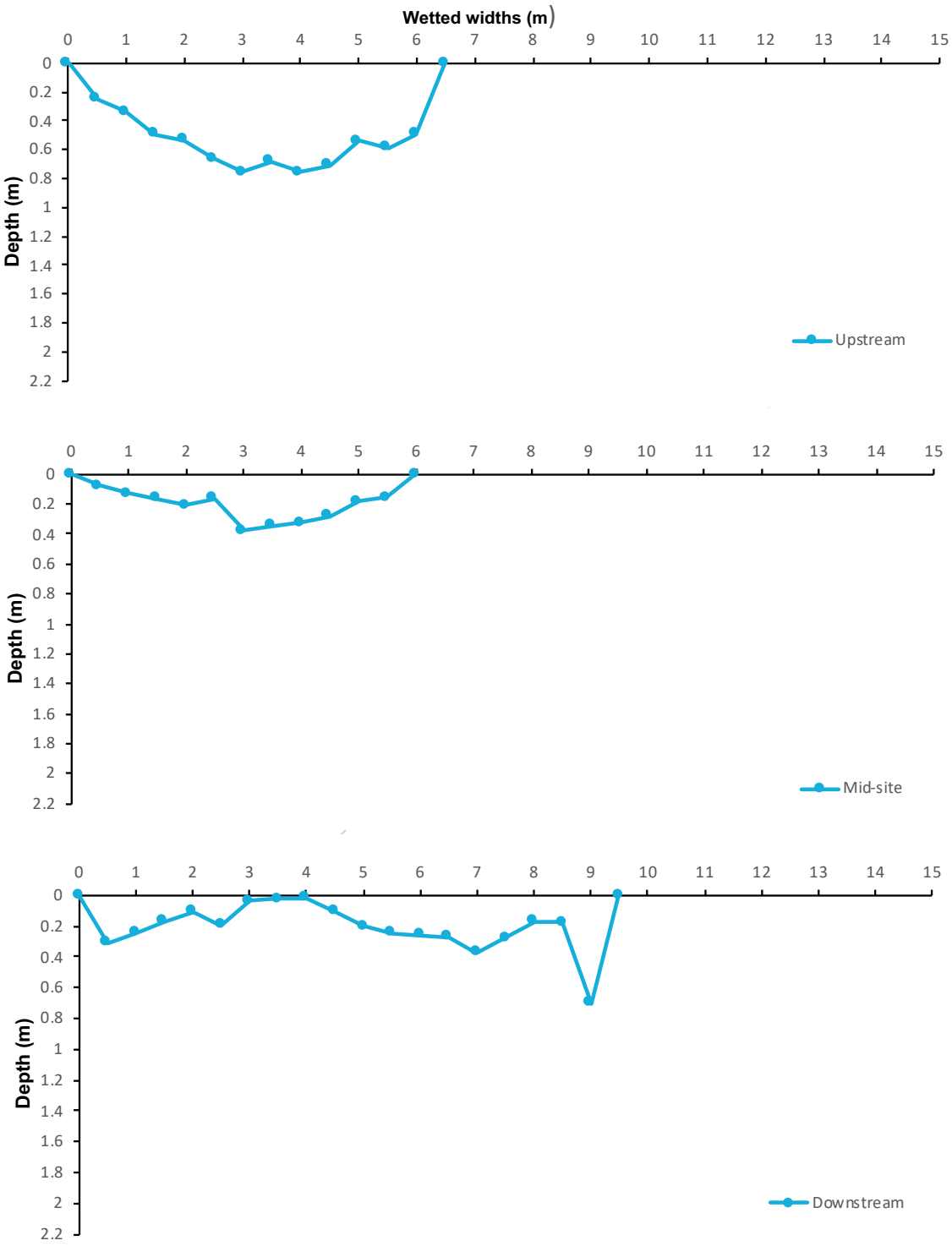

Figure B.4 Site SMC5 – channel depth profiles.

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

MNES Species Habitat

Rocks provide basking habitat

Logs provide basking habitat

Bank basking 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	Absent	Branch pile >50% dense (diameter <300mm)	Present
Aquatic vegetation	Present	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 – Dense
Submerged boulders / rock crevices	Absent		
Overall suitability	Potential for Mary River cod, white-throated snapping turtle and Mary River turtle, unsuitable for Australian lungfish		

MNES Species Habitat	
Comments:	Some shaded, 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