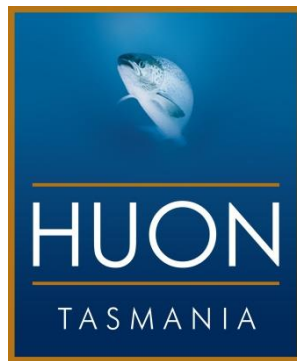




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Annual Environmental Review 2018



Lonnvale Hatchery



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Executive Summary of Site Environmental Management 2018

Recirculating Aquaculture System (RAS) 2018

- Wastewater generated: **63,621KL**
- Peak wastewater day: **Presmolt 575KL** (28/5/2018) **Fry 259KL** (21/1/2018)
- Wastewater irrigated: estimated 63,000KL
- Sludge removed: estimated 300KL (Spectran to composting at Interlaken)

Summary Broodstock Flow-through Hatchery 2018

- Flow-through peak feed day: 33kg 8/1/2018.
- Flow-through annual feed: 4319kg
- Monthly average feed: 360kg
- Maximum monthly feed: 907kg January.
- Peak biomass: 6552kg 31/12/2018
- Current biomass at end of period: 6552kg 31/12/2018.
- Benthic macroinvertebrates sampling Autumn and Spring with both upstream and downstream results achieving an A rating. (A rating also in 2017)
- Environmental monitoring (lab testing) occurred 12 times throughout the period.
- Field data was collected twice daily at site inlet and outlet for pH, DO, temp and flow.

Summary of Non – Compliance Broodstock Flow Through 2018 in relation to discharge limits and site conditions (EPN 7677-2 section G6 1.1) EL9842-1

There were 3 non-compliances to discharge emission limits in 2018 all relating to the exceedance of Nitrate + Nitrite. These exceedances occurred:

- 31/1/2018 exceedance of 0.01mg/L
- 22/2/2018 exceedance of 0.005mg/L
- 27/9/2018 exceedance of 0.03mg/L

The exceedances did not appear to relate to site operations and the concentrations are still considered to be at extremely low levels. The site was inspected for short circuiting of the wastewater process and or additional inputs of nutrients, none were located.



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Annual Environmental Management Review (AEMR 2018)

Table 1: AEMR Approval

Project Name	Annual Environmental Management Review Lonnvale 2018		
Controlled document code	AEMR 2018 Lonnvale		
AEMR 2018 has been prepared by:			
Environmental Manager			
Name: Adam Chapman	Signature:	Date:	
AEMR 2018 has been approved by:			
General Manager Freshwater Operations			
General Manager Statement			
<i>In response to EL 9842/1</i>			
<i>I David Mitchell acknowledge the contents of this Annual Environmental Review</i>			
Name: David Mitchell	Signature:	Date:	

Purpose

The purpose of this document is to summarise the management of the site across the annual period 2018.

It also allows Huon Aquaculture management to review results of the environmental principles and procedures used to maintain its obligations and commitments to responsible and sustainable environmental and biodiversity management of its Lonnvale Hatchery.

The Huon Aquaculture Group of Companies (Huon) believes that:

- The safety of people and product are the highest company priorities.
- Work related injury, illness, disease and property loss are normally preventable.
- Successful environmental management makes good business practice.
- The safety of people, aquatic life and the environment is of the highest company priority.
- Supplying the public, staff and the relevant government authorities with up to date non-confidential information on our site's operations is a priority.

Huon would like to promote a clean green environmental openness about all sites operations.

Huon is committed to providing sound control management procedures, including planning, hazard control and appropriate training for the level of responsibility.

It is the policy of this company to make every reasonable effort to:

- Eliminate/minimise reasonably any foreseeable risk of environmental harm.
- Comply with relevant environmental legislation and guidelines.
- Make appropriate resources available to prevent environmental damage from occurring and appropriately respond to environmental issues if they occur.



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Scope

This site AEMR applies to the site title contained on the front cover of this document and is specifically developed to provide details of onsite operations – specifically in relation to environmental management.

Objectives

Our aim is to provide, as far as reasonably practical, a workplace free from reasonably foreseeable environmental risks.

This shall be achieved by complying with all legislation, including the environmental guidelines and Australian Standards. This also includes:

- design of potential storage areas
- maintenance and inspection of storage areas
- prevention of spills
- development of spill response plans
- containment of spills
- testing of environmental procedures for all usual employees (including casual/shift workers) at least annually
- standardised environmental management across all sites where possible
- maintaining an Environmental Management System
- providing relevant information, environmental guidance and environmental training for workers, contractors and visitors on environmental management where applicable
- each site having accessible and current contact details in case of environmental emergency
- regular assessment and continual improvement of environmental preparedness
- where any doubt exists, professional advice is sought as soon as possible.

Environmental Management System (EMS)

The AEMR forms a key element within the company's EMS and can be located within the EMS folder on the R Drive. Copies of the report can be made available by contacting the environmental manager or the site manager. Information contained within the AEMR is viewed as sensitive and the information contained remains the property of Huon always and can only be reproduced or copied by non-Huon staff once approved by David Wood, the company Quality Systems Manager, unless the information is required to be made publicly available under site regulations. This AEMR is required to be publicly available.

The EMS incorporates:

- the site Environmental Management Plan (EMP)
- the site Operations Manual
- the site Water Management Plan
- the site Waste Management Plan
- the company's Environmental Spills Procedure
- the company's Environmental Complaints Procedure
- the company's Compost Management Plan
- adherence to guidelines.



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1 Site Details

Lonnvale Hatchery
1374 Lonnvale Road Lonnvale Tasmania 7109

1.1 Site Contacts

Table 2: Site contacts Lonnvale Hatchery

Position	Name	Contact details
Hatchery Manager	Lindsay Pettit	6266 0066
RAS Hatchery Manager	Nathan Rowe	6266 0066
Environmental Manager	Adam Chapman	0497 042 809
Quality Systems Manager	David Wood	6295 8111

1.2 Site Operations Description

The Huon Lonnvale Hatchery is located on the banks of the Russell River approximately 28 km north-west of Huonville. The hatchery has a combination of traditional flow-through and recirculation sections, which are utilised to provide the company with Atlantic salmon smolt for growout in its marine aquaculture leases.

The site is surrounded by forest, or forest plantation owned by the Crown, Huon or as private land. The elevation of the site varies from 100–130 m ASL. The site is owned by the Huon Aquaculture Company Pty Ltd, and holds the two titles (137730/1 & 115827/1). The title area is approximately 36 ha; however, the bulk of the irrigation is completed on the forest plantation known as Maiden Meadows.

The Lonnvale hatchery site consists of one dwelling, a large enclosed hatchery, several smaller sheds and an external growout section consisting of a bio-filtration unit and a series of circular, partially in-ground tanks. The upper sections of the land consist of native forest providing habitat for native animals. The site is well managed, with all staff taking pride in the site and in protecting the surrounding ecosystem.

1.3 Recirculating Aquaculture System (RAS)

The recirculation section of the hatchery is designed to provide the company with the maximum quantity of smolt, whilst using the minimum amount of water. Water within the hatchery is recirculated through bio-filtration, UV lights and ozone. Water quality is monitored constantly with inline probes and the water is sampled daily for nutrient levels, dissolved oxygen, pH and conductivity. To maintain optimum growing conditions for the fish, some of the recirculated water is exchanged each day. This water is sent from the facility to be utilised as irrigation water.

1.4 Broodstock

The flow-through section of the facility was in operation when purchased by Huon in 2007. It consists of 6 earthen ponds and 4 concrete tanks. The layout of the farm was designed to minimise the site's impact on the Russell River by spreading the ponds and tanks throughout the system, with solids settlement areas in between to buffer any impacts from feeding operations. Biomass reached its peak in 2007 with over 49,000 kg of fish within the flow-through. Due to environmental concerns raised in regards to algae in the Russell River, Huon reduced stocking

and feed rates within the broodstock system. In response to these concerns Huon has further reduced this biomass and typically operates this section of the facility with <5000kg of broodstock contained.

Maximum feed at peak production in 2007 was 475 kg per day, whereas levels of feed are now internally capped at 20kg per day (average feed day across a month).

The AEMR has been developed in response to the Environmental Licence 9842/1 and to provide responses to specific guidelines within.

Figure 1: Biomass and feed, Flow-through site 2005 to present

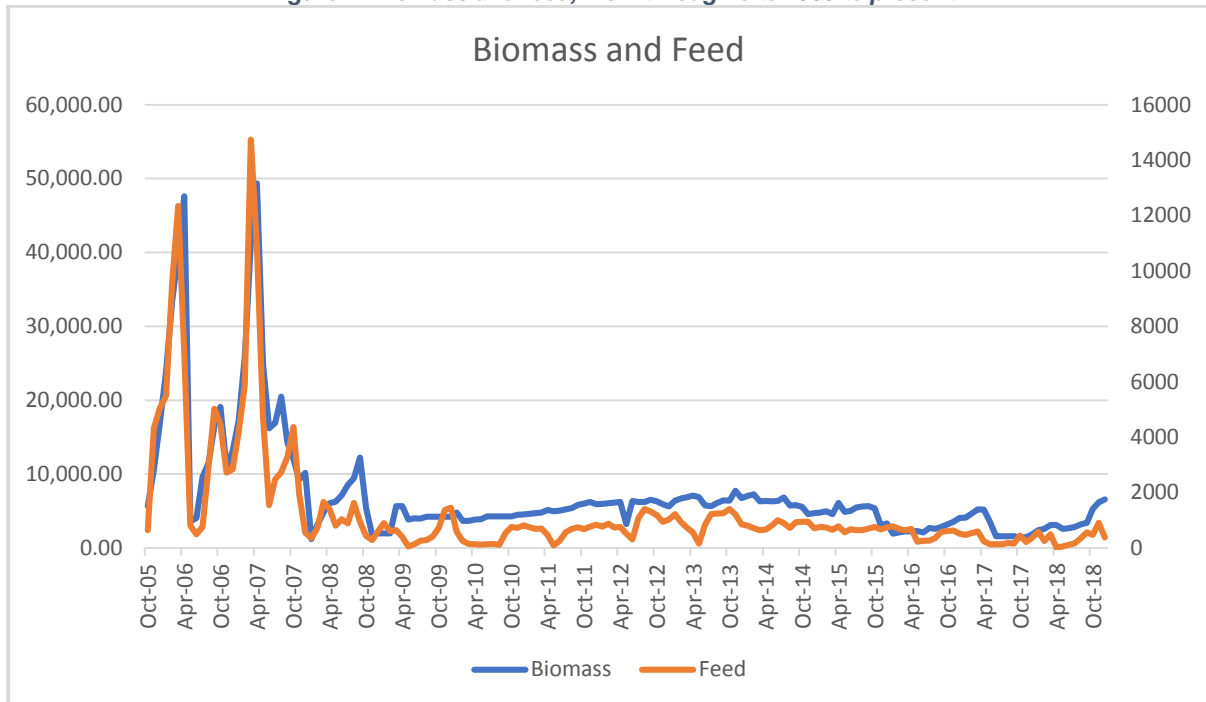


Figure 1, above, highlights the reduction in feed and biomass that has occurred within the Lonnvale broodstock flow-through section of the facility over time. The reduction seen since 2007 occurred when growout of salmonoids was transferred to the newly built recirculating aquaculture system (RAS) facility, as planned when the site was purchased from private owners.

The development of the RAS and the cost involved for that development has therefore meant that Huon dramatically reduced the impact potential on the receiving downstream environment from site operations.

2 Environmental Management Conducted at the Lonnvale Facility

2.1 Daily Field Monitoring

- river flows collected and recorded at the broodstock site inlet
- river flows collected and recorded at Lorkins Bridge downstream from the facility and automatically logged
- pH field data collected and recorded at inlet and outlet of broodstock facility twice daily
- dissolved oxygen field data recorded at inlet and outlet of broodstock facility twice daily
- water temperature field data collected and recorded at the inlet and outlet twice daily
- feed recorded daily
- broodstock biomass recorded daily (estimate of growth)
- visual inspection of inlet and outlet twice daily
- visual inspection of post broodstock microstrainer.

2.2 Monthly Laboratory Monitoring

Laboratory sampling is conducted at the following locations:

Table 3: Sampling Locations Russell River and Irrigation

Site	Description	Location	requirement
1	Russell River bridge upstream	42°56.4848 S, 146 47.2724 E	Yes
RAS (irrigation)	Delivery line to irrigation	Next to road at valve	Yes
3	Broodstock site inflow	42°56.6509 S, 146°47.5547 E	Yes
4	Farm outflow (discharge)	42°56.7860 S, 146°47.9183 E	Yes
5	Russell River 50 m below discharge	42°56.800 S, 146° 47.9444 E	Yes
6	200 m downstream	Near swimming hole	No
7	Lorkins Rd Bridge	42°57.6133 S, 146°49.4038 E	Yes
50 m DS	50 m DS Lorkins Bridge	50m downstream of Lorkins Bridge	No

2.3 Biological Monitoring

- Twice annually for a range of parameters as described in EL 9842/1

2.4 Other

- twice-annual benthic macroinvertebrate sampling (Spring and Autumn) (internal) to AusRivas standard
- weed management
- irrigation of wastewater management including soil and groundwater sampling.

3 Summary of Site Environmental Management 2018

3.1 Summary of Recirculating Aquaculture System (RAS) 2018

- Wastewater generated: 63,621KL (irrigation water)
- Peak wastewater day: Presmolt 575KL, Fry 259KL
- Sludge removed: estimated 300KL (Spectran to composting at Interlaken)

3.2 Summary Broodstock Flow-through Hatchery 2018

3.2.1 Flow-through peak feed day

- 33kg 8/1/2018

3.2.2 Flow-through annual feed

- 4052kg (12.6% increase over 3596kg in 2017)

3.2.3 Monthly average feed

- 337kg

3.2.4 Maximum monthly feed

- 582kg January

3.2.5 Peak biomass

- 6552kg 31/12/2018

3.2.6 Current biomass at end of period

- 6552kg 31/12/2018

3.2.7 Benthic macroinvertebrates sampling

Macroinvertebrate sampling is conducted in Spring and Autumn as per AusRivas guidelines see results below (Table 4).

Table 4: results Macroinvertebrate sampling 2018

Site	Autumn 2018		Spring 2018	
	Score	Rating	Score	Rating
Russell River upstream of Huon Aquaculture	1.22	A	1.09	A
Russell River downstream of Huon Aquaculture	1.14	A	1.08	A

3.2.7.1 Discussion of AusRivas results

“The scores at both sites on the Russell River are very similar, with both sites scoring an excellent “A” rating (similar to reference site). There appears to be little impact on macroinvertebrate diversity from the aquaculture operation, more sampling will be required to determine long term trends.

*Many highly sensitive invertebrate families have been found above and below the aquaculture facility. The Lonnavele site scores are similar to pristine bush sites”**

* Walsh, T (2018). AusRivAS autumn/spring surveys of Lonnavele.

3.2.8 Water Diversion from Russell River into Broodstock Facility

Water Board regulation for the site states that <50% of the Russell River can pass through the hatchery each day as a maximum. Huon records all flows into the facility. The site is a non-consumptive user, returning all water back to the Russell River.

The gauge board and flow logger were destroyed during the May 2018 floods. The contractor conducting the repairs Tony Spandler required low water conditions to install and gauge flows for the Russell River. The flow board was completed in late December 2018, gauging was not completed until 3/2/2019.

Table 5: Actual % Ave Flow Passing Through Hatchery per Day 2018

Month	Broodstock flow ML per day	Lorkins flow ML per day	Average diverted per month %
January	11.14	56.16	19.83
February	12.96	136.51	9.49
March	12.61	121.82	10.35
April	15.12	270.43	5.59
May	18.58	210	8.84
June	16.64	NR	NR
July	18.84	NR	NR
August	19.52	NR	NR
September	17.19	NR	NR
October	13.04	NR	NR
November	17.28	NR	NR
December	13.48	NR	NR
Average	15.53	NA	NA
Year total	186.40	NA	NA



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4 Laboratory Sampling Lonnavele 2018

Under site operating conditions, Huon must engage in monthly laboratory sampling at its Lonnavele flow-through outlet (Broodstock Outlet) into the Russell River. This is required to provide the EPA with a monthly report of the discharge concentrations at this location.

Table 6, below, highlights the Effluent Quality Limits for the Lonnavele Broodstock Outlet. Due to the low concentrations, laboratory measurement uncertainty has been added to the discharge limits to generate the practical emission limits for the site.

Environmental monitoring (lab testing) occurred 12 times throughout the period.

Please note in Table 6 below:

Biological oxygen demand (BOD) Effluent Quality limit of <2 mg/L is set below AST laboratories minimum detection level of 5 mg/L; therefore, 5 mg/L is considered compliant.

All the analytes are set at or near laboratories minimum detection levels.

Table 6: Effluent Quality Limits EL 9842/1 and practical limits adding measurement uncertainty

Analyte	Units	MU ±%	EPN discharge limits	Practical Emission limits
pH	Units		6.5 – 8.5	<6.5 – >8.5
BOD	mg/L		<2	<5
TSS	mg/L	15	2	>2
Total Ammonia	mg/L	15	0.021	0.026
Nitrate and Nitrite Nitrogen	mg/L	15	0.018	0.021
Total Nitrogen	mg/L	23	0.172	0.272
Dissolved Reactive Phosphorus	mg/L	20	0.008	0.011
Total Phosphorus	mg/L	28	0.015	>0.02

4.1 Summary of Laboratory Results 2018

Table 7: Median results 2018

Analyte	MU ±%	EPN discharge limits	Enforceable Emission limits	Inlet 2018	Outlet 2018	Diff inlet v outlet 2018
Laboratory pH Units	0	6.5–8.5	<6.5 or >8.5	7.45	7.4	-0.05
Ammonia mg-N/L	15	0.021	0.026	0.005	0.01	0.005
Phosphate as P (filt) mg/L	20	0.008	0.011	0.003	0.004	0.001
Nitrate and Nitrite mg-N/L	15	0.018	0.021	0.003	0.008	0.005
Total Nitrogen mg-N/L	23	0.172	0.272	0.1	0.11	0.01
Total Phosphorus mg-P/L	28	0.015	0.025	0.01	0.01	0
Total Suspended Solids mg/L	15	2	>2	2	2	0
BOD O ² /L	11	<2	>5	NR	5	0

Table 8: Comparison Across All Sites Sampled in 2018 (Median Results)

Analyte	Site 1 upstream	Inlet	50 m below outlet	Site 6 200 m downstream	Lorkins Bridge	50 m below Lorkins	Sample number
Ammonia and ammonium as N mg/L	0.005	0.005	0.005	0.005	0.005	0.005	12(4)
Phosphate as P (filt) mg/L	0.003	0.003	0.003	0.003	0.003	0.003	12(4)
Nitrite and Nitrate as N mg/L	0.003	0.003	0.004	0.004	0.003	0.003	12(4)
Nitrogen (Total) as N mg/L	0.1	0.1	0.1	0.1	0.11	0.11	12(4)
Phosphorus (Total) as P mg/L	0.01	0.01	0.01	0.01	0.01	0.01	12(4)

(4) 50 metres below Lorkins Bridge was only conducted 4 times (quarterly)

4.1.1 Laboratory pH

Huon adds no chemicals or materials to the flow-through system to manage or manipulate pH.

4.1.1.1 Summary of 2018 pH Results

pH has remained compliant throughout the site's history.

Figure 2: pH Units 2018 Lonnvale Broodstock (Limits in Red)

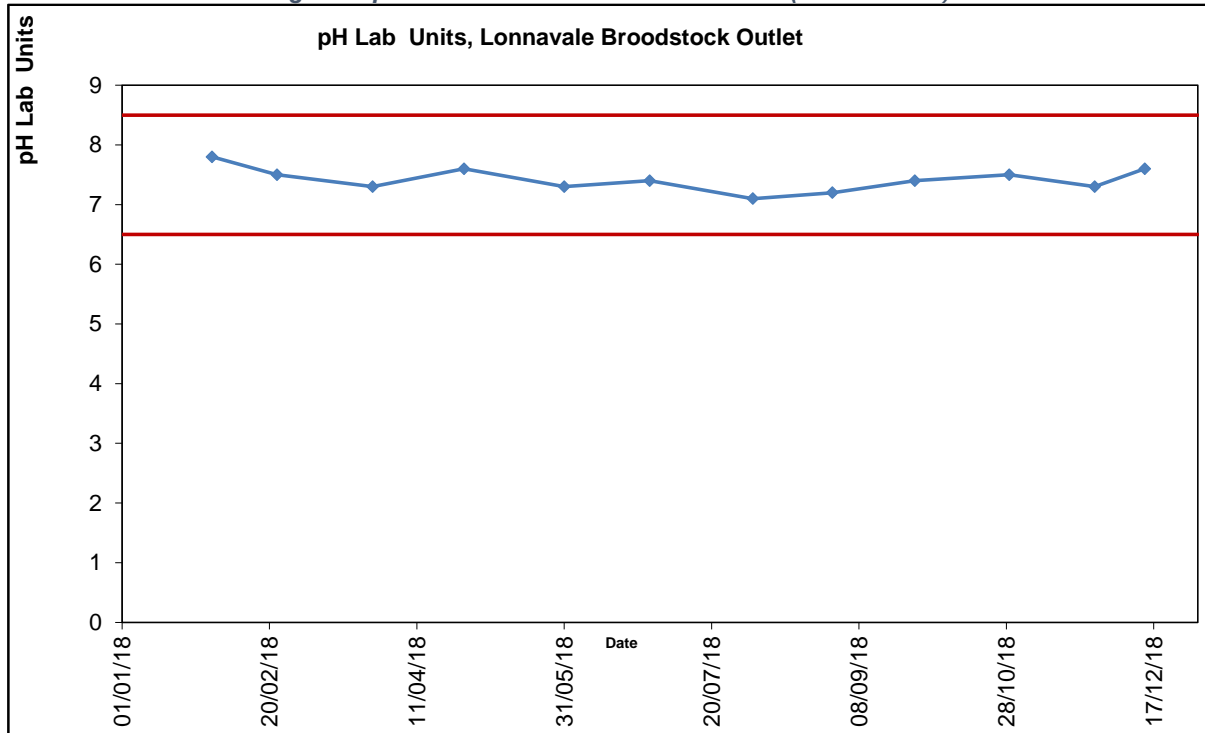
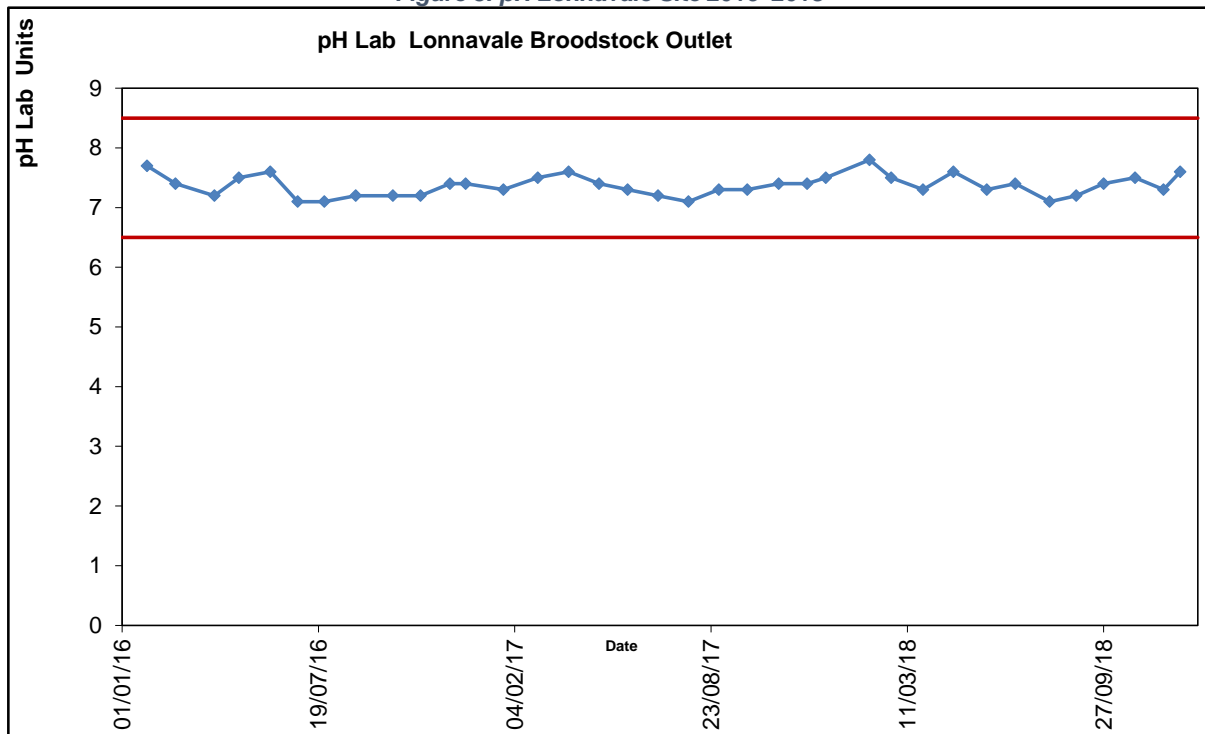


Figure 3: pH Lonnvale Site 2016–2018



4.1.2 Total Ammonia

4.1.2.1 Summary of Total Ammonia Results

Figure 4 below, highlights that Total Ammonia remained compliant to the site discharge limits throughout 2018. Figure 5 highlights the downward trend in Total Ammonia results that has occurred since 2016.

Figure 4: Total Ammonia N-mg/L 2018 Broodstock Outlet (Guideline Red)

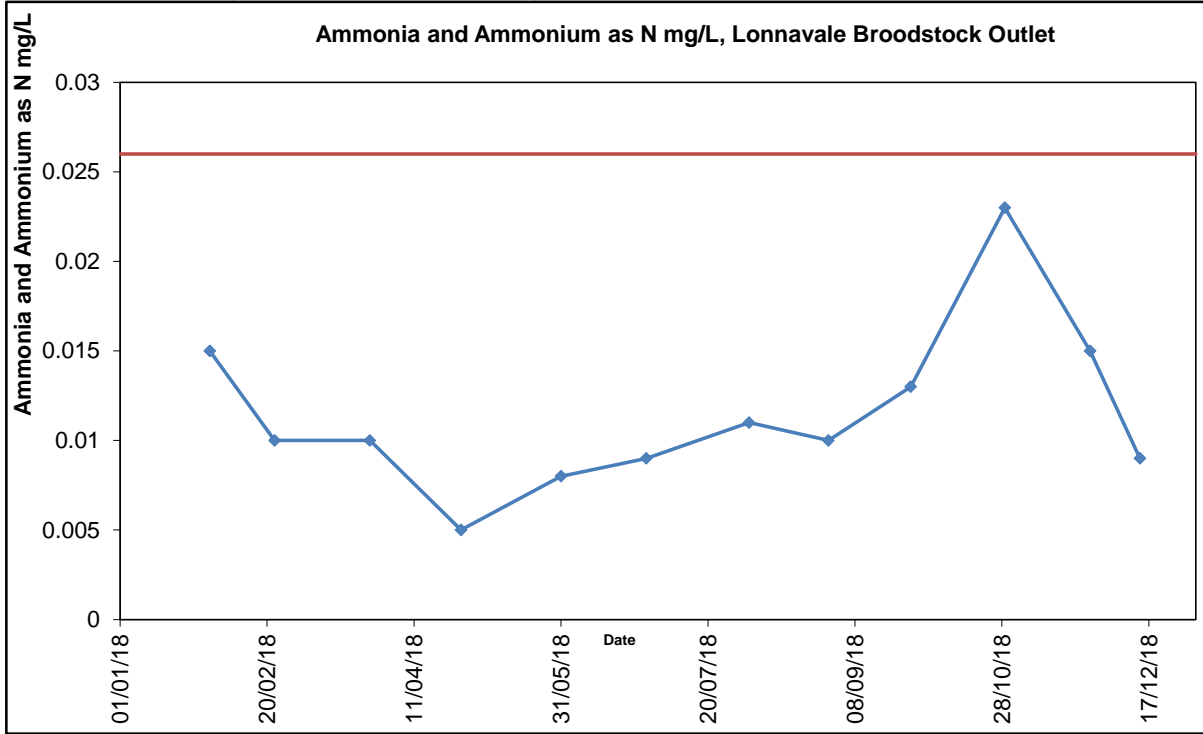
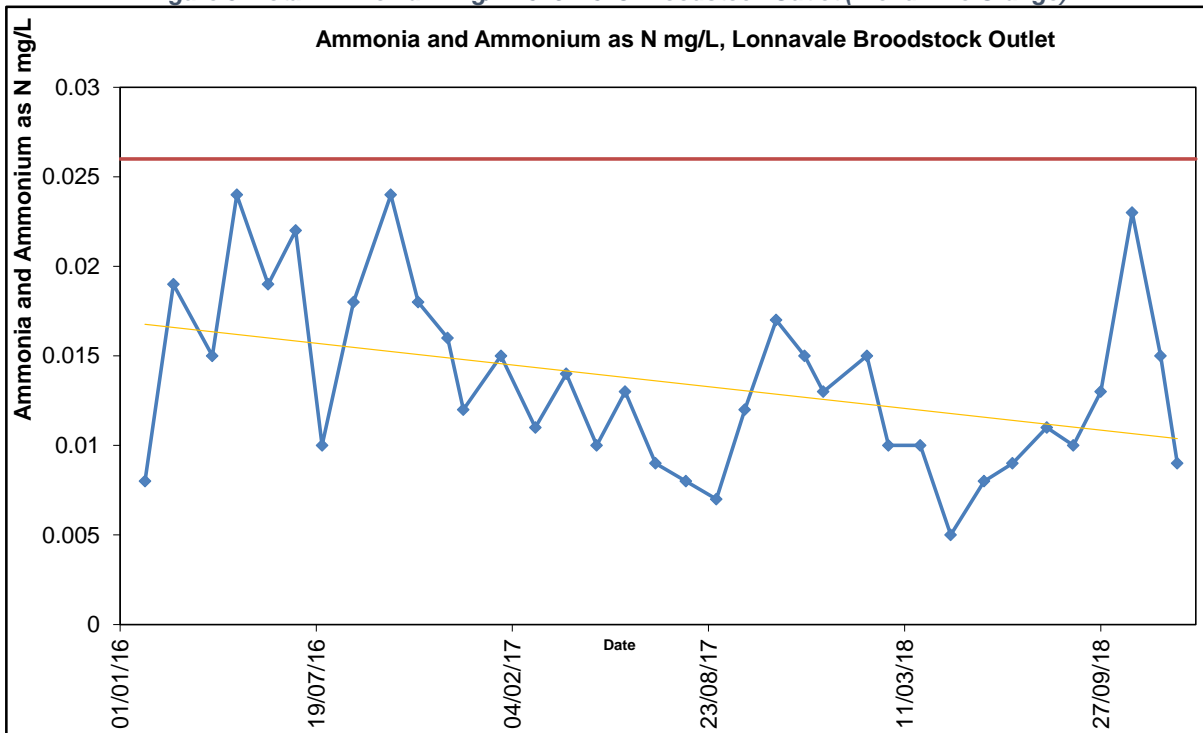


Figure 5: Total Ammonia N-mg/L 2016–2018 Broodstock Outlet (Trend Line Orange)



4.1.3 Dissolved Reactive Phosphorus

4.1.3.1 Summary of Dissolved Reactive Phosphorus Results

Dissolved reactive phosphorus (DRP) remained compliant to the enforceable limit in 2018 (Figure 6) and has trended lower across the past 3 years (Figure 7).

Figure 6: Dissolved Reactive Phosphorus 2018 Broodstock Outlet (Enforcement Limit in Red)

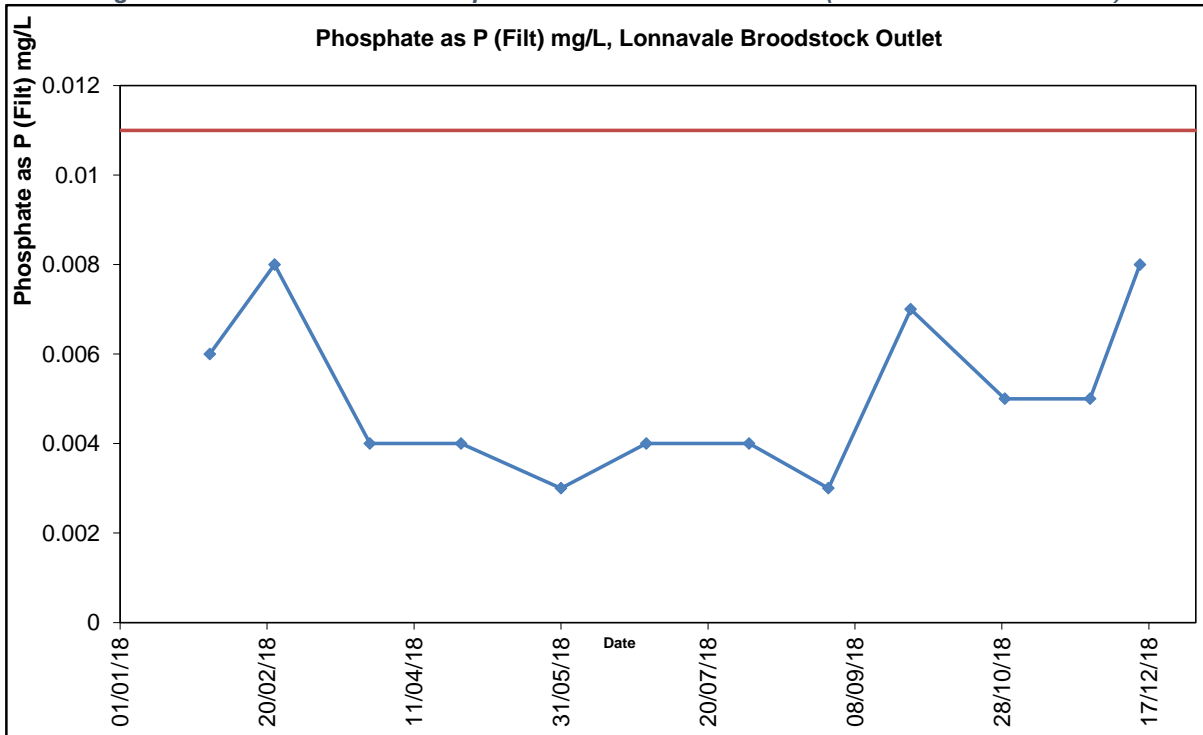
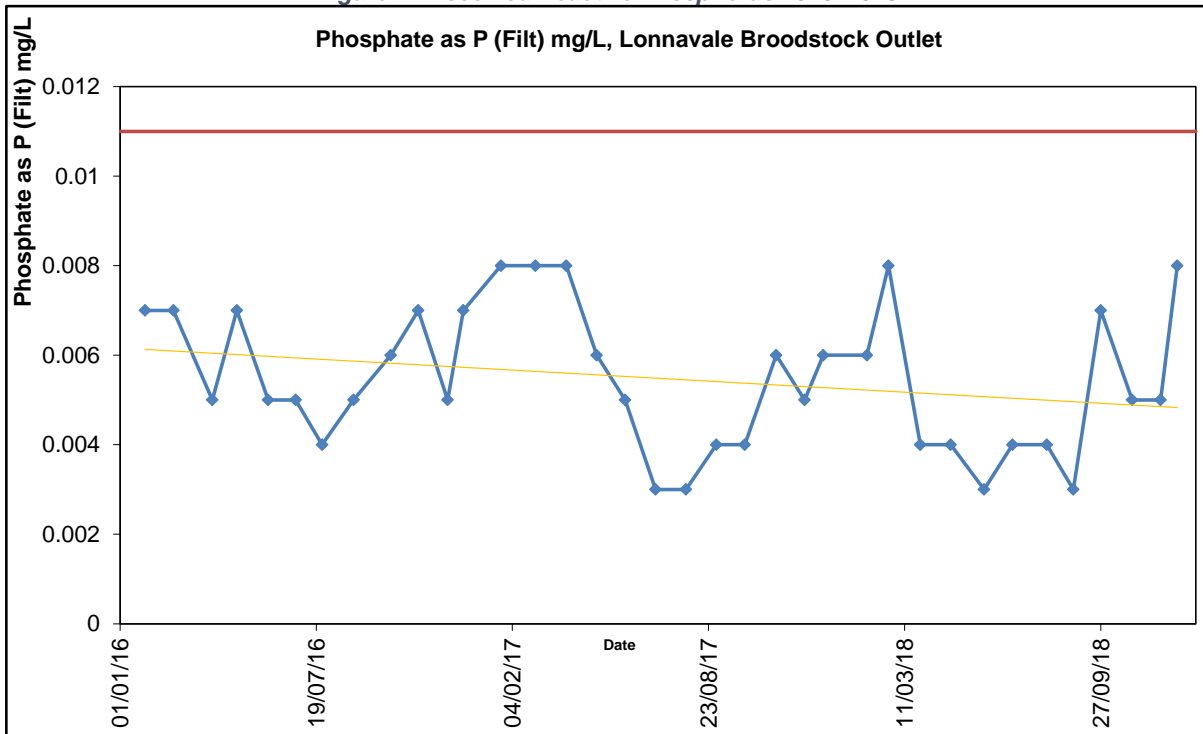


Figure 7: Dissolved Reactive Phosphorus 2016–2018



4.1.4 Nitrate and Nitrite Nitrogen

4.1.4.1 Summary Nitrate and Nitrite Nitrogen

There were 3 non-compliance events regarding Nitrate and Nitrite in 2018 (Figure 8). There have been 4 non-compliance events regarding this analyte in the past 3 years. Nitrate and Nitrite are considered nearly harmless at these levels with any potential impact considered minor to negligible.

Figure 8: Nitrate and Nitrite Nitrogen 2018 Broodstock Outlet

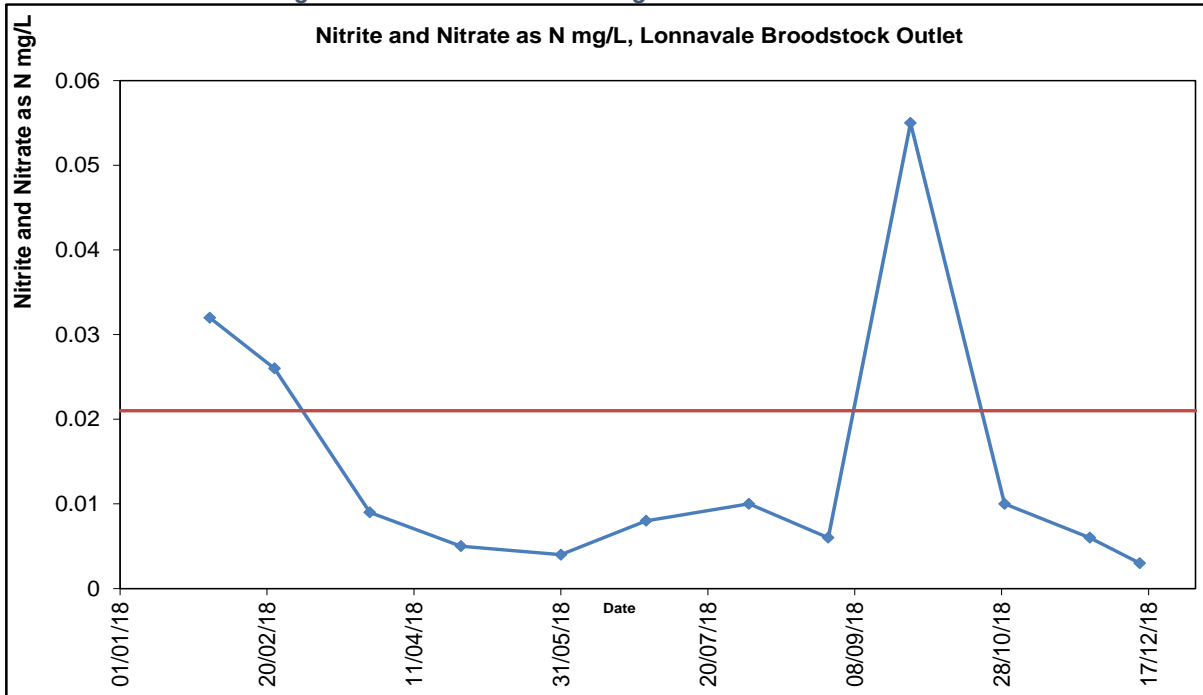
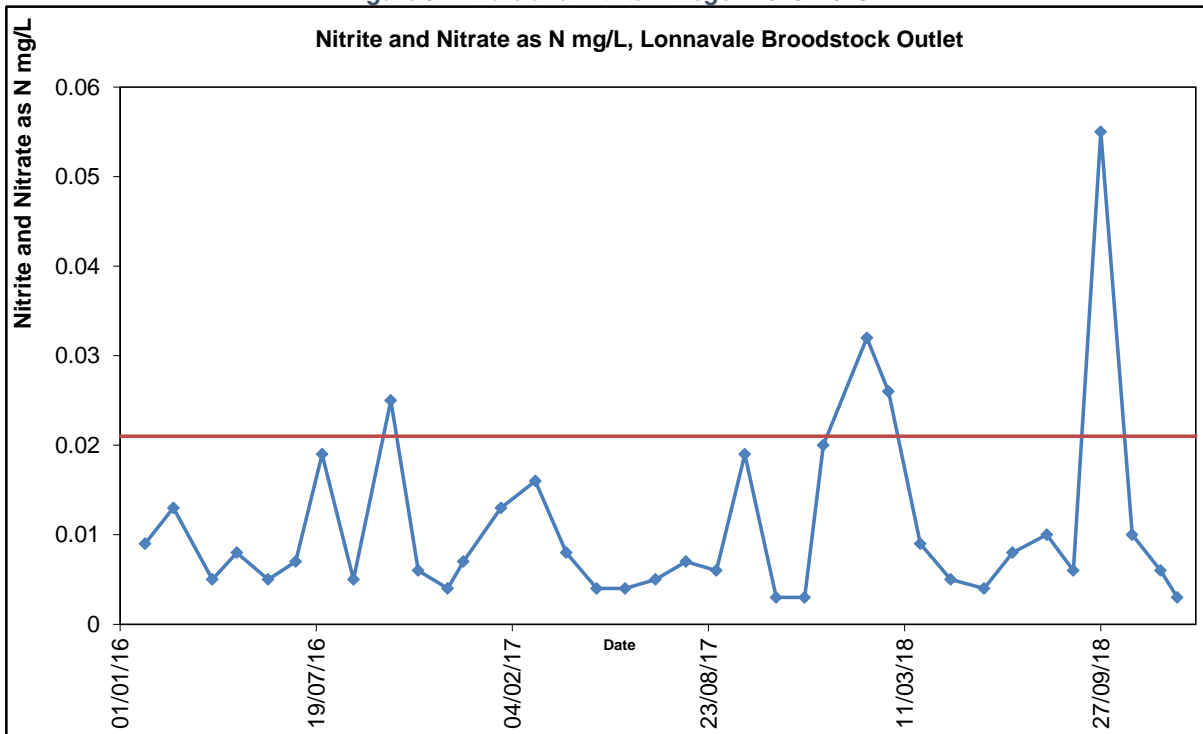


Figure 9: Nitrate and Nitrite Nitrogen 2016–2018



4.1.5 Total Nitrogen

4.1.5.1 Summary Total Nitrogen

Total Nitrogen remained compliant throughout 2018 (Figure 10).

Total Nitrogen has remained stable (trend-line) since 2016 (Figure 11).

Figure 10: Total Nitrogen 2018 Broodstock Outlet

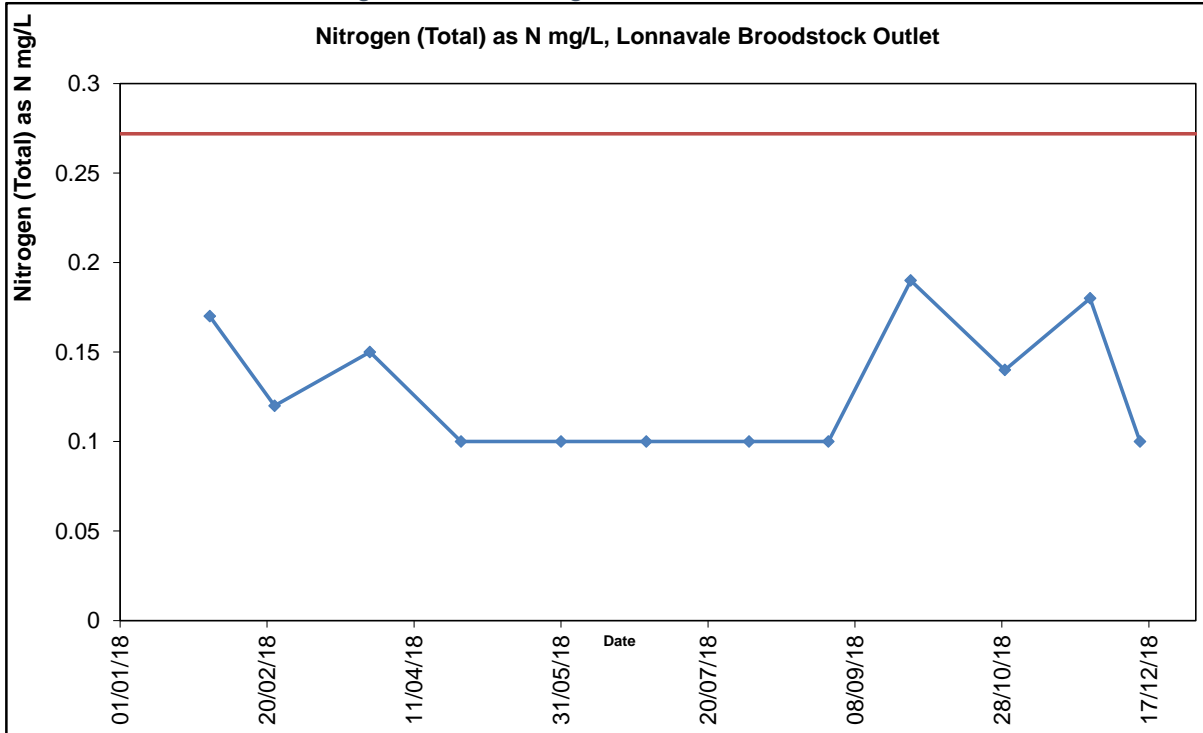
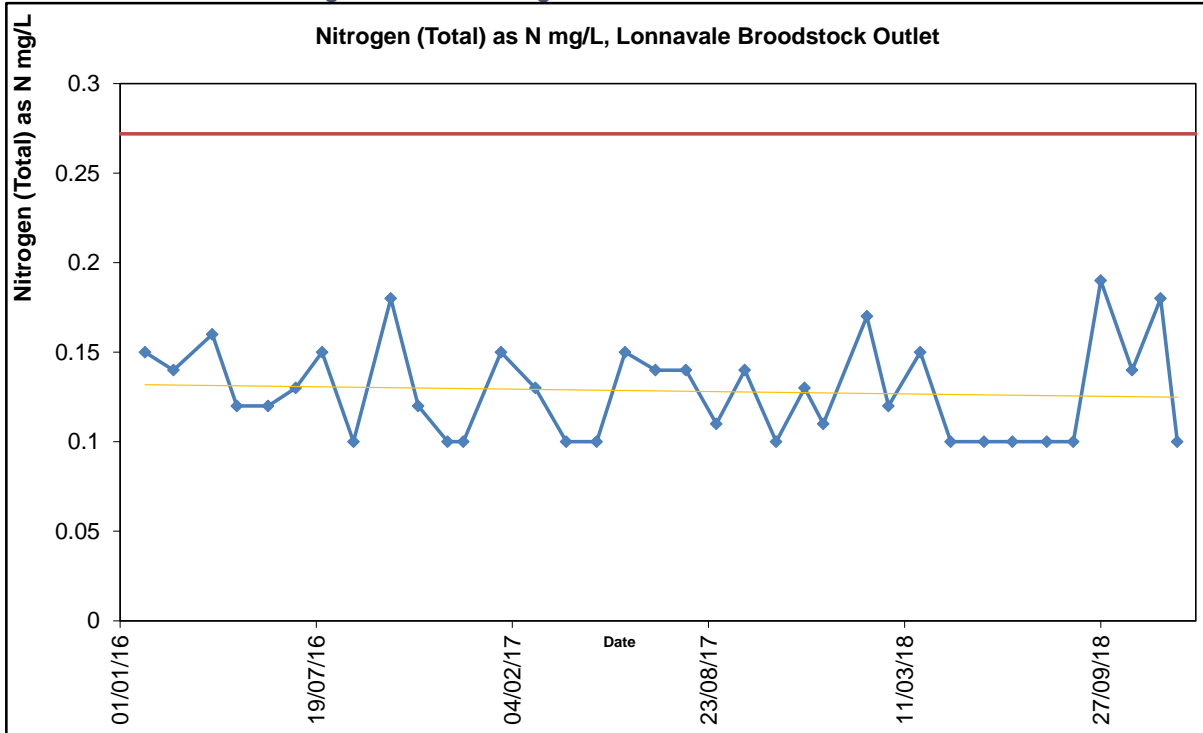


Figure 11: Total Nitrogen 2016–2018 Broodstock Outlet



4.1.6 Total Phosphorus

4.1.6.1 Summary Total Phosphorus Broodstock Outlet

Total Phosphorus remained compliant at minimum detectable levels throughout 2018 (Figure 12). Total Phosphorus has remained at minimum detectable levels for the past 3 years.

Figure 12: Total Phosphorus 2018 Broodstock Outlet

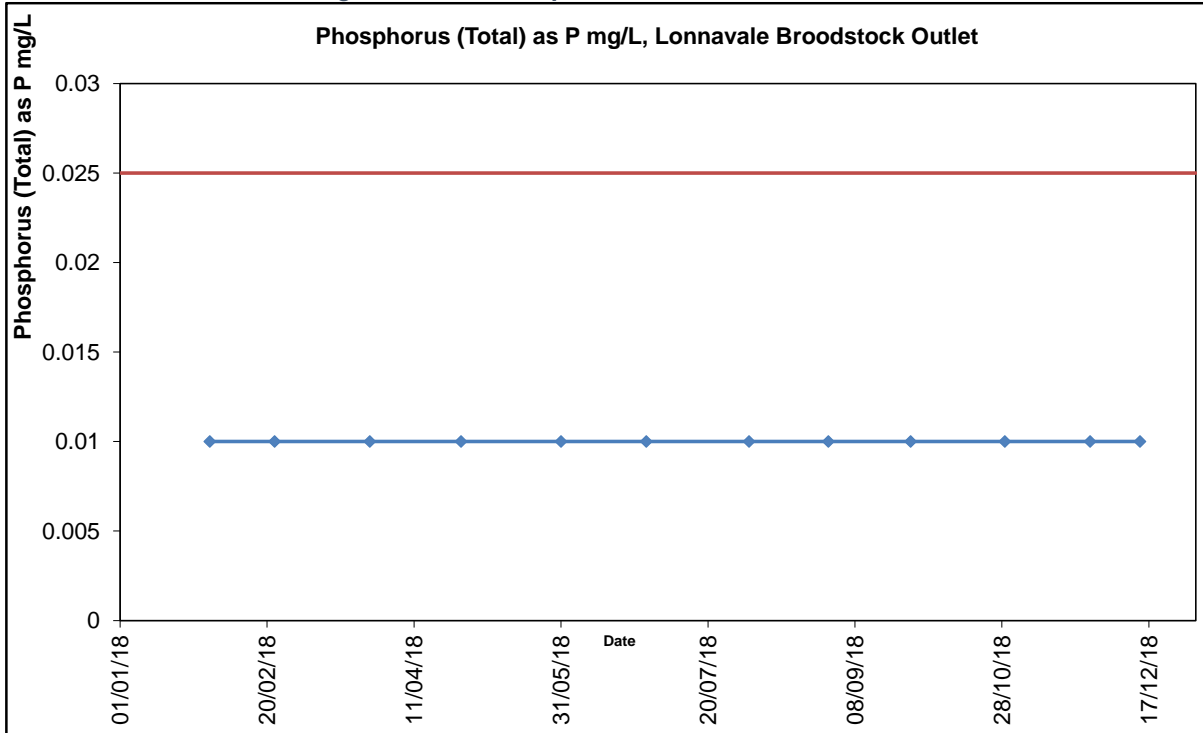
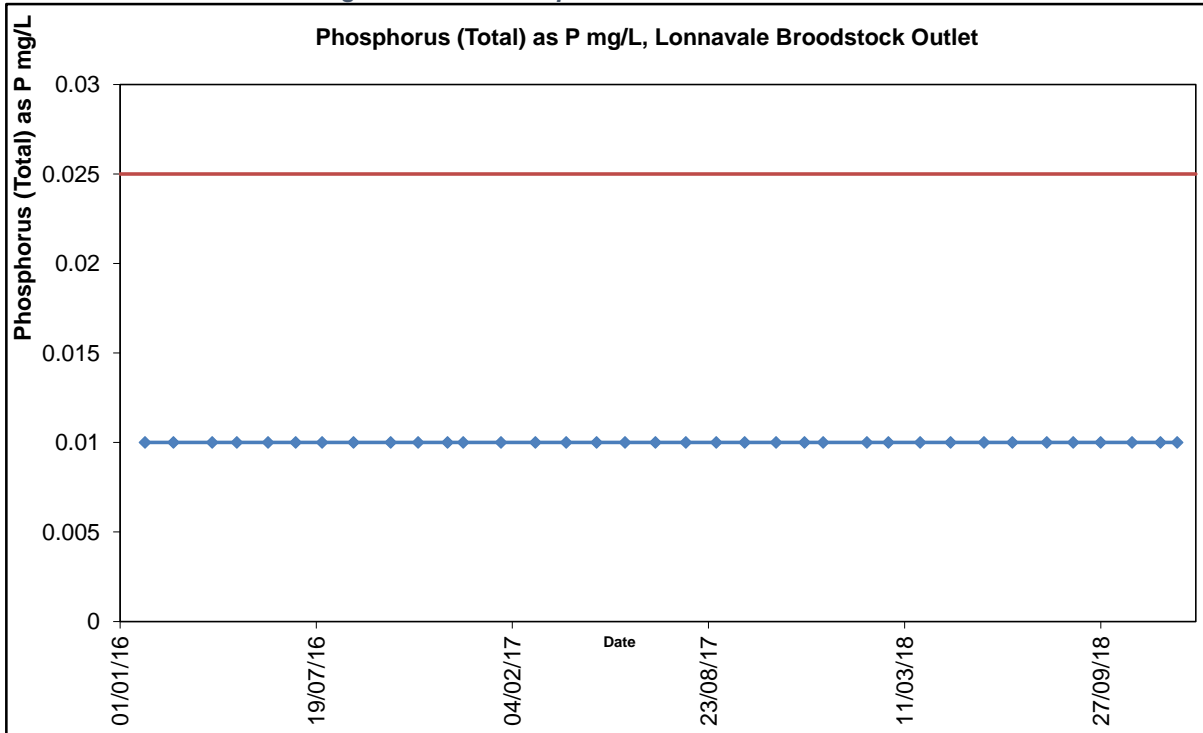


Figure 13: Total Phosphorus Broodstock 2016–2018



4.1.7 Total Suspended Solids

4.1.7.1 Summary of Results Total Suspended Solids Lonnvale Broodstock Outlet

Total Suspended Solids remained at the minimum detectable level throughout 2018 (Figure 14). There has only been one record of a result above minimum detectable level since 2016 (Figure 15).

Figure 14: Total Suspended Solids 2018 Broodstock Outlet

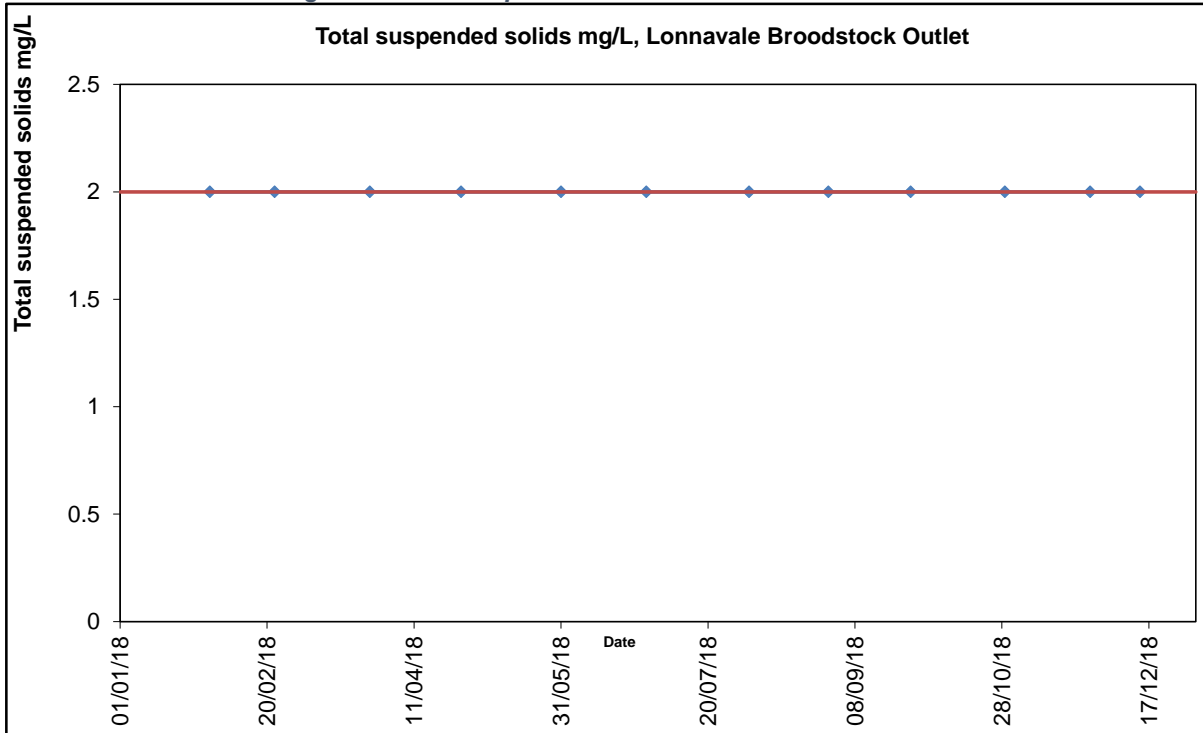
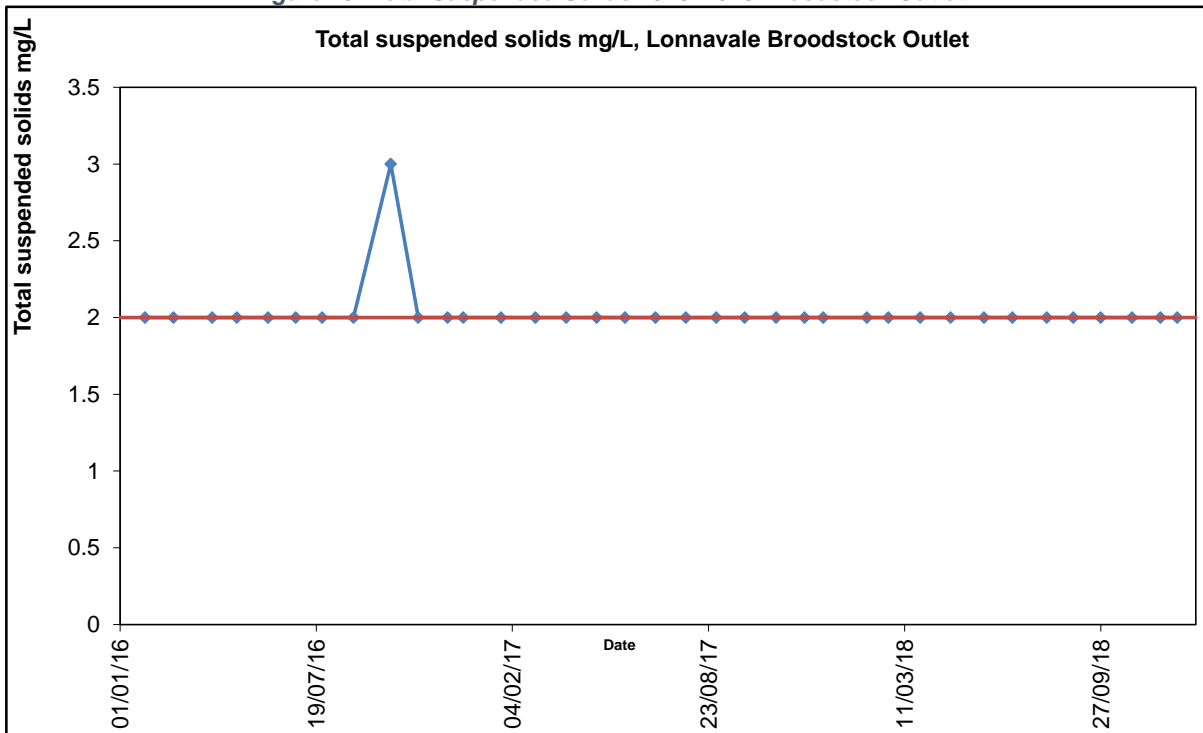


Figure 15: Total Suspended Solids 2016–2018 Broodstock Outlet



4.1.8 Biological Oxygen Demand

4.1.8.1 Summary Biological Oxygen Demand Lonnvale Broodstock Outlet

All results for this analyte have remained at or below the minimum detectable level since sampling has been conducted under the Environmental Protection Notice.

Figure 16: Biological Oxygen Demand Lonnvale Broodstock Outlet 2018

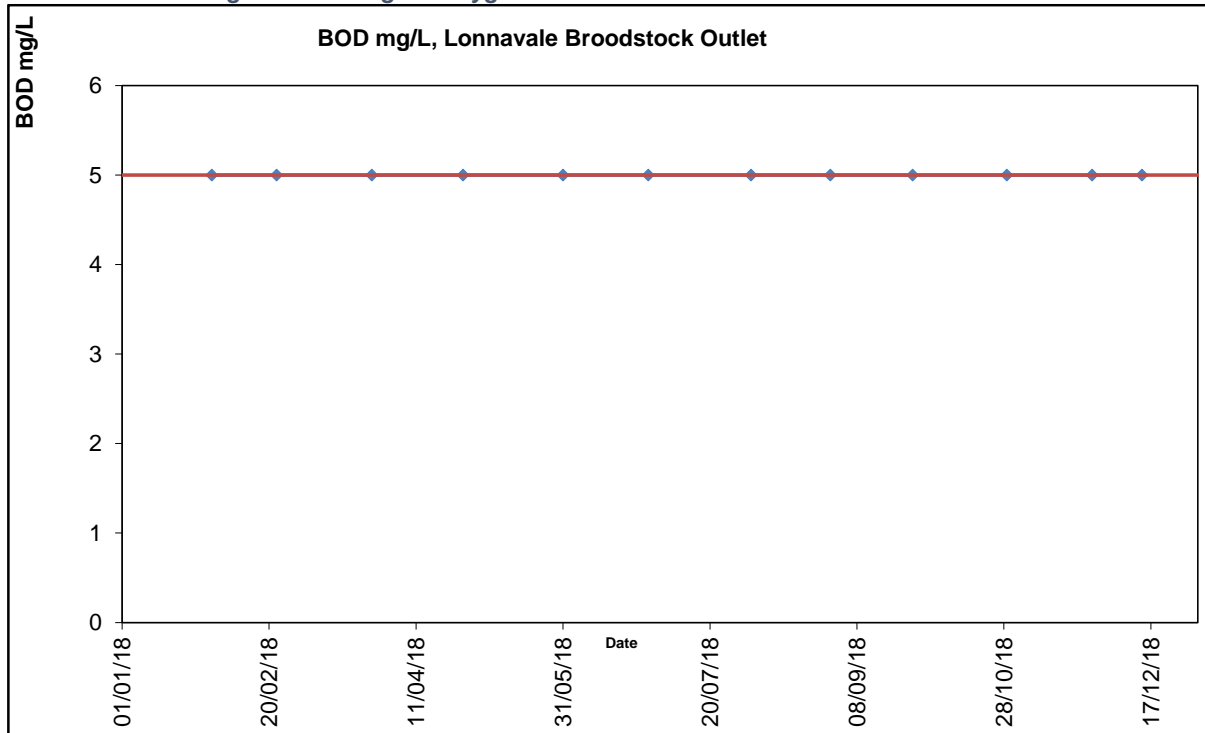
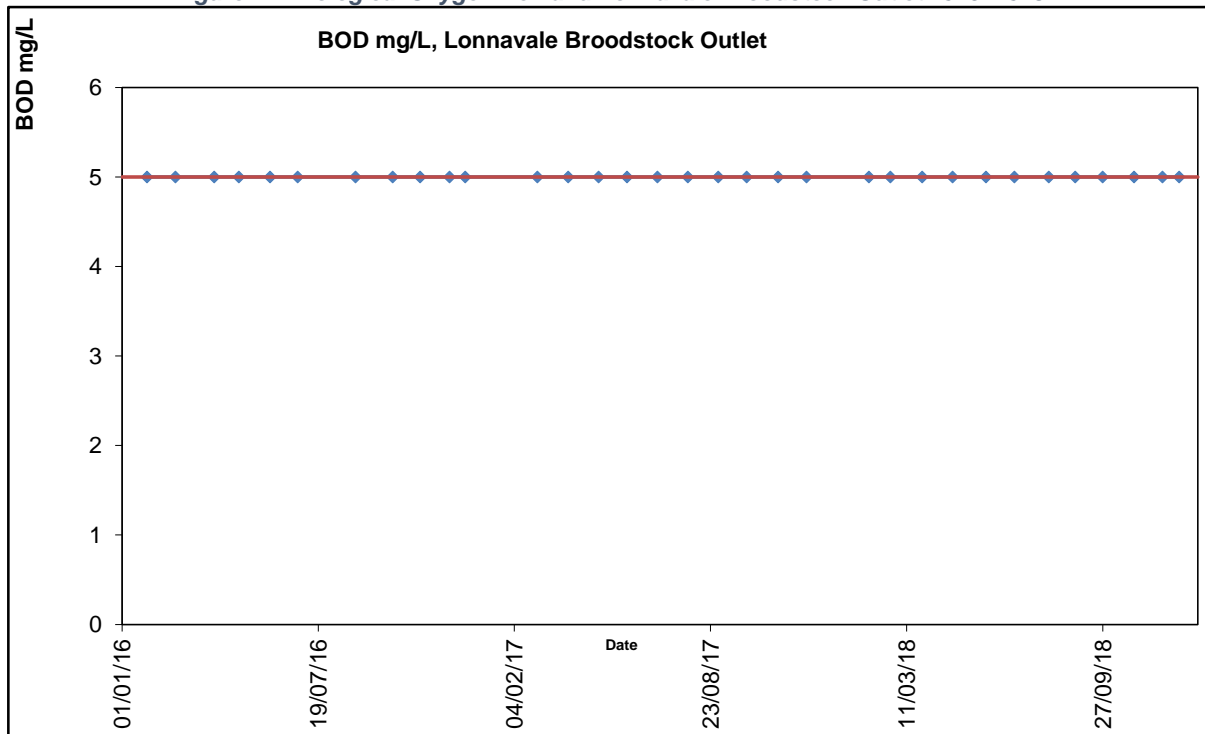


Figure 17: Biological Oxygen Demand Lonnvale Broodstock Outlet 2016–2018



5 Summary of all sampling data 2018

Table 9: Site 1 – 2018

Site Lonnvale 1 (Upstream of Inlet) Monthly						
	Max	80th Percentile	Median	20th Percentile	Min	Sample Number
Ammonia and Ammonium as N mg/L	0.01	0.005	0.005	0.005	0.005	12
Chlorophyll a mg/m3	0.5	0.5	0.5	0.5	0.5	12
Conductivity Lab uS/cm uS/cm	88	69.6	58	48.8	46	12
Nitrite and Nitrate as N mg/L	0.01	0.004	0.003	0.002	0.002	12
Nitrogen (Total Kjeldahl) as N mg/L	0.14	0.1	0.1	0.1	0.1	12
Nitrogen (Total) as N mg/L	0.15	0.108	0.1	0.1	0.1	12
pH Lab Units	7.9	7.6	7.45	7.3	7.2	12
Phosphate as P (Filt) mg/L	0.006	0.003	0.003	0.003	0.003	12
Phosphorus (Total) as P mg/L	0.01	0.01	0.01	0.01	0.01	12
Total suspended solids mg/L	2	2	2	2	2	12

Table 10: Site 3 – 2018

Site Lonnvale 3 (Inlet) Monthly						
	Max	80th Percentile	Median	20th Percentile	Min	Sample Number
Ammonia and Ammonium as N mg/L	0.006	0.005	0.005	0.005	0.005	12
Chlorophyll a mg/m3	0.5	0.5	0.5	0.5	0.5	12
Conductivity Lab uS/cm uS/cm	87	69.6	57.5	48	46	12
Nitrite and Nitrate as N mg/L	0.009	0.005	0.003	0.002	0.002	12
Nitrogen (Total Kjeldahl) as N mg/L	0.14	0.1	0.1	0.1	0.1	12
Nitrogen (Total) as N mg/L	0.15	0.1	0.1	0.1	0.1	12
pH Lab Units	7.9	7.6	7.45	7.3	7.2	12
Phosphate as P (Filt) mg/L	0.004	0.004	0.003	0.003	0.003	12
Phosphorus (Total) as P mg/L	0.01	0.01	0.01	0.01	0.01	12
Total suspended solids mg/L	2	2	2	2	2	12

Table 11: Lonnvale Broodstock Outlet data 2018

Site Lonnvale Broodstock Outlet Monthly						
	Max	80th Percentile	Median	20th Percentile	Min	Sample Number
Ammonia and Ammonium as N mg/L	0.023	0.014	0.01	0.009	0.005	12
BOD mg/L	5	5	5	5	5	12
Chlorophyll a mg/m3	1.5	1	0.5	0.5	0.5	12
Conductivity Lab uS/cm uS/cm	89	67.8	56	54.2	48	12
Nitrite and Nitrate as N mg/L	0.055	0.022	0.008	0.005	0.003	12
Nitrogen (Total Kjeldahl) as N mg/L	0.17	0.138	0.1	0.1	0.1	12
Nitrogen (Total) as N mg/L	0.19	0.166	0.11	0.1	0.1	12
pH Lab Units	7.8	7.58	7.4	7.3	7.1	12
Phosphate as P (Filt) mg/L	0.008	0.006	0.004	0.004	0.003	12
Phosphorus (Total) as P mg/L	0.01	0.01	0.01	0.01	0.01	12
Total suspended solids mg/L	2	2	2	2	2	12

Table 12: Site 5 – 2018

Site Lonnvale 5A (ALL) Monthly						
	Max	80th Percentile	Median	20th Percentile	Min	Sample Number
Ammonia and Ammonium as N mg/L	0.005	0.005	0.005	0.005	0.005	12
Chlorophyll a mg/m3	0.6	0.5	0.5	0.5	0.5	11
Conductivity Lab uS/cm uS/cm	88	68	58.5	48.6	46	12
Nitrite and Nitrate as N mg/L	0.011	0.007	0.004	0.002	0.002	12
Nitrogen (Total Kjeldahl) as N mg/L	0.17	0.1	0.1	0.1	0.1	12
Nitrogen (Total) as N mg/L	0.17	0.1	0.1	0.1	0.1	12
pH Lab Units	7.7	7.6	7.5	7.32	7.2	12
Phosphate as P (Filt) mg/L	0.005	0.004	0.003	0.003	0.003	12
Phosphorus (Total) as P mg/L	0.01	0.01	0.01	0.01	0.01	12
Total suspended solids mg/L	2	2	2	2	2	12

Table 13: Site 7 – 2018

Site Lonnvale 7 (ALL) Monthly						
	Max	80th Percentile	Median	20th Percentile	Min	Sample Number
Ammonia and Ammonium as N mg/L	0.006	0.005	0.005	0.005	0.005	12
Chlorophyll a mg/m3	0.7	0.5	0.5	0.5	0.5	12
Conductivity Lab uS/cm uS/cm	76	67.4	59.5	49.2	47	12
Nitrite and Nitrate as N mg/L	0.011	0.004	0.003	0.002	0.002	12
Nitrogen (Total Kjeldahl) as N mg/L	0.16	0.12	0.105	0.1	0.1	12
Nitrogen (Total) as N mg/L	0.16	0.128	0.11	0.1	0.1	12
pH Lab Units	7.8	7.6	7.5	7.3	7.3	12
Phosphate as P (Filt) mg/L	0.007	0.004	0.0035	0.003	0.003	12
Phosphorus (Total) as P mg/L	0.01	0.01	0.01	0.01	0.01	12
Total suspended solids mg/L	11	2	2	2	2	12

Table 14: RAS Irrigation water -2018

Site Lonnvale RAS (ALL) Monthly						
	Max	80th Percentile	Median	20th Percentile	Min	Sample Number
Ammonia and Ammonium as N mg/L	9.9	4.18	2.6	0.14	0.006	12
BOD mg/L	14	10.8	5.5	5	5	12
Conductivity Lab uS/cm uS/cm	2190	1862	1705	1592	1450	12
Nitrite and Nitrate as N mg/L	75	62.8	46	29.8	12	12
Nitrogen (Total Kjeldahl) as N mg/L	14	6.52	4.95	2.22	1.5	12
Nitrogen (Total) as N mg/L	89	72.4	50	32.4	14	12
pH Lab Units	8.9	8.48	8.1	7.9	7.7	12
Phosphate as P (Filt) mg/L	6	4.28	2.5	1.28	1	12
Phosphorus (Total) as P mg/L	10	6.68	4.65	2.3	1.9	12
Total suspended solids mg/L	35	18	8.5	5.2	2	12



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6 Summary of Amounts of Solid and or Liquid Wastes (EPN 7677/2 condition G6 1.4)

6.1 RAS Waste Summary 2018

6.1.1 Water

The recirculating aquaculture system utilises biological and mechanical filtration to minimise its water use. Water circulating internally within the system receives ozone and UV treatment to prevent any disease from occurring. To maintain a healthy system, some water is discharged each day and replaced with chlorine-dosed bore water.

The discharged water removed from the system is mechanically filtered to remove solids, sent to a settlement dam to remove finer solids and then enters the site's irrigation system.

Total water exchanged from the RAS in 2018 was 63,621KL

6.1.2 Water irrigated

Water was irrigated according to the site's Wastewater Reuse Environmental Management Plan (WREMP).

Irrigated water estimate 63,000 KL*

*estimate based on storage dam levels and RAS discharge (evaporation not considered).

6.1.3 RAS sludge

During the mechanical filtration of the RAS water, solids are captured and sent to a radial flow separator for concentration. These solids are then pumped to a sludge digester system.

6.1.4 Sludge removed 240KL*

*This is an estimate as Spectran manage the system by collecting sludge on set days. Huon pays for 8,000 litres removal each time but the actual amount removed could be less than 8,000 litres.

6.2 Flow-through Waste Summary 2018

All water passing through the flow-through is mechanically filtered through a 50 micron microstrainer – solids collected within this microstrainer are pumped directly to the RAS wastewater system. This occurs automatically and actual solids captured is not recorded. Estimated volume is 219 KL (600 litres per day); actual sludge is less than 1% of this figure (99% water).

6.3 General Waste 2018

All general waste is disposed of per the site Waste Management Plan; all fish mortalities are composted on site per the site Compost Management Plan.

Controlled culls are sent to K100 approved facilities for composting.

Wherever possible, older broodstock or unwanted smaller fish are donated live to IFS Tasmania.

6.4 Community Consultation (EPN 7677/2 Condition G6 1.10)

6.4.1 Letterbox Drop

During the reporting period Huon conducted a letterbox drop to local Lonnvale residents with information regarding movements of smolt transfer trucks.



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6.4.2 List of any Issues not addressed elsewhere in the report that must be addressed to improve compliance (EPN 7677/2 Condition G6 1.8)

Suggestions were made within a report conducted on the site and the Russell River by EPA and the state government (Kelly report) regarding the potential of high nutrient water entering the Russell River from the site, either during periods of rainfall or from irrigation. Huon Aquaculture manages this site to an extremely high standard and rejects this assumption. Laboratory testing results of the Russell River validates Huon Aquacultures position with no evidence of any high nutrient flows being emitted from the site.

Median results for all key nutrients are within 1 part per Billion between site 1 above the facility and site 7 below all site operations.

6.5 A Summary of Fulfilment of Environmental Commitments Made for the Period 2018 (EPN 7677/2 Condition G6 1.9)

No commitments were made in the 2017 report.

6.6 Complaints Received (EPN 7677/2 Condition G6 1.2)

There were no complaints received by Huon Aquaculture in 2018 regarding the site.

A request for Russell River and Kemps Creek sampling data post 2008 was received from Mr Swan via Rosalie Woodruff.

This request was rejected.

7 Environmental Statement

This AEMR was generated utilising information collected by both Huon staff using calibrated equipment and qualified independent contractors.

All laboratory testing was conducted at AST laboratories (NATA accredited) by independent consultants. All information contained within this document is therefore deemed to be correct at the time of writing.

All laboratory sampling results have been supplied to the Tasmanian EPA as required under the site EPN.

Adam Chapman

Environmental Manager

Huon Aquaculture

Freshwater Operations