



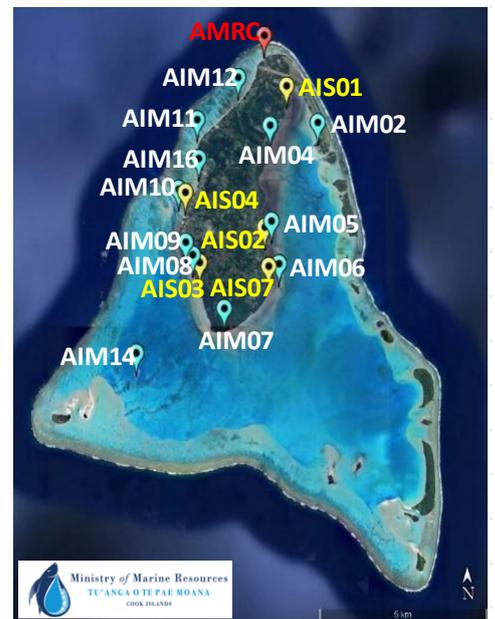
AITUTAKI WATER QUALITY REPORT MARCH 2026

SUMMARY

Water sampling was carried out on Tuesday 10th March under calm weather conditions. The tide remained low throughout the sample collection period, allowing clear visibility and easy access to all twelve lagoon sites. Each site was sampled successfully. During the sample collection, notable algal growth was observed at six of the lagoon locations, including *Boodlea*, *Dictyota*, cyanobacteria and *Spirogyra*. These occurrences were recorded as part of the routine ecological assessment. In contrast, all five monitored streams were found to be stagnant and completely dry. Due to the absence of flowing water, no stream samples were collected. Below is the summary table for Enterococci bacteria, total suspended solids and dissolved oxygen results and levels.

Lagoon Site	Site ID	Enterococci (MPN/100mL)	Total Suspended Solids (mg/L)	Dissolved Oxygen (%)
Ootu	AIM02	<1	2.3	103
Vaipeka	AIM04	<1	3.2	74
Vaipae Wharf	AIM05	10	6.0	104
Tautu Wharf	AIM06	<1	5.6	99
Taravao	AIM07	<1	12.9	105
Vainamu	AIM08	20	6.8	47
Vainamu Wharf	AIM09	<1	2.6	51
Arutanga Wharf	AIM10	<1	3.9	98
Rapae	AIM11	<1	1.5	82
Maunga Pu	AIM12	10	3.3	64
Maina Nursery	AIM14	<1	0.4	102
Amuri Wharf	AIM16	10	2.4	64

GRADING SCALE	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor
---------------	-----------	-----------	------	------	-----------	----------------



Lagoon:

- Enterococci bacteria levels were consistently excellent across all twelve sites, indicating safe swimming conditions.
- Total suspended solids were within healthy limits for coral reefs at eight sites, suggesting clear water. However, Vaipae and Tautu Wharves, Taravao and Vainamu exceeded the recommended limit, showing poor to very poor levels and potential risk to coral health.
- Dissolved oxygen was good to excellent at seven sites, remaining above the recommended 80% threshold. The other five sites fell below this threshold, indicating poor and very poor levels.
- Temperature ranged from 26.1 degrees at Vaipeka to 29.5 degrees at Vainamu and Arutanga Wharves, with an average of 28.4 degrees.
- Salinity varied between 33.5 ppt at Maunga Pu and 38.9 ppt at Vaipeka, averaging 36.9 ppt.
- pH levels ranged from 6.45 at Vaipeka to 7.65 at Ootu, with a mean of 7.15.

The monthly summary reports, rainfall data and lab study report can be found at the end of this report.

1. ENTEROCOCCI BACTERIAL COUNTS - AITUTAKI

Most Probable Number of Enterococci per 100 mL (MPN/100mL)

Lagoon Site	Site ID	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
Ootu	AIM02	<1	<1	ND	<1	<1	<1
Vaipaka	AIM04	<1	20	ND	<1	<1	<1
Vaipae Wharf	AIM05	<1	187	ND	146	<1	10
Tautu Wharf	AIM06	<1	<1	ND	158	<1	<1
Taravao	AIM07	<1	10	ND	20	<1	<1
Vainamu	AIM08	107	<1	ND	10	<1	20
Vainamu Wharf	AIM09	10	30	ND	<1	<1	<1
Arutanga Wharf	AIM10	<1	<1	ND	30	<1	<1
Rapae	AIM11	41	10	ND	10	<1	<1
Maunga Pu	AIM12	<1	<1	ND	20	<1	10
Maina Nursery	AIM14	NW	NW	ND	NW	<1	<1
Amuri Wharf	AIM16	41	41	ND	135	<1	10

Stream Site	Site ID	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
Vaitiare	AIS01	NW	NW	NW	NW	NW	NW
Vaipae	AIS02	NW	NW	NW	NW	NW	NW
Pata	AIS03	NW	NW	NW	NW	NW	NW
Arutanga	AIS04	NW	NW	NW	NW	NW	NW
Tautu	AIS07	56	NW	NW	228	NW	NW



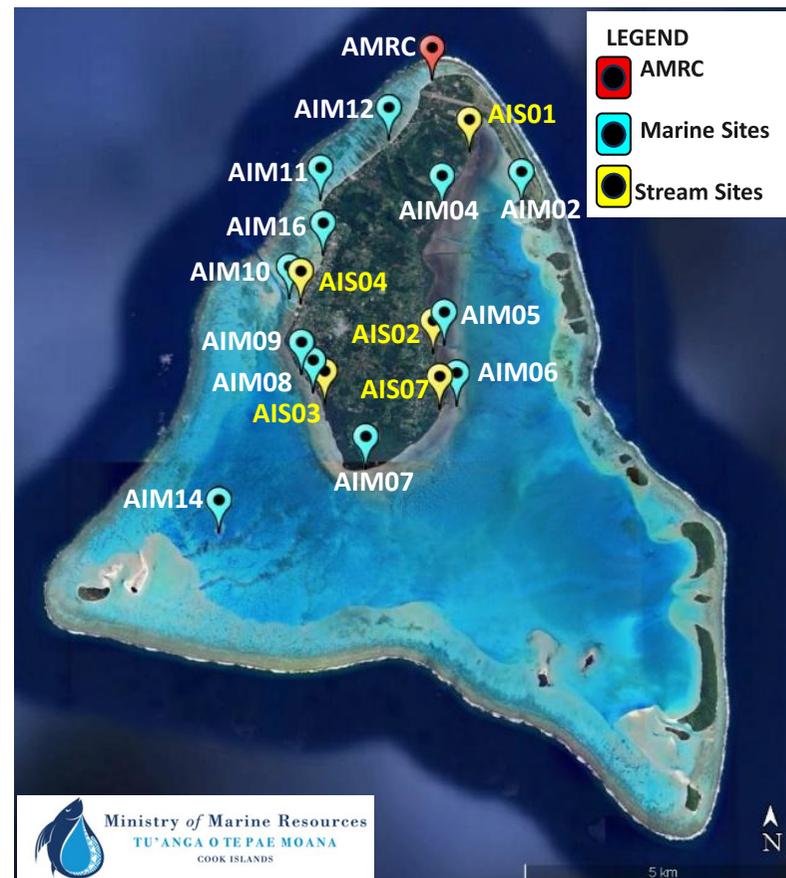
ENTEROCOCCI BACTERIA STANDARDS	< 41	41 ≥ 100	101 ≥ 200	201 ≥ 350	351 ≥ 500	> 500
	A	B	C	D	E	F
	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor

REFERENCE: WHO 2021 Guidelines on Recreational Water Quality for Coastal and Fresh Waters.

2. TOTAL SUSPENDED SOLIDS - AITUTAKI - Milligrams per Litre (mg/L)

Lagoon Site	Site ID	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
Ootu	AIM02	7.5	3.0	4.4	2.5	4.9	2.3
Vaipaka	AIM04	7.7	3.0	0.3	2.2	2.3	3.2
Vaipae Wharf	AIM05	13.6	4.0	5.2	8.8	3.5	6.0
Tautu Wharf	AIM06	4.0	2.0	5.4	6.8	2.8	5.6
Taravao	AIM07	5.4	5.0	2.4	10.9	5.7	12.9
Vainamu	AIM08	17.9	6.7	13.6	44.8	30.3	6.8
Vainamu Wharf	AIM09	9.5	13.2	2.2	1.8	3.0	2.6
Arutanga Wharf	AIM10	8.9	3.9	3.1	2.4	2.6	3.9
Rapae	AIM11	2.0	1.0	0.3	4.3	0.7	1.5
Maunga Pu	AIM12	0.3	4.8	1.4	3.2	2.1	3.3
Maina Nursery	AIM14	NW	NW	0.3	NW	0.9	0.4
Amuri Wharf	AIM16	2.4	1.0	2.3	4.8	2.5	2.4

Stream Site	Site ID	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
Vaitiare	AIS01	NW	NW	NW	NW	NW	NW
Vaipae	AIS02	NW	NW	NW	NW	NW	NW
Pata	AIS03	NW	NW	NW	NW	NW	NW
Arutanga	AIS04	NW	NW	NW	NW	NW	NW
Tautu	AIS07	10.0	NW	NW	7.9	NW	NW



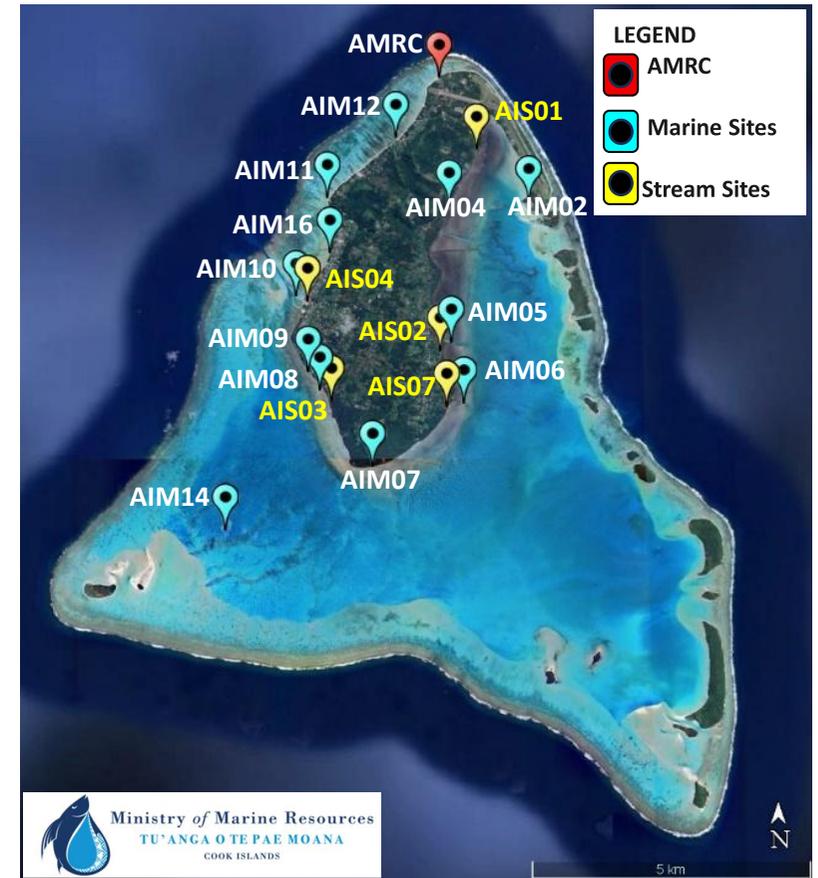
TOTAL SUSPENDED SOLIDS STANDARDS	< 1.0	1.0 ≥ 2.5	2.5 ≥ 5.0	5.0 ≥ 10	10 ≥ 20	> 20
	A	B	C	D	E	F
	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor

REFERENCE: Bell 1992, total suspended solids recommended limit is ≤5 mg/L for healthy coral reef.

3. DISSOLVED OXYGEN - AITUTAKI - Percent (%)

Lagoon Site	Site ID	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
Ootu	AIM02	110	87	99	104	101	103
Vaipaka	AIM04	117	112	114	105	87	74
Vaipae Wharf	AIM05	122	119	112	110	116	104
Tautu Wharf	AIM06	117	107	110	103	81	99
Taravao	AIM07	117	97	113	94	70	105
Vainamu	AIM08	87	79	100	88	68	47
Vainamu Wharf	AIM09	94	78	82	71	75	51
Arutanga Wharf	AIM10	106	104	81	102	104	98
Rapae	AIM11	84	88	95	100	91	82
Maunga Pu	AIM12	83	77	80	77	66	64
Maina Nursery	AIM14	NW	NW	78	NW	106	102
Amuri Wharf	AIM16	87	73	73	89	71	64

Stream Site	Site ID	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26
Vaitiare	AIS01	NW	NW	NW	NW	NW	NW
Vaipae	AIS02	NW	NW	NW	NW	NW	NW
Pata	AIS03	NW	NW	NW	NW	NW	NW
Arutanga	AIS04	NW	NW	NW	NW	NW	NW
Tautu	AIS07	15	NW	NW	26	NW	NW

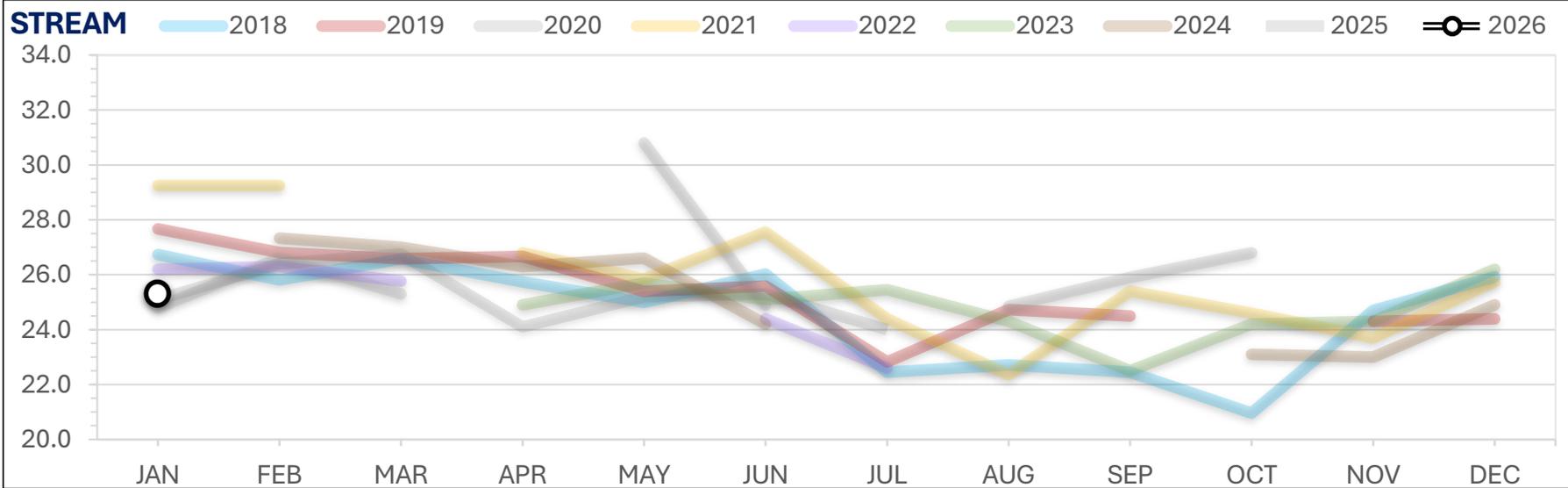
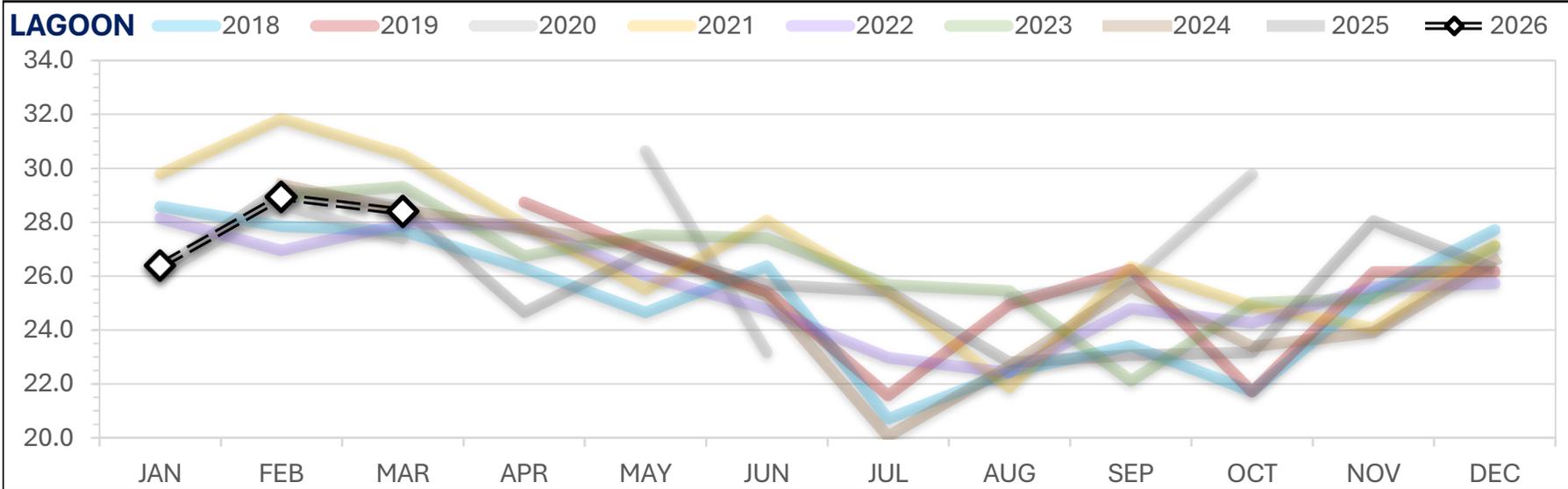


DISSOLVED OXYGEN STANDARDS	> 95	90 ≥ 95	80 ≥ 90	60 ≥ 80	40 ≥ 60	< 40
	A	B	C	D	E	F
	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor

REFERENCE: Department of Health, Clean Water Branch Hawaii 1994: Dissolved oxygen recommended limit is ≥75% saturation for oceanic waters, embayments, open coastal waters & estuaries; ≥80% saturation for streams.

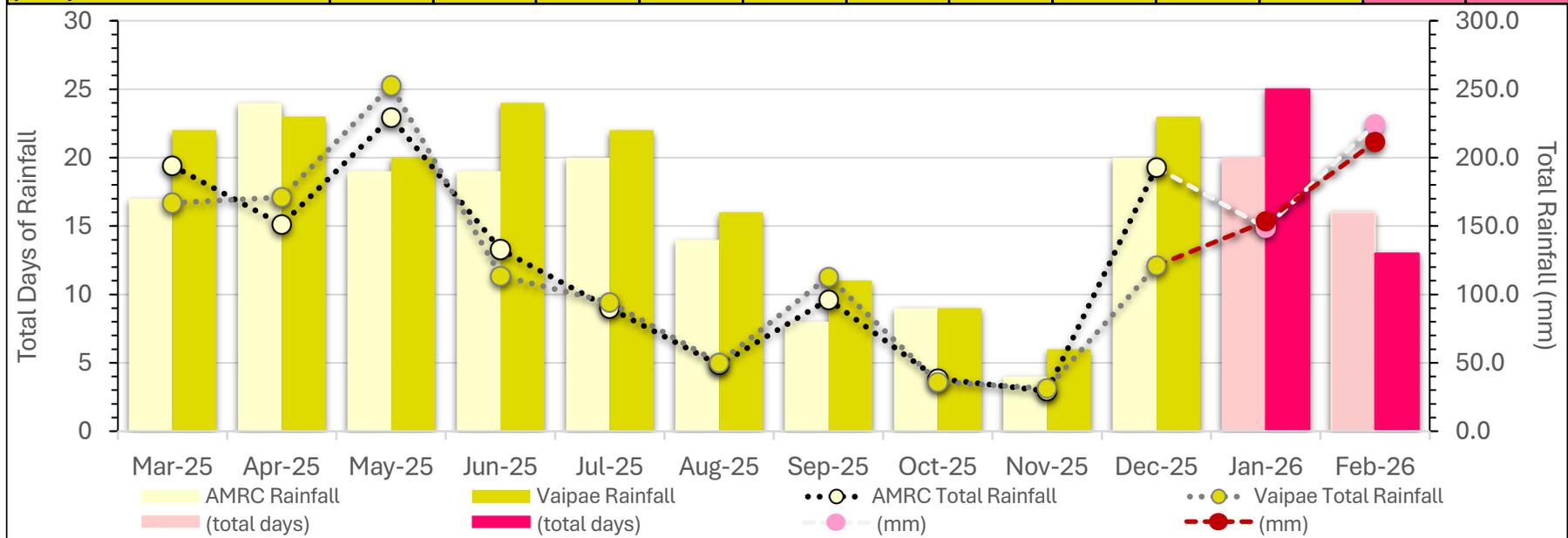
4. AVERAGE TEMPERATURE - AITUTAKI - Degrees Celcius (° C)

2026	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Lagoon	26.4	28.9	28.4									
Stream	25.3	ND	ND									



5. AITUTAKI RAINFALL - AMRC & VAIPAE - Total Rainfall (mm) & Total Days of Rainfall

2025 - 2026	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26
AMRC Total Rainfall (mm)	193.8	151.0	229.4	132.9	89.9	48.6	96.2	38.4	29.4	192.8	148.8	224.2
AMRC Rainfall (total days)	17	24	19	19	20	14	8	9	4	20	20	16
AMRC Highest 1-Day (mm)	39.6	75.8	95.0	72.4	20.4	19.2	74.8	14.0	14.0	62.6	44.8	118.8
AMRC Highest 1-Day (date)	3rd	6th	24th	26th	11th	7th	18th	5th	30th	17th	26th	18th
Vaipae Total Rainfall (mm)	166.8	171.0	252.6	113.6	94.2	50.0	113.0	36.2	31.2	121.0	153.4	211.4
Vaipae Rainfall (total days)	22	23	20	24	22	16	11	9	6	23	25	13
Vaipae Highest 1-Day (mm)	33.0	68.4	100.2	52.0	20.0	19.0	89.0	14.4	14.4	34.2	40.2	103.8
Vaipae Highest 1-Day (date)	3rd	6th	24th	26th	11th	7th	18th	5th	30th	17th	26th	18th



Report Date: 11.03.2026		AITUTAKI LAB STUDY REPORT – MARCH 2026				Lab Report No.: 03M5484 – 03M5495		
SAMPLE DESCRIPTION								
Date Samples Collected:		Name of Sample:	Collected By:	Submitted By:	Time of Receipt:	Physical Description:		Quantity Per Site Received:
Tuesday 10 th March		Marine	MMR		10:10am	Clear		2.5L
Study No.		1	2	3	4	5	6	7
SITE ID	LAB ID	Enterococci (MPN/100ml)	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH	Total Suspended Solids (mg/L)
MARINE								
AIM02	03M5484	<1	29.1	36.8	103.3	6.47	7.65	2.3
AIM04	03M5485	<1	26.1	38.9	74.2	4.83	6.45	3.2
AIM05	03M5486	10	28.2	38.1	103.8	6.54	7.32	6.0
AIM06	03M5487	<1	28.1	37.6	98.9	6.27	7.23	5.6
AIM07	03M5488	<1	26.6	37.8	105.0	6.81	6.54	12.9
AIM08	03M5489	20	28.6	34.5	47.3	3.02	7.01	6.8
AIM09	03M5490	<1	29.5	38.3	50.5	3.12	7.20	2.6
AIM10	03M5491	<1	29.5	37.6	97.9	6.07	7.44	3.9
AIM11	03M5492	<1	28.4	36.7	81.6	5.17	7.34	1.5
AIM12	03M5493	10	29.2	33.5	63.6	4.05	7.47	3.3
AIM14	03M5494	<1	28.2	37.1	102.4	6.49	6.69	0.4
AIM16	03M5495	10	29.2	36.4	64.3	4.03	7.40	2.4
Study Method		IDEXX Enterolert*	YSI Manual	YSI Manual	YSI Manual	YSI Manual	YSI Manual	MMR Lab Manual Water Quality Monitoring V5
Recommended Limit		Ref. Comments	Ref. Comments	Ref. Comments	Ref. Comments	Ref. Comments	Ref. Comments	Ref. Comments

Abbreviation

NL: Not Listed, MPN: Most Probable Number, cfu: Colony Forming Unit, mL: milli Litre, FAU: Formazin Attenuation Unit, NTU: Nephelometric Turbidity Unit, ppt: Parts Per Thousand, DB: Designated Bathing Beach, MB: Moderate Use of Bathing, LB: Light Use of Bathing, IB: Infrequent Use of Bathing

NA: Not Available, however data will be available at a later date; ND: No Data due to equipment failure or logistics problems or time delay or methodology problem or combination of all; NW: No Water, stream dry or water stagnant or water level too low for sample collection or water dirty/murky.

Comments

1. Temperature[#]
Subtropical regions (south of Cape Canaveral and Tampa Bay, Florida, and Hawaii).
Short-term Max. 32.2°C, Max. True daily mean 29.4°C (average of 24-hourly temperature reading).
Temperature is the measure of warmth and coldness, reported as an average and measured in degrees celcius (°C).
2. pH
Changes to pH can be caused by a range of potential water quality problems (e.g., low values due to acid sulphate runoff). pH values are also related to soil geology and may be naturally low or high (in limestone areas). High pH values can also be caused temporarily when high rates of photosynthesis by aquatic plants (including algae) lead to a decrease in carbon dioxide, and therefore a decrease in carbonic acid in the water.
3. Salinity
A measure of the amount of dissolved salts in the water, and therefore an indicator of salinity. Excess salinity in freshwater streams occurs as a result of excess soil salinity, which may be caused by excess land clearing and changes to the groundwater table. Salinity is reported as parts per thousand (ppt).
4. Dissolved Oxygen[^]
DO levels indicate how much oxygen is in the water. Low DO levels indicate an abnormal disturbance in the ecosystem such as an algal bloom. DO is measured in percentage (%).
Low DO: 3.5 mg/L at 26C leads to 100% mortality of *Acipenser oxyrinchus*
2.7 mg/L at 19C leads to 22% mortality of *Acipenser oxyrinchus*
<3.7 mg/L Demersal finfish biomass diminishes
<3.5 mg/L Species richness diminishes
Below 2 mg/L infaunal species migrate to sediment surface and epifaunal species move to better aerated water.
Oxygen is essential for life processes of most aquatic organisms. Many aquatic organisms will suffocate if there is insufficient oxygen in the water.
5. Suspended Solids[@]
Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10% from the seasonably established norm for aquatic life. Total suspended solids (TSS) are non-living (inorganic) such as silt and mud; and organic matter such as animal and plant material found in the water. The presence of large amounts of particles are responsible for creating the murky appearance of dirty water and can quickly kill coral reefs. TSS is measured in milligrams per litre (mg/L).
6. Turbidity
Water clarity (the degree of light penetration) is important as aquatic plants depend on light to photosynthesize and produce oxygen. Large amounts of sediment in a water body can also smother benthic organisms. Suspended solid results are interactive and interdependent with turbidity. Expert interpretation needed. Turbidity is measured as FAU.
7. Enterococci[‡]
The presence of bacteria Enterococci *sp* is monitored as an indicator of human and animal waste pollution. The higher the numbers of Enterococci bacteria present in a sample, the greater the amount of faecal pollution in the water. Bacteria count is measured in Most Probable Number of Enterococci cells per 100mL of sample (MPN/100mL).
8. Nutrients (Nitrate, Nitrite, Ammonia, Phosphate)
High nutrient concentrations in a water body (eutrophication) may lead to excessive weed and algal growth. Excess nutrients enter a water body through several means, including discharge of treated sewage, storm water, and in run-off from land, for example as fertiliser, animal waste, or decaying plant matter.
9. Chlorophyll-a
Chlorophyll-a is a pigment found in green plants, including aquatic plants. Measuring the amount of chlorophyll-a in the water therefore indicates the amount of green algae present in the water. High concentrations of algae (algal blooms) may harm other aquatic organisms, either through the production of toxins, reduction of available light through covering the water surface, or by using all available oxygen during respiration at night. Chlorophyll-a is measured in micrograms per litre (µg/L).
10. Rainfall
Rarotonga: daily rainfall data is provided by the Cook Islands Meteorological Service.
Aitutaki: daily rainfall data is recorded by MMR Staff at Amuri (Aitutaki Marine Research Centre – AMRC) and at Vaipae (Rowan Strickland's residence).
Rainfall is measured in millimetres (mm) and reported as total rainfall per month, total number of days that had rainfall and the highest amount of rainfall in 1-day and date(s).

[#]EPA Quality Criteria for Water Gold Book 1986

[^]EPA Ambient Aquatic Life Water Quality Criteria for DO (Saltwater): Cape Cod to Cape Hatteras Nov 2000

[@]EPA Quality Criteria for Water Red Book 1976

[‡]WHO Guidelines on Recreational Water Quality for Coastal and Fresh Waters 2021