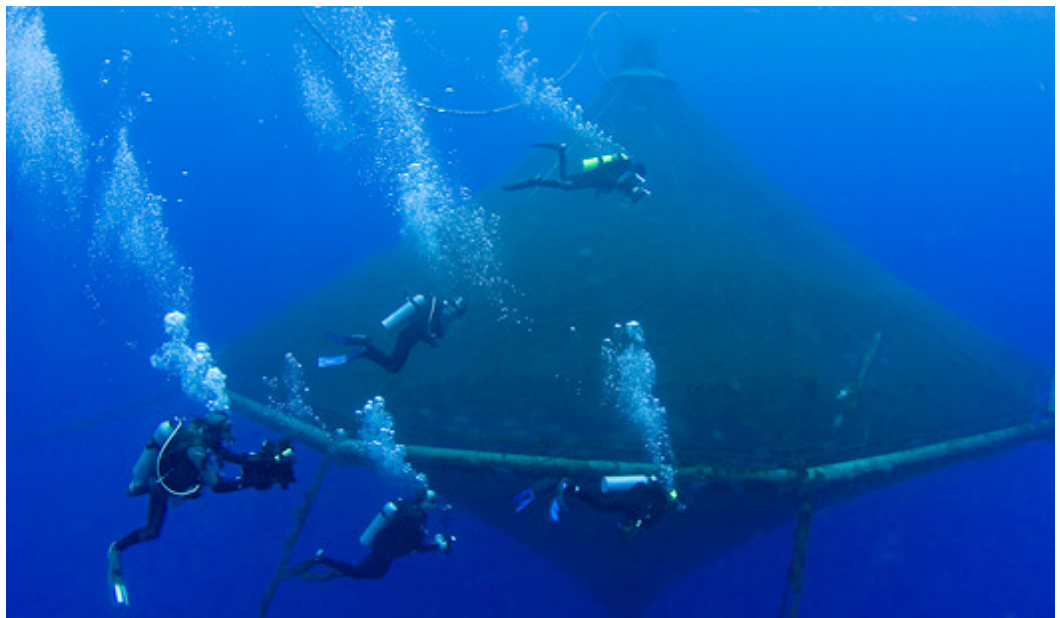




BLUE OCEAN MARICULTURE



7/10/2026

Water Quality Monitoring – July 2026

Prepared by



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BLUE OCEAN MARICULTURE

WATER QUALITY MONITORING – JULY 2026

SAMPLING REPORT

Survey Date: 7/10/2026

Client: Blue Ocean Mariculture

Current: North

Log Number: BOM-WQ-JULY-2026

Environmental Conditions

Effluent samples were collected adjacent to the net pen containing the highest biomass of fish. Sample collection occurred approximately 2-hours after a feeding event at a distance of 3-meters from the pen. The pen was partially raised prior to sampling. The water was clear with no evidence of high turbidity, discoloration, visible sheen, foam, solids, or floating debris near the pen during the sampling event.

Samples were collected during a rising tide (-0.2ft to 2.1ft) influenced by a 18% waxing moon. Conditions consisted of 3-5kt Southwest winds that stayed consistent during sampling at the ZOM sites and increased to 7-9kt Southwest winds at the Effluent and Control sites. A 3-4ft South swell was present during sampling and stayed consistent throughout the entire sampling event. Overall, sea conditions exhibited moderately choppy seas. Skies were clear along the shoreline with rainclouds present at higher elevation. The air had moderate levels of vog from the Kilauea geological activity. There were visible slicks at all sampling stations with high amounts visible particulates in the water. There were schools of baitfish, dolphins and birds observed at the Effluent site.

A mild North current was evident during the time of sampling.



Description of sampling methods

Water samples are collected at the monitoring sites monthly throughout the year. Monitoring sites are at the effluent discharge location near the pen containing the highest biomass of fish, four zone of mixing sites, and two control sites. Effluent samples are collected down current from the net pen containing the highest biomass at the surface, mid-pen, and bottom of the receiving water two hours after feeding. Surface samples are collected no less than 1 meter or more than 5 meters below the surface, and no farther than 10 meters down current from the net pen. Mid-pen samples are collected at the mid-pen depth no farther than one 1 meter down current from the net pen. Bottom samples are collected no less than 1 meter or more than five 5 meters above the sea floor, and no farther than 10 meters down current from the net pen. Zone of Mixing (ZOM) samples are collected down-current from the facility at the boundaries of the ZOM. Samples are collected at the north or south locations depending on the dominant current during the day of sampling. Samples are collected at the surface, mid-pen depth, and bottom of the receiving waters. Surface samples are collected not less than 1 meter or more than 5 meters below the surface. Bottom samples are collected not less than 1 meter nor more than 5 meters above the sea floor.

Water samples collected from the monitoring sites are filtered through pre-combusted (500° C, 6h) GF/F (Whatman) filters (pore size 0.7- μ m), as well as directly collected for RAW samples. These water samples are transported to the laboratory on ice and stored at -20°C until analysis. Samples are analyzed for nitrate + nitrite (NO₃⁻ + NO₂⁻), ammonium (NH₄⁺), phosphate (PO₄³⁻), total dissolved phosphorus (TDP), and total dissolved nitrogen (TDN). The nutrient values are measured using standard autoanalyzer methods. Inorganic nitrogen and phosphorus will be considered indirect measure of terrigenous effluents. Values recorded below the minimum detection limit (MDL) are presented as '<MDL.'. The MDL is calculated with analysis of seven of the same samples (Gravimetric Standard C4, 10, 100, 10, 10 ug/L for NH₃, Si, PO₄, NO₃, and NO₂ respectively). These samples are analyzed in order to determine the standard deviation, which is multiplied by the degree of freedom in order to calculate the precise MDL. The gravimetric standards are analyzed throughout the runs to determine calibration drift. Copper values are determined with inductively coupled plasma—mass spectrometry (ICP-MS). Analytical mass and instrumental parameters are selected to ensure accurate and precise determination of copper by using known standards. Turbidity is measured for all samples collected from these locations using a turbidimeter. The turbidimeter is calibrated with known standards prior to analyzing the collected samples to ensure accuracy.

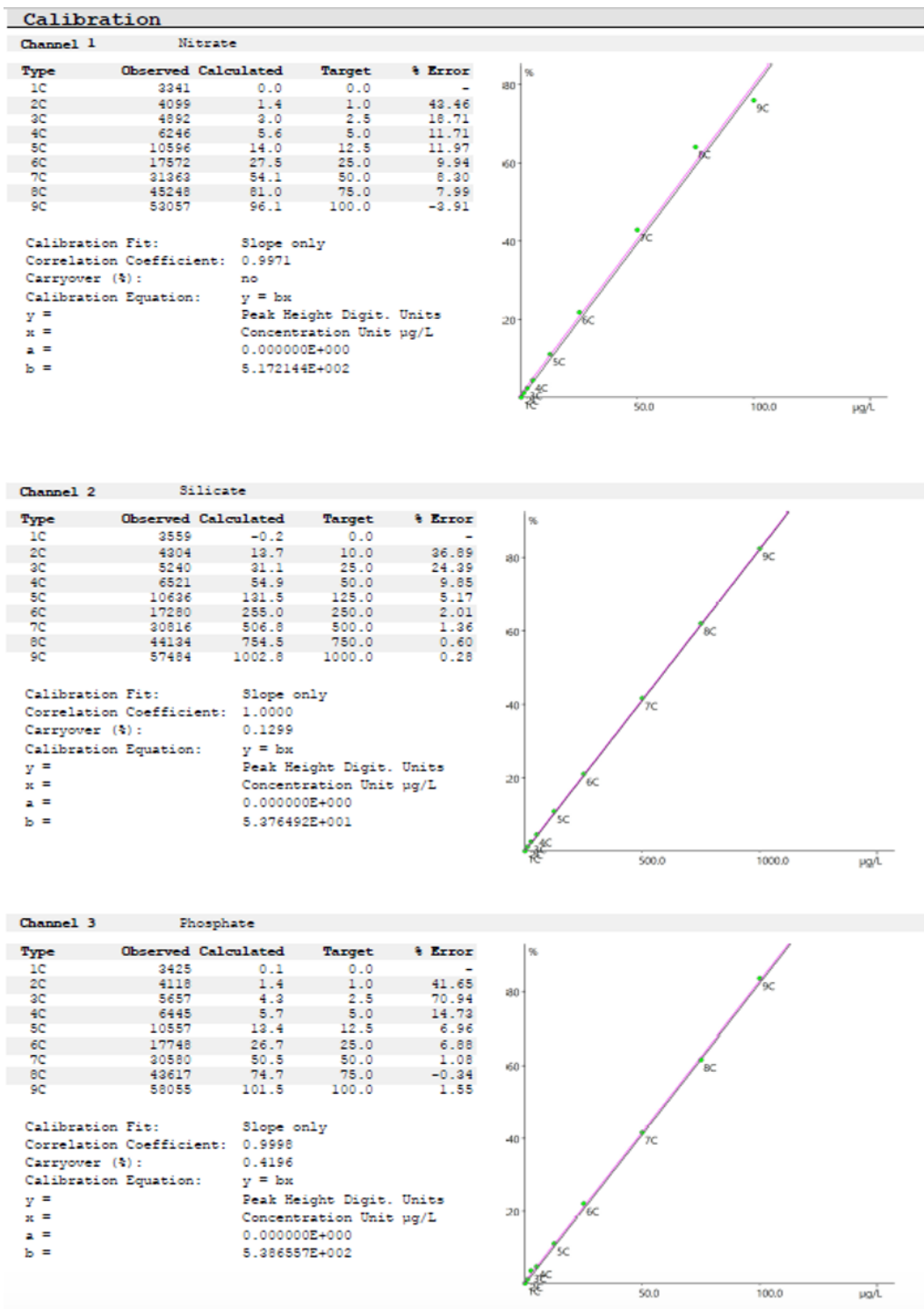
To characterize the conditions at each monitoring station during sampling events, physiochemical parameters (temperature, salinity, conductivity, dissolved oxygen concentration, dissolved oxygen percent saturation, pH) are measured on site using multi-parameter YSI and pH meters. The multi-parameter sonde sensors are calibrated prior to taking measurements using known standards.

LABORATORY TEST RESULTS

ID	DATE	LAB ID	Reported in µg/L				TDN
			NO2+NO3	NH3+NH4	PO4	TDP	
			MDL	0.2	0.1	0.1	
Z1B	7/10/26	31	0.70	4.00	3.90	10.10	61.70
Z1M	7/10/26	34	0.20	2.40	3.90	10.30	59.70
Z1S	7/10/26	35	0.80	87.10	0.80	9.90	225.00
Z2B	7/10/26	36	<MDL	2.70	3.80	11.00	61.20
Z2M	7/10/26	37	<MDL	1.90	3.70	10.70	62.10
Z2S	7/10/26	38	0.90	84.00	0.80	10.50	221.70
Z3B	7/10/26	43	<MDL	4.50	4.00	10.30	64.30
Z3M	7/10/26	44	<MDL	2.50	3.90	10.70	56.90
Z3S	7/10/26	45	0.60	33.10	1.40	9.90	112.80
Z4B	7/10/26	46	0.20	10.20	5.10	10.20	60.50
Z4M	7/10/26	47	<MDL	3.80	4.00	10.40	53.20
Z4S	7/10/26	50	0.50	30.70	0.90	9.20	113.70
EB	7/10/26	59	<MDL	4.50	4.10	27.70	73.50
EM	7/10/26	60	<MDL	4.50	4.10	12.40	65.20
ES	7/10/26	61	<MDL	6.70	4.60	11.80	65.00
C1B	7/10/26	51	0.20	3.80	3.90	10.90	73.70
C1M	7/10/26	52	0.40	7.80	4.10	11.60	60.40
C1S	7/10/26	53	0.60	21.90	6.00	13.40	84.70
C2B	7/10/26	54	<MDL	3.90	4.20	18.90	99.40
C2M	7/10/26	57	0.30	4.40	3.70	13.40	75.20
C2S	7/10/26	58	0.30	8.60	4.10	12.50	90.50



LAB QUALITY CONTROL AND QUALITY ASSURANCE



GRAB SAMPLE RESULTS

<u>Sample ID</u>	<u>Time</u>	<u>Date</u>	<u>Dissolved Oxygen</u>	<u>Dissolved Oxygen</u>	<u>Temperature</u>
Z1B	11:33	7/10/26	6.39	96.19	80.96
Z1M	11:37	7/10/26	6.58	93.29	80.96
Z1S	11:41	7/10/26	6.49	94.67	81.14
Z2B	11:48	7/10/26	6.80	95.10	80.96
Z2M	11:52	7/10/26	6.78	96.62	80.96
Z2S	11:55	7/10/26	6.52	95.75	81.14
Z3B	12:03	7/10/26	6.61	96.44	80.96
Z3M	12:10	7/10/26	6.76	96.52	80.96
Z3S	12:12	7/10/26	6.88	95.84	81.14
Z4B	12:20	7/10/26	6.71	97.01	80.96
Z4M	12:26	7/10/26	6.66	95.51	80.96
Z4S	12:29	7/10/26	6.60	98.86	81.14
EB	12:41	7/10/26	6.39	97.56	80.96
EM	12:48	7/10/26	6.86	96.13	80.96
ES	12:55	7/10/26	6.45	93.15	81.14
C1B	13:05	7/10/26	6.50	95.48	80.96
C1M	13:10	7/10/26	6.87	93.81	80.96
C1S	13:11	7/10/26	6.50	92.30	81.14
C2B	13:18	7/10/26	6.46	91.86	80.96
C2M	13:21	7/10/26	6.70	92.28	80.96
C2S	13:23	7/10/26	6.87	92.63	80.96
Units			mg/mL	% Saturation	Fahrenheit
DL			0.01	0.01	0.01



GRAB SAMPLE RESULTS

<u>Sample ID</u>	<u>Time</u>	<u>Date</u>	<u>pH</u>	<u>Salinity</u>	<u>Turbidity</u>
Z1B	11:33	7/10/26	8.10	35.36	0.08
Z1M	11:37	7/10/26	8.10	35.31	0.08
Z1S	11:41	7/10/26	8.10	35.38	0.24
Z2B	11:48	7/10/26	8.10	35.35	0.08
Z2M	11:52	7/10/26	8.10	35.31	0.10
Z2S	11:55	7/10/26	8.10	35.39	0.22
Z3B	12:03	7/10/26	8.10	35.34	0.10
Z3M	12:10	7/10/26	8.10	35.36	0.08
Z3S	12:12	7/10/26	8.10	35.35	0.15
Z4B	12:20	7/10/26	8.10	35.38	0.10
Z4M	12:26	7/10/26	8.10	35.36	0.11
Z4S	12:29	7/10/26	8.10	35.39	0.39
EB	12:41	7/10/26	8.10	35.36	0.24
EM	12:48	7/10/26	8.10	35.38	0.27
ES	12:55	7/10/26	8.10	35.39	0.27
C1B	13:05	7/10/26	8.10	35.30	0.10
C1M	13:10	7/10/26	8.10	35.30	0.09
C1S	13:11	7/10/26	8.10	35.37	0.16
C2B	13:18	7/10/26	8.10	35.34	0.18
C2M	13:21	7/10/26	8.10	35.32	0.21
C2S	13:23	7/10/26	8.10	35.31	0.36
Units				PPT	NTU
DL			0.01	0.01	0.01



ICP RESULTS

2026-A4B4 (10)

260723

n.a.: below MDL (method detection limit)

e: eliminated (over calibration range, failed qc, interference, etc)

Primary: Primary/preferred wavelength for elements measured at multiple wavelengths

IS: internal standard, yttrium

Note:

Analyst: IG

	Primary ppb Ag3280	ppb As1937	Primary ppb Cr2055	Primary ppb Cu3247	Primary ppb Se1960	ppb Zn2138
MDL	0.6	1.6	0.2	6.7	2.1	2.2
icv	200.8	194.5	194.7	199	195.7	194.3
Blank	n.a.	e	n.a.	n.a.	n.a.	n.a.
C-1 July26	n.a.	e	n.a.	n.a.	n.a.	e
EB-1 July26	n.a.	e	n.a.	n.a.	n.a.	e
EM-1 July26	n.a.	e	n.a.	n.a.	n.a.	e
ES-1 July26	n.a.	e	n.a.	n.a.	n.a.	e
Blank	n.a.	e	n.a.	n.a.	n.a.	n.a.
ccv	203	186.4	186	204	188.6	182.1

												Y_2243	Y_3710			
												Sept-ES	2476.7	2807.2		
												Sept-EM	2478.1	2824.9		
												Sept-ES	2484.9	2874.9		
												Oct-ES	2486.9	2883.7		
												Oct-EM	2489.2	2846.3		
												Oct-ES	2481.4	2880.5		
												MeanIS_SW	2482.9	2852.9		
		Ag3280	Ag3382	As1890	As1937	Cr2055	Cr2677	Cr2835	Cu2247	Cu3247	Se1960	Se2039	Y_2243	Y_3710	Zn2062	Zn2138
MDL1	0.5698	0.9961	9.297	8.367	1.577	1.885	0.7865	6.948	9.779	4.055	5.749	4070.8	3566	9.873	9.674	*Zn background contamination
MDL2	0.5804	0.7866	8.951	7.801	1.502	1.768	0.5203	4.023	9.129	4.842	3.943	4108.7	3549.3	3.774	3.588	
MDL3	0.7971	0.7996	9.41	8.458	1.541	1.993	0.7386	2.567	10.46	4.868	2.069	4123.2	3538.4	3.07	2.853	
MDL4	0.7443	0.8875	9.74	7.051	1.582	2.097	0.4002	3.924	10.96	5.304	5.58	4123.7	3563.1	3.071	2.776	
MDL5	1.025	0.8257	10.62	7.566	1.679	2.031	0.7028	2.359	10.93	4.796	4.317	4123.4	3512.5	3.049	2.784	
MDL6	1.101	0.8551	9.935	7.632	1.528	1.957	0.507	1.713	10.63	4.861	4.809	4142	3533.2	3.346	3.03	
MDL7	0.841	1.129	10.65	7.393	1.538	1.948	0.581	0.7272	9.664	4.686	5.251	4124.9	3528.5	3.275	3.026	
												MeanIS	4116.7	3541.6		
	SD	0.2028	0.124	0.651	0.508	0.0578	0.1059	0.1412	2.0281	0.7037	0.3713	1.2671				
	MDL	0.7	0.4	2.1	1.6	0.2	0.4	0.5	6.4	2.3	1.2	4				
MDL SW	0.9	0.5	3.5	2.7	0.4	0.5	0.7	10.7	2.9	2	6.7				4	4

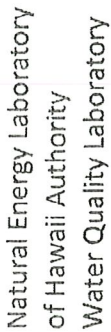


Please call if you have any questions regarding the water quality monitoring report.

Sincerely,

A handwritten signature in black ink, appearing to read 'John Burns', with a stylized flourish extending to the right.

John Burns, Ph.D.
Associate Professor - Marine Science and Data Science
University of Hawai'i at Hilo
200 W. Kawili St.
Hilo, HI 96720



Sample Chain of Custody

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808-327-9585 <http://nelha.hawaii.gov>

Client Name:	Blue Ocean Mariculture/MEGA Lab		
Address:	200 W. Kawili St.,	Hilo HI 96720	Phone: 808-854-4057
			Fax:
Contact Name:	John Burns		
	Email: johnhr@hawaii.edu		

Project Information: Offshore monitoring
 Project Location: Keahole Point
 Turn-Around Time:
 Notes:

[illegible]

Relinquished By:	Date/Time	Received By:	Date/Time	Temp °C:	Matrix Key:
M. Cortes manueltorres	07/19/26	<i>[Signature]</i>	7/15/26 0810	<i>24.8</i>	E = effluent GW = groundwater O = ocean water X = other/unknown