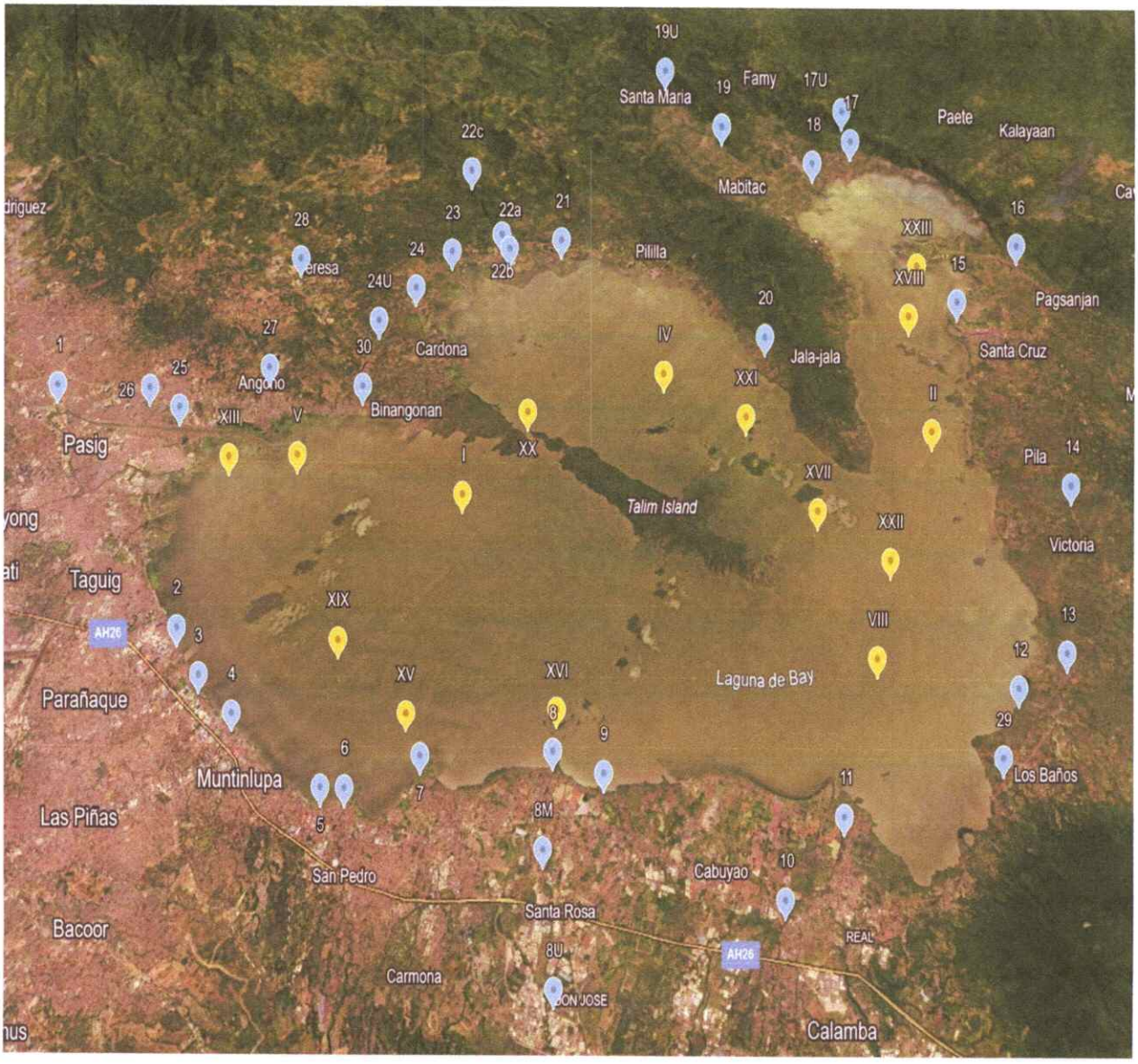
LLDA Quarterly Water Quality Monitoring Report

Laguna Lake and Tributary Rivers

October to December 2024



Laguna Lake Development Authority
Resource Management and Development Department
Environmental Laboratory and Research Division

BAGONG PILIPINAS

Quarterly Water Quality Report
Laguna Lake and Tributary Rivers
October to December 2024

Laguna Lake Stations

Monitoring Stations		Water Quality Parameters											
		BOD (mg/L)			Dissolved Oxygen (mg/L)			Fecal Coliform (MPN/100mL) in Geomean			Chloride (mg/L)		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
I	(Central West Bay)	4	2	4	6.0	7.0	7.0	95	80	59	298	233	202
II	(East Bay)	2	2	3	8.0	7.0	8.0	29	30	44	186	116	23
IV	(Central Bay)	2	2	4	6.0	6.0	7.0	18	18	23	264	256	229
V	(Northern West Bay)	2	2	3	6.0	8.0	6.0	62	49	25	298	298	194
VIII	(South Bay)	2	2	3	8.0	7.0	8.0	39	39	30	271	159	174
XIII	(Taytay)	3	3	3	6.0	8.0	6.0	41	59	115	291	295	186
XV	San Pedro (West Bay)	3	2	4	6.0	6.0	6.0	818	260	215	283	233	182
XVI	Sta Rosa (West Bay)	2	2	3	7.0	6.0	7.0	128	173	88	287	221	171
XVII	Fish Sanctuary (Central Bay)	3	4	3	7.0	8.0	8.0	25	19	25	326	194	202
XVIII	Pagsanjan (East Bay)	2	2	4	8.0	7.0	7.0	38	28	23	62	54	178
XIX	(Muntinlupa)	2	2	4	6.0	7.0	8.0	65	65	112	294	275	198
XX	(GEMS)	2	3	4	6.0	6.0	6.0	25	64	143	267	221	194
XXI	(Cardona)	3	3	4	6.0	8.0	8.0	34	59	92	279	264	233
XXII	(Jala-jala)	2	2	5	9.0	7.0	9.0	18	29	54	310	171	233
XXIII	(Lumban)	2	2	4	7.0	7.0	7.0	47	92	74	70	12	16

Monitoring Stations		Water Quality Parameters														
		pH (units)			Ammonia (mg/L)			Nitrate (mg/L)			Inorganic Phosphate (mg/L)			Total Suspended Solids (mg/L)		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
I	(Central West Bay)	8.0	7.8	7.8	0.200	0.090	0.300	0.30	0.70	0.40	0.014	0.021	0.048	12	20	20
II	(East Bay)	8.0	7.6	7.4	0.100	0.030	0.100	<0.1	0.60	0.30	0.033	0.051	0.031	17	47	47
IV	(Central Bay)	7.7	7.7	8.1	0.200	0.090	0.200	0.20	0.40	<0.1	0.014	0.015	0.022	11	43	43
V	(Northern West Bay)	7.9	7.3	7.6	0.200	0.050	0.100	0.20	0.20	0.60	0.017	0.018	0.079	30	23	23
VIII	(South Bay)	8.3	7.6	8.2	0.070	0.040	0.090	0.20	0.50	0.40	0.011	0.050	0.052	12	18	18
XIII	(Taytay)	8.0	8.4	7.8	0.100	0.060	0.100	0.10	0.10	0.50	0.030	0.045	0.075	43	59	35
XV	San Pedro (West Bay)	7.5	7.8	7.6	0.300	0.060	0.200	<0.1	0.30	0.50	0.079	0.044	0.069	20	28	17
XVI	Sta Rosa (West Bay)	7.8	7.6	7.5	0.100	0.040	0.090	<0.1	0.50	0.50	0.029	0.043	0.072	21	25	65
XVII	Fish Sanctuary (Central Bay)	8.2	8.0	8.1	0.090	0.100	0.060	<0.1	0.40	0.40	0.010	0.024	0.039	13	39	28
XVIII	Pagsanjan (East Bay)	7.7	7.4	8.1	0.100	0.070	0.090	<0.1	0.50	0.50	0.044	0.050	0.073	15	40	23
XIX	(Muntinlupa)	7.7	7.8	8.1	0.070	0.060	0.200	0.10	0.50	0.20	0.037	0.026	0.046	22	18	18
XX	(GEMS)	7.7	7.6	7.6	0.100	0.060	0.100	<0.1	0.80	0.50	0.031	0.035	0.068	12	24	31
XXI	(Cardona)	7.6	8.1	8.4	0.100	0.009	0.070	0.20	0.30	0.20	<0.01	0.035	0.014	12	17	19
XXII	(Jala-jala)	8.3	7.7	8.6	0.080	0.100	0.080	<0.1	0.50	0.10	0.010	0.040	<0.01	11	44	14
XXIII	(Lumban)	7.1	7.1	7.4	0.200	0.200	0.060	<0.1	0.40	0.40	0.048	0.045	0.054	12	10	14

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Laguna Lake and Tributary Rivers
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Tributary Rivers Stations

Station	Monitoring Stations	Water Quality Parameters								
		BOD (mg/L)			Dissolved Oxygen (mg/L)			Fecal Coliform (MPN/100mL) in Geomean		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
1	Marikina River	5	6	***	4.0	2.0	***	221,240	221,240	252,389
2	Baqumbayan River (Taguig)	18	23	125	<0.1	<0.1	<0.1	12,786,126	6,471,035	5,518,615
3	Buli Creek	356	49	178	<0.1	0.3	<0.1	9,602,763	7,333,827	11,065,314
4	Mangangate River (Muntinlupa) -Downstream	145	14	36	<0.1	0.7	<0.1	1,987,759	1,987,759	2,645,406
5	Tunasan River (Muntinlupa) -Downstream	57	24	24	<0.1	<0.1	<0.1	5,905,491	5,235,932	5,235,932
6	San Pedro River (T_2)	**	20	20	**	2.0	1.0	852,056	2,297,825	2,400,000
7	Biñan River	**	24	23	**	0.4	0.2	2,065,430	7,048,404	4,498,889
8	Sta. Rosa River - Downstream	**	141	20	**	<0.1	1.0	54,000,000	34,467,376	22,978,251
8M	Sta. Rosa River - Midstream	**	319	44	**	<0.1	2.0	4,698,936	12,132,601	8,854,377
8U	Sta. Rosa River - Upstream	**	10	8	**	6.0	6.0	852,056	2,297,825	1,084,435
9	Cabuyao River	**	13	21	**	<0.1	<0.1	12,688,578	7,713,624	3,449,638
10	San Cristobal River (T_3)	**	44	51	**	0.5	0.7	100,598,211	113,490,088	17,549,929
11	San Juan River (T_5)	**	3	4	**	6.0	6.0	133,940	125,060	125,060
12	Molawin Creek (Los Baños)	**	2	2	**	6.0	7.0	169,115	269,444	160,437
13	Bay River (T_9)	**	2	2	**	6.0	6.0	170,000	148,661	134,907
14	Pila River	**	1	2	**	2.0	4.0	33,000	40,212	40,212
15	Sta. Cruz River (T_6)	**	1	2	**	7.0	8.0	13,394	13,100	15,556
16	Pagsanjan River (T_8)	<1	1	2	7.0	6.0	8.0	7,319	5,753	5,309
17	Pangil River - Downstream	<1	<1	<1	8.0	8.0	7.0	22,124	22,124	27,598
17U	Pangil River - Upstream	<1	1	<1	8.0	8.0	8.0	735	696	728
18	Siniloan River	<1	1	1	6.0	6.0	6.0	35,389	20,902	29,127
19	Sta. Maria River - Downstream	<1	1	2	7.0	6.0	6.0	13,815	28,151	22,343
19U	Sta. Maria River - Upstream	<1	1	<1	8.0	8.0	8.0	1,011	1,636	1,636
20	Jala-jala River									
21	Pililla River	3	2	2	2.0	4.0	2.0	103,659	103,659	47,338
22 A	Tanay River - Brgy. Wawa (Downstream)	2	2	1	5.0	7.0	6.0	338,744	382,062	193,926
22 B	Tanay River - Midstream	<1	1	2	8.0	8.0	7.0	33,713	56,259	67,373
22 C	Tanay River - Daranak Falls (Upstream)	<1	1	1	8.0	8.0	8.0	6,334	10,003	11,451
23	Baras River	5	6	3	4.0	5.0	2.0	259,422	245,371	306,087
24	Morong River - Downstream	8	8	10	6.0	4.0	5.0	250,813	226,773	241,935
24U	Morong River - Upstream	8	7	9	4.0	4.0	4.0	45,470	38,778	48,373
25	Manggahan Floodway (Taytay)	4	4	3	3.0	0.8	0.9	205,766	127,223	57,205
26	Sapang Baho River (Cainta)	12	15	14	<0.1	0.5	0.3	1,700,000	5,375,872	36,646,964
27	Angono River	5	4	6	4.0	5.0	3.0	641,596	562,386	562,386
28	Teresa River	6	3	2	6.0	7.0	7.0	272,947	272,947	272,947
29	Saran River	**	*	3	**	*	5.0	330,000	330,000	170,000
30	Binangonan River	37	24	25	<0.1	0.8	0.3	25,423,196	30,014,808	21,074,565

** No sample due to shallow water*
*** No sample due to Typhoon Kristine*
**** No sample due to an on-going bridge construction*

Station	Monitoring Stations	Water Quality Parameters											
		pH (units)			Ammonia (mg/L)			Nitrate (mg/L)			Inorganic Phosphate (mg/L)		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
1	Marikina River	7.2	7.1	***	2.00	3.00	***	1.00	0.60	***	1.300	0.11	***
2	Baqumbayan River (Taguig)	6.9	6.9	6.8	7.00	4.00	20.00	<0.1	<0.1	<0.1	2.800	0.38	1.700
3	Buli Creek	7.2	6.8	7.0	24.00	2.00	0.90	0.10	<0.1	<0.1	2.600	0.20	0.160
4	Mangangate River (Muntinlupa) -Downstream	7.0	7.0	7.2	20.00	3.00	16.00	<0.1	0.50	<0.1	2.300	0.30	1.500
5	Tunasan River (Muntinlupa) -Downstream	7.3	7.3	7.3	7.00	4.00	7.00	0.10	<0.1	<0.1	0.290	0.63	1.300
6	San Pedro River (T_2)	**	7.4	7.5	**	6.00	6.00	**	1.00	0.50	**	1.100	2.000
7	Biñan River	**	7.4	7.5	**	7.00	9.00	**	<0.1	<0.1	**	1.200	1.900
8	Sta. Rosa River - Downstream	**	7.3	8.1	**	4.00	3.00	**	<0.1	<0.1	**	1.000	0.940
8M	Sta. Rosa River - Midstream	**	7.3	8.3	**	4.00	2.00	**	<0.1	<0.1	**	1.600	1.400
8U	Sta. Rosa River - Upstream	**	7.7	7.7	**	1.00	0.70	**	1.20	0.90	**	0.340	0.440
9	Cabuyao River	**	7.4	7.2	**	8.00	10.00	**	<0.1	<0.1	**	1.300	1.500
10	San Cristobal River (T_3)	**	6.7	6.9	**	2.00	2.00	**	<0.1	<0.1	**	0.450	0.660
11	San Juan River (T_5)	**	7.3	7.4	**	0.20	0.20	**	4.00	2.00	**	0.430	0.590
12	Molawin Creek (Los Baños)	**	6.7	7.1	**	0.30	0.09	**	1.00	0.70	**	0.087	<0.01
13	Bay River (T_9)	**	7.6	7.6	**	0.10	0.07	**	1.00	0.40	**	0.200	0.290
14	Pila River	**	6.8	6.9	**	0.10	0.08	**	0.30	0.30	**	0.072	0.150
15	Sta. Cruz River (T_6)	**	7.2	7.3	**	0.10	0.08	**	1.00	0.60	**	0.160	0.200
16	Pagsanjan River (T_8)	6.8	6.7	7.1	0.02	0.09	0.10	0.20	0.40	0.30	0.061	0.050	0.082
17	Pangil River - Downstream	7.1	6.9	7.2	0.01	0.07	0.04	<0.1	<0.1	<0.1	0.060	0.018	0.072
17U	Pangil River - Upstream	7.1	6.8	7.0	0.02	0.03	0.070	<0.1	<0.1	<0.1	0.052	0.026	0.062
18	Siniloan River	7.6	6.2	6.7	0.10	0.10	0.10	0.40	0.40	0.20	0.062	0.042	0.078
19	Sta. Maria River - Downstream	7.2	6.9	7.1	0.03	0.10	0.09	0.30	0.40	0.20	0.070	0.039	0.060
19U	Sta. Maria River - Upstream	7.3	7.2	7.4	<0.002	0.07	0.06	0.10	0.30	0.20	0.075	0.042	0.100
20	Jala-jala River												
21	Pililla River	7.0	7.0	7.1	0.20	0.20	0.20	0.40	0.90	0.50	0.110	0.150	0.170
22 A	Tanay River - Brgy. Wawa	7.3	7.4	7.5	0.01	0.30	0.10	0.70	1.00	0.80	0.083	0.220	0.095
22 B	Tanay River - Midstream	7.6	7.8	7.6	0.01	0.06	0.02	0.80	0.80	0.70	0.078	0.076	0.071
22 C	Tanay River - Daranak Falls	8.0	7.8	8.1	<0.002	0.06	0.10	0.70	0.80	0.60	0.047	0.063	0.079
23	Baras River	7.0	6.7	6.8	0.50	0.50	0.20	2.00	2.00	1.00	0.340	0.300	0.270
24	Morong River - Downstream	7.7	7.7	7.7	2.00	1.00	3.00	2.00	2.00	2.00	0.160	0.640	1.100
24U	Morong River - Upstream	7.4	7.5	7.4	4.00	2.00	2.00	2.00	2.00	2.00	1.100	0.690	1.000
25	Manggahan Floodway (Taytay)	6.9	6.8	6.8	0.80	1.00	2.00	0.20	<0.1	0.30	0.120	0.250	0.110
26	Sapang Baho River (Cainta)	7.0	7.0	7.0	7.00	6.00	7.00	<0.1	<0.1	0.20	0.720	0.800	0.710
27	Angono River	7.3	7.4	7.3	3.00	1.00	0.10	1.00	1.00	0.90	0.370	0.240	0.380
28	Teresa River	7.7	7.7	7.7	1.00	0.09	0.10	2.00	2.00	2.00	0.150	0.120	0.180
29	Saran River	**	*	7.2	**	*	0.10	**	*	1.00	**	*	0.069
30	Binangonan River	7.0	7.1	7.2	5.00	3.00	5.00	0.10	<0.1	<0.1	1.200	0.450	1.200

** No sample due to shallow water*
*** No sample due to Typhoon Kristine*
**** No sample due to an on-going bridge construction*

Water Quality Guidelines (WQG) Prescribed in DENR Administrative Order No. 2016-08

pH

Legend:

- Conformed with WQG for Classes A and B (6.5 to 8.5)
- Conformed with WQG for Class C (6.5 to 9.0)
- Conformed with WQG for Class D (6.0 to 9.0)
- Failed the WQG for Classes A to D (less than 6.0 and more than 9.0)

BOD

- Conformed with WQG for Class A (conc. of less than and up to 3 mg/L)
- Conformed with WQG for Class B (conc. of more than 3 and up to 5 mg/L)
- Conformed with WQG for Class C (conc. of more than 5 mg/L up to 7 mg/L)
- Conformed witih WQG for Class D (conc. of more than 7 mg/L up to 15 mg/L)
- Failed the WQG for Classes A to D (more than 15 mg/L)

DO

- Conformed with WQG for Classes A, B and C (conc. of equal and more than 5 mg/L)
- Conformed with WQG for Class D (conc. of more than 2 mg/L up to less than 5 mg/L)
- Failed the WQG for Classes A to D (less than 2 mg/L)

Chloride

- Conformed with WQG for Classes A and B (conc. of less than and up to 250 mg/L)
- Conformed with WQG for Class C (conc. of more than 250 mg/L and up to 350 mg/L)
- Conformed with WQG for Class D (conc. of more than 350 mg/L and up to 400 mg/L)
- Failed the WQG for Classes A to D (more than 400 mg/L)

TSS

- Conformed with WQG for Class A (conc. of less than and up to 50 mg/L)
- Conformed with WQG for Class B (conc. of more than 50 mg/L and up to 65 mg/L)
- Conformed with WQG for Class B (conc. of more than 65 mg/L and up to 80 mg/L)
- Conformed with WQG for Class B (conc. of more than 80 mg/L and up to 110 mg/L)
- Failed the WQG for Classes A to D (more than 110 mg/L)

Oil and Grease

- Conformed with WQG for Classes A and B (conc. of less than and up to 1 mg/L)
- Conformed with WQG for Class C (conc. of more than 1 mg/L and up to 2 mg/L)
- Conformed with WQG for Class D (conc. of more than 2 mg/L and up to 5 mg/L)
- Failed the WQG for Classes A to D (more than 5 mg/L)

Nitrate

- Conformed with WQG for Classes A, B and C (conc. of less than and up to 7 mg/L)
- Conformed with WQG for Class D (conc. of more than 7 mg/L and up to 15 mg/L)
- Failed the WQG for Classes A to D (more than 15 mg/L)

Water Quality Guidelines (WQG) Prescribed in DENR Administrative Order No. 2021-19

Ammonia

- Conformed with WQG for Classes A, B and C (conc. of less than and up to 0.06 mg/L)
- Conformed with WQG for Class D (conc. of more than 0.06 mg/L and up to 0.3 mg/L)
- Failed the WQG for Classes A to D (more than 0.3 mg/L)

Phosphate

- Conformed with WQG for Classes A, B and C (conc. of less than and up to 0.025 mg/L)
- Conformed with WQG for Class D (conc. of more than 0.025 mg/L and up to 0.05 mg/L)
- Failed the WQG for Classes A to D (more than 0.05 mg/L)

Fecal Coliform

- Conformed with WQG for Class A (< 50 MPN/ 100 mL)
- Conformed with WQG for Class B (more than 50 MPN/ 100 mL and up to 100 MPN/ 100 mL)
- Conformed with WQG for Class C (more than 100 MPN/ 100 mL and up to 200 MPN/ 100 mL)
- Conformed with WQG for Class D (more than 200 MPN/ 100 mL and up to 400 MPN/ 100 mL)
- Failed the WQG for Classes A to D (more than 400 MPN/ 100 mL)

FINDINGS FOR THE 4th QUARTER 2024

Note: For the tributary rivers, no water samples were collected in the following stations:

- Stns. 6, 7, 8, 8M, 8U, 9, 10, 11, 12, 13, 14, 15 – due to Typhoon Kristine
- Stn. 1 (Marikina River) – on-going bridge construction
- Stn. 29 (Saran River) – water level too shallow

Biochemical Oxygen Demand (BOD)

Laguna Lake

- All lake monitoring stations complied with the DENR Water Quality Guideline (WQG) set for Classes A to C from October to December. Out of the fifteen (15) monitoring stations, five (5) were consistently assessed as Class A, specifically: Stns. II, V, VIII, XIII, and XVI.
- The lowest BOD concentration at 2 mg/L which indicates good water quality was observed in several stations in October and November. The highest concentration at 5 mg/L was noted in Stn. XXII (Jala-jala) in December.

Tributary Rivers

- The monthly BOD concentrations ranged from <1 mg/L to 356 mg/L. The highest was observed in Stn. 3 (Buli Creek) in October while the lowest was consistently observed in Stn. 17 (Pangil – Downstream) from October to December.
- For this quarter, the following stations were consecutively assessed as:
  - Class A – ten (10) stations, specifically: Stns. 16, 17, 17U, 18, 19, 19U, 21, 22A, 22B, and 22C
  - Class D – Stns. 24 (Morong River – Downstream) and 26 (Sapang Baho – Cainta)
  - Failed the WQG from Classes A to D – four (4) stations, namely: Stns. 2 (Bagumbayan River), 3 (Buli Creek), 5 (Tunasan River – Downstream), and 30 (Binangonan River).

Dissolved Oxygen (DO)

Laguna Lake

- For the 4th Quarter of 2024, all fifteen (15) lake monitoring stations consistently conformed with the WQG for Class A.
- The concentrations ranged from 6 mg/L to 9 mg/L indicating good water condition in terms of DO.

Tributary Rivers

- For three consecutive months, the following stations were consistently assessed as:
  - Class A – ten (10) stations: Stns. 16, 17, 17U, 18, 19, 19U, 22A, 22B, 22C, and 28.
  - Class D – Stns. 21 (Pilillia River) and 24U (Morong River – Upstream)
  - Failed the WQG from Classes A to D – six (6) stations, specifically: Stns. 2, 3, 4, 5, 26, and 30
- Other stations were sporadically assessed at different classes where DO concentrations ranged from <0.1 mg/L to 8 mg/L. The highest concentrations were noted in several stations from October to December but was consistently observed in Stns. 17U (Pangil River – Upstream), 19U (Sta. Maria River – Upstream), and 22C (Tanay River – Daranak Falls (Upstream)). The higher the DO, the better is the water quality.

Fecal Coliform

Laguna Lake

- All lake monitoring stations conformed with Classes A, B and C except for Stn. XV (San Pedro – West Bay) which failed to conform with the WQG classes A to D in October, but was assessed at Class D in November and December.
- Out of (15) stations, five (5) displayed good water quality condition in terms of fecal coliform counts and were consistently assessed at Class A, specifically: Stns. II, IV, VIII, XVII, and XVIII.
- The fecal coliform counts expressed in geomean ranged from 18 MPN/100mL to 818 MPN/100mL wherein the highest was at Stn. XV (San Pedro – West Bay) and the lowest was observed at Stn. XXII (Jala-jala) in October and Stn. IV (Central Bay) in October and November.

Tributary Rivers

- All thirty-six (36) tributary river stations failed to conform with the WQG set for Classes A to D for fecal coliform counts.
- The fecal coliform counts expressed in geometric mean ranged from 696 MPN/100mL to 113,490,088 MPN/100mL. The highest geomean count was recorded at Stn. 10 (San Cristobal River) in November which was recorded in October. On the other hand, the lowest was noted at Stn. 17U (Pangil River – Upstream) in November, which also had the lowest counts for three consecutive months.

Chloride

Laguna Lake

- The chloride concentrations for this quarter conformed with the WQG for Classes A, B and C which ranged from 12 mg/L to 326 mg/L. The lowest was noted at Stn. XXIII (Lumban) in November while the highest was at Stn. XVII (Fish Sanctuary – Central Bay) in October.
- There are three (3) lake stations that consistently met the WQG for Class A standards from October to December, namely: Stns. II (East Bay), XVIII (Pagsanjan – East Bay), and XXIII (Lumban).

pH

Laguna Lake

- All monthly lake monitoring stations conformed with the WQG set for Class A except for Stn. XXII (Jala-jala) in December which was assessed at Class C but still complied with the required classification for Laguna Lake.
- The pH levels for this quarter ranged from 7.1 to 8.6, with the lowest value recorded at Stn. XXIII (Lumban) in October and November and the highest in Stn. XXII (Jala-Jala) in December.

Tributary Rivers

- All monitored tributary rivers conformed with WQG for Class A for the whole quarter except for Stn. 18 (Siniloan River) in November at a pH level of 6.2 which fell within the range for Class D waters, making it the lowest recorded value for pH.
- On the other hand, 8.3 was the highest pH level and was noted at Stn. 8M (Sta. Rosa – Midstream) in December.

Ammonia

Laguna Lake

- The monthly concentrations for ammonia ranged from 0.009 mg/L to 0.3 mg/L. The lowest was assessed at Class A in Stn. XXI (Cardona) in November. Conversely, the highest concentration was at Class D recorded at Stn. XV (San Pedro – West Bay) in October and Stn. I (Central West Bay) in December.
- In October, all lake monitoring stations were determined to be Class D.
- In November, nine (9) stations were evaluated as Class A, specifically: Stns. II, V, VIII, XIII, XV, XVI, XIX, XX, and XXI; while the rest of the stations were Class D.

- Only two (2) stations were conformed with Class A in December, namely: Stns. XVII (Fish Sanctuary – Central Bay) and XXIII (Lumban). The rest of the stations were assessed at Class D.

Tributary Rivers

- Out of all stations with samples collected, the following were consecutively assessed from October to December as:
  - Class A – Stn. 22B (Tanay River – Midstream)
  - Class D – Stns. 18 (Siniloan River) and 22A (Pililla River)
  - Failed the WQG for Classes A to D – nine (9) stations, specifically: Stns. 2, 3, 4, 5, 24, 24U, 25, 26, and 30.
- The ammonia levels ranged from <0.002 mg/L to 24 mg/L wherein the lowest was at Stns. 19U (Sta. Maria – Upstream) and 22C (Tanay River – Daranak Falls) in October and the highest at Stn. 3 (Buli Creek) in October.

Nitrate

Laguna Lake

- All lake monitoring stations were observed to conform with the WQG set for Class A waters which ranged from <0.1 mg/L to 0.8 mg/L wherein the highest was recorded at Stn. XX (GEMS) in November.

Tributary Rivers

- All tributary river stations conformed with the WQG set for Class A waters. The monthly concentrations ranged from <0.1 mg/L to 4 mg/L. The highest was noted at Stn. 11 (San Juan River) in November while the lowest was observed at several stations.

Inorganic Phosphate

Laguna Lake

- The lowest inorganic phosphate concentration at <0.01 mg/L and assessed at Class A was recorded in Stns. XXI (Cardona) in October and XXII (Jala-jala) in December. Conversely, the highest concentration was at 0.079 mg/L which failed to conform with the WQG for Classes A to D and was noted in Stns. XV (San Pedro - West Bay) in October and V (Northern West Bay) in December.

- For this quarter, only Stn. IV (Central Bay) was consistently assessed at Class A while the following lake stations were noted to have failed to conform with A, B and C, namely: Stns. II, XIII, XV, XVI, XVIII, XIX, XX, and XXIII.

Tributary Rivers

- In October and December, all tributary river stations failed the WQG for Classes A to D except for Stn. 22C (Tanay River – Daranak Falls) in October.
- In November, almost all of the monitored stations failed the WQG for Classes A to D except for the following that were assessed as:
  - Class A – Stn. 17 (Pangil River – Downstream)
  - Class D – five (5) stations, specifically: Stns. 16, 17U, 18, 19, and 19U.
- For this quarter, the phosphate concentrations ranged from 0.018 mg/L to 2.8 mg/L. The highest was noted at Stn. 2 (Bagumbayan River) in October, while the lowest was at Stn. 17 (Pangil River – Downstream) in November.

Total Suspended Solids (TSS)

Laguna Lake

- All lake monitoring stations conformed with Class A for all months except for Stn. XIII (Taytay) in November and Stn. XVI (Sta. Rosa – West Bay) in December which were assessed at Class B.
- The TSS concentrations ranged from 10 mg/L to 65 mg/L. The lowest was noted at Stn. XXIII (Lumban) in November while the highest was at Stn. XVI (Sta. Rosa – West Bay) in December.

Summary/Recommendations:

For the Laguna Lake, as based on the average results from October to November 2024, Stn. XXI (Cardona) exhibited the best water quality among all fifteen (15) Laguna lake stations as it conformed with the standards set for Classes A, B, and C for all parameters. Conversely, the worst station was determined to be Stn. XV (San Pedro – West Bay) since it failed to meet the WQG set for fecal coliform and inorganic phosphate, and was assessed at Class D for ammonia.

For the tributary rivers, out of the thirty-six (36) monitored stations, Stns. 17 (Pangil River – Downstream) and 17U (Pangil River – Upstream) were the stations that had the most passing parameters. Both stations only failed the WQG for fecal coliform and were the only stations that were assessed at Class D for inorganic phosphate, while the rest of the stations failed. On the other hand, the poorest water quality was observed in multiple stations near the West Bay area

of the lake and these were Stns. 2, 3, 4, 5, 6, 7, 8, 9, 10, and 30. These stations failed to meet the WQG for all classes for BOD, DO, fecal, coliform, ammonia, and inorganic phosphate.

All throughout the year, sampling stations located near the West Bay area, which has high population density, showed poor water quality in several parameters. Various factors may have contributed to this bad condition, including anthropogenic activities near the lake and rivers, as well as the continuous discharge of untreated domestic and industrial wastes into the bodies of water. Thus, the following measures are recommended to prevent further deterioration of Laguna lake and its tributaries:

1) Strict implementation of environmental laws and ordinances
   - Conduct regular inspections to ensure no overflow from septic tanks
   - Penalizing illegal disposal of solid wastes and industrial wastewaters directly into the lake and rivers.
2) Implement proactive environmental strategies with the active participation and involvement of LGUs, communities and stakeholders
   - Conduct IEC campaigns and clean-up drives to encourage collective action in safeguarding the environment.
3) Adopt a comprehensive plan on proper solid waste management such as:
   - Put up trash traps along shorelines and river banks to control and stop the solid wastes from getting in the lake and rivers; and
   - Devise marked garbage bins (Nabubulok/Hindi Nabubulok) in accessible and within reach areas.

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