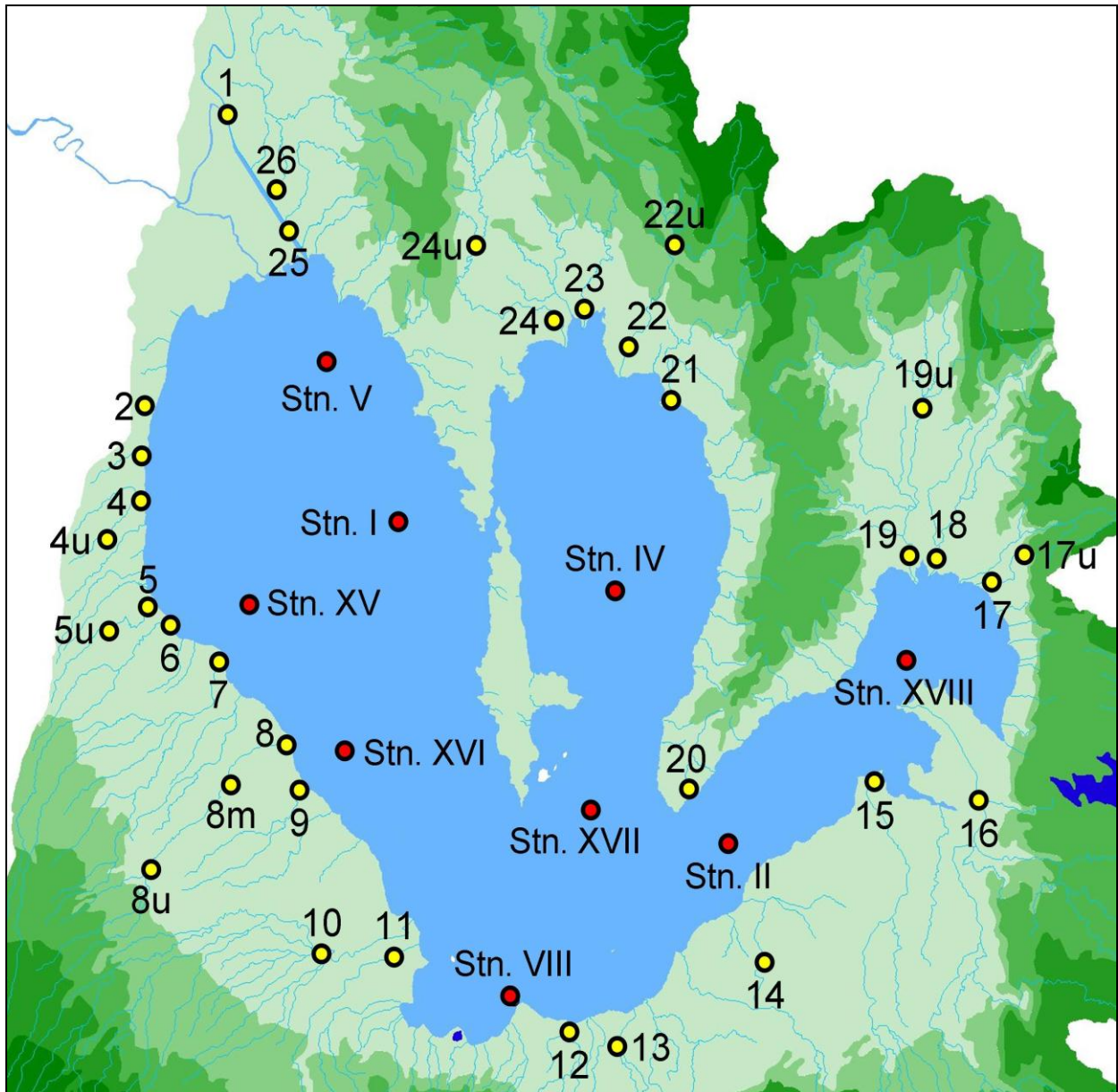




QUARTERLY WATER QUALITY MONITORING REPORT

Laguna Lake and Tributary Rivers
January to March 2014



Sampling Stations and Locations

II. Water Quality Data:

A. Laguna Lake

Location	Water Quality Parameters*								
	BOD (mg/l)			Dissolved Oxygen (mg/l)			Total coliforms (MPN/100ml)**		
	Jan.	Feb.	Mar.	Jan.	Feb.	Mar.	Jan.	Feb.	Mar.
Stn. I (Central West Bay)	2	1	2	7.8	9.7	7.9	222	188	183
Stn. II (East Bay)	2	3	2	7.8	9.8	8.9	197	246	185
Stn. IV (Central Bay)	1	2	5	7.3	8.4	8.5	57	80	135
Stn. V (Nothorn West Bay)	2	2	3	7.4	10.1	8.0	168	140	82
Stn. VIII (South Bay)	2	3	2	7.8	10.3	8.5	488	464	323
Stn. XV (San Pedro)	2	3	2	6.6	10.7	8.7	314	263	263
Stn. XVI (Sta. Rosa)	1	3	2	7.8	9.6	8.9	383	108	246
Stn. XVII (Sanctuary)	2	3	2	7.5	9.8	8.4	39	35	76
Stn. XVIII (Pagsanjan)	2	2	2	7.9	9.6	8.5	64	33	35

Notes: * DENR Class C Water Quality Criteria:

Biochemical Oxygen Demand (BOD) - 10 mg/l

Dissolved Oxygen (DO) - 5 mg/l

Total Coliforms - 5000 MPN/100 ml

** Based on computed geomean

B. Tributary Rivers

Station	Location	Water Quality Parameters*								
		BOD (mg/l)			Dissolved Oxygen (mg/l)			Total coliforms (MPN/100ml)**		
		Jan.	Feb.	Mar.	Jan.	Feb.	Mar.	Jan.	Feb.	Mar.
1	Marikina	25	26	48	0.1	0.1	0.1	16,000,000	-	-
2	Bagumbayan (Taguig)	148	185	158	0.1	0.1	0.1	5,400,000	-	-
3	Buli Creek (Taguig)	345	128	780	0.1	0.1	0.1	3,500,000	-	-
4	Mangangate (Muntinlupa)-Down	*	*	*	*	*	*	-	-	-
4U	Mangangate (Muntinlupa)-Up	14	12	7	2.5	3.0	2.8	2,400,000	-	-
5	Tunasan (Muntinlupa)- Down	322	410	398	0.1	0.1	0.1	160,000,000	-	-
5U	Tunasan (Muntinlupa)- Up	7	4	3	2.4	4.0	2.0	310,000	-	-
6	San Pedro River (T2)	4	*	*	0.6	*	*	1,700,000	-	-
7	Biñan	23	96	22	0.2	0.1	0.4	3,500,000	-	-
8	Sta. Rosa- Down	10	15	18	2.2	2.7	2.9	3,500,000	-	-
8M	Sta. Rosa- M	14	16	6	1.6	2.2	3.1	1,700,000	-	-
8U	Sta. Rosa- U	3	4	2	6.5	6.8	6.3	540,000	-	-
9	Cabuyao	17	18	*	0.5	0.7	*	3,500,000	-	-
10	San Cristobal River (T3)	*	50	56	*	2.9	0.1	3,300,000	-	-
11	San Juan River (T5)	*	11	5	*	5.0	6.3	490,000	-	-
12	Los Baños	*	3	4	*	2.5	2.7	79,000	-	-
13	Bay River (T9)	*	1	1	*	8.3	7.2	270,000	-	-
14	Pila	*	4	2	*	5.1	5.1	330,000	-	-
15	Sta. Cruz River (T6)	*	1	1	*	6.2	6.3	11,000	-	-
16	Pagsanjan River (T8)	*	3	1	*	6.8	6.8	49,000	-	-
17	Pangil- Down	*	1	1	*	7.6	8.5	33,000	-	-
17U	Pangil- Up	*	1	1	*	7.9	7.8	11,000	-	-
18	Siniloan	4	4	*	*	2.0	3.2	350,000	-	-
19	Sta. Maria- Down	*	4	3	*	5.4	6.0	240,000	-	-
19U	Sta. Maria- Up	*	1	1	*	8.7	9.2	2,300	-	-
20	Jala-jala	*	*	*	*	*	*	*	-	-
21	Pililla	*	4	2	*	2.6	2.5	540,000	-	-
22	Tanay- Down	4	3	6	4.2	6.1	7.3	33,000	-	-
22U	Tanay- Up	2	6	1	7.0	8.2	8.1	4,900	-	-
23	Baras	6	8	8	1.5	5.4	4.3	1,300,000	-	-
24	Morong- Down	13	*	10	2.7	*	5.5	490,000	-	-
24U	Morong- Up	12	9	13	5.8	8.4	5.8	49,000	-	-
25	Manggahan Floodway (Taytay)	20	32	20	0.2	1.2	0.1	790,000	-	-
26	Sapang Baho (Cainta)	37	34	32	1.1	0.1	0.1	2,400,000	-	-
27	Angono	7	22	8	2.3	1.6	1.7	9,200,000	-	-

FINDINGS:

A. On Biochemical Oxygen Demand (BOD)

Laguna Lake

- For the 1st quarter of 2014, all of the nine (9) lake stations passed the 10 mg/L BOD criterion set for Class C waters by the DENR.
- The recorded BOD concentrations for the 1st quarter ranged only from 1 to 5 mg/L.

Tributary Rivers

- The results of the BOD analysis showed that out of the 34 tributary river stations monitored, 18 stations consistently conformed to the Class C criterion for BOD and these were Stns. 5U, 6, 8U, and 12 to 23.
- During the 1st quarter, all of the monthly BOD concentrations in Stns. 1, 2, 3, 5, 7, 9, 10, 25 and 26 failed the 10 mg/L Class C criterion.
- The river stations with monthly BOD concentrations that sometimes either complying or exceeding the Class C criterion were Stns. 4u, 8, 8M, 11, 24, 24U and 27.
- The BOD concentrations for the 1st quarter of 2014 ranged from 1.0 to 780 mg/L wherein the highest was noted in Stn. 3 in March.

B. On Dissolved Oxygen (D.O.)

Laguna Lake

- All of the nine (9) lake stations conformed to the DENR Class C criterion set at a minimum concentration of 5 mg/L.
- The lowest D.O. concentration measured at 6.6 mg/L was noted in Stn. XV in January while the highest concentration of 10.7 mg/L was noted in Stn. XV in February.

Tributary Rivers

- Out of the 35 tributary river stations monitored, only 13 stations namely: Stns. 8U, 11, 13 to 17u, 19, 19u, 22U and 24U consistently passed the Class C criterion for DO.
- The 17 tributary river stations whose recorded monthly concentrations for DO always failed the Class C criterion were Stns. 1, 2, 3, 4U to 8m, 9, 10, 12, 18, 21, and 25 to 27.
- The DO concentrations ranged from 0.1 to 8.3 mg/L wherein the highest reading was noted in Stn. 13 in February.

C. On Total Coliform (T. Coli)

Laguna Lake

- For the 1st quarter of 2014, the total coliform as based on monthly geomeans, all of the nine (9) lake stations conformed to the DENR Class C criterion of 5000 MPN/100ml.
- The computed monthly geomeans for T.coli in the lake ranged from 33 to 488 MPN/100ml.

Tributary Rivers

- For 2014, monitoring of total coliforms in the tributary rivers is conducted on a quarterly basis.
- For January, all of the T. coli concentrations in tributary stations failed the DENR Class C criterion of 5000MPN/100ml. Only Stns. 19U and 22U complied with the criterion.
- The total coliform concentrations in the tributary river stations ranged from 2,300 to 160,000,000 MPN/100ml.

D. On pH

Laguna Lake

- For the 1st quarter of 2014, all lake stations consistently conformed to the DENR criterion except Stns. II and XVI which slightly exceeded the maximum criterion of 8.5.
- The pH concentrations in the lake ranged from 7.4 to 8.7.

Tributary Rivers

- For the 1st quarter of 2014, all 35 tributary river stations monitored consistently passed the Class C range for pH which is set at 6.5 – 8.5.
- The pH of tributary rivers ranged from 6.5 to 8.3.

E. On Ammonia

Laguna Lake

- For the 1st quarter of 2014, no analysis for ammonia was conducted due to inavailability of filter paper.

Tributary Rivers

- For the 1st quarter of 2014, no analysis for ammonia was conducted due to inavailability of filter paper.

F. On Nitrate

Laguna Lake

- For the 1st quarter of 2014, the analysis for nitrate is only on February and March.
- All of the nine (9) lake stations conformed to the DENR Class C criterion of 10 mg/L.
- The nitrate levels in the lake ranged from 0.009 to 0.075 mg/L.

Tributary Rivers

- For the 1st quarter of 2014, all the 34 tributary stations conformed to the Class C criterion.
- Stn. 11 consistently registered the highest nitrate concentration.
- The lowest nitrate concentration measured at 0.001 mg/L was noted in Stn. 25 in March while the highest nitrate concentration measured at 4.588 mg/L was registered in Stn.11 in March.

G. On Inorganic Phosphate

Laguna Lake

- All of the nine (9) lake stations conformed to the DENR Class C criterion set at a maximum of 0.1 mg/L.
- The lowest inorganic concentration measured at 0.009 mg/L was noted in Stn. XVIII in March while the highest concentration of 0.06 mg/L was noted in Stn. I in March.

Tributary Rivers

- For tributary rivers the DENR Class C criterion is set at 0.4 mg/L. Out of 35 monitored stations, only 12 stations namely; Stns.14 to 23 consistently conformed to the criterion.
- The river stations inorganic phosphate concentrations that sometimes either complying or exceeding the Class C criterion were Stns. 12, 13 and 27.
- The tributary stations that constantly failed the criterion are Stns. 1, 2, 3, 4U to 11, 24 to 26.
- The levels of inorganic phosphate in tributary rivers ranged from 0.001 mg/L to 3.996 mg/L.

II. Water Quality Data:

A. Laguna Lake

Location	Water Quality Parameters*								
	BOD (mg/l)			Dissolved Oxygen (mg/l)			Total coliforms (MPN/100ml)**		
	Apr.	May	Jun.	Apr.	May	Jun.	Apr.	May	Jun.
Stn. I (Central West Bay)	2	2	2	8.1	7.3	9.6	52	46	11
Stn. II (East Bay)	2	2	2	7.6	8.0	8.9	31	17	16
Stn. IV (Central Bay)	2	2	4	8.0	7.4	11.8	49	35	17
Stn. V (Nothem West Bay)	2	4	4	7.0	7.0	11.1	61	254	83
Stn. VIII (South Bay)	2	2	2	7.4	8.0	7.6	78	225	284
Stn.XV (San Pedro)	2	3	5	7.5	7.4	8.8	340	150	112
Stn.XVI (Sta. Rosa)	2	2	4	8.2	7.8	11.0	210	73	40
Stn.XVII (Sanctuary)	3	3	3	8.1	8.6	8.5	116	45	46
Stn.XVIII (Pagsanjan)	2	2	1	8.9	8.4	8.4	21	12	11

Notes: * DENR Class C Water Quality Criteria:
 Biochemical Oxygen Demand (BOD) - 10 mg/l
 Dissolved Oxygen (DO) - 5 mg/l
 Total Coliforms - 5000 MPN/100 ml
 ** Based on computed geomean

B. Tributary Rivers

Station	Location	Water Quality Parameters*								
		BOD (mg/l)			Dissolved Oxygen (mg/l)			Total coliforms (MPN/100ml)**		
		Apr.	May	Jun.	Apr.	May	Jun.	Apr.	May	Jun.
1	Marikina	35	18	20	0.1	0.1	1.1	3,500,000	-	-
2	Bagumbayan (Taguig)	73	92	106	0.1	0.1	0.1	24,000,000	-	-
3	Buli Creek (Taguig)	84	134	114	0.1	0.1	0.1	35,000,000	-	-
4	Mangagate (Muntinlupa)-Down	29	34	22	0.1	0.1	0.1	11,000,000	-	-
4U	Mangagate (Muntinlupa)-Up	19	12	6	2.8	3.6	4.1	2,400,000	-	-
5	Tunasan (Muntinlupa)- Down	180	142	134	0.1	0.1	0.1	35,000,000	-	-
5U	Tunasan (Muntinlupa)- Up	4	15	3	4.6	1.7	3.9	230,000	-	-
6	San Pedro River (T2)	24	12	15	0.1	0.5	1.2	9,200,000	-	-
7	Biñan	20	14	5	0.1	0.6	2.4	5,400,000	-	-
8	Sta. Rosa- Down	21	18	7	3.7	1.3	2.8	16,000,000	-	-
8M	Sta. Rosa- M	11	10	7	1.2	2.3	2.8	13,000,000	-	-
8U	Sta. Rosa- U	7	5	3	5.2	4.9	5.9	920,000	-	-
9	Cabuyao	28	46	23	0.1	0.1	0.4	16,000,000	-	-
10	San Cristobal River (T3)	71	65	63	0.1	1.6	0.2	16,000,000	-	-
11	San Juan River (T5)	4	2	4	3.4	2.8	3.3	230,000	-	-
12	Los Baños	3	1	4	2.6	2.7	3.9	130,000	-	-
13	Bay River (T9)	2	2	25	7.3	5.9	5.9	490,000	-	-
14	Pila	3	1	2	4.0	3.8	4.7	350,000	-	-
15	Sta. Cruz River (T6)	6	2	13	4.6	5.1	3.9	49,000	-	-
16	Pagsanjan River (T8)	8	2	3	5.3	5.6	5.9	33,000	-	-
17	Pangil- Down	2	3	2	7.2	6.7	6.8	920,000	-	-
17U	Pangil- Up	2	1	2	6.9	7.2	7.3	7,900	-	-
18	Siniloan	4	4	3	2.9	2.5	3.3	7,800	-	-
19	Sta. Maria- Down	2	3	2	7.2	4.9	5.0	49,000	-	-
19U	Sta. Maria- Up	2	1	1	8.5	8.7	8.3	1,700	-	-
20	Jala-jala	-	-	-	-	-	-	-	-	-
21	Pililla	3	11	3	1.2	1.0	4.5	49,000	-	-
22	Tanay- Down	5	5	-	5.7	10.1	-	49,000	-	-
22U	Tanay- Up	2	1	2	8.1	8.2	8.9	54,000	-	-
23	Baras	5	15	12	3.4	6.3	6.0	350,000	-	-
24	Morong- Down	-	6	28	-	8.0	2.1	-	-	-
24U	Morong- Up	20	35	21	9.5	4.9	1.6	13,000	-	-
25	Manggahan Floodway (Taytay)	11	11	30	1.4	0.3	0.1	220,000	-	-
26	Sapang Baho (Cainta)	28	11	32	0.1	0.5	0.7	3,500,000	-	-

FINDINGS:

H. On Biochemical Oxygen Demand (BOD):

Laguna Lake:

- For the 2nd quarter of 2013, all of the nine (9) lake stations passed the 10 mg/L BOD criterion set for Class C waters by the DENR.
- The recorded BOD concentrations for the 2nd quarter ranged only from 1 to 5 mg/L.

Tributary Rivers:

- The results of the BOD analysis showed that out of the 34 tributary river stations monitored, only 12 stations consistently conformed to the Class C criterion for BOD and these were Stns. 8u, 11, 12, 14, 16 to 19u, 22 and 22u.
- All of the monthly BOD concentrations in Stns. 1, 2, 3, 4, 5, 6, 9, 10, 24u, 25 and 26 during the 2nd quarter failed the 10 mg/L Class C criterion.
- The river stations with monthly BOD concentrations that sometimes either complying or exceeding the Class C criterion were Stns. 4u, 5u, 7, 8, 8m, 13, 15, 21, 23 and 24.

- The BOD concentrations for the 2nd quarter of 2013 ranged from 1.0 to 180 mg/L wherein the highest was noted in Stn. 5 in April.

I. On Dissolved Oxygen (D.O.):

Laguna Lake:

- All of the nine (9) lake stations conformed to the DENR Class C criterion set at a minimum 5 mg/L.
- The lowest D.O. concentration measured at 7.0mg/L was noted in Stn. V in April and May while the highest concentration of 11.8 mg/L was noted in Stn. IV in June.

Tributary Rivers:

- Out of the 34 tributary river stations monitored, only 7 stations namely: Stns.13, 16, 17, 17u,19u, 22 and 22u consistently passed the Class C criterion for DO.
- Those tributary river stations whose recorded monthly concentrations for DO always failed the Class C criterion were Stns. 1 to 8m, 9 to 12, 14 18, 21, 25 and 26.
- Stns.15 and 24u measured DO concentration failed the Class C criterion except in May and April respectively.
- Stns. 8u and 19 conformed with the criteria except in May.
- Stn. 24 conformed with the criteria in May while failed in June.

J. On Total Coliform (T. Coli) :

Laguna Lake:

- For the 2nd quarter of 2013, the total coliform as based on monthly geomeans, all of the nine (9) lake stations conformed to the DENR Class C criterion of 5000 MPN/100ml .
- The computed monthly geomeans for T.coli in the lake ranged from 12 to 340 MPN/100ml.

Tributary Rivers:

- For 2013, monitoring of total coliforms in the tributary rivers is conducted on a quarterly basis.
- For April, all of the T. coli concentrations in tributary stations failed the DENR Class C criterion of 5000MPN/100ml. Only Stn. 19u complied with the criterion.
- The total coliform concentrations in the tributary river stations ranged from 1,700 to 35,000,000 MPN/100ml.

K. On pH :

Laguna Lake:

- For the 2nd quarter of 2013, no lake station consistently conformed to the DENR Class C criterion set at 6.5 - 8.5.
- Four (4) stations constantly exceeded the maximum criterion and these were stations I, XV, XVI and XVIII.
- Stns. II, IV, V and VIII met the criterion only in April while Stn. XVII in June.
- The pH concentrations in the lake ranged from 7.8 to 9.5.

Tributary Rivers:

- Out of the 34 tributary river stations monitored, only 26 stations namely: Stns.2 to 16, and 22 to 26 consistently passed the Class C criterion for pH.
- Stns. 1, 17 to 19u and 21 failed to meet the criterion only in the month of June.

L. On Ammonia:

Laguna Lake:

- DAO 34 has no Class C criterion for ammonia. For the 2nd quarter of 2013, the highest concentration of ammonia measured at 0.0139 mg/L was noted in Stn. V in May while the lowest concentration of 0.016 mg/L was measured in Stns. V and XVI in May and April respectively.

Tributary Rivers:

- For the tributary stations, Stn. 24u recorded the highest ammonia concentration at 32.850 mg/L while Stn. 419u measured the lowest ammonia concentration of 0.009 mg/L. From the level of ammonia concentrations in tributary stations it showed that those stations with high ammonia

concentrations were mostly located in the Western part of the lake specifically, Stns. 1 to 9, 25 and 26.

M. On Nitrate:

Laguna Lake:

- For the 2nd quarter of 2013, the nitrate concentrations in all of the nine (9) lake stations conformed to the DENR Class C criterion of 10 mg/L .
- The nitrate levels in the lake ranged from 0.005 to 0.094 mg/L.

Tributary Rivers:

- For the 2nd quarter of 2013, all the 34 tributary stations conformed to the Class C criterion.
- Stn. V consistently registered the highest nitrate concentration.
- The lowest nitrate concentration measured at 0.004 mg/L was noted in Stn. 26 in June while the highest nitrate concentration measured at 6.111 mg/L was registered in Stn.11 in May.

N. On Inorganic Phosphate

Laguna Lake:

- All of the nine (9) lake stations conformed to the DENR Class C criterion set at a maximum of 0.1 mg/L.
- The lowest inorganic concentration measured at 0.01.0mg/L was noted in Stns. XVII and XVIII in June and April respectively while the highest concentration of 0.176 mg/L was noted in Stn. V in June.

Tributary Rivers:

- For tributary rivers the DENR Class C criterion is set at 0.4 mg/L. Out of 34 monitored stations, only 11 stations namely; Stns.13, 14, 16 to 19u, 22, 22u and 23 consistently conformed to the criterion.
- The river stations inorganic phosphate concentrations that sometimes either complying or exceeding the Class C criterion were Stns. 1, 10, 12, 15 and 21.
- The tributary stations that constantly failed the criterion are Stns. 2 to 9, 11, 24 to 26.
- The levels of inorganic phosphate in tributary rivers ranged from 0.009 mg/L to 3.820 mg/L.

