Water Quality of Ponds with respect to Criteria parameters during 2018 (January- December)

Sl. No	Sampling Location	No. of Obs.	Annual average values (Range of values) Parameters					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			pH	DO (mg/l)	BOD (mg/l)	TC (MPN/ 100 ml)	FC (MPN/ 100 ml)	pH	DO	BOD	TC	FC			
(a) Bindusagar Pond in Bhubaneswar City															
1.	Lingaraj Temple side	12	7.7 (7.1-8.4)	6.0 (3.5-7.7)	2.8 (1.0-4.9)	62561 (170-160000)	57600 (78-160000)	0	2 (17)	5 (42)	10 (83)	7 (58)	Does not conform to Class B	DO,BOD, TC,FC	Human activities
2.	Ananta Vasudev	12	7.7 (6.7-8.6)	6.9 (4.5-12.4)	2.7 (1.0-5.3)	23584 (230-160000)	17971 (78-160000)	1 (8)	1 (8)	4 (33)	10 (83)	5 (42)		pH, DO,BOD, TC,FC	
3.	Gyananagar	12	7.6 (6.8-8.4)	5.5 (1.2-8.9)	3.5 (0.9-6.9)	79659 (98->160000)	57524 (20-160000)	0	4 (33)	5 (42)	10 (83)	8 (67)		DO,BOD, TC,FC	
4.	Near Kedarnath Research Centre	12	7.9 (7.0-8.4)	7.5 (2.4-11.5)	2.6 (1.0-4.3)	18361 (330->160000)	15429 (130-160000)	0	1 (8)	4 (33)	11 (92)	5 (42)		DO,BOD, TC,FC	
	*Class 'B'		6.5-8.5	5 and above	3 or less	500 or less		Outdoor bathing							
	Water quality criteria for bathing water (MOEF Notification G.S.R. No. 742(E) Dt. 25.09.2000)		6.5-8.5	5 and above	3 or less		2500 (Maximum Permissible)	**Water use for organised outdoor bathing**							

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Note : The criteria of non-compliance with respect to TC has been calculated on the following basis:
TC values with more than 5% of samples show more than 20,000 MPN/100 ml and more than 20% of the samples show more than 5000 MPN/ 100 ml.
(Ref : IS 2296-1982 foot note)

Sl. No	Sampling Location	No. of Obs.	Annual average values (Range of values) Parameters					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			pH	DO (mg/l)	BOD (mg/l)	TC (MPN/ 100 ml)	FC (MPN/ 100 ml)	pH	DO	BOD	TC	FC			
(b) Ponds (Puri)															
1.	Narendra	12	8.5 (8.0-9.1)	10.0 (5.0-13.4)	7.1 (3.8-11.3)	5353 (<1.8->16000)	1782 (<1.8-16000)	6 (50)	0	12 (100)	9 (75)	1 (9)	Does not conform to Class B	pH, BOD, TC,FC	Human activities
2.	Markanda	12	8.1 (7.3-9.0)	11.6 (4.7-18.3)	6.3 (3.6-8.1)	7922 (<1.8->16000)	3625 (<1.8-16000)	3 (25)	2 (17)	12 (100)	9 (75)	5 (42)		pH, DO, BOD, TC,FC	
3.	Indradyumna	12	8.1 (7.6-8.8)	7.8 (3.3-12.9)	4.7 (3.2-7.0)	11639 (270-54000)	3222 (78-16000)	2 (17)	3 (25)	12 (100)	11 (92)	3 (25)		pH, DO, BOD, TC,FC	
4.	Swetaganga	12	7.9 (6.6-9.0)	6.3 (1.6-12.9)	9.2 (4.1-16.4)	8166 (790-16000)	3150 (330-16000)	1 (8)	7 (58)	12 (100)	12 (100)	3 (25)		pH, DO, BOD, TC,FC	
5.	Parvati sagar	12	7.9 (6.6-8.9)	10.4 (4.8-14.8)	9.9 (3.1-17.8)	6413 (130-16000)	4260 (20-16000)	2 (17)	1 (8)	12 (100)	10 (83)	4 (33)		pH, DO, BOD, TC,FC	
	*Class 'B'		6.5-8.5	5 and above	3 or less	500 or less	-	Outdoor bathing							
	Water quality criteria for bathing water (MOEF Notification G.S.R. No. 742(E) Dt. 25.09.2000)		6.5-8.5	5 and above	3 or less		2500 (Maximum Permissible)	` Water use for organised outdoor bathing							

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

NB : The criteria of non-compliance with respect to TC has been calculated on the following basis:
TC values with more than 5% of samples show more than 2000 MPN/100 ml and more than 20% of the samples show more than 500 MPN/ 100 ml.
(Ref : IS 2296-1982 foot note)

Sl. No	Sampling Location	No. of Obs.	Annual average values (Range of values) Parameters					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			pH	DO (mg/l)	BOD (mg/l)	TC (MPN/ 100 ml)	FC (MPN/ 100 ml)	pH	DO	BOD	TC	FC			
(c)	Pond in Jeypore town														
1.	Jagannathsagar Pond	12	7.7 (6.8-8.5)	7.0 (6.5-7.6)	1.7 (0.7-2.8)	1525 (45-4300)	605 (20-2500)	0	0	0	7 (58)	0	Does not conform to Class B	TC	Human activities
(d)	Pond in Angul Town														
1.	Raniguda Pond	12	8.0 (7.4-8.8)	8.0 (2.3-16.2)	8.7 (2.5-18.1)	2732 (170-16000)	1780 (20-16000)	1 (8)	4 (33)	11 (92)	6 (50)	1 (8)	Does not conform to Class B	pH, DO, BOD, TC, FC	Human activities
	*Class 'B'		6.5-8.5	5 and above	3 or less	500 or less	-	Outdoor bathing							
	Water quality criteria for bathing water (MOEF Notification G.S.R. No. 742(E) Dt. 25.09.2000)		6.5-8.5	5 and above	3 or less		2500 (Maximum Permissible)	` Water use for organised outdoor bathing							

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

NB : The criteria of non-compliance with respect to TC has been calculated on the following basis:
TC values with more than 5% of samples show more than 2000 MPN/100 ml and more than 20% of the samples show more than 500 MPN/ 100 ml.
(Ref : IS 2296-1982 foot note)

Water quality of Ponds with respect to other parameters during 2018 (January- December)

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents							
							Annual average values (Range of values)								
		TSS	Total alkal-inity	COD	NH_4-N	Free NH_3-N	TKN	EC	SAR	B	TDS	TH	Cl	SO_4	F
		(mg/l)		(mg/l)				(μS/cm)		(mg/l)					
(a)	Bindusagar Pond in Bhubaneswar City														
1.	Lingaraj Temple side	20 (4-38)	126 (104-150)	24.4 (6.6-49.5)	0.330 (0.056-0.840)	0.017 (0.001-0.084)	3.57 (0.56-14.00)	432 (387-477)	1.85 (1.18-3.24)	0.089 (0.035-0.148)	259 (224-298)	97 (76-116)	61.82 (40.70-99.95)	17.12 (2.86-67.20)	0.33 (0.20-0.48)
2.	Ananta Vasudev	12 (2-32)	122 (102-140)	23.1 (10.0-43.3)	0.425 (0.056-2.240)	0.029 (0-0.146)	2.33 (0.56-11.20)	425 (369-458)	1.66 (1.10-2.16)	0.090 (0.017-0.186)	250 (218-281)	96 (72-112)	60.53 (43.50-79.96)	13.80 (1.36-31.46)	0.33 (0.21-0.49)
3.	Gyananagar	20 (4-38)	130 (104-156)	26.5 (6.6-53.5)	0.154 (0.056-0.560)	0.005 (0-0.022)	2.36 (0.28-8.96)	436 (384-480)	1.71 (1.10-2.30)	0.080 (0.003-0.164)	257 (222-311)	98 (80-118)	62.73 (44.40-89.95)	13.54 (3.60-46.30)	0.35 (0.23-0.55)
4.	Near Kedarnath research Centre	27 (6-163)	123 (92-154)	22.7 (10.0-39.1)	0.200 (0.056-0.560)	0.014 (0-0.070)	2.36 (0.56-5.04)	416 (341-477)	1.81 (1.15-2.67)	0.068 (0.003-0.172)	247 (204-308)	92 (60-104)	60.38 (40.70-99.95)	12.31 (2.61-26.90)	0.33 (0.21-0.48)
	*Class 'C'	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Class 'C' : Drinking water source with conventional treatment followed by disinfection

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Sl. No.	Sampling Location	Nutrients		Heavy metals								
				Annual average values (Range of values)								
		NO_3^-	PO_4^{3-}-P	Cr(VI) [##]	T. Cr[##]	Fe[##]	Ni[##]	Cu[##]	Zn[##]	Cd[##]	Hg[##]	Pb[##]
		(mg/l)		(mg/l)								
(a)	Bindusagar Pond in Bhubaneswar City											
1.	Lingaraj Temple side	6.630 (1.067-16.714)	0.188 (0.002-0.637)	0.002	0.015	1.4076	0.00613	0.0014	0.0052	0.0006	0.00063	0.0031
2.	Ananta Vasudev	5.751 (0.717-14.484)	0.165 (0.001-0.494)	0.015	0.029	1.448	0.00981	0.0036	0.0083	0.0006	0.00057	0.0086
3.	Gyananagar	3.855 (0.411-14.746)	0.077 (0.002-0.391)	0.012	0.021	1.1985	0.00569	0.0031	0.008	0.0006	0.00063	0.0026
4.	Near Kedarnath Research Centre	3.757 (0.446-14.877)	0.139 (0.001-0.547)	0.008	0.017	1.7748	0.00338	0.0049	0.0069	0.0006	0.00070	0.0046
	*Class 'C'	50	-	0.05	-	50	-	1.5	15.0	0.01	-	0.10

*   Tolerance limit for Inland Surface water bodies (IS-2296-1982)

\##   Data for the period April, 2018

Class 'C' : Drinking water source with conventional treatment followed by disinfection

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents							
		Annual average values (Range of values)													
		TSS	Total alkal-inity	COD	NH$_4$-N	Free NH$_3$-N	TKN	EC (µS/cm)	SAR	B	TDS	TH	Cl	SO$_4$	F
		(mg/l)		(mg/l)							(mg/l)				
Ponds in Puri town															
1.	Narendra	27 (4-136)	177 (130-268)	40.3 (20.4-80.3)	0.330 (0.056-1.120)	0.063 (0.003-0.168)	5.30 (0.56-18.76)	863 (642-1007)	2.02 (0.88-6.67)	0.162 (0.039-0.453)	579 (378-1240)	175 (136-252)	187.6 (60.0-599.7)	41.5 (26.4-57.1)	0.30 (0.16-0.47)
2.	Markanda	24 (2-42)	197 (162-232)	42.8 (21.8-73.9)	0.248 (0.056-0.670)	0.044 (0.002-0.190)	4.69 (0.56-12.88)	802 (608-1517)	4.38 (1.30-15.20)	0.241 (0.007-1.544)	427 (336-560)	200 (146-250)	93.06 (49.97-199.90)	50.34 (23.25-74.87)	0.28 (0.11-0.39)
3.	Indradyumna	14 (2-38)	103 (78-152)	37.8 (22.1-67.5)	0.364 (0.056-1.008)	0.029 (0.002-0.148)	6.35 (0.56-21.28)	514 (332-701)	3.72 (1.06-14.20)	0.097 (0.003-0.425)	362 (194-1160)	91 (66-126)	135.16 (39.98-599.70)	25.72 (14.43-47.38)	0.28 (0.14-0.39)
4.	Swetaganga	32 (12-64)	205 (108-308)	55.6 (21.0-86.7)	0.382 (0.056-1.120)	0.043 (0-0.280)	5.93 (1.12-15.12)	958 (528-1266)	1.89 (0.87-3.93)	0.230 (0.003-1.190)	643 (318-1570)	197 (104-280)	232.66 (69.96-849.90)	41.13 (6.21-61.44)	0.28 (0.09-0.49)
5.	Parvati sagar	32 (14-58)	123 (76-202)	70.5 (45.9-109.8)	0.369 (0.056-1.120)	0.030 (0-0.174)	5.37 (0.56-13.44)	412 (249-683)	3.89 (0.99-10.80)	0.075 (0.004-0.143)	293 (148-783)	116 (62-240)	80.83 (30.85-349.90)	24.24 (10.07-99.62)	0.28 (0.12-0.40)
	*Class 'C'	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Class 'C' : Drinking water source with conventional treatment followed by disinfection

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Sl. No.	Sampling Location	Nutrients		Heavy metals								
				Annual average values (Range of values)								
		NO_3^-	PO_4^{3-}-P	Cr(VI) ##	T. Cr##	Fe##	Ni##	Cu##	Zn##	Cd##	Hg##	Pb##
		(mg/l)		(mg/l)								
Ponds in Puri town												
1.	Narendra	6.170 (0.367-12.787)	0.311 (0.178-0.531)	<0.002	0.005	0.286	0.009	0.004	0.004	0.0019	0.00032	0.011
2.	Markanda	29.771 (11.815-68.878)	0.989 (0.240-3.733)	<0.002	0.015	0.418	0.007	0.005	0.006	0.0005	0.00019	0.012
3.	Indradyumna	4.448 (0.638-10.057)	0.126 (0.001-0.637)	<0.002	0.005	0.223	0.011	0.0033	0.0059	0.0006	0.00019	0.005
4.	Swetaganga	11.408 (2.440-34.697)	0.475 (0.044-1.506)	<0.002	0.007	0.750	0.009	0.0061	0.0061	0.0019	0.00013	0.017
5.	Parvati sagar	3.401 (0.499-7.772)	0.097 (0.001-0.403)	<0.002	0.018	0.556	0.009	0.0171	0.0084	0.0011	0.00063	0.008
	*Class 'C'	50	-	0.05	-	50	-	1.5	15.0	0.01	-	0.10

*   Tolerance limit for Inland Surface water bodies (IS-2296-1982)
Data for the period April, 2018

Class 'C' : Drinking water source with conventional treatment followed by disinfection

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents							
		\ Annual average values (Range of values)													
		TSS	Total alkal-inity	COD	NH$_4$-N	Free NH$_3$-N	TKN	EC (µS/cm)	SAR	B	TDS	TH	Cl	SO$_4$	F
		(mg/l)		(mg/l)						(mg/l)					
Pond in Jeypore town															
1.	Jagannathsagar	39 (6-134)	164 (34-256)	20.0 (9.7-41.6)	0.265 (0.056-0.780)	0.018 (0-0.104)	2.64 (0.28-7.28)	451 (93-639)	1.21 (0.35-1.55)	0.177 (0.004-1.544)	262 (58-352)	135 (30-196)	52.60 (6.70-71.96)	9.95 (1.12-24.62)	0.24 (0.11-0.40)
Pond in Angul town															
1.	Raniguda	66 (6-408)	236 (142-326)	65.4 (32.3-118.8)	0.219 (BDL-0.670)	0.017 (0-0.087)	3.66 (0.28-12.80)	795 (595-1020)	2.19 (0.69-6.25)	0.131 (0.003-0.560)	449 (58-722)	227 (168-302)	114.59 (51.97-299.85)	41.25 (13.18-96.60)	0.70 (0.48-0.96)
	*Class 'C'	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

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Sl. No.	Sampling Location	Nutrients		Heavy metals								
		Annual average values (Range of values)										
		NO$_3^-$	PO$_4^{3-}$-P	Cr(VI)##	T. Cr##	Fe##	Ni##	Cu##	Zn##	Cd##	Hg##	Pb##
		(mg/l)		(mg/l)								
Pond in Jeypore town												
1.	Jagannathsagar	3.947 (0.505-11.285)	0.104 (0.003-0.223)	<0.002	0.009	1.566	0.004	0.009	0.045	0.0006	<0.00006	0.004
Pond in Angul town												
1.	Raniguda	10.249 (2.043-28.715)	0.431 (0.031-1.242)	0.002	0.005	0.153	0.008	0.006	0.064	0.0004	0.00013	0.017
	*Class 'C'	50	-	0.05	-	50	-	1.5	15.0	0.01	-	0.10

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

\## Data for the period April, 2018

Class 'C' : Drinking water source with conventional treatment followed by disinfection