Water Quality of Ponds with respect to Criteria parameters during 2023 (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	7.3 (7.2-7.6)	6.7 (5.6-7.8)	1.8 (1.2-2.6)	22070 (940-54000)	7028 (140-24000)	0	0	0	12 (100)	7 (58)	Does not conform to Class B	TC,FC	Human activities
2.	Ananta Vasudev	12	7.4 (6.6-7.8)	7.1 (5.0-10.0)	2.0 (1.4-2.6)	16208 (790-54000)	4536 (170-22000)	0	0	0	12 (100)	4 (33)		TC,FC	
3.	Gyananagar	12	7.4 (7.3-7.7)	6.9 (5.2-9.7)	1.6 (1.3-1.8)	15983 (3500-28000)	3258 (1100-7900)	0	0	0	12 (100)	5 (42)		TC,FC	
4.	Near Kedarnath Research Centre	12	7.4 (6.9-7.7)	6.4 (5.3-8.8)	1.9 (1.6-2.2)	8618 (330-24000)	2087 (78-7000)	0	0	0	10 (83)	4 (40)		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)

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Sl. No	Sampling Location	No. of Obs.	Annual averagevalues (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	8.7 (8.2-9.5)	8.7 (3.1-12.3)	6.3 (5.0-8.0)	3543 (130-24000)	826 (45-4900)	6 (50)	1 (8)	12 (100)	10 (83)	1 (8)	Does not conform to Class B	pH, DO, BOD, TC,FC	Human activities
2.	Markanda	8*	8.2 (7.6-9)	8.2 (3.5-10.3)	6.0 (1.2-10.0)	8115 (240-35000)	2511 (79-13000)	2 (25)	1 (8)	7 (88)	5 (63)	2 (25)		pH, DO, BOD, TC,FC	
3.	Indradyumna	12	8.5 (7.8-9.3)	9.2 (4.2-11.6)	5.3 (3.3-8.0)	4661 (78-35000)	1473 (20-13000)	4 (33)	1 (8)	12 (100)	6 (50)	1 (8)		pH, DO, BOD, TC,FC	
4.	Swetaganga	12	8.3 (7.4-9.6)	8.3 (3.2-10.8)	8.0 (3.2-19.0)	23097 (330-160000)	6823 (45-54000)	3 (25)	1 (8)	12 (100)	10 (83)	2 (17)		pH, DO, BOD, TC,FC	
5.	Parvati sagar	12	8.3 (7.7-9.1)	8.5 (3.5-10.9)	8.6 (3.8-14.0)	13173 (33-92000)	5645 (13-54000)	2 (17)	1 (8)	12 (100)	10 (83)	1 (8)		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							

- **Monitored during the month of Jan, Feb, March, August, September, October, November and December, 2023**
** 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)

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SI. No	Sampling Location	No. of Obs.	Annual average values (Range of values)					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			Parameters					pH	DO	BOD	TC	FC			
			pH	DO (mg/L)	BOD (mg/L)	TC (MPN/ 100 ml)	FC (MPN/ 100 ml)								
(c)	**Pond in Jeypore town**														
1.	Jagannath sagar	12	7.6 (6.9-8.6)	6.6 (2.4-10.4)	3.8 (1.8-6.5)	21249 (790-54000)	8373 (130-35000)	1 (8)	5 (42)	11 (92)	12 (100)	6 (50)	Does not conform to Class B	pH, DO, BOD,TC, FC	Human activities
(d)	**Pond in Angul Town**														
1.	Raniguda Pond	12	7.8 (7.3-8.4)	8.4 (3.4-13.6)	6.1 (3.2-16.0)	2725 (1100-4700)	855 (330-1700)	0	2 (17)	12 (100)	12 (100)	0	Does not conform to Class B	DO, BOD, TC	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 2023 (January- December)

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents								
								Annual average values (Range of values)								
		TSS	Total alkal-inity	COD	NH₄-N	Free NH₃-N	TKN	EC	SAR	% Na	B	TDS	TH	Cl	SO₄	F
		(mg/L)		(mg/L)				(μS/cm)			(mg/L)					
(a)	**Bindusagar Pond in Bhubaneswar City**															
1.	Lingaraj Temple side	19 (<10-115)	107 (88-128)	12.9 (7.4-22.0)	1.07 (0.56-1.68)	0.015 (0.006-0.034)	5.04 (2.8-8.4)	294 (240-365)	1.05 (0.52-1.55)	32.03 (20.01-40.88)	<0.5 (<0.5-0.75)	180 (140-228)	90 (68-104)	32 (20-54)	12.6 (8-18.7)	0.41 (0.22-0.775)
2.	Ananta Vasudev	13 (<10-34)	99 (80-116)	13.8 (7.4-22.0)	0.7 (0.56-1.12)	0.013 (0-0.022)	4.28 (1.68-6.16)	286 (241-328)	1.07 (0.74-1.4)	33.29 (26.63-41.44)	<0.5 (<0.5-<0.5)	173 (148-188)	86 (72-108)	31 (22-46)	13.9 (8.7-21.9)	0.37 (0.19-0.672)
3.	Gyananagar	11 (<10-27)	106 (92-117)	12.2 (7.5-20.0)	1.07 (0.56-2.8)	0.02 (0.007-0.056)	4.99 (3.92-8.4)	287 (235-330)	1.02 (0.56-1.29)	32 (21.29-38.61)	<0.5 (<0.5-<0.5)	176 (152-198)	88 (72-108)	29 (20-42)	13.3 (9.1-24.2)	0.38 (0.24-0.6)
4.	Near Kedarnath research Centre	13 (<10-23)	104 (88-128)	14.3 (11-20.0)	0.93 (0.56-1.68)	0.016 (0-0.034)	4.9 (2.8-6.16)	293 (248-365)	1.03 (0.85-1.3)	32.41 (26.23-38.07)	<0.5 (<0.5-<0.5)	174 (152-196)	88 (68-120)	29 (22-44)	13.4 (6.5-34.4)	0.38 (0.23-0.653)
	***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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SI. 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	3.871 (0.466-29.818)	<0.05 (<0.05-0.095)	<0.002	0.005	0.100	0.007	0.003	0.008	<0.0005	0.00077	0.008
2.	Ananta Vasudev	1.578 (0.522-3.234)	<0.05 (<0.05-0.078)	<0.002	0.004	0.572	0.008	0.004	0.036	<0.0005	0.00062	0.010
3.	Gyananagar	1.462 (0.629-2.405)	<0.05 (<0.05-0.097)	<0.002	0.005	1.030	0.006	0.002	0.005	<0.0005	0.00031	0.009
4.	Near Kedarnath Research Centre	1.907 (0.353-5.952)	<0.05 (<0.05-0.13)	<0.002	0.01	0.986	0.006	0.002	0.005	0.0006	0.00092	0.009
	Class 'C'	50										
	Class 'E'	-	-	-		-	-	-	-	-	-	-

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)
Data for the period April, 2023
Class 'C' :Drinking water source with conventional treatment followed by disinfection

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Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents								
				Annual average values (Range of values)												
		TSS	Total alkal-inity	COD	NH₄-N	Free NH₃-N	TKN	EC	SAR	% Na	B	TDS	TH	Cl	SO₄	F
		(mg/L)		(mg/L)				(µS/cm)			(mg/L)					
(b) Ponds in Puri town																
1.	Narendra	24 (<10-52)	190 (144-284)	41.7 (26-56)	0.76 (0.56-1.12)	0.042 (0-0.174)	4.54 (2.8-6.72)	925 (715-1142)	3.85 (2.11-8.49)	51.48 (37.65-71.12)	<0.5 (<0.5-0.59)	600 (420-952)	198 (132-240)	183 (120-400)	61.1 (10.4-103.1)	0.33 (0.11-0.72)
2.	Markanda	30 (12-49)	182 (112-220)	40.7 (7.8-68)	1.12 (0.56-3.36)	0.02 (0-0.067)	5.6 (2.8-12.32)	638 (530-740)	1.32 (0.97-1.89)	28.3 (24-36.11)	<0.5 (<0.5-0.72)	415 (344-548)	211 (180-224)	79 (70-90)	41.2 (22.1-62)	0.27 (0.12-0.42)
3.	Indradyumna	17 (<10-65)	149 (108-212)	37.8 (22-58)	1.22 (0.56-2.8)	0.06 (0-0.21)	6.33 (3.92-7.84)	652 (521-870)	2.47 (1.61-4.27)	43.8 (32.61-57.98)	<0.5 (<0.5-0.66)	410 (328-520)	160 (96-228)	109 (80-160)	48.3 (22.9-112.7)	0.34 (0.12-0.7)
4.	Swetaganga	34 (<10-98)	177 (128-244)	50.7 (22-94)	1.32 (0.56-3.36)	0.051 (0-0.174)	6.16 (3.36-11.2)	1018 (430-1745)	4.31 (1.45-7.79)	52.42 (35.09-68.02)	<0.5 (<0.5-0.733)	588 (268-868)	185 (76-248)	239 (50-420)	36.8 (17.4-59)	0.34 (0.13-0.74)
5.	Parvati sagar	50 (<10-111)	131 (92-172)	55.5 (23-83)	1.12 (0.56-2.8)	0.075 (0-0.21)	7.17 (3.36-11.2)	461 (395-530)	2.1 (1.38-3.57)	43.5 (31.64-57.49)	<0.5 (<0.5-0.617)	298 (258-340)	117 (84-172)	83 (70-100)	18.5 (7.5-30.9)	0.29 (0.11-0.73)
	*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)			
(b) Ponds in Puri town												
1.	Narendra	5.392 (0.878-28.476)	0.746 (0.191-0.977)	0.003	0.008	0.597	0.014	0.003	0.013	0.0009	0.00062	0.009
2.	Markanda	27.514 (19.565-39.547)	1.988 (0.934-3.879)	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.	Indradyumna	12.617 (1.342-28.541)	0.456 (0.068-0.917)	0.004	0.01	0.428	0.011	0.003	0.004	0.0008	0.00062	0.010
4.	Swetaganga	5.088 (0.779-19.098)	0.656 (<0.05-1.156)	0.006	0.017	0.418	0.011	0.004	0.008	0.0015	0.00046	0.014
5.	Parvati sagar	2.661 (1.022-4.704)	0.073 (<0.05-0.193)	0.008	0.013	0.219	0.007	0.004	0.006	0.0006	0.00031	0.007
	**Class 'C'	50	-	0.05	-	50	-	1.5	15.0	0.01	-	0.10
	**Class 'E'	-	-	-	-	-	-	-	-	-	-	-

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)
Data for the period April, 2023   NA : Not Analysed

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

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Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents								
		Annual average values (Range of values)														
		TSS	Total alkal-inity	COD	NH₄-N	Free NH₃-N	TKN	EC (µS/cm)	SAR	% Na	B	TDS	TH	Cl	SO₄	F
		(mg/L)		(mg/L)								(mg/L)				
Pond in Jeypore town																
1.	Jagannathsagar	29 (15-47)	115 (88-156)	29.4 (7.8-53)	0.71 (0.56-1.12)	0.01 (0-0.022)	5.21 (1.68-12.32)	332 (225-465)	1.21 (0.37-1.87)	33.93 (14.72-42.36)	<0.5 (<0.5-0.803)	208 (152-296)	105 (84-136)	46 (14-80)	9.6 (<5-18.4)	0.28 (0.12-0.55)
Pond in Angul town																
1.	Raniguda	29 (15-47)	115 (88-156)	29.4 (7.8-53)	0.71 (0.56-1.12)	0.01 (0-0.022)	5.21 (1.68-12.32)	332 (225-465)	1.21 (0.37-1.87)	33.93 (14.72-42.36)	<0.5 (<0.5-0.803)	208 (152-296)	105 (84-136)	46 (14-80)	9.6 (<5-18.4)	0.28 (0.12-0.55)
	*Class 'C'	-	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

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Sl. No.	Sampling Location	Nutrients		Heavy metals								
		Annual average values (Range of values)										
		NO₃⁻	PO₄³⁻-P	Cr(VI) ##	T Cr	Fe##	Ni##	Cu##	Zn##	Cd##	Hg##	Pb##
		(mg/L)						(mg/L)				
Pond in Jeypore town												
1.	Jagannathsagar	3.513 (0.765-12.139)	0.08 (<0.05-0.183)	0.003	0.008	2.230	0.012	0.002	0.009	0.0006	0.00092	0.005
Pond in Angul town												
1.	Raniguda	11.397 (0.478-71.134)	0.397 (<0.05-0.886)	0.004	0.006	1.488	0.008	0.004	0.009	0.0017	0.00031	0.010
	**Class 'C'	50	-	0.05	-	50	-	1.5	15.0	0.01	-	0.10
	**Class 'E'	-	-	-	-	-	-	-	-	-	-	-

*   Tolerance limit for Inland Surface water bodies (IS-2296-1982)
##Data for the period April, 2023
Class 'C' :Drinking water source with conventional treatment followed by disinfection