Water Quality of Bindusagar Pond with respect to Criteria parameters during 2015 (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			
1.	Lingaraj Temple side	12	8.2 (7.4-9.9)	6.3 (1.3-11.9)	4.5 (2.4-9.3)	54158 (3900-160000)	28417 (2600-160000)	2 (17)	4 (33)	9 (75)	12 (100)	8 (67)	Does not conform to Class B	pH, DO,BOD, TC,FC	Human activities
2.	Ananta Vasudev	12	7.9 (7.1-9.1)	6.0 (1.5-9.6)	4.6 (1.9-9.9)	82767 (9200-160000)	52058 (700-160000)	1 (8)	4 (33)	9 (75)	12 (100)	10 (91)			
3.	Near Kedarnath Research Centre	12	8.0 (7.2-9.4)	5.7 (1.7-9.4)	4.3 (1.9-12.9)	69953 (230-160000)	52040 (78-160000)	1 (8)	3 (25)	9 (75)	11 (92)	8 (73)			
4.	Gyananagar	12	7.8 (6.4-8.3)	5.2 (1.3-7.6)	5.0 (1.5-12.5)	71658 (4900-160000)	47608 (2300-160000)	0	4 (33)	8 (73)	12 (100)	9 (82)	Does not conform to Class B	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)

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)

Water Quality of Religious Ponds in Puri with respect to Criteria parameters during 2015 (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			
1.	Narendra	12	8.9 (8.2-10.0)	8.4 (3.6-13.9)	7.0 (3.8-14.6)	6365 (230-35000)	3885 (78-24000)	9 (75)	3 (25)	12 (100)	10 (83)	5 (42)	Does not conform to Class B	pH, DO, BOD, TC,FC	Human activities
2.	Markanda	12	8.6 (7.5-9.7)	11.5 (4.0-20.7)	7.8 (4.1-19.5)	16335 (45-54000)	7930 (20-35000)	6 (50)	1 (8)	12 (100)	9 (75)	8 (67)			
3.	Indradyumna	12	8.2 (7.5-8.8)	9.7 (6.9-13.5)	6.1 (4.0-8.8)	7999 (490-22000)	3952 (130-13000)	2 (17)	0	12 (100)	11 (92)	6 (50)	Does not conform to Class B	pH, BOD, TC,FC	Human activities
4.	Swetaganga	12	8.5 (7.6-8.9)	13.0 (6.4-21.4)	8.4 (4.6-16.0)	33801 (220-160000)	25672 (78-160000)	8 (67)	0	12 (100)	11 (92)	7 (58)			
5.	Parvati sagar	12	7.9 (7.1-9.2)	14.3 (9.2-21.0)	13.9 (5.8-32.5)	30983 (2400-160000)	12398 (490-54000)	2 (17)	0	12 (100)	12 (100)	7 (58)			
	*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 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)

Water quality of ponds with respect to other parameters during 2015 (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	CI	SO$_4$	F
		(mg/l)		(mg/l)				(μS/cm)		(mg/l)					
Bindusagar Pond (Bhubaneswar)															
1.	Lingaraj Temple side	9 (3-25)	115 (88-136)	27.9 (12.0-54.1)	0.149 (0.056-0.560)	0.003 (0.002-0.004)	1.68 (1.40-2.24)	417 (364-464)	1.97 (1.72-2.27)	0.052 (0.021-0.098)	243 (212-284)	98 (74-120)	58.6 (48.9-68.5)	12.8 (3.6-40.6)	0.550 (0.272-0.680)
2.	Ananta Vasudev	13 (3-32)	111 (84-136)	26.6 (14.4-46.8)	0.154 (0.056-0.616)	0.003 (0-0.006)	1.68 (1.12-2.24)	430 (388-526)	2.14 (1.68-3.54)	0.050 (0.013-0.123)	249 (210-305)	93 (68-112)	64.1 (43.0-107.6)	13.1 (4.6-33.7)	0.542 (0.313-0.690)
3.	Near Kedarnath research Centre	12 (4-35)	112 (80-128)	25.3 (8.0-38.7)	0.135 (0.056-0.336)	0.003 (0.001-0.006)	1.59 (1.12-2.24)	429 (358-517)	2.11 (1.59-2.67)	0.052 (0.016-0.112)	248 (204-282)	97 (76-116)	61.9 (50.9-78.3)	13.5 (2.4-43.7)	0.545 (0.286-0.664)
4.	Gyananagar	24 (4-24)	110 (72-132)	25.6 (12.2-57.7)	0.154 (0.056-0.560)	0.004 (0-0.007)	1.66 (1.12-2.24)	423 (346-480)	2.15 (1.67-2.86)	0.053 (0.016-0.130)	247 (192-270)	94 (76-118)	62.5 (46.9-78.3)	14.1 (4.9-44.9)	0.540 (0.135-0.642)
	*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)								
Bindusagar Pond (Bhubaneswar)												
1.	Lingaraj Temple side	9.976 (0.332-24.906)	0.180 (0.045-1.186)	0.011 (<0.002-0.033)	0.039 (0.018-0.081)	0.483 (0.060-1.200)	0.016 (0.005-0.030)	0.045 (<0.001-0.011)	0.008 (0.001-0.024)	0.0035 (0.0008-0.0091)	0.00025 (0.00006-0.00070)	0.012 (0.003-0.019)
2.	Ananta Vasudev	11.554 (0.133-41.153)	0.262 (0.033-1.315)	0.017 (<0.002-0.080)	0.053 (0.008-0.167)	0.620 (0.117-1.190)	0.015 (0.004-0.027)	0.005 (0.001-0.009)	0.012 (0.001-0.0028)	0.0036 (0.0009-0.0095)	0.00020 (<0.00006-0.00070)	0.018 (0.003-0.061)
3.	Near Kedarnath research Centre	10.529 (0.328-21.324)	0.273 (0.029-1.113)	0.009 (<0.002-0.040)	0.035 (0.009-0.064)	0.504 (0.020-1.430)	0.017 (0.004-0.035)	0.005 (0.002-0.011)	0.011 (0.001-0.020)	0.0033 (0.0009-0.0084)	0.00022 (0.00006-0.00040)	0.014 (0.004-0.032)
4.	Gyananagar	8.639 (0.195-23.525)	0.198 (0.011-1.353)	0.013 (<0.002-0.072)	0.040 (0.015-0.112)	0.921 (0.120-2.390)	0.015 (0.004-0.023)	0.005 (0.001-0.011)	0.009 (0.002-0.021)	0.0036 (0.0012-0.0096)	0.00024 (0.00006-0.00060)	0.012 (0.002-0.024)
	*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- December, 2015

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

Water quality of ponds in Puri with respect to other parameters during 2015 (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 (µS/cm)	SAR	B	TDS	TH	Cl	SO₄	F
		(mg/l)		(mg/l)							(mg/l)				
1.	Narendra	24 (14-62)	215 (160-264)	49.1 (20.0-149.1)	0.196 (0.112-0.448)	0.056 (0.016-0.112)	1.94 (1.40-2.52)	899 (686-1222)	3.88 (3.03-5.78)	0.106 (0.019-0.164)	528 (420-712)	201 (146-260)	147.3 (112.5-244.6)	38.7 (16.7-108.8)	0.372 (0.180-0.612)
2.	Markanda	23 (11-35)	207 (174-268)	48.7 (23.7-137.2)	0.369 (0.112-2.240)	0.069 (0.003-0.134)	2.03 (1.40-3.64)	723 (611-990)	2.83 (1.88-6.01)	0.211 (0.019-1.329)	423 (330-588)	195 (180-236)	93.2 (68.5-171.2)	38.3 (18.7-98.1)	0.263 (0.070-0.503)
3.	Indradyumna	17 (5-45)	150 (102-328)	42.3 (27.0-71.6)	0.182 (0.112-0.336)	0.026 (0.004-0.084)	1.84 (1.40-2.24)	670 (581-904)	4.28 (2.99-8.04)	0.097 (0.022-0.250)	390 (320-540)	129 (94-244)	132.7 (97.9-244.6)	29.6 (10.9-61.7)	0.638 (0.220-4.200)
4.	Swetaganga	23 (6-51)	260 (114-352)	45.9 (24.9-92.0)	0.243 (0.112-0.616)	0.035 (0.004-0.074)	2.03 (1.68-2.80)	1219 (633-1439)	6.56 (3.85-10.10)	0.182 (0.010-0.834)	750 (352-890)	232 (100-306)	238.7 (117.4-332.5)	52.1 (12.3-105.1)	0.279 (0.080-0.591)
5.	Parvati sagar	33 (18-53)	127 (84-212)	96.9 (33.8-166.4)	0.233 (0.112-0.560)	0.011 (0.001-0.025)	2.01 (1.40-2.80)	569 (389-874)	3.32 (1.40-6.41)	0.065 (0.035-0.131)	339 (220-502)	114 (66-196)	100.0 (58.7-195.7)	28.2 (10.4-57.6)	0.317 (0.160-0.552)
	*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

Contd..

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)								
1.	Narendra	8.795 (0.771-24.264)	0.121 (0.025-0.445)	0.009 (<0.002-0.042)	0.036 (0.013-0.092)	0.360 (0.040-0.950)	0.021 (0.008-0.060)	0.005 (0.001-0.021)	0.022 (0.004-0.046)	0.0054 (0.0006-0.0263)	0.00029 (<0.00006-0.00089)	0.010 (0.002-0.024)
2.	Markanda	9.906 (1.829-24.176)	0.113 (0.045-0.257)	0.010 (<0.002-0.043)	0.035 (0.015-0.109)	0.375 (0.070-1.100)	0.018 (0.009-0.031)	0.006 (0.002-0.013)	0.018 (0.004-0.054)	0.0029 (0.0008-0.0056)	0.00040 (<0.00006-0.00089)	0.012 (0.004-0.032)
3.	Indradyumna	8.749 (0.390-23.870)	0.177 (0.023-1.045)	0.011 (<0.002-0.040)	0.043 (0.020-0.121)	0.799 (0.040-2.670)	0.018 (0.010-0.025)	0.008 (0.003-0.019)	0.020 (0.004-0.047)	0.0018 (0.0009-0.0054)	0.00037 (<0.00006-0.00083)	0.010 (0.004-0.014)
4.	Swetaganga	8.856 (0.407-21.522)	0.219 (0.040-1.699)	0.009 (<0.002-0.033)	0.042 (0.013-0.076)	0.706 (0.090-2.390)	0.021 (0.008-0.061)	0.008 (0.003-0.015)	0.032 (0.004-0.059)	0.0021 (0.0009-0.0263)	0.00034 (<0.00006-0.00102)	0.013 (0.006-0.023)
5.	Parvati sagar	9.901 (1.017-28.888)	0.178 (0.029-1.241)	0.018 (<0.002-0.038)	0.045 (0.015-0.094)	0.458 (0.030-0.880)	0.013 (0.008-0.025)	0.006 (0.003-0.017)	0.016 (0.003-0.037)	0.0021 (0.0006-0.0049)	0.00030 (<0.00006-0.00095)	0.010 (0.004-0.019)
	*Class 'C'			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-December, 2014**

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