

ANNEXURES

Annexure – I: Physico - Chemical Parameters for Thol Wetland during the Year 2015-2016

Sr. No	Parameters	Unit	Summer - I						Monsoon - I						Winter - I						Min	Max	Yearly Average	Standard Deviation
			L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3				
1	Temperature (Ambient)	°C	35	35	36	31	34	34	28	30	31	28	29.5	30	29	30	30	30	31	31	28	36	31.3	2.5
2	Temperature (Water)	°C	29	29.5	29.5	30	31	32	26.5	27	27	23	26	26.5	19	25	25	27	27	26	19	32	27.0	3.0
3	pH	in pH units	7.39	7.69	7.71	7.80	8.95	8.65	7.70	8.34	8.12	7.68	8.65	8.88	7.92	9.39	9.38	8.11	8.57	8.90	7.39	9.39	8.32	0.62
4	Colour	Hazen	40	70	80	30	60	50	10	30	20	5	20	20	5	10	10	10	20	20	5	80	28.3	22.75
5	Turbidity	NTU	26	29	24	56	190	183	12	31	27	7	10	14	2.27	2.21	2.29	1.51	1.59	1.56	1.51	190	34.5	57.21
6	Conductivity	µs/cm	388	379	365	570	874	880	300	289	280	260	245	244	232	217	209	255	300	264	209	880	364	205
7	Total Solids	mg/L	224	330	272	520	980	910	190	258	239	173	200	206	166	196	214	256	256	210	166	980	322	240
8	Total Dissolved Solids	mg/L	188	187	192	370	580	470	152	168	189	140	152	168	134	156	176	174	180	168	134	580	219	124
9	Total Suspended Solids	mg/L	36	143	80	150	400	440	38	90	50	33	48	38	32	40	38	82	76	42	32	440	103	121
10	Ammonical Nitrogen	mg/L	1.34	2.02	1.79	0.96	2.16	2.98	1.00	1.89	1.72	0.50	1.05	1.00	0.29	0.42	0.35	0.46	0.17	0.10	0.10	2.98	1.12	0.82
11	Total Kjeldahl Nitrogen	mg/L	11.20	15.68	16.80	15.68	19.46	17.20	18.80	20.20	19.46	17.20	24.51	19.46	24.47	31.56	31.56	24.51	15.96	13.68	11.20	31.56	19.86	5.57
12	Nitrate (NO ₃ -N)	mg/L	1.919	0.045	0.054	0.290	0.360	0.297	0.270	0.088	0.045	0.190	0.055	0.040	0.170	0.048	0.040	0.360	0.302	0.267	0.040	1.919	0.269	0.430
13	Nitrite	mg/L	0.068	0.056	0.067	0.120	0.096	0.102	0.162	0.060	0.060	0.206	0.076	0.076	0.390	0.074	0.077	0.009	0.011	0.017	0.009	0.390	0.096	0.088
14	phosphate	mg/L	0.010	0.040	0.045	0.010	0.019	0.010	0.020	0.020	0.010	0.010	0.020	0.010	0.016	0.000	0.000	0.090	0.050	0.060	0.000	0.090	0.024	0.024
15	Alkalinity as CaCO ₃	mg/L	88	94	108	128	136	124	90	92	96	95	86	90	100	80	84	124	108	116	80	136	102	16.92
16	Total Hardness as CaCO ₃	mg/L	90	40	40	116	112	76	80.2	54.2	56.9	73.3	69.5	68.8	74.4	62.8	64.8	101.6	84.4	83.2	40	116	74.89	21.28
17	Calcium	mg/L	20.4	12.02	12.02	20.78	21.64	19.98	18.19	14.9	11.8	15.7	13.69	12.5	13.95	14.42	12.5	24.34	16.19	20.68	11.8	24.34	16.43	3.99
18	Magnesium	mg/L	9.72	2.43	2.43	8.78	6.88	7	8.8	5.63	6.24	7.6	5.7	6.05	9.63	6.52	8.17	9.92	10.17	7.68	2.43	10.17	7.19	2.27
19	Sodium	mg/L	20.7	24.3	23.3	65	103	75	19	22.8	22	16.7	21	22.9	20.46	23.52	23.9	20.63	25.51	24.97	16.7	103	31.93	23.67
20	Potassium	mg/L	4.8	4.3	4.4	2.0	4.0	3.0	4.1	3.9	3.6	3.1	2.9	2.6	3.1	2.5	2.3	1.0	1.0	1.0	1.0	4.8	2.98	1.19
21	% Sodium	%	31.68	53.73	52.61	60.95	71.92	66.4	32.23	43.14	44.47	32.79	42.68	45.59	36.21	43.65	43.65	30.37	39.9	39.12	30.37	71.92	45.06	11.95
22	SAR	millimole/L	0.94	1.67	1.6	3.01	4.93	3.67	0.91	1.27	1.28	0.86	1.2	1.32	1.03	1.29	1.29	0.89	1.22	1.19	0.86	4.93	1.64	1.10
23	Fluoride	mg/L	0.69	0.16	0.16	0.80	1.00	0.60	0.29	0.023	0.012	0.14	0.19	0.08	0.00	0.51	0.00	0.19	0.35	0.54	0.00	1.00	0.319	0.303
24	Dissolved Oxygen	mg/L	12.60	6.00	14.68	9.62	12.20	11.00	8.60	9.90	8.89	5.80	10.10	9.80	4.55	13.00	11.40	10.31	11.07	12.28	4.55	14.68	10.10	2.64
25	Chemical Oxygen Demand	mg/L	91	172	147	178	460	480	65	126	119	56	97	102	40	89	68	79	133	149	40	480	147	124
26	BOD (3 days 27°C)	mg/L	23	45	43	67	149	168	17	37	32	16	31	28	10	26	22	15	19	22	10	168	43	44
27	Chloride as Cl ⁻	mg/L	58	52	46	68	120	98	38	31	32	28	33	29	23	41	27	19	22	25	19	120	44	27
28	Sulphate	mg/L	14	22	18	28	67	55	8	13	14	12	15	16	14	16	27	11	20	19	8	67	22	15
29	Total Organic Carbon	mg/L	33.5	45.6	52.2	39.4	101.2	87.9	36.4	37.7	42.0	26.3	31.5	39.8	9.1	11.6	12.7	4.7	6.7	5.7	4.7	101.2	34.7	26.6

Annexure – II: Physico - Chemical Parameters for Thol Wetland during the Year 2016-2017

Sr. No	Parameters	Unit	Summer - II						Monsoon - II						Winter - II						Min	Max	Yearly Average	Standard Deviation
			L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3				
1	Temperature (Ambient)	°C	30	31	31	32	35	36	29	29.5	31	26	31.5	32	21.5	28.5	27	28.5	29.3	31	21.5	36	30.0	3.2
2	Temperature (Water)	°C	28.5	25	29.5	30	32	35	26.5	26.5	27	23	25.5	26.5	18	20	19.5	25.5	27.5	29	18	35	26.4	4.3
3	pH	in pH units	7.52	7.20	8.29	7.66	9.05	9.65	7.77	8.77	8.80	7.25	8.80	8.55	7.92	9.07	9.16	7.50	7.49	8.48	7.20	9.65	8.27	0.75
4	Colour	Hazen	60	100	90	40	90	90	5	20	10	5	10	10	10	20	20	20	40	30	5	100	37.2	33.5
5	Turbidity	NTU	8	14	18	66.3	234.6	320.6	2.2	10	5.1	2	28	32	8	12	14	18	57	61	2	320.6	50.6	86.2
6	Conductivity	µs/cm	400	466	451	889	947	896	202	229	224	194	195	224	251	211	217	251	232	210	194	947	372	262
7	Total Solids	mg/L	332	326	350	660	1260	1055	98	118	150	121	133	136	172	176	180	194	270	246	98	1260	332	330
8	Total Dissolved Solids	mg/L	238	216	234	480	700	555	90	100	128	113	122	127	162	132	144	166	188	160	90	700	225	172
9	Total Suspended Solids	mg/L	94	110	116	180	560	500	8	18	22	8	11	9	10	44	36	28	82	86	8	560	107	4
10	Ammonical Nitrogen	mg/L	0.60	0.80	0.60	0.56	1.12	3.08	1.12	2.24	2.24	0.56	0.28	0.28	0.28	0.28	0.28	1.12	2.24	1.12	0.28	3.08	1.04	0.85
11	Total Kjeldahl Nitrogen	mg/L	5.37	7.58	5.37	19.88	24.64	31.64	11.20	14.56	15.45	2.24	1.68	0.56	0.56	0.56	0.84	2.24	4.48	2.24	0.56	31.64	8.39	9.29
12	Nitrate (NO ₃ -N)	mg/L	0.200	0.164	0.187	0.370	0.310	0.272	0.190	0.240	0.210	0.210	0.161	0.185	0.122	0.092	0.076	0.117	0.159	0.184	0.076	0.370	0.192	0.074
13	Nitrite	mg/L	0.085	0.066	0.077	0.133	0.109	0.106	0.000	0.092	0.000	0.023	0.000	0.000	0.071	0.063	0.026	0.067	0.073	0.082	0.000	0.133	0.060	0.042
14	Phosphate	mg/L	0.014	0.053	0.056	0.010	0.096	0.150	0.020	0.020	0.020	0.040	0.027	0.014	0.000	0.000	0.000	0.066	0.295	0.256	0.000	0.295	0.063	0.086
15	Alkalinity as CaCO ₃	mg/L	126	124	104	128	152	124	92	100	98	96	96	92	140	100	112	96	92	80	80	152	108.4	19.5
16	Total Hardness as CaCO ₃	mg/L	116	100	80	116	112	76	85	76	80	72	60	72	80	68	76	92	80	76	60	116	84.3	16.4
17	Calcium	mg/L	22.45	20.04	16.03	30.46	32.64	19.24	28.05	26.05	22.04	14.42	16.3	12.82	16.03	16.03	17.63	19.23	22.44	20.84	12.82	32.64	20.71	5.58
18	Magnesium	mg/L	14.59	12.16	9.73	9.73	7.78	6.81	3.65	3.04	6.08	8.75	4.86	9.72	9.73	6.80	7.80	10.70	5.83	5.83	3.04	14.59	7.98	2.97
19	Sodium	mg/L	37.23	30.46	36.82	75.00	119.00	85.00	28.00	39.00	40.00	31.00	41.57	44.02	21.33	26.02	34.06	26.66	25.14	28.12	21.33	119	42.69	25.24
20	Potassium	mg/L	0.00	0.00	0.00	2.00	4.00	1.00	6.60	8.20	7.00	3.28	3.05	3.88	5.13	3.61	4.14	4.95	4.73	4.61	0.00	8.2	3.68	2.39
21	% Sodium	%	41.31	40.44	50.01	57.89	68.57	70.5	39.44	49.07	49.43	46.94	58.33	55.43	34.88	43.8	47.67	37.1	38.85	42.75	34.88	70.5	48.47	10.26
22	SAR	milimole/L	1.51	1.33	1.8	3.02	4.86	4.24	1.32	1.92	1.94	1.58	2.32	2.25	1.03	1.37	1.69	1.21	1.22	1.4	1.03	4.86	2.00	1.05
23	Fluoride	mg/L	0.16	0.00	0.00	0.90	1.30	1.00	0.48	0.39	0.53	0.31	0	0.59	0.70	0.50	0.16	0.45	0.39	0.42	0	1.3	0.46	0.35
24	Dissolved Oxygen	mg/L	13.64	5.12	14.81	14.62	15.97	15.17	7.3	12.5	11.8	4.77	10.27	10.45	6.55	11.26	11.56	7.38	7.74	12.57	4.77	15.97	10.70	3.64
25	Chemical Oxygen Demand	mg/L	133	183	208	189	555	577	30	59	28	21	45	57	42	49	53	44	115	111	21	577	139	166
26	BOD (3 days 27°C)	mg/L	59	69	80	70	187	201	12	21	12	8	14	18	11	16	18	12	41	40	8	201	49	58
27	Chloride as Cl ⁻	mg/L	47	45	42	77	148	82	12	28	35	15	21	20	28	20	20	43	50	44	12	148	43	33
28	Sulphate	mg/L	17	19	21	30	92	35	11	21	22	8	11	13	18	15	16	23	40	23	8	92	24	19
29	Total Organic Carbon	mg/L	35.3	49.9	57.6	37.0	116.0	98.0	46.0	70.0	40.2	24.8	11.2	11.2	15.1	22.7	23.5	8.2	9.1	10.7	8.2	116.0	38.1	31.0

Annexure – III: Physico - Chemical Parameters for Thol Wetland during the Year 2017-2018

Sr. No	Parameters	Unit	Summer - III						Monsoon - III						Winter - III						Min	Max	Yearly Average	Standard Deviation
			L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3				
1	Temperature (Ambient)	°C	38.5	32	37	28	28	29	28	31.5	31	33.8	32.5	31	20.5	25.8	26	29	32.5	32	20.5	38.5	30.3	4.2
2	Temperature (Water)	°C	29.5	28.6	30.8	24.5	25	25.8	26.5	28.8	29	29.5	28.5	28	17.5	21.5	22	27.5	29.5	30	17.5	30.8	26.8	3.5
3	pH	in pH units	7.80	7.59	7.83	7.27	7.53	7.57	7.78	7.98	7.86	7.80	8.24	8.39	8.08	8.11	8.08	7.93	8.33	8.08	7.27	8.39	7.90	0.29
4	Colour	Hazen	20	20	30	15	20	20	15	20	10	30	30	30	15	20	20	30	45	20	10	45	22.8	8.3
5	Turbidity	NTU	24.2	11.1	30.2	7.4	8.1	8.9	20.2	26.3	28	21.4	23.1	22.7	22.3	24.6	27	42	67	27	7.4	67	24.5	13.7
6	Conductivity	µs/cm	264	273	267	457	482	465	359	274	273	378	334	336	375	353	361	528	458	361	264	528	367	82
7	Total Solids	mg/L	206	186	208	236	252	246	226	148	182	272	310	278	262	260	274	358	351	274	148	358	252	55
8	Total Dissolved Solids	mg/L	182	170	166	228	246	240	206	130	156	238	250	212	242	234	244	302	267	244	130	302	220	44
9	Total Suspended Solids	mg/L	24	16	42	8	6	6	20	18	20	34	60	66	20	26	30	56	84	30	6	84	31	22
10	Ammonical Nitrogen	mg/L	0.34	0.42	0.36	0.20	0.22	0.22	1.79	1.43	1.82	0.50	0.50	0.48	0.50	0.58	0.53	0.98	0.89	0.53	0.20	1.82	0.68	0.51
11	Total Kjeldahl Nitrogen	mg/L	0.62	0.73	0.67	0.31	0.34	0.34	3.02	2.41	3.11	0.87	0.90	0.87	0.92	1.01	0.95	2.41	3.11	0.95	0.31	3.11	1.31	1.00
12	Nitrate (NO ₃ -N)	mg/L	0.156	0.176	0.232	0.076	0.068	0.088	0.096	0.108	0.12	0.143	0.132	0.12	0.084	0.076	0.097	0.08	0.092	0.097	0.068	0.232	0.113	0.042
13	Nitrite	mg/L	0.057	0.047	0.066	0.02	0.026	0.032	0.027	0.032	0.042	0.108	0.056	0.058	0.01	0.016	0.012	0.038	0.044	0.012	0.01	0.108	0.039	0.024
14	Phosphate	mg/L	0.170	0.099	0.175	0.000	0.000	0.000	0.000	0.000	0.000	0.143	0.293	0.309	0.17	0.114	0.08	0.000	0.000	0.080	0.000	0.309	0.091	0.102
15	Alkalinity as CaCO ₃	mg/L	136	132	144	131	124	130	107	74	81	119	101	101	116	115	116	117	103	116	74	144	115	18
16	Total Hardness as CaCO ₃	mg/L	98	90	90	62	82	77	110	90	80	123	88	84	104	108	102	110	70	102	62	123	93	16
17	Calcium	mg/L	25.65	22.44	18.43	19.63	22.04	20.04	28.05	24.05	16.03	28.05	24.04	22.44	28.00	32.00	26.00	28.05	16.03	26.00	16.03	32.00	23.72	4.47
18	Magnesium	mg/L	8.26	8.26	10.7	3.16	6.56	6.56	9.73	7.30	9.73	12.88	6.80	6.80	8.00	7.00	9.00	9.72	7.29	9.00	3.16	12.88	8.15	2.09
19	Sodium	mg/L	29.54	31.19	31.14	21.74	32.85	29.65	54.65	45.22	43.85	48.61	37.14	36.74	40.00	38.00	38.00	65.00	55.00	38	21.74	65	39.80	10.76
20	Potassium	mg/L	11.79	11.98	11.99	3.24	4.88	4.70	5.65	5.17	5.09	4.29	4.75	4.69	4.00	3.00	4.00	5.00	4.00	4.00	3.00	11.99	5.68	2.95
21	% Sodium	%	36.29	39.27	39.12	41.68	44.73	43.71	50.33	50.42	52.42	45.12	46.18	47.01	44.63	42.35	44.56	54.84	61.42	44.56	36.29	61.42	46.04	6.08
22	SAR	milimole/L	1.2	1.4	1.4	1.2	1.57	1.46	2.26	2.07	2.13	1.9	1.72	1.74	1.7	1.58	1.63	2.69	2.85	1.63	1.2	2.85	1.79	0.46
23	Fluoride	mg/L	0.41	0.34	0.3	0.3	0.21	0.26	0.00	0.24	0.00	0.09	0.30	0.16	0.25	0.27	0.35	0.25	0.22	0.35	0	0.41	0.24	0.11
24	Dissolved Oxygen	mg/L	7.13	3.77	8.27	3.20	4.84	5.02	1.93	4.76	2.89	7.39	9.65	10.37	7.15	9.57	6.28	9.20	13.70	6.28	1.93	13.70	6.74	3.04
25	Chemical Oxygen Demand	mg/L	60	43	68	44	18	25	57	55	65	35	68	48	63	81	59	97	116	59	18	116	59	23.55
26	BOD (3 days 27°C)	mg/L	17	14	19	12	6	9	18	16	21	9	21	12	19	26	13	28	31	21	6	31	17	6.76
27	Chloride as Cl ⁻	mg/L	42	34	29	80	65	81	60	48	66	77	89	73	64	68	63	97	73	63	29	97	65	17.94
28	Sulphate	mg/L	22	17	18	25	34	31	30	20	16	30	31	28	24	30	32	20	11	32	11	34	25	6.80
29	Total Organic Carbon	mg/L	8.9	9.9	11.7	8.2	3.5	4.4	20.6	17.1	20.8	9.4	10.3	9.9	23.4	18.1	18.2	25.7	32.1	33.2	3.5	33.2	15.86	8.84

Annexure – IV: Trace Analysis (Heavy Metals) for Thol Wetland during the Year 2016-2017 (Values in mg/L)

Sr. No	Parameters	Summer - II						Monsoon - II						Winter - II						Yearly Min	Yearly Max	Yearly Average
		L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3			
1	Cadmium	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000
2	Copper	0.000	0.000	0.000	0.082	0.075	0.062	0.003	0.004	0.000	0.019	0.003	0.004	0.003	0.003	0.004	0.002	0.001	0.002	0.000	0.082	0.015
3	Iron	0.886	0.916	0.541	0.084	0.941	0.840	0.000	0.000	0.000	0.268	0.088	0.084	0.194	0.252	0.285	0.023	0.043	0.050	0.000	0.941	0.305
4	Lead	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.001	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.009	0.001
5	Manganese	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	Nickel	0.000	0.000	0.000	0.009	0.008	0.012	0.003	0.002	0.000	0.001	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.000	0.012	0.003
7	Hexavalent Chromium	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	Total Chromium	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.003	0.000	0.000	0.002	0.002	0.003	0.001	0.000	0.001	0.000	0.003	0.001
9	Zinc	0.066	0.060	0.112	0.061	0.050	0.041	0.010	0.002	0.002	0.041	0.002	0.003	0.004	0.006	0.005	0.001	0.000	0.002	0.000	0.112	0.026

Annexure – V: Trace Analysis (Heavy Metals) for Thol Wetland during the Year 2017-2018 (Values in mg/L)

Sr. No	Parameters	Summer - III						Monsoon - III						Winter - III						Yearly Min	Yearly Max	Yearly Average
		L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3	L 1	L 2	L 3			
1	Cadmium	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.131	0.131	0.114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.131	0.021
2	Copper	0.001	0.001	0.001	0.012	0.004	0.002	0.000	0.000	0.000	0.008	0.009	0.009	0.000	0.000	0.000	0.029	0.093	0.000	0.000	0.093	0.009
3	Iron	0.034	0.019	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.031	0.048	0.060	0.141	0.000	0.800	0.507	0.520	0.800	0.000	0.800	0.166
4	Lead	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.185	0.000	0.000	0.185	0.010
5	Manganese	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	Nickel	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.140	0.000	0.000	0.140	0.008
7	Hexavalent Chromium	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	Total Chromium	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.801	0.000	0.000	0.801	0.046
9	Zinc	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.080	0.032	0.172	0.427	0.032	0.000	0.427	0.042

Annexure – VI: Saprobic (BMWP) Score and Diversity Score Card of Thol Wetland During the Study Period

Season	Location	Taxonomic Group	Taxonomic Family	Abundancy*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
Summer-I	L1	Odonata	Gomphidae	C	1	8	8						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	B	2	6	12						
		Hemiptera	Hydrometridae	B									
			Gerridae	D									
			Nepidae	B	3	5	15						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	C	1	2	2	40	8	5.00	81	139	0.58
Summer-I	L2	Odonata	Gomphidae	B	1	8	8						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	B	2	6	12						
		Hemiptera	Hydrometridae	B	1	5	5						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	35	8	4.38	59	108	0.55
Monsoon -I	L1	Odonata	Lestidae	B									
			Gomphidae	C	2	8	16						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	C	2	6	12						
		Hemiptera	Hydrometridae	C									
			Gerridae	D									
			Nepidae	B	3	5	15						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	D	1	2	2	48	9	5.33	69	114	0.61
Monsoon -I	L2	Odonata	Gomphidae	B	1	8	8						
		Mollusca	Bithynidae	C									

Season	Location	Taxonomic Group	Taxonomic Family	Abundancy*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
		Crustacea	Atydae	B	2	6	12						
		Hemiptera	Hydrometridae	B	1	5	5						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Chironomidae	D	1	2	2	33	7	4.71	60	98	0.61
Winter-I	L1	Odonata	Lestidae	B									
			Gomphidae	C	2	8	16						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	C	2	6	12						
		Hemiptera	Hydrometridae	C									
			Gerridae	D									
			Nepidae	B	3	5	15						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	D	1	2	2	48	9	5.33	105	201	0.52
Winter-I	L2	Odonata	Lestidae	B									
			Gomphidae	B	2	8	16						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	B	2	6	12						
		Hemiptera	Hydrometridae	B	1	5	5						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	43	9	4.78	81	163	0.50
Summer-II	L1	Odonata	Gomphidae	C	1	8	8						
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	C	3	6	18						
		Hemiptera	Corixidae	B									
			Hydrometridae	C									
			Gerridae	D									

Season	Location	Taxonomic Group	Taxonomic Family	Abundancy*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
			Nepidae	B									
		Ephemeroptera	Baetidae	B	5	5	25						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	C	1	2	2	56	11	5.09	79	142	0.56
Summer-II	L2	Odonata	Gomphidae	B	1	8	8						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	B	2	6	12						
		Hemiptera	Hydrometridae	B	1	5	5						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	35	8	4.38	55	109	0.50
Monsoon -II	L1	Odonata	Lestidae	B									
			Gomphidae	C	2	8	16						
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	C	3	6	18						
		Hemiptera	Corixidae	B									
			Hydrometridae	C									
			Gerridae	D									
			Belastomatidae	C									
			Nepidae	B									
		Ephemeroptera	Baetidae	B	6	5	30						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	C	1	2	2	69	13	5.31	77	111	0.69
Monsoon -II	L2	Odonata	Gomphidae	B	1	8	8						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	B	2	6	12						
		Hemiptera	Hydrometridae	B									
			Belastomatidae	C	2	5	10						

Season	Location	Taxonomic Group	Taxonomic Family	Abundancy*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	40	9	4.44	60	101	0.59
Winter-II	L1	Odonata	Lestidae	B									
			Gomphidae	C	2	8	16						
		Ephemeroptera	Caenidae	B	1	7	7						
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	D	3	6	18						
		Hemiptera	Corixidae	B									
			Hydrometridae	C									
			Gerridae	D									
			Ranatrinidae	D									
			Nepidae	B									
		Ephemeroptera	Baetidae	B	6	5	30						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	C	1	2	2	76	14	5.43	137	211	0.65
Winter-II	L2	Odonata	Lestidae	B									
			Gomphidae	B	2	8	16						
		Mollusca	Bithynidae	C									
		Crustacea	Atydae	C	2	6	12						
		Hemiptera	Hydrometridae	B									
			Ranatrinidae	C	2	5	10						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
Winter-II	L2	Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	48	10	4.80	120	170	0.71
Summer-III	L1	Odonata	Lestidae	B									
			Gomphidae	C	2	8	16						

Season	Location	Taxonomic Group	Taxonomic Family	Abundancy*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	C	3	6	18						
		Hemiptera	Corixidae	B									
			Hydrometridae	C									
			Gerridae	D									
		Ephemeroptera	Nepidae	B									
			Baetidae	B	5	5	25						
			Planorbidae	C	1	3	3						
		Diptera	Chironomidae	C	1	2	2	64	12	5.33	73	123	0.59
Summer-III	L2	Odonata	Lestidae	B									
			Gomphidae	B	2	8	16						
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	B	3	6	18						
		Hemiptera	Hydrometridae	B	1	5	5						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	49	10	4.90	59	112	0.53
Monsoon -III	L1	Odonata	Lestidae	B									
			Gomphidae	C	2	8	16						
		Plecoptera	Nemouridae	B									
		Ephemeroptera	Caenidae	B	2	7	14						
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	C	3	6	18						
		Hemiptera	Belostomatidae	B									
			Hydrometridae	C									
			Gerridae	D									

Season	Location	Taxonomic Group	Taxonomic Family	Abundancy*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
			Nepidae	B									
		Ephemeroptera	Baetidae	B	5	5	25						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	C	1	2	2	78	14	5.57	80	128	0.63
Monsoon -III	L2	Odonata	Lestidae	B									
			Gomphidae	B	2	8	16						
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	C	3	6	18						
		Hemiptera	Hydrometridae	C	1	5	5						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Syrphidae	B									
			Chironomidae	D	2	2	4	49	10	4.90	66	110	0.60
Winter-III	L1	Odonata	Lestidae	B									
			Gomphidae	C									
			Aeschidae	B	3	8	24						
		Ephemeroptera	Caenidae	B	1	7	7						
		Odonata	Coenagridae	B									
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	D	4	6	24						
		Hemiptera	Belostomatidae	B									
			Hydrometridae	C									
			Gerridae	D									
			Ranatriniidae	C									
			Nepidae	B									
		Ephemeroptera	Baetidae	B	6	5	30						
		Mollusca	Planorbidae	C	1	3	3						
		Diptera	Chironomidae	B	1	2	2	90	16	5.63	124	189	0.66

Season	Location	Taxonomic Group	Taxonomic Family	Abundance*	Total Families	BMWP Score [#]	Multiplied Score	Grand Total Multiplied Score	Grand Total Number of Families	Saprobic Score	Number of Runs	Total No of Organisms	Diversity Score
Winter-III	L2	Odonata	Gomphidae	B	2	8	16						
			Aeschidae	B									
		Odonata	Coenagridae	B									
		Mollusca	Bithynidae	C									
			Viviparidae	C									
		Crustacea	Atydae	D	4	6	24						
		Hemiptera	Hydrometridae	B									
			Ranatrinidae	C									
			Gerridae	D	3	5	15						
		Mollusca	Lymnaeidae	C									
			Planorbidae	C	2	3	6						
		Diptera	Chironomidae	C	1	2	2	63	12	5.25	103	163	0.63

*Abundance Scale: A = Single (1 Individual), B = Scarce (2-10 Individuals), C = Common (10-50 Individuals), D = Abundant (50-100 Individuals), E = Excessive (> 100 Individuals) #BMWP score card designed by CPCB

Annexure – VII: Sediment Quality of Thol Wetland during the Year 2016-2017

Sr. No	Parameters	Unit	Summer - II				Monsoon - II				Winter - II				Min Value	Max Value	Average Value
			L 1	L 2	L 1	L 2	L 1	L 2	L 1	L 2	L 1	L 2	L 1	L 2			
1	Colour	-	Blackish Brown	Blackish Brown	Blackish	Blackish	Blackish Brown	Blackish Brown	light Brown	Blackish Brown	light Brown	Blackish Brown	Light Brown	Blackish Brown			
2	pH	pH Units	7.09	7.46	7.8	7.92	7.82	6.66	7.59	7.66	8.22	7.19	7.73	6.97	6.66	8.22	7.51
3	Conductivity	µs/cm	207.0	346.0	486.0	517.0	177.2	283.0	197.0	265.0	200.0	402.0	349.0	432.0	177.2	517.0	321.8
4	Total Kjeldahl Nitrogen	%	0.11	0.15	0.22	0.21	0.09	0.14	0.11	0.14	0.04	0.26	0.10	0.62	0.04	0.62	0.18
5	Available Nitrogen	%	1.00	1.40	0.42	0.56	0.42	0.44	0.56	0.33	0.86	1.40	0.39	0.44	0.33	1.40	0.69
6	Available Phosphorous	kg/hectare	8.59	12.10	14.91	17.83	63.70	64.10	32.10	10.10	0.60	0.50	4.40	10.53	0.50	64.10	19.95
7	Organic Carbon	%	0.18	0.22	0.30	0.20	0.25	0.45	0.68	0.91	0.47	1.57	0.50	1.54	0.18	1.57	0.61
8	Organic Matter	%	0.30	0.38	0.52	0.35	0.43	0.78	1.17	1.57	0.81	2.71	0.86	2.65	0.30	2.71	1.04
9	Bulk Density	mg/m ³	1.32	1.39	1.26	1.32	1.37	1.31	1.45	1.48	1.36	1.39	1.41	1.27	1.26	1.48	1.36
10	Sodium	kg/hectare	1.4	1.9	2.8	3.8	0.3	0.6	0.5	0.6	0.3	0.9	76.2	77.5	0.3	77.5	13.9
11	Potassium	kg/hectare	1.2	1.1	1.3	1.0	1.1	1.1	0.9	0.7	0.3	0.9	100.0	100.0	0.3	100.0	17.5
12	Calcium	mg/kg	5.3	6.2	11.9	7.8	7.2	4.4	5.3	4.91	6.4	3.0	3.0	4.2	3	11.9	5.8
13	Magnesium	mg/kg	1.1	1.7	1.3	1.8	0.9	0.7	1.3	1.7	1.1	2.5	0.7	0.6	0.6	2.5	1.3

Annexure – VIII: Sediment Quality of Thol Wetland during the Year 2017-2018

Sr. No	Parameters	Unit	Summer - II				Monsoon - II				Winter - II				Min Value	Max Value	Average Value
			L 1	L 2	L 1	L 2	L 1	L 2	L 1	L 2	L 1	L 2	L 1	L 2			
1	Colour	-	Light Brown	Blackish Brown	Light Brown	Light Black	Light Brown	Light Blackish	Light Brown	Light Blackish	Light Brown	Blackish Brown	Light Brown	Light Black			
2	pH	pH Units	7.73	6.97	7.95	6.38	8.58	8.09	8.04	7.52	8.24	7.02	7.38	7.34	6.38	8.58	7.60
3	Conductivity	µs/cm	349.0	432.0	84.8	295.0	145.9	204.0	243.0	269.0	153.5	427.0	134.2	1227.0	84.8	1227	330.4
4	Total Kjeldahl Nitrogen	%	0.10	0.62	0.06	0.17	0.08	0.12	0.10	0.20	0.03	0.20	0.05	0.50	0.03	0.62	0.19
5	Available Nitrogen	%	0.39	0.44	0.25	0.56	0.56	0.56	0.14	0.42	0.28	1.68	0.33	3.73	0.14	3.73	0.78
6	Available Phosphorous	kg/hectare	4.40	10.53	14.96	11.81	4.48	4.80	5.89	10.28	45.74	49.17	3.32	1.47	1.47	49.17	13.90
7	Organic Carbon	%	0.51	1.54	0.94	1.42	0.20	0.79	0.46	2.35	0.79	1.76	0.99	2.74	0.2	2.74	1.21
8	Organic Matter	%	0.87	2.65	1.62	2.44	0.34	1.36	0.79	4.05	1.36	3.00	1.70	4.72	0.34	4.72	2.08
9	Bulk Density	mg/m ³	1.41	1.27	1.39	1.38	1.25	1.39	1.47	1.47	1.38	1.25	1.38	1.47	1.25	1.47	1.38
10	Sodium	kg/hectare	76.2	77.5	388.0	403.0	151.3	87.5	89.0	82.0	85.1	122.0	104.2	998.0	76.2	998	222.0
11	Potassium	kg/hectare	137.0	163.0	107.0	119.0	110.0	116.0	128.0	35.4	176.0	206.5	178.4	694.3	35.4	694.3	180.9
12	Calcium	mg/kg	3.0	4.2	3.5	3.3	9.1	4.6	4.0	2.3	5.6	3.2	3.0	9.0	2.3	9.1	4.6
13	Magnesium	mg/kg	0.7	0.6	0.3	0.4	2.0	1.9	1.1	1.4	0.6	1.9	1.8	6.0	0.3	6	1.5

Annexure – IX: Gross Primary Productivity and Photosynthesis Respiration Ratio of Thol Wetland During the Study Period (2015-2018)

Season	Location	Incubation Time in Hrs	Initial DO	Final Light Bottle DO mg/l	Final Dark Bottle DO mg/l	Net Oxygen Production mg/l	Oxygen Consumed by Community Respiration mg/l	Total Dissolved Oxygen Production mg/l	Total Carbon Production mgC/l	Carbon Production Rate mgC/l/hr	Total Daily Productivity gC/m ² /d	Photosynthesis – Respiration Ratio	Temperature °C (Ambient)	Temperature °C (Water)	Approximate Average Depth (ft)	Light Penetration - Sacchi Disc Depth (ft)	Colour of water body - Visual appearance	General Weather Conditions
Summer-I	L1	3	12.600	14.210	10.340	1.61	2.26	3.87	1.451	0.484	11.61	0.642	35.0	29.0	2.2	0.7	Turbid with Green tint. (rich phytoplankton growth)	Clear, high sun intensity
Summer-I	L3	6	14.680	16.060	8.810	1.38	5.87	7.25	2.719	0.453	10.88	0.463	36.0	29.5	2.5	1.5	Turbid with Green tint. (rich phytoplankton growth)	Clear, high sun intensity
Monsoon-I	L1	3	8.600	8.950	7.780	0.35	0.82	1.17	0.439	0.146	3.51	0.535	28.0	26.5	4.5	1.0	Colourless and clean.	Cloudy, occasional rain showers, intermittent low sun intensity.
Monsoon-I	L3	6	8.890	8.960	6.790	0.07	2.1	2.17	0.814	0.136	3.26	0.388	31.0	27.0	6.0	1.3	Colourless and clean.	Cloudy, occasional rain showers, intermittent low sun intensity.
Winter-I	L1	3	4.575	5.850	4.190	1.275	0.385	1.66	0.623	0.208	4.98	1.617	25.6	19.0	4.5	1.5	Light green. (phytoplankton growth)	Clear with moderate sun intensity.
Winter-I	L3	6	11.400	13.430	7.900	2.03	3.5	5.53	2.074	0.346	8.30	0.593	30.0	25.0	5.0	1.5	Light green. (due to phytoplankton growth)	Clear, moderate sun intensity.
Summer-II	L1	3	13.640	17.035	12.885	3.395	0.755	4.15	1.556	0.519	12.45	2.061	35.5	28.0	2.3	1.0	Greenish. (rich phytoplankton growth)	Clear, high sun intensity
Summer-II	L3	6	14.810	16.065	10.810	1.255	4.0	5.255	1.971	0.328	7.88	0.493	31.0	29.5	2.5	1.0	Greenish. (rich phytoplankton growth)	Clear, high sun intensity
Monsoon-II	L1	3	7.300	6.225	6.125	-1.075	1.175	0.1	0.037	0.013	0.30	0.032	29.0	26.5	5.0	2.0	Colourless and clean.	Cloudy, occasional rain showers of several minutes, intermittent low sun intensity.
Monsoon-II	L3	6	11.800	12.110	9.970	0.31	1.83	2.14	0.803	0.134	3.21	0.439	31.0	27.0	6.5	2.0	Colourless and clean.	Cloudy, occasional rain showers of several minutes, intermittent low sun intensity.

Season	Location	Incubation Time in Hrs	Initial DO	Final Light Bottle DO mg/l	Final Dark Bottle DO mg/l	Net Oxygen Production mg/l	Oxygen Consumed by Community Respiration mg/l	Total Dissolved Oxygen Production mg/l	Total Carbon Production mgC/l	Carbon Production Rate mgC/l/hr	Total Daily Productivity gC/m ³ /d	Photosynthesis – Respiration Ratio	Temperature °C (Ambient)	Temperature °C (Water)	Approximate Average Depth (ft)	Light Penetration - Sacchi Disc Depth (ft)	Colour of water body -Visual appearance	General Weather Conditions
Winter-II	L1	4	6.550	6.925	6.390	0.375	0.16	0.535	0.201	0.050	1.20	1.254	21.5	18.0	4.7	1.3	Light green. (phytoplankton growth)	Clear, moderate sun intensity.
Winter-II	L3	6.5	11.560	13.430	10.900	1.87	0.66	2.53	0.949	0.146	3.50	1.438	27.0	19.5	5.0	1.2	Light green. (phytoplankton growth)	Clear, moderate sun intensity.
Summer-III	L1	3	7.130	8.590	5.840	1.46	1.29	2.75	1.031	0.344	8.25	0.799	38.5	29.5	2.0	0.5	Turbid with Green tint. (rich phytoplankton growth)	Clear, high sun intensity
Summer-III	L3	6	8.270	11.065	4.910	2.795	3.36	6.155	2.308	0.385	9.23	0.687	37.0	30.5	2.4	1.5	Slight Turbid with Green tint. (rich phytoplankton growth)	Clear, high sun intensity
Monsoon-III	L1	3	1.930	1.900	1.610	-0.03	0.32	0.29	0.109	0.036	0.87	0.340	28.0	26.5	4.8	1.0	Colourless and clean.	Cloudy, occasional rain showers of several minutes, intermittent low sun intensity.
Monsoon-III	L3	6	2.890	4.120	2.270	1.23	0.62	1.85	0.694	0.116	2.78	1.119	31.0	29.0	6.3	1.2	Colourless and clean.	Cloudy, occasional rain showers of several minutes, intermittent low sun intensity.
Winter-III	L1	3	7.150	8.020	6.110	0.87	1.04	1.91	0.716	0.239	5.73	0.689	20.5	17.5	4.3	1.4	Light green. (phytoplankton growth)	Clear, moderate sun intensity.
Winter-III	L3	6	6.280	8.760	5.930	2.48	0.35	2.83	1.061	0.177	4.25	3.032	26.0	22.0	4.9	1.2	Light green. (phytoplankton growth)	Clear, moderate sun intensity.