

Report on Water quality of river Yamuna Pre and Post Idol Immersion (Ganesh Chaturthi)

**(Follow-up action as per Minutes of the Meeting held on 28.08.2018
by the Monitoring Committee constituted by Hon'ble NGT in the
matter of O.A. 06 of 2012 in the matter of Manoj Mishra Vs Union of
India & Ors.)**



Central Pollution Control Board

(Ministry of Environment, Forest & Climate Change, Govt. of India)

Parivesh Bhawan, East Arjun Nagar,

Delhi – 110032

Year - 2018

Water quality of River Yamuna - Pre and Post Idol Immersion (Ganesh Chaturthi)

In compliance of Hon'ble Monitoring Committee constituted by Hon'ble NGT in the matter of O.A. 06 of 2012 in the matter of Manoj Mishra Vs Union of India & Ors held on 28.08.2018, CPCB conducted water quality assessment of Upstream and Downstream of 10 Ghats on river Yamuna for pre Ganesh Chaturthi Idol immersion activity on 11.09.2018 and post immersion activity on 24.09.2018 and 25.09.2018.

Water quality with respect to physicochemical parameters and heavy metals was assessed. Assessment revealed that before Immersion activity, water quality was not conforming to the Primary Water Quality Criteria for Bathing. Post immersion activity, water quality remained as non-conforming to the criteria and further deteriorated significantly. The locational site details are given in **Annexure I**.

Pre Idol Immersion (11/9/2018)

- I. Analysis results of Physicochemical parameters are in the range of DO (0.6 – 7.1 mg/l); pH(7.1 – 7.8); Conductivity (277 - 889 μ mho/cm); TDS (142 - 492 mg/l), Turbidity (16 – 46 NTU), COD (9 - 36 mg/l), BOD (1 - 10 mg/l)
- II. Analysis results of Heavy Metals are in the range of As (BDL – 0.01mg/l), Cd (BDL), Cr (BDL-0.12mg/l), Cu (BDL-0.04mg/l), Fe (0.27-26.37mg/l), Ni (BDL-0.03mg/l), Pb (BDL-0.02mg/l), Zn (BDL-0.08mg/l) and Hg (BDL)

Post Idol Immersion (24/9/2018 – 25/9/2018)

- III. Analysis results of Physicochemical parameters are in the range of DO (0.6 – 6.7 mg/l); pH (7.2 – 8); Conductivity (171 - 1620 μ mho/cm); TDS (96 - 1182 mg/l), Turbidity (5 – 50 NTU), COD (18 – 172 mg/l), BOD (1 - 63 mg/l)
- IV. Analysis results of Heavy Metals are in the range of As (BDL - 0.04mg/l), Cd (BDL), Cr (BDL - 0.41mg/l), Cu (BDL - 0.2mg/l), Fe (0.41 - 99.54mg/l), Ni (BDL -0.11mg/l), Pb (BDL - 0.26mg/l), Zn (BDL - 0.35mg/l), Hg (BDL – 0.00162 mg/l)

Assessment of Water Quality in the pre and post immersion of Idols revealed that pH did not change significantly and remain complying at all the ghats. Dissolved Oxygen depleted on all ghats and remained non-complying. Biochemical Oxygen Demand (BOD) did not meet the criteria and increased at all ghats except Ram Ghat.

During Pre Idol Immersion, no exceedance observed for 5 Heavy metals - As, Cd, Cu, Zn, Hg. During Post immersion, no exceedance observed for 2 Heavy metals - Cd and Zn.

Arsenic was found within BIS limits at all ghats on Pre Immersion however post immersion exceeded at 8 ghats (except Kali and Ram Ghat). On Pre immersion, the exceedance of total Cr was found at 2 locations whereas, post immersion, exceeded at 15 locations. On Pre Immersion Copper has not exceeded at all locations however post immersion exceeded the BIS limit at 10 locations. It was revealed that Fe has exceeded at all locations except one (U/s Kali Ghat) on pre-immersion while exceeded at all locations on post immersion. On Pre event, Ni was exceeded at 5 locations and post immersion at 16 locations (except Kali and Ram Ghat). On Pre event Pb exceeded at 4 locations while post immersion at 16 locations (except Kali and Ram Ghat). On Pre Immersion Mercury was not detected at any location however post immersion Mercury was detected and exceeded at 3 locations at D/s of 3 ghats (Shyam ghat, Geeta Colony ghat & Kalindi Ghat). Refer **Annexure II** for comparison of pre and post analysis (Fig 1-8) and **Annexure III** is given at plate no 1-19. The analysis results of samples collected for Physico-chemical and Heavy metals are given in **Annexure IV**.

Findings

- i) The impact of Immersion activities was evident at most of the ghats monitored.
- ii) During pre and post idol immersion of Ganesh Chaturthi, the organic pollution such as BOD is overall increased due to human influence and puja ingredients.
- iii) Concentration of heavy metals increased in the river due to immersion of painted/polished idols with metallic ornaments and shiny materials. During post immersion, Arsenic increased from the BIS limit (0.01 mg/l) by 3 times; Chromium increased from the BIS limit (0.05 mg/l) by 2.8 times; Copper concentration increased from BIS limit (0.05 mg/l) by 1.6 times; Iron concentration increased from BIS limit (0.3 mg/l) by 331 times; Lead increased from BIS limit (0.01 mg/l) to 25 times; Nickel

increased from BIS limit (0.02 mg/l) to 4 times and Mercury increased from BIS limit (0.001 mg/l) by 0.6 times in the River Yamuna.

The above findings revealed that the Yamuna River water is not fit for drinking and bathing purposes in Delhi stretch.

Recommendations

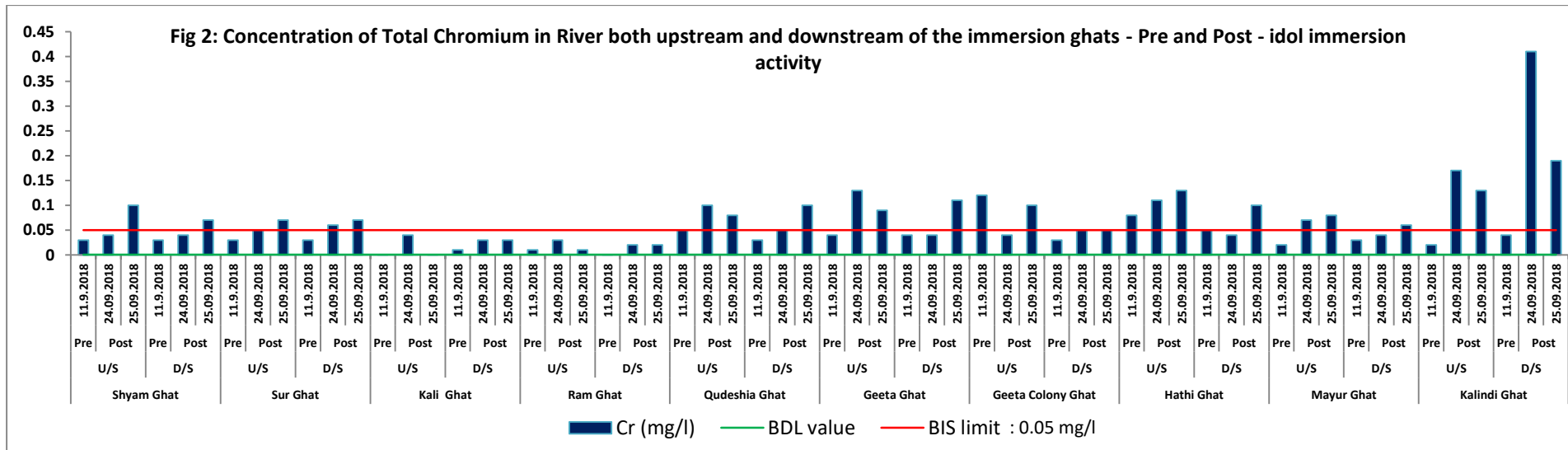
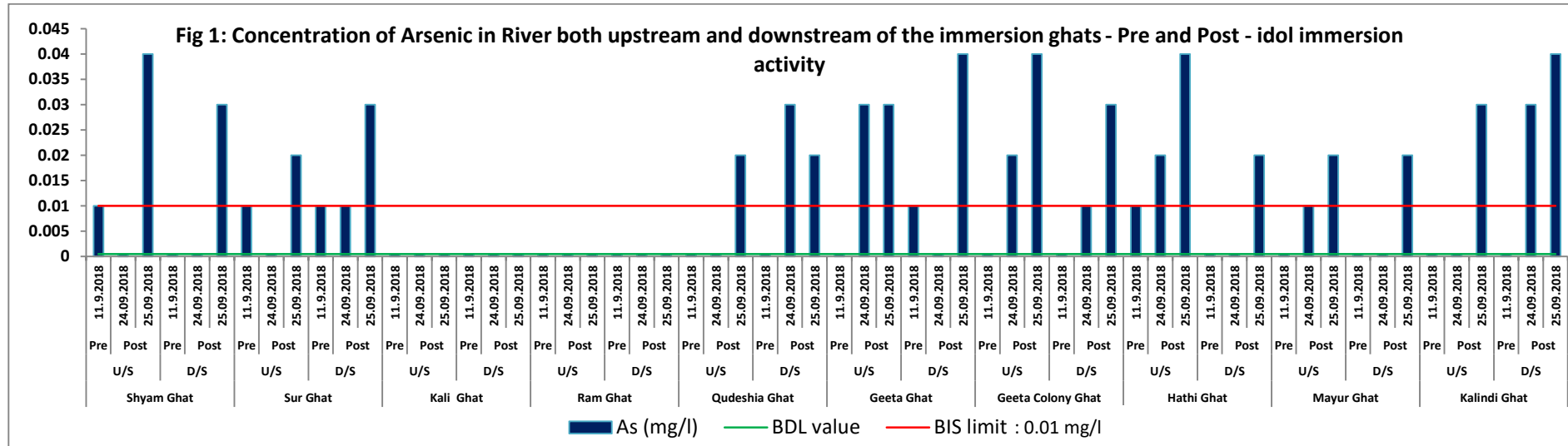
- i) Plaster of Paris (PoP) based idols should be discouraged.
- ii) Proper collection of flowers and other Pooja material after idol immersion activity should be taken up.
- iii) Temporary ponds having earthen bunds along river bank should be created as idol immersion spots.
- iv) Removable synthetic liner may be placed well in advance in bottom of pond. The said liner along with remains of idols should be removed from the point within 48 hours of immersion of idols.

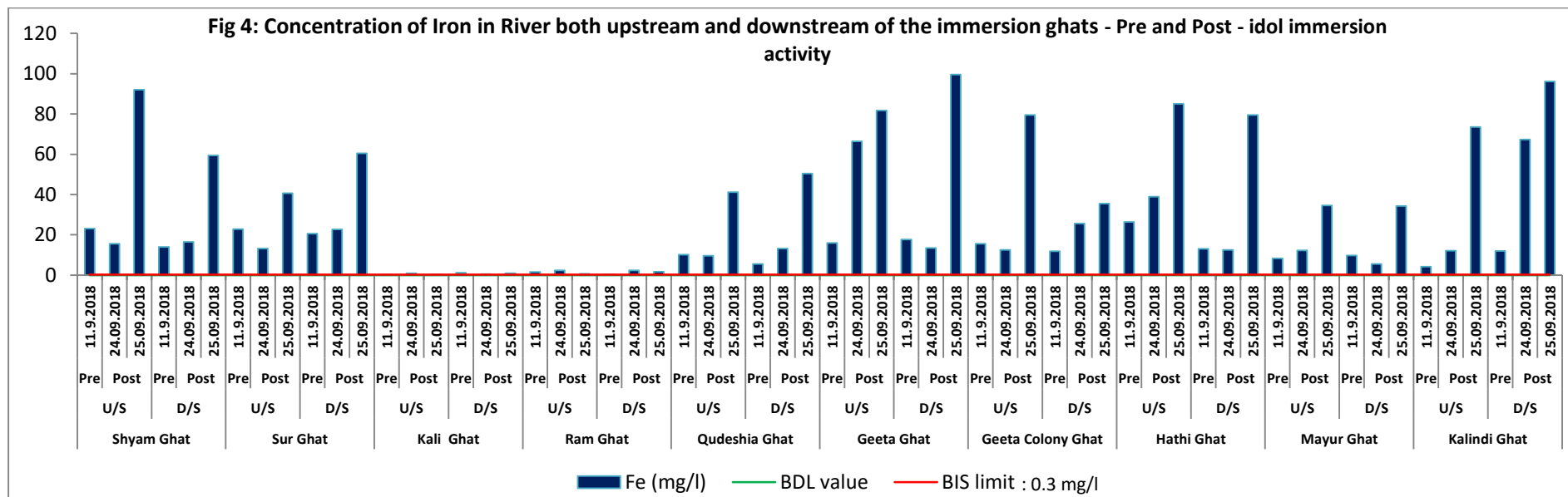
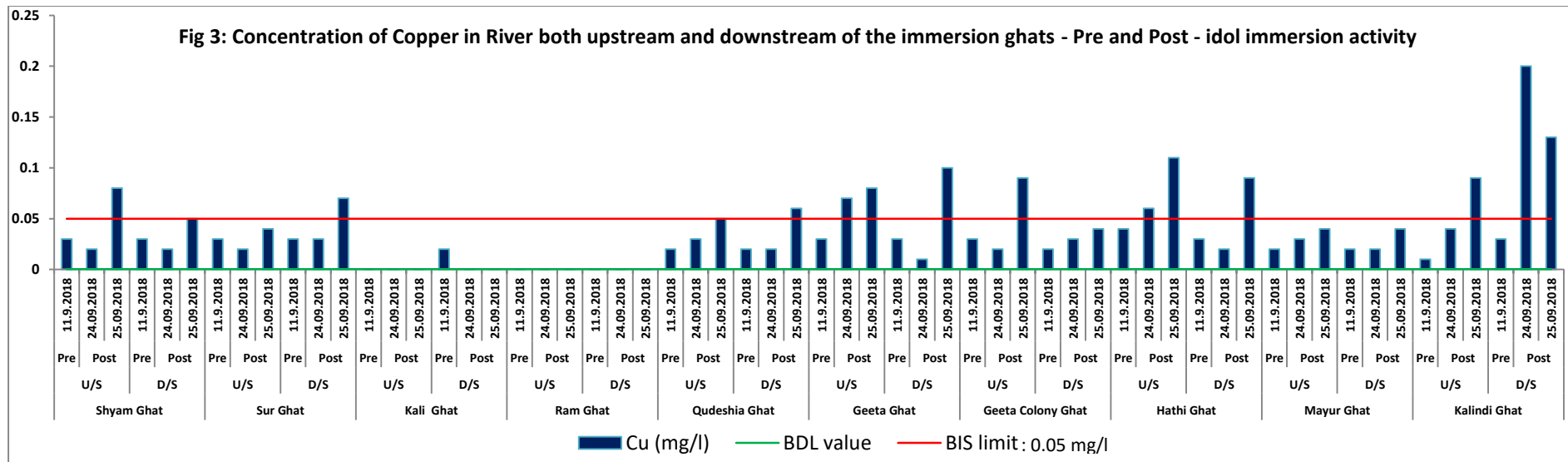
The above recommendations shall be followed by Urban local bodies (ULBs)/ Authorities as per the CPCB guidelines on Idol immersion, June 2010.

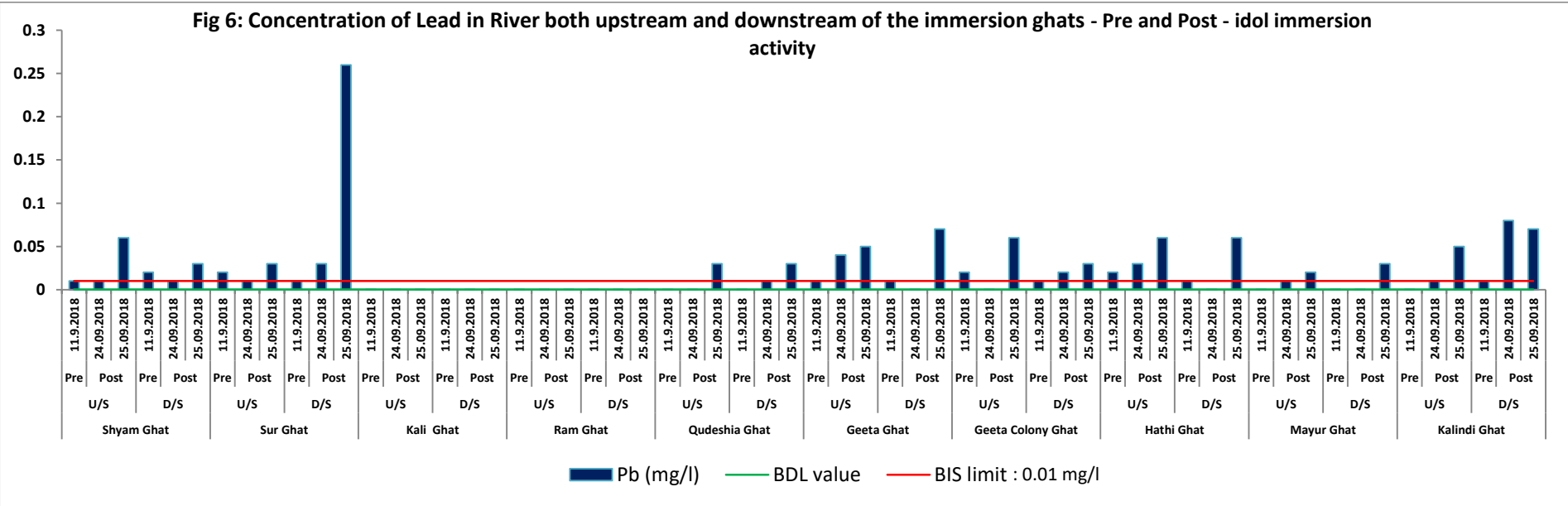
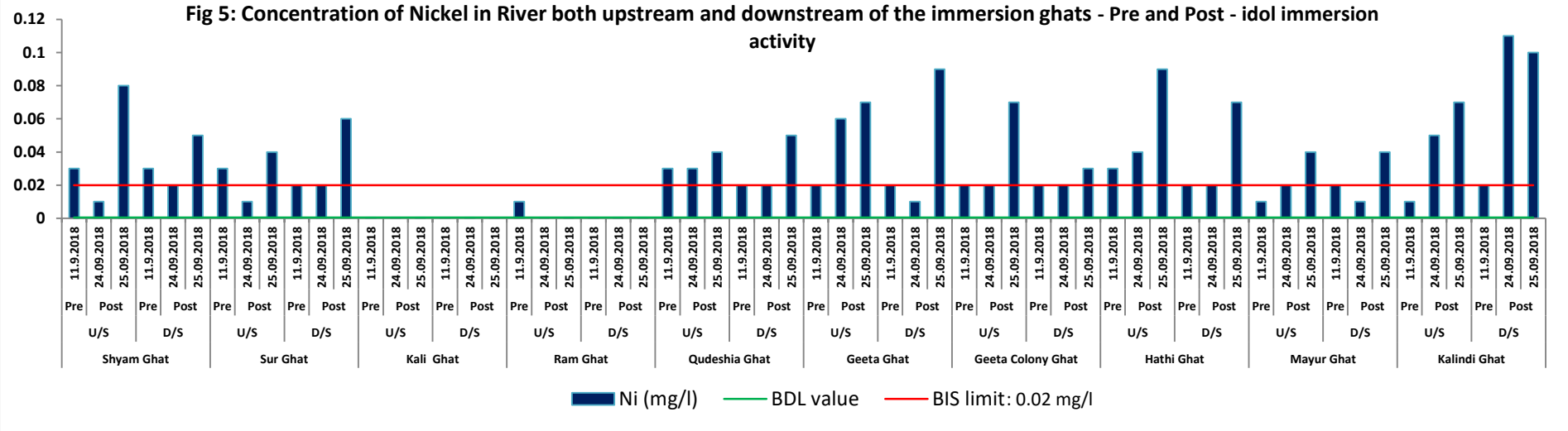
Sampling locations & Co-ordinates-----Annexure I

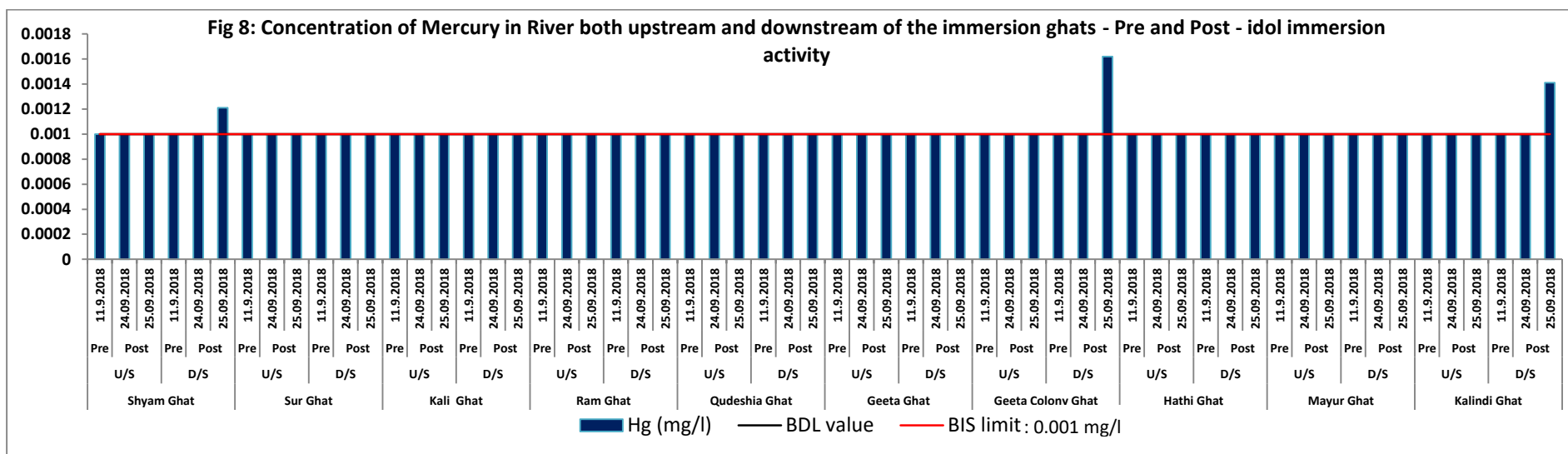
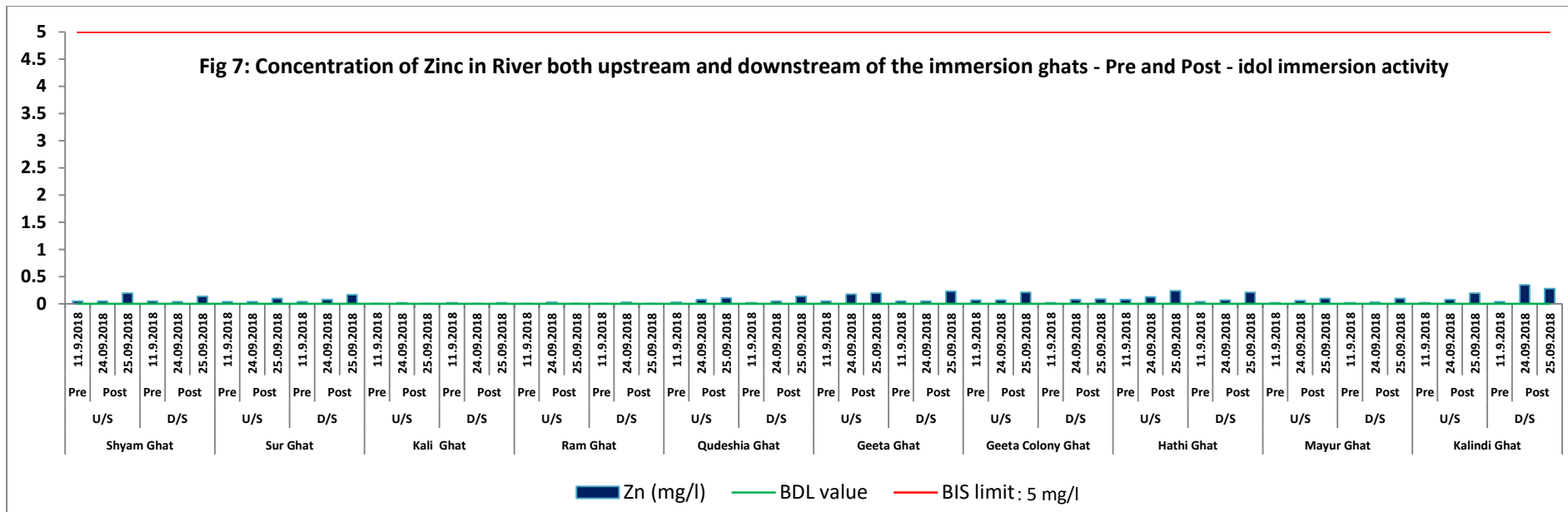
S.N	Location	Latitude	Longitude	Dates of Monitoring		Parameters monitored
				Pre-immersion	Post-immersion	
1	Shyam Ghat	28.743907 N	77.226647 E	11.9.2018	24.9.2018 and 25.9.2018	pH, Conductivity, $\mu\text{mho/cm}$ Turbidity, NTU COD, mg/L BOD, mg/l Total Dissolved Solids, mg/L Total Fixed Dissolved Solids, mg/L Total suspended Solids, mg/L Total Solids, mg/L DO, mg/l Arsenic, mg/L Cadmium, mg/L Copper, mg/L Lead, mg/L Chromium (Total) , mg/L Nickel, mg/L Zinc, mg/L Iron (Total) , mg/L Mercury, mg/L
2	Sur Ghat	28.7393084 N	77.2269857 E			
3	Kali Ghat	28.7226842 N	77.2311444 E			
4	Ram Ghat	28.720687 N	77.231548 E			
5	Qudeshia Ghat	28.672393 N	77.232467 E			
6	Geeta Ghat	28.652827 N	77.263333 E			
7	Geeta Colony Ghat	28.650566 N	77.264114 E			
8	Hathi Ghat	28.627534 N	77.253431 E			
9	Mayur Vihar Ghat	28.5843163 N	77.2877548 E			
10	Kalindi Ghat	28.5439313 N	77.3129293 E			

Heavy metals – trend in Pre and post immersion results-----Annexure II









Pictures of sampling locations-----Annexure III

1. Shyam Ghat, U/s and D/s



2. Sur Ghat, U/s and D/s



3. Kali Ghat, U/s and D/s



4. Ram Ghat, U/s and D/s



5. Qudesia Ghat, U/s and D/s



6. Geeta Ghat, U/s and D/s



7. Geeta Colony Ghat, U/s and D/s



8. Hathi Ghat, U/s and D/s



9. Kalindi Ghat, U/s and D/s



10. Mayur Vihar Ghat, U/s and D/s



Analysis Results-----Annexure IV

Analysis results of samples of River Yamuna water for both on upstream and downstream of the immersion ghats carried out during pre and post idol immersion activity in Sept, 2018 are tabulated in table 1 (i – iii) for Physicochemical parameters and table 2 (i – iii) for Heavy metals.

Analysis results (Physico-chemical parameters) of samples of River water both upstream and downstream of the immersion ghats of pre and post idol immersion activity

Table 1 (i) - Analysis results (Physico-chemical parameters) of samples of River water both upstream and downstream of the immersion ghats of pre - idol immersion activity (11.9.2018)													
Water Quality parameters				Dissolved Oxygen (mg/l)	pH	Conductivity (µmho/cm)	TDS (mg/l)	TSS (mg/l)	TFDS (mg/l)	TS (mg/l)	Turbidity (mg/l)	COD (mg/l)	BOD (mg/l)
S No	Sampling point	U/S or D/S	Date										
Primary water quality criteria for Bathing:				>5 mg/l	6.5-8.5								<3 mg/l
BIS IS 10500 : 2012 Drinking water Standards:							<500 mg/l						
1	Shyam Ghat	U/S	11.9.2018	6.8	7.7	279	172	467	160	641	30	14	1
2		D/S	11.9.2018	6.5	7.7	278	152	345	146	497	26	15	1
3	Sur Ghat	U/S	11.9.2018	7.1	7.8	278	150	456	144	606	25	11	1
4		D/S	11.9.2018	7	7.8	277	142	393	140	535	20	10	1
5	Kali Ghat	U/S	11.9.2018	1.4	7.1	445	236	BDL	224	237	30	18	3
6		D/S	11.9.2018	1.9	7.1	458	234	34	226	268	30	19	2
7	Ram Ghat	U/S	11.9.2018	1.1	7.1	475	306	47	290	353	36	25	4
8		D/S	11.9.2018	1.5	7.2	506	266	33	252	299	32	20	4
9	Qudeshia Ghat	U/S	11.9.2018	0.6	7.1	889	484	189	470	673	40	27	8
10		D/S	11.9.2018	0.8	7.2	876	492	121	480	613	46	25	6
11	Geeta Ghat	U/S	11.9.2018	4.7	7.4	419	230	351	220	581	18	13	4
12		D/S	11.9.2018	4.8	7.4	418	214	461	204	675	16	17	5
13	Geeta Colony Ghat	U/S	11.9.2018	5.1	7.4	422	226	375	218	601	22	15	3
14		D/S	11.9.2018	5	7.5	404	222	346	214	568	16	9	3
15	Hathi Ghat	U/S	11.9.2018	1	7.4	614	392	758	374	1150	36	36	10
16		D/S	11.9.2018	1.1	7.2	612	346	355	326	701	32	32	6
17	Mayur Ghat	U/S	11.9.2018	2.9	7.4	451	346	204	320	550	30	23	5
18		D/S	11.9.2018	4.3	7.4	445	392	288	376	680	36	28	1
19	Kalindi Ghat	U/S	11.9.2018	3.2	7.4	489	264	105	248	369	20	10	4
20		D/S	11.9.2018	6.4	7.5	510	266	264	250	530	24	16	5

Pre Immersion:

- No exceedance observed in pH, TDS
- DO not meeting the criteria at 13 locations
- BOD not meeting the criteria at 11 locations

Table 1 (ii) - Analysis results (Physico-chemical parameters) of samples of River water both upstream and downstream of the immersion ghats of post idol immersion activity (24.9.2018)													
Water Quality parameters				Dissolved Oxygen (mg/l)	pH	Conductivity (µmho/cm)	TDS (mg/l)	TSS (mg/l)	TFDS (mg/l)	TS (mg/l)	Turbidity (mg/l)	COD (mg/l)	BOD (mg/l)
S No	Sampling point	U/S or D/S	Date										
Primary water quality criteria for Bathing:				>5 mg/l	6.5-8.5								<3 mg/l
BIS IS 10500 : 2012 Drinking water Standards:							<500 mg/l						
1	Shyam Ghat	U/S	24.9.2018	4.9	7.9	651	434	349	420	783	15	20	4
2		D/S	24.9.2018	4.7	7.9	390	256	606	248	862	20	24	5
3	Sur Ghat	U/S	24.9.2018	4.5	7.8	366	250	1172	242	1422	30	32	6
4		D/S	24.9.2018	4.6	7.9	740	488	495	472	983	20	24	5
5	Kali Ghat	U/S	24.9.2018	1.7	7.2	390	260	28	250	288	10	19	3
6		D/S	24.9.2018	1.7	7.7	380	240	8	232	248	5	21	2
7	Ram Ghat	U/S	24.9.2018	1.5	8	393	264	75	254	339	10	20	2
8		D/S	24.9.2018	1.6	7.3	392	270	33	258	303	6	21	3
9	Qudeshia Ghat	U/S	24.9.2018	1.9	7.3	1224	754	207	740	961	15	55	20
10		D/S	24.9.2018	1.4	7.2	1620	1182	218	1132	1400	20	172	63
11	Geeta Ghat	U/S	24.9.2018	3.8	7.8	436	306	1608	300	1914	40	35	7
12		D/S	24.9.2018	3.8	7.9	444	310	291	290	601	16	18	4
13	Geeta Colony Ghat	U/S	24.9.2018	3.6	7.5	482	314	1087	300	1401	40	27	6
14		D/S	24.9.2018	3.5	7.9	484	312	804	302	1116	20	20	3
15	Hathi Ghat	U/S	24.9.2018	2.3	7.5	755	480	1097	464	1577	30	53	14
16		D/S	24.9.2018	1.8	7.5	766	508	315	500	823	15	29	6
17	Mayur Ghat	U/S	24.9.2018	0.7	7.5	688	480	204	470	684	20	31	7
18		D/S	24.9.2018	1.2	7.4	883	570	173	558	743	20	28	4
19	Kalindi Ghat	U/S	24.9.2018	1.7	7.4	874	576	292	550	868	16	65	12
20		D/S	24.9.2018	3.6	7.5	922	640	883	610	1523	30	98	21

Post Immersion (24.9.2018):

- No exceedance observed in pH
- DO not meeting the criteria at all locations
- TDS not meeting the criteria at 6 locations
- BOD not meeting the criteria at 15 locations

Table 1 (iii) - Analysis results (Physico-chemical parameters) of samples of River water both upstream and downstream of the immersion ghats of post idol immersion activity (25.9.2018)													
Water Quality parameters				Dissolved Oxygen (mg/l)	pH	Conductivity (µmho/cm)	TDS (mg/l)	TSS (mg/l)	TFDS (mg/l)	TS (mg/l)	Turbidity (mg/l)	COD (mg/l)	BOD (mg/l)
S No	Sampling point	U/S or D/S	Date										
Primary water quality criteria for Bathing:				>5 mg/l	6.5-8.5								<3 mg/l
BIS IS 10500 : 2012 Drinking water Standards:							<500 mg/l						
1	Shyam Ghat	U/S	25.9.2018	6.7	7.7	240	140	1721	136	1861	40	54	5
2		D/S	25.9.2018	5.7	7.8	171	96	1197	88	1293	36	26	1
3	Sur Ghat	U/S	25.9.2018	6.4	7.9	241	116	1400	108	1516	40	29	2
4		D/S	25.9.2018	5	7.3	292	180	1319	168	1499	40	66	7
5	Kali Ghat	U/S	25.9.2018	0.9	7.2	405	316	31	302	347	10	25	4
6		D/S	25.9.2018	0.6	7.2	417	304	18	292	322	10	24	4
7	Ram Ghat	U/S	25.9.2018	0.7	7.2	415	302	23	290	325	6	23	3
8		D/S	25.9.2018	0.7	7.2	405	284	16	270	300	8	52	4
9	Qudeshia Ghat	U/S	25.9.2018	4.4	7.7	331	216	1341	208	1557	30	41	5
10		D/S	25.9.2018	4	7.3	503	332	1269	308	1601	30	103	12
11	Geeta Ghat	U/S	25.9.2018	6	7.9	210	144	1750	140	1894	35	49	2
12		D/S	25.9.2018	6	7.8	202	160	1817	148	1977	35	47	3
13	Geeta Colony Ghat	U/S	25.9.2018	5.8	7.8	221	144	2894	136	3038	50	63	3
14		D/S	25.9.2018	5.9	7.8	213	144	1234	136	1378	30	37	5
15	Hathi Ghat	U/S	25.9.2018	4.4	7.7	265	164	3640	148	3804	30	91	7
16		D/S	25.9.2018	4.7	7.7	256	184	2766	172	2950	30	80	6
17	Mayur Ghat	U/S	25.9.2018	4.5	7.7	405	224	756	200	980	36	26	2
18		D/S	25.9.2018	4.8	7.6	246	180	1225	172	1405	40	36	2
19	Kalindi Ghat	U/S	25.9.2018	3.8	7.5	417	200	2220	192	2420	40	66	5
20		D/S	25.9.2018	5.6	7.6	415	212	1698	196	1910	40	54	5

Post Immersion (25.9.2018):

- No exceedance observed in pH & TDS
- DO not meeting the criteria at 11 locations
- BOD not meeting the criteria at 12 locations

Analysis results (Heavy metals) of samples of River water both upstream and downstream of the immersion ghats of pre and post idol immersion activity

Table 2 (i) - Analysis results (Heavy metals) of samples of River water both upstream and downstream of the immersion ghats of pre - idol immersion activity (11.9.2018)												
Water Quality parameter				As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Ni (mg/l)	Pb (mg/l)	Zn (mg/l)	Hg (mg/l)
S. no.	Sampling point	U/S or D/S	Date									
BIS IS 10500 : 2012 Drinking water Standards:				0.01	0.003	0.05	0.05	0.3	0.02	0.01	5	0.001
1	Shyam Ghat	U/S	11.9.2018	0.01	BDL	0.03	0.03	23.09	0.03	0.01	0.05	BDL
2		D/S	11.9.2018	BDL	BDL	0.03	0.03	13.98	0.03	0.02	0.05	BDL
3	Sur Ghat	U/S	11.9.2018	0.01	BDL	0.03	0.03	22.83	0.03	0.02	0.04	BDL
4		D/S	11.9.2018	0.01	BDL	0.03	0.03	20.62	0.02	0.01	0.04	BDL
5	Kali Ghat	U/S	11.9.2018	BDL	BDL	BDL	BDL	0.27	BDL	BDL	BDL	BDL
6		D/S	11.9.2018	BDL	BDL	0.01	0.02	1.12	BDL	BDL	0.02	BDL
7	Ram Ghat	U/S	11.9.2018	BDL	BDL	0.01	BDL	1.51	0.01	BDL	BDL	BDL
8		D/S	11.9.2018	BDL	BDL	BDL	BDL	0.4	BDL	BDL	BDL	BDL
9	Qudeshia Ghat	U/S	11.9.2018	BDL	BDL	0.05	0.02	10.19	0.03	BDL	0.03	BDL
10		D/S	11.9.2018	BDL	BDL	0.03	0.02	5.55	0.02	BDL	0.02	BDL
11	Geeta Ghat	U/S	11.9.2018	BDL	BDL	0.04	0.03	15.95	0.02	0.01	0.05	BDL
12		D/S	11.9.2018	0.01	BDL	0.04	0.03	17.75	0.02	0.01	0.05	BDL
13	Geeta Colony Ghat	U/S	11.9.2018	BDL	BDL	0.12	0.03	15.62	0.02	0.02	0.07	BDL
14		D/S	11.9.2018	BDL	BDL	0.03	0.02	11.88	0.02	0.01	0.02	BDL
15	Hathi Ghat	U/S	11.9.2018	0.01	BDL	0.08	0.04	26.37	0.03	0.02	0.08	BDL
16		D/S	11.9.2018	BDL	BDL	0.05	0.03	13.06	0.02	0.01	0.04	BDL
17	Mayur Ghat	U/S	11.9.2018	BDL	BDL	0.02	0.02	8.29	0.01	BDL	0.02	BDL
18		D/S	11.9.2018	BDL	BDL	0.03	0.02	9.76	0.02	BDL	0.02	BDL
19	Kalindi Ghat	U/S	11.9.2018	BDL	BDL	0.02	0.01	4.17	0.01	BDL	0.02	BDL
20		D/S	11.9.2018	BDL	BDL	0.04	0.03	12.03	0.02	0.01	0.04	BDL

BDL- Below Detection Limit

Detection limit ($\mu\text{g/l}$): As-0.49, Cd-0.42, Cr-0.56, Cu-0.35, Fe-0.67, Ni-0.54, Pb-0.31, Zn-0.59 & Hg-1.0

Pre Immersion:

- No exceedance observed in 5 Heavy metals - As, Cd, Cu, Zn, Hg
- Exceedances (in 4 metals): Cr- 2 locations
 Fe- all locations except one
 Ni- 5 locations
 Pb – 4 locations

Table 2 (ii) - Analysis results (Heavy metals) of samples of River water both upstream and downstream of the immersion ghats of post - idol immersion activity (24.9.2018)												
Water Quality parameter				As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Ni (mg/l)	Pb (mg/l)	Zn (mg/l)	Hg (mg/l)
S. no.	Sampling point	U/S or D/S	Date									
BIS IS 10500 : 2012 Drinking water Standards:				0.01	0.003	0.05	0.05	0.3	0.02	0.01	5	0.001
1	Shyam Ghat	U/S	24.09.2018	BDL	BDL	0.04	0.02	15.59	0.01	0.01	0.05	BDL
2		D/S	24.09.2018	BDL	BDL	0.04	0.02	16.45	0.02	0.01	0.04	BDL
3	Sur Ghat	U/S	24.09.2018	BDL	BDL	0.05	0.02	13.22	0.01	0.01	0.04	BDL
4		D/S	24.09.2018	0.01	BDL	0.06	0.03	22.66	0.02	0.03	0.08	BDL
5	Kali Ghat	U/S	24.09.2018	BDL	BDL	0.04	BDL	0.92	BDL	BDL	0.02	BDL
6		D/S	24.09.2018	BDL	BDL	0.03	BDL	0.51	BDL	BDL	BDL	BDL
7	Ram Ghat	U/S	24.09.2018	BDL	BDL	0.03	BDL	2.36	BDL	BDL	0.03	BDL
8		D/S	24.09.2018	BDL	BDL	0.02	BDL	2.36	BDL	BDL	0.03	BDL
9	Qudeshia Ghat	U/S	24.09.2018	BDL	BDL	0.1	0.03	9.66	0.03	BDL	0.08	BDL
10		D/S	24.09.2018	0.03	BDL	0.05	0.02	13.15	0.02	0.01	0.05	BDL
11	Geeta Ghat	U/S	24.09.2018	0.03	BDL	0.13	0.07	66.44	0.06	0.04	0.18	BDL
12		D/S	24.09.2018	BDL	BDL	0.04	0.01	13.49	0.01	BDL	0.05	BDL
13	Geeta Colony Ghat	U/S	24.09.2018	0.02	BDL	0.04	0.02	12.49	0.02	BDL	0.07	BDL
14		D/S	24.09.2018	0.01	BDL	0.05	0.03	25.65	0.02	0.02	0.08	BDL
15	Hathi Ghat	U/S	24.09.2018	0.02	BDL	0.11	0.06	39	0.04	0.03	0.13	BDL
16		D/S	24.09.2018	BDL	BDL	0.04	0.02	12.49	0.02	BDL	0.07	BDL
17	Mayur Ghat	U/S	24.09.2018	0.01	BDL	0.07	0.03	12.28	0.02	0.01	0.06	BDL
18		D/S	24.09.2018	BDL	BDL	0.04	0.02	5.49	0.01	BDL	0.03	BDL
19	Kalindi Ghat	U/S	24.09.2018	BDL	BDL	0.17	0.04	12.09	0.05	0.01	0.08	BDL
20		D/S	24.09.2018	0.03	BDL	0.41	0.2	67.4	0.11	0.08	0.35	BDL

BDL- Below Detection Limit

Detection limit ($\mu\text{g/l}$): As-0.49, Cd-0.42, Cr-0.56, Cu-0.35, Fe-0.67, Ni-0.54, Pb-0.31, Zn-0.59 & Hg-1.0

Post Immersion (24.9.2018):

- No exceedance observed in 3 Heavy metals - Cd, Zn, Hg
- Exceedances (in 6 metals): As- 5 locations
Cr- 7 locations
Cu- 3 locations
Fe- all locations
Ni- 5 locations
Pb – 5 locations

Table 2 (iii) - Analysis results (Heavy metals) of samples of River water both upstream and downstream of the immersion ghats of post - idol immersion activity (25.9.2018)												
Water Quality parameter				As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Ni (mg/l)	Pb (mg/l)	Zn (mg/l)	Hg (mg/l)
S. no.	Sampling point	U/S or D/S	Date									
BIS IS 10500 : 2012 Drinking water Standards:				0.01	0.003	0.05	0.05	0.3	0.02	0.01	5	0.001
1	Shyam Ghat	U/S	25.09.2018	0.04	BDL	0.1	0.08	92.05	0.08	0.06	0.2	BDL
2		D/S	25.09.2018	0.03	BDL	0.07	0.05	59.4	0.05	0.03	0.14	0.00121
3	Sur Ghat	U/S	25.09.2018	0.02	BDL	0.07	0.04	40.72	0.04	0.03	0.1	BDL
4		D/S	25.09.2018	0.03	BDL	0.07	0.07	60.52	0.06	0.26	0.17	BDL
5	Kali Ghat	U/S	25.09.2018	BDL	BDL	BDL	BDL	0.41	BDL	BDL	BDL	BDL
6		D/S	25.09.2018	BDL	BDL	0.03	BDL	0.94	BDL	BDL	0.02	BDL
7	Ram Ghat	U/S	25.09.2018	BDL	BDL	0.01	BDL	0.6	BDL	BDL	BDL	BDL
8		D/S	25.09.2018	BDL	BDL	0.02	BDL	1.72	BDL	BDL	BDL	BDL
9	Qudeshia Ghat	U/S	25.09.2018	0.02	BDL	0.08	0.05	41.14	0.04	0.03	0.11	BDL
10		D/S	25.09.2018	0.02	BDL	0.1	0.06	50.43	0.05	0.03	0.14	BDL
11	Geeta Ghat	U/S	25.09.2018	0.03	BDL	0.09	0.08	81.81	0.07	0.05	0.2	BDL
12		D/S	25.09.2018	0.04	BDL	0.11	0.1	99.54	0.09	0.07	0.23	BDL
13	Geeta Colony Ghat	U/S	25.09.2018	0.04	BDL	0.1	0.09	79.45	0.07	0.06	0.21	BDL
14		D/S	25.09.2018	0.03	BDL	0.05	0.04	35.51	0.03	0.03	0.09	0.00162
15	Hathi Ghat	U/S	25.09.2018	0.04	BDL	0.13	0.11	85.11	0.09	0.06	0.24	BDL
16		D/S	25.09.2018	0.02	BDL	0.1	0.09	79.45	0.07	0.06	0.21	BDL
17	Mayur Ghat	U/S	25.09.2018	0.02	BDL	0.08	0.04	34.64	0.04	0.02	0.1	BDL
18		D/S	25.09.2018	0.02	BDL	0.06	0.04	34.31	0.04	0.03	0.1	BDL
19	Kalindi Ghat	U/S	25.09.2018	0.03	BDL	0.13	0.09	73.52	0.07	0.05	0.2	BDL
20		D/S	25.09.2018	0.04	BDL	0.19	0.13	96.2	0.1	0.07	0.28	0.00141

BDL- Below Detection Limit

Detection limit ($\mu\text{g/l}$): As-0.49, Cd-0.42, Cr-0.56, Cu-0.35, Fe-0.67, Ni-0.54, Pb-0.31, Zn-0.59 & Hg-1.0

Post Immersion (25.9.2018):

- No exceedance observed in 2 Heavy metals - Cd, Zn
- Exceedances (in 7 metals): As- 16 locations
Cr- 15 locations
Cu- 10 locations
Fe- all locations
Ni- 16 locations
Pb – 16 locations
Hg – 3 locations