

REPORT ON
THE WATER QUALITY OF RIVERS/STREAMS
&
AMBIENT NOISE LEVEL QUALITY AT IMMERSION GHATS OF IDOL

October 2019



Meghalaya State Pollution Control Board
'Arden', Lumpyngad,
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MONITORING OF RIVERS USED AS IMMERSION GHATS

The Meghalaya State Pollution Control Board, Shillong, in pursuance of the order of the Central Pollution Control Board, Delhi, conducted the monitoring of the rivers located in Shillong, Tura and Jowai where Immersion Ghats are located. The monitoring was conducted with the aim of assessing the environmental impact due to such immersion.

Sampling Methodology

The sampling procedure used during collection of samples from the selected sites is the 'Grab Sample' method.

The monitoring was conducted in three phases:

- Phase 1 - Pre-immersion monitoring, conducted on the 4th of October, 2019.
 - Phase 2 - Immersion Day monitoring, conducted on the 8th of October, 2019.
 - Phase 3 - Post-immersion monitoring, conducted on the 11th of October, 2019.
- i. **Shillong, East Khasi Hills District:** The Immersion Ghat is located along the river Umkhrah at Polo, Shillong. The three (3) sampling points selected along the stretches of the river for collection of water samples are:
- (i) 1st sampling point - approximately 100 meters upstream of the immersion ghat
 - (ii) 2nd sampling point - site of the Immersion Ghat.
 - (iii) 3rd sampling point - approximately 100 meters downstream of the ghat.
- ii. **Jowai, West Jaintia Hills District:** The Immersion Ghat is located along the river Myntdu at Lynter Archaka, Syntu Ksiar. The three (3) sampling points selected along the stretches of the river for collection of water samples are:
- (i) 1st sampling point - approximately 100 meters upstream of the immersion ghat
 - (ii) 2nd sampling point - site of the Immersion Ghat.
 - (iii) 3rd sampling point - approximately 100 meters downstream of the ghat.
- iii. **Tura, West Garo Hills District:** The Immersion Ghat is located along the river Babupara-Rongkhon at Babupara. The three (3) sampling points selected along the stretches of the river for collection of water samples are:
- (i) 1st sampling point - approximately 100 meters upstream of the immersion ghat
 - (ii) 2nd sampling point - site of the Immersion Ghat.
 - (iii) 3rd sampling point - approximately 100 meters downstream of the ghat.

Parameters Analyzed

- The quality of water at the selected sampling points have been examined in terms of Temperature, pH, Conductivity, Dissolved Oxygen, BOD, COD, Calcium, Magnesium, Turbidity, Hardness, Total Dissolved Solids, Total Suspended Solids, Chromium, Copper, Lead and Zinc among the Physico-Chemical parameters.
- The analysis was carried out in accordance with the standard procedures APHA-AWWA-WEF (American Public Health Association, American Water Works Association, Water Environment Federation) – 23rdEdn.
- The analysis result of the rivers Umkhrah, Myntdu and Babupara-Rongkhon is presented in Table1, 2 & 3 respectively.

Findings

- **Water quality of Umkhrah River in Shillong:**From the analysis data (**Table 1**),it is observed that on immersion day, the level of turbidity at all three sampling points especially the point of immersion (i.e. ghat) is high in comparison to that during pre and post immersion days. This is likely due to activities related with the immersion process i.e. wading of worshippers in the waters of the river, immersing of idols into it and splashing of water by the devotees etc. Correspondingly, the concentration of total suspended solids (TSS) is also observed to be on the higher side on the day of immersion especially at the immersion site (2nd Sampling Points).
- **Water quality of Myntdu River in Jowai:**It is observed from the analysis data (**Table 2**), that the water quality remains more or less the same during the three phases of monitoring except the highest level of turbidity observed at the site of immersion during the immersion day which is likely due to the wading of worshippers in the waters, immersing of idols into it and splashing of water by the devotees etc.
- **Water quality of Babupara-Rongkhon River in Tura:** From the analysis data (**Table 3**)it is observed that the water quality remains more or less the same during the three phases of monitoring with only a slight increase in the turbidity at the immersion site on the day of immersion which can be attributed to activities related to the immersion process like wading of worshippers in the waters of the river, immersing of idols into it.

Conclusion

The findings above indicate that the monitored water bodies of the three mentioned rivers located in Shillong, Tura and Jowai do not indicate any significant change or deterioration their characteristics as a result of immersion of idols into the water systems.

1. AMBIENT NOISE LEVEL MONITORING

The ambient noise level monitoring was conducted on the 8th of October, 2019 (i.e. immersion day) at the respective immersion sites in Shillong, Tura and Jowai in order to monitor the level of noise during the occasion.

Sampling Methodology & Parameter Analyzed

The monitoring was carried out using Envirotech SLM 109 and Larson-Davis DSP 80 sound level meters, and the noise levels were measured in dB (A) i.e. the level of sound in decibels on scale – A, as per the human ear sensitivity requirements. The result was expressed in Leq, denoting the A weighted energy mean of the noise level averaged over the measurement period. The monitoring was conducted for continuous 30 minutes duration wherein Leq readings were recorded for every 10 minute interval.

Findings & Conclusion

The levels recorded during the occasion at the respective immersion sites in Shillong, Tura and Jowai is given in tables below:

Table 1-A

Location A	River Umkhrah Immersion Site, Polo, Shillong	
Time duration	dB(A) Leq	Ambient Noise Level Standard (Day time) [Residential Area] dB(A) Leq
12:45 Hrs. to 12:55 Hrs.	70.5	55.0
12:55 Hrs. to 13:05 Hrs.	73.6	
13:05 Hrs. to 13:15 Hrs.	75.3	

The above table (Table 1-A) reveals that the ambient noise level at the immersion ghat along the river Umkhrah at Polo, Shillong is high.

The levels recorded at every ten minute interval from the time duration of 12:45 Hrs. (12:45 pm) to 13:15 Hrs. (1:15 pm) shows that the level exceeds the daytime Ambient Noise Standard of 55.0 dB(A) Leq (for a Residential area) during every monitored time interval.

The noise, as observed on the above day and duration of monitoring is due to various kinds of festival activities during the immersion process.

Table 1-B

Location B	River Babupara-Rongkhon Immersion Site, Babupara, Tura	
Time duration	Leq dB(A)	Ambient Noise Level Standard (Day time) [Residential Area] Leq dB(A)
12:50 Hrs. to 13:00 Hrs.	70.0	55.0
13:00 Hrs. to 13:10 Hrs.	66.0	
13:10 Hrs. to 13:20 Hrs.	68.5	

The Table 1-B reveals that the ambient noise level at the immersion ghat along the river Babupara-Rongkhon at Babupara, is high.


The recorded noise levels shows that the level obtained exceeds the daytime Ambient Noise Standard of 55.0 dB(A) Leq (for a Residential area) during the monitored time intervals.

The noise, as observed during monitoring, is due to festive activities during the immersion process.

Table 1-C

Location: C	River Myntdu Immersion Site, Syntu Ksiar, Jowai	
Time duration	Leq dB(A)	Ambient Noise Level Standard (Day time) [Residential Area] Leq dB(A)
13:30 Hrs. to 13:45 Hrs.	62.4	55.0
13:45 Hrs. to 14:00 Hrs.	61.9	
14:00 Hrs. to 14:15 Hrs.	57.8	

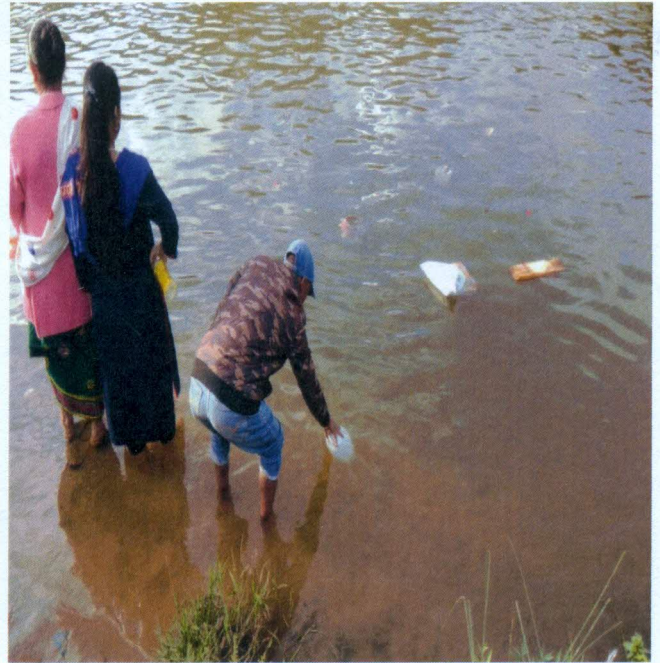
The above table (Table 1-C) reveals that the ambient noise level at the immersion ghat along the river Myntdu at Lynter Archaka, Syntu Ksiar, Jowai, exceeds the daytime Ambient Noise Standard of 55.0 dB(A) Leq (for a Residential area) but is comparatively lower than the noise levels obtained at the immersion sites in Shillong and Tura.


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A GLIMPSE OF IMAGES OF SAMPLING OF WATER AND IMMERSION OF IDOLS DURING PUJA FESTIVALS



CROWDS THROUGH THE IMMERSION SITE AT POLO, SHILLONG ON IMMERSION DAY, 8TH OCTOBER 2019



SAMPLING OF WATER FROM THE MYNTDU RIVER AT SYNTU KSIAR JOWAI ON 8TH OCTOBER 2019



CROWDS THROUGH THE IMMERSION SITE AT SYNTU KSIAR, JOWAI ON IMMERSION DAY, 8TH OCTOBER 2019



SAMPLING OF WATER FROM THE BABUPARA-RONGKHON RIVER ON 4TH OCTOBER 2019

TABLE 1: WATER QUALITY DATA OF RIVER WAH UMKHRAH DURING PRE-IMMERSSION, IMMERSION & POST-IMMERSION DAY, KALI PUJA FESTIVAL 2019

	Date of Sampling	Site I (100m Upstream of Immersion Ghat)			Site II (Site of Immersion Ghat)			Site III (100 m downstream of Immersion Ghat)		
		04.10.2019	08.10.2019	11.10.2019	04.10.2019	08.10.2019	11.10.2019	04.10.2019	08.10.2019	11.10.2019
	Time	12:15	18:57	14:55	12:23	19:19	15:46	12:40	19:48	15:27
	Weather	Rainy	Rainy	Cloudy	Rainy	Rainy	Cloudy	Rainy	Rainy	Cloudy
	Colour	Light brown	Brown	Greenish brown	Light brown	Brown	Greenish brown	Light brown	Brown	Greenish brown
1.	Temperature (°C)	20.2	21.0	21.7	19.0	20.0	23.0	20.0	20.0	23.0
2.	pH	7.3	7.3	7.3	7.2	7.3	7.4	7.2	7.3	7.4
3.	Conductivity $\mu\text{S/cm}$	228.0	235.0	240.0	240.0	240.0	245.0	233.0	245.0	243
4.	Dissolved Oxygen mg/L	4.0	2.8	3.2	3.2	2.7	2.7	3.8	2.9	2.9
5.	BOD mg/L	19.0	20.0	12.5	22.0	25.0	15.0	24.0	22.0	15.1
6.	COD mg/L	23.0	8.0	24.0	21.0	7.0	22.0	25.0	6.0	20.0
7.	Calcium mg/L	46.0	42.0	60.0	50.0	46.0	66.0	50.0	40.0	60.0
8.	Magnesium mg/L	24.0	22.0	24	24.0	22.0	22.0	22.0	24.0	14.0
9.	Turbidity (NTU)	11.5	10.5	7.2	14.1	25.5	10.8	12.8	30.4	7.8
10.	Hardness mg/L	70.0	64.0	80.0	74.0	68.0	88.0	72.0	64.0	74.0
11.	Total Dissolved Solids mg/L	149.0	163.0	166.0	157.0	167.0	169.0	152.0	166.0	168.0
12.	Total Suspended Solids mg/L	12.0	20.0	10.0	15.0	22	10.0	11.0	23.0	10.0
13.	Chromium mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.	Copper mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15.	Lead mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.	Zinc mg/L	0.18	0.01	0.08	0.12	0.03	0.12	0.16	0.10	0.09

TABLE 2: WATER QUALITY DATA OF RIVER MYNTDU DURING PRE-IMMERSSION, IMMERSION & POST-IMMERSION DAY, KALI PUJA FESTIVAL 2019

	Date of Sampling	Site I (100m Upstream of Immersion Ghat)			Site II (Site of Immersion Ghat)			Site III (100 m downstream of Immersion Ghat)		
		04.10.2019	08.10.2019	11.10.2019	04.10.2019	08.10.2019	11.10.2019	04.10.2019	08.10.2019	11.10.2019
	Time	12:02	15:00	14:20	12:10	15:30	14:37	12:23	15:45	14:53
	Weather	Cloudy	Clear	Cloudy	Cloudy	Clear	Cloudy	Cloudy	Clear	Cloudy
	Colour	Slightly brown	Clear	Clear	Slightly brown	Clear	Clear	Slightly brown	Clear	Clear
1.	Temperature (°C)	20.0	24.0	21.0	20.0	24.0	21.0	20.0	24.0	21.0
2.	pH	7.2	7.1	7.6	7.1	7.1	7.6	7.1	7.2	7.5
3.	Conductivity $\mu\text{S}/\text{cm}$	42.0	48.0	35.0	44.0	47.0	33.0	47.0	43.0	32.0
4.	Dissolved Oxygen mg/L	7.4	6.2	7.2	7.4	7.1	7.4	6.9	6.9	7.1
5.	BOD mg/L	1.4	1.7	1.8	1.6	1.5	1.5	1.5	1.6	1.7
6.	COD mg/L	4.0	4.0	8.0	4.0	6.0	6.0	4.0	4.0	8.0
7.	Calcium mg/L	7.0	6.0	12.0	6.0	6.0	12.0	6.0	6.0	12.0
8.	Magnesium mg/L	5.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0
9.	Turbidity (NTU)	6.5	5.9	5.5	6.7	6.2	7.0	6.9	5.8	6.2
10.	Hardness mg/L	10.0	20.0	19.0	10.0	18.0	18.0	10.0	18.0	18.0
11.	Total Dissolved Solids mg/L	25.0	23.0	24.0	23.0	21.0	23.0	24.0	22.0	22.0
12.	Total Suspended Solids mg/L	5.0	35.0	10.0	5.0	15.0	10.0	5.0	25.0	10.0
13.	Chromium mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.	Copper mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15.	Lead mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.	Zinc mg/L	BDL	BDL	0.04	BDL	BDL	0.09	BDL	0.04	0.08

TABLE 3: WATER QUALITY DATA OF RIVER BABUPARA-RONGKHON DURING PRE-IMMERSSION, IMMERSION & POST-IMMERSION DAY, KALI PUJA FESTIVAL 2019

	Date of Sampling	Site I (100m Upstream of Immersion Ghat)			Site II (Site of Immersion Ghat)			Site III (100 m downstream of Immersion Ghat)		
		04.10.2019	08.10.2019	11.10.2019	04.10.2019	08.10.2019	11.10.2019	04.10.2019	08.10.2019	11.10.2019
	Time	15:06	20:02	11:14	15:19	20:19	11:27	15:32	20:49	11:44
	Weather	Sunny	Rainy	Sunny	Sunny	Rainy	Sunny	Sunny	Rainy	Sunny
	Colour	Clear	Brownish	Clear	Clear	Brownish	Clear	Clear	Brownish	Clear
1.	Temperature (°C)	26.0	24.0	26.0	26.0	25.0	26.0	26.0	25.0	26.0
2.	pH	7.3	7.5	7.4	7.4	7.5	7.4	7.3	7.4	7.5
3.	Conductivity $\mu\text{S}/\text{cm}$	87.0	74.0	83.0	93.0	75.0	86.0	92.0	77.0	85.0
4.	Dissolved Oxygen mg/L	7.4	7.3	7.4	7.5	7.1	7.6	7.6	7.2	6.7
5.	BOD mg/L	1.8	2.0	1.6	1.8	1.9	1.4	1.9	2.0	2.0
6.	COD mg/L	4.0	4.0	4.0	5.0	6.0	4.0	4.0	4.0	5.0
7.	Calcium mg/L	22.0	20.0	20.0	24.0	20.0	24.0	20.0	22.0	20.0
8.	Magnesium mg/L	12.0	12.0	12.0	12.0	10.0	10.0	14.0	12.0	12.0
9.	Turbidity (NTU)	11.6	15.2	12.4	20.5	12.7	11.5	13.6	18.5	10.8
10.	Hardness mg/L	34.0	30.0	32.0	36.0	50.0	34.0	34.0	34.0	32.0
11.	Total Dissolved Solids mg/L	60.0	51.0	57.0	64.0	30.0	59.0	63.0	53.0	59.0
12.	Total Suspended Solids mg/L	15.0	15.0	15.0	25.0	15.0	15.0	15.0	15.0	15.0
13.	Chromium mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.	Copper mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15.	Lead mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.	Zinc mg/L	0.06	0.04	0.05	0.07	0.03	BDL	0.05	0.05	0.03