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#### 1. Introduction

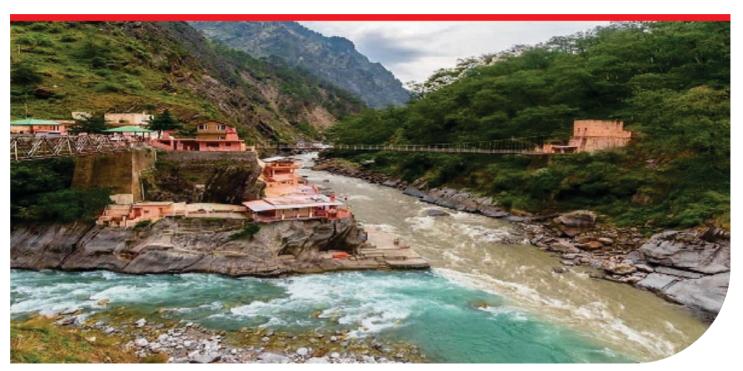
Uttarakhand Pollution Control Board (UKPCB) is Monitoring the watre quality of River Alaknanda. River Bhagrirathi, Ganga and Yamuna on monthiy basis in 12 monitoring location with 37 sampling points. The monitoring of water quality of River Alaknanda, Bhagirathi' Ganga and Yamuna and characterization of water quality is carried out under project "Strengthening of Laboratories" funded by National Mission for clean Ganga (NMCG). The Location wise sampling point are as follows:

S.N.	Monitoring Locations	District	Sampling Points
1	Vishnuprayag	Chamoli	1. River Alaknanda before joining River Dhauliganga
			2. River Dhauliganag before joining to Alaknanda
			3. River Alaknanda after confluence to Dhauliganga
2	Nandprayag	Chamoli	1. River Alaknanda before joining River Nandakani
			2. River Nandakani before joining to Alaknanda
			3. River Alaknanda after confluence to Nandakani
3	Karanprayag	Chamoli	1. River Alaknanda before joining to River Pindar
			2. River Pindar before joining to Alaknanda
			3. River Alaknanda after confluence to Pindar
4	Rudarprayag	Rudarprayag	1. River Alaknanda before joining River Mandakani
			2. River Mandakani before joining to Alaknanda
			3. River Alaknanda after confluence to Mandakani
			4. River Mandakani D/s Augustmuni
5	Uttarkashi	Uttarkashi	1. River Bhagirathi D/s Uttarkashi town
			2. River Bhagirathi U/s Gangotri
6	Devprayag	Tehri	1. River Alaknanda before joining River Bhagirathi
			2. River Bhagirathi before joining to Alaknanda
			3. River Ganga at Devprayag
7	Rishikesh	Dehradun	1. River Ganga U/s of Laxmunjula
			2. River Ganga D/s Swargasharam
			3. River Ganga D/s at Baraj
			4. River Ganga D/s Lakarghat
			5. River Ganga D/s at Raiwala
			6. River Ganga D/s near Birla Guest house
8	Haridwar	Haridwar	1. River Ganga U/s at Bindughat Dudhiyavan
			2. River Ganga at Harikipadi
			3. River Ganga D/s Balakumari Mandir
			4. River Ganga D/s Bishanpur Kundi
			5. River Ganga D/s at Sultanpur
			6. River Ganga canal at Lalita raw bridge
			7. River Ganga canal at Damkothi
			8. River Ganga canal D/s at Harikipadi Rishikul Bridge
			9. Upper Ganga Canal D/s at Roorkee
9.	Yamunotri	Uttarkashi	1. River Yamuna U/s at Yamunotri
10.	Sayanchatti	Uttarkashi	2. River Yamuna U/s at Sayanchatti
11.	Lakhwar Dam	Dehradun	3. River Yamuna U/s at Lakhwar Dam
12.	Dakpathar	Dehradun	4. River Yamuna U/s at Dakpathar

This bulletin is basically prepared for assessment of water quality at different location in reference to the used based classification of surface water. The location and sampling point wise analysis data of water quality is as follows.

### 2. Vishnuprayag District Chamoli

The Alaknanda River, which originates from Satopanth glacier is joined by the Dhauli Ganga River near Joshimath, after merger Dhaula Ganga identity is lost and both rivers flow together by the name 'Alaknanda'.

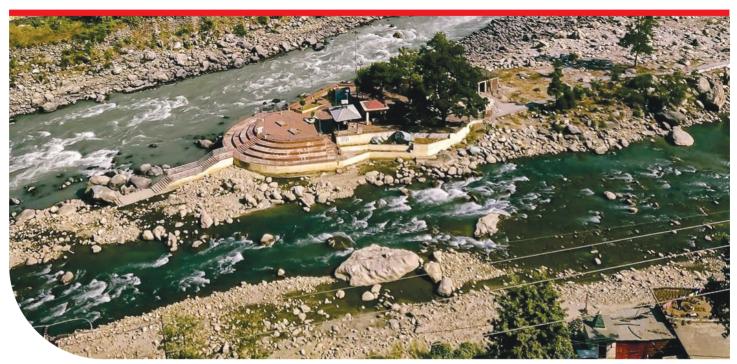


View of River Alaknanda and Dhauliganga Confluence

SN.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Alaknanda before	рН	7.23	8.0	0.28	7.67
	confluence to River	Dissolved Oxygen	9.0	11	0.75	10.3
	Dhauli Ganga	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
2	River Dhauli Ganaga	рН	7.62	8.08	0.31	7.62
	before confluence to	Dissolved Oxygen	2.0	10.4	4.16	5.31
	Alaknanda	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
3	River Alaknanda after	рН	7.11	8.19	0.38	7.69
	confluence to River	Dissolved Oxygen	8.2	10.8	0.90	10.02
	Dhauli Ganga	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0

### 3. Nandaprayag District Chamoli

In the descending sequence of the confluences, Nandakini River orginated from Nandaghuti joins the main Alaknanda River at Nandprayag, after which Nandakini loses its identity and becomes part of river Alaknanda.

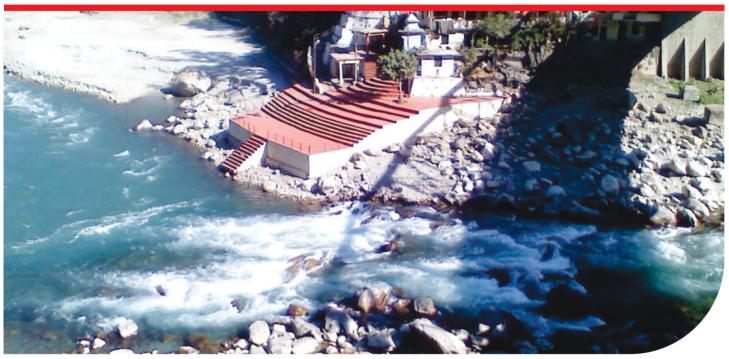


View of River Alaknanda and Nandakini Confluence

S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Alaknanda before	рН	7.72	8.29	0.19	7.93
	confluence to River	Dissolved Oxygen	8.8	10	0.40	9.51
	Nandakini	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
2	River Nandakini before	рН	7.58	8.13	0.22	7.84
	confluence to River	Dissolved Oxygen	8.8	10.2	0.53	9.6
	Alaknanda	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	32	80	16.39	46.89
		Fecal Coliform	13	50	13.53	26
3	River Alaknanda after	рН	7.66	8.0	0.13	7.85
	confluence to River	Dissolved Oxygen	9.6	10.8	0.43	10.13
	Nandakini	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0

### 4. Karanaprayag, District Chamoli

Alaknanda River confluence with Pindar River which originates from the Pindar glacier and further loses its name and becomes part of Alaknanda.

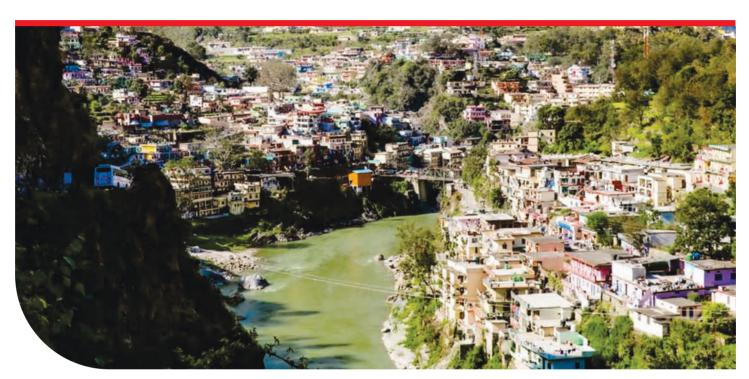


**View of River Alaknanda and Pindar Confluence** 

S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Alaknanda before	рН	7.19	8.24	0.41	7.75
	confluence to River Pindar	Dissolved Oxygen	9.4	10	0.25	9.71
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
2	River Pindar before	рН	7.65	8.26	0.20	7.97
	confluence to River	Dissolved Oxygen	8.6	9.8	0.50	9.37
	Alaknanda	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	28	70	13.20	44.2
		Fecal Coliform	11	15.2	11.36	46.7
3	River Alaknanda after	рН	7.45	8.2	0.30	7.82
	confluence to River	Dissolved Oxygen	9.2	10.4	0.35	9.82
	Pindar	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	21	40	7.02	30.56
		Fecal Coliform	10	26	5.71	14.44

### 5. Rudraprayag, District Rudraprayag

Mandakini River originate from chorabari glacier and confluence with River Alaknanda and become part of River Alaknanda.

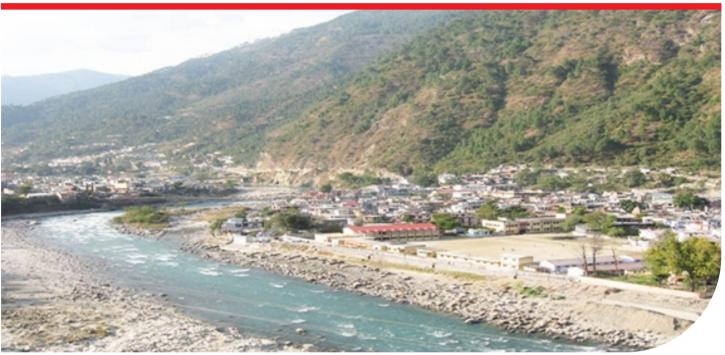


View of River Alaknanda and Mandakini Confluence

S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Manakini before	рН	7.45	8.15	0.25	7.72
	confluence to River	Dissolved Oxygen	9.8	11.2	0.45	10.57
	Alaknanda	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
2	River Alaknanda before	рН	7.02	8.16	0.40	7.58
	confluence to River	Dissolved Oxygen	9.2	10.8	0.60	9.93
	Mandakini	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
3	River Alaknanda after	рН	7.49	8.18	0.26	7.74
	confluence to River	Dissolved Oxygen	10	10.8	0.27	10.31
	Mandakini	Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0

#### 6. Uttarakashi

River Bhagirathi originate from Gaumukh glacier and finds its path from district Uttarakashi, Tehari and finally merged with river Alaknanda at Devprayag.



View of River Bhagirathi at Uttarkashi

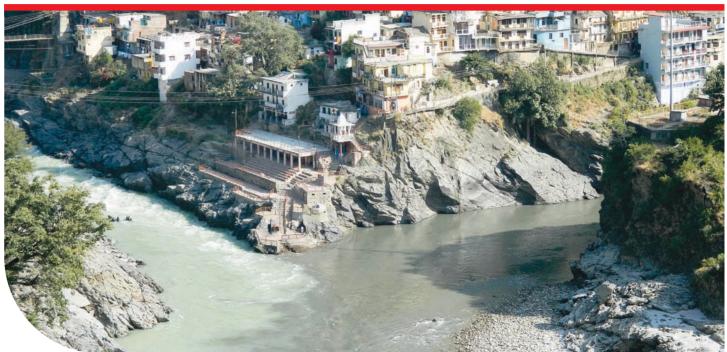
S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1.	River Bhagirathi	рН	7.0	7.81	0.28	7.44
	D/s Uttarkashi	Dissolved Oxygen	7.8	10.6	0.89	9.32
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0



View of water Reservior, Tehari Dam

### 7. Devprayag, District Tehri Garhwal

DevPrayag is the confluence of the two holy rivers, the Bhagirathi originate from Gomukh and River Alaknanda. After confluence both the rivers lost their name and become named as Ganga.



View of River Alaknanda and Bhagirathi Confluence

S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Bhagirathi before	рН	7.23	8.1	0.30	7.58
	confluence to River	Dissolved Oxygen	8.8	12	0.88	14
	Alaknanda	Biological Oxygen demand	0.4	1.0	0.17	0.91
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
2	River Alaknanda before	рН	7.0	8.14	0.37	7.63
	confluence to River	Dissolved Oxygen	9.0	11.4	0.82	10.17
	Bhagirathi	Biological Oxygen demand	0.6	1.0	0.11	0.94
		Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0
3	River Ganga after	рН	7.3	8.28	0.26	7.71
	confluence to River	Dissolved Oxygen	9.0	11.8	0.65	10.30
	Bhagirathi and River	Biological Oxygen demand	0.8	1.0	0.5	0.97
	Alaknanda	Total Coliform	2.0	2.0	0	2.0
		Fecal Coliform	2.0	2.0	0	2.0

### 8. Rishikesh, District Dehradun

Rishikesh is known as the "Gateway to the Garhwal Himalayas" and "Yoga Capital of the World".



View of River Ganga at Rishikesh

S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Ganga up stream	рН	7.1	8.0	0.28	7.58
	at Lakshmanjhula	Dissolved Oxygen	9.8	11.6	0.54	10.57
		Biological Oxygen demand	0.4	1.0	0.21	0.88
		Total Coliform	22	40	6.23	38.78
		Fecal Coliform	10	26	4.30	15.21
2	River Ganga D/S	рН	7.1	8.06	0.26	7.64
	Rishikesh	Dissolved Oxygen	8.4	10	0.58	9.35
		Biological Oxygen demand	0.8	1.2	0.14	1.02
		Total Coliform	30	50	6.09	41.28
		Fecal Coliform	14	34	6.26	24



View of River Ganga at Rishikesh

#### 9. Haridwar District Haridwar

The city is situated on the right bank of the Ganga river, at the foothills of the Shivalik ranges.



View of River Ganga at Haridwar

S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Ganga at Dudhiabar	рН	7.47	8.3	0.24	7.85
		Dissolved Oxygen	8.2	10.8	0.84	9.44
		Biological Oxygen demand	1.0	1.2	0	1.06
		Total Coliform	60	120	18.81	89.07
		Fecal Coliform	30	70	14.44	50.38
2	Upper Ganga Canal	рН	7.3	8.33	0.30	7.8
	down stream	Dissolved Oxygen	8.0	10.8	0.79	9.54
	Har Ki Pauri	Biological Oxygen demand	0.6	1.2	0.21	0.97
		Total Coliform	40	90	16.36	69.07
		Fecal Coliform	26	60	10.49	40.14
3	River Ganga	рН	7.18	8.42	0.34	7.82
	downstream	Dissolved Oxygen	8.6	11.6	0.82	9.64
	Bishanpur Kundi,	Biological Oxygen demand	1.0	1.6	0.19	1.21
	Haridwar	Total Coliform	70	130	20.95	97.43
		Fecal Coliform	30	84	15.20	55.57

#### 10. River Yamuna

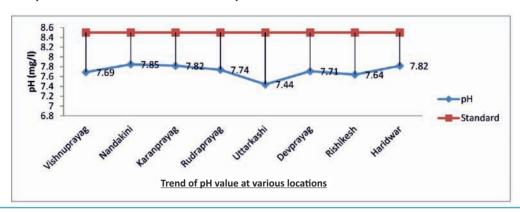
The Yamuna River is largest tributaries of River Ganga and originated from Yamunotri Glacier near banderpooch peaks in Uttarkashi district. The combined stream Yamuna flows through shivalik range of hills of Uttarakhand and enters plain of Dakpather

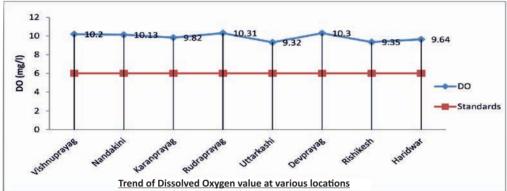


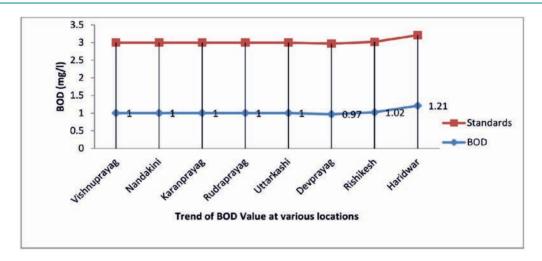
### **View of River Yamuna**

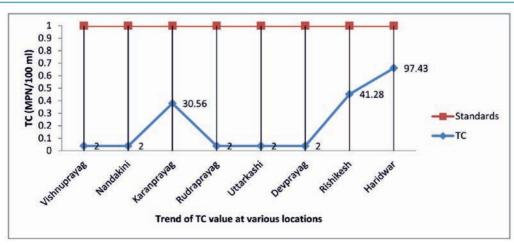
S.N.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Yamuna U/s at Yamunotri,	рН	7.44	7.44	7.44	7.44
	District Uttarkashi	Dissolved Oxygen	10.8	10.8	10.8	10.8
		Biological Oxygen	1.0	1.0	1.0	1.0
		Demand				
		Total Coliform	2.0	2.0	2.0	2.0
		Fecal Coliform	2.0	2.0	2.0	2.0
2	River Yamuna D/s at Sayanchatti,	рН	7.88	7.88	7.88	7.88
	District Uttarkashi	Dissolved Oxygen	10.6	10.6	10.6	10.6
		Biological Oxygen	1.0	1.0	1.0	1.0
		Demand				
		Total Coliform	2.0	2.0	2.0	2.0
		Fecal Coliform	2.0	2.0	2.0	2.0
3	River Yamuna U/s at Lakhwar	рН	7.57	7.46	0.44	8.01
	Dam , District Dehradun	Dissolved Oxygen	8.6	10	0.61	9.15
		Biological Oxygen	0.8	1.0	0.1	0.95
		Demand				
		Total Coliform	2.0	2.0	14	9.0
		Fecal Coliform	2.0	2.0	3.5	3.75
4	River Yamuna U/s at Dakpathar	рН	7.74	8.25	0.22	8.04
	Dam, District Dehradun	Dissolved Oxygen	8.2	9.0	0.34	8.55
		Biological Oxygen	1.0	1.2	0.1	1.15
		Demand				
		Total Coliform	2.0	2.0	14.70	59.15
		Fecal Coliform	2.0	2.0	6.55	31.75

The graphical representation of trends of various parameters is shown as follows:-

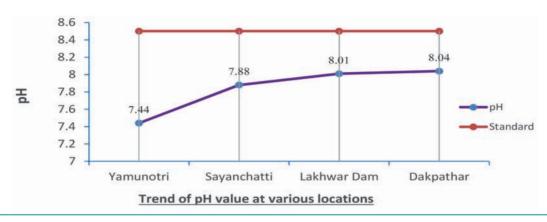


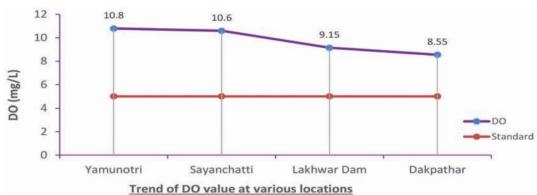


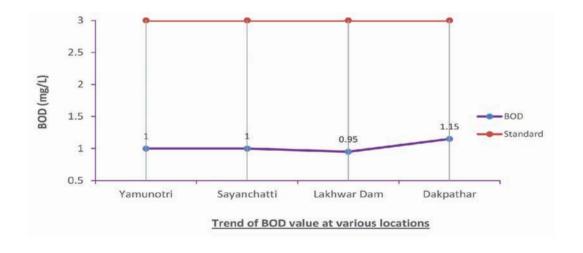




The graphical representation of trends of various parameters is shown as follows:-









The water quality of the river Alaknanda, Bhagirathi, Ganga and Yamuna at various monitoring locations is compared with the designated best use criteria. The designated best use quality/class of the water is as follows:-

S.N.	Monitoring Locations	Primary quality criteria Q		Quality/	Designated best use		
		рН	DO	BOD	тс	Class	
1	River Alaknanda after confluence	7.11	8.2	1.0	2.0	А	Drinking water source without
	to River Dhauli Ganga at						conventional treatment,
	Vishnuprayag						but with chlorination.
2	River Alaknanda after confluence	7.11	8.2	1.0	2.0	А	Drinking water source
	to River Nandakini at Nandaprayag						without conventional treatment,
							but with chlorination.
3	River Alaknanda after confluence	7.45	9.2	1.0	21	А	Drinking water source
	to River Pindar at Karanaprayag						without conventional treatment,
							but with chlorination.
4	River Alaknanda after confluence	7.49	10	1.0	2.0	А	Drinking water source without
	to River Mandakini at Rudraprayag						conventional treatment,
							but with chlorination.
5	Bhagirathi D/s Uttarkashi	7.0	7.8	1.0	2.0	А	Drinking water source
							but with chlorination.
							without conventional treatment,
6	River Ganga after confluence to	7.3	9.0	0.8	2.0	А	Drinking water source
	River Bhagirathi and River						without conventional treatment,
	Alaknanda at Devprayag						but with chlorination.
7	River Ganga D/S Rishikesh	7.1	8.4	0.8	30	А	Drinking water source
							without conventional treatment,
							but with chlorination.
8	River Ganga D/s Bisharpur Kundi	7.18	8.6	1.0	70	В	Outdoor bathing (organized).
	at Haridwar						
9	River Yamuna U/s at Yamunotri,	7.44	10.8	1.0	2.0	А	Drinking water source without
	District Uttarkashi						conventional treatment, but with
							Chlorination.
10.	River Yamuna D/s at Sayanchatti District Uttarkashi	7.88	10.6	1.0	2.0	А	Drinking water source without conventional treatment, but
	Sayanchatti District Ottarkasiii						with chlorination
11.	River Yamuna U/s at Lakhwar Dam	8.01	9.15	0.95	9.0	А	Drinking water source without
	District Dehradun						conventional treatment but with chlorination
12.	River Yamuna U/s at Dakpathar,	8.04	8.55	1.15	59.15	В	Outdoor bathing (organized)
	District Dehradun  DBU criteria values :- "A"	6.5-	>6	<2	50		
		8.5					
	DBU criteria values :- "B"	6.5- 8.5	>5	<3	500		



### **Uttarakhand Pollution Control Board**

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