WATER QUALITY BULLETIN UTTARAKHAND

WATER QUALITY CHARACTERISTIC OF RIVER ALAKNANDA BHAGIRATHI AND GANGA UTTARAKHAND 2019-2020

UTTARAKHAND POLLUTION CONTROL BOARD

UTTARAKHAND RIVER MAP

Panch Prayag is an expression in Hindu religious ethos, specifically used to five sacred river confluences in the Garhwal Himalayas in the state of Uttarakhand, The five prayags- prayag meaning "place of confluence of rivers" The five prayag in Uttarakhand are Vishnuprayag, Nandaprayag, Karanaprayag, Rudraprayag and Devprayag, in the descending flow sequence of their occurrence.

Alaknanda descending from the foot of the Satopanth (a triangular lake, which is located at 4,402m (14,442.3 ft), above the sea level Bhagirath Kharak glaciers near the Nanda Devi peak, in Uttarakhand the five prayags joined Dev Prayag Bhagirathi, and from Ganga river. It flows down south towards Rishikesh and Haridwar, two holy places on the bank of the Ganges in Uttarakhand.

The Uttarakhand Pollution Control Board (UKPCB) is monitoring the water quality of river Alaknanda, Bhagirathi and Ganga on monthly basis for the parameters pH, DO, BOD, Total Coliform as per the designated best use criteria.The present bulletin is brought out by Central laboratory of UKPCB entails water quality characteristic of river Alaknanda, Bhagirathi and Ganga from Vishnuprayag to Haridwar and it has been compared with the designated best use criteria under the project Strengthening of Laboratories funded by National Mission for Clean Gange (NMCG). The Water Quality Characteristic at Panch Prayagand holy town Rishikesh and Haridwar is as follows.

VISHNUPRAYAG
JOSHIMATH 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.

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Alaknanda before confluence to River Dhauli Ganga	pH	7.78	8.28	0.20	7.9
		Dissolved Oxygen	10.2	11.2	0.38	10.64
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
2	River Dhauli Ganaga before confluence to Alaknanda	pH	7.82	8.12	0.12	7.9
		Dissolved Oxygen	10.6	11.4	0.32	10.96
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
3	River Alaknanda after confluence to River Dhauli Ganga	pH	7.82	8.1	0.11	7.9
		Dissolved Oxygen	10.2	11.4	0.44	10.8
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0

Designated best use category- 'A' (Drinking water source without conventional treatment but after disinfection).

NANDAPRAYAG
DISTRICT CHAMOLI

Nand Prayag is the second prayag in the descending sequence of the confluences where the Nandakini River joins the main Alaknanda River. After which Nandakini loses its name and becomes part of river Alaknanda.

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Alaknanda before confluence to River Nandakini	pH	7.58	8.01	0.13	7.78
		Dissolved Oxygen	9.6	11	0.43	10.21
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
2	River Nandakini before confluence to River Alaknanda	pH	7.42	7.87	0.12	7.73
		Dissolved Oxygen	9.2	9.8	0.21	9.51
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	40	80	28.28	60
3	River Alaknanda after confluence to River Nandakini	pH	7.56	7.88	0.09	7.73
		Dissolved Oxygen	9.6	10.8	0.39	9.98
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0

Designated best use criteria- 'A' (Drinking water source without conventional treatment but after disinfection). The BDU of river Nandakini before confluence to the river Alaknanda is 'B' because of total coliform value is 60 MPN/100ml. which is more than 50 MPN/100 ml. This is by reason no STP are installed in up stream of the Nandakini river.

KARANAPRAYAG
DISTRICT CHAMOLI

Karn Prayag is the location where Alaknanda River is joined by the Pindar River that originates from the Pindar glacier, below the Nanda Devi Mountain range,after which Pindar loses its name and becomes part of Alaknanda.

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Alaknanda before confluence to River Pindar	pH	7.62	8.08	0.12	7.8
		Dissolved Oxygen	9.6	10.6	0.31	10.08
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
2	River Pindar before confluence to River Alaknanda	pH	7.62	7.92	0.09	7.74
		Dissolved Oxygen	9.4	9.8	0.14	9.56
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	40	70	21.21	55
3	River Alaknanda after confluence to River Pindar	pH	7.72	7.92	0.06	7.81
		Dissolved Oxygen	9.6	10.8	0.41	10.01
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	30	40	7.07	35

Designated best use criteria-'A' (Drinking water source without conventional treatment but after disinfection). The BDU of river Pindar before confluence to the river Alaknanda is 'B' because of total coliform value is 55 MPN/100ml. which is more than 50 MPN/100 ml. This is by reason no STP are installed in up stream of the Pindar river.

RUDRAPRAYAG
DISTRICT RUDRAPRAYAG

At Rudra Prayag the Alaknanda meets the Mandakini River. The confluence is named after god Shiva, who is also known as Rudra. After which mandakini loses its name and form and becomes part of Alaknanda.

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Manakini before confluence to River Alaknanda	pH	7.58	7.94	0.10	7.76
		Dissolved Oxygen	9.4	10.2	0.24	9.78
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
2	River Alaknanda before confluence to River Mandakini	pH	7.28	7.94	0.16	7.75
		Dissolved Oxygen	9.4	10.8	0.37	9.81
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
3	River Alaknanda after confluence to River Mandakini	pH	7.65	7.88	0.06	7.8
		Dissolved Oxygen	9.2	10.6	0.37	10.01
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0

Designated best use criteria-'A' (Drinking water source without conventional treatment but after disinfection).

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Bhagirathi before confluence to River Alaknanda	pH	7.64	8.01	0.10	7.8
		Dissolved Oxygen	9.6	10.8	0.38	10.06
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
2	River Alaknanda before confluence to River Bhagirathi	pH	7.42	7.98	0.14	7.72
		Dissolved Oxygen	9.2	10.8	0.42	9.73
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0
3	River Ganga after confluence to River Bhagirathi and River Alaknanda	pH	7.64	8.05	0.10	7.78
		Dissolved Oxygen	9.4	10.2	0.23	9.71
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	2.0	2.0	0	2.0

Designated best use criteria- 'A' (Drinking water source without conventional treatment but after disinfection).

DEVPRAYAG
DISTRICT TEHRI GARHWAL

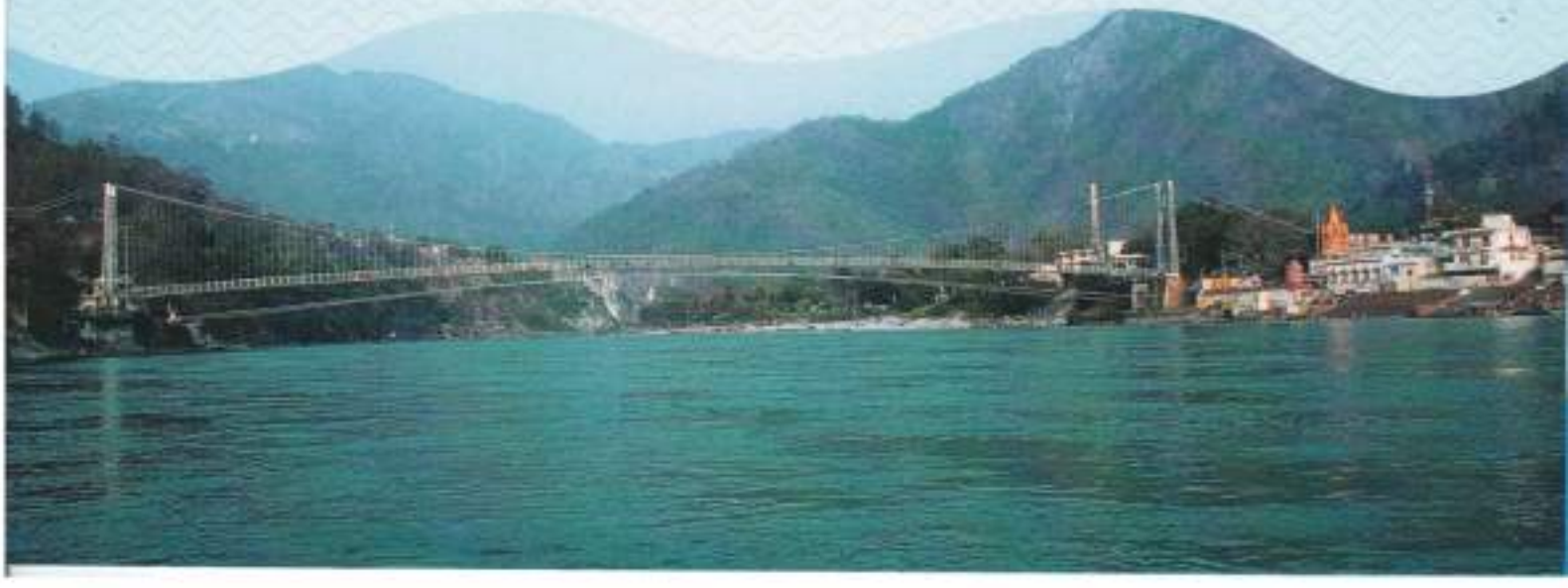
Dev Prayag is the confluence of the two holy rivers, the Bhagirathi - the chief stream of the Ganges and the Alaknanda. Bhagirathi joins, and merges, with Alaknanda at Deva Prayag (after which Alaknanda, and Bhagirathi, lose their names and forms 'new name' Ganges.

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	River Ganga up stream at Lakshman jhula	pH	7.42	8.23	0.27	7.76
		Dissolved Oxygen	9.8	11.8	0.55	10.21
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	40	40	0	40
2	River Ganga D/S Rishikesh	pH	7.32	8.29	0.26	7.76
		Dissolved Oxygen	9	11.2	0.51	9.85
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	40	50	7.07	45

Designated best use criteria- 'A' (Drinking water source without conventional treatment but after disinfection).

RISHIKESH
DISTRICT DEHRADUN

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



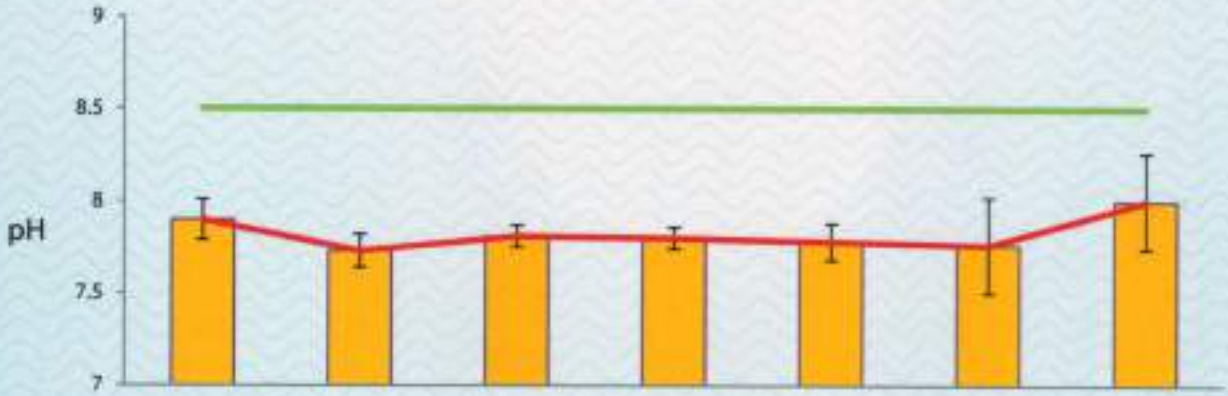
HARIDWAR

DISTRICT HARIDWAR

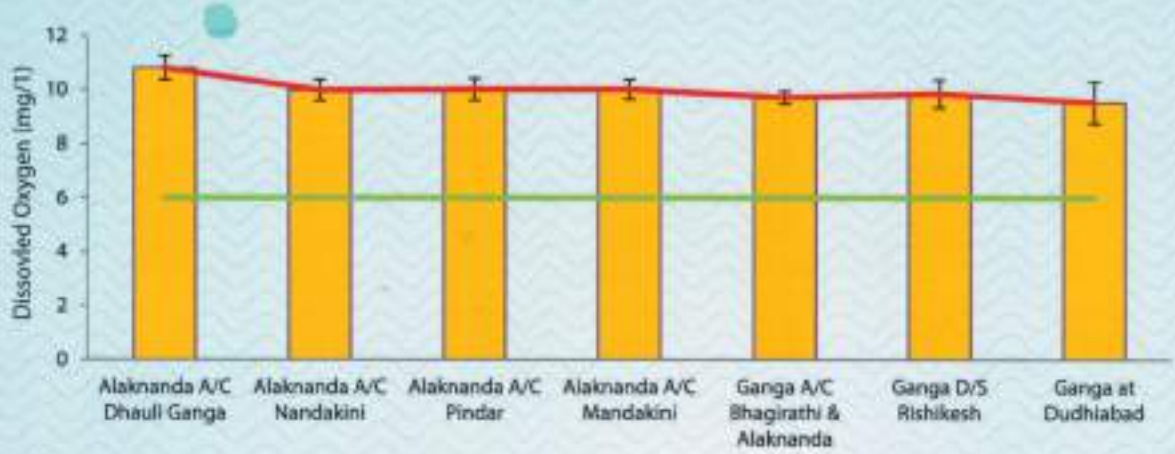
The city is situated on the right bank of the Ganga river, at the foothills of the Shivalik ranges. Most significant of the events is the Kumbhamela, which is celebrated every 12 years in Haridwar.

S.No.	Location	Parameters	Min Value	Max Value	S.D	Mean Value
1	Upper Ganga Canal at Lalitarao Bridge	pH	7.62	8.4	0.25	8
		Dissolved Oxygen	9	10	0.35	9.48
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	110	130	14.14	120
2	Upper Ganga Canal down stream Har Ki Pauri	pH	7.54	8.4	0.28	7.9
		Dissolved Oxygen	9	10.2	0.40	9.66
		Biological Oxygen demand	1.0	1.0	0	1.0
		Total Coliform	80	90	7.07	85
3	River Ganga at Dudhiabad	pH	7.64	8.44	0.26	8
		Dissolved Oxygen	8.2	10.8	0.78	9.53
		Biological Oxygen demand	1.0	1.2	0.05	1.01
		Total Coliform	70	90	14.14	80

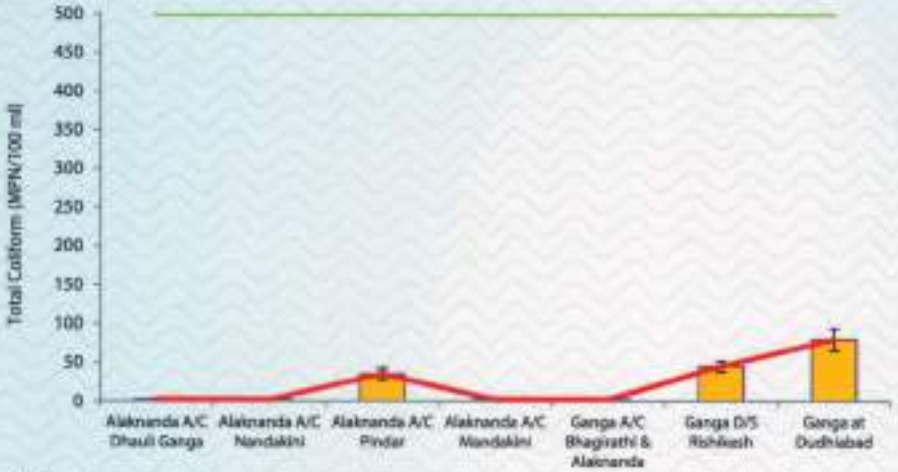
Designated best use criteria- 'B' (Outdoor Bathing).



pH of River Alaknanda and River Ganga water at different sites



Dissolved Oxygen level in River Alaknanda and River Ganga at different sites



Total Coliform in River Alaknanda and River Ganga at different sites

Biochemical Oxygen Demand in River Alaknanda and River Ganga at different sites

SUMMARY

The river water quality of the river Alaknanda and Ganga is compared with the designated best use criteria evolved by CPCB.

Class	Designated best use	Water Quality Criteria
Class A	Drinking water source without conventional treatment but after treatment but after disinfection	Dissolved Oxygen-6.0 mg/l or more Biochemical Oxygen Demand-2.0 mg/l or less, Total Coliform-50 MPN/100 mL
Class B	Outdoor bathing	Dissolved Oxygen-5mg/l or more biochemical Oxygen Demand-3 mg/l or less. Fecal Colifrom-500 MPN/100 ml (desirable), 2500 MPN/100 ml (maximum permissible).
Class C	Drinking water source with conventional treatment followed by disinfection	Dissolved Oxygen-4mg/l or more Biochemical Oxygen Demand-3mg/l or less, total coliform-5000 MPN/100 ml.
Class D	Propagation of wildlife and Fisheries	Dissolved Oxygen-4mg/l or more Free ammonia-1.3 mg/l.
Class E	Irrigation, Industrial Cooling and Controlled Waste Disposal	Electrical Conductivity- 2,250 mhos/cu. Sodium Absorption Ration-26 or less Boron-2mg/l.

The River water quality at all the location eq. Vishnuprayag, Nandprayag, Karanprayag, Rudarprayg, Devprayag and D/s of Rishikesh are within the prescribed norms for class 'A' (Drinking water source without conventional treatment but after disinfection) of designated best use criteria. The water quality characteristicof river Ganga at Downstream of Haridwar is Class 'B' (Suitable for outdoor bathing) because the total coliform value at the location are higher than the 50 MPN/100 ml. (80 to 120 MPN/100ml) of A category however all the other parameters are within the limit for outdoor bathing class.

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