2017-18

जल गुणवत्ता आँकड़े पुस्तक

Water Quality Data Book

नर्मदा बेसिन संगठन

केन्द्रीय जल आयोग,भोपाल

मार्च 2019

NARMADA BASIN ORGANISATION

Central Water Commission, Bhopal

March 2019

केवल सरकारी उपयोग के लिये

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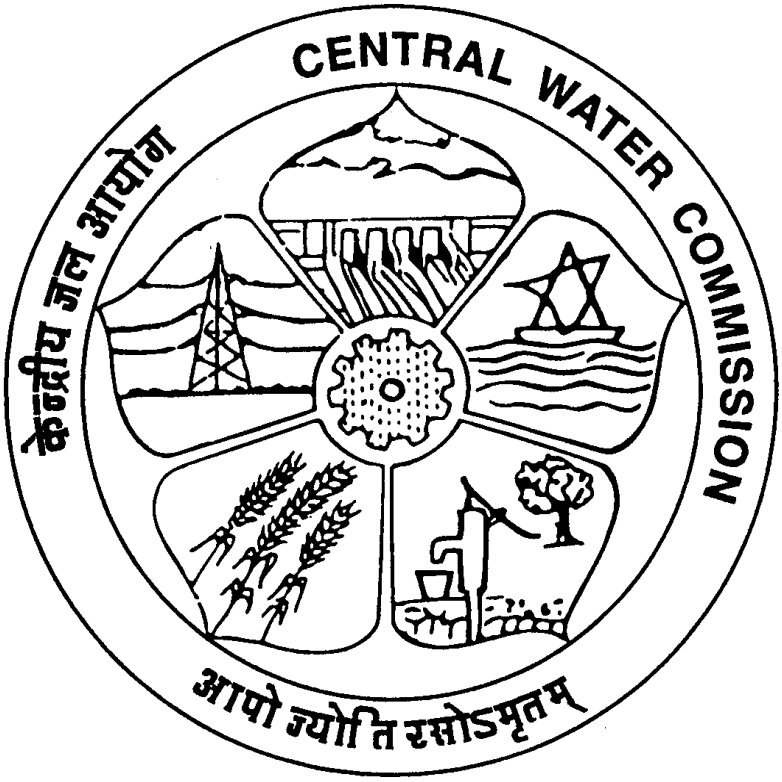
WATER QUALITY DATA BOOK

नर्मदा बेसिन

Narmada Basin

जून 2017 - मई 2018

June 2017 – May 2018



केन्द्रीय जल आयोग

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मार्च 2019

CENTRAL WATER COMMISSION

Narmada Basin Organisation

March 2019

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Abbreviation and Symbols Used

W YEAR	:	Water Year
cumec	:	Cubic metre per second
mmhos/cm	:	Micro mhos per centimetre
+	:	Cation
-	:	Anion
ppm	:	Part per million
m.e./ l	:	Milli equivalent per litre
^{0}C	:	Temperature in degree centigrade
pH	:	Negative logarithm of hydrogen ion concentration
K^{+}	:	Potassium ion
Na^{+}	:	Sodium ion
Ca^{++}	:	Calcium ion
Mg^{++}	:	Magnesium ion
NH_4^{+}	:	Ammonium ion
CO_3^{--}	:	Carbonate ion
HCO_3^{-}	:	Bicarbonate ion
Cl^{-}	:	Chloride ion
F^{-}	:	Fluoride ion
SO_4^{--}	:	Sulphate ion
SO_3^{--}	:	Sulphite ion
NO_3^{-}	:	Nitrate ion
NO_2^{-}	:	Nitrite ion
PO_4^{---}	:	Phosphate ion
SiO_3^{--}	:	Silicate ion
DO	:	Dissolved oxygen
BOD	:	Bio-chemical oxygen demand
Sod % age	:	Sodium percentage
SAR	:	Sodium Adsorption ratio
RSC	:	Residual Sodium Carbonate
NDN	:	Narmada Division
TDN		Tapi Division
NBO	:	Narmada Basin Organisation
MPN	:	Most probable number
mg/l	:	Milligram per litre
max	:	Maximum
min	:	Minimum
WQ	:	Water Quality
Sq km	:	Square Kilometre
m	:	Metre
TDS	:	Total Dissolved Solids
SNR	:	Sample not received
NF	:	No flow
RD	:	River dry
NTU	:	Nephelometeric Turbidity Unit

1 Introduction

1.1 Scope

Watersheds are valuable resource for the country. Adequate knowledge of these watersheds is necessary for a rational formulation of water management policies. Moreover growth of anthropogenic activities in river basins may lead to river pollution. Keeping this in mind, Central Water Commission observed a number of physico-chemical parameters of surface water to understand the water quality of large watersheds.

Narmada Basin is the fifth largest among the twelve major river basins of the country. Narmada is an interstate river having total length of 1312 km, of which 1079 km flows in Madhya Pradesh, 35 km flows along the common border of Madhya Pradesh and Maharashtra, 39 km flows along the border of Maharashtra, and Gujarat and 159 km flows in Gujarat. The total basin area is approximately 98796 sq km, out of which 85859 sq km lies in Madhya Pradesh, 1538 sq km in Maharashtra and 11399 sq km. lies in Gujarat. The river originates from the Amarkantak Plateau of Maikal range at about 1057 metre above Mean Sea Level (MSL) and major part flows through narrow elongated trough running east to west with slight inclination towards the south, before it drains into the Arabian Sea at the Gulf of Khambat near Bharuch in Gujarat.

In its 1312 km long stretch, tributaries of various sizes contribute water and their pollution load to the Narmada River. A characteristic change in the water quality is expected when the tributaries join the river. There are about 19 major tributaries of Narmada listed by Narmada Water Disputes Tribunal, out of which eight are being considered for water quality assessment during present observation period.

1.2 Sources of Information

During the reporting period of 2017-2018 the results of water sample analysis carried out in the laboratory at Narmada Division Bhopal are compiled in this report. The water samples were collected at 16 hydro meteorological and water quality monitoring stations in Narmada basin on monthly basis, the same are shown in Plate-1. Out of 16, 14 water quality stations are functioning under the administrative control of Narmada Division, Bhopal while two stations (at Sl No. 1 and 2 of the Table1-1) are under the administrative control of Tapi Division, Surat. These stations are functioning under plan scheme viz. “Development of Water Resources Information System”, during 12th Five Year Plan. The sites and the codes of Water Quality Observation Stations in the Narmada basin are given in Table 1-1.

Table 1-1, Water Quality Observation Stations in Narmada Basin Organization

Sr.	Name of River/Station	Code No.	Sr.	Name of River/Station	Code No.
1.	Orsang at Chandwada	10215032	9.	Shakkar at Gadarwara	10215012
2.	Narmada at Garudeshwar	10215030	10.	Narmada at Barman	10215011
3	Narmada at Mandleshwar	10215026	11.	Sher at Belkheri	10215010
4	Kundi at Kogaon	10215025	12.	Hiran at Patan	10215009
5.	Narmada at Handia	10215022	13.	Banjar at Bamni	10215006
6.	Ganjal at Chhidgaon	10215020	14.	Burhner at Mohgaon	10215004
7.	Narmada at Hoshangabad	10215019	15.	Narmada at Manot	10215002
8.	Narmada at Sandia	10215013	16.	Narmada at Dindori	10215001

1.3 Availability of Water Quality Data

The dates of starting water quality observations on the various water quality stations are given in **Table 1-2**. Long-term monitoring data may facilitate to assess and give an idea of the status of the aquatic environment in the Narmada basin.

Table 1-2, Details of Sites on Narmada River

Sl. No	Name of Site	Site Opening Date	Data availability
Group 'A' : Sites in operation	Orsang at Chandwada	15.03.1980	Up to date
	Narmada at Garudeshwar	15.06.1977	- do -
	Narmada at Barmanghat	01.06.1979	- do -
	Narmada at Mandleshwar	15.06.1979	- do -
	Narmada at Hoshangabad	15.07.1979	- do -
	Narmada at Handia	01.08.1979	- do -
	Shakkar at Gadarwara	16.08.1979	- do -
	Narmada at Sandia	15.09.1979	- do -
	Narmada at Manot	01.01.1980	- do -
	Hiran at Patan	01.09.1986	- do -
	Sher at Belkheri	01.09.1986	- do -
	Burhner at Mohgaon	15.09.1986	- do -
	Kundi at Kogaon	15 .09.1986	- do -
	Ganjal at Chhidgaon	16.09.1986	- do -
	Narmada at Dindori	15.03.1990	- do -
	Banjar at Bamni	20.06.1999	- do -

Sl. No	Name of Site	Site Opening Date	Data availability
Group 'B' Sites closed	Uri at Dhulsar	01.07.2008	Closed on 31.03.2017
	Goi at Pati	01.07.2008	Closed on 01.03.2017
	Narmada at Jamtara	28.10.1971	Closed on 31.03.2001
	Narmada at Rajghat	15.06.1979	Closed on 01.07.2007
	Chhota Tawa at Ginnore	16.07.1979	Closed on 31.03.1999
	Banjar at Hridaynagar	01.09.1986	Closed on 07.04.2002
	Tawa at Manegaon	15.09.1986	Closed on 20.08.1991
	Narmada at Mortakka	01.09.1999	Closed on 01.07.2007

1.4 Common Characteristics of Water

The water samples received at Divisional Laboratories are stored in deep freezer and analysed for various physical, chemical and biological parameters as mentioned in **Table 1-3**.

Table 1-3, Parameters analysed at the Divisional Laboratory

Physical					
1	Colour	3	EC_GEN (µmho/cm)	5	TDS (mg/L)
2	Odour	4	pH_GEN (pH units)	6	Temp (deg C)
				7	Turb (NTU)
Chemical					
1	Alk-Phen (mg $CaCO_3$/L)	6	F (mg/L)	11	NO_2+NO_3 (mg N/L)
2	ALK-TOT (mg $CaCO_3$/L)	7	HCO_3 (mg/L)	12	NO_2-N (mg N/L)
3	Ca (mg/L)	8	K (mg/L)	13	NO_3 -N (mg N/L)
4	Cl (mg/L)	9	Mg (mg/L)	14	o-PO_4-P (mg P/L)
5	CO_3 (mg/L)	10	Na (mg/L)	15	SiO_2 (mg/L)
				16	SO_4 (mg/L)
Trace and Toxic			1. Al (mg/L) *		
Biological					
1	BOD (mg/L)	3	DO (mg/L)		
2	COD (mg/L)	4	DO_SAT% (%)		
Chemical Indices					
1	HAR_Ca (mg $CaCO_3$/L)	3	Na% (%)	5	SAR (-)
2	HAR_Total (mg $CaCO_3$/L)	4	RSC (-)		

2 Water Quality Observation

2.1 Sampling

The periodicity of collection of water samples is monthly i.e., on the first working day of the month provided that the samples reaches to the Divisional Laboratory at Bhopal on the next day. These water samples are collected at 0.6 times the depth from surface without disturbing the bottom sediments, from the point across the river section having maximum depth or maximum flow along the cross section of the river, so that sample must be representative of the source (i.e. water stream) that is to be evaluated. The samples are collected in clean and pre-rinsed plastic bottles of one litre capacity, filled up to their full capacity without air bubbles. Measurements of some other parameters like in-situ temperature; depth, velocity of water etc. are written on paper slip and pasted on the polythene bottles for identification. The water samples thus collected are sent for analysis to Divisional Laboratory Bhopal by special messenger so as to reach within 24 hours of collection for minimum changes, if any, in the properties during the transit period (time when the samples are collected and the time when they are analysed).

2.2 Method of Analysis

The water sample preserved in laboratory is analysed using standard analytical and/or instrumental methods, which are quick, usually much faster than purely chemical procedures and suited for number of routine analysis. The quantitative estimation for the parameters detailed above are determined by titrimetric methods, electrical methods and optical methods. The applications of different methods to analyse physical and chemical characteristics of water sample are summarized below.

2.2.1 Physical Characteristics

The major physical characteristics or parameters of water are,

- **Discharge** in cumecs is measured by current meter and this average rate of volume of water with concentration of pollutant give the possibility to detect significant pollution sources and its peaking factor.

- **Colour** in water is the result of dissolved extracts from metals in rocks and soil, from organic matter in soil and plants, and occasionally from industrial by-products. The colour of the water sample is determined by visual comparison method.

- **Odour** of the water sample is determined by qualitative human receptor method.

- The in-situ **temperature** in degree centigrade is measured by thermometer and is recorded to decide the intended use of water, the treatment process to remove impurities and its transport.

- The **pH** of water is measure of the acidic or basic nature of the water. Water with pH lower than 7 are acidic and those with a higher pH are basic. This is observed with a pH meter which actually measures the electrical potential exerted by the H^+ ions.

- Measuring its **electrical resistance** between two electrodes dipped in the sample and comparing its resistance with the resistance of a standard solution of potassium chloride at 25° C by Electrical Conductivity meter determines the conductivity of the water sample. The value of conductivity coefficient is measured in micro-mhos/cm and is an indicator of type of dissolved salts in water.

- **Total Dissolved Solids (TDS)** concentration in mg/l, in conjunction with a detailed chemical analysis, is used to assess the suitability of various water sources for alternative uses such as industry or agriculture. Its value should be between 0.55 and 0.70 of the conductivity coefficient. This is measured with a potentiometer.

- **Turbidity** is defined as the presence of soil particles, clay, silt and other colloidal impurities in the water which obstruct the passage of light through water and hence decreases the clarity of water. The degree of turbidity measured in NTU depends on the fineness of the particles and their concentration. This is measured with a turbidity meter (discussed under nephelometeric method) by measuring the interference to the passage of light through a water sample. Surface waters in which there is significant increase in the level of turbidity after a rainfall are often identified as "flashing waters". Such water is more difficult to treat than waters in which the level of turbidity remains reasonably constant.

2.2.2 Chemical Characteristics

The common tests used to quantify the inorganic constituents of water are:

- **Titrimetric Method**: The term titrimetric analysis refers to quantitative chemical analysis carried out by determining the volume of a solution of accurately known concentration (standard solution), which is required to react with the known volume of solution of the substance to be determined. The end point of titration is detectable by perceptible change of colour of the solution produced usually by the addition of an auxiliary reagent known as indicator. Parameters determined by this technique are **Carbonate, Bicarbonate, Chloride, Calcium, Magnesium, Oxygen Absorbed in four Hrs, Chemical Oxygen Demand [COD], Dissolved Oxygen [DO] and Biochemical Oxygen Demand [BOD].**

- **Spectrophotometeric/ Colorimeteric Method**: This instrument works on measurement of the amount of optical energy of a particular wavelength absorbed/transmitted by the solution. The instruments used in this method are UV Double Beam Spectrophotometer. A series of standard solutions of known concentration are prepared and treated with appropriate reagents to produce colored solution. Then the light of specific wavelength is passed through the standard solutions. The transmittance / absorbency is plotted against the concentration and this is termed as calibration or reference curve. Water samples are treated with the same reagents for colour development under the same experimental conditions and then transmittance/ absorbance is measured. Concentration of the constituent is being determined from calibration curve. Parameters analysed by this method are **Iron, Chromium, Ammonium, Fluoride, Nitrate, Nitrite, Phosphate and Silicate.**

- **Flame Spectrophotometery Method:** This is also an optical method of analysis based on measurement of the amount of energy of a particular wavelength emitted. If a solution containing 'a metallic salt is aspirated into a flame, the metal atoms are excited by the thermal energy of the flame and then electrons in the ultimate shell go to higher energy levels and eventually return to ground state and emit the energy in form of radiation. The filter, interposed between the flame and the photocell detector, is used to select a given emission line. To convert the measured emission values into the concentration of the substance being determined, a calibration curve is plotted by aspirating into the flame, samples of solutions containing known concentration of salts (standard solution). A graph is plotted with measured emission against the concentration of solutions. Then the test samples are aspirated for flame emission and emission intensity is measured. From these values of emission from unknown test solution, concentration of substance can be determined from the calibration curve. Parameters estimated through this method are **Sodium and Potassium**.

- **Nephelometeric Method**: The measurement of the intensity of the scattered light at right angles to the direction of the incident light as a function of the concentration of the solution is the basis of nephelometric analysis. The calibration curve is plotted by measuring the scattering intensity of standard sulphate solutions added with barium chloride to inhibit the growth of micro crystals of barium sulphate against concentration of solution. Then the test samples are allowed for scattering. The concentration of sulphate-ion content of unknown solution is determined from the calibration curve. Turbidity of the water sample is measured directly by calibrating the instrument with standard turbid solution of 10% Hexamethylene and 1 % Hydrazine sulphate. The parameter analysed by nephelometric method are **Sulphate and turbidity.**

2.3 Explanatory Notes

For dissemination of processed information, the water quality database has been tabulated in succeeding pages for making realistic assessments. The information is grouped under two headlines, namely, History Sheet and Water Quality Data of hydrological station. Tabular summaries bring together processed data from selected stations detailed previously in this book. These explanatory notes below are designed to assist in the interpretation of characteristics incorporated in the book.

- Frequency of publication of "**Water Quality Data Book**" is annual and water year starts from 1st June of every calendar year to the 31st May of the next calendar year and covers one complete hydrological cycle. This book presents updated water quality data for the period 1st June 2017 to 31st May 2018.

- In the history sheet, a catalogue is designed to identify the hydrological records grouping name of river basin, location, catchments area, period of the stream flow and water quality (including general comment on sediment transport) record and status of water quality.

- Every permanent site is given a unique identifier code that will be used to denote all data and other Information pertinent to the site. A unique nine-column numeric code system is

used for site identification to facilitate multi data storage and its retrieval. The first two columns are identifiers measuring authority. Third and fourth columns are for drainage zone/basin. Fifth and Sixth columns are for Independent River and last three i.e. seventh, eighth and ninth columns are for station numbers within the region.

- The following four chemical indices namely Hardness number, Sodium percentage, Sodium Absorption Ratio and Residual Sodium Carbonate are calculated by empirical formula taking different observed values. These are detailed below:

Hardness number

Calcium and Magnesium are the principle ions that make the water hard. Hardness is expressed in milligrams per litre of equivalent Calcium Carbonate. Hardness Number is expressed by:

$$\textbf{Hardness Number} = (\mathbf{Ca^{++} + Mg^{++}}) \times \mathbf{50}$$

Sodium percentage

Salts of Calcium, Magnesium, Sodium and Potassium in irrigation water are critical for almost all crops. In excessive quantities these salts reduce the osmotic activity of plants, preventing the absorption of nutrients by plant and indirect chemical effects on the metabolism of the plant. These ions also affect soil permeability, preventing adequate drainage or aeration. Percent Sodium is defined as the percentage of the Sodium content of water in the total cations content.

Sodium percentage is determined by dividing the Sodium content by the sum of Calcium, Magnesium, Sodium and Potassium contents by formula given below:

$$\textbf{Sodium Percentage} = \frac{\mathbf{Na^{+}} \times \mathbf{100}}{\mathbf{Ca^{++} + Mg^{++} + Na^{+} + K^{+}}}$$

($\boldsymbol{all\ expressed\ as\ milliequivalents\ per\ litre}$)

Sodium Absorption Ratio

Since Calcium and Magnesium will replace Sodium more readily than vice versa, the ratio reflects the Sodium hazard. The SAR indicates the relative activity of the Sodium ions in exchange reactions with the soil. Irrigation water with a high SAR will cause the soil to tighten up. The Sodium Adsorption Ratio (SAR) is defined as:

$$\textbf{Sodium Absorption Ratio} = \frac{\mathbf{Na^{+}}}{\left[\frac{(\mathbf{Ca^{++} + Mg^{++}})}{\mathbf{2}}\right]^{\mathbf{1/2}}}$$

(Residual Sodium Carbonate)

Residual Sodium Carbonate is calculated using the following formula

$$\textbf{Residual Sodium Carbonate} = (\mathbf{CO_3^{--} + HCO_3^{-}}) - (\mathbf{Ca^{++} + Mg^{++}})$$

The U.S. Department of Agriculture has classified irrigation waters in four groups depending on SAR and the specific conductance (Diagram for classification and use of Irrigation Water is given at **Annexure -1**. Classification of water sample for suitability of agriculture as per salinity diagram is indicated lastly on compilation sheet.)

2.4 Comments on Site-wise Data of Water Quality for 2017-18

Orsang at Chandwada

The degree of Hardness Number at this Station showed the range of medium hard water. The fluoride values were within their respective tolerance limits. The pH values were above the tolerance limit on 01.06.2017 (8.8) and on 01.05.2018 (9.3). The BOD values were above the tolerance limit on 01.07.2017 (2.0), on 03.10.2017 (3.1), on 01.01.2018 (2.9) and on 01.05.2018 (2.5). The load of chemical constituents varied within the tolerance limit, hence water qualified for all use class A, B, C, D, and E.

Narmada at Garudeshwar

The degree of Hardness Number at this Station showed the range of medium hard water. The BOD values were above the tolerance limits on 01.08.2017 (2.0), and on 03.10.2017 (2.4). The pH and fluoride values were within their respective tolerance limits. The ionic concentration varied in value below the prescribed limits, hence water stream qualified for all designated classes A, B, C, D, and E.

Narmada at Mandleshwar

The water stream at this site has been found to be generally within 'Medium Hard' range. The pH, fluoride, BOD and other parameters values were within their respective tolerance limits for all designated use classes A, B, C, D, and E.

Kundi at Kogaon

The water at this station was alkaline and hardness number showed the range for 'Hard Water' and diluting to 'Medium Hard' range during monsoon period. The pH, fluoride, BOD and other parameters were within their respective tolerance limits, hence the water stream qualified for all designated classes A, B, C, D, and E.

Narmada at Handia

The hardness number showed the range of 'Medium Hard' water values. The pH, fluoride, BOD and other parameters varied in values below the prescribed limits; hence the water stream at this station qualifies suitable for all usable classes A, B, C, D & E.

Ganjal at Chhidgaon

The degree of hardness number classified the water stream toward 'Hard Water' type. Ionic concentrations were below the prescribed tolerance limit. The BOD values were above the tolerance limits on 05.03.2018 (2.7), on 02.04.2018(2.4) and on 01.05.2018 (2.1). The pH and Fluoride values were within the tolerance limit for all designated use classes.

Narmada at Hoshangabad

Generally, the degree of hardness remained within the values of 'Medium Hard Water'. The pH, fluoride and BOD values were within the tolerance limit for all designated use classes. The ionic concentrations of other constituents were quite lower than the tolerance limits hence the same are non-interfering.

Narmada at Sandia

The degree of hardness showed the values more towards 'Medium Hard Water'. The pH fluoride & BOD values recorded were within the tolerance limits. The concentration of anions and cations were lower than their respective tolerance limits, hence the water stream at this station qualifies suitable for all usable classes A, B, C, D & E.

Shakkar at Gadarwara

Hardness number projected the water of 'Medium Hard Water' type throughout the year. The pH and fluoride values were within the tolerance limit for all designated use classes. The BOD value was above the tolerance limit only on 01.01.2018 (2.2).

Narmada at Barmanghat

The water at this station was 'Medium Hard Water' range. The BOD, pH and Fluoride values were within the tolerance limit for all designated use classes A, B, C, D & E.

Sher at Belkheri

The degree of hardness observed towards 'Hard Water' range in most number of samples. The BOD values were above the tolerance limits on 05.03.2018 (2.5), on 02.04.2018 (2.2) and on 01.05.2018 (2.0). The pH values and fluoride concentrations were within the limit for all designated use classes. Ionic concentrations are non-interfering as pollutants due to their low concentrations from maximum prescribed limit of designated best user classes A, B, C, D and E.

Hiran at Patan

The hardness number values projected water channel as 'Medium Hard Water' range. Ionic concentrations were below the prescribed tolerance limit. The BOD, pH and Fluoride values were within the tolerance limit for all designated use classes.

Banjar at Bamni

The degree of hardness at this station is within 'Medium Hard Water' range. Conductivity values are quite low in spite of low discharge. The ionic concentrations of all the chemical constituents analysed were below the tolerance limit attributed to all user classes A, B, C, D and E.

Burhner at Mohgaon

The pH, B.O.D, Fluoride and other chemical parameters were within their respective tolerance limits. The low concentration of pollutant constituents qualifies the water stream suitable for user classes A, B, C, D and E.

Narmada at Manot

The degree of hardness is within 'Medium Hard' range. The pH, BOD and Fluoride values were within their respective tolerance limits for all designated use classes. The low concentration of pollutant constituents qualifies the water stream suitable for all user classes A, B, C, D and E.

Narmada at Dindori

The water exhibited 'Medium Hard' water as per hardness number. The pH, BOD and fluoride values and all other parameters were within their tolerance limit for all designated user classes A,B,C,D and E.

3 Analysis Results

3.1 General

Based on discussion presented in Chapter 1 and 2, the results of chemical analysis carried out at each of 16 sites in respect of 24 parameters are presented in this chapter.

3.1.1 Method of Presentation

In the succeeding pages station wise water quality data/ parameters are presented comprising of history sheet and water quality analysis results in tabular form. The series of the water quality observation stations is arranged from the mouth of the river to the upstream giving priority to an intermediate tributary station in a similar fashion.

History sheets give brief description of the water quality observation station. This sheet also contains the status of water quality at the site as per Bureau of Indian Standard IS: 2296-1982. The water analysis result tables are given for the river water only and for the parameters analysed at the site and at the laboratory. The table showing tolerance limits of water quality parameters for various uses of water as per IS: 2296-1982 is given as Annexure -2.

3.2 Orsang at Chandwada

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Orsang at Chandwada**	**Code**	**:**	**01 02 15 032**
State	:	Gujarat	District		Vadodara
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Orsang	Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Orsang
Division	:	Tapi Division, Surat	Sub-Division	:	LNSD Bharuch
Drainage Area	:	3846 Sq. Km.	Bank	:	Right
Latitude	:	22°01'48"	Longitude	:	73°25'30"
		Opening Date	Closing Date		
Gauge	:	11/01/1979			
Discharge	:	01/11/1979			
Sediment	:	01/08/1988			
Water Quality	:	15/03/1980			

Water Quality Datasheet for the period : 2017-2018

Station Name : Orsang at Chandwada (01 02 15 032) Division : Tapi Division, Surat

Local River : Orsang Sub-Division: LNSD Bharuch

River Water Analysis

S.No	Parameters	01/06/17	01/07/17	01/08/17	04/09/17	03/10/17	01/11/17	04/12/17	01/01/18	02/02/18	01/05/18
		A	A	A	A	A	A	A	A	A	A
	PHYSICAL										
1	Q (cumec)	0	0	25.04	112.46	30.43	0	0	0	0	0
2	Colour_Cod (-)	Clear	Clear	Clear	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_FLD (µmho/cm)	700									
4	EC_GEN (µmho/cm)	650	522	385	462	440	480	500	625	682	1535
5	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
6	pH_FLD (pH units)	8.8	8.4	7.2	8.3	7.5	7.4	7.9	8.2	8.0	9.3
7	pH_GEN (pH units)	8.1	8.2	7.9	8.0	8.1	7.9	8.2	8.0	7.5	8.6
8	SS (mg/L)	230	160	150	140	145	170	190	280	270	67
9	TDS (mg/L)	420	339	250	302	289	300	350	409	448	912
10	Temp (deg C)	27.0	28.0	26.0	24.0	25.0	19.0	17.0	14.0	15.0	28.0
11	TS (mg/L)	650	499	400	442	434	470	540	689	518	979
12	Turb (NTU)	1.0	1.0	2.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8
2	ALK-TOT (mgCaCO3/L)	155	120	110	150	100	100	100	180	120	189
3	Ca (mg/L)	48	40	36	48	40	41	38	48	36	45
4	Cl (mg/L)	100.0	68.0	70.0	55.0	85.0	68.0	70.0	60.0	74.0	156.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
6	F (mg/L)	0.14	0.13	0.11	0.11	0.14	0.14	0.26	0.14	0.13	0.31
7	HCO3 (mg/L)	189	146	134	183	122	122	122	220	146	179
8	K (mg/L)	4.0	3.6	4.6	6.8	6.0	5.0	4.6	4.8	3.8	
9	Mg (mg/L)	11.7	6.1	12.2	7.3	7.3	6.6	5.0	14.6	14.6	23.6
10	Na (mg/L)	70.0	52.0	42.0	42.0	56.0	40.0	48.0	48.0	46.0	
11	NH3-N (mg N/L)	0.13	0.13	0.06	0.13	0.12	0.14	0.16	0.21	0.12	0.22
12	NO2+NO3 (mg N/L)	0.16	0.21	0.16	0.26	0.19	0.20	0.24	0.20	0.18	0.64
13	NO2-N (mgN/L)	0.06	0.10	0.05	0.08	0.06	0.10	0.08	0.10	0.06	0.09
14	NO3-N (mgN/L)	0.10	0.11	0.11	0.18	0.13	0.10	0.16	0.10	0.12	0.55
15	o-PO4-P (mg P/L)										0.080
16	P-Tot (mgP/L)	0.140	0.130	0.130	0.100	0.150	0.150	0.130	0.140	0.130	0.080
17	SiO2 (mg/L)	6.0	8.0	10.0	12.0	8.0	8.0	6.0	10.0	10.0	38.9
18	SO4 (mg/L)	10.0	10.0	6.0	5.0	14.0	13.0	10.0	6.0	6.0	19.4
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)	1.2	2.0	1.0	1.0	3.1	1.0	1.8	2.9	1.8	2.5
2	COD (mg/L)	36.0	6.0	32.0	24.0	56.0	24.0	20.0	12.0	10.0	
3	DO (mg/L)	8.5	8.0	8.0	8.0	8.2	8.0	8.3	8.0	8.1	5.2
4	DO_SAT% (%)	107	102	99	95	99	86	86	78	80	67
5	FCol-MPN (MPN/100mL)	1500	1200	600	800	600	1100	700	400	300	
6	Tcol-MPN (MPN/100mL)	2800	2700	1200	2000	1400	2400	1600	1200	700	
	TRACE & TOXIC										
1	Al (mg/L)	0.12	0.12	0.09	0.12	0.10	0.14	0.06	0.16	0.12	0.07
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	120	100	90	120	100	103	95	120	90	113
2	HAR_Total (mgCaCO3/L)	169	126	141	151	131	131	116	181	151	211
3	Na% (%)	47	47	38	37	47	39	46	36	39	
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	2.4	2.0	1.5	1.5	2.1	1.5	1.9	1.6	1.6	

Water Quality Summary for the period :2017-2018

Station Name : Orsang at Chandwada (01 02 15 032) Division : Tapi Division, Surat

Local River : Orsang Sub-Division : LNSD Bharuch

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_FLD (µmho/cm)	1	700	700	700
3	EC_GEN (µmho/cm)	10	1535	385	628
4	pH_FLD (pH units)	10	9.3	7.2	8.1
5	pH_GEN (pH units)	10	8.6	7.5	8.1
6	SS (mg/L)	10	280	67	180
7	TDS (mg/L)	10	912	250	402
8	Temp (deg C)	10	28.0	14.0	22.3
9	TS (mg/L)	10	979	400	593
10	Turb (NTU)	10	3.0	1.0	1.9
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	10	20.8	0.0	2.1
2	ALK-TOT (mgCaCO3/L)	10	189	100	132
3	Ca (mg/L)	10	48	36	42
4	Cl (mg/L)	10	156.0	55.0	80.6
5	CO3 (mg/L)	10	25.0	0.0	2.5
6	F (mg/L)	10	0.31	0.11	0.16
7	HCO3 (mg/L)	10	220	122	156
8	K (mg/L)	9	6.8	3.6	4.8
9	Mg (mg/L)	10	23.6	5.0	10.9
10	Na (mg/L)	9	70.0	40.0	49.3
11	NH3-N (mg N/L)	10	0.22	0.06	0.14
12	NO2+NO3 (mg N/L)	10	0.64	0.16	0.24
13	NO2-N (mgN/L)	10	0.10	0.05	0.08
14	NO3-N (mgN/L)	10	0.55	0.10	0.17
15	o-PO4-P (mg P/L)	1	0.080	0.080	0.08
16	P-Tot (mgP/L)	10	0.150	0.080	0.128
17	SiO2 (mg/L)	10	38.9	6.0	11.7
18	SO4 (mg/L)	10	19.4	5.0	9.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	10	3.1	1.0	1.8
2	COD (mg/L)	9	56.0	6.0	24.4
3	DO (mg/L)	10	8.5	5.2	7.8
4	DO_SAT% (%)	10	107	67	90
5	FCol-MPN (MPN/100mL)	9	1500	300	800
6	Tcol-MPN (MPN/100mL)	9	2800	700	1778
	TRACE & TOXIC				
1	Al (mg/L)	10	0.16	0.06	0.11
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	10	120	90	105
2	HAR_Total (mgCaCO3/L)	10	211	116	151
3	Na% (%)	9	47	36	42
4	RSC (-)	10	0.0	0.0	0
5	SAR (-)	9	2.4	1.5	1.8

Water Quality Seasonal Average for the period: 2013-2018

Station Name : Orsang at Chandwada (01 02 15 032) Division : Tapi Division, Surat

Local River : Orsang Sub-Division : LNSD Bharuch

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar – May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
	PHYSICAL															
1	Q (cumec)															
2	EC_FLD (µmho/cm)		300	600	350	700		600	600	650			600		300	
3	EC_GEN (µmho/cm)	386	456	424	383	492	651	403	370	553	572	703	530		580	1535
4	pH_FLD (pH units)		7.0	7.0	7.8	8.0		7.0	7.0	8.2	7.9		7.0		8.0	9.3
5	pH_GEN (pH units)	8.1	8.4	8.2	8.0	8.1	7.8	8.3	8.2	8.2	7.9	8.4	8.0		8.2	8.6
6	SS (mg/L)	130	163	138	130	165	223	140	110	165	228	233	220		190	67
7	TDS (mg/L)	251	286	274	253	320	440	262	240	359	377	466	340		384	912
8	Temp (deg C)	26.5	28.3	24.0	25.0	26.0	19.5	19.0	20.0	13.5	16.3	24.0	25.0		24.0	28.0
9	TS (mg/L)	381	450	789	383	485	662	467		524	632	699	700		574	979
10	Turb (NTU)	13.0	5.7	3.0	16.0	1.6	2.0	1.0	1.0	1.0	2.3	1.0	1.0		1.0	2.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	6.1	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	5.8	0.0		0.0	20.8
2	ALK-TOT (mgCaCO3/L)	107	99	97	93	127	111	95	103	167	125	122	197		100	189
3	Ca (mg/L)	33	35	31	35	42	32	28	34	38	41	38	47		32	45
4	Cl (mg/L)	85.5	75.3	72.5	71.5	75.6	100.0	66.5	58.0	67.5	68.0	100.0	65.0		58.0	156.0
5	CO3 (mg/L)	0.0	7.3	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	7.0	0.0		0.0	25.0
6	F (mg/L)	0.15	0.13	0.13	0.10	0.13	0.15	0.20		0.13	0.17	0.20	0.14		0.14	0.31
7	HCO3 (mg/L)	130	106	118	113	155	136	110	126	204	153	134	240		122	179
8	K (mg/L)	6.9	3.9	4.1	3.7	5.0	5.3	4.0	3.6	3.6	4.6	3.4	3.6		3.8	
9	Mg (mg/L)	6.4	7.7	11.5	7.3	8.9	7.3	10.0	7.3	20.7	10.2	8.0	19.0		4.9	23.6
10	Na (mg/L)	63.0	48.7	44.0	43.0	52.4	75.4	45.4	40.4	44.4	45.5	72.0	42.6		41.0	
11	NH3-N (mg N/L)	0.13	0.15	0.12	0.13	0.11	0.14	0.12	0.12	0.13	0.16	0.20	0.13		0.12	0.22
12	NO2+NO3 (mg N/L)	0.19	0.19	0.22	0.17	0.20	0.21	0.20	0.19	0.20	0.20		0.20		0.18	0.64
13	NO2-N (mgN/L)	0.06	0.07	0.09	0.06	0.07	0.08	0.07	0.06	0.08	0.08		0.06		0.05	0.09
14	NO3-N (mgN/L)	0.13	0.13	0.13	0.11	0.13	0.13	0.13	0.13	0.11	0.12	0.12	0.14		0.13	0.55
15	o-PO4-P (mg P/L)															0.080
16	P-Tot (mgP/L)	0.220	0.177	0.125	0.135	0.130	0.200	0.120	0.150	0.110	0.137	0.180	0.100		0.150	0.080
17	SiO2 (mg/L)	7.9	8.4	9.0	11.0	8.8	8.5	7.3	8.0	10.0	8.5	7.5	8.6		8.0	38.9
18	SO4 (mg/L)	10.3	8.6	7.5	9.0	9.0	12.6	9.3	6.0	10.0	8.8	16.0	2.0		6.0	19.4
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.8	1.0	0.5	1.3	1.6	1.4	1.7	0.8	1.6	1.9	3.2	4.8		0.6	2.5
2	COD (mg/L)			82.0	28.0	30.8		16.0	24.0	22.0	16.5		37.0		44.0	
3	DO (mg/L)	7.8	6.4	6.8	8.0	8.1		8.0	7.0	7.7	8.1		8.0		4.5	5.2
4	DO_SAT% (%)	98	82	79	97	100		86	77	73	83		97		54	67
5	FCol-MPN (MPN/100mL)		483	250	950	940	400	290	600	1150	625	800	300		1100	
6	Tcol-MPN (MPN/100mL)		1000	450	2200	2020	1000	500	1100	2450	1475	1800	500		2300	
	TRACE & TOXIC															
1	Al (mg/L)	0.12	0.11	0.07	0.07	0.11	0.11	0.07	0.05	0.11	0.12	0.10	0.14		0.08	0.07
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	83	88	78	88	106	80	71	85	95	102	95	118		80	113
2	HAR_Total (mgCaCO3/L)	109	121	126	118	143	110	112	116	181	145	129	197		100	211
3	Na% (%)	52	46	42	43	43	58	46	42	34	40	54	32		46	
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
5	SAR (-)	2.6	1.9	1.7	1.7	1.9	3.1	1.9	1.6	1.4	1.7	2.8	1.3		1.8	

3.3 Narmada at Garudeshwar

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Garudeshwar**	**Code**	**:**	**01 02 15 030**
State	:	Gujarat	District		Bharuch
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:		S ub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Narmada
Division	:	Tapi Division, Surat	Sub-Division	:	LNSD Bharuch
Drainage Area	:	87892 Sq. Km.	Bank	:	Right
Latitude	:	21°53'00"	Longitude	:	73°39'00"
Zero of Gauge (m)	:	10 .000 (M.S.L.)	22/12/1971		
		Opening Date	Closing Date		
Gauge	:	22/12/1971			
Discharge	:	23/03/1972			
Sediment	:	21/03/1973			
Water Quality	:	15/06/1977			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Garudeshwar (01 02 15 030) Division : Tapi Division, Surat

Local River : Narmada Sub-Division : LNSD Bharuch

River Water Analysis

S.No	Parameters	01/06/17	01/07/17	01/08/17	04/09/17	03/10/17	01/11/17	04/12/17	01/01/18	01/02/18	01/05/18
		A	A	A	A	A	A	A	A	A	A
	PHYSICAL										
1	Q (cumec)	31.37	30.6	55.18	50.25	37.12	32.22	29.45	31.65	38.65	23.03
2	Colour_Cod (-)	Clear	Clear	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	400	410	377	448	362	460	320	358	424	456
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_FLD (pH units)	7.0	7.2	6.8	6.6	6.9	6.6	6.8	6.8	6.9	6.4
6	pH_GEN (pH units)	8.2	8.1	8.0	8.2	7.8	8.1	8.1	7.9	8.2	8.2
7	SS (mg/L)	100	115	130	170	120	150	130	80	180	32
8	TDS (mg/L)	260	270	246	295	243	300	230	232	278	287
9	Temp (deg C)	29.0	25.0	26.0	24.0	24.0	21.0	19.0	15.0	21.0	27.0
10	TS (mg/L)	360	385	376	465	363	450	360	312	458	319
11	Turb (NTU)	1.0	1.0	2.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	85	120	80	100	140	100	120	90	100	126
3	Ca (mg/L)	46	49	34	36	36	34	28	38	36	29
4	Cl (mg/L)	110.0	80.0	80.0	60.0	80.0	60.0	65.0	70.0	70.0	32.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.14	0.14	0.14	0.14	0.13	0.13	0.12	0.21	0.14	0.20
7	HCO3 (mg/L)	104	146	98	122	171	122	146	110	122	154
8	K (mg/L)	3.6	3.2	4.0	3.8	4.4	4.8	4.2	4.6	5.0	
9	Mg (mg/L)	2.9	7.1	6.1	9.7	14.6	5.8	18.2	10.2	12.2	15.8
10	Na (mg/L)	60.0	50.0	48.0	36.0	52.0	44.0	44.0	40.0	36.0	
11	NH3-N (mg N/L)	0.12	0.11	0.12	0.05	0.12	0.10	0.12	0.22	0.13	0.16
12	NO2+NO3 (mg N/L)	0.19	0.23	0.24	0.22	0.18	0.22	0.20	0.24	0.23	0.31
13	NO2-N (mgN/L)	0.06	0.10	0.10	0.10	0.08	0.10	0.10	0.10	0.10	0.08
14	NO3-N (mgN/L)	0.13	0.13	0.14	0.12	0.10	0.12	0.10	0.14	0.13	0.23
15	o-PO4-P (mg P/L)										0.110
16	P-Tot (mgP/L)	0.140	0.120	0.150	0.120	0.160	0.160	0.140	0.130	0.130	0.110
17	SiO2 (mg/L)	11.0	10.0	14.0	6.0	8.0	12.0	8.0	10.0	14.0	38.7
18	SO4 (mg/L)	12.0	12.0	8.0	10.0	8.0	10.0	10.0	10.0	10.0	9.1
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)	1.4	1.4	2.0	0.8	2.4	0.8	1.2	1.6	0.8	0.9
2	COD (mg/L)	8.0	40.0	52.0	32.0	8.0	32.0	8.0	16.0	11.0	
3	DO (mg/L)	4.8	6.4	6.4	6.8	7.0	7.5	6.5	7.5	6.8	6.0
4	DO_SAT% (%)	62	77	79	81	83	84	70	74	76	75
5	FCol-MPN (MPN/100mL)	1000	900	300	600	200	400	300	1000	400	
6	Tcol-MPN (MPN/100mL)	2200	1800	900	1200	600	1000	700	2000	1200	
	TRACE & TOXIC										
1	Al (mg/L)	0.12	0.12	0.13	0.11	0.06	0.12	0.08	0.08	0.11	0.03
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	116	121	85	90	90	86	69	95	90	73
2	HAR_Total (mgCaCO3/L)	128	151	111	131	151	110	145	138	141	139
3	Na% (%)	50	41	48	37	42	45	39	38	35	
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	2.3	1.8	2.0	1.4	1.8	1.8	1.6	1.5	1.3	

Water Quality Summary for the period : 2017-2018

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	10	460	320	402
3	pH_FLD (pH units)	10	7.2	6.4	6.8
4	pH_GEN (pH units)	10	8.2	7.8	8.1
5	SS (mg/L)	10	180	32	121
6	TDS (mg/L)	10	300	230	264
7	Temp (deg C)	10	29.0	15.0	23.1
8	TS (mg/L)	10	465	312	385
9	Turb (NTU)	10	2.0	1.0	1.3
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	10	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	10	140	80	106
3	Ca (mg/L)	10	49	28	37
4	Cl (mg/L)	10	110.0	32.0	70.7
5	CO3 (mg/L)	10	0.0	0.0	0
6	F (mg/L)	10	0.21	0.12	0.15
7	HCO3 (mg/L)	10	171	98	130
8	K (mg/L)	9	5.0	3.2	4.2
9	Mg (mg/L)	10	18.2	2.9	10.3
10	Na (mg/L)	9	60.0	36.0	45.6
11	NH3-N (mg N/L)	10	0.22	0.05	0.12
12	NO2+NO3 (mg N/L)	10	0.31	0.18	0.23
13	NO2-N (mgN/L)	10	0.10	0.06	0.09
14	NO3-N (mgN/L)	10	0.23	0.10	0.13
15	o-PO4-P (mg P/L)	1	0.110	0.110	0.11
16	P-Tot (mgP/L)	10	0.160	0.110	0.136
17	SiO2 (mg/L)	10	38.7	6.0	13.2
18	SO4 (mg/L)	10	12.0	8.0	9.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	10	2.4	0.8	1.3
2	COD (mg/L)	9	52.0	8.0	23
3	DO (mg/L)	10	7.5	4.8	6.6
4	DO_SAT% (%)	10	84	62	76
5	FCol-MPN (MPN/100mL)	9	1000	200	567
6	Tcol-MPN (MPN/100mL)	9	2200	600	1289
	TRACE & TOXIC				
1	Al (mg/L)	10	0.13	0.03	0.1
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	10	121	69	92
2	HAR_Total (mgCaCO3/L)	10	151	110	134
3	Na% (%)	9	50	35	42
4	RSC (-)	10	0.0	0.0	0
5	SAR (-)	9	2.3	1.3	1.7

Water Quality Seasonal Average for the period: 2013-2018

Station Name : Narmada at Garudeshwar (01 02 15 030) Division : Tapi Division, Surat

Local River : Narmada Sub-Division : LNSD Bharuch

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
	PHYSICAL															
1	Q (cumec)															
2	EC_FLD (µmho/cm)				348			340	356	405			340	345	500	
3	EC_GEN (µmho/cm)	306	310	357	321	399	405	390	321	317	391	382	330	351	380	456
4	pH_FLD (pH units)	8.2			7.6	6.9		7.8	8.1	6.9	6.8		7.8	7.1	7.0	6.4
5	pH_GEN (pH units)	7.8	8.4	8.2	7.8	8.1	8.2	8.2	8.0	8.3	8.1	8.0	8.2	8.1	8.0	8.2
6	SS (mg/L)	103	115	120	122	127	125	138	105	100	135	100	100	119	110	32
7	TDS (mg/L)	204	203	231	204	263	258	233	208	205	260	237	213	238	247	287
8	Temp (deg C)	24.3	24.3	24.3	24.7	25.6	20.5	15.5	18.0	17.5	19.0	22.0	22.0	22.0	24.0	27.0
9	TS (mg/L)	307	318	462	326	390	383	390	352	307	395	337	313	357	248	319
10	Turb (NTU)	3.3	1.0	1.7	3.3	1.4	1.0	1.0	1.0	1.0	1.3	1.0	1.0	1.0	1.0	1.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	4.7	0.0	0.0	0.0	5.0	1.2	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	90	96	95	87	105	103	91	92	129	102	103	121	120	115	126
3	Ca (mg/L)	31	33	31	30	40	31	28	34	37	34	32	33	34	30	29
4	Cl (mg/L)	67.3	66.7	63.0	60.0	82.0	75.5	61.0	61.5	70.0	66.3	50.0	70.0	50.0	65.0	32.0
5	CO3 (mg/L)	0.0	5.7	0.0	0.0	0.0	6.0	1.5	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.17	0.15	0.14	0.12	0.14	0.15	0.14	0.13	0.13	0.15	0.18	0.15	0.12	0.13	0.20
7	HCO3 (mg/L)	110	106	116	106	128	113	108	112	158	125	110	148	146	140	154
8	K (mg/L)	6.8	4.0	3.7	4.2	3.8	7.4	3.9	3.8	3.7	4.6	4.8	4.6	4.0	4.2	
9	Mg (mg/L)	8.8	6.9	9.3	6.4	8.1	8.0	6.5	7.3	16.4	11.6	7.8	14.4	10.9	10.9	15.8
10	Na (mg/L)	42.0	44.8	38.7	42.0	49.2	51.6	41.3	40.1	41.0	41.0	38.0	44.8	38.0	47.0	
11	NH3-N (mg N/L)	0.11	0.13	0.12	0.18	0.10	0.14	0.16	0.13	0.12	0.14	0.12	0.13	0.13	0.13	0.16
12	NO2+NO3 (mg N/L)	0.18	0.20	0.20	0.20	0.21	0.20	0.24	0.18	0.17	0.22		0.17	0.18	0.18	0.31
13	NO2-N (mgN/L)	0.05	0.09	0.07	0.08	0.09	0.09	0.08	0.05	0.05	0.10		0.04	0.06	0.05	0.08
14	NO3-N (mgN/L)	0.13	0.12	0.13	0.12	0.12	0.11	0.16	0.13	0.11	0.12	0.16	0.13	0.12	0.13	0.23
15	o-PO4-P (mg P/L)															0.110
16	P-Tot (mgP/L)	0.213	0.157	0.130	0.120	0.138	0.200	0.180	0.140	0.125	0.140	0.120	0.150	0.120	0.140	0.110
17	SiO2 (mg/L)	6.5	8.4	8.0	10.7	9.8	8.9	10.4	11.0	12.5	11.0	8.4	5.0	6.0	14.0	38.7
18	SO4 (mg/L)	10.0	10.2	8.5	9.3	10.0	11.2	11.2	10.5	12.0	10.0	16.0	5.0	11.0	12.0	9.1
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.0	0.7	0.6	1.3	1.6	1.6	1.1	1.4	1.1	1.1	3.1	4.9	2.8	1.0	0.9
2	COD (mg/L)			66.7	42.7	28.0		8.0	118.0	18.0	16.8		26.0	80.0	40.0	
3	DO (mg/L)	7.0	6.5		7.1	6.3		6.7	7.6	7.4	7.1		6.9	7.5	8.1	6.0
4	DO_SAT% (%)	82	78		81	77		67	76	77	76		79	86	96	75
5	FCol-MPN (MPN/100mL)		400	400	633	600	600	400	600	500	525	500	600	500	1000	
6	Tcol-MPN (MPN/100mL)		900	833	1373	1340	1200	800	1150	1150	1225	1000	1200	1400	1800	
	TRACE & TOXIC															
1	Al (mg/L)	0.11	0.11	0.09	0.08	0.11	0.07	0.08	0.09	0.08	0.10	0.08	0.12	0.09		0.03
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	77	83	78	74	101	78	70	85	93	85	80	82	85	75	73
2	HAR_Total (mgCaCO3/L)	114	112	117	100	134	111	97	116	161	133	113	142	131	121	139
3	Na% (%)	42	45	41	46	43	48	48	42	36	39	41	40	38	45	
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	1.7	1.8	1.6	1.8	1.9	2.1	1.9	1.6	1.5	1.6	1.6	1.6	1.4	1.9	

3.4 Narmada at Mandleshwar

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Mandleshwar**	**Code**	**:**	**010215026**
State	:	Madhya Pradesh	District		Khargone
			Independent		
Basin	:	Narmada	River	:	Narmada
Tributary	:		Local River	:	Narmada
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-III, Indore
Drainage Area	:	72809 Sq. Km.	Bank	:	Right
Latitude	:	22°10'18"	Longitude	:	75°39'39"
Zero of					
Gauge (m)	:	138 .000 (M.S.L.)	16/12/1970		
		Opening Date	Closing Date		
Gauge	:	16/12/1970			
Discharge	:	28/08/1971			
Sediment	:	14/04/1972			
Water Quality	:	18/06/1979			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Mandleshwar (010215026) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-III, Indore

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	1007.9	713.16	316	175.2	128.7	30.34	163.1	104.3	348.1	91.2	84.8	250.3
2	Colour_Cod (-)	Clear	Clear	Clear	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	242	323	315	450	453	345	336	329	324	358	288	293
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.5	8.0	8.1	8.0	8.2	7.8	7.8	7.9	7.6	7.9	8.3	7.9
6	TDS (mg/L)	152	210	205	292	279	228	227	214	211	233	187	191
7	Temp (deg C)	26.0	27.0	27.0	27.0	27.0	25.0	20.0	17.0	16.0	21.0	24.0	26.0
8	Turb (NTU)	0.0	0.0	36.0	70.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0
2	ALK-TOT (mgCaCO3/L)	123	125	143	193	170	136	143	152	147	152	131	131
3	Ca (mg/L)	29	19	31	42	44	28	32	31	29	28	27	25
4	Cl (mg/L)	6.0	8.0	12.0	22.0	26.0	10.0	14.0	12.0	4.0	13.0	12.0	11.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0
6	F (mg/L)	0.20	0.34	0.36	0.33	0.36	0.34	0.30	0.31	0.33	0.29	0.26	0.26
7	HCO3 (mg/L)	150	153	175	235	208	166	174	186	179	185	147	160
8	K (mg/L)	1.1	1.3	2.4	2.8	3.2	3.0	3.3	2.8	2.7	3.2	1.8	1.9
9	Mg (mg/L)	8.5	14.3	12.6	20.9	13.9	12.6	14.6	14.3	14.3	14.8	12.9	11.7
10	Na (mg/L)	10.1	11.4	14.5	20.4	18.6	18.4	14.2	15.1	15.3	14.5	11.9	15.2
11	NO2+NO3 (mg N/L)	0.13	1.10	1.47	1.28	3.33	3.12	2.81	3.08	2.89	2.05	2.17	0.32
12	NO2-N (mgN/L)	0.02	0.06	0.08	0.07	0.03	0.04	0.04	0.04	0.04	0.03	0.03	0.27
13	NO3-N (mgN/L)	0.11	1.04	1.39	1.21	3.30	3.08	2.77	3.04	2.86	2.02	2.14	0.05
14	o-PO4-P (mg P/L)	0.093	0.264	0.275	0.262	0.114	0.105	0.099	0.137	0.128	0.116	0.105	0.032
15	SiO2 (mg/L)	19.5	23.8	21.3	23.6	22.6	23.4	21.1	21.6	21.4	21.0	21.3	21.6
16	SO4 (mg/L)	6.0	16.3	17.8	14.9	25.1	24.6	23.9	21.9	19.9	19.9	17.8	13.2
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.2	0.4	0.9	1.0	1.2	1.0	0.6	1.2	1.5	1.7	1.4	1.0
2	COD (mg/L)	26.0	39.0	41.0	36.0	36.0	37.0	24.0	44.0	24.0	42.0	46.0	24.0
3	DO (mg/L)	5.8	5.8	5.6	5.7	5.3	5.5	5.3	5.6	5.7	4.9	5.1	5.0
4	DO_SAT% (%)	71	73	70	72	67	67	58	58	58	55	61	62
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	73	48	77	106	110	70	81	79	73	70	67	64
2	HAR_Total (mgCaCO3/L)	108	108	130	193	167	123	142	138	132	132	121	112
3	Na% (%)	17	19	19	18	19	24	18	19	20	19	17	22
4	RSC (-)	0.3	0.4	0.3	0.0	0.1	0.3	0.0	0.3	0.3	0.4	0.2	0.4
5	SAR (-)	0.4	0.5	0.6	0.6	0.6	0.7	0.5	0.6	0.6	0.6	0.5	0.6

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Mandleshwar (010215026) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-III, Indore

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	453	242	338
3	pH_GEN (pH units)	12	8.3	7.5	7.9
4	TDS (mg/L)	12	292	152	219
5	Temp (deg C)	12	27.0	16.0	23.6
6	Turb (NTU)	12	70.0	0.0	11.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	5.2	0.0	0.4
2	ALK-TOT (mgCaCO3/L)	12	193	123	146
3	Ca (mg/L)	12	44	19	31
4	Cl (mg/L)	12	26.0	4.0	12.5
5	CO3 (mg/L)	12	6.3	0.0	0.5
6	F (mg/L)	12	0.36	0.20	0.31
7	HCO3 (mg/L)	12	235	147	177
8	K (mg/L)	12	3.3	1.1	2.5
9	Mg (mg/L)	12	20.9	8.5	13.8
10	Na (mg/L)	12	20.4	10.1	15
11	NO2+NO3 (mg N/L)	12	3.33	0.13	1.98
12	NO2-N (mgN/L)	12	0.27	0.02	0.06
13	NO3-N (mgN/L)	12	3.30	0.05	1.92
14	o-PO4-P (mg P/L)	12	0.275	0.032	0.144
15	SiO2 (mg/L)	12	23.8	19.5	21.8
16	SO4 (mg/L)	12	25.1	6.0	18.4
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.7	0.4	1.1
2	COD (mg/L)	12	46.0	24.0	34.9
3	DO (mg/L)	12	5.8	4.9	5.4
4	DO_SAT% (%)	12	73	55	64
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	110	48	77
2	HAR_Total (mgCaCO3/L)	12	193	108	134
3	Na% (%)	12	24	17	19
4	RSC (-)	12	0.4	0.0	0.2
5	SAR (-)	12	0.7	0.4	0.6

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Mandleshwar (010215026) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-III, Indore

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	2416	524.0	725.6			633.3	632.6	359.5			1271	853.9	500.2		
2	EC_GEN (µmho/cm)	241	240	213	231	357	243	201	209	261	334	218	201	286	239	313
3	pH_GEN (pH units)	8.0	7.9	8.1	7.8	7.9	8.2	8.1	8.2	7.9	7.8	8.1	8.1	8.2	7.7	8.0
4	TDS (mg/L)	152	153	135	147	228	145	132	133	172	220	138	127	181	155	204
5	Temp (deg C)	26.4	26.0	22.4	24.8	26.8	23.5	16.3	18.3	21.5	19.5	24.0	20.0	20.3	21.3	23.7
6	Turb (NTU)	96.4	15.8	9.2	33.8	26.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.5	0.9	0.0	0.0	0.0	1.3	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.7
2	ALK-TOT (mgCaCO3/L)	119	140	149	109	151	134	122	122	121	144	143	128	129	119	138
3	Ca (mg/L)	25	28	26	24	33	29	27	27	28	30	29	26	27	29	27
4	Cl (mg/L)	10.1	19.5	8.3	6.2	14.8	8.3	6.5	8.3	7.8	10.0	30.2	8.6	8.0	8.0	12.0
5	CO3 (mg/L)	0.6	1.0	0.0	0.0	0.0	1.5	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	2.1
6	F (mg/L)	0.24	0.25	0.40	0.26	0.32	0.15	0.35	0.36	0.18	0.32	0.14	0.48	0.26	0.30	0.27
7	HCO3 (mg/L)	143	169	181	133	184	161	149	146	148	176	174	156	158	145	164
8	K (mg/L)	4.5	3.1	2.3	1.8	2.2	1.6	2.0	2.0	1.4	2.9	1.3	1.4	2.0	1.5	2.3
9	Mg (mg/L)	11.0	12.1	11.9	8.7	14.0	12.0	10.1	10.3	9.5	14.0	12.4	11.4	11.6	10.4	13.1
10	Na (mg/L)	11.0	16.7	11.2	9.4	15.0	12.5	10.6	10.1	9.3	15.8	12.1	9.0	10.4	10.6	13.9
11	NO2+NO3 (mg N/L)	1.66	1.53	1.35	1.52	1.46	0.75	1.31	0.51	0.45	2.98	0.44	0.59	0.33	0.30	1.51
12	NO2-N (mgN/L)	0.04	0.03	0.01	0.12	0.05	0.04	0.04	0.06	0.01	0.04	0.01	0.05	0.01	0.02	0.11
13	NO3-N (mgN/L)	1.63	1.50	1.34	1.40	1.41	0.71	1.27	0.45	0.43	2.94	0.43	0.54	0.32	0.28	1.40
14	o-PO4-P (mg P/L)	0.161	0.345	0.199	0.243	0.202	0.048	0.177	0.135	0.086	0.117	0.054	0.112	0.114	0.081	0.084
15	SiO2 (mg/L)	20.5	18.7	16.9	24.8	22.1	22.3	17.5	16.1	18.2	21.9	18.4	16.5	21.8	19.3	21.3
16	SO4 (mg/L)	11.7	18.9	15.2	16.9	16.0	5.8	11.1	4.0	9.3	22.6	7.7	25.5	5.0	7.2	17.0
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.0	1.5	0.8	1.0	0.9	0.9	0.9	0.7	0.9	1.1	0.8	0.8	0.8	1.2	1.4
2	COD (mg/L)	28.0	25.6	36.0	39.6	35.6	24.3	42.3	26.0	44.8	32.3	28.3	48.3	33.0	35.0	37.3
3	DO (mg/L)	5.9	6.2	6.1	6.0	5.6	7.3	7.1	7.3	6.7	5.5	6.5	6.6	6.2	5.1	5.0
4	DO_SAT% (%)	73	77	71	73	71	85	72	77	75	60	77	72	68	57	59
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	63	71	66	60	83	72	68	67	71	76	73	66	67	71	67
2	HAR_Total (mgCaCO3/L)	109	121	115	97	141	122	110	110	111	134	125	113	115	115	122
3	Na% (%)	17	21	17	18	18	18	17	16	15	20	17	15	16	17	20
4	RSC (-)	0.2	0.4	0.7	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.4	0.3	0.3	0.1	0.3
5	SAR (-)	0.5	0.6	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.6	0.5	0.4	0.4	0.4	0.5

3.5 Kundi at Kogaon

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Kundi at Kogaon**	**Code**	**:**	**010215025**
State	:	Madhya Pradesh	District		Khargone
			Independent		
Basin	:	Narmada	River	:	Narmada
Tributary	:	Kundi	Local River	:	Kundi
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-III, Indore
Drainage Area	:	3919 Sq. Km.	Bank	:	Right
Latitude	:	22°06'06"	Longitude	:	75°41'02"
Zero of		151 .000			
Gauge (m)	:	(M.S.L.)	03/02/1978		
		Opening Date	Closing Date		
Gauge	:	03/02/1978			
Discharge	:	01/07/1978			
Sediment	:				
Water Quality	:	15/09/1986			

Water Quality Datasheet for the period : 2017-2018

Station Name : Kundi at Kogaon (010215025) Division : Narmada Division, Bhopal

Local River : Kundi Sub-Division : MNSD-III, Indore

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	5.64	16.58	41.27	43.05	19.91	2.837	5.594	9.905	0	0	0
2	Colour_Cod (-)		Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear			
3	EC_GEN (µmho/cm)		375	395	432	496	493	426	344	342			
4	Odour_Code (-)		odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free			
5	pH_GEN (pH units)		8.4	8.4	8.0	8.4	8.0	8.0	8.0	7.9			
6	TDS (mg/L)		243	256	282	314	326	289	224	222			
7	Temp (deg C)		29.0	29.0	29.0	30.5	25.0	20.5	20.0	20.5			
8	Turb (NTU)		0.0	33.0	30.0	30.0	0.0	0.0	0.0	0.0			
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)		7.7	10.2	0.0	10.4	0.0	0.0	0.0	0.0			
2	ALK-TOT (mgCaCO3/L)		131	162	193	186	165	179	152	152			
3	Ca (mg/L)		24	36	41	39	33	31	31	29			
4	Cl (mg/L)		11.0	20.0	16.0	20.0	22.0	23.0	14.0	5.0			
5	CO3 (mg/L)		9.2	12.3	0.0	12.6	0.0	0.0	0.0	0.0			
6	F (mg/L)		0.35	0.32	0.31	0.05	0.06	0.09	0.10	0.11			
7	HCO3 (mg/L)		141	172	235	201	201	218	186	186			
8	K (mg/L)		1.4	1.6	1.1	1.5	1.6	2.0	1.8	1.9			
9	Mg (mg/L)		15.1	18.0	23.8	24.5	20.7	20.7	17.7	15.6			
10	Na (mg/L)		15.8	17.2	16.0	16.9	17.0	21.3	15.5	15.9			
11	NO2+NO3 (mg N/L)		1.20	1.28	1.23	4.10	3.86	3.46	3.43	3.23			
12	NO2-N (mgN/L)		0.04	0.09	0.07	0.04	0.04	0.04	0.05	0.04			
13	NO3-N (mgN/L)		1.16	1.19	1.16	4.07	3.82	3.42	3.38	3.19			
14	o-PO4-P (mg P/L)		0.313	0.298	0.284	0.089	0.088	0.079	0.121	0.113			
15	SiO2 (mg/L)		22.7	16.1	22.3	22.0	22.6	19.1	18.2	18.1			
16	SO4 (mg/L)		13.9	17.7	13.7	23.0	21.8	22.9	21.0	18.1			
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		0.9	1.9	1.3	0.9	0.8	0.8	1.0	1.0			
2	COD (mg/L)		42.0	34.0	35.0	33.0	31.0	50.0	54.0	51.0			
3	DO (mg/L)		5.7	5.1	5.5	5.8	6.0	5.8	6.0	6.2			
4	DO_SAT% (%)		74	66	72	77	73	64	66	68			
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		59	90	102	97	83	78	76	72			
2	HAR_Total (mgCaCO3/L)		122	165	201	199	169	164	150	137			
3	Na% (%)		22	18	15	16	18	22	18	20			
4	RSC (-)		0.2	0.0	0.0	0.0	0.0	0.3	0.1	0.3			
5	SAR (-)		0.6	0.6	0.5	0.5	0.6	0.7	0.6	0.6			

Water Quality Summary for the period : 2017-2018

Station Name : Kundi at Kogaon (010215025) Division : Narmada Division, Bhopal

Local River : Kundi Sub-Division : MNSD-III, Indore

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	8	496	342	413
3	pH_GEN (pH units)	8	8.4	7.9	8.1
4	TDS (mg/L)	8	326	222	270
5	Temp (deg C)	8	30.5	20.0	25.4
6	Turb (NTU)	8	33.0	0.0	11.6
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	8	10.4	0.0	3.5
2	ALK-TOT (mgCaCO3/L)	8	193	131	165
3	Ca (mg/L)	8	41	24	33
4	Cl (mg/L)	8	23.0	5.0	16.4
5	CO3 (mg/L)	8	12.6	0.0	4.3
6	F (mg/L)	8	0.35	0.05	0.17
7	HCO3 (mg/L)	8	235	141	193
8	K (mg/L)	8	2.0	1.1	1.6
9	Mg (mg/L)	8	24.5	15.1	19.5
10	Na (mg/L)	8	21.3	15.5	16.9
11	NO2+NO3 (mg N/L)	8	4.10	1.20	2.72
12	NO2-N (mgN/L)	8	0.09	0.04	0.05
13	NO3-N (mgN/L)	8	4.07	1.16	2.67
14	o-PO4-P (mg P/L)	8	0.313	0.079	0.173
15	SiO2 (mg/L)	8	22.7	16.1	20.1
16	SO4 (mg/L)	8	23.0	13.7	19
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	8	1.9	0.8	1.1
2	COD (mg/L)	8	54.0	31.0	41.3
3	DO (mg/L)	8	6.2	5.1	5.8
4	DO_SAT% (%)	8	77	64	70
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	8	102	59	82
2	HAR_Total (mgCaCO3/L)	8	201	122	163
3	Na% (%)	8	22	15	19
4	RSC (-)	8	0.3	0.0	0.1
5	SAR (-)	8	0.7	0.5	0.6

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Kundi at Kogaon (010215025) Division : Narmada Division, Bhopal

Local River : Kundi Sub-Division : MNSD-III, Indore

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	63.87		11.13			3.907		7.067			0.015				
2	EC_GEN (µmho/cm)	399	312	303	372	425	533	343	349	333	401		305			
3	pH_GEN (pH units)	8.4	8.0	8.3	7.8	8.3	8.4	8.3	8.3	7.9	8.0		8.3			
4	TDS (mg/L)	253	199	193	237	274	336	226	210	216	265		195			
5	Temp (deg C)	27.9	27.7	26.8	29.2	29.4	25.0	22.8	26.5	21.6	21.5		24.3			
6	Turb (NTU)	39.3	123.7	16.0	91.3	23.3	2.6	0.0	0.0	0.0	0.0		0.0			
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	7.6	1.7	5.4	0.0	7.1	10.2	4.2	4.6	0.0	0.0		2.5			
2	ALK-TOT (mgCaCO3/L)	186	150	170	151	168	232	177	190	156	162		169			
3	Ca (mg/L)	28	26	32	32	35	37	32	28	33	31		29			
4	Cl (mg/L)	18.6	13.2	14.1	9.3	16.8	12.3	23.0	25.0	13.0	16.0		19.5			
5	CO3 (mg/L)	9.2	2.1	6.5	0.0	8.5	12.3	5.1	5.6	0.0	0.0		3.0			
6	F (mg/L)	0.27	0.43	0.46	0.22	0.26	0.06	0.37	0.60	0.19	0.09		0.74			
7	HCO3 (mg/L)	208	179	194	184	187	258	206	221	191	198		200			
8	K (mg/L)	3.4	3.1	2.2	2.2	1.4	1.4	1.4	1.8	1.3	1.8		1.6			
9	Mg (mg/L)	26.8	20.2	20.9	15.2	20.3	33.4	24.0	24.1	15.6	18.7		17.9			
10	Na (mg/L)	19.3	15.2	18.6	13.2	16.5	32.0	25.4	28.5	12.9	17.4		19.9			
11	NO2+NO3 (mg N/L)	6.47	3.07	2.52	1.83	1.95	6.10	5.88	3.63	0.59	3.49		1.58			
12	NO2-N (mgN/L)	0.03	0.04	0.02	0.07	0.06	0.03	0.03	0.02	0.01	0.04		0.09			
13	NO3-N (mgN/L)	6.44	3.03	2.49	1.76	1.89	6.08	5.85	3.61	0.58	3.45		1.48			
14	o-PO4-P (mg P/L)	0.173	0.438	0.148	0.238	0.246	0.053	0.125	0.192	0.118	0.100		0.087			
15	SiO2 (mg/L)	28.5	21.1	24.8	27.9	20.8	47.3	31.9	27.1	18.9	19.5		25.8			
16	SO4 (mg/L)	27.6	27.8	23.5	30.8	17.1	30.2	17.5	13.2	11.6	20.9		27.0			
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.9	0.9	1.0	0.7	1.2	1.5	0.9	1.5	1.2	0.9		1.9			
2	COD (mg/L)	35.0	28.3	32.3	40.7	36.0	35.0	34.7	35.0	48.3	46.5		34.0			
3	DO (mg/L)	6.3	5.9	5.9	6.0	5.5	6.7	7.0	6.0	6.5	6.0		5.4			
4	DO_SAT% (%)	79	75	74	78	72	80	81	74	74	68		62			
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	70	66	81	79	87	93	79	69	82	77		74			
2	HAR_Total (mgCaCO3/L)	182	150	168	143	172	233	179	169	147	155		148			
3	Na% (%)	19	17	19	17	18	23	23	27	16	19		22			
4	RSC (-)	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.5	0.2	0.2		0.4			
5	SAR (-)	0.6	0.5	0.6	0.5	0.6	0.9	0.8	1.0	0.5	0.6		0.7			

3.6 Narmada at Handia

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Handia**	**Code**	**:**	**010215022**
State	:	Madhya Pradesh	District		Harda
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	-	Sub Tributary	:	-
Sub-Sub Tributary	:	-	Local River	:	Narmada
Division	:	Narmada Division,Bhopal	Sub-Division	:	MNSD-II Bhopal
Drainage Area	:	54027 Sq. Km.	Bank	:	Left
Latitude	:	22°29'25"	Longitude	:	76°59'37"
Zero of Gauge (m)	:	258 .000 (M.S.L.)	09/02/1977		
		Opening Date	Closing Date		
Gauge	:	09/02/1977			
Discharge	:	26/04/1977			
Sediment	:	11/12/1977			
Water Quality	:	01/08/1979			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Handia (010215022) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-II, Bhopal

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	124	218	973	358	334	155.7	111.9	107.4	119.6	42.2	23.4	22.9
2	Colour_Cod (-)	Clear	Clear	Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	255	306	210	245	334	424	353	348	292	337	350	313
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.8	7.9	8.0	7.7	8.3	8.0	7.9	7.9	7.8	8.0	8.4	8.3
6	TDS (mg/L)	162	200	135	159	214	280	240	229	190	221	228	205
7	Temp (deg C)	29.0	21.5	21.5	23.5	24.0	19.5	16.0	15.5	14.5	24.5	26.0	28.5
8	Turb (NTU)	0.0	0.0	200.0	130.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	10.4	7.8
2	ALK-TOT (mgCaCO3/L)	125	118	98	107	157	175	168	152	134	162	165	139
3	Ca (mg/L)	28	23	26	26	37	34	33	36	27	28	23	22
4	Cl (mg/L)	8.0	8.0	5.0	6.0	9.0	13.0	11.0	12.0	4.0	9.0	16.0	15.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	0.0	12.6	9.4
6	F (mg/L)	0.18	0.37	0.36	0.35	0.28	0.29	0.26	0.28	0.28	0.23	0.19	0.20
7	HCO3 (mg/L)	153	144	119	131	172	214	205	186	163	198	176	150
8	K (mg/L)	1.1	1.2	1.2	1.3	2.1	1.9	1.9	1.9	1.7	1.6	1.8	1.6
9	Mg (mg/L)	9.2	14.1	5.8	9.0	10.5	15.6	17.7	11.4	12.2	14.8	16.9	15.6
10	Na (mg/L)	10.5	9.9	8.4	11.2	12.2	12.8	16.3	16.5	16.6	13.3	17.9	17.9
11	NO2+NO3 (mg N/L)	0.12	0.97	1.18	1.05	1.25	1.21	1.19	1.22	1.23	0.70	0.66	0.11
12	NO2-N (mgN/L)	0.02	0.04	0.07	0.05	0.04	0.05	0.04	0.05	0.04	0.03	0.03	0.03
13	NO3-N (mgN/L)	0.10	0.94	1.11	1.00	1.21	1.17	1.15	1.17	1.19	0.67	0.63	0.08
14	o-PO4-P (mg P/L)	0.069	0.282	0.266	0.250	0.110	0.118	0.101	0.139	0.147	0.134	0.110	0.022
15	SiO2 (mg/L)	15.9	23.7	20.7	23.4	23.7	22.7	21.6	20.8	20.3	19.1	19.4	19.3
16	SO4 (mg/L)	5.4	16.7	17.3	14.1	22.4	22.0	22.1	20.2	14.7	14.3	13.8	8.0
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	0.4	0.7	0.6	0.7	1.1	1.2	0.6	1.2	1.4	1.1	1.2	1.3
2	COD (mg/L)	31.0	48.0	35.0	41.0	39.0	36.0	20.0	47.0	46.0	27.0	31.0	29.0
3	DO (mg/L)	5.0	5.7	5.4	5.4	6.2	6.2	6.4	6.6	6.6	6.0	6.0	5.7
4	DO_SAT% (%)	65	64	61	63	74	67	65	66	64	71	74	73
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	71	58	66	66	92	84	83	89	67	71	58	54
2	HAR_Total (mgCaCO3/L)	109	116	90	103	136	149	157	136	117	133	128	119
3	Na% (%)	17	16	17	19	16	16	18	21	23	18	23	25
4	RSC (-)	0.3	0.1	0.2	0.1	0.4	0.5	0.3	0.3	0.3	0.6	0.8	0.4
5	SAR (-)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.5	0.7	0.7

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Handia (010215022) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-II, Bhopal

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	424	210	314
3	pH_GEN (pH units)	12	8.4	7.7	8
4	TDS (mg/L)	12	280	135	205
5	Temp (deg C)	12	29.0	14.5	22
6	Turb (NTU)	12	200.0	0.0	32.1
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	10.4	0.0	2.2
2	ALK-TOT (mgCaCO3/L)	12	175	98	142
3	Ca (mg/L)	12	37	22	29
4	Cl (mg/L)	12	16.0	4.0	9.7
5	CO3 (mg/L)	12	12.6	0.0	2.6
6	F (mg/L)	12	0.37	0.18	0.27
7	HCO3 (mg/L)	12	214	119	168
8	K (mg/L)	12	2.1	1.1	1.6
9	Mg (mg/L)	12	17.7	5.8	12.7
10	Na (mg/L)	12	17.9	8.4	13.6
11	NO2+NO3 (mg N/L)	12	1.25	0.11	0.91
12	NO2-N (mgN/L)	12	0.07	0.02	0.04
13	NO3-N (mgN/L)	12	1.21	0.08	0.87
14	o-PO4-P (mg P/L)	12	0.282	0.022	0.146
15	SiO2 (mg/L)	12	23.7	15.9	20.9
16	SO4 (mg/L)	12	22.4	5.4	15.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.4	0.4	1
2	COD (mg/L)	12	48.0	20.0	35.8
3	DO (mg/L)	12	6.6	5.0	5.9
4	DO_SAT% (%)	12	74	61	67
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	92	54	71
2	HAR_Total (mgCaCO3/L)	12	157	90	125
3	Na% (%)	12	25	16	19
4	RSC (-)	12	0.8	0.1	0.4
5	SAR (-)	12	0.7	0.4	0.5

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Handia (010215022) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-II, Bhopal

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	4110	373.6	319.3			291.2	272.0	152.8			260.6	252.9	117.9		
2	EC_GEN (µmho/cm)	219	231	231	235	270	308	236	268	279	354	214	197	265	248	333
3	pH_GEN (pH units)	8.1	8.1	8.3	7.9	7.9	8.3	8.2	8.4	7.9	7.9	8.3	8.3	8.3	7.8	8.2
4	TDS (mg/L)	139	148	146	151	174	182	155	172	180	235	134	128	172	161	218
5	Temp (deg C)	26.7	27.9	29.4	25.6	23.9	24.5	21.4	23.7	18.8	16.4	22.2	26.0	26.2	27.0	26.3
6	Turb (NTU)	256.8	83.2	31.4	85.8	77.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	1.5	4.5	2.3	2.3	1.6	5.3	1.3	5.8	0.0	0.0	6.6	4.2	1.6	0.0	6.1
2	ALK-TOT (mgCaCO3/L)	113	140	143	112	121	180	147	161	149	157	145	129	129	131	155
3	Ca (mg/L)	23	27	29	22	28	35	32	33	33	32	27	25	26	31	24
4	Cl (mg/L)	5.9	7.2	7.3	5.3	7.2	9.2	7.4	7.8	7.3	10.0	12.4	7.9	7.7	6.7	13.3
5	CO3 (mg/L)	1.9	5.4	2.8	2.8	1.9	6.4	1.5	7.0	0.0	0.0	7.9	5.0	1.9	0.0	7.3
6	F (mg/L)	0.26	0.28	0.35	0.25	0.31	0.19	0.40	0.22	0.17	0.28	0.16	0.15	0.31	0.28	0.21
7	HCO3 (mg/L)	134	160	169	131	144	207	177	182	181	192	161	147	154	160	175
8	K (mg/L)	3.9	2.0	2.8	1.7	1.4	1.5	1.5	1.7	1.3	1.9	1.5	1.4	1.5	1.2	1.6
9	Mg (mg/L)	10.9	13.1	11.8	10.2	9.7	15.6	12.5	13.6	11.8	14.2	13.2	11.6	11.3	9.7	15.7
10	Na (mg/L)	8.0	12.7	13.5	8.5	10.4	18.7	13.4	16.0	11.6	15.6	15.1	8.9	8.9	10.8	16.4
11	NO2+NO3 (mg N/L)	0.86	1.54	1.18	1.20	0.91	1.51	2.01	1.42	0.46	1.21	0.41	0.62	1.14	0.32	0.49
12	NO2-N (mgN/L)	0.02	0.02	0.01	0.13	0.04	0.06	0.04	0.02	0.01	0.04	0.02	0.05	0.01	0.01	0.03
13	NO3-N (mgN/L)	0.84	1.53	1.17	1.07	0.87	1.45	1.97	1.40	0.45	1.17	0.39	0.57	1.14	0.31	0.46
14	o-PO4-P (mg P/L)	0.185	0.353	0.339	0.298	0.195	0.051	0.206	0.148	0.088	0.126	0.035	0.120	0.436	0.071	0.089
15	SiO2 (mg/L)	23.4	21.6	18.3	25.5	21.5	24.6	17.9	16.3	18.5	21.3	19.0	17.3	20.5	19.2	19.2
16	SO4 (mg/L)	9.5	13.4	14.7	19.4	15.2	9.5	13.8	6.2	8.8	19.7	4.4	26.9	11.9	6.5	12.0
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.7	1.2	0.7	0.7	0.7	1.3	1.0	0.7	1.1	1.1	1.1	0.6	0.9	1.2	1.2
2	COD (mg/L)	26.2	33.2	36.2	38.0	38.8	28.0	35.0	38.5	41.5	37.3	26.3	34.7	35.0	37.0	29.0
3	DO (mg/L)	6.2	6.1	6.3	5.9	5.5	7.5	6.9	7.6	7.0	6.4	6.8	6.8	6.3	5.3	5.9
4	DO_SAT% (%)	78	77	82	72	65	89	77	89	75	65	77	84	78	67	73
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	58	68	73	55	70	88	80	82	83	81	68	63	64	78	61
2	HAR_Total (mgCaCO3/L)	103	122	122	97	111	153	132	138	133	140	123	112	112	119	127
3	Na% (%)	15	18	19	16	17	21	18	20	16	19	21	15	15	16	22
4	RSC (-)	0.2	0.4	0.4	0.3	0.2	0.6	0.3	0.5	0.3	0.4	0.5	0.4	0.4	0.3	0.6
5	SAR (-)	0.4	0.5	0.5	0.4	0.4	0.7	0.5	0.6	0.4	0.6	0.6	0.4	0.4	0.4	0.6

3.7 Ganjal at Chhidgaon

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Ganjal at Chhidgaon**	**Code**	**:**	**010215020**
State	:	Madhya Pradesh	District		Harda
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Ganjal	Sub Tributary	:	-
Sub-Sub Tributary	:	-	Local River	:	Ganjal
Division	:	Narmada Division,Bhopal	Sub-Division	:	MNSD-II,Bhopal
Drainage Area	:	1729 Sq. Km.	Bank	:	Left
Latitude	:	22°24'21"	Longitude	:	77°18'28"
Zero of Gauge (m)	:	287 .000 (M.S.L.)	02/12/1976		
		Opening Date	Closing Date		
Gauge	:	22/12/1976			
Discharge	:	22/12/1976			
Sediment	:				
Water Quality	:	16/09/1986			

Water Quality Datasheet for the period : 2017-2018

Station Name : Ganjal at Chhidgaon (010215020) Division : Narmada Division, Bhopal

Local River : Ganjal Sub-Division : MNSD-II, Bhopal

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	16.6	37.32	19.66	17.34	0	0	0	0	0	0	0
2	Colour_Cod (-)	Clear	Light Brown	Clear	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	437	355	233	269	334	408	469	467	489	514	487	484
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.8	7.9	8.2	7.9	8.3	8.3	7.6	7.9	7.5	8.0	8.3	7.9
6	TDS (mg/L)	269	228	151	174	214	268	318	302	318	333	316	311
7	Temp (deg C)	31.0	29.0	28.0	29.0	30.5	25.0	19.5	16.0	18.0	23.5	24.0	26.0
8	Turb (NTU)	0.0	116.0	30.0	80.0	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	7.8	7.8	0.0	0.0	0.0	0.0	7.8	0.0
2	ALK-TOT (mgCaCO3/L)	213	131	113	136	160	173	228	216	225	230	226	222
3	Ca (mg/L)	33	29	25	34	30	33	37	36	33	30	34	27
4	Cl (mg/L)	14.0	7.0	4.0	5.0	9.0	7.0	12.0	13.0	6.0	17.0	17.0	18.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	9.4	9.4	0.0	0.0	0.0	0.0	9.4	0.0
6	F (mg/L)	0.44	0.38	0.38	0.37	0.29	0.30	0.29	0.32	0.30	0.30	0.25	0.24
7	HCO3 (mg/L)	260	160	138	166	176	192	278	264	274	281	256	271
8	K (mg/L)	1.1	1.6	0.6	0.7	1.7	1.8	1.6	1.5	1.6	1.3	1.7	1.5
9	Mg (mg/L)	16.5	10.5	10.5	10.0	15.3	14.6	20.9	19.7	20.9	21.9	19.4	21.6
10	Na (mg/L)	35.2	12.9	7.0	8.6	13.9	14.3	27.3	28.0	27.6	29.9	29.1	40.6
11	NO2+NO3 (mg N/L)	0.18	1.20	1.29	1.19	0.43	0.32	0.34	0.36	0.38	0.40	0.39	0.05
12	NO2-N (mgN/L)	0.03	0.07	0.07	0.07	0.09	0.03	0.03	0.04	0.03	0.04	0.03	0.04
13	NO3-N (mgN/L)	0.15	1.13	1.22	1.13	0.34	0.28	0.31	0.32	0.34	0.36	0.36	0.01
14	o-PO4-P (mg P/L)	0.143	0.234	0.216	0.195	0.091	0.094	0.083	0.094	0.097	0.090	0.085	0.025
15	SiO2 (mg/L)	24.9	28.1	20.2	24.0	22.1	21.5	19.7	19.2	18.6	18.3	18.4	18.6
16	SO4 (mg/L)	8.6	16.3	18.2	15.1	11.1	11.3	11.4	10.7	11.2	10.9	10.3	20.6
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.4	0.9	0.8	1.0	0.7	1.0	0.5	1.1	1.6	2.7	2.4	2.1
2	COD (mg/L)	34.0	26.0	14.0	22.0	22.0	28.0	38.0	36.0	35.0	44.0	42.0	26.0
3	DO (mg/L)	4.6	5.0	5.3	5.5	6.7	6.7	5.2	5.5	5.7	6.6	6.5	6.0
4	DO_SAT% (%)	62	65	68	72	89	81	56	56	60	77	77	74
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	82	73	63	85	76	83	92	90	82	74	84	66
2	HAR_Total (mgCaCO3/L)	151	116	106	126	139	144	179	172	169	165	165	157
3	Na% (%)	34	19	13	13	18	18	25	26	26	28	28	36
4	RSC (-)	1.3	0.3	0.2	0.2	0.4	0.6	1.0	0.9	1.1	1.3	1.2	1.3
5	SAR (-)	1.3	0.5	0.3	0.3	0.5	0.5	0.9	0.9	0.9	1.0	1.0	1.4

Water Quality Summary for the period : 2017-2018

Station Name : Ganjal at Chhidgaon (010215020) Division : Narmada Division, Bhopal

Local River : Ganjal Sub-Division : MNSD-II, Bhopal

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	514	233	412
3	pH_GEN (pH units)	12	8.3	7.5	8
4	TDS (mg/L)	12	333	151	267
5	Temp (deg C)	12	31.0	16.0	25
6	Turb (NTU)	12	116.0	0.0	21.5
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	7.8	0.0	2
2	ALK-TOT (mgCaCO3/L)	12	230	113	189
3	Ca (mg/L)	12	37	25	32
4	Cl (mg/L)	12	18.0	4.0	10.8
5	CO3 (mg/L)	12	9.4	0.0	2.4
6	F (mg/L)	12	0.44	0.24	0.32
7	HCO3 (mg/L)	12	281	138	226
8	K (mg/L)	12	1.8	0.6	1.4
9	Mg (mg/L)	12	21.9	10.0	16.8
10	Na (mg/L)	12	40.6	7.0	22.9
11	NO2+NO3 (mg N/L)	12	1.29	0.05	0.54
12	NO2-N (mgN/L)	12	0.09	0.03	0.05
13	NO3-N (mgN/L)	12	1.22	0.01	0.5
14	o-PO4-P (mg P/L)	12	0.234	0.025	0.121
15	SiO2 (mg/L)	12	28.1	18.3	21.1
16	SO4 (mg/L)	12	20.6	8.6	13
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	2.7	0.5	1.4
2	COD (mg/L)	12	44.0	14.0	30.6
3	DO (mg/L)	12	6.7	4.6	5.8
4	DO_SAT% (%)	12	89	56	70
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	92	63	79
2	HAR_Total (mgCaCO3/L)	12	179	106	149
3	Na% (%)	12	36	13	24
4	RSC (-)	12	1.3	0.2	0.8
5	SAR (-)	12	1.4	0.3	0.8

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Ganjal at Chhidgaon (010215020) Division : Narmada Division, Bhopal

Local River : Ganjal Sub-Division : MNSD-II, Bhopal

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	1349		29.90			5.196		7.825			2.097		3.466		
2	EC_GEN (µmho/cm)	306	299	278	320	326	446	365	404	438	458	398	482	532	476	495
3	pH_GEN (pH units)	7.9	8.0	8.0	7.7	8.0	8.2	8.1	8.1	7.6	7.8	8.2	8.2	8.1	7.6	8.1
4	TDS (mg/L)	194	192	172	207	207	276	242	258	309	302	253	307	346	308	320
5	Temp (deg C)	26.5	29.2	28.6	29.9	29.5	23.6	20.3	22.0	20.6	19.6	25.0	22.8	26.0	26.0	24.5
6	Turb (NTU)	178.8	100.4	35.2	129.6	51.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	2.6	0.0	2.3	1.6	0.0	1.3	1.2	0.0	2.0	1.5	3.3	0.0	0.0	2.6
2	ALK-TOT (mgCaCO3/L)	160	192	173	155	151	260	244	249	243	210	266	315	265	248	226
3	Ca (mg/L)	27	28	30	26	30	40	40	39	42	35	34	43	37	31	30
4	Cl (mg/L)	8.8	9.9	8.5	7.7	7.8	9.4	10.3	10.3	11.0	9.5	14.7	17.9	13.0	13.0	17.3
5	CO3 (mg/L)	0.0	3.1	0.0	2.8	1.9	0.0	1.5	1.4	0.0	2.3	1.8	4.0	0.0	0.0	3.1
6	F (mg/L)	0.25	0.24	0.35	0.29	0.37	0.21	0.37	0.28	0.21	0.30	0.19	0.38	0.52	0.44	0.26
7	HCO3 (mg/L)	195	228	212	183	180	317	295	301	296	252	321	376	323	302	269
8	K (mg/L)	3.0	2.1	2.1	1.7	1.1	1.0	1.1	1.3	1.1	1.6	1.3	0.8	1.5	1.3	1.5
9	Mg (mg/L)	14.8	16.6	15.8	14.0	12.5	23.6	21.7	22.2	21.3	19.0	24.9	30.1	22.9	22.9	21.0
10	Na (mg/L)	17.9	26.7	18.5	25.4	15.5	27.5	26.3	30.8	25.1	24.3	34.1	47.8	40.5	35.4	33.2
11	NO2+NO3 (mg N/L)	1.21	1.21	0.65	1.75	0.86	1.20	1.46	1.22	0.58	0.35	1.10	1.55	0.91	0.53	0.28
12	NO2-N (mgN/L)	0.03	0.02	0.01	0.10	0.07	0.05	0.04	0.03	0.02	0.04	0.01	0.09	0.02	0.03	0.03
13	NO3-N (mgN/L)	1.18	1.19	0.64	1.65	0.79	1.15	1.42	1.19	0.56	0.31	1.09	1.47	0.90	0.50	0.25
14	o-PO4-P (mg P/L)	0.173	0.338	0.200	0.224	0.176	0.095	0.219	0.141	0.114	0.092	0.059	0.137	0.173	0.162	0.067
15	SiO2 (mg/L)	22.7	29.8	23.1	28.7	23.9	39.9	27.0	27.6	18.4	19.7	28.2	31.5	24.9	21.0	18.4
16	SO4 (mg/L)	13.6	38.6	15.3	21.3	13.8	10.4	15.4	13.9	9.9	11.1	6.5	35.7	15.8	9.9	14.0
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.0	1.1	1.2	1.1	1.0	1.3	0.7	1.0	1.2	1.1	0.9	0.8	0.8	1.2	2.4
2	COD (mg/L)	26.4	35.6	35.0	29.0	23.6	24.8	33.0	23.5	30.0	34.3	28.7	27.7	31.3	35.3	37.3
3	DO (mg/L)	5.9	6.0	5.2	5.6	5.4	7.6	6.8	7.1	6.4	5.8	6.9	6.5	6.6	4.3	6.4
4	DO_SAT% (%)	73	79	66	73	71	90	75	81	71	63	83	75	80	53	76
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	68	71	74	66	76	100	100	97	106	87	84	107	91	78	75
2	HAR_Total (mgCaCO3/L)	129	140	140	125	128	198	191	190	195	166	188	232	187	173	162
3	Na% (%)	20	25	22	31	19	23	23	26	21	24	28	31	32	31	31
4	RSC (-)	0.6	1.1	0.7	0.7	0.5	1.3	1.1	1.2	1.0	0.9	1.6	1.7	1.6	1.5	1.3
5	SAR (-)	0.6	0.9	0.7	1.0	0.6	0.9	0.8	1.0	0.8	0.8	1.1	1.4	1.3	1.2	1.1

3.8 Narmada at Hoshangabad

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Hoshangabad**	**Code**	**:**	**010215019**
State	:	Madhya Pradesh	District		Hoshangabad
Basin	:	Narmada	Independent River	:	Narmada
Sub-Sub Tributary	:		Local River	:	Narmada
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-1, Hoshangabad
Drainage Area	:	44548 Sq. Km.	Bank	:	Left
Latitude	:	22°45'21"	Longitude	:	77°43'58"
Zero of Gauge (m)	:	282 .000 (M.S.L.)	21/05/1972		
		Opening Date	Closing Date		
Gauge	:	21/05/1972			
Discharge	:	16/09/1972			
Sediment	:	29/12/1972			
Water Quality	:	15/07/1979			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Hoshangabad (010215019) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-1, Hoshangabad

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	115.2	449.4	435.9	412.7	254.2	223.3	65	70.6	100.1	48.1	34.2	61.6
2	Colour_Cod (-)	Clear	Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	185	286	226	257	343	368	353	319	264	354	344	298
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.7	8.3	7.9	7.7	8.2	8.1	7.9	7.9	8.1	7.9	7.8	7.9
6	TDS (mg/L)	122	185	148	165	219	243	239	207	172	230	224	193
7	Temp (deg C)	25.0	24.0	22.0	22.0	23.0	21.0	20.0	15.0	16.0	20.0	20.0	28.0
8	Turb (NTU)	0.0	248.0	180.0	148.0	74.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	120	115	105	125	167	157	176	155	129	165	165	139
3	Ca (mg/L)	32	26	25	32	38	30	37	31	25	31	31	24
4	Cl (mg/L)	6.0	5.0	5.0	6.0	9.0	10.0	10.0	7.0	4.0	10.0	13.0	12.0
5	CO3 (mg/L)	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.13	0.31	0.33	0.31	0.30	0.30	0.27	0.26	0.26	0.24	0.22	0.23
7	HCO3 (mg/L)	147	128	128	153	204	192	215	189	157	201	201	169
8	K (mg/L)	0.9	1.4	1.3	1.9	2.1	2.2	1.5	1.6	1.7	1.5	1.8	1.5
9	Mg (mg/L)	6.1	9.5	9.7	8.5	8.5	13.9	15.8	14.1	13.1	15.8	16.0	16.0
10	Na (mg/L)	7.3	9.0	8.0	967.0	12.8	11.9	14.5	14.4	14.6	11.1	13.4	4.8
11	NO2+NO3 (mg N/L)	0.10	0.74	1.00	0.83	1.17	1.14	1.01	1.13	1.18	0.67	0.76	0.08
12	NO2-N (mgN/L)	0.02	0.06	0.07	0.06	0.03	0.03	0.02	0.04	0.03	0.02	0.20	0.04
13	NO3-N (mgN/L)	0.09	0.68	0.93	0.76	1.14	1.11	0.98	1.10	1.15	0.64	0.56	0.05
14	o-PO4-P (mg P/L)	0.070	0.173	0.205	0.185	0.066	0.074	0.068	0.078	0.072	0.068	0.064	0.056
15	SiO2 (mg/L)	15.5	24.6	16.7	22.1	22.4	23.0	20.6	20.1	20.1	19.5	19.4	19.5
16	SO4 (mg/L)	5.3	17.3	17.1	14.7	20.1	19.6	24.7	21.7	16.9	16.4	16.4	8.0
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.6	1.1	0.5	0.8	1.7	1.4	0.9	0.7	0.6	1.3	1.4	1.2
2	COD (mg/L)	32.0	35.0	37.0	35.0	36.0	33.0	43.0	32.0	31.0	54.0	49.0	30.0
3	DO (mg/L)	5.6	5.8	5.4	5.2	5.9	6.2	7.1	7.4	7.5	6.1	6.2	5.8
4	DO_SAT% (%)	68	69	62	59	69	70	78	73	76	67	68	74
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	79	64	61	80	94	76	91	77	62	78	77	59
2	HAR_Total (mgCaCO3/L)	104	104	102	115	129	134	157	136	117	144	144	126
3	Na% (%)	13	16	14	95	18	16	17	19	21	14	17	8
4	RSC (-)	0.3	0.2	0.1	0.2	0.8	0.5	0.4	0.4	0.2	0.4	0.4	0.3
5	SAR (-)	0.3	0.4	0.3	39.2	0.5	0.4	0.5	0.5	0.6	0.4	0.5	0.2

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Hoshangabad (010215019) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division:MNSD-1, Hoshangabad

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	368	185	300
3	pH_GEN (pH units)	12	8.3	7.7	8
4	TDS (mg/L)	12	243	122	196
5	Temp (deg C)	12	28.0	15.0	21.3
6	Turb (NTU)	12	248.0	0.0	54.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	5.1	0.0	0.4
2	ALK-TOT (mgCaCO3/L)	12	176	105	143
3	Ca (mg/L)	12	38	24	30
4	Cl (mg/L)	12	13.0	4.0	8.1
5	CO3 (mg/L)	12	6.2	0.0	0.5
6	F (mg/L)	12	0.33	0.13	0.26
7	HCO3 (mg/L)	12	215	128	174
8	K (mg/L)	12	2.2	0.9	1.6
9	Mg (mg/L)	12	16.0	6.1	12.3
10	Na (mg/L)	12	967.0	4.8	90.7
11	NO2+NO3 (mg N/L)	12	1.18	0.08	0.82
12	NO2-N (mgN/L)	12	0.20	0.02	0.05
13	NO3-N (mgN/L)	12	1.15	0.05	0.77
14	o-PO4-P (mg P/L)	12	0.205	0.056	0.098
15	SiO2 (mg/L)	12	24.6	15.5	20.3
16	SO4 (mg/L)	12	24.7	5.3	16.5
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.7	0.5	1.1
2	COD (mg/L)	12	54.0	30.0	37.3
3	DO (mg/L)	12	7.5	5.2	6.2
4	DO_SAT% (%)	12	78	59	69
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	94	59	75
2	HAR_Total (mgCaCO3/L)	12	157	102	126
3	Na% (%)	12	95	8	22
4	RSC (-)	12	0.8	0.1	0.4
5	SAR (-)	12	39.2	0.2	3.7

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Hoshangabad (010215019) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-1, Hoshangabad

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	3509	294.6	487.2			245.4	215.7	146.0			264.5	198.5	157.1		
2	EC_GEN (µmho/cm)	204	221	236	174	259	287	208	260	286	326	208	194	306	243	332
3	pH_GEN (pH units)	8.0	8.0	8.1	7.6	8.0	8.2	8.1	8.2	7.9	8.0	8.1	8.2	7.7	7.9	7.9
4	TDS (mg/L)	128	140	149	113	168	175	138	166	185	215	133	124	199	157	216
5	Temp (deg C)	27.0	26.3	23.3	19.0	23.2	21.3	17.3	14.9	16.9	18.0	24.0	23.3	16.3	20.0	22.7
6	Turb (NTU)	177.8	122.8	23.0	82.6	130.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	3.0	0.0	0.0	1.0	2.6	0.0	2.9	0.0	0.0	0.0	1.7	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	104	143	145	95	127	167	135	164	147	154	142	128	150	126	156
3	Ca (mg/L)	23	28	27	20	30	32	30	35	33	31	29	27	30	32	29
4	Cl (mg/L)	6.5	6.9	8.1	5.8	6.2	8.4	5.9	8.0	7.5	7.8	9.4	6.9	9.3	6.3	11.7
5	CO3 (mg/L)	0.0	3.7	0.0	0.0	1.2	3.1	0.0	3.5	0.0	0.0	0.0	2.0	0.0	0.0	0.0
6	F (mg/L)	0.27	0.31	0.31	0.29	0.28	0.16	0.26	0.22	0.20	0.27	0.14	0.29	0.27	0.15	0.23
7	HCO3 (mg/L)	127	167	177	116	152	198	165	193	179	188	173	152	183	153	190
8	K (mg/L)	4.1	2.8	2.5	1.6	1.5	1.3	1.3	1.6	1.3	1.7	1.4	1.2	1.3	1.1	1.6
9	Mg (mg/L)	9.4	12.8	14.7	7.5	8.5	16.2	11.3	12.2	12.0	14.2	11.9	12.3	11.8	8.7	16.0
10	Na (mg/L)	7.2	10.9	13.8	6.6	200.8	12.8	9.3	14.9	9.8	13.8	10.5	7.8	15.3	9.7	9.7
11	NO2+NO3 (mg N/L)	1.02	1.38	1.25	1.22	0.77	0.66	0.67	0.44	0.37	1.11	0.28	0.41	0.22	0.25	0.50
12	NO2-N (mgN/L)	0.03	0.02	0.02	0.07	0.05	0.07	0.03	0.01	0.01	0.03	0.01	0.06	0.01	0.01	0.09
13	NO3-N (mgN/L)	1.00	1.37	1.23	1.15	0.72	0.59	0.65	0.42	0.36	1.08	0.28	0.36	0.21	0.24	0.42
14	o-PO4-P (mg P/L)	0.276	0.478	0.226	0.221	0.140	0.033	0.198	0.123	0.097	0.073	0.046	0.055	0.099	0.089	0.063
15	SiO2 (mg/L)	17.4	18.3	16.2	17.2	20.3	25.8	18.7	14.5	14.5	20.9	20.4	18.9	13.0	15.8	19.5
16	SO4 (mg/L)	8.9	12.0	11.6	14.6	14.9	4.7	9.0	4.0	8.7	20.7	1.6	17.0	4.1	5.6	13.6
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.7	0.9	0.8	0.9	1.1	0.8	0.8	0.6	1.1	0.9	0.7	0.7	1.1	0.8	1.3
2	COD (mg/L)	33.4	28.6	25.2	37.2	35.0	29.5	33.8	32.5	46.8	34.8	24.0	36.0	28.7	42.3	44.3
3	DO (mg/L)	6.1	5.9	5.6	5.9	5.6	7.5	7.1	6.6	6.8	7.0	6.8	6.7	5.5	5.4	6.0
4	DO_SAT% (%)	77	73	66	64	65	84	73	65	70	74	80	78	56	59	70
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	57	69	67	50	76	80	76	88	81	77	73	69	74	81	71
2	HAR_Total (mgCaCO3/L)	96	122	128	81	111	148	123	139	132	136	123	120	123	117	138
3	Na% (%)	14	16	18	15	31	16	14	19	14	18	16	12	20	15	13
4	RSC (-)	0.2	0.4	0.3	0.3	0.3	0.4	0.3	0.5	0.3	0.4	0.4	0.2	0.6	0.2	0.4
5	SAR (-)	0.3	0.4	0.5	0.3	8.2	0.5	0.4	0.6	0.4	0.5	0.4	0.3	0.6	0.4	0.4

3.9 Narmada at Sandia

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Sandia**	**Code**	**:**	**010215013**
State	:	Madhya Pradesh	District		Hoshangabad
Basin	:	Narmada	Independent River	:	Narmada
Sub-Sub Tributary	:		Local River	:	Narmada
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-1,Hoshangabad
Drainage Area	:	33953.5 Sq. Km.	Bank	:	Left
Latitude	:	22°54'57"	Longitude	:	78°20'51"
Zero of Gauge (m)	:	297 .000 (M.S.L.)	01/03/1978		
		Opening Date	Closing Date		
Gauge	:	01/03/1978			
Discharge	:	18/04/1978			
Sediment	:	09/08/1978			
Water Quality	:	15/09/1979			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Sandia (010215013) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-1, Hoshangabad

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	77.5	277.2	226	206.6	146.7	96	65	43	74	36	0	0
2	Colour_Cod (-)	Clear	Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	212	230	221	242	337	327	294	298	227	383	288	243
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.7	7.9	8.0	7.8	7.9	7.9	7.8	7.9	7.7	7.8	7.7	7.7
6	TDS (mg/L)	139	145	144	157	215	218	199	199	148	248	187	157
7	Temp (deg C)	27.5	22.5	25.0	29.5	28.0	24.0	18.0	17.5	17.0	23.5	25.5	27.5
8	Turb (NTU)	0.0	240.0	176.0	140.0	66.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	113	100	105	118	165	134	143	144	110	165	134	102
3	Ca (mg/L)	30	25	27	29	35	29	31	32	27	32	31	25
4	Cl (mg/L)	4.0	5.0	5.0	6.0	7.0	7.0	12.0	10.0	4.0	17.0	15.0	11.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.22	0.35	0.36	0.34	0.37	0.36	0.23	0.28	0.29	0.23	0.20	0.19
7	HCO3 (mg/L)	138	122	128	144	201	163	174	176	134	201	163	125
8	K (mg/L)	0.9	1.2	1.5	1.4	2.0	1.8	1.4	1.4	1.3	2.1	1.6	1.8
9	Mg (mg/L)	6.3	7.1	8.5	9.5	11.2	11.9	14.8	14.3	10.2	17.0	10.9	10.9
10	Na (mg/L)	7.2	5.6	7.2	7.2	10.2	9.8	8.9	9.1	9.1	11.9	9.4	6.5
11	NO2+NO3 (mg N/L)	0.09	0.67	1.17	0.92	0.69	0.71	0.67	0.65	0.89	0.47	0.44	0.11
12	NO2-N (mgN/L)	0.01	0.05	0.06	0.06	0.03	0.03	0.03	0.04	0.03	0.02	0.02	0.05
13	NO3-N (mgN/L)	0.08	0.63	1.11	0.87	0.67	0.68	0.65	0.61	0.86	0.45	0.43	0.06
14	o-PO4-P (mg P/L)	0.058	0.252	0.260	0.243	0.083	0.078	0.072	0.091	0.084	0.074	0.071	0.136
15	SiO2 (mg/L)	16.9	27.3	19.5	23.0	23.1	23.4	19.3	18.9	19.1	18.2	18.1	18.2
16	SO4 (mg/L)	5.7	15.9	16.2	14.0	28.5	27.3	27.7	19.8	15.2	14.7	14.1	21.7
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.0	1.1	0.4	0.9	1.6	1.2	0.6	1.0	1.1	1.1	0.9	1.1
2	COD (mg/L)	39.0	49.0	53.0	52.0	49.0	36.0	38.0	18.0	26.0	51.0	56.0	29.0
3	DO (mg/L)	5.8	5.0	5.3	5.4	5.5	6.0	6.3	6.7	6.3	5.2	5.5	5.1
4	DO_SAT% (%)	73	57	64	70	70	71	67	69	65	61	67	64
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	74	63	68	72	87	72	78	80	68	79	78	62
2	HAR_Total (mgCaCO3/L)	100	93	103	111	134	122	140	140	110	150	124	108
3	Na% (%)	13	12	13	12	14	15	12	12	15	15	14	11
4	RSC (-)	0.3	0.2	0.0	0.2	0.6	0.3	0.1	0.1	0.0	0.3	0.2	0.0
5	SAR (-)	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.3

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Sandia (010215013) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division:MNSD-1, Hoshangabad

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	383	212	275
3	pH_GEN (pH units)	12	8.0	7.7	7.8
4	TDS (mg/L)	12	248	139	180
5	Temp (deg C)	12	29.5	17.0	23.8
6	Turb (NTU)	12	240.0	0.0	51.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	165	100	128
3	Ca (mg/L)	12	35	25	29
4	Cl (mg/L)	12	17.0	4.0	8.6
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.37	0.19	0.28
7	HCO3 (mg/L)	12	201	122	156
8	K (mg/L)	12	2.1	0.9	1.5
9	Mg (mg/L)	12	17.0	6.3	11.1
10	Na (mg/L)	12	11.9	5.6	8.5
11	NO2+NO3 (mg N/L)	12	1.17	0.09	0.62
12	NO2-N (mgN/L)	12	0.06	0.01	0.03
13	NO3-N (mgN/L)	12	1.11	0.06	0.59
14	o-PO4-P (mg P/L)	12	0.260	0.058	0.125
15	SiO2 (mg/L)	12	27.3	16.9	20.4
16	SO4 (mg/L)	12	28.5	5.7	18.4
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.6	0.4	1
2	COD (mg/L)	12	56.0	18.0	41.3
3	DO (mg/L)	12	6.7	5.0	5.7
4	DO_SAT% (%)	12	73	57	67
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	87	62	73
2	HAR_Total (mgCaCO3/L)	12	150	93	120
3	Na% (%)	12	15	11	13
4	RSC (-)	12	0.6	0.0	0.2
5	SAR (-)	12	0.4	0.3	0.3

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Sandia (010215013) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-1, Hoshangabad

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	1714	309.4	274.5			217.0	203.4	103.4			238.7	138.6	90.18		
2	EC_GEN (µmho/cm)	239	211	227	193	248	281	207	235	258	287	198	191	258	231	305
3	pH_GEN (pH units)	8.0	8.0	8.2	7.6	7.8	8.2	8.1	8.3	7.8	7.8	8.1	8.2	8.1	7.7	7.7
4	TDS (mg/L)	152	138	144	125	160	175	137	150	167	191	127	123	167	150	197
5	Temp (deg C)	26.6	29.0	28.6	27.3	26.5	20.5	21.0	20.8	18.1	19.1	25.8	25.0	23.8	25.8	25.5
6	Turb (NTU)	283.0	114.2	38.6	145.8	124.4	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	2.2	0.0	0.9	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	123	142	144	92	120	167	135	144	130	133	139	125	130	121	134
3	Ca (mg/L)	27	29	28	23	29	32	29	32	32	30	27	29	27	33	29
4	Cl (mg/L)	7.0	6.8	7.4	4.9	5.4	8.8	5.9	7.5	6.5	8.3	9.9	7.3	6.3	5.7	14.3
5	CO3 (mg/L)	0.0	2.6	0.0	1.1	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.28	0.25	0.32	0.35	0.33	0.12	0.38	0.24	0.19	0.29	0.15	0.13	0.23	0.19	0.21
7	HCO3 (mg/L)	151	168	175	110	147	204	165	170	158	162	170	152	158	147	163
8	K (mg/L)	3.4	2.4	2.7	1.5	1.4	1.4	1.5	1.5	1.2	1.5	1.2	1.1	1.3	1.0	1.8
9	Mg (mg/L)	9.5	14.3	14.3	7.3	8.5	15.1	12.7	12.7	9.7	12.8	12.7	21.6	12.1	7.7	13.0
10	Na (mg/L)	7.9	10.0	10.1	4.9	7.5	13.3	10.5	10.5	7.2	9.2	9.1	7.1	7.9	7.8	9.2
11	NO2+NO3 (mg N/L)	1.42	1.27	1.21	1.85	0.71	0.76	0.79	0.26	0.38	0.73	0.28	0.41	0.07	0.22	0.34
12	NO2-N (mgN/L)	0.02	0.02	0.01	0.10	0.04	0.04	0.03	0.01	0.01	0.03	0.01	0.04	0.01	0.01	0.03
13	NO3-N (mgN/L)	1.40	1.25	1.20	1.75	0.67	0.72	0.76	0.25	0.37	0.70	0.26	0.37	0.06	0.21	0.31
14	o-PO4-P (mg P/L)	0.139	0.299	0.323	0.230	0.179	0.073	0.112	0.103	0.077	0.081	0.033	0.127	0.106	0.075	0.094
15	SiO2 (mg/L)	17.3	17.6	14.7	21.5	22.0	24.9	18.8	14.5	14.8	20.2	21.9	18.1	13.4	15.6	18.2
16	SO4 (mg/L)	10.7	12.6	12.1	12.6	16.1	5.2	11.6	2.1	9.2	22.5	2.1	23.0	2.7	5.1	16.8
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.7	1.0	0.7	0.9	1.0	0.9	0.9	0.7	1.2	1.0	0.4	0.6	0.4	1.0	1.0
2	COD (mg/L)	38.8	29.0	29.4	94.8	48.4	31.0	31.5	29.0	49.5	29.5	30.7	33.7	30.7	38.3	45.3
3	DO (mg/L)	6.2	5.6	6.0	5.4	5.4	7.3	7.2	7.5	6.7	6.3	6.4	6.7	6.5	5.3	5.3
4	DO_SAT% (%)	77	73	77	69	67	81	80	84	71	68	78	80	76	65	64
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	69	74	70	59	73	80	73	79	80	75	68	72	68	82	73
2	HAR_Total (mgCaCO3/L)	108	133	130	89	108	143	126	132	121	128	121	162	119	114	127
3	Na% (%)	14	14	14	11	13	17	15	14	11	14	14	9	12	13	13
4	RSC (-)	0.4	0.2	0.3	0.1	0.2	0.5	0.2	0.2	0.2	0.1	0.4	0.1	0.2	0.2	0.2
5	SAR (-)	0.3	0.4	0.4	0.2	0.3	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.4

3.10 Shakkar at Gadarwara

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Shakkar at Gadarwara**	**Code**	**:**	**010215012**
State	:	Madhya Pradesh	District		Narsinghpur
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Shakkar	Local River	:	Shakkar
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-1, Hoshangabad
Drainage Area	:	2270 Sq. Km.	Bank	:	Left
Latitude	:	22°55'26"	Longitude	:	78°47'20"
Zero of Gauge (m)	:	321 .000 (M.S.L.)	01/02/1977		
		Opening Date	Closing Date		
Gauge	:	01/02/1977			
Discharge	:	01/02/1977			
Sediment	:	15/06/1978			
Water Quality	:	16/08/1979			

Water Quality Datasheet for the period : 2017-2018

Station Name : Shakkar at Gadarwara (010215012) Division : Narmada Division, Bhopal

Local River : Shakkar Sub-Division : MNSD-1, Hoshangabad

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	10.82	86.31	96.63	50.45	8.62	5.9	0.9	0	0	0	0
2	Colour_Cod (-)		Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear		
3	EC_GEN (µmho/cm)		366	236	225	312	406	356	775	580	843		
4	Odour_Code (-)		odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free		
5	pH_GEN (pH units)		7.9	8.2	7.8	8.3	7.9	7.7	7.8	7.5	7.7		
6	TDS (mg/L)		236	153	145	199	270	242	506	378	535		
7	Temp (deg C)		20.0	23.0	27.0	25.0	24.0	22.0	17.5	20.5	21.0		
8	Turb (NTU)		118.0	88.0	96.0	70.0	0.0	0.0	0.0	0.0	0.0		
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)		0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	0.0		
2	ALK-TOT (mgCaCO3/L)		136	113	111	147	167	181	313	273	293		
3	Ca (mg/L)		34	28	29	33	41	37	61	56	59		
4	Cl (mg/L)		11.0	7.0	3.0	7.0	11.0	7.0	54.0	7.0	86.0		
5	CO3 (mg/L)		0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0		
6	F (mg/L)		0.36	0.37	0.35	0.30	0.31	0.29	0.43	0.40	0.30		
7	HCO3 (mg/L)		166	138	135	166	204	221	382	333	358		
8	K (mg/L)		2.5	0.9	0.7	1.0	0.9	1.3	6.8	5.5	2.4		
9	Mg (mg/L)		14.8	10.0	9.7	13.9	14.8	17.7	36.0	31.4	42.0		
10	Na (mg/L)		10.0	5.5	5.9	7.6	7.7	9.9	33.4	29.0	12.5		
11	NO2+NO3 (mg N/L)		1.20	1.47	1.23	1.30	1.31	1.04	3.64	3.31	2.12		
12	NO2-N (mgN/L)		0.07	0.10	0.09	0.04	0.05	0.04	0.06	0.08	0.08		
13	NO3-N (mgN/L)		1.13	1.37	1.14	1.26	1.27	1.00	3.58	3.23	2.04		
14	o-PO4-P (mg P/L)		0.314	0.333	0.317	0.076	0.081	0.075	0.261	0.284	0.134		
15	SiO2 (mg/L)		25.6	19.7	22.4	22.0	22.7	19.1	21.2	22.1	21.7		
16	SO4 (mg/L)		16.5	18.1	15.3	10.5	11.0	11.1	25.4	24.7	24.3		
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		1.9	0.7	0.8	0.8	0.9	0.7	2.2	0.4	1.7		
2	COD (mg/L)		53.0	43.0	50.0	46.0	38.0	27.0	46.0	26.0	21.0		
3	DO (mg/L)		4.5	5.7	5.1	5.5	6.0	5.9	3.6	2.9	4.8		
4	DO_SAT% (%)		49	66	64	67	71	67	37	32	54		
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		85	71	72	84	102	93	153	141	148		
2	HAR_Total (mgCaCO3/L)		146	113	113	141	163	167	303	271	324		
3	Na% (%)		13	10	10	10	9	11	19	19	8		
4	RSC (-)		0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.1	0.0		
5	SAR (-)		0.4	0.2	0.2	0.3	0.3	0.3	0.8	0.8	0.3		

Water Quality Summary for the period : 2017-2018

Station Name : Shakkar at Gadarwara (010215012) Division : Narmada Division, Bhopal

Local River : Shakkar Sub-Division:MNSD-1, Hoshangabad

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	9	843	225	455
3	pH_GEN (pH units)	9	8.3	7.5	7.9
4	TDS (mg/L)	9	535	145	296
5	Temp (deg C)	9	27.0	17.5	22.2
6	Turb (NTU)	9	118.0	0.0	41.3
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	9	5.2	0.0	0.6
2	ALK-TOT (mgCaCO3/L)	9	313	111	193
3	Ca (mg/L)	9	61	28	42
4	Cl (mg/L)	9	86.0	3.0	21.4
5	CO3 (mg/L)	9	6.3	0.0	0.7
6	F (mg/L)	9	0.43	0.29	0.35
7	HCO3 (mg/L)	9	382	135	234
8	K (mg/L)	9	6.8	0.7	2.4
9	Mg (mg/L)	9	42.0	9.7	21.1
10	Na (mg/L)	9	33.4	5.5	13.5
11	NO2+NO3 (mg N/L)	9	3.64	1.04	1.85
12	NO2-N (mgN/L)	9	0.10	0.04	0.07
13	NO3-N (mgN/L)	9	3.58	1.00	1.78
14	o-PO4-P (mg P/L)	9	0.333	0.075	0.208
15	SiO2 (mg/L)	9	25.6	19.1	21.8
16	SO4 (mg/L)	9	25.4	10.5	17.4
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	9	2.2	0.4	1.1
2	COD (mg/L)	9	53.0	21.0	38.9
3	DO (mg/L)	9	6.0	2.9	4.9
4	DO_SAT% (%)	9	71	32	56
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	9	153	71	105
2	HAR_Total (mgCaCO3/L)	9	324	113	193
3	Na% (%)	9	19	8	12
4	RSC (-)	9	0.3	0.0	0.1
5	SAR (-)	9	0.8	0.2	0.4

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Shakkar at Gadarwara (010215012) Division : Narmada Division, Bhopal

Local River : Shakkar Sub-Division : MNSD-1, Hoshangabad

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	205.6	50.34	47.91			9.174	3.611	1.540			4.041	1.889	0.006		
2	EC_GEN (µmho/cm)	233	233	247	228	285	378	311	290	420	529	283	279	370	545	843
3	pH_GEN (pH units)	7.9	7.9	8.2	7.5	8.0	8.2	8.1	8.3	7.8	7.7	8.2	8.2	8.0	7.6	7.7
4	TDS (mg/L)	146	150	155	147	183	237	206	184	272	349	180	176	242	354	535
5	Temp (deg C)	19.5	23.0	23.8	24.0	23.8	18.4	18.3	20.3	19.8	21.0	22.0	25.3	21.0	21.8	21.0
6	Turb (NTU)	224.3	96.6	8.2	155.0	93.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	3.9	2.0	0.0	1.3	0.0	1.3	5.2	0.0	0.0	1.4	2.5	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	123	150	156	103	127	233	204	167	204	234	193	189	170	250	293
3	Ca (mg/L)	27	26	30	26	31	36	41	34	44	49	34	32	23	46	59
4	Cl (mg/L)	6.3	8.1	8.1	4.8	7.0	9.1	8.7	7.8	9.0	19.8	13.5	10.7	15.0	27.0	86.0
5	CO3 (mg/L)	0.0	4.7	2.4	0.0	1.6	0.0	1.5	6.3	0.0	0.0	1.7	3.0	0.0	0.0	0.0
6	F (mg/L)	0.43	0.26	0.26	0.37	0.34	0.09	0.40	0.20	0.15	0.36	0.11	0.11	0.25	0.24	0.30
7	HCO3 (mg/L)	150	173	185	126	151	284	246	192	249	285	232	225	207	305	358
8	K (mg/L)	3.7	2.2	1.7	1.8	1.2	0.9	1.6	0.8	1.0	3.6	1.1	1.1	3.1	2.6	2.4
9	Mg (mg/L)	11.5	14.5	16.2	9.2	12.1	26.3	20.4	19.6	20.0	25.0	17.7	19.5	20.9	27.2	42.0
10	Na (mg/L)	7.2	11.3	9.4	6.0	7.3	12.8	12.0	10.9	11.2	20.0	13.5	11.7	15.6	29.6	12.4
11	NO2+NO3 (mg N/L)	1.79	1.37	1.31	1.80	1.30	0.90	1.69	0.27	0.53	2.32	0.30	0.34	0.06	0.79	2.12
12	NO2-N (mgN/L)	0.04	0.04	0.03	0.19	0.08	0.05	0.06	0.01	0.02	0.06	0.01	0.05	0.01	0.04	0.08
13	NO3-N (mgN/L)	1.75	1.34	1.28	1.61	1.23	0.85	1.63	0.26	0.51	2.27	0.29	0.29	0.05	0.75	2.04
14	o-PO4-P (mg P/L)	0.216	0.319	0.219	0.345	0.260	0.026	0.187	0.104	0.092	0.175	0.040	0.120	0.182	0.146	0.134
15	SiO2 (mg/L)	18.7	23.4	19.0	25.1	22.4	28.9	22.4	20.6	17.3	21.2	18.9	19.9	21.6	19.2	21.7
16	SO4 (mg/L)	13.3	10.6	9.4	20.6	15.1	5.1	18.2	2.5	10.8	18.0	2.3	41.0	2.2	9.9	24.3
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.9	1.0	0.8	0.9	1.0	0.9	1.0	0.6	1.0	1.1	0.9	1.0	3.0	0.8	1.7
2	COD (mg/L)	36.8	28.6	28.4	41.5	48.0	34.3	39.0	25.8	36.8	34.3	31.0	27.3	44.0	40.0	21.0
3	DO (mg/L)	5.7	5.8	6.2	4.9	5.2	7.3	6.8	7.6	6.6	4.6	6.5	7.1	3.0	4.3	4.8
4	DO_SAT% (%)	62	68	74	59	62	78	72	83	72	52	74	86	34	48	54
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	68	65	76	64	78	90	101	84	109	122	85	80	57	114	148
2	HAR_Total (mgCaCO3/L)	116	125	143	103	128	200	186	166	193	226	159	162	144	227	324
3	Na% (%)	12	16	13	11	11	12	12	13	11	15	16	14	19	21	8
4	RSC (-)	0.2	0.5	0.3	0.1	0.0	0.7	0.4	0.3	0.2	0.2	0.7	0.6	0.5	0.5	0.0
5	SAR (-)	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.5	0.4	0.6	0.8	0.3

3.11 Narmada at Barman

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Barman**	**Code**	**:**	**010215011**
State	:	Madhya Pradesh	District		Narsinghpur
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Narmada
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-1, Hoshangabad
Drainage Area	:	26453 Sq. Km.	Bank	:	Right
Latitude	:	23°01'52"	Longitude	:	79°00'56"
Zero of Gauge (m)	:	306 .000 (M.S.L.)	09/12/1970		
		Opening Date	Closing Date		
Gauge	:	09/12/1970			
Discharge	:	20/11/1971			
Sediment	:	27/08/1972			
Water Quality	:	01/06/1979			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Barman (010215011) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-1, Hoshangabad

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	34.4	245	119	93	69.8	58.9	33.8	35.5	66.7	24	23.3	58.9
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	218	244	221	233	332	291	274	281	219	285	259	207
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.6	7.8	8.0	7.8	8.2	7.8	7.8	7.7	7.9	7.9	7.2	7.8
6	TDS (mg/L)	142	158	139	151	211	193	185	183	139	185	169	140
7	Temp (deg C)	29.0	27.0	28.0	30.0	29.0	26.0	20.0	17.0	18.0	24.0	25.0	28.0
8	Turb (NTU)	0.0	141.0	118.0	88.0	76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	107	95	100	123	152	120	116	125	102	123	112	92
3	Ca (mg/L)	29	23	31	26	36	29	30	28	24	24	25	25
4	Cl (mg/L)	8.0	5.0	6.0	8.0	8.0	8.0	16.0	15.0	2.0	13.0	14.0	7.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.19	0.30	0.34	0.31	0.31	0.29	0.28	0.30	0.30	0.23	0.20	0.18
7	HCO3 (mg/L)	131	116	122	150	185	147	142	153	124	150	137	112
8	K (mg/L)	0.8	1.2	1.5	1.3	2.0	1.9	1.3	1.4	1.3	2.1	1.4	1.2
9	Mg (mg/L)	7.1	7.8	6.1	11.4	13.4	9.7	13.1	15.8	10.9	13.4	12.2	8.3
10	Na (mg/L)	6.6	6.2	6.7	7.4	10.4	10.2	7.1	8.2	8.4	7.1	7.6	4.7
11	NO2+NO3 (mg N/L)	0.10	0.83	1.09	0.97	0.41	0.42	0.41	0.43	0.43	0.21	0.20	0.07
12	NO2-N (mgN/L)	0.01	0.05	0.09	0.08	0.03	0.04	0.03	0.04	0.03	0.02	0.02	0.06
13	NO3-N (mgN/L)	0.09	0.78	1.00	0.88	0.38	0.39	0.38	0.39	0.41	0.19	0.17	0.01
14	o-PO4-P (mg P/L)	0.084	0.197	0.200	0.181	0.146	0.149	0.141	0.132	0.124	0.110	0.101	0.079
15	SiO2 (mg/L)	17.9	24.0	15.8	19.8	19.0	19.5	18.7	18.4	18.1	17.2	17.3	17.7
16	SO4 (mg/L)	6.9	17.0	17.0	14.6	10.4	11.0	11.2	11.6	10.8	10.3	10.8	9.5
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	0.4	0.7	0.5	0.4	0.6	0.7	1.0	1.4	1.3	1.0	1.2	1.4
2	COD (mg/L)	23.0	27.0	32.0	33.0	34.0	37.0	29.0	27.0	37.0	56.0	48.0	23.0
3	DO (mg/L)	5.2	5.3	5.3	5.4	5.6	6.2	6.0	6.9	6.5	5.8	6.0	5.2
4	DO_SAT% (%)	68	67	68	71	73	76	66	71	69	69	73	66
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	71	58	77	66	89	74	74	69	60	61	62	62
2	HAR_Total (mgCaCO3/L)	101	91	102	114	145	114	129	135	105	117	112	96
3	Na% (%)	12	13	12	12	13	16	11	12	15	11	13	10
4	RSC (-)	0.1	0.1	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0
5	SAR (-)	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.2

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Barman (010215011) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division:MNSD-1, Hoshangabad

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	332	207	255
3	pH_GEN (pH units)	12	8.2	7.2	7.8
4	TDS (mg/L)	12	211	139	166
5	Temp (deg C)	12	30.0	17.0	25.1
6	Turb (NTU)	12	141.0	0.0	35.3
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	152	92	114
3	Ca (mg/L)	12	36	23	27
4	Cl (mg/L)	12	16.0	2.0	9.2
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.34	0.18	0.27
7	HCO3 (mg/L)	12	185	112	139
8	K (mg/L)	12	2.1	0.8	1.4
9	Mg (mg/L)	12	15.8	6.1	10.8
10	Na (mg/L)	12	10.4	4.7	7.5
11	NO2+NO3 (mg N/L)	12	1.09	0.07	0.46
12	NO2-N (mgN/L)	12	0.09	0.01	0.04
13	NO3-N (mgN/L)	12	1.00	0.01	0.42
14	o-PO4-P (mg P/L)	12	0.200	0.079	0.137
15	SiO2 (mg/L)	12	24.0	15.8	18.6
16	SO4 (mg/L)	12	17.0	6.9	11.8
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.4	0.4	0.9
2	COD (mg/L)	12	56.0	23.0	33.8
3	DO (mg/L)	12	6.9	5.2	5.8
4	DO_SAT% (%)	12	76	66	70
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	89	58	69
2	HAR_Total (mgCaCO3/L)	12	145	91	113
3	Na% (%)	12	16	10	12
4	RSC (-)	12	0.2	0.0	0.1
5	SAR (-)	12	0.4	0.2	0.3

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Barman (010215011) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : MNSD-1, Hoshangabad

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	959.6	274.1	191.3			157.5	175.5	85.17			235.7	139.3	93.33		
2	EC_GEN (µmho/cm)	208	185	193	198	250	237	167	201	224	266	175	168	224	221	250
3	pH_GEN (pH units)	8.0	7.8	8.2	7.7	7.9	8.1	8.1	8.2	7.9	7.8	8.1	8.1	8.1	7.8	7.6
4	TDS (mg/L)	131	118	121	130	160	145	111	127	145	175	114	108	146	144	165
5	Temp (deg C)	26.8	27.8	28.4	28.2	28.6	21.8	20.5	21.8	21.5	20.3	24.7	24.0	25.3	25.0	25.7
6	Turb (NTU)	121.8	54.4	25.4	82.0	84.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	106	131	117	91	115	136	109	119	106	116	117	110	107	110	109
3	Ca (mg/L)	24	27	27	23	29	29	25	29	25	28	26	24	25	31	25
4	Cl (mg/L)	7.6	8.6	7.8	4.7	7.0	7.7	5.9	7.8	6.3	10.3	10.6	8.0	6.7	9.3	11.3
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.29	0.26	0.33	0.32	0.29	0.15	0.20	0.23	0.15	0.29	0.18	0.14	0.32	0.20	0.20
7	HCO3 (mg/L)	129	160	143	111	141	167	133	138	130	142	143	134	130	135	133
8	K (mg/L)	2.7	2.3	2.3	1.5	1.4	1.2	1.2	1.5	1.1	1.5	1.2	1.2	1.4	1.0	1.5
9	Mg (mg/L)	10.4	13.8	11.2	7.6	9.1	13.5	9.7	9.5	10.4	12.4	9.9	10.7	10.0	7.8	11.3
10	Na (mg/L)	6.8	10.0	8.2	5.1	7.5	9.8	6.5	9.6	5.2	8.5	7.0	5.5	6.2	6.5	6.5
11	NO2+NO3 (mg N/L)	1.25	1.50	0.89	1.05	0.68	0.39	0.64	0.30	0.26	0.42	0.16	0.37	0.05	0.18	0.16
12	NO2-N (mgN/L)	0.04	0.03	0.01	0.08	0.05	0.05	0.03	0.01	0.01	0.03	0.01	0.06	0.01	0.01	0.03
13	NO3-N (mgN/L)	1.21	1.46	0.87	0.98	0.63	0.34	0.61	0.29	0.25	0.39	0.15	0.31	0.05	0.17	0.12
14	o-PO4-P (mg P/L)	0.158	0.167	0.396	0.230	0.162	0.046	0.120	0.107	0.073	0.137	0.045	0.118	0.103	0.072	0.097
15	SiO2 (mg/L)	18.6	23.6	16.7	19.3	19.3	23.0	21.7	15.8	14.3	18.7	21.2	14.3	15.0	16.5	17.4
16	SO4 (mg/L)	10.4	9.5	9.2	14.5	13.2	3.6	5.2	4.9	9.6	11.2	2.8	27.7	3.0	6.0	10.2
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.6	1.2	0.8	0.9	0.5	0.9	0.8	1.7	1.2	1.1	0.7	0.5	0.4	1.0	1.2
2	COD (mg/L)	39.2	29.8	31.0	35.4	29.8	33.0	44.0	36.8	33.5	32.5	24.7	27.0	23.7	29.0	42.3
3	DO (mg/L)	6.2	5.1	5.9	6.0	5.4	7.2	7.1	6.4	6.2	6.4	6.5	6.5	5.6	5.4	5.7
4	DO_SAT% (%)	78	64	76	76	69	82	78	72	70	71	78	77	67	65	69
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	60	66	67	57	72	73	63	73	63	69	66	59	62	78	61
2	HAR_Total (mgCaCO3/L)	103	124	114	89	110	129	103	113	106	121	107	104	104	111	108
3	Na% (%)	13	14	13	11	13	14	12	15	10	13	12	10	11	11	11
4	RSC (-)	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1
5	SAR (-)	0.3	0.4	0.3	0.2	0.3	0.4	0.3	0.4	0.2	0.3	0.3	0.2	0.3	0.3	0.3

3.12 Sher at Belkheri

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Sher at Belkheri**	**Code**	**:**	**010215010**
State	:	Madhya Pradesh	District		Narsinghpur
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Sher	Local River	:	Sher
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-1, Hoshangabad
Drainage Area	:	1508 Sq. Km.	Bank	:	Right
Latitude	:	22°55'40"	Longitude	:	79°20'23"
Zero of Gauge (m)	:	340 .000 (M.S.L.)	01/02/1977		
		340 .000 (M.S.L.)	16/03/1977		
		Opening Date	Closing Date		
Gauge	:	16/03/1977			
Discharge	:	16/03/1977			
Sediment	:				
Water Quality	:	01/09/1986			

Water Quality Datasheet for the period : 2017-2018

Station Name : Sher at Belkheri (010215010) Division : Narmada Division, Bhopal

Local River : Sher Sub-Division : MNSD-1, Hoshangabad

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0.357	49.27	16.67	24.69	9.397	0	0	0	0	0	0	0
2	Colour_Cod (-)	Clear	Light Brown	Clear	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	462	187	272	190	324	454	465	511	467	528	498	487
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.6	7.7	8.0	7.7	8.0	7.7	7.7	7.9	7.9	8.0	7.9	7.9
6	TDS (mg/L)	280	113	179	128	206	298	309	333	304	341	323	317
7	Temp (deg C)	29.0	27.0	27.0	27.0	25.0	26.0	22.0	20.0	20.0	25.0	25.0	28.0
8	Turb (NTU)	0.0	138.0	45.0	94.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	284	69	131	98	157	199	259	302	238	280	272	259
3	Ca (mg/L)	39	20	33	22	35	43	42	47	37	28	38	36
4	Cl (mg/L)	9.0	5.0	7.0	4.0	7.0	8.0	8.0	6.0	3.0	4.0	8.0	9.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.48	0.25	0.28	0.26	0.28	0.27	0.22	0.24	0.29	0.27	0.23	0.22
7	HCO3 (mg/L)	347	84	160	119	192	243	316	369	290	342	332	316
8	K (mg/L)	0.8	0.8	0.6	0.7	0.9	0.9	1.1	1.1	1.2	1.4	1.3	1.3
9	Mg (mg/L)	34.8	3.9	13.6	9.0	15.1	17.0	28.9	31.8	29.9	32.6	31.9	27.7
10	Na (mg/L)	18.7	4.1	6.9	4.8	8.1	8.4	14.0	20.5	19.3	20.7	18.1	19.6
11	NO2+NO3 (mg N/L)	0.20	0.97	1.17	1.07	0.01	0.03	0.05	0.08	0.75	1.60	1.38	0.09
12	NO2-N (mgN/L)	0.04	0.04	0.08	0.07	0.00	0.01	0.00	0.02	0.09	0.09	0.07	0.03
13	NO3-N (mgN/L)	0.16	0.92	1.09	1.00	0.01	0.02	0.04	0.06	0.67	1.52	1.31	0.07
14	o-PO4-P (mg P/L)	0.194	0.160	0.214	0.199	0.059	0.052	0.055	0.079	0.112	0.101	0.095	0.022
15	SiO2 (mg/L)	28.6	21.9	19.3	22.1	19.8	19.2	19.6	20.6	21.4	19.3	19.5	18.9
16	SO4 (mg/L)	9.6	15.0	16.5	13.5	10.8	11.2	12.0	11.4	13.9	13.4	13.3	1.3
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.0	0.6	1.0	1.2	0.8	0.8	0.7	1.6	0.6	2.5	2.2	2.0
2	COD (mg/L)	30.0	43.0	45.0	47.0	43.0	40.0	49.0	61.0	35.0	44.0	57.0	21.0
3	DO (mg/L)	5.4	4.6	5.5	5.6	5.9	6.0	7.2	6.6	7.6	5.8	5.7	5.5
4	DO_SAT% (%)	70	58	69	70	71	74	82	73	84	70	69	70
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	97	50	81	56	86	108	104	118	92	70	96	90
2	HAR_Total (mgCaCO3/L)	242	66	138	93	149	179	225	251	217	206	229	205
3	Na% (%)	14	12	10	10	11	9	12	15	16	18	15	17
4	RSC (-)	0.9	0.1	0.0	0.1	0.2	0.4	0.7	1.1	0.5	1.5	0.9	1.1
5	SAR (-)	0.5	0.2	0.3	0.2	0.3	0.3	0.4	0.6	0.6	0.6	0.5	0.6

Water Quality Summary for the period : 2017-2018

Station Name : Sher at Belkheri (010215010) Division : Narmada Division, Bhopal

Local River : Sher Sub-Division:MNSD-1Hoshangabad

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	718	171	410
3	pH_GEN (pH units)	12	8.1	7.2	7.7
4	TDS (mg/L)	12	464	102	265
5	Temp (deg C)	12	31.0	20.0	25
6	Turb (NTU)	12	148.0	0.0	40.1
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	308	3	198
3	Ca (mg/L)	12	56	19	38
4	Cl (mg/L)	12	11.0	3.0	7.4
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.52	0.16	0.33
7	HCO3 (mg/L)	12	376	3	241
8	K (mg/L)	12	1.4	0.6	0.9
9	Mg (mg/L)	12	39.4	5.6	22.6
10	Na (mg/L)	12	20.2	5.1	12.3
11	NO2+NO3 (mg N/L)	12	1.92	0.08	0.89
12	NO2-N (mgN/L)	12	0.42	0.01	0.08
13	NO3-N (mgN/L)	12	1.50	0.08	0.81
14	o-PO4-P (mg P/L)	12	0.362	0.047	0.23
15	SiO2 (mg/L)	12	29.2	18.5	23.9
16	SO4 (mg/L)	12	20.7	8.8	14.5
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	2.0	0.8	1.2
2	COD (mg/L)	12	61.0	27.0	39.4
3	DO (mg/L)	11	8.5	3.5	6.1
4	DO_SAT% (%)	11	93	45	72
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	140	48	95
2	HAR_Total (mgCaCO3/L)	12	265	71	189
3	Na% (%)	12	18	7	12
4	RSC (-)	12	1.3	0.0	0.6
5	SAR (-)	12	0.6	0.2	0.4

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Sher at Belkheri (010215010) Division : Narmada Division, Bhopal

Local River : Sher Sub-Division : MNSD-1, Hoshangabad

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	64.94		11.46			4.438		0.646			2.441		0.359		
2	EC_GEN (µmho/cm)	321	282	286	296	287	453	373	404	521	474	396	305	523	451	504
3	pH_GEN (pH units)	8.1	7.9	8.0	7.6	7.8	8.1	8.1	8.0	7.8	7.8	8.0	8.0	7.8	7.7	8.0
4	TDS (mg/L)	205	181	178	191	181	286	248	258	339	311	256	199	341	290	327
5	Temp (deg C)	25.6	28.4	29.0	27.4	27.0	22.3	22.8	23.5	21.5	22.0	26.0	26.3	25.0	25.7	26.0
6	Turb (NTU)	115.2	60.8	17.6	96.2	62.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	172	188	187	99	148	289	258	269	274	250	287	214	284	259	270
3	Ca (mg/L)	33	29	33	28	30	48	46	38	49	42	45	33	42	39	34
4	Cl (mg/L)	7.2	8.9	8.5	5.2	6.4	9.5	8.6	8.0	8.5	6.3	13.0	21.0	7.3	9.7	7.0
5	CO3 (mg/L)	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.27	0.32	0.34	0.33	0.31	0.16	0.30	0.23	0.20	0.26	0.17	0.23	0.47	0.51	0.24
7	HCO3 (mg/L)	210	230	226	121	180	352	315	329	335	305	350	262	346	316	330
8	K (mg/L)	2.8	2.0	1.6	1.1	0.8	0.8	0.8	0.9	0.8	1.1	1.0	1.0	1.1	0.9	1.3
9	Mg (mg/L)	16.5	19.8	21.3	15.8	15.3	29.3	28.9	33.3	27.2	26.9	28.4	23.2	31.8	27.8	30.7
10	Na (mg/L)	11.2	11.0	11.0	7.4	8.5	16.7	14.2	16.3	14.5	15.5	19.0	9.3	16.1	17.5	19.4
11	NO2+NO3 (mg N/L)	0.93	1.37	1.25	1.09	0.68	1.18	0.90	0.78	0.75	0.22	0.92	0.67	0.07	0.76	1.02
12	NO2-N (mgN/L)	0.03	0.03	0.03	0.13	0.05	0.05	0.03	0.01	0.05	0.03	0.01	0.05	0.01	0.05	0.06
13	NO3-N (mgN/L)	0.90	1.34	1.22	0.96	0.64	1.13	0.86	0.77	0.69	0.20	0.91	0.62	0.07	0.72	0.96
14	o-PO4-P (mg P/L)	0.234	0.349	0.627	0.262	0.165	0.066	0.091	0.103	0.204	0.075	0.059	0.066	0.291	0.213	0.073
15	SiO2 (mg/L)	25.9	29.8	23.7	23.0	22.3	44.9	29.7	37.3	22.4	20.2	31.9	27.8	30.9	27.3	19.3
16	SO4 (mg/L)	13.1	11.0	10.4	17.3	13.1	5.6	4.2	5.6	13.3	12.1	3.6	9.0	12.5	11.3	9.3
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.7	1.0	0.5	0.9	0.9	0.8	0.9	0.8	1.4	0.9	1.0	0.9	1.1	1.3	2.2
2	COD (mg/L)	25.2	34.8	22.2	41.2	41.6	29.0	44.8	25.3	40.0	46.3	24.0	27.7	27.3	35.7	40.7
3	DO (mg/L)	6.0	5.7	5.7	5.1	5.4	7.1	7.3	6.7	7.6	6.8	6.6	6.0	5.3	5.3	5.7
4	DO_SAT% (%)	74	73	74	64	68	81	84	78	85	78	81	74	64	65	70
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	82	73	83	71	74	119	115	95	122	106	114	83	105	98	85
2	HAR_Total (mgCaCO3/L)	151	155	172	136	138	241	235	234	236	218	232	179	237	214	213
3	Na% (%)	13	12	13	11	11	13	12	13	11	13	15	10	13	15	17
4	RSC (-)	0.5	0.7	0.3	0.2	0.2	1.0	0.5	0.7	0.8	0.7	1.1	0.7	1.0	0.9	1.2
5	SAR (-)	0.4	0.4	0.4	0.3	0.3	0.5	0.4	0.5	0.4	0.5	0.5	0.3	0.5	0.5	0.6

3.13 Hiran at Patan

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Hiran at Patan**	**Code**	**:**	**010215009**
State	:	Madhya Pradesh	District		Jabalpur
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Hiran	Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Hiran
Division	:	Narmada Division, Bhopal	Sub-Division	:	UNSD, Jabalpur
Drainage Area	:	3950 Sq. Km.	Bank	:	Left
Latitude	:	23°18'42"	Longitude	:	79°39'46"
Zero of Gauge (m)	:	341.5 .000 (M.S.L.)	30/08/1979		
		Opening Date	Closing Date		
Gauge	:	30/08/1979			
Discharge	:	30/08/1979			
Sediment	:				
Water Quality	:	01/09/1986			

Water Quality Datasheet for the period : 2017-2018

Station Name : Hiran at Patan (010215009) Division : Narmada Division, Bhopal

Local River : Hiran Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	3.93	26.95	23.47	28.48	0	0	0	0	0	0	0
2	Colour_Cod (-)		Light Brown	Light Brown	Light Brown	Light Brown	Clear						
3	EC_GEN (µmho/cm)		167	229	269	352	480						
4	Odour_Code (-)		odour free	odour free	odour free	odour free	odour free						
5	pH_GEN (pH units)		7.9	7.8	7.7	7.8	7.6						
6	TDS (mg/L)		100	149	178	225	315						
7	Temp (deg C)		30.0	29.0	30.0	30.0	26.0						
8	Turb (NTU)		122.0	112.0	100.0	61.0	0.0						
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)		0.0	0.0	0.0	0.0	0.0						
2	ALK-TOT (mgCaCO3/L)		57	102	139	160	202						
3	Ca (mg/L)		16	31	32	40	45						
4	Cl (mg/L)		5.0	7.0	8.0	9.0	12.0						
5	CO3 (mg/L)		0.0	0.0	0.0	0.0	0.0						
6	F (mg/L)		0.33	0.36	0.33	0.32	0.29						
7	HCO3 (mg/L)		69	125	169	195	246						
8	K (mg/L)		1.4	2.2	2.4	3.3	3.4						
9	Mg (mg/L)		2.9	6.1	11.4	10.7	15.3						
10	Na (mg/L)		7.0	7.4	9.8	11.7	12.3						
11	NO2+NO3 (mg N/L)		1.18	1.27	1.22	1.18	1.20						
12	NO2-N (mgN/L)		0.04	0.09	0.07	0.05	0.05						
13	NO3-N (mgN/L)		1.15	1.18	1.15	1.14	1.15						
14	o-PO4-P (mg P/L)		0.239	0.259	0.239	0.247	0.222						
15	SiO2 (mg/L)		22.3	20.9	21.3	19.2	18.7						
16	SO4 (mg/L)		12.7	14.7	12.0	2.7	3.1						
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		0.8	1.1	0.8	1.2	1.0						
2	COD (mg/L)		30.0	39.0	37.0	36.0	38.0						
3	DO (mg/L)		4.5	3.8	4.0	4.4	5.8						
4	DO_SAT% (%)		60	49	53	58	71						
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		41	78	81	100	112						
2	HAR_Total (mgCaCO3/L)		53	103	129	145	176						
3	Na% (%)		22	13	14	15	13						
4	RSC (-)		0.1	0.0	0.2	0.3	0.5						
5	SAR (-)		0.4	0.3	0.4	0.4	0.4						

Water Quality Summary for the period : 2017-2018

Station Name : Hiran at Patan (010215009) Division : Narmada Division, Bhopal

Local River : Hiran Sub-Division : UNSD, Jabalpur

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	5	480	167	299
3	pH_GEN (pH units)	5	7.9	7.6	7.8
4	TDS (mg/L)	5	315	100	193
5	Temp (deg C)	5	30.0	26.0	29
6	Turb (NTU)	5	122.0	0.0	79
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	5	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	5	202	57	132
3	Ca (mg/L)	5	45	16	33
4	Cl (mg/L)	5	12.0	5.0	8.2
5	CO3 (mg/L)	5	0.0	0.0	0
6	F (mg/L)	5	0.36	0.29	0.33
7	HCO3 (mg/L)	5	246	69	161
8	K (mg/L)	5	3.4	1.4	2.5
9	Mg (mg/L)	5	15.3	2.9	9.3
10	Na (mg/L)	5	12.3	7.0	9.7
11	NO2+NO3 (mg N/L)	5	1.27	1.18	1.21
12	NO2-N (mgN/L)	5	0.09	0.04	0.06
13	NO3-N (mgN/L)	5	1.18	1.14	1.15
14	o-PO4-P (mg P/L)	5	0.259	0.222	0.241
15	SiO2 (mg/L)	5	22.3	18.7	20.5
16	SO4 (mg/L)	5	14.7	2.7	9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	5	1.2	0.8	1
2	COD (mg/L)	5	39.0	30.0	36
3	DO (mg/L)	5	5.8	3.8	4.5
4	DO_SAT% (%)	5	71	49	58
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	5	112	41	83
2	HAR_Total (mgCaCO3/L)	5	176	53	121
3	Na% (%)	5	22	13	15
4	RSC (-)	5	0.5	0.0	0.2
5	SAR (-)	5	0.4	0.3	0.4

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Hiran at Patan (010215009) Division : Narmada Division, Bhopal

Local River : Hiran Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	200.8		56.63			15.29		10.41			7.099		2.302		
2	EC_GEN (µmho/cm)	350	395	273	269	254	476	376	402	483	480	421	411	448	314	
3	pH_GEN (pH units)	7.9	7.9	8.0	7.5	7.8	8.1	8.1	8.1	7.6	7.6	7.9	8.2	8.3	7.6	
4	TDS (mg/L)	222	257	166	172	163	295	249	258	311	315	269	263	294	204	
5	Temp (deg C)	26.7	29.1	28.8	29.4	29.8	19.5	22.5	22.8	21.1	26.0	22.7	26.3	22.8	24.0	
6	Turb (NTU)	194.0	31.0	303.6	130.0	98.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	2.6	1.5	0.0	0.0	0.0	2.5	3.5	0.0	0.0	0.0	4.2	6.9	0.0	
2	ALK-TOT (mgCaCO3/L)	166	235	159	115	114	280	226	221	211	202	272	233	188	149	
3	Ca (mg/L)	36	47	33	28	30	59	49	50	52	45	52	48	39	36	
4	Cl (mg/L)	16.9	28.7	17.0	5.4	7.3	16.1	21.6	16.5	18.3	12.0	24.6	32.4	20.5	14.0	
5	CO3 (mg/L)	0.0	3.1	1.8	0.0	0.0	0.0	3.0	4.2	0.0	0.0	0.0	5.0	8.4	0.0	
6	F (mg/L)	0.32	0.58	0.37	0.35	0.33	0.37	0.68	0.32	0.20	0.29	0.56	0.43	0.53	0.43	
7	HCO3 (mg/L)	202	281	190	140	140	342	270	261	258	246	331	274	213	182	
8	K (mg/L)	5.0	7.3	4.9	2.8	2.3	3.4	4.8	5.9	4.1	3.4	5.5	6.7	5.5	3.2	
9	Mg (mg/L)	11.6	21.0	15.3	8.7	7.8	24.7	19.0	18.3	17.1	15.3	20.2	19.6	14.5	13.2	
10	Na (mg/L)	17.2	24.9	16.6	14.1	9.0	21.8	19.5	20.4	15.5	12.3	22.6	24.0	18.8	13.8	
11	NO2+NO3 (mg N/L)	1.02	3.00	1.34	1.65	1.21	2.08	4.35	2.43	0.72	1.20	2.02	2.13	2.17	0.76	
12	NO2-N (mgN/L)	0.05	0.19	0.12	0.28	0.06	0.08	0.44	0.09	0.04	0.05	0.01	0.07	0.08	0.04	
13	NO3-N (mgN/L)	0.97	2.82	1.21	1.36	1.15	2.00	3.91	2.34	0.68	1.15	2.00	2.06	2.09	0.73	
14	o-PO4-P (mg P/L)	0.206	0.528	0.537	0.346	0.246	0.267	0.546	0.632	0.247	0.222	0.375	0.732	0.281	0.192	
15	SiO2 (mg/L)	20.0	19.4	15.4	18.4	20.9	21.7	20.2	13.0	15.9	18.7	21.7	16.0	24.6	20.2	
16	SO4 (mg/L)	12.7	18.0	13.2	17.5	10.5	11.7	10.2	5.1	10.8	3.1	4.3	13.8	8.9	5.5	
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.1	1.9	0.8	0.7	1.0	1.3	1.3	1.7	2.5	1.0	2.1	1.0	1.4	1.6	
2	COD (mg/L)	33.4	39.0	26.0	40.0	35.5	26.8	36.3	40.3	38.3	38.0	30.7	31.7	36.5	46.0	
3	DO (mg/L)	5.3	4.7	5.2	4.7	4.2	6.9	6.3	5.9	6.1	5.8	5.0	5.3	5.3	4.6	
4	DO_SAT% (%)	66	61	67	62	55	74	72	68	67	71	58	65	62	54	
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	91	119	83	70	75	147	124	125	129	112	131	121	97	90	
2	HAR_Total (mgCaCO3/L)	140	206	146	107	108	250	202	202	200	176	215	203	157	145	
3	Na% (%)	19	18	18	23	16	16	17	18	14	13	18	20	20	17	
4	RSC (-)	0.5	0.6	0.3	0.2	0.1	0.6	0.5	0.4	0.3	0.5	1.2	0.6	0.6	0.1	
5	SAR (-)	0.6	0.7	0.6	0.6	0.4	0.6	0.6	0.6	0.5	0.4	0.7	0.7	0.7	0.5	

3.14 Banjar at Bamni

History sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Banjar at Bamni**	**Code**	**:**	CWC SITE
State	:	Madhya Pradesh	District		Mandla
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Banjar	Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Banjar
Division	:	Narmada Division, Bhopal	Sub-Division	:	UNSD, Jabalpur
Drainage Area	:	1864 Sq. Km.	Bank	:	Left
Latitude	:	22°29'06"	Longitude	:	80°22'58"
Zero of Gauge (m)	:	440 .000 (M.S.L.)	20/06/1999		
		Opening Date	Closing Date		
Gauge	:	20/06/1999			
Discharge	:	30/11/1999			
Sediment	:	01/07/2002			
Water Quality	:	01/07/2002			

Water Quality Datasheet for the period : 2017-2018

Station Name : Banjar at Bamni
Local River : Banjar

Division : Narmada Division, Bhopal
Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
			A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	41.37	12.01	42.19	32.4	5.784	1.42	0.3044	0	0	0	0
2	Colour_Cod (-)		Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear		
3	EC_GEN (µmho/cm)		101	138	95	191	303	226	281	293	315		
4	Odour_Code (-)		odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free		
5	pH_GEN (pH units)		7.8	7.7	7.9	8.1	7.5	7.8	7.6	7.6	7.9		
6	TDS (mg/L)		65	90	62	121	200	155	182	192	205		
7	Temp (deg C)		25.0	26.0	26.5	26.0	24.0	19.0	15.5	14.0	18.0		
8	Turb (NTU)		145.0	110.0	130.0	68.0	0.0	0.0	0.0	0.0	0.0		
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
2	ALK-TOT (mgCaCO3/L)		39	57	43	86	123	114	139	142	144		
3	Ca (mg/L)		2	15	11	23	27	26	31	31	30		
4	Cl (mg/L)		4.0	5.0	2.0	5.0	6.0	6.0	5.0	2.0	7.0		
5	CO3 (mg/L)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
6	F (mg/L)		0.26	0.31	0.28	0.23	0.24	0.22	0.27	0.26	0.26		
7	HCO3 (mg/L)		47	69	53	105	150	139	170	173	176		
8	K (mg/L)		2.2	1.6	1.0	1.7	1.8	1.8	1.6	1.7	2.1		
9	Mg (mg/L)		6.3	5.1	3.2	5.4	10.0	10.7	12.4	11.4	12.9		
10	Na (mg/L)		2.5	5.3	3.2	6.7	6.2	8.0	9.7	8.8	9.3		
11	NO2+NO3 (mg N/L)		0.85	0.91	0.88	0.12	0.14	0.15	0.17	0.17	0.11		
12	NO2-N (mgN/L)		0.03	0.06	0.05	0.02	0.02	0.03	0.04	0.03	0.02		
13	NO3-N (mgN/L)		0.82	0.85	0.83	0.10	0.12	0.13	0.13	0.15	0.08		
14	o-PO4-P (mg P/L)		0.322	0.338	0.328	0.055	0.060	0.069	0.073	0.071	0.052		
15	SiO2 (mg/L)		20.8	16.3	20.1	18.4	18.7	15.9	17.5	15.9	15.9		
16	SO4 (mg/L)		11.3	13.7	11.8	12.8	11.9	12.7	13.3	11.4	10.8		
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		0.7	0.6	0.5	0.5	0.7	1.1	0.8	1.6	1.5		
2	COD (mg/L)		49.0	44.0	48.0	49.0	35.0	32.0	36.0	20.0	33.0		
3	DO (mg/L)		4.5	5.1	5.6	5.4	5.5	7.1	6.5	6.3	4.2		
4	DO_SAT% (%)		54	63	69	67	65	77	65	61	44		
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		5	37	27	57	66	64	78	78	74		
2	HAR_Total (mgCaCO3/L)		31	58	40	79	108	108	130	126	128		
3	Na% (%)		14	16	15	15	11	14	14	13	14		
4	RSC (-)		0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.3	0.3		
5	SAR (-)		0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.4		

Water Quality Summary for the period : 2017-2018

Station Name : Banjar at Bamni Division : Narmada Division, Bhopal

Local River : Banjar Sub-Division : UNSD, Jabalpur

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	9	315	95	216
3	pH_GEN (pH units)	9	8.1	7.5	7.8
4	TDS (mg/L)	9	205	62	141
5	Temp (deg C)	9	26.5	14.0	21.6
6	Turb (NTU)	9	145.0	0.0	50.3
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	9	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	9	144	39	99
3	Ca (mg/L)	9	31	2	22
4	Cl (mg/L)	9	7.0	2.0	4.7
5	CO3 (mg/L)	9	0.0	0.0	0
6	F (mg/L)	9	0.31	0.22	0.26
7	HCO3 (mg/L)	9	176	47	120
8	K (mg/L)	9	2.2	1.0	1.7
9	Mg (mg/L)	9	12.9	3.2	8.6
10	Na (mg/L)	9	9.7	2.5	6.7
11	NO2+NO3 (mg N/L)	9	0.91	0.11	0.39
12	NO2-N (mgN/L)	9	0.06	0.02	0.03
13	NO3-N (mgN/L)	9	0.85	0.08	0.36
14	o-PO4-P (mg P/L)	9	0.338	0.052	0.152
15	SiO2 (mg/L)	9	20.8	15.9	17.7
16	SO4 (mg/L)	9	13.7	10.8	12.2
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	9	1.6	0.5	0.9
2	COD (mg/L)	9	49.0	20.0	38.4
3	DO (mg/L)	9	7.1	4.2	5.6
4	DO_SAT% (%)	9	77	44	63
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	9	78	5	54
2	HAR_Total (mgCaCO3/L)	9	130	31	90
3	Na% (%)	9	16	11	14
4	RSC (-)	9	0.3	0.0	0.2
5	SAR (-)	9	0.4	0.2	0.3

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Banjar at Bamni
Local River : Banjar

Division : Narmada Division, Bhopal
Sub-Division : UNSD, Jabalpur

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	84.35	32.27	30.64			16.37	17.33	3.859			0.000	0.796	0.166		
2	EC_GEN (µmho/cm)	113	121	134	127	131	175	198	174	220	276		197	372	268	315
3	pH_GEN (pH units)	7.6	7.6	7.9	7.3	7.9	8.0	7.9	8.0	7.5	7.6		8.0	8.1	7.6	7.9
4	TDS (mg/L)	71	75	84	80	85	105	131	111	143	182		126	241	174	205
5	Temp (deg C)	23.1	26.3	26.8	26.4	25.9	17.8	18.0	18.6	15.4	18.1		22.3	23.8	19.7	18.0
6	Turb (NTU)	110.5	52.3	47.8	138.5	113.3	8.5	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	1.6	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	55	66	76	54	56	94	122	98	98	130		117	153	137	144
3	Ca (mg/L)	14	15	19	14	13	21	26	22	24	29		26	23	29	30
4	Cl (mg/L)	6.0	6.2	6.2	4.1	4.0	9.8	7.1	4.5	6.5	4.8		10.1	21.7	11.3	7.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	1.9	0.0	0.0
6	F (mg/L)	0.34	0.36	0.27	0.28	0.27	0.21	0.27	0.22	0.15	0.25		0.20	0.28	0.32	0.26
7	HCO3 (mg/L)	67	81	93	66	69	114	149	120	120	158		143	183	168	176
8	K (mg/L)	3.3	3.4	4.0	3.1	1.6	1.5	1.4	2.0	1.5	1.7		2.5	5.4	2.1	2.1
9	Mg (mg/L)	4.9	7.4	7.6	5.3	5.0	8.5	13.4	9.8	7.4	11.1		10.5	14.9	11.3	12.9
10	Na (mg/L)	6.4	6.6	8.2	4.2	4.5	9.2	12.1	8.0	7.1	8.2		8.7	30.0	13.3	9.3
11	NO2+NO3 (mg N/L)	0.69	1.09	0.74	0.93	0.69	0.21	0.45	0.10	0.15	0.16		0.78	0.07	0.14	0.11
12	NO2-N (mgN/L)	0.04	0.03	0.03	0.13	0.04	0.06	0.01	0.01	0.01	0.03		0.08	0.01	0.01	0.02
13	NO3-N (mgN/L)	0.65	1.05	0.71	0.79	0.65	0.16	0.44	0.09	0.14	0.13		0.70	0.05	0.13	0.08
14	o-PO4-P (mg P/L)	0.178	0.456	0.346	0.344	0.261	0.044	0.112	0.081	0.070	0.068		0.090	0.099	0.051	0.052
15	SiO2 (mg/L)	15.5	18.4	12.3	17.9	18.9	17.7	18.5	12.5	15.0	17.0		15.8	19.1	17.0	15.9
16	SO4 (mg/L)	10.4	10.1	16.6	15.2	12.4	7.4	12.0	5.9	8.5	12.3		26.6	4.1	3.2	10.8
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.8	1.2	0.8	0.8	0.6	0.7	0.6	0.6	1.0	1.1		0.8	1.9	1.8	1.5
2	COD (mg/L)	29.3	36.8	26.5	36.0	47.5	27.0	30.0	26.0	39.8	30.8		35.0	35.3	36.0	33.0
3	DO (mg/L)	5.8	5.9	6.3	4.6	5.1	7.4	7.0	6.8	6.5	6.4		5.8	5.3	4.5	4.2
4	DO_SAT% (%)	68	72	78	58	63	78	74	72	66	67		65	61	47	44
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	34	38	47	35	31	51	64	55	60	72		64	57	73	74
2	HAR_Total (mgCaCO3/L)	55	68	79	57	52	87	120	96	91	118		108	119	120	128
3	Na% (%)	19	16	18	13	15	19	18	15	14	13		15	35	19	14
4	RSC (-)	0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.2	0.2		0.2	0.7	0.4	0.3
5	SAR (-)	0.4	0.3	0.4	0.2	0.3	0.4	0.5	0.4	0.3	0.3		0.4	1.3	0.5	0.4

3.15 Burhner at Mohgaon

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Burhner at Mohgaon**	**Code**	**:**	**010215004**
State	:	Madhya Pradesh	District		Mandla
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:	Burhner	Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Burhner
Division	:	Narmada Division, Bhopal	Sub-Division	:	UNSD, Jabalpur
Drainage Area	:	3919 Sq. Km.	Bank	:	Right
Latitude	:	22°45'57"	Longitude	:	80°37'22"
Zero of Gauge (m)	:	447 .000 (M.S.L.)	13/01/1977		
		Opening Date	Closing Date		
Gauge	:	13/01/1977			
Discharge	:	13/01/1977			
Sediment	:	27/08/1992			
Water Quality	:	16/09/1986			

Water Quality Datasheet for the period : 2017-2018

Station Name : Burhner at Mohgaon (010215004) Division : Narmada Division, Bhopal

Local River : Burhner Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	25.84	34.13	74.18	33.75	10.2	5.897	3.729	2.522	2.166	0.83	0.6
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	294	179	187	153	214	274	237	249	265	271	283	304
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.8	7.9	8.0	7.5	8.3	7.9	7.7	7.7	7.7	7.9	7.8	8.0
6	TDS (mg/L)	190	120	122	103	138	181	161	161	171	177	184	199
7	Temp (deg C)	28.0	28.0	28.0	29.0	29.5	25.0	18.0	16.5	17.5	20.0	26.0	28.0
8	Turb (NTU)	0.0	130.0	80.0	110.0	63.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	152	69	95	82	107	118	127	134	136	136	144	141
3	Ca (mg/L)	23	24	20	23	26	27	30	29	32	28	25	26
4	Cl (mg/L)	11.0	5.0	7.0	2.0	6.0	5.0	4.0	6.0	4.0	19.0	9.0	13.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.17	0.25	0.29	0.27	0.51	0.44	0.39	0.42	0.37	0.24	0.08	0.21
7	HCO3 (mg/L)	185	84	116	100	118	144	155	163	166	166	176	172
8	K (mg/L)	2.2	1.7	0.9	0.9	1.1	1.1	1.2	1.1	1.2	1.5	1.8	2.9
9	Mg (mg/L)	17.3	2.2	9.5	5.1	8.8	8.5	12.2	11.4	10.2	10.2	13.9	14.1
10	Na (mg/L)	15.7	3.8	5.2	3.8	5.5	5.7	6.2	7.0	7.2	7.3	12.1	15.2
11	NO2+NO3 (mg N/L)	0.11	0.49	0.73	0.59	0.02	0.04	0.08	0.11	0.14	0.10	0.09	0.06
12	NO2-N (mgN/L)	0.00	0.05	0.08	0.06	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.02
13	NO3-N (mgN/L)	0.11	0.44	0.65	0.53	0.01	0.04	0.08	0.10	0.13	0.09	0.08	0.04
14	o-PO4-P (mg P/L)	0.041	0.283	0.313	0.296	0.068	0.053	0.059	0.087	0.079	0.068	0.630	0.007
15	SiO2 (mg/L)	16.6	17.5	16.6	17.8	17.6	18.2	15.4	15.9	15.6	15.2	16.1	16.4
16	SO4 (mg/L)	2.4	11.1	13.6	12.3	8.0	8.2	9.0	9.5	6.0	5.4	5.1	3.7
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.2	0.8	0.5	0.6	0.6	0.9	0.5	0.6	0.8	1.4	1.4	1.4
2	COD (mg/L)	39.0	15.0	15.0	21.0	22.0	28.0	40.0	24.0	32.0	36.0	50.0	36.0
3	DO (mg/L)	4.2	5.5	5.6	5.3	4.8	5.9	6.3	6.4	6.3	5.4	5.5	4.1
4	DO_SAT% (%)	54	70	72	69	62	71	67	65	65	59	68	52
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	57	61	51	57	65	68	76	73	81	71	63	66
2	HAR_Total (mgCaCO3/L)	129	70	91	78	101	103	127	120	123	114	121	124
3	Na% (%)	21	10	11	10	10	11	10	11	11	12	18	21
4	RSC (-)	0.5	0.0	0.1	0.1	0.1	0.3	0.0	0.3	0.3	0.5	0.5	0.4
5	SAR (-)	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.6

Water Quality Summary for the period : 2017-2018

Station Name : Burhner at Mohgaon (010215004) Division : Narmada Division, Bhopal

Local River : Burhner Sub-Division : UNSD, Jabalpur

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	304	153	243
3	pH_GEN (pH units)	12	8.3	7.5	7.8
4	TDS (mg/L)	12	199	103	159
5	Temp (deg C)	12	29.5	16.5	24.5
6	Turb (NTU)	12	130.0	0.0	31.9
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	5.2	0.0	0.4
2	ALK-TOT (mgCaCO3/L)	12	152	69	120
3	Ca (mg/L)	12	32	20	26
4	Cl (mg/L)	12	19.0	2.0	7.6
5	CO3 (mg/L)	12	6.3	0.0	0.5
6	F (mg/L)	12	0.51	0.08	0.3
7	HCO3 (mg/L)	12	185	84	145
8	K (mg/L)	12	2.9	0.9	1.5
9	Mg (mg/L)	12	17.3	2.2	10.3
10	Na (mg/L)	12	15.7	3.8	7.9
11	NO2+NO3 (mg N/L)	12	0.73	0.02	0.21
12	NO2-N (mgN/L)	12	0.08	0.00	0.02
13	NO3-N (mgN/L)	12	0.65	0.01	0.19
14	o-PO4-P (mg P/L)	12	0.630	0.007	0.165
15	SiO2 (mg/L)	12	18.2	15.2	16.6
16	SO4 (mg/L)	12	13.6	2.4	7.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.4	0.5	0.9
2	COD (mg/L)	12	50.0	15.0	29.8
3	DO (mg/L)	12	6.4	4.1	5.4
4	DO_SAT% (%)	12	72	52	65
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	81	51	66
2	HAR_Total (mgCaCO3/L)	12	129	70	109
3	Na% (%)	12	21	10	13
4	RSC (-)	12	0.5	0.0	0.2
5	SAR (-)	12	0.6	0.2	0.3

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Burhner at Mohgaon (010215004) Division : Narmada Division, Bhopal

Local River : Burhner Sub-Division : UNSD, Jabalpur

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	180.5	64.34	60.38			23.97	14.56	9.371			10.26	5.471	1.499		
2	EC_GEN (µmho/cm)	175	150	157	176	205	205	174	192	214	256	194	189	279	253	286
3	pH_GEN (pH units)	7.9	7.8	8.1	7.6	7.9	8.3	8.1	8.2	7.8	7.7	8.1	8.2	8.0	7.8	7.9
4	TDS (mg/L)	111	95	97	114	135	124	115	121	138	169	127	121	181	164	187
5	Temp (deg C)	21.1	27.8	27.9	28.6	28.5	20.4	20.3	20.5	19.1	19.3	25.3	25.8	25.8	24.3	24.7
6	Turb (NTU)	189.8	134.4	131.4	168.4	76.6	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	1.9	1.4	1.0	3.6	1.3	2.3	0.0	0.0	1.5	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	90	98	101	82	101	123	121	126	123	129	144	126	139	141	140
3	Ca (mg/L)	20	22	22	17	23	29	27	29	29	30	28	28	26	30	27
4	Cl (mg/L)	8.7	6.0	7.2	6.1	6.2	7.6	5.5	6.0	5.3	4.8	10.0	7.6	6.3	7.3	13.7
5	CO3 (mg/L)	0.0	0.0	2.3	1.7	1.3	4.4	1.5	2.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0
6	F (mg/L)	0.28	0.21	0.36	0.26	0.30	0.10	0.21	0.15	0.13	0.41	0.14	0.14	0.22	0.22	0.18
7	HCO3 (mg/L)	110	120	119	96	121	141	144	148	150	157	172	154	169	172	171
8	K (mg/L)	2.8	2.5	2.2	1.8	1.3	0.8	0.9	1.1	0.8	1.1	1.3	1.6	1.8	1.6	2.0
9	Mg (mg/L)	7.5	10.2	9.4	8.7	8.6	9.2	13.0	12.8	10.8	10.6	12.0	12.1	14.5	12.1	12.7
10	Na (mg/L)	8.0	6.9	6.6	5.3	6.8	7.2	5.8	6.4	5.5	6.5	8.8	6.7	8.7	10.6	11.5
11	NO2+NO3 (mg N/L)	1.06	1.03	0.88	0.72	0.39	0.12	0.19	0.06	0.19	0.10	0.17	0.30	0.04	0.18	0.08
12	NO2-N (mgN/L)	0.05	0.03	0.01	0.08	0.04	0.05	0.02	0.01	0.01	0.01	0.03	0.05	0.01	0.01	0.01
13	NO3-N (mgN/L)	1.01	1.01	0.87	0.64	0.35	0.07	0.17	0.06	0.18	0.08	0.15	0.25	0.03	0.18	0.07
14	o-PO4-P (mg P/L)	0.203	0.332	0.203	0.300	0.200	0.045	0.089	0.075	0.079	0.070	0.046	0.108	0.070	0.048	0.235
15	SiO2 (mg/L)	21.6	21.1	20.9	21.6	17.2	26.2	19.6	19.5	15.5	16.3	20.4	19.6	19.6	17.7	15.9
16	SO4 (mg/L)	12.0	8.1	8.1	13.8	9.5	1.5	9.4	1.5	8.8	8.2	1.1	20.3	2.6	3.8	4.7
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.9	0.6	0.6	0.6	0.7	0.6	0.5	0.4	1.0	0.7	0.8	0.7	1.1	1.4	1.4
2	COD (mg/L)	30.0	30.6	28.0	27.8	22.4	21.8	30.0	27.5	25.3	31.0	25.3	35.7	26.3	38.0	40.7
3	DO (mg/L)	6.0	5.5	5.9	5.3	5.1	7.2	6.7	6.9	6.4	6.2	6.1	6.0	5.3	4.5	5.0
4	DO_SAT% (%)	66	69	76	67	65	79	74	76	69	67	74	74	64	54	60
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	49	54	56	43	58	74	67	72	72	74	71	70	65	74	67
2	HAR_Total (mgCaCO3/L)	81	96	95	80	94	112	121	125	117	118	121	120	126	124	120
3	Na% (%)	17	13	13	12	12	12	10	10	9	11	14	11	13	15	17
4	RSC (-)	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.5	0.1	0.3	0.3	0.4
5	SAR (-)	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5

3.16 Narmada at Manot

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Manot**	**Code**	**:**	**010215002**
State	:	Madhya Pradesh	District		Mandla
Basin	:	Narmada	Independent River	:	Narmada
Sub-Sub Tributary	:		Local River	:	Narmada
Division	:	Narmada Division, Bhopal	Sub-Division	:	UNSD, Jabalpur
Drainage Area	:	4667 Sq. Km.	Bank	:	Right
Latitude	:	22°44'08"	Longitude	:	80°30'44"
Zero of Gauge (m)	:	442 .000 (M.S.L.)	16/12/1976		
		Opening Date	Closing Date		
Gauge	:	16/12/1976			
Discharge	:	16/12/1976			
Sediment	:	09/11/1979			
Water Quality	:	01/01/1980			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Manot (010215002) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0	21.04	91.26	92.92	42.59	18.43	12.61	11.26	9.979	11.2	5.4	0
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	254	280	186	177	284	279	244	250	273	281	284	289
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.7	7.8	7.8	7.5	8.2	7.9	7.7	7.8	7.6	7.8	7.9	8.0
6	TDS (mg/L)	157	184	121	115	158	185	167	162	183	184	185	189
7	Temp (deg C)	27.0	25.0	25.5	25.0	24.0	22.5	18.0	17.5	18.0	17.0	21.0	24.0
8	Turb (NTU)	0.0	140.0	89.0	92.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	139	111	93	98	123	125	132	142	142	141	149	139
3	Ca (mg/L)	22	26	24	22	32	26	28	27	30	25	26	26
4	Cl (mg/L)	8.0	6.0	7.0	3.0	4.0	3.0	5.0	6.0	3.0	7.0	7.0	12.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.15	0.22	0.24	0.23	0.54	0.45	0.40	0.38	0.39	0.19	0.17	0.16
7	HCO3 (mg/L)	169	135	113	119	150	153	161	173	173	172	182	169
8	K (mg/L)	1.2	1.4	0.6	0.7	0.9	0.9	0.6	0.5	0.5	0.6	0.8	1.0
9	Mg (mg/L)	12.2	10.0	8.0	7.1	10.7	12.4	15.1	12.2	14.3	13.4	15.3	14.3
10	Na (mg/L)	14.8	7.7	4.6	3.9	5.7	5.8	7.2	8.4	9.1	7.8	10.4	14.1
11	NO2+NO3 (mg N/L)	0.09	0.57	0.87	0.65	0.26	0.25	0.29	0.31	0.25	0.18	0.20	0.05
12	NO2-N (mgN/L)	0.01	0.06	0.07	0.07	0.04	0.04	0.04	0.05	0.02	0.02	0.02	0.03
13	NO3-N (mgN/L)	0.08	0.51	0.80	0.58	0.23	0.21	0.25	0.26	0.22	0.16	0.18	0.02
14	o-PO4-P (mg P/L)	0.057	0.263	0.267	0.254	0.064	0.059	0.065	0.090	0.084	0.072	0.068	0.013
15	SiO2 (mg/L)	21.4	18.8	19.0	18.8	18.8	19.2	18.2	16.1	17.2	16.9	17.0	17.2
16	SO4 (mg/L)	3.9	11.7	14.9	12.8	7.3	8.1	8.8	8.3	6.3	5.7	5.4	1.3
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	0.7	0.8	0.5	0.7	0.5	0.6	1.0	1.0	0.9	1.1	1.0	0.9
2	COD (mg/L)	48.0	32.0	36.0	38.0	38.0	34.0	52.0	32.0	30.0	31.0	42.0	32.0
3	DO (mg/L)	4.7	5.3	5.5	5.4	5.3	5.5	7.0	7.2	6.2	4.9	5.4	5.2
4	DO_SAT% (%)	59	64	67	65	63	63	74	75	65	51	61	62
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	55	65	61	56	81	64	70	68	76	63	64	64
2	HAR_Total (mgCaCO3/L)	106	106	94	85	126	116	133	119	136	119	128	124
3	Na% (%)	23	14	10	9	9	10	11	13	13	12	15	20
4	RSC (-)	0.7	0.1	0.0	0.3	0.0	0.2	0.0	0.5	0.1	0.5	0.4	0.3
5	SAR (-)	0.6	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.6

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Manot (010215002) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	289	177	257
3	pH_GEN (pH units)	12	8.2	7.5	7.8
4	TDS (mg/L)	12	189	115	166
5	Temp (deg C)	12	27.0	17.0	22
6	Turb (NTU)	12	140.0	0.0	32.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	149	93	128
3	Ca (mg/L)	12	32	22	26
4	Cl (mg/L)	12	12.0	3.0	5.9
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	11	0.45	0.15	0.27
7	HCO3 (mg/L)	12	182	113	156
8	K (mg/L)	12	1.4	0.5	0.8
9	Mg (mg/L)	12	15.3	7.1	12.1
10	Na (mg/L)	12	14.8	3.9	8.3
11	NO2+NO3 (mg N/L)	12	0.87	0.05	0.33
12	NO2-N (mgN/L)	12	0.07	0.01	0.04
13	NO3-N (mgN/L)	12	0.80	0.02	0.29
14	o-PO4-P (mg P/L)	12	0.267	0.013	0.113
15	SiO2 (mg/L)	12	21.4	16.1	18.2
16	SO4 (mg/L)	12	14.9	1.3	7.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.1	0.5	0.8
2	COD (mg/L)	12	52.0	30.0	37.1
3	DO (mg/L)	12	7.2	4.7	5.6
4	DO_SAT% (%)	12	75	51	64
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	81	55	66
2	HAR_Total (mgCaCO3/L)	12	136	85	116
3	Na% (%)	12	23	9	13
4	RSC (-)	12	0.7	0.0	0.3
5	SAR (-)	12	0.6	0.2	0.3

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Manot (010215002) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	140.8	78.22	59.96			32.05	23.78	11.70			9.246	8.394	2.726		
2	EC_GEN (µmho/cm)	202	176	151	207	236	219	213	208	277	262	198	193	304	260	285
3	pH_GEN (pH units)	8.0	7.8	8.0	7.7	7.8	8.2	7.7	8.3	7.7	7.8	8.2	8.2	8.0	7.9	7.9
4	TDS (mg/L)	128	113	94	134	147	136	141	133	181	174	127	124	197	169	186
5	Temp (deg C)	26.2	27.7	27.7	26.6	25.3	20.0	20.0	19.5	19.3	19.0	25.2	23.5	20.3	22.2	20.7
6	Turb (NTU)	139.4	97.2	273.8	121.0	77.2	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	1.5	0.0	1.0	0.0	0.0	2.2	0.0	4.6	0.0	0.0	1.5	3.3	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	102	114	100	114	112	133	121	142	143	135	140	133	156	148	143
3	Ca (mg/L)	23	25	23	22	25	30	31	28	32	28	28	29	27	32	26
4	Cl (mg/L)	8.3	6.8	6.3	5.4	5.6	8.0	7.6	7.8	6.3	4.3	10.6	6.8	7.3	6.3	8.7
5	CO3 (mg/L)	1.9	0.0	1.2	0.0	0.0	2.6	0.0	5.6	0.0	0.0	1.8	4.0	0.0	0.0	0.0
6	F (mg/L)	0.23	0.21	0.17	0.26	0.21	0.18	0.18	0.15	0.16	0.40	0.13	0.11	0.26	0.19	0.18
7	HCO3 (mg/L)	121	139	119	139	137	157	148	163	175	165	167	154	190	181	174
8	K (mg/L)	2.8	2.7	2.5	1.7	1.0	0.7	0.6	0.7	0.5	0.6	0.7	1.0	1.0	0.8	0.8
9	Mg (mg/L)	8.6	10.7	9.3	11.5	9.6	14.6	12.0	16.0	12.9	13.5	12.3	12.1	16.5	11.8	14.3
10	Na (mg/L)	8.4	7.6	6.2	7.4	7.4	7.4	6.5	8.2	7.0	7.6	8.9	7.2	9.8	11.0	10.8
11	NO2+NO3 (mg N/L)	1.25	1.17	0.82	1.05	0.49	0.15	0.42	0.07	0.17	0.27	0.17	0.33	0.05	0.15	0.14
12	NO2-N (mgN/L)	0.06	0.02	0.02	0.05	0.05	0.06	0.02	0.01	0.01	0.04	0.02	0.05	0.01	0.01	0.02
13	NO3-N (mgN/L)	1.19	1.14	0.80	1.00	0.44	0.09	0.39	0.07	0.16	0.24	0.15	0.27	0.04	0.14	0.12
14	o-PO4-P (mg P/L)	0.191	0.404	0.324	0.307	0.181	0.044	0.147	0.102	0.093	0.075	0.051	0.141	0.082	0.066	0.051
15	SiO2 (mg/L)	22.8	23.1	19.7	23.2	19.3	28.2	31.8	21.3	20.3	17.7	21.9	23.8	20.8	24.8	17.0
16	SO4 (mg/L)	12.9	10.1	8.8	16.0	10.1	1.7	30.0	1.8	10.3	7.9	1.5	25.9	3.0	6.1	4.1
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.8	1.3	0.5	1.0	0.6	0.7	0.8	0.6	0.9	0.9	1.4	1.1	1.0	1.3	1.0
2	COD (mg/L)	33.0	30.6	33.0	46.2	38.4	28.3	36.5	28.8	40.8	37.0	19.0	28.7	35.7	40.0	35.0
3	DO (mg/L)	6.1	5.7	6.1	5.3	5.2	7.2	7.2	7.3	6.6	6.5	6.6	6.6	5.9	5.5	5.2
4	DO_SAT% (%)	75	72	78	66	64	79	78	80	72	69	79	77	65	63	58
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	58	62	58	55	64	74	79	70	79	70	70	72	68	81	64
2	HAR_Total (mgCaCO3/L)	94	107	97	103	103	135	129	136	133	126	122	122	136	130	124
3	Na% (%)	16	12	12	13	13	11	10	12	10	12	14	11	14	15	16
4	RSC (-)	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.4	0.2	0.4	0.4	0.4
5	SAR (-)	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4

3.17 Narmada at Dindori

History Sheet

			Water Year	**:**	**2017-2018**
Site	**:**	**Narmada at Dindori**	**Code**	**:**	**010215001**
State	:	Madhya Pradesh	District		Dindori
Basin	:	Narmada	Independent River	:	Narmada
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Narmada
Division	:	Narmada Division, Bhopal	Sub-Division	:	UNSD, Jabalpur
Drainage Area	:	2292 Sq. Km.	Bank	:	Left
Latitude	:	22°56'53"	Longitude	:	81°04'34"
Zero of Gauge (m)	:	660 .000 (M.S.L.)	26/06/1988		
		Opening Date	Closing Date		
Gauge	:	26/06/1988			
Discharge	:	01/08/1988			
Sediment	:				
Water Quality	:	15/03/1990			

Water Quality Datasheet for the period : 2017-2018

Station Name : Narmada at Dindori (010215001) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2017	03/07/2017	01/08/2017	04/09/2017	03/10/2017	01/11/2017	04/12/2017	01/01/2018	01/02/2018	05/03/2018	02/04/2018	01/05/2018
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	2.074	15.3	7.193	42.85	13.58	6.73	4.872	6.858	6.514	3.607	1.348	0.814
2	Colour_Cod (-)	Clear	Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	291	243	264	263	274	330	300	326	330	334	316	315
4	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
5	pH_GEN (pH units)	7.4	7.7	7.8	7.4	7.9	7.7	7.7	7.8	7.5	7.6	7.6	7.6
6	TDS (mg/L)	188	160	174	174	178	220	202	213	221	217	208	205
7	Temp (deg C)	27.0	25.0	26.0	25.5	25.5	24.5	14.0	13.0	12.0	11.0	19.5	24.0
8	Turb (NTU)	0.0	230.0	86.0	88.0	52.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	152	72	131	136	131	141	145	161	157	149	152	141
3	Ca (mg/L)	27	27	34	33	36	29	38	38	29	30	25	31
4	Cl (mg/L)	9.0	13.0	8.0	8.0	6.0	6.0	10.0	12.0	5.0	12.0	10.0	14.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.17	0.23	0.25	0.24	0.08	0.09	0.11	0.09	0.10	0.08	0.08	0.07
7	HCO3 (mg/L)	185	88	160	166	160	172	177	196	192	182	185	172
8	K (mg/L)	1.4	2.4	1.0	1.0	1.1	1.0	1.2	1.1	1.1	1.4	1.5	2.8
9	Mg (mg/L)	12.9	5.8	10.0	12.4	9.7	16.3	14.6	16.3	16.8	15.1	17.0	10.9
10	Na (mg/L)	14.5	7.4	7.5	8.2	6.7	7.2	8.8	10.6	10.9	10.0	13.2	16.3
11	NO2+NO3 (mg N/L)	0.11	0.64	0.92	0.72	0.01	0.03	0.07	0.08	0.15	0.08	0.07	1.52
12	NO2-N (mgN/L)	0.02	0.04	0.06	0.05	0.00	0.01	0.01	0.02	0.04	0.01	0.01	0.02
13	NO3-N (mgN/L)	0.10	0.60	0.86	0.67	0.01	0.03	0.06	0.06	0.12	0.07	0.06	1.50
14	o-PO4-P (mg P/L)	0.076	0.208	0.212	0.186	0.071	0.068	0.061	0.085	0.080	0.069	0.066	0.281
15	SiO2 (mg/L)	23.9	19.0	17.4	19.6	17.2	17.6	18.8	16.6	16.1	16.2	16.6	16.9
16	SO4 (mg/L)	4.0	15.9	18.0	15.0	9.4	10.2	11.2	10.1	7.5	7.1	6.8	11.0
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.7	1.4	1.2	0.9	0.7	0.9	1.4	1.1	1.4	1.8	1.6	1.5
2	COD (mg/L)	55.0	63.0	66.0	61.0	59.0	41.0	49.0	35.0	52.0	30.0	46.0	39.0
3	DO (mg/L)	4.5	3.9	5.2	5.0	5.1	5.3	5.7	5.4	5.1	4.1	4.5	4.2
4	DO_SAT% (%)	56	47	64	61	62	63	55	51	47	37	49	50
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	68	68	84	82	90	73	95	95	74	74	63	77
2	HAR_Total (mgCaCO3/L)	121	92	126	133	131	141	156	163	143	137	133	122
3	Na% (%)	20	14	11	12	10	10	11	12	14	14	18	22
4	RSC (-)	0.6	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.3	0.4	0.4
5	SAR (-)	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.6

Water Quality Summary for the period : 2017-2018

Station Name : Narmada at Dindori (010215001) Division : Narmada Division, Bhopal

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_GEN (µmho/cm)	12	334	243	299
3	pH_GEN (pH units)	12	7.9	7.4	7.7
4	TDS (mg/L)	12	221	160	197
5	Temp (deg C)	12	27.0	11.0	20.6
6	Turb (NTU)	12	230.0	0.0	38
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	161	72	139
3	Ca (mg/L)	12	38	25	31
4	Cl (mg/L)	12	14.0	5.0	9.4
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.25	0.07	0.13
7	HCO3 (mg/L)	12	196	88	170
8	K (mg/L)	12	2.8	1.0	1.4
9	Mg (mg/L)	12	17.0	5.8	13.1
10	Na (mg/L)	12	16.3	6.7	10.1
11	NO2+NO3 (mg N/L)	12	1.52	0.01	0.37
12	NO2-N (mgN/L)	12	0.06	0.00	0.02
13	NO3-N (mgN/L)	12	1.50	0.01	0.34
14	o-PO4-P (mg P/L)	12	0.281	0.061	0.122
15	SiO2 (mg/L)	12	23.9	16.1	18
16	SO4 (mg/L)	12	18.0	4.0	10.5
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.8	0.7	1.3
2	COD (mg/L)	12	66.0	30.0	49.7
3	DO (mg/L)	12	5.7	3.9	4.8
4	DO_SAT% (%)	12	64	37	54
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	95	63	79
2	HAR_Total (mgCaCO3/L)	12	163	92	133
3	Na% (%)	12	22	10	14
4	RSC (-)	12	0.6	0.0	0.2
5	SAR (-)	12	0.6	0.3	0.4

Water Quality Seasonal Average for the period : 2013-2018

Station Name : Narmada at Dindori (010215001) Division : Narmada Division, Bhopal

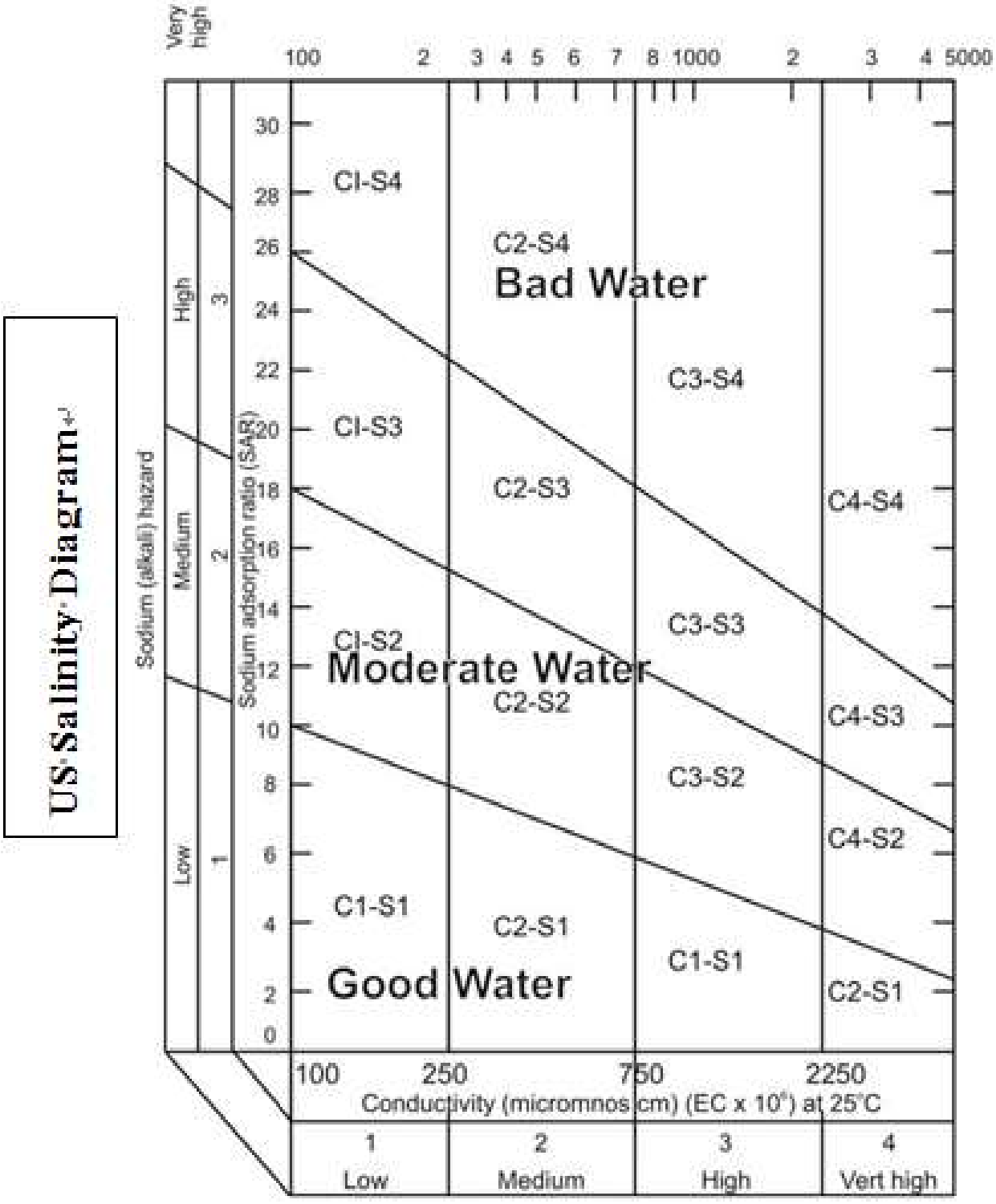
Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2014	2015	2016	2017	2018
	PHYSICAL															
1	Q (cumec)	145.7		20.07			16.50		5.603			5.466		1.864		
2	EC_GEN (µmho/cm)	215	192	198	225	267	245	326	241	300	322	221	217	323	288	322
3	pH_GEN (pH units)	7.6	7.8	7.9	7.5	7.6	8.1	8.1	8.1	7.4	7.7	7.9	8.1	7.9	7.5	7.6
4	TDS (mg/L)	136	124	124	147	175	154	216	152	197	214	142	139	210	192	210
5	Temp (deg C)	25.7	28.9	26.4	26.5	25.8	18.4	17.3	18.0	17.8	15.9	23.0	22.0	22.3	23.5	18.2
6	Turb (NTU)	194.4	131.8	57.0	162.6	91.2	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	105	125	122	108	124	141	177	154	150	151	153	144	157	155	147
3	Ca (mg/L)	24	26	26	25	31	34	44	34	33	34	29	31	31	31	28
4	Cl (mg/L)	9.3	8.3	7.0	6.9	8.8	8.1	16.1	8.0	7.0	8.3	11.8	7.7	9.0	9.3	12.0
5	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
6	F (mg/L)	0.20	0.21	0.17	0.22	0.19	0.17	0.30	0.15	0.15	0.10	0.24	0.14	0.27	0.25	0.08
7	HCO3 (mg/L)	128	152	149	132	152	169	216	188	183	184	187	172	191	189	180
8	K (mg/L)	3.0	1.9	2.4	2.0	1.4	0.8	0.8	1.1	0.8	1.1	1.0	1.1	1.7	1.3	1.9
9	Mg (mg/L)	9.1	12.6	12.5	10.1	10.2	13.9	18.1	15.8	13.9	16.0	14.9	14.3	14.3	15.1	14.3
10	Na (mg/L)	9.4	8.1	9.0	6.0	8.9	9.7	19.6	8.8	7.7	9.4	9.8	7.8	12.1	13.6	13.1
11	NO2+NO3 (mg N/L)	1.26	1.37	1.57	0.91	0.48	0.33	3.78	0.33	0.29	0.08	0.32	0.34	0.12	0.21	0.56
12	NO2-N (mgN/L)	0.11	0.04	0.11	0.04	0.03	0.18	0.03	0.14	0.06	0.02	0.02	0.06	0.02	0.02	0.01
13	NO3-N (mgN/L)	1.15	1.33	1.46	0.87	0.45	0.15	3.74	0.19	0.22	0.07	0.30	0.28	0.11	0.20	0.54
14	o-PO4-P (mg P/L)	0.188	0.231	0.283	0.232	0.151	0.075	0.139	0.087	0.105	0.074	0.054	0.163	0.132	0.082	0.139
15	SiO2 (mg/L)	28.7	23.4	17.9	24.8	19.4	30.0	19.1	16.6	18.2	17.3	25.0	24.6	20.3	18.5	16.5
16	SO4 (mg/L)	21.3	10.2	12.1	20.2	12.5	3.1	29.9	2.7	11.5	9.7	1.8	20.0	3.1	7.4	8.3
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.2	1.4	1.0	0.9	1.2	1.8	0.6	1.3	1.3	1.2	1.7	1.2	1.9	2.2	1.6
2	COD (mg/L)	32.4	34.6	30.2	38.4	60.8	26.8	36.0	33.0	50.5	44.3	27.7	34.3	33.7	46.3	38.3
3	DO (mg/L)	5.2	4.7	5.0	4.3	4.7	6.4	7.1	5.3	5.7	5.4	5.2	5.5	6.0	4.2	4.3
4	DO_SAT% (%)	63	61	61	53	58	67	74	56	60	54	60	62	69	50	45
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	61	66	65	63	78	85	111	85	83	84	73	78	76	78	71
2	HAR_Total (mgCaCO3/L)	99	118	118	105	121	143	186	151	141	151	135	138	136	141	131
3	Na% (%)	16	12	14	11	14	13	15	11	10	12	14	11	16	17	18
4	RSC (-)	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.4	0.1	0.4	0.3	0.3
5	SAR (-)	0.4	0.3	0.4	0.3	0.4	0.4	0.5	0.3	0.3	0.3	0.4	0.3	0.4	0.5	0.5

Annexure 1 U. S. Salinity diagram

U. S. Salinity diagram for the classification of irrigation of water



Annexure 2 Tolerance Limits as prescribed by the Bureau of Indian Standards

Tolerance Limits in respect of selected pollution characteristics for inland surface water required for different uses as prescribed by the Bureau of Indian Standards (IS 2296-1982)

Sr.	Characteristics	Class A*	Class B*	Class C*	Class D*	Class E*
1.	pH value	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2.	Conductivity at 25^0 C u mhos/cm (max)				1000	2250
3.	Color, Hazen units, Max	10	300	300		
4.	Dissolved Oxygen, mg/l, Min	6	5	4	4	
5.	Biochemical oxygen demand (5 days at 20^o C), mg/l, Max	2	3	3		
6.	Total dissolved solids, mg/l, Max	500		1500		2100
7.	Total Hardness as ($CaCO_3$) mg/l, max	300				--
8.	Calcium Hardness as ($CaCO_3$) mg/l, max	200				
9.	Magnesium as ($CaCO_3$) mg/l, max	100				
10.	Iron (as Fe), mg/l, Max	0.3		5		
11.	Copper (as Cu), mg/l, Max	1.5		1.5		
12.	Chlorides (as Cl), mg/l, Max	250		600		600
13.	Fluorides (as F), mg/l, Max	1.5	1.5	1.5		
14.	Sulphates (as SO_4), mg/l, Max	400		400		1000
15.	Nitrate (as NO_3), mg/l, max	20		50		
16.	Free Ammonia				1.2	
17.	Chromium (as Cr), mg/l, Max	0.05	0.05	0.05		
18.	Boron, mg/l, Max					2
19.	Percent Sodium, Max					60
20.	Sodium Adsorption Ratio, Max					26

* For use classes A to E refer table below

Sr.	Class of stream	Designated best use
1.	Class A	Drinking water source without conventional treatment but after disinfection
2.	Class B	Outdoor bathing (Organised)
3.	Class C	Drinking water source with conventional treatment followed by disinfection.
4.	Class D	Fish culture and wild life propagation
5.	Class E	Irrigation, industrial cooling or controlled waste disposal

Plate 1: Line Diagram of Narmada Basin

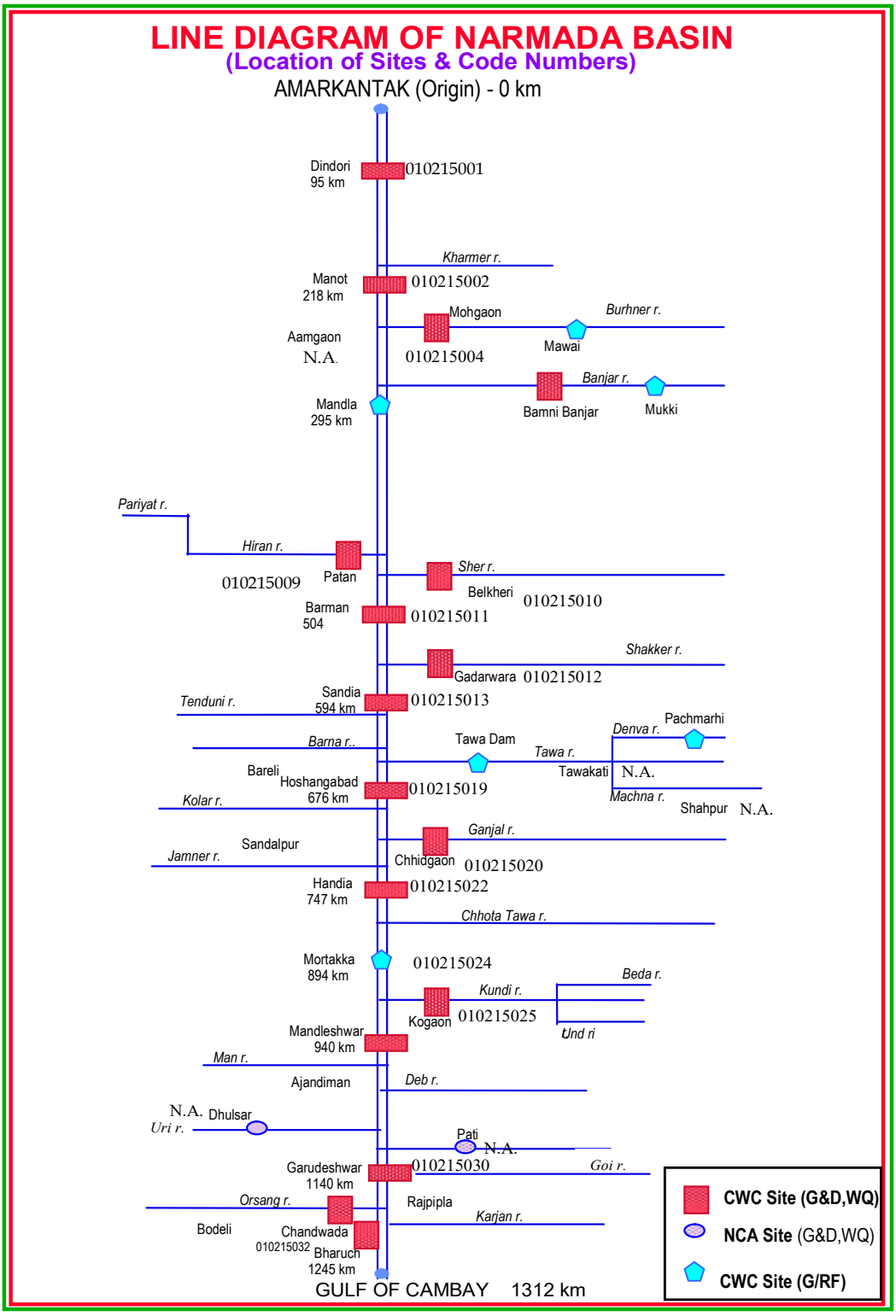


Plate 2: Index Map of Narmada Basin