2016-17

जल गुणवत्ता आँकड़े पुस्तक

Water Quality Data Book

नर्मदा बेसिन संगठन

केन्द्रीय जल आयोग,भोपाल

फरवरी 2018

NARMADA BASIN ORGANISATION

Central Water Commission, Bhopal

February 2018

केवल सरकारी उपयोग के लिये

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WATER QUALITY DATA BOOK

नर्मदा बेसिन

Narmada Basin

जून 2016 - मई 2017

June 2016 – May 2017

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CENTRAL WATER COMMISSION

Narmada Basin Organisation

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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 2016-2017 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 18 hydro meteorological and water quality monitoring stations in Narmada basin on monthly basis, the same are shown in Plate-1. Out of 18, 16 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 12^{th} 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	10.	Narmada at Sandia	10215013
2.	Narmada at Garudeshwar	10215030	11.	Shakkar at Gadarwara	10215012
3.	Goi at Pati	NCA Site	12.	Narmada at Barman	10215011
4.	Uri at Dhulsar	NCA Site	13.	Sher at Belkheri	10215010
5.	Narmada at Mandleshwar	10215026	14.	Hiran at Patan	10215009
6.	Kundi at Kogaon	10215025	15.	Banjar at Bamni	10215006
7.	Narmada at Handia	10215022	16.	Burhner at Mohgaon	10215004
8.	Ganjal at Chhidgaon	10215020	17.	Narmada at Manot	10215002
9.	Narmada at Hoshangabad	10215019	18.	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 -
	Uri at Dhulsar	01.07.2008	- do -
	Pati at Goi	01.07.2008	- do -

Sl. No	Name of Site	Site Opening Date	Data availability
Group 'B' Sites closed	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 2016 to 31st May 2017.

- 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:

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

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:

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

(*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:

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

(Residual Sodium Carbonate)

Residual Sodium Carbonate is calculated using the following formula

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

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 2016-17

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 value was above the tolerance limit only on 01.10.2016 (8.5). The BOD value was above the tolerance limit on 01.02.2017 (2.2). 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 pH, BOD 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.

Goi at Pati

Most of the chemical constituents analyses were within their respective tolerance limits, attributed to water stream suitable for all user classes A, B, C, D and E. The pH value was above the tolerance limit only on 01.06.2016 (8.5).

Uri at Dhulsar

All the chemical constituents analyses including pH, Fluoride and BOD. were within their respective tolerance limits, attributed to water stream suitable for all user 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.

Kundi at Kogaon

The 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 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. The pH value was above the tolerance limit only on 01.06.2016 (8.8).

Ganjal at Chhidgaon

The degree of hardness number classified the water stream toward 'Hard Water' type. The values of all chemical and physical parameters were within the prescribed limit for designated use classes A, B, C, D & E . The BOD value was above the tolerance limit only on 01.06.2016 (2.2) .

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, fluoride and BOD values were within the tolerance limit for all designated use classes.

Narmada at Barmanghat

The water at this station was alkaline and towards 'Medium Hard Water' range. The BOD value was above the tolerance limits only on 01.12.2016(2.3). The pH and Fluoride values were within the tolerance limit for all designated use classes.

Sher at Belkheri

The degree of hardness observed towards 'Hard Water' range in most number of samples. The BOD value was above the tolerance limits only on 01.03.2017(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 values were above the tolerance limits on 01.11.2016 (2.0), on 01.12.2016 (3.9) and on 01.02.2017 (2.0). The 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. The BOD value was above the tolerance limit only on 01.05.2017 (2.4).

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 BOD values were above the tolerance limit on 03.04.2017 (2.9) and on 01.05.2017 (2.2). The pH 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 18 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	**:**	**2016-2017**
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 : 2016-2017

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	01/06/2016	01/07/2016	01/08/2016	01/09/2016	01/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	01/04/2017	01/05/2017
		A	A	A	A	A	A	A	B	A	A	A	A
	PHYSICAL												
1	Q (cumec)			19.35	91.16	42.02	9.14	1.57					
2	Colour_Cod (-)			2		Clear		Clear		Clear		Clear	
3	EC_FLD (µmho/cm)			300		400		600		700		300	
4	EC_GEN (µmho/cm)			310		455		570		536		580	
5	Odour_Code (-)			1		odour free		odour free		odour free		odour free	
6	pH_FLD (pH units)			7.0		8.5		8.0		8.3		8.0	
7	pH_GEN (pH units)			7.7		8.2		8.1		8.2		8.2	
8	SS (mg/L)			100		160		170		160		190	
9	TDS (mg/L)			205		300		369		349		384	
10	Temp (deg C)			24.0		26.0		14.0		13.0		24.0	
11	TS (mg/L)			305		460		539		509		574	
12	Turb (NTU)			12.0		20.0		1.0		1.0		1.0	
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)			0.0		0.0		0.0		0.0		0.0	
2	ALK-TOT (mgCaCO3/L)			80		105		165		170		100	
3	Ca (mg/L)			34		36		32		44		32	
4	Cl (mg/L)			80.0		63.0		70.0		65.0		58.0	
5	CO3 (mg/L)			0.0		0.0		0.0		0.0		0.0	
6	F (mg/L)			0.08		0.13		0.14		0.13		0.14	
7	HCO3 (mg/L)			98		128		201		207		122	
8	K (mg/L)			3.2		4.2		3.8		3.4		3.8	
9	Mg (mg/L)			7.3		7.3		21.9		19.4		4.9	
10	Na (mg/L)			44.0		42.0		48.0		40.8		41.0	
11	NH3-N (mg N/L)			0.06		0.20		0.14		0.12		0.12	
12	NO2+NO3 (mg N/L)			0.16		0.18		0.20		0.19		0.18	
13	NO2-N (mgN/L)			0.06		0.06		0.10		0.06		0.05	
14	NO3-N (mgN/L)			0.10		0.12		0.10		0.13		0.13	
15	P-Tot (mgP/L)			0.130		0.140		0.100		0.120		0.150	
16	SiO2 (mg/L)			12.0		10.0		10.0		10.0		8.0	
17	SO4 (mg/L)			12.0		6.0		10.0		10.0		6.0	
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)			1.2		1.4		1.0		2.2		0.6	
2	COD (mg/L)			12.0		44.0		12.0		32.0		44.0	
3	DO (mg/L)			8.0		8.0		7.5		7.8		4.5	
4	DO_SAT% (%)			95		99		73		74		54	
5	FCol-MPN (MPN/100mL)			500		1400		1800		500		1100	
6	Tcol-MPN (MPN/100mL)			1600		2800		4200		700		2300	
	TRACE & TOXIC												
1	Al (mg/L)			0.07		0.08		0.12		0.10		0.08	
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)			85		90		80		110		80	
2	HAR_Total (mgCaCO3/L)			116		121		171		191		100	
3	Na% (%)			45		42		37		31		46	
4	RSC (-)			0.0		0.0		0.0		0.0		0.0	
5	SAR (-)			1.8		1.7		1.6		1.3		1.8	

Water Quality Summary for the period :2016-2017

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)	5	700	300	460
3	EC_GEN (µmho/cm)	5	580	310	490
4	pH_FLD (pH units)	5	8.5	7.0	8
5	pH_GEN (pH units)	5	8.2	7.7	8.1
6	SS (mg/L)	5	190	100	156
7	TDS (mg/L)	5	384	205	321
8	Temp (deg C)	5	26.0	13.0	20.2
9	TS (mg/L)	5	574	305	477
10	Turb (NTU)	5	20.0	1.0	7
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	5	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	5	170	80	124
3	Ca (mg/L)	5	44	32	36
4	Cl (mg/L)	5	80.0	58.0	67.2
5	CO3 (mg/L)	5	0.0	0.0	0
6	F (mg/L)	5	0.14	0.08	0.12
7	HCO3 (mg/L)	5	207	98	151
8	K (mg/L)	5	4.2	3.2	3.7
9	Mg (mg/L)	5	21.9	4.9	12.2
10	Na (mg/L)	5	48.0	40.8	43.2
11	NH3-N (mg N/L)	5	0.20	0.06	0.13
12	NO2+NO3 (mg N/L)	5	0.20	0.16	0.18
13	NO2-N (mgN/L)	5	0.10	0.05	0.07
14	NO3-N (mgN/L)	5	0.13	0.10	0.12
15	P-Tot (mgP/L)	5	0.150	0.100	0.128
16	SiO2 (mg/L)	5	12.0	8.0	10
17	SO4 (mg/L)	5	12.0	6.0	8.8
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	5	2.2	0.6	1.3
2	COD (mg/L)	5	44.0	12.0	28.8
3	DO (mg/L)	5	8.0	4.5	7.2
4	DO_SAT% (%)	5	99	54	79
5	FCol-MPN (MPN/100mL)	5	1800	500	1060
6	Tcol-MPN (MPN/100mL)	5	4200	700	2320
	TRACE & TOXIC				
1	Al (mg/L)	5	0.12	0.07	0.09
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	5	110	80	89
2	HAR_Total (mgCaCO3/L)	5	191	100	140
3	Na% (%)	5	46	31	40
4	RSC (-)	5	0.0	0.0	0
5	SAR (-)	5	1.8	1.3	1.6

Water Quality Seasonal Average for the period: 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	54.75	166.1	48.93	33.80		4.063	11.94	1.121	0.000		0.000	2.284	0.747	0.000	
2	EC_FLD (µmho/cm)			300	600	350			600	600	650			600		300
3	EC_GEN (µmho/cm)	471	386	456	424	383	260	651	480	370	553		703	728		580
4	pH_FLD (pH units)			7.0	7.0	7.8			7.0	7.0	8.2			7.0		8.0
5	pH_GEN (pH units)	7.8	8.1	8.2	8.2	8.0	7.2	7.8	8.3	8.2	8.2		8.4	8.0		8.2
6	SS (mg/L)	150	130	163	138	130	92	223	140	110	165		233	220		190
7	TDS (mg/L)	305	251	286	274	253	180	440	317	240	359		466	480		384
8	Temp (deg C)	29.0	26.5	28.3	24.0	25.0	29.0	19.5	19.0	20.0	13.5		24.0	25.0		24.0
9	TS (mg/L)	455	381	450	789	383	272	662	467		524		699	700		574
10	Turb (NTU)	4.0	13.0	5.7	3.0	16.0	1.0	2.0	1.0	1.0	1.0		1.0	1.0		1.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	8.6	0.0	0.0	0.0	0.0	7.5	0.0	0.0		5.8	14.1		0.0
2	ALK-TOT (mgCaCO3/L)	72	107	104	97	93	75	111	95	103	167		122	176		100
3	Ca (mg/L)	34	33	35	31	35	30	32	28	34	38		38	47		32
4	Cl (mg/L)	85.0	85.5	75.3	72.5	71.5	100.0	100.0	66.5	58.0	67.5		100.0	65.0		58.0
5	CO3 (mg/L)	0.0	0.0	10.3	0.0	0.0	0.0	0.0	9.0	0.0	0.0		7.0	17.0		0.0
6	F (mg/L)	0.13	0.15	0.13	0.13	0.10	0.20	0.15	0.20		0.13		0.20	0.14		0.14
7	HCO3 (mg/L)	88	130	106	118	113	92	136	98	126	204		134	180		122
8	K (mg/L)	2.3	6.9	3.9	4.1	3.7	3.8	5.3	4.0	3.6	3.6		3.4	3.6		3.8
9	Mg (mg/L)	6.9	6.4	7.7	11.5	7.3	7.5	7.3	10.0	7.3	20.7		8.0	19.0		4.9
10	Na (mg/L)	50.1	63.0	48.7	44.0	43.0	58.4	75.4	45.4	40.4	44.4		72.0	42.6		41.0
11	NH3-N (mg N/L)	0.15	0.13	0.15	0.12	0.13	0.10	0.14	0.12	0.12	0.13		0.20	0.13		0.12
12	NO2+NO3 (mg N/L)	0.18			0.22	0.17	0.18			0.19	0.20					0.18
13	NO2-N (mgN/L)	0.06			0.09	0.06	0.03			0.06	0.08					0.05
14	NO3-N (mgN/L)	0.12	0.13	0.13	0.13	0.11	0.15	0.13	0.13	0.13	0.11		0.12	0.14		0.13
15	o-PO4-P (mg P/L)	0.060					0.050									
16	P-Tot (mgP/L)	0.180	0.220	0.177	0.125	0.135	0.440	0.200	0.120	0.150	0.110		0.180	0.100		0.150
17	SiO2 (mg/L)	21.0	7.9	8.4	9.0	11.0	8.0	8.5	7.3	8.0	10.0		7.5	8.6		8.0
18	SO4 (mg/L)	11.8	10.3	8.6	7.5	9.0	12.0	12.6	9.3	6.0	10.0		16.0	2.0		6.0
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.8	1.8	1.0	0.5	1.3	1.4	1.4	1.7	0.8	1.6		3.2	4.8		0.6
2	COD (mg/L)				82.0	28.0			16.0	24.0	22.0			37.0		44.0
3	DO (mg/L)		7.8	7.0	6.8	8.0			8.0	7.0	7.7			8.0		4.5
4	DO_SAT% (%)		98	89	79	97			86	77	73			97		54
5	FCol-MPN (MPN/100mL)			483	250	950		400	290	600	1150		800	300		1100
6	Tcol-MPN (MPN/100mL)			1000	450	2200		1000	500	1100	2450		1800	500		2300
	TRACE & TOXIC															
1	Al (mg/L)	0.10	0.12	0.11	0.07	0.07	0.08	0.11	0.07	0.05	0.11		0.10	0.14		0.08
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	85	83	88	78	88	75	80	71	85	95		95	118		80
2	HAR_Total (mgCaCO3/L)	114	109	121	126	118	106	110	112	116	181		129	197		100
3	Na% (%)	48	52	46	42	43	53	58	46	42	34		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
5	SAR (-)	2.0	2.6	1.9	1.7	1.7	2.5	3.1	1.9	1.6	1.4		2.8	1.3		1.8

3.3 Narmada at Garudeshwar

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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	01/06/2016	01/07/2016	01/08/2016	01/09/2016	01/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	01/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	40.69	46.44	1373.02	2253.28	935.44	40.31	33.39	18.32	32.53	619.75	26.82	55.42
2	Colour_Cod (-)	Clear		1		Clear		Clear		Clear		Clear	
3	EC_FLD (µmho/cm)			345		350		500		310		500	
4	EC_GEN (µmho/cm)	446		256		261		301		332		380	
5	Odour_Code (-)	odour free		1		odour free		odour free		odour free		odour free	
6	pH_FLD (pH units)			7.2		8.1		7.0		6.8		7.0	
7	pH_GEN (pH units)	7.4		7.7		8.2		8.2		8.3		8.0	
8	SS (mg/L)	190		85		90		100		100		110	
9	TDS (mg/L)	276		165		172		195		215		247	
10	Temp (deg C)	30.0		24.0		20.0		20.0		15.0		24.0	
11	TS (mg/L)	466		250		262		295		318		248	
12	Turb (NTU)	1.0		8.0		1.0		1.0		1.0		1.0	
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0		0.0		0.0		0.0		0.0		0.0	
2	ALK-TOT (mgCaCO3/L)	90		90		80		98		160		115	
3	Ca (mg/L)	32		34		22		32		42		30	
4	Cl (mg/L)	60.0		60.0		60.0		62.0		78.0		65.0	
5	CO3 (mg/L)	0.0		0.0		0.0		0.0		0.0		0.0	
6	F (mg/L)	0.13		0.12		0.10		0.14		0.13		0.13	
7	HCO3 (mg/L)	110		110		98		120		195		140	
8	K (mg/L)	4.0		4.4		4.2		3.8		3.6		4.2	
9	Mg (mg/L)	7.3		3.7		8.3		7.3		25.5		10.9	
10	Na (mg/L)	40.0		40.0		46.0		40.0		42.0		47.0	
11	NH3-N (mg N/L)	0.12		0.11		0.30		0.13		0.11		0.13	
12	NO2+NO3 (mg N/L)	0.20		0.17		0.22		0.16		0.18		0.18	
13	NO2-N (mgN/L)	0.07		0.06		0.10		0.04		0.07		0.05	
14	NO3-N (mgN/L)	0.13		0.11		0.12		0.12		0.11		0.13	
15	P-Tot (mgP/L)	0.130		0.130		0.100		0.120		0.130		0.140	
16	SiO2 (mg/L)	6.0		14.0		12.0		15.0		10.0		14.0	
17	SO4 (mg/L)	6.0		10.0		12.0		14.0		10.0		12.0	
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.4		1.6		0.9		1.4		0.8		1.0	
2	COD (mg/L)	92.0		12.0		24.0		20.0		16.0		40.0	
3	DO (mg/L)			7.5		6.6		7.7		7.1		8.1	
4	DO_SAT% (%)			89		73		84		70		96	
5	FCol-MPN (MPN/100mL)	900		500		500		600		400		1000	
6	Tcol-MPN (MPN/100mL)	2000		1000		1120		1400		900		1800	
	TRACE & TOXIC												
1	Al (mg/L)	0.10		0.07		0.08		0.05		0.12			
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	80		85		56		80		105		75	
2	HAR_Total (mgCaCO3/L)	111		100		91		111		211		121	
3	Na% (%)	43		45		51		43		30		45	
4	RSC (-)	0.0		0.0		0.0		0.0		0.0		0.0	
5	SAR (-)	1.7		1.7		2.1		1.7		1.3		1.9	

Water Quality Summary for the period : 2016-2017

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_FLD (µmho/cm)	5	500	310	401
3	EC_GEN (µmho/cm)	6	446	256	329
4	pH_FLD (pH units)	5	8.1	6.8	7.2
5	pH_GEN (pH units)	6	8.3	7.4	8
6	SS (mg/L)	6	190	85	113
7	TDS (mg/L)	6	276	165	212
8	Temp (deg C)	6	30.0	15.0	22.2
9	TS (mg/L)	6	466	248	307
10	Turb (NTU)	6	8.0	1.0	2.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	6	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	6	160	80	106
3	Ca (mg/L)	6	42	22	32
4	Cl (mg/L)	6	78.0	60.0	64.2
5	CO3 (mg/L)	6	0.0	0.0	0
6	F (mg/L)	6	0.14	0.10	0.12
7	HCO3 (mg/L)	6	195	98	129
8	K (mg/L)	6	4.4	3.6	4
9	Mg (mg/L)	6	25.5	3.7	10.5
10	Na (mg/L)	6	47.0	40.0	42.5
11	NH3-N (mg N/L)	6	0.30	0.11	0.15
12	NO2+NO3 (mg N/L)	6	0.22	0.16	0.18
13	NO2-N (mgN/L)	6	0.10	0.04	0.07
14	NO3-N (mgN/L)	6	0.13	0.11	0.12
15	P-Tot (mgP/L)	6	0.140	0.100	0.125
16	SiO2 (mg/L)	6	15.0	6.0	11.8
17	SO4 (mg/L)	6	14.0	6.0	10.7
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	6	1.6	0.8	1.2
2	COD (mg/L)	6	92.0	12.0	34
3	DO (mg/L)	5	8.1	6.6	7.4
4	DO_SAT% (%)	5	96	70	82
5	FCol-MPN (MPN/100mL)	6	1000	400	650
6	Tcol-MPN (MPN/100mL)	6	2000	900	1370
	TRACE & TOXIC				
1	Al (mg/L)	5	0.12	0.05	0.08
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	6	105	56	80
2	HAR_Total (mgCaCO3/L)	6	211	91	124
3	Na% (%)	6	51	30	43
4	RSC (-)	6	0.0	0.0	0
5	SAR (-)	6	2.1	1.3	1.7

Water Quality Seasonal Average for the period: 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	568.7	1891	590.6	358.3		112.3	48.81	83.65	26.00		87.71	111.3	24.09	36.12	
2	EC_FLD (µmho/cm)					348			340	356	405			340	345	500
3	EC_GEN (µmho/cm)	373	306	310	357	321	386	405	390	321	317	306	382	330	351	380
4	pH_FLD (pH units)		8.2			7.6			7.8	8.1	6.9			7.8	7.1	7.0
5	pH_GEN (pH units)	7.5	7.8	8.2	8.2	7.8	7.9	8.2	8.2	8.0	8.3	8.2	8.0	8.2	8.1	8.0
6	SS (mg/L)	123	103	115	120	122	131	125	138	105	100	102	100	100	119	110
7	TDS (mg/L)	247	204	203	231	204	235	258	253	208	205	235	237	213	238	247
8	Temp (deg C)	25.3	24.3	24.3	24.3	24.7	21.0	20.5	15.5	18.0	17.5	25.0	22.0	22.0	22.0	24.0
9	TS (mg/L)	370	307	318	462	326	366	383	390	352	307	337	337	313	357	248
10	Turb (NTU)	3.3	3.3	1.0	1.7	3.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	7.7	0.0	0.0	0.0	5.0	10.0	0.0	0.0	0.0	6.6	5.8	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	80	90	97	95	87	85	103	78	92	129	100	103	184	120	115
3	Ca (mg/L)	31	31	33	31	30	33	31	28	34	37	32	32	33	34	30
4	Cl (mg/L)	136.3	67.3	66.7	63.0	60.0	52.3	75.5	61.0	61.5	70.0	74.5	50.0	90.0	50.0	65.0
5	CO3 (mg/L)	0.0	0.0	9.3	0.0	0.0	0.0	6.0	12.0	0.0	0.0	0.0	8.0	7.0	0.0	0.0
6	F (mg/L)	0.23	0.17	0.15	0.14	0.12	0.18	0.15	0.14	0.13	0.13	0.14	0.18	0.15	0.12	0.13
7	HCO3 (mg/L)	98	110	100	116	106	104	113	71	112	158	122	110	210	146	140
8	K (mg/L)	5.5	6.8	4.0	3.7	4.2	3.8	7.4	3.9	3.8	3.7	3.6	4.8	4.6	4.0	4.2
9	Mg (mg/L)	7.5	8.8	6.9	9.3	6.4	6.7	8.0	6.5	7.3	16.4	6.8	7.8	14.4	10.9	10.9
10	Na (mg/L)	83.2	42.0	44.8	38.7	42.0	30.6	51.6	41.3	40.1	41.0	53.1	38.0	44.8	38.0	47.0
11	NH3-N (mg N/L)	0.11	0.11	0.13	0.12	0.18	0.06	0.14	0.16	0.13	0.12	0.10	0.12	0.13	0.13	0.13
12	NO2+NO3 (mg N/L)	0.15			0.20	0.20	0.24			0.18	0.17				0.18	0.18
13	NO2-N (mgN/L)	0.03			0.07	0.08	0.05			0.05	0.05				0.06	0.05
14	NO3-N (mgN/L)	0.12	0.13	0.12	0.13	0.12	0.17	0.11	0.16	0.13	0.11	0.23	0.16	0.13	0.12	0.13
15	o-PO4-P (mg P/L)	0.060					0.060									
16	P-Tot (mgP/L)	0.320	0.213	0.157	0.130	0.120	0.250	0.200	0.180	0.140	0.125	0.260	0.120	0.150	0.120	0.140
17	SiO2 (mg/L)	9.5	6.5	8.4	8.0	10.7	9.0	8.9	10.4	11.0	12.5	10.0	8.4	5.0	6.0	14.0
18	SO4 (mg/L)	9.6	10.0	10.2	8.5	9.3	13.0	11.2	11.2	10.5	12.0	10.2	16.0	5.0	11.0	12.0
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.6	1.0	0.7	0.6	1.3	0.9	1.6	1.1	1.4	1.1	2.7	3.1	4.9	2.8	1.0
2	COD (mg/L)				66.7	42.7			8.0	118.0	18.0			26.0	80.0	40.0
3	DO (mg/L)		7.0			7.1			6.9	7.6	7.4			6.9	7.5	8.1
4	DO_SAT% (%)		82			81			65	76	77			79	86	96
5	FCol-MPN (MPN/100mL)			400	400	633		600	400	600	500		500	600	500	1000
6	Tcol-MPN (MPN/100mL)			900	833	1373		1200	800	1150	1150		1000	1200	1400	1800
	TRACE & TOXIC															
1	Al (mg/L)	0.08	0.11	0.11	0.09	0.08	0.11	0.07	0.08	0.09	0.08	0.12	0.08	0.12	0.09	
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	77	77	83	78	74	81	78	70	85	93	80	80	82	85	75
2	HAR_Total (mgCaCO3/L)	108	114	112	117	100	109	111	97	116	161	108	113	142	131	121
3	Na% (%)	50	42	45	41	46	37	48	48	42	36	51	41	40	38	45
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
5	SAR (-)	3.4	1.7	1.8	1.6	1.8	1.3	2.1	1.9	1.6	1.5	2.2	1.6	1.6	1.4	1.9

3.4 Goi at Pati

History sheet

			Water Year	**:**	**2016-2017**
					N.C.A.
Site	**:**	**Goi at Pati**	**Code**	**:**	**PATI**
State	:	Madhya Pradesh	District		Barwani
Basin	:	Narmada	River	:	Independent Narmada
Tributary	:	Goi			
Sub Tributary	:		Local River	:	Goi
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-III, Indore
Drainage Area	:	2151 Sq. km.	Bank	:	Right
Latitude	:	21°56'37"	Longitude	:	74°44'42"
Zero of Gauge (m)	:	187 .000 (M.S.L.)	15/06/2008 Closing Date		
		Opening Date			
Gauge	:	15/06/2008			
Discharge	:	15/06/2008			
Sediment	:				
Water Quality	:	01/07/2008			

Water Quality Datasheet for the period : 2016-2017

Station Name : Goi at Pati (N.C.A. PATI) Division : Narmada Division, Bhopal

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017
		A	A	A	A	A	B	A	A	A	A
	PHYSICAL										
1	Q (cumec)	1.83	3.58	29.22	30.13	46.7	7.19	3.18	2.2	1.99	2.67
2	Colour_Cod (-)	Clear	Light Brown	Clear	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	393	274	274	456	289	410	379	550	395	362
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_GEN (pH units)	8.5	7.4	7.5	7.8	8.3	7.8	8.1	8.1	8.0	8.3
6	TDS (mg/L)	255	177	178	280	176	270	246	358	255	235
7	Temp (deg C)	27.0	26.0	25.0	24.0	25.5	21.0	18.0	15.0	15.0	19.0
8	Turb (NTU)	0.0	170.0	42.0	117.0	98.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	7.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	7.7
2	ALK-TOT (mgCaCO3/L)	156	125	116	158	159	166	172	170	158	167
3	Ca (mg/L)	26	26	28	37	36	36	38	39	36	32
4	Cl (mg/L)	25.0	7.6	7.0	11.0	9.0	15.0	19.0	18.0	18.0	18.0
5	CO3 (mg/L)	8.5	0.0	0.0	0.0	8.3	0.0	0.0	0.0	0.0	9.2
6	F (mg/L)	0.15	0.40	0.33	0.34	0.32	0.25	0.22	0.23	0.24	0.42
7	HCO3 (mg/L)	173	153	142	193	177	202	210	208	193	185
8	K (mg/L)	1.1	0.8	2.1	2.3	0.7	1.1	0.6	0.7	0.8	0.7
9	Mg (mg/L)	18.5	12.2	10.7	17.0	17.5	20.4	22.6	20.4	21.6	18.0
10	Na (mg/L)	18.6	8.5	8.2	11.3	10.6	11.1	13.4	20.0	19.2	19.8
11	NO2+NO3 (mg N/L)	0.21	2.54	1.87	1.89	1.98	1.15	0.58	0.53	0.60	0.60
12	NO2-N (mgN/L)	0.01	0.39	0.13	0.15	0.05	0.04	0.03	0.04	0.03	0.04
13	NO3-N (mgN/L)	0.20	2.15	1.74	1.74	1.94	1.11	0.55	0.49	0.57	0.56
14	o-PO4-P (mg P/L)	0.041	0.260	0.284	0.306	0.245	0.184	0.175	0.140	0.135	0.147
15	SiO2 (mg/L)	23.8	30.9	32.3	29.4	30.9	21.4	19.6	19.7	17.2	20.7
16	SO4 (mg/L)	14.3	21.6	23.5	22.4	19.9	14.5	14.3	12.6	11.7	10.6
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)	1.0	0.8	0.6	0.9	0.6	0.4	0.6	0.4	0.6	0.8
2	COD (mg/L)	14.0	43.0	30.0	28.0	34.0	40.0	13.0	20.0	23.0	48.0
3	DO (mg/L)	5.0	4.6	6.1	5.4	5.2		7.4	7.0	5.6	5.9
4	DO_SAT% (%)	63	57	74	64	63		78	69	56	64
	TRACE & TOXIC										
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	65	64	70	92	89	90	96	98	90	79
2	HAR_Total (mgCaCO3/L)	142	115	115	163	162	175	190	183	180	154
3	Na% (%)	22	14	13	13	12	12	13	19	19	22
4	RSC (-)	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3
5	SAR (-)	0.7	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.6	0.7

Water Quality Summary for the period : 2016-2017

Station Name : Goi at Pati (N.C.A. PATI) Division : Narmada Division, Bhopal

Local River : Goi 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)	10	550	274	378
3	pH_GEN (pH units)	10	8.5	7.4	8
4	TDS (mg/L)	10	358	176	243
5	Temp (deg C)	10	27.0	15.0	21.6
6	Turb (NTU)	10	170.0	0.0	42.7
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	10	7.7	0.0	2.2
2	ALK-TOT (mgCaCO3/L)	10	172	116	155
3	Ca (mg/L)	10	39	26	33
4	Cl (mg/L)	10	25.0	7.0	14.8
5	CO3 (mg/L)	10	9.2	0.0	2.6
6	F (mg/L)	10	0.42	0.15	0.29
7	HCO3 (mg/L)	10	210	142	184
8	K (mg/L)	10	2.3	0.6	1.1
9	Mg (mg/L)	10	22.6	10.7	17.9
10	Na (mg/L)	10	20.0	8.2	14.1
11	NO2+NO3 (mg N/L)	10	2.54	0.21	1.2
12	NO2-N (mgN/L)	10	0.39	0.01	0.09
13	NO3-N (mgN/L)	10	2.15	0.20	1.11
14	o-PO4-P (mg P/L)	10	0.306	0.041	0.192
15	SiO2 (mg/L)	10	32.3	17.2	24.6
16	SO4 (mg/L)	10	23.5	10.6	16.5
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	10	1.0	0.4	0.7
2	COD (mg/L)	10	48.0	13.0	29.3
3	DO (mg/L)	9	7.4	4.6	5.8
4	DO_SAT% (%)	9	78	56	65
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	10	98	64	83
2	HAR_Total (mgCaCO3/L)	10	190	115	158
3	Na% (%)	10	22	12	16
4	RSC (-)	10	0.3	0.0	0.1
5	SAR (-)	10	0.7	0.3	0.5

Water Quality Seasonal Average for the period : 2012-2017

Station Name : Goi at Pati (N.C.A. PATI) Division : Narmada Division, Bhopal

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

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	35.19	33.11		14.36		0.763	2.131		2.914		0.000	0.000		1.860	
2	EC_GEN (µmho/cm)	289	376	317	314	337	463	483	384	341	434				409	362
3	pH_GEN (pH units)	8.1	8.3	8.1	8.3	7.9	8.2	8.1	8.2	8.3	8.0				8.2	8.3
4	TDS (mg/L)	179	237	202	204	213	291	297	255	217	282				266	235
5	Temp (deg C)	27.0	27.6	27.3	26.0	25.5	23.5	23.0	21.0	18.5	17.3				23.7	19.0
6	Turb (NTU)	130.0	27.0	212.0	40.0	85.4	0.0	1.5	0.0	0.0	0.0				0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	5.7	1.7	4.6	2.8	0.0	1.9	2.5	3.5	0.0				0.0	7.7
2	ALK-TOT (mgCaCO3/L)	118	171	150	170	143	199	191	179	168	167				165	167
3	Ca (mg/L)	27	25	33	33	30	40	42	36	36	37				30	32
4	Cl (mg/L)	11.5	15.3	9.3	9.6	11.9	18.8	16.9	23.9	13.3	17.5				19.7	18.0
5	CO3 (mg/L)	0.0	6.9	2.1	5.6	3.4	0.0	2.3	3.0	4.2	0.0				0.0	9.2
6	F (mg/L)	0.36	0.34	0.49	0.44	0.31	0.29	0.20	0.15	0.30	0.23				0.33	0.42
7	HCO3 (mg/L)	144	195	179	196	168	243	228	212	196	203				201	185
8	K (mg/L)	1.4	3.0	2.4	2.3	1.4	1.1	0.8	0.8	0.8	0.8				1.0	0.7
9	Mg (mg/L)	12.5	25.7	19.8	21.7	15.2	23.4	22.5	25.6	19.9	21.3				20.0	18.0
10	Na (mg/L)	14.5	17.2	14.1	17.8	11.4	22.5	26.6	23.7	17.9	15.9				18.6	19.8
11	NO2+NO3 (mg N/L)	5.09	5.77	5.35	6.01	1.70	4.65	8.63	10.69	3.76	0.72				1.84	0.60
12	NO2-N (mgN/L)	0.07	0.03	0.07	0.03	0.15	0.03	0.04	0.02	0.04	0.03				0.02	0.04
13	NO3-N (mgN/L)	5.03	5.74	5.28	5.99	1.55	4.62	8.59	10.67	3.72	0.68				1.82	0.56
14	o-PO4-P (mg P/L)	0.046	0.216	0.545	0.331	0.227	0.042	0.181	0.152	0.125	0.159				0.141	0.147
15	SiO2 (mg/L)	26.3	31.4	30.5	30.6	29.5	34.1	39.0	30.8	29.5	19.5				24.4	20.7
16	SO4 (mg/L)	18.7	21.5	30.5	22.9	20.3	15.4	23.5	19.2	15.0	13.3				15.6	10.6
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.1	0.8	0.7	0.3	0.8	0.6	0.6	0.8	0.5	0.5				0.7	0.8
2	COD (mg/L)	29.7	24.8	36.3	28.3	29.8	37.0	27.0	41.5	31.0	24.0				42.0	48.0
3	DO (mg/L)	5.8	6.6	6.4	6.6	5.3	5.8	6.8	7.1	6.9	6.7				5.3	5.9
4	DO_SAT% (%)	73	84	80	81	64	68	79	80	74	68				63	64
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	68	64	83	83	76	99	104	89	90	94				74	79
2	HAR_Total (mgCaCO3/L)	120	171	166	173	139	197	198	196	173	182				158	154
3	Na% (%)	21	18	15	18	15	19	23	21	18	16				20	22
4	RSC (-)	0.1	0.1	0.0	0.1	0.1	0.1	0.3	0.0	0.0	0.0				0.2	0.3
5	SAR (-)	0.6	0.6	0.5	0.6	0.4	0.7	0.8	0.7	0.6	0.5				0.6	0.7

3.5 Uri at Dhulsar

History sheet

			Water Year	**:**	**2016-2017**
Site	**:**	**Uri at Dhulsar**	**Code**	**:**	**NCA DHULSAR**
State	:	Madhya Pradesh	District		Dhar
			Independent		
Basin	:	Narmada	River	:	Narmada
Tributary	:	Uri	Local River	:	Uri
Division	:	Narmada Division, Bhopal	Sub-Division	:	MNSD-III, Indore
Drainage Area	:	787 Sq. Km.	Bank	:	Right
Latitude	:	22°12'20"	Longitude	:	74°51'06"
Zero of		151 .000			
Gauge (m)	:	(M.S.L.)	15/06/2008		
		Opening Date	Closing Date		
Gauge	:	15/06/2008			
Discharge	:	15/06/2008			
Sediment	:				
Water Quality	:	01/08/2008			

Water Quality Datasheet for the period : 2016-2017

Station Name : Uri at Dhulsar (NCA Dhulsar) Division : Narmada Division, Bhopal

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017
		A	A	A	A	A	A	A	A	A	A
	PHYSICAL										
1	Q (cumec)		2.51	9.03	16.98	37.18	0				
2	Colour_Cod (-)			Clear	Clear	Clear	Clear				
3	EC_GEN (µmho/cm)			460	605	248	534				
4	Odour_Code (-)			odour free	odour free	odour free	odour free				
5	pH_GEN (pH units)			7.6	7.8	8.2	7.7				
6	TDS (mg/L)			296	364	160	345				
7	Temp (deg C)			29.0	28.0	28.0	24.0				
8	Turb (NTU)			40.0	42.0	45.0	0.0				
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)			0.0	0.0	0.0	0.0				
2	ALK-TOT (mgCaCO3/L)			172	186	196	180				
3	Ca (mg/L)			34	41	48	40				
4	Cl (mg/L)			9.2	19.0	25.0	37.0				
5	CO3 (mg/L)			0.0	0.0	0.0	0.0				
6	F (mg/L)			0.30	0.31	0.29	0.31				
7	HCO3 (mg/L)			210	227	239	219				
8	K (mg/L)			2.2	2.6	1.9	2.4				
9	Mg (mg/L)			19.0	25.3	23.6	29.2				
10	Na (mg/L)			14.6	14.9	15.8	15.0				
11	NO2+NO3 (mg N/L)			2.16	2.05	2.15	1.68				
12	NO2-N (mgN/L)			0.11	0.11	0.02	0.05				
13	NO3-N (mgN/L)			2.05	1.94	2.13	1.63				
14	o-PO4-P (mg P/L)			0.410	0.383	0.319	0.245				
15	SiO2 (mg/L)			31.1	30.4	32.4	29.9				
16	SO4 (mg/L)			33.3	32.4	28.7	15.0				
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)			0.7	1.0	0.7	0.5				
2	COD (mg/L)			46.0	35.0	37.0	35.0				
3	DO (mg/L)			5.7	5.2	5.3	6.2				
4	DO_SAT% (%)			74	66	68	74				
	TRACE & TOXIC										
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)			84	102	119	99				
2	HAR_Total (mgCaCO3/L)			163	207	217	220				
3	Na% (%)			16	13	14	13				
4	RSC (-)			0.2	0.0	0.0	0.0				
5	SAR (-)			0.5	0.5	0.5	0.4				

Water Quality Summary for the period : 2016-2017

Station Name : Uri at Dhulsar (NCA Dhulsar) Division : Narmada Division, Bhopal

Local River : Uri 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)	4	605	248	462
3	pH_GEN (pH units)	4	8.2	7.6	7.8
4	TDS (mg/L)	4	364	160	291
5	Temp (deg C)	4	29.0	24.0	27.3
6	Turb (NTU)	4	45.0	0.0	31.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	4	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	4	196	172	183
3	Ca (mg/L)	4	48	34	40
4	Cl (mg/L)	4	37.0	9.2	22.5
5	CO3 (mg/L)	4	0.0	0.0	0
6	F (mg/L)	4	0.31	0.29	0.3
7	HCO3 (mg/L)	4	239	210	224
8	K (mg/L)	4	2.6	1.9	2.3
9	Mg (mg/L)	4	29.2	19.0	24.2
10	Na (mg/L)	4	15.8	14.6	15.1
11	NO2+NO3 (mg N/L)	4	2.16	1.68	2.01
12	NO2-N (mgN/L)	4	0.11	0.02	0.07
13	NO3-N (mgN/L)	4	2.13	1.63	1.94
14	o-PO4-P (mg P/L)	4	0.410	0.245	0.339
15	SiO2 (mg/L)	4	32.4	29.9	30.9
16	SO4 (mg/L)	4	33.3	15.0	27.3
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	4	1.0	0.5	0.7
2	COD (mg/L)	4	46.0	35.0	38.3
3	DO (mg/L)	4	6.2	5.2	5.6
4	DO_SAT% (%)	4	74	66	70
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	4	119	84	101
2	HAR_Total (mgCaCO3/L)	4	220	163	202
3	Na% (%)	4	16	13	14
4	RSC (-)	4	0.2	0.0	0.1
5	SAR (-)	4	0.5	0.4	0.5

Water Quality Seasonal Average for the period : 2012-2017

Station Name : Uri at Dhulsar (NCA DHULSAR) Division : Narmada Division, Bhopal

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

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	4.175	18.89		6.542		0.000	0.872				0.000	0.000			
2	EC_GEN (µmho/cm)	445	415	382	321	438	418	474	340		534					
3	pH_GEN (pH units)	8.3	8.5	7.9	8.3	7.9	8.3	8.2	7.9		7.7					
4	TDS (mg/L)	278	262	243	208	273	269	292	218		345					
5	Temp (deg C)	27.8	27.4	28.0	27.0	28.3	24.0	22.8	26.0		24.0					
6	Turb (NTU)	15.0	25.5	81.7	6.0	42.3	0.0	2.6	0.0		0.0					
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	3.3	8.2	0.0	4.1	0.0	5.0	0.0	0.0		0.0					
2	ALK-TOT (mgCaCO3/L)	177	181	164	158	185	148	173	148		180					
3	Ca (mg/L)	35	33	30	35	41	28	36	17		40					
4	Cl (mg/L)	25.8	21.5	19.6	11.8	17.7	19.8	17.7	26.2		37.0					
5	CO3 (mg/L)	4.0	9.9	0.0	4.9	0.0	6.0	0.0	0.0		0.0					
6	F (mg/L)	0.35	0.35	0.44	0.51	0.30	0.37	0.10	0.36		0.31					
7	HCO3 (mg/L)	207	201	200	183	225	168	211	181		219					
8	K (mg/L)	3.6	4.0	3.2	3.3	2.2	2.8	2.1	2.3		2.4					
9	Mg (mg/L)	19.6	23.9	23.1	18.3	22.6	19.9	26.0	28.9		29.2					
10	Na (mg/L)	26.7	23.0	19.8	21.8	15.1	26.5	30.4	27.6		15.0					
11	NO2+NO3 (mg N/L)	7.02	1.68	5.02	3.58	2.12	2.57	4.60	2.93		1.68					
12	NO2-N (mgN/L)	0.07	0.04	0.07	0.05	0.08	0.13	0.11	0.01		0.05					
13	NO3-N (mgN/L)	6.94	1.64	4.95	3.53	2.04	2.43	4.50	2.92		1.63					
14	o-PO4-P (mg P/L)	0.006	0.146	0.438	0.370	0.371	0.008	0.044	0.085		0.245					
15	SiO2 (mg/L)	28.9	28.4	37.1	34.3	31.3	44.5	49.3	24.9		29.9					
16	SO4 (mg/L)	25.7	30.2	30.0	27.2	31.5	19.9	32.6	22.9		15.0					
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.8	1.0	0.8	0.5	0.8	0.4	1.1	1.4		0.5					
2	COD (mg/L)	15.0	24.8	27.7	48.3	39.3	44.0	20.0	27.0		35.0					
3	DO (mg/L)	6.2	6.5	5.8	5.6	5.4	4.8	6.2	5.5		6.2					
4	DO_SAT% (%)	79	83	74	70	69	57	71	68		74					
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	89	81	75	87	102	71	89	44		99					
2	HAR_Total (mgCaCO3/L)	170	181	171	163	196	154	198	164		220					
3	Na% (%)	26	23	20	23	14	27	25	27		13					
4	RSC (-)	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0		0.0					
5	SAR (-)	0.9	0.8	0.7	0.8	0.5	0.9	0.9	0.9		0.4					

3.6 Narmada at Mandleshwar

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	743.11	669.9	2235.19	2619.35	1165.51	146.92	531.69	642.0	497.05	742.96	275.02	227.6
2	Colour_Cod (-)	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	269	263	163	258	200	229	224	345	247	240	240	237
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)	8.2	7.7	7.6	7.5	8.1	7.4	8.1	8.0	8.1	7.8	7.7	7.7
6	TDS (mg/L)	174	169	106	158	130	151	150	226	160	156	156	154
7	Temp (deg C)	25.0	24.0	22.0	24.0	29.0	25.0	21.0	20.0	20.0	20.0	20.0	24.0
8	Turb (NTU)	0.0	35.0	46.0	48.0	40.0	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)	127	128	91	98	102	111	116	133	125	118	116	123
3	Ca (mg/L)	28	24	18	25	26	25	28	28	33	31	27	28
4	Cl (mg/L)	7.0	4.0	4.8	7.0	8.0	9.0	9.0	7.0	6.0	7.0	9.0	8.0
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	0.39	0.24	0.24	0.23	0.18	0.13	0.19	0.22	0.34	0.34	0.23
7	HCO3 (mg/L)	155	156	111	119	124	136	142	162	152	144	141	150
8	K (mg/L)	1.8	1.6	1.9	2.5	1.3	1.4	1.3	1.5	1.7	1.5	1.5	1.3
9	Mg (mg/L)	10.5	12.2	6.8	5.8	8.5	8.0	12.2	11.4	6.6	9.0	10.2	11.9
10	Na (mg/L)	9.6	10.2	10.1	11.5	5.8	5.9	7.5	11.7	12.3	10.6	9.3	12.1
11	NO2+NO3 (mg N/L)	0.20	2.54	2.05	1.93	0.91	0.65	0.42	0.33	0.39	0.37	0.38	0.14
12	NO2-N (mgN/L)	0.01	0.42	0.09	0.08	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.02
13	NO3-N (mgN/L)	0.19	2.12	1.96	1.85	0.89	0.64	0.41	0.32	0.38	0.36	0.37	0.12
14	o-PO4-P (mg P/L)	0.018	0.304	0.308	0.327	0.258	0.114	0.085	0.063	0.081	0.086	0.074	0.082
15	SiO2 (mg/L)	19.4	27.7	27.6	25.7	23.5	19.9	18.4	18.4	16.0	19.0	19.6	19.3
16	SO4 (mg/L)	5.0	22.6	18.0	20.5	18.4	10.4	10.0	8.6	8.2	7.4	7.3	6.9
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.4	1.3	0.6	0.8	0.7	0.7	1.0	0.9	0.9	1.0	1.0	1.5
2	COD (mg/L)	37.0	40.0	35.0	39.0	47.0	44.0	46.0	65.0	24.0	48.0	24.0	33.0
3	DO (mg/L)	5.2	6.2	6.0	6.4	6.3	5.8	8.5	6.6	5.8	5.4	5.2	
4	DO_SAT% (%)	63	74	69	76	82	70	95	73	64	59	57	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	70	60	44	63	64	63	69	71	82	77	69	69
2	HAR_Total (mgCaCO3/L)	114	111	72	87	99	96	119	119	109	114	111	119
3	Na% (%)	15	17	23	22	11	12	12	18	19	17	15	18
4	RSC (-)	0.3	0.4	0.4	0.2	0.1	0.3	0.0	0.3	0.3	0.1	0.1	0.1
5	SAR (-)	0.4	0.4	0.5	0.5	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.5

Water Quality Summary for the period : 2016-2017

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	345	163	243
3	pH_GEN (pH units)	12	8.2	7.4	7.8
4	TDS (mg/L)	12	226	106	158
5	Temp (deg C)	12	29.0	20.0	22.8
6	Turb (NTU)	12	48.0	0.0	14.1
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	133	91	116
3	Ca (mg/L)	12	33	18	27
4	Cl (mg/L)	12	9.0	4.0	7.2
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.39	0.13	0.24
7	HCO3 (mg/L)	12	162	111	141
8	K (mg/L)	12	2.5	1.3	1.6
9	Mg (mg/L)	12	12.2	5.8	9.4
10	Na (mg/L)	12	12.3	5.8	9.7
11	NO2+NO3 (mg N/L)	12	2.54	0.14	0.86
12	NO2-N (mgN/L)	12	0.42	0.01	0.06
13	NO3-N (mgN/L)	12	2.12	0.12	0.8
14	o-PO4-P (mg P/L)	12	0.327	0.018	0.15
15	SiO2 (mg/L)	12	27.7	16.0	21.2
16	SO4 (mg/L)	12	22.6	5.0	11.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.5	0.6	1
2	COD (mg/L)	12	65.0	24.0	40.2
3	DO (mg/L)	11	8.5	5.2	6.1
4	DO_SAT% (%)	11	95	57	71
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	82	44	67
2	HAR_Total (mgCaCO3/L)	12	119	72	106
3	Na% (%)	12	23	11	17
4	RSC (-)	12	0.4	0.0	0.2
5	SAR (-)	12	0.5	0.3	0.4

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	857.0	2416	524.0	725.6		621.0	633.3	632.6	359.5		689.5	1271	853.9	500.2	
2	EC_GEN (µmho/cm)	267	241	240	213	231	240	243	201	209	261	268	218	201	286	239
3	pH_GEN (pH units)	8.1	8.0	7.9	8.1	7.8	8.1	8.2	8.1	8.2	7.9	8.2	8.1	8.1	8.2	7.7
4	TDS (mg/L)	166	152	153	135	147	158	145	132	133	172	170	138	127	181	155
5	Temp (deg C)	27.8	26.4	26.0	22.4	24.8	21.4	23.5	16.3	18.3	21.5	22.3	24.0	20.0	20.3	21.3
6	Turb (NTU)	18.0	96.4	15.8	9.2	33.8	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	2.0	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
2	ALK-TOT (mgCaCO3/L)	127	119	140	149	109	138	134	122	122	121	135	143	128	129	119
3	Ca (mg/L)	27	25	28	26	24	27	29	27	27	28	27	29	26	27	29
4	Cl (mg/L)	8.7	10.1	19.5	8.3	6.2	7.2	8.3	6.5	8.3	7.8	7.9	30.2	8.6	8.0	8.0
5	CO3 (mg/L)	2.4	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
6	F (mg/L)	0.23	0.24	0.25	0.40	0.26	0.28	0.15	0.35	0.36	0.18	0.23	0.14	0.48	0.26	0.30
7	HCO3 (mg/L)	150	143	169	181	133	168	161	149	146	148	165	174	156	158	145
8	K (mg/L)	2.7	4.5	3.1	2.3	1.8	1.8	1.6	2.0	2.0	1.4	1.7	1.3	1.4	2.0	1.5
9	Mg (mg/L)	9.5	11.0	12.1	11.9	8.7	10.8	12.0	10.1	10.3	9.5	10.9	12.4	11.4	11.6	10.4
10	Na (mg/L)	13.5	11.0	16.7	11.2	9.4	11.9	12.5	10.6	10.1	9.3	10.9	12.1	9.0	10.4	10.6
11	NO2+NO3 (mg N/L)	1.13	1.66	1.53	1.35	1.52	0.74	0.75	1.31	0.51	0.45	0.43	0.44	0.59	0.33	0.30
12	NO2-N (mgN/L)	0.02	0.04	0.03	0.01	0.12	0.08	0.04	0.04	0.06	0.01	0.02	0.01	0.05	0.01	0.02
13	NO3-N (mgN/L)	1.11	1.63	1.50	1.34	1.40	0.66	0.71	1.27	0.45	0.43	0.41	0.43	0.54	0.32	0.28
14	o-PO4-P (mg P/L)	0.030	0.161	0.345	0.199	0.243	0.036	0.048	0.177	0.135	0.086	0.202	0.054	0.112	0.114	0.081
15	SiO2 (mg/L)	24.7	20.5	18.7	16.9	24.8	22.6	22.3	17.5	16.1	18.2	25.9	18.4	16.5	21.8	19.3
16	SO4 (mg/L)	21.1	11.7	18.9	15.2	16.9	5.4	5.8	11.1	4.0	9.3	5.2	7.7	25.5	5.0	7.2
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.7	1.0	1.5	0.8	1.0	0.8	0.9	0.9	0.7	0.9	0.7	0.8	0.8	0.8	1.2
2	COD (mg/L)	18.4	28.0	25.6	36.0	39.6	38.5	24.3	42.3	26.0	44.8	23.3	28.3	48.3	33.0	35.0
3	DO (mg/L)	5.6	5.9	6.2	6.1	6.0	6.0	7.3	7.1	7.3	6.7	5.1	6.5	6.6	6.2	5.3
4	DO_SAT% (%)	71	73	77	71	73	68	85	72	77	75	58	77	72	68	58
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	67	63	71	66	60	68	72	68	67	71	66	73	66	67	71
2	HAR_Total (mgCaCO3/L)	107	109	121	115	97	113	122	110	110	111	112	125	113	115	115
3	Na% (%)	21	17	21	17	18	18	18	17	16	15	17	17	15	16	17
4	RSC (-)	0.4	0.2	0.4	0.7	0.3	0.5	0.3	0.3	0.3	0.2	0.5	0.4	0.3	0.3	0.1
5	SAR (-)	0.6	0.5	0.6	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4

3.7 Kundi at Kogaon

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	River Dry	River Dry	23.0	67.2	267.58	19.66	10.75	13.3	11.79	River Dry	River Dry	River Dry
2	Colour_Cod (-)			Clear	Light Brown	Light Brown	Clear	Clear	Clear	Clear			
3	EC_GEN (µmho/cm)			362	439	315	412	361	283	275			
4	Odour_Code (-)			odour free	odour free	odour free	odour free	odour free	odour free	odour free			
5	pH_GEN (pH units)			7.7	7.4	8.2	7.8	8.1	8.1	7.8			
6	TDS (mg/L)			236	270	205	268	233	184	178			
7	Temp (deg C)			29.0	29.0	29.5	24.5	24.0	18.0	20.0			
8	Turb (NTU)			50.0	108.0	116.0	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	ALK-TOT (mgCaCO3/L)			151	144	157	182	166	143	133			
3	Ca (mg/L)			31	31	33	36	33	29	33			
4	Cl (mg/L)			4.0	13.0	11.0	17.0	16.0	10.0	9.0			
5	CO3 (mg/L)			0.0	0.0	0.0	0.0	0.0	0.0	0.0			
6	F (mg/L)			0.22	0.22	0.21	0.21	0.16	0.18	0.21			
7	HCO3 (mg/L)			184	176	191	222	203	175	162			
8	K (mg/L)			2.6	2.8	1.2	1.3	1.2	1.3	1.4			
9	Mg (mg/L)			11.7	17.3	16.8	21.6	18.5	13.1	9.2			
10	Na (mg/L)			14.9	15.1	9.6	10.6	12.7	14.2	14.0			
11	NO2+NO3 (mg N/L)			2.23	1.27	2.00	1.13	0.45	0.38	0.40			
12	NO2-N (mgN/L)			0.11	0.10	0.01	0.02	0.01	0.01	0.01			
13	NO3-N (mgN/L)			2.12	1.17	1.99	1.12	0.44	0.36	0.39			
14	o-PO4-P (mg P/L)			0.245	0.263	0.206	0.189	0.107	0.074	0.104			
15	SiO2 (mg/L)			28.9	27.3	27.4	21.9	19.4	17.7	16.7			
16	SO4 (mg/L)			33.8	30.6	28.1	14.6	13.9	9.2	8.5			
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)			0.6	0.8	0.7	1.0	1.5	1.0	1.2			
2	COD (mg/L)			41.0	32.0	49.0	42.0	57.0	56.0	38.0			
3	DO (mg/L)			5.8	6.0		7.1	6.8	7.0	5.1			
4	DO_SAT% (%)			75	78		84	81	74	56			
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)			78	78	82	89	82	73	83			
2	HAR_Total (mgCaCO3/L)			127	150	152	180	159	127	122			
3	Na% (%)			20	18	12	11	15	19	20			
4	RSC (-)			0.5	0.0	0.1	0.1	0.2	0.3	0.2			
5	SAR (-)			0.6	0.5	0.3	0.3	0.4	0.5	0.6			

Water Quality Summary for the period : 2016-2017

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)	7	439	275	350
3	pH_GEN (pH units)	7	8.2	7.4	7.9
4	TDS (mg/L)	7	270	178	225
5	Temp (deg C)	7	29.5	18.0	24.9
6	Turb (NTU)	7	116.0	0.0	39.1
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	7	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	7	182	133	154
3	Ca (mg/L)	7	36	29	32
4	Cl (mg/L)	7	17.0	4.0	11.4
5	CO3 (mg/L)	7	0.0	0.0	0
6	F (mg/L)	7	0.22	0.16	0.2
7	HCO3 (mg/L)	7	222	162	188
8	K (mg/L)	7	2.8	1.2	1.7
9	Mg (mg/L)	7	21.6	9.2	15.4
10	Na (mg/L)	7	15.1	9.6	13
11	NO2+NO3 (mg N/L)	7	2.23	0.38	1.12
12	NO2-N (mgN/L)	7	0.11	0.01	0.04
13	NO3-N (mgN/L)	7	2.12	0.36	1.09
14	o-PO4-P (mg P/L)	7	0.263	0.074	0.17
15	SiO2 (mg/L)	7	28.9	16.7	22.8
16	SO4 (mg/L)	7	33.8	8.5	19.8
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	7	1.5	0.6	1
2	COD (mg/L)	7	57.0	32.0	45
3	DO (mg/L)	6	7.1	5.1	6.3
4	DO_SAT% (%)	6	84	56	75
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	7	89	73	81
2	HAR_Total (mgCaCO3/L)	7	180	122	145
3	Na% (%)	7	20	11	16
4	RSC (-)	7	0.5	0.0	0.2
5	SAR (-)	7	0.6	0.3	0.5

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	30.09	63.87		11.13		0.996	3.907		7.067		0.000	0.015			
2	EC_GEN (µmho/cm)	422	399	312	303	372	436	533	343	349	333	493		305		
3	pH_GEN (pH units)	8.0	8.4	8.0	8.3	7.8	8.3	8.4	8.3	8.3	7.9	8.3		8.3		
4	TDS (mg/L)	262	253	199	193	237	284	336	226	210	216	315		195		
5	Temp (deg C)	29.0	27.9	27.7	26.8	29.2	21.1	25.0	22.8	26.5	21.6	22.3		24.3		
6	Turb (NTU)	26.7	39.3	123.7	16.0	91.3	0.0	2.6	0.0	0.0	0.0	0.0		0.0		
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	0.0	7.6	1.7	5.4	0.0	3.1	10.2	4.2	4.6	0.0	2.6		2.5		
2	ALK-TOT (mgCaCO3/L)	186	186	150	170	151	198	232	177	190	156	199		169		
3	Ca (mg/L)	35	28	26	32	32	31	37	32	28	33	27		29		
4	Cl (mg/L)	19.2	18.6	13.2	14.1	9.3	26.9	12.3	23.0	25.0	13.0	19.2		19.5		
5	CO3 (mg/L)	0.0	9.2	2.1	6.5	0.0	3.7	12.3	5.1	5.6	0.0	3.1		3.0		
6	F (mg/L)	0.16	0.27	0.43	0.46	0.22	0.35	0.06	0.37	0.60	0.19	0.20		0.74		
7	HCO3 (mg/L)	227	208	179	194	184	234	258	206	221	191	237		200		
8	K (mg/L)	2.1	3.4	3.1	2.2	2.2	1.8	1.4	1.4	1.8	1.3	1.9		1.6		
9	Mg (mg/L)	20.7	26.8	20.2	20.9	15.2	25.0	33.4	24.0	24.1	15.6	25.5		17.9		
10	Na (mg/L)	26.3	19.3	15.2	18.6	13.2	33.5	32.0	25.4	28.5	12.9	28.5		19.9		
11	NO2+NO3 (mg N/L)	6.16	6.47	3.07	2.52	1.83	3.01	6.10	5.88	3.63	0.59	4.86		1.58		
12	NO2-N (mgN/L)	0.21	0.03	0.04	0.02	0.07	0.04	0.03	0.03	0.02	0.01	0.02		0.09		
13	NO3-N (mgN/L)	5.95	6.44	3.03	2.49	1.76	2.98	6.08	5.85	3.61	0.58	4.84		1.48		
14	o-PO4-P (mg P/L)	0.021	0.173	0.438	0.148	0.238	0.063	0.053	0.125	0.192	0.118	0.058		0.087		
15	SiO2 (mg/L)	32.5	28.5	21.1	24.8	27.9	38.9	47.3	31.9	27.1	18.9	35.4		25.8		
16	SO4 (mg/L)	19.8	27.6	27.8	23.5	30.8	16.3	30.2	17.5	13.2	11.6	13.8		27.0		
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.8	0.9	0.9	1.0	0.7	0.9	1.5	0.9	1.5	1.2	0.8		1.9		
2	COD (mg/L)	21.3	35.0	28.3	32.3	40.7	31.0	35.0	34.7	35.0	48.3	25.5		34.0		
3	DO (mg/L)	5.7	6.3	5.9	5.9	5.9	5.3	6.7	7.0	6.0	6.5	5.8		5.4		
4	DO_SAT% (%)	74	79	75	74	77	59	80	81	74	74	66		62		
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	89	70	66	81	79	76	93	79	69	82	68		74		
2	HAR_Total (mgCaCO3/L)	175	182	150	168	143	181	233	179	169	147	174		148		
3	Na% (%)	23	19	17	19	17	29	23	23	27	16	26		22		
4	RSC (-)	0.3	0.2	0.1	0.1	0.2	0.4	0.1	0.1	0.5	0.2	0.5		0.4		
5	SAR (-)	0.9	0.6	0.5	0.6	0.5	1.1	0.9	0.8	1.0	0.5	0.9		0.7		

3.8 Narmada at Handia

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	140.0	128.0	1600	3417.9	930.0	690.5	254.0	180.0	220.0	135.0	122.0	90.0
2	Colour_Cod (-)	Clear	Clear	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	209	240	230	273	223	293	319	228	274	273	253	219
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)	8.8	7.7	7.7	7.2	8.0	8.1	7.8	7.9	8.0	7.8	7.7	7.9
6	TDS (mg/L)	137	156	150	167	145	188	204	148	178	178	164	142
7	Temp (deg C)	29.0	27.0	27.8	23.0	21.0	19.0	18.0	19.9	18.5	22.0	29.0	30.0
8	Turb (NTU)	0.0	50.0	127.0	122.0	130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	11.7	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)	24	116	116	102	113	143	172	148	130	146	128	120
3	Ca (mg/L)	20	21	24	21	25	30	38	32	33	32	33	30
4	Cl (mg/L)	4.0	3.6	3.9	6.0	9.0	7.0	8.0	7.0	7.0	7.0	7.0	6.0
5	CO3 (mg/L)	14.2	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)	0.12	0.41	0.24	0.25	0.25	0.19	0.14	0.15	0.20	0.31	0.32	0.22
7	HCO3 (mg/L)	1	142	142	125	138	175	210	181	159	178	156	147
8	K (mg/L)	1.1	1.3	2.3	2.8	1.3	1.4	1.2	1.2	1.4	1.2	1.4	0.9
9	Mg (mg/L)	9.7	11.7	9.7	10.7	9.0	12.2	14.8	11.7	8.8	11.9	8.5	8.8
10	Na (mg/L)	6.7	9.2	9.2	10.2	7.2	8.6	9.5	14.0	14.2	13.9	9.3	9.4
11	NO2+NO3 (mg N/L)	0.18	2.16	1.35	1.33	0.98	0.58	0.44	0.39	0.43	0.44	0.40	0.13
12	NO2-N (mgN/L)	0.01	0.43	0.09	0.09	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02
13	NO3-N (mgN/L)	0.18	1.72	1.26	1.24	0.97	0.57	0.43	0.39	0.42	0.42	0.39	0.11
14	o-PO4-P (mg P/L)	0.038	0.292	0.397	0.419	0.345	0.103	0.095	0.069	0.084	0.078	0.065	0.071
15	SiO2 (mg/L)	20.0	24.0	26.2	28.3	28.9	20.3	18.6	17.1	17.9	20.9	21.1	15.7
16	SO4 (mg/L)	14.0	18.5	22.7	22.0	20.0	9.8	10.1	7.9	7.3	7.1	6.5	5.8
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	0.8	0.8	0.4	0.7	0.7	1.1	1.4	1.1	0.9	1.2	1.6	0.9
2	COD (mg/L)	33.0	30.0	32.0	39.0	56.0	42.0	40.0	53.0	31.0	48.0	44.0	19.0
3	DO (mg/L)	6.0	5.4	6.4	5.7	5.9	7.6	7.2	7.2	6.1	5.2	5.0	
4	DO_SAT% (%)	78	68	80	66	66	82	76	78	64	59	65	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	49	52	60	52	62	75	95	79	83	80	81	74
2	HAR_Total (mgCaCO3/L)	90	101	101	96	100	126	156	128	120	130	117	110
3	Na% (%)	14	16	16	18	13	13	12	19	20	19	15	16
4	RSC (-)	0.0	0.3	0.3	0.1	0.3	0.4	0.3	0.4	0.2	0.3	0.2	0.2
5	SAR (-)	0.3	0.4	0.4	0.5	0.3	0.3	0.3	0.5	0.6	0.5	0.4	0.4

Water Quality Summary for the period : 2016-2017

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	319	209	253
3	pH_GEN (pH units)	12	8.8	7.2	7.9
4	TDS (mg/L)	12	204	137	163
5	Temp (deg C)	12	30.0	18.0	23.7
6	Turb (NTU)	12	130.0	0.0	35.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	11.7	0.0	1
2	ALK-TOT (mgCaCO3/L)	12	172	24	122
3	Ca (mg/L)	12	38	20	28
4	Cl (mg/L)	12	9.0	3.6	6.3
5	CO3 (mg/L)	12	14.2	0.0	1.2
6	F (mg/L)	12	0.41	0.12	0.23
7	HCO3 (mg/L)	12	210	1	146
8	K (mg/L)	12	2.8	0.9	1.4
9	Mg (mg/L)	12	14.8	8.5	10.6
10	Na (mg/L)	12	14.2	6.7	10.1
11	NO2+NO3 (mg N/L)	12	2.16	0.13	0.73
12	NO2-N (mgN/L)	12	0.43	0.01	0.06
13	NO3-N (mgN/L)	12	1.72	0.11	0.67
14	o-PO4-P (mg P/L)	12	0.419	0.038	0.171
15	SiO2 (mg/L)	12	28.9	15.7	21.6
16	SO4 (mg/L)	12	22.7	5.8	12.6
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.6	0.4	1
2	COD (mg/L)	12	56.0	19.0	38.9
3	DO (mg/L)	11	7.6	5.0	6.2
4	DO_SAT% (%)	11	82	59	71
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	95	49	70
2	HAR_Total (mgCaCO3/L)	12	156	90	114
3	Na% (%)	12	20	12	16
4	RSC (-)	12	0.4	0.0	0.3
5	SAR (-)	12	0.6	0.3	0.4

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	1151	4110	373.6	319.3		227.6	291.2	272.0	152.8		129.0	260.6	252.9	117.9	
2	EC_GEN (µmho/cm)	267	219	231	231	235	281	308	236	268	279	293	214	197	265	248
3	pH_GEN (pH units)	8.2	8.1	8.1	8.3	7.9	8.2	8.3	8.2	8.4	7.9	8.3	8.3	8.3	8.3	7.8
4	TDS (mg/L)	167	139	148	146	151	184	182	155	172	180	185	134	128	172	161
5	Temp (deg C)	28.2	26.7	27.9	29.4	25.6	19.9	24.5	21.4	23.7	18.8	25.7	22.2	26.0	26.2	27.0
6	Turb (NTU)	37.0	256.8	83.2	31.4	85.8	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	6.0	1.5	4.5	2.3	2.3	1.9	5.3	1.3	5.8	0.0	6.0	6.6	4.2	1.6	0.0
2	ALK-TOT (mgCaCO3/L)	131	113	140	143	95	164	180	147	161	149	161	145	129	129	131
3	Ca (mg/L)	26	23	27	29	22	32	35	32	33	33	27	27	25	26	31
4	Cl (mg/L)	7.9	5.9	7.2	7.3	5.3	8.4	9.2	7.4	7.8	7.3	8.2	12.4	7.9	7.7	6.7
5	CO3 (mg/L)	7.2	1.9	5.4	2.8	2.8	2.3	6.4	1.5	7.0	0.0	7.2	7.9	5.0	1.9	0.0
6	F (mg/L)	0.11	0.26	0.28	0.35	0.25	0.32	0.19	0.40	0.22	0.17	0.27	0.16	0.15	0.31	0.28
7	HCO3 (mg/L)	145	134	160	169	110	196	207	177	182	181	182	161	147	154	160
8	K (mg/L)	2.2	3.9	2.0	2.8	1.7	1.5	1.5	1.5	1.7	1.3	1.7	1.5	1.4	1.5	1.2
9	Mg (mg/L)	10.6	10.9	13.1	11.8	10.2	12.2	15.6	12.5	13.6	11.8	13.2	13.2	11.6	11.3	9.7
10	Na (mg/L)	12.0	8.0	12.7	13.5	8.5	15.0	18.7	13.4	16.0	11.6	13.6	15.1	8.9	8.9	10.8
11	NO2+NO3 (mg N/L)	2.62	0.86	1.54	1.18	1.20	0.73	1.51	2.01	1.42	0.46	0.36	0.41	0.62	1.14	0.32
12	NO2-N (mgN/L)	0.05	0.02	0.02	0.01	0.13	0.01	0.06	0.04	0.02	0.01	0.01	0.02	0.05	0.01	0.01
13	NO3-N (mgN/L)	2.57	0.84	1.53	1.17	1.07	0.72	1.45	1.97	1.40	0.45	0.35	0.39	0.57	1.14	0.31
14	o-PO4-P (mg P/L)	0.030	0.185	0.353	0.339	0.298	0.063	0.051	0.206	0.148	0.088	0.626	0.035	0.120	0.436	0.071
15	SiO2 (mg/L)	25.5	23.4	21.6	18.3	25.5	22.6	24.6	17.9	16.3	18.5	25.1	19.0	17.3	20.5	19.2
16	SO4 (mg/L)	11.6	9.5	13.4	14.7	19.4	5.2	9.5	13.8	6.2	8.8	12.6	4.4	26.9	11.9	6.5
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.6	0.7	1.2	0.7	0.7	0.8	1.3	1.0	0.7	1.1	0.7	1.1	0.6	0.9	1.2
2	COD (mg/L)	22.2	26.2	33.2	36.2	38.0	25.3	28.0	35.0	38.5	41.5	23.7	26.3	34.7	35.0	37.0
3	DO (mg/L)	5.8	6.2	6.1	6.3	5.9	6.6	7.5	6.9	7.6	7.0	5.8	6.8	6.8	6.3	5.1
4	DO_SAT% (%)	74	78	77	82	72	72	89	77	89	75	71	77	84	78	62
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	64	58	68	73	55	79	88	80	82	83	67	68	63	64	78
2	HAR_Total (mgCaCO3/L)	108	103	122	122	97	130	153	132	138	133	122	123	112	112	119
3	Na% (%)	19	15	18	19	16	20	21	18	20	16	19	21	15	15	16
4	RSC (-)	0.5	0.2	0.4	0.4	0.2	0.7	0.6	0.3	0.5	0.3	0.8	0.5	0.4	0.4	0.3
5	SAR (-)	0.5	0.4	0.5	0.5	0.4	0.6	0.7	0.5	0.6	0.4	0.5	0.6	0.4	0.4	0.4

3.9 Ganjal at Chhidgaon

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017
		A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL											
1	Q (cumec)	0	1.29	133.65	167.08	0	0	0	0	0	0	0
2	Colour_Cod (-)	Clear	Clear	Light Brown	Dark Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	456	459	258	121	304	389	466	461	437	484	486
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
5	pH_GEN (pH units)	8.4	7.5	7.6	6.9	8.3	7.6	7.3	7.8	7.6	7.4	7.6
6	TDS (mg/L)	302	295	166	74	197	257	394	300	284	314	314
7	Temp (deg C)	29.0	31.0	29.5	29.0	31.0	22.5	20.5	19.5	20.0	23.0	26.5
8	Turb (NTU)	0.0	40.0	118.0	378.0	112.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL											
1	Alk-Phen (mgCaCO3/L)	7.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	231	233	89	49	173	214	265	262	230	241	257
3	Ca (mg/L)	25	32	26	13	36	43	46	44	36	33	33
4	Cl (mg/L)	18.0	4.6	4.8	3.0	8.0	10.0	12.0	11.0	11.0	12.0	13.0
5	CO3 (mg/L)	8.5	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.11	0.48	0.30	0.30	0.29	0.21	0.18	0.21	0.23	0.41	0.43
7	HCO3 (mg/L)	265	284	108	60	200	261	323	320	280	294	313
8	K (mg/L)	1.8	1.6	2.0	2.0	1.1	1.4	1.0	0.9	1.3	1.3	1.5
9	Mg (mg/L)	21.6	19.4	10.2	4.4	14.3	20.2	22.4	21.4	21.1	23.6	26.0
10	Na (mg/L)	37.8	38.7	21.2	18.3	10.9	11.9	18.9	33.6	36.1	36.1	36.3
11	NO2+NO3 (mg N/L)	0.17	3.86	1.95	1.74	1.03	0.64	0.53	0.54	0.61	0.71	0.69
12	NO2-N (mgN/L)	0.01	0.29	0.08	0.09	0.03	0.02	0.02	0.02	0.02	0.02	0.02
13	NO3-N (mgN/L)	0.17	3.57	1.88	1.65	1.00	0.62	0.51	0.52	0.59	0.69	0.67
14	o-PO4-P (mg P/L)	0.055	0.215	0.299	0.309	0.240	0.125	0.123	0.098	0.111	0.149	0.188
15	SiO2 (mg/L)	21.5	34.7	31.9	29.7	25.7	19.3	19.6	18.5	16.1	18.9	19.6
16	SO4 (mg/L)	11.8	33.2	22.3	20.8	18.4	10.2	10.7	9.9	8.8	10.0	10.2
	BIOLOGICAL/BACTERIOLOGICAL											
1	BOD3-27 (mg/L)	2.2	0.9	0.6	0.9	0.8	1.0	1.3	1.3	1.1	1.1	0.9
2	COD (mg/L)	33.0	26.0	37.0	22.0	27.0	34.0	35.0	30.0	21.0	28.0	31.0
3	DO (mg/L)	5.4	3.9	5.8	5.9	6.8	7.3	6.4	6.4	5.6	4.1	3.8
4	DO_SAT% (%)	70	52	75	77	92	84	70	69	62	48	47
	TRACE & TOXIC											
	CHEMICAL INDICES											
1	HAR_Ca (mgCaCO3/L)	63	80	66	33	90	108	114	111	91	82	82
2	HAR_Total (mgCaCO3/L)	153	161	109	51	150	192	208	200	179	180	190
3	Na% (%)	35	34	29	43	14	12	17	27	30	30	29
4	RSC (-)	1.6	1.5	0.0	0.0	0.5	0.5	1.2	1.3	1.0	1.3	1.4
5	SAR (-)	1.3	1.3	0.9	1.1	0.4	0.4	0.6	1.0	1.2	1.2	1.2

Water Quality Summary for the period : 2016-2017

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	486	121	398
3	pH_GEN (pH units)	12	8.4	6.9	7.6
4	TDS (mg/L)	12	394	74	266
5	Temp (deg C)	12	31.0	19.5	25.8
6	Turb (NTU)	12	378.0	0.0	54
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	7.0	0.0	1
2	ALK-TOT (mgCaCO3/L)	12	265	49	207
3	Ca (mg/L)	12	46	13	33
4	Cl (mg/L)	12	18.0	3.0	10.1
5	CO3 (mg/L)	12	8.5	0.0	1.2
6	F (mg/L)	12	0.48	0.11	0.3
7	HCO3 (mg/L)	12	323	60	251
8	K (mg/L)	12	2.0	0.9	1.4
9	Mg (mg/L)	12	26.0	4.4	18.7
10	Na (mg/L)	12	38.7	10.9	27.8
11	NO2+NO3 (mg N/L)	12	3.86	0.17	1.05
12	NO2-N (mgN/L)	12	0.29	0.01	0.05
13	NO3-N (mgN/L)	12	3.57	0.14	1
14	o-PO4-P (mg P/L)	12	0.309	0.055	0.172
15	SiO2 (mg/L)	12	34.7	16.1	23.3
16	SO4 (mg/L)	12	33.2	8.8	14.7
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	2.2	0.6	1.1
2	COD (mg/L)	12	47.0	21.0	30.9
3	DO (mg/L)	11	7.3	3.8	5.6
4	DO_SAT% (%)	11	92	47	68
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	114	33	82
2	HAR_Total (mgCaCO3/L)	12	208	51	160
3	Na% (%)	12	43	12	28
4	RSC (-)	12	1.9	0.0	1
5	SAR (-)	12	1.3	0.4	1

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	91.77	1349		29.90		3.783	5.196		7.825		1.103	2.097		3.466	
2	EC_GEN (µmho/cm)	377	306	299	278	320	471	446	365	404	438	525	398	482	532	476
3	pH_GEN (pH units)	8.1	7.9	8.0	8.0	7.7	8.1	8.2	8.1	8.1	7.6	8.4	8.2	8.2	8.1	7.6
4	TDS (mg/L)	232	194	192	172	207	304	276	242	258	309	331	253	307	346	308
5	Temp (deg C)	27.8	26.5	29.2	28.6	29.9	17.0	23.6	20.3	22.0	20.6	22.5	25.0	22.8	26.0	26.0
6	Turb (NTU)	36.0	178.8	100.4	35.2	129.6	0.0	2.0	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	2.6	0.0	2.3	0.0	0.0	1.3	1.2	0.0	9.4	1.5	3.3	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	187	160	192	173	155	270	260	244	249	243	265	266	315	265	248
3	Ca (mg/L)	27	27	28	30	26	40	40	40	39	42	29	34	43	37	31
4	Cl (mg/L)	9.1	8.8	9.9	8.5	7.7	12.9	9.4	10.3	10.3	11.0	14.9	14.7	17.9	13.0	13.0
5	CO3 (mg/L)	1.8	0.0	3.1	0.0	2.8	0.0	0.0	1.5	1.4	0.0	11.3	1.8	4.0	0.0	0.0
6	F (mg/L)	0.26	0.25	0.24	0.35	0.29	0.44	0.21	0.37	0.28	0.21	0.33	0.19	0.38	0.52	0.44
7	HCO3 (mg/L)	225	195	228	212	183	330	317	295	301	296	301	321	376	323	302
8	K (mg/L)	1.5	3.0	2.1	2.1	1.7	1.4	1.0	1.1	1.3	1.1	1.7	1.3	0.8	1.5	1.3
9	Mg (mg/L)	14.9	14.8	16.6	15.8	14.0	23.8	23.6	21.7	22.2	21.3	22.0	24.9	30.1	22.9	22.9
10	Na (mg/L)	26.2	17.9	26.7	18.5	25.4	30.7	27.5	26.3	30.8	25.1	39.9	34.1	47.8	40.5	35.4
11	NO2+NO3 (mg N/L)	0.55	1.21	1.21	0.65	1.75	1.37	1.20	1.46	1.22	0.58	0.69	1.10	1.55	0.91	0.53
12	NO2-N (mgN/L)	0.04	0.03	0.02	0.01	0.10	0.01	0.05	0.04	0.03	0.02	0.01	0.01	0.09	0.02	0.03
13	NO3-N (mgN/L)	0.51	1.18	1.19	0.64	1.65	1.36	1.15	1.42	1.19	0.56	0.67	1.09	1.47	0.90	0.50
14	o-PO4-P (mg P/L)	0.040	0.173	0.338	0.200	0.224	0.038	0.095	0.219	0.141	0.114	0.203	0.059	0.137	0.173	0.162
15	SiO2 (mg/L)	29.2	22.7	29.8	23.1	28.7	35.5	39.9	27.0	27.6	18.4	32.1	28.2	31.5	24.9	21.0
16	SO4 (mg/L)	12.0	13.6	38.6	15.3	21.3	11.7	10.4	15.4	13.9	9.9	13.4	6.5	35.7	15.8	9.9
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.2	1.0	1.1	1.2	1.1	0.9	1.3	0.7	1.0	1.2	1.2	0.9	0.8	0.8	1.2
2	COD (mg/L)	24.8	26.4	35.6	35.0	29.0	29.8	24.8	33.0	23.5	30.0	22.7	28.7	27.7	31.3	35.3
3	DO (mg/L)	5.3	5.9	6.0	5.2	5.6	6.8	7.6	6.8	7.1	6.4	6.6	6.9	6.5	6.6	3.9
4	DO_SAT% (%)	67	73	79	66	73	70	90	75	81	71	76	83	75	80	47
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	68	68	71	74	66	99	100	100	97	106	73	84	107	91	78
2	HAR_Total (mgCaCO3/L)	130	129	140	140	125	198	198	191	190	195	165	188	232	187	173
3	Na% (%)	27	20	25	22	31	25	23	23	26	21	34	28	31	32	31
4	RSC (-)	1.2	0.6	1.1	0.7	0.7	1.5	1.3	1.1	1.2	1.0	2.0	1.6	1.7	1.6	1.5
5	SAR (-)	1.0	0.6	0.9	0.7	1.0	1.0	0.9	0.8	1.0	0.8	1.4	1.1	1.4	1.3	1.2

3.10 Narmada at Hoshangabad

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	182.2	156.9	1450.0	2291.0	990.0	382.8	233.4	268.0	276.5	153.5	227.0	124.8
2	Colour_Cod (-)	Clear	Clear	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	210	238	145	174	104	288	316	282	257	266	234	228
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)	8.2	7.5	7.5	7.1	7.9	7.8	7.9	8.0	7.9	8.0	7.8	7.8
6	TDS (mg/L)	138	153	101	104	68	187	202	184	167	173	151	147
7	Temp (deg C)	20.0	15.0	20.0	20.0	20.0	17.5	16.0	17.0	17.0	18.0	21.0	21.0
8	Turb (NTU)	0.0	30.0	132.0	131.0	120.0	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)	125	121	86	65	80	148	170	140	130	141	120	116
3	Ca (mg/L)	22	24	16	16	21	33	36	31	30	33	33	31
4	Cl (mg/L)	6.0	5.8	5.2	6.0	6.0	9.0	8.0	7.0	6.0	6.0	7.0	6.0
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	0.39	0.32	0.31	0.29	0.22	0.16	0.20	0.21	0.21	0.23	0.02
7	HCO3 (mg/L)	152	148	105	79	98	180	207	171	159	172	147	141
8	K (mg/L)	1.0	1.2	1.8	2.8	1.3	1.5	1.2	1.1	1.2	1.2	1.2	1.0
9	Mg (mg/L)	9.7	11.2	5.8	4.6	6.3	12.6	15.1	10.7	9.7	10.2	6.8	9.0
10	Na (mg/L)	5.6	7.2	7.9	8.1	4.3	5.7	9.9	11.4	12.3	12.0	7.7	9.4
11	NO2+NO3 (mg N/L)	0.05	1.92	1.54	1.76	0.86	0.59	0.33	0.22	0.34	0.30	0.33	0.11
12	NO2-N (mgN/L)	0.01	0.20	0.08	0.07	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
13	NO3-N (mgN/L)	0.04	1.72	1.46	1.69	0.85	0.58	0.32	0.22	0.33	0.29	0.32	0.10
14	o-PO4-P (mg P/L)	0.048	0.236	0.268	0.305	0.250	0.113	0.109	0.066	0.100	0.096	0.098	0.073
15	SiO2 (mg/L)	13.1	25.9	15.4	15.1	16.4	16.3	15.6	12.9	13.3	15.3	15.2	17.1
16	SO4 (mg/L)	3.8	17.3	19.4	17.1	15.2	10.1	9.9	7.7	7.0	5.3	5.4	6.1
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.1	1.6	0.4	0.5	0.8	1.7	1.4	0.5	0.7	0.8	1.1	0.6
2	COD (mg/L)	24.0	37.0	34.0	40.0	51.0	35.0	57.0	56.0	39.0	62.0	33.0	32.0
3	DO (mg/L)	5.5	6.0	5.4	6.3	6.3	7.4	7.0	7.3	5.6	5.2	5.1	
4	DO_SAT% (%)	60	60	59	69	69	77	71	76	58	55	57	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	56	60	40	40	52	82	91	77	76	84	81	77
2	HAR_Total (mgCaCO3/L)	96	107	64	59	78	135	154	122	116	126	110	115
3	Na% (%)	11	13	21	22	11	8	12	17	19	17	13	15
4	RSC (-)	0.6	0.3	0.4	0.1	0.0	0.3	0.3	0.4	0.3	0.3	0.2	0.0
5	SAR (-)	0.2	0.3	0.4	0.5	0.2	0.2	0.3	0.5	0.5	0.5	0.3	0.4

Water Quality Summary for the period : 2016-2017

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	316	104	229
3	pH_GEN (pH units)	12	8.2	7.1	7.8
4	TDS (mg/L)	12	202	68	148
5	Temp (deg C)	12	21.0	15.0	18.5
6	Turb (NTU)	12	132.0	0.0	34.4
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	170	65	120
3	Ca (mg/L)	12	36	16	27
4	Cl (mg/L)	12	9.0	5.2	6.5
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.39	0.02	0.22
7	HCO3 (mg/L)	12	207	79	147
8	K (mg/L)	12	2.8	1.0	1.4
9	Mg (mg/L)	12	15.1	4.6	9.3
10	Na (mg/L)	12	12.3	4.3	8.4
11	NO2+NO3 (mg N/L)	12	1.92	0.05	0.69
12	NO2-N (mgN/L)	12	0.20	0.01	0.04
13	NO3-N (mgN/L)	12	1.72	0.04	0.66
14	o-PO4-P (mg P/L)	12	0.305	0.048	0.147
15	SiO2 (mg/L)	12	25.9	12.9	16
16	SO4 (mg/L)	12	19.4	3.8	10.4
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.7	0.4	0.9
2	COD (mg/L)	12	62.0	24.0	41.7
3	DO (mg/L)	11	7.4	5.1	6.1
4	DO_SAT% (%)	11	77	55	65
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	91	40	68
2	HAR_Total (mgCaCO3/L)	12	154	59	107
3	Na% (%)	12	22	8	15
4	RSC (-)	12	0.6	0.0	0.3
5	SAR (-)	12	0.5	0.2	0.4

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	819.6	3509	294.6	487.2		204.7	245.4	215.7	146.0		120.6	264.5	198.5	157.1	
2	EC_GEN (µmho/cm)	316	204	221	236	174	249	287	208	260	286	283	208	194	306	243
3	pH_GEN (pH units)	8.2	8.0	8.0	8.1	7.6	8.2	8.2	8.1	8.2	7.9	8.2	8.1	8.2	7.7	7.9
4	TDS (mg/L)	196	128	140	149	113	163	175	138	166	185	177	133	124	199	157
5	Temp (deg C)	26.4	27.0	26.3	23.3	19.0	18.4	21.3	17.3	14.9	16.9	23.0	24.0	23.3	16.3	20.0
6	Turb (NTU)	46.0	177.8	122.8	23.0	82.6	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	3.5	0.0	3.0	0.0	0.0	1.3	2.6	0.0	2.9	0.0	1.7	0.0	1.7	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	156	104	143	145	95	148	167	135	164	147	154	142	128	150	126
3	Ca (mg/L)	28	23	28	27	20	29	32	30	35	33	28	29	27	30	32
4	Cl (mg/L)	9.0	6.5	6.9	8.1	5.8	7.2	8.4	5.9	8.0	7.5	7.4	9.4	6.9	9.3	6.3
5	CO3 (mg/L)	4.2	0.0	3.7	0.0	0.0	1.5	3.1	0.0	3.5	0.0	2.1	0.0	2.0	0.0	0.0
6	F (mg/L)	0.34	0.27	0.31	0.31	0.29	0.30	0.16	0.26	0.22	0.20	0.22	0.14	0.29	0.27	0.15
7	HCO3 (mg/L)	182	127	167	177	116	177	198	165	193	179	184	173	152	183	153
8	K (mg/L)	2.1	4.1	2.8	2.5	1.6	1.4	1.3	1.3	1.6	1.3	1.6	1.4	1.2	1.3	1.1
9	Mg (mg/L)	12.9	9.4	12.8	14.7	7.5	12.0	16.2	11.3	12.2	12.0	13.1	11.9	12.3	11.8	8.7
10	Na (mg/L)	15.5	7.2	10.9	13.8	6.6	12.4	12.8	9.3	14.9	9.8	10.1	10.5	7.8	15.3	9.7
11	NO2+NO3 (mg N/L)	0.81	1.02	1.38	1.25	1.22	89.03	0.66	0.67	0.44	0.37	0.37	0.28	0.41	0.22	0.25
12	NO2-N (mgN/L)	0.02	0.03	0.02	0.02	0.07	0.01	0.07	0.03	0.01	0.01	0.02	0.01	0.06	0.01	0.01
13	NO3-N (mgN/L)	0.79	1.00	1.37	1.23	1.15	89.02	0.59	0.65	0.42	0.36	0.35	0.28	0.36	0.21	0.24
14	o-PO4-P (mg P/L)	0.043	0.276	0.478	0.226	0.221	0.050	0.033	0.198	0.123	0.097	0.196	0.046	0.055	0.099	0.089
15	SiO2 (mg/L)	23.4	17.4	18.3	16.2	17.2	21.6	25.8	18.7	14.5	14.5	22.1	20.4	18.9	13.0	15.8
16	SO4 (mg/L)	15.9	8.9	12.0	11.6	14.6	4.4	4.7	9.0	4.0	8.7	3.8	1.6	17.0	4.1	5.6
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.7	0.7	0.9	0.8	0.9	0.7	0.8	0.8	0.6	1.1	0.7	0.7	0.7	1.1	0.8
2	COD (mg/L)	25.0	33.4	28.6	25.2	37.2	26.8	29.5	33.8	32.5	46.8	30.3	24.0	36.0	28.7	42.3
3	DO (mg/L)	6.1	6.1	5.9	5.6	5.9	7.0	7.5	7.1	6.6	6.8	6.0	6.8	6.7	5.5	5.1
4	DO_SAT% (%)	75	77	73	66	64	74	84	73	65	70	69	80	78	56	56
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	70	57	69	67	50	72	80	76	88	81	69	73	69	74	81
2	HAR_Total (mgCaCO3/L)	124	96	122	128	81	122	148	123	139	132	124	123	120	123	117
3	Na% (%)	21	14	16	18	15	18	16	14	19	14	15	16	12	20	15
4	RSC (-)	0.7	0.2	0.4	0.3	0.3	0.5	0.4	0.3	0.5	0.3	0.6	0.4	0.2	0.6	0.2
5	SAR (-)	0.6	0.3	0.4	0.5	0.3	0.5	0.5	0.4	0.6	0.4	0.4	0.4	0.3	0.6	0.4

3.11 Narmada at Sandia

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	124.2	124.9	1241.8	1894.3	1516.7	257.3	145.1	157.0	163.9	118.4	125.4	90.8
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Dark Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	201	204	228	173	159	248	253	286	243	262	228	204
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)	8.3	7.3	7.5	7.0	7.9	7.8	7.9	8.0	7.6	7.6	7.8	7.7
6	TDS (mg/L)	131	131	153	104	104	159	165	187	157	171	148	131
7	Temp (deg C)	29.0	28.5	26.0	26.0	27.0	23.0	17.0	13.0	19.5	22.0	28.0	27.5
8	Turb (NTU)	0.0	132.0	141.0	366.0	90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	4.7	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)	106	102	95	72	85	123	135	143	117	136	116	111
3	Ca (mg/L)	23	25	27	21	22	29	31	38	30	35	30	33
4	Cl (mg/L)	7.0	4.7	4.6	2.0	6.0	6.0	8.0	6.0	6.0	8.0	5.0	4.0
5	CO3 (mg/L)	5.7	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)	0.29	0.37	0.37	0.38	0.35	0.25	0.17	0.17	0.19	0.17	0.17	0.24
7	HCO3 (mg/L)	118	125	116	88	104	150	165	175	143	166	141	135
8	K (mg/L)	1.0	1.2	1.7	2.4	1.2	1.6	1.0	1.0	1.1	1.2	1.1	0.9
9	Mg (mg/L)	9.5	7.3	7.3	4.4	8.3	11.2	11.2	6.8	9.5	8.5	8.8	5.8
10	Na (mg/L)	4.5	4.8	5.0	6.3	4.1	5.2	5.7	9.2	8.7	9.6	6.5	7.2
11	NO2+NO3 (mg N/L)	0.05	1.97	2.74	2.75	1.73	0.64	0.30	0.27	0.30	0.28	0.28	0.11
12	NO2-N (mgN/L)	0.01	0.34	0.07	0.07	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02
13	NO3-N (mgN/L)	0.04	1.63	2.67	2.69	1.72	0.63	0.29	0.26	0.29	0.27	0.27	0.10
14	o-PO4-P (mg P/L)	0.058	0.275	0.259	0.315	0.242	0.094	0.085	0.056	0.071	0.080	0.096	0.048
15	SiO2 (mg/L)	14.2	26.6	22.6	22.2	21.8	16.4	16.0	13.8	13.0	15.0	15.5	16.2
16	SO4 (mg/L)	3.8	17.1	15.6	14.1	12.6	10.0	9.8	9.0	8.1	4.4	4.3	6.4
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.2	0.9	0.7	0.7	0.8	1.6	1.7	0.7	0.6	0.8	1.4	0.7
2	COD (mg/L)	295.0	35.0	27.0	47.0	70.0	46.0	61.0	61.0	30.0	47.0	36.0	32.0
3	DO (mg/L)	5.6	5.1	5.6	5.3	5.6	7.6	7.1	6.7	5.4	5.4	5.4	
4	DO_SAT% (%)	73	65	69	65	70	89	73	64	58	62	69	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	57	62	68	52	55	72	78	95	76	87	74	84
2	HAR_Total (mgCaCO3/L)	96	92	98	70	89	119	124	124	116	122	111	108
3	Na% (%)	9	10	10	16	9	9	9	14	14	14	11	13
4	RSC (-)	0.2	0.2	0.0	0.0	0.0	0.1	0.2	0.4	0.0	0.3	0.1	0.1
5	SAR (-)	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.4	0.4	0.4	0.3	0.3

Water Quality Summary for the period : 2016-2017

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	286	159	224
3	pH_GEN (pH units)	12	8.3	7.0	7.7
4	TDS (mg/L)	12	187	104	145
5	Temp (deg C)	12	29.0	13.0	23.9
6	Turb (NTU)	12	366.0	0.0	60.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	4.7	0.0	0.4
2	ALK-TOT (mgCaCO3/L)	12	143	72	112
3	Ca (mg/L)	12	38	21	29
4	Cl (mg/L)	12	8.0	2.0	5.6
5	CO3 (mg/L)	12	5.7	0.0	0.5
6	F (mg/L)	12	0.38	0.17	0.26
7	HCO3 (mg/L)	12	175	88	136
8	K (mg/L)	12	2.4	0.9	1.3
9	Mg (mg/L)	12	11.2	4.4	8.2
10	Na (mg/L)	12	9.6	4.1	6.4
11	NO2+NO3 (mg N/L)	12	2.75	0.05	0.95
12	NO2-N (mgN/L)	12	0.34	0.01	0.05
13	NO3-N (mgN/L)	12	2.69	0.04	0.9
14	o-PO4-P (mg P/L)	12	0.315	0.048	0.14
15	SiO2 (mg/L)	12	26.6	13.0	17.8
16	SO4 (mg/L)	12	17.1	3.8	9.6
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.7	0.6	1
2	COD (mg/L)	12	295.0	27.0	65.6
3	DO (mg/L)	11	7.6	5.1	5.9
4	DO_SAT% (%)	11	89	58	69
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	95	52	72
2	HAR_Total (mgCaCO3/L)	12	124	70	106
3	Na% (%)	12	16	9	11
4	RSC (-)	12	0.4	0.0	0.1
5	SAR (-)	12	0.4	0.2	0.3

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	621.9	1714	309.4	274.5		183.3	217.0	203.4	103.4		123.7	238.7	138.6	90.18	
2	EC_GEN (µmho/cm)	286	239	211	227	193	215	281	207	235	258	248	198	191	258	231
3	pH_GEN (pH units)	8.1	8.0	8.0	8.2	7.6	8.3	8.2	8.1	8.3	7.8	8.2	8.1	8.2	8.1	7.7
4	TDS (mg/L)	176	152	138	144	125	141	175	137	150	167	156	127	123	167	150
5	Temp (deg C)	28.0	26.6	29.0	28.6	27.3	20.8	20.5	21.0	20.8	18.1	25.3	25.8	25.0	23.8	25.8
6	Turb (NTU)	33.0	283.0	114.2	38.6	145.8	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	3.0	0.0	2.2	0.0	0.9	2.6	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	141	123	142	144	92	130	167	135	144	130	127	139	125	130	121
3	Ca (mg/L)	29	27	29	28	23	27	32	29	32	32	26	27	29	27	33
4	Cl (mg/L)	9.2	7.0	6.8	7.4	4.9	6.7	8.8	5.9	7.5	6.5	6.7	9.9	7.3	6.3	5.7
5	CO3 (mg/L)	3.6	0.0	2.6	0.0	1.1	3.1	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0
6	F (mg/L)	0.22	0.28	0.25	0.32	0.35	0.27	0.12	0.38	0.24	0.19	0.17	0.15	0.13	0.23	0.19
7	HCO3 (mg/L)	164	151	168	175	110	152	204	165	170	158	155	170	152	158	147
8	K (mg/L)	2.0	3.4	2.4	2.7	1.5	1.5	1.4	1.5	1.5	1.2	1.4	1.2	1.1	1.3	1.0
9	Mg (mg/L)	11.9	9.5	14.3	14.3	7.3	10.6	15.1	12.7	12.7	9.7	10.7	12.7	21.6	12.1	7.7
10	Na (mg/L)	10.0	7.9	10.0	10.1	4.9	9.6	13.3	10.5	10.5	7.2	8.6	9.1	7.1	7.9	7.8
11	NO2+NO3 (mg N/L)	1.03	1.42	1.27	1.21	1.85	0.26	0.76	0.79	0.26	0.38	0.27	0.28	0.41	0.07	0.22
12	NO2-N (mgN/L)	0.03	0.02	0.02	0.01	0.10	0.01	0.04	0.03	0.01	0.01	0.01	0.01	0.04	0.01	0.01
13	NO3-N (mgN/L)	1.00	1.40	1.25	1.20	1.75	0.26	0.72	0.76	0.25	0.37	0.26	0.26	0.37	0.06	0.21
14	o-PO4-P (mg P/L)	0.021	0.139	0.299	0.323	0.230	0.050	0.073	0.112	0.103	0.077	0.189	0.033	0.127	0.106	0.075
15	SiO2 (mg/L)	25.5	17.3	17.6	14.7	21.5	21.9	24.9	18.8	14.5	14.8	22.8	21.9	18.1	13.4	15.6
16	SO4 (mg/L)	8.3	10.7	12.6	12.1	12.6	3.2	5.2	11.6	2.1	9.2	3.5	2.1	23.0	2.7	5.1
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.1	0.7	1.0	0.7	0.9	0.5	0.9	0.9	0.7	1.2	0.6	0.4	0.6	0.4	1.0
2	COD (mg/L)	21.0	38.8	29.0	29.4	94.8	29.8	31.0	31.5	29.0	49.5	21.0	30.7	33.7	30.7	38.3
3	DO (mg/L)	6.2	6.2	5.6	6.0	5.4	6.8	7.3	7.2	7.5	6.7	5.8	6.4	6.7	6.5	5.4
4	DO_SAT% (%)	79	77	73	77	69	76	81	80	84	71	70	78	80	76	65
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	71	69	74	70	59	66	80	73	79	80	64	68	72	68	82
2	HAR_Total (mgCaCO3/L)	121	108	133	130	89	110	143	126	132	121	109	121	162	119	114
3	Na% (%)	15	14	14	14	11	16	17	15	14	11	15	14	9	12	13
4	RSC (-)	0.4	0.4	0.2	0.3	0.1	0.4	0.5	0.2	0.2	0.2	0.4	0.4	0.1	0.2	0.2
5	SAR (-)	0.4	0.3	0.4	0.4	0.2	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3

3.12 Shakkar at Gadarwara

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)		52.41	186.8	362.51	55.93	8.71	5.57	4.01	0.97	0.70	0.06	
2	Colour_Cod (-)		Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	
3	EC_GEN (µmho/cm)		229	212	209	262	355	420	557	346	305	784	
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_GEN (pH units)		7.2	7.7	7.2	8.0	7.8	7.9	8.0	7.7	7.6	7.6	
6	TDS (mg/L)		147	142	128	170	225	273	363	227	199	509	
7	Temp (deg C)		22.0	23.0	25.0	26.0	20.0	20.0	19.5	19.5	20.0	23.5	
8	Turb (NTU)		250.0	116.0	148.0	106.0	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	
2	ALK-TOT (mgCaCO3/L)		107	93	81	131	184	225	225	181	159	341	
3	Ca (mg/L)		25	26	21	31	44	51	45	35	25	66	
4	Cl (mg/L)		4.1	4.0	4.0	7.0	6.0	12.0	10.0	8.0	9.0	45.0	
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)		0.39	0.37	0.37	0.35	0.09	0.10	0.19	0.20	0.22	0.26	
7	HCO3 (mg/L)		131	114	99	160	225	274	274	221	194	416	
8	K (mg/L)		2.4	1.9	2.1	0.8	1.1	1.1	0.7	0.9	1.0	4.2	
9	Mg (mg/L)		9.7	7.3	8.0	11.9	16.8	21.4	22.6	19.4	19.0	35.5	
10	Na (mg/L)		5.9	5.7	7.2	5.1	6.1	9.6	14.8	14.2	14.7	44.6	
11	NO2+NO3 (mg N/L)		2.14	2.07	1.81	1.18	0.73	0.54	0.40	0.44	0.48	1.10	
12	NO2-N (mgN/L)		0.43	0.16	0.15	0.03	0.02	0.02	0.02	0.02	0.01	0.06	
13	NO3-N (mgN/L)		1.71	1.91	1.66	1.15	0.71	0.53	0.38	0.42	0.46	1.04	
14	o-PO4-P (mg P/L)		0.491	0.330	0.309	0.249	0.105	0.109	0.077	0.076	0.064	0.227	
15	SiO2 (mg/L)		28.1	26.2	23.7	22.6	18.1	17.8	17.5	16.0	18.7	19.8	
16	SO4 (mg/L)		20.6	20.4	21.4	19.9	12.2	12.7	9.6	8.8	6.9	12.8	
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		1.2	0.8	0.8	0.8	0.9	1.4	0.9	0.8	1.0	0.5	
2	COD (mg/L)		44.0	28.0	40.0	54.0	30.0	48.0	31.0	38.0	55.0	25.0	
3	DO (mg/L)		3.3	5.1	5.6	5.8	6.9	6.3	7.0	6.1	5.1	3.4	
4	DO_SAT% (%)		38	59	68	71	76	69	76	66	56	40	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		62	64	54	77	109	127	113	88	62	166	
2	HAR_Total (mgCaCO3/L)		103	94	87	127	179	216	208	169	141	314	
3	Na% (%)		11	11	15	8	7	9	13	15	18	23	
4	RSC (-)		0.1	0.0	0.0	0.1	0.1	0.2	0.4	0.3	0.4	0.6	
5	SAR (-)		0.3	0.3	0.3	0.2	0.2	0.3	0.4	0.5	0.5	1.1	

Water Quality Summary for the period : 2016-2017

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)	10	784	209	368
3	pH_GEN (pH units)	10	8.0	7.2	7.7
4	TDS (mg/L)	10	509	128	238
5	Temp (deg C)	10	26.0	19.5	21.9
6	Turb (NTU)	10	250.0	0.0	62
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	10	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	10	341	81	173
3	Ca (mg/L)	10	66	21	37
4	Cl (mg/L)	10	45.0	4.0	10.9
5	CO3 (mg/L)	10	0.0	0.0	0
6	F (mg/L)	10	0.39	0.09	0.26
7	HCO3 (mg/L)	10	416	99	211
8	K (mg/L)	10	4.2	0.7	1.6
9	Mg (mg/L)	10	35.5	7.3	17.2
10	Na (mg/L)	10	44.6	5.1	12.8
11	NO2+NO3 (mg N/L)	10	2.14	0.40	1.09
12	NO2-N (mgN/L)	10	0.43	0.01	0.09
13	NO3-N (mgN/L)	10	1.91	0.38	1
14	o-PO4-P (mg P/L)	10	0.491	0.064	0.204
15	SiO2 (mg/L)	10	28.1	16.0	20.8
16	SO4 (mg/L)	10	21.4	6.9	14.5
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	10	1.4	0.5	0.9
2	COD (mg/L)	10	55.0	25.0	39.3
3	DO (mg/L)	10	7.0	3.3	5.5
4	DO_SAT% (%)	10	76	38	62
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	10	166	54	92
2	HAR_Total (mgCaCO3/L)	10	314	87	164
3	Na% (%)	10	23	7	13
4	RSC (-)	10	0.6	0.0	0.2
5	SAR (-)	10	1.1	0.2	0.4

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	145.4	205.6	50.34	47.91		2.635	9.174	3.611	1.540		1.389	4.041	1.889	0.006	
2	EC_GEN (µmho/cm)	236	233	233	247	228	325	378	311	290	420	297	283	279	370	545
3	pH_GEN (pH units)	8.0	7.9	7.9	8.2	7.5	8.3	8.2	8.1	8.3	7.8	8.7	8.2	8.2	8.0	7.6
4	TDS (mg/L)	141	146	150	155	147	212	237	206	184	272	188	180	176	242	354
5	Temp (deg C)	22.3	19.5	23.0	23.8	24.0	19.5	18.4	18.3	20.3	19.8	20.0	22.0	25.3	21.0	21.8
6	Turb (NTU)	68.8	224.3	96.6	8.2	155.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	1.9	0.0	3.9	2.0	0.0	2.5	0.0	1.3	5.2	0.0	13.6	1.4	2.5	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	115	123	150	156	103	195	233	204	167	204	164	193	189	170	250
3	Ca (mg/L)	25	27	26	30	26	31	36	41	34	44	22	34	32	23	46
4	Cl (mg/L)	7.1	6.3	8.1	8.1	4.8	8.8	9.1	8.7	7.8	9.0	10.1	13.5	10.7	15.0	27.0
5	CO3 (mg/L)	2.2	0.0	4.7	2.4	0.0	3.0	0.0	1.5	6.3	0.0	16.4	1.7	3.0	0.0	0.0
6	F (mg/L)	0.28	0.43	0.26	0.26	0.37	0.32	0.09	0.40	0.20	0.15	0.15	0.11	0.11	0.25	0.24
7	HCO3 (mg/L)	136	150	173	185	126	232	284	246	192	249	167	232	225	207	305
8	K (mg/L)	1.6	3.7	2.2	1.7	1.8	1.2	0.9	1.6	0.8	1.0	1.5	1.1	1.1	3.1	2.6
9	Mg (mg/L)	11.5	11.5	14.5	16.2	9.2	18.6	26.3	20.4	19.6	20.0	18.1	17.7	19.5	20.9	27.2
10	Na (mg/L)	7.5	7.2	11.3	9.4	6.0	11.9	12.8	12.0	10.9	11.2	13.4	13.5	11.7	15.6	29.6
11	NO2+NO3 (mg N/L)	1.13	1.79	1.37	1.31	1.80	0.46	0.90	1.69	0.27	0.53	0.11	0.30	0.34	0.06	0.79
12	NO2-N (mgN/L)	0.02	0.04	0.04	0.03	0.19	0.02	0.05	0.06	0.01	0.02	0.01	0.01	0.05	0.01	0.04
13	NO3-N (mgN/L)	1.11	1.75	1.34	1.28	1.61	0.44	0.85	1.63	0.26	0.51	0.10	0.29	0.29	0.05	0.75
14	o-PO4-P (mg P/L)	0.016	0.216	0.319	0.219	0.345	0.016	0.026	0.187	0.104	0.092	0.188	0.040	0.120	0.182	0.146
15	SiO2 (mg/L)	26.3	18.7	23.4	19.0	25.1	26.5	28.9	22.4	20.6	17.3	20.5	18.9	19.9	21.6	19.2
16	SO4 (mg/L)	13.6	13.3	10.6	9.4	20.6	4.9	5.1	18.2	2.5	10.8	4.1	2.3	41.0	2.2	9.9
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.1	0.9	1.0	0.8	0.9	1.1	0.9	1.0	0.6	1.0	1.6	0.9	1.0	3.0	0.8
2	COD (mg/L)	25.5	36.8	28.6	28.4	41.5	32.5	34.3	39.0	25.8	36.8	30.3	31.0	27.3	44.0	40.0
3	DO (mg/L)	5.9	5.7	5.8	6.2	4.9	7.3	7.3	6.8	7.6	6.6	5.5	6.5	7.1	3.0	4.3
4	DO_SAT% (%)	67	62	68	74	59	79	78	72	83	72	60	74	86	34	48
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	63	68	65	76	64	79	90	101	84	109	54	85	80	57	114
2	HAR_Total (mgCaCO3/L)	111	116	125	143	103	156	200	186	166	193	130	159	162	144	227
3	Na% (%)	13	12	16	13	11	15	12	12	13	11	18	16	14	19	21
4	RSC (-)	0.2	0.2	0.5	0.3	0.1	0.8	0.7	0.4	0.3	0.2	0.7	0.7	0.6	0.5	0.5
5	SAR (-)	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.6	0.8

3.13 Narmada at Barman

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	49.7	97.5	1015	2430	1672	222	150	153	134	96	109	90.4
2	Colour_Cod (-)	Clear	Clear	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	177	225	209	211	166	191	215	282	206	213	264	187
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)	8.2	7.5	7.6	7.3	8.0	7.8	8.0	8.0	7.9	7.8	7.5	7.9
6	TDS (mg/L)	126	145	140	130	108	124	140	185	130	138	172	122
7	Temp (deg C)	29.0	29.0	27.0	27.0	29.0	24.0	22.0	20.0	20.0	22.0	26.0	27.0
8	Turb (NTU)	0.0	50.0	130.0	120.0	110.0	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)	99	105	84	84	83	100	111	114	99	111	118	102
3	Ca (mg/L)	24	25	24	21	21	24	29	24	23	30	34	30
4	Cl (mg/L)	5.0	5.6	5.0	4.0	4.0	6.0	8.0	7.0	4.0	9.0	11.0	8.0
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	0.38	0.37	0.35	0.33	0.12	0.08	0.19	0.21	0.20	0.20	0.19
7	HCO3 (mg/L)	121	128	102	102	101	122	136	139	121	135	144	125
8	K (mg/L)	1.0	1.1	2.0	2.1	1.1	1.3	0.9	1.0	1.1	1.1	1.1	0.9
9	Mg (mg/L)	9.7	9.2	7.3	6.6	5.4	10.9	10.2	10.7	10.0	7.5	10.9	4.9
10	Na (mg/L)	4.5	5.3	5.4	6.9	3.2	3.5	4.6	6.8	6.1	6.8	6.8	6.1
11	NO2+NO3 (mg N/L)	0.05	1.72	1.34	1.30	0.87	0.57	0.12	0.10	0.25	0.24	0.21	0.09
12	NO2-N (mgN/L)	0.00	0.18	0.10	0.10	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
13	NO3-N (mgN/L)	0.05	1.54	1.24	1.20	0.86	0.56	0.11	0.08	0.24	0.23	0.20	0.08
14	o-PO4-P (mg P/L)	0.050	0.127	0.354	0.339	0.278	0.087	0.081	0.059	0.066	0.055	0.081	0.079
15	SiO2 (mg/L)	14.9	29.5	18.1	17.5	16.3	15.4	14.9	13.2	13.8	16.2	16.3	16.8
16	SO4 (mg/L)	4.1	17.6	17.9	17.4	15.7	11.0	10.7	8.5	8.3	4.8	5.6	7.7
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.0	0.7	0.8	1.3	0.7	0.6	2.3	0.9	0.9	1.1	0.8	1.1
2	COD (mg/L)	38.0	19.0	36.0	36.0	48.0	38.0	21.0	49.0	26.0	35.0	26.0	26.0
3	DO (mg/L)	5.6	5.6	5.9	6.3	6.4	6.1	6.0	6.9	5.7	5.9	5.2	
4	DO_SAT% (%)	73	73	74	79	83	72	69	76	63	67	64	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	60	62	60	51	53	61	72	60	58	75	84	76
2	HAR_Total (mgCaCO3/L)	100	100	90	79	76	106	114	104	100	107	130	96
3	Na% (%)	9	10	11	16	8	7	8	12	12	12	10	12
4	RSC (-)	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.0	0.1	0.0	0.1
5	SAR (-)	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3

Water Quality Summary for the period : 2016-2017

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	282	166	212
3	pH_GEN (pH units)	12	8.2	7.3	7.8
4	TDS (mg/L)	12	185	108	138
5	Temp (deg C)	12	29.0	20.0	25.2
6	Turb (NTU)	12	130.0	0.0	34.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	118	83	101
3	Ca (mg/L)	12	34	21	26
4	Cl (mg/L)	12	11.0	4.0	6.4
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.38	0.08	0.23
7	HCO3 (mg/L)	12	144	101	123
8	K (mg/L)	12	2.1	0.9	1.2
9	Mg (mg/L)	12	10.9	4.9	8.6
10	Na (mg/L)	12	6.9	3.2	5.5
11	NO2+NO3 (mg N/L)	12	1.72	0.05	0.57
12	NO2-N (mgN/L)	12	0.18	0.00	0.04
13	NO3-N (mgN/L)	12	1.54	0.05	0.53
14	o-PO4-P (mg P/L)	12	0.354	0.050	0.138
15	SiO2 (mg/L)	12	29.5	13.2	16.9
16	SO4 (mg/L)	12	17.9	4.1	10.8
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	2.3	0.6	1
2	COD (mg/L)	12	49.0	19.0	33.2
3	DO (mg/L)	11	6.9	5.2	6
4	DO_SAT% (%)	11	83	63	72
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	84	51	64
2	HAR_Total (mgCaCO3/L)	12	130	76	100
3	Na% (%)	12	16	7	11
4	RSC (-)	12	0.2	0.0	0.1
5	SAR (-)	12	0.3	0.1	0.2

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	282.6	959.6	274.1	191.3		161.3	157.5	175.5	85.17		166.0	235.7	139.3	93.33	
2	EC_GEN (µmho/cm)	272	208	185	193	198	199	237	167	201	224	212	175	168	224	221
3	pH_GEN (pH units)	8.0	8.0	7.8	8.2	7.7	8.2	8.1	8.1	8.2	7.9	8.1	8.1	8.1	8.1	7.8
4	TDS (mg/L)	168	131	118	121	130	131	145	111	127	145	135	114	108	146	144
5	Temp (deg C)	27.0	26.8	27.8	28.4	28.2	21.0	21.8	20.5	21.8	21.5	23.0	24.7	24.0	25.3	25.0
6	Turb (NTU)	26.0	121.8	54.4	25.4	82.0	0.0	2.0	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	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
2	ALK-TOT (mgCaCO3/L)	129	106	131	117	91	120	136	109	119	106	114	117	110	107	110
3	Ca (mg/L)	28	24	27	27	23	24	29	25	29	25	25	26	24	25	31
4	Cl (mg/L)	9.7	7.6	8.6	7.8	4.7	6.4	7.7	5.9	7.8	6.3	8.0	10.6	8.0	6.7	9.3
5	CO3 (mg/L)	1.8	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
6	F (mg/L)	0.27	0.29	0.26	0.33	0.32	0.25	0.15	0.20	0.23	0.15	0.14	0.18	0.14	0.32	0.20
7	HCO3 (mg/L)	153	129	160	143	111	147	167	133	138	130	139	143	134	130	135
8	K (mg/L)	1.8	2.7	2.3	2.3	1.5	1.4	1.2	1.2	1.5	1.1	1.3	1.2	1.2	1.4	1.0
9	Mg (mg/L)	10.0	10.4	13.8	11.2	7.6	11.2	13.5	9.7	9.5	10.4	9.3	9.9	10.7	10.0	7.8
10	Na (mg/L)	9.0	6.8	10.0	8.2	5.1	8.8	9.8	6.5	9.6	5.2	7.4	7.0	5.5	6.2	6.5
11	NO2+NO3 (mg N/L)	0.92	1.25	1.50	0.89	1.05	0.20	0.39	0.64	0.30	0.26	0.12	0.16	0.37	0.05	0.18
12	NO2-N (mgN/L)	0.08	0.04	0.03	0.01	0.08	0.01	0.05	0.03	0.01	0.01	0.01	0.01	0.06	0.01	0.01
13	NO3-N (mgN/L)	0.84	1.21	1.46	0.87	0.98	0.19	0.34	0.61	0.29	0.25	0.10	0.15	0.31	0.05	0.17
14	o-PO4-P (mg P/L)	0.010	0.158	0.167	0.396	0.230	0.019	0.046	0.120	0.107	0.073	0.812	0.045	0.118	0.103	0.072
15	SiO2 (mg/L)	26.3	18.6	23.6	16.7	19.3	23.1	23.0	21.7	15.8	14.3	22.6	21.2	14.3	15.0	16.5
16	SO4 (mg/L)	8.7	10.4	9.5	9.2	14.5	2.9	3.6	5.2	4.9	9.6	2.7	2.8	27.7	3.0	6.0
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.9	0.6	1.2	0.8	0.9	0.7	0.9	0.8	1.7	1.2	0.9	0.7	0.5	0.4	1.0
2	COD (mg/L)	26.8	39.2	29.8	31.0	35.4	29.8	33.0	44.0	36.8	33.5	29.7	24.7	27.0	23.7	29.0
3	DO (mg/L)	5.8	6.2	5.1	5.9	6.0	6.7	7.2	7.1	6.4	6.2	5.6	6.5	6.5	5.6	5.5
4	DO_SAT% (%)	73	78	64	76	76	75	82	78	72	70	65	78	77	67	66
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	69	60	66	67	57	60	73	63	73	63	63	66	59	62	78
2	HAR_Total (mgCaCO3/L)	111	103	124	114	89	107	129	103	113	106	102	107	104	104	111
3	Na% (%)	15	13	14	13	11	15	14	12	15	10	13	12	10	11	11
4	RSC (-)	0.4	0.1	0.2	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1
5	SAR (-)	0.4	0.3	0.4	0.3	0.2	0.4	0.4	0.3	0.4	0.2	0.3	0.3	0.2	0.3	0.3

3.14 Sher at Belkheri

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0.27	2.61	79.15	222.3	70.81	9.22	1.09	0.86	0.76	0.63	0.49	0.45
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	495	234	306	171	276	409	500	718	458	448	447	457
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)	8.1	7.2	7.6	7.3	8.1	7.6	7.9	8.0	7.6	7.6	7.7	7.8
6	TDS (mg/L)	325	151	201	102	178	268	327	464	297	291	282	298
7	Temp (deg C)	31.0	28.0	26.0	26.0	26.0	24.0	22.0	20.0	20.0	23.0	26.0	28.0
8	Turb (NTU)	0.0	142.0	148.0	141.0	50.0	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)	3	130	135	75	154	225	293	308	270	259	261	257
3	Ca (mg/L)	30	27	28	19	37	46	48	56	46	39	47	31
4	Cl (mg/L)	9.0	4.8	4.1	3.0	5.0	10.0	8.0	8.0	8.0	8.0	10.0	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)	0.25	0.38	0.34	0.33	0.33	0.18	0.16	0.23	0.24	0.52	0.52	0.49
7	HCO3 (mg/L)	3	159	165	91	188	275	358	376	330	316	319	313
8	K (mg/L)	1.0	1.0	1.3	1.4	0.7	1.0	0.6	0.6	0.8	0.8	1.0	1.0
9	Mg (mg/L)	39.4	10.7	11.2	5.6	12.2	20.7	29.2	29.9	28.9	29.7	25.5	28.2
10	Na (mg/L)	14.7	5.1	5.2	6.7	5.4	6.6	12.2	20.2	18.9	17.6	15.7	19.2
11	NO2+NO3 (mg N/L)	0.08	1.92	1.41	1.20	0.81	0.62	0.62	0.84	0.90	1.09	1.01	0.20
12	NO2-N (mgN/L)	0.01	0.42	0.09	0.08	0.04	0.04	0.04	0.08	0.05	0.05	0.04	0.05
13	NO3-N (mgN/L)	0.08	1.50	1.32	1.12	0.77	0.59	0.58	0.76	0.85	1.04	0.96	0.15
14	o-PO4-P (mg P/L)	0.047	0.273	0.336	0.362	0.290	0.109	0.246	0.210	0.250	0.287	0.169	0.182
15	SiO2 (mg/L)	21.2	28.8	22.1	21.9	21.0	19.9	18.5	29.2	22.3	26.7	27.3	27.9
16	SO4 (mg/L)	8.8	18.3	20.7	19.9	18.6	11.9	12.6	14.9	13.9	11.5	12.4	10.0
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.0	0.9	0.8	1.0	1.0	1.1	1.0	1.7	1.8	2.0	1.1	0.8
2	COD (mg/L)	42.0	34.0	41.0	28.0	61.0	41.0	49.0	43.0	27.0	47.0	33.0	27.0
3	DO (mg/L)	4.5	3.5	5.1	5.9	6.3	6.8	7.4	8.5	7.5	6.2	4.9	
4	DO_SAT% (%)	61	45	63	73	78	81	85	93	82	72	60	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	75	68	70	48	92	114	120	140	115	99	119	78
2	HAR_Total (mgCaCO3/L)	239	113	117	71	143	200	241	265	236	222	225	195
3	Na% (%)	12	9	9	17	8	7	10	14	15	15	13	18
4	RSC (-)	0.0	0.4	0.4	0.1	0.2	0.5	1.1	0.9	0.7	0.8	0.8	1.3
5	SAR (-)	0.4	0.2	0.2	0.3	0.2	0.2	0.3	0.5	0.5	0.5	0.5	0.6

Water Quality Summary for the period : 2016-2017

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 : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	38.46	64.94		11.46		1.083	4.438		0.646		0.643	2.441		0.359	
2	EC_GEN (µmho/cm)	372	321	282	286	296	446	453	373	404	521	504	396	305	523	451
3	pH_GEN (pH units)	8.0	8.1	7.9	8.0	7.6	8.0	8.1	8.1	8.0	7.8	7.9	8.0	8.0	7.8	7.7
4	TDS (mg/L)	230	205	181	178	191	290	286	248	258	339	308	256	199	341	290
5	Temp (deg C)	28.0	25.6	28.4	29.0	27.4	20.8	22.3	22.8	23.5	21.5	24.7	26.0	26.3	25.0	25.7
6	Turb (NTU)	16.0	115.2	60.8	17.6	96.2	0.0	1.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	1.0	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
2	ALK-TOT (mgCaCO3/L)	186	172	188	187	99	274	289	258	269	274	290	287	214	284	259
3	Ca (mg/L)	30	33	29	33	28	42	48	46	38	49	38	45	33	42	39
4	Cl (mg/L)	8.5	7.2	8.9	8.5	5.2	11.1	9.5	8.6	8.0	8.5	9.6	13.0	21.0	7.3	9.7
5	CO3 (mg/L)	1.2	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
6	F (mg/L)	0.15	0.27	0.32	0.34	0.33	0.31	0.16	0.30	0.23	0.20	0.20	0.17	0.23	0.47	0.51
7	HCO3 (mg/L)	224	210	230	226	121	335	352	315	329	335	353	350	262	346	316
8	K (mg/L)	1.6	2.8	2.0	1.6	1.1	1.2	0.8	0.8	0.9	0.8	1.5	1.0	1.0	1.1	0.9
9	Mg (mg/L)	20.9	16.5	19.8	21.3	15.8	28.2	29.3	28.9	33.3	27.2	29.6	28.4	23.2	31.8	27.8
10	Na (mg/L)	12.9	11.2	11.0	11.0	7.4	15.6	16.7	14.2	16.3	14.5	18.2	19.0	9.3	16.1	17.5
11	NO2+NO3 (mg N/L)	0.99	0.93	1.37	1.25	1.09	0.72	1.18	0.90	0.78	0.75	0.39	0.92	0.67	0.07	0.76
12	NO2-N (mgN/L)	0.04	0.03	0.03	0.03	0.13	0.01	0.05	0.03	0.01	0.05	0.01	0.01	0.05	0.01	0.05
13	NO3-N (mgN/L)	0.95	0.90	1.34	1.22	0.96	0.72	1.13	0.86	0.77	0.69	0.38	0.91	0.62	0.07	0.72
14	o-PO4-P (mg P/L)	0.014	0.234	0.349	0.627	0.262	0.010	0.066	0.091	0.103	0.204	0.158	0.059	0.066	0.291	0.213
15	SiO2 (mg/L)	32.7	25.9	29.8	23.7	23.0	39.9	44.9	29.7	37.3	22.4	34.1	31.9	27.8	30.9	27.3
16	SO4 (mg/L)	9.7	13.1	11.0	10.4	17.3	6.1	5.6	4.2	5.6	13.3	4.4	3.6	9.0	12.5	11.3
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.6	0.7	1.0	0.5	0.9	0.6	0.8	0.9	0.8	1.4	0.9	1.0	0.9	1.1	1.3
2	COD (mg/L)	24.0	25.2	34.8	22.2	41.2	27.8	29.0	44.8	25.3	40.0	28.3	24.0	27.7	27.3	35.7
3	DO (mg/L)	5.3	6.0	5.7	5.7	5.1	6.9	7.1	7.3	6.7	7.6	5.3	6.6	6.0	5.3	5.5
4	DO_SAT% (%)	68	74	73	74	64	77	81	84	78	85	64	81	74	64	66
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	75	82	73	83	71	105	119	115	95	122	96	114	83	105	98
2	HAR_Total (mgCaCO3/L)	162	151	155	172	136	222	241	235	234	236	219	232	179	237	214
3	Na% (%)	15	13	12	13	11	13	13	12	13	11	15	15	10	13	15
4	RSC (-)	0.5	0.5	0.7	0.3	0.2	1.1	1.0	0.5	0.7	0.8	1.4	1.1	0.7	1.0	0.9
5	SAR (-)	0.4	0.4	0.4	0.4	0.3	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.3	0.5	0.5

3.15 Hiran at Patan

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

Local River : Hiran Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)		8.24	227.9	218.6	95.47	17	6.22	9.75	10.98	5.5	8.5	
2	Colour_Cod (-)		Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	
3	EC_GEN (µmho/cm)		287	207	302	279	460	530	525	416	322	305	
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_GEN (pH units)		7.5	7.7	7.0	7.6	7.4	7.7	7.9	7.5	7.5	7.7	
6	TDS (mg/L)		184	135	186	181	300	345	326	271	209	198	
7	Temp (deg C)		28.5	28.5	30.5	30.0	25.0	21.5	18.5	19.5	21.0	27.0	
8	Turb (NTU)		135.0	170.0	129.0	86.0	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	
2	ALK-TOT (mgCaCO3/L)		102	89	114	154	227	252	181	186	157	141	
3	Ca (mg/L)		21	25	31	36	53	62	43	47	37	36	
4	Cl (mg/L)		3.7	3.9	5.0	9.0	15.0	22.0	15.0	21.0	15.0	13.0	
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)		0.39	0.35	0.33	0.32	0.19	0.17	0.21	0.22	0.43	0.44	
7	HCO3 (mg/L)		125	108	139	188	277	307	221	227	191	172	
8	K (mg/L)		2.7	3.1	3.6	2.0	2.2	5.4	3.6	5.4	3.0	3.5	
9	Mg (mg/L)		6.3	6.8	6.8	14.8	18.2	20.7	12.9	16.8	15.6	10.9	
10	Na (mg/L)		21.6	15.6	11.6	7.8	8.9	17.1	17.4	18.5	14.1	13.5	
11	NO2+NO3 (mg N/L)		2.02	1.73	1.68	1.16	0.78	0.76	589.04	0.71	0.80	0.73	
12	NO2-N (mgN/L)		0.41	0.35	0.33	0.04	0.04	0.05	0.04	0.04	0.04	0.03	
13	NO3-N (mgN/L)		1.61	1.39	1.35	1.11	0.74	0.72	589.00	0.67	0.76	0.70	
14	o-PO4-P (mg P/L)		0.284	0.372	0.400	0.327	0.258	0.267	0.229	0.234	0.255	0.129	
15	SiO2 (mg/L)		29.3	15.6	15.0	13.6	13.0	16.1	17.7	16.8	20.1	20.3	
16	SO4 (mg/L)		17.4	18.3	18.7	15.8	12.4	13.2	9.2	8.5	5.5	5.6	
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		0.8	0.4	0.9	0.9	2.0	3.9	1.9	2.0	1.7	1.5	
2	COD (mg/L)		33.0	34.0	39.0	54.0	42.0	37.0	35.0	39.0	53.0	39.0	
3	DO (mg/L)		4.5	4.4	5.1	4.9	5.4	6.0	7.0	5.8	4.9	4.3	
4	DO_SAT% (%)		58	56	68	65	65	67	74	63	55	54	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		52	62	78	90	134	156	107	119	91	89	
2	HAR_Total (mgCaCO3/L)		78	90	106	152	210	242	161	188	156	134	
3	Na% (%)		37	27	19	10	8	13	19	17	16	18	
4	RSC (-)		0.5	0.0	0.2	0.1	0.4	0.2	0.4	0.0	0.0	0.1	
5	SAR (-)		1.1	0.7	0.5	0.3	0.3	0.5	0.6	0.6	0.5	0.5	

Water Quality Summary for the period : 2016-2017

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)	10	530	207	363
3	pH_GEN (pH units)	10	7.9	7.0	7.5
4	TDS (mg/L)	10	345	135	234
5	Temp (deg C)	10	30.5	18.5	25
6	Turb (NTU)	10	170.0	0.0	52
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	10	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	10	252	89	160
3	Ca (mg/L)	10	62	21	39
4	Cl (mg/L)	10	22.0	3.7	12.3
5	CO3 (mg/L)	10	0.0	0.0	0
6	F (mg/L)	10	0.44	0.17	0.31
7	HCO3 (mg/L)	10	307	108	196
8	K (mg/L)	10	5.4	2.0	3.4
9	Mg (mg/L)	10	20.7	6.3	13
10	Na (mg/L)	10	21.6	7.8	14.6
11	NO2+NO3 (mg N/L)	10	589.04	0.71	59.94
12	NO2-N (mgN/L)	10	0.41	0.03	0.14
13	NO3-N (mgN/L)	10	589.00	0.67	59.8
14	o-PO4-P (mg P/L)	10	0.400	0.129	0.275
15	SiO2 (mg/L)	10	29.3	13.0	17.7
16	SO4 (mg/L)	10	18.7	5.5	12.4
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	10	3.9	0.4	1.6
2	COD (mg/L)	10	54.0	33.0	40.5
3	DO (mg/L)	10	7.0	4.3	5.2
4	DO_SAT% (%)	10	74	54	62
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	10	156	52	98
2	HAR_Total (mgCaCO3/L)	10	242	78	152
3	Na% (%)	10	37	8	18
4	RSC (-)	10	0.5	0.0	0.2
5	SAR (-)	10	1.1	0.3	0.5

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	58.89	200.8		56.63		14.80	15.29		10.41		3.437	7.099		2.302	
2	EC_GEN (µmho/cm)	487	350	395	273	269	359	476	376	402	483	430	421	411	448	314
3	pH_GEN (pH units)	8.2	7.9	7.9	8.0	7.5	8.1	8.1	8.1	8.1	7.6	7.8	7.9	8.2	8.3	7.6
4	TDS (mg/L)	301	222	257	166	172	233	295	249	258	311	268	269	263	294	204
5	Temp (deg C)	27.7	26.7	29.1	28.8	29.4	20.8	19.5	22.5	22.8	21.1	24.7	22.7	26.3	22.8	24.0
6	Turb (NTU)	23.0	194.0	31.0	303.6	130.0	0.0	1.5	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	3.5	0.0	2.6	1.5	0.0	1.3	0.0	2.5	3.5	0.0	0.0	0.0	4.2	6.9	0.0
2	ALK-TOT (mgCaCO3/L)	218	166	235	159	115	211	280	226	221	211	196	272	233	188	149
3	Ca (mg/L)	42	36	47	33	28	45	59	49	50	52	39	52	48	39	36
4	Cl (mg/L)	24.0	16.9	28.7	17.0	5.4	11.0	16.1	21.6	16.5	18.3	21.7	24.6	32.4	20.5	14.0
5	CO3 (mg/L)	4.2	0.0	3.1	1.8	0.0	1.5	0.0	3.0	4.2	0.0	0.0	0.0	5.0	8.4	0.0
6	F (mg/L)	0.18	0.32	0.58	0.37	0.35	0.35	0.37	0.68	0.32	0.20	0.18	0.56	0.43	0.53	0.43
7	HCO3 (mg/L)	257	202	281	190	140	255	342	270	261	258	239	331	274	213	182
8	K (mg/L)	6.5	5.0	7.3	4.9	2.8	3.4	3.4	4.8	5.9	4.1	5.3	5.5	6.7	5.5	3.2
9	Mg (mg/L)	16.5	11.6	21.0	15.3	8.7	16.0	24.7	19.0	18.3	17.1	15.6	20.2	19.6	14.5	13.2
10	Na (mg/L)	28.6	17.2	24.9	16.6	14.1	16.5	21.8	19.5	20.4	15.5	17.7	22.6	24.0	18.8	13.8
11	NO2+NO3 (mg N/L)	1.77	1.02	3.00	1.34	1.65	1.03	2.08	4.35	2.43	147.82	1.14	2.02	2.13	2.17	0.76
12	NO2-N (mgN/L)	0.32	0.05	0.19	0.12	0.28	0.05	0.08	0.44	0.09	0.04	0.01	0.01	0.07	0.08	0.04
13	NO3-N (mgN/L)	1.45	0.97	2.82	1.21	1.36	0.97	2.00	3.91	2.34	147.78	1.13	2.00	2.06	2.09	0.73
14	o-PO4-P (mg P/L)	0.069	0.206	0.528	0.537	0.346	0.077	0.267	0.546	0.632	0.247	0.206	0.375	0.732	0.281	0.192
15	SiO2 (mg/L)	26.6	20.0	19.4	15.4	18.4	23.5	21.7	20.2	13.0	15.9	25.9	21.7	16.0	24.6	20.2
16	SO4 (mg/L)	15.5	12.7	18.0	13.2	17.5	3.8	11.7	10.2	5.1	10.8	16.4	4.3	13.8	8.9	5.5
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.4	1.1	1.9	0.8	0.7	0.9	1.3	1.3	1.7	2.5	1.4	2.1	1.0	1.4	1.6
2	COD (mg/L)	29.0	33.4	39.0	26.0	40.0	34.3	26.8	36.3	40.3	38.3	31.3	30.7	31.7	36.5	46.0
3	DO (mg/L)	4.6	5.3	4.7	5.2	4.7	6.6	6.9	6.3	5.9	6.1	4.4	5.0	5.3	5.3	4.6
4	DO_SAT% (%)	58	66	61	67	62	74	74	72	68	67	53	58	65	62	54
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	104	91	119	83	70	112	147	124	125	129	97	131	121	97	90
2	HAR_Total (mgCaCO3/L)	173	140	206	146	107	179	250	202	202	200	162	215	203	157	145
3	Na% (%)	25	19	18	18	23	16	16	17	18	14	19	18	20	20	17
4	RSC (-)	0.9	0.5	0.6	0.3	0.2	0.7	0.6	0.5	0.4	0.3	0.7	1.2	0.6	0.6	0.1
5	SAR (-)	0.9	0.6	0.7	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.7	0.7	0.7	0.5

3.16 Banjar at Bamni

History sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

Station Name : Banjar at Bamni
Local River : Banjar

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

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)			53.6	96.73	177	32.2	8.85	1.88	0.57	0	0	0
2	Colour_Cod (-)		Light Brown	Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)		108	121	171	107	200	178	297	206	239	248	317
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
5	pH_GEN (pH units)		6.9	7.6	7.2	7.5	7.4	7.6	7.7	7.4	7.4	7.7	7.8
6	TDS (mg/L)		70	80	102	69	132	114	192	135	158	160	205
7	Temp (deg C)		26.0	26.0	26.5	27.0	23.0	17.5	10.0	11.0	17.0	18.5	23.5
8	Turb (NTU)		120.0	236.0	118.0	80.0	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
2	ALK-TOT (mgCaCO3/L)		39	58	70	48	95	88	106	105	128	123	161
3	Ca (mg/L)		10	14	20	11	24	21	24	26	27	30	31
4	Cl (mg/L)		4.6	4.8	4.0	3.0	6.0	7.0	7.0	6.0	6.0	10.0	18.0
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
6	F (mg/L)		0.19	0.33	0.31	0.31	0.12	0.07	0.22	0.20	0.31	0.34	0.31
7	HCO3 (mg/L)		48	71	85	59	116	107	129	128	156	150	197
8	K (mg/L)		3.5	3.7	3.8	1.4	2.2	1.2	1.3	1.3	1.4	1.8	3.0
9	Mg (mg/L)		4.4	4.4	5.4	7.1	6.3	7.1	8.0	8.3	12.4	8.0	13.4
10	Na (mg/L)		2.4	4.9	6.8	2.8	4.3	5.7	9.6	8.8	9.1	11.1	19.6
11	NO2+NO3 (mg N/L)		1.23	0.97	0.95	0.55	0.25	0.12	0.09	0.14	0.14	0.16	0.12
12	NO2-N (mgN/L)		0.33	0.10	0.09	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
13	NO3-N (mgN/L)		0.90	0.88	0.86	0.54	0.24	0.11	0.09	0.14	0.13	0.15	0.11
14	o-PO4-P (mg P/L)		0.361	0.346	0.366	0.304	0.094	0.084	0.054	0.049	0.054	0.057	0.042
15	SiO2 (mg/L)		22.1	16.7	16.0	16.6	15.1	14.6	15.6	14.7	17.5	17.1	16.4
16	SO4 (mg/L)		16.2	15.4	16.2	13.1	10.7	10.1	7.2	6.0	3.9	3.8	2.1
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)		0.7	0.5	0.9	1.0	0.6	0.8	1.1	1.4	1.4	1.6	2.4
2	COD (mg/L)		32.0	30.0	34.0	48.0	42.0	40.0	54.0	23.0	42.0	33.0	33.0
3	DO (mg/L)		4.2	5.2	5.1	4.1	7.1	7.2	6.7	5.2	4.2	4.8	
4	DO_SAT% (%)		52	64	63	51	83	75	59	47	43	51	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)		26	34	50	28	60	53	61	66	67	74	77
2	HAR_Total (mgCaCO3/L)		44	52	73	58	86	82	94	100	119	108	133
3	Na% (%)		10	16	16	9	10	13	18	16	14	18	24
4	RSC (-)		0.0	0.1	0.0	0.0	0.2	0.1	0.2	0.1	0.2	0.3	0.6
5	SAR (-)		0.2	0.3	0.3	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.7

Water Quality Summary for the period : 2016-2017

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)	11	317	107	199
3	pH_GEN (pH units)	11	7.8	6.9	7.5
4	TDS (mg/L)	11	205	69	129
5	Temp (deg C)	11	27.0	10.0	20.5
6	Turb (NTU)	11	236.0	0.0	50.4
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	11	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	11	161	39	93
3	Ca (mg/L)	11	31	10	22
4	Cl (mg/L)	11	18.0	3.0	6.9
5	CO3 (mg/L)	11	0.0	0.0	0
6	F (mg/L)	11	0.34	0.07	0.24
7	HCO3 (mg/L)	11	197	48	113
8	K (mg/L)	11	3.8	1.2	2.2
9	Mg (mg/L)	11	13.4	4.4	7.7
10	Na (mg/L)	11	19.6	2.4	7.7
11	NO2+NO3 (mg N/L)	11	1.23	0.09	0.43
12	NO2-N (mgN/L)	11	0.33	0.00	0.05
13	NO3-N (mgN/L)	11	0.90	0.09	0.38
14	o-PO4-P (mg P/L)	11	0.366	0.042	0.165
15	SiO2 (mg/L)	11	22.1	14.6	16.6
16	SO4 (mg/L)	11	16.2	2.1	9.5
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	11	7.0	0.5	1.7
2	COD (mg/L)	11	54.0	23.0	37.4
3	DO (mg/L)	10	7.2	4.1	5.4
4	DO_SAT% (%)	10	83	43	59
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	11	77	26	54
2	HAR_Total (mgCaCO3/L)	11	133	44	86
3	Na% (%)	11	24	9	15
4	RSC (-)	11	0.6	0.0	0.2
5	SAR (-)	11	0.7	0.2	0.3

Water Quality Seasonal Average for the period : 2012-20117

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	40.30	84.35	32.27	30.64		5.414	16.37	17.33	3.859		1.182	0.000	0.796	0.166	
2	EC_GEN (µmho/cm)	133	113	121	134	127	209	175	198	174	220	240		197	372	268
3	pH_GEN (pH units)	7.8	7.6	7.6	7.9	7.3	7.9	8.0	7.9	8.0	7.5	8.0		8.0	8.1	7.6
4	TDS (mg/L)	82	71	75	84	80	137	105	131	111	143	154		126	241	174
5	Temp (deg C)	26.3	23.1	26.3	26.8	26.4	18.3	17.8	18.0	18.6	15.4	17.5		22.3	23.8	19.7
6	Turb (NTU)	43.3	110.5	52.3	47.8	138.5	0.0	8.5	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	1.6	0.0
2	ALK-TOT (mgCaCO3/L)	65	55	66	76	54	116	94	122	98	98	124		117	153	137
3	Ca (mg/L)	14	14	15	19	14	24	21	26	22	24	24		26	23	29
4	Cl (mg/L)	5.6	6.0	6.2	6.2	4.1	8.1	9.8	7.1	4.5	6.5	8.8		10.1	21.7	11.3
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	1.9	0.0
6	F (mg/L)	0.13	0.34	0.36	0.27	0.28	0.25	0.21	0.27	0.22	0.15	0.14		0.20	0.28	0.32
7	HCO3 (mg/L)	79	67	81	93	66	141	114	149	120	120	151		143	183	168
8	K (mg/L)	2.6	3.3	3.4	4.0	3.1	1.8	1.5	1.4	2.0	1.5	1.8		2.5	5.4	2.1
9	Mg (mg/L)	4.9	4.9	7.4	7.6	5.3	9.0	8.5	13.4	9.8	7.4	8.5		10.5	14.9	11.3
10	Na (mg/L)	9.6	6.4	6.6	8.2	4.2	10.7	9.2	12.1	8.0	7.1	11.4		8.7	30.0	13.3
11	NO2+NO3 (mg N/L)	0.95	0.69	1.09	0.74	0.93	0.12	0.21	0.45	0.10	0.15	0.05		0.78	0.07	0.14
12	NO2-N (mgN/L)	0.05	0.04	0.03	0.03	0.13	0.01	0.06	0.01	0.01	0.01	0.00		0.08	0.01	0.01
13	NO3-N (mgN/L)	0.89	0.65	1.05	0.71	0.79	0.11	0.16	0.44	0.09	0.14	0.05		0.70	0.05	0.13
14	o-PO4-P (mg P/L)	0.010	0.178	0.456	0.346	0.344	0.020	0.044	0.112	0.081	0.070	0.025		0.090	0.099	0.051
15	SiO2 (mg/L)	18.0	15.5	18.4	12.3	17.9	19.2	17.7	18.5	12.5	15.0	23.9		15.8	19.1	17.0
16	SO4 (mg/L)	17.4	10.4	10.1	16.6	15.2	6.2	7.4	12.0	5.9	8.5	3.7		26.6	4.1	3.2
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.9	0.8	1.2	0.8	2.3	0.6	0.7	0.6	0.6	1.0	0.5		0.8	1.9	1.8
2	COD (mg/L)	26.3	29.3	36.8	26.5	36.0	27.0	27.0	30.0	26.0	39.8	15.0		35.0	35.3	36.0
3	DO (mg/L)	6.0	5.8	5.9	6.3	4.6	6.3	7.4	7.0	6.8	6.5	6.2		5.8	5.3	4.5
4	DO_SAT% (%)	74	68	72	78	58	67	78	74	72	66	64		65	61	47
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	35	34	38	47	35	59	51	64	55	60	61		64	57	73
2	HAR_Total (mgCaCO3/L)	56	55	68	79	57	97	87	120	96	91	96		108	119	120
3	Na% (%)	27	19	16	18	13	19	19	18	15	14	20		15	35	19
4	RSC (-)	0.2	0.1	0.0	0.0	0.0	0.4	0.2	0.2	0.1	0.2	0.6		0.2	0.7	0.4
5	SAR (-)	0.6	0.4	0.3	0.4	0.2	0.5	0.4	0.5	0.4	0.3	0.5		0.4	1.3	0.5

3.17 Burhner at Mohgaon

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

Local River : Burhner Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	B	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0.18	25.45	474	167.6	316.1	32.49	13.99	7.3	5.12	3.43	1.2	0.22
2	Colour_Cod (-)	Clear	Brown	Dark Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	286	99	108	218	170	208	213	212	223	227	266	267
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)	8.4	7.2	7.5	7.2	7.7	7.7	7.9	8.0	7.5	7.8	7.9	7.8
6	TDS (mg/L)	188	65	68	139	110	135	140	130	146	147	173	173
7	Temp (deg C)	31.0	31.0	26.0	28.0	27.0	22.5	18.0	17.5	18.5	20.0	25.0	28.0
8	Turb (NTU)	0.0	255.0	382.0	109.0	96.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	7.0	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)	144	49	33	91	92	116	121	133	122	128	148	146
3	Ca (mg/L)	19	14	12	22	21	30	25	30	30	26	32	30
4	Cl (mg/L)	11.0	5.8	5.5	5.0	3.0	5.0	6.0	5.0	5.0	6.0	7.0	9.0
5	CO3 (mg/L)	8.5	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)	0.28	0.14	0.30	0.30	0.28	0.10	0.08	0.17	0.16	0.22	0.24	0.21
7	HCO3 (mg/L)	158	60	40	111	112	141	148	162	149	156	181	178
8	K (mg/L)	2.2	1.8	1.9	2.1	1.0	1.2	0.5	0.7	0.9	1.2	1.7	2.1
9	Mg (mg/L)	17.7	5.4	3.9	8.5	7.8	9.0	12.9	10.5	10.9	10.5	13.6	12.2
10	Na (mg/L)	11.7	1.5	4.8	5.3	3.3	3.7	4.5	6.7	6.9	8.0	9.8	14.2
11	NO2+NO3 (mg N/L)	0.01	0.90	1.05	1.04	0.58	0.29	0.15	0.10	0.22	0.21	0.24	0.10
12	NO2-N (mgN/L)	0.00	0.20	0.09	0.09	0.02	0.01	0.01	0.00	0.01	0.01	0.00	0.01
13	NO3-N (mgN/L)	0.01	0.70	0.96	0.96	0.57	0.27	0.14	0.10	0.22	0.20	0.23	0.10
14	o-PO4-P (mg P/L)	0.031	0.451	0.367	0.359	0.294	0.097	0.095	0.064	0.058	0.068	0.046	0.031
15	SiO2 (mg/L)	16.9	21.5	23.5	23.5	22.4	16.0	14.5	16.1	15.3	18.4	17.8	17.0
16	SO4 (mg/L)	2.6	15.5	18.4	19.0	13.7	10.9	10.4	7.5	6.4	4.8	4.6	1.9
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	0.4	0.9	0.7	0.6	0.4	0.5	1.0	1.1	1.2	1.3	1.3	1.6
2	COD (mg/L)	28.0	22.0	38.0	21.0	30.0	26.0	28.0	15.0	32.0	41.0	28.0	45.0
3	DO (mg/L)	3.9		5.5	6.0	5.6	6.7	6.8	6.9	5.2	5.4	5.1	
4	DO_SAT% (%)	52		68	77	70	77	72	71	55	59	62	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	48	34	30	54	52	76	62	74	76	66	81	76
2	HAR_Total (mgCaCO3/L)	122	56	46	89	84	113	116	117	122	110	138	126
3	Na% (%)	17	5	18	11	8	7	8	11	11	14	13	19
4	RSC (-)	0.5	0.0	0.0	0.0	0.2	0.1	0.1	0.3	0.0	0.4	0.2	0.4
5	SAR (-)	0.5	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.6

Water Quality Summary for the period : 2016-2017

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	286	99	208
3	pH_GEN (pH units)	12	8.4	7.2	7.7
4	TDS (mg/L)	12	188	65	135
5	Temp (deg C)	12	31.0	17.5	24.4
6	Turb (NTU)	12	382.0	0.0	70.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	7.0	0.0	0.6
2	ALK-TOT (mgCaCO3/L)	12	148	33	110
3	Ca (mg/L)	12	32	12	24
4	Cl (mg/L)	12	11.0	3.0	6.1
5	CO3 (mg/L)	12	8.5	0.0	0.7
6	F (mg/L)	12	0.30	0.08	0.21
7	HCO3 (mg/L)	12	181	40	133
8	K (mg/L)	12	2.2	0.5	1.4
9	Mg (mg/L)	12	17.7	3.9	10.2
10	Na (mg/L)	12	14.2	1.5	6.7
11	NO2+NO3 (mg N/L)	12	1.05	0.01	0.41
12	NO2-N (mgN/L)	12	0.20	0.00	0.04
13	NO3-N (mgN/L)	12	0.96	0.01	0.37
14	o-PO4-P (mg P/L)	12	0.451	0.031	0.163
15	SiO2 (mg/L)	12	23.5	14.5	18.6
16	SO4 (mg/L)	12	19.0	1.9	9.6
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.6	0.4	0.9
2	COD (mg/L)	12	45.0	15.0	29.5
3	DO (mg/L)	10	6.9	3.9	5.7
4	DO_SAT% (%)	10	77	52	66
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	81	30	61
2	HAR_Total (mgCaCO3/L)	12	138	46	103
3	Na% (%)	12	19	5	12
4	RSC (-)	12	0.5	0.0	0.2
5	SAR (-)	12	0.6	0.1	0.3

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	95.56	180.5	64.34	60.38		8.650	23.97	14.56	9.371		2.113	10.26	5.471	1.499	
2	EC_GEN (µmho/cm)	224	175	150	157	176	221	205	174	192	214	255	194	189	279	253
3	pH_GEN (pH units)	8.1	7.9	7.8	8.1	7.6	8.1	8.3	8.1	8.2	7.8	8.1	8.1	8.2	8.0	7.8
4	TDS (mg/L)	139	111	95	97	114	145	124	115	121	138	159	127	121	181	164
5	Temp (deg C)	28.2	21.1	27.8	27.9	28.6	19.9	20.4	20.3	20.5	19.1	25.8	25.3	25.8	25.8	24.3
6	Turb (NTU)	30.0	189.8	134.4	131.4	168.4	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	2.5	0.0	0.0	1.9	1.4	0.0	3.6	1.3	2.3	0.0	1.7	1.5	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	103	90	98	101	82	140	123	121	126	123	139	144	126	139	141
3	Ca (mg/L)	22	20	22	22	17	29	29	27	29	29	26	28	28	26	30
4	Cl (mg/L)	7.6	8.7	6.0	7.2	6.1	6.4	7.6	5.5	6.0	5.3	7.9	10.0	7.6	6.3	7.3
5	CO3 (mg/L)	3.0	0.0	0.0	2.3	1.7	0.0	4.4	1.5	2.8	0.0	2.0	1.8	0.0	0.0	0.0
6	F (mg/L)	0.08	0.28	0.21	0.36	0.26	0.21	0.10	0.21	0.15	0.13	0.18	0.14	0.14	0.22	0.22
7	HCO3 (mg/L)	119	110	120	119	96	171	141	144	148	150	166	172	154	169	172
8	K (mg/L)	2.1	2.8	2.5	2.2	1.8	1.0	0.8	0.9	1.1	0.8	1.5	1.3	1.6	1.8	1.6
9	Mg (mg/L)	10.4	7.5	10.2	9.4	8.7	10.9	9.2	13.0	12.8	10.8	11.8	12.0	12.1	14.5	12.1
10	Na (mg/L)	10.2	8.0	6.9	6.6	5.3	8.7	7.2	5.8	6.4	5.5	10.0	8.8	6.7	8.7	10.6
11	NO2+NO3 (mg N/L)	0.60	1.06	1.03	0.88	0.72	0.05	0.12	0.19	0.06	0.19	0.03	0.17	0.30	0.04	0.18
12	NO2-N (mgN/L)	0.03	0.05	0.03	0.01	0.08	0.01	0.05	0.02	0.01	0.01	0.01	0.03	0.05	0.01	0.01
13	NO3-N (mgN/L)	0.57	1.01	1.01	0.87	0.64	0.05	0.07	0.17	0.06	0.18	0.02	0.15	0.25	0.03	0.18
14	o-PO4-P (mg P/L)	0.005	0.203	0.332	0.203	0.300	0.033	0.045	0.089	0.075	0.079	0.179	0.046	0.108	0.070	0.048
15	SiO2 (mg/L)	24.0	21.6	21.1	20.9	21.6	21.6	26.2	19.6	19.5	15.5	23.3	20.4	19.6	19.6	17.7
16	SO4 (mg/L)	11.4	12.0	8.1	8.1	13.8	2.1	1.5	9.4	1.5	8.8	9.8	1.1	20.3	2.6	3.8
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.0	0.9	0.6	0.6	0.6	0.6	0.6	0.5	0.4	1.0	1.1	0.8	0.7	1.1	1.4
2	COD (mg/L)	22.4	30.0	30.6	28.0	27.8	33.8	21.8	30.0	27.5	25.3	26.3	25.3	35.7	26.3	38.0
3	DO (mg/L)	5.7	6.0	5.5	5.9	5.3	6.5	7.2	6.7	6.9	6.4	5.3	6.1	6.0	5.3	5.3
4	DO_SAT% (%)	73	66	69	76	67	72	79	74	76	69	65	74	74	64	61
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	56	49	54	56	43	71	74	67	72	72	65	71	70	65	74
2	HAR_Total (mgCaCO3/L)	99	81	96	95	80	117	112	121	125	117	114	121	120	126	124
3	Na% (%)	18	17	13	13	12	14	12	10	10	9	16	14	11	13	15
4	RSC (-)	0.3	0.2	0.1	0.1	0.1	0.5	0.2	0.1	0.1	0.1	0.5	0.5	0.1	0.3	0.3
5	SAR (-)	0.5	0.4	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.4

3.18 Narmada at Manot

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	B	A	A
	PHYSICAL												
1	Q (cumec)	0	27.68	287.2	228.4	268	32.49	16.7	11.45	6.12	5.52	2.65	0.8
2	Colour_Cod (-)	Clear	Clear	Brown	Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	343	228	167	185	114	240	253	364	252	244	264	271
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)	8.2	7.6	7.6	7.2	7.8	7.5	7.7	7.8	7.7	7.8	7.9	7.9
6	TDS (mg/L)	222	148	110	115	74	155	163	239	166	159	172	177
7	Temp (deg C)	28.0	29.0	25.0	26.0	25.0	24.0	17.0	18.0	18.0	19.0	23.5	24.0
8	Turb (NTU)	0.0	35.0	260.0	221.0	89.0	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)	182	114	98	79	99	134	143	154	143	136	154	154
3	Ca (mg/L)	28	20	20	18	24	30	30	31	35	30	31	36
4	Cl (mg/L)	10.0	5.2	5.0	3.0	4.0	7.0	7.0	6.0	5.0	6.0	6.0	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)	0.21	0.36	0.24	0.25	0.24	0.12	0.10	0.21	0.22	0.21	0.20	0.17
7	HCO3 (mg/L)	222	139	119	96	121	164	174	188	174	166	188	188
8	K (mg/L)	1.5	1.5	2.2	2.5	0.8	0.9	0.4	0.4	0.5	0.5	0.8	0.9
9	Mg (mg/L)	23.1	13.1	6.3	8.3	6.8	12.9	14.1	13.9	10.7	12.9	10.9	11.7
10	Na (mg/L)	11.6	7.6	7.1	7.8	3.1	4.7	5.6	8.7	9.1	9.4	10.0	13.6
11	NO2+NO3 (mg N/L)	0.02	1.88	1.28	1.29	0.79	0.25	0.17	0.11	0.17	0.16	0.17	0.11
12	NO2-N (mgN/L)	0.00	0.06	0.09	0.08	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
13	NO3-N (mgN/L)	0.02	1.82	1.20	1.21	0.77	0.24	0.15	0.11	0.16	0.15	0.16	0.10
14	o-PO4-P (mg P/L)	0.041	0.644	0.259	0.324	0.266	0.112	0.108	0.071	0.081	0.080	0.072	0.045
15	SiO2 (mg/L)	17.8	22.6	26.6	25.7	23.3	20.0	18.3	22.2	20.6	25.0	25.0	24.4
16	SO4 (mg/L)	2.9	19.3	20.5	21.3	16.1	12.0	11.6	9.2	8.3	7.1	6.8	4.4
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	1.0	1.3	0.6	0.8	1.4	0.7	0.5	1.4	0.9	1.5	1.2	1.1
2	COD (mg/L)	41.0	31.0	46.0	43.0	70.0	45.0	36.0	43.0	39.0	46.0	39.0	35.0
3	DO (mg/L)	5.0	5.0	4.9	6.0	5.7	7.0	7.0	7.1	5.4	5.6	5.3	
4	DO_SAT% (%)	64	65	59	74	69	83	72	75	57	60	62	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	71	50	50	46	59	75	75	77	88	75	79	89
2	HAR_Total (mgCaCO3/L)	167	105	76	80	87	129	134	134	133	128	124	138
3	Na% (%)	13	13	16	17	7	7	8	12	13	14	15	18
4	RSC (-)	0.3	0.2	0.4	0.0	0.2	0.1	0.2	0.4	0.2	0.2	0.6	0.3
5	SAR (-)	0.4	0.3	0.4	0.4	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5

Water Quality Summary for the period : 2016-2017

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	364	114	244
3	pH_GEN (pH units)	12	8.2	7.2	7.7
4	TDS (mg/L)	12	239	74	158
5	Temp (deg C)	12	29.0	17.0	23
6	Turb (NTU)	12	260.0	0.0	50.4
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	182	79	132
3	Ca (mg/L)	12	36	18	28
4	Cl (mg/L)	12	10.0	3.0	5.9
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.36	0.10	0.21
7	HCO3 (mg/L)	12	222	96	162
8	K (mg/L)	12	2.5	0.4	1.1
9	Mg (mg/L)	12	23.1	6.3	12
10	Na (mg/L)	12	13.6	3.1	8.2
11	NO2+NO3 (mg N/L)	12	1.88	0.02	0.53
12	NO2-N (mgN/L)	12	0.09	0.00	0.03
13	NO3-N (mgN/L)	12	1.82	0.02	0.51
14	o-PO4-P (mg P/L)	12	0.644	0.041	0.175
15	SiO2 (mg/L)	12	26.6	17.8	22.6
16	SO4 (mg/L)	12	21.3	2.9	11.6
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	1.5	0.5	1
2	COD (mg/L)	12	70.0	31.0	42.8
3	DO (mg/L)	11	7.1	4.9	5.8
4	DO_SAT% (%)	11	83	57	67
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	89	46	69
2	HAR_Total (mgCaCO3/L)	12	167	76	120
3	Na% (%)	12	18	7	13
4	RSC (-)	12	0.6	0.0	0.3
5	SAR (-)	12	0.5	0.1	0.3

Water Quality Seasonal Average for the period : 2012-2017

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				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	100.7	140.8	78.22	59.96		13.75	32.05	23.78	11.70		4.487	9.246	8.394	2.726	
2	EC_GEN (µmho/cm)	254	202	176	151	207	240	219	213	208	277	255	198	193	304	260
3	pH_GEN (pH units)	8.2	8.0	7.8	8.0	7.7	8.0	8.2	7.7	8.3	7.7	8.2	8.2	8.2	8.0	7.9
4	TDS (mg/L)	156	128	113	94	134	159	136	141	133	181	159	127	124	197	169
5	Temp (deg C)	27.4	26.2	27.7	27.7	26.6	18.4	20.0	20.0	19.5	19.3	24.7	25.2	23.5	20.3	22.2
6	Turb (NTU)	24.0	139.4	97.2	273.8	121.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	3.5	1.5	0.0	1.0	0.0	0.0	2.2	0.0	4.6	0.0	2.6	1.5	3.3	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	131	102	114	100	114	156	133	121	142	143	139	140	133	156	148
3	Ca (mg/L)	23	23	25	23	22	29	30	31	28	32	26	28	29	27	32
4	Cl (mg/L)	7.8	8.3	6.8	6.3	5.4	7.0	8.0	7.6	7.8	6.3	9.9	10.6	6.8	7.3	6.3
5	CO3 (mg/L)	4.2	1.9	0.0	1.2	0.0	0.0	2.6	0.0	5.6	0.0	3.1	1.8	4.0	0.0	0.0
6	F (mg/L)	0.22	0.23	0.21	0.17	0.26	0.21	0.18	0.18	0.15	0.16	0.13	0.13	0.11	0.26	0.19
7	HCO3 (mg/L)	151	121	139	119	139	191	157	148	163	175	163	167	154	190	181
8	K (mg/L)	1.4	2.8	2.7	2.5	1.7	0.7	0.7	0.6	0.7	0.5	1.0	0.7	1.0	1.0	0.8
9	Mg (mg/L)	12.3	8.6	10.7	9.3	11.5	13.3	14.6	12.0	16.0	12.9	11.1	12.3	12.1	16.5	11.8
10	Na (mg/L)	9.9	8.4	7.6	6.2	7.4	8.6	7.4	6.5	8.2	7.0	10.3	8.9	7.2	9.8	11.0
11	NO2+NO3 (mg N/L)	0.63	1.25	1.17	0.82	1.05	0.03	0.15	0.42	0.07	0.17	0.02	0.17	0.33	0.05	0.15
12	NO2-N (mgN/L)	0.01	0.06	0.02	0.02	0.05	0.00	0.06	0.02	0.01	0.01	0.01	0.02	0.05	0.01	0.01
13	NO3-N (mgN/L)	0.62	1.19	1.14	0.80	1.00	0.03	0.09	0.39	0.07	0.16	0.01	0.15	0.27	0.04	0.14
14	o-PO4-P (mg P/L)	0.009	0.191	0.404	0.324	0.307	0.037	0.044	0.147	0.102	0.093	0.119	0.051	0.141	0.082	0.066
15	SiO2 (mg/L)	28.3	22.8	23.1	19.7	23.2	27.4	28.2	31.8	21.3	20.3	23.5	21.9	23.8	20.8	24.8
16	SO4 (mg/L)	6.4	12.9	10.1	8.8	16.0	2.4	1.7	30.0	1.8	10.3	17.6	1.5	25.9	3.0	6.1
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	0.9	0.8	1.3	0.5	1.0	0.5	0.7	0.8	0.6	0.9	1.3	1.4	1.1	1.0	1.3
2	COD (mg/L)	22.2	33.0	30.6	33.0	46.2	21.8	28.3	36.5	28.8	40.8	25.3	19.0	28.7	35.7	40.0
3	DO (mg/L)	6.0	6.1	5.7	6.1	5.3	6.6	7.2	7.2	7.3	6.6	5.8	6.6	6.6	5.9	5.5
4	DO_SAT% (%)	76	75	72	78	66	71	79	78	80	72	69	79	77	65	61
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	58	58	62	58	55	72	74	79	70	79	66	70	72	68	81
2	HAR_Total (mgCaCO3/L)	109	94	107	97	103	128	135	129	136	133	112	122	122	136	130
3	Na% (%)	16	16	12	12	13	13	11	10	12	10	17	14	11	14	15
4	RSC (-)	0.4	0.2	0.2	0.1	0.2	0.6	0.1	0.1	0.2	0.2	0.6	0.4	0.2	0.4	0.4
5	SAR (-)	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4

3.19 Narmada at Dindori

History Sheet

			Water Year	**:**	**2016-2017**
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 : 2016-2017

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

Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water Analysis

S.No	Parameters	01/06/2016	01/07/2016	01/08/2016	01/09/2016	03/10/2016	01/11/2016	01/12/2016	02/01/2017	01/02/2017	01/03/2017	03/04/2017	01/05/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	3.55	4.72	42.78	116.67	156.44	11.72	6.11	4.26	3.49	2.97	2.85	2.12
2	Colour_Cod (-)	Clear	Brown	Dark Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_GEN (µmho/cm)	235	253	177	230	229	227	285	388	300	267	302	294
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)	8.1	7.5	7.2	7.1	7.6	7.6	7.1	7.3	7.6	7.4	7.7	7.6
6	TDS (mg/L)	153	164	121	148	148	149	181	258	198	179	198	199
7	Temp (deg C)	27.5	27.0	25.5	26.0	26.5	21.0	15.0	18.0	17.0	21.5	23.0	26.0
8	Turb (NTU)	0.0	240.0	370.0	118.0	85.0	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)	111	116	109	84	120	120	175	157	148	154	157	154
3	Ca (mg/L)	24	29	22	21	30	24	35	40	35	30	32	32
4	Cl (mg/L)	9.0	5.6	5.1	7.0	8.0	5.0	7.0	8.0	8.0	7.0	11.0	10.0
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)	0.18	0.38	0.18	0.20	0.17	0.11	0.09	0.19	0.21	0.26	0.26	0.23
7	HCO3 (mg/L)	135	142	133	102	146	147	213	191	181	188	191	188
8	K (mg/L)	1.8	2.5	2.7	2.4	0.9	0.9	0.8	0.7	0.7	0.8	1.6	1.5
9	Mg (mg/L)	13.9	9.2	6.3	11.2	9.7	16.0	15.3	10.7	13.4	14.6	14.6	16.3
10	Na (mg/L)	6.3	6.2	6.4	6.6	4.4	4.3	6.8	10.3	9.4	10.8	13.5	16.5
11	NO2+NO3 (mg N/L)	0.07	1.27	1.17	1.19	0.85	0.41	0.22	0.29	0.23	0.23	0.26	0.15
12	NO2-N (mgN/L)	0.01	0.01	0.07	0.07	0.04	0.03	0.03	0.17	0.02	0.02	0.02	0.01
13	NO3-N (mgN/L)	0.06	1.26	1.10	1.12	0.81	0.38	0.19	0.12	0.21	0.21	0.25	0.13
14	o-PO4-P (mg P/L)	0.179	0.486	0.124	0.218	0.153	0.118	0.111	0.077	0.114	0.091	0.084	0.070
15	SiO2 (mg/L)	18.7	23.7	29.0	27.1	25.4	20.8	19.2	17.3	15.6	18.6	18.8	18.2
16	SO4 (mg/L)	3.2	22.5	27.8	27.1	20.5	13.0	12.7	10.5	9.8	8.2	7.9	6.2
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)	0.8	1.4	0.8	1.2	0.4	1.3	1.1	1.3	1.4	1.6	2.9	2.2
2	COD (mg/L)	32.0	42.0	33.0	29.0	56.0	44.0	61.0	54.0	43.0	59.0	47.0	33.0
3	DO (mg/L)	3.0	3.3	4.7	5.0	5.5	6.8	6.0	5.5	4.4	4.5	3.9	
4	DO_SAT% (%)	38	41	57	62	68	76	60	58	46	51	45	
	TRACE & TOXIC												
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	60	72	56	53	76	59	87	100	86	74	81	80
2	HAR_Total (mgCaCO3/L)	118	110	82	99	117	126	151	144	142	135	141	147
3	Na% (%)	10	11	14	12	8	7	9	13	13	15	17	20
4	RSC (-)	0.0	0.1	0.5	0.0	0.1	0.0	0.5	0.3	0.1	0.4	0.3	0.2
5	SAR (-)	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.4	0.3	0.4	0.5	0.6

Water Quality Summary for the period : 2016-2017

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	388	177	266
3	pH_GEN (pH units)	12	8.1	7.1	7.5
4	TDS (mg/L)	12	258	121	175
5	Temp (deg C)	12	27.5	15.0	22.8
6	Turb (NTU)	12	370.0	0.0	67.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	175	84	134
3	Ca (mg/L)	12	40	21	29
4	Cl (mg/L)	12	11.0	5.0	7.6
5	CO3 (mg/L)	12	0.0	0.0	0
6	F (mg/L)	12	0.38	0.09	0.21
7	HCO3 (mg/L)	12	213	102	163
8	K (mg/L)	12	2.7	0.7	1.4
9	Mg (mg/L)	12	16.3	6.3	12.6
10	Na (mg/L)	12	16.5	4.3	8.5
11	NO2+NO3 (mg N/L)	12	1.27	0.07	0.53
12	NO2-N (mgN/L)	12	0.17	0.01	0.04
13	NO3-N (mgN/L)	12	1.26	0.06	0.49
14	o-PO4-P (mg P/L)	12	0.486	0.070	0.152
15	SiO2 (mg/L)	12	29.0	15.6	21
16	SO4 (mg/L)	12	27.8	3.2	14.1
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	2.9	0.4	1.4
2	COD (mg/L)	12	61.0	29.0	44.4
3	DO (mg/L)	11	6.8	3.0	4.8
4	DO_SAT% (%)	11	76	38	55
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	100	53	74
2	HAR_Total (mgCaCO3/L)	12	151	82	126
3	Na% (%)	12	20	7	12
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 : 2012-2017

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

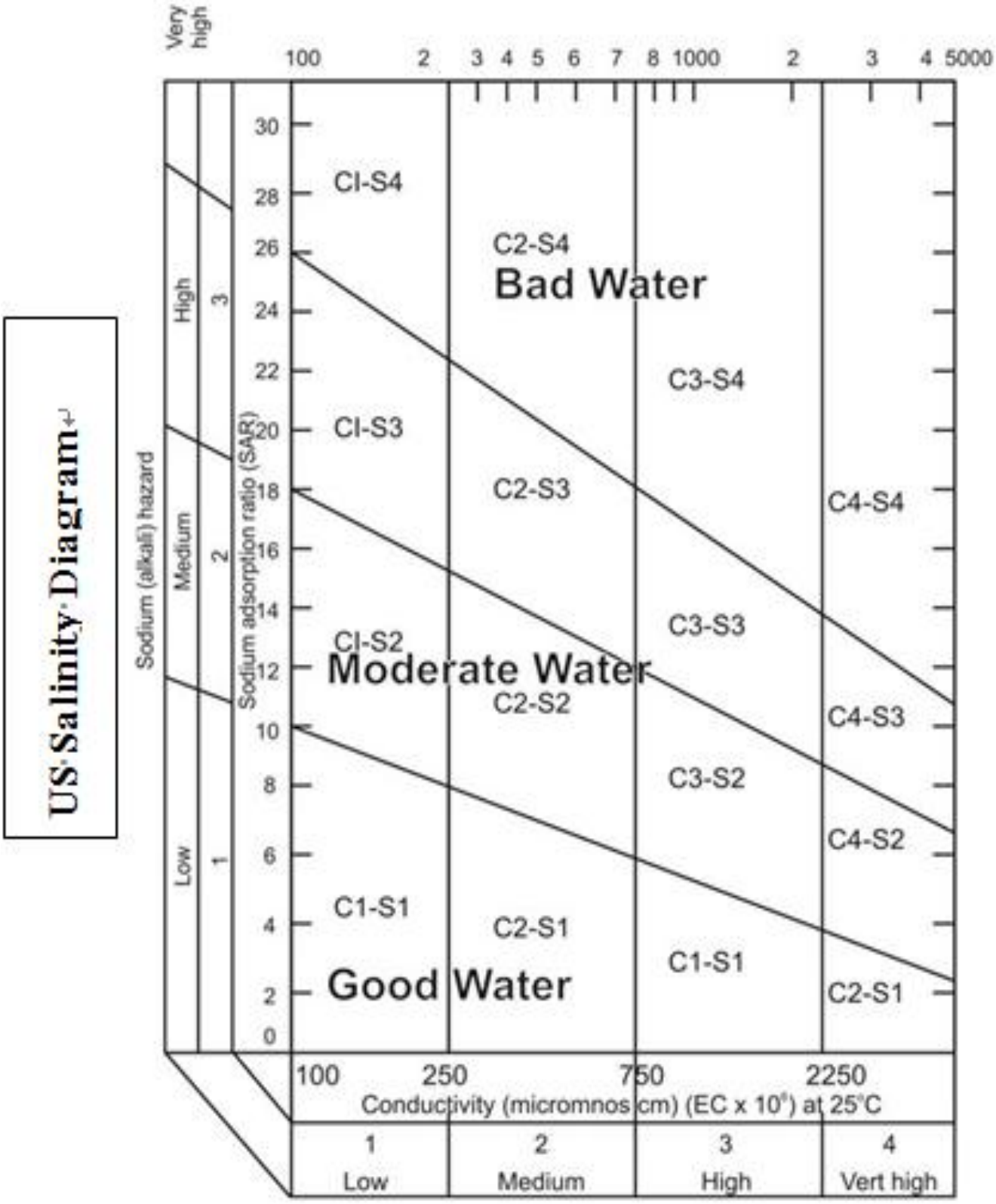
Local River : Narmada Sub-Division : UNSD, Jabalpur

River Water

S.No	Parameters	Flood					Winter					Summer				
		Jun - Oct					Nov - Feb					Mar - May				
		2012	2013	2014	2015	2016	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2013	2014	2015	2016	2017
	PHYSICAL															
1	Q (cumec)	36.42	145.7		20.07		4.811	16.50		5.603		1.533	5.466		1.864	
2	EC_GEN (µmho/cm)	289	215	192	198	225	260	245	326	241	300	269	221	217	323	288
3	pH_GEN (pH units)	8.0	7.6	7.8	7.9	7.5	7.8	8.1	8.1	8.1	7.4	8.0	7.9	8.1	7.9	7.5
4	TDS (mg/L)	166	136	124	124	147	171	154	216	152	197	168	142	139	210	192
5	Temp (deg C)	26.2	25.7	28.9	26.4	26.5	20.4	18.4	17.3	18.0	17.8	22.9	23.0	22.0	22.3	23.5
6	Turb (NTU)	21.0	194.4	131.8	57.0	162.6	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CHEMICAL															
1	Alk-Phen (mgCaCO3/L)	1.0	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
2	ALK-TOT (mgCaCO3/L)	133	105	125	122	108	157	141	177	154	150	146	153	144	157	155
3	Ca (mg/L)	26	24	26	26	25	33	34	44	34	33	27	29	31	31	31
4	Cl (mg/L)	9.2	9.3	8.3	7.0	6.9	7.0	8.1	16.1	8.0	7.0	9.5	11.8	7.7	9.0	9.3
5	CO3 (mg/L)	1.2	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
6	F (mg/L)	0.23	0.20	0.21	0.17	0.22	0.23	0.17	0.30	0.15	0.15	0.21	0.24	0.14	0.27	0.25
7	HCO3 (mg/L)	159	128	152	149	132	192	169	216	188	183	178	187	172	191	189
8	K (mg/L)	1.9	3.0	1.9	2.4	2.0	0.8	0.8	0.8	1.1	0.8	1.1	1.0	1.1	1.7	1.3
9	Mg (mg/L)	14.9	9.1	12.6	12.5	10.1	12.5	13.9	18.1	15.8	13.9	13.9	14.9	14.3	14.3	15.1
10	Na (mg/L)	10.8	9.4	8.1	9.0	6.0	10.9	9.7	19.6	8.8	7.7	10.9	9.8	7.8	12.1	13.6
11	NO2+NO3 (mg N/L)	1.02	1.26	1.37	1.57	0.91	0.11	0.33	3.78	0.33	0.29	0.18	0.32	0.34	0.12	0.21
12	NO2-N (mgN/L)	0.19	0.11	0.04	0.11	0.04	0.04	0.18	0.03	0.14	0.06	0.05	0.02	0.06	0.02	0.02
13	NO3-N (mgN/L)	0.84	1.15	1.33	1.46	0.87	0.07	0.15	3.74	0.19	0.22	0.12	0.30	0.28	0.11	0.20
14	o-PO4-P (mg P/L)	0.012	0.188	0.231	0.283	0.232	0.044	0.075	0.139	0.087	0.105	0.136	0.054	0.163	0.132	0.082
15	SiO2 (mg/L)	26.4	28.7	23.4	17.9	24.8	26.0	30.0	19.1	16.6	18.2	25.8	25.0	24.6	20.3	18.5
16	SO4 (mg/L)	10.5	21.3	10.2	12.1	20.2	1.8	3.1	29.9	2.7	11.5	4.5	1.8	20.0	3.1	7.4
	BIOLOGICAL/BACTERIOLOGICAL															
1	BOD3-27 (mg/L)	1.3	1.2	1.4	1.0	0.9	0.8	1.8	0.6	1.3	1.3	1.2	1.7	1.2	1.9	2.2
2	COD (mg/L)	23.4	32.4	34.6	30.2	38.4	27.8	26.8	36.0	33.0	50.5	21.3	27.7	34.3	33.7	46.3
3	DO (mg/L)	5.0	5.2	4.7	5.0	4.3	6.4	6.4	7.1	5.3	5.7	4.5	5.2	5.5	6.0	4.2
4	DO_SAT% (%)	61	63	61	61	53	71	67	74	56	60	51	60	62	69	48
	TRACE & TOXIC															
	CHEMICAL INDICES															
1	HAR_Ca (mgCaCO3/L)	65	61	66	65	63	83	85	111	85	83	67	73	78	76	78
2	HAR_Total (mgCaCO3/L)	127	99	118	118	105	135	143	186	151	141	125	135	138	136	141
3	Na% (%)	15	16	12	14	11	15	13	15	11	10	16	14	11	16	17
4	RSC (-)	0.2	0.2	0.2	0.1	0.1	0.5	0.1	0.1	0.2	0.2	0.4	0.4	0.1	0.4	0.3
5	SAR (-)	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.5	0.3	0.3	0.4	0.4	0.3	0.4	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

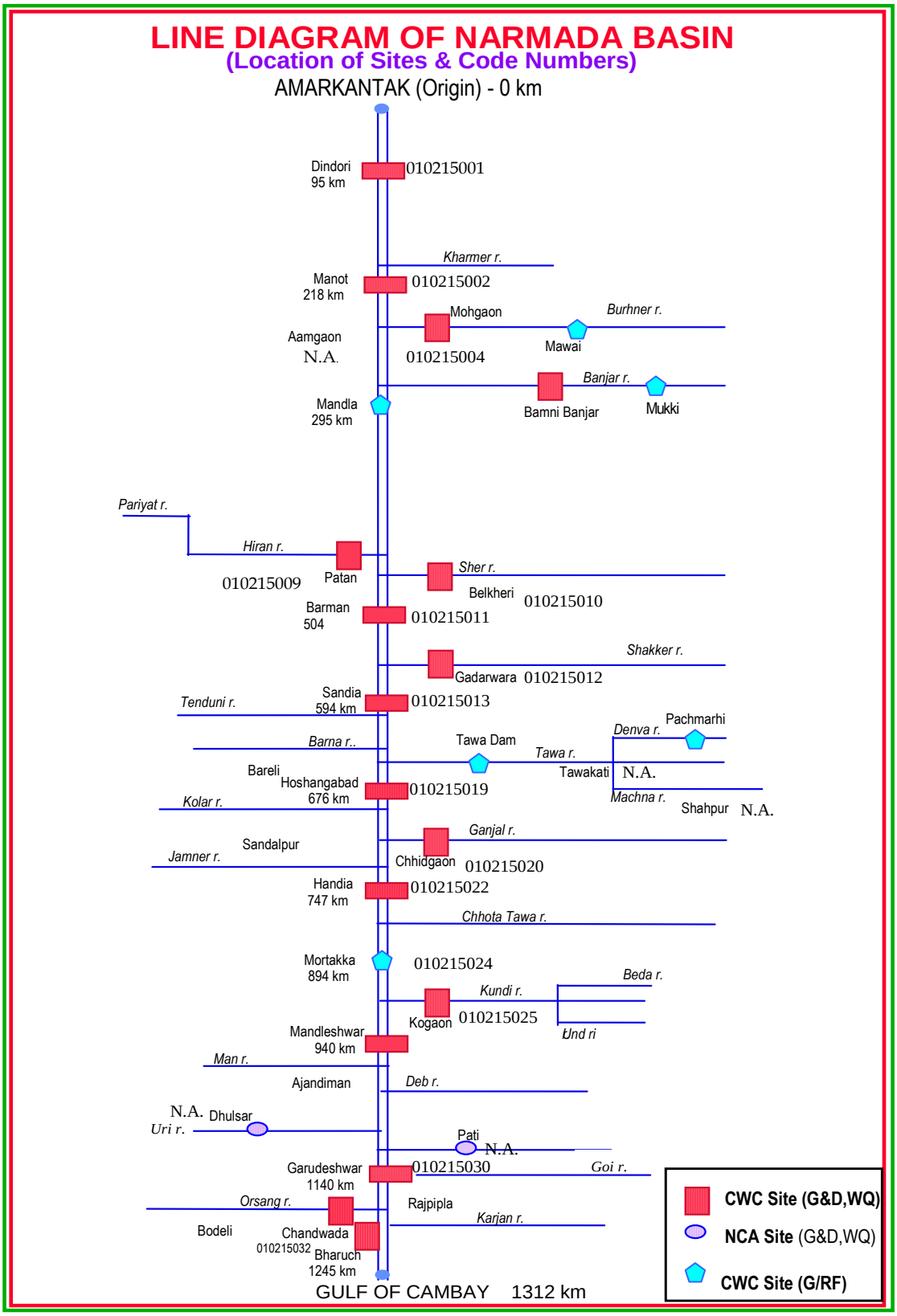


Plate 2: Index Map of Narmada Basin