खंड–4
(केवल कार्यालय उपयोग हेतु)

Volume-IV
(FOR OFFICIAL USE ONLY)

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
जल संसाधन नदी विकास और गंगा संरक्षण मंत्रालय
MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION
केन्द्रीय जल आयोग
CENTRAL WATER COMMISSION

जलवर्ष पुस्तिका
WATER YEAR BOOK
(जून 2015 - मई 2016) (June 2015 – May 2016)
वंषधारा,ऋषिकुल्या,सारदा एंव नागावली बेसिन
VAMSADHARA, RUSHIKULYA, NAGAVALI & SARADA BASIN

जल विज्ञानीय प्रेक्षण परिमंडल
HYDROLOGICAL OBSERVATION CIRCLE
भुवनेश्वर (BHUBANESWAR)

February: 2017

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जलवर्ष पुस्तिका

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वंषधारा,रूषिकुल्या,सारदा एंव नागावली बेसिन

VAMSADHARA, RUSHIKULYA, NAGAVALI & SARADA BASIN

FOREWORD

Proper assessment, analysis and compilation of hydro-meteorological data are essential for planning and management of precious water resources, which is vital not only for economic development but also for providing basic needs for such a large population of our country. Water reaches the land-mass through precipitation, a part of which evaporates, a portion of it percolates into ground as natural ground water and the excess runoff flows through rivulets and rivers and drain into the sea. Central Water Commission (CWC), an apex technical Organisation of Government of India for surface water resources, carries out systematic collection of hydro-meteorological data and assessment of surface water as one of its prime functions.

Hydro-meteorological observation stations have been established by CWC in almost all the river basins of India in a phased manner. These are further modernised and strengthened under various schemes. In the process, additional Divisions, Circles and Regional offices have been set up on a basin-wise concept.

The basin encompassing the east flowing rivers in-between the Ganga and the Godavari basins viz. Subarnarekha, Burhabalang, Baitarani, Brahmani, Mahanadi, Rushikulya, Vamsadhara, Nagavali and Sarada has been identified as Mahanadi and Eastern Rivers Basin which is dealt by Mahanadi and Eastern Rivers Organisation (MERO), CWC, Bhubaneswar. Hydrological Observation Circle (HOC), Bhubaneswar under MERO carries out hydrological observation and flood forecasting activities in these 9 river basins flowing mainly through Odisha along with its neighbouring States of Jharkhand, Chattisgarh, Andhra Pradesh and West Bengal through two Divisions under its jurisdiction viz. Mahanadi Division (MD), Burla and Eastern Rivers Division (ERD), Bhubaneswar.

There are a total of 104 observation stations under MERO. Systematic gauge and discharge observations are regularly conducted at 42 hydrological stations (out of the above 104) throughout the year. Sediment, Water Quality and Meteorological data are also observed at some of the stations. After scrutiny and checking, the collected & processed data are stored in a database through a custom made software “Surface Water Data Entry System (SWDES) and published in the form of Water Year Books. The present publication of Water Year Book contains Hydrological, Sediment and Water Quality data for the hydrological year 2015-16, i.e. from June 2015 to May 2016.

Water Year Book pertaining to the Hydrological Observation Circle, CWC, Bhubaneswar is published in four volumes. While Volume-I incorporates data of Mahanadi basin, Volume-II contains data of Brahmani basin, Volume-III of Subarnarekha, Burhabalang & Baitarani basins and Volume-IV of Rushikulya, Vamsadhara, Nagavali and Sarada basins. Each Volume contains Discharge data as Section-I, Sediment data as Section-II and Water Quality data as Section-III for respective river basins.

This Volume-IV covers hydrological, sediment and water quality data for Water Year 2015-16 of five sites of Rushikulya, Vamsadhara, Nagavali and Sarada river basins alongwith salient features and other important statistical information. Sincere effort put in by the officers and staff of ERD, CWC, Bhubaneswar namely, Smt.Dr. Shanthala Devi B.S, Extra Assistant Director and S.S. Mohanty, Senior Computer of Hydromet Sections under the able leadership of Shri N.C. Nanda, Executive Engineer, in collecting & processing the data and bringing out this publication is highly commendable. The guidance and encouragement of Shri A.K.Nayak, Chief Engineer, MERO, Bhubaneswar and co-operation of the officials of H.O. Circle and Chief Engineer’s office are duly acknowledged.

Place: Bhubaneswar
Date: February,2017

(D.K. Jena)
Superintending Engineer
HOC, CWC
Bhubaneswar

LIST OF ABBREVIATIONS USED:

General:

CWC	:	Central Water Commission
H.P.	:	Hydrology Project
IMD	:	India Meteorological Department
msl	:	mean sea level
Q	:	Discharge
WL	:	Water level

Type of station:

G	:	Gauge (Water Level)
D	:	Discharge (Average discharge passing across a cross section of the river
S	:	Sediment (suspended sediment load)
Q	:	Water Quality

Units:

m	:	meter
mm	:	milli meter
km	:	kilometer
s	:	second
MCM	:	million cubic meters
MT	:	metric tonne
g	:	gramme
l	:	litre

CONTENTS

(VOLUME-IV)

VAMSADHARA, RUSHIKULYA, NAGAVALI & SARADA BASINS

VAMSHADHARA BASIN

VAMSADHARA BASIN

1. GENERAL

1.1 Introduction

Vamsadhara river is an important east flowing river between Mahanadi and Godavari. The river originates near Lanjigarh village in Kalahandi district (Odisha) and runs for a total distance of about 254 km before it joins the Bay of Bengal at Kalingapatnam (Andhra Pradesh). The basin is narrow and undulated. It is situated within the geographical co-ordinates of 18°15′ to 19°55′ north latitudes and 83°20′ to 84°20′ east longitudes. The total catchment area of this basin works out to 10830 sq. km. The state-wise break-up is as follows:-

Sl. No.	Name of State	Catchment Area (sq. km)	Percentage of total catchment area
1.	Odisha	8,015	74
2.	Andhra Pradesh	2,815	26
	Total	**10,830**	**100**

Basin Map of Vamsadhara river system showing the various hydrological and hydro meteorological observation stations maintained by CWC, State Government and India Meteorological Department is enclosed herewith. Central Water Commission is maintaining 7 sites, out of which 1 is of GDSQ type, 1 of G&D type, and balance 5 of G type.

1.2 River system.

The Vamsadhara River is joined by six principal tributaries. Details for the same are tabulated below.

Name of River	River/Tributary	Length (km)	Catchment area (sq.km)	Percentage of total catchment area
Vamsadhara	Main Stream	254	5,458	50.4
Chauldua	Left Tributary	60	768	7.1
Phalphalia	Left Tributary	50	524	4.8
Ganguda(Harbhangi)	Left Tributary	85	1,689	15.6
Sanna Nadhi	Left Tributary	100	1,276	11.8
Mahendrathanaya	Left Tributary	70	1,115	10.3
	Total		**10,830**	**100.0**

1.3 Climatic Characteristics.

The climate in the basin is characterized by hot summers and mild winters. The basin is influenced by the south-west monsoon during June to November and occasional cyclones due to formation of depressions in the Bay of Bengal. The average annual rainfall is around 1400 mm. The maximum temperature in the plains of the basin rises up to 43 ^{0}C during May and goes down to 12 ^{0}C in December-January. The humidity during monsoon is as high as 95% to 96%. Due to topographical and other characters of the basin, the run-off time is limited, thus creating flash floods.

1.4 Geology

The basin surface is mostly covered with Kankar and Murum. The important minerals found in the Vamsadhara basin are Manganese, Graphite, Quartz, Lime Stone, Mica and Bauxite besides building materials. Manganese Ore is available extensively in Srikakulam (Andhra Pradesh) and Koraput (Odisha).

1.5 Site Details

Sl. No.	Name of Project	River	Status
1	Harbhangi	Harbhangi	Existing
2	Badanalla	Badanalla	Existing
3	Gotta Barrage	Vamsadhara	Existing
4	Chelligarha	Badajore	Under Construction

2. STREAM FLOW DATA

2.1 Methodology

Area-velocity method is generally adopted for measuring discharge at sites. Cup type current meter is used to measure the velocity of the flow and the depth is measured by using sounding rod for depths upto 3 m and by log line beyond 3 m. Discharge by area velocity method is being observed once in a day starting at 0800 Hrs. at all the sites except on Sundays and holidays. Besides, silt and water quality observation are also being carried out at CWC sites as list above.

The observed stage and discharge figures for each season (monsoon and non-monsoon) are plotted and a mean Stage V/s. Discharge curve is drawn, giving due attention to the scattered points with reference to area, velocity etc.

The factors responsible for the shifting of the curves are also taken care of by studying the river cross section at regular intervals and with super imposition of previous years' Stage V/s. Discharge curves. Accordingly, the trend of the current curve is finalised. Finally, the discharges of the non observed days are computed from these Stage V/s. Discharge Curves.

2.2Data Availability

Details of data availability for Vamsadhara Basin is tabulated below:

Sl. No.	Code No.	Station Name	Type	Data available From	To
1.	AV000K9	Gunupur	G&D	G -19.04.78 D -01.06.01	Continuing -do-
2.	AV000J4	Kashinagar	GDSQ	G -20.03.71 D -28.04.71 S - 13.10.72 Q -01.09.72	Continuing -do- -do- -do-
3.	KUTRAGADA	Kutragada	G	G -08.06.87	Continuing
4.	GUDARI	Gudari	G	G -02.07.78	Continuing
5.	MAHENDRAGARH	Mahendragarh	G	G -01.06.87	Continuing
6.	MOHANA	Mohana	G	G -26.05.87	Continuing
7.	GOTTA BARRAGE	Gottabarrage	G	G -01.06.77	Continuing

2.3 Explanatory Notes on Water Year Book

SWDES (Surface Water Data Entry Software), a custom made software for processing hydrological data, has been used for preparation of this volume. The explanatory notes described below can be used for interpretation of data presented in this volume.

i) Water Year ranges from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.

ii) Discharge is given in cubic meters per second.

iii) Discharges are expressed as 0.000 when river bed is dry and 0.000 N.F. when velocity is observed as 'NIL'.

iv) The zero R.L. of gauge is a datum level fixed for given site, which is kept 1 or 2 m lower than the lowest water level recorded in a perennial stream. In a non-perennial stream, it is kept 1 or 2 m lower than the lowest bed level of the stream.

v) Discharges are rounded off as per standard practice.

vi) Runoff in mm is the notional depth of water in millimeters over the catchment, equivalent to annual runoff volume calculated at the discharge measurement station. It is computed using the relation:

$$\text{Runoff (mm)} = \frac{\text{Annual runoff } (Mm^3) \times 1000}{\text{Catchment area } (km^2)}$$

vii) Peak and lowest flow correspond to the highest and lowest water levels recorded from 'SWDES' entered data.

viii) Measuring Authority refers to the field division of Central Water Commission (Eastern Rivers Division) responsible for the operation of the gauging station.

ix) The gauging station code number is a unique seven column alphanumeric reference number which facilitates storage and retrieval of flow data in data base. The first column is identifier of either an integral river basin or, for the sake of convenience, a region having several contiguous river catchments. This is followed by a column which identifies an independent river system which either has one or more outlets to the sea or crosses international border to enter another country. The third, fourth and fifth column spaces denote first, second and third order tributaries, respectively, from the mouth upstream. The sixth and seventh column spaces indicate the location of the gauging station in one of the 225 slots earmarked on the river. The blank column spaces are filled by zero.

3. HYDROLOGICAL DATA

This volume contains the following information for each site stated above:

i. History Sheet: Site Name, State, District, River Basin, Tributary, Sub-Tributary, Catchment Area, Latitude / Longitude, Opening / Closing date for various types of data.

ii. Annual maximum/minimum discharge since period of observation.

iii. Daily Water level and observed/ computed discharge data including 10-daily, monthly and annual totals etc.

iv. Histogram and Hydrograph showing current year monthly mean discharges, Historical monthly mean discharges, historical monthly minimum and monthly maximum discharges.
v. Histogram showing Annual Run off volume since beginning of observation.
vi. Pie-Chart showing monthly mean run off (as percentage of Annual Run off) historical for the current year.
vii. Plot of Pre and Post Monsoon Cross-section of the rivers for current year.
viii. Water Level hydrograph for 3(three) major flood events of current year.

4. SEDIMENT DATA (In case of Sediment Observation sites)

The frequency of sediment observation is carried out daily during monsoon season and once in a week (on Monday) during the non-monsoon period. Data for non-observed days is estimated/ interpolated from the relationship of discharge v/s. sediment load, prepared on the basis of observed sediment concentration and weighted mean discharge of the same year.

Sediment samples are collected from 0.6 depth, using Punjab type bottle sampler, from all the verticals along the hydrological observation sections where velocity is observed for computation of discharge. The collected samples from all the segments are combined in 3 to 7 groups having compartments or groups of equal or nearly equal discharges for analysis. Quantum of suspended sediment load is estimated in three grades, viz. Coarse, Medium and Fine. Coarse and medium grades are separated by sieving process and the fine grade by filtration of left over samples after sieving through filter paper. Grade wise concentration is derived gravimetrically as per standard procedure. The following parameters are derived and recorded:

- Daily Observed suspended sediment (g/l).
- Corresponding discharge.
- Average sediment load in tonnes/day (10 daily & monthly basis).
- Annual sediment load for the current year.
- Annual & Seasonal sediment load and the corresponding volume of inflow for all the years since inception.
- Grain size distribution of bed load.

5. WATER QUALITY DATA (In case of Water Quality Observation sites)

The water samples are collected at a regular interval of once in a month for trend stations and once in two month for base station (on 1st working day, from the main flowing segment of the stream just below the water surface (20 to 30 cm) on the Station Gauge line where depth of flow and velocity are maximum, preferably in the mid stream. The water samples are collected in the pre-rinsed and cleaned one-litre capacity polythene bottle having double stopper (inside and outside) facility. Sampling bottle is filled to its full capacity without entrapping air bubbles inside.

After sampling, the collected samples are sent to the Water Quality Laboratory (Level-II) based at Bhubaneswar (under the Eastern Rivers Division) and to Raipur laboratory (under Mahanadi Division, Burla), along with in-situ physical characteristics, for analysis. The samples received from the sites are preserved in a refrigerator in the water quality laboratories for analysis**.**

Analysis of parameters, namely pH, Electrical conductivity, Sodium, Potassium, Iron, Aluminum, Ammonia, Fluoride, Nitrate, Nitrite, Phosphate, Silicate, Boron, Sulphate, Calcium, Magnesium, Carbonate, Bi-carbonate, Chloride, Dissolved Oxygen, BOD and COD,

are carried out at the Level II laboratory by using standard methodology. Micro biological parameters like total colliform and faecal colliform are also being analyzed. For analysis of trace and toxic elements, samples are sent to Level-II+ laboratory at Hyderabad once in a year, in the month of April.

The following parameters are analyzed and recorded:

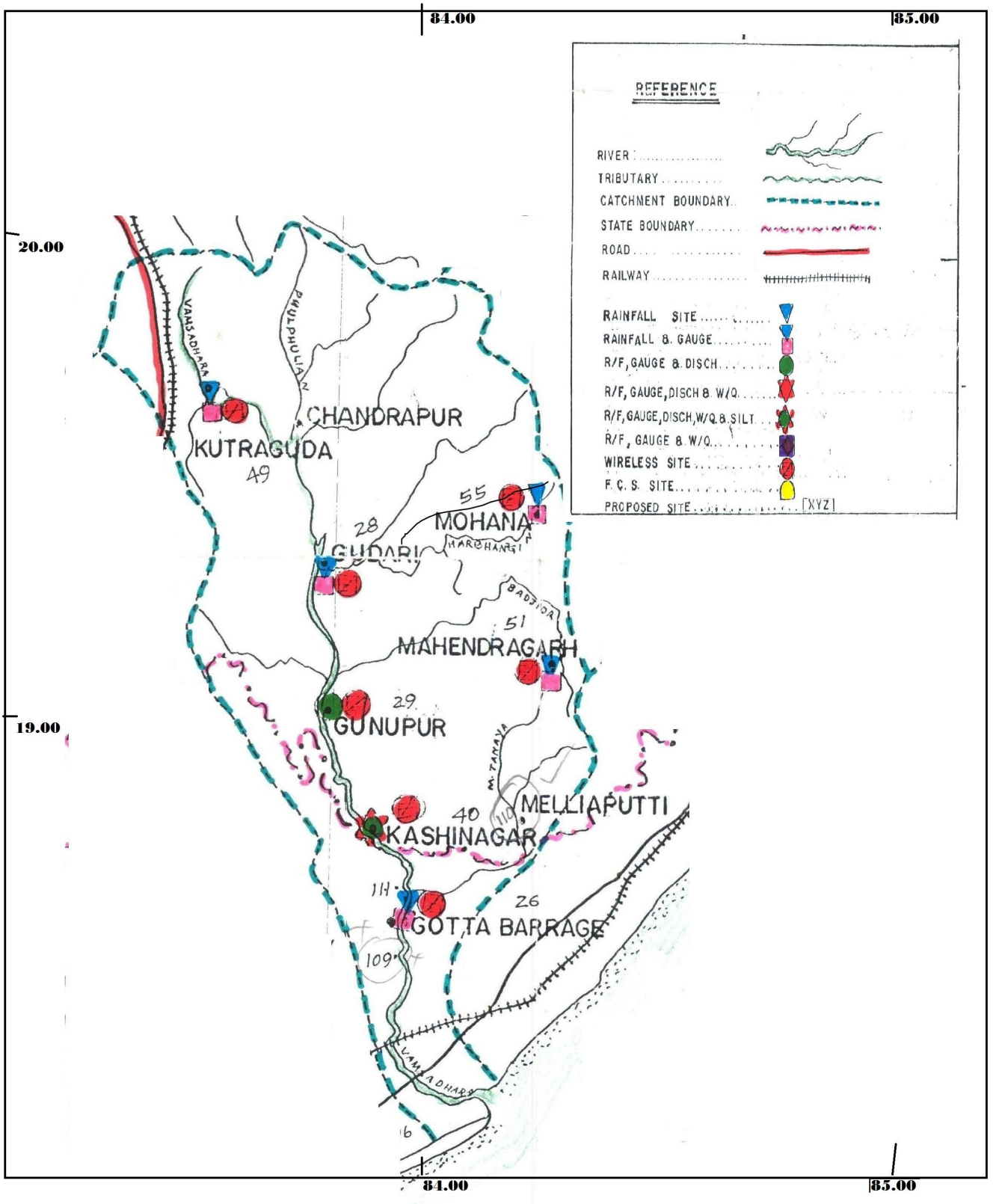
- Monthly Values: Physical; Chemical (mg/l); Biological (mg/l); Traces & Toxic (mg/l) and Chemical Indices.

- Average Values for the Year: 10 Years data to be given season wise averages:-

  - Average for Summer (March to June).
  - Average for Floods (July to October).
  - Average for Winter (November to February)

NAME OF THE SITES IN OPERATION UNDER VAMSADHARA BASIN

Sl. No.	Station Name	River/ Tributary	Code No.	Type	Latitude	Longitude
1.	Gottabarrage	Vamsadhara		G	18° 42' 00"	83° 57' 00"
2.	Gudari	Vamsadhara		G	19° 23' 00"	83° 48' 00"
3.	Gunupur	Vamsadhara	AV000K9	GD	19° 05' 00"	83° 49' 00"
4.	Kashinagar	Vamsadhara	AV000J4	GDSQ	18° 50' 49"	83° 57' 04"
5.	Kutragada	Vamsadhara		G	19° 36' 48"	83° 33' 33"
6.	Mahendragarh	Badajore		G	19° 13' 19"	84° 15' 55"
7.	Mohana	Harbhangi		G	19° 26' 40"	84° 16' 21"


84.00
85.00
20.00
19.00
REFERENCE
RIVER
TRIBUTARY
CATCHMENT BOUNDARY
STATE BOUNDARY
ROAD
RAILWAY
RAINFALL SITE
RAINFALL & GAUGE
R/F, GAUGE & DISCH
R/F, GAUGE, DISCH & W/Q
R/F, GAUGE, DISCH, W/Q & SILT
R/F, GAUGE & W/Q
WIRELESS SITE
F.C.S. SITE
PROPOSED SITE [XYZ]
VAMSADHARA
PHULPHULIAN
CHANDRAPUR
KUTRAGUDA
49
55
MOHANA
28
MARCHHANGI R
BADJOR
51
MAHENDRAGARH
29
GUNUPUR
M. TAMAYA
40
MELLIAPUTTI
KASHINAGAR
111
26
GOTTA BARRAGE
109
VAMSADHARA
84.00
85.00

HYDROLOGICAL DATA

HISTORY SHEET

Water Year : 2015-2016

Site	:	**GUNUPUR**	**Code**	:	**AV000K9**
State	:	Orissa	District		Rayagada
Basin	:	EFR B Mahanadi-Godavari	Independent River	:	Vamsadhara
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Vamsadhara
Division	:	E.E., Bhubaneswar	Sub-Division	:	Behrampur
Drainage Area	:	6740 Sq. Km.	Bank	:	Left
Latitude	:	19°05'00"	Longitude	:	83°49'00"
Zero of Gauge (m)	:	80.25 (m.s.l)	01.01.1970	-	01.01.2158
		Opening Date	Closing Date		
Gauge	:	19.04.1978			
Discharge	:	01.06.2001			
Sediment	:	15.11.2013			
Water Quality	:	30.12.2013			

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)

	Maximum			Minimum		
Year	**Q (cumecs)**	**WL (m)**	**Date**	**Q (cumecs)**	**WL (m)**	**Date**
1990-1991	4.824	83.600	22.08.1990	0.926	80.080	09.07.1990
1991-1992	5286	85.750	29.07.1991	10.50	80.550	05.07.1991
1992-1993	4499	85.100	27.07.1992	11.20	80.475	15.06.1992
1993-1994	376.2	82.110	16.07.1993	10.70	80.730	02.07.1993
1994-1995	3094	84.380	04.09.1994	7.300	80.830	25.06.1994
1995-1996	1835	83.000	31.08.1995	24.95	80.460	19.06.1995
1996-1997	968.5	82.950	23.08.1996	23.14	80.800	25.06.1996
1997-1998	2201	84.180	21.08.1997	4.652	80.770	17.07.1997
1998-1999	332.1	82.240	02.07.1998	9.207	80.750	27.06.1998
1999-2000	342.7	82.300	29.07.1999	11.40	81.110	28.06.1999
2000-2001	388.3	82.470	18.07.2000	1.358	80.910	03.05.2001
2001-2002	2211	83.790	07.07.2001	1.106	80.680	15.05.2002
2002-2003	450.2	82.640	29.08.2002	1.162	80.690	13.03.2003
2003-2004	3924	84.910	07.10.2003	0.000	80.530	07.06.2003
2004-2005	771.5	82.995	06.10.2004	1.200	80.550	22.05.2005
2005-2006	1893	83.785	19.09.2005	2.361	80.570	07.06.2005
2006-2007	5243	85.025	03.07.2006	5.070	80.090	07.04.2007
2007-2008	2987	85.950	07.08.2007	3.836	79.940	23.05.2008
2008-2009	3617	84.730	17.09.2008	1.543	79.380	02.05.2009
2009-2010	2049	84.000	19.07.2009	1.682	79.800	28.04.2010
2010-2011	1000	82.560	25.07.2010	1.775	79.800	08.06.2010
2011-2012	899.4	82.470	02.09.2011	1.222	80.070	31.05.2012
2012-2013	1121	82.795	03.08.2012	0.640	80.030	08.06.2012
2013-2014	1211	83.060	28.10.2013	4.011	80.070	30.04.2014
2014-2015	2855	84.125	07.09.2014	4.405	80.230	29.03.2015
2015-2016	670.0	82.500	16.09.2015	0.714	80.090	02.05.2016

Stage-Discharge Data for the period 2015 - 2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Jun		Jul		Aug		Sep		Oct		Nov	
	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q
1	80.260	5.795	80.795	75.04	80.530	26.82	81.040	121.3	80.860	71.65	80.430	18.09 *
2	80.250	5.388	80.660	42.45	80.500	24.05 *	80.870	75.92	80.840	68.00 *	80.580	31.86
3	80.290	7.723	80.650	41.16	80.490	23.43	80.860	73.08	80.820	65.90	80.540	28.02
4	80.270	6.784	80.815	75.43	80.480	22.93	80.830	60.85	80.840	68.00 *	80.510	25.64
5	80.325	9.931	80.700	54.00 *	80.535	27.91	80.750	55.38	80.880	80.41	80.490	24.28
6	80.330	10.45	80.600	35.55	80.510	26.10	80.700	48.68 *	80.830	70.04	80.460	21.63
7	80.360	12.00 *	80.540	29.68	80.480	23.04	80.840	69.01	80.780	60.38	80.440	19.33
8	80.330	5.433	80.490	23.98	80.450	21.78	80.760	57.59	80.770	58.46	80.440	19.00 *
9	80.340	10.56	80.460	21.35	80.470	23.05 *	80.700	48.21	80.760	59.44	80.430	18.72
10	80.330	9.162	80.460	21.39	80.540	28.44	80.720	50.23	80.730	56.22	80.430	18.49
11	80.300	7.851	80.470	23.29	80.500	25.03	80.790	61.98	80.690	51.00 *	80.430	18.61 *
12	80.280	7.195	80.580	33.04 *	80.490	24.89	80.790	61.43	80.660	47.68	80.430	18.54
13	80.320	9.458	80.645	39.81	80.870	77.73	80.850	70.08 *	80.630	44.35	80.430	18.18
14	80.310	9.400 *	80.530	27.85	80.910	85.19	80.790	61.09	80.610	41.25	80.420	17.88
15	80.590	32.10	80.480	23.01	80.720	57.89 *	80.890	80.93	80.600	40.03	80.420	17.64 *
16	80.755	58.71	80.460	21.18	80.660	46.70 *	82.500	670.0	80.590	39.02	80.410	16.90
17	80.860	76.07	80.440	19.42	81.005	101.0	82.250	557.0 *	80.605	40.68	80.410	16.68
18	80.640	45.13	80.750	56.60 *	81.050	114.4	82.030	411.6	80.620	42.00 *	80.440	19.23
19	80.620	36.19	80.990	90.05 *	81.010	101.6	81.700	286.4	80.590	38.41	80.460	22.17
20	80.590	34.70	80.885	80.36	80.880	83.72	82.100	450.0 *	80.580	36.47	80.440	19.29
21	80.270	7.000 *	80.800	74.77	80.835	71.77	82.270	586.1	80.570	35.02 *	80.430	18.54
22	81.820	321.3	80.700	50.74	80.985	98.91	81.670	274.3	80.560	33.71 *	80.410	16.46 *
23	81.185	159.7	80.670	47.46	80.860	76.64 *	81.440	211.8	80.540	28.03	80.400	15.92
24	81.015	107.8	80.765	65.08	80.750	54.64	81.290	179.4	80.530	27.00 *	80.390	14.42
25	80.870	79.21	80.690	50.64	80.690	44.03	81.200	155.6 *	80.510	25.07 *	80.380	13.50 *
26	80.730	69.32	80.820	75.04 *	80.680	48.57	81.120	125.4	80.490	23.20	80.380	13.36
27	80.750	70.78	80.725	57.51	80.770	57.10	81.040	101.5 *	80.480	22.32	80.370	12.28
28	80.670	50.67 *	80.740	60.72	80.760	55.31	81.000	99.22	80.450		80.370	12.27
29	80.590	34.58	80.635	38.92	81.180	153.2	80.980	95.45	80.450	20.25	80.370	12.30 *
30	80.650	41.22	80.590	34.64	80.970	100.5 *	80.910	85.93	80.440	19.35	80.360	12.87
31			80.550	27.99	81.060	127.5			80.440	19.22		
Ten-Daily Mean												
I Ten-Daily	80.309	8.322	80.617	42.00	80.499	24.75	80.807	66.03	80.811	65.85	80.475	22.51
II Ten-Daily	80.527	31.68	80.623	41.46	80.809	71.81	81.469	271.1	80.618	42.09	80.429	18.51
III Ten-Daily	80.855	94.16	80.699	53.05	80.867	80.74	81.292	191.5	80.496	25.32	80.386	14.19
Monthly												
Min.	80.250	5.388	80.440	19.42	80.450	21.78	80.700	48.21	80.440	19.22	80.360	12.27
Max.	81.820	321.3	80.990	90.05	81.180	153.2	82.500	670.0	80.880	80.41	80.580	31.86
Mean	80.563	44.72	80.648	45.75	80.730	59.8	81.189	176.2	80.637	44.42	80.430	18.4

Annual Runoff in MCM = 1047 Annual Runoff in mm = 155

Peak Observed Discharge = 670.0 cumecs on 16/09/2015 Corres. Water Level :82.5 m

Lowest Observed Discharge = 0.714 cumecs on 02/05/2016 Corres. Water Level :80.09 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

Stage-Discharge Data for the period 2015 - 2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	80.360	12.35	80.320		80.240	3.839	80.200	2.899	80.200	2.411	80.130	1.350 *
2	80.360	11.95	80.310		80.240	3.763	80.200	2.804	80.200	2.318	80.090	0.714
3	80.360	11.71	80.310		80.240	3.573	80.200	2.769	80.180	2.000 *	80.090	0.763
4	80.370	12.69	80.300		80.240	3.515	80.200	2.739	80.170	1.985	80.090	0.769
5	80.370	12.48	80.300		80.240	3.513	80.200	2.646	80.170	1.919	80.100	0.877
6	80.370		80.300		80.240	3.367	80.200	2.600 *	80.160	1.779	80.100	0.861
7	80.360		80.290		80.230	3.101 *	80.190	2.460 *	80.150	1.715	80.110	0.978
8	80.360		80.290		80.230	3.289	80.190	2.185	80.150	1.626	80.110	0.974 *
9	80.350		80.290		80.230	3.159	80.190	2.112	80.150	1.558	80.110	0.971
10	80.350		80.290		80.230	3.110	80.190	2.062	80.150	1.500 *	80.140	1.346
11	80.350		80.290		80.220	2.886	80.190	2.010	80.150	1.629	80.090	0.765
12	80.350		80.290		80.220	2.865	80.190	1.951	80.150	1.606	80.290	5.865
13	80.340		80.290		80.220	2.764	80.190	2.000 *	80.140	1.438	80.270	5.468
14	80.340		80.280		80.210	2.400 *	80.190	1.907	80.140	1.402 *	80.220	2.835
15	80.340		80.280		80.210	2.386	80.190	1.907	80.130	1.365	80.400	15.98 *
16	80.340		80.280		80.210	2.334	80.200	2.082	80.120	1.283	80.320	8.121
17	80.450		80.280		80.210	2.338	80.190	1.981	80.120	1.160 *	80.200	2.890
18	80.440		80.280		80.210	2.342	80.200	2.183	80.110	1.054	80.180	2.582
19	80.430		80.270		80.210	3.237	80.240	3.192	80.110	1.055	80.180	2.567
20	80.420		80.260		80.210	3.137	80.240	3.170 *	80.110	1.020 *	80.200	2.965
21	80.400		80.260		80.210	3.425 *	80.210	2.513	80.110	1.040	80.190	2.800 *
22	80.390		80.260		80.210	3.100	80.210	2.488	80.110	1.013	80.170	2.780 *
23	80.370		80.260		80.200	3.203	80.210	2.420	80.110	1.005	80.160	1.761
24	80.360		80.260		80.200	3.027	80.200	2.040 *	80.110	1.003 *	80.160	1.840
25	80.350		80.260		80.200	2.907	80.200	2.040 *	80.110	0.970	80.150	1.559
26	80.350		80.250		80.200	2.827	80.190	2.101	80.100	0.849	80.140	1.657
27	80.340		80.250		80.200	2.723	80.190	2.030 *	80.100	0.854	80.130	1.510
28	80.340		80.250		80.200	2.640 *	80.170	1.897	80.100	0.821	80.130	1.473
29	80.330		80.240				80.160	1.750	80.100	0.812	80.120	1.139 *
30	80.330		80.240				80.160	1.655	80.100	0.800	80.120	1.390
31	80.320		80.240				80.160	1.647			80.120	1.387
Ten-Daily Mean												
I Ten-Daily	80.361	12.24	80.300		80.236	3.423	80.196	2.528	80.168	1.881	80.107	0.960
II Ten-Daily	80.380		80.280		80.213	2.669	80.202	2.238	80.128	1.301	80.235	5.004
III Ten-Daily	80.353		80.252		80.203	2.981	80.187	2.053	80.105	0.917	80.145	1.754
Monthly												
Min.	80.320	11.71	80.240		80.200	2.334	80.160	1.647	80.100	0.800	80.090	0.714
Max.	80.450	12.69	80.320		80.240	3.839	80.240	3.192	80.200	2.411	80.400	15.98
Mean	80.364	12.24	80.276		80.218	3.028	80.195	2.266	80.134	1.366	80.162	2.546

Peak Computed Discharge = 557.0 cumecs on 17/09/2015 Corres. Water Level :82.25 m

Lowest Computed Discharge = 0.974 cumecs on 08/05/2016 Corres. Water Level :80.11 m

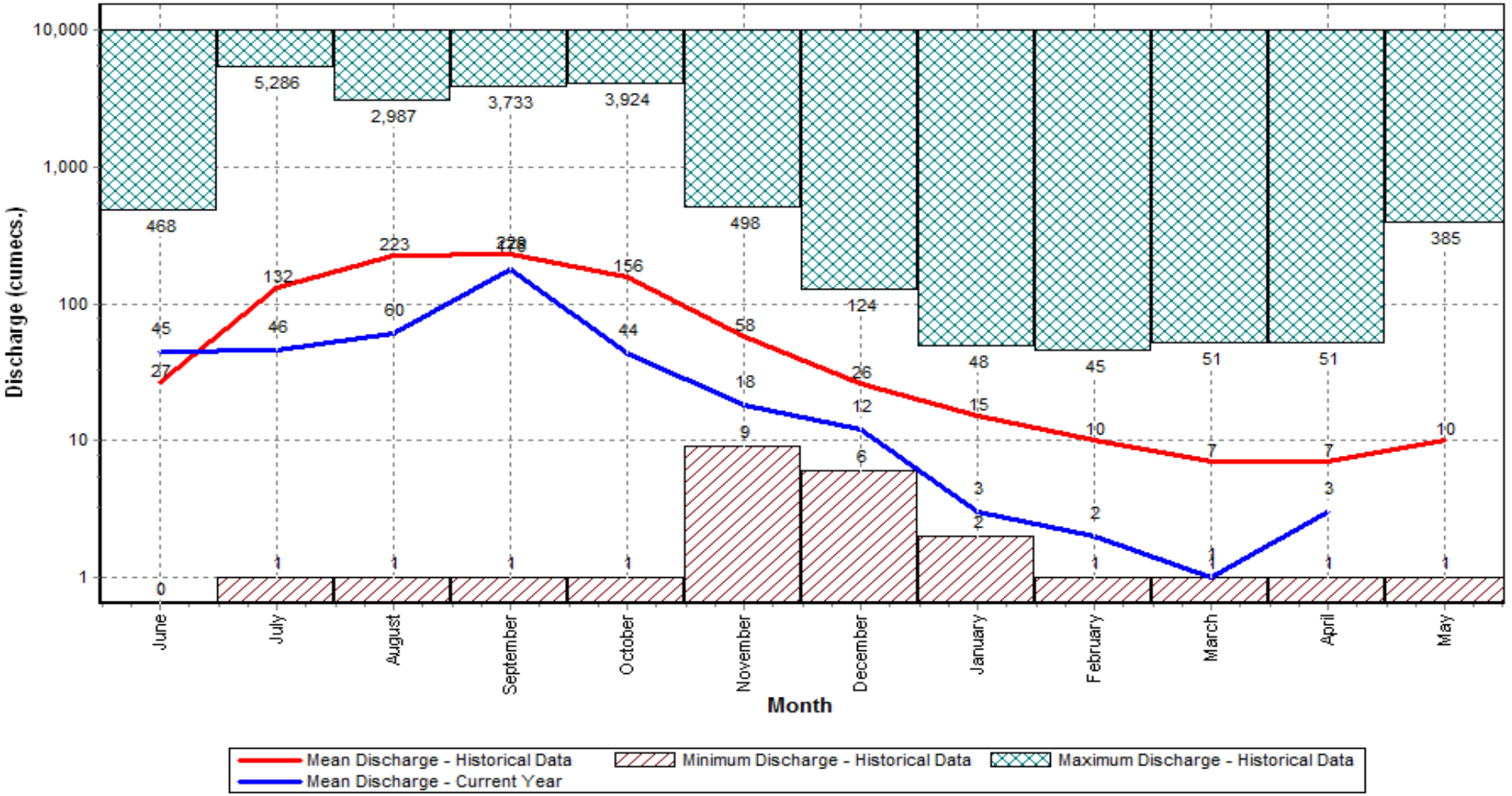
Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

HISTOGRAM - HYDROGRAPH for Water Year : 2015-2016

Station Name : GUNUPUR (AV000K9) | **Data considered : 1990-2016** | **Division : E.E., Bhubaneswar**

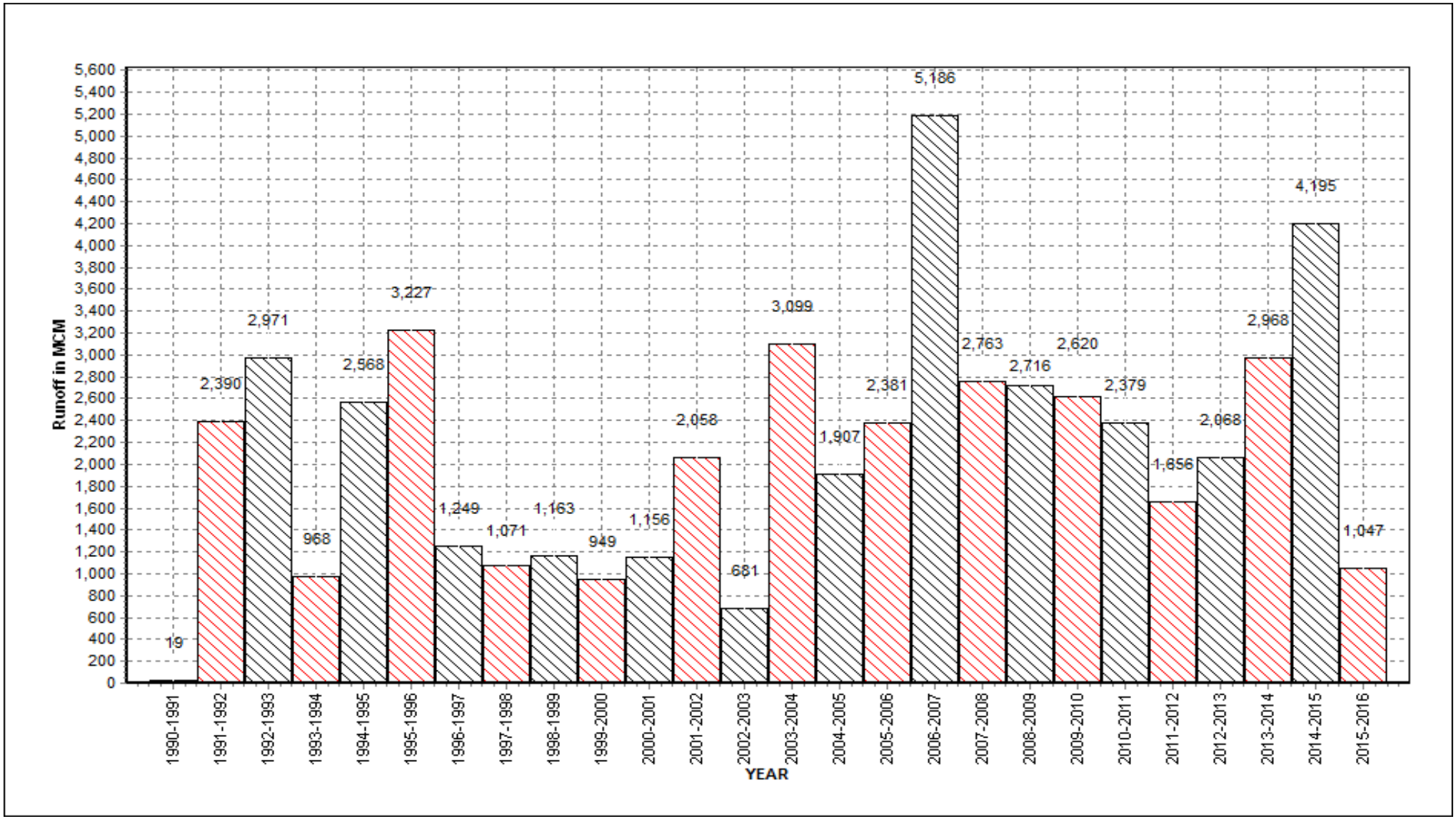
Local River : Vamsadhara | **Sub-Division : Behrampur**



Annual Runoff Values for the period: 1990 - 2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

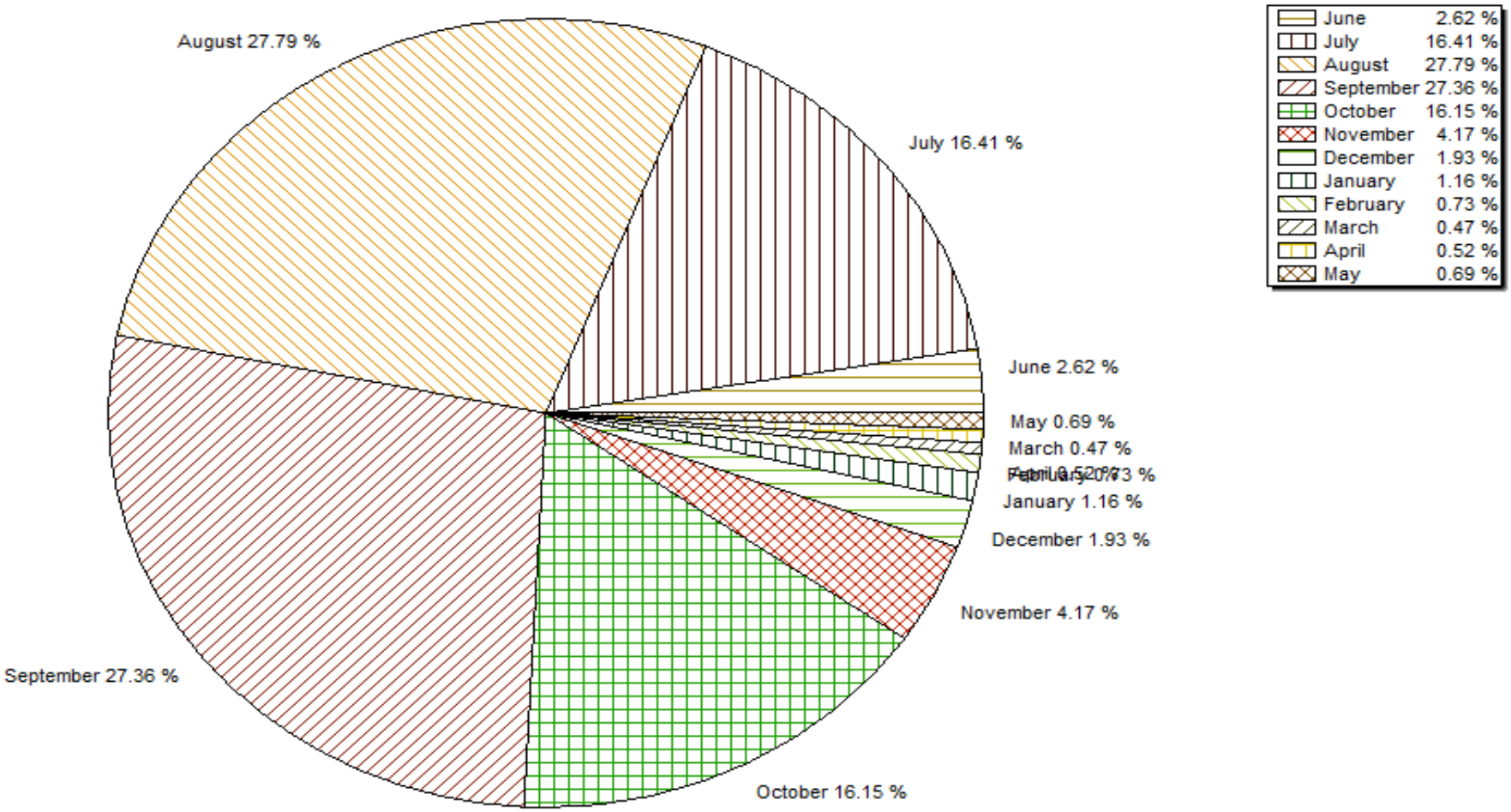


Note: Missing values have not been considered while arriving at Annual Runoff

Monthly Average Runoff based on period : 1990-2015

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

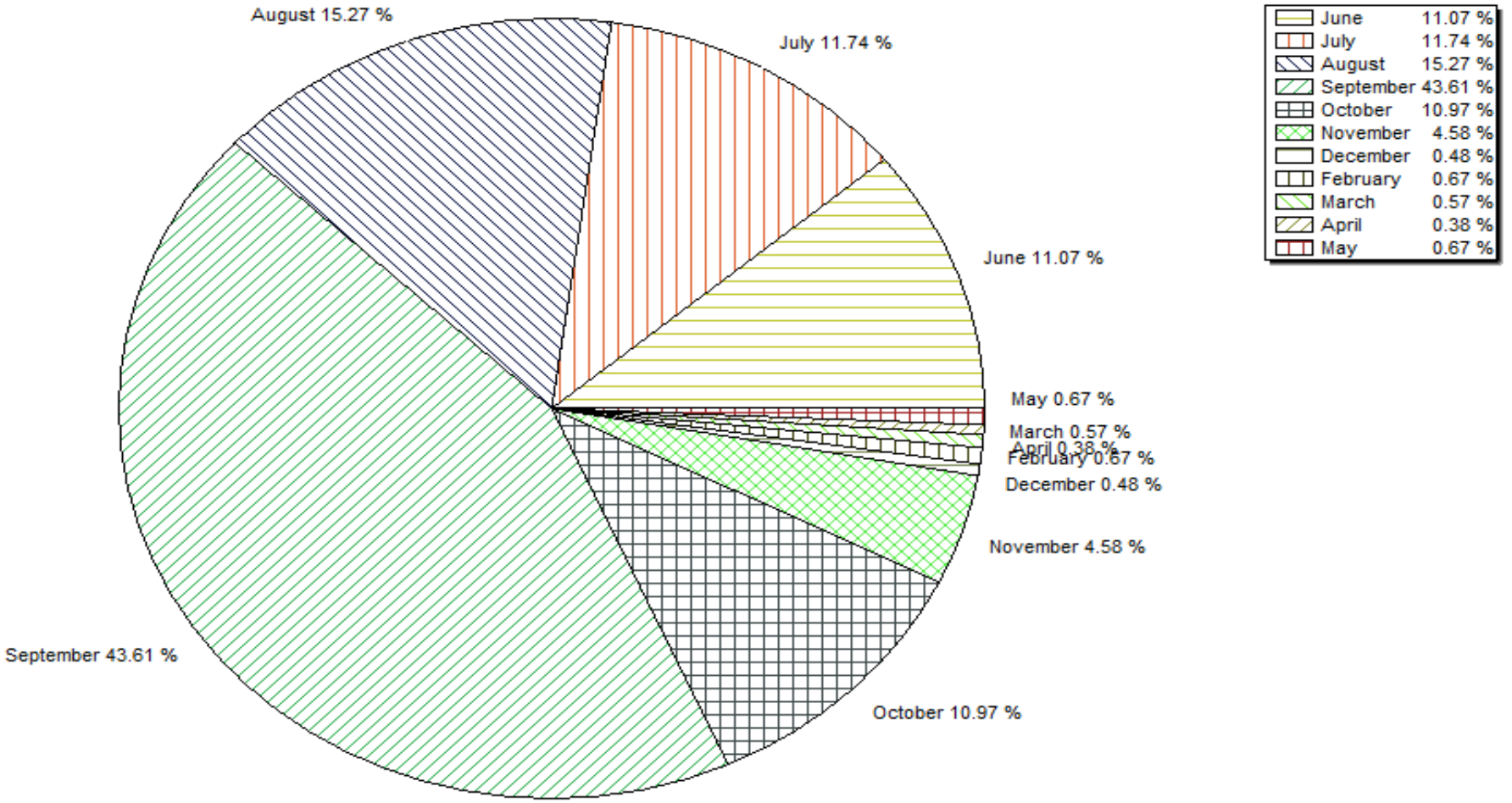
Local River : Vamsadhara **Sub-Division : Behrampur**



Monthly Runoff for the Year : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

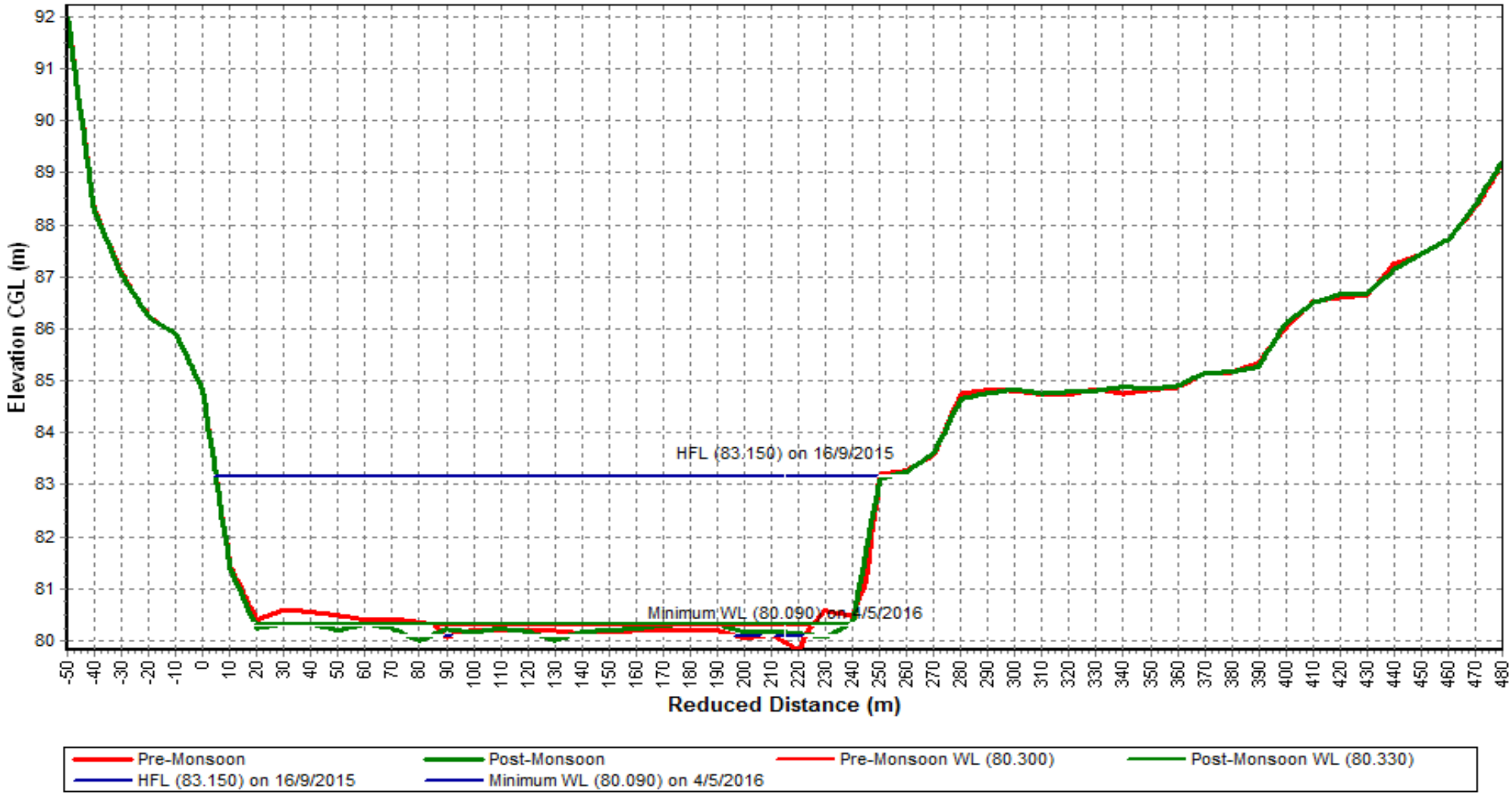
Local River : Vamsadhara **Sub-Division : Behrampur**



Pre-Monsoon & Post-Monsoon X-Section for Water Year : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

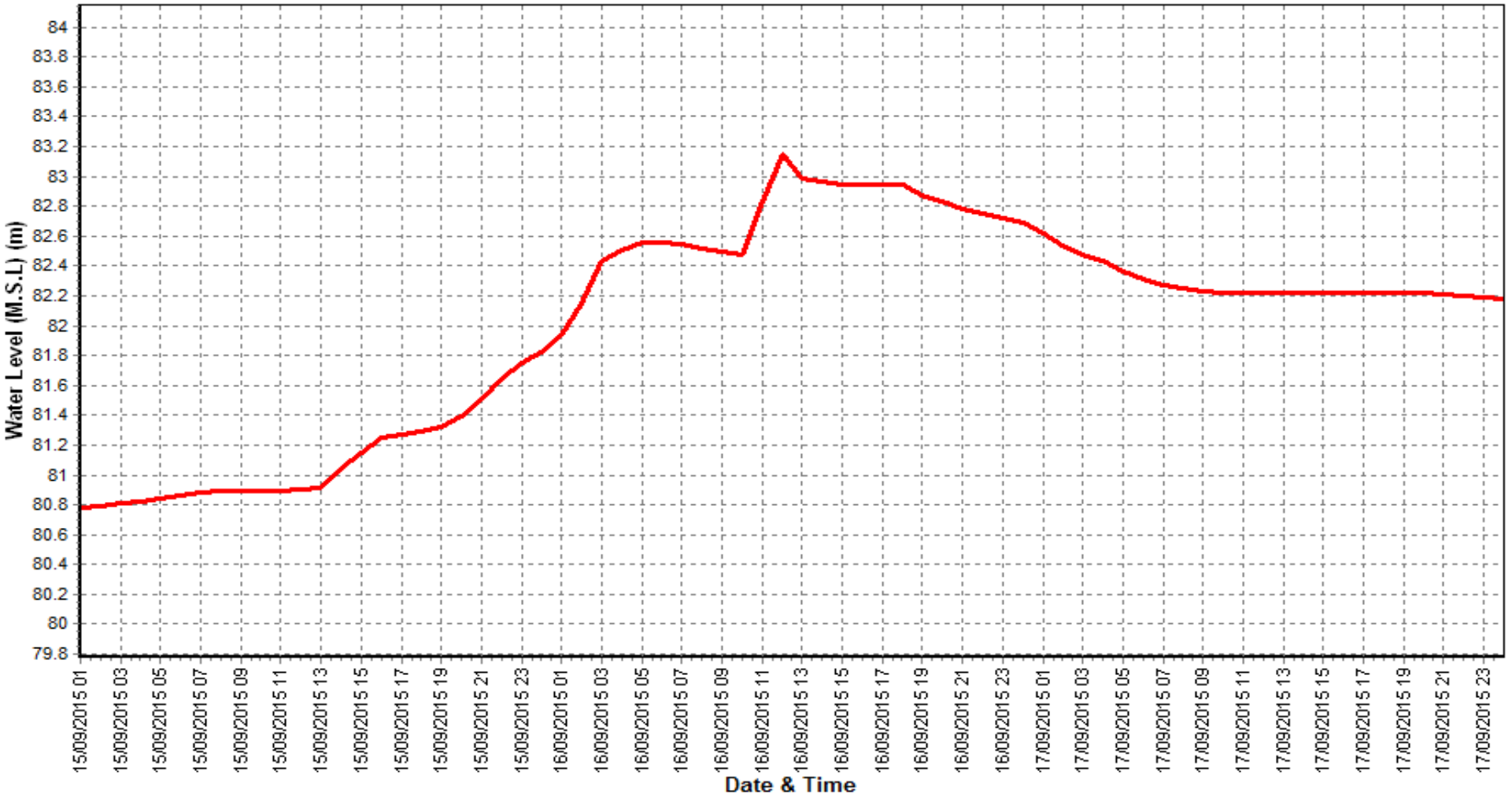
Local River : Vamsadhara **Sub-Division : Behrampur**



Water Level vs. Time - Graph of Highest Flood Peak during the Year : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

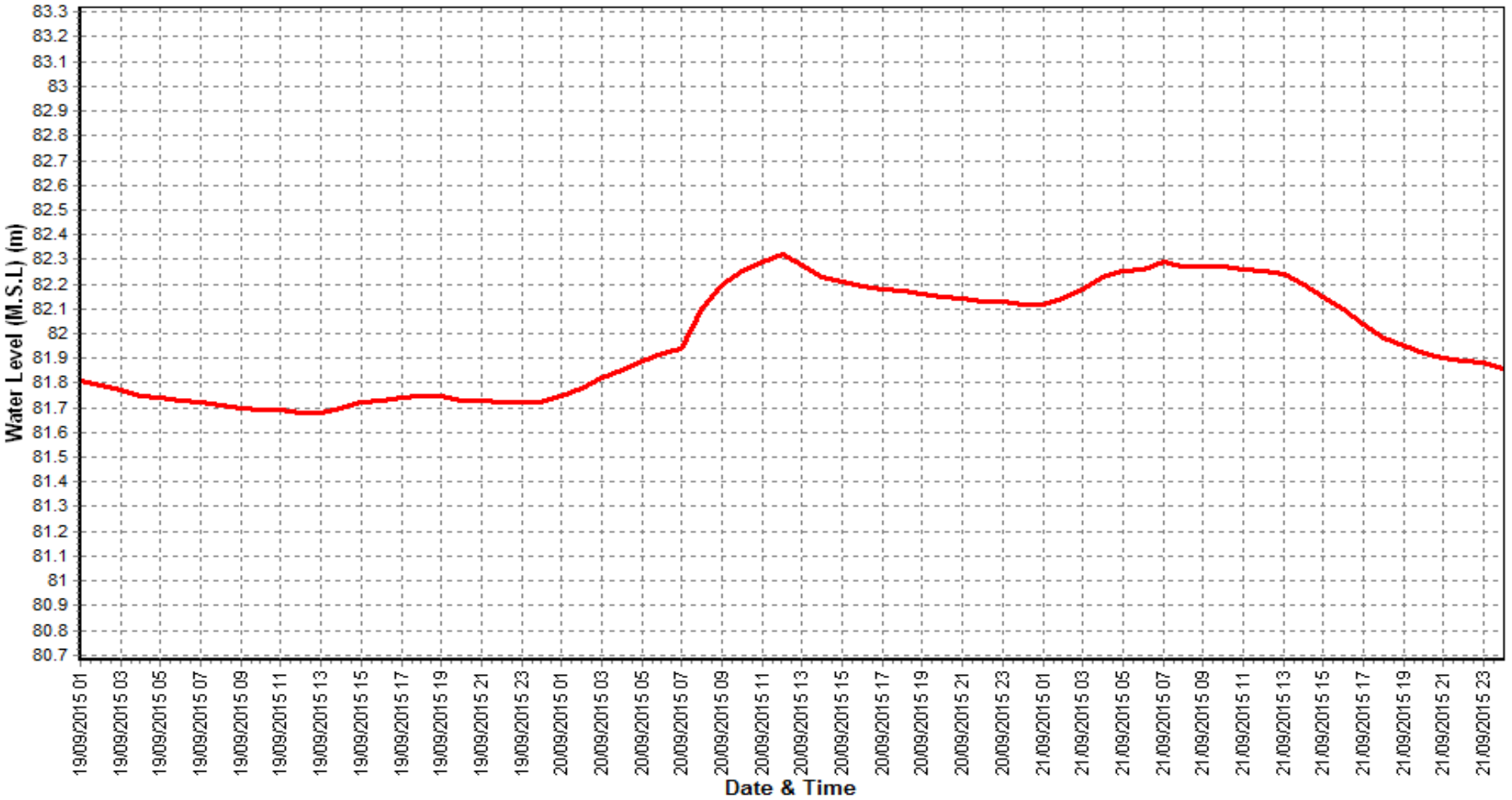


Time Span: 72 Hrs

Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

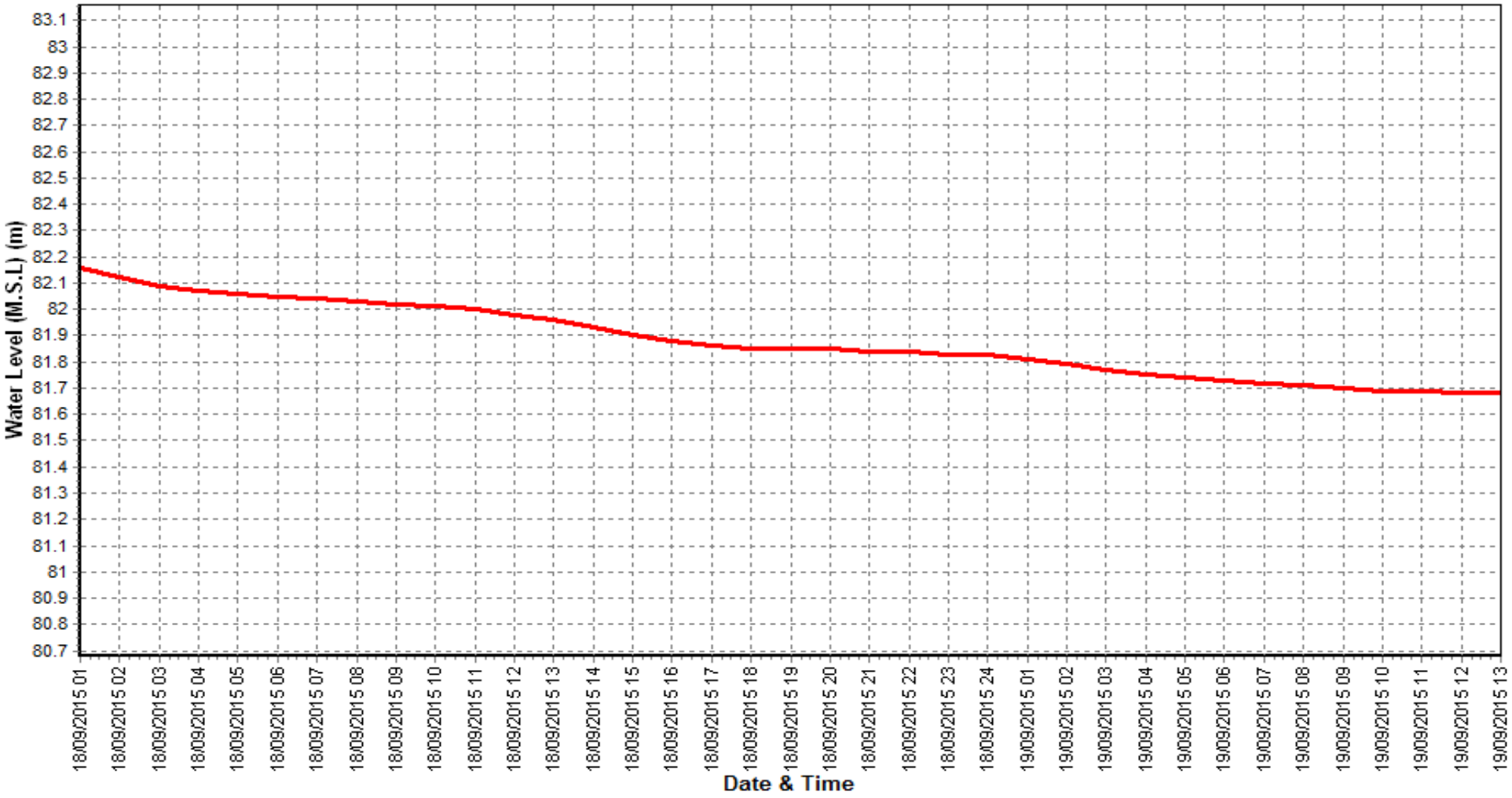


Time Span: 72 Hrs

Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**



Time Span: 72 Hrs

SEDIMENT DATA

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Jun						Jul						Aug					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	5.795	0.000	0.000	0.229	0.229	115	75.04	0.000	0.000	0.252	0.252	1633	26.82	0.000	0.000	0.448	0.448	1038
2	5.388	0.000	0.000	0.123	0.123	57	42.45	0.000	0.000	0.247	0.247	907	24.05	0.000	0.000	0.182	0.182	378
3	7.723	0.000	0.000	0.158	0.158	105	41.16	0.000	0.000	0.690	0.690	2452	23.43	0.000	0.000	0.733	0.733	1484
4	6.784	0.000	0.000	0.127	0.127	74	75.43	0.000	0.000	0.227	0.227	1478	22.93	0.000	0.000	0.585	0.585	1158
5	9.931	0.000	0.000	0.183	0.183	157	54.00	0.000	0.000	0.254	0.254	1184	27.91	0.000	0.000	0.340	0.340	819
6	10.45	0.000	0.000	0.233	0.233	210	35.55	0.000	0.000	0.167	0.167	513	26.10	0.000	0.000	0.322	0.322	727
7	12.00	0.000	0.000	0.282	0.282	292	29.68	0.000	0.000	0.103	0.103	265	23.04	0.000	0.000	2.081	2.081	4142
8	5.433	0.000	0.000	0.137	0.137	64	23.98	0.000	0.000	0.117	0.117	243	21.78	0.000	0.000	1.388	1.388	2613
9	10.56	0.000	0.000	0.486	0.486	443	21.35	0.000	0.000	0.118	0.118	218	23.05	0.000	0.000	0.362	0.362	720
10	9.162	0.000	0.000	0.237	0.237	187	21.39	0.000	0.000	0.140	0.140	258	28.44	0.000	0.000	0.389	0.389	955
11	7.851	0.000	0.000	0.125	0.125	85	23.29	0.000	0.000	0.008	0.008	15	25.03	0.000	0.000	0.072	0.072	155
12	7.195	0.000	0.000	0.103	0.103	64	33.04	0.000	0.000	0.293	0.293	836	24.89	0.000	0.000	0.086	0.086	184
13	9.458	0.000	0.000	0.120	0.120	98	39.81	0.000	0.000	0.353	0.353	1214	77.73	0.000	0.000	0.084	0.084	561
14	9.400	0.000	0.000	0.119	0.119	97	27.85	0.000	0.000	0.007	0.007	16	85.19	0.000	0.000	0.078	0.078	572
15	32.10	0.000	0.000	0.701	0.701	1945	23.01	0.000	0.000	0.054	0.054	106	57.89	0.000	0.000	0.123	0.123	613
16	58.71	0.000	0.000	0.602	0.602	3056	21.18	0.000	0.000	0.068	0.068	124	46.70	0.000	0.000	0.092	0.092	370
17	76.07	0.000	0.000	0.470	0.470	3089	19.42	0.000	0.000	0.087	0.087	146	101.0	0.000	0.000	0.077	0.077	673
18	45.13	0.000	0.000	0.360	0.360	1403	56.60	0.000	0.000	0.414	0.414	2026	114.4	0.000	0.000	0.074	0.074	732
19	36.19	0.000	0.000	0.485	0.485	1516	90.05	0.000	0.000	0.659	0.659	5128	101.6	0.000	0.000	0.288	0.288	2524
20	34.70	0.000	0.000	0.320	0.320	959	80.36	0.000	0.000	0.587	0.587	4075	83.72	0.000	0.000	0.355	0.355	2566
21	7.000	0.000	0.000	0.303	0.303	183	74.77	0.000	0.000	0.110	0.110	708	71.77	0.000	0.000	0.270	0.270	1676
22	321.3	0.000	0.000	1.217	1.217	33786	50.74	0.000	0.000	0.206	0.206	904	98.91	0.000	0.000	0.428	0.428	3660
23	159.7	0.000	0.000	0.330	0.330	4552	47.46	0.000	0.000	0.156	0.156	639	76.64	0.000	0.000	0.199	0.199	1320
24	107.8	0.000	0.000	0.194	0.194	1802	65.08	0.000	0.000	0.173	0.173	974	54.64	0.000	0.000	0.136	0.136	643
25	79.21	0.000	0.000	0.145	0.145	992	50.64	0.000	0.000	0.233	0.233	1021	44.03	0.000	0.000	0.127	0.127	483
26	69.32	0.000	0.000	0.151	0.151	906	75.04	0.000	0.000	0.431	0.431	2793	48.57	0.000	0.000	0.133	0.133	559
27	70.78	0.000	0.000	0.217	0.217	1327	57.51	0.000	0.000	0.331	0.331	1644	57.10	0.000	0.000	0.131	0.131	644
28	50.67	0.000	0.000	0.184	0.184	803	60.72	0.000	0.000	0.329	0.329	1726	55.31	0.000	0.000	0.163	0.163	778
29	34.58	0.000	0.000	0.125	0.125	374	38.92	0.000	0.000	0.192	0.192	645	153.2	0.061	0.054	0.928	1.043	13804
30	41.22	0.000	0.000	0.145	0.145	517	34.64	0.000	0.000	0.126	0.126	378	100.5	0.000	0.000	0.332	0.332	2880
31							27.99	0.000	0.000	0.108	0.108	260	127.5	0.051	0.057	0.423	0.531	5848
Ten Daily Mean																		
Ten Daily I	8.322	0.000	0.000	0.219	0.219	171	42.00	0.000	0.000	0.231	0.231	915	24.75	0.000	0.000	0.683	0.683	1403
Ten Daily II	31.68	0.000	0.000	0.341	0.341	1231	41.46	0.000	0.000	0.253	0.253	1369	71.81	0.000	0.000	0.133	0.133	895
Ten Daily III	94.16	0.000	0.000	0.301	0.301	4524	53.05	0.000	0.000	0.218	0.218	1063	80.74	0.010	0.010	0.297	0.318	2936
Monthly																		
Total						59260						34531						55278

Annual Sediment Load (Metric Tonnes) : 412326

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Sep						Oct						Nov					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	121.3	0.000	0.000	0.216	0.216	2264	71.65	0.000	0.000	0.360	0.360	2229	18.09	0.000	0.000	0.051	0.051	80
2	75.92	0.000	0.000	0.150	0.150	986	68.00	0.000	0.000	0.077	0.077	453	31.86	0.000	0.000	0.090	0.090	247
3	73.08	0.000	0.000	0.436	0.436	2752	65.90	0.000	0.000	0.068	0.068	384	28.02	0.000	0.000	0.006	0.006	15
4	60.85	0.000	0.000	0.104	0.104	548	68.00	0.000	0.000	0.165	0.165	969	25.64	0.000	0.000	0.011	0.011	23
5	55.38	0.000	0.000	0.089	0.089	426	80.41	0.000	0.000	0.190	0.190	1316	24.28	0.000	0.000	0.015	0.015	32
6	48.68	0.000	0.000	0.449	0.449	1887	70.04	0.000	0.000	0.160	0.160	965	21.63	0.000	0.000	0.006	0.006	12
7	69.01	0.000	0.000	0.636	0.636	3791	60.38	0.000	0.000	0.089	0.089	462	19.33	0.000	0.000	0.010	0.010	17
8	57.59	0.000	0.000	0.383	0.383	1904	58.46	0.000	0.000	0.047	0.047	239	19.00	0.000	0.000	0.012	0.012	20
9	48.21	0.000	0.000	0.185	0.185	772	59.44	0.000	0.000	0.076	0.076	390	18.72	0.000	0.000	0.012	0.012	19
10	50.23	0.000	0.000	0.185	0.185	802	56.22	0.000	0.000	0.055	0.055	268	18.49	0.000	0.000	0.010	0.010	16
11	61.98	0.000	0.000	0.206	0.206	1101	51.00	0.000	0.000	0.036	0.036	158	18.61	0.000	0.000	0.010	0.010	16
12	61.43	0.000	0.000	0.231	0.231	1226	47.68	0.000	0.000	0.034	0.034	140	18.54	0.000	0.000	0.010	0.010	16
13	70.08	0.000	0.000	0.234	0.234	1418	44.35	0.000	0.000	0.032	0.032	121	18.18	0.000	0.000	0.012	0.012	19
14	61.09	0.000	0.000	0.205	0.205	1082	41.25	0.000	0.000	0.025	0.025	90	17.88	0.000	0.000	0.016	0.016	24
15	80.93	0.000	0.000	0.228	0.228	1594	40.03	0.000	0.000	0.031	0.031	106	17.64	0.000	0.000	0.006	0.006	9
16	670.0	0.131	0.143	1.334	1.608	93106	39.02	0.000	0.000	0.023	0.023	77	16.90	0.000	0.000	0.006	0.006	9
17	557.0	0.109	0.119	0.847	1.075	51710	40.68	0.000	0.000	0.058	0.058	203	16.68	0.000	0.000	0.004	0.004	6
18	411.6	0.101	0.112	0.375	0.588	20925	42.00	0.000	0.000	0.019	0.019	69	19.23	0.000	0.000	0.004	0.004	7
19	286.4	0.052	0.061	0.221	0.334	8257	38.41	0.000	0.000	0.022	0.022	72	22.17	0.000	0.000	0.005	0.005	10
20	450.0	0.082	0.096	0.347	0.525	20393	36.47	0.000	0.000	0.008	0.008	25	19.29	0.000	0.000	0.007	0.007	12
21	586.1	0.110	0.112	0.134	0.356	18007	35.02	0.000	0.000	0.021	0.021	64	18.54	0.000	0.000	0.009	0.009	15
22	274.3	0.050	0.053	0.119	0.222	5257	33.71	0.000	0.000	0.020	0.020	59	16.46	0.000	0.000	0.006	0.006	9
23	211.8	0.025	0.030	0.121	0.175	3208	28.03	0.000	0.000	0.017	0.017	41	15.92	0.000	0.000	0.006	0.006	8
24	179.4	0.018	0.021	0.071	0.109	1693	27.00	0.000	0.000	0.010	0.010	22	14.42	0.000	0.000	0.006	0.006	7
25	155.6	0.012	0.014	0.092	0.118	1589	25.07	0.000	0.000	0.009	0.009	19	13.50	0.000	0.000	0.004	0.004	5
26	125.4	0.010	0.011	0.072	0.093	1004	23.20	0.000	0.000	0.008	0.008	16	13.36	0.000	0.000	0.004	0.004	5
27	101.5	0.009	0.010	0.069	0.089	778	22.32	0.000	0.000	0.017	0.017	32	12.28	0.000	0.000	0.006	0.006	7
28	99.22	0.000	0.000	0.112	0.112	964							12.27	0.000	0.000	0.004	0.004	5
29	95.45	0.000	0.000	0.108	0.108	891	20.25	0.000	0.000	0.013	0.013	23	12.30	0.000	0.000	0.004	0.004	5
30	85.93	0.000	0.000	0.069	0.069	515	19.35	0.000	0.000	0.006	0.006	11	12.87	0.000	0.000	0.004	0.004	5
31							19.22	0.000	0.000	0.006	0.006	10						
Ten Daily Mean																		
Ten Daily I	66.03	0.000	0.000	0.283	0.283	1613	65.85	0.000	0.000	0.129	0.129	768	22.51	0.000	0.000	0.022	0.022	48
Ten Daily II	271.1	0.047	0.053	0.423	0.523	20081	42.09	0.000	0.000	0.029	0.029	106	18.51	0.000	0.000	0.008	0.008	13
Ten Daily III	191.5	0.023	0.025	0.097	0.145	3390	25.32	0.000	0.000	0.013	0.013	30	14.19	0.000	0.000	0.006	0.006	7
Monthly																		
Total						250849						9033						679

Annual Sediment Load (Metric Tonnes) : 412326

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Dec						Jan						Feb					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	12.35							0.000	0.000	0.008	0.008		3.839	0.000	0.000	0.006	0.006	2
2	11.95							0.000	0.000	0.008	0.008		3.763	0.000	0.000	0.006	0.006	2
3	11.71							0.000	0.000	0.008	0.008		3.573	0.000	0.000	0.006	0.006	2
4	12.69							0.000	0.000	0.006	0.006		3.515	0.000	0.000	0.005	0.005	2
5	12.48							0.000	0.000	0.006	0.006		3.513	0.000	0.000	0.005	0.005	2
6								0.000	0.000	0.006	0.006		3.367	0.000	0.000	0.005	0.005	2
7								0.000	0.000	0.006	0.006		3.101	0.000	0.000	0.011	0.011	3
8								0.000	0.000	0.006	0.006		3.289	0.000	0.000	0.012	0.012	3
9								0.000	0.000	0.006	0.006		3.159	0.000	0.000	0.012	0.012	3
10								0.000	0.000	0.006	0.006		3.110	0.000	0.000	0.011	0.011	3
11								0.000	0.000	0.012	0.012		2.886	0.000	0.000	0.012	0.012	3
12								0.000	0.000	0.012	0.012		2.865	0.000	0.000	0.012	0.012	3
13								0.000	0.000	0.011	0.011		2.764	0.000	0.000	0.012	0.012	3
14								0.000	0.000	0.010	0.010		2.400	0.000	0.000	0.010	0.010	2
15								0.000	0.000	0.010	0.010		2.386	0.000	0.000	0.010	0.010	2
16								0.000	0.000	0.010	0.010		2.334	0.000	0.000	0.010	0.010	2
17								0.000	0.000	0.010	0.010		2.338	0.000	0.000	0.010	0.010	2
18								0.000	0.000	0.012	0.012		2.342	0.000	0.000	0.010	0.010	2
19								0.000	0.000	0.011	0.011		3.237	0.000	0.000	0.014	0.014	4
20								0.000	0.000	0.010	0.010		3.137	0.000	0.000	0.013	0.013	4
21								0.000	0.000	0.015	0.015		3.425	0.000	0.000	0.010	0.010	3
22								0.000	0.000	0.015	0.015		3.100	0.000	0.000	0.010	0.010	3
23								0.000	0.000	0.015	0.015		3.203	0.000	0.000	0.010	0.010	3
24								0.000	0.000	0.014	0.014		3.027	0.000	0.000	0.009	0.009	2
25								0.000	0.000	0.014	0.014		2.907	0.000	0.000	0.009	0.009	2
26								0.000	0.000	0.014	0.014		2.827	0.000	0.000	0.008	0.008	2
27								0.000	0.000	0.013	0.013		2.723	0.000	0.000	0.008	0.008	2
28								0.000	0.000	0.013	0.013		2.640	0.000	0.000	0.008	0.008	2
29								0.000	0.000	0.012	0.012							
30								0.000	0.000	0.012	0.012							
31								0.000	0.000	0.012	0.012							
Ten Daily Mean																		
Ten Daily I	12.24							0.000	0.000	0.007	0.007		3.423	0.000	0.000	0.008	0.008	2
Ten Daily II								0.000	0.000	0.011	0.011		2.669	0.000	0.000	0.011	0.011	3
Ten Daily III								0.000	0.000	0.013	0.013		2.981	0.000	0.000	0.009	0.009	2
Monthly																		
Total												0						68

Annual Sediment Load (Metric Tonnes) : 412326

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Mar						Apr						May					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	2.899	0.000	0.000	0.006	0.006	1	2.411	0.000	0.000	0.014	0.014	3	1.350	0.000	0.000	0.011	0.011	1
2	2.804	0.000	0.000	0.005	0.005	1	2.318	0.000	0.000	0.014	0.014	3	0.714	0.000	0.000	0.006	0.006	0
3	2.769	0.000	0.000	0.005	0.005	1	2.000	0.000	0.000	0.012	0.012	2	0.763	0.000	0.000	0.006	0.006	0
4	2.739	0.000	0.000	0.005	0.005	1	1.985	0.000	0.000	0.012	0.012	2	0.769	0.000	0.000	0.006	0.006	0
5	2.646	0.000	0.000	0.005	0.005	1	1.919	0.000	0.000	0.012	0.012	2	0.877	0.000	0.000	0.007	0.007	1
6	2.600	0.000	0.000	0.005	0.005	1	1.779	0.000	0.000	0.011	0.011	2	0.861	0.000	0.000	0.016	0.016	1
7	2.460	0.000	0.000	0.005	0.005	1	1.715	0.000	0.000	0.010	0.010	1	0.978	0.000	0.000	0.018	0.018	2
8	2.185	0.000	0.000	0.004	0.004	1	1.626	0.000	0.000	0.010	0.010	1	0.974	0.000	0.000	0.018	0.018	2
9	2.112	0.000	0.000	0.004	0.004	1	1.558	0.000	0.000	0.009	0.009	1	0.971	0.000	0.000	0.018	0.018	2
10	2.062	0.000	0.000	0.004	0.004	1	1.500	0.000	0.000	0.090	0.090	12	1.346	0.000	0.000	0.025	0.025	3
11	2.010	0.000	0.000	0.009	0.009	1	1.629	0.000	0.000	0.008	0.008	1	0.765	0.000	0.000	0.039	0.039	3
12	1.951	0.000	0.000	0.008	0.008	1	1.606	0.000	0.000	0.008	0.008	1	5.865	0.000	0.000	0.297	0.297	151
13	2.000	0.000	0.000	0.008	0.008	1	1.438	0.000	0.000	0.007	0.007	1	5.468	0.000	0.000	0.277	0.277	131
14	1.907	0.000	0.000	0.008	0.008	1	1.402	0.000	0.000	0.007	0.007	1	2.835	0.000	0.000	0.144	0.144	35
15	1.907	0.000	0.000	0.008	0.008	1	1.365	0.000	0.000	0.007	0.007	1	15.98	0.000	0.000	0.810	0.810	1118
16	2.082	0.000	0.000	0.009	0.009	2	1.283	0.000	0.000	0.006	0.006	1	8.121	0.000	0.000	0.418	0.418	293
17	1.981	0.000	0.000	0.008	0.008	1	1.160	0.000	0.000	0.006	0.006	1	2.890	0.000	0.000	0.146	0.146	37
18	2.183	0.000	0.000	0.009	0.009	2	1.054	0.000	0.000	0.005	0.005	0	2.582	0.000	0.000	0.118	0.118	26
19	3.192	0.000	0.000	0.013	0.013	4	1.055	0.000	0.000	0.005	0.005	0	2.567	0.000	0.000	0.129	0.129	29
20	3.170	0.000	0.000	0.013	0.013	4	1.020	0.000	0.000	0.005	0.005	0	2.965	0.000	0.000	0.150	0.150	39
21	2.513	0.000	0.000	0.022	0.022	5	1.040	0.000	0.000	0.007	0.007	1	2.800	0.000	0.000	0.530	0.530	128
22	2.488	0.000	0.000	0.022	0.022	5	1.013	0.000	0.000	0.007	0.007	1	2.780	0.000	0.000	0.526	0.526	126
23	2.420	0.000	0.000	0.021	0.021	4	1.005	0.000	0.000	0.006	0.006	1	1.761	0.000	0.000	0.334	0.334	51
24	2.040	0.000	0.000	0.018	0.018	3	1.003	0.000	0.000	0.006	0.006	1	1.840	0.000	0.000	0.347	0.347	55
25	2.040	0.000	0.000	0.011	0.011	2	0.970	0.000	0.000	0.006	0.006	1	1.559	0.000	0.000	0.340	0.340	46
26	2.101	0.000	0.000	0.011	0.011	2	0.849	0.000	0.000	0.005	0.005	0	1.657	0.000	0.000	0.314	0.314	45
27	2.030	0.000	0.000	0.011	0.011	2	0.854	0.000	0.000	0.005	0.005	0	1.510	0.000	0.000	0.373	0.373	49
28	1.897	0.000	0.000	0.010	0.010	2	0.821	0.000	0.000	0.005	0.005	0	1.473	0.000	0.000	0.364	0.364	46
29	1.750	0.000	0.000	0.009	0.009	1	0.812	0.000	0.000	0.005	0.005	0	1.139	0.000	0.000	0.296	0.296	29
30	1.655	0.000	0.000	0.009	0.009	1	0.800	0.000	0.000	0.005	0.005	0	1.390	0.000	0.000	0.330	0.330	40
31	1.647	0.000	0.000	0.008	0.008	1							1.387	0.000	0.000	0.343	0.343	41
Ten Daily Mean																		
Ten Daily I	2.528	0.000	0.000	0.005	0.005	1	1.881	0.000	0.000	0.019	0.019	3	0.960	0.000	0.000	0.013	0.013	1
Ten Daily II	2.238	0.000	0.000	0.009	0.009	2	1.301	0.000	0.000	0.006	0.006	1	5.004	0.000	0.000	0.253	0.253	186
Ten Daily III	2.053	0.000	0.000	0.014	0.014	3	0.917	0.000	0.000	0.006	0.006	0	1.754	0.000	0.000	0.372	0.372	60
Monthly																		
Total						58						41						2529

Annual Sediment Load (Metric Tonnes) : 412326

Annual Sediment Load for period : 2014-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

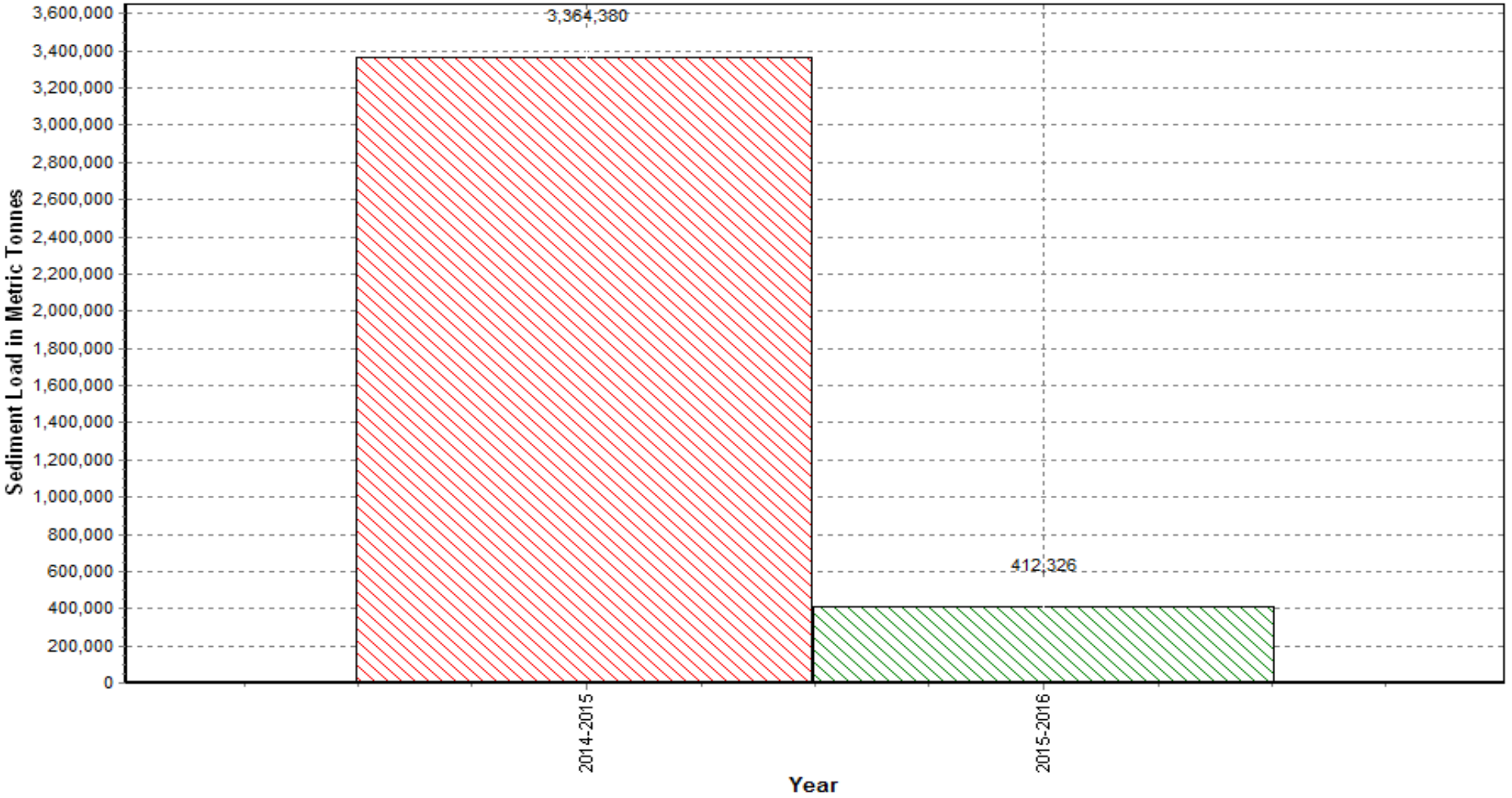
Local River : Vamsadhara **Sub-Division : Behrampur**

Year	Monsoon (M.T.)	Non-Monsoon (M.T.)	Annual Load (M.T.)	Annual Run Off (MCM)
2014-2015	3351292	13088	3364380	4195
2015-2016	409630	2696	412326	1047

Annual Sediment Load for the period: 2014-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**



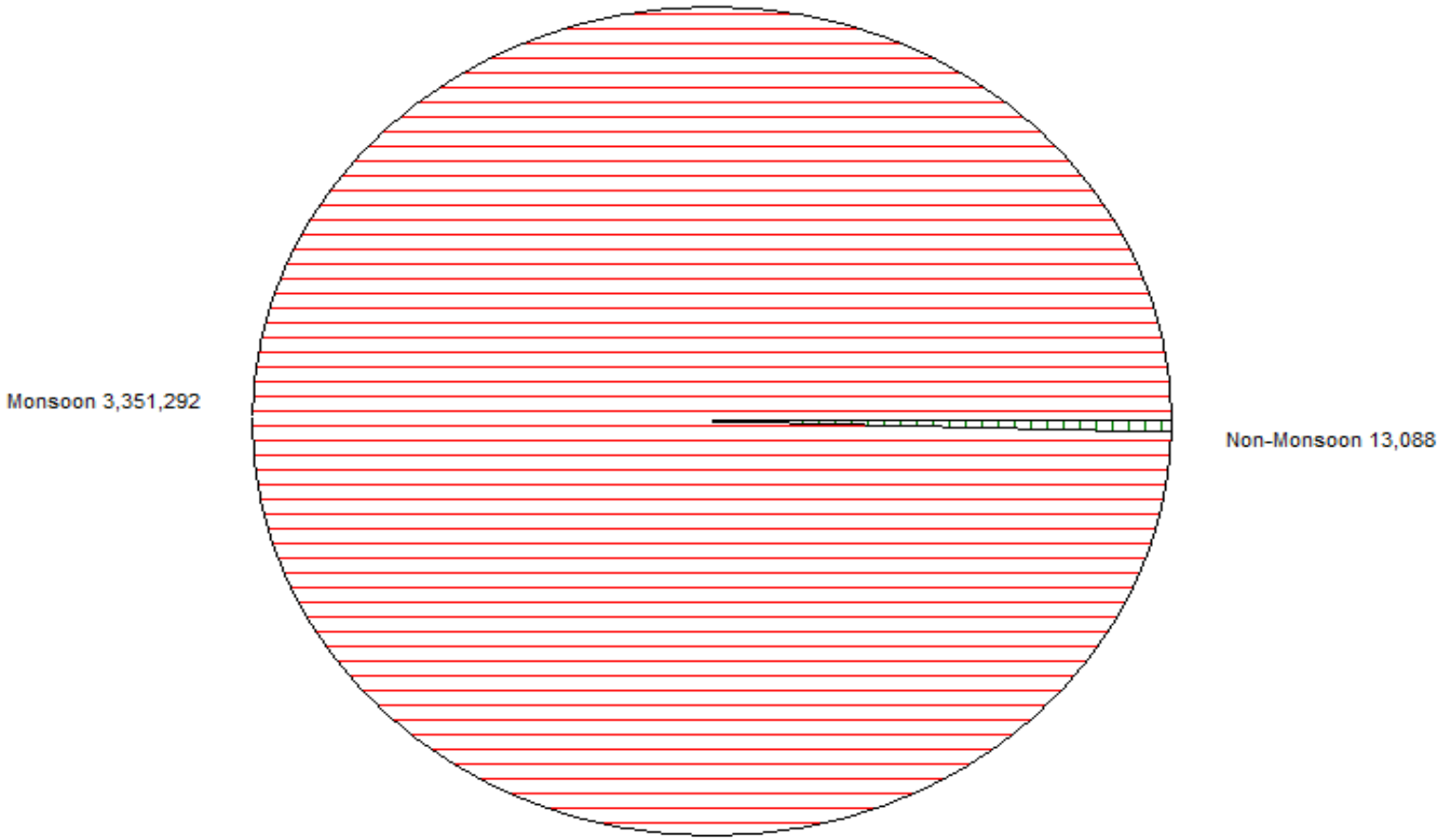
Seasonal Sediment Load for the period : 2014-2015

Station Name : GUNUPUR (AV000K9)

Local River : Vamsadhara

Division : E.E., Bhubaneswar

Sub-Division : Behrampur



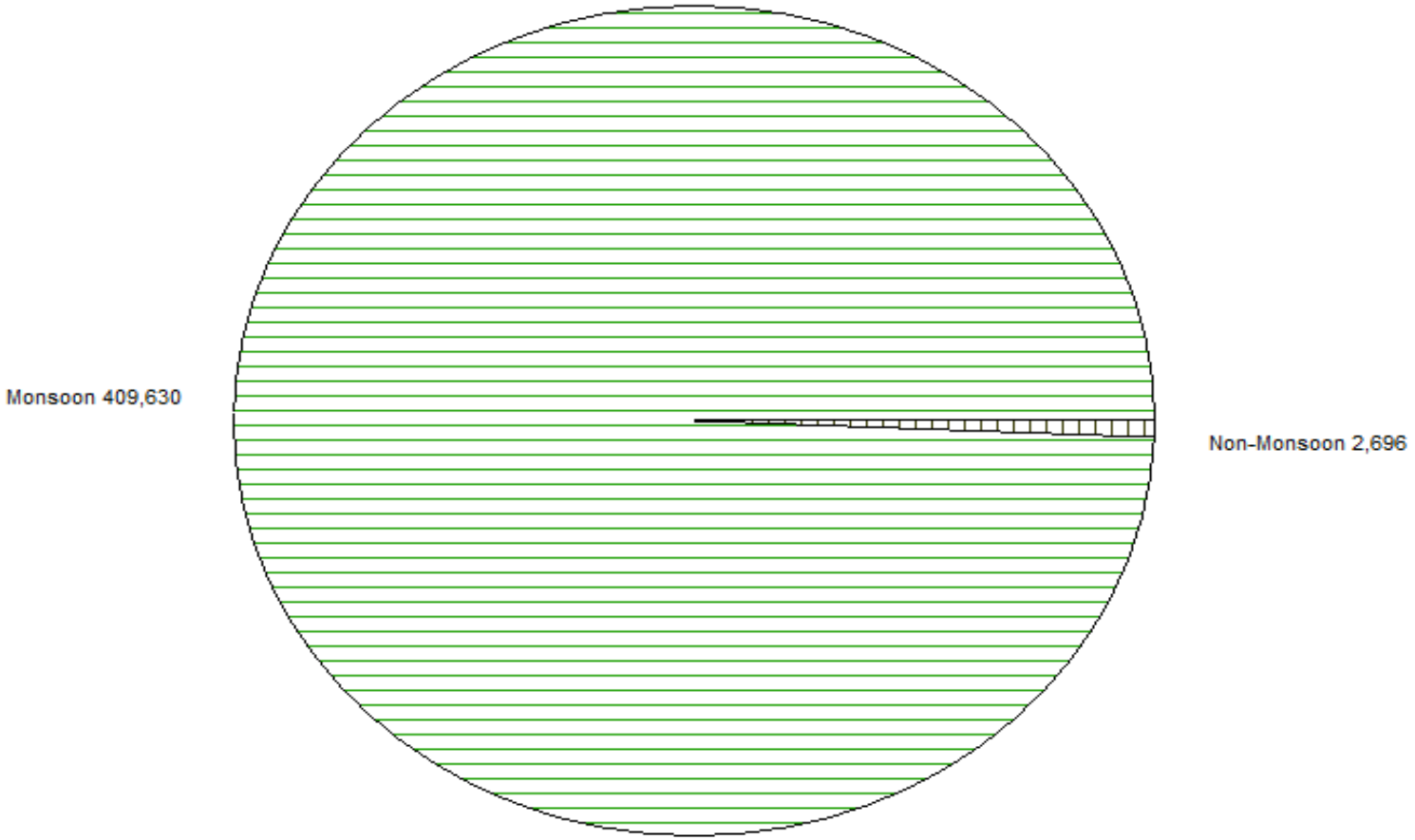
Seasonal Sediment Load for the Year: 2015-2016

Station Name : GUNUPUR (AV000K9)

Local River : Vamsadhara

Division : E.E., Bhubaneswar

Sub-Division : Behrampur



WATER QUALITY DATA

Water Quality Datasheet for the period : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **River Water Analysis** **Sub-Division : Behrampur**

S.No	Parameters	01.06.2015	01.08.2015	01.10.2015	01.12.2015	01.02.2016	01.04.2016
		A	A	A	A	A	A
	PHYSICAL						
1	Q (cumec)						
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Clear	Clear	Clear
3	EC_FLD (µmho/cm)	358	360	356	256	538	710
4	EC_GEN (µmho/cm)	367	369	362	247	540	713
5	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free
6	pH_FLD (pH units)	7.3	7.3	7.4	7.5	8.2	8.0
7	pH_GEN (pH units)	7.2	7.2	7.2	7.4	8.4	8.0
8	Temp (deg C)	27.0	26.5	28.0	19.5	17.5	22.5
	CHEMICAL						
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	9.2	18.4
2	ALK-TOT (mgCaCO3/L)	97	88	51	55	74	97
3	B (mg/L)	0.01	0.01	0.01	0.01	0.01	0.02
4	Ca (mg/L)	21	21	18	19	22	27
5	Cl (mg/L)	9.4	15.1	11.3	13.2	17.0	18.9
6	CO3 (mg/L)	0.0	0.0	0.0	0.0	11.1	22.2
7	F (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)	0.6	0.4	0.4	0.5	0.3	0.4
9	HCO3 (mg/L)	118	107	62	68	68	73
10	K (mg/L)	2.4	2.5	3.1	2.4	3.2	8.0
11	Mg (mg/L)	11.7	10.7	8.8	8.8	9.7	14.6
12	Na (mg/L)	13.5	13.6	4.0	15.8	27.2	17.0
13	NO2+NO3 (mg N/L)	1.04	0.88	0.83	0.99	1.09	0.98
14	NO2-N (mgN/L)	0.00	0.03	0.01	0.01	0.00	0.03
15	NO3-N (mgN/L)	1.04	0.85	0.81	0.98	1.09	0.95
16	P-Tot (mgP/L)	0.001	0.001	0.001	0.001	0.001	0.002
17	SiO2 (mg/L)	5.0	6.0	6.0	6.0	5.0	6.0
18	SO4 (mg/L)	1.5	19.3	18.8	6.8	7.2	7.7
	BIOLOGICAL/BACTERIOLOGICAL						
	TRACE & TOXIC						
	CHEMICAL INDICES						
1	HAR_Ca (mgCaCO3/L)	52	52	44	48	56	68
2	HAR_Total (mgCaCO3/L)	101	97	81	85	97	129
3	Na% (%)	22	23	9	28	37	21
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.6	0.6	0.2	0.7	1.2	0.7
	PESTICIDES						

Water Quality Summary for the period : 2015-2016

Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_FLD (µmho/cm)	6	710	256	430
3	EC_GEN (µmho/cm)	6	713	247	433
4	pH_FLD (pH units)	6	8.2	7.3	7.6
5	pH_GEN (pH units)	6	8.4	7.2	7.6
6	Temp (deg C)	6	28.0	17.5	23.5
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	6	18.4	0.0	4.6
2	ALK-TOT (mgCaCO3/L)	6	97	51	77
3	B (mg/L)	6	0.02	0.01	0.01
4	Ca (mg/L)	6	27	18	21
5	Cl (mg/L)	6	18.9	9.4	14.1
6	CO3 (mg/L)	6	22.2	0.0	5.5
7	F (mg/L)	6	0.05	0.05	0.05
8	Fe (mg/L)	6	0.6	0.3	0.4
9	HCO3 (mg/L)	6	118	62	83
10	K (mg/L)	6	8.0	2.4	3.6
11	Mg (mg/L)	6	14.6	8.8	10.7
12	Na (mg/L)	6	27.2	4.0	15.2
13	NO2+NO3 (mg N/L)	6	1.09	0.83	0.97
14	NO2-N (mgN/L)	6	0.03	0.00	0.01
15	NO3-N (mgN/L)	6	1.09	0.81	0.96
16	P-Tot (mgP/L)	6	0.002	0.001	0.001
17	SiO2 (mg/L)	6	6.0	5.0	5.7
18	SO4 (mg/L)	6	19.3	1.5	10.2
	BIOLOGICAL/BACTERIOLOGICAL				
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	6	68	44	53
2	HAR_Total (mgCaCO3/L)	6	129	81	98
3	Na% (%)	6	37	9	24
4	RSC (-)	6	0.0	0.0	0
5	SAR (-)	6	1.2	0.2	0.7
	PESTICIDES				

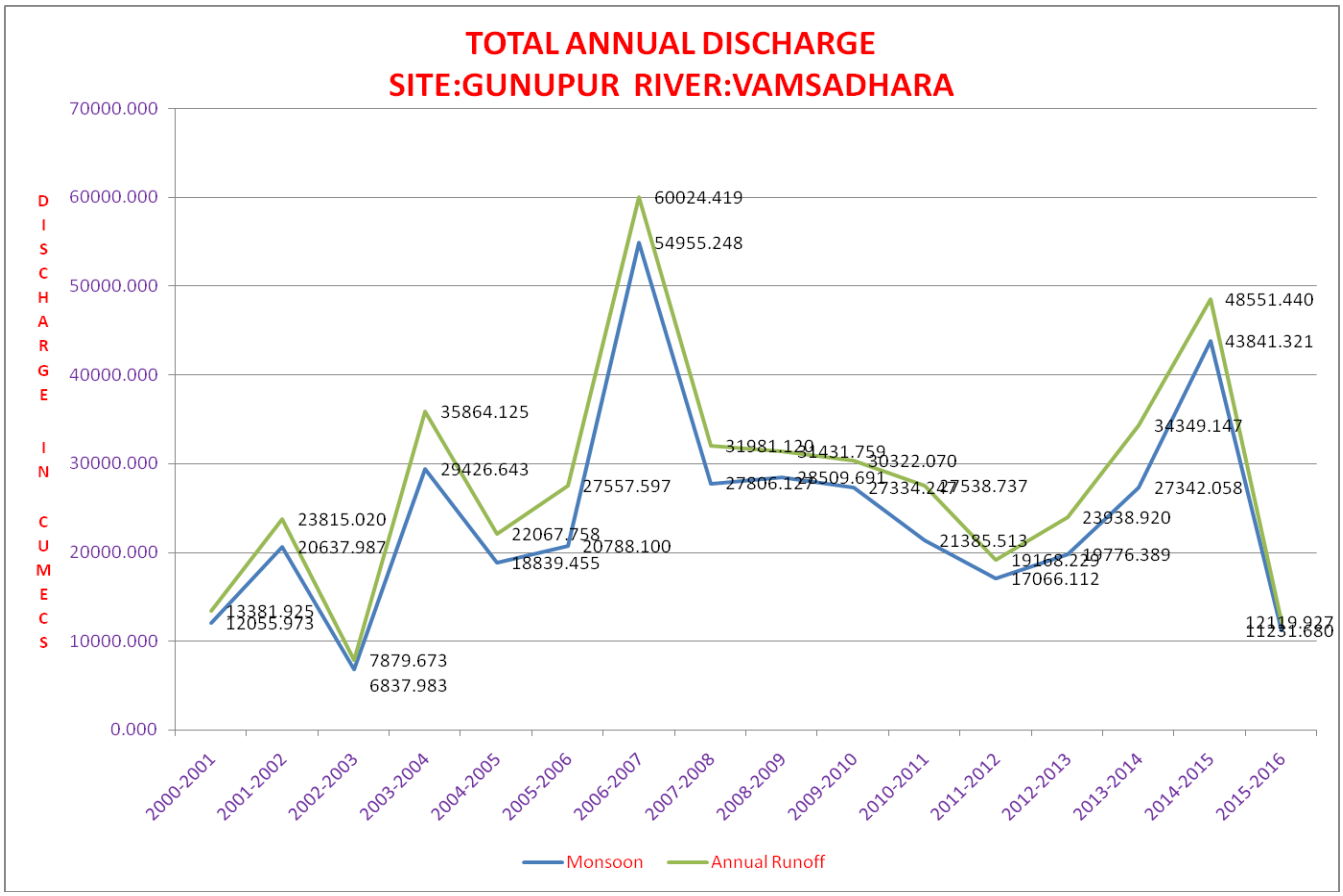
Water Quality Seasonal Average for the period: 2015-2016

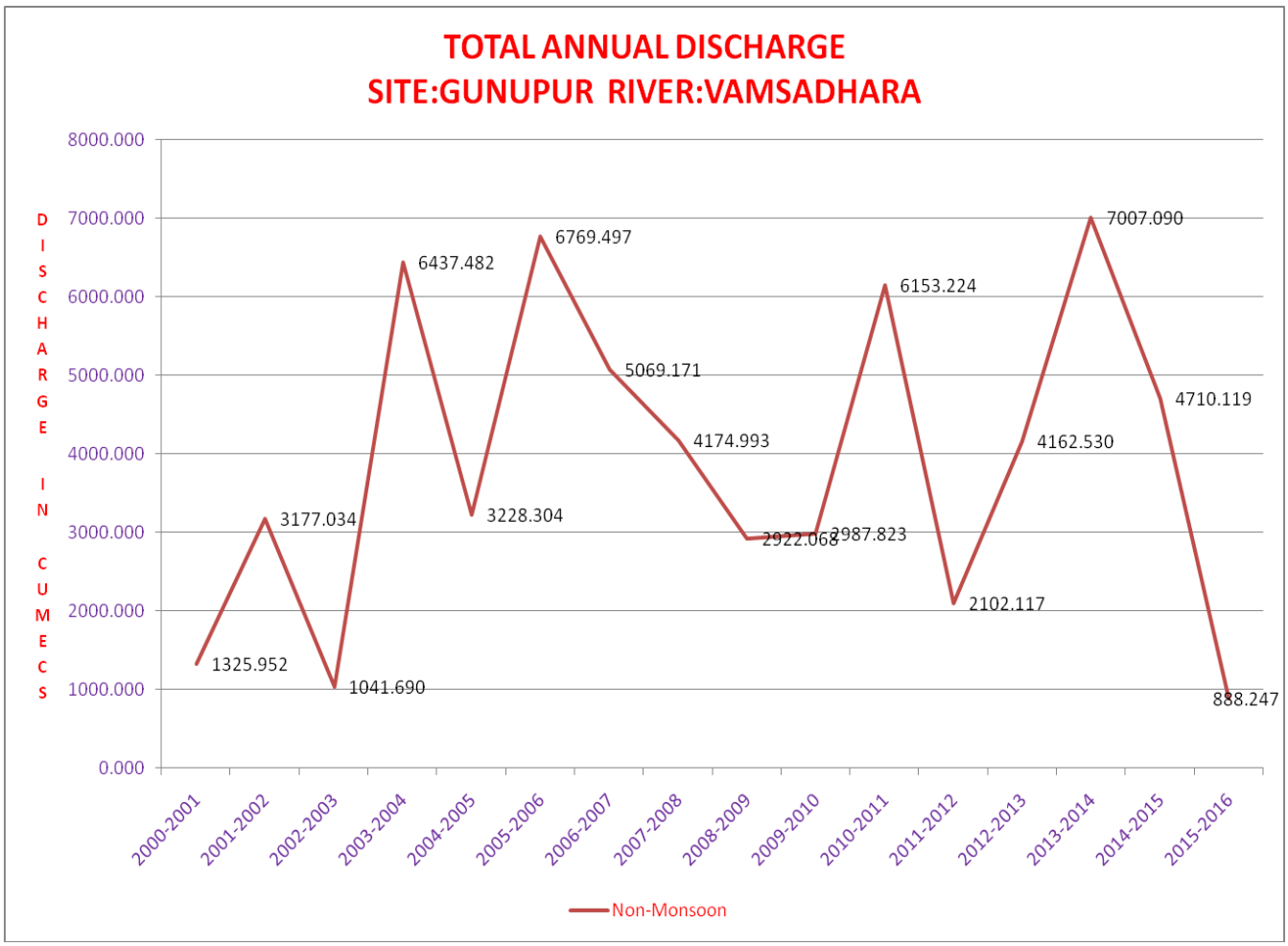
Station Name : GUNUPUR (AV000K9) **Division : E.E., Bhubaneswar**

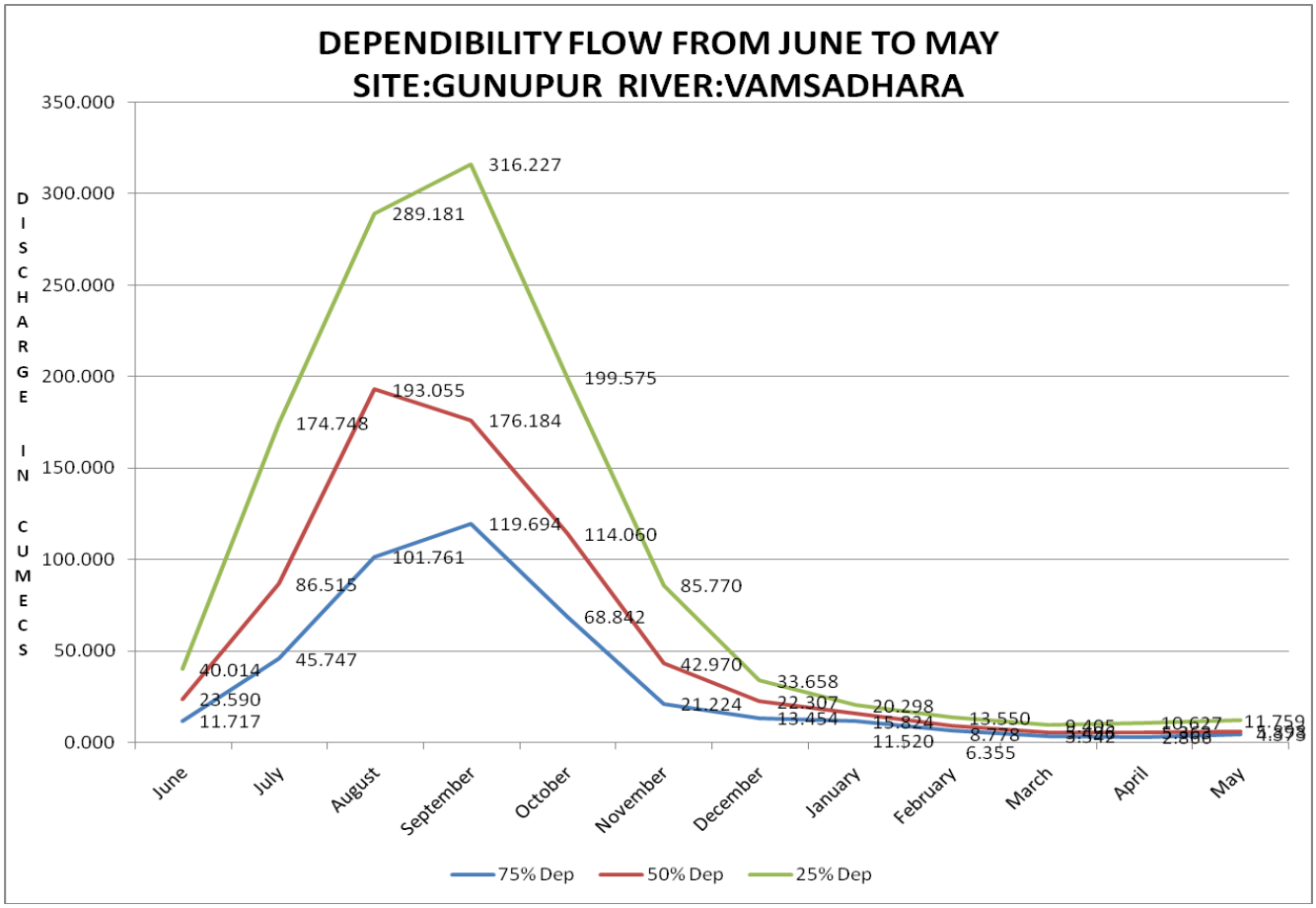
Local River : Vamsadhara **River Water** **Sub-Division : Behrampur**

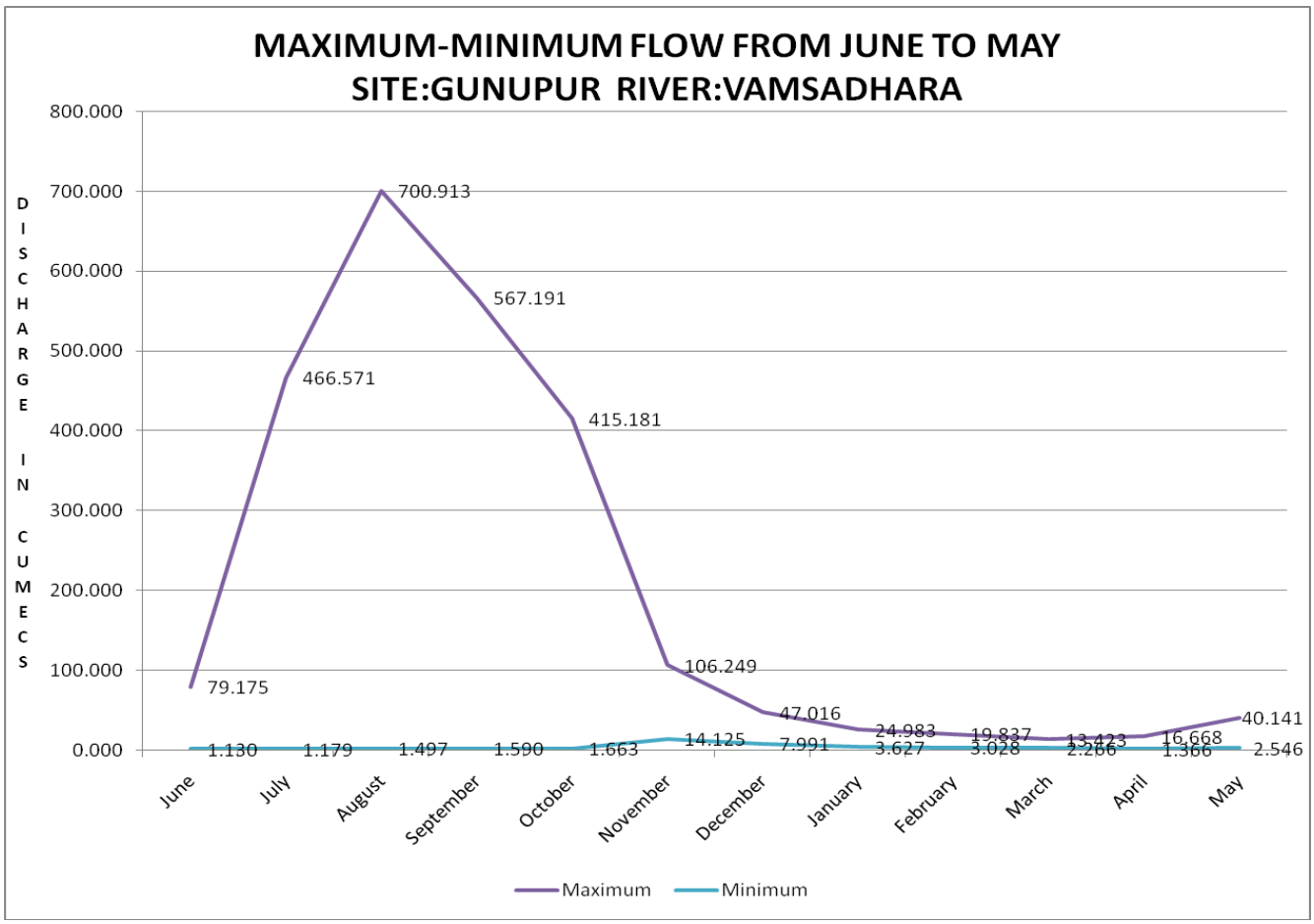
S.No	Parameters	Flood	Winter	Summer
		Jun - Oct	Nov - Feb	Mar - May
		2015	2015-2016	2016
	PHYSICAL			
1	Q (cumec)			
2	EC_FLD (µmho/cm)	358	397	710
3	EC_GEN (µmho/cm)	366	394	713
4	pH_FLD (pH units)	7.3	7.9	8.0
5	pH_GEN (pH units)	7.2	7.9	8.0
6	Temp (deg C)	27.2	18.5	22.5
	CHEMICAL			
1	Alk-Phen (mgCaCO3/L)	0.0	4.6	18.4
2	ALK-TOT (mgCaCO3/L)	79	65	97
3	B (mg/L)	0.01	0.01	0.02
4	Ca (mg/L)	20	21	27
5	Cl (mg/L)	11.9	15.1	18.9
6	CO3 (mg/L)	0.0	5.5	22.2
7	F (mg/L)	0.05	0.05	0.05
8	Fe (mg/L)	0.5	0.4	0.4
9	HCO3 (mg/L)	96	68	73
10	K (mg/L)	2.7	2.8	8.0
11	Mg (mg/L)	10.4	9.2	14.6
12	Na (mg/L)	10.4	21.5	17.0
13	NO2+NO3 (mg N/L)	0.92	1.04	0.98
14	NO2-N (mgN/L)	0.01	0.01	0.03
15	NO3-N (mgN/L)	0.90	1.04	0.95
16	P-Tot (mgP/L)	0.001	0.001	0.002
17	SiO2 (mg/L)	5.7	5.5	6.0
18	SO4 (mg/L)	13.2	7.0	7.7
	BIOLOGICAL/BACTERIOLOGICAL			
	TRACE & TOXIC			
	CHEMICAL INDICES			
1	HAR_Ca (mgCaCO3/L)	49	52	68
2	HAR_Total (mgCaCO3/L)	93	91	129
3	Na% (%)	18	33	21
4	SAR (-)	0.5	1.0	0.7
	PESTICIDES			

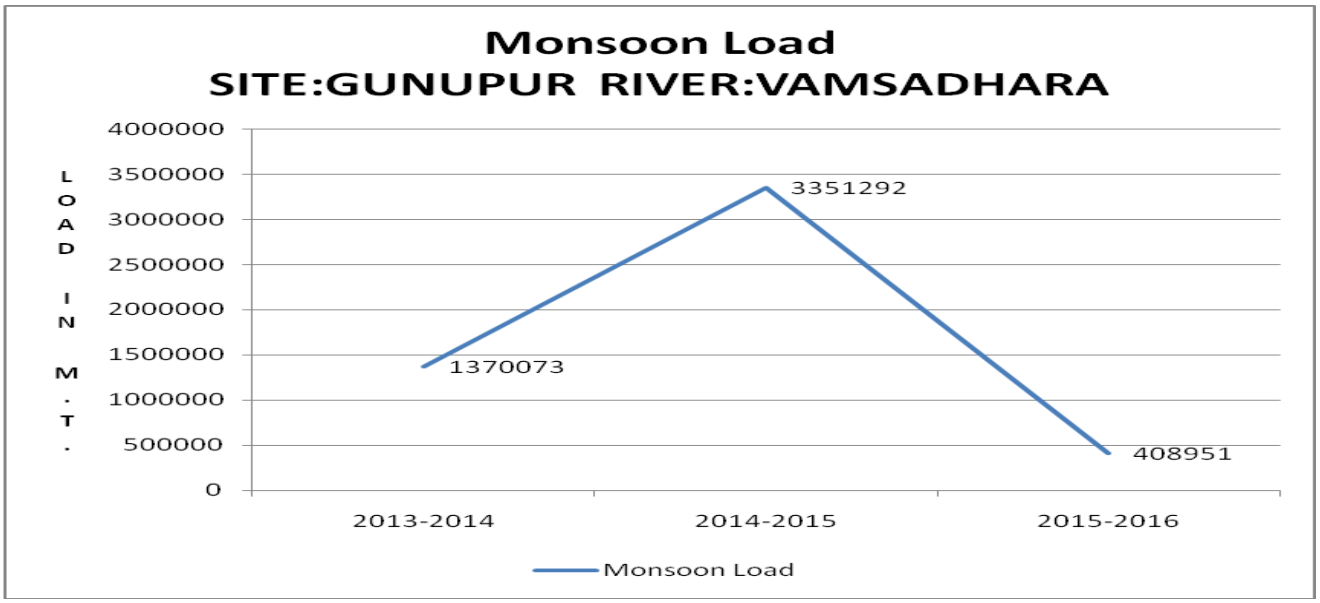
TREND ANALYSIS

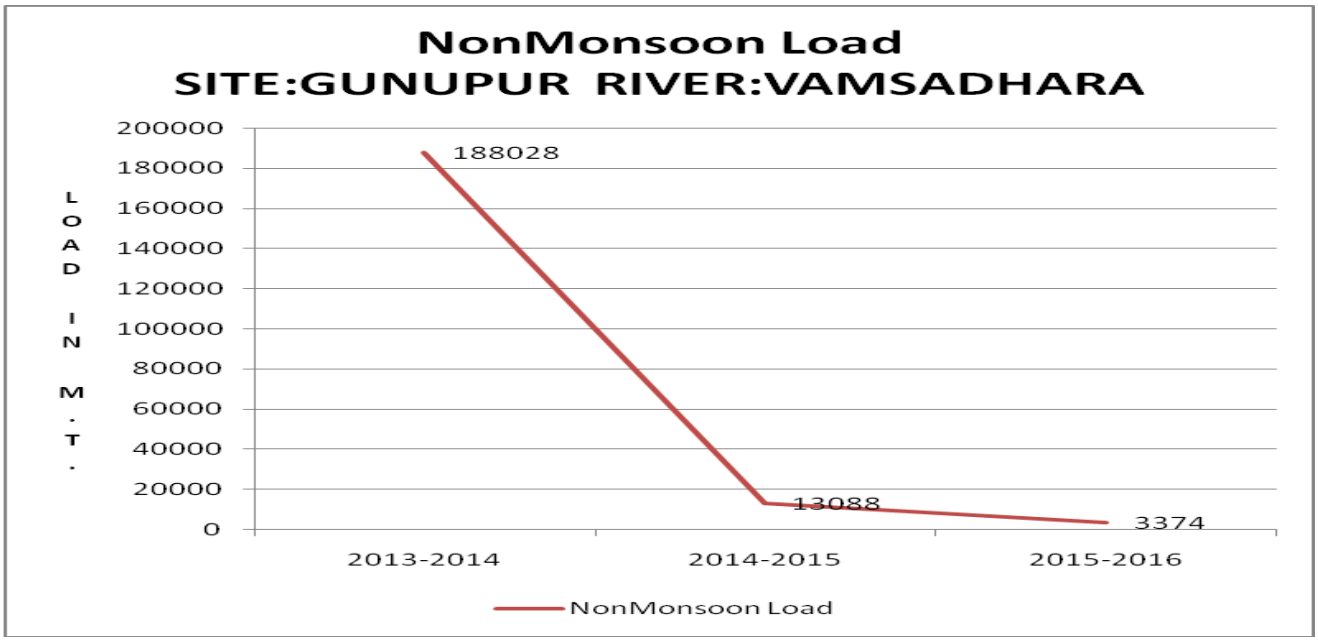

TOTAL ANNUAL DISCHARGE
SITE:GUNUPUR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
70000.000
60000.000
50000.000
40000.000
30000.000
20000.000
10000.000
0.000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
13381.925
12055.973
23815.020
20637.987
7879.673
6837.983
35864.125
29426.643
22067.758
18839.455
27557.597
20788.100
60024.419
54955.248
31981.120
27806.127
31431.759
28509.691
30322.070
27334.247
27538.737
21385.513
19168.229
17066.112
23938.920
19776.389
34349.147
27342.058
48551.440
43841.321
12119.927
11231.680
Monsoon
Annual Runoff

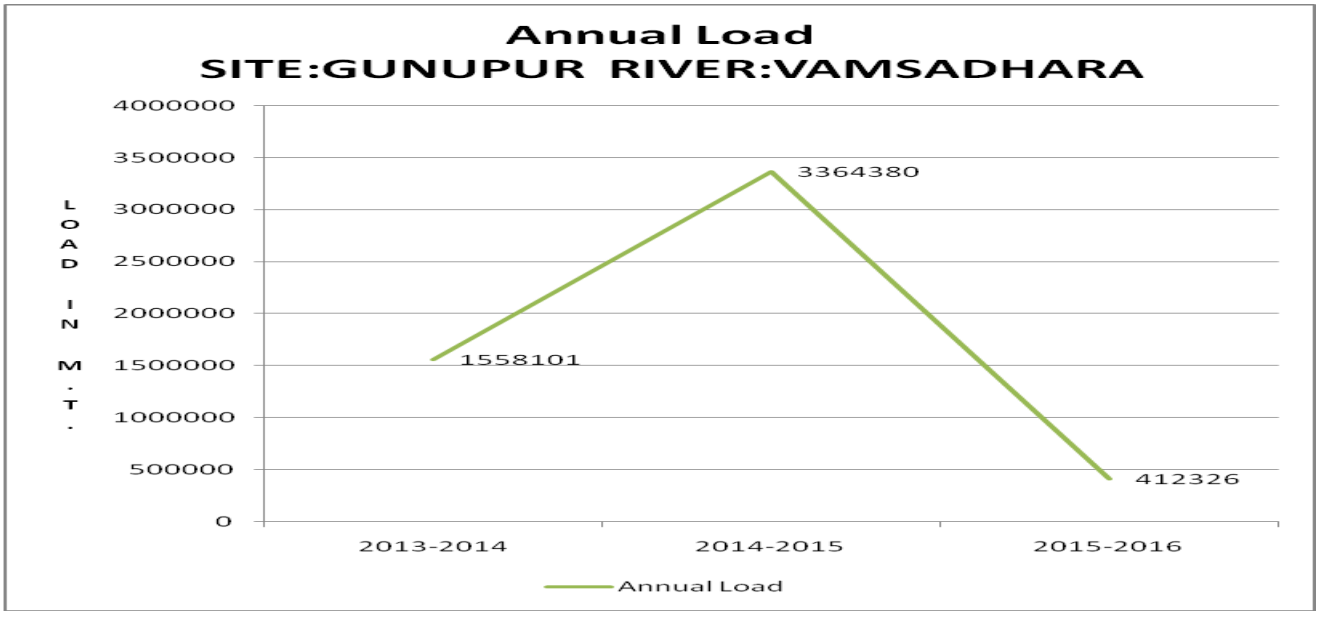

TOTAL ANNUAL DISCHARGE
SITE:GUNUPUR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
8000.000
7000.000
6000.000
5000.000
4000.000
3000.000
2000.000
1000.000
0.000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
1325.952
3177.034
1041.690
6437.482
3228.304
6769.497
5069.171
4174.993
2922.068
2987.823
6153.224
2102.117
4162.530
7007.090
4710.119
888.247
Non-Monsoon


DEPENDIBILITY FLOW FROM JUNE TO MAY
SITE:GUNUPUR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
350.000
300.000
250.000
200.000
150.000
100.000
50.000
0.000
316.227
289.181
199.575
193.055
174.748
176.184
119.694
114.060
101.761
86.515
85.770
68.842
45.747
42.970
40.014
33.658
23.590
22.307
21.224
20.298
13.454
11.717
11.520
8.778
6.355
June
July
August
September
October
November
December
January
February
March
April
May
75% Dep
50% Dep
25% Dep


MAXIMUM-MINIMUM FLOW FROM JUNE TO MAY
SITE:GUNUPUR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
700.913
567.191
466.571
415.181
106.249
79.175
47.016
40.141
24.983
19.837
16.668
14.125
7.991
3.627
3.028
2.546
1.130
1.179
1.497
1.590
1.663
June
July
August
September
October
November
December
January
February
March
April
May
Maximum
Minimum


Monsoon Load
SITE:GUNUPUR RIVER:VAMSADHARA
LOAD IN M.T.
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
1370073
3351292
408951
2013-2014
2014-2015
2015-2016
Monsoon Load


NonMonsoon Load
SITE:GUNUPUR RIVER:VAMSADHARA
LOAD IN M.T.
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
188028
13088
3374
2013-2014
2014-2015
2015-2016
NonMonsoon Load


Annual Load
SITE:GUNUPUR RIVER:VAMSADHARA
LOAD IN M.T.
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
1558101
3364380
412326
2013-2014
2014-2015
2015-2016
Annual Load

HYDROLOGICAL DATA

HISTORY SHEET

Water Year : 2015-2016

Site	**: KASHINAGAR**		**Code**	**: AV000J4**	
State	: Orissa		District	Gajapati	
Basin	: EFR B Mahanadi-Godavari		Independent River	: Vamsadhara	
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	: Vamsadhara	
Division	: E.E., Bhubaneswar		Sub-Division	: Behrampur	
Drainage Area	: 7820 Sq. Km.		Bank	: Left	
Latitude	: 18°50'49"		Longitude	: 83°57'04"	
Zero of Gauge (m)	: 50 (m.s.l)	20.03.1971	-	31.05.1985	
	51 (m.s.l)	01.06.1985	-	31.12.2999	
	Opening Date	Closing Date			
Gauge	: 20.03.1971				
Discharge	: 28.04.1971				
Sediment	: 13.10.1972				
Water Quality	: 01.09.1972				

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)

	Maximum			Minimum		
Year	**Q (cumecs)**	**WL (m)**	**Date**	**Q (cumecs)**	**WL (m)**	**Date**
1971-1972	3348	55.565	05.09.1971	0.100	53.095	29.05.1972
1972-1973	6589	56.303	23.09.1972	0.100	53.080	08.06.1972
1973-1974	763.3	53.735	23.08.1973	0.300	51.760	21.04.1974
1974-1975	1081	54.160	17.06.1974	0.100	52.125	20.04.1975
1975-1976	867.1	53.985	27.06.1975	0.500	52.268	10.05.1976
1976-1977	1611	54.370	04.09.1976	0.400	51.835	06.04.1977
1977-1978	2148	54.770	12.09.1977	1.000	51.825	31.05.1978
1978-1979	1292	54.565	28.08.1978	0.400	52.150	13.04.1979
1979-1980	1158	54.415	08.08.1979	0.200	52.230	27.05.1980
1980-1981	1901	53.980	17.09.1980	2.000	52.415	01.06.1980
1981-1982	1160	54.500	09.08.1981	2.000	51.000	09.05.1982
1982-1983	2001	53.790	30.08.1982	0.865	51.450	06.05.1983
1983-1984	765.3	53.820	07.10.1983	0.261	51.570	25.05.1984
1984-1985	850.0	54.460	13.06.1984	0.016	51.510	06.05.1985
1985-1986	928.9	54.790	07.08.1985	0.520	52.595	01.06.1985
1986-1987	1006	54.985	22.07.1986	1.036	52.680	15.04.1987
1987-1988	327.3	54.340	17.10.1987	0.020	52.530	15.04.1988
1988-1989	1100	54.950	02.10.1988	0.040	52.660	12.04.1989
1989-1990	1499	55.755	11.05.1990	0.484	52.690	01.06.1989
1990-1991	3217	55.928	12.10.1990	5.000	53.325	22.05.1991
1991-1992	3246	56.250	29.07.1991	2.450	53.015	25.04.1992

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)

	Maximum			Minimum		
Year	**Q (cumecs)**	**WL (m)**	**Date**	**Q (cumecs)**	**WL (m)**	**Date**
1992-1993	3078	56.190	28.07.1992	2.210	52.955	12.05.1993
1993-1994	294.5	54.620	20.08.1993	0.870	53.035	02.04.1994
1994-1995	2486	56.045	04.09.1994	2.130	53.100	03.06.1994
1995-1996	1640	55.595	31.08.1995	2.590	53.345	17.05.1996
1996-1997	529.0	55.140	23.08.1996	1.000	53.330	23.03.1997
1997-1998	2052	55.885	21.08.1997	0.380	53.230	11.06.1997
1998-1999	278.6	54.815	17.11.1998	0.065	53.495	24.04.1999
1999-2000	326.8	54.895	29.07.1999	2.233	53.495	18.04.2000
2000-2001	465.0	54.975	27.08.2000	0.568	53.480	05.05.2001
2001-2002	1235	55.685	07.07.2001	1.060	53.425	14.05.2002
2002-2003	457.3	55.060	29.08.2002	0.000	51.000	17.05.2003
2003-2004	4268	56.480	07.10.2003	0.000	51.000	10.06.2003
2004-2005	1040	55.535	11.08.2004	0.950	53.275	23.05.2005
2005-2006	1624	55.880	19.09.2005	1.531	53.300	18.06.2005
2006-2007	4062	56.560	03.07.2006	5.796	53.375	10.04.2007
2007-2008	7322	57.850	07.08.2007	4.731	53.040	22.05.2008
2008-2009	5399	56.955	18.09.2008	1.500	52.735	03.05.2009
2009-2010	1553	55.542	20.07.2009	1.344	52.885	23.04.2010
2010-2011	1563	55.545	05.08.2010	2.417	52.870	10.06.2010
2011-2012	1948	55.725	02.09.2011	1.118	53.115	08.04.2012
2012-2013	729.3	55.215	06.08.2012	0.862	53.215	16.06.2012
2013-2014	1999	55.688	25.10.2013	4.584	53.160	02.05.2014
2014-2015	4250	56.605	07.09.2014	7.600	53.505	31.05.2015
2015-2016	572.5	55.110	16.09.2015	0.700	53.220	01.05.2016

Stage-Discharge Data for the period 2015 - 2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Jun		Jul		Aug		Sep		Oct		Nov	
	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q
1	53.515	9.280	53.915	117.7	53.660	33.47	54.260	165.1	53.980	104.9	53.540	26.00 *
2	53.540	10.21	53.890	100.9	53.625	31.00 *	54.100	105.7	53.920	80.00 *	53.560	29.60
3	53.530	9.237	54.080	179.6	53.610	29.81	54.060	89.81	53.925	78.59	53.710	49.34
4	53.525	9.006	54.015	151.1	53.600	28.25	54.010	81.92	53.900	75.00 *	53.710	48.24
5	53.550	10.66	53.910	105.0 *	53.590	28.38	53.970	72.93	53.890	74.35	53.700	45.36
6	53.610	15.69	53.770	43.75	53.660	34.13	53.915	60.00 *	53.920	81.50	53.670	35.03
7	53.595	29.60 *	53.680	38.52	53.610	29.46	54.125	109.4	53.860	76.36	53.660	32.00
8	53.625	16.83	53.650	35.98	53.590	28.23	53.960	71.01	53.840	74.32	53.650	30.00 *
9	53.655	20.12	53.610	33.12	53.570	27.00 *	53.890	61.71	53.810	71.99	53.630	25.20
10	53.630	18.34	53.585	31.65	53.560	27.01	53.990	75.30	53.800	70.90	53.610	21.33
11	53.595	14.67	53.590	32.83	53.640	32.88	53.930	71.50	53.790	68.00 *	53.610	22.00 *
12	53.575	13.54	53.620	34.00 *	53.570	27.84	53.920	69.16	53.770	62.35	53.610	22.96
13	53.565	13.08	53.740	41.19	53.800	54.70	54.035	84.00 *	53.730	55.74	53.600	21.66
14	53.660	34.60 *	53.690	38.91	53.990	105.3	54.060	87.24	53.700	51.15	53.600	21.71
15	53.715	35.62	53.635	35.28	53.910	81.00 *	54.050	86.75	53.680	48.37	53.590	20.00 *
16	53.815	48.91	53.655	37.32	53.790	45.00 *	55.110	572.5	53.670	47.83	53.590	20.35
17	53.870	56.56	53.630	35.26	53.930	86.96	54.720	490.0 *	53.660	46.86	53.580	19.67
18	53.950	68.13	53.675	44.00 *	54.070	124.9	54.430	428.4	53.700	49.00 *	53.630	25.35
19	53.780	46.25	53.855	78.00 *	53.860	92.25	54.400	395.0	53.685	48.04	53.620	24.58
20	53.765	44.55	53.930	92.62	54.140	147.2	54.530	435.0 *	53.665	46.62	53.620	25.19
21	53.815	65.00 *	53.900	86.29	54.040	113.4	54.960	565.2	53.660	46.00 *	53.610	23.30
22	54.670	415.4	53.873	88.12	54.130	157.9	54.460	399.3	53.650	45.00 *	53.605	23.00 *
23	54.025	195.7	53.800	80.95	54.170	166.0 *	54.280	292.5	53.640	43.38	53.580	21.42
24	53.815	123.6	53.840	79.88	54.030	102.3	54.240	271.4	53.630	41.00 *	53.570	20.37
25	53.790	116.5	53.830	76.94	53.960	96.49	54.200	240.0 *	53.610	36.00 *	53.570	20.00 *
26	53.770	98.94	53.950	112.0 *	53.970	96.45	54.180	223.9	53.590	31.83	53.550	19.18
27	53.750	92.60	53.955	102.6	54.030	100.7	54.160	205.0 *	53.580	30.40	53.540	18.63
28	53.740	86.00 *	53.900	93.93	54.000	90.13	54.130	176.1	53.570	29.22	53.540	18.44
29	53.710	65.11	53.820	72.37	54.220	162.2	54.110	146.4	53.560	28.23	53.530	18.00 *
30	53.920	130.0	53.750	62.25	54.240	169.0 *	54.060	121.9	53.550	28.03	53.530	18.47
31			53.705	54.90	54.360	209.3			53.550	27.95		
Ten-Daily Mean												
I Ten-Daily	53.577	14.90	53.810	83.74	53.608	29.67	54.028	89.29	53.884	78.79	53.644	34.21
II Ten-Daily	53.729	37.59	53.702	46.94	53.870	79.80	54.318	271.9	53.705	52.39	53.605	22.35
III Ten-Daily	53.901	138.9	53.848	82.75	54.105	133.1	54.278	264.2	53.599	35.19	53.563	20.08
Monthly												
Min.	53.515	9.006	53.585	31.65	53.560	27.00	53.890	60.00	53.550	27.95	53.530	18.00
Max.	54.670	415.4	54.080	179.6	54.360	209.3	55.110	572.5	53.980	104.9	53.710	49.34
Mean	53.736	63.79	53.789	71.52	53.869	82.54	54.208	208.5	53.725	54.8	53.604	25.55

Annual Runoff in MCM = 1438 Annual Runoff in mm = 184

Peak Observed Discharge = 572.5 cumecs on 16/09/2015 Corres. Water Level :55.11 m

Lowest Observed Discharge = 0.700 cumecs on 29/04/2016 Corres. Water Level :53.22 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

Stage-Discharge Data for the period 2015 - 2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	53.530	18.28	53.490	12.42	53.410	5.861	53.380	4.539	53.360	3.768	53.220	0.700 *
2	53.530	18.08	53.490	12.30	53.400	5.638	53.360	3.635	53.350	3.539	53.250	1.060
3	53.530	18.03	53.490	12.00 *	53.400	5.520	53.350	3.599	53.350	3.537 *	53.250	1.002
4	53.530	17.91	53.490	12.18	53.390	5.245	53.350	3.410	53.350	3.318	53.290	2.201
5	53.520	17.26	53.480	11.45	53.390	5.155	53.350	3.371	53.340	2.796	53.280	1.444
6	53.520	17.00 *	53.480	11.41	53.390	5.016	53.350	3.000 *	53.340	2.723	53.260	1.433
7	53.520	17.47	53.480	11.19	53.390	5.000 *	53.340	3.000 *	53.340	2.614	53.260	1.430
8	53.520	17.57	53.470	10.22	53.390	5.132	53.330	2.809	53.330	2.366	53.250	1.000 *
9	53.520	17.22	53.470	10.04	53.380	4.959	53.330	2.797	53.330	2.404	53.270	1.624
10	53.510	16.16	53.470	10.00 *	53.380	4.588	53.330	2.740	53.310	2.000 *	53.270	1.610
11	53.510	16.44	53.460	8.811	53.380	4.561	53.320	2.557	53.300	2.164	53.260	1.492
12	53.500	15.26	53.460	9.187	53.380	4.550	53.320	2.510	53.290	2.141	53.260	1.481
13	53.500	15.26 *	53.460	9.117	53.380	4.452	53.310	2.000 *	53.290	2.148	53.390	4.903
14	53.490	14.80	53.460	9.044	53.380	4.000 *	53.310	2.328	53.290	2.000 *	53.420	6.768
15	53.490	14.34	53.460	9.066	53.370	4.107	53.310	2.240	53.270	1.635	53.440	8.000 *
16	53.500	15.56	53.450	8.591	53.370	4.616	53.310	2.214	53.270	1.638	53.560	14.08
17	53.500	15.07	53.450	8.000 *	53.370	4.565	53.350	3.423	53.260	1.500 *	53.510	11.52
18	53.570	21.45	53.440	8.013	53.370	4.485	53.340	2.689	53.250	1.179	53.440	8.043
19	53.550	20.12	53.435	7.998	53.360	4.369	53.430	7.064	53.250	1.157	53.450	8.841
20	53.550	20.00 *	53.430	7.548	53.360	4.402	53.420	7.000 *	53.250	1.000 *	53.470	9.157
21	53.540	18.02	53.430	7.532	53.360	4.000 *	53.410	6.446	53.250	1.072	53.510	11.72
22	53.530	17.15	53.430	7.409	53.350	3.969	53.400	6.181	53.250	1.068	53.460	9.000 *
23	53.520	16.36	53.430	7.364	53.350	3.968	53.400	6.035	53.250	1.017	53.420	6.466
24	53.520	16.00 *	53.430	7.000 *	53.350	3.993	53.390	5.500 *	53.250	1.000 *	53.400	5.542
25	53.510	16.00 *	53.420	6.437	53.350	3.962	53.370	3.307 *	53.250	1.034	53.400	5.446
26	53.510	15.64	53.420	6.000 *	53.340	3.538	53.350	3.307	53.240	1.004	53.400	5.182
27	53.510	16.00 *	53.420	6.486	53.340	3.375	53.330	3.000 *	53.240	0.954	53.390	4.907
28	53.510	15.74	53.420	6.405	53.340	3.000 *	53.320	2.664	53.240	0.972	53.390	4.668
29	53.510	15.18	53.420	6.417			53.310	2.586	53.220	0.700	53.380	4.000 *
30	53.500	13.24	53.420	6.230			53.310	2.568	53.220	0.740	53.360	3.342
31	53.490	12.72	53.410	6.000 *			53.310	2.454			53.380	4.181
Ten-Daily Mean												
I Ten-Daily	53.523	17.50	53.481	11.32	53.392	5.212	53.347	3.290	53.340	2.907	53.260	1.350
II Ten-Daily	53.516	16.83	53.451	8.538	53.372	4.411	53.342	3.402	53.272	1.656	53.420	7.428
III Ten-Daily	53.514	15.64	53.423	6.662	53.347	3.726	53.355	4.004	53.241	0.956	53.408	5.860
Monthly												
Min.	53.490	12.72	53.410	6.000	53.340	3.000	53.310	2.000	53.220	0.700	53.220	0.700
Max.	53.570	21.45	53.490	12.42	53.410	5.861	53.430	7.064	53.360	3.768	53.560	14.08
Mean	53.517	16.62	53.450	8.77	53.372	4.501	53.348	3.58	53.284	1.84	53.364	4.911

Peak Computed Discharge = 490.0 cumecs on 17/09/2015 Corres. Water Level :54.72 m

Lowest Computed Discharge = 0.700 cumecs on 01/05/2016 Corres. Water Level :53.22 m

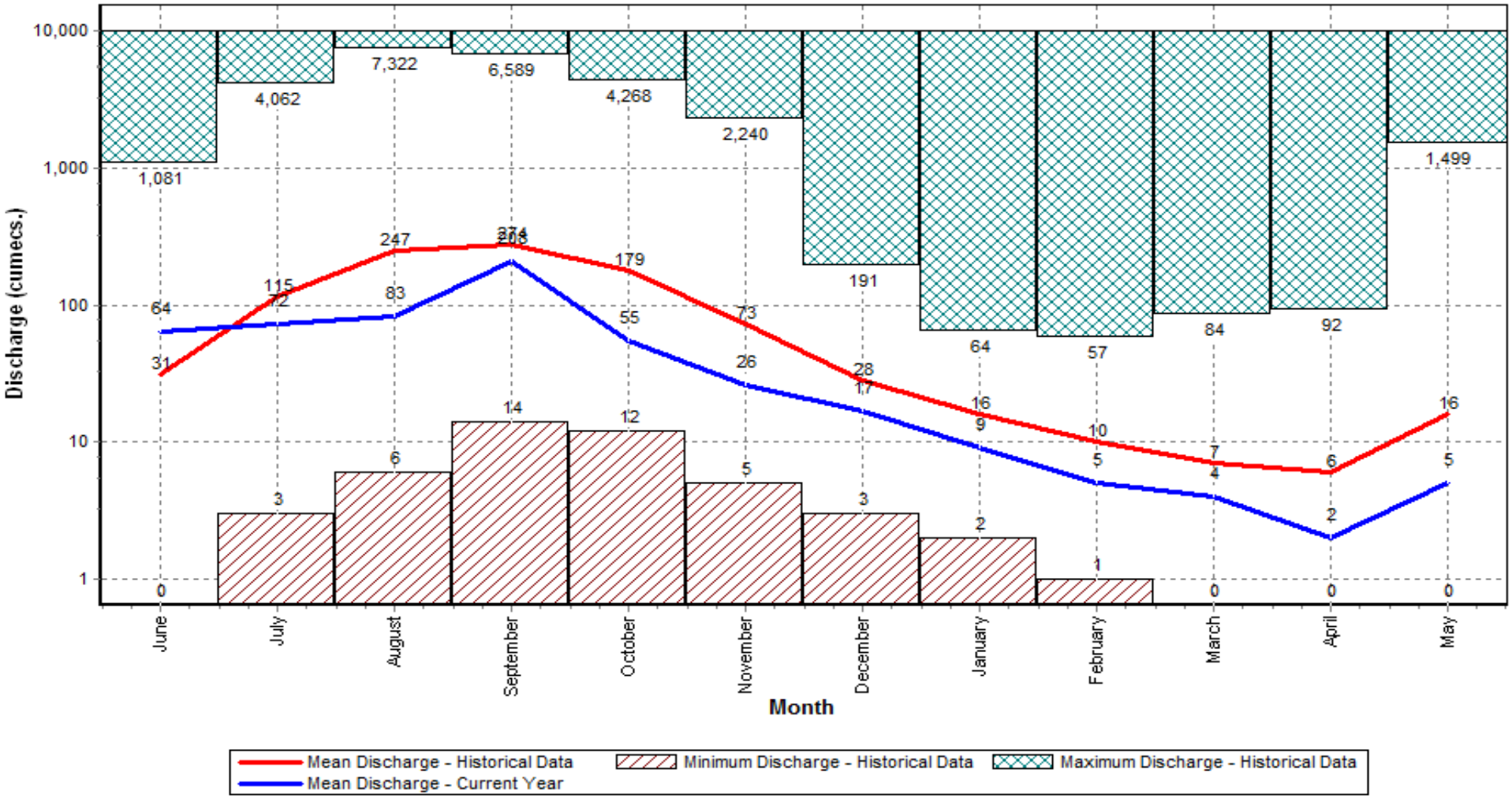
Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

HISTOGRAM - HYDROGRAPH for Water Year : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Data considered : 1971-2016** **Division : E.E., Bhubaneswar**

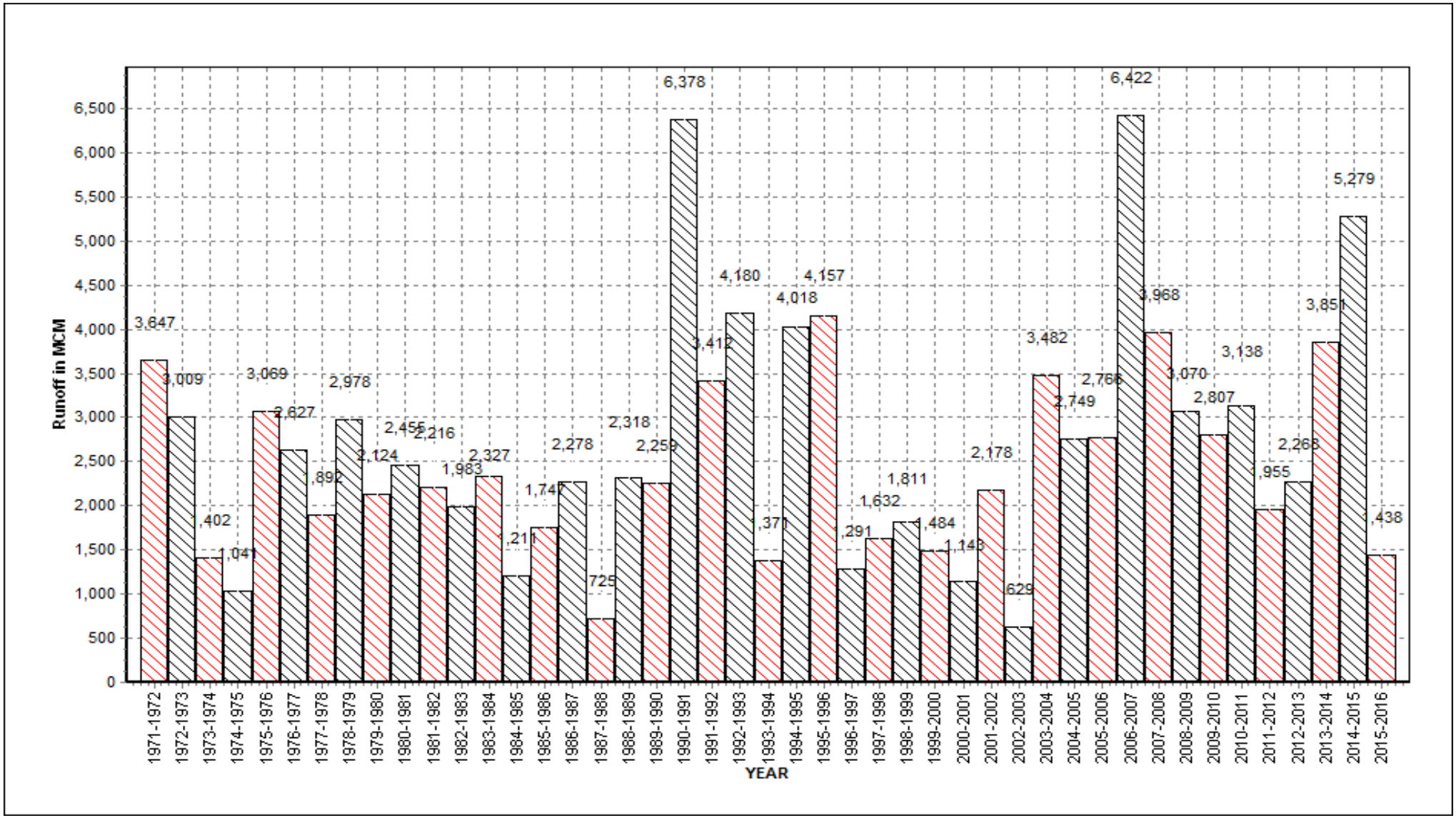
Local River : Vamsadhara **Sub-Division : Behrampur**



Annual Runoff Values for the period: 1971 - 2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**



Note: Missing values have not been considered while arriving at Annual Runoff

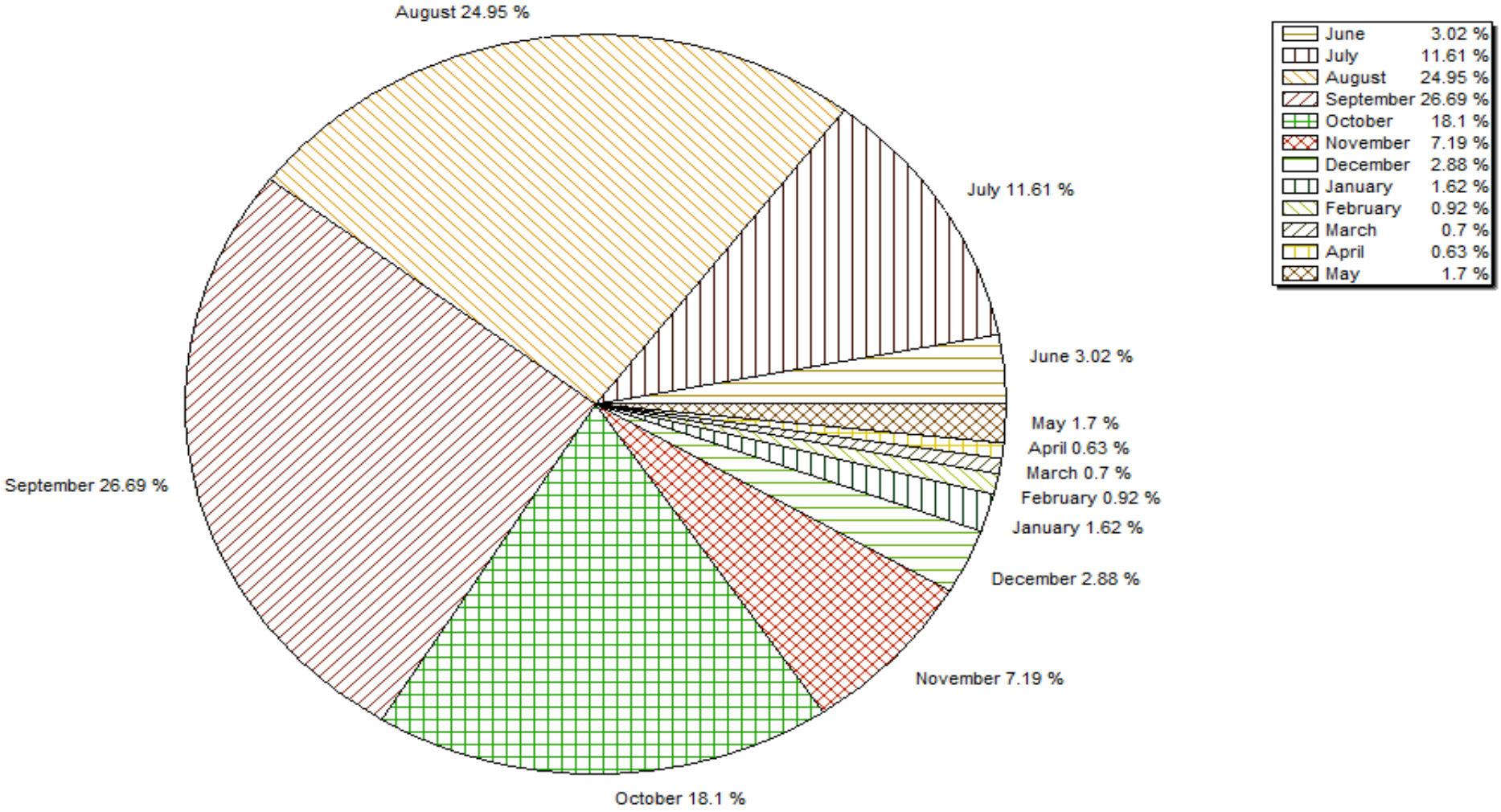
Monthly Average Runoff based on period : 1971-2015

Station Name : KASHINAGAR (AV000J4)

Local River : Vamsadhara

Division : E.E., Bhubaneswar

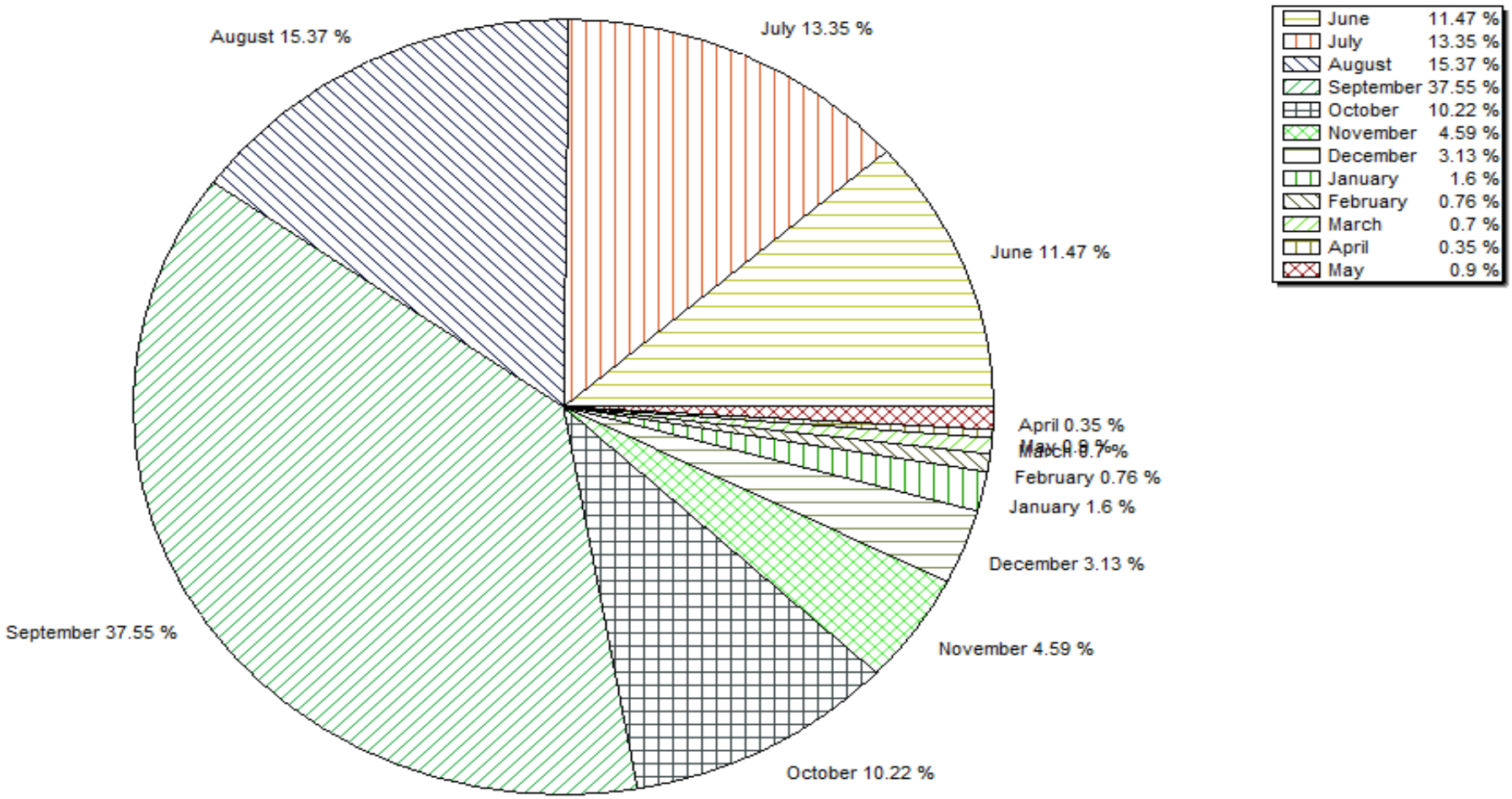
Sub-Division : Behrampur



Monthly Runoff for the Year : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

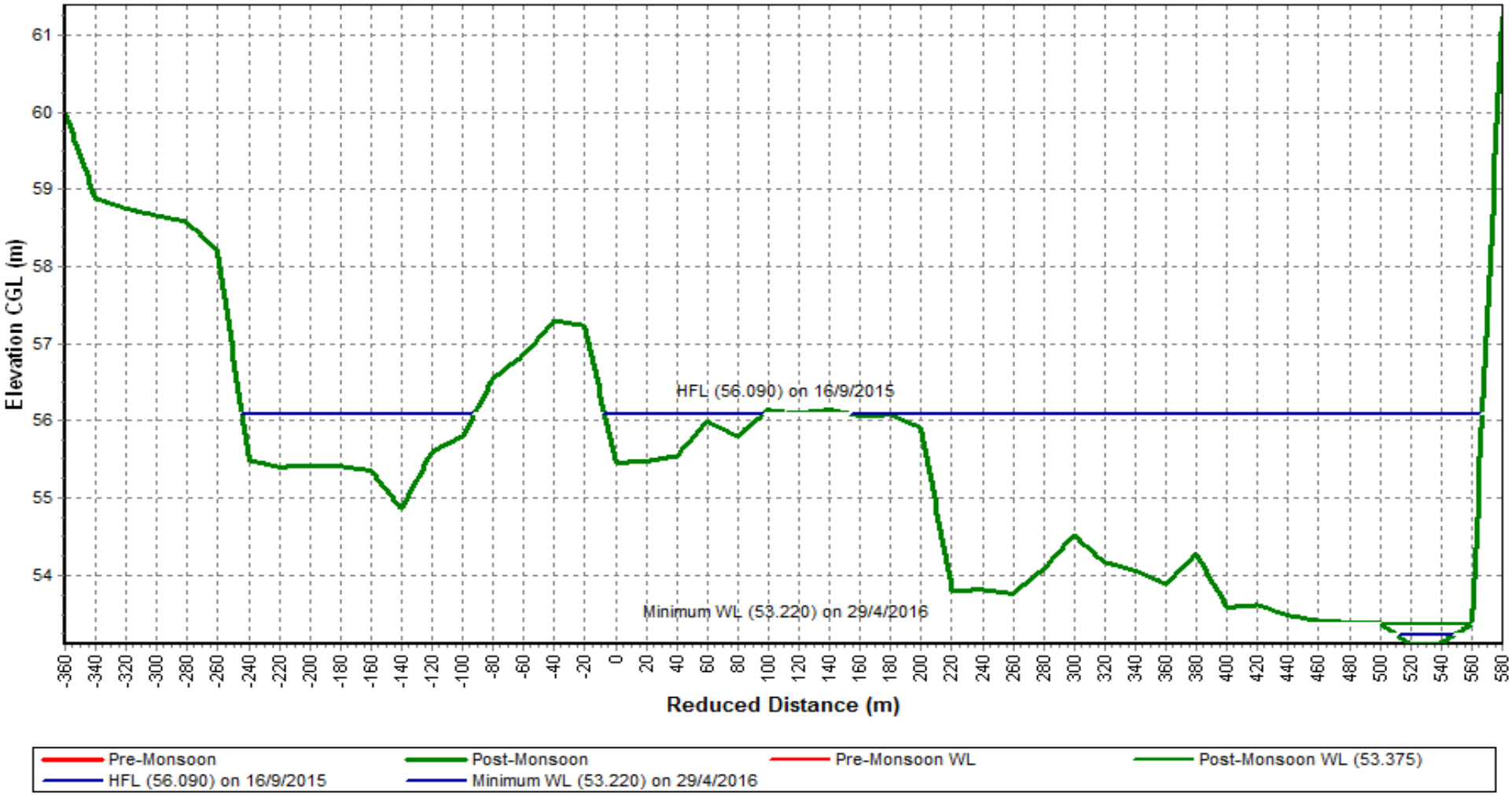
Local River : Vamsadhara **Sub-Division : Behrampur**



Pre-Monsoon & Post-Monsoon X-Section for Water Year : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

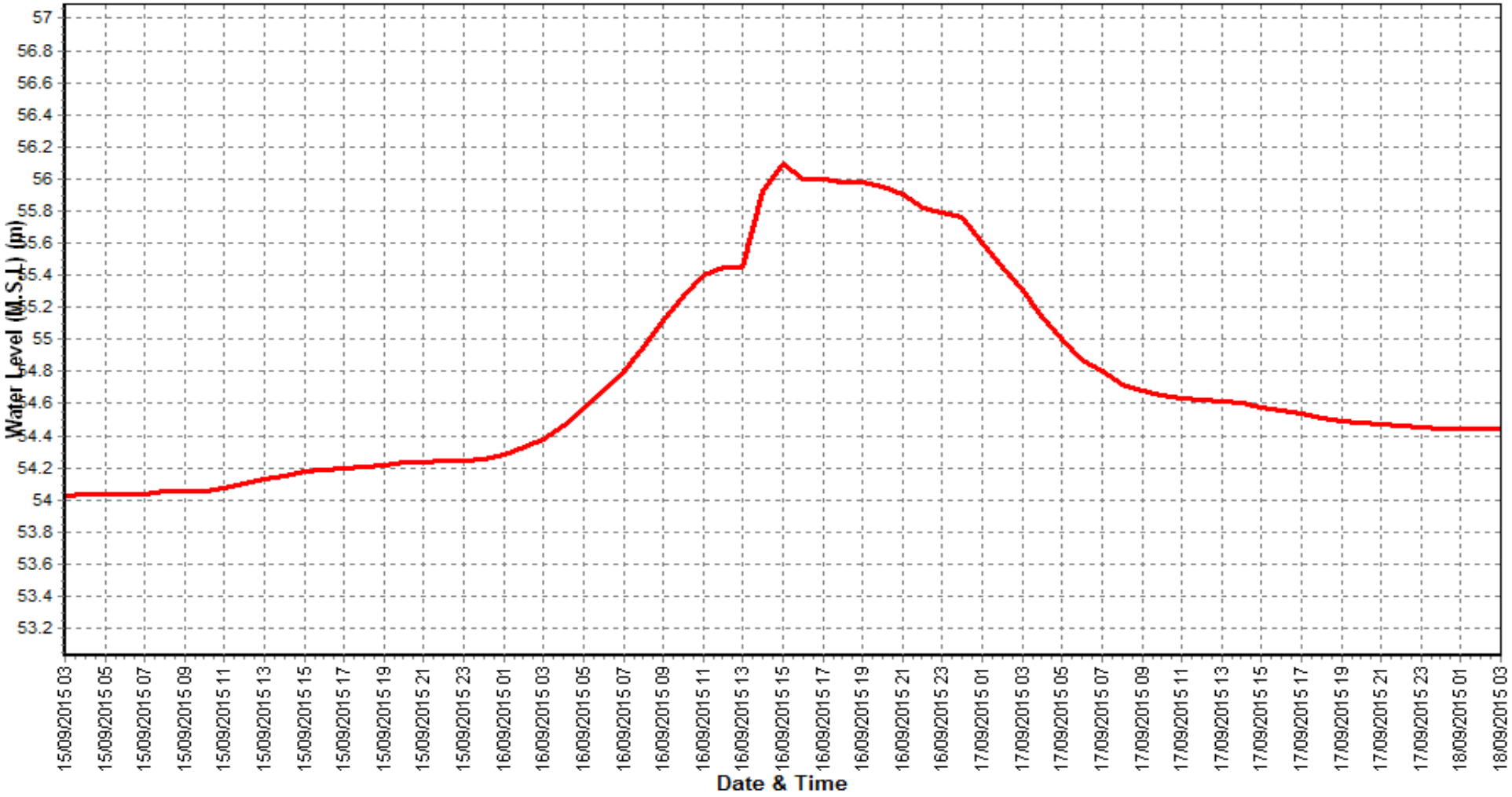
Local River : Vamsadhara **Sub-Division : Behrampur**



Water Level vs. Time - Graph of Highest Flood Peak during the Year : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

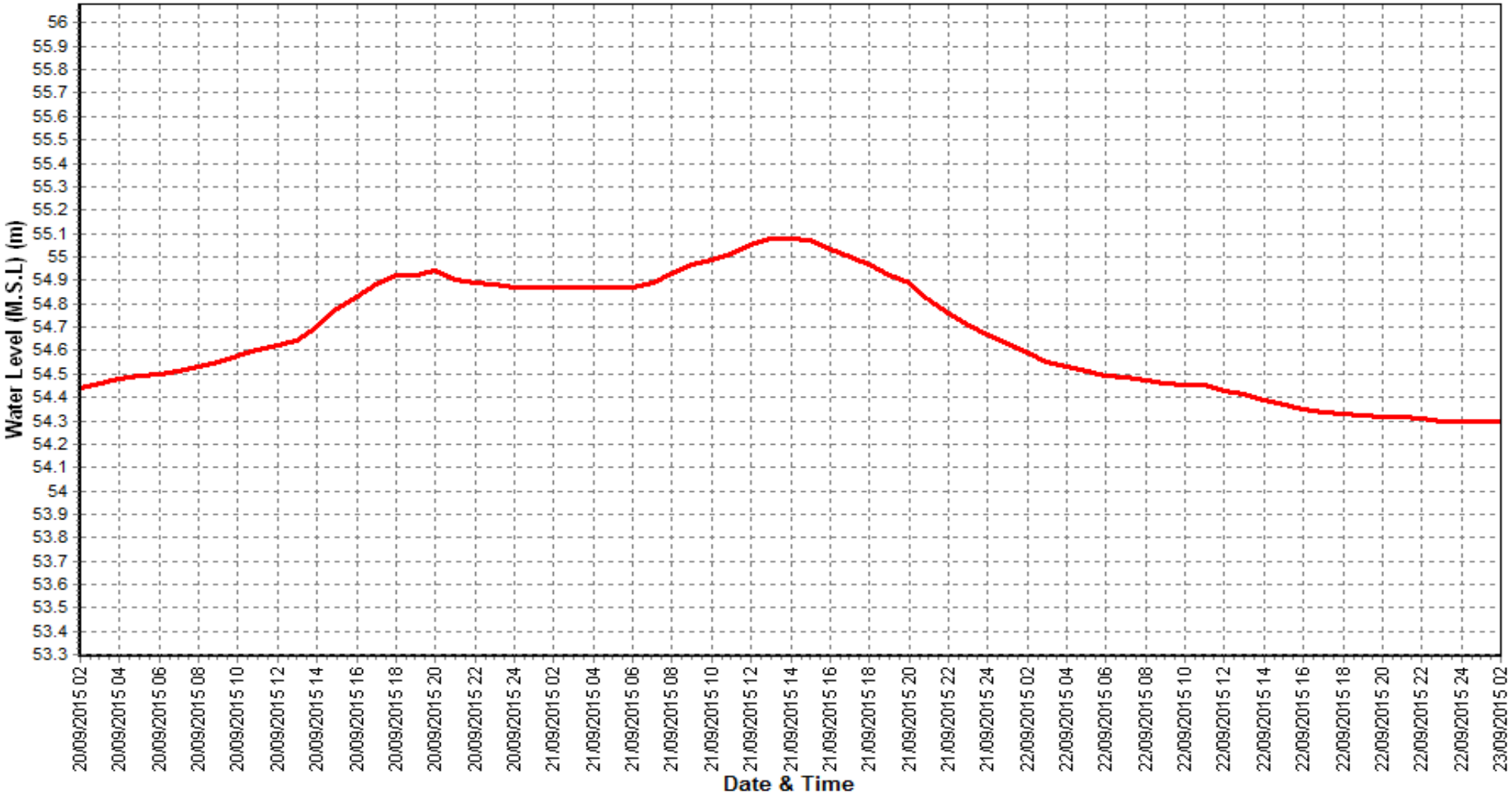


Time Span: 72 Hrs

Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

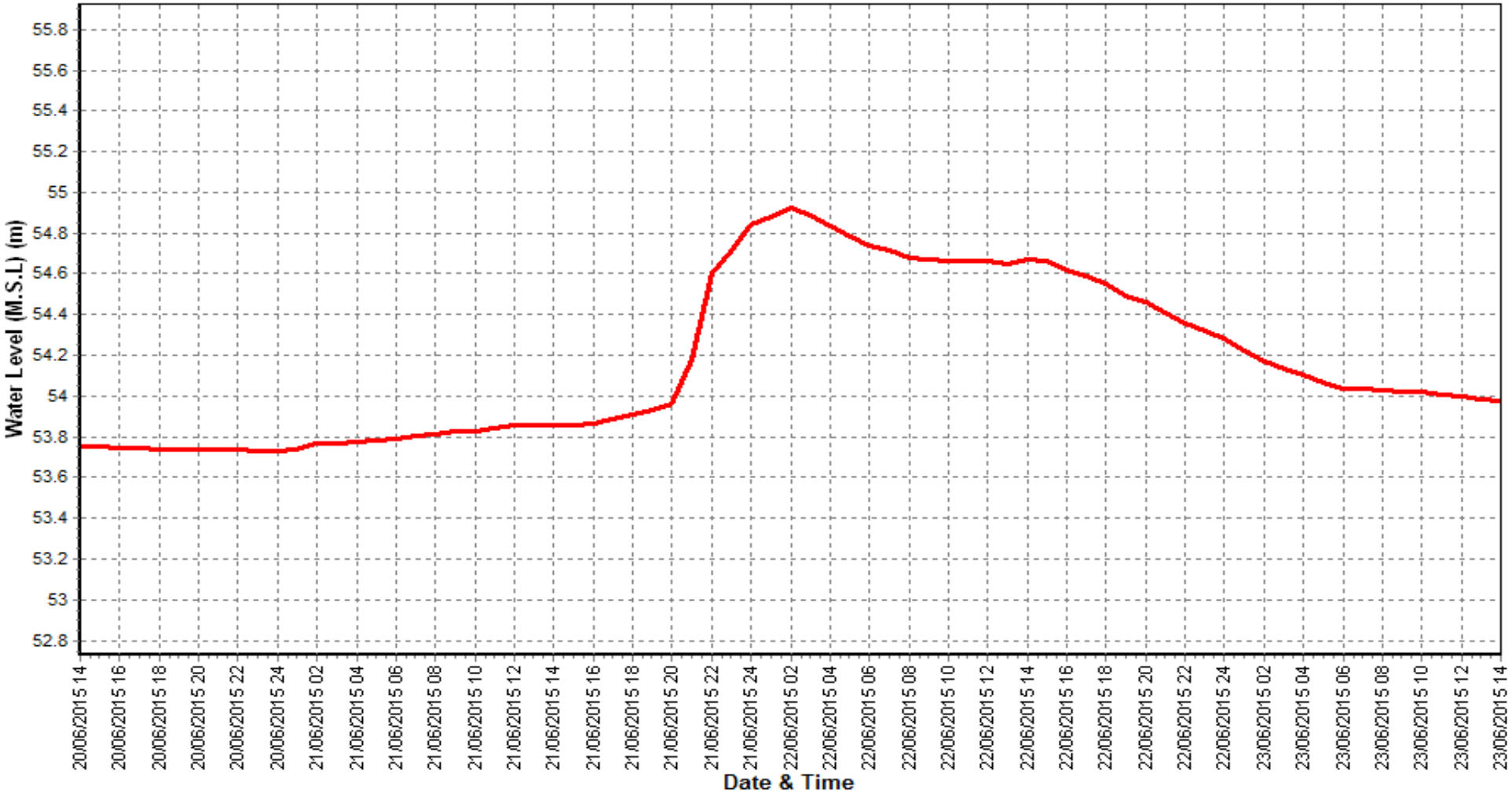


Time Span: 72 Hrs

Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**



Time Span: 72 Hrs

SEDIMENT DATA

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Jun						Jul						Aug					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	9.280	0.000	0.000	0.001	0.001	1	117.7						33.47	0.000	0.000	0.201	0.201	581
2	10.21	0.000	0.000	0.002	0.002	1	100.9						31.00	0.000	0.000	0.186	0.186	498
3	9.237	0.000	0.000	0.001	0.001	1	179.6						29.81	0.000	0.000	0.199	0.199	513
4	9.006	0.000	0.000	0.001	0.001	1	151.1						28.25	0.000	0.000	0.199	0.199	487
5	10.66	0.000	0.000	0.002	0.002	1	105.0	0.007	0.013	0.047	0.067	606	28.38	0.000	0.000	0.199	0.199	487
6	15.69	0.000	0.000	0.002	0.002	2	43.75						34.13	0.000	0.000	0.212	0.212	626
7	29.60	0.000	0.000	0.002	0.002	4	38.52						29.46	0.000	0.000	0.210	0.210	535
8	16.83	0.000	0.000	0.002	0.002	3	35.98						28.23	0.000	0.000	0.209	0.209	511
9	20.12	0.000	0.000	0.002	0.002	4	33.12						27.00	0.000	0.000	0.200	0.200	467
10	18.34	0.000	0.000	0.002	0.002	3	31.65						27.01	0.000	0.000	0.207	0.207	482
11	14.67	0.000	0.000	0.002	0.002	2	32.83	0.000	0.000	0.003	0.003	9	32.88	0.000	0.000	0.133	0.133	377
12	13.54	0.000	0.000	0.002	0.002	2	34.00	0.000	0.000	0.003	0.003	10	27.84	0.000	0.000	0.144	0.144	347
13	13.08	0.000	0.000	0.001	0.001	1	41.19	0.000	0.000	0.004	0.004	13	54.70	0.000	0.000	0.165	0.165	781
14	34.60	0.000	0.000	0.003	0.003	8	38.91	0.000	0.000	0.003	0.003	11	105.3	0.004	0.007	0.191	0.201	1831
15	35.62	0.000	0.000	0.003	0.003	10	35.28	0.000	0.000	0.003	0.003	10	81.00	0.003	0.005	0.147	0.155	1083
16	48.91	0.000	0.000	0.004	0.004	15	37.32	0.000	0.000	0.004	0.004	11	45.00	0.000	0.000	0.082	0.082	317
17	56.56	0.000	0.000	0.004	0.004	18	35.26	0.000	0.000	0.003	0.003	10	86.96	0.003	0.006	0.203	0.212	1594
18	68.13	0.000	0.000	0.005	0.005	26	44.00	0.000	0.000	0.004	0.004	16	124.9	0.005	0.009	0.333	0.346	3732
19	46.25	0.000	0.000	0.004	0.004	14	78.00	0.000	0.000	0.007	0.007	49	92.25	0.004	0.008	0.260	0.272	2169
20	44.55	0.000	0.000	0.003	0.003	13	92.62	0.000	0.000	0.013	0.013	104	147.2	0.007	0.012	0.349	0.368	4677
21	65.00	0.000	0.000	0.005	0.005	28	86.29	0.000	0.000	0.215	0.215	1603	113.4	0.006	0.013	0.323	0.341	3339
22	415.4	0.036	0.052	0.172	0.259	9295	88.12	0.000	0.000	0.180	0.180	1371	157.9	0.008	0.017	0.276	0.301	4105
23	195.7	0.018	0.027	0.111	0.155	2628	80.95	0.000	0.000	0.174	0.174	1217	166.0	0.008	0.019	0.253	0.280	4014
24	123.6	0.002	0.004	0.016	0.021	228	79.88	0.000	0.000	0.193	0.193	1332	102.3	0.004	0.007	0.423	0.434	3840
25	116.5	0.001	0.002	0.014	0.017	171	76.94	0.000	0.000	0.186	0.186	1236	96.49	0.004	0.009	0.374	0.387	3225
26	98.94	0.000	0.002	0.013	0.015	126	112.0	0.000	0.000	0.325	0.325	3145	96.45	0.005	0.010	0.154	0.168	1402
27	92.60	0.000	0.000	0.010	0.010	82	102.6	0.000	0.000	0.298	0.298	2646	100.7	0.005	0.012	0.558	0.575	5000
28	86.00	0.000	0.000	0.010	0.010	71	93.93	0.000	0.000	0.267	0.267	2164	90.13	0.004	0.007	0.295	0.305	2378
29	65.11	0.000	0.000	0.005	0.005	26	72.37	0.000	0.000	0.238	0.238	1487	162.2	0.016	0.025	0.580	0.621	8701
30	130.0	0.002	0.005	0.020	0.027	304	62.25	0.000	0.000	0.209	0.209	1124	169.0	0.017	0.027	0.590	0.634	9253
31							54.90	0.000	0.000	0.201	0.201	954	209.3	0.024	0.039	0.648	0.710	12840
Ten Daily Mean																		
Ten Daily I	14.90	0.000	0.000	0.002	0.002	2	83.74	0.007	0.013	0.047	0.067	606	29.67	0.000	0.000	0.202	0.202	519
Ten Daily II	37.59	0.000	0.000	0.003	0.003	11	46.94	0.000	0.000	0.005	0.005	24	79.80	0.003	0.005	0.201	0.208	1691
Ten Daily III	138.9	0.006	0.009	0.037	0.052	1296	82.75	0.000	0.000	0.226	0.226	1662	133.1	0.009	0.017	0.407	0.432	5282
Monthly																		
Total						13091						19128						80190

Annual Sediment Load (Metric Tonnes) : 430895

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Sep						Oct						Nov					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	165.1	0.017	0.029	0.491	0.538	7677	104.9	0.000	0.000	0.070	0.070	630	26.00	0.000	0.000	0.019	0.019	42
2	105.7	0.005	0.011	0.287	0.303	2762	80.00	0.000	0.000	0.058	0.058	398	29.60	0.000	0.000	0.031	0.031	80
3	89.81	0.003	0.006	0.210	0.219	1695	78.59	0.000	0.000	0.059	0.059	399	49.34	0.000	0.000	0.065	0.065	278
4	81.92	0.003	0.005	0.485	0.493	3490	75.00	0.000	0.000	0.056	0.056	365	48.24	0.000	0.000	0.052	0.052	216
5	72.93	0.000	0.000	0.169	0.169	1064	74.35	0.000	0.000	0.056	0.056	357	45.36	0.000	0.000	0.044	0.044	173
6	60.00	0.000	0.000	0.120	0.120	623	81.50	0.000	0.000	0.067	0.067	474	35.03	0.000	0.000	0.042	0.042	128
7	109.4	0.004	0.009	0.308	0.321	3039	76.36	0.000	0.000	0.063	0.063	413	32.00	0.000	0.000	0.032	0.032	87
8	71.01	0.000	0.000	0.127	0.127	778	74.32	0.000	0.000	0.066	0.066	423	30.00	0.000	0.000	0.031	0.031	79
9	61.71	0.000	0.000	0.147	0.147	782	71.99	0.000	0.000	0.045	0.045	281	25.20	0.000	0.000	0.029	0.029	62
10	75.30	0.000	0.000	0.144	0.144	937	70.90	0.000	0.000	0.048	0.048	293	21.33	0.000	0.000	0.026	0.026	47
11	71.50	0.000	0.000	0.059	0.059	364	68.00	0.000	0.000	0.047	0.047	274	22.00	0.000	0.000	0.029	0.029	54
12	69.16	0.000	0.000	0.062	0.062	370	62.35	0.000	0.000	0.044	0.044	239	22.96	0.000	0.000	0.018	0.018	36
13	84.00	0.000	0.000	0.267	0.267	1937	55.74	0.000	0.000	0.041	0.041	199	21.66	0.000	0.000	0.021	0.021	39
14	87.24	0.000	0.000	0.312	0.312	2349	51.15	0.000	0.000	0.031	0.031	138	21.71	0.000	0.000	0.017	0.017	32
15	86.75	0.000	0.000	0.300	0.300	2251	48.37	0.000	0.000	0.030	0.030	123	20.00	0.000	0.000	0.011	0.011	18
16	572.5	0.043	0.071	0.812	0.926	45805	47.83	0.000	0.000	0.029	0.029	119	20.35	0.000	0.000	0.023	0.023	40
17	490.0	0.040	0.061	0.741	0.842	35655	46.86	0.000	0.000	0.028	0.028	114	19.67	0.000	0.000	0.014	0.014	24
18	428.4	0.037	0.054	0.689	0.780	28868	49.00	0.000	0.000	0.042	0.042	178	25.35	0.000	0.000	0.024	0.024	52
19	395.0	0.032	0.049	0.664	0.745	25423	48.04	0.000	0.000	0.036	0.036	148	24.58	0.000	0.000	0.023	0.023	48
20	435.0	0.033	0.051	0.691	0.775	29120	46.62	0.000	0.000	0.036	0.036	146	25.19	0.000	0.000	0.027	0.027	58
21	565.2	0.036	0.058	0.778	0.872	42586	46.00	0.000	0.000	0.035	0.035	140	23.30	0.000	0.000	0.025	0.025	51
22	399.3	0.030	0.048	0.512	0.590	20346	45.00	0.000	0.000	0.034	0.034	130	23.00	0.000	0.000	0.018	0.018	36
23	292.5	0.021	0.039	0.356	0.417	10528	43.38	0.000	0.000	0.031	0.031	116	21.42	0.000	0.000	0.019	0.019	34
24	271.4	0.021	0.036	0.343	0.400	9367	41.00	0.000	0.000	0.030	0.030	107	20.37	0.000	0.000	0.017	0.017	30
25	240.0	0.019	0.032	0.304	0.356	7374	36.00	0.000	0.000	0.029	0.029	89	20.00	0.000	0.000	0.014	0.014	24
26	223.9	0.018	0.030	0.285	0.334	6450	31.83	0.000	0.000	0.027	0.027	75	19.18	0.000	0.000	0.008	0.008	13
27	205.0	0.018	0.030	0.253	0.301	5330	30.40	0.000	0.000	0.028	0.028	73	18.63	0.000	0.000	0.007	0.007	11
28	176.1	0.017	0.029	0.205	0.251	3812	29.22	0.000	0.000	0.027	0.027	68	18.44	0.000	0.000	0.007	0.007	11
29	146.4	0.014	0.023	0.174	0.211	2668	28.23	0.000	0.000	0.026	0.026	64	18.00	0.000	0.000	0.007	0.007	10
30	121.9	0.011	0.020	0.193	0.225	2367	28.03	0.000	0.000	0.026	0.026	62	18.47	0.000	0.000			
31							27.95	0.000	0.000	0.025	0.025	61						
Ten Daily Mean																		
Ten Daily I	89.29	0.003	0.006	0.249	0.258	2285	78.79	0.000	0.000	0.059	0.059	403	34.21	0.000	0.000	0.037	0.037	119
Ten Daily II	271.9	0.018	0.029	0.460	0.507	17214	52.39	0.000	0.000	0.036	0.036	168	22.35	0.000	0.000	0.020	0.020	40
Ten Daily III	264.2	0.020	0.035	0.340	0.395	11083	35.19	0.000	0.000	0.029	0.029	90	20.08	0.000	0.000	0.013	0.013	24
Monthly																		
Total						305817						6695						1813

Annual Sediment Load (Metric Tonnes) : 430895

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Dec						Jan						Feb					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	18.28	0.000	0.000	0.006	0.006	10	12.42	0.000	0.000	0.027	0.027	29	5.861	0.000	0.000	0.010	0.010	5
2	18.08	0.000	0.000	0.006	0.006	10	12.30	0.000	0.000	0.027	0.027	29	5.638	0.000	0.000	0.010	0.010	5
3	18.03	0.000	0.000	0.006	0.006	10	12.00	0.000	0.000	0.026	0.026	27	5.520	0.000	0.000	0.010	0.010	5
4	17.91	0.000	0.000	0.006	0.006	10	12.18	0.000	0.000	0.021	0.021	22	5.245	0.000	0.000	0.009	0.009	4
5	17.26	0.000	0.000	0.006	0.006	9	11.45	0.000	0.000	0.020	0.020	19	5.155	0.000	0.000	0.009	0.009	4
6	17.00	0.000	0.000	0.006	0.006	9	11.41	0.000	0.000	0.020	0.020	19	5.016	0.000	0.000	0.009	0.009	4
7	17.47	0.000	0.000	0.006	0.006	9	11.19	0.000	0.000	0.019	0.019	18	5.000	0.000	0.000	0.009	0.009	4
8	17.57	0.000	0.000	0.006	0.006	9	10.22	0.000	0.000	0.018	0.018	16	5.132	0.000	0.000	0.010	0.010	5
9	17.22	0.000	0.000	0.006	0.006	9	10.04	0.000	0.000	0.017	0.017	15	4.959	0.000	0.000	0.010	0.010	4
10	16.16	0.000	0.000	0.006	0.006	8	10.00	0.000	0.000	0.017	0.017	15	4.588	0.000	0.000	0.009	0.009	4
11	16.44	0.000	0.000	0.006	0.006	8	8.811	0.000	0.000	0.017	0.017	13	4.561	0.000	0.000	0.009	0.009	4
12	15.26	0.000	0.000	0.005	0.005	7	9.187	0.000	0.000	0.017	0.017	13	4.550	0.000	0.000	0.009	0.009	4
13	15.26	0.000	0.000	0.005	0.005	7	9.117	0.000	0.000	0.016	0.016	13	4.452	0.000	0.000	0.009	0.009	3
14	14.80	0.000	0.000	0.005	0.005	6	9.044	0.000	0.000	0.016	0.016	13	4.000	0.000	0.000	0.008	0.008	3
15	14.34	0.000	0.000	0.005	0.005	6	9.066	0.000	0.000	0.016	0.016	13	4.107	0.000	0.000	0.009	0.009	3
16	15.56	0.000	0.000	0.005	0.005	7	8.591	0.000	0.000	0.016	0.016	12	4.616	0.000	0.000	0.010	0.010	4
17	15.07	0.000	0.000	0.005	0.005	7	8.000	0.000	0.000	0.015	0.015	11	4.565	0.000	0.000	0.010	0.010	4
18	21.45	0.000	0.000	0.007	0.007	13	8.013	0.000	0.000	0.014	0.014	10	4.485	0.000	0.000	0.010	0.010	4
19	20.12	0.000	0.000	0.007	0.007	12	7.998	0.000	0.000	0.014	0.014	10	4.369	0.000	0.000	0.010	0.010	4
20	20.00	0.000	0.000	0.007	0.007	12	7.548	0.000	0.000	0.013	0.013	9	4.402	0.000	0.000	0.010	0.010	4
21	18.02	0.000	0.000	0.041	0.041	64	7.532	0.000	0.000	0.013	0.013	9	4.000	0.000	0.000	0.009	0.009	3
22	17.15	0.000	0.000	0.039	0.039	58	7.409	0.000	0.000	0.013	0.013	8	3.969	0.000	0.000	0.009	0.009	3
23	16.36	0.000	0.000	0.037	0.037	52	7.364	0.000	0.000	0.013	0.013	8	3.968	0.000	0.000	0.009	0.009	3
24	16.00	0.000	0.000	0.036	0.036	50	7.000	0.000	0.000	0.012	0.012	7	3.993	0.000	0.000	0.009	0.009	3
25	16.00	0.000	0.000	0.036	0.036	50	6.437	0.000	0.000	0.012	0.012	7	3.962	0.000	0.000	0.009	0.009	3
26	15.64	0.000	0.000	0.035	0.035	48	6.000	0.000	0.000	0.011	0.011	6	3.538	0.000	0.000	0.008	0.008	3
27	16.00	0.000	0.000	0.036	0.036	50	6.486	0.000	0.000	0.012	0.012	7	3.375	0.000	0.000	0.008	0.008	2
28	15.74	0.000	0.000	0.034	0.034	47	6.405	0.000	0.000	0.012	0.012	7	3.000	0.000	0.000	0.007	0.007	2
29	15.18	0.000	0.000	0.033	0.033	43	6.417	0.000	0.000	0.012	0.012	7						
30	13.24	0.000	0.000	0.029	0.029	33	6.230	0.000	0.000	0.011	0.011	6						
31	12.72	0.000	0.000	0.028	0.028	31	6.000	0.000	0.000	0.011	0.011	6						
Ten Daily Mean																		
Ten Daily I	17.50	0.000	0.000	0.006	0.006	9	11.32	0.000	0.000	0.021	0.021	21	5.212	0.000	0.000	0.009	0.009	4
Ten Daily II	16.83	0.000	0.000	0.006	0.006	8	8.538	0.000	0.000	0.015	0.015	11	4.411	0.000	0.000	0.009	0.009	4
Ten Daily III	15.64	0.000	0.000	0.035	0.035	48	6.662	0.000	0.000	0.012	0.012	7	3.726	0.000	0.000	0.009	0.009	3
Monthly																		
Total						703						400						101

Annual Sediment Load (Metric Tonnes) : 430895

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

Day	Mar						Apr						May					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	4.539	0.000	0.000	0.012	0.012	5	3.768	0.000	0.000	0.013	0.013	4	0.700	0.000	0.000	0.000	0.000	0
2	3.635	0.000	0.000	0.010	0.010	3	3.539	0.000	0.000	0.013	0.013	4	1.060	0.000	0.000	0.000	0.000	0
3	3.599	0.000	0.000	0.009	0.009	3	3.537	0.000	0.000	0.011	0.011	3	1.002	0.000	0.000	0.000	0.000	0
4	3.410	0.000	0.000	0.009	0.009	3	3.318	0.000	0.000	0.010	0.010	3	2.201	0.000	0.000	0.000	0.000	0
5	3.371	0.000	0.000	0.009	0.009	3	2.796	0.000	0.000	0.008	0.008	2	1.444	0.000	0.000	0.000	0.000	0
6	3.000	0.000	0.000	0.008	0.008	2	2.723	0.000	0.000	0.008	0.008	2	1.433	0.000	0.000	0.000	0.000	0
7	3.000	0.000	0.000	0.008	0.008	2	2.614	0.000	0.000	0.008	0.008	2	1.430	0.000	0.000	0.000	0.000	0
8	2.809	0.000	0.000	0.009	0.009	2	2.366	0.000	0.000	0.007	0.007	1	1.000	0.000	0.000	0.000	0.000	0
9	2.797	0.000	0.000	0.009	0.009	2	2.404	0.000	0.000	0.007	0.007	1	1.624	0.000	0.000	0.000	0.000	0
10	2.740	0.000	0.000	0.008	0.008	2	2.000	0.000	0.000	0.006	0.006	1	1.610	0.000	0.000	0.000	0.000	0
11	2.557	0.000	0.000	0.008	0.008	2	2.164	0.000	0.000	0.009	0.009	2	1.492	0.000	0.000	0.000	0.000	0
12	2.510	0.000	0.000	0.008	0.008	2	2.141	0.000	0.000	0.009	0.009	2	1.481	0.000	0.000	0.000	0.000	0
13	2.000	0.000	0.000	0.006	0.006	1	2.148	0.000	0.000	0.009	0.009	2	4.903	0.000	0.000	0.000	0.000	0
14	2.328	0.000	0.000	0.008	0.008	2	2.000	0.000	0.000	0.009	0.009	1	6.768	0.000	0.000	0.000	0.000	0
15	2.240	0.000	0.000	0.008	0.008	1	1.635	0.000	0.000	0.007	0.007	1	8.000	0.000	0.000	0.000	0.000	0
16	2.214	0.000	0.000	0.007	0.007	1	1.638	0.000	0.000	0.007	0.007	1	14.08	0.000	0.000	0.537	0.537	653
17	3.423	0.000	0.000	0.011	0.011	3	1.500	0.000	0.000	0.006	0.006	1	11.52	0.000	0.000	0.439	0.439	437
18	2.689	0.000	0.000	0.009	0.009	2	1.179	0.000	0.000	0.007	0.007	1	8.043	0.000	0.000	0.307	0.307	213
19	7.064	0.000	0.000	0.024	0.024	14	1.157	0.000	0.000	0.007	0.007	1	8.841	0.000	0.000	0.338	0.338	258
20	7.000	0.000	0.000	0.023	0.023	14	1.000	0.000	0.000	0.006	0.006	0	9.157	0.000	0.000	0.348	0.348	275
21	6.446	0.000	0.000	0.010	0.010	6	1.072	0.000	0.000	0.006	0.006	1	11.72	0.000	0.000	0.447	0.447	453
22	6.181	0.000	0.000	0.010	0.010	5	1.068	0.000	0.000	0.006	0.006	1	9.000	0.000	0.000	0.345	0.345	269
23	6.035	0.000	0.000	0.010	0.010	5	1.017	0.000	0.000	0.006	0.006	1	6.466	0.000	0.000	0.086	0.086	48
24	5.500	0.000	0.000	0.008	0.008	4	1.000	0.000	0.000	0.006	0.006	0	5.542	0.000	0.000	0.074	0.074	35
25	3.307	0.000	0.000	0.006	0.006	2	1.034	0.000	0.000	0.006	0.006	1	5.446	0.000	0.000	0.072	0.072	34
26	3.307	0.000	0.000	0.005	0.005	1	1.004	0.000	0.000	0.006	0.006	0	5.182	0.000	0.000	0.070	0.070	31
27	3.000	0.000	0.000	0.005	0.005	1	0.954	0.000	0.000	0.006	0.006	0	4.907	0.000	0.000	0.065	0.065	28
28	2.664	0.000	0.000	0.010	0.010	2	0.972	0.000	0.000	0.006	0.006	0	4.668	0.000	0.000	0.065	0.065	26
29	2.586	0.000	0.000	0.009	0.009	2	0.700	0.000	0.000	0.004	0.004	0	4.000	0.000	0.000	0.053	0.053	18
30	2.568	0.000	0.000	0.009	0.009	2	0.740	0.000	0.000	0.004	0.004	0	3.342	0.000	0.000	0.054	0.054	16
31	2.454	0.000	0.000	0.009	0.009	2							4.181	0.000	0.000	0.068	0.068	24
Ten Daily Mean																		
Ten Daily I	3.290	0.000	0.000	0.009	0.009	3	2.907	0.000	0.000	0.009	0.009	2	1.350	0.000	0.000	0.000	0.000	0
Ten Daily II	3.402	0.000	0.000	0.011	0.011	4	1.656	0.000	0.000	0.008	0.008	1	7.428	0.000	0.000	0.197	0.197	184
Ten Daily III	4.004	0.000	0.000	0.008	0.008	3	0.956	0.000	0.000	0.005	0.005	0	5.860	0.000	0.000	0.127	0.127	89
Monthly																		
Total						101						40						2819

Annual Sediment Load (Metric Tonnes) : 430895

Annual Sediment Load for period : 1973-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

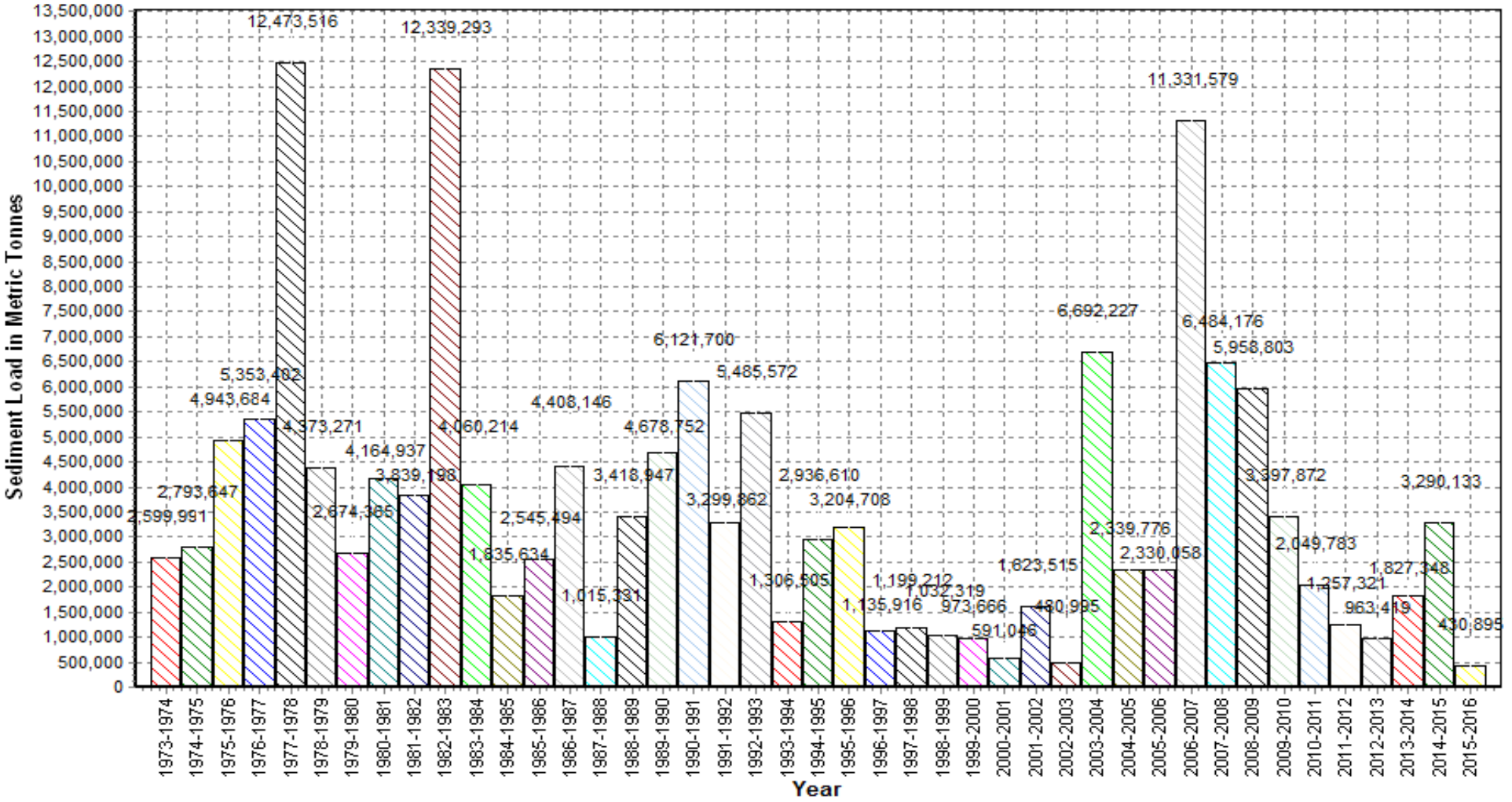
Local River : Vamsadhara **Sub-Division : Behrampur**

Year	Monsoon (M.T.)	Non-Monsoon (M.T.)	Annual Load (M.T.)	Annual Run Off (MCM)
1973-1974	2569538	30454	2599991	1402
1974-1975	2790025	3622	2793647	1041
1975-1976	4882208	61477	4943684	3069
1976-1977	5188944	164458	5353402	2627
1977-1978	12453545	19972	12473516	1892
1978-1979	4358146	15125	4373271	2978
1979-1980	2669363	5001	2674365	2124
1980-1981	4004290	160647	4164937	2455
1981-1982	3786144	53054	3839198	2216
1982-1983	12299387	39905	12339293	1983
1983-1984	4025441	34774	4060214	2327
1984-1985	1807576	28058	1835634	1211
1985-1986	2518690	26804	2545494	1747
1986-1987	4398063	10083	4408146	2278
1987-1988	960277	55054	1015331	725
1988-1989	3414346	4601	3418947	2318
1989-1990	2865627	1813125	4678752	2259
1990-1991	6062374	59325	6121700	6378
1991-1992	3242905	56957	3299862	3412
1992-1993	5469000	16572	5485572	4180
1993-1994	1294039	12467	1306505	1371
1994-1995	2225060	711550	2936610	4018
1995-1996	3158582	46126	3204708	4157
1996-1997	1121950	13966	1135916	1291
1997-1998	1111565	87647	1199212	1632
1998-1999	1017652	14667	1032319	1811
1999-2000	931830	41836	973666	1484
2000-2001	590826	221	591046	1143
2001-2002	1621344	2171	1623515	2158
2002-2003	480891	104	480995	629
2003-2004	6647555	44672	6692227	3482
2004-2005	2332260	7516	2339776	2749
2005-2006	2315377	14681	2330058	2650
2006-2007	11315384	16195	11331579	6422
2007-2008	6433261	50916	6484176	3968
2008-2009	5955785	3018	5958803	3070
2009-2010	3385979	11893	3397872	2807
2010-2011	2026336	23447	2049783	3138
2011-2012	1243490	13831	1257321	1955
2012-2013	956305	7114	963419	2268
2013-2014	1767458	59890	1827348	3849
2014-2015	3289200	933	3290133	5279
2015-2016	426732	4163	430895	1438

Annual Sediment Load for the period: 1973-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**



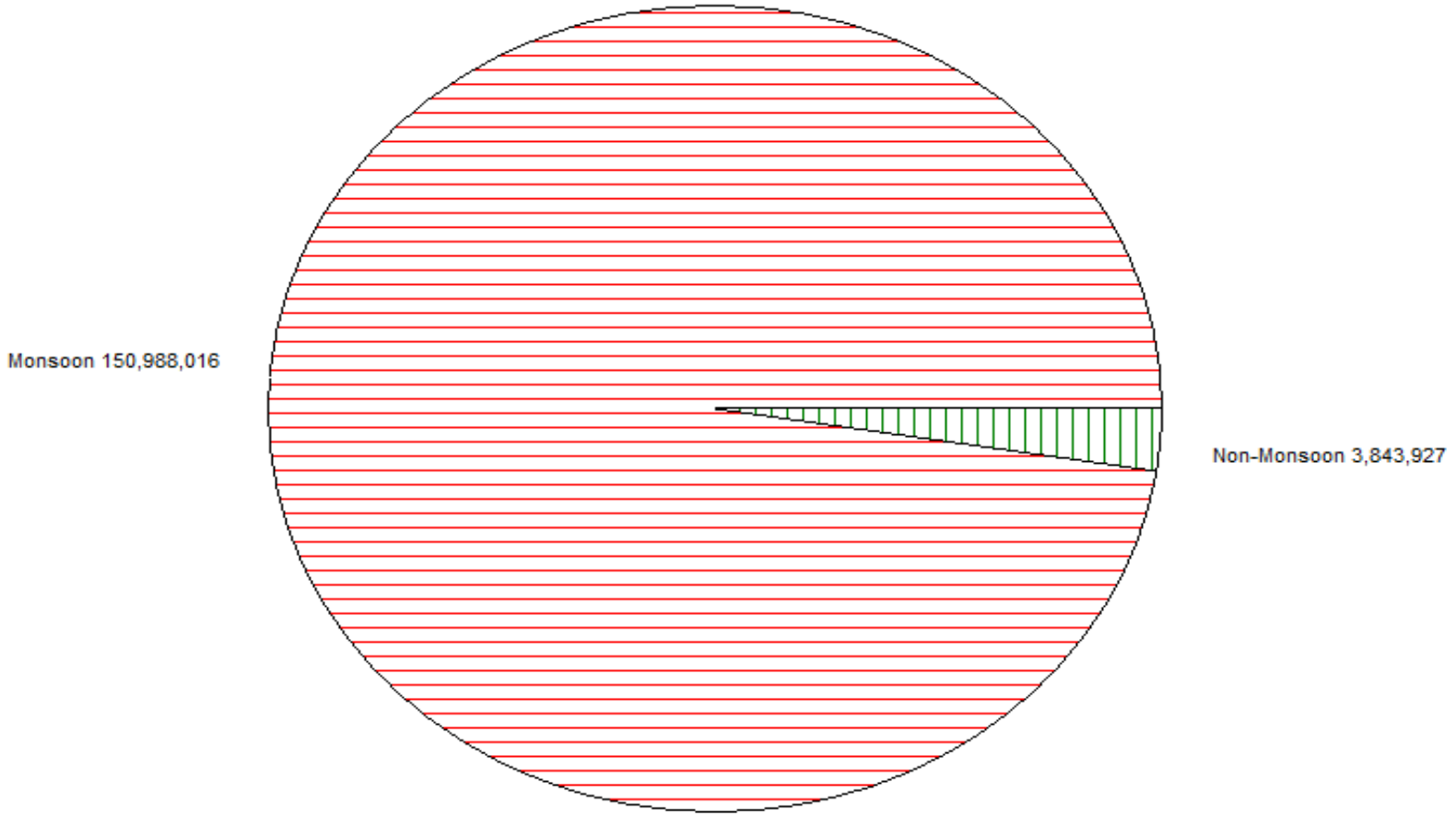
Seasonal Sediment Load for the period : 1973-2015

Station Name : KASHINAGAR (AV000J4)

Local River : Vamsadhara

Division : E.E., Bhubaneswar

Sub-Division : Behrampur



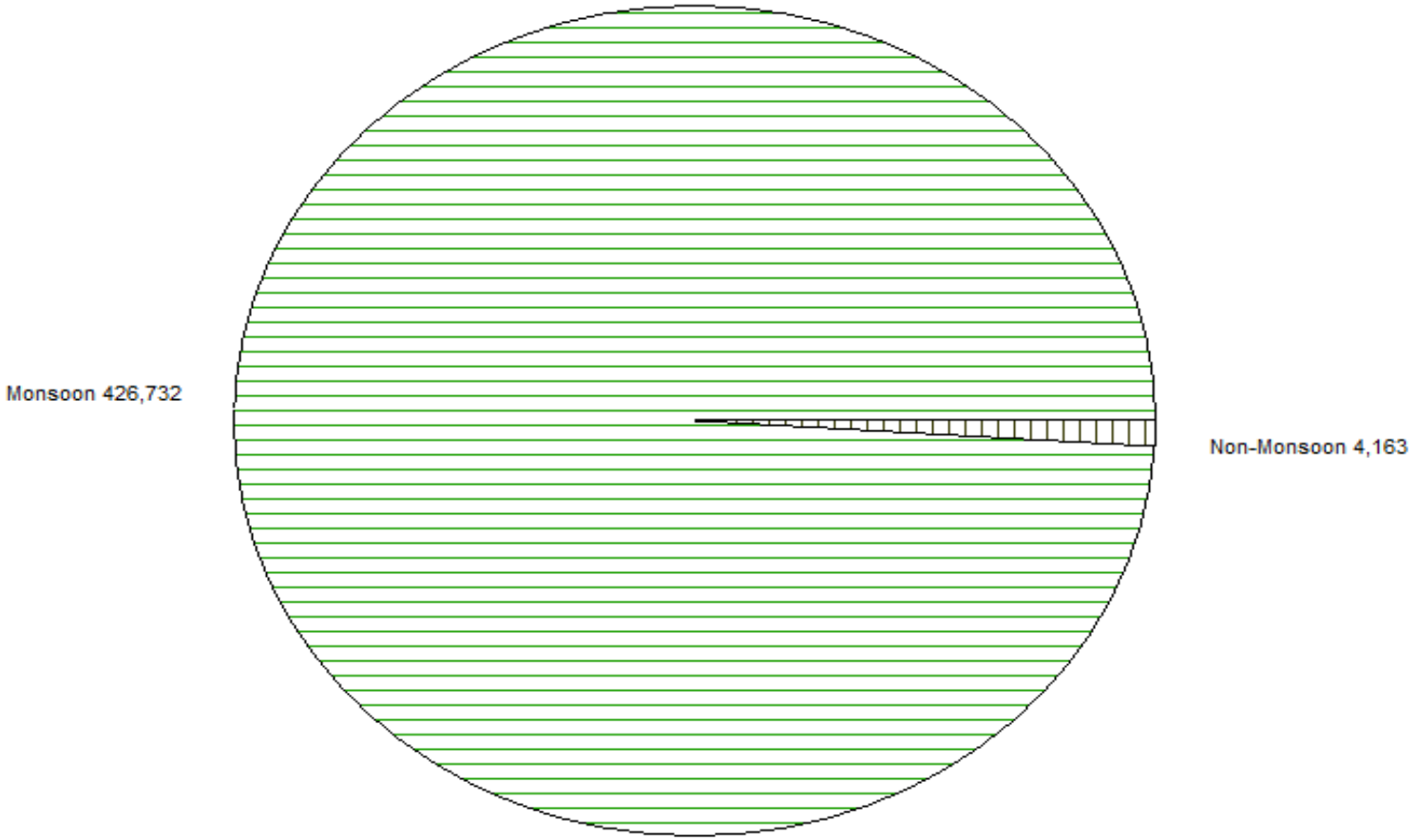
Seasonal Sediment Load for the Year: 2015-2016

Station Name : KASHINAGAR (AV000J4)

Local River : Vamsadhara

Division : E.E., Bhubaneswar

Sub-Division : Behrampur



WATER QUALITY DATA

Water Quality Datasheet for the period : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **River Water Analysis** **Sub-Division : Behrampur**

S.No	Parameters	01.06.2015	01.08.2015	01.10.2015	01.12.2015	01.02.2016	01.04.2016
		A	A	A	A	A	A
	PHYSICAL						
1	Q (cumec)						
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Clear	Clear	Clear
3	EC_FLD (µmho/cm)	265	550	401	512	637	582
4	EC_GEN (µmho/cm)	253	546	411	618	630	599
5	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free
6	pH_FLD (pH units)	7.3	7.3	7.3	7.8	8.3	8.1
7	pH_GEN (pH units)	7.4	7.2	7.4	7.7	8.4	8.1
8	Temp (deg C)	21.0	28.0	24.0	23.0	29.0	24.0
	CHEMICAL						
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	46.0	9.2
2	ALK-TOT (mgCaCO3/L)	88	83	60	83	305	226
3	B (mg/L)	0.00	0.01	0.01	0.01	0.01	0.01
4	Ca (mg/L)	22	21	19	18	21	26
5	Cl (mg/L)	11.3	13.2	13.2	13.2	15.1	17.0
6	CO3 (mg/L)	0.0	0.0	0.0	0.0	55.4	11.1
7	F (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)	0.6	0.4	0.4	0.4	0.4	0.5
9	HCO3 (mg/L)	107	101	73	101	259	254
10	K (mg/L)	2.6	2.7	2.9	3.0	3.4	2.4
11	Mg (mg/L)	14.6	13.6	12.6	9.7	11.7	11.7
12	Na (mg/L)	9.7	9.8	3.9	17.6	24.5	24.8
13	NO2+NO3 (mg N/L)	0.78	0.80	0.98	0.94	1.05	0.70
14	NO2-N (mgN/L)	0.01	0.00	0.03	0.03	0.00	0.00
15	NO3-N (mgN/L)	0.77	0.80	0.95	0.91	1.05	0.70
16	P-Tot (mgP/L)	0.001	0.010	0.001	0.010	0.010	0.010
17	SiO2 (mg/L)	6.0	6.0	5.0	6.0	6.0	5.0
18	SO4 (mg/L)	8.2	20.8	20.0	2.8	2.7	2.8
	BIOLOGICAL/BACTERIOLOGICAL						
	TRACE & TOXIC						
	CHEMICAL INDICES						
1	HAR_Ca (mgCaCO3/L)	56	52	48	44	52	64
2	HAR_Total (mgCaCO3/L)	117	109	101	85	101	113
3	Na% (%)	15	16	8	30	34	32
4	RSC (-)	0.0	0.0	0.0	0.0	4.1	2.3
5	SAR (-)	0.4	0.4	0.2	0.8	1.1	1.0
	PESTICIDES						

Water Quality Summary for the period : 2015-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **Sub-Division : Behrampur**

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_FLD (µmho/cm)	6	637	265	491
3	EC_GEN (µmho/cm)	6	630	253	510
4	pH_FLD (pH units)	6	8.3	7.3	7.7
5	pH_GEN (pH units)	6	8.4	7.2	7.7
6	Temp (deg C)	6	29.0	21.0	24.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	6	46.0	0.0	9.2
2	ALK-TOT (mgCaCO3/L)	6	305	60	141
3	B (mg/L)	6	0.01	0.00	0.01
4	Ca (mg/L)	6	26	18	21
5	Cl (mg/L)	6	17.0	11.3	13.8
6	CO3 (mg/L)	6	55.4	0.0	11.1
7	F (mg/L)	6	0.05	0.05	0.05
8	Fe (mg/L)	6	0.6	0.4	0.5
9	HCO3 (mg/L)	6	259	73	149
10	K (mg/L)	6	3.4	2.4	2.8
11	Mg (mg/L)	6	14.6	9.7	12.3
12	Na (mg/L)	6	24.8	3.9	15
13	NO2+NO3 (mg N/L)	6	1.05	0.70	0.88
14	NO2-N (mgN/L)	6	0.03	0.00	0.01
15	NO3-N (mgN/L)	6	1.05	0.70	0.86
16	P-Tot (mgP/L)	6	0.010	0.001	0.007
17	SiO2 (mg/L)	6	6.0	5.0	5.7
18	SO4 (mg/L)	6	20.8	2.7	9.5
	BIOLOGICAL/BACTERIOLOGICAL				
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	6	64	44	53
2	HAR_Total (mgCaCO3/L)	6	117	85	104
3	Na% (%)	6	34	8	22
4	RSC (-)	6	4.1	0.0	1.1
5	SAR (-)	6	1.1	0.2	0.6
	PESTICIDES				

Water Quality Seasonal Average for the period: 2001-2016

Station Name : KASHINAGAR (AV000J4) | **Division : E.E., Bhubaneswar**

Local River : Vamsadhara | **River Water** | **Sub-Division : Behrampur**

S.No	Parameters	Flood																	
		Jun - Oct																	
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2001-2002	2002-2003	2003-2004
	PHYSICAL																		
1	Q (cumec)																		
2	EC_FLD (µmho/cm)	219	238	207	212			275		352	275	229	218	250	250	405	227	342	177
3	EC_GEN (µmho/cm)	214	248	207	211			270		352	270	229	218	250	250	403	225	335	197
4	pH_FLD (pH units)	7.7	7.6	7.2	7.6			7.9		7.7	7.9	7.8	7.7	7.5	7.7	7.3	7.5	7.4	7.4
5	pH_GEN (pH units)	7.8	7.7	7.2	7.6			7.9		7.7	7.9	7.8	7.7	7.5	7.7	7.3	7.5	7.4	7.4
6	Temp (deg C)	30.9	29.0	29.2	31.3			28.3		29.0	29.5	29.3	26.6	26.3	27.3	24.3	21.0	18.8	22.4
	CHEMICAL																		
1	Alk-Phen (mgCaCO3/L)							0.0		2.0		0.0	0.0		0.0	0.0			
2	ALK-TOT (mgCaCO3/L)							86		88		125	81		82	77			
3	B (mg/L)	0.00	0.00	0.00	0.00			0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
4	Ca (mg/L)	20	25	20	19			27		26	27	17	26	16	22	21	22	35	19
5	Cl (mg/L)	17.4	19.0	15.5	17.5			21.4		35.9	19.5	15.7	18.9	17.8	11.0	12.6	18.1	24.2	13.6
6	CO3 (mg/L)	0.0	0.0	0.0	0.0			0.0		2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	F (mg/L)	0.08	0.06	0.06	0.21			0.00		0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.07	0.02	0.02
8	Fe (mg/L)	0.1	0.2	0.1	0.2			0.1		0.3	0.2	0.0	2.2	0.0	0.7	0.5	0.1	0.1	0.1
9	HCO3 (mg/L)	86	100	85	94			109		102	102	152	110	81	100	94	97	156	80
10	K (mg/L)	3.4	3.5	3.0	3.7			3.4		10.7	4.3	2.5	3.0	1.1	2.4	2.7	3.1	3.8	2.4
11	Mg (mg/L)	6.1	5.8	5.5	7.2			6.5		9.2	7.8	10.0	10.9	4.2	11.2	13.6	5.8	11.7	3.0
12	Na (mg/L)	12.7	12.5	11.8	11.7			15.7		24.9	12.8	9.8	12.1	11.5	20.6	7.8	13.2	14.8	10.9
13	NO2+NO3 (mg N/L)	0.64	0.73	0.60	0.36			1.63		0.44	0.81	0.38	0.73	0.53	1.63	0.85	0.65	0.63	0.25
14	NO2-N (mgN/L)	0.00	0.28	0.00	0.00			0.00		0.01	0.00	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.64	0.45	0.60	0.36			1.63		0.43	0.81	0.31	0.73	0.52	1.63	0.84	0.65	0.63	0.25
16	o-PO4-P (mg P/L)				0.024			0.055		0.090									
17	P-Tot (mgP/L)	0.077	0.069	0.083	0.003			0.017		0.010	0.001	0.010	0.001	0.001	0.001	0.004	0.120	0.070	0.072
18	SiO2 (mg/L)	17.0	19.5	19.7	30.9			10.9		9.8	10.0	14.0	17.9	9.1	5.3	5.7	24.5	21.9	18.3
19	SO4 (mg/L)	4.6	5.3	4.2	3.2			7.3		17.6	21.8	22.4	18.9	21.5	6.9	16.3	3.6	3.1	1.7
	BIOLOGICAL/BACTERIOLOGICAL																		
	TRACE & TOXIC																		
1	Al (mg/L)				0.00														
	CHEMICAL INDICES																		
1	HAR_Ca (mgCaCO3/L)	51	63	50	48			67		66	68	41	64	41	56	52	55	87	48
2	HAR_Total (mgCaCO3/L)	76	97	73	79			98		105	101	83	110	58	103	109	79	141	60
3	Na% (%)	26	25	26	23			26		27	21	20	17	30	30	13	26	22	29
4	RSC (-)	0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.8	0.2	0.2	0.0	0.0	0.1	0.0	0.1
5	SAR (-)	0.6	0.6	0.6	0.6			0.7		0.9	0.6	0.5	0.5	0.7	0.9	0.3	0.6	0.6	0.7
	PESTICIDES																		

Water Quality Seasonal Average for the period: 2001-2016

Station Name : KASHINAGAR (AV000J4) **Division : E.E., Bhubaneswar**

Local River : Vamsadhara **River Water** **Sub-Division : Behrampur**

S.No	Parameters	Winter Nov - Feb																	
		2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2002	2003	2004	2005	2006	2007
	PHYSICAL																		
1	Q (cumec)																		
2	EC_FLD (µmho/cm)	222			232		240	300	265	192	190	418	575	278	345	308			
3	EC_GEN (µmho/cm)	210			225		240	300	265	192	190	418	624	275	343	295			
4	pH_FLD (pH units)	7.9			7.8		7.7	7.7	7.8	7.7	8.0	7.4	8.1	7.8	7.7	7.5			
5	pH_GEN (pH units)	8.1			7.7		7.7	7.7	7.8	7.7	8.0	7.4	8.0	7.9	7.5	7.4			
6	Temp (deg C)	21.5			19.1		18.8	22.9	21.5	27.6		23.8	26.0	28.8	28.0	27.5			
	CHEMICAL																		
1	Alk-Phen (mgCaCO3/L)				0.0		0.0	0.0	0.0	0.0		0.0	23.0						
2	ALK-TOT (mgCaCO3/L)				80		76	88	132	115		110	194						
3	B (mg/L)	0.00			0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00			
4	Ca (mg/L)	21			23		22	29	34	20	15	34	19	20	32	25			
5	Cl (mg/L)	15.5			18.1		17.5	18.7	14.1	16.8	18.5	15.1	14.1	26.3	30.3	24.3			
6	CO3 (mg/L)	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	27.7	0.0	0.0	0.0			
7	F (mg/L)	0.51			0.04		0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00			
8	Fe (mg/L)	0.3			0.3		0.2	0.1	0.0	2.0	0.0	0.2	0.4	0.0	0.1	0.0			
9	HCO3 (mg/L)	99			98		93	108	161	129	90	135	180	120	148	129			
10	K (mg/L)	2.3			3.3		2.7	2.7	2.2	3.2	1.4	2.3	3.2	3.8	3.7	3.8			
11	Mg (mg/L)	6.8			5.6		8.8	9.7	17.5	11.0	3.5	4.2	10.7	9.7	9.7	9.7			
12	Na (mg/L)	9.9			12.7		11.6	12.4	13.6	14.5	10.6	15.6	21.1	17.9	20.0	17.9			
13	NO2+NO3 (mg N/L)	0.04			0.39		0.22	0.86	0.36	0.95	0.95	0.98	0.99	0.34	0.85	0.28			
14	NO2-N (mgN/L)	0.00			0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.00			
15	NO3-N (mgN/L)	0.04			0.39		0.22	0.86	0.29	0.95	0.95	0.98	0.98	0.34	0.85	0.28			
16	o-PO4-P (mg P/L)				0.041		0.070												
17	P-Tot (mgP/L)	0.001			0.001		0.010	0.001	0.010	0.005	0.001	0.001	0.010	0.001	0.041	0.001			
18	SiO2 (mg/L)	28.7			9.6		9.0	11.7	8.0	19.2	11.2	6.5	6.0	19.2	28.3	23.3			
19	SO4 (mg/L)	1.8			10.5		13.0	12.5	1.4	3.8	21.4	15.5	2.7	1.3	2.2	2.5			
	BIOLOGICAL/BACTERIOLOGICAL																		
	TRACE & TOXIC																		
1	Al (mg/L)																		
	CHEMICAL INDICES																		
1	HAR_Ca (mgCaCO3/L)	52			58		54	72	85	51	38	84	48	50	80	63			
2	HAR_Total (mgCaCO3/L)	80			81		91	113	158	96	53	102	93	90	121	104			
3	Na% (%)	21			25		22	20	16	24	30	25	32	29	26	27			
4	RSC (-)	0.0			0.0		0.0	0.0	0.3	0.2	0.4	0.2	2.0	0.2	0.1	0.1			
5	SAR (-)	0.5			0.6		0.5	0.5	0.5	0.6	0.6	0.7	1.0	0.8	0.8	0.8			
	PESTICIDES																		

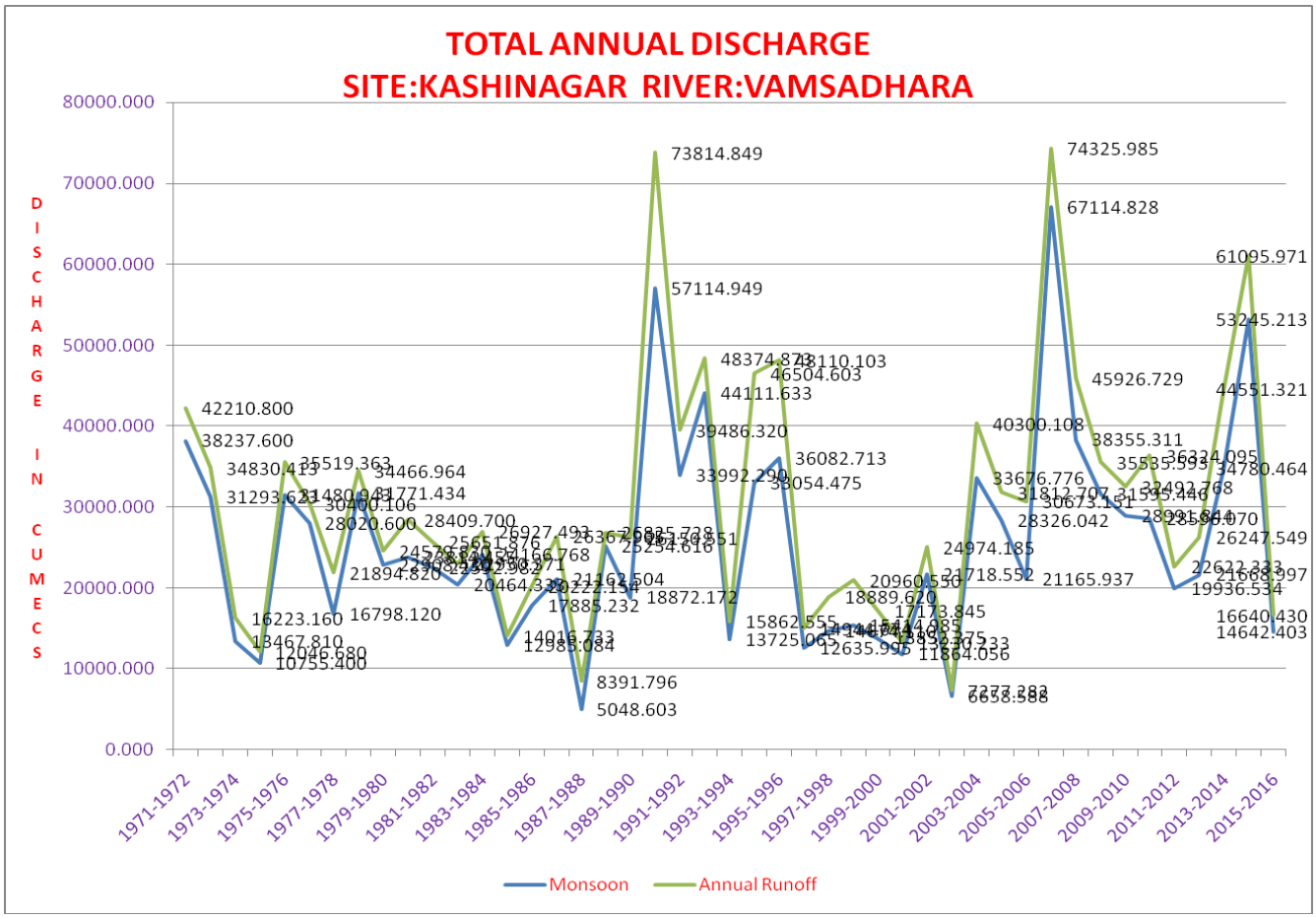
Water Quality Seasonal Average for the period: 2001-2016

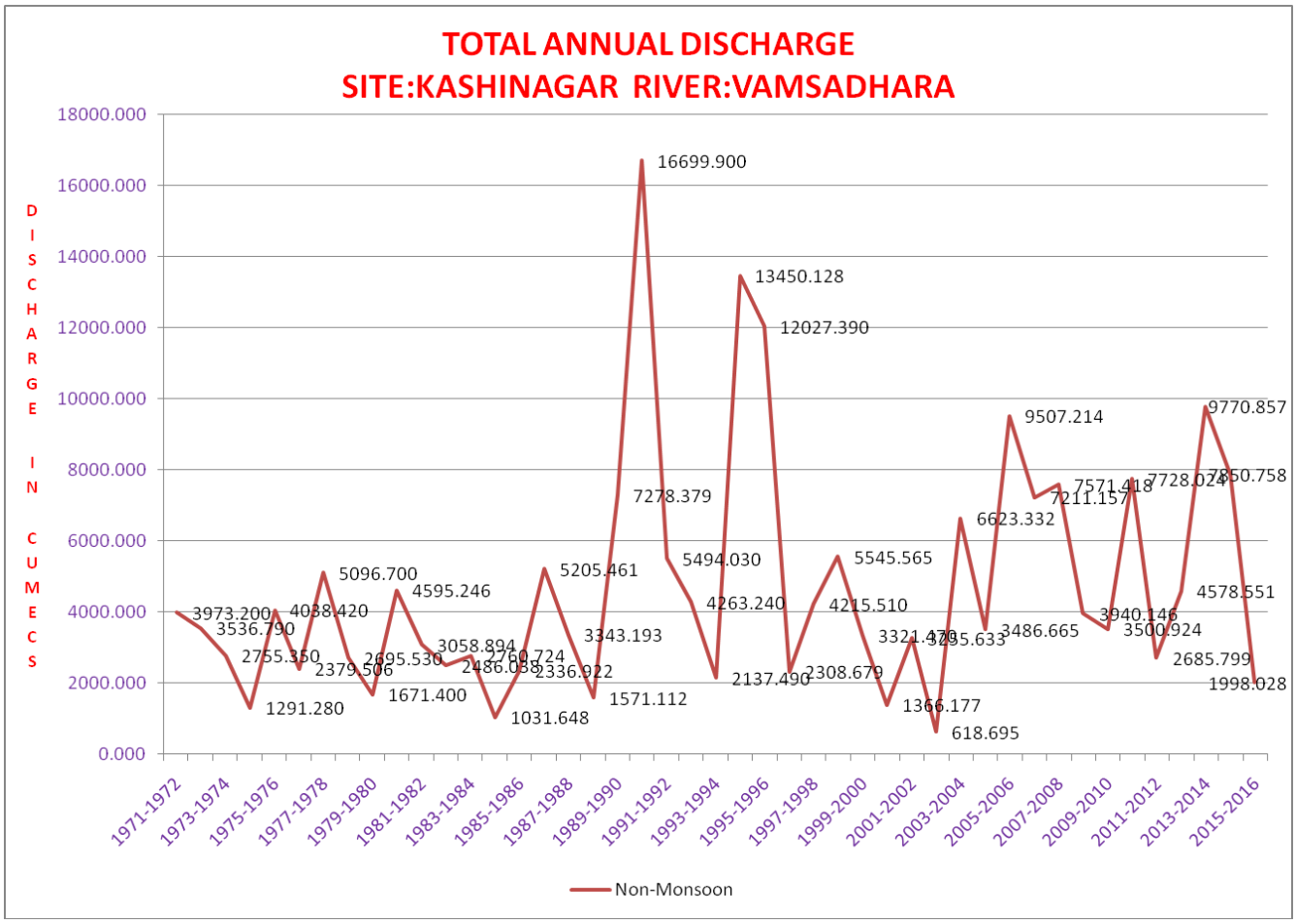
Station Name : KASHINAGAR (AV000J4) | **Division : E.E., Bhubaneswar**

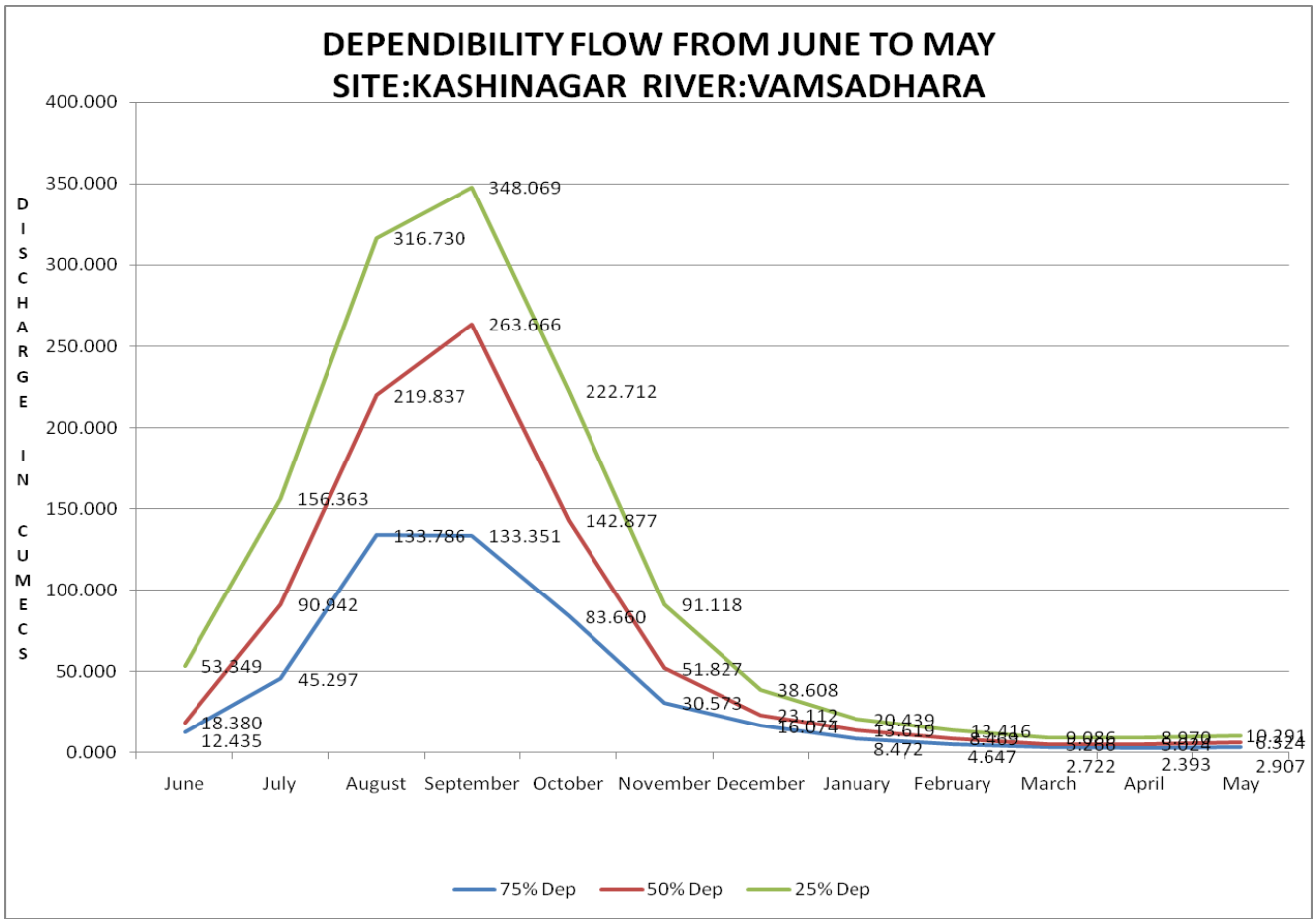
Local River : Vamsadhara | **River Water** | **Sub-Division : Behrampur**

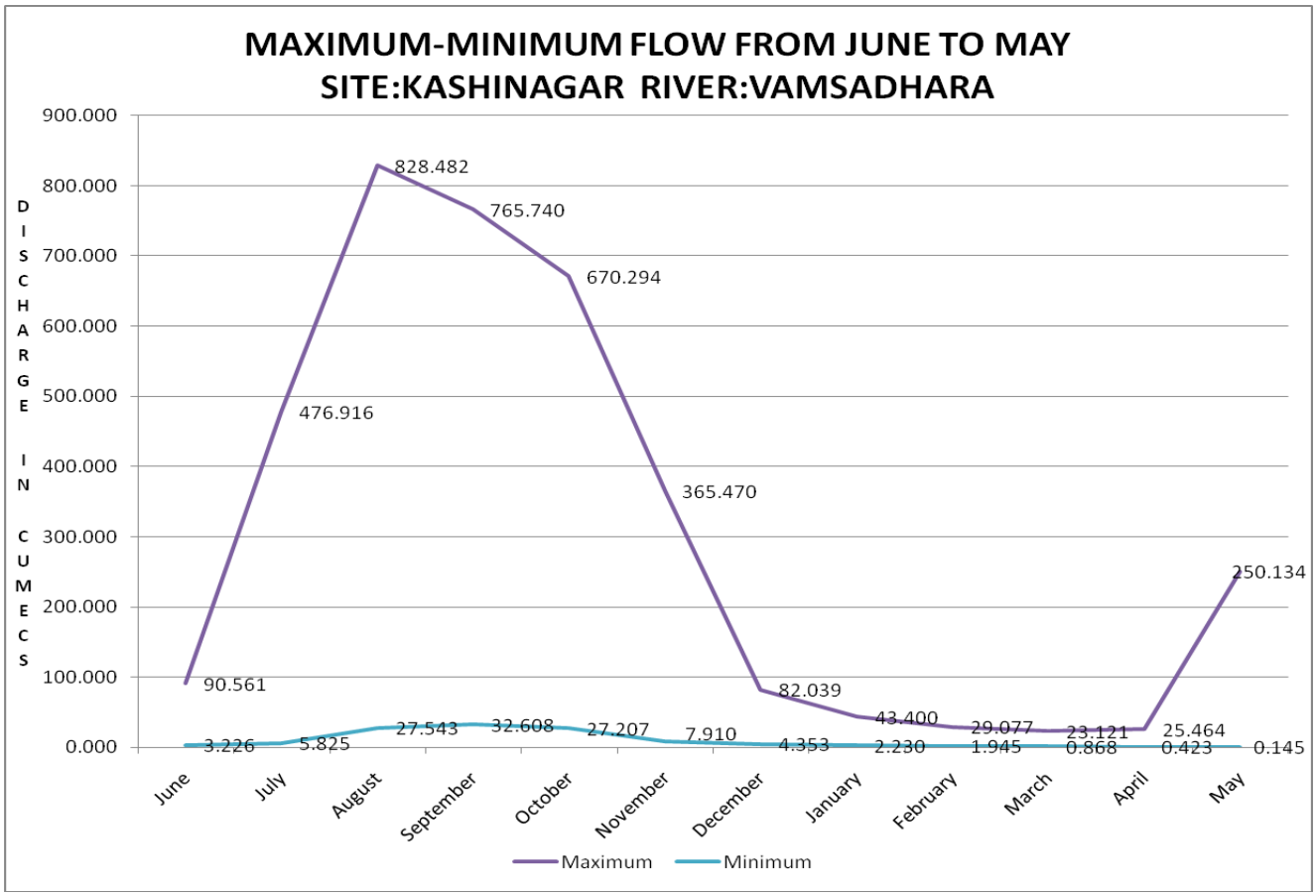
S.No	Parameters	Summer								
		Mar - May								
		2008	2009	2010	2011	2012	2013	2014	2015	2016
	PHYSICAL									
1	Q (cumec)									
2	EC_FLD (µmho/cm)	230		380	400	310	145	200	430	582
3	EC_GEN (µmho/cm)	230		380	400	310	145	200	430	599
4	pH_FLD (pH units)	8.2		8.4	7.9	7.9	7.4	8.0	7.9	8.1
5	pH_GEN (pH units)	8.2		8.4	7.9	7.9	7.4	8.0	7.9	8.1
6	Temp (deg C)	25.0		28.0	27.0		28.3	25.8	24.5	24.0
	CHEMICAL									
1	Alk-Phen (mgCaCO3/L)	0.0		0.0		0.0			0.0	9.2
2	ALK-TOT (mgCaCO3/L)	79		123		148			149	226
3	B (mg/L)	0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01
4	Ca (mg/L)	24		26	32	35	22	16	42	26
5	Cl (mg/L)	18.8		33.4	22.6	22.6	23.8	22.3	22.6	17.0
6	CO3 (mg/L)	0.0		0.0	0.0	0.0	0.0	0.0	0.0	11.1
7	F (mg/L)	0.05		0.00	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)	0.0		0.1	1.9	0.0	2.2	0.1	0.2	0.5
9	HCO3 (mg/L)	96		150	172	180	114	103	181	254
10	K (mg/L)	3.6		3.5	2.9	2.7	4.6	1.1	2.6	2.4
11	Mg (mg/L)	5.4		16.5	17.5	11.7	8.3	2.4	11.2	11.7
12	Na (mg/L)	12.8		24.6	16.9	20.2	12.6	10.4	20.1	24.8
13	NO2+NO3 (mg N/L)	0.22		0.34	1.16	0.36	1.04	1.15	0.91	0.70
14	NO2-N (mgN/L)	0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.22		0.34	1.16	0.29	1.04	1.15	0.91	0.70
16	o-PO4-P (mg P/L)			0.000						
17	P-Tot (mgP/L)	0.002		0.010	0.001	0.010	0.001	0.001	0.001	0.010
18	SiO2 (mg/L)	9.7		9.6	8.6	18.0	16.4	8.5	7.0	5.0
19	SO4 (mg/L)	10.2		12.2	12.8	2.8	5.6	25.6	18.0	2.8
	BIOLOGICAL/BACTERIOLOGICAL									
	TRACE & TOXIC									
1	Al (mg/L)									
	CHEMICAL INDICES									
1	HAR_Ca (mgCaCO3/L)	60		64	80	88	56	41	105	64
2	HAR_Total (mgCaCO3/L)	83		133	153	137	90	51	152	113
3	Na% (%)	24		28	19	24	22	30	22	32
4	RSC (-)	0.0		0.0	0.0	0.2	0.1	0.7	0.0	2.3
5	SAR (-)	0.6		0.9	0.6	0.8	0.6	0.6	0.7	1.0
	PESTICIDES									

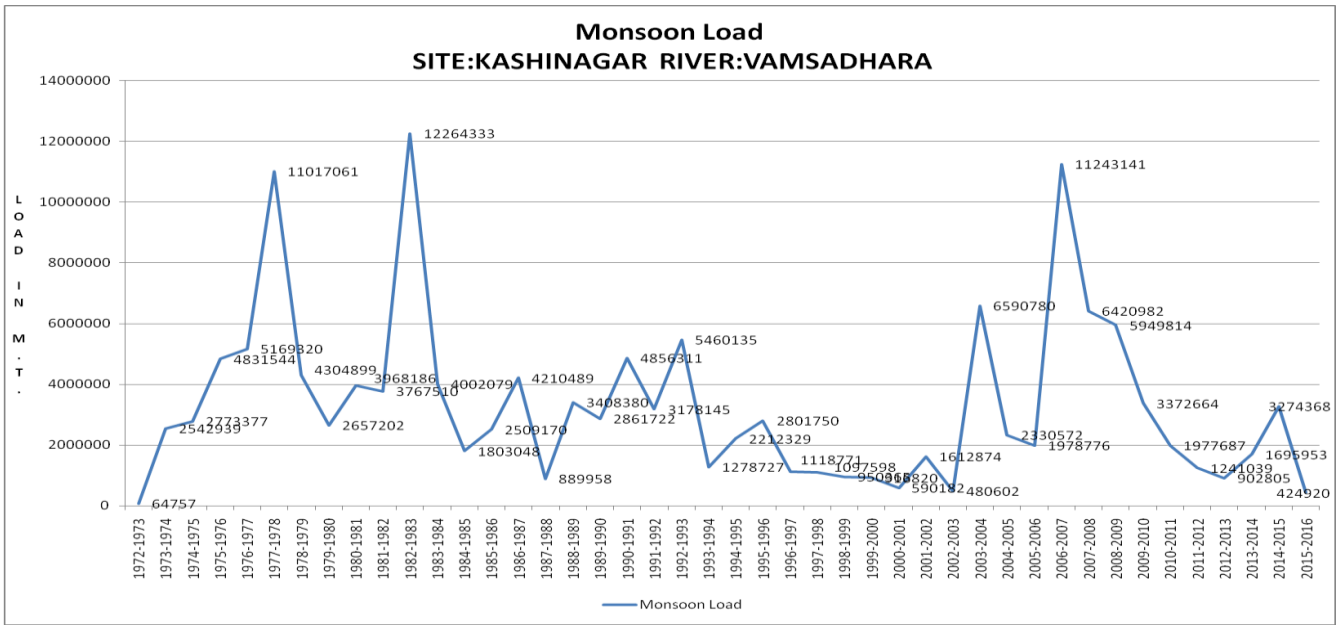
TREND ANALYSIS

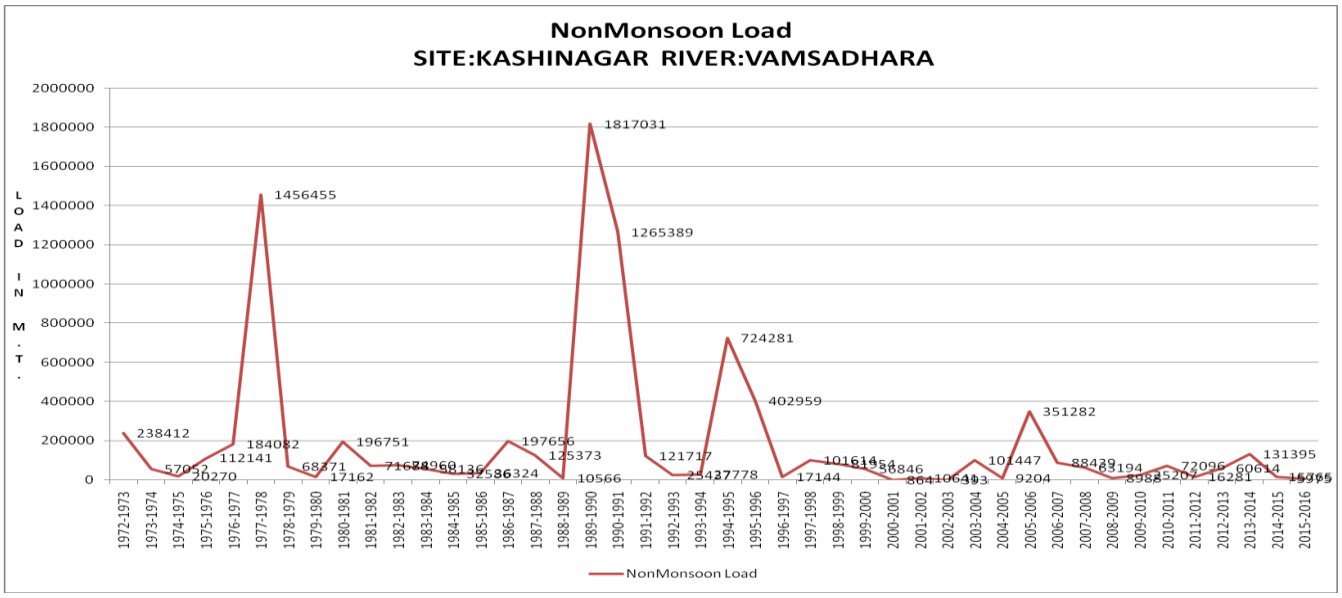

TOTAL ANNUAL DISCHARGE
SITE:KASHINAGAR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
80000.000
70000.000
60000.000
50000.000
40000.000
30000.000
20000.000
10000.000
0.000
1971-1972
1973-1974
1975-1976
1977-1978
1979-1980
1981-1982
1983-1984
1985-1986
1987-1988
1989-1990
1991-1992
1993-1994
1995-1996
1997-1998
1999-2000
2001-2002
2003-2004
2005-2006
2007-2008
2009-2010
2011-2012
2013-2014
2015-2016
Monsoon
Annual Runoff

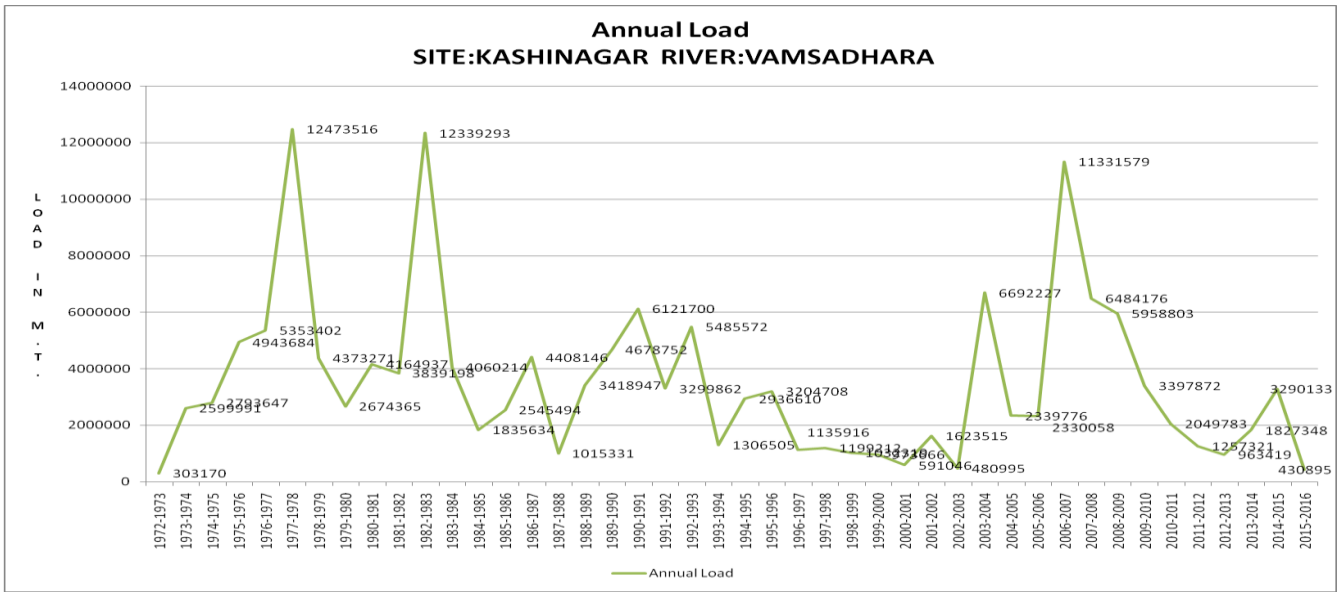

TOTAL ANNUAL DISCHARGE
SITE:KASHINAGAR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
18000.000
16000.000
14000.000
12000.000
10000.000
8000.000
6000.000
4000.000
2000.000
0.000
1971-1972
1973-1974
1975-1976
1977-1978
1979-1980
1981-1982
1983-1984
1985-1986
1987-1988
1989-1990
1991-1992
1993-1994
1995-1996
1997-1998
1999-2000
2001-2002
2003-2004
2005-2006
2007-2008
2009-2010
2011-2012
2013-2014
2015-2016
Non-Monsoon

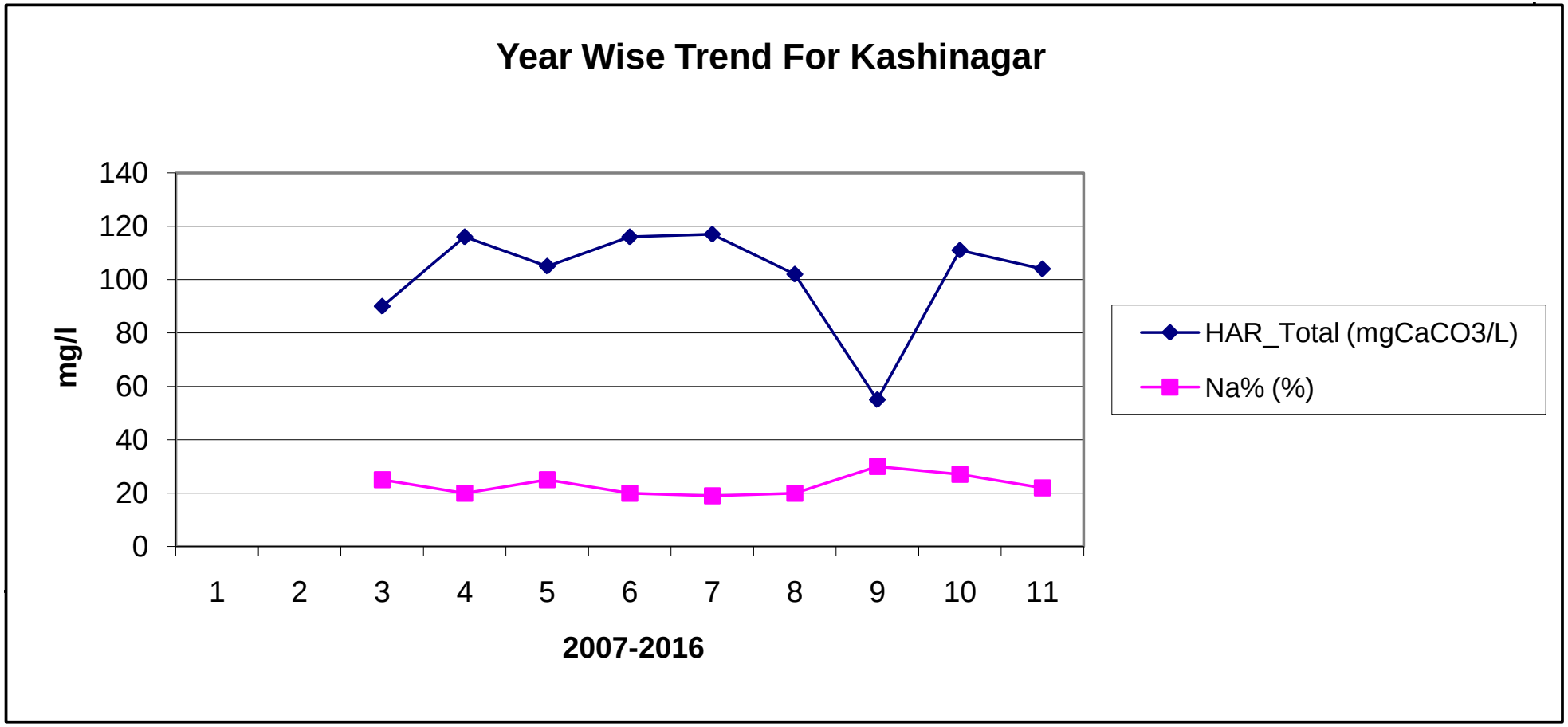

DEPENDIBILITY FLOW FROM JUNE TO MAY
SITE:KASHINAGAR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
400.000
350.000
300.000
250.000
200.000
150.000
100.000
50.000
0.000
348.069
316.730
263.666
219.837
222.712
156.363
142.877
133.786
133.351
91.118
90.942
83.660
53.349
51.827
45.297
38.608
30.573
18.380
12.435
June
July
August
September
October
November
December
January
February
March
April
May
75% Dep
50% Dep
25% Dep

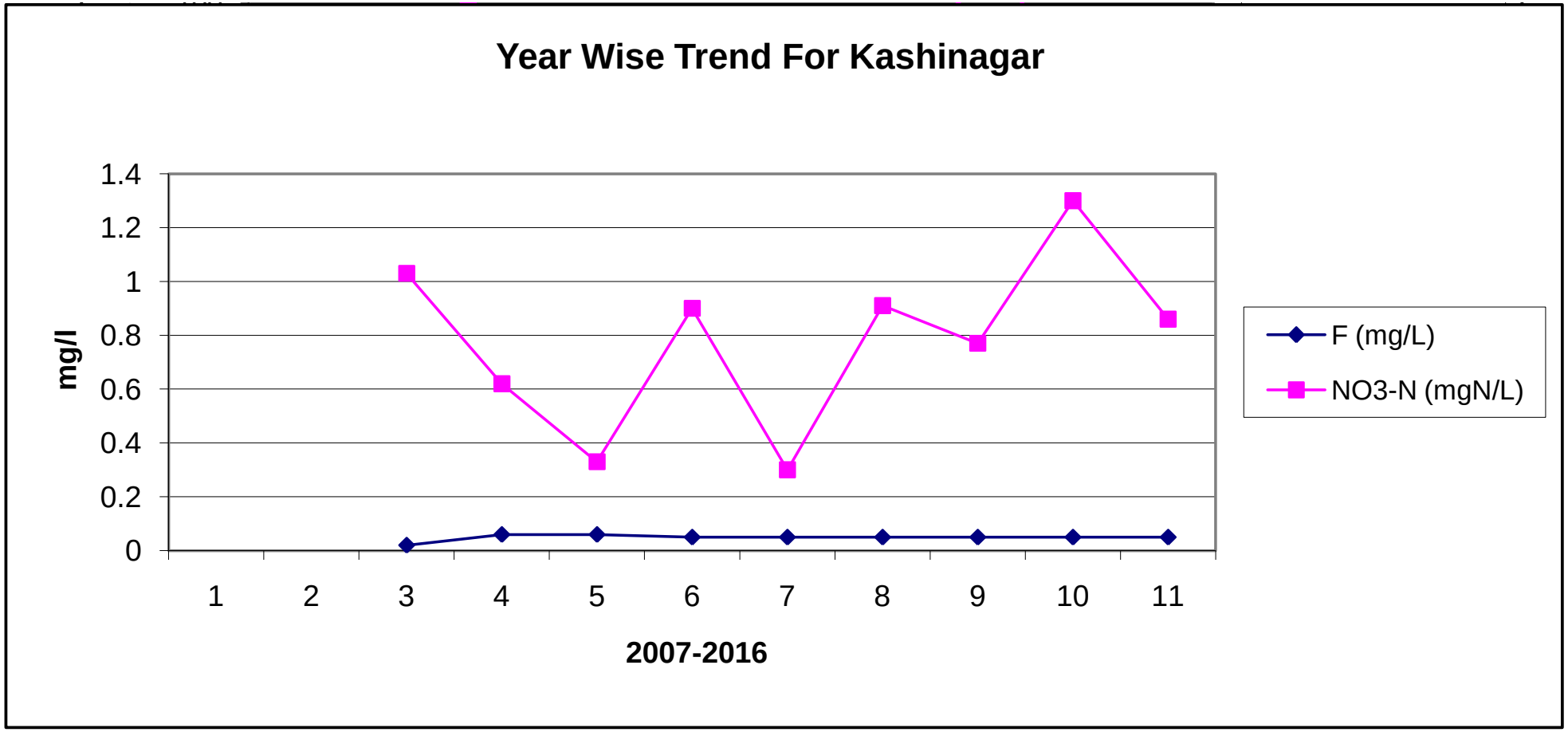

MAXIMUM-MINIMUM FLOW FROM JUNE TO MAY
SITE:KASHINAGAR RIVER:VAMSADHARA
DISCHARGE IN CUMECS
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
828.482
765.740
670.294
476.916
365.470
250.134
90.561
82.039
43.400
29.077
27.543
32.608
27.207
25.464
23.121
7.910
5.825
4.353
3.226
2.230
1.945
0.868
0.423
0.145
June
July
August
September
October
November
December
January
February
March
April
May
Maximum
Minimum

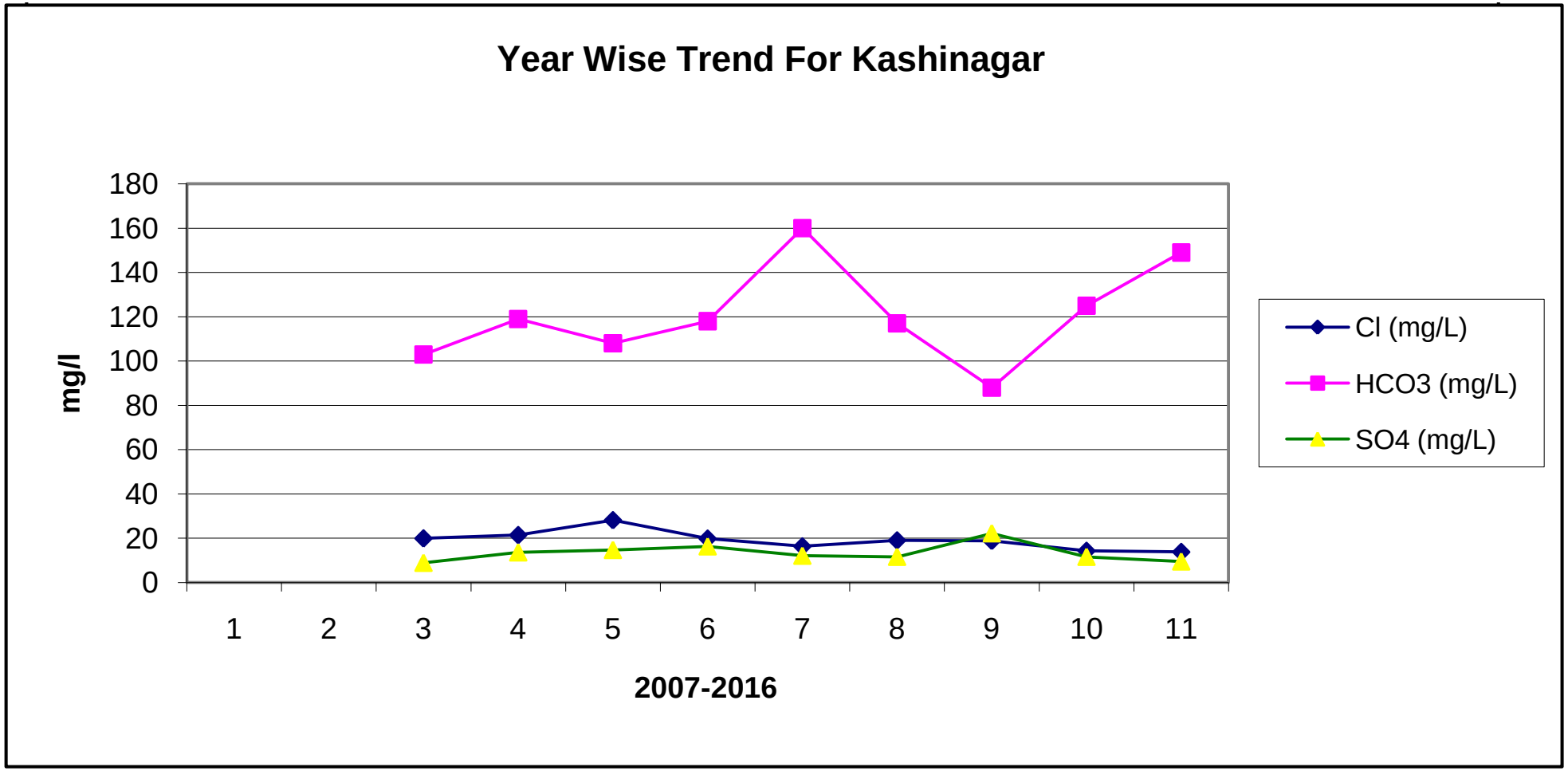

Monsoon Load
SITE:KASHINAGAR RIVER:VAMSADHARA
LOAD IN M.T.
Monsoon Load

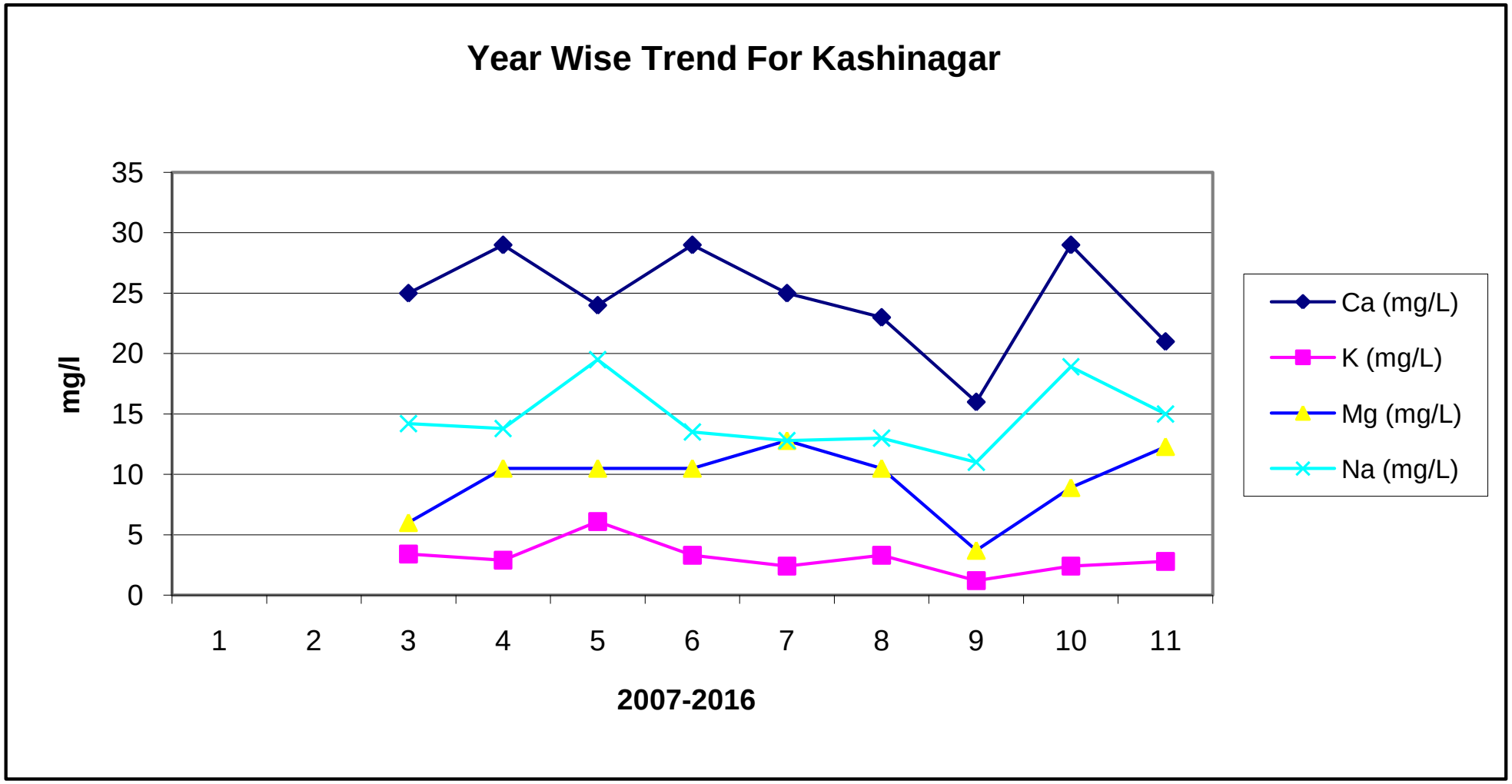

NonMonsoon Load
SITE:KASHINAGAR RIVER:VAMSADHARA
LOAD IN M.T.
NonMonsoon Load


Annual Load
SITE:KASHINAGAR RIVER:VAMSADHARA
LOAD IN M.T.
Annual Load


Year Wise Trend For Kashinagar
140
120
100
80
60
40
20
0
mg/l
1
2
3
4
5
6
7
8
9
10
11
2007-2016
HAR_Total (mgCaCO3/L)
Na% (%)


Year Wise Trend For Kashinagar
1.4
1.2
1
0.8
0.6
0.4
0.2
0
mg/l
1
2
3
4
5
6
7
8
9
10
11
2007-2016
F (mg/L)
NO3-N (mgN/L)


Year Wise Trend For Kashinagar
mg/l
180
160
140
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
Cl (mg/L)
HCO3 (mg/L)
SO4 (mg/L)


Year Wise Trend For Kashinagar
mg/l
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
Ca (mg/L)
K (mg/L)
Mg (mg/L)
Na (mg/L)

RUSHIKULYA BASIN

RUSHIKULYA BASIN

1. GENERAL

1.1 Introduction

River Rushikulya is one of the East flowing river in Odisha. The river Rushikulya originates at an elevation of about 1000 m near Matabarhi village of Kandhamal district of Odisha State and lies within the geographical co-ordinates of 19° 07′ to 20° 19′ North latitude and 84° 01′ to 85° 06′ East longitude. The river flows through Purushottampur, Pratapur and joins with the Bay of Bengal at Ganjam district (Odisha). The total catchment area is 7700 sq.km., entirely in the districts of Kandhamal and Ganjam (Odisha).

The entire basin is grouped into flat plains and valleys with isolated hills. The coastal plains of the basin contain fertile and irrigated lands. The basin is continuously sloping towards main valley and hence no drainage congestion is anticipated.

Basin Map of Rushikulya river system showing the various hydrological and hydro-meteorological observation stations maintained by CWC and State Government and India Meteorological Department is enclosed herewith.

1.2 River system

The catchment is of a leaf shape and the basin is considerably harnessed by inter linking canal network among its tributaries. The details of the principal tributaries joining the river on both the banks are given below:

Name of River	River/Tributary	Length (km)	Catchment area (sq.km)	Percentage of total catchment area
Rushikulya	Main Stream	162	2798	36.3
Baghua	Left Tributary	68	736	9.6
Badanadi	Left Tributary	93	2353	30.6
Pathama	Right Tributary	43	663	8.6
Ghodahada	Right Tributary	83	1150	14.9
		Total	7700	100.0

1.3 Climatic Characteristics

The South West monsoon is normally active from June to October/November. The average annual rainfall is around 1360 mm. Very heavy rainfall occurs at several places in some years, which causes severe floods. In certain years, serious drought also occurs due to inadequate rainfall.

1.4 Geology

The catchment mostly comprises of Khondolite and Charcolite groups of rock formation. Ground water is available in the region of alluvium in confined and unconfined aquifers below 250 m. The basin is rich in mineral wealth. The major economic minerals are Lime Stone, Manganese, Sand Talc, black sand, Clay and grinding materials

1.5 Site Details

The basin is developed with an integrated canal system, which includes Jayamangal, Ghodahada, Daha dam and a few diversion weirs/ anicuts and number of Minor Irrigation Projects.

Details of water storage/ diversion structures in the Baitarani Basin are as below:

Sl.No.	Name of Project	River	Status
1.	Bhanjanagar Reservoir	Boringanalla	Existing
2.	Sorada Reservoir	Padma	Existing
3.	Ghodahada Reservoir	Ghodahad	Existing
4.	Baghua Reservoir	Baghua	Ongoing
5.	Daha Reservoir	Daha & Kalinga	Existing
6.	Hiradharbhati Barrage	Rushikulya	Existing
7.	Jagamangal weir	Rushikulya	Existing

2. STREAM FLOW DATA

2.1 Methodology

Area-velocity method is generally adopted for measuring discharge at sites. Cup type current meter is used to measure the velocity of the flow and the depth is measured by using sounding rod for depths upto 3 m and by log line beyond 3 m. Discharge by area velocity method is being observed once in a day starting at 0800 Hrs. at all the sites except on Sundays and holidays. Besides, silt and water quality observation are also being carried out at the sites of CWC as list above.

The observed stage and discharge figures for each season (monsoon and non-monsoon) are plotted and a mean Stage V/s. Discharge curve is drawn, giving due attention to the scattered points with reference to area, velocity etc.

The factors responsible for the shifting of the curves are also taken care of by studying the river cross section at regular intervals and with super imposition of previous years' Stage V/s. Discharge curves. Accordingly, the trend of the current curve is finalised. Finally, the discharges of the non observed days are computed from these Stage V/s. Discharge Curves.

2.2 Data Availability

Sl. No.	Code No.	Station Name	Type	Data available From	To
1.	ER000U5	Purushottampur	G & D	G - 14.07.1978	Continuing
				D - 14.06.1989	-do-
				S - 15.01.2001	-do-
				WQ- 08.10.2001	-do-
2	MADHABARIDA	Madhabarida	G	G - 09.08.1978	Continuing
3	SORADA	Sorada	G	G - 12.07.1978	Continuing

2.3 Explanatory Notes on Water Year Book

SWDES (Surface Water Data Entry Software), a custom made software for processing hydrological data, has been used for preparation of this volume. The explanatory notes described below can be used for interpretation of data presented in this volume.

i) Water Year ranges from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.

ii) Discharge is given in cubic meters per second.

iii) Discharges are expressed as 0.000 when river bed is dry and 0.000 N.F. when velocity is observed as 'NIL'.

iv) The zero R.L. of gauge is a datum level fixed for given site, which is kept 1 or 2 m lower than the lowest water level recorded in a perennial stream. In a non-perennial stream, it is kept 1 or 2 m lower than the lowest bed level of the stream.

v) Discharges are rounded off as per standard practice.

vi) Runoff in mm is the notional depth of water in millimeters over the catchment, equivalent to annual runoff volume calculated at the discharge measurement station. It is computed using the relation:

$$\text{Runoff (mm)} = \frac{\text{Annual runoff } (Mm^3) \times 1000}{\text{Catchment area } (km^2)}$$

vii) Peak and lowest flow correspond to the highest and lowest water levels recorded from 'SWDES' entered data.

viii) Measuring Authority refers to the field division of Central Water Commission (Eastern Rivers Division) responsible for the operation of the gauging station.

ix) The gauging station code number is a unique seven column alphanumeric reference number which facilitates storage and retrieval of flow data in data base. The first column is identifier of either an integral river basin or, for the sake of convenience, a region having several contiguous river catchments. This is followed by a column which identifies an independent river system which either has one or more outlets to the sea or crosses international border to enter another country. The third, fourth and fifth column spaces denote first, second and third order tributaries, respectively, from the mouth upstream. The sixth and seventh column spaces indicate the location of the gauging station in one of the 225 slots earmarked on the river. The blank column spaces are filled by zero.

3. HYDROLOGICAL DATA

This volume contains the following information for each site stated above:

i. History Sheet: Site Name, State, District, River Basin, Tributary, Sub-Tributary, Catchment Area, Latitude / Longitude, Opening / Closing date for various types of data.

ii. Annual maximum/minimum discharge since period of observation.

iii. Daily Water level and observed/ computed discharge data including 10-daily, monthly and annual totals etc.

iv. Histogram and Hydrograph showing current year monthly mean discharges, Historical monthly mean discharges, historical monthly minimum and monthly maximum discharges.
v. Histogram showing Annual Run off volume since beginning of observation.
vi. Pie-Chart showing monthly mean run off (as percentage of Annual Run off) historical for the current year.
vii. Plot of Pre and Post Monsoon Cross-section of the rivers for current year.
viii. Water Level hydrograph for 3(three) major flood events of current year.

4. SEDIMENT DATA (In case of Sediment Observation sites)

The frequency of sediment observation is carried out daily during monsoon season and once in a week (on Monday) during the non-monsoon period. Data for non-observed days is estimated/ interpolated from the relationship of discharge v/s. sediment load, prepared on the basis of observed sediment concentration and weighted mean discharge of the same year.

Sediment samples are collected from 0.6 depth, using Punjab type bottle sampler, from all the verticals along the hydrological observation sections where velocity is observed for computation of discharge. The collected samples from all the segments are combined in 3 to 7 groups having compartments or groups of equal or nearly equal discharges for analysis. Quantum of suspended sediment load is estimated in three grades, viz. Coarse, Medium and Fine. Coarse and medium grades are separated by sieving process and the fine grade by filtration of left over samples after sieving through filter paper. Grade wise concentration is derived gravimetrically as per standard procedure. The following parameters are derived and recorded:

- Daily Observed suspended sediment (g/l).
- Corresponding discharge.
- Average sediment load in tonnes/day (10 daily & monthly basis).
- Annual sediment load for the current year.
- Annual & Seasonal sediment load and the corresponding volume of inflow for all the years since inception.
- Grain size distribution of bed load.

5. WATER QUALITY DATA (In case of Water Quality Observation sites)

The water samples are collected at a regular interval of once in a month for trend stations and once in two month for base stations (on 1st working day), from the main flowing segment of the stream just below the water surface (20 to 30 cm) on the Station Gauge line where depth of flow and velocity are maximum, preferably in the mid stream. The water samples are collected in the pre-rinsed and cleaned one-litre capacity polythene bottle having double stopper (inside and outside) facility. Sampling bottle is filled to its full capacity without entrapping air bubbles inside.

After sampling, the collected samples are sent to the Water Quality Laboratory (Level-II) based at Bhubaneswar (under the Eastern Rivers Division) and to Raipur laboratory (under Mahanadi Division, Burla), along with in-situ physical characteristics, for analysis. The samples received from the sites are preserved in a refrigerator in the water quality laboratories for analysis**.**

Analysis of parameters, namely pH, Electrical conductivity, Sodium, Potassium, Iron, Aluminum, Ammonia, Fluoride, Nitrate, Nitrite, Phosphate, Silicate, Boron, Sulphate, Calcium, Magnesium, Carbonate, Bi-carbonate, Chloride, Dissolved Oxygen, BOD and COD, are carried out at the Level II laboratory by using standard methodology. Micro biological parameters like total colliform and faecal colliform are also being analyzed. For analysis of trace and toxic elements, samples are sent to Level-II+ laboratory at Hyderabad once in a year, in the month of April.

The following parameters are analyzed and recorded:

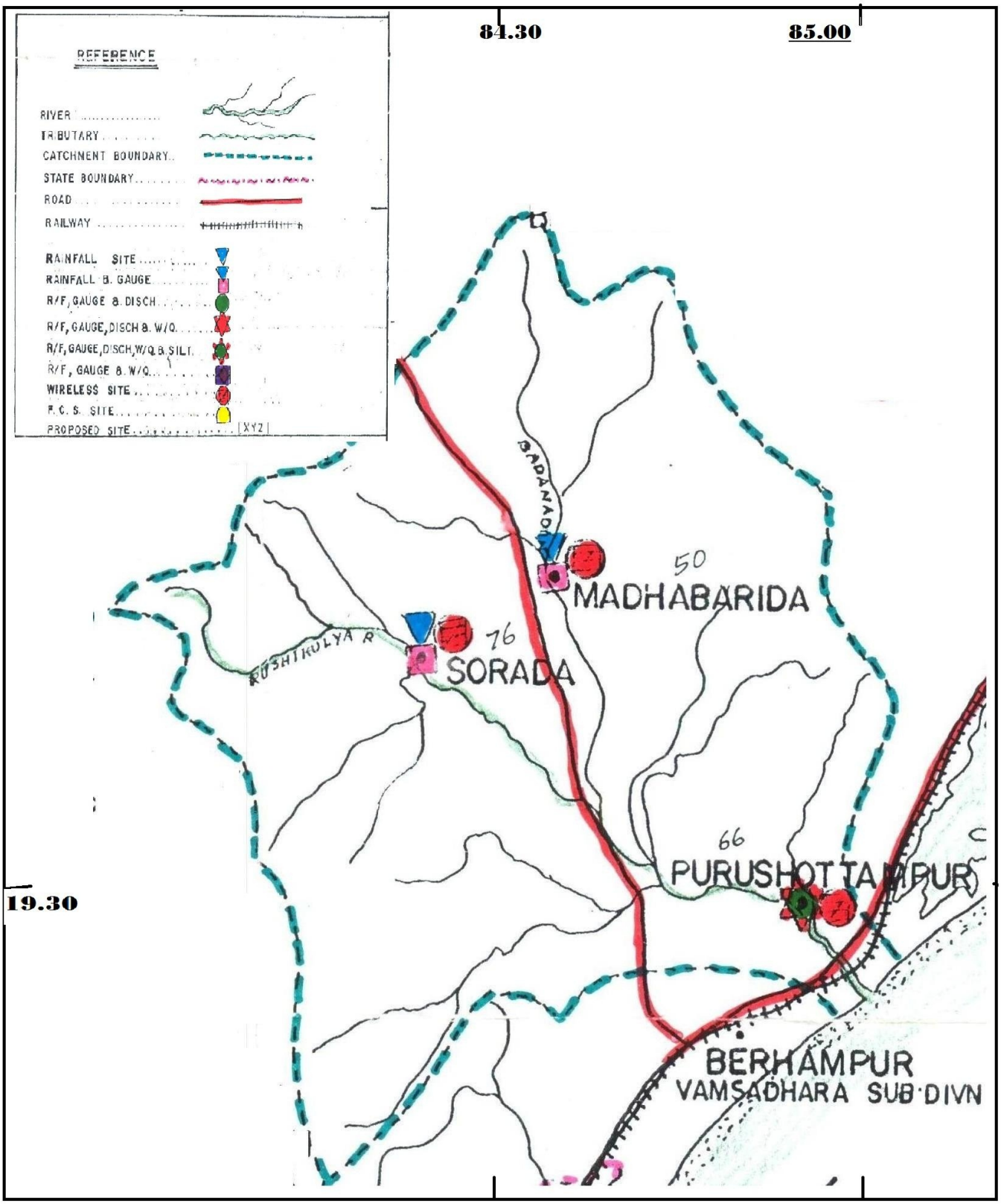
- Monthly Values: Physical; Chemical (mg/l); Biological (mg/l); Traces & Toxic (mg/l) and Chemical Indices.

- Average Values for the Year: 10 Years data to be given season wise averages:-

  - Average for Summer (March to June).
  - Average for Floods (July to October).
  - Average for Winter (November to February)

NAME OF THE SITES IN OPERATION UNDER RUSHIKULYA BASIN

Sl. No.	Station Name	River/ Tributary	Code No.	Type	Latitude	Longitude
1.	Madhabarida	Badanadi		G	19° 55' 00"	84° 38' 00"
2.	Purushottampur	Rushikulya	ER000U5	GDSQ	19° 31' 00"	84° 53' 00"
3.	Sorada	Rushikulya		G	19° 45' 30"	84° 38' 30"


84.30
85.00
REFERENCE
RIVER
TRIBUTARY
CATCHMENT BOUNDARY
STATE BOUNDARY
ROAD
RAILWAY
RAINFALL SITE
RAINFALL S. GAUGE
R/F, GAUGE & DISCH
R/F, GAUGE, DISCH & W/Q
R/F, GAUGE, DISCH, W/Q & SILT
R/F, GAUGE & W/Q
WIRELESS SITE
F. C. S. SITE
PROPOSED SITE [XYZ]
BADANADI
50
MADHABARIDA
76
SORADA
RUSHIKULYA R
66
PURUSHOTTAMPUR
BERHAMPUR
VAMSADHARA SUB DIVN
19.30
19.30
84.30
85.00

HYDROLOGICAL DATA

HISTORY SHEET

Water Year : 2015-2016

Site	:	**PURUSHOTTAMPUR**	**Code**	:	**ER000U5**
State	:	Orissa	District		Ganjam
Basin	:	EFR B Mahanadi-Godavari	Independent River	:	Rushikulya
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Rushikulya
Division	:	E.E., Bhubaneswar	Sub-Division	:	Behrampur
Drainage Area	:	7112 Sq. Km.	Bank	:	Right
Latitude	:	19°31'00"	Longitude	:	84°53'00"
Zero of Gauge (m)	:	12 (m.s.l)	14.07.1978	-	14.07.2078
		Opening Date	Closing Date		
Gauge	:	14.07.1978			
Discharge	:	14.06.1989			
Sediment	:	15.01.2001			
Water Quality	:	08.10.2001			

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)

	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1993-1994	800.0	14.990	01.08.1993	0.000	12.210	19.04.1994
1994-1995	2450	16.900	11.05.1995	0.000	12.120	02.04.1995
1995-1996	1910	17.120	10.11.1995	0.000	12.000	20.05.1996
1996-1997	758.1	15.460	03.10.1996	0.000	12.980	17.02.1997
1997-1998	2195	17.560	22.08.1997	0.000	12.000	15.06.1997
1998-1999	997.1	15.685	17.11.1998	0.000	13.070	13.04.1999
1999-2000	3020	17.760	19.10.1999	0.000	12.850	10.04.2000
2000-2001	609.8	15.345	29.08.2000	0.000	12.000	09.03.2001
2001-2002	1202	15.610	13.06.2001	0.000	12.990	22.04.2002
2002-2003	700.0	15.070	08.09.2002	0.000	12.000	07.05.2003
2003-2004	2279	17.940	08.10.2003	0.000	12.730	07.04.2004
2004-2005	1270	15.810	05.10.2004	0.000	12.000	02.04.2005
2005-2006	1648	16.530	13.09.2005	0.000	12.610	17.02.2006
2006-2007	2151	17.525	04.07.2006	0.000	12.730	27.02.2007
2007-2008	2086	17.500	07.08.2007	0.000	12.540	12.05.2008
2008-2009	1757	16.765	18.09.2008	0.328	12.770	17.02.2009
2009-2010	2260	17.250	20.07.2009	0.000	12.500	18.05.2010
2010-2011	2047	16.390	09.11.2010	0.000	12.570	22.06.2010
2011-2012	1004	15.360	01.09.2011	0.000	12.470	25.05.2012
2012-2013	1776	16.510	03.11.2012	0.000	12.270	16.05.2013
2013-2014	3750	18.640	25.10.2013	0.000	12.390	10.06.2013
2014-2015	1934	16.370	14.10.2014	0.561	12.040	23.06.2014
2015-2016	1225	15.190	16.09.2015	0.480	12.040	24.04.2016

Stage-Discharge Data for the period 2015 - 2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

Day	Jun		Jul		Aug		Sep		Oct		Nov	
	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q
1	12.050	1.997	12.810	110.7	12.000	12.72	12.900	121.4	12.835	85.09	12.380	12.00 *
2	12.050	1.996	12.660	36.72	12.260	8.500 *	12.900	121.8	12.720	60.00 *	12.710	40.40
3	12.060	2.499	12.510	25.89	12.000	7.778	12.850	105.5	12.825	82.80	13.070	125.1
4	12.060	2.445	12.530	26.43	12.000	6.042	12.945	133.5	12.900	90.00 *	13.050	121.4
5	12.060	2.390	12.500	25.48	12.000	16.43	13.050	204.6	12.955	99.59	12.800	45.96
6	12.070	2.866	12.500	25.48	12.000	16.77	13.000	150.0 *	12.960	98.41	12.750	41.90
7	12.070	2.850 *	12.460	19.46	12.000	30.93	12.835	119.0	12.940	91.39	12.540	24.43
8	12.070	2.849	12.405	16.89	12.000	9.405	12.970	147.9	12.970	96.24	12.510	23.00 *
9	12.100	3.849	12.380	15.57	12.220	6.000 *	12.930	133.5	12.895	94.40	12.400	14.67
10	12.100	3.861	12.370	14.74	12.000	6.884	12.850	113.6	12.820	79.59	12.330	12.40
11	12.080	2.966	12.300	13.34	12.000	9.926	12.930	134.0	12.690	42.00 *	12.320	11.00 *
12	12.080	2.969	12.360	13.70 *	12.000	22.81	12.845	112.8	12.000	33.42	12.320	10.28
13	12.070	2.692	12.000	13.76	12.000	36.49	12.960	145.0 *	12.000	30.04	12.310	9.817
14	12.070	2.870 *	12.000	14.73	12.920	132.2	13.725	500.8	12.000	23.05	12.290	8.913
15	12.080	3.054	12.000	17.24	12.750	98.00 *	13.785	516.2	12.000	31.21	12.250	4.590 *
16	12.080	2.858	12.000	17.67	12.000	34.17	15.190	1225	12.700	70.36	12.230	4.638
17	12.460	18.71	12.000	31.89	12.000	42.43	15.180	1215 *	12.000	31.61	12.260	5.544
18	12.480	19.78	12.570	30.00 *	13.090	175.0	15.190	1221	12.080	30.00 *	12.260	5.559
19	12.500	18.56	12.610	35.00 *	13.060	161.8	14.270	715.8	12.000	28.43	12.240	4.661
20	12.540	23.70	12.850	116.7	12.960	142.0	14.010	625.0 *	12.000	26.91	12.310	9.846
21	12.670	40.00 *	12.685	80.92	12.850	118.0	15.060	1146	12.300	31.00 *	12.250	4.703
22	14.805	849.3	12.000	29.18	12.700	61.14	14.295	716.5	12.400	21.00 *	12.240	4.500 *
23	13.780	467.8	12.000	29.21	12.530	36.00 *	13.670	518.4	12.400	25.16	12.230	4.519
24	13.140	194.3	13.310	220.0	12.000	50.57	13.400	456.5	12.480	25.00 *	12.240	4.584
25	12.900	158.3	12.880	120.5	12.000	62.64	13.180	190.0 *	12.470	23.00 *	12.230	4.400 *
26	12.780	107.1	12.670	90.00 *	12.000	51.43	13.060	123.9	12.400	22.90	12.230	4.303
27	12.660	79.91	12.860	116.6	12.000	56.36	13.030	120.0 *	12.400	11.99	12.230	4.384
28	12.600	64.00 *	12.700	73.37	13.130	231.9	13.020	116.2	12.390	11.56	12.220	4.283
29	12.510	25.79	12.000	32.00	13.100	196.6	12.900	99.79	12.340	10.45	12.220	4.200 *
30	12.505	25.37	12.000	28.79	13.050	160.0 *	12.870	92.89	12.340	10.33	12.210	4.135
31			12.000	18.77	12.975	138.2			12.340	10.28		
Ten-Daily Mean												
I Ten-Daily	12.069	2.760	12.512	31.73	12.048	12.15	12.923	135.1	12.882	87.75	12.654	46.13
II Ten-Daily	12.244	9.816	12.269	30.40	12.478	85.48	14.008	641.1	12.147	34.70	12.279	7.485
III Ten-Daily	13.035	201.2	12.464	76.30	12.576	105.7	13.448	358.0	12.387	18.42	12.230	4.401
Monthly												
Min.	12.050	1.996	12.000	13.34	12.000	6.000	12.835	92.89	12.000	10.28	12.210	4.135
Max.	14.805	849.3	13.310	220.0	13.130	231.9	15.190	1225	12.970	99.59	13.070	125.1
Mean	12.449	71.26	12.417	47.12	12.374	69	13.460	378.1	12.469	46.04	12.388	19.34

Annual Runoff in MCM = 1692 Annual Runoff in mm = 238

Peak Observed Discharge = 1225 cumecs on 16/09/2015 Corres. Water Level :15.19 m

Lowest Observed Discharge = 0.483 cumecs on 25/04/2016 Corres. Water Level :12.04 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

Stage-Discharge Data for the period 2015 - 2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	12.200	3.965	12.180	6.584	12.060	1.490	12.050	1.300	12.120	2.228	12.020	
2	12.200	3.851	12.180	6.178	12.050	1.473	12.050	1.271	12.110	2.164	12.020	
3	12.200	3.806	12.180	6.150 *	12.050	1.461	12.050	1.305	12.110	2.150 *	12.020	
4	12.230	4.304	12.170	5.937	12.050	1.442	12.050	1.319	12.100	2.077	12.030	
5	12.240	4.501	12.170	6.202	12.050	1.454	12.050	1.314	12.100	2.429	12.030	
6	12.240	4.439 *	12.160	5.988	12.070	1.718	12.050	1.300 *	12.070	1.216	12.030	
7	12.230	4.468	12.160	5.097	12.070	1.700 *	12.050	1.300 *	12.070	1.204	12.030	
8	12.230	4.287	12.160	5.025	12.070	1.697	12.050	1.313	12.070	1.179	12.030	
9	12.230	4.882	12.150	4.831	12.060	1.593	12.070	1.407	12.070	1.189	12.030	
10	12.230	4.040	12.150	5.000 *	12.060	1.588	12.070	1.400	12.060	1.150 *	12.040	
11	12.220	4.706	12.150	4.948	12.060	1.565	12.060	1.370	12.060	1.146	12.040	
12	12.220	4.705	12.140	4.690	12.060	1.537	12.060	1.372	12.060	1.146	12.040	
13	12.220	4.600 *	12.120	2.253	12.060	1.347	12.060	1.375 *	12.060	1.119	12.040	
14	12.210	4.594	12.120	2.191	12.060	1.400 *	12.060	1.311	12.060	1.120 *	12.040	
15	12.210	4.547	12.110	2.039	12.050	1.406	12.060	1.311	12.050	0.980	12.040	
16	12.210	4.460	12.100	1.870	12.050	1.373	12.060	1.338	12.050	0.905	12.040	
17	12.390	18.56	12.100	1.800 *	12.050	1.358	12.060	1.304	12.050	0.805 *	12.040	
18	12.320	16.42	12.090	1.784	12.050	1.369	12.050	0.998	12.050	0.767	12.040	
19	12.300	15.68	12.090	1.752	12.050	1.366	12.050	1.181	12.050	0.758	12.040	
20	12.300	15.50 *	12.090	1.692	12.050	1.361	12.050	1.182 *	12.050	0.750 *	12.060	1.383
21	12.300	12.47	12.080	1.637	12.050	1.360 *	12.050	1.128	12.040	0.679	12.110	5.838
22	12.300	12.31	12.080	1.616	12.040	1.234	12.050	1.115	12.040	0.496	12.150	6.000 *
23	12.260	11.26	12.080	1.618	12.040	1.239	12.050	1.114	12.040	0.490	12.200	10.29
24	12.250	11.20 *	12.070	1.580 *	12.040	1.243	12.060	1.300 *	12.040	0.480 *	12.130	6.042
25	12.240	9.000 *	12.060	1.553	12.040	1.248	12.070	1.350 *	12.040	0.483	12.090	4.680
26	12.240	8.977	12.060	1.500 *	12.040	1.239	12.060	1.270			12.080	4.426
27	12.220	7.000 *	12.060	1.551	12.040	1.242	12.060	1.200 *			12.080	4.155
28	12.190	6.449	12.060	1.554	12.040	1.250 *	12.050	0.837			12.050	1.787
29	12.180	6.196	12.060	1.519			12.160	5.348			12.050	1.750 *
30	12.180	6.134	12.060	1.511			12.140	4.691			12.050	1.742
31	12.200	8.282	12.060	1.500 *			12.120	2.279			12.050	1.758
Ten-Daily Mean												
I Ten-Daily	12.223	4.254	12.166	5.699	12.059	1.562	12.054	1.323	12.088	1.699	12.028	
II Ten-Daily	12.260	9.378	12.111	2.502	12.054	1.408	12.057	1.274	12.054	0.950	12.042	1.383
III Ten-Daily	12.233	9.025	12.066	1.558	12.041	1.257	12.079	1.967	12.040	0.526	12.095	4.406
Monthly												
Min.	12.180	3.806	12.060	1.500	12.040	1.234	12.050	0.837	12.040	0.480	12.020	1.383
Max.	12.390	18.56	12.180	6.584	12.070	1.718	12.160	5.348	12.120	2.429	12.200	10.29
Mean	12.238	7.6	12.113	3.198	12.052	1.42	12.064	1.536	12.065	1.164	12.056	4.154

Peak Computed Discharge = 1215 cumecs on 17/09/2015 Corres. Water Level :15.18 m

Lowest Computed Discharge = 0.480 cumecs on 24/04/2016 Corres. Water Level :12.04 m

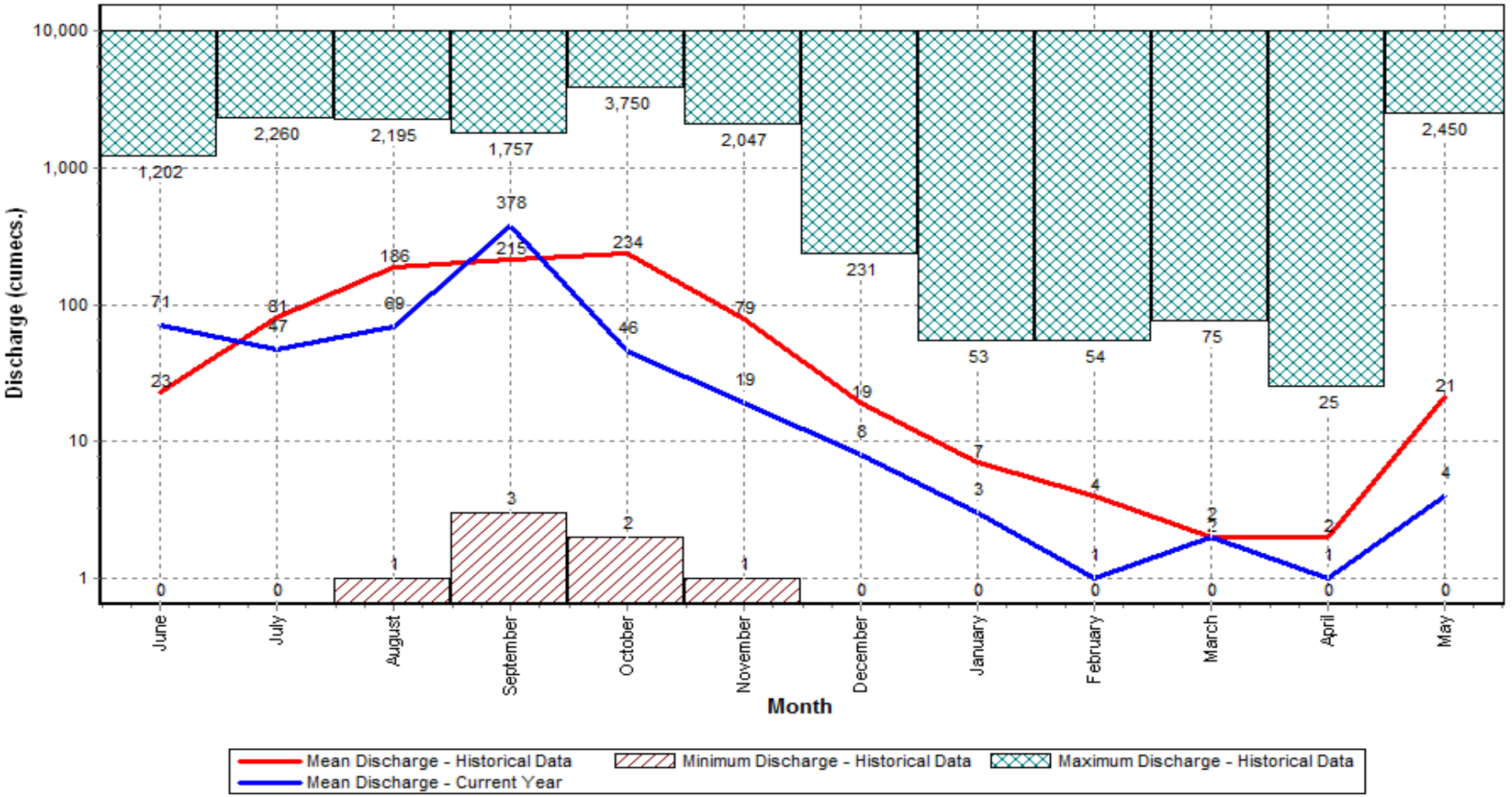
Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

HISTOGRAM - HYDROGRAPH for Water Year : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Data considered : 1993-2016** **Division : E.E., Bhubaneswar**

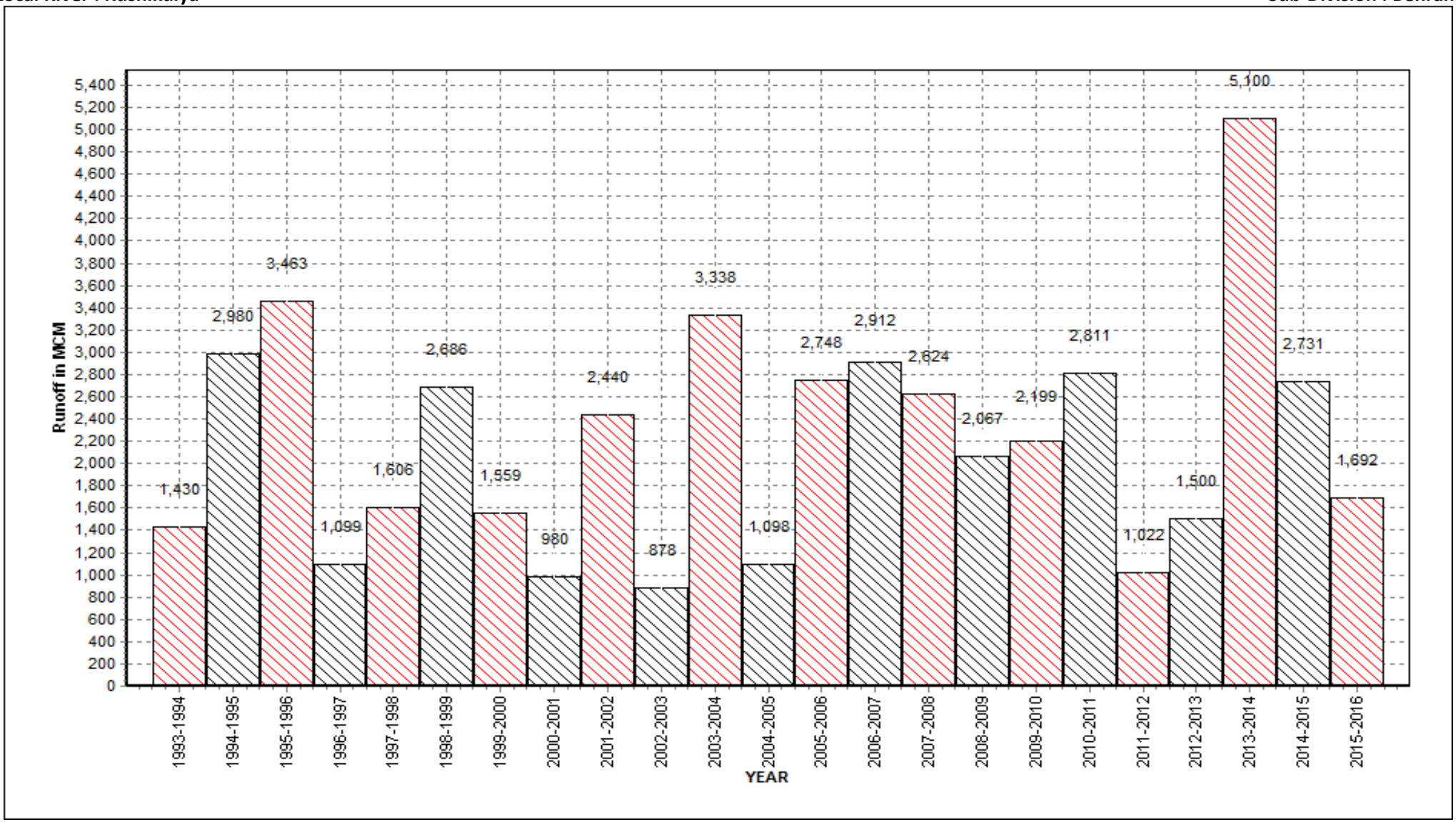
Local River : Rushikulya **Sub-Division : Behrampur**



Annual Runoff Values for the period: 1993 - 2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

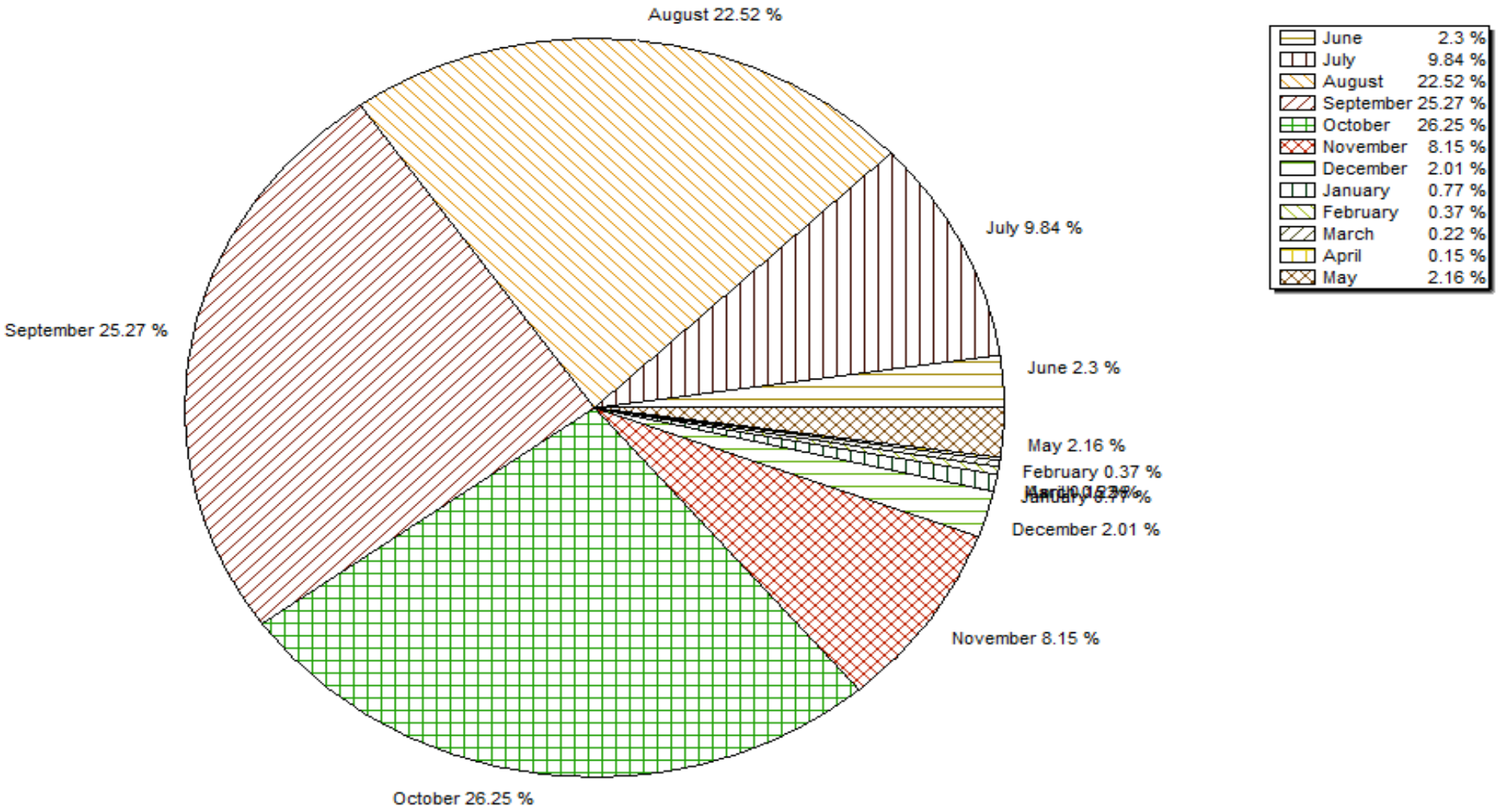


Note: Missing values have not been considered while arriving at Annual Runoff

Monthly Average Runoff based on period : 1993-2015

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

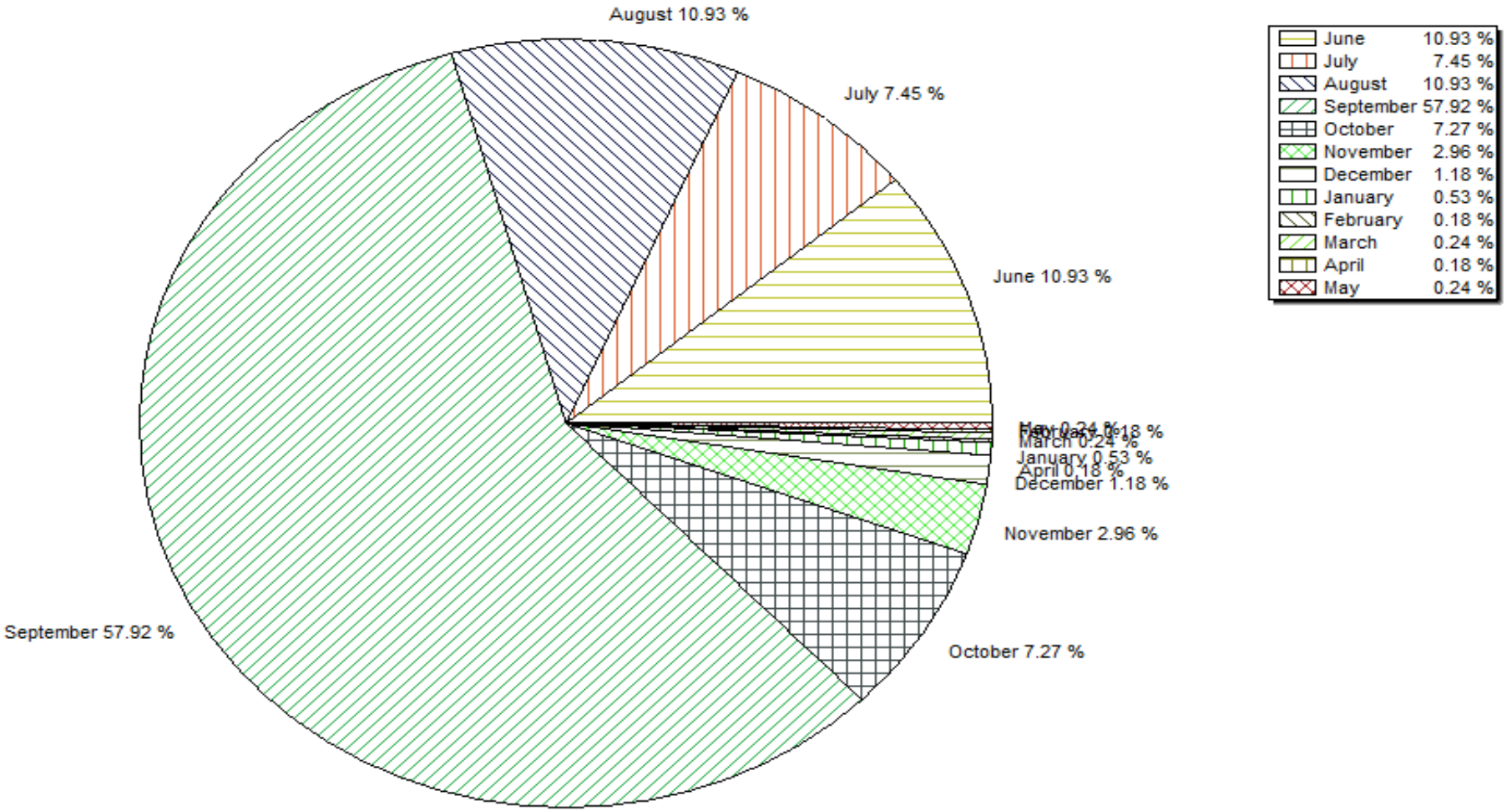
Local River : Rushikulya **Sub-Division : Behrampur**



Monthly Runoff for the Year : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

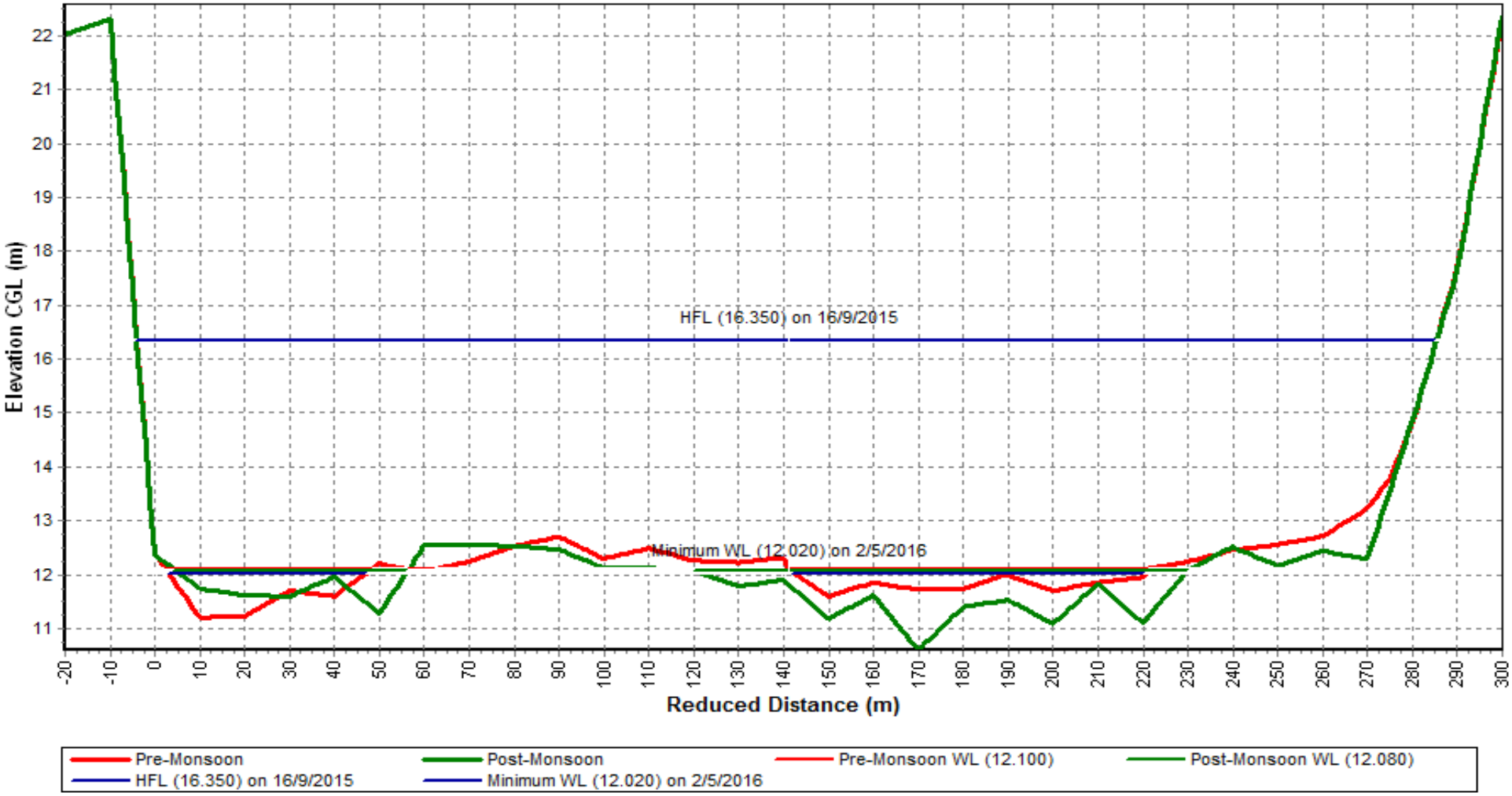
Local River : Rushikulya **Sub-Division : Behrampur**



Pre-Monsoon & Post-Monsoon X-Section for Water Year : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

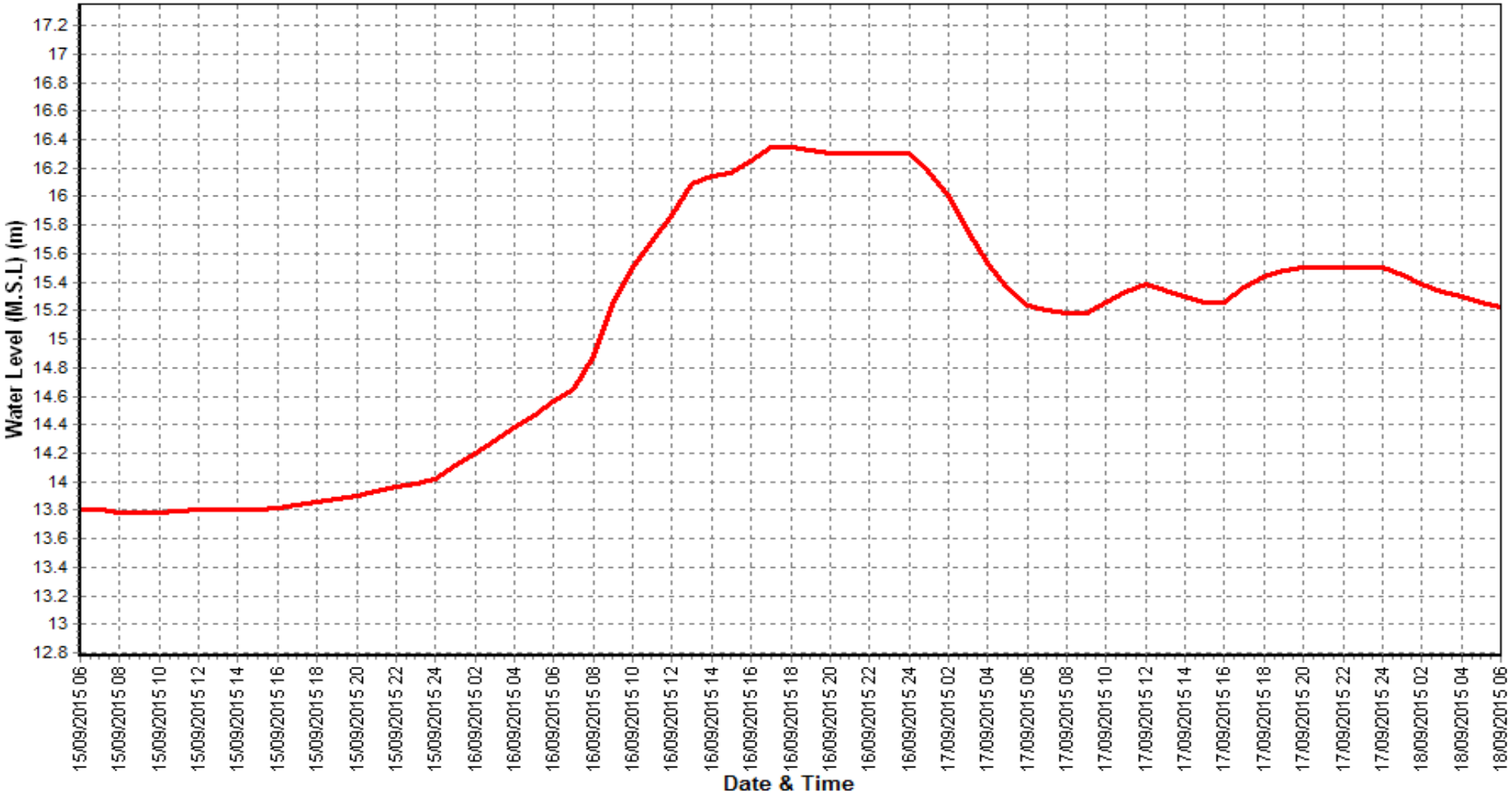
Local River : Rushikulya **Sub-Division : Behrampur**



Water Level vs. Time - Graph of Highest Flood Peak during the Year : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

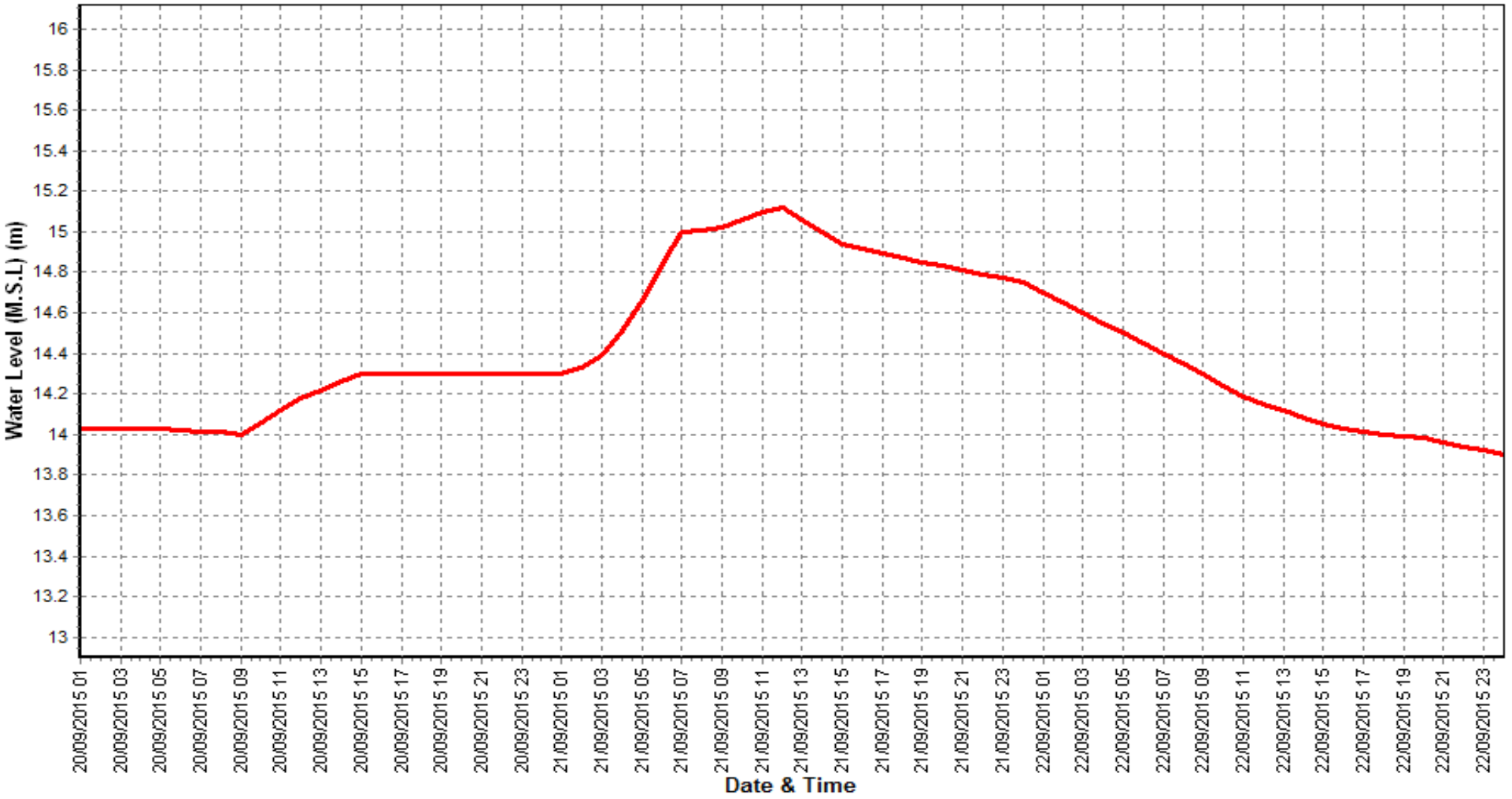


Time Span: 72 Hrs

Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

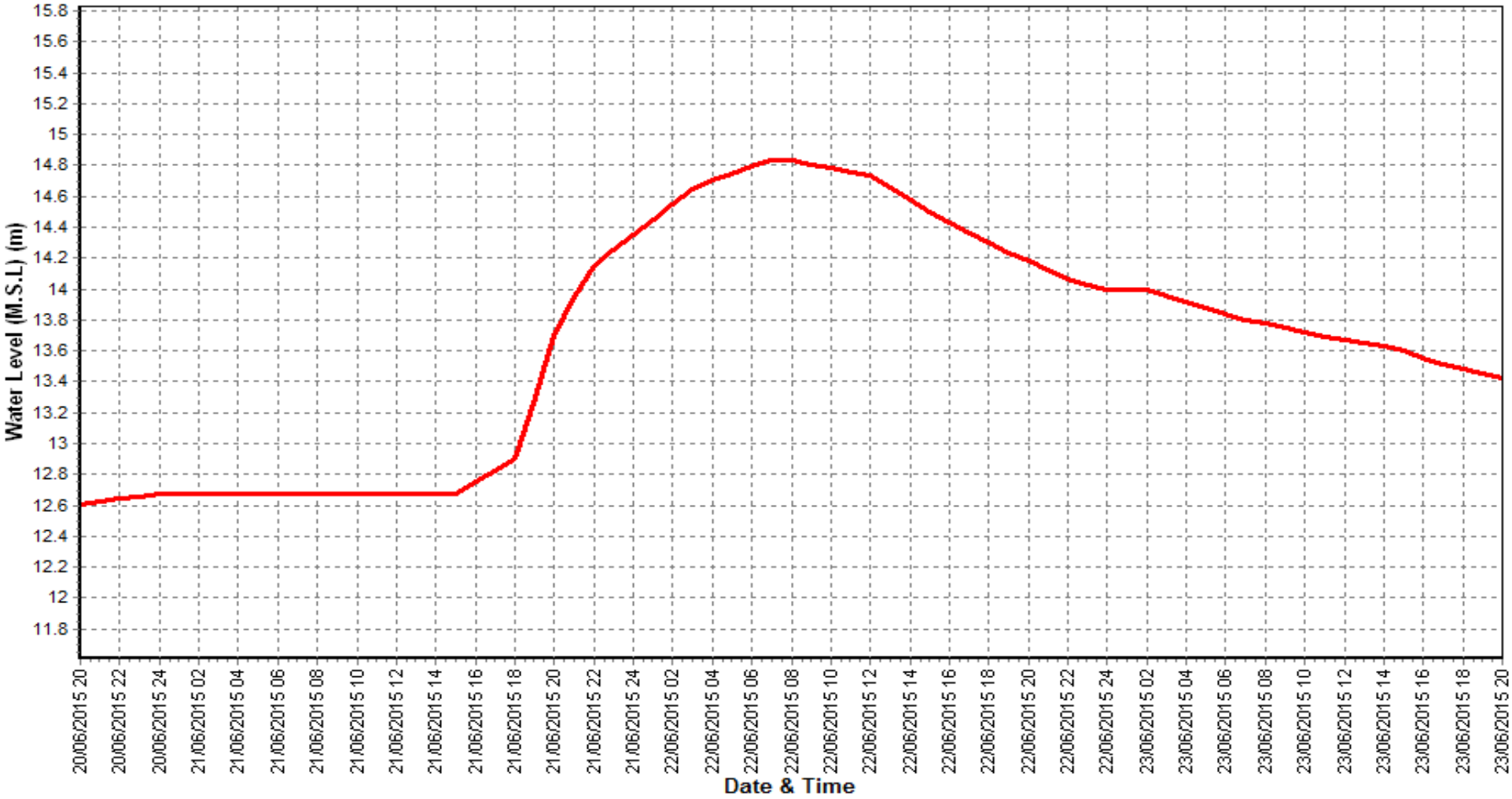


Time Span: 72 Hrs

Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**



Time Span: 72 Hrs

SEDIMENT DATA

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

Day	Jun						Jul						Aug					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	1.997	0.000	0.000	0.000	0.000	0	110.7						12.72	0.000	0.000	0.083	0.083	92
2	1.996	0.000	0.000	0.000	0.000	0	36.72						8.500	0.000	0.000	0.000	0.000	0
3	2.499	0.000	0.000	0.000	0.000	0	25.89						7.778	0.000	0.000	0.144	0.144	97
4	2.445	0.000	0.000	0.000	0.000	0	26.43						6.042	0.000	0.000	0.113	0.113	59
5	2.390	0.000	0.000	0.000	0.000	0	25.48						16.43	0.000	0.000	0.148	0.148	210
6	2.866	0.000	0.000	0.000	0.000	0	25.48						16.77	0.000	0.000	0.101	0.101	147
7	2.850	0.000	0.000	0.000	0.000	0	19.46						30.93	0.000	0.000	0.464	0.464	1241
8	2.849	0.000	0.000	0.000	0.000	0	16.89						9.405	0.000	0.000	0.158	0.158	129
9	3.849	0.000	0.000	0.000	0.000	0	15.57						6.000	0.000	0.000	0.000	0.000	0
10	3.861	0.000	0.000	0.000	0.000	0	14.74						6.884	0.000	0.000	0.144	0.144	86
11	2.966	0.000	0.000	0.000	0.000	0	13.34	0.000	0.000	0.772	0.772	890	9.926	0.000	0.000	0.139	0.139	119
12	2.969	0.000	0.000	0.000	0.000	0	13.70						22.81	0.000	0.000	0.153	0.153	301
13	2.692	0.000	0.000	0.000	0.000	0	13.76	0.000	0.000	0.031	0.031	37	36.49	0.000	0.000	0.362	0.362	1140
14	2.870	0.000	0.000	0.000	0.000	0	14.73	0.000	0.000	0.000	0.000	0	132.2	0.000	0.000	0.324	0.324	3697
15	3.054	0.000	0.000	0.000	0.000	0	17.24	0.000	0.000	0.097	0.097	144	98.00	0.000	0.000	0.000	0.000	0
16	2.858	0.000	0.000	0.000	0.000	0	17.67	0.000	0.000	0.054	0.054	82	34.17	0.000	0.000	0.167	0.167	492
17	18.71	0.000	0.000	0.383	0.383	620	31.89	0.000	0.000	0.096	0.096	265	42.43	0.000	0.000	0.153	0.153	560
18	19.78	0.000	0.000	0.522	0.522	892	30.00						175.0	0.000	0.000	0.520	0.520	7863
19	18.56	0.000	0.000	0.219	0.219	351	35.00						161.8	0.000	0.000	0.270	0.270	3773
20	23.70	0.000	0.000	0.388	0.388	794	116.7	0.000	0.000	0.111	0.111	1122	142.0	0.000	0.000	0.261	0.261	3196
21	40.00	0.000	0.000	0.000	0.000	0	80.92	0.000	0.000	0.365	0.365	2555	118.0	0.000	0.000	0.265	0.265	2705
22	849.3	0.000	0.000	1.088	1.088	79848	29.18	0.000	0.000	0.000	0.000	0	61.14	0.000	0.000	0.180	0.180	953
23	467.8	0.000	0.000	0.385	0.385	15579	29.21	0.000	0.000	0.000	0.000	0	36.00	0.000	0.000	0.000	0.000	0
24	194.3	0.000	0.000	0.212	0.212	3565	220.0	0.000	0.000	0.207	0.207	3928	50.57	0.000	0.000	0.153	0.153	667
25	158.3	0.000	0.000	0.127	0.127	1731	120.5	0.000	0.000				62.64	0.000	0.000	0.205	0.205	1110
26	107.1	0.000	0.000	0.066	0.066	615	90.00						51.43	0.000	0.000	0.124	0.124	552
27	79.91	0.000	0.000	0.073	0.073	503	116.6	0.000	0.000				56.36	0.000	0.000	0.101	0.101	490
28	64.00	0.000	0.000	0.000	0.000	0	73.37	0.000	0.000				231.9	0.000	0.000	0.503	0.503	10071
29	25.79	0.000	0.000	0.051	0.051	114	32.00	0.000	0.000				196.6	0.000	0.000	0.250	0.250	4240
30	25.37	0.000	0.000	0.051	0.051	111	28.79	0.000	0.000				160.0	0.000	0.000	0.000	0.000	0
31							18.77	0.000	0.000				138.2	0.000	0.000	0.210	0.210	2509
Ten Daily Mean																		
Ten Daily I	2.760	0.000	0.000	0.000	0.000	0	31.73						12.15	0.000	0.000	0.136	0.136	206
Ten Daily II	9.816	0.000	0.000	0.151	0.151	266	30.40	0.000	0.000	0.166	0.166	363	85.48	0.000	0.000	0.235	0.235	2114
Ten Daily III	201.2	0.000	0.000	0.205	0.205	10207	76.30	0.000	0.000	0.143	0.143	1621	105.7	0.000	0.000	0.181	0.181	2118
Monthly																		
Total						104722						9023						46499

Annual Sediment Load (Metric Tonnes) : 651282

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

Day	Sep						Oct						Nov					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	121.4	0.000	0.000	0.163	0.163	1710	85.09	0.000	0.000	0.102	0.102	749	12.00	0.000	0.000	0.000	0.000	0
2	121.8	0.000	0.000	0.082	0.082	860	60.00	0.000	0.000	0.000	0.000	0	40.40	0.000	0.000	0.079	0.079	277
3	105.5	0.000	0.000	0.144	0.144	1309	82.80	0.000	0.000	0.076	0.076	543	125.1	0.000	0.000	0.077	0.077	837
4	133.5	0.000	0.000	0.540	0.540	6230	90.00	0.000	0.000	0.000	0.000	0	121.4	0.000	0.000	0.134	0.134	1406
5	204.6	0.000	0.000	0.501	0.501	8854	99.59	0.000	0.000	0.068	0.068	588	45.96	0.000	0.000	0.110	0.110	438
6	150.0	0.000	0.000	0.000	0.000	0	98.41	0.000	0.000	0.075	0.075	640	41.90	0.000	0.000	0.082	0.082	296
7	119.0	0.000	0.000	0.117	0.117	1208	91.39	0.000	0.000	0.124	0.124	980	24.43	0.000	0.000	0.033	0.033	69
8	147.9	0.000	0.000	0.207	0.207	2648	96.24	0.000	0.000	0.154	0.154	1283	23.00	0.000	0.000	0.000	0.000	0
9	133.5	0.000	0.000	0.102	0.102	1180	94.40	0.000	0.000	0.269	0.269	2190	14.67	0.000	0.000	0.009	0.009	11
10	113.6	0.000	0.000	0.207	0.207	2030	79.59	0.000	0.000	0.085	0.085	584	12.40	0.000	0.000	0.007	0.007	8
11	134.0	0.000	0.000	0.187	0.187	2159	42.00	0.000	0.000	0.000	0.000	0	11.00	0.000	0.000	0.000	0.000	0
12	112.8	0.000	0.000	0.077	0.077	752	33.42	0.000	0.000	0.050	0.050	145	10.28	0.000	0.000	0.121	0.121	108
13	145.0	0.000	0.000	0.000	0.000	0	30.04	0.000	0.000	0.043	0.043	111	9.817	0.000	0.000	0.036	0.036	31
14	500.8	0.000	0.000	0.416	0.416	18008	23.05	0.000	0.000	0.159	0.159	317	8.913	0.000	0.000	0.035	0.035	27
15	516.2	0.000	0.000	0.276	0.276	12317	31.21	0.000	0.000	0.070	0.070	190	4.590	0.000	0.000	0.000	0.000	0
16	1225	0.000	0.000	1.334	1.334	141210	70.36	0.000	0.000	0.040	0.040	244	4.638	0.000	0.000	0.042	0.042	17
17	1215	0.000	0.000	0.000	0.000	0	31.61	0.000	0.000	0.053	0.053	144	5.544	0.000	0.000	0.049	0.049	23
18	1221	0.000	0.000	0.345	0.345	36449	30.00	0.000	0.000	0.000	0.000	0	5.559	0.000	0.000	0.047	0.047	22
19	715.8	0.000	0.000	0.398	0.398	24632	28.43	0.000	0.000	0.052	0.052	129	4.661	0.000	0.000	0.055	0.055	22
20	625.0	0.000	0.000	0.000	0.000	0	26.91	0.000	0.000	0.040	0.040	94	9.846	0.000	0.000	0.060	0.060	51
21	1146	0.000	0.000	1.904	1.904	188476	31.00	0.000	0.000	0.000	0.000	0	4.703	0.000	0.000	0.049	0.049	20
22	716.5	0.000	0.000	0.227	0.227	14066	21.00	0.000	0.000	0.000	0.000	0	4.500	0.000	0.000	0.000	0.000	0
23	518.4	0.000	0.000	0.110	0.110	4932	25.16	0.000	0.000	0.035	0.035	75	4.519	0.000	0.000	0.057	0.057	22
24	456.5	0.000	0.000	0.124	0.124	4885	25.00	0.000	0.000	0.000	0.000	0	4.584	0.000	0.000	0.041	0.041	16
25	190.0	0.000	0.000	0.000	0.000	0	23.00	0.000	0.000	0.000	0.000	0	4.400	0.000	0.000	0.000	0.000	0
26	123.9	0.000	0.000	0.082	0.082	880	22.90	0.000	0.000	0.085	0.085	167	4.303	0.000	0.000	0.052	0.052	19
27	120.0	0.000	0.000	0.000	0.000	0	11.99	0.000	0.000	0.023	0.023	23	4.384	0.000	0.000	0.060	0.060	23
28	116.2	0.000	0.000	0.126	0.126	1261	11.56	0.000	0.000	0.115	0.115	115	4.283	0.000	0.000	0.059	0.059	22
29	99.79	0.000	0.000	0.092	0.092	790	10.45	0.000	0.000	0.034	0.034	31	4.200	0.000	0.000	0.000	0.000	0
30	92.89	0.000	0.000	0.083	0.083	669	10.33	0.000	0.000	0.024	0.024	21	4.135	0.000	0.000	0.062	0.062	22
31							10.28	0.000	0.000	0.076	0.076	68						
Ten Daily Mean																		
Ten Daily I	135.1	0.000	0.000	0.206	0.206	2603	87.75	0.000	0.000	0.095	0.095	756	46.13	0.000	0.000	0.053	0.053	334
Ten Daily II	641.1	0.000	0.000	0.303	0.303	23553	34.70	0.000	0.000	0.051	0.051	137	7.485	0.000	0.000	0.044	0.044	30
Ten Daily III	358.0	0.000	0.000	0.275	0.275	21596	18.42	0.000	0.000	0.036	0.036	45	4.401	0.000	0.000	0.038	0.038	14
Monthly																		
Total						477516						9430						3787

Annual Sediment Load (Metric Tonnes) : 651282

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

Day	Dec						Jan						Feb					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	3.965	0.000	0.000	0.000	0.000	0	6.584	0.000	0.000	0.000	0.000	0	1.490	0.000	0.000			
2	3.851	0.000	0.000	0.000	0.000	0	6.178	0.000	0.000	0.000	0.000	0	1.473	0.000	0.000			
3	3.806	0.000	0.000	0.000	0.000	0	6.150	0.000	0.000	0.000	0.000	0	1.461	0.000	0.000			
4	4.304	0.000	0.000	0.000	0.000	0	5.937	0.000	0.000	0.053	0.053	27	1.442	0.000	0.000			
5	4.501	0.000	0.000	0.000	0.000	0	6.202	0.000	0.000	0.000	0.000	0	1.454	0.000	0.000			
6	4.439	0.000	0.000	0.000	0.000	0	5.988	0.000	0.000	0.000	0.000	0	1.718	0.000	0.000			
7	4.468	0.000	0.000	0.047	0.047	18	5.097	0.000	0.000	0.000	0.000	0	1.700	0.000	0.000	0.056	0.056	8
8	4.287	0.000	0.000	0.000	0.000	0	5.025	0.000	0.000	0.000	0.000	0	1.697	0.000	0.000	0.051	0.051	8
9	4.882	0.000	0.000	0.000	0.000	0	4.831	0.000	0.000	0.000	0.000	0	1.593	0.000	0.000			
10	4.040	0.000	0.000	0.000	0.000	0	5.000	0.000	0.000	0.000	0.000	0	1.588	0.000	0.000			
11	4.706	0.000	0.000	0.000	0.000	0	4.948	0.000	0.000	0.074	0.074	32	1.565	0.000	0.000			
12	4.705	0.000	0.000	0.000	0.000	0	4.690	0.000	0.000	0.000	0.000	0	1.537	0.000	0.000			
13	4.600	0.000	0.000	0.000	0.000	0	2.253	0.000	0.000	0.000	0.000	0	1.347	0.000	0.000			
14	4.594	0.000	0.000	0.042	0.042	17	2.191	0.000	0.000	0.000	0.000	0	1.400	0.000	0.000	0.052	0.052	6
15	4.547	0.000	0.000	0.000	0.000	0	2.039	0.000	0.000	0.000	0.000	0	1.406	0.000	0.000			
16	4.460	0.000	0.000	0.000	0.000	0	1.870	0.000	0.000	0.000	0.000	0	1.373	0.000	0.000			
17	18.56	0.000	0.000	0.000	0.000	0	1.800	0.000	0.000	0.000	0.000	0	1.358	0.000	0.000			
18	16.42	0.000	0.000	0.000	0.000	0	1.784	0.000	0.000	0.057	0.057	9	1.369	0.000	0.000			
19	15.68	0.000	0.000	0.000	0.000	0	1.752	0.000	0.000	0.000	0.000	0	1.366	0.000	0.000			
20	15.50	0.000	0.000	0.000	0.000	0	1.692	0.000	0.000	0.000	0.000	0	1.361	0.000	0.000			
21	12.47	0.000	0.000	0.055	0.055	59	1.637	0.000	0.000	0.000	0.000	0	1.360	0.000	0.000	0.048	0.048	6
22	12.31	0.000	0.000	0.000	0.000	0	1.616	0.000	0.000	0.000	0.000	0	1.234	0.000	0.000			
23	11.26	0.000	0.000	0.000	0.000	0	1.618	0.000	0.000	0.000	0.000	0	1.239	0.000	0.000			
24	11.20	0.000	0.000	0.000	0.000	0	1.580	0.000	0.000	0.000	0.000	0	1.243	0.000	0.000			
25	9.000	0.000	0.000	0.000	0.000	0	1.553	0.000	0.000	0.050	0.050	7	1.248	0.000	0.000			
26	8.977	0.000	0.000	0.000	0.000	0	1.500	0.000	0.000	0.000	0.000	0	1.239	0.000	0.000			
27	7.000	0.000	0.000	0.000	0.000	0	1.551	0.000	0.000	0.000	0.000	0	1.242	0.000	0.000			
28	6.449	0.000	0.000	0.048	0.048	27	1.554	0.000	0.000	0.000	0.000	0	1.250	0.000	0.000	0.052	0.052	6
29	6.196	0.000	0.000	0.000	0.000	0	1.519	0.000	0.000	0.000	0.000	0						
30	6.134	0.000	0.000	0.000	0.000	0	1.511	0.000	0.000	0.000	0.000	0						
31	8.282	0.000	0.000	0.000	0.000	0	1.500	0.000	0.000	0.000	0.000	0						
Ten Daily Mean																		
Ten Daily I	4.254	0.000	0.000	0.005	0.005	2	5.699	0.000	0.000	0.005	0.005	3	1.562	0.000	0.000	0.054	0.054	8
Ten Daily II	9.378	0.000	0.000	0.004	0.004	2	2.502	0.000	0.000	0.013	0.013	4	1.408	0.000	0.000	0.052	0.052	6
Ten Daily III	9.025	0.000	0.000	0.009	0.009	8	1.558	0.000	0.000	0.005	0.005	1	1.257	0.000	0.000	0.050	0.050	6
Monthly																		
Total						121						75						33

Annual Sediment Load (Metric Tonnes) : 651282

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

Day	Mar						Apr						May					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	1.300	0.000	0.000	0.000	0.000	0	2.228	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
2	1.271	0.000	0.000	0.000	0.000	0	2.164	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
3	1.305	0.000	0.000	0.000	0.000	0	2.150	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
4	1.319	0.000	0.000	0.000	0.000	0	2.077	0.000	0.000	0.059	0.059	11		0.000	0.000	0.000	0.000	
5	1.314	0.000	0.000	0.000	0.000	0	2.429	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
6	1.300	0.000	0.000	0.000	0.000	0	1.216	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
7	1.300	0.000	0.000	0.000	0.000	0	1.204	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
8	1.313	0.000	0.000	0.054	0.054	6	1.179	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
9	1.407	0.000	0.000	0.000	0.000	0	1.189	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
10	1.400	0.000	0.000	0.000	0.000	0	1.150	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
11	1.370	0.000	0.000	0.000	0.000	0	1.146	0.000	0.000	0.043	0.043	4		0.000	0.000	0.000	0.000	
12	1.372	0.000	0.000	0.000	0.000	0	1.146	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
13	1.375	0.000	0.000	0.000	0.000	0	1.119	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
14	1.311	0.000	0.000	0.060	0.060	7	1.120	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
15	1.311	0.000	0.000	0.000	0.000	0	0.980	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
16	1.338	0.000	0.000	0.000	0.000	0	0.905	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
17	1.304	0.000	0.000	0.000	0.000	0	0.805	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
18	0.998	0.000	0.000	0.000	0.000	0	0.767	0.000	0.000	0.032	0.032	2		0.000	0.000	0.000	0.000	
19	1.181	0.000	0.000	0.000	0.000	0	0.758	0.000	0.000	0.000	0.000	0		0.000	0.000	0.000	0.000	
20	1.182	0.000	0.000	0.000	0.000	0	0.750	0.000	0.000	0.000	0.000	0	1.383	0.000	0.000	0.000	0.000	0
21	1.128	0.000	0.000	0.056	0.056	5	0.679	0.000	0.000	0.000	0.000	0	5.838	0.000	0.000	0.000	0.000	0
22	1.115	0.000	0.000	0.000	0.000	0	0.496	0.000	0.000	0.000	0.000	0	6.000	0.000	0.000	0.000	0.000	0
23	1.114	0.000	0.000	0.000	0.000	0	0.490	0.000	0.000	0.000	0.000	0	10.29	0.000	0.000	0.033	0.033	30
24	1.300	0.000	0.000	0.000	0.000	0	0.480	0.000	0.000	0.000	0.000	0	6.042	0.000	0.000	0.000	0.000	0
25	1.350	0.000	0.000	0.000	0.000	0	0.483	0.000	0.000	0.000	0.000	0	4.680	0.000	0.000	0.000	0.000	0
26	1.270	0.000	0.000	0.000	0.000	0							4.426	0.000	0.000	0.000	0.000	0
27	1.200	0.000	0.000	0.000	0.000	0							4.155	0.000	0.000	0.000	0.000	0
28	0.837	0.000	0.000	0.052	0.052	4							1.787	0.000	0.000	0.000	0.000	0
29	5.348	0.000	0.000	0.000	0.000	0							1.750	0.000	0.000	0.000	0.000	0
30	4.691	0.000	0.000	0.000	0.000	0							1.742	0.000	0.000	0.051	0.051	8
31	2.279	0.000	0.000	0.000	0.000	0							1.758	0.000	0.000	0.000	0.000	0
Ten Daily Mean																		
Ten Daily I	1.323	0.000	0.000	0.005	0.005	1	1.699	0.000	0.000	0.006	0.006	1		0.000	0.000	0.000	0.000	
Ten Daily II	1.274	0.000	0.000	0.006	0.006	1	0.950	0.000	0.000	0.008	0.008	1	1.383	0.000	0.000	0.000	0.000	0
Ten Daily III	1.967	0.000	0.000	0.010	0.010	1	0.526	0.000	0.000	0.000	0.000	0	4.406	0.000	0.000	0.008	0.008	3
Monthly																		
Total						22						17						37

Annual Sediment Load (Metric Tonnes) : 651282

Annual Sediment Load for period : 2001-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

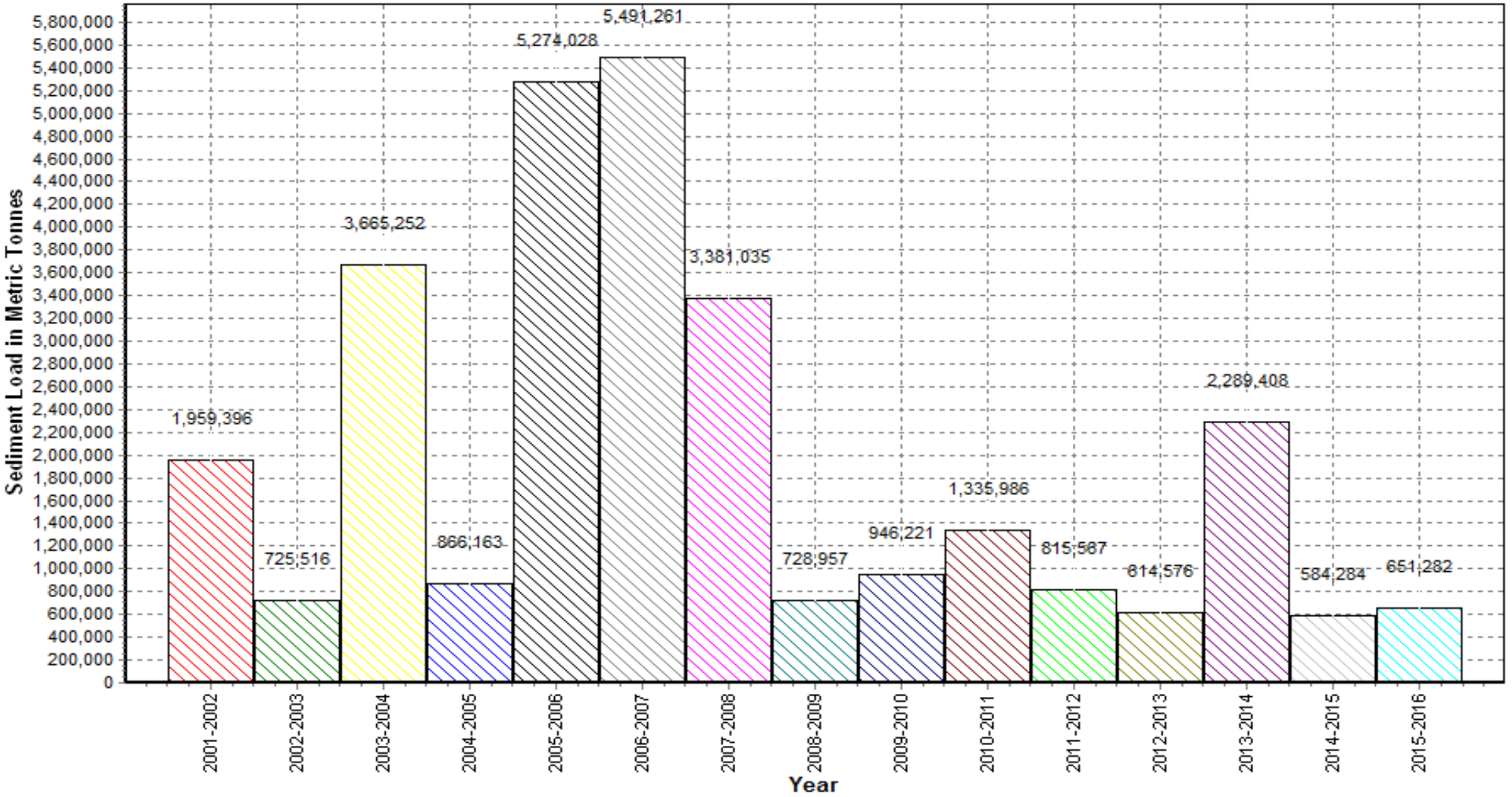
Local River : Rushikulya **Sub-Division : Behrampur**

Year	Monsoon (M.T.)	Non-Monsoon (M.T.)	Annual Load (M.T.)	Annual Run Off (MCM)
2001-2002	1958975	421	1959396	2416
2002-2003	725480	36	725516	878
2003-2004	3637975	27277	3665252	3338
2004-2005	866121	41	866163	1098
2005-2006	5267692	6336	5274028	2748
2006-2007	5489784	1477	5491261	2912
2007-2008	3379928	1107	3381035	2624
2008-2009	728823	134	728957	2067
2009-2010	945977	244	946221	2199
2010-2011	1280999	54988	1335986	2811
2011-2012	815111	456	815567	1022
2012-2013	614544	33	614576	1500
2013-2014	2288254	1154	2289408	5100
2014-2015	584148	136	584284	2731
2015-2016	650977	305	651282	1692

Annual Sediment Load for the period: 2001-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**



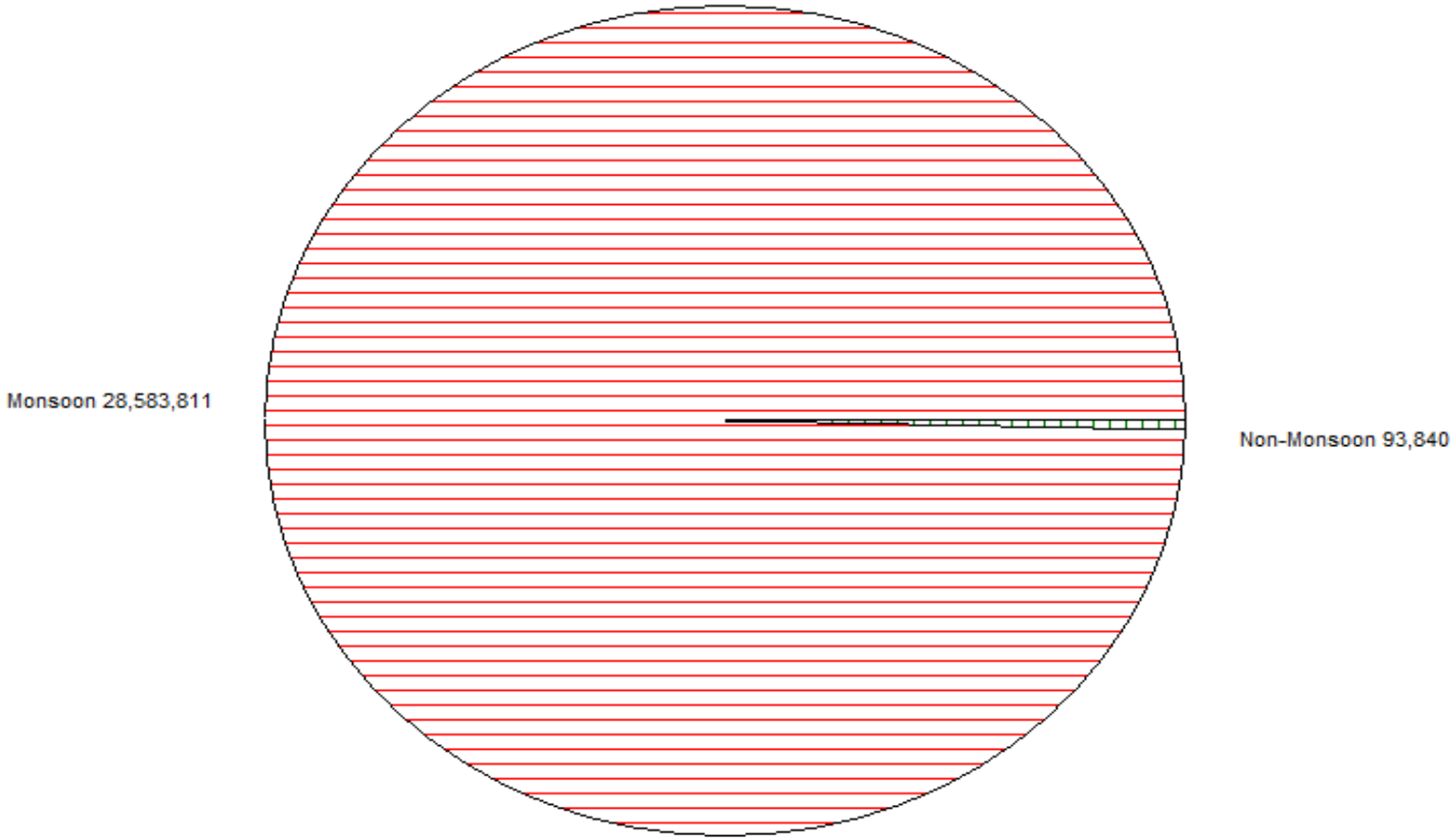
Seasonal Sediment Load for the period : 2001-2015

Station Name : PURUSHOTTAMPUR (ER000U5)

Division : E.E., Bhubaneswar

Local River : Rushikulva

Sub-Division : Behrampur



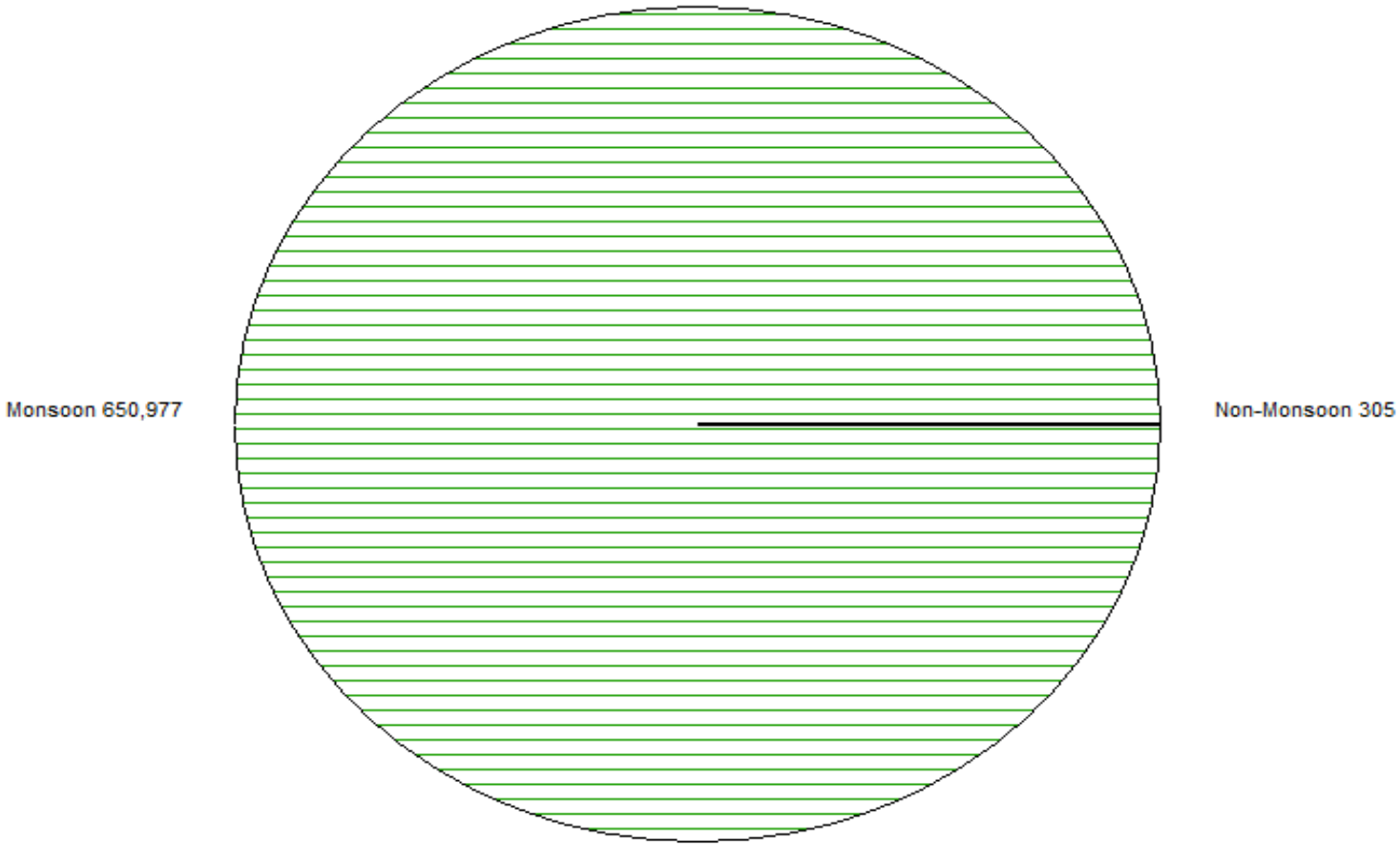
Seasonal Sediment Load for the Year: 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5)

Division : E.E., Bhubaneswar

Local River : Rushikulya

Sub-Division : Behrampur



WATER QUALITY DATA

Water Quality Datasheet for the period : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **River Water Analysis** **Sub-Division : Behrampur**

S.No	Parameters	01.06.2015	01.08.2015	01.10.2015	01.12.2015	01.02.2016	01.04.2016
		A	A	A	A	A	A
	PHYSICAL						
1	Q (cumec)						
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Clear	Clear	Clear
3	EC_FLD (µmho/cm)	339	809	688	186	581	580
4	EC_GEN (µmho/cm)	345	806	692	199	578	588
5	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free
6	pH_FLD (pH units)	7.8	6.8	7.3	7.7	8.2	7.9
7	pH_GEN (pH units)	8.1	7.0	7.4	7.6	8.3	8.0
8	Temp (deg C)	26.0	25.0	18.0	31.0	23.0	21.0
	CHEMICAL						
1	Alk-Phen (mgCaCO3/L)	9.2	0.0	0.0	0.0	46.0	46.0
2	ALK-TOT (mgCaCO3/L)	125	69	74	69	157	157
3	B (mg/L)	0.01	0.01	0.01	0.01	0.01	0.01
4	Ca (mg/L)	26	22	21	19	21	29
5	Cl (mg/L)	20.8	13.2	17.0	15.1	17.0	18.9
6	CO3 (mg/L)	11.1	0.0	0.0	0.0	55.4	55.4
7	F (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)	0.3	0.2	0.3	0.6	0.4	0.5
9	HCO3 (mg/L)	130	85	90	85	79	79
10	K (mg/L)	2.5	1.4	2.8	1.2	1.3	3.5
11	Mg (mg/L)	13.6	12.6	11.7	10.7	13.6	13.6
12	Na (mg/L)	23.3	1.8	3.8	3.1	3.0	53.0
13	NO2+NO3 (mg N/L)	0.95	0.69	1.15	1.22	0.85	1.16
14	NO2-N (mgN/L)	0.00	0.01	0.03	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.95	0.67	1.12	1.22	0.85	1.16
16	P-Tot (mgP/L)	0.001	0.010	0.010	0.010	0.010	0.010
17	SiO2 (mg/L)	8.0	6.0	6.0	6.0	5.0	5.0
18	SO4 (mg/L)	1.2	18.4	18.2	2.6	2.8	3.2
	BIOLOGICAL/BACTERIOLOGICAL						
	TRACE & TOXIC						
	CHEMICAL INDICES						
1	HAR_Ca (mgCaCO3/L)	64	56	52	48	52	72
2	HAR_Total (mgCaCO3/L)	121	109	101	93	109	129
3	Na% (%)	29	3	7	7	6	47
4	RSC (-)	0.1	0.0	0.0	0.0	1.0	0.6
5	SAR (-)	0.9	0.1	0.2	0.1	0.1	2.0
	PESTICIDES						

Water Quality Summary for the period : 2015-2016

Station Name : PURUSHOTTAMPUR (ER000U5) **Division : E.E., Bhubaneswar**

Local River : Rushikulya **Sub-Division : Behrampur**

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_FLD (µmho/cm)	6	809	186	531
3	EC_GEN (µmho/cm)	6	806	199	535
4	pH_FLD (pH units)	6	8.2	6.8	7.6
5	pH_GEN (pH units)	6	8.3	7.0	7.7
6	Temp (deg C)	6	31.0	18.0	24
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	6	46.0	0.0	16.9
2	ALK-TOT (mgCaCO3/L)	6	157	69	109
3	B (mg/L)	6	0.01	0.01	0.01
4	Ca (mg/L)	6	29	19	23
5	Cl (mg/L)	6	20.8	13.2	17
6	CO3 (mg/L)	6	55.4	0.0	20.3
7	F (mg/L)	6	0.05	0.05	0.05
8	Fe (mg/L)	6	0.6	0.2	0.4
9	HCO3 (mg/L)	6	130	79	91
10	K (mg/L)	6	3.5	1.2	2.1
11	Mg (mg/L)	6	13.6	10.7	12.6
12	Na (mg/L)	6	53.0	1.8	14.7
13	NO2+NO3 (mg N/L)	6	1.22	0.69	1
14	NO2-N (mgN/L)	6	0.03	0.00	0.01
15	NO3-N (mgN/L)	6	1.22	0.67	1
16	P-Tot (mgP/L)	6	0.010	0.001	0.008
17	SiO2 (mg/L)	6	8.0	5.0	6
18	SO4 (mg/L)	6	18.4	1.2	7.7
	BIOLOGICAL/BACTERIOLOGICAL				
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	6	72	48	57
2	HAR_Total (mgCaCO3/L)	6	129	93	110
3	Na% (%)	6	47	3	16
4	RSC (-)	6	1.0	0.0	0.3
5	SAR (-)	6	2.0	0.1	0.6
	PESTICIDES				

Water Quality Seasonal Average for the period: 2001-2016

Station Name : PURUSHOTTAMPUR (ER000U5) | **Division : E.E., Bhubaneswar**

Local River : Rushikulya | **River Water** | **Sub-Division : Behrampur**

S.No	Parameters	Flood																	
		Jun - Oct																	
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2001-2002	2002-2003	2003-2004
	PHYSICAL																		
1	Q (cumec)																		
2	EC_FLD (µmho/cm)	235	255	280	290			270		300	325	293	206	230	180	612	316	285	243
3	EC_GEN (µmho/cm)	235	254	276	290			263		300	325	293	206	230	180	614	316	281	245
4	pH_FLD (pH units)	7.9	7.7	7.3	7.7			7.9		7.8	7.8	8.1	7.8	7.5	7.5	7.3	7.5	7.7	7.5
5	pH_GEN (pH units)	7.9	7.7	7.3	7.7			7.9		7.8	7.8	8.1	7.8	7.5	7.5	7.5	7.5	7.6	7.5
6	Temp (deg C)	29.6	31.3	31.0	29.6			32.5		30.7	28.8	27.0	30.1	30.3	26.1	23.0	25.8	26.8	26.1
	CHEMICAL																		
1	Alk-Phen (mgCaCO3/L)							0.0		0.0	0.0	0.0		0.0	0.0	3.1			
2	ALK-TOT (mgCaCO3/L)							92		99	76	115		51	98	89			
3	B (mg/L)	0.00	0.00	0.00	0.00			0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
4	Ca (mg/L)	24	25	30	30			27		25	36	30	20	19	33	23	30	34	27
5	Cl (mg/L)	17.5	18.3	18.2	18.3			18.1		20.7	17.7	17.6	16.0	20.8	17.0	17.0	23.8	15.1	16.5
6	CO3 (mg/L)	0.1	0.1	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0
7	F (mg/L)	0.48	0.55	0.07	0.47			0.05		0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.61	0.40	0.02
8	Fe (mg/L)	0.0	0.1	0.1	0.1			0.1		0.2	0.1	0.0	1.3	0.1	0.4	0.3	0.1	0.0	0.1
9	HCO3 (mg/L)	102	113	124	136			108		120	93	141	130	61	119	101	141	134	112
10	K (mg/L)	1.7	1.7	2.1	3.6			2.8		2.8	3.8	2.6	2.6	1.1	3.3	2.2	2.1	1.6	2.3
11	Mg (mg/L)	6.8	8.7	7.3	9.7			9.6		12.6	8.8	11.7	7.4	3.5	13.6	12.6	10.0	7.8	6.2
12	Na (mg/L)	13.4	12.6	12.6	11.8			11.7		14.2	12.0	14.1	11.0	11.1	18.7	9.6	17.2	10.1	11.0
13	NO2+NO3 (mg N/L)	0.15	0.43	0.44	0.63			0.85		0.53	0.76	0.41	0.78	1.04	0.91	0.93	0.41	0.23	0.74
14	NO2-N (mgN/L)	0.00	0.00	0.00	0.00			0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.15	0.43	0.44	0.63			0.85		0.53	0.76	0.35	0.78	1.04	0.91	0.92	0.41	0.23	0.74
16	o-PO4-P (mg P/L)							0.017		0.043									0.000
17	P-Tot (mgP/L)	0.008	0.001	0.001	0.001			0.025		0.010	0.001	0.010	0.001	0.001	0.001	0.007	0.001	0.001	0.003
18	SiO2 (mg/L)	8.6	11.7	15.6	32.4			9.0		8.4	9.5	12.7	11.5	9.2	6.0	6.7	11.5	9.2	15.9
19	SO4 (mg/L)	5.2	4.5	5.1	2.2			10.8		14.9	48.3	3.9	4.0	18.3	6.4	12.6	5.1	6.0	4.2
	BIOLOGICAL/BACTERIOLOGICAL																		
	TRACE & TOXIC																		
	CHEMICAL INDICES																		
1	HAR_Ca (mgCaCO3/L)	59	64	76	75			67		61	90	75	50	49	83	57	76	84	69
2	HAR_Total (mgCaCO3/L)	87	100	106	105			107		114	127	123	81	63	140	110	118	116	94
3	Na% (%)	25	21	20	18			19		21	17	20	23	28	22	13	23	16	20
4	RSC (-)	0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.6	0.5	0.5	0.5			0.5		0.6	0.5	0.6	0.5	0.6	0.7	0.4	0.7	0.4	0.5
	PESTICIDES																		

Water Quality Seasonal Average for the period: 2001-2016

Station Name : PURUSHOTTAMPUR (ER000U5) | **Division : E.E., Bhubaneswar**

Local River : Rushikulya | **River Water** | **Sub-Division : Behrampur**

S.No	Parameters	Winter																	
		Nov - Feb																	
		2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2002	2003	2004	2005	2006	2007
	PHYSICAL																		
1	Q (cumec)																		
2	EC_FLD (µmho/cm)	345			271		330	385	300	220	260	225	384	330	324	287			
3	EC_GEN (µmho/cm)	345			255		330	385	300	220	260	225	389	330	327	290			
4	pH_FLD (pH units)	7.9			7.9		7.8	7.8	7.9	7.9	8.0	7.7	7.9	8.0	7.9	7.6			
5	pH_GEN (pH units)	8.0			8.0		7.8	7.8	7.9	7.9	8.0	7.7	8.0	8.0	8.0	7.7			
6	Temp (deg C)	29.0			21.0		20.5	24.8	22.5	24.6	21.2	22.8	27.0	29.8	29.7	30.0			
	CHEMICAL																		
1	Alk-Phen (mgCaCO3/L)				0.0		0.0	0.0	0.0			0.0	23.0						
2	ALK-TOT (mgCaCO3/L)				83		93	121	92			125	113						
3	B (mg/L)	0.00			0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00			
4	Ca (mg/L)	34			24		26	36	32	30	20	35	20	31	36	29			
5	Cl (mg/L)	26.3			19.0		33.1	32.1	14.1	18.9	18.2	17.9	16.0	25.5	21.4	19.1			
6	CO3 (mg/L)	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	27.7	0.0	0.0	0.0			
7	F (mg/L)	0.50			0.28		0.11	0.05	0.05	0.05	0.05	0.05	0.05	0.55	0.53	0.00			
8	Fe (mg/L)	0.1			0.1		0.1	0.1	0.0	1.1	0.0	0.3	0.5	0.1	0.1	0.0			
9	HCO3 (mg/L)	159			102		113	147	113	138	96	153	82	146	146	129			
10	K (mg/L)	2.8			3.4		2.2	3.2	3.0	2.7	1.4	3.2	1.3	3.0	1.7	2.2			
11	Mg (mg/L)	11.7			9.1		11.7	12.2	17.5	7.3	6.3	8.8	12.1	9.7	8.4	9.6			
12	Na (mg/L)	16.5			12.8		22.6	21.2	18.3	20.2	10.2	18.0	3.0	19.2	16.9	13.6			
13	NO2+NO3 (mg N/L)	0.54			0.89		0.74	0.81	0.41	0.71	0.53	0.95	1.04	0.46	0.42	0.56			
14	NO2-N (mgN/L)	0.00			0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
15	NO3-N (mgN/L)	0.54			0.89		0.74	0.81	0.34	0.71	0.53	0.95	1.04	0.46	0.42	0.56			
16	o-PO4-P (mg P/L)				0.000		0.050												
17	P-Tot (mgP/L)	0.001			0.001		0.010	0.001	0.010	0.001	0.001	0.001	0.010	0.001	0.004	0.001			
18	SiO2 (mg/L)	33.4			9.7		9.8	8.8	11.5	11.5	10.8	6.0	5.5	15.3	12.6	15.9			
19	SO4 (mg/L)	2.4			10.5		16.5	18.3	2.5	2.3	16.3	8.3	2.7	5.4	7.4	4.0			
	BIOLOGICAL/BACTERIOLOGICAL																		
	TRACE & TOXIC																		
	CHEMICAL INDICES																		
1	HAR_Ca (mgCaCO3/L)	84			60		64	90	80	75	51	87	50	78	91	73			
2	HAR_Total (mgCaCO3/L)	123			98		113	141	153	106	77	124	101	118	126	112			
3	Na% (%)	21			21		30	24	20	29	22	24	6	26	22	21			
4	RSC (-)	0.0			0.0		0.0	0.0	0.0	0.2	0.1	0.1	0.5	0.0	0.0	0.0			
5	SAR (-)	0.6			0.6		0.9	0.8	0.6	0.9	0.5	0.7	0.1	0.8	0.7	0.6			
	PESTICIDES																		

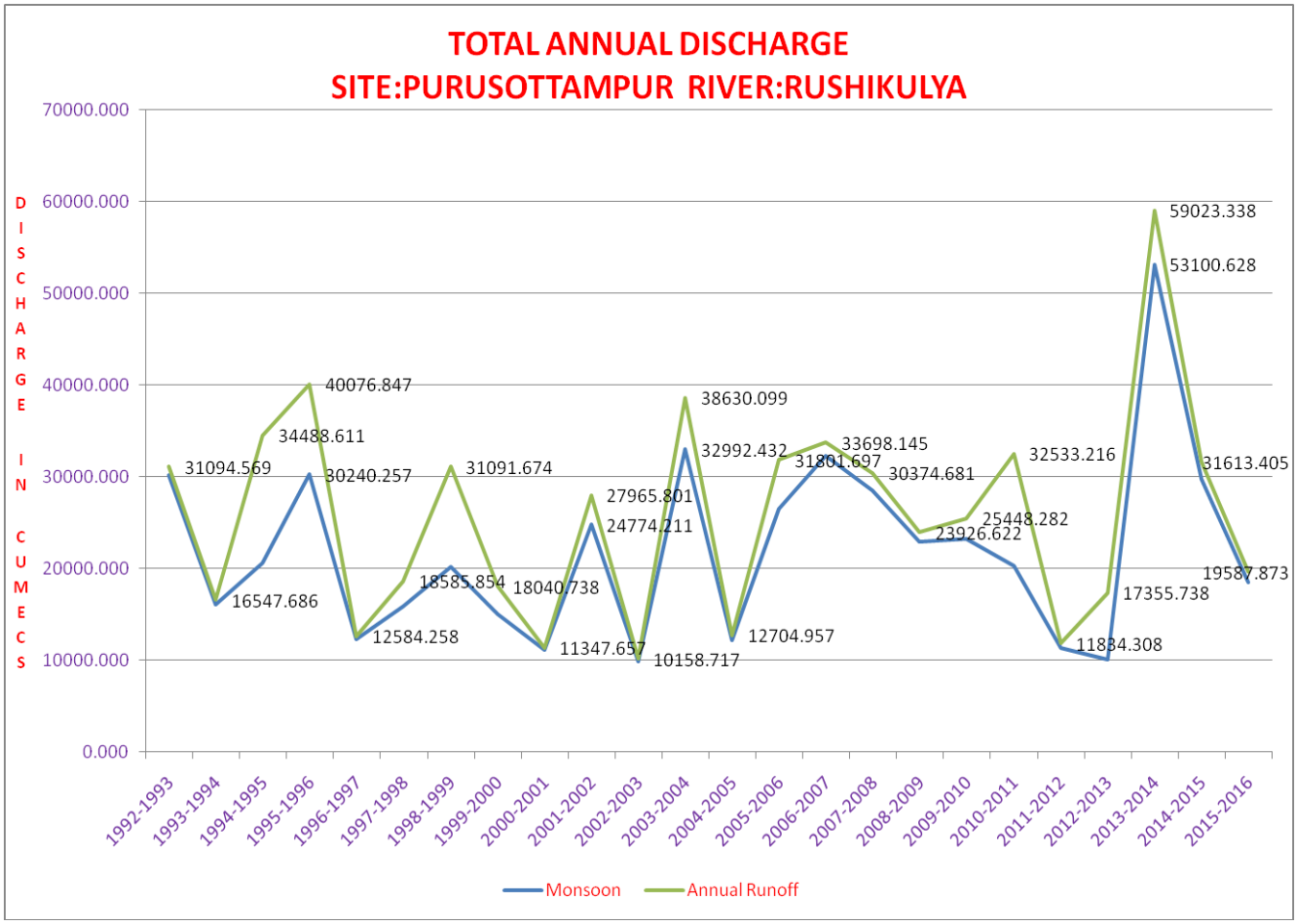
Water Quality Seasonal Average for the period: 2001-2016

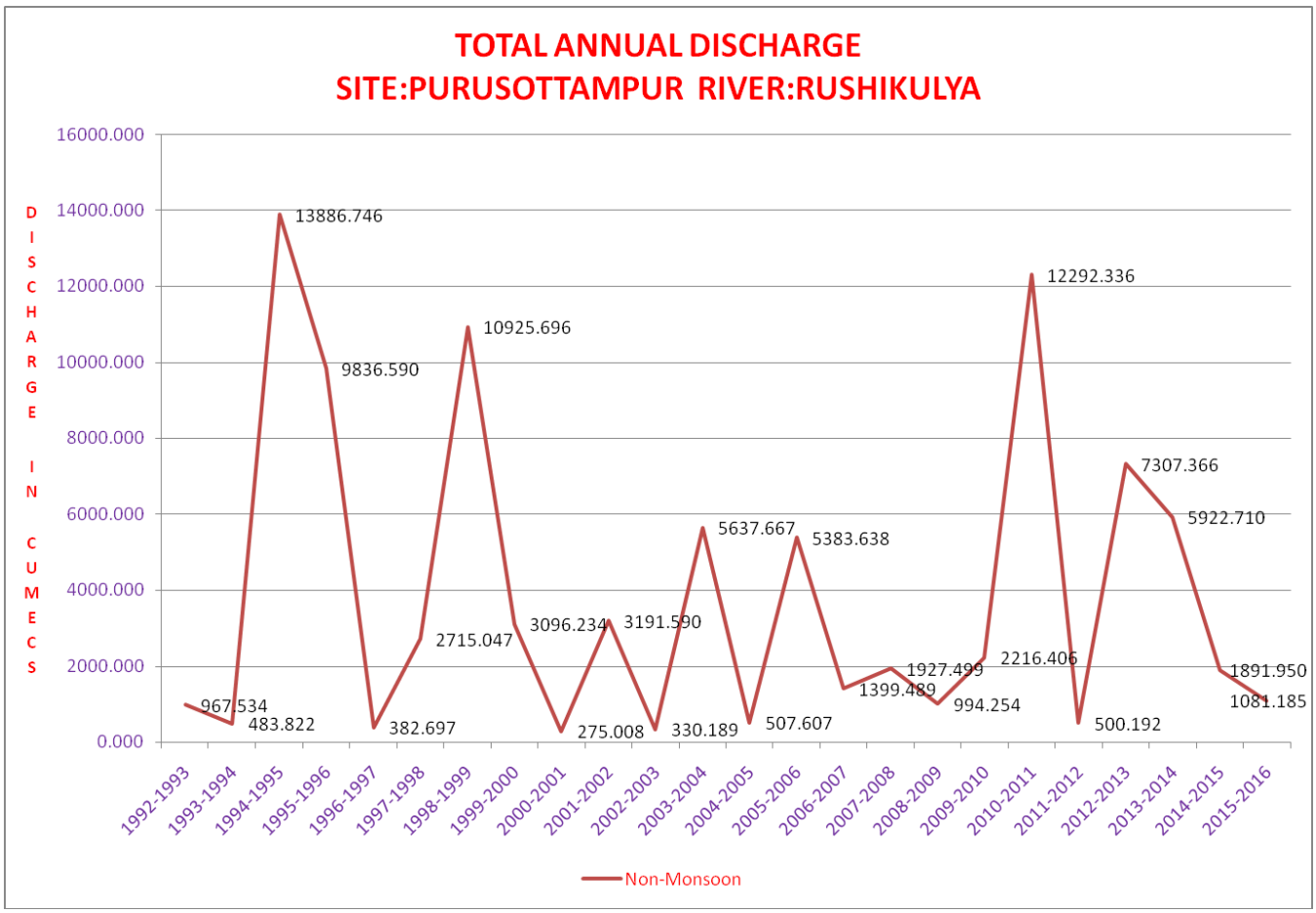
Station Name : PURUSHOTTAMPUR (ER000U5) | **Division : E.E., Bhubaneswar**

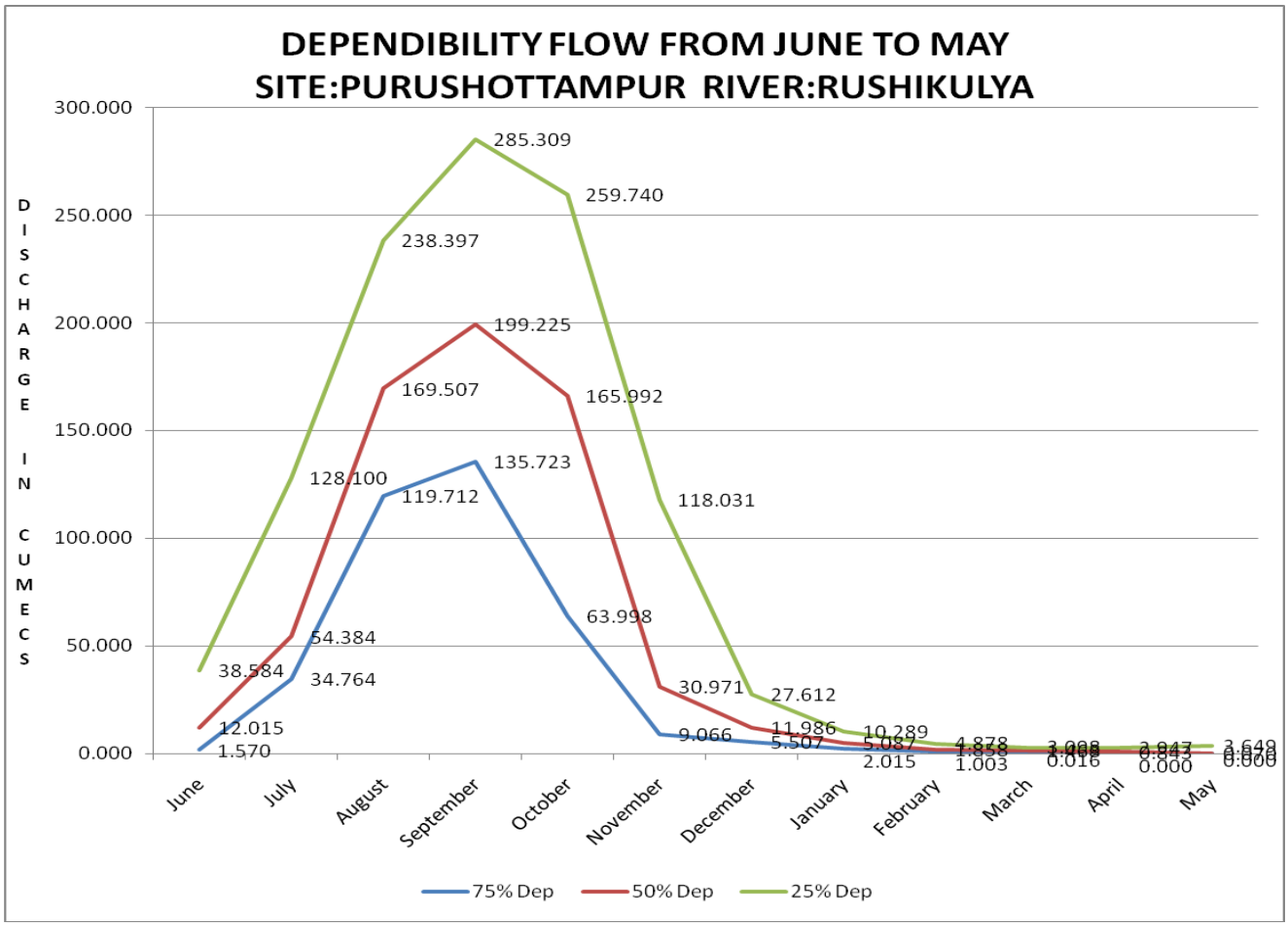
Local River : Rushikulya | **River Water** | **Sub-Division : Behrampur**

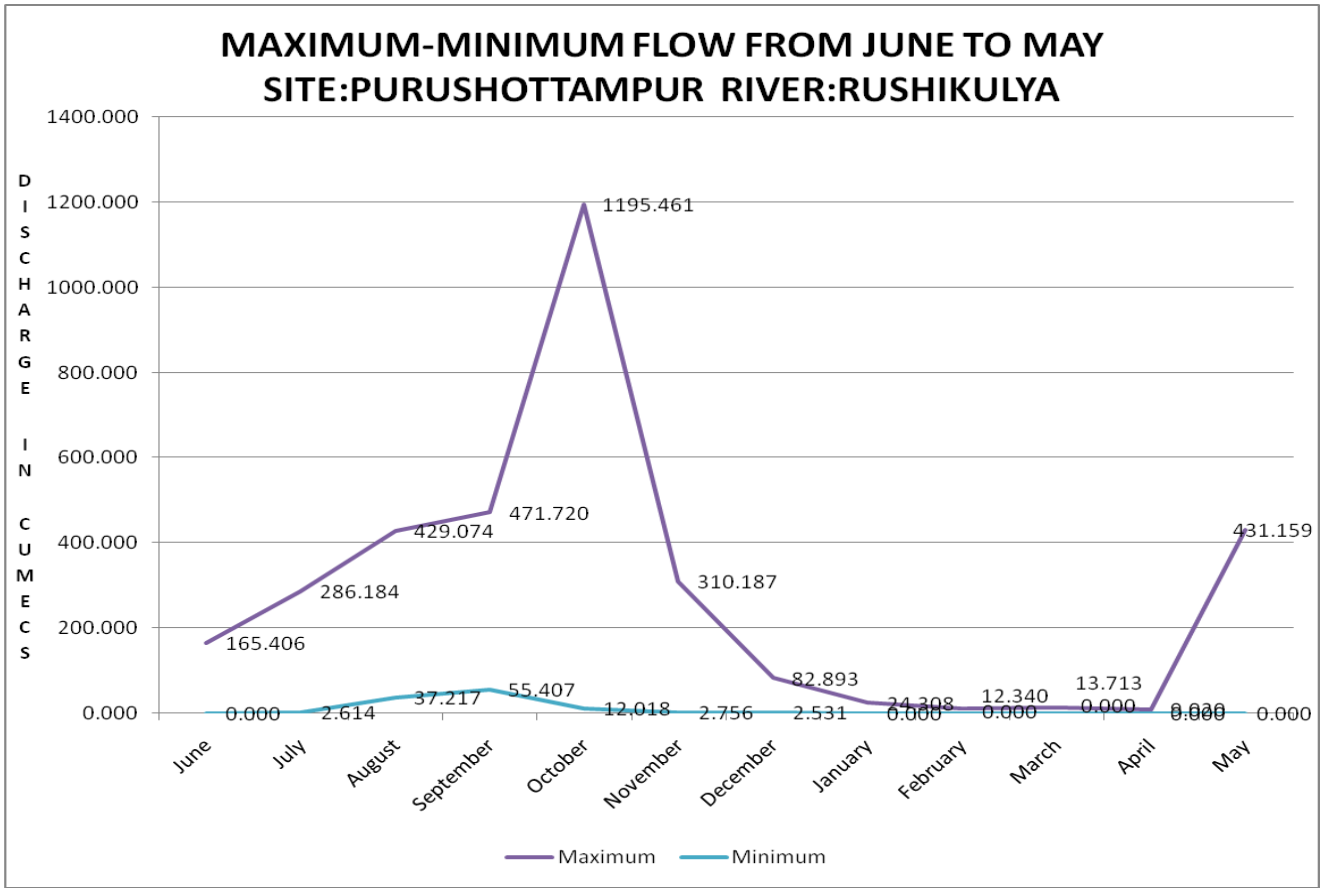
S.No	Parameters	Summer								
		Mar - May								
		2008	2009	2010	2011	2012	2013	2014	2015	2016
	PHYSICAL									
1	Q (cumec)									
2	EC_FLD (µmho/cm)	300		280	420	290	210	340	380	580
3	EC_GEN (µmho/cm)	300		280	420	290	210	340	380	588
4	pH_FLD (pH units)	8.2		7.9	8.1	7.6	7.7	8.0	7.3	7.9
5	pH_GEN (pH units)	8.3		7.9	8.1	7.6	7.7	8.0	7.3	8.0
6	Temp (deg C)	29.0		32.0	28.0			26.3	29.5	21.0
	CHEMICAL									
1	Alk-Phen (mgCaCO3/L)	0.0		0.0	0.0	0.0	0.0		0.0	46.0
2	ALK-TOT (mgCaCO3/L)	115		76	123	125	120		126	157
3	B (mg/L)	0.07		0.00	0.00	0.01	0.00	0.00	0.00	0.01
4	Ca (mg/L)	26		19	32	27	27	24	38	29
5	Cl (mg/L)	16.9		29.7	34.0	32.1	18.2	25.6	31.1	18.9
6	CO3 (mg/L)	0.0		0.0	0.0	0.0	0.0	0.0	0.0	55.4
7	F (mg/L)	0.05		0.00	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)			0.0	0.1	0.0	1.1	0.0	0.4	0.5
9	HCO3 (mg/L)	140		93	151	152	147	113	153	79
10	K (mg/L)	2.1		4.7	3.4		2.6	2.1	2.1	3.5
11	Mg (mg/L)	12.4		9.7	16.5	3.9	7.8	6.2	3.9	13.6
12	Na (mg/L)	13.1		21.9	21.3		10.2	12.8	19.1	53.0
13	NO2+NO3 (mg N/L)	0.43		0.99	0.60	0.36	0.71	1.18	0.78	1.16
14	NO2-N (mgN/L)	0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.43		0.99	0.60	0.29	0.71	1.18	0.78	1.16
16	o-PO4-P (mg P/L)	0.021		0.020						
17	P-Tot (mgP/L)	0.050		0.010	0.001	0.010	0.001	0.001	0.001	0.010
18	SiO2 (mg/L)	9.9		8.3	9.5	8.0	12.0	11.6	6.0	5.0
19	SO4 (mg/L)	10.2		11.4	29.5	3.7	4.5	22.8	9.4	3.2
	BIOLOGICAL/BACTERIOLOGICAL									
	TRACE & TOXIC									
	CHEMICAL INDICES									
1	HAR_Ca (mgCaCO3/L)	66		48	80	68	68	61	95	72
2	HAR_Total (mgCaCO3/L)	117		89	149	84	101	86	111	129
3	Na% (%)	19		34	23		18	24	27	47
4	RSC (-)	0.0		0.0	0.0	0.8	0.4	0.1	0.3	0.6
5	SAR (-)	0.5		1.0	0.8		0.4	0.6	0.8	2.0
	PESTICIDES									

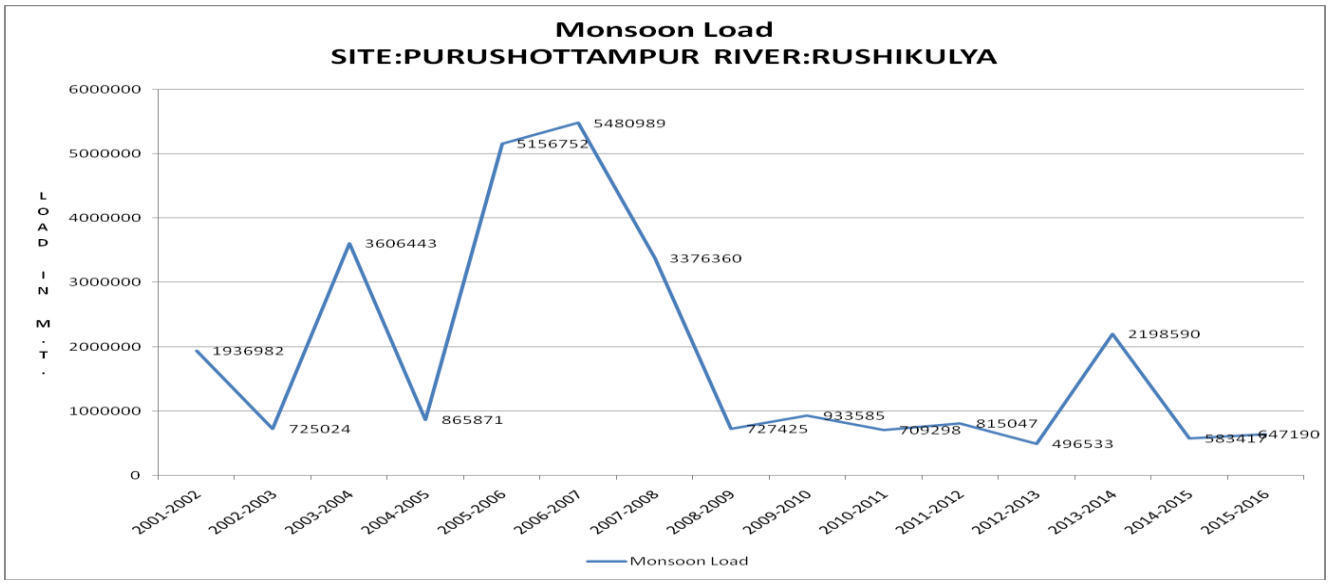
TREND ANALYSIS

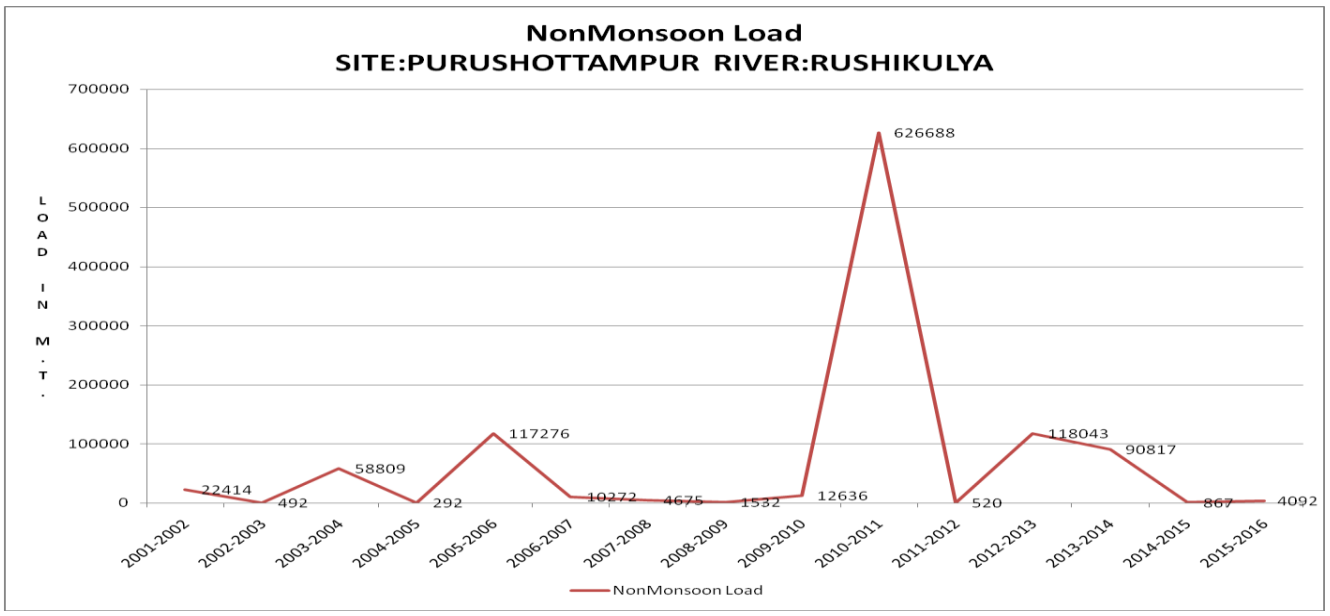

TOTAL ANNUAL DISCHARGE
SITE:PURUSOTTAMPUR RIVER:RUSHIKULYA
DISCHARGE IN CUMECS
70000.000
60000.000
50000.000
40000.000
30000.000
20000.000
10000.000
0.000
31094.569
16547.686
34488.611
40076.847
30240.257
12584.258
31091.674
18585.854
18040.738
11347.657
27965.801
24774.211
38630.099
32992.432
10158.717
12704.957
33698.145
31801.697
30374.681
23926.622
25448.282
32533.216
11834.308
17355.738
59023.338
53100.628
31613.405
19587.873
1992-1993
1993-1994
1994-1995
1995-1996
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Monsoon
Annual Runoff

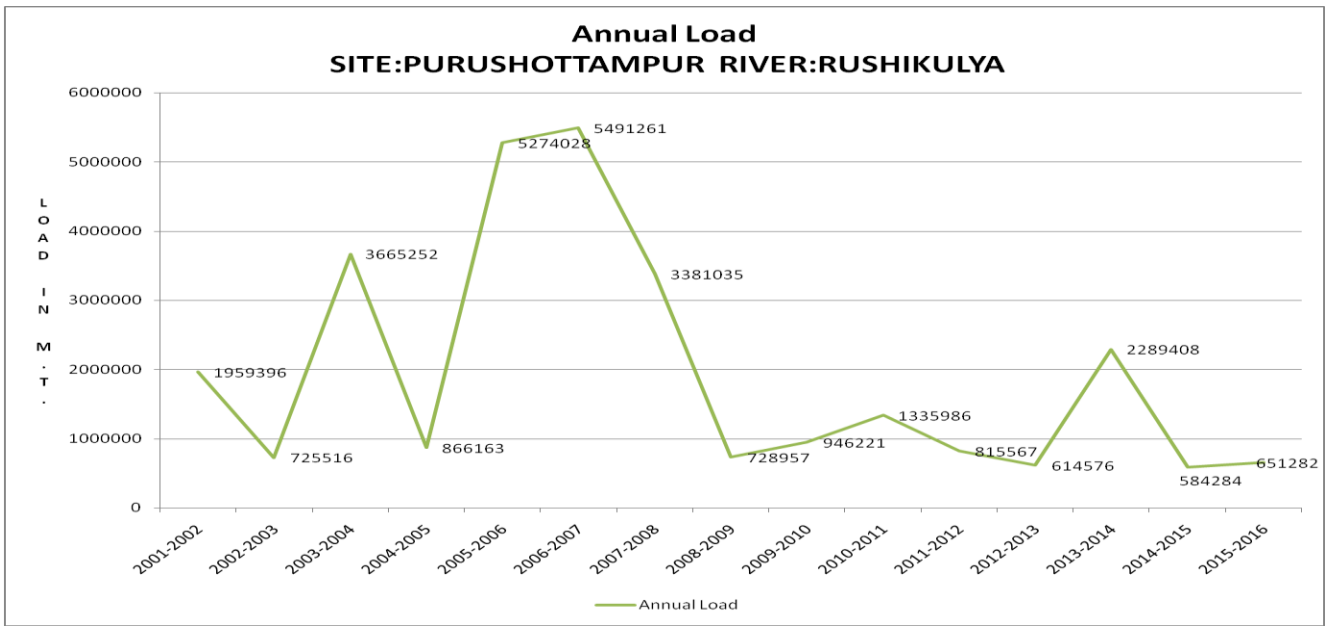

TOTAL ANNUAL DISCHARGE
SITE:PURUSOTTAMPUR RIVER:RUSHIKULYA
DISCHARGE IN CUMECS
16000.000
14000.000
12000.000
10000.000
8000.000
6000.000
4000.000
2000.000
0.000
967.534
483.822
13886.746
9836.590
382.697
2715.047
10925.696
3096.234
275.008
3191.590
330.189
5637.667
507.607
5383.638
1399.489
1927.499
994.254
2216.406
12292.336
500.192
7307.366
5922.710
1891.950
1081.185
1992-1993
1993-1994
1994-1995
1995-1996
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Non-Monsoon

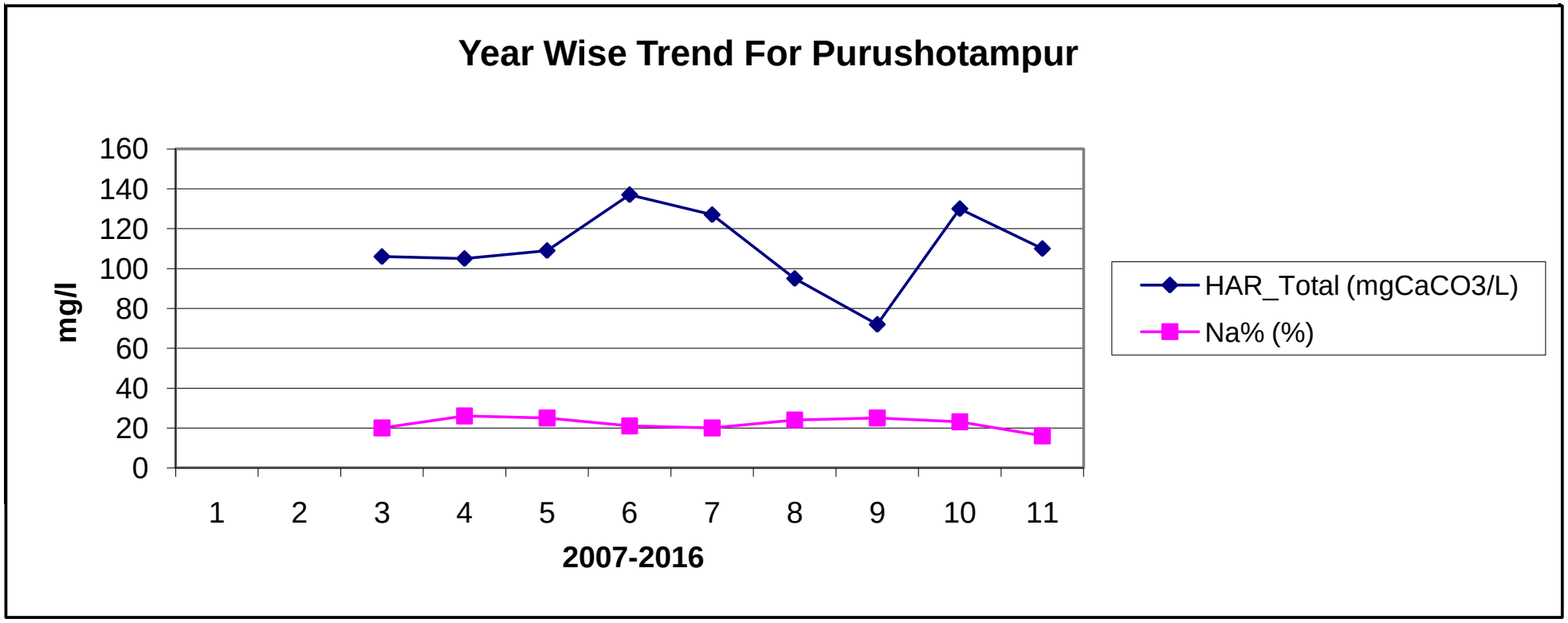

DEPENDIBILITY FLOW FROM JUNE TO MAY
SITE:PURUSHOTTAMPUR RIVER:RUSHIKULYA
DISCHARGE IN CUMECS
300.000
250.000
200.000
150.000
100.000
50.000
0.000
285.309
259.740
238.397
199.225
169.507
165.992
135.723
128.100
119.712
118.031
63.998
54.384
38.584
34.764
30.971
27.612
12.015
1.570
9.066
5.507
2.015
1.003
0.016
0.000
June
July
August
September
October
November
December
January
February
March
April
May
75% Dep
50% Dep
25% Dep

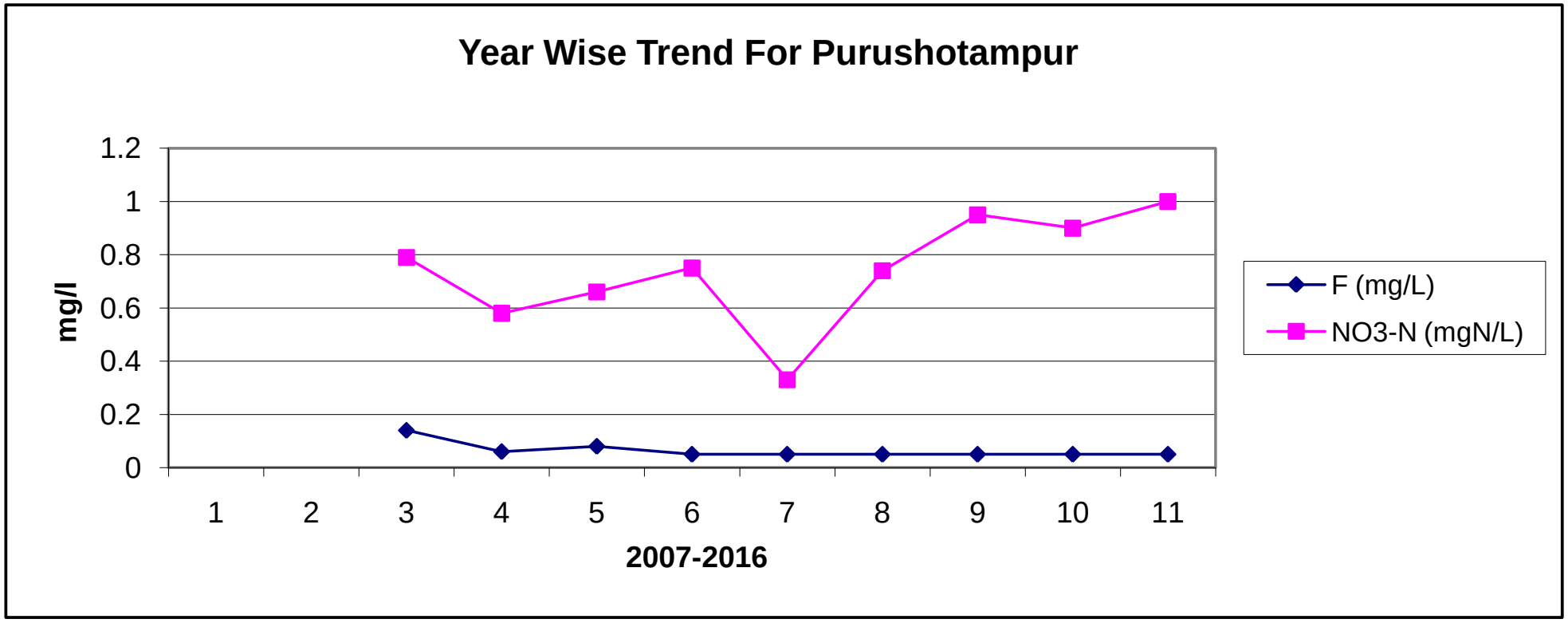

MAXIMUM-MINIMUM FLOW FROM JUNE TO MAY
SITE:PURUSHOTTAMPUR RIVER:RUSHIKULYA
DISCHARGE IN CUMECS
1400.000
1200.000
1000.000
800.000
600.000
400.000
200.000
0.000
1195.461
471.720
429.074
431.159
310.187
286.184
165.406
82.893
55.407
37.217
13.713
12.340
12.018
2.756
2.614
2.531
0.000
0.000
0.000
0.000
0.000
0.000
June
July
August
September
October
November
December
January
February
March
April
May
Maximum
Minimum

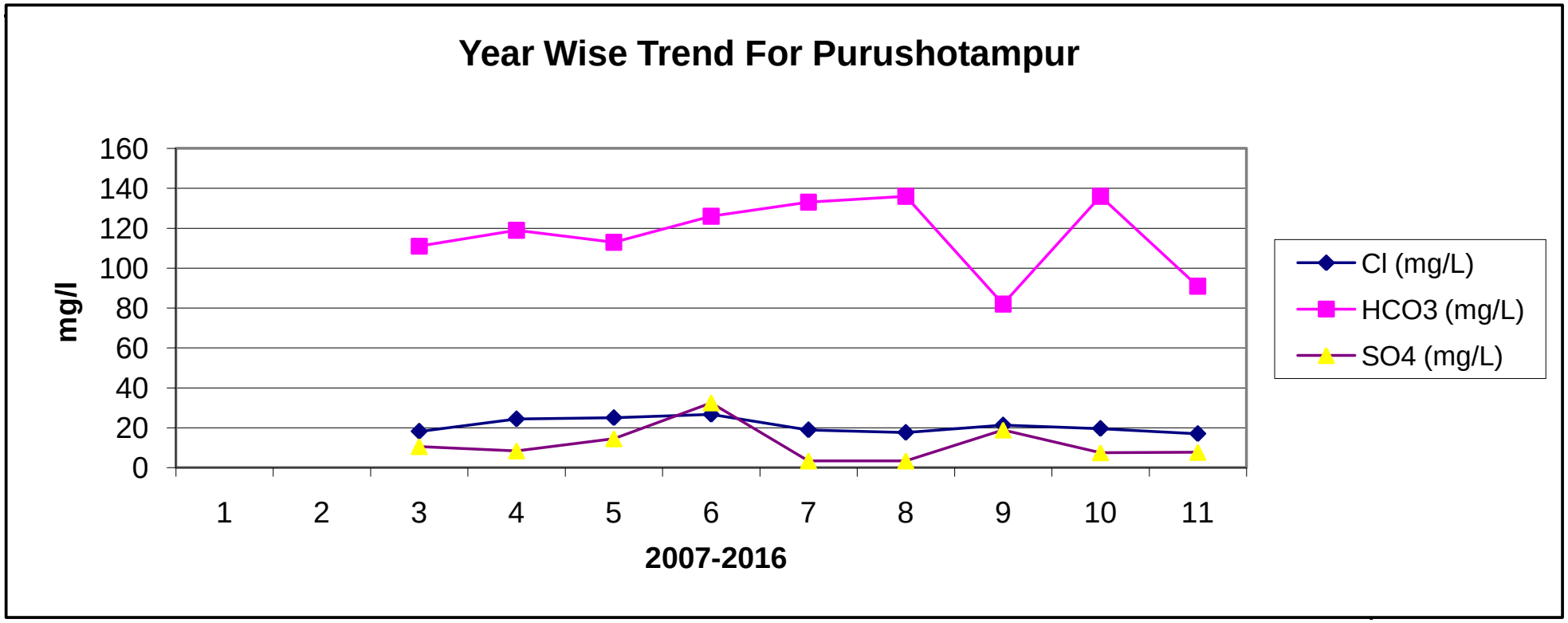

Monsoon Load
SITE:PURUSHOTTAMPUR RIVER:RUSHIKULYA
LOAD IN M.T.
6000000
5000000
4000000
3000000
2000000
1000000
0
1936982
725024
3606443
865871
5156752
5480989
3376360
727425
933585
709298
815047
496533
2198590
583417
647190
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Monsoon Load

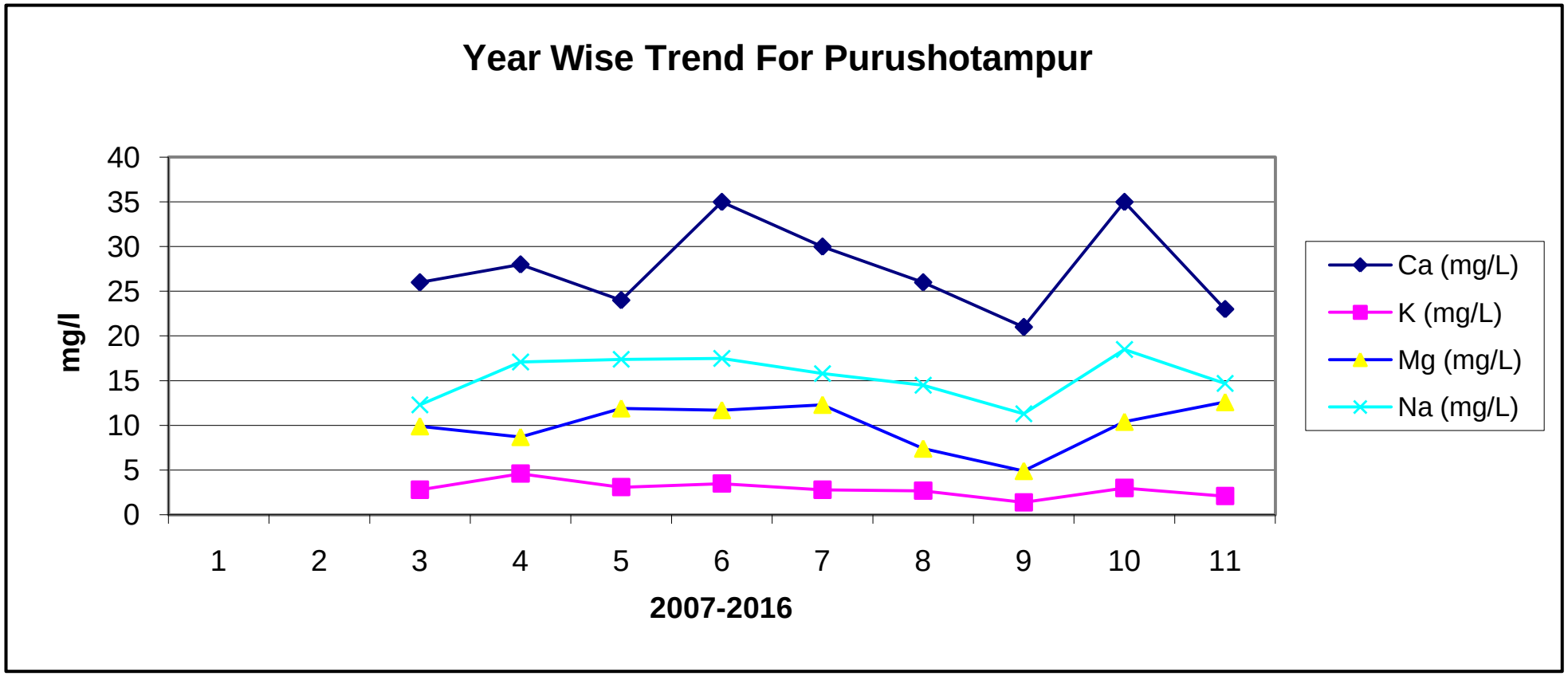

NonMonsoon Load
SITE:PURUSHOTTAMPUR RIVER:RUSHIKULYA
LOAD IN M.T.
700000
600000
500000
400000
300000
200000
100000
0
22414
492
58809
292
117276
10272
4675
1532
12636
626688
520
118043
90817
867
4092
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
NonMonsoon Load


Annual Load
SITE:PURUSHOTTAMPUR RIVER:RUSHIKULYA
LOAD IN M.T.
6000000
5000000
4000000
3000000
2000000
1000000
0
1959396
725516
3665252
866163
5274028
5491261
3381035
728957
946221
1335986
815567
614576
2289408
584284
651282
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Annual Load


Year Wise Trend For Purushotampur
mg/l
160
140
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
HAR_Total (mgCaCO3/L)
Na% (%)


Year Wise Trend For Purushotampur
1.2
1
0.8
0.6
0.4
0.2
0
mg/l
1
2
3
4
5
6
7
8
9
10
11
2007-2016
F (mg/L)
NO3-N (mgN/L)


Year Wise Trend For Purushotampur
160
140
120
100
80
60
40
20
0
mg/l
1
2
3
4
5
6
7
8
9
10
11
2007-2016
Cl (mg/L)
HCO3 (mg/L)
SO4 (mg/L)


Year Wise Trend For Purushotampur
mg/l
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
Ca (mg/L)
K (mg/L)
Mg (mg/L)
Na (mg/L)

NAGAVALI BASIN

NAGAVALI BASIN

1 GENERAL

1.1 Introduction

River Nagavali is a medium sized east flowing river in peninsular India and lies within the geographical co-ordinates of North latitude 18°10 ′to 19°44′ and East longitudes of 82 °53′ and 84 °05′. It originates near the Lakhbahal village in Kalahandi district (Odisha) at an elevation of about 1300 m. The total length of the river run is 256 km. It is surrounded by Vamsadhara in the North, Champavathi and Peddagedda in the South, Godavari in the West and the Bay of Bengal in the East. It drains parts of the districts of Kalahandi, Rayagada, Koraput of Odisha State and Srikakulam, Vijayanagaram and Visakhapatanam of Andhra Pradesh State. The total basin area is 9510 sq. km and the state wise break-up is tabulated below.

State-wise Catchment area distribution

Sl. No.	**Name of State**	**Catchment Area (sq. km)**	**Percentage of total catchment area**
1.	Odisha	4462	46.9
2.	Andhra Pradesh	5048	53.1
	Total	**9510**	**100.0**

Basin Map of Nagavali river system showing the various hydrological and hydro-meteorological observation stations maintained by CWC, State Government and India Meteorological Department is enclosed herewith.

1.2 River System.

The important tributaries are Janjhavati, Vottigedda, Suvarnamukhi, and Vegavathi. Details of the tributaries which join Nagavali River on both sides are tabulated below:

Name of River	River/Tributary	Length (km)	Catchment area (sq.km)	Percentage of total catchment area
Nagavali	Main Stream	256	5704	59.9
Janjhavati	Right Tributary	70	931	9.8
Vottigedda	Left Tributary	50	606	6.4
Suvarnamukhi	Right Tributary	95	1275	13.4
Vegavathi	Right Tributary	90	994	10.5
		Total	9510	100.0

1.3 Climatic Characteristics

The Basin is mostly influenced by South West monsoon, in addition to cyclonic rainfall due to the formation of depressions in the Bay of Bengal. The average annual rainfall in the basin is around 1000mm. The maximum temperature in the plains of the basin rises upto 40°C during May and goes down to 16ºC in December-January. The average relative humidity during monsoon varies between 80% to 84%.

1.4 Geology

The geological structure of the basin is formed with Pleistocene deposits along the coastal belt and along the course of the river and its major tributaries. Khondalites, unclassified Crystalline and Granites are found in limited areas. Manganese, Quartz, Mica, Graphite, Limestone, Bauxite and construction materials are found in abundance in the Basin.

1.5 Site Details

Details of water storage/ diversion structures in the Nagavali Basin are as below:

Sl. No.	Name of Project	River	Status
1.	Thotapally regulator	Nagavali	Existing
2.	Narayan Puram Anicut	Nagavali	Existing
3.	Vegavathi Anicut	Peddagedda	Existing
4.	Vottigedda Reservoir	Vottigedda	Existing
5.	Peddankumal Anicut	Suvarnamukhi	Existing
6.	Janjavathi Reservoir	Janjavathi	Existing
7.	Madhuvalsa Project	Suvarnamukhi	Existing
8.	Suvarnamukhi-Gomukhi Reservoir	Suvarnamukhi	Existing

2. STREAM FLOW DATA

2.1 Methodology

Area-velocity method is generally adopted for measuring discharge at sites. Cup type current meter is used to measure the velocity of the flow and the depth is measured by using sounding rod for depths upto 3 m and by log line beyond 3 m. Discharge by area velocity method is being observed once in a day starting at 0800 Hrs. at all the sites except on Sundays and holidays. Besides, silt and water quality observation are also being carried out at CWC sites as list above.
The observed stage and discharge figures for each season (monsoon and non-monsoon) are plotted and a mean Stage V/s. Discharge curve is drawn, giving due attention to the scattered points with reference to area, velocity etc.

The factors responsible for the shifting of the curves are also taken care of by studying the river cross section at regular intervals and with super imposition of previous years' Stage V/s. Discharge curves. Accordingly, the trend of the current curve is finalised. Finally, the discharges of the non observed days are computed from these Stage V/s. Discharge Curves.

2.2 Data Availability

Details of data availability for Nagavali Basin is tabulated below:

Code No.	Station Name	Type	Data available	
			From	To
AN000Y2	Srikakulam	GDSQ	G -16.02.88	Continuing
			D -25.08.90	-do-
			S -27.06.01	-do-
			Q -27.06.01	-do-

2.3 Explanatory Notes on Water Year Book

SWDES (Surface Water Data Entry Software), a custom made software for processing hydrological data has been used for preparation of this volume. The explanatory notes described below can be used for interpretation of data presented in this volume.

i) Water Year ranges from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.

ii) Discharge is given in cubic meters per second.

iii) Discharges are expressed as 0.000 when river bed is dry and 0.000 N.F. when velocity is observed as 'NIL'.

iv) The zero R.L. of gauge is a datum level fixed for given site, which is kept 1 or 2 m lower than the lowest water level recorded in a perennial stream. In a non-perennial stream, it is kept 1 or 2 m lower than the lowest bed level of the stream.

v) Discharges are rounded off as per standard practice.

vi) Runoff in mm is the notional depth of water in millimeters over the catchment, equivalent to annual runoff volume calculated at the discharge measurement station. It is computed using the relation:

$$\text{Runoff (mm)} = \frac{\text{Annual runoff (Mm3) x 1000}}{\text{Catchment area (km2)}}$$

vii) Peak and lowest flow correspond to the highest and lowest water levels recorded from 'SWDES' entered data.

viii) Measuring Authority refers to the field division of Central Water Commission (Eastern Rivers Division) responsible for the operation of the gauging station.

ix) The gauging station code number is a unique seven column alphanumeric reference number which facilitates storage and retrieval of flow data in data base. The first column is identifier of either an integral river basin or, for the sake of convenience, a region having several contiguous river catchments. This is followed by a column which identifies an independent river system which either has one or more outlets to the sea or crosses international border to enter another country. The third, fourth and fifth column spaces denote first, second and third order tributaries, respectively, from the mouth upstream. The sixth and seventh column spaces indicate the location of the gauging station in one of the 225 slots earmarked on the river. The blank column spaces are filled by zero.

3. HYDROLOGICAL DATA

This volume contains the following information for each site stated above:

i. History Sheet: Site Name, State, District, River Basin, Tributary, Sub-Tributary, Catchment Area, Latitude / Longitude, Opening / Closing date for various types of data.

ii. Annual maximum/minimum discharge since period of observation.

iii. Daily Water level and observed/ computed discharge data including 10-daily, monthly and annual totals etc.

iv. Histogram and Hydrograph showing current year monthly mean discharges, Historical monthly mean discharges, historical monthly minimum and monthly maximum discharges.

v. Histogram showing Annual Run off volume since beginning of observation.

vi. Pie-Chart showing monthly mean run off (as percentage of Annual Run off) historical for the current year.

vii. Plot of Pre and Post Monsoon Cross-section of the rivers for current year.

viii. Water Level hydrograph for 3(three) major flood events of current year.

4. SEDIMENT DATA (In case of Sediment Observation sites)

The frequency of sediment observation is carried out daily during monsoon season and once in a week (on Monday) during the non-monsoon period. Data for non-observed days is estimated/ interpolated from the relationship of discharge v/s. sediment load, prepared on the basis of observed sediment concentration and weighted mean discharge of the same year.

Sediment samples are collected from 0.6 depth, using Punjab type bottle sampler, from all the verticals along the hydrological observation sections where velocity is observed for computation of discharge. The collected samples from all the segments are combined in 3 to 7 groups having compartments or groups of equal or nearly equal discharges for analysis. Quantum of suspended sediment load is estimated in three grades, viz. Coarse, Medium and Fine. Coarse and medium grades are separated by sieving process and the fine grade by filtration of left over samples after sieving through filter paper. Grade wise concentration is derived gravimetrically as per standard procedure. The following parameters are derived and recorded:

- Daily Observed suspended sediment (g/l).
- Corresponding discharge.
- Average sediment load in tonnes/day (10 daily & monthly basis).
- Annual sediment load for the current year.
- Annual & Seasonal sediment load and the corresponding volume of inflow for all the years since inception.
- Grain size distribution of bed load.

5. WATER QUALITY DATA (In case of Water Quality Observation sites)

The water samples are collected at a regular interval of once in a month for trend stations and once in two month for base stations (on 1st working day), from the main flowing segment of the stream just below the water surface (20 to 30 cm) on the Station Gauge line where depth of flow and velocity are maximum, preferably in the mid stream. The water samples are collected in the pre-rinsed and cleaned one-litre capacity polythene bottle having double stopper (inside and outside) facility. Sampling bottle is filled to its full capacity without entrapping air bubbles inside.

After sampling, the collected samples are sent to the Water Quality Laboratory (Level-II) based at Bhubaneswar (under the Eastern Rivers Division) and to Raipur laboratory (under Mahanadi Division, Burla), along with in-situ physical characteristics, for analysis. The samples received from the sites are preserved in a refrigerator in the water quality laboratories for analysis.

Analysis of parameters, namely pH, Electrical conductivity, Sodium, Potassium, Iron, Aluminum, Ammonia, Fluoride, Nitrate, Nitrite, Phosphate, Silicate, Boron, Sulphate, Calcium, Magnesium, Carbonate, Bi-carbonate, Chloride, Dissolved Oxygen, BOD and COD, are carried out at the Level II laboratory by using standard methodology. Micro biological parameters like total colliform and faecal colliform are also being analyzed. For analysis of trace and toxic elements, samples are sent to Level-II+ laboratory at Hyderabad once in a year, in the month of April.

The following parameters are analyzed and recorded:

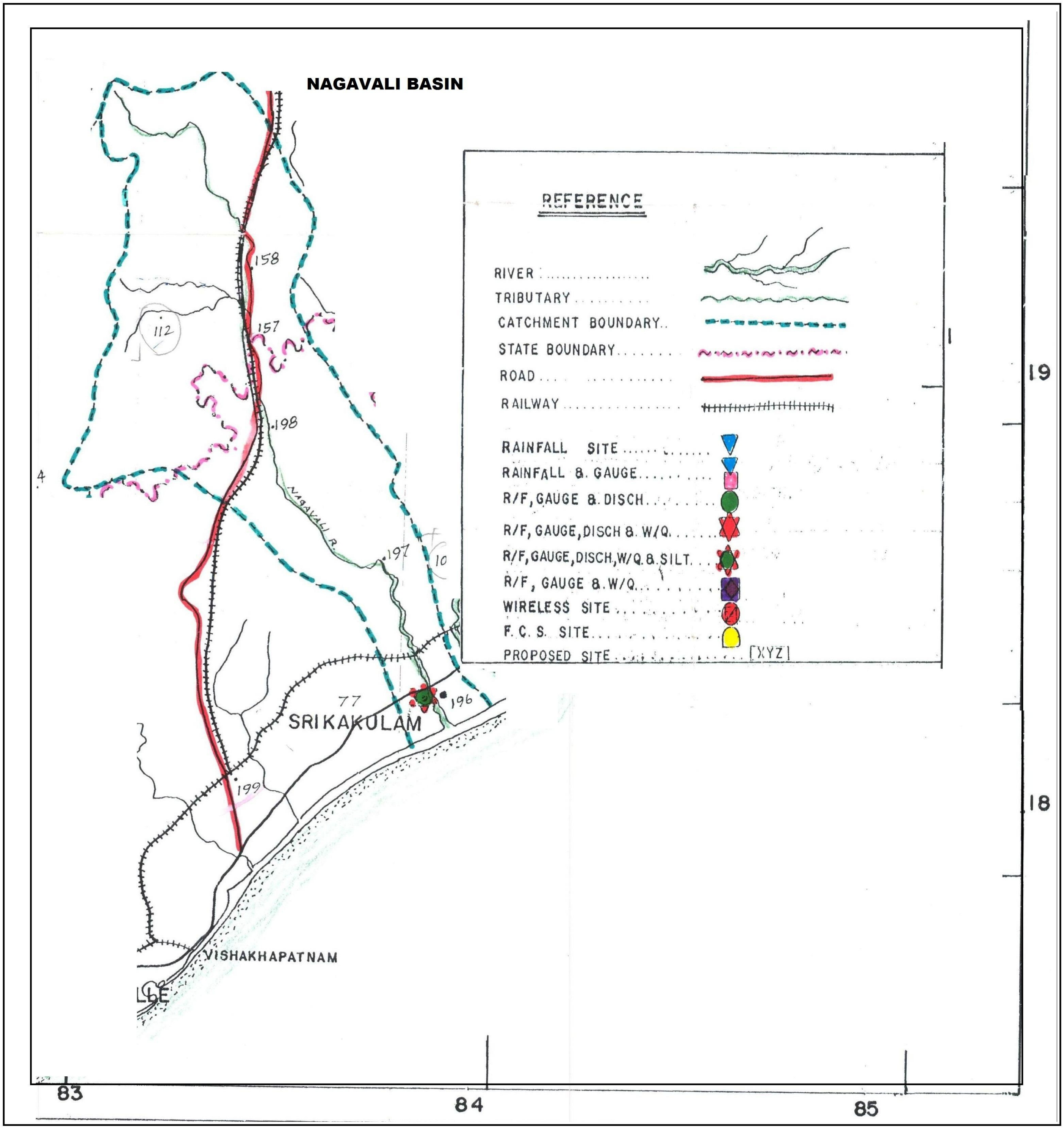
- Monthly Values: Physical; Chemical (mg/l); Biological (mg/l); Traces & Toxic (mg/l) and Chemical Indices.

- Average Values for the Year: 10 Years data to be given season wise averages:-

    - Average for Summer (March to June).
    - Average for Floods (July to October).
    - Average for Winter (November to February)

NAME OF THE SITES IN OPERATION UNDER NAGAVALI BASIN

Sl. No.	Station Name	River/ Tributary	Code No.	Type	Latitude	Longitude
1.	Srikakulam	Nagavali	AN000Y2	GDSQ	18° 18' 48"	83° 53' 18


NAGAVALI BASIN
REFERENCE
RIVER
TRIBUTARY
CATCHMENT BOUNDARY
STATE BOUNDARY
ROAD
RAILWAY
RAINFALL SITE
RAINFALL & GAUGE
R/F, GAUGE & DISCH
R/F, GAUGE, DISCH & W/Q
R/F, GAUGE, DISCH, W/Q & SILT
R/F, GAUGE & W/Q
WIRELESS SITE
F.C.S. SITE
PROPOSED SITE
[XYZ]
158
157
112
198
NAGAVALI R.
197
77
196
SRIKAKULAM
199
VISHAKHAPATNAM
19
18
83
84
85

HYDROLOGICAL DATA

HISTORY SHEET

Water Year : 2015-2016

Site	**:**	**SRIKAKULAM**	**Code**	**:**	**AN000Y2**
State	:	Andhra Pradesh	District		Srikakulam
Basin	:	EFR B Mahanadi-Godavari	Independent River	:	Nagavali
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Nagavali
Division	:	E.E., Bhubaneswar	Sub-Division	:	Behrampur
Drainage Area	:	9500 Sq. Km.	Bank	:	Left
Latitude	:	18°18'48"	Longitude	:	83°53'18"
Zero of Gauge (m)	:	6.65 (m.s.l)	01.01.1988	-	12.01.2090
		Opening Date	Closing Date		
Gauge	:	16.02.1988			
Discharge	:	25.08.1990			
Sediment	:	27.06.2001			
Water Quality	:	27.06.2001			

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)

	Maximum			Minimum		
Year	**Q (cumecs)**	**WL (m)**	**Date**	**Q (cumecs)**	**WL (m)**	**Date**
1991-1992	1497	10.935	30.07.1991	0.870	8.050	22.05.1992
1992-1993	2013	11.530	28.07.1992	0.075	7.880	12.04.1993
1993-1994	337.5	9.790	14.07.1993	0.000	8.070	05.04.1994
1994-1995	1917	11.410	11.05.1995	0.000	8.040	06.05.1995
1995-1996	1128	10.760	01.09.1995	1.052	8.030	18.03.1996
1996-1997	1284	10.740	23.08.1996	0.080	7.945	25.03.1997
1997-1998	577.8	10.155	18.09.1997	0.240	7.865	23.04.1998
1998-1999	451.1	9.950	11.11.1998	0.000	7.775	28.04.1999
1999-2000	370.3	9.720	09.09.1999	0.000	7.790	05.04.2000
2000-2001	852.9	10.637	25.08.2000	0.000	7.735	12.03.2001
2001-2002	758.8	10.200	07.07.2001	0.355	7.875	20.03.2002
2002-2003	301.2	9.490	17.10.2002	0.000	7.630	29.04.2003
2003-2004	1087	10.785	08.10.2003	0.000	7.780	14.06.2003
2004-2005	658.6	10.350	05.08.2004	0.120	7.930	23.05.2005
2005-2006	796.3	10.470	21.09.2005	0.106	7.500	16.04.2006
2006-2007	5625	14.085	04.08.2006	3.579	7.660	09.03.2007
2007-2008	1014	11.000	07.08.2007	3.960	7.950	13.05.2008
2008-2009	1703	11.035	18.09.2008	0.055	7.320	30.04.2009
2009-2010	1375	10.740	14.07.2009	0.554	7.690	25.04.2010
2010-2011	1339	10.640	09.12.2010	4.942	7.990	22.03.2011
2011-2012	1443	10.820	02.09.2011	2.583	7.600	15.03.2012
2012-2013	1900	11.030	04.11.2012	0.061	7.450	19.04.2013
2013-2014	2142	11.375	28.10.2013	1.058	7.400	30.04.2014
2014-2015	4224	12.610	14.10.2014	3.029	7.390	03.03.2015
2015-2016	1200	10.670	17.09.2015	0.280	7.150	25.02.2016

Q : Observed / Computed Discharge WL : Corresponding Water Level(m.s.l)

Stage-Discharge Data for the period 2015 - 2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

Day	Jun		Jul		Aug		Sep		Oct		Nov	
	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q
1	7.470	3.872	7.990	65.69	7.390	4.536	8.660	203.3	7.890	68.03	7.680	27.50 *
2	7.470	3.556	8.040	72.06	7.490	6.500 *	8.750	228.4	7.830	57.00 *	7.820	49.84
3	7.470	3.468	7.995	59.76	7.450	6.336	8.810	251.5	7.830	56.47	7.710	35.36
4	7.510	6.496	8.085	91.43	7.510	8.144	8.565	205.6	7.780	45.00 *	7.670	26.73
5	7.560	9.774	8.180	96.00 *	7.455	5.853	8.230	108.1	8.220	107.5	7.630	24.02
6	7.580	12.33	8.115	69.84	7.420	4.909	8.140	92.00 *	8.200	98.19	7.610	20.51
7	7.610	17.00 *	7.885	48.06	7.370	3.812	8.255	111.4	8.145	94.44	7.600	19.59
8	7.830	44.51	7.780	33.20	7.390	4.523	8.450	170.4	8.170	95.35	7.590	18.37 *
9	7.780	38.55	7.595	16.15	7.470	5.000 *	8.270	111.3	8.050	70.47	7.570	16.42
10	7.700	25.35	7.520	11.75	7.420	5.326	8.370	137.2	8.080	80.74	7.580	17.35
11	7.670	22.94	7.480	8.233	7.380	4.345	8.420	150.4	8.120	88.00 *	7.580	17.20 *
12	7.690	22.64	7.460	6.690 *	7.520	13.09	8.490	168.9	8.050	70.71	7.570	16.65
13	7.680	21.17	7.460	8.181	7.990	61.83	8.630	235.0 *	7.870	59.83	7.630	24.09
14	7.670	20.00 *	7.430	5.017	8.150	91.94	8.790	249.6	7.800	47.25	7.630	24.09
15	7.660	19.36	7.430	5.746	8.690	250.0 *	8.950	300.4	7.770	44.35	7.620	23.00 *
16	7.640	18.17	7.460	7.090	8.290	110.0 *	9.130	364.1	7.750	41.31	7.670	25.49
17	7.770	35.55	7.535	12.93	8.190	98.74	10.670	1200 *	7.700	34.64	7.640	23.73
18	7.880	46.16	7.620	18.00 *	8.120	80.59	8.930	386.2	7.670	30.00 *	7.630	23.40
19	7.890	48.40	7.570	13.00 *	8.200	99.41	9.190	392.6	7.640	24.89	7.700	34.17
20	7.950	56.00	7.520	9.297	8.045	65.89	8.720	247.0 *	7.630	24.27	7.700	34.03
21	8.020	68.00 *	7.650	20.50	8.170	95.51	10.050	694.5	7.610	15.00 *	7.710	35.57
22	8.260	105.7	7.660	18.81	8.190	98.52	8.745	232.9	7.660	19.00 *	7.710	35.00 *
23	8.250	104.3	7.590	13.64	8.040	70.00 *	8.940	301.2	7.670	28.11	7.700	34.06
24	8.310	115.0	7.540	11.11	7.990	60.22	8.605	198.2	7.690	29.00 *	7.670	25.96
25	8.190	98.15	7.470	7.118	7.970	56.75	8.240	105.0 *	7.680	28.50 *	7.600	19.00 *
26	8.130	82.41	7.450	5.980 *	7.950	55.66	8.150	90.86	7.630	24.13	7.600	24.06
27	7.990	55.44	7.540	11.52	8.150	91.05	8.190	98.00 *	7.670	26.69	7.630	21.77
28	7.890	57.00 *	7.560	12.63	8.290	113.4	8.120	84.76	7.650	22.72	7.640	22.19
29	7.860	52.00	7.500	9.039	8.330	130.7	8.090	80.81	7.620	19.65	7.630	20.00 *
30	7.935	61.57	7.460	6.683	8.430	140.0 *	8.120	96.77	7.580	16.89	7.620	20.86
31			7.400	4.880	8.470	172.7			7.630	24.93		
Ten-Daily Mean												
I Ten-Daily	7.598	16.49	7.918	56.39	7.436	5.494	8.450	161.9	8.020	77.32	7.646	25.57
II Ten-Daily	7.750	31.04	7.496	9.419	8.057	87.58	8.992	369.4	7.800	46.53	7.637	24.58
III Ten-Daily	8.083	79.96	7.529	11.08	8.180	98.58	8.525	198.3	7.645	23.15	7.651	25.85
Monthly												
Min.	7.470	3.468	7.400	4.880	7.370	3.812	8.090	80.81	7.580	15.00	7.570	16.42
Max.	8.310	115.0	8.180	96.00	8.690	250.0	10.670	1200	8.220	107.5	7.820	49.84
Mean	7.810	42.5	7.644	25.16	7.901	65.01	8.656	243.2	7.816	48.16	7.645	25.33

Annual Runoff in MCM = 1231 Annual Runoff in mm = 130

Peak Observed Discharge = 694.5 cumecs on 21/09/2015 Corres. Water Level :10.05 m

Lowest Observed Discharge = 0.280 cumecs on 25/02/2016 Corres. Water Level :7.15 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

Stage-Discharge Data for the period 2015 - 2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	7.620	19.51	7.580	15.57	7.350	3.087	7.310	2.515	7.330	1.817	7.360	2.350 *
2	7.600	17.13	7.530	11.21	7.380	3.245	7.310	2.531	7.350	2.476	7.370	2.756
3	7.570	15.48	7.510	9.580 *	7.380	3.052	7.260	1.404	7.360	2.550 *	7.360	2.305
4	7.590	16.45	7.410	5.354	7.330	2.470	7.280	1.672	7.380	2.732	7.360	2.304
5	7.580	15.82	7.390	4.864	7.310	2.256	7.310	2.567	7.380	2.769	7.350	
6	7.580	14.50 *	7.380	3.087	7.300	2.110	7.320	2.820 *	7.400	2.918	7.350	2.205
7	7.550	13.04	7.380	3.072	7.290	2.000 *	7.300	2.000 *	7.370	2.735	7.340	2.008
8	7.520	10.38	7.340	2.821	7.270	1.328	7.320	2.886	7.350	2.237	7.330	1.800 *
9	7.490	8.252	7.330	2.495	7.250	1.048	7.280	1.461	7.360	2.104	7.310	1.429
10	7.450	6.551	7.320	2.250 *	7.250	1.082	7.220	1.019	7.360	2.270 *	7.310	1.384
11	7.430	5.491	7.310	2.064	7.230	0.962	7.190	0.460	7.310	1.384	7.300	1.339
12	7.410	4.510	7.310	2.084	7.290	1.813	7.170	0.407	7.320	1.520	7.300	1.293
13	7.400	3.750 *	7.310	2.180	7.280	1.540	7.170	0.400 *	7.330	1.772	7.290	1.259
14	7.590	16.23	7.310	2.251	7.270	1.450 *	7.200	0.666	7.330	1.820 *	7.260	1.165
15	7.490	7.209	7.450	6.513	7.260	1.415	7.190	0.607	7.340	1.899	7.260	1.160 *
16	7.420	4.692	7.520	10.14	7.260	1.262	7.170	0.434	7.350	1.922	7.320	1.708
17	7.390	3.937	7.460	7.800 *	7.260	1.266	7.170	0.405	7.350	1.890 *	7.340	2.000
18	7.380	3.037	7.410	5.027	7.210	0.756	7.240	0.966	7.340	1.833	7.320	1.673
19	7.370	2.531	7.400	4.858	7.200	0.646	7.240	0.961	7.330	1.755	7.390	2.939
20	7.370	2.500 *	7.350	3.013	7.200	0.644	7.220	0.920 *	7.310	1.400 *	7.510	6.961
21	7.350	2.417	7.330	2.493	7.200	0.605 *	7.240	0.975	7.310	1.399	7.580	10.00 *
22	7.330	2.135	7.290	1.857	7.180	0.468	7.230	0.796	7.310	1.403	7.610	12.45 *
23	7.330	2.185	7.290	1.778	7.180	0.471	7.230	1.010	7.320	1.589	7.450	5.007
24	7.320	2.190 *	7.290	1.778 *	7.170	0.442	7.230	1.050 *	7.320	1.600 *	7.440	4.523
25	7.320	2.190 *	7.290	1.803	7.150	0.280	7.220	1.000 *	7.340	1.812	7.440	4.511
26	7.320	2.191	7.290	1.500 *	7.150	0.441	7.240	1.073	7.340	1.830	7.430	4.384
27	7.320	2.190 *	7.270	1.378	7.220	0.950	7.230	1.010 *	7.350	2.077	7.380	2.797
28	7.610	17.85	7.270	1.517	7.220	0.945 *	7.250	1.106	7.330	1.724	7.360	2.318
29	7.560	15.13	7.260	1.467			7.240	1.065	7.340	1.796	7.360	2.330 *
30	7.620	19.59	7.260	1.447			7.270	1.261	7.360	2.314	7.340	1.968 *
31	7.610	18.07	7.260	1.400 *			7.270	1.242			7.340	1.922
Ten-Daily Mean												
I Ten-Daily	7.555	13.71	7.417	6.031	7.311	2.168	7.291	2.087	7.364	2.461	7.344	2.060
II Ten-Daily	7.425	5.389	7.383	4.593	7.246	1.175	7.196	0.623	7.331	1.719	7.329	2.150
III Ten-Daily	7.426	7.831	7.282	1.674	7.184	0.575	7.241	1.053	7.332	1.754	7.430	4.746
Monthly												
Min.	7.320	2.135	7.260	1.378	7.150	0.280	7.170	0.400	7.310	1.384	7.260	1.160
Max.	7.620	19.59	7.580	15.57	7.380	3.245	7.320	2.886	7.400	2.918	7.610	12.45
Mean	7.467	8.94	7.358	4.021	7.251	1.358	7.243	1.248	7.342	1.978	7.370	3.075

Peak Computed Discharge = 1200 cumecs on 17/09/2015 **Corres. Water Level :10.67 m**

Lowest Computed Discharge = 0.400 cumecs on 13/03/2016 **Corres. Water Level :7.17 m**

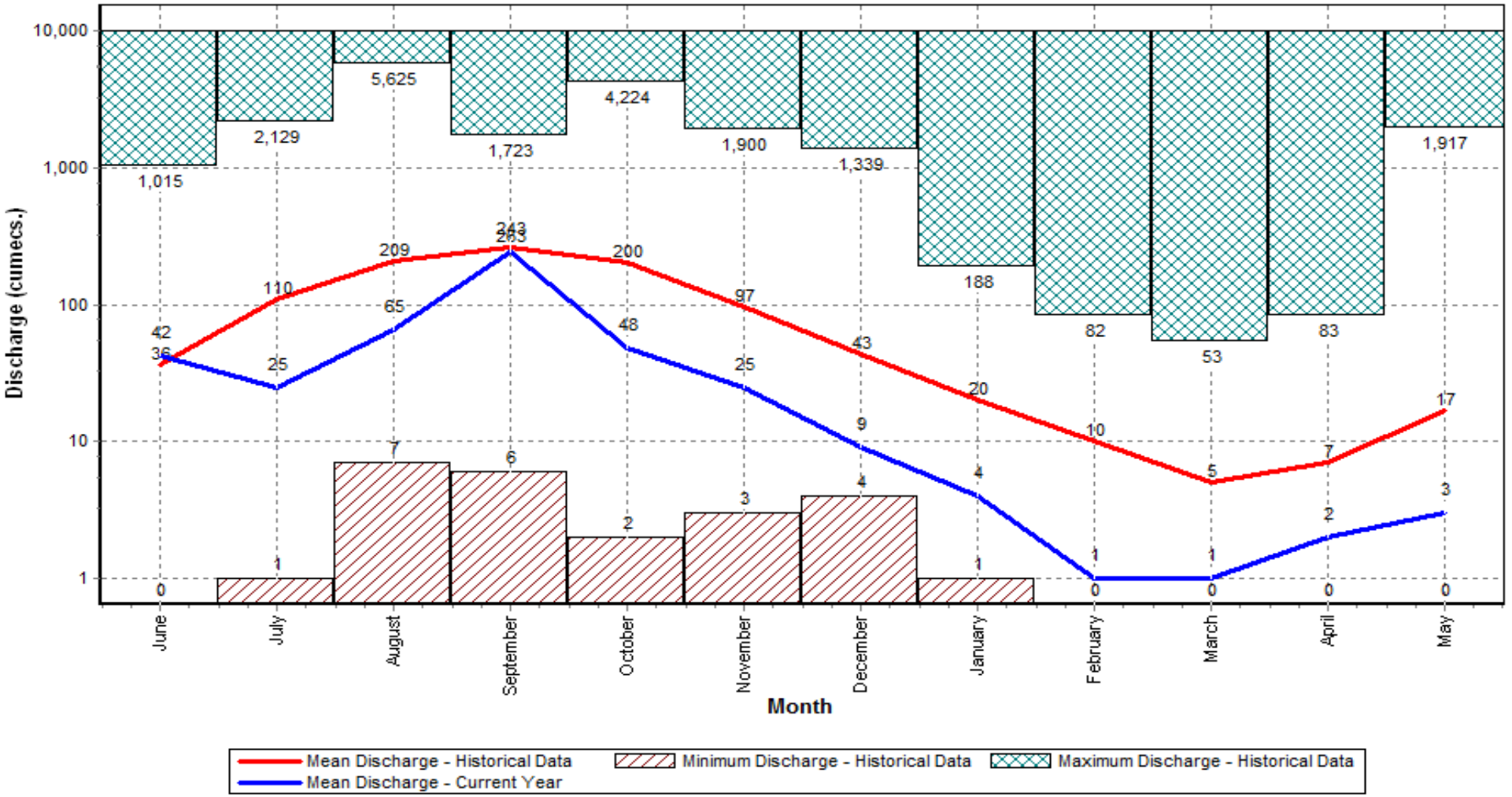
Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

HISTOGRAM - HYDROGRAPH for Water Year : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) | **Data considered : 1991-2016** | **Division : E.E., Bhubaneswar**

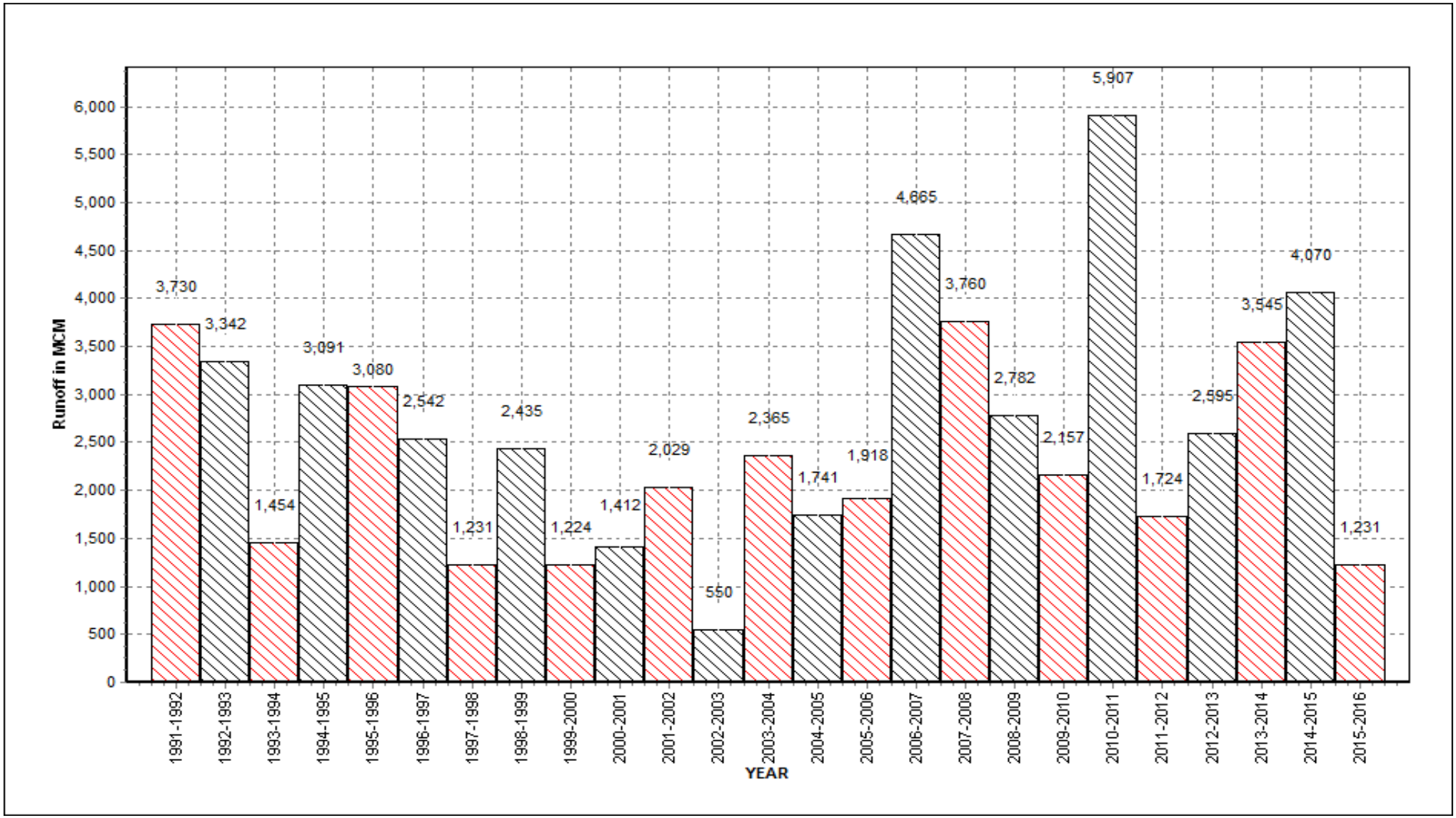
Local River : Nagavali | **Sub-Division : Behrampur**



Annual Runoff Values for the period: 1991 - 2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

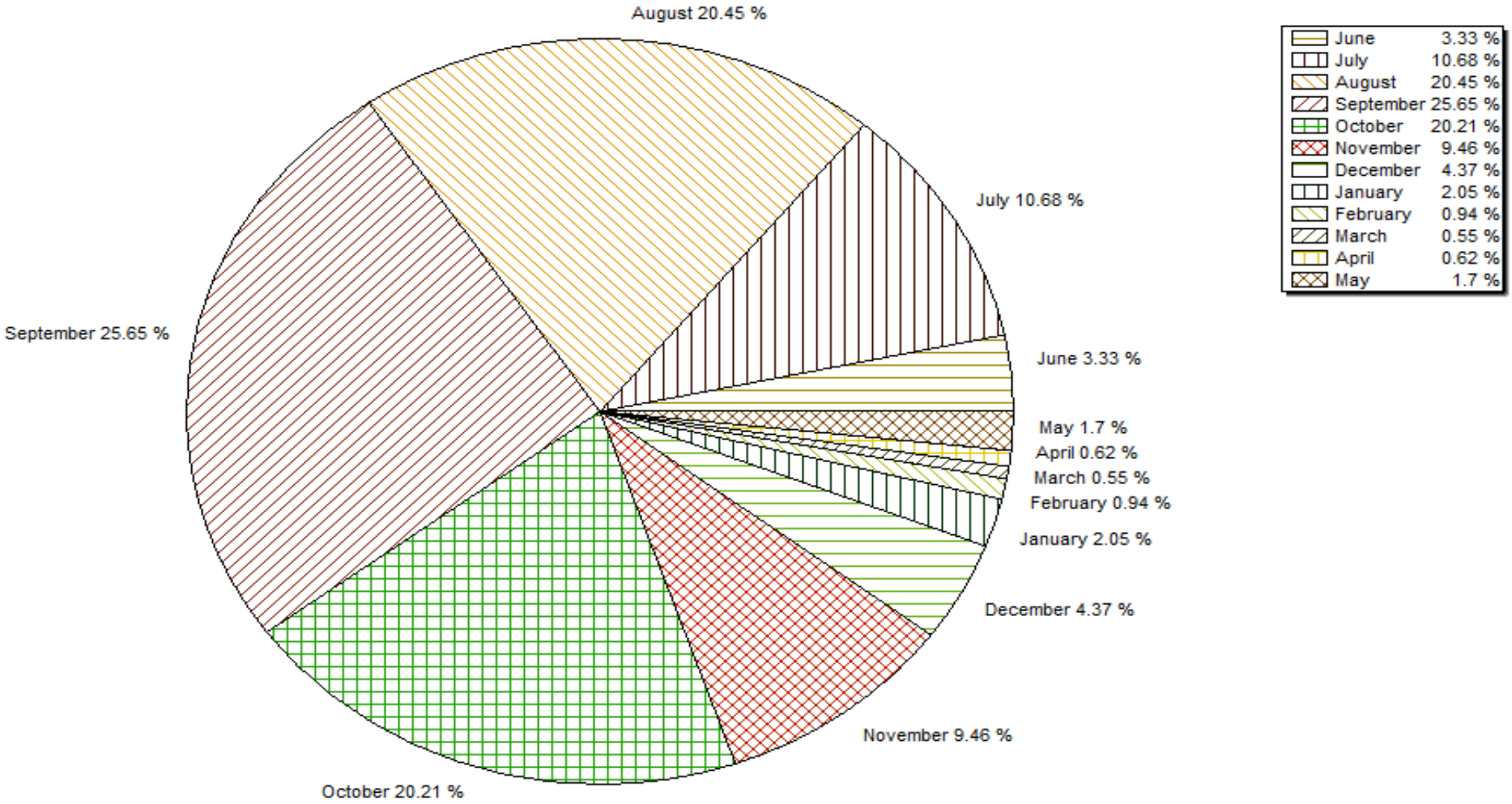


Note: Missing values have not been considered while arriving at Annual Runoff

Monthly Average Runoff based on period : 1991-2015

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

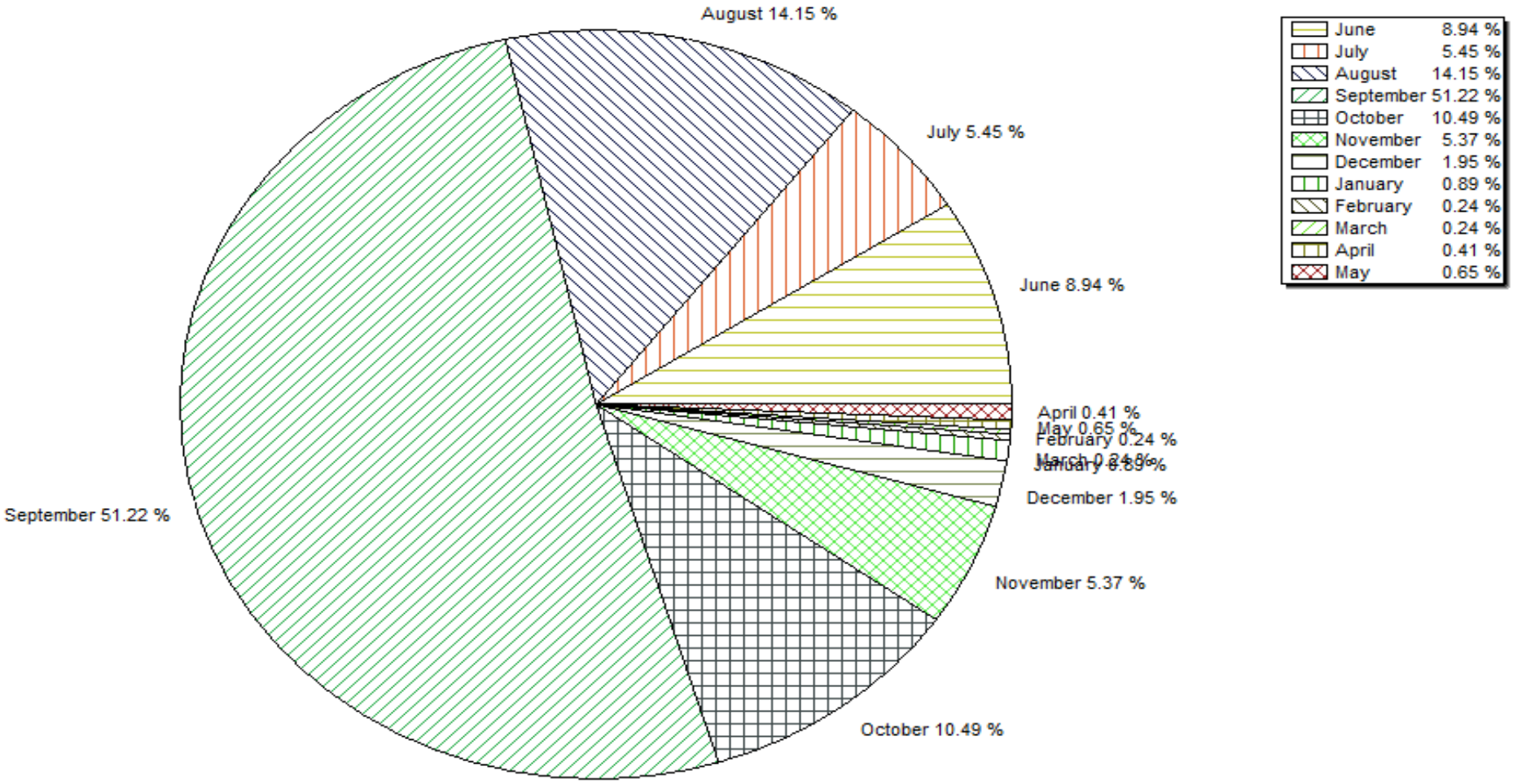
Local River : Nagavali **Sub-Division : Behrampur**



Monthly Runoff for the Year : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

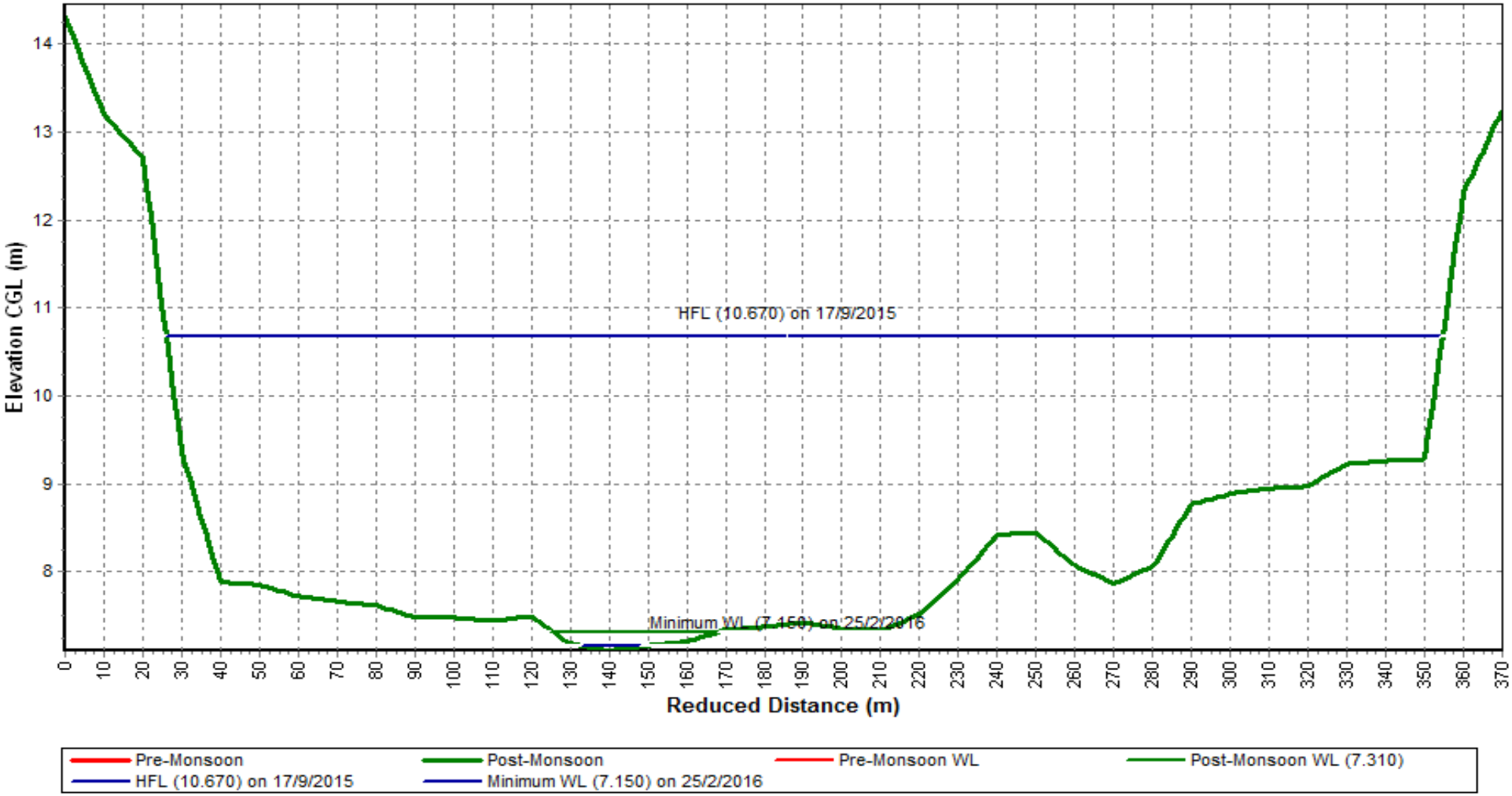
Local River : Nagavali **Sub-Division : Behrampur**



Pre-Monsoon & Post-Monsoon X-Section for Water Year : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

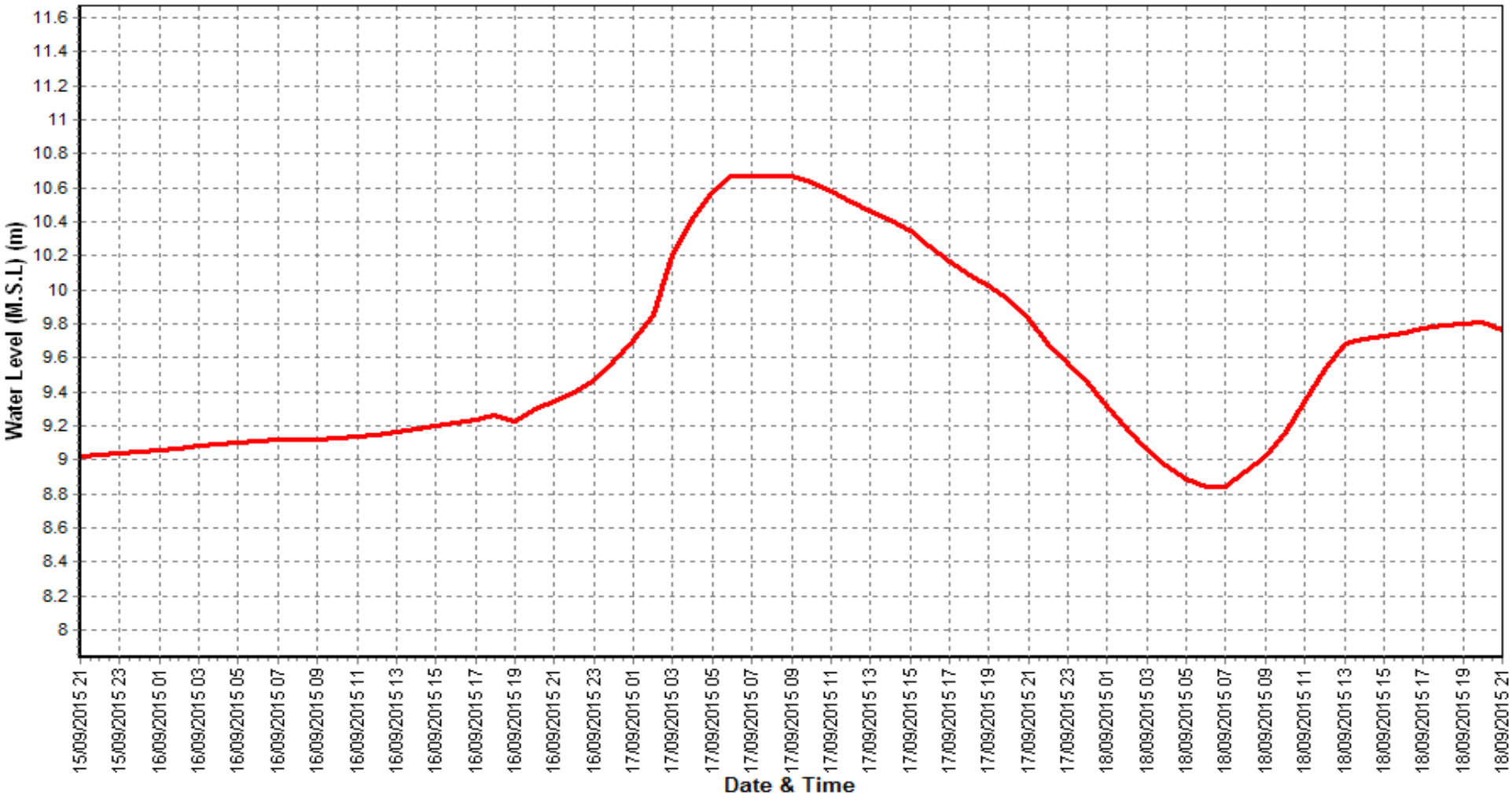
Local River : Nagavali **Sub-Division : Behrampur**



Water Level vs. Time - Graph of Highest Flood Peak during the Year : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

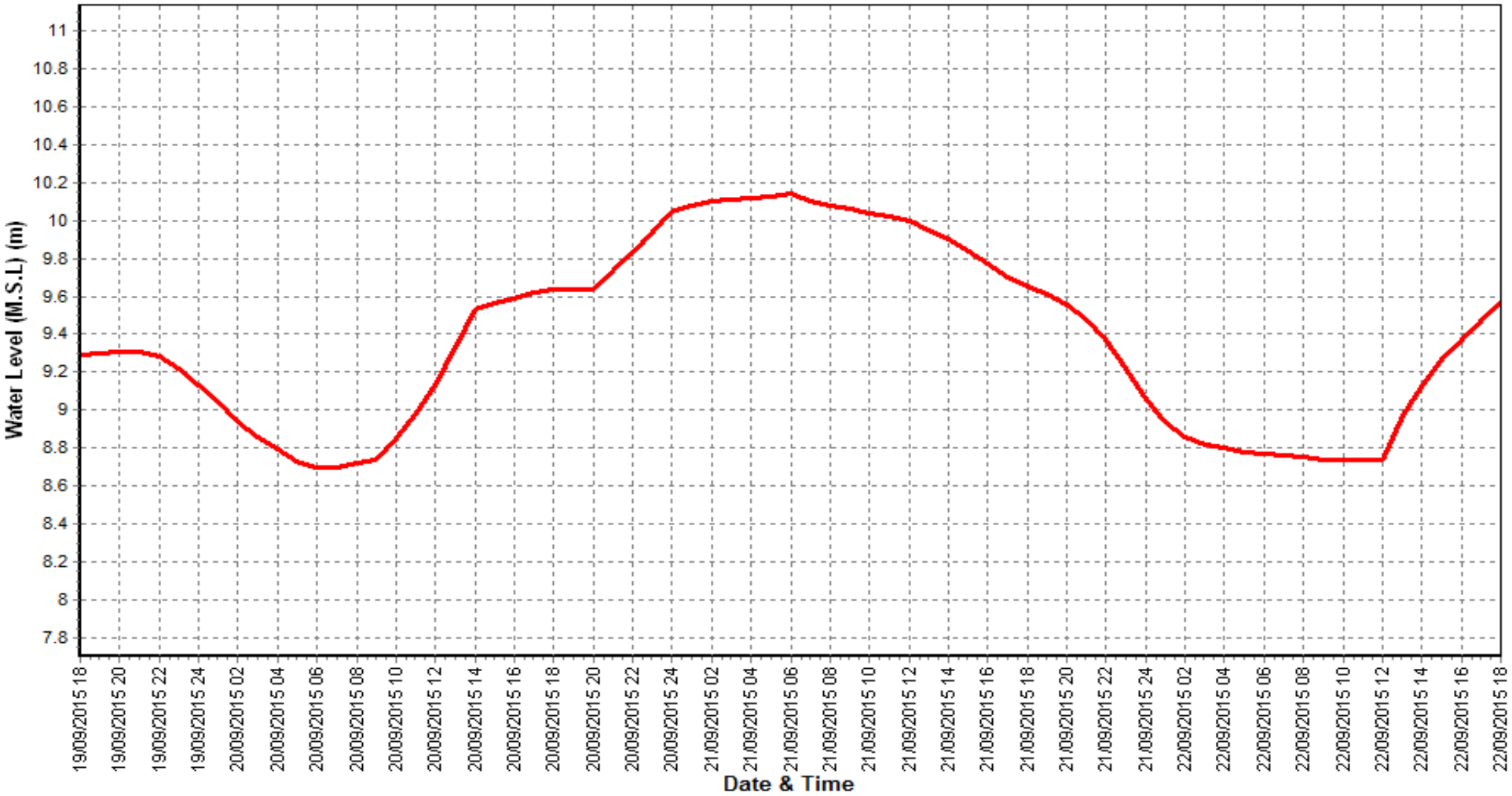


Time Span: 72 Hrs

Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

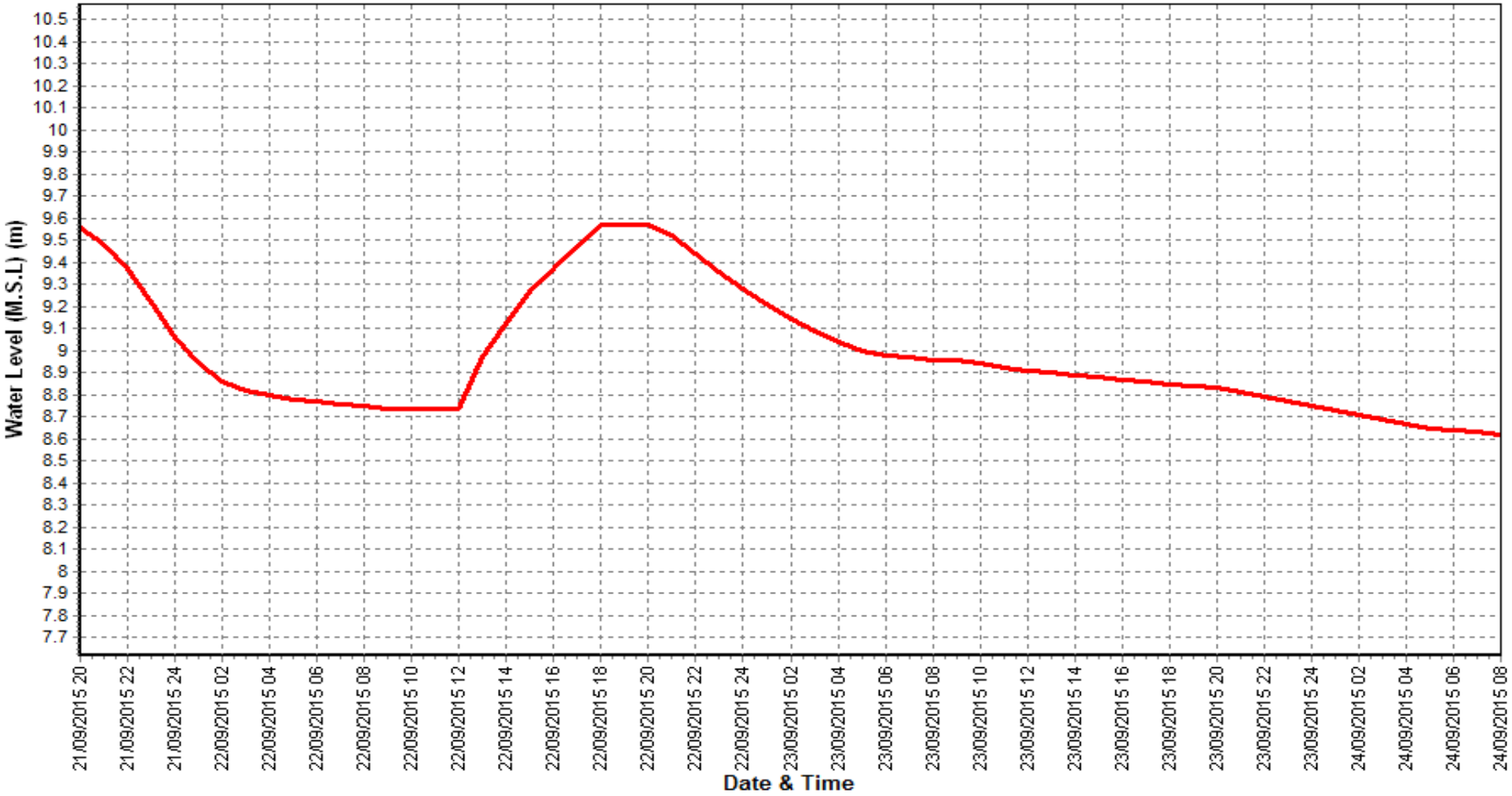


Time Span: 72 Hrs

Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**



Time Span: 72 Hrs

SEDIMENT DATA

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

Day	Jun						Jul						Aug					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	3.872	0.000	0.000	0.027	0.027	9	65.69						4.536	0.000	0.000	0.008	0.008	3
2	3.556	0.000	0.000	0.255	0.255	78	72.06						6.500	0.000	0.000	0.015	0.015	8
3	3.468	0.000	0.000	0.012	0.012	3	59.76						6.336	0.000	0.000	0.014	0.014	8
4	6.496	0.000	0.000	0.052	0.052	29	91.43						8.144	0.000	0.000	0.103	0.103	72
5	9.774	0.000	0.000	0.051	0.051	43	96.00						5.853	0.000	0.000	0.051	0.051	26
6	12.33	0.000	0.000	0.076	0.076	81	69.84						4.909	0.000	0.000	0.073	0.073	31
7	17.00	0.000	0.000	0.048	0.048	71	48.06						3.812	0.000	0.000	0.041	0.041	13
8	44.51	0.000	0.000	0.126	0.126	484	33.20						4.523	0.000	0.000	0.092	0.092	36
9	38.55	0.000	0.000	0.115	0.115	383	16.15						5.000	0.000	0.000	0.083	0.083	36
10	25.35	0.000	0.000	0.100	0.100	219	11.75						5.326	0.000	0.000	0.089	0.089	41
11	22.94	0.000	0.000	0.089	0.089	177	8.233						4.345	0.000	0.000	0.086	0.086	32
12	22.64	0.000	0.000	0.078	0.078	152	6.690						13.09	0.000	0.000	0.131	0.131	148
13	21.17	0.000	0.000	0.045	0.045	82	8.181						61.83	0.000	0.000	0.269	0.269	1436
14	20.00	0.000	0.000	0.061	0.061	105	5.017						91.94	0.000	0.000	0.197	0.197	1564
15	19.36	0.000	0.000	0.059	0.059	99	5.746						250.0	0.000	0.000	0.535	0.535	11545
16	18.17	0.000	0.000	0.038	0.038	60	7.090						110.0	0.000	0.000	0.235	0.235	2235
17	35.55	0.000	0.000	0.154	0.154	473	12.93						98.74	0.000	0.000	0.211	0.211	1801
18	46.16	0.000	0.000	0.134	0.134	533	18.00						80.59	0.000	0.000	0.259	0.259	1800
19	48.40	0.000	0.000	0.132	0.132	551	13.00						99.41	0.000	0.000	0.290	0.290	2493
20	56.00	0.000	0.000	0.112	0.112	541	9.297						65.89	0.000	0.000	0.132	0.132	749
21	68.00	0.000	0.000	0.087	0.087	513	20.50						95.51	0.000	0.000	0.318	0.318	2625
22	105.7	0.000	0.000	0.136	0.136	1240	18.81						98.52	0.000	0.000	0.220	0.220	1869
23	104.3	0.000	0.000	0.122	0.122	1099	13.64						70.00	0.000	0.000	0.201	0.201	1216
24	115.0	0.000	0.000	0.176	0.176	1744	11.11						60.22	0.000	0.000	0.173	0.173	900
25	98.15	0.000	0.000	0.105	0.105	893	7.118						56.75	0.000	0.000	0.208	0.208	1021
26	82.41	0.000	0.000	0.094	0.094	672	5.980						55.66	0.000	0.000	0.121	0.121	581
27	55.44	0.000	0.000	0.114	0.114	545	11.52						91.05	0.000	0.000	0.155	0.155	1219
28	57.00	0.000	0.000	0.077	0.077	379	12.63						113.4	0.003	0.007	0.174	0.183	1795
29	52.00	0.000	0.000	0.079	0.079	354	9.039						130.7	0.004	0.008	0.093	0.106	1191
30	61.57	0.000	0.000	0.082	0.082	436	6.683						140.0	0.010	0.018	0.100	0.127	1541
31							4.880						172.7	0.012	0.022	0.123	0.157	2342
Ten Daily Mean																		
Ten Daily I	16.49	0.000	0.000	0.086	0.086	140	56.39						5.494	0.000	0.000	0.057	0.057	27
Ten Daily II	31.04	0.000	0.000	0.090	0.090	277	9.419						87.58	0.000	0.000	0.234	0.234	2380
Ten Daily III	79.96	0.000	0.000	0.107	0.107	788	11.08						98.58	0.003	0.005	0.171	0.179	1482
Monthly																		
Total						12049												40377

Annual Sediment Load (Metric Tonnes) : 518506

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

Day	Sep						Oct						Nov					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	203.3	0.012	0.016	0.241	0.269	4722	68.03	0.000	0.000	0.068	0.068	397	27.50	0.000	0.000	0.031	0.031	74
2	228.4	0.015	0.019	0.423	0.457	9015	57.00	0.000	0.000	0.052	0.052	256	49.84	0.000	0.000	0.071	0.071	304
3	251.5	0.022	0.032	0.294	0.347	7548	56.47	0.000	0.000	0.053	0.053	257	35.36	0.000	0.000	0.053	0.053	163
4	205.6	0.012	0.013	0.266	0.290	5156	45.00	0.000	0.000	0.035	0.035	138	26.73	0.000	0.000	0.048	0.048	112
5	108.1	0.014	0.024	0.144	0.182	1699	107.5	0.000	0.000	0.129	0.129	1197	24.02	0.000	0.000	0.048	0.048	99
6	92.00	0.007	0.012	0.104	0.123	976	98.19	0.000	0.000	0.078	0.078	660	20.51	0.000	0.000	0.027	0.027	47
7	111.4	0.006	0.010	0.240	0.255	2457	94.44	0.000	0.000	0.062	0.062	507	19.59	0.000	0.000	0.026	0.026	45
8	170.4	0.012	0.019	0.290	0.320	4713	95.35	0.000	0.000	0.079	0.079	652	18.37	0.000	0.000	0.025	0.025	40
9	111.3	0.006	0.013	0.159	0.179	1718	70.47	0.000	0.000	0.092	0.092	561	16.42	0.000	0.000	0.029	0.029	41
10	137.2	0.008	0.016	0.150	0.174	2062	80.74	0.000	0.000	0.065	0.065	456	17.35	0.000	0.000	0.024	0.024	35
11	150.4	0.010	0.019	0.123	0.153	1982	88.00	0.000	0.000	0.067	0.067	507	17.20	0.000	0.000	0.023	0.023	34
12	168.9	0.012	0.022	0.195	0.228	3332	70.71	0.000	0.000	0.064	0.064	389	16.65	0.000	0.000	0.021	0.021	29
13	235.0	0.016	0.030	0.236	0.281	5714	59.83	0.000	0.000	0.058	0.058	301	24.09	0.000	0.000	0.053	0.053	109
14	249.6	0.021	0.031	0.145	0.198	4264	47.25	0.000	0.000	0.035	0.035	144	24.09	0.000	0.000	0.055	0.055	114
15	300.4	0.027	0.041	0.145	0.212	5494	44.35	0.000	0.000	0.069	0.069	264	23.00	0.000	0.000	0.054	0.054	106
16	364.1	0.031	0.049	0.155	0.234	7365	41.31	0.000	0.000	0.049	0.049	173	25.49	0.000	0.000	0.057	0.057	125
17	1200	0.105	0.203	2.293	2.601	269651	34.64	0.000	0.000	0.035	0.035	104	23.73	0.000	0.000	0.048	0.048	98
18	386.2	0.035	0.056	0.257	0.348	11601	30.00	0.000	0.000	0.027	0.027	69	23.40	0.000	0.000	0.050	0.050	100
19	392.6	0.036	0.060	0.439	0.536	18169	24.89	0.000	0.000	0.018	0.018	39	34.17	0.000	0.000	0.059	0.059	174
20	247.0	0.020	0.031	0.410	0.461	9836	24.27	0.000	0.000	0.030	0.030	62	34.03	0.000	0.000	0.057	0.057	167
21	694.5	0.070	0.120	0.500	0.691	41434	15.00	0.000	0.000	0.027	0.027	35	35.57	0.000	0.000	0.060	0.060	184
22	232.9	0.023	0.035	0.267	0.325	6537	19.00	0.000	0.000	0.035	0.035	57	35.00	0.000	0.000	0.590	0.590	1784
23	301.2	0.028	0.044	0.283	0.356	9252	28.11	0.000	0.000	0.051	0.051	124	34.06	0.000	0.000	0.056	0.056	164
24	198.2	0.019	0.030	0.251	0.300	5143	29.00	0.000	0.000	0.055	0.055	139	25.96	0.000	0.000	0.055	0.055	123
25	105.0	0.010	0.016	0.134	0.160	1450	28.50	0.000	0.000	0.054	0.054	134	19.00	0.000	0.000	0.025	0.025	40
26	90.86	0.000	0.000	0.154	0.154	1205	24.13	0.000	0.000	0.046	0.046	96	24.06	0.000	0.000	0.026	0.026	54
27	98.00	0.000	0.000	0.235	0.235	1989	26.69	0.000	0.000	0.054	0.054	125	21.77	0.000	0.000	0.035	0.035	67
28	84.76	0.000	0.000	0.086	0.086	630	22.72	0.000	0.000	0.036	0.036	71	22.19	0.000	0.000	0.043	0.043	83
29	80.81	0.000	0.000	0.827	0.827	5774	19.65	0.000	0.000	0.018	0.018	31	20.00	0.000	0.000	0.034	0.034	58
30	96.77	0.000	0.000	0.080	0.080	666	16.89	0.000	0.000	0.066	0.066	96	20.86	0.000	0.000	0.037	0.037	67
31							24.93	0.000	0.000	0.027	0.027	57						
Ten Daily Mean																		
Ten Daily I	161.9	0.011	0.017	0.231	0.260	4007	77.32	0.000	0.000	0.071	0.071	508	25.57	0.000	0.000	0.038	0.038	96
Ten Daily II	369.4	0.031	0.054	0.440	0.525	33741	46.53	0.000	0.000	0.045	0.045	205	24.58	0.000	0.000	0.047	0.047	106
Ten Daily III	198.3	0.015	0.025	0.282	0.321	7408	23.15	0.000	0.000	0.043	0.043	88	25.85	0.000	0.000	0.096	0.096	262
Monthly																		
Total						451555						8097						4643

Annual Sediment Load (Metric Tonnes) : 518506

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

Day	Dec						Jan						Feb					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	19.51	0.000	0.000	0.052	0.052	88	15.57	0.000	0.000	0.051	0.051	69	3.087	0.000	0.000	0.036	0.036	10
2	17.13	0.000	0.000	0.046	0.046	68	11.21	0.000	0.000	0.037	0.037	36	3.245	0.000	0.000	0.038	0.038	11
3	15.48	0.000	0.000	0.042	0.042	56	9.580	0.000	0.000	0.032	0.032	26	3.052	0.000	0.000	0.036	0.036	9
4	16.45	0.000	0.000	0.044	0.044	63	5.354	0.000	0.000	0.018	0.018	8	2.470	0.000	0.000	0.029	0.029	6
5	15.82	0.000	0.000	0.042	0.042	58	4.864	0.000	0.000	0.016	0.016	7	2.256	0.000	0.000	0.026	0.026	5
6	14.50	0.000	0.000	0.039	0.039	49	3.087	0.000	0.000	0.010	0.010	3	2.110	0.000	0.000	0.024	0.024	4
7	13.04	0.000	0.000	0.035	0.035	40	3.072	0.000	0.000	0.010	0.010	3	2.000	0.000	0.000	0.023	0.023	4
8	10.38	0.000	0.000	0.028	0.028	25	2.821	0.000	0.000	0.009	0.009	2	1.328	0.000	0.000	0.029	0.029	3
9	8.252	0.000	0.000	0.022	0.022	16	2.495	0.000	0.000	0.008	0.008	2	1.048	0.000	0.000	0.024	0.024	2
10	6.551	0.000	0.000	0.018	0.018	10	2.250	0.000	0.000	0.007	0.007	1	1.082	0.000	0.000	0.024	0.024	2
11	5.491	0.000	0.000	0.021	0.021	10	2.064	0.000	0.000	0.016	0.016	3	0.962	0.000	0.000	0.021	0.021	2
12	4.510	0.000	0.000	0.017	0.017	7	2.084	0.000	0.000	0.016	0.016	3	1.813	0.000	0.000	0.040	0.040	6
13	3.750	0.000	0.000	0.014	0.014	5	2.180	0.000	0.000	0.017	0.017	3	1.540	0.000	0.000	0.034	0.034	5
14	16.23	0.000	0.000	0.062	0.062	86	2.251	0.000	0.000	0.017	0.017	3	1.450	0.000	0.000	0.032	0.032	4
15	7.209	0.000	0.000	0.027	0.027	17	6.513	0.000	0.000	0.050	0.050	28	1.415	0.000	0.000	0.032	0.032	4
16	4.692	0.000	0.000	0.018	0.018	7	10.14	0.000	0.000	0.078	0.078	69	1.262	0.000	0.000	0.028	0.028	3
17	3.937	0.000	0.000	0.015	0.015	5	7.800	0.000	0.000	0.060	0.060	41	1.266	0.000	0.000	0.028	0.028	3
18	3.037	0.000	0.000	0.012	0.012	3	5.027	0.000	0.000	0.048	0.048	21	0.756	0.000	0.000	0.017	0.017	1
19	2.531	0.000	0.000	0.010	0.010	2	4.858	0.000	0.000	0.047	0.047	20	0.646	0.000	0.000	0.014	0.014	1
20	2.500	0.000	0.000	0.010	0.010	2	3.013	0.000	0.000	0.029	0.029	8	0.644	0.000	0.000	0.014	0.014	1
21	2.417	0.000	0.000	0.022	0.022	5	2.493	0.000	0.000	0.024	0.024	5	0.605	0.000	0.000	0.000	0.000	0
22	2.135	0.000	0.000	0.019	0.019	3	1.857	0.000	0.000	0.018	0.018	3	0.468	0.000	0.000	0.000	0.000	0
23	2.185	0.000	0.000	0.020	0.020	4	1.778	0.000	0.000	0.017	0.017	3	0.471	0.000	0.000	0.000	0.000	0
24	2.190	0.000	0.000	0.020	0.020	4	1.778	0.000	0.000	0.015	0.015	2	0.442	0.000	0.000	0.000	0.000	0
25	2.190	0.000	0.000	0.020	0.020	4	1.803	0.000	0.000	0.026	0.026	4	0.280	0.000	0.000	0.000	0.000	0
26	2.191	0.000	0.000	0.020	0.020	4	1.500	0.000	0.000	0.021	0.021	3	0.441	0.000	0.000	0.000	0.000	0
27	2.190	0.000	0.000	0.020	0.020	4	1.378	0.000	0.000	0.019	0.019	2	0.950	0.000	0.000	0.000	0.000	0
28	17.85	0.000	0.000	0.067	0.067	104	1.517	0.000	0.000	0.021	0.021	3	0.945	0.000	0.000	0.018	0.018	2
29	15.13	0.000	0.000	0.058	0.058	75	1.467	0.000	0.000	0.021	0.021	3						
30	19.59	0.000	0.000	0.074	0.074	126	1.447	0.000	0.000	0.020	0.020	3						
31	18.07	0.000	0.000	0.069	0.069	107	1.400	0.000	0.000	0.020	0.020	2						
Ten Daily Mean																		
Ten Daily I	13.71	0.000	0.000	0.037	0.037	47	6.031	0.000	0.000	0.020	0.020	16	2.168	0.000	0.000	0.029	0.029	6
Ten Daily II	5.389	0.000	0.000	0.020	0.020	14	4.593	0.000	0.000	0.038	0.038	20	1.175	0.000	0.000	0.026	0.026	3
Ten Daily III	7.831	0.000	0.000	0.037	0.037	40	1.674	0.000	0.000	0.020	0.020	3	0.575	0.000	0.000	0.002	0.002	0
Monthly																		
Total						1054						387						88

Annual Sediment Load (Metric Tonnes) : 518506

Daily Observed Sediment Datasheet for period : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

Day	Mar						Apr						May					
	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day	Q cumecs.	Coarse g/l	Medium g/l	Fine g/l	Total g/l	Total M.T./day
1	2.515	0.000	0.000	0.049	0.049	11	1.817	0.000	0.000	0.000	0.000	0	2.350					
2	2.531	0.000	0.000	0.049	0.049	11	2.476	0.000	0.000	0.000	0.000	0	2.756					
3	1.404	0.000	0.000	0.027	0.027	3	2.550	0.000	0.000	0.043	0.043	9	2.305					
4	1.672	0.000	0.000	0.032	0.032	5	2.732	0.000	0.000	0.046	0.046	11	2.304					
5	2.567	0.000	0.000	0.050	0.050	11	2.769	0.000	0.000	0.047	0.047	11		0.000	0.000	0.027	0.027	
6	2.820	0.000	0.000	0.049	0.049	12	2.918	0.000	0.000	0.049	0.049	12	2.205					
7	2.000	0.000	0.000	0.034	0.034	6	2.735	0.000	0.000	0.046	0.046	11	2.008					
8	2.886	0.000	0.000	0.050	0.050	12	2.237	0.000	0.000	0.038	0.038	7	1.800					
9	1.461	0.000	0.000	0.025	0.025	3	2.104	0.000	0.000	0.038	0.038	7	1.429					
10	1.019	0.000	0.000	0.018	0.018	2	2.270	0.000	0.000	0.045	0.045	9	1.384					
11	0.460	0.000	0.000	0.007	0.007	0	1.384	0.000	0.000	0.028	0.028	3	1.339	0.000	0.000	0.000	0.000	0
12	0.407	0.000	0.000	0.007	0.007	0	1.520	0.000	0.000	0.030	0.030	4	1.293	0.000	0.000	0.000	0.000	0
13	0.400	0.000	0.000	0.000	0.000	0	1.772	0.000	0.000	0.035	0.035	5	1.259	0.000	0.000	0.000	0.000	0
14	0.666	0.000	0.000	0.000	0.000	0	1.820	0.000	0.000	0.036	0.036	6	1.165	0.000	0.000	0.000	0.000	0
15	0.607	0.000	0.000	0.000	0.000	0	1.899	0.000	0.000	0.038	0.038	6	1.160	0.000	0.000	0.000	0.000	0
16	0.434	0.000	0.000	0.000	0.000	0	1.922	0.000	0.000	0.038	0.038	6	1.708	0.000	0.000	0.000	0.000	0
17	0.405	0.000	0.000	0.000	0.000	0	1.890	0.000	0.000	0.037	0.037	6	2.000	0.000	0.000	0.000	0.000	0
18	0.966	0.000	0.000	0.000	0.000	0	1.833	0.000	0.000	0.036	0.036	6	1.673	0.000	0.000	0.000	0.000	0
19	0.961	0.000	0.000	0.000	0.000	0	1.755	0.000	0.000	0.034	0.034	5	2.939	0.000	0.000	0.000	0.000	0
20	0.920	0.000	0.000	0.000	0.000	0	1.400	0.000	0.000	0.027	0.027	3	6.961	0.000	0.000	0.000	0.000	0
21	0.975	0.000	0.000	0.000	0.000	0	1.399	0.000	0.000	0.027	0.027	3	10.00	0.000	0.000	0.000	0.000	0
22	0.796	0.000	0.000	0.000	0.000	0	1.403	0.000	0.000	0.028	0.028	3	12.45	0.000	0.000	0.000	0.000	0
23	1.010	0.000	0.000	0.000	0.000	0	1.589	0.000	0.000	0.031	0.031	4	5.007	0.000	0.000	0.000	0.000	0
24	1.050	0.000	0.000	0.000	0.000	0	1.600	0.000	0.000	0.030	0.030	4	4.523	0.000	0.000	0.000	0.000	0
25	1.000	0.000	0.000	0.000	0.000	0	1.812	0.000	0.000	0.034	0.034	5	4.511	0.000	0.000	0.000	0.000	0
26	1.073	0.000	0.000	0.000	0.000	0	1.830	0.000	0.000	0.034	0.034	5	4.384	0.000	0.000	0.000	0.000	0
27	1.010	0.000	0.000	0.000	0.000	0	2.077	0.000	0.000	0.039	0.039	7	2.797	0.000	0.000	0.000	0.000	0
28	1.106	0.000	0.000	0.000	0.000	0	1.724	0.000	0.000	0.032	0.032	5	2.318	0.000	0.000	0.000	0.000	0
29	1.065	0.000	0.000	0.000	0.000	0	1.796	0.000	0.000	0.034	0.034	5	2.330	0.000	0.000	0.000	0.000	0
30	1.261	0.000	0.000	0.000	0.000	0	2.314	0.000	0.000	0.043	0.043	9	1.968	0.000	0.000	0.000	0.000	0
31	1.242	0.000	0.000	0.000	0.000	0							1.922	0.000	0.000	0.000	0.000	0
Ten Daily Mean																		
Ten Daily I	2.087	0.000	0.000	0.038	0.038	8	2.461	0.000	0.000	0.035	0.035	8	2.060	0.000	0.000	0.027	0.027	
Ten Daily II	0.623	0.000	0.000	0.001	0.001	0	1.719	0.000	0.000	0.034	0.034	5	2.150	0.000	0.000	0.000	0.000	0
Ten Daily III	1.053	0.000	0.000	0.000	0.000	0	1.754	0.000	0.000	0.033	0.033	5	4.746	0.000	0.000	0.000	0.000	0
Monthly																		
Total						76						180						0

Annual Sediment Load (Metric Tonnes) : 518506

Annual Sediment Load for period : 2002-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

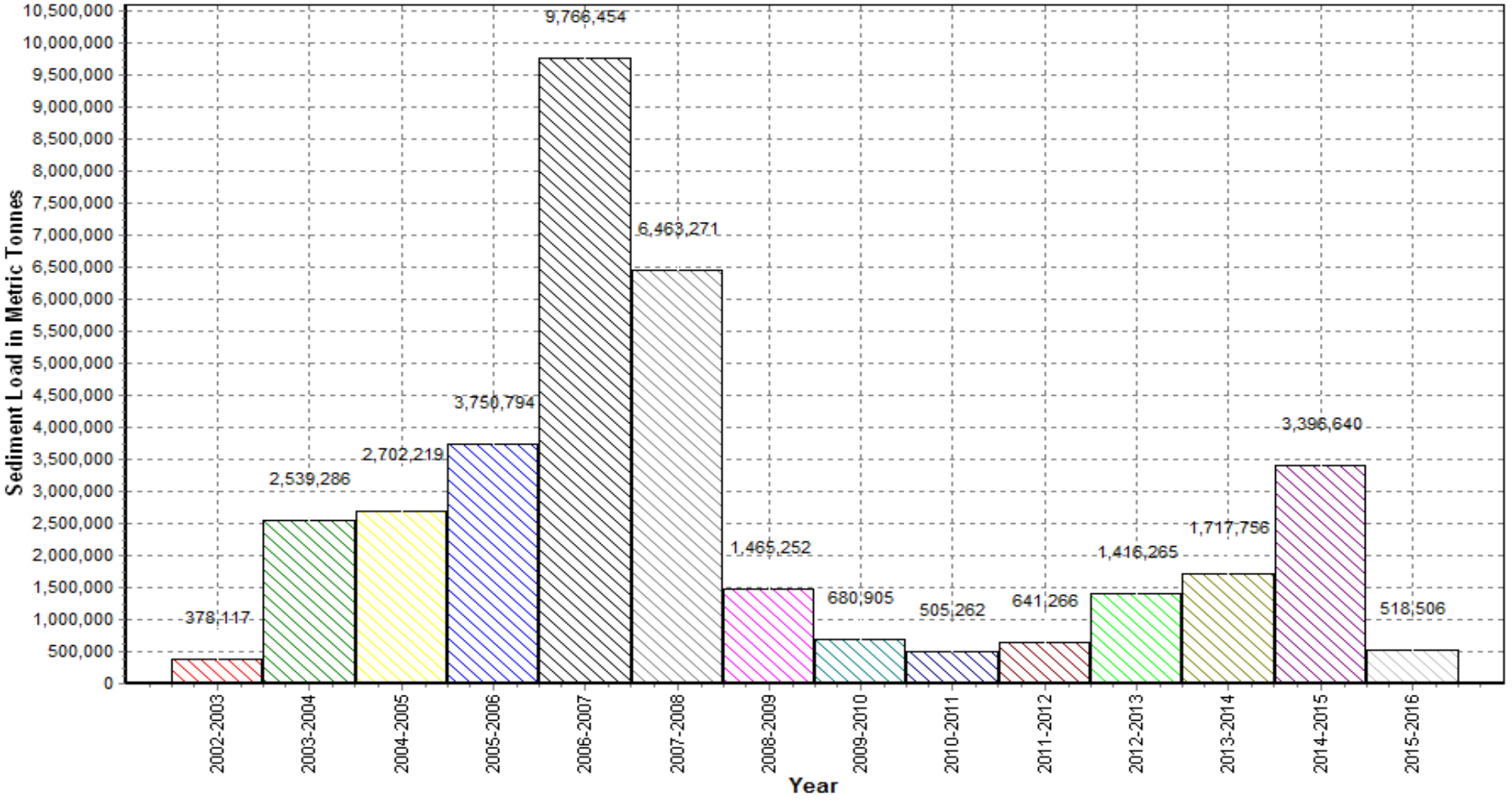
Local River : Nagavali **Sub-Division : Behrampur**

Year	Monsoon (M.T.)	Non-Monsoon (M.T.)	Annual Load (M.T.)	Annual Run Off (MCM)
2002-2003	375944	2174	378117	550
2003-2004	2412284	127002	2539286	2365
2004-2005	2685839	16379	2702219	1741
2005-2006	3742198	8596	3750794	1918
2006-2007	9674341	92114	9766454	4665
2007-2008	6430165	33106	6463271	3760
2008-2009	1429168	36085	1465252	2782
2009-2010	675387	5518	680905	2157
2010-2011	503206	2055	505262	5907
2011-2012	639727	1539	641266	1724
2012-2013	1413063	3202	1416265	2595
2013-2014	1688300	29456	1717756	3535
2014-2015	3379522	17118	3396640	4070
2015-2016	516720	1785	518506	1231

Annual Sediment Load for the period: 2002-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**



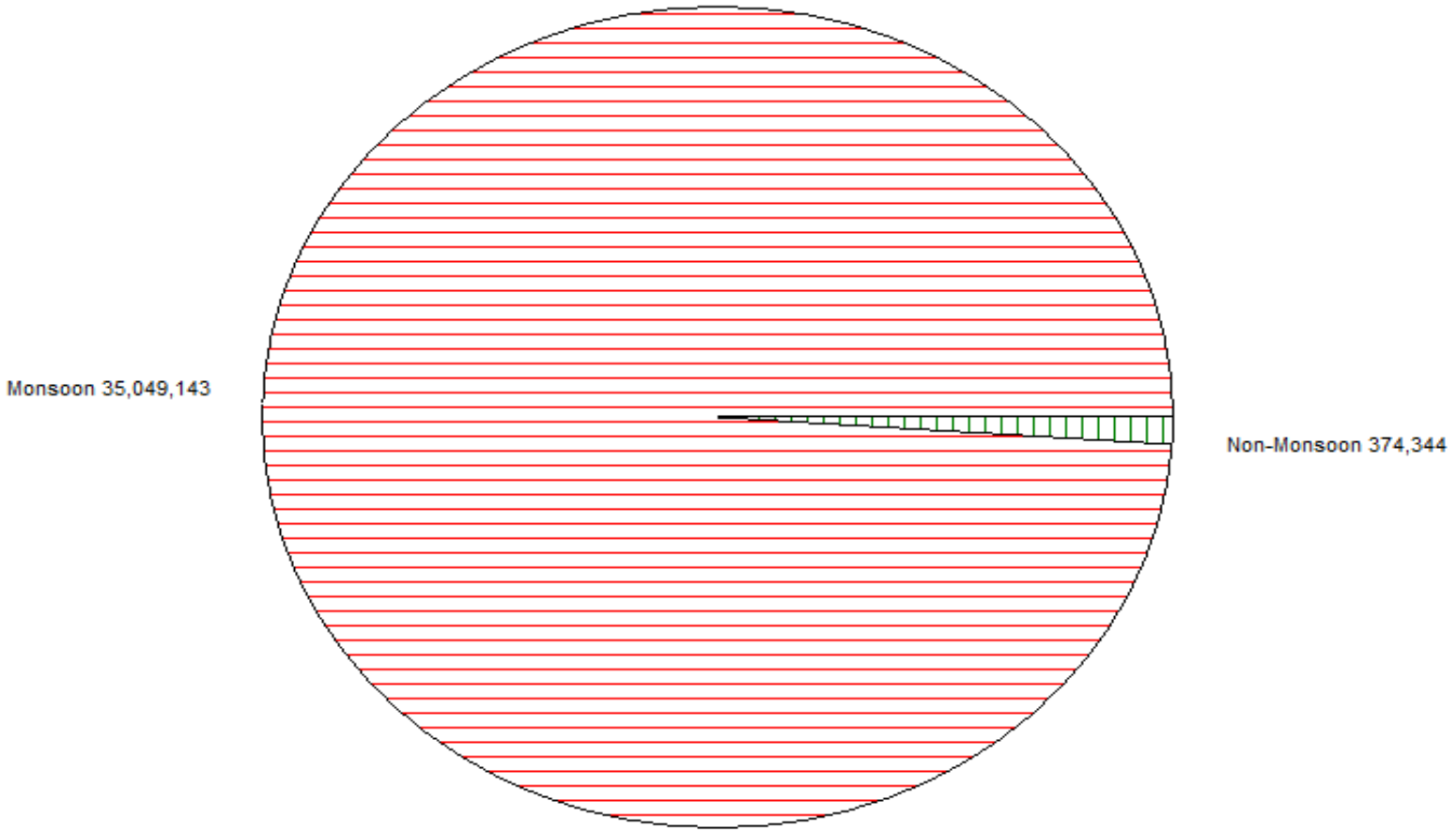
Seasonal Sediment Load for the period : 2002-2015

Station Name : SRIKAKULAM (AN000Y2)

Local River : Nagavali

Division : E.E., Bhubaneswar

Sub-Division : Behrampur



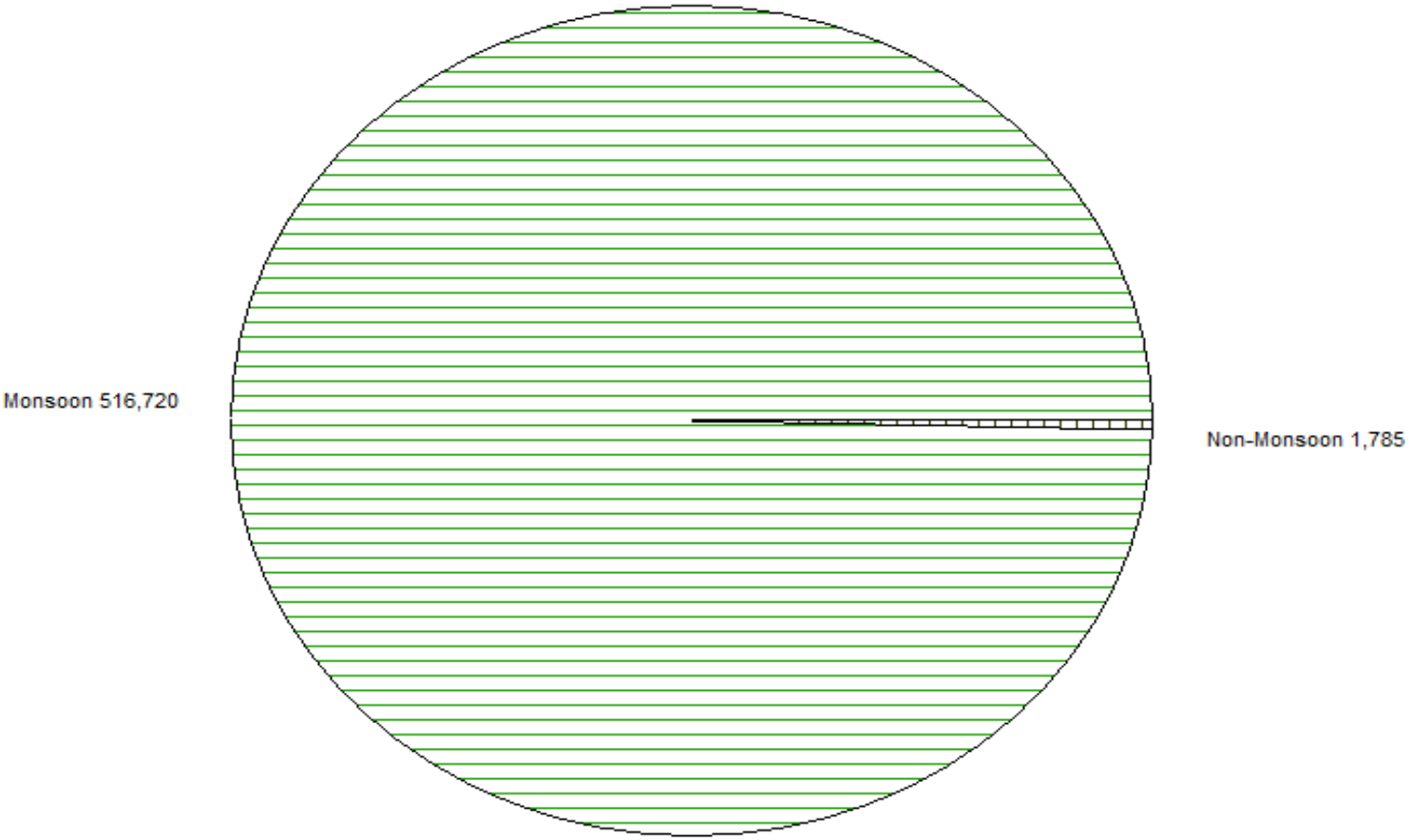
Seasonal Sediment Load for the Year: 2015-2016

Station Name : SRIKAKULAM (AN000Y2)

Local River : Nagavali

Division : E.E., Bhubaneswar

Sub-Division : Behrampur



WATER QUALITY DATA

Water Quality Datasheet for the period : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **River Water Analysis** **Sub-Division : Behrampur**

S.No	Parameters	01.06.2015	01.08.2015	01.10.2015	01.12.2015	01.02.2016	01.04.2016
		A	A	A	A	A	A
	PHYSICAL						
1	Q (cumec)						
2	Colour_Cod (-)	Clear	Light Brown	Light Brown	Clear	Clear	Clear
3	EC_FLD (µmho/cm)	376	1092	780	326	718	899
4	EC_GEN (µmho/cm)	360	1098	783	220	730	908
5	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free
6	pH_FLD (pH units)	7.3	7.6	7.6	7.5	8.3	7.8
7	pH_GEN (pH units)	7.4	7.6	7.5	7.5	8.4	7.8
8	Temp (deg C)	26.0	31.0	29.0	25.0	28.0	30.0
	CHEMICAL						
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	23.0	0.0
2	ALK-TOT (mgCaCO3/L)	97	65	65	74	115	74
3	B (mg/L)	0.00	0.01	0.01	0.01	0.01	0.01
4	Ca (mg/L)	27	26	22	21	24	30
5	Cl (mg/L)	22.6	11.3	15.1	17.0	18.9	22.6
6	CO3 (mg/L)	0.0	0.0	0.0	0.0	27.7	0.0
7	F (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)	0.3	0.3	0.6	0.4	0.4	0.4
9	HCO3 (mg/L)	118	79	79	90	85	90
10	K (mg/L)	3.6	1.3	4.0	1.2	1.1	1.5
11	Mg (mg/L)	14.6	13.6	12.6	11.7	13.6	12.6
12	Na (mg/L)	16.0	2.9	5.1	10.0	18.3	5.0
13	NO2+NO3 (mg N/L)	1.12	1.05	1.29	1.08	1.13	1.05
14	NO2-N (mgN/L)	0.00	0.00	0.00	0.03	0.00	0.00
15	NO3-N (mgN/L)	1.12	1.05	1.29	1.05	1.13	1.05
16	P-Tot (mgP/L)	0.001	0.010	0.001	0.010	0.010	0.010
17	SiO2 (mg/L)	6.0	6.0	6.0	6.0	5.0	5.0
18	SO4 (mg/L)	8.4	20.8	20.6	4.8	5.2	5.7
	BIOLOGICAL/BACTERIOLOGICAL						
	TRACE & TOXIC						
	CHEMICAL INDICES						
1	HAR_Ca (mgCaCO3/L)	68	64	56	52	60	76
2	HAR_Total (mgCaCO3/L)	129	121	109	101	117	129
3	Na% (%)	21	5	9	18	25	8
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.6	0.1	0.2	0.4	0.7	0.2
	PESTICIDES						

Water Quality Summary for the period : 2015-2016

Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

Local River : Nagavali **Sub-Division : Behrampur**

River Water Summary

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)				
2	EC_FLD (µmho/cm)	6	1092	326	699
3	EC_GEN (µmho/cm)	6	1098	220	683
4	pH_FLD (pH units)	6	8.3	7.3	7.7
5	pH_GEN (pH units)	6	8.4	7.4	7.7
6	Temp (deg C)	6	31.0	25.0	28.2
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	6	23.0	0.0	3.8
2	ALK-TOT (mgCaCO3/L)	6	115	65	82
3	B (mg/L)	6	0.01	0.00	0.01
4	Ca (mg/L)	6	30	21	25
5	Cl (mg/L)	6	22.6	11.3	17.9
6	CO3 (mg/L)	6	27.7	0.0	4.6
7	F (mg/L)	6	0.05	0.05	0.05
8	Fe (mg/L)	6	0.6	0.3	0.4
9	HCO3 (mg/L)	6	118	79	90
10	K (mg/L)	6	4.0	1.1	2.1
11	Mg (mg/L)	6	14.6	11.7	13.1
12	Na (mg/L)	6	18.3	2.9	9.5
13	NO2+NO3 (mg N/L)	6	1.29	1.05	1.12
14	NO2-N (mgN/L)	6	0.03	0.00	0
15	NO3-N (mgN/L)	6	1.29	1.05	1.12
16	P-Tot (mgP/L)	6	0.010	0.001	0.007
17	SiO2 (mg/L)	6	6.0	5.0	5.7
18	SO4 (mg/L)	6	20.8	4.8	10.9
	BIOLOGICAL/BACTERIOLOGICAL				
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	6	76	52	63
2	HAR_Total (mgCaCO3/L)	6	129	101	117
3	Na% (%)	6	25	5	14
4	RSC (-)	6	0.0	0.0	0
5	SAR (-)	6	0.7	0.1	0.4
	PESTICIDES				

Water Quality Seasonal Average for the period: 2001-2016

Station Name : SRIKAKULAM (AN000Y2) | **Division : E.E., Bhubaneswar**

Local River : Nagavali | **River Water** | **Sub-Division : Behrampur**

S.No	Parameters	Flood																	
		Jun - Oct																	
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2001-2002	2002-2003	2003-2004
	PHYSICAL																		
1	Q (cumec)																		
2	EC_FLD (µmho/cm)	237	322	262	330			333		281	355	370	232	291	273	749	280	357	274
3	EC_GEN (µmho/cm)	238	318	260	328			327		281	357	370	232	291	273	747	279	356	270
4	pH_FLD (pH units)	7.4	7.9	7.3	7.5			7.8		7.5	7.9	8.2	7.7	7.6	7.9	7.5	7.7	7.7	7.5
5	pH_GEN (pH units)	7.8	7.9	7.3	7.6			7.8		7.6	7.8	8.2	7.7	7.6	7.9	7.5	7.6	7.7	7.5
6	Temp (deg C)	31.9	32.2	31.0	30.5			30.0		26.2	25.7	26.0	29.4	27.4	27.3	28.7	27.4	27.0	26.8
	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)							123		79	104	136	91		104	75			
3	B (mg/L)	0.00	0.00	0.00	0.00			0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
4	Ca (mg/L)	27	35	25	26			33		26	29	29	34	20	27	25	28	40	28
5	Cl (mg/L)	18.0	19.3	24.3	35.0			24.2		25.3	21.0	29.2	23.1	21.7	20.0	16.3	28.7	28.2	21.3
6	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	0.0	0.0	0.0
7	F (mg/L)	0.33	0.00	0.02	0.54			0.58		0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.81	0.26	0.08
8	Fe (mg/L)	0.1	0.1	0.1	0.3			0.1		0.0	0.1	0.0		0.4	0.5	0.4	0.1	0.1	0.1
9	HCO3 (mg/L)	101	143	95	135			147		97	146	166	111	100	126	92	109	156	119
10	K (mg/L)	1.9	2.4	2.2	3.1			6.8		3.2	2.4	2.8	4.0	2.0	2.9	3.0	2.3	2.5	2.2
11	Mg (mg/L)	5.3	9.5	6.3	9.3			9.8		8.4	16.2	13.1	7.8	6.6	14.5	13.6	4.9	7.5	7.5
12	Na (mg/L)	12.4	13.7	17.2	24.3			16.4		17.8	13.4	19.8	18.6	13.2	11.5	8.0	21.7	20.4	14.5
13	NO2+NO3 (mg N/L)	0.92	1.95	0.44	0.27			2.04		0.59	2.26	0.36		0.71	0.83	1.15	0.40	1.21	0.64
14	NO2-N (mgN/L)	0.01	0.00	0.00	0.01			0.00		0.00	0.00	0.07		0.01	0.01	0.00	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.91	1.95	0.44	0.26			2.04		0.59	2.26	0.29		0.70	0.82	1.15	0.40	1.21	0.64
16	o-PO4-P (mg P/L)							0.007		0.033	0.065								
17	P-Tot (mgP/L)	0.029	0.066	0.008	0.001			0.001		0.001	0.004	0.010	0.001	0.001	0.001	0.004	0.001	1.321	0.034
18	SiO2 (mg/L)	7.7	10.1	13.4	37.6			16.4		9.2	10.3	9.0	20.0	11.7	4.7	6.0	9.7	9.9	9.9
19	SO4 (mg/L)	5.9	6.8	6.8	5.8			7.7		13.8	14.5	12.2	11.4	23.1	8.9	16.6	5.9	5.5	5.3
	BIOLOGICAL/BACTERIOLOGICAL																		
	TRACE & TOXIC																		
	CHEMICAL INDICES																		
1	HAR_Ca (mgCaCO3/L)	67	88	62	66			83		65	73	72	86	49	67	63	69	100	70
2	HAR_Total (mgCaCO3/L)	89	128	88	100			126		100	141	127	119	76	127	119	89	131	101
3	Na% (%)	23	18	32	33			22		26	17	25	25	28	16	12	34	25	23
4	RSC (-)	0.0	0.0	0.0	0.2			0.1		0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1	0.1	0.0
5	SAR (-)	0.6	0.5	0.8	1.1			0.7		0.7	0.5	0.8	0.7	0.7	0.5	0.3	1.0	0.8	0.6
	PESTICIDES																		

Water Quality Seasonal Average for the period: 2001-2016

Station Name : SRIKAKULAM (AN000Y2) | **Division : E.E., Bhubaneswar**

Local River : Nagavali | **River Water** | **Sub-Division : Behrampur**

S.No	Parameters	Winter																	
		Nov - Feb																	
		2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2002	2003	2004	2005	2006	2007
	PHYSICAL																		
1	Q (cumec)																		
2	EC_FLD (µmho/cm)	365			305		284	410	310	247	280	556	522	395	461	409			
3	EC_GEN (µmho/cm)	350			295		280	410	310	247	280	556	475	393	460	400			
4	pH_FLD (pH units)	8.0			7.8		7.8	7.7	8.3	7.7	8.0	7.4	7.9	7.5	7.8	7.8			
5	pH_GEN (pH units)	8.0			7.8		7.7	7.7	8.3	7.7	8.0	7.4	7.9	7.9	7.8	7.8			
6	Temp (deg C)	25.8			25.7		20.0	21.5	21.0	28.0		22.8	26.5	31.1	28.8	27.8			
	CHEMICAL																		
1	Alk-Phen (mgCaCO3/L)				0.0		0.0	0.0	0.0	0.0		0.0	11.5						
2	ALK-TOT (mgCaCO3/L)				111		99	147	134	111		117	95						
3	B (mg/L)	0.00			0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00			
4	Ca (mg/L)	34			31		30	34	42	28	21	39	22	36	45	47			
5	Cl (mg/L)	28.2			24.1		21.4	24.3	26.4	23.8	21.2	23.6	17.9	38.9	41.0	20.2			
6	CO3 (mg/L)	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	13.9	0.0	0.0	0.0			
7	F (mg/L)	0.52			0.31		0.11	0.05	0.05	0.05	0.05	0.05	0.05	0.11	0.90	0.00			
8	Fe (mg/L)	0.2			0.1		0.1	0.1	0.0		0.1	0.6	0.4	0.0	0.2	0.1			
9	HCO3 (mg/L)	163			134		121	172	163	136	101	143	87	165	199	198			
10	K (mg/L)	2.4			12.2		2.0	2.3	2.6	3.3	1.4	2.4	1.2	3.1	3.8	2.8			
11	Mg (mg/L)	11.7			7.7		7.3	17.0	25.3	14.9	3.5	2.9	12.6	9.1	10.7	12.1			
12	Na (mg/L)	19.3			15.4		15.2	18.4	20.9	22.7	13.3	17.9	14.1	30.3	32.0	14.9			
13	NO2+NO3 (mg N/L)	0.06			0.55		0.80	0.43	0.36		0.97	1.04	1.11	0.25	0.98	0.66			
14	NO2-N (mgN/L)	0.00			0.00		0.00	0.00	0.07		0.00	0.01	0.01	0.00	0.00	0.00			
15	NO3-N (mgN/L)	0.06			0.55		0.80	0.43	0.29		0.97	1.02	1.09	0.25	0.98	0.66			
16	o-PO4-P (mg P/L)				0.010		0.020	0.083											
17	P-Tot (mgP/L)	0.001			0.001		0.001	0.001	0.010	0.001	0.001	0.001	0.010	0.001	0.001	0.026			
18	SiO2 (mg/L)	37.0			9.5		7.4	12.2	8.0	28.0	8.7	6.0	5.5	12.2	14.8	11.8			
19	SO4 (mg/L)	4.1			9.6		6.8	9.3	4.7	9.9	18.5	5.7	5.0	5.9	8.9	4.3			
	BIOLOGICAL/BACTERIOLOGICAL																		
	TRACE & TOXIC																		
	CHEMICAL INDICES																		
1	HAR_Ca (mgCaCO3/L)	86			78		74	84	104	71	51	98	56	89	113	118			
2	HAR_Total (mgCaCO3/L)	131			122		104	155	209	133	66	110	109	127	158	169			
3	Na% (%)	23			21		24	20	18	26	30	26	21	34	30	16			
4	RSC (-)	0.0			0.1		0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.2	0.1	0.0			
5	SAR (-)	0.7			0.6		0.6	0.6	0.6	0.9	0.7	0.7	0.6	1.2	1.1	0.5			
	PESTICIDES																		

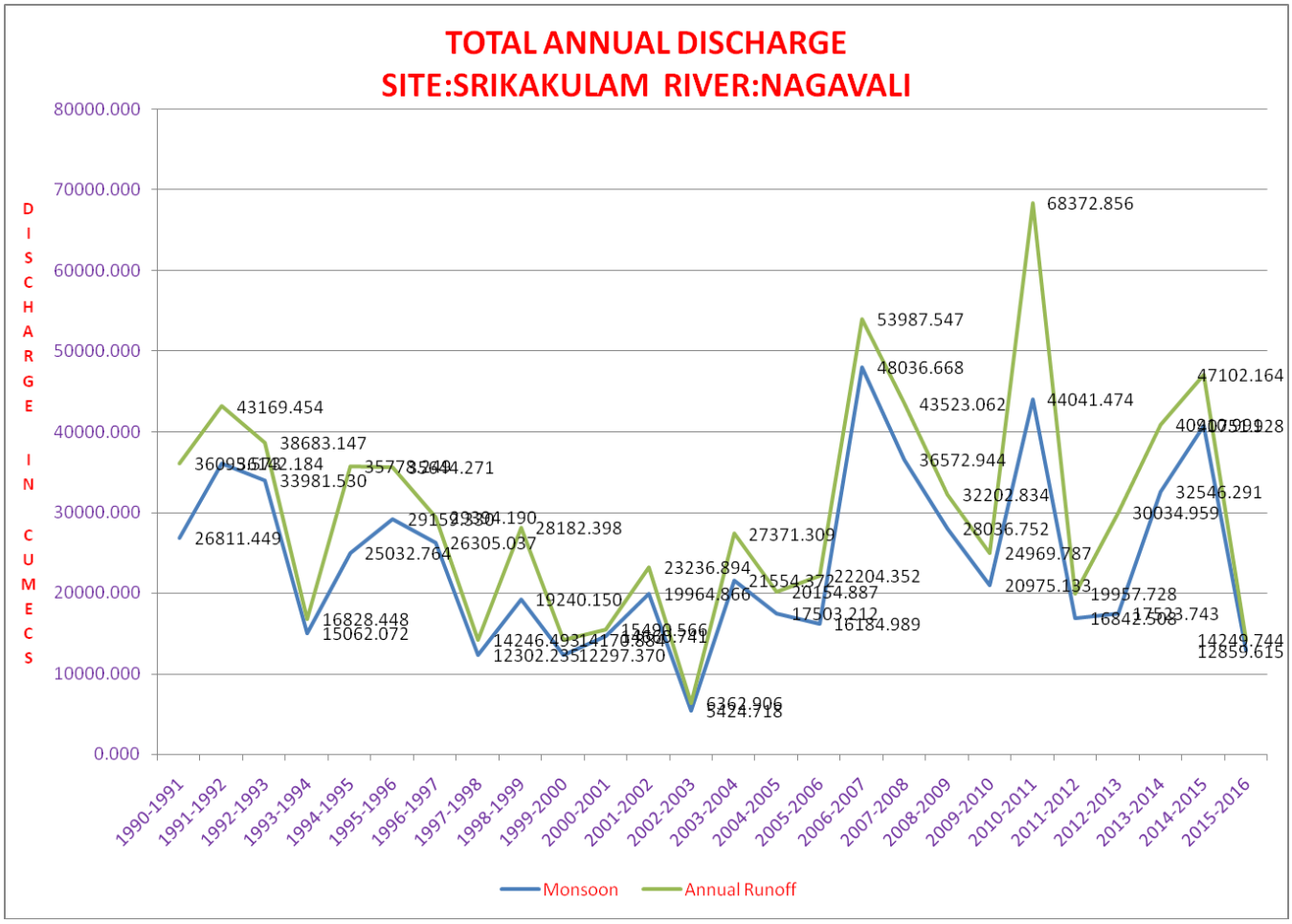
Water Quality Seasonal Average for the period: 2001-2016

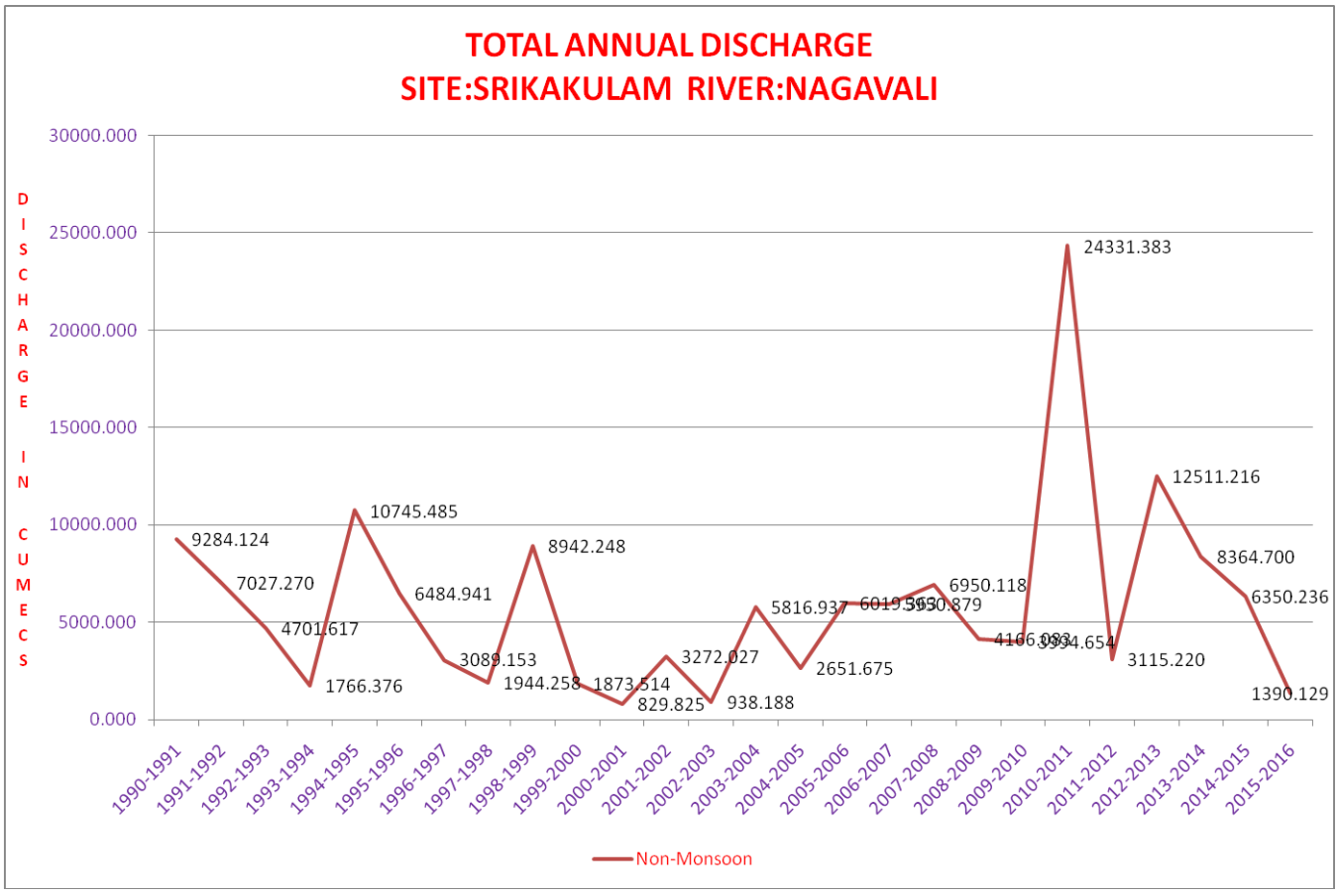
Station Name : SRIKAKULAM (AN000Y2) **Division : E.E., Bhubaneswar**

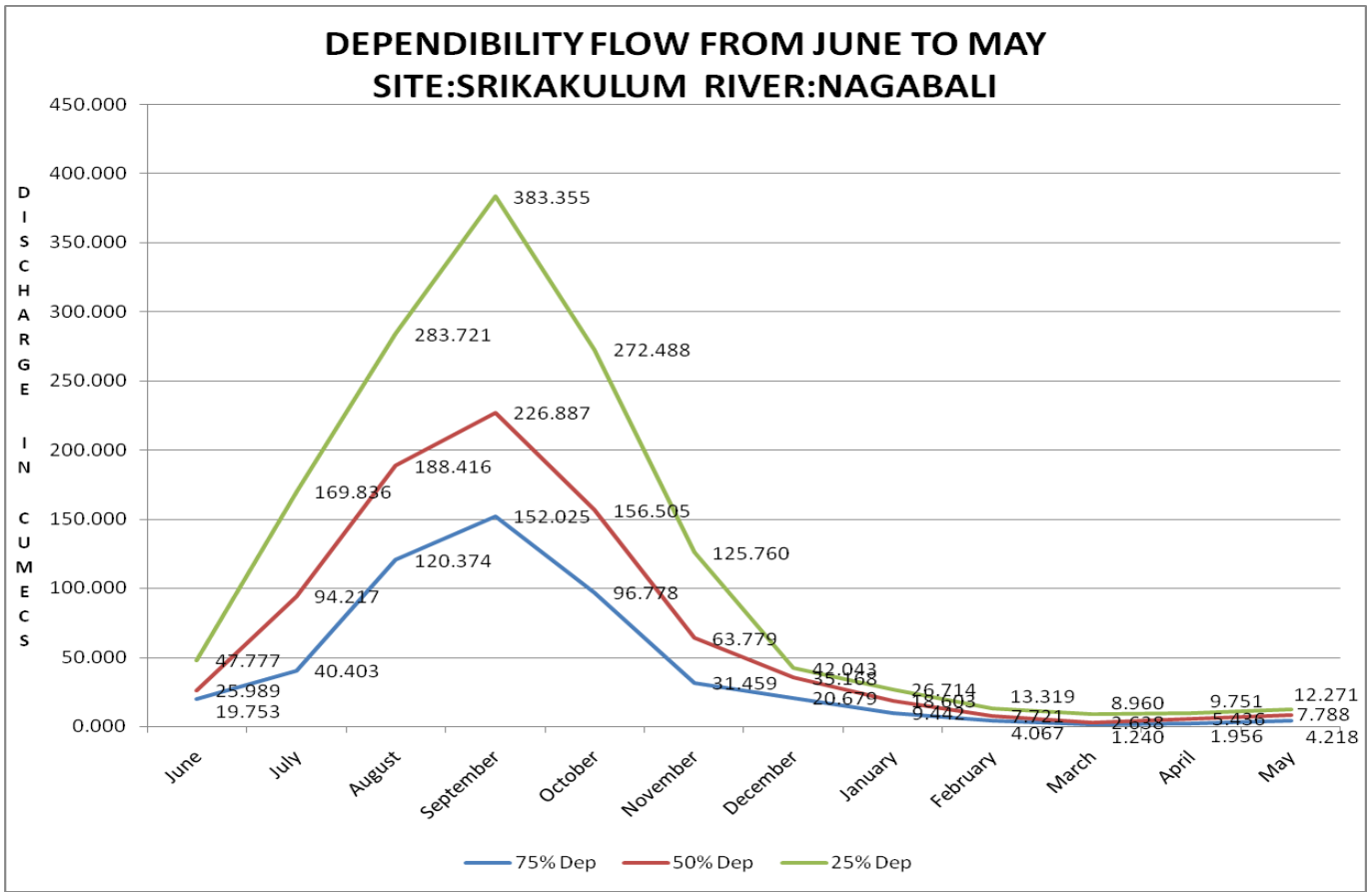
Local River : Nagavali **River Water** **Sub-Division : Behrampur**

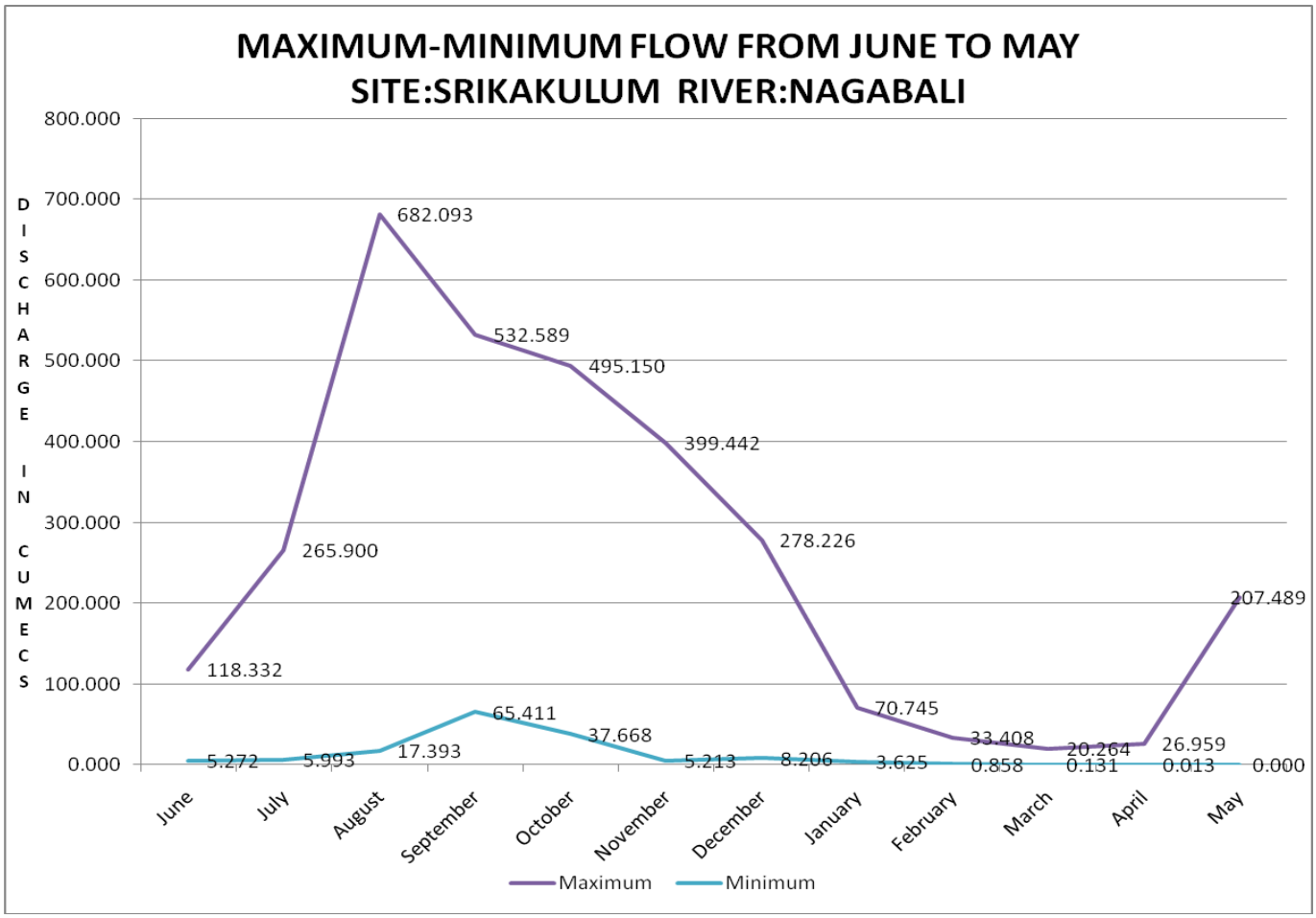
S.No	Parameters	Summer								
		Mar - May								
		2008	2009	2010	2011	2012	2013	2014	2015	2016
	PHYSICAL									
1	Q (cumec)									
2	EC_FLD (µmho/cm)	298		480	430	380	295	295	510	899
3	EC_GEN (µmho/cm)	290		280	430	380	295	295	510	908
4	pH_FLD (pH units)	8.2		8.4	8.0	8.0	7.4	7.9	8.1	7.8
5	pH_GEN (pH units)	8.2		8.4	8.0	8.0	7.4	7.9	8.1	7.8
6	Temp (deg C)	32.4		25.0	18.5		31.2	26.5	27.5	30.0
	CHEMICAL									
1	Alk-Phen (mgCaCO3/L)	0.0		0.5	0.0	0.0			0.0	0.0
2	ALK-TOT (mgCaCO3/L)	105		170	171	157			120	74
3	B (mg/L)	0.00		0.00	0.00	0.01	0.00	0.00	0.00	0.01
4	Ca (mg/L)	32		29	32	21	33	16	45	30
5	Cl (mg/L)	28.0		35.3	24.5	17.0	22.3	14.6	17.0	22.6
6	CO3 (mg/L)	0.0		0.6	0.0	0.0	0.0	0.0	0.0	0.0
7	F (mg/L)	0.06		0.05	0.05	0.05	0.05	0.05	0.05	0.05
8	Fe (mg/L)	0.1		0.1	0.1	0.0	3.7	0.0	0.2	0.4
9	HCO3 (mg/L)	128		207	208	192	122	84	146	90
10	K (mg/L)	2.0		3.5	2.7		9.2	1.0	2.5	1.5
11	Mg (mg/L)	8.9		24.3	19.4	24.3	8.3	4.3	25.3	12.6
12	Na (mg/L)	18.1		25.3	16.1		21.5	12.4	19.4	5.0
13	NO2+NO3 (mg N/L)	0.55		0.85	0.62	0.36	14.29	0.48	0.71	1.05
14	NO2-N (mgN/L)	0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.00
15	NO3-N (mgN/L)	0.55		0.85	0.62	0.29	14.29	0.48	0.71	1.05
16	o-PO4-P (mg P/L)	0.010		0.000						
17	P-Tot (mgP/L)	0.003		0.001	0.001	0.010	0.001	0.001	0.001	0.010
18	SiO2 (mg/L)	12.3		8.6	11.0	8.0	24.2	12.3	6.0	5.0
19	SO4 (mg/L)	9.4		9.1	7.3	7.0	12.3	16.2	8.0	5.7
	BIOLOGICAL/BACTERIOLOGICAL									
	TRACE & TOXIC									
	CHEMICAL INDICES									
1	HAR_Ca (mgCaCO3/L)	80		72	80	52	83	41	113	76
2	HAR_Total (mgCaCO3/L)	117		173	161	153	118	58	218	129
3	Na% (%)	25		24	18		27	31	16	8
4	RSC (-)	0.0		0.0	0.2	0.1	0.0	0.2	0.0	0.0
5	SAR (-)	0.7		0.8	0.6		0.9	0.7	0.6	0.2
	PESTICIDES									

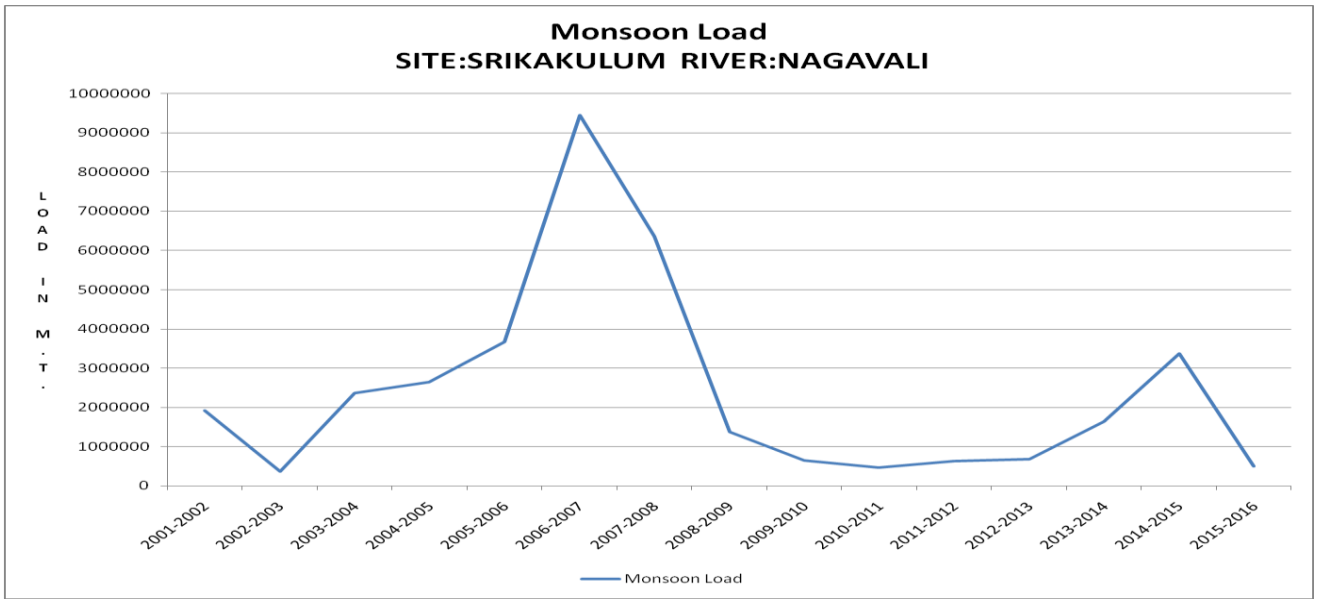
TREND ANALYSIS

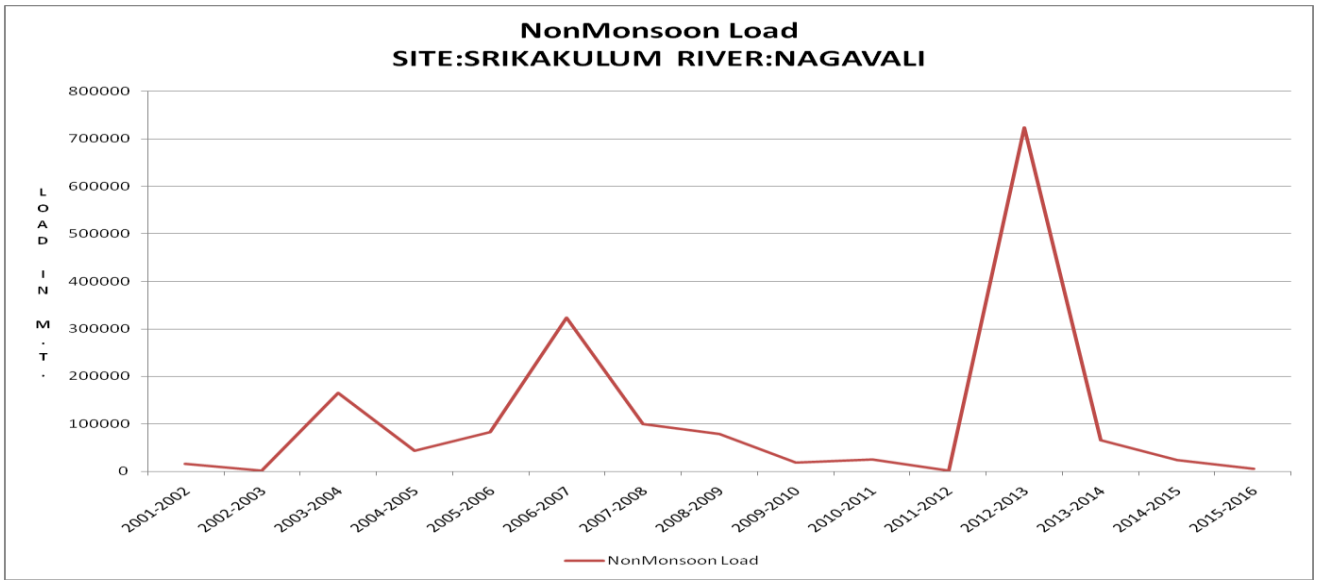

TOTAL ANNUAL DISCHARGE
SITE:SRIKAKULAM RIVER:NAGAVALI
DISCHARGE IN CUMECS
80000.000
70000.000
60000.000
50000.000
40000.000
30000.000
20000.000
10000.000
0.000
1990-1991
1991-1992
1992-1993
1993-1994
1994-1995
1995-1996
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Monsoon
Annual Runoff

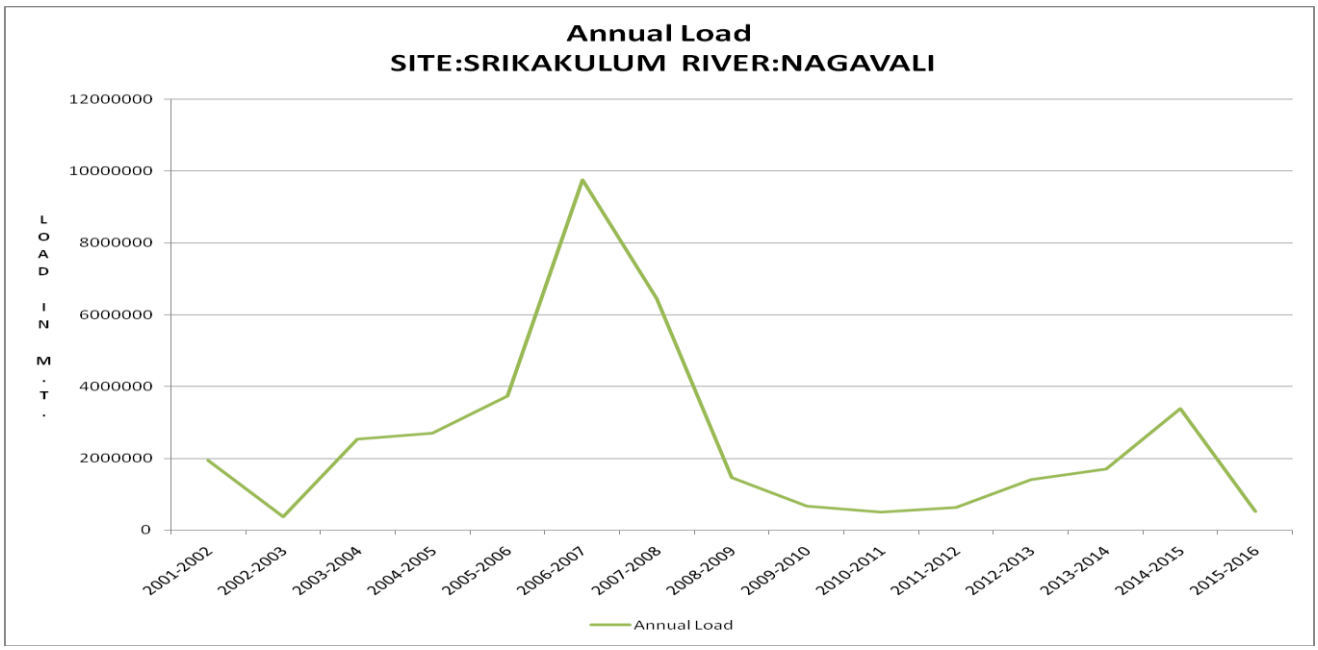

TOTAL ANNUAL DISCHARGE
SITE:SRIKAKULAM RIVER:NAGAVALI
DISCHARGE IN CUMECS
30000.000
25000.000
20000.000
15000.000
10000.000
5000.000
0.000
1990-1991
1991-1992
1992-1993
1993-1994
1994-1995
1995-1996
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Non-Monsoon

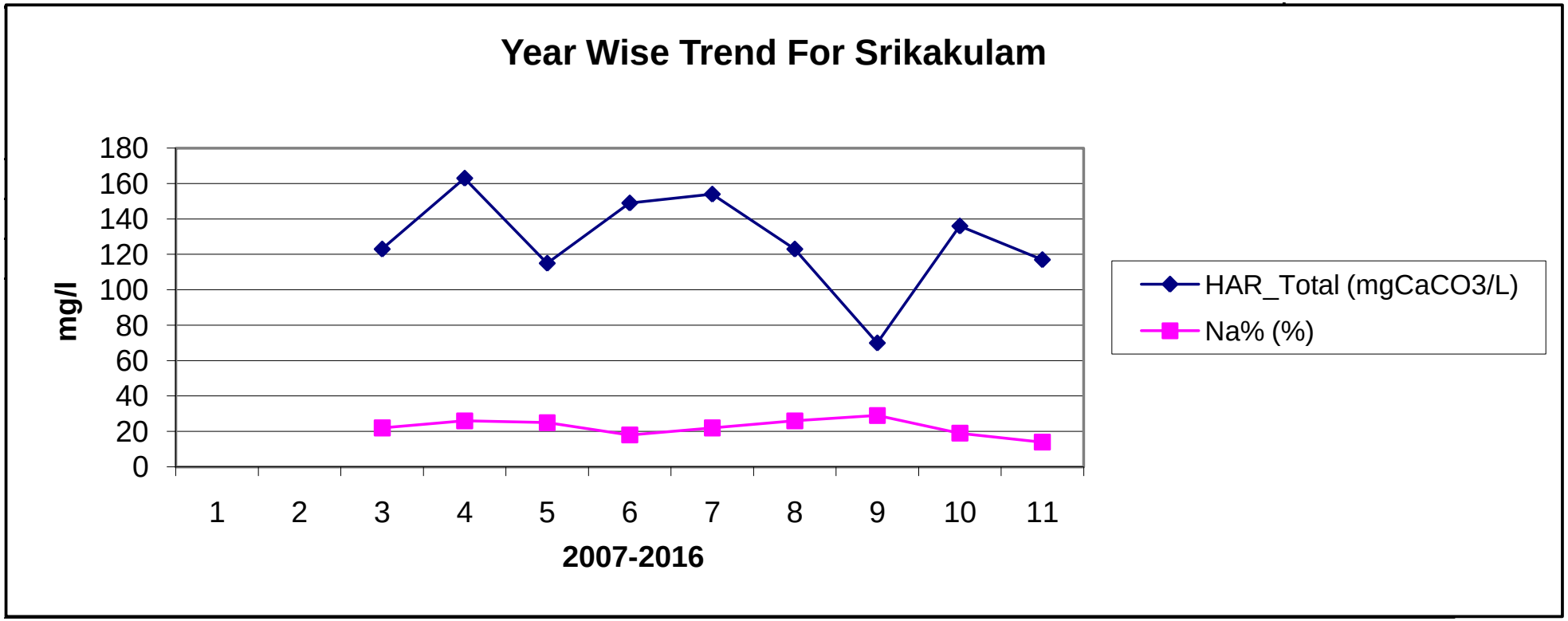

DEPENDIBILITY FLOW FROM JUNE TO MAY
SITE:SRIKAKULUM RIVER:NAGABALI
DISCHARGE IN CUMECS
450.000
400.000
350.000
300.000
250.000
200.000
150.000
100.000
50.000
0.000
383.355
283.721
272.488
226.887
188.416
169.836
156.505
152.025
125.760
120.374
96.778
94.217
63.779
47.777
42.043
40.403
35.168
31.459
26.714
25.989
20.679
19.753
18.603
13.319
9.442
9.751
8.960
7.721
7.788
5.436
4.067
2.638
1.956
1.240
12.271
4.218
June
July
August
September
October
November
December
January
February
March
April
May
75% Dep
50% Dep
25% Dep

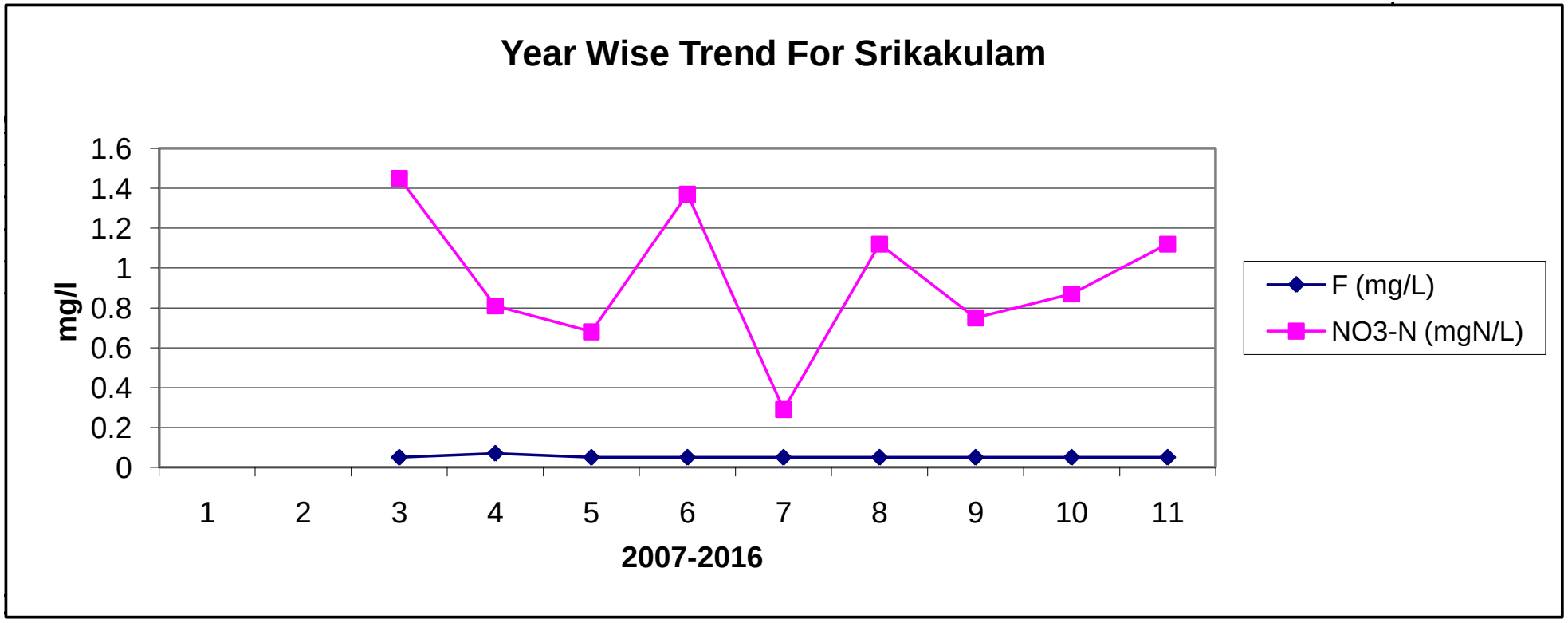

MAXIMUM-MINIMUM FLOW FROM JUNE TO MAY
SITE:SRIKAKULUM RIVER:NAGABALI
DISCHARGE IN CUMECS
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
682.093
532.589
495.150
399.442
278.226
265.900
207.489
118.332
70.745
65.411
37.668
33.408
26.959
20.264
17.393
5.272
5.993
5.213
8.206
3.625
0.858
0.131
0.013
0.000
June
July
August
September
October
November
December
January
February
March
April
May
Maximum
Minimum

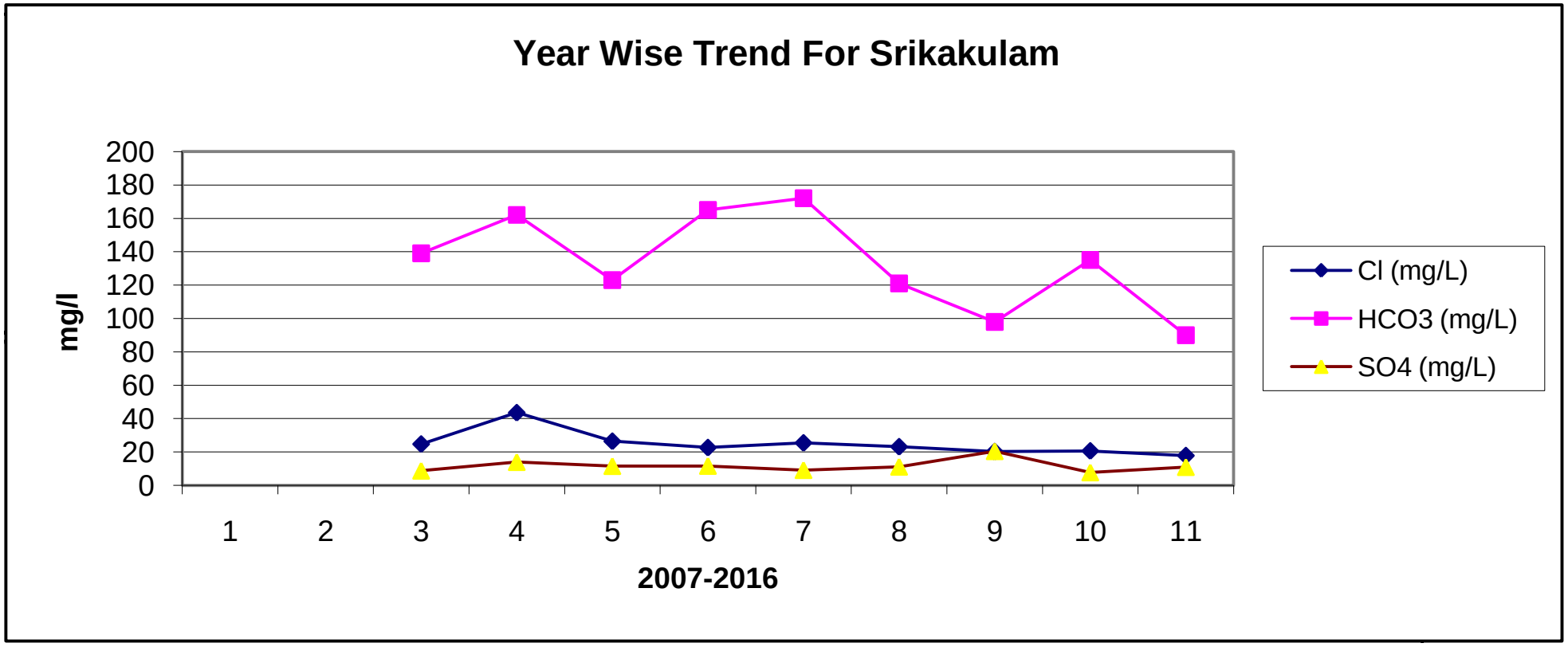

Monsoon Load
SITE:SRIKAKULUM RIVER:NAGAVALI
LOAD IN M.T.
10000000
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Monsoon Load

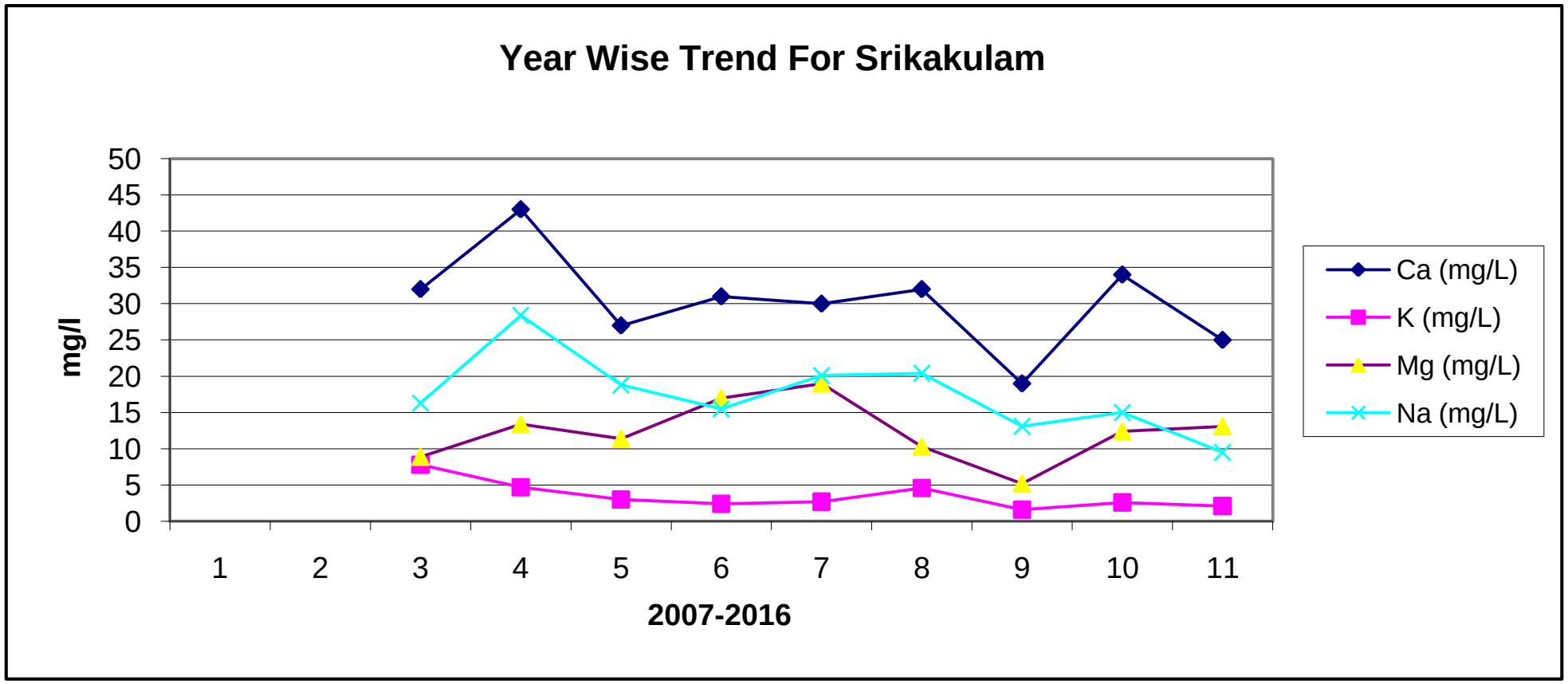

NonMonsoon Load
SITE:SRIKAKULUM RIVER:NAGAVALI
LOAD IN M.T.
800000
700000
600000
500000
400000
300000
200000
100000
0
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
NonMonsoon Load


Annual Load
SITE:SRIKAKULUM RIVER:NAGAVALI
LOAD IN M.T.
12000000
10000000
8000000
6000000
4000000
2000000
0
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Annual Load


Year Wise Trend For Srikakulam
mg/l
180
160
140
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
HAR_Total (mgCaCO3/L)
Na% (%)


Year Wise Trend For Srikakulam
mg/l
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
F (mg/L)
NO3-N (mgN/L)


Year Wise Trend For Srikakulam
mg/l
200
180
160
140
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
Cl (mg/L)
HCO3 (mg/L)
SO4 (mg/L)


Year Wise Trend For Srikakulam
mg/l
50
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
2007-2016
Ca (mg/L)
K (mg/L)
Mg (mg/L)
Na (mg/L)

SARADA BASIN

SARADA BASIN

1 GENERAL

1.1 Introduction

River Sarada, an east flowing medium sized river, lies in the district of Visakhapatnam of Andhra Pradesh. The geographical co-ordinates of the river are North latitude 17 °25′ to 18°17′ and East longitude 82°32′ to 83°06′. The basin is surrounded by Nagavali in the North, Gostari, Gambi Ramgedda, Megadnigedda in the East, Bay of Bengal in the South and Machhkund sub- basin of the Godavari in the West. The catchment area of the basin is 2665 sq. km. It rises at an elevation of 1000 m near Longuparu village and runs a distance of 122 km before out-falling in the Bay of Bengal.

Basin Map of Sarada river system showing the various hydrological and hydrometeorological observation stations maintained by CWC, State Government and the India Meteorological Department is enclosed herewith.

1.2 River system

Details of the important tributaries of the river Sarada is tabulated below:

Name of River	River/Tributary	Length (km)	Catchment area (sq.km)	Percentage of total catchment area
Sarada	Mainstream	122	1,577	59.2
Bodderu	Left Tributary	19	125	4.7
Pedderu	Right Tributary	54	963	36.1
		Total	2,665	100.0

1.3 Climatic Characteristics

This basin is generally influenced by south west monsoon. The average annual rainfall of the basin is around 1000 mm. The maximum temperature in the basin rises up to 42.5°C during May and goes down to 18ºC in December-January.

1.4 Geology

Deposits of the basin are alluvium, beach sands and laterite soils. Bed soil of clay, sand, gravel and boulders stretch all along the coast except near to Visakhapatnam city. Important minerals found in the basin are Manganese, Quartz, Graphite, Mica, Bauxite, Aluminium and Fire Clay.

1.5 Site Details

Sl.No.	Name of Project	River	Status
1.	Raiwada	Sarada	Existing
2.	Konam	Bodderu (Tributary)	Ongoing
3.	Pedderu	Pedderu (Tributary)	Ongoing

2. STREAM FLOW DATA

2.1 Methodology

Area-velocity method is generally adopted for measuring discharge at sites. Cup type current meter is used to measure the velocity of the flow and the depth is measured by

using sounding rod for depths upto 3 m and by log line beyond 3 m. Discharge by area velocity method is being observed once in a day starting at 0800 Hrs. at all the sites except on Sundays and holidays. Besides, silt and water quality observation are also being carried out at sites of CWC, as listed above.

The observed stage and discharge figures for each season (monsoon and non-monsoon) are plotted and a mean Stage V/s. Discharge curve is drawn, giving due attention to the scattered points with reference to area, velocity etc.

The factors responsible for the shifting of the curves are also taken care of by studying the river cross section at regular intervals and with super imposition of previous years' Stage V/s. Discharge curves. Accordingly, the trend of the current curve is finalised. Finally, the discharges of the non observed days are computed from these Stage V/s. Discharge Curves..

2.2 Data Availability

Code No.	Station Name	Type	Data available	
			From	To
AS000S3	Anakapalli	G & D	G-01.12.87 D-06.08.89	Continuing -do-

2.3 Explanatory Notes on Water Year Book

SWDES (Surface Water Data Entry Software), a custom made software for processing hydrological data, has been used for preparation of this volume. The explanatory notes described below can be used for interpretation of data presented in this volume.

i) Water Year ranges from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.

ii) Discharge is given in cubic meters per second.

iii) Discharges are expressed as 0.000 when river bed is dry and 0.000 N.F. when velocity is observed as 'NIL'.

iv) The zero R.L. of gauge is a datum level fixed for given site, which is kept 1 or 2 m lower than the lowest water level recorded in a perennial stream. In a non-perennial stream, it is kept 1 or 2 m lower than the lowest bed level of the stream.

v) Discharges are rounded off as per standard practice.

vi) Runoff in mm is the notional depth of water in millimeters over the catchment, equivalent to annual runoff volume calculated at the discharge measurement station. It is computed using the relation:

$$\text{Runoff (mm)} = \frac{\text{Annual runoff } (Mm^3) \times 1000}{\text{Catchment area } (km^2)}$$

vii) Peak and lowest flow correspond to the highest and lowest water levels recorded from 'SWDES' entered data.

viii) Measuring Authority refers to the field division of Central Water Commission (Eastern Rivers Division) responsible for the operation of the gauging station.

ix) The gauging station code number is a unique seven column alphanumeric reference number which facilitates storage and retrieval of flow data in data base. The first column is identifier of either an integral river basin or, for the sake of convenience, a region having several contiguous river catchments. This is followed by a column which identifies an independent river system which either has one or more outlets to the sea or crosses international border to enter another country. The third, fourth and fifth column spaces denote first, second and third order tributaries, respectively, from the mouth upstream. The sixth and seventh column spaces indicate the location of the gauging station in one of the 225 slots earmarked on the river. The blank column spaces are filled by zero.

3. HYDROLOGICAL DATA

This volume contains the following information for each site stated above:

i. History Sheet: Site Name, State, District, River Basin, Tributary, Sub-Tributary, Catchment Area, Latitude / Longitude, Opening / Closing date for various types of data.
ii. Annual maximum/minimum discharge since period of observation.
iii. Daily Water level and observed/ computed discharge data including 10-daily, monthly and annual totals etc.
iv. Histogram and Hydrograph showing current year monthly mean discharges, Historical monthly mean discharges, historical monthly minimum and monthly maximum discharges.
v. Histogram showing Annual Run off volume since beginning of observation
vi. Pie-Chart showing monthly mean run off (as percentage of Annual Run off) historical for the current year.
vii. Plot of Pre and Post Monsoon Cross-section of the rivers for current year.
viii. Water Level hydrograph for 3(three) major flood events of current year.

4. SEDIMENT DATA (In case of Sediment Observation sites)

The frequency of sediment observation is carried out daily during monsoon season and once in a week (on Monday) during the non-monsoon period. Data for non-observed days is estimated/ interpolated from the relationship of discharge v/s. sediment load, prepared on the basis of observed sediment concentration and weighted mean discharge of the same year.

Sediment samples are collected from 0.6 depth, using Punjab type bottle sampler, from all the verticals along the hydrological observation sections where velocity is observed for computation of discharge. The collected samples from all the segments are combined in 3 to 7 groups having compartments or groups of equal or nearly equal discharges for analysis. Quantum of suspended sediment load is estimated in three grades, viz. Coarse, Medium and Fine. Coarse and medium grades are separated by sieving process and the fine grade by filtration of left over samples after sieving through filter paper. Grade wise concentration is derived gravimetrically as per standard procedure. The following parameters are derived and recorded:

- Daily Observed suspended sediment (g/l).
- Corresponding discharge.
- Average sediment load in tonnes/day (10 daily & monthly basis).
- Annual sediment load for the current year.
- Annual & Seasonal sediment load and the corresponding volume of inflow for all the years since inception.
- Grain size distribution of bed load.

3. WATER QUALITY DATA (In case of Water Quality Observation sites)

The water samples are collected at a regular interval of once in a month for trend stations and once in two month for base station (on 1st working day), from the main flowing segment of the stream just below the water surface (20 to 30 cm) on the Station Gauge line where depth of flow and velocity are maximum, preferably in the mid stream. The water samples are collected in the pre-rinsed and cleaned one-litre capacity polythene bottle having double stopper (inside and outside) facility. Sampling bottle is filled to its full capacity without entrapping air bubbles inside.

After sampling, the collected samples are sent to the Water Quality Laboratory (Level-II) based at Bhubaneswar (under the Eastern Rivers Division) and to Raipur laboratory (under Mahanadi Division, Burla), along with in-situ physical characteristics, for analysis. The samples received from the sites are preserved in a refrigerator in the water quality laboratories for analysis**.**

Analysis of parameters, namely pH, Electrical conductivity, Sodium, Potassium, Iron, Aluminum, Ammonia, Fluoride, Nitrate, Nitrite, Phosphate, Silicate, Boron, Sulphate, Calcium, Magnesium, Carbonate, Bi-carbonate, Chloride, Dissolved Oxygen, BOD and COD, are carried out at the Level II laboratory by using standard methodology. Micro biological parameters like total colliform and faecal colliform are also being analyzed. For analysis of trace and toxic elements, samples are sent to Level-II+ laboratory at Hyderabad once in a year, in the month of April.

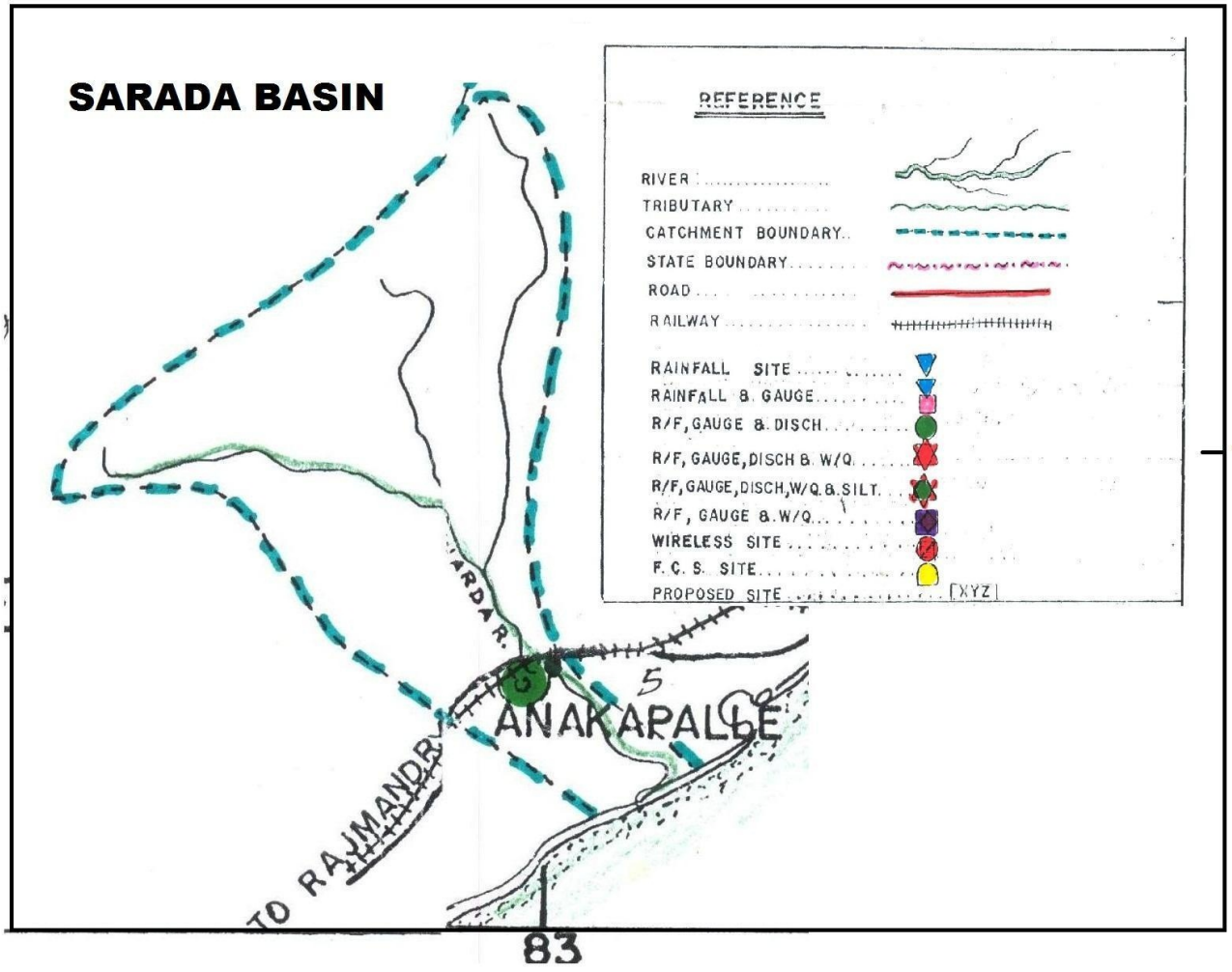
The following parameters are analyzed and recorded:

- Monthly Values: Physical; Chemical (mg/l); Biological (mg/l); Traces & Toxic (mg/l) and Chemical Indices.

- Average Values for the Year: 10 Years data to be given season wise averages:-
  - Average for Summer (March to June).
  - Average for Floods (July to October).
  - Average for Winter (November to February)
  -

NAME OF THE SITE IN OPERATION UNDER SARADA BASIN

Sl. No.	Station Name	River/ Tributary	Code No.	Type	Latitude	Longitude
1.	Anakapalli	Sarada	AS000S3	G & D	17°-.41-'00"	85°-35-'00"


SARADA BASIN
REFERENCE
RIVER
TRIBUTARY
CATCHMENT BOUNDARY
STATE BOUNDARY
ROAD
RAILWAY
RAINFALL SITE
RAINFALL & GAUGE
R/F, GAUGE & DISCH
R/F, GAUGE, DISCH & W/Q
R/F, GAUGE, DISCH, W/Q & SILT
R/F, GAUGE & W/Q
WIRELESS SITE
F. C. S. SITE
PROPOSED SITE
XYZ
ANAKAPALLE
TO RAJMANDRY
83

18

HYDROLOGICAL DATA

HISTORY SHEET

Water Year : 2015-2016

Site : ANAKAPALLI **Code : AS000S3**

State	:	Andhra Pradesh	District		Visakhapatnam
Basin	:	EFR B Mahanadi-Godavari	Independent River	:	Sarada
Tributary	:		Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Sarada
Division	:	E.E., Bhubaneswar	Sub-Division	:	Behrampur
Drainage Area	:	2090 Sq. Km.	Bank	:	Left
Latitude	:	17°41'00"	Longitude	:	83°01'08"
Zero of Gauge (m)	:	20.4 (m.s.l)	01.01.1987	-	12.01.2090
		Opening Date	Closing Date		
Gauge	:	01.12.1987			
Discharge	:	16.08.1989			
Sediment	:				
Water Quality	:				

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)

	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1991-1992	114.2	22.800	12.10.1991	0.000	20.770	23.05.1992
1992-1993	499.7	24.250	10.10.1992	0.000	20.785	21.05.1993
1993-1994	64.72	22.378	22.10.1993	0.000	20.400	07.04.1994
1994-1995	250.5	23.500	11.05.1995	0.000	20.400	03.04.1995
1995-1996	571.1	23.975	11.10.1995	0.000	20.590	24.04.1996
1996-1997	897.0	25.100	03.10.1996	0.000	20.610	24.03.1997
1997-1998	130.8	22.590	25.09.1997	0.000	20.490	17.05.1998
1998-1999	887.0	25.200	16.11.1998	0.000	20.560	05.05.1999
1999-2000	96.34	22.340	11.10.1999	0.000	20.330	17.04.2000
2000-2001	157.8	22.600	26.08.2000	0.000	20.010	21.03.2001
2001-2002	93.94	22.555	08.10.2001	0.000	19.780	28.04.2002
2002-2003	24.95	22.060	16.10.2002	0.000	19.600	26.02.2003
2003-2004	280.5	23.600	25.10.2003	0.000	20.520	21.04.2004
2004-2005	153.2	23.690	14.06.2004	0.000	20.560	13.04.2005
2005-2006	572.7	23.950	15.10.2005	0.000	20.400	02.08.2005
2006-2007	374.2	23.540	04.08.2006	0.000	20.520	10.05.2007
2007-2008	542.1	24.050	06.10.2007	0.000	21.400	07.03.2008
2008-2009	179.2	22.920	12.09.2008	1.125	20.680	06.03.2009
2009-2010	140.9	22.550	03.10.2009	0.000	20.710	26.01.2010
2010-2011	590.0	23.720	09.12.2010	0.000	20.680	07.05.2011
2011-2012	308.9	22.800	03.09.2011	0.000	20.410	19.05.2012
2012-2013	3981	27.480	04.11.2012	1.070	20.690	18.04.2013
2013-2014	850.5	24.430	27.10.2013	0.000	20.850	05.04.2014
2014-2015	767.9	24.550	13.10.2014	0.000	20.790	21.07.2014
2015-2016	366.3	23.315	20.09.2015	0.000	20.710	13.04.2016

Q : Observed / Computed Discharge WL : Corresponding Water Level(m.s.l)

Stage-Discharge Data for the period 2015 - 2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**

Day	Jun		Jul		Aug		Sep		Oct		Nov	
	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q
1			21.620	12.38	21.530	4.328	21.710	21.27	21.900	34.29	21.710	23.20 *
2	20.880		21.610	11.04	21.540	5.100 *	21.710	21.07	21.880	32.90 *	21.870	33.97
3	20.880		21.580	9.383	21.520	4.185	21.740	21.16	21.900	34.80	21.800	27.89
4	20.860		21.560	7.970	21.470	2.691	21.710	19.02	21.840	31.00 *	21.710	23.43
5	20.860		21.560	7.900 *	21.440	2.059	21.840	34.96	21.800	25.48	21.640	20.85
6	20.860		21.570	8.111	21.420	2.000	21.900	45.00 *	21.760	22.51	21.620	16.83
7	20.840		21.550	6.089	21.390	1.709	22.210	80.52	21.720	20.56	21.630	18.09
8	20.890		21.520	4.603	21.350	1.709	22.210	58.71	21.710	19.97	21.590	14.70 *
9	20.970		21.480	3.303	21.530	6.100 *	21.970	46.72	21.700	19.22	21.580	11.67
10	20.970		21.460	2.496	21.520	5.740	21.900	37.64	21.670	16.61	21.580	11.36
11	21.320	4.295	21.460	2.493	21.780	29.70	21.940	42.54	21.630	13.30 *	21.590	12.20 *
12	21.290	3.219	21.460	2.500 *	22.280	83.25	21.880	36.88	21.620	14.38	21.560	9.858
13	21.290	3.199	21.390	1.392	22.740	173.6	22.340	140.0 *	21.590	12.17	21.550	9.295
14	21.510	6.700 *	21.600	9.022	22.295	85.25	22.345	142.7	21.580	11.18	21.530	8.039
15	21.550	7.352	21.670	19.70	22.090	62.50 *	22.475	196.1	21.580	11.21	21.520	9.865 *
16	21.530	7.021	21.680	20.29	21.970	47.86 *	22.650	264.2	21.880	34.49	21.540	9.028
17	21.530	7.190	21.640	16.38	21.890	39.83	22.660	271.0 *	21.850	30.40	21.560	9.851
18	21.960	47.39	21.610	14.40 *	22.140	67.12	22.395	172.7	21.740	26.60 *	21.670	17.04
19	21.800	29.57	21.580		22.070	60.39	22.550	227.3	21.710	24.19	21.750	24.10
20	21.940	46.60	21.540		21.955	46.06	23.315	366.3	21.660	22.20	21.680	18.09
21	22.030	57.00 *	21.550	4.719	21.955	45.73	22.640	257.6	21.620	16.50 *	21.650	15.66
22	21.940	46.33	21.540	4.630	21.830	31.52	22.450	191.3	21.600	13.60 *	21.610	13.60 *
23	21.860	36.82	21.530	4.160	21.880	37.20 *	22.350	140.5	21.590	12.84	21.590	12.52
24	21.780	28.92	21.600	9.770	21.830	31.52	22.060	82.33	21.600	13.50 *	21.580	11.81
25	21.710	23.50	21.680	20.97	21.820	31.41	22.100	93.50 *	21.590	12.80 *	21.570	11.30 *
26	21.640	19.17	21.660	17.20 *	22.110	62.12	22.070	85.04	21.570	10.23	21.560	11.41
27	21.600	12.26	21.630	16.21	22.050	55.72	22.140	82.31 *	21.540	8.635	21.560	11.36
28	21.580	10.00 *	21.600	13.09	21.990	51.82	22.060	82.31	21.530	8.144	21.540	9.758
29	21.600	12.39	21.580	9.770	21.920	45.19	22.010	69.28	21.510	7.860	21.540	9.782 *
30	21.600	12.12	21.560	7.511	21.850	34.50 *	21.950	53.08	21.520	8.229	21.540	9.785
31			21.540	4.438	21.780	25.37			21.500	7.700		
Ten-Daily Mean												
I Ten-Daily	20.890		21.551	7.327	21.471	3.562	21.890	38.61	21.788	25.73	21.673	20.20
II Ten-Daily	21.572	16.25	21.563	10.77	22.121	69.55	22.455	186.0	21.684	20.01	21.595	12.74
III Ten-Daily	21.734	25.85	21.588	10.22	21.910	41.10	22.183	113.7	21.561	10.91	21.574	11.70
Monthly												
Min.	20.840	3.199	21.390	1.392	21.350	1.709	21.710	19.02	21.500	7.700	21.520	8.039
Max.	22.030	57.00	21.680	20.97	22.740	173.6	23.315	366.3	21.900	34.80	21.870	33.97
Mean	21.416	21.05	21.568	9.376	21.837	38.17	22.176	112.8	21.674	18.63	21.614	14.88

Annual Runoff in MCM = 563 Annual Runoff in mm = 269

Peak Observed Discharge = 366.3 cumecs on 20/09/2015 Corres. Water Level :23.315 m

Lowest Observed Discharge = 0.000 cumecs on 01/03/2016 Corres. Water Level :20.79 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

Stage-Discharge Data for the period 2015 - 2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	21.520	8.662	21.100	2.400	20.940	0.416	20.790	0.000				
2	21.510	8.197	21.090	2.313	20.940	0.608	20.780	0.000 *	20.680	0.000 *	20.550	
3	21.500	7.745	21.090	2.100 *	21.060	1.727	20.780	0.000 *	20.690	0.000 *	20.550	
4	21.490	7.399	21.070	2.180	21.060	1.719	20.780	0.000 *	20.700	0.000 *	20.550	
5	21.490	7.379	21.070	2.178	21.050	1.641	20.770	0.000 *	20.700	0.000 *	20.540	
6	21.480	7.034 *	21.060	1.671	21.050	1.652	20.760	0.000 *	20.730	0.000 *	20.540	
7	21.480	7.034	21.060	1.667	21.040	1.425 *	20.760	0.000 *	20.740	0.000 *	20.530	
8	21.450	6.322	21.040	1.362	21.040	1.415	21.060	2.314	20.730	0.000 *	20.520	
9	21.450	6.308	21.060	1.911	21.060	1.718	21.020	1.970	20.730	0.000 *	20.510	
10	21.420	5.492	21.070	2.070 *	21.060	1.771	21.000	1.618	20.730	0.000 *	20.500	
11	21.400	5.336	21.040	1.369	21.050	1.599	20.990	1.313	20.740	0.000 *	20.470	
12	21.420	5.517	21.030	1.307	21.050	1.594	20.900	0.922	20.720	0.000 *	20.430	
13	21.400	5.201 *	21.020	1.052	21.050	1.523	20.880	0.000 *	20.710	0.000 *	20.480	
14	21.400	5.273	21.020	1.015	21.070	1.421 *	20.860	0.000 *	20.700	0.000 *	20.480	
15	21.390	4.990	21.020	1.011	21.060	1.344	20.840	0.000 *	20.700	0.000 *	20.480	
16	21.350	4.153	21.010	0.957	21.060	1.270	20.830	0.000 *	20.700	0.000 *	20.470	
17	21.310	3.705	21.010	0.942 *	21.050	1.167	20.830	0.000 *	20.690	0.000 *	20.470	
18	21.300	3.636	21.060	1.688	21.050	1.157	20.820	0.000 *	20.690	0.000 *	20.470	
19	21.220	3.727	21.040	1.362	21.040	1.041	20.810	0.000 *	20.680	0.000 *	20.700	
20	21.200	3.510 *	21.040	1.347	21.040	1.013	20.780	0.000 *	20.670	0.000 *	20.780	
21	21.160	3.091	21.020	0.998	21.030	0.951 *	20.740	0.000 *	20.670	0.000 *	20.950	
22	21.140	3.087	21.000	0.907	20.980	0.647	20.730	0.000 *	20.630	0.000 *	21.350	
23	21.140	3.022	21.000	0.895	20.960	0.543	20.720	0.000 *	20.630	0.000 *	21.260	
24	21.160	3.090 *	21.000	0.861 *	20.940	0.492	20.710	0.000 *	20.630	0.000 *	21.180	
25	21.140	3.026 *	21.000	0.884	20.860	0.450	20.700	0.000 *	20.600	0.000 *	21.110	
26	21.140	3.032	20.990	0.747 *	20.830	0.430 *	20.690	0.000 *	20.590	0.000 *	21.100	
27	21.130	2.910 *	20.980	0.657	20.800	0.400 *	20.690	0.000 *	20.580	0.000 *	21.100	
28	21.130	2.845	20.980	0.636	20.800	0.400 *	20.690	0.000 *	20.560	0.000 *	21.060	
29	21.130	2.694	20.970	0.599	20.790	0.390 *	20.690	0.000 *	20.560	0.000 *	21.050	
30	21.120	2.604	20.970	0.604			20.660	0.000 *	20.560	0.000 *	21.040	
31	21.110	2.508	20.960	0.571 *			20.660	0.000 *			20.980	
Ten-Daily Mean												
I Ten-Daily	21.479	7.157	21.071	1.985	21.030	1.409	20.850	0.590	20.714	0.000	20.532	
II Ten-Daily	21.339	4.505	21.029	1.205	21.052	1.313	20.854	0.224	20.700	0.000	20.523	
III Ten-Daily	21.136	2.901	20.988	0.760	20.888	0.523	20.698	0.000	20.601	0.000	21.107	
Monthly												
Min.	21.110	2.508	20.960	0.571	20.790	0.390	20.660	0.000	20.560	0.000	20.430	
Max.	21.520	8.662	21.100	2.400	21.070	1.771	21.060	2.314	20.740	0.000	21.350	
Mean	21.312	4.791	21.028	1.299	20.993	1.101	20.797	0.262	20.670	0	20.740	

Peak Computed Discharge = 271.0 cumecs on 17/09/2015 **Corres. Water Level :22.66 m**

Lowest Computed Discharge = 0.000 cumecs on 02/03/2016 **Corres. Water Level :20.78 m**

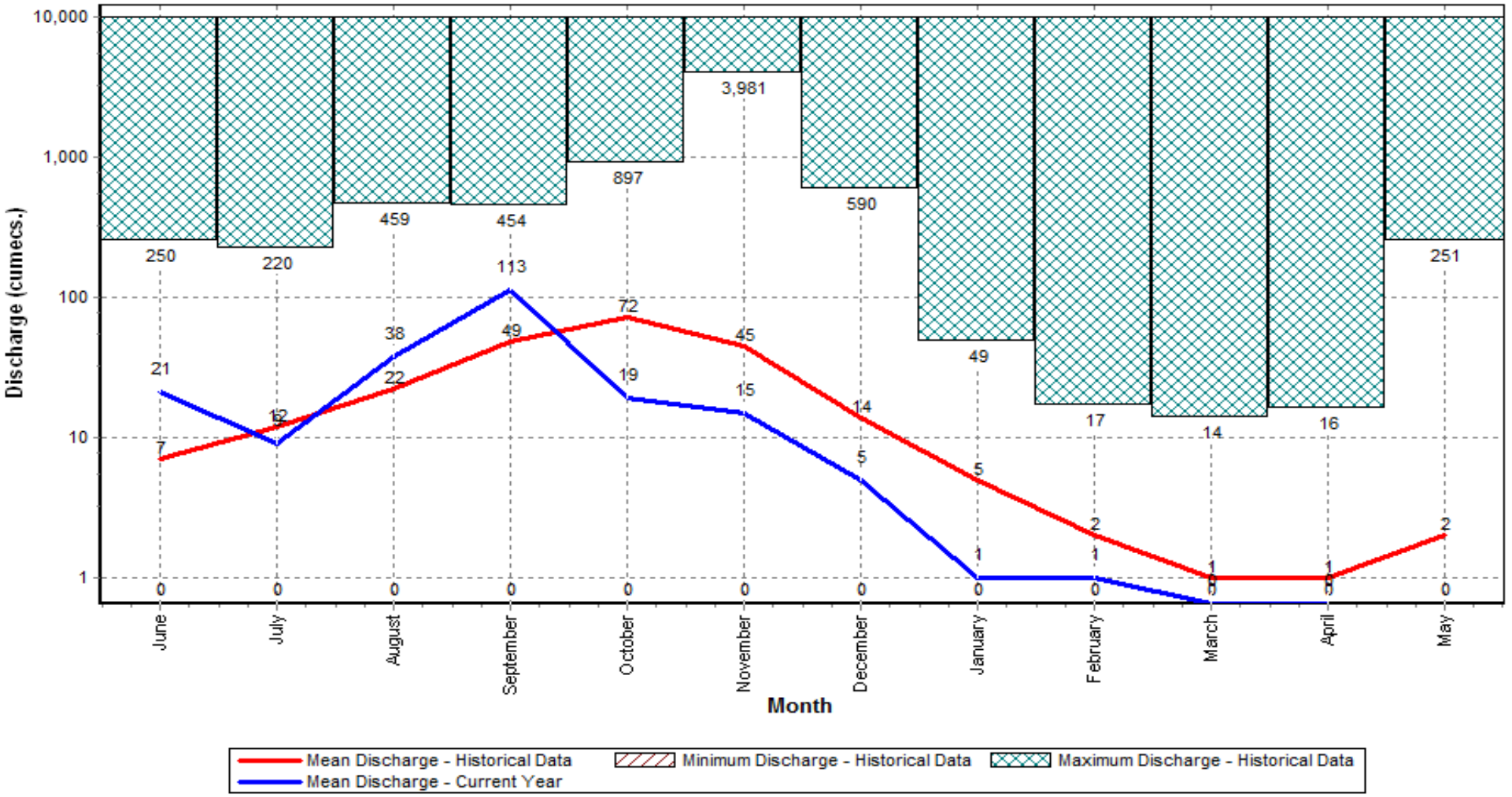
Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(m.s.l) in m *:Computed Discharge

Note:Missing values ignored while arriving at Annual Runoff

HISTOGRAM - HYDROGRAPH for Water Year : 2015-2016

Station Name : ANAKAPALLI (AS000S3) | **Data considered : 1991-2016** | **Division : E.E., Bhubaneswar**

Local River : Sarada | **Sub-Division : Behrampur**



HISTOGRAM - HYDROGRAPH for Water Year : 2015-2016

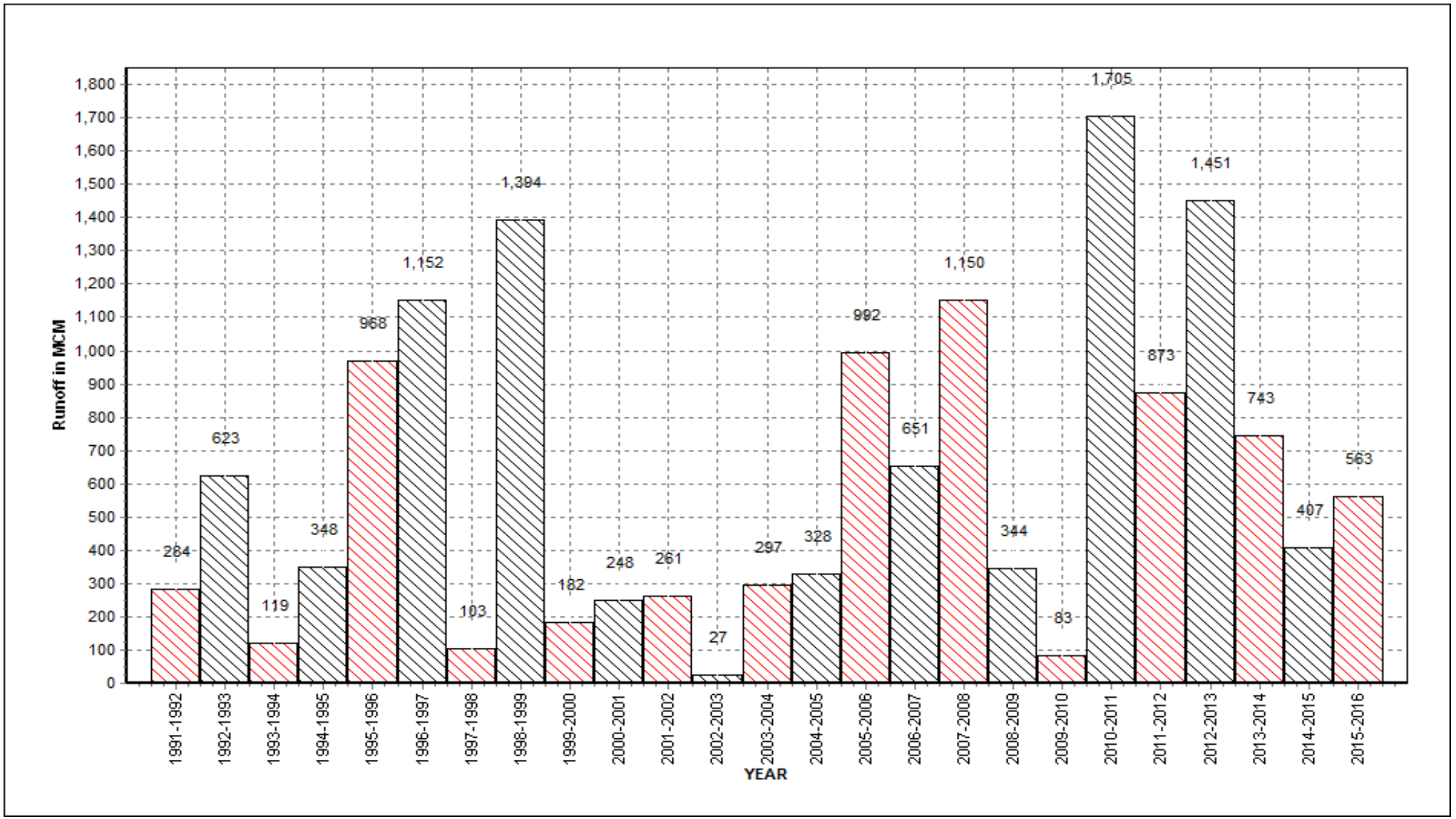
Station Name : ANAKAPALLI (AS000S3) **Data considered : 1991-2016** **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**

Annual Runoff Values for the period: 1991 - 2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**

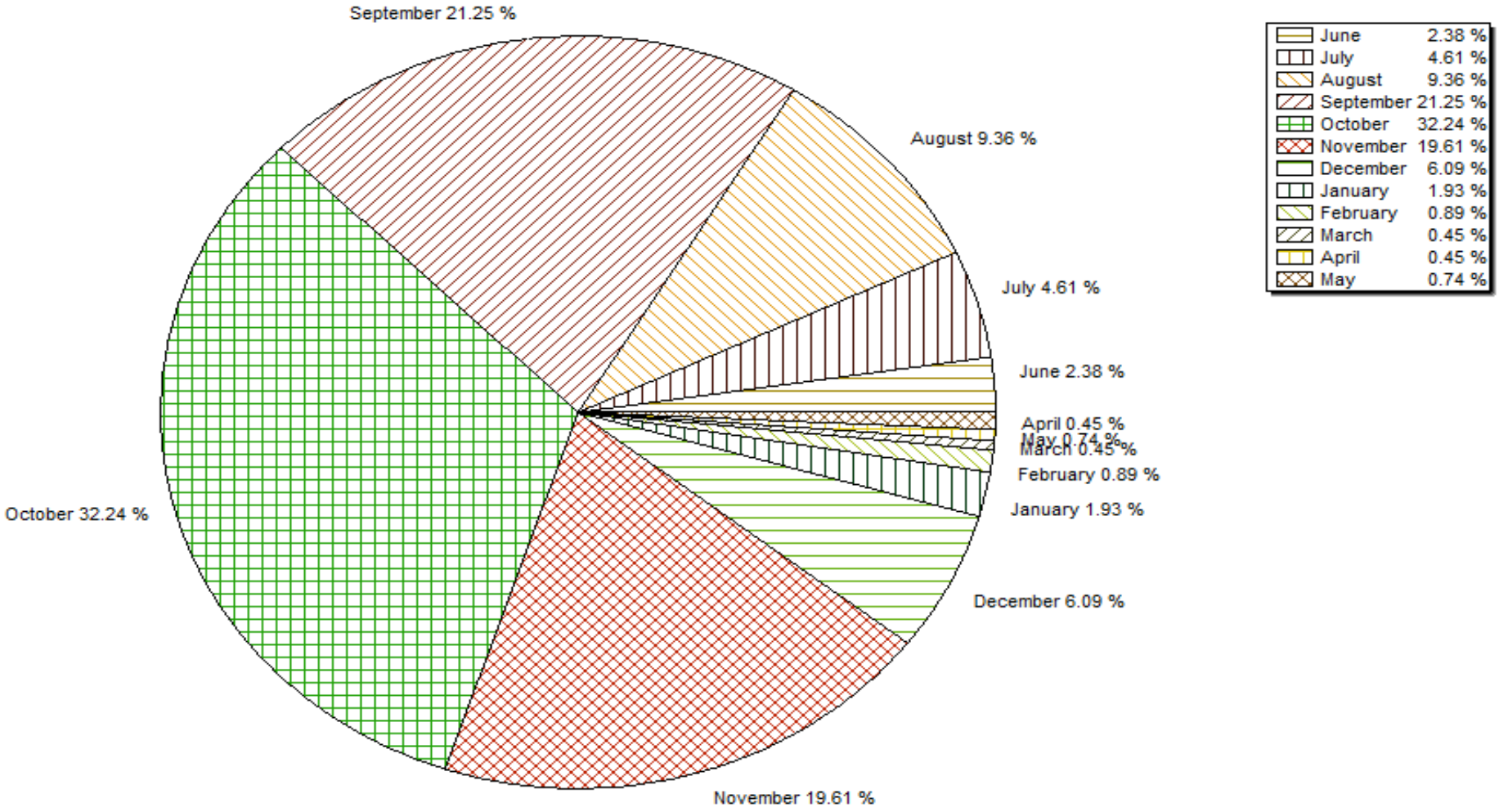


Note: Missing values have not been considered while arriving at Annual Runoff

Monthly Average Runoff based on period : 1991-2015

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

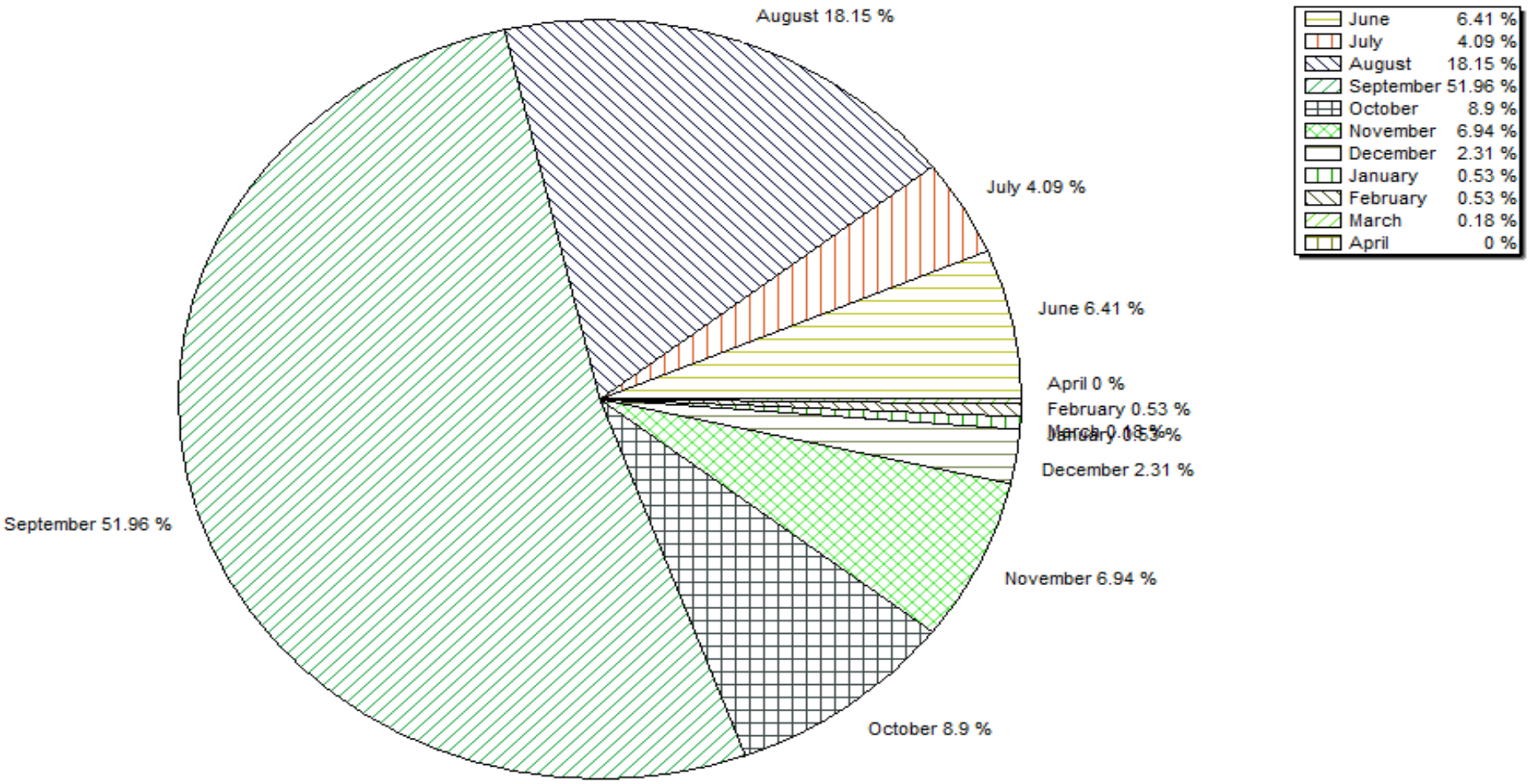
Local River : Sarada **Sub-Division : Behrampur**



Monthly Runoff for the Year : 2015-2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

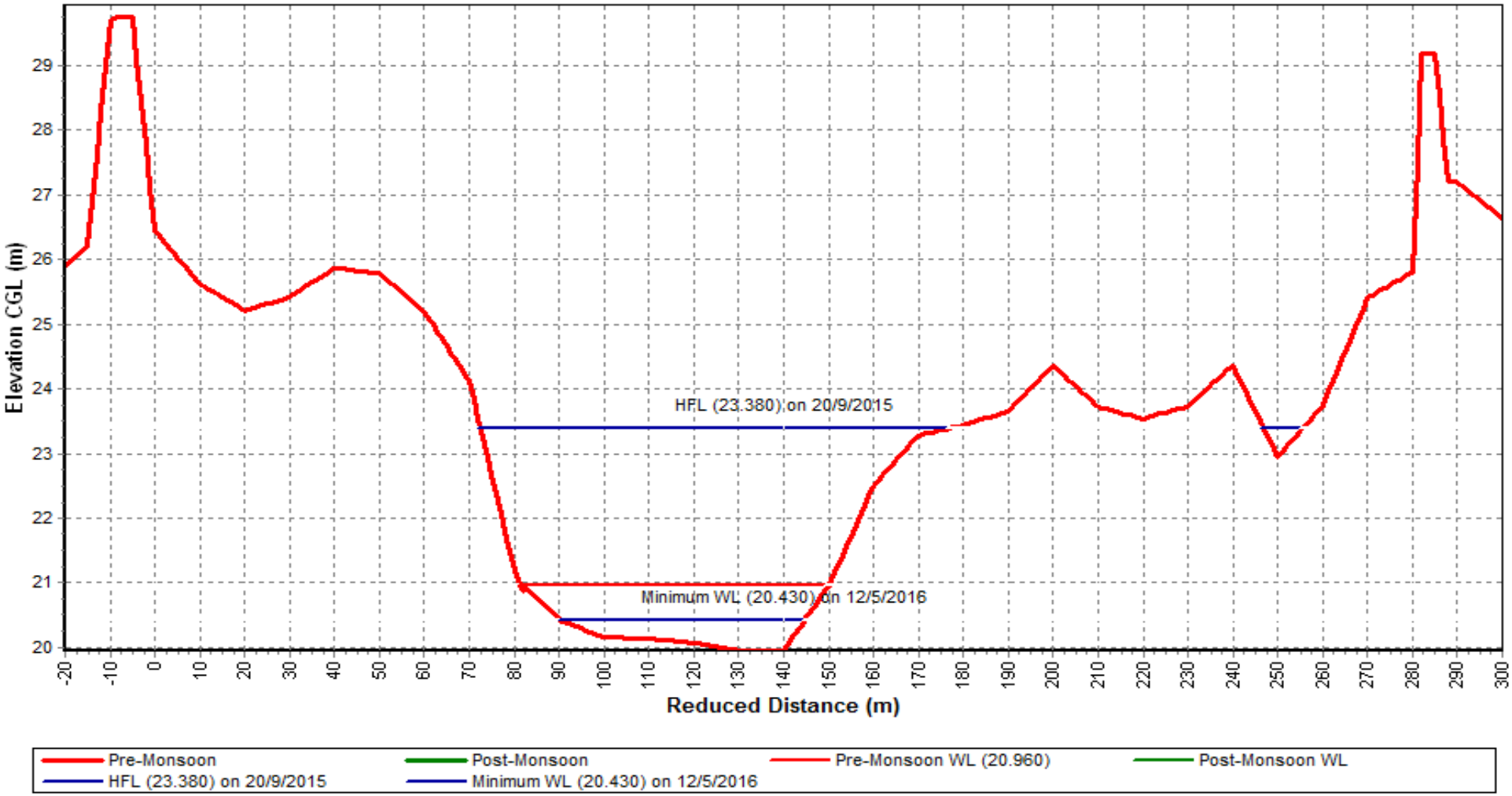
Local River : Sarada **Sub-Division : Behrampur**



Pre-Monsoon & Post-Monsoon X-Section for Water Year : 2015-2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

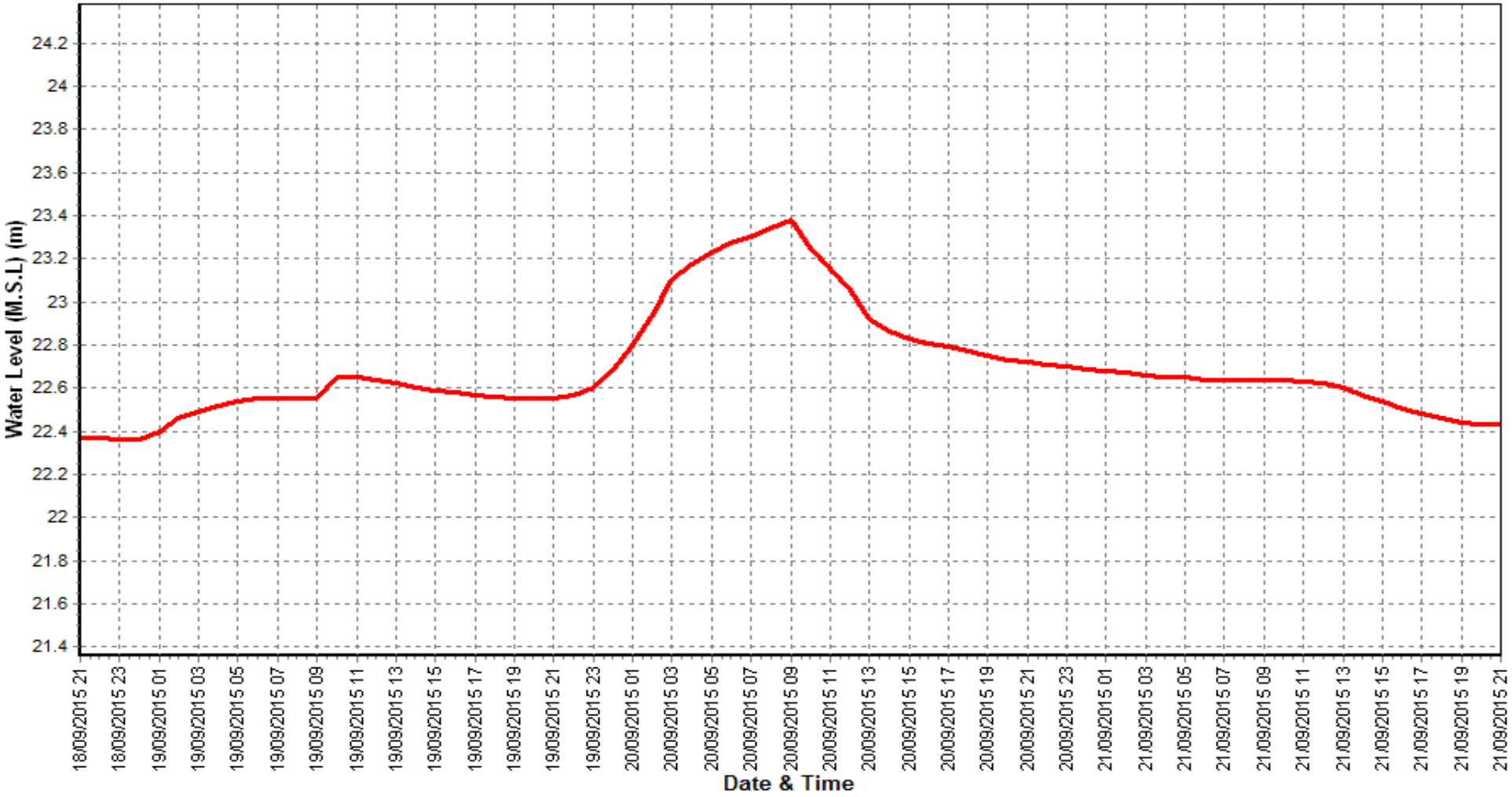
Local River : Sarada **Sub-Division : Behrampur**



Water Level vs. Time - Graph of Highest Flood Peak during the Year : 2015-2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**

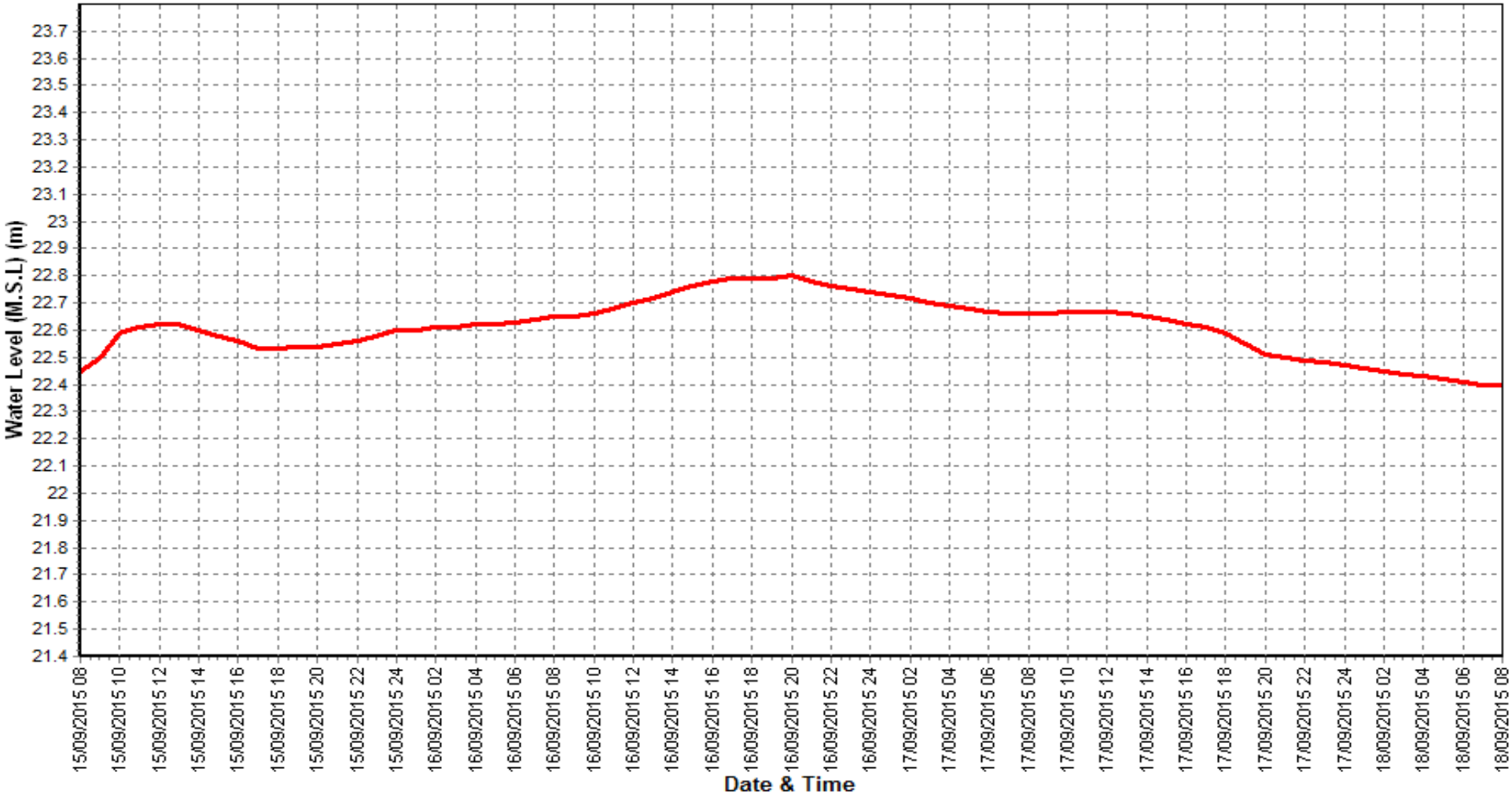


Time Span: 72 Hrs

Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year : 2015-2016

Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**

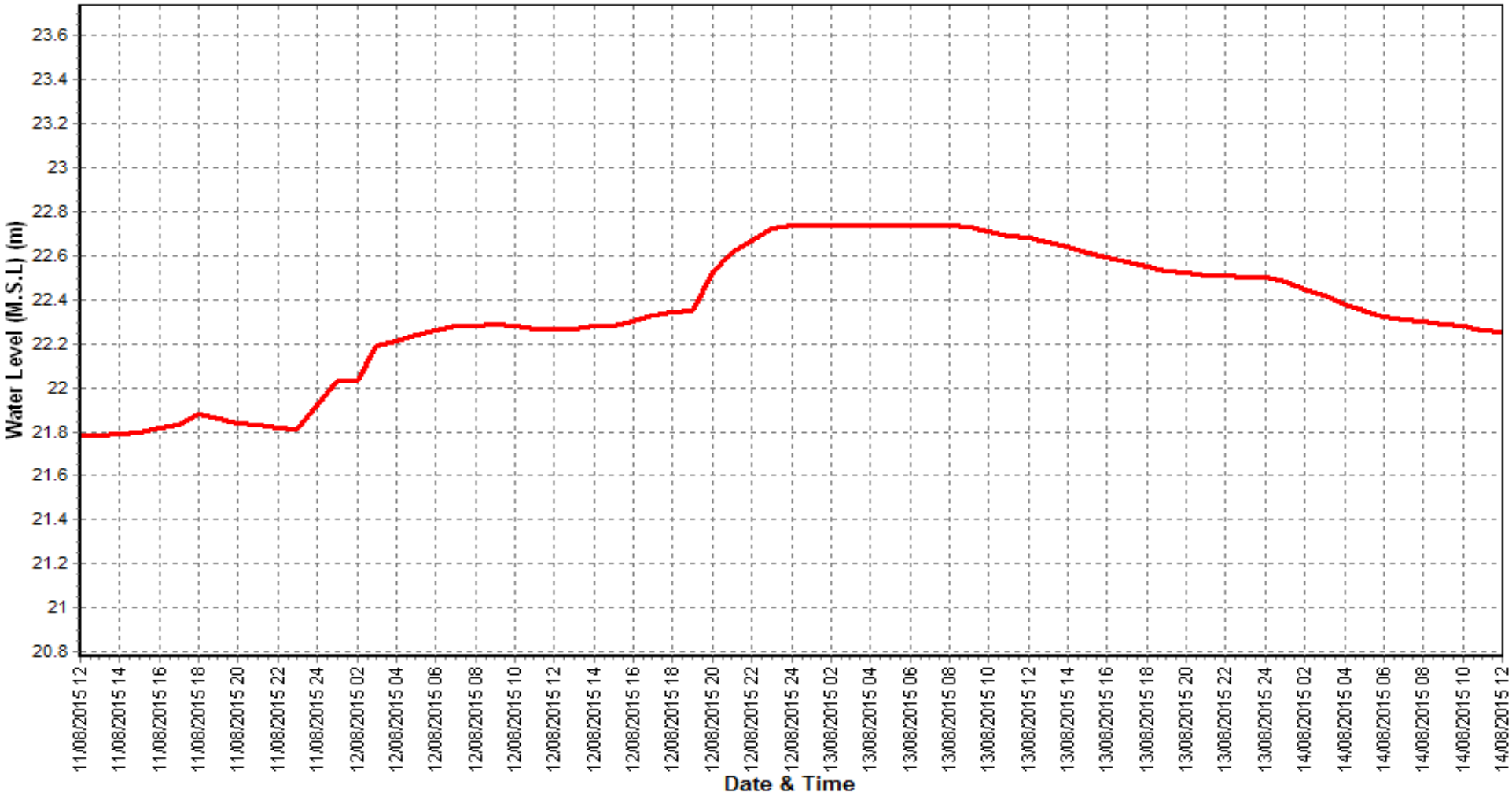


Time Span: 72 Hrs

Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year : 2015-2016

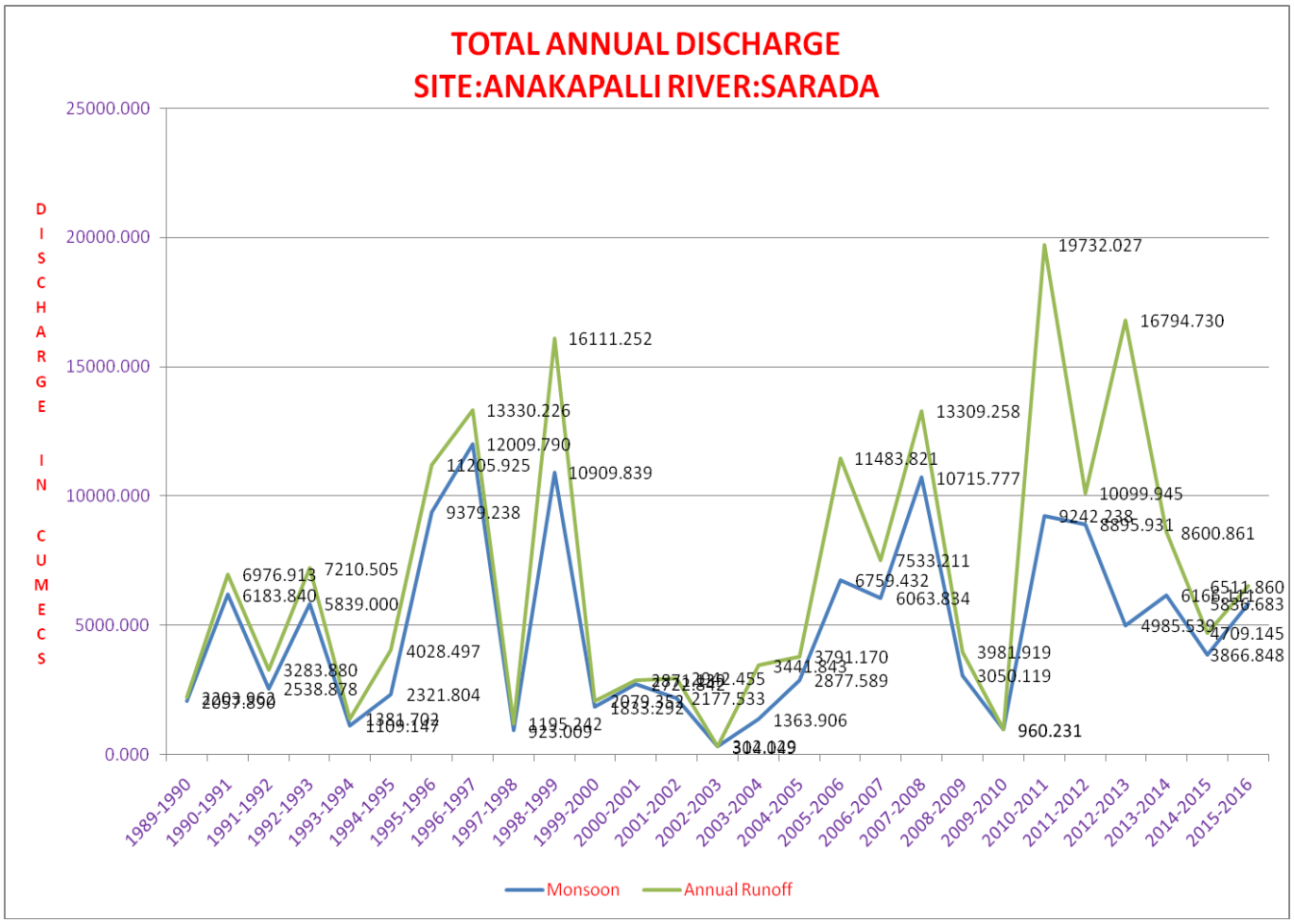
Station Name : ANAKAPALLI (AS000S3) **Division : E.E., Bhubaneswar**

Local River : Sarada **Sub-Division : Behrampur**



Time Span: 72 Hrs

TREND ANALYSIS


TOTAL ANNUAL DISCHARGE
SITE:ANAKAPALLI RIVER:SARADA
DISCHARGE IN CUMECS
25000.000
20000.000
15000.000
10000.000
5000.000
0.000
1989-1990
1990-1991
1991-1992
1992-1993
1993-1994
1994-1995
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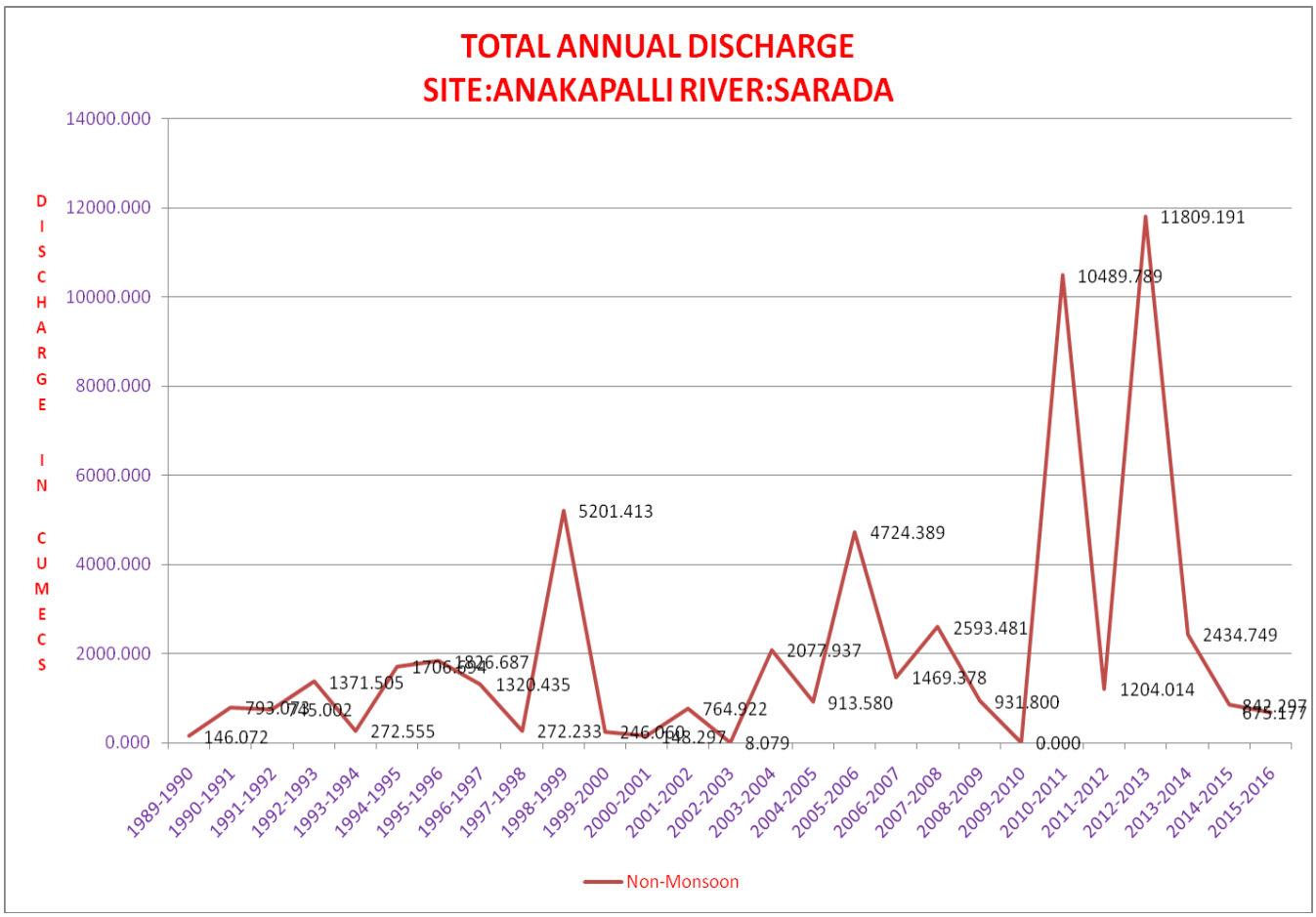
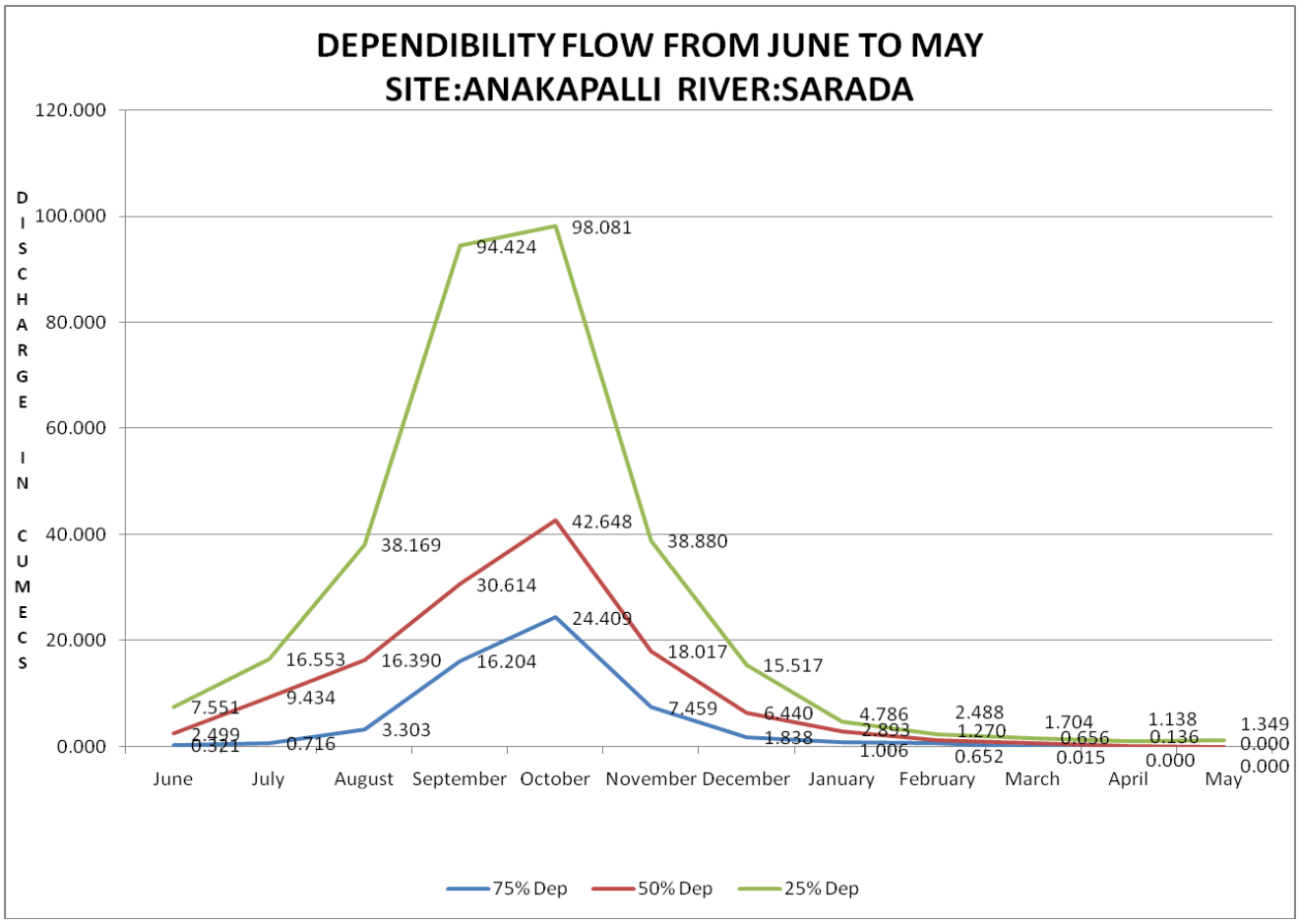
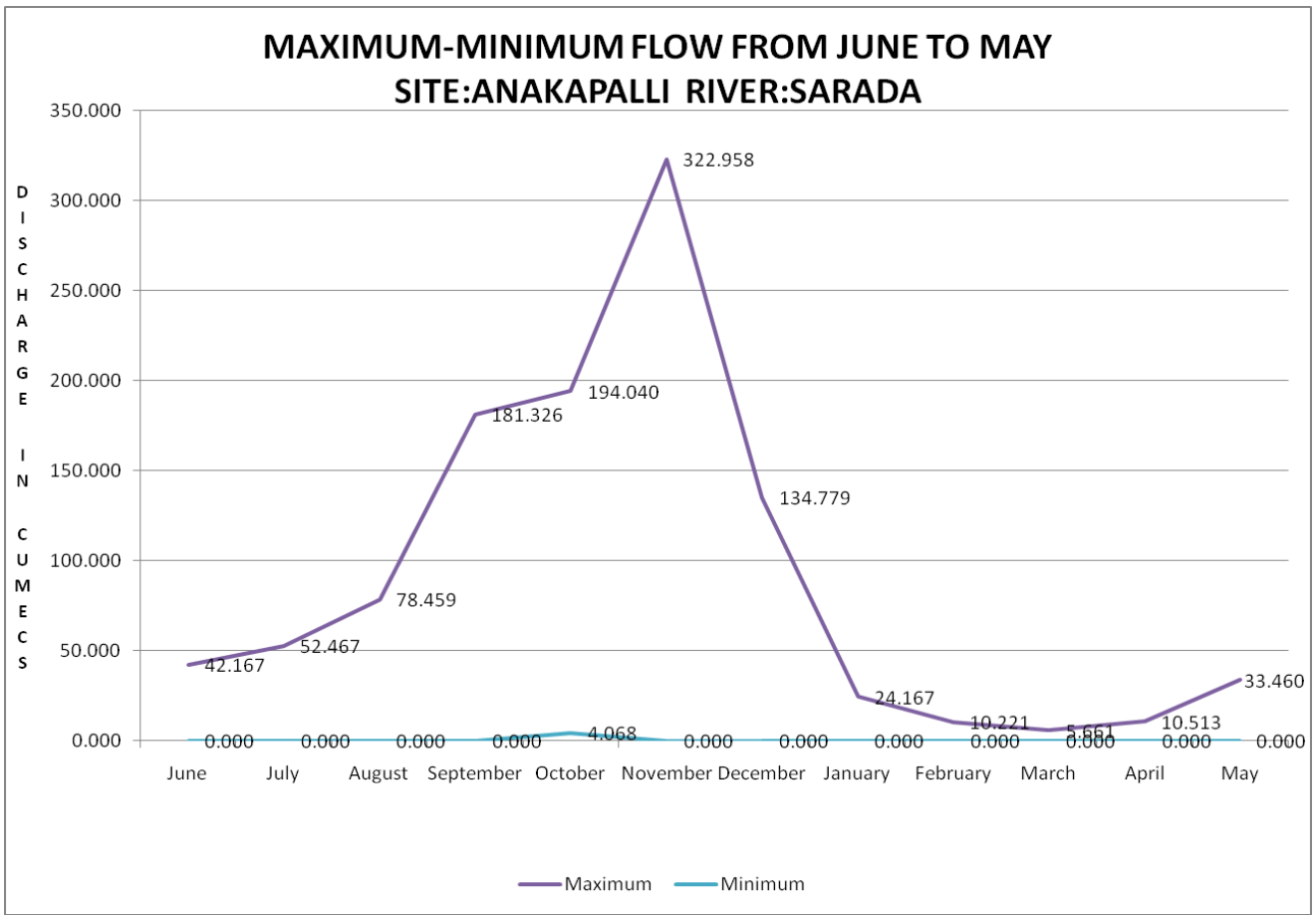
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Monsoon
Annual Runoff


TOTAL ANNUAL DISCHARGE
SITE:ANAKAPALLI RIVER:SARADA
DISCHARGE IN CUMECS
14000.000
12000.000
10000.000
8000.000
6000.000
4000.000
2000.000
0.000
1989-1990
1990-1991
1991-1992
1992-1993
1993-1994
1994-1995
1995-1996
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
Non-Monsoon


DEPENDIBILITY FLOW FROM JUNE TO MAY
SITE:ANAKAPALLI RIVER:SARADA
DISCHARGE IN CUMECS
120.000
100.000
80.000
60.000
40.000
20.000
0.000
June
July
August
September
October
November
December
January
February
March
April
May
75% Dep
50% Dep
25% Dep


MAXIMUM-MINIMUM FLOW FROM JUNE TO MAY
SITE:ANAKAPALLI RIVER:SARADA
DISCHARGE IN CUMECS
350.000
300.000
250.000
200.000
150.000
100.000
50.000
0.000
June
July
August
September
October
November
December
January
February
March
April
May
Maximum
Minimum

LIST OF PERSONS INVOLVED IN THE PREPARATION OF WATER YEAR BOOK

1. Sri. N.C. Nanda, Executive Engineer, ERD, CWC, Bhubaneswar
2. Sri. D.S. Prasad, AEE, H.O. Circle, CWC, Bhubaneswar
3. Sri. S. K. Jagat, AEE, ERD, CWC, Bhubaneswar
4. Sri. P.Shivprasad, SDE, Vamsadhara Sub-Division, Berhampur
5. Smt. B.S Shanthala Devi, EAD, ERD, CWC, Bhubaneswar
6. Sri. N.K. Bhuyan, SRA, ERD, CWC, Bhubaneswar
7. Sri. B.B. Nayak, JE (HQS), ERD, CWC, Bhubaneswar
8. Sri. S.S. Mohanty, Sr. Computer, ERD, CWC, Bhubaneswar
9. Sri. Ashok Mishra, SWA,ERD, Bhubaneswar