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केवल शासकीय उपयोग

हेतु

एकीकृत जलवर्षपुस्तिका

जून 2016- मई 2017

नर्मदा बेसिन

INTEGRATED WATER YEAR BOOK

JUNE 2016– MAY 2017

NARMADA BASIN



केन्द्रीय जल आयोग

नर्मदा बेसिन संगठन भोपाल

अप्रैल 2018

Central Water Commission

Narmada Basin Organisation, Bhopal

April 2018

प्रस्तावना

राष्ट्रीय जल नीति में जल संसाधन से संबंधित आंकड़ों के एकत्रीकरण एवं उनकी उपलब्धता हेतु सूचना केंद्र के मानकीकरण एवं आधुनिकीकरण पर जोर दिया गया है ताकि इस कार्य में संलग्न केंद्र सरकार एवं राज्य सरकार के विभिन्न विभागों को उच्च स्तरीय आंकड़े सुगमता से उपलब्ध हो सके। तथा इन आंकड़ों के विश्लेषित किये जाने की क्षमता बढ़ाई जा सके इसका महत्व इसलिये भी है कि इससे जल संसाधनों के अधिकतम उपयोग हेतु विभिन्न कार्यों के लिये लगातार बढ़ती मांग के परिप्रेक्ष्य में प्रभावी योजनाएं बनाई जा सकती हैं।

केन्द्रीय जल आयोग जल संसाधनों के विकास में संलग्न भारत सरकार, जल संसाधन , नदी विकास एवं गंगा संरक्षण मंत्रालय के अंतर्गत देश की एक शीर्षस्थ तकनीकी संस्था है इस संस्था द्वारा जल विज्ञानीय आंकड़ों के एकत्रण से लेकर परियोजनाओं के मूल्यांकन, अभिकल्पन, प्रबोधन तथा परिचालन से संबंधित कार्य किये जा रहे हैं। नर्मदा एवं उसकी सहायक नदियों पर 16 स्थलों पर नर्मदा बेसिन संगठन के अंतर्गत नर्मदा मंडल, भोपाल द्वारा एवं नर्मदा के 2 स्थलों पर , नर्मदा एवं तापी बेसिन संगठन के तापी मंडल, सूरत द्वारा जल विज्ञानीय आंकड़े एकत्रित किये जाते हैं, जिनका संकलन इस पुस्तिका में किया गया है। इन आंकड़ों के अतिरिक्त मध्यप्रदेश के जल संसाधन विभाग के अंतर्गत नर्मदा नदी पर स्थित बिजौरा स्थल के आंकड़ों को संकलित कर कुल 19 जल विज्ञानीय स्थलों के आंकड़े इस पुस्तिका में संकलित किये गये हैं।

जल वर्ष पुस्तिका 2016-17 को नदी आंकड़े निदेशालय, केन्द्रीय जल आयोग, नई दिल्ली के पत्र क्र. 4/50/2005/RD/WYBF/3329-95, दिनांक 19.11.05 द्वारा जारी किये गये मार्ग निर्देशन के अनुसार संकलित किया गया है। इस पुस्तिका के आंकड़ों को SWDES व e-SWIS साफ्टवेयर में संकलित व परिष्कृत कर विभिन्न तकनीकी माध्यमों से प्रदर्शित किया गया है।

इस पुस्तक की समस्त जानकारी के एकत्रण, संकलन, विश्लेषण एवं संपादन से सम्बद्ध केन्द्रीय जल आयोग के अधिकारियों एवं कर्मचारियों का अथक परिश्रम एवं समर्पण सराहनीय है। मैं केन्द्र एवं राज्य सरकार के विभिन्न विभाग, केन्द्रीय भू जल बोर्ड , केन्द्रीय प्रदूषण नियंत्रण बोर्ड, जनगणना विभाग, नर्मदा घाटी विकास प्राधिकरण, नर्मदा जल विद्युत विकास निगम लिमिटेड तथा पर्यावरण प्रदूषण नियन्त्रण संगठन आदि के साथ उन सभी का आभारी हूं, जिन्होंने इस पुस्तक से संबंधित विविध जानकारियां उपलब्ध कराने तथा प्रकाशन में सहयोग एवं सहायता दी।

स्थान भोपाल
मार्च 2018


(प्रदीप कुमार ठाकुर)
अधीक्षण अभियंता (समन्वय)

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	GENERAL.....	1
1.2	ORGANISATION OF THE WATER YEAR BOOK	3
2	NARMADA BASIN DESCRIPTION	5
2.1	GEOGRAPHICAL DESCRIPTION OF NARMADA BASIN	5
2.2	DESCRIPTION OF THE RIVER SYSTEM	9
2.3	CLIMATE CHARACTERISTICS	10
2.3.1	Temperature	10
2.3.2	Rainfall.....	12
2.3.3	Wind.....	14
2.3.4	Evaporation	15
2.3.5	Humidity.....	16
2.4	GEOLOGY	17
2.5	SOILS.....	18
2.6	MINERALS	19
2.7	GROUND WATER.....	19
2.8	DESCRIPTION OF WATER STORAGE / DIVERSION PROJECTS	20
3	STREAM FLOW DATA	32
3.1	METHODOLOGY.....	32
3.1.1	Gauge Measurement.....	32
3.1.2	Discharge Observations.....	32
3.2	DATA AVAILABILITY.....	32
3.2.1	Explanatory Notes	34
3.2.2	Method of Presentation	35
4	HYDROLOGICAL DATA	37
4.1	ORSANG AT CHANDWADA.....	39
4.2	NARMADA AT GARUDESHWAR	53
4.2	GOI AT PATI	67
4.3	URI AT DHULSAR	80
4.4	NARMADA AT MANDLESHWAR	92
4.5	KUNDI AT KOGAON	105
4.6	NARMADA AT HANDIA	118
4.7	GANJAL AT CHHIDGAON	131
4.8	NARMADA AT HOSHANGABAD	145
4.9	NARMADA AT SANDIA.....	159
4.10	SHAKKAR AT GADARWARA.....	173
4.11	NARMADA AT BARMANGHAT	187
4.12	SHER AT BELKHERI	201
4.13	HIRAN AT PATAN	215
4.14	BANJAR AT BAMNI	229
4.15	BURHNER AT MOHGAON	241
4.16	NARMADA AT MANOT.....	255
4.17	NARMADA AT DINDORI	268
4.18	NARMADA AT BIJORA	281

LIST OF TABLES

TABLE 1-1	CLASSIFICATION OF HYDROLOGICAL OBSERVATION STATIONS	1
TABLE 2-1	STATEWISE DISTRIBUTION OF DRAINAGE AREA	5
TABLE 2-2	CENTRAL WATER COMMISSION, GOVT. OF MP AND NCA SITES	5
TABLE 2-3	STATE GOVERNMENT SITES	6
TABLE 2-4	IMPORTANT TRIBUTARIES	9
TABLE 2-5	TEMPERATURE DATA OF NARMADA BASIN.....	11
TABLE 2-6	RAINFALL IN DISTRICTS OF NARMADA BASIN (AVERAGE FOR THE PERIOD 1901-1950)	12
TABLE 2-7	FIVE YEAR AVERAGE RAINFALL FOR THE DISTRICTS OF THE BASIN (2006-10)	13
TABLE 2-8	WIND SPEED AND DIRECTION DATA FOR NARMADA BASIN.....	15
TABLE 2-9	RELATIVE HUMIDITY DATA FOR NARMADA BASIN.....	16
TABLE 2-10	GEOLOGICAL SEQUENCE IN NARMADA BASIN	17
TABLE 2-11	SOIL SURVEYS CARRIED OUT BY THE CENTRAL WATER COMMISSION IN VARIOUS PROJECTS IN NARMADA BASIN	18
TABLE 2-12	GROUND WATER RECHARGE AND DRAFT CHARACTERISTICS IN THE DISTRICTS OF NARMADA BASIN	20
TABLE 2-13	MAJOR PROJECTS (COMPLETED, ON-GOING & PROPOSED) IN NARMADA BASIN	21
TABLE 2-14	MEDIUM PROJECTS IN NARMADA BASIN (COMPLETED & ON-GOING & PROPOSED).....	24
TABLE 3-1	DATA AVAILABILITY AT CWC SITES	33

LIST OF FIGURES

FIGURE 2-1	LINE DIAGRAM OF NARMADA BASIN (LOCATION OF SITES AND CODE NUMBERS).....	8
FIGURE 2-2	LINE DIAGRAM OF NARMADA BASIN (LOCATION OF MAJOR & MEDIUM PROJECTS AND THEIR WITHDRAWAL)	25
FIGURE 2-3	NARMADA BASIN	26
FIGURE 2-4	NARMADA BASIN - TEMPERATURE.....	27
FIGURE 2-5	NARMADA BASIN – AVERAGE ANNUAL RAINFALL	28
FIGURE 2-6	NARMADA BASIN – 50 YEARS 24 HOURS RAINFALL.....	29
FIGURE 2-7	NARMADA BASIN – SOIL CLASSIFICATION	30
FIGURE 2-8	NARMADA BASIN – GEOLOGY & MINERAL MAP	31

LIST OF SYMBOLS

CWC	:	Central Water Commission
IMD	:	India Meteorological Department
WRD of GoMP	:	Water Resources Department of Government of Madhya Pradesh
NCA	:	Narmada Control Authority
MCM	:	Million Cubic Metres
Cumec	:	Cubic Metre Per Second
Ha	:	Hectare
ha ²	:	Square Hectare
ha ³	:	Cubic Hectare (Million cubic metres)
M.S.L.	:	Mean sea level
F	:	Float Observation
FF	:	Flood forecasting
G	:	Gauge
GTS	:	Great Trigonometrical Survey
Hrs	:	Hours
IWYB	:	Integrated Water Year Book
Hm ³	:	Hectometre Cube = Million Cubic Metre
Mm	:	Millimetre
M	:	Metre
m ³ /s	:	Cubic Metre Per Second
°	:	Degree (00°)
,	:	Minute (00')
”	:	Second (00’')
80 key	:	80 key Hydrological Station Scheme
67 key	:	67 key Hydrological Station Scheme

1 Introduction

1.1 General

Central Water Commission (CWC) is conducting hydrological observations on major river basins under National Network which was initially started under 80 Key Stations, 163 Key Stations and Flood Forecasting schemes. Presently hydrological sites are operated under Plan & Non Plan schemes named "*Development of Water Resources Information Systems*" and "*Flood Forecasting*" of Central Water Commission. This Water Year Book presents data of 19 hydrological observation stations for the year 2016-17 in Narmada basin. The data of 19 hydrological observation sites, which is presented in this publication, have been collected by Narmada Division, Bhopal & Tapi Division, Surat of CWC. Out of 19 sites in Narmada Basin, 02 sites viz., Orsang at Chandwada and Narmada at Garudeshwar are being maintained by Tapi Division, Surat; 01 site named Narmada at Bijora is being maintained by WRD, Govt of Madhya Pradesh; while the remaining 16 sites are being maintained by Narmada Division, Bhopal. Jurisdiction of Narmada Division is as given in Figure 2-3.

State Government Sites in Madhya Pradesh are operated by the Director (Hydromet), WRD, Bhopal. The data of one site i.e. Narmada at Bijora have been obtained from the State Government and included in the Water Year Book.

The classification and scheme wise distribution of hydrological observation stations is presented in Table 1-1 and Table 2-1 respectively.

Table 1-1 Classification of Hydrological Observation Stations

S. No.	Site	River	Basin	Code	Type
1.	Narmada at Dindori	Narmada	Narmada	010215001	GDWQ
2.	Narmada at Manot	Narmada	Narmada	010215002	GDSWQ
3.	Burhner at Mohgaon	Burhner	Narmada	010215004	GDSWQ
4.	Banjar at Bamni	Banjar	Narmada	--	GDSWQ
5.	Hiran at Patan	Hiran	Narmada	010215009	GDWQ
6.	Sher at Belkheri	Sher	Narmada	010215010	GDWQ
7.	Narmada at Barmanghat	Narmada	Narmada	010215011	GDSWQ
8.	Shakkar at Gadarwara	Shakkar	Narmada	010215012	GDSWQ
9.	Narmada at Sandia	Narmada	Narmada	010215013	GDSWQ
10.	Narmada at Hoshangabad	Narmada	Narmada	010215019	GDSWQ
11.	Ganjali at Chhidgaon	Ganjali	Narmada	010215020	GDWQ
12.	Narmada at Handia	Narmada	Narmada	010215022	GDSWQ
13.	Kundi at Kogaon	Kundi	Narmada	010215025	GDWQ

S. No.	Site	River	Basin	Code	Type
14.	Narmada at Mandleshwar	Narmada	Narmada	010215026	GDSWQ
15.	Uri at Dhulsar	Uri	Narmada	--	GDWQ
16.	Goi at Pati	Goi	Narmada	--	GDWQ
17.	Narmada at Garudeshwar	Narmada	Narmada	010215030	GDSWQ
18.	Orsang at Chandwada	Orsang	Narmada	010215032	GDSWQ
19.	Narmada at Bijora	Narmada	Narmada	--	GD

Table 1-2 Schemewise Distribution of Sites

Sl No.	Name of Site	Station Code No.	Scheme
I	2711 Flood Forecasting		
1.	Narmada at Dindori	010215001	Plan
2.	Narmada at Manot	010215002	Plan
3.	Burhner at Mohgaon	010215004	Plan
4.	Banjar at Bamni	--	Plan
II	2701 –DWRIS-Data Collection		
5.	Orsang at Chandwada	010215032	Non Plan
6.	Hiran at Patan	010215009	Non Plan
7.	Sher at Belkheri	010215010	Non Plan
8.	Narmada at Barmanghat	010215011	Non Plan
9.	Shakkar at Gadarwara	010215012	Non Plan
10.	Narmada at Sandia	010215013	Non Plan
11.	Narmada at Hoshangabad	010215019	Non Plan
12.	Ganjal at Chhidgaon	010215020	Non Plan
13.	Narmada at Handia	010215022	Non Plan
14.	Kundi at Kogaon	010215025	Non Plan
15.	Narmada at Mandleshwar	010215026	Non Plan
16.	Narmada at Garudeshwar	010215030	Non Plan
III	NCA Deposit Work		
17.	Uri at Dhulsar (Closed on dated 31.03.2017)	--	NCA
18.	Goi at Pati (Closed on dated 31.03.2017)	--	NCA
IV	Govt. of Madhya Pradesh		
19.	Narmada at Bijora	..	State Govt. Site

The river basin description is given in Section-2

1.2 Organisation of the Water Year Book

The WaterYear Book gives detailed description of river basin, its river system, climatic characteristics, geology along with methodology of stream flow data collection, its availability and hydrological data observed at various stations during the year. The station wise data sheet presents various parameters like monthly flow summary, 10-daily as well as monthly mean flows besides peak flow results. The analysed data has also been presented in form of charts and maps.

The Year Book runs under four sections as given below.

Section-1: Introduction

Section-2: Basin Description

Section-3: Stream Flow Data

Section-4: Hydrological Data

2 Narmada Basin Description

2.1 Geographical Description of Narmada Basin

The Narmada is the largest West flowing and fifth largest river of India. It drains a large area in Madhya Pradesh besides some area in the states of Maharashtra and Gujarat. The Narmada basin lies between East Longitudes 72° 32' to 81° 45' and North Latitudes 21° 20' to 23° 45'. It flows through Deccan trap in between Vindhya and Satpura ranges of hills before falling into the Gulf of Cambay in the Arabian Sea.

The Narmada drains an area of 98796 sq km. out of which nearly 87% lies in Madhya Pradesh. The statewide distribution of drainage area is shown in **Table 2-1**.

Table 2-1 Statewise Distribution of Drainage Area

Sl. No.	Name of State	Drainage Area (sq km)	Percentage
1.	Madhya Pradesh	85859	86.9
2.	Maharashtra	1538	1.5
3.	Gujarat	11399	11.6
	Total	98796	100

The details of CWC hydrological observation stations are given in Table 2-2. Further, there are 31 gauge/gauge and discharge sites being maintained by State Government of Madhya Pradesh and 12 gauge/gauge and discharge sites being maintained by State Government of Gujarat in Narmada basin. The details of the sites maintained by the State Government of Madhya Pradesh are given in Table 2-3. The line diagram of Narmada basin showing the observation stations is given in Figure 2-1.

Table 2-2 Central Water Commission, Govt. of MP and NCA Sites

Sl No.	Name of Site	Station Code No.	Scheme
1.	Narmada at Dindori	010215001	2711 Flood Forecasting (Plan)
2.	Narmada at Manot	010215002	2711 Flood Forecasting (Plan)
3.	Burhner at Mohgaon	010215004	2711 Flood Forecasting (Plan)
4.	Banjar at Bamni	--	2711 Flood Forecasting (Plan)
5.	Narmada at Bijora	--	Govt. of MP
6.	Hiran at Patan	010215009	2701 DWRIS Data Collection (Non Plan)

7.	Sher at Belkheri	010215010	2701 DWRIS Data Collection (Non Plan)
8.	Narmada at Barmanghat	010215011	2701 DWRIS Data Collection (Non Plan)
9.	Shakkar at Gadarwara	010215012	2701 DWRIS Data Collection (Non Plan)
10.	Narmada at Sandia	010215013	2701 DWRIS Data Collection (Non Plan)
11.	Narmada at Hoshangabad	010215019	2701 DWRIS Data Collection (Non Plan)
12.	Ganjal at Chhidgaon	010215020	2701 DWRIS Data Collection (Non Plan)
13.	Narmada at Handia	010215022	2701 DWRIS Data Collection (Non Plan)
14.	Kundi at Kogaon	010215025	2701 DWRIS Data Collection (Non Plan)
15.	Narmada at Mandleshwar	010215026	2701 DWRIS Data Collection (Non Plan)
16.	Uri at Dhulasr	--	Deposit Work NCA
17.	Goi at Pati	--	Deposit Work NCA
18.	Narmada at Garudeshwar	010215030	2701 DWRIS Data Collection (Non Plan)
19.	Orsang at Chandwada	010215032	2701 DWRIS Data Collection (Non Plan)

Table 2-3 State Government Sites

Sl. No.	StationName	Type	Sl. No.	StationName	Type
1	Narmada at Mortakka	GDS	17	Beda at Lower Beda	GD
2	Narmada at Sankalghat	GD	18	Undri at Gadigatter	GD
3	Narmada at Jansighat	GD	19	Jamner at Sandalpur	GD
4	Narmada at Jamtara	GD	20	Ganjal at Chhidgaon	G
5	Narmada at Bargi	GD	21	Beda at Upper Beda	GD
6	Narmada at Mandla	GD	22	Kolar at Satrana	GD
7	Narmada at Manot	GD	23	Kolar at Lawakheda	G
8	Narmada at Bijora	GD	24	Barna at Bareli	GD
9	Hathni at Tikola	G	25	Tawa at Bagratawa	G
10	Hathni at Hatnia	GD	26	Tendoni at Maheshwar	GD
11	Sukari at Sukkad	G	27	Banjar at Hirdayanagar	G
12	Deb at Lingwa	G	28	Pariyat at Tikheria	G
13	Man at Ajandiman	GD	29	Banjar at Bamni Banjar	G

Sl. No.	StationName	Type	Sl. No.	StationName	Type
14	Kundia at Badi	G	30	Burhner at Parastala	G
15	Kundi at Dejla Dewda	G	31	Kharmer at Shakkar	G
16	Man at Man Project	GD			

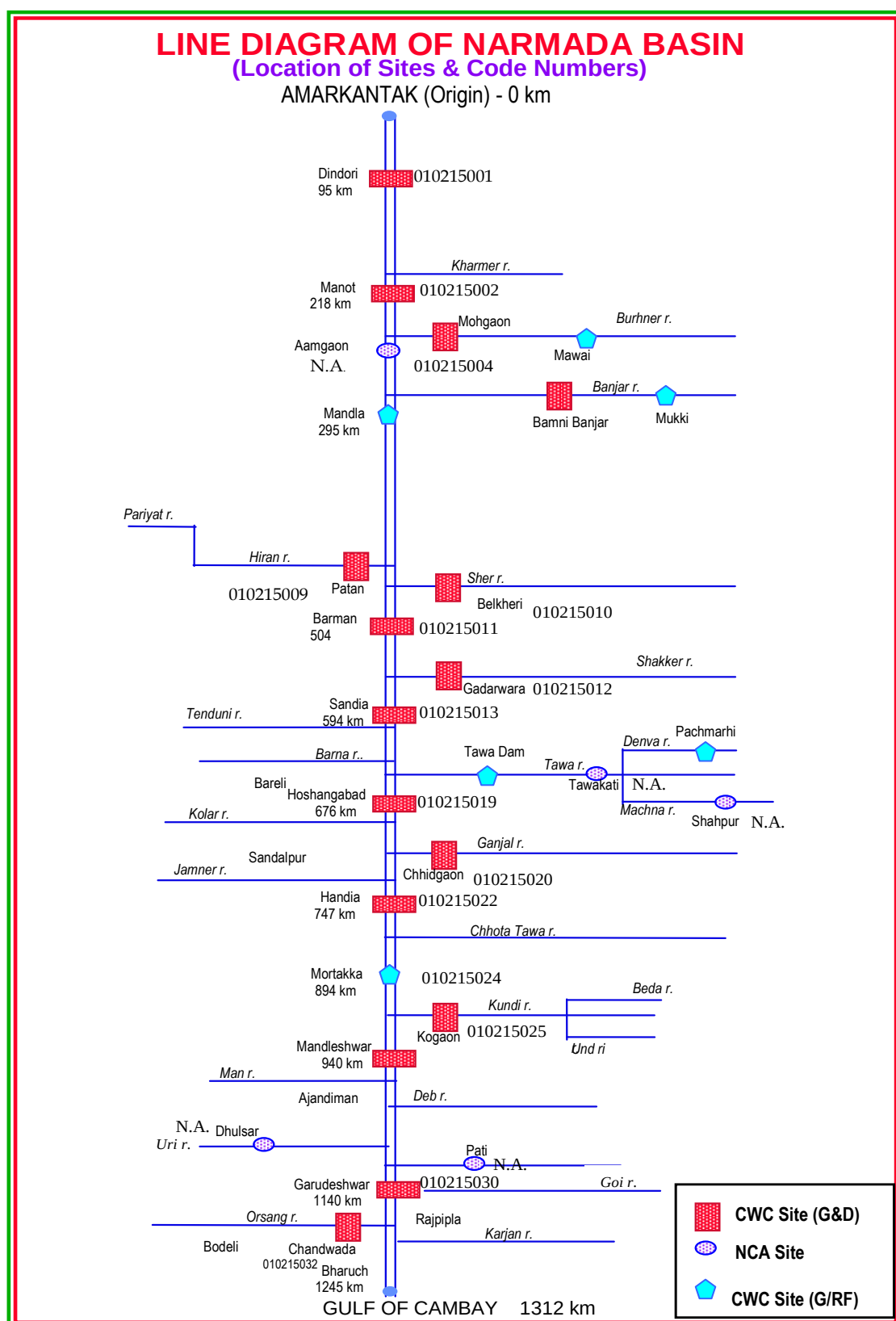


Figure 2-1 Line Diagram of Narmada Basin (Location of Sites and Code Numbers)

2.2 Description of the River System

The Narmada originates from a Kund (spring) at an elevation of 1057m at Amarkantak in the Maikal hill in Shahdol district of Madhya Pradesh and flows through Madhya Pradesh, Maharashtra and Gujarat between Vindhya and Satpura hill ranges before falling into the Gulf of Cambay in the Arabian Sea, about 10 km north of Bharuch, Gujarat. The total length of this west flowing river from its origin to its outfall into the Arabian Sea is 1312 km. For the first 1079 km it flows in Madhya Pradesh and thereafter forms the common boundary between Madhya Pradesh and Maharashtra for 35 km, and Maharashtra and Gujarat for 39 km. In Gujarat State it stretches for 159 km.

There are 41 important tributaries to the Narmada river. Significant among them are Burhner, Banjar, Hiran, Tawa, Chhota Tawa, Orsang and Kundi which are major tributaries having catchment area more than 3500 sq km. The remaining tributaries are having catchment area ranging from 500 to 2500 sq km. The catchment area, length and elevation of the origin of the important tributaries are indicated in Table 2-4.

Table 2-4 Important Tributaries

Sl. No	Tributary	Bank	Elevation of Origin above MSL (m)	Catchment Area (km ²)	Total length from origin (km)
1	Kharmer	Left	-	557	64.0
2	Silgi	Right	-	531	65.0
3	Burhner	Left	900	4228	177.0
4	Banjar	Left	600	3282	183.0
5	Balai	Right	-	531	46.0
6	Temur	Left	550	892	54.0
7	Gaur	Right	690	1107	79.5
8	Soner	Left	-	581	51.0
9	Hiran	Right	500	4795	188.0
10	Sher	Left	650	2903	129.0
11	Biranjo	Right	-	1172	62.0
12	Shakkar	Left	900	2294	161.0
13	Dudhi	Left	900	1542	129.0
14	Sukhri	Left	-	609	39.0
15	Tendoni	Right	500	1633	177.0
16	Barna	Right	450	1789	105.0
17	Tawa	Left	600	6338	172.0
18	Hather	Left	-	645	37.5
19	Kolar	Right	600	1348	101.0
20	Ganjal	Left	700	1931	89.0
21	Sip	Right	-	879	45.0

Sl. No	Tributary	Bank	Elevation of Origin above MSL (m)	Catchment Area (km ²)	Total length from origin (km)
22	Jamner	Right	470	671	30.0
23	Chankesher	Right	600	1249	30.0
24	Anjal	Left	-	1203	62.5
25	Machak	Left	550	1112	87.5
26	Chhota Tawa	Left	400	5055	169.0
27	Khari	Right	-	754	41.0
28	Kenar	Right	-	1581	62.5
29	Kaveri	Left	-	954	32.5
30	Choral	Right	-	601	55.0
31	Kharkia	Left	-	1099	24.0
32	Kundi	Left	900	3973	120.0
33	Karan	Right	-	858	45.0
34	Board	Left	-	866	62.5
35	Man	Right	550	1529	89.0
36	Deb	Left	350	969	82.5
37	Uri	Right	-	2004	74.0
38	Goi	Left	800	1892	129.0
39	Hatni	Right	350	1944	30.0
40	Orsang	Right	300	3946	101.0
41	Karjan	Left	200	1490	93.0

2.3 Climate Characteristics

2.3.1 Temperature

Temperature of Narmada Basin varies like any other part of Central India. The difference between the maximum & minimum temperature, in any part of the basin, is quite pronounced. The temperature is maximum in the month of May and minimum in the month of January. In general, the upper NarmadaBasin records lower temperature as compared to middle basin. In lower section of the basin, the influence of the sea is prominent, and temperature though lower than the middle basin, is still higher than the upper reaches of NarmadaRiver. The temperature profile in the basin is given in the Figure 2-4 and Table 2-5.

Table 2-5 Temperature Data of Narmada Basin

Month/ Location	Mean Monthly Maximum Temperature (°C)						Mean Monthly Minimum Temperature (°C)					
	HO	PAC	KHN	JA	PEN	VA	HO	PAC	KHN	JA	PEN	VA
January	26.6	22.4	29.3	26.1	24	29.6	12.7	8.7	12.0	9.0	10.9	12.7
February	29.8	24.7	31.9	28.9	26.5	32.5	14.3	10.4	13.6	11.4	12.5	14.2
March	34.9	28.9	36.4	34.0	31.5	36.5	18.6	14.8	18.1	15.5	17.6	18.5
April	39.3	33.4	40.2	38.5	36	39.7	23.5	20.1	23.9	20.5	22.3	22.9
May	42.0	36.0	41.9	41.9	39.3	40.6	27.6	24.3	27.9	25.9	26.1	26.8
June	37.6	31.4	37.5	37.6	35.1	36.7	26.6	22.5	26.2	26.4	25.0	27.0
July	30.2	23.3	30.9	30.3	28.7	32.1	24.0	19.9	23.8	23.9	22.8	25.6
August	29.2	23.8	29.9	29.5	28.3	31.1	23.5	19.6	23.2	23.6	22.5	24.9
September	30.7	25.2	31	30.8	28.9	32.7	23.2	19.1	22.7	23.1	22	24.4
October	32.1	26.2	33.4	31.4	28.5	34.9	19.5	14.8	18.9	18.4	18.4	21.4
November	29.3	24.1	31.2	28.9	26.3	33.3	14.5	9.6	13.5	11.7	13.4	16.4
December	27.1	22.8	29.6	26.9	24.2	31	12.3	7.5	11.2	9	10.1	13.5
Annual Mean	32.4	26.9	33.6	32.1	29.8	34.3	20.0	15.9	19.6	18.3	18.6	20.7

HO: Hoshangabad

PAC: Pachmarhi

KHN: Khandwa

JA: Jabalpur

PEN: Pendra Road

VA: Vadodara

Source: Basin Sub-basin Inventory of Water Pollution- The Narmada Basin, CPCB, Delhi March 1994.

2.3.2 Rainfall

The Inter-departmental Committee on Soil Conservation and Afforestation of Sardar Sarovar & Narmada Sagar projects constituted by the Ministry of Agriculture and Rural Development, Government of India had compiled annual & seasonal rain fall data of the Narmada basin between 1901-1950 which is presented in Table 2-6.

Above data suggests that a major portion of the precipitation in the basin takes place during the southwest monsoon, and accounts for about 85% to 95% of the total precipitation. The post monsoon accounts for about 9% of the precipitation whereas the winter and the pre-monsoon, together account for about a maximum of 10% of the total precipitation.

Table 2-6 Rainfall in Districts of Narmada Basin (Average for the period 1901-1950)

Sl. No.	District	Seasonal Average Rainfall(mm)				Total
		Winter Monsoon (Jan-Feb)	Pre-Monsoon (March-May)	South-West Monsoon (June-Sept)	Post Monsoon (Oct-Dec)	Annual Average Rainfall
1	Shahdol	76 (5.4)	58 (4.1)	1184 (84.7)	79 (5.6)	1397
2	Mandla	53 (3.4)	58 (3.7)	1163 (86.8)	86 (5.5)	1570
3	Balaghat	47 (2.9)	47 (2.9)	1447 (89.1)	82 (5.0)	1623
4	Seoni	57 (4.1)	60 (4.3)	1179 (85.1)	89 (6.4)	1385
5	Jabalpur	50 (3.9)	16 (1.2)	1113 (88.8)	67 (5.2)	1274
6	Narsinghpur	33 (2.5)	30 (2.3)	1171 (90.0)	67 (5.1)	1301
7	Sagar	38 (3.1)	24 (1.9)	1113 (90.1)	60 (4.8)	1235
8	Damoh	34 (2.8)	26 (2.1)	1103 (85.6)	61 (5.0)	1224
9	Chhindwara	48 (3.6)	52 (3.9)	1133 (85.6)	91 (6.9)	1324
10	Hoshangabad	23 (1.8)	20 (1.5)	1188 (91.7)	64 (4.9)	1295
11	Betul	35 (3.2)	37 (3.4)	925 (85.3)	87 (8.0)	1084
12	Raisen	33 (2.5)	20 (1.5)	1218 (91.6)	58 (4.4)	1330
13	Sehore	19 (1.5)	17 (1.4)	1153 (92.7)	55 (4.4)	1244
14	Khandwa	14 (1.6)	15 (1.7)	786 (89.3)	65 (7.4)	880
15	Khargone	4 (0.5)	13 (1.6)	753 (90.5)	62 (7.4)	832
16	Dewas	13 (1.2)	18 (1.7)	995 (91.9)	57 (5.3)	1083

Sl. No.	District	Seasonal Average Rainfall(mm)				Total
		Winter Monsoon (Jan-Feb)	Pre-Monsoon (March-May)	South-West Monsoon (June-Sept)	Post Monsoon (Oct-Dec)	Annual Average Rainfall
17	Indore	8 (0.8)	17 (1.7)	887 (91.0)	63 (6.5)	975
18	Dhar	5 (0.6)	12 (1.4)	763 (91.6)	53 (6.4)	833
19	Jhabua	6 (0.7)	12 (1.4)	773 (93.3)	37 (4.5)	825
20	Dhule	8 (1.2)	12 (1.8)	596 (88.4)	58 (8.6)	674
21	Vadodara	5 (0.5)	9 (0.9)	917 (94.6)	38 (3.9)	969
22	Bharuch	5 (0.5)	9 (0.9)	892 (93.9)	44 (4.6)	950
	Range	5-76	9-60	596-1363	37-89	674 -1623
		(0.5-5.4)	(0.9-4.3)	(84.7-94.6)	(3.9-8.6)	

Note: Figures in brackets are percentage w.r.t. Annual Rainfall

Source: Basin Sub-basin Inventory of Water Pollution- The Narmada Basin, CPCB, Delhi March 1994

The recent rainfall data for five years from 2006-10 is shown in the table 2.7

Table2-7 Five Year Average Rainfall for the Districts of the Basin (2006-10)

Sl. No.	District	Seasonal Average Rainfall(mm)				Total
		Winter Monsoon (Jan-Feb)	Pre-Monsoon (March-May)	South-West Monsoon (June-Sept)	Post Monsoon (Oct-Dec)	Annual Average Rainfall
1	Shahdol	17	26	858	16	916
2	Mandla	6	16	1192	40	1253
3	Balaghat	10	52	1202	52	1315
4	Seoni	4	36	1007	38	1085
5	Jabalpur	15	31	1058	46	1151
6	Narsingpur	9	31	927	22	990
7	Sagar	7	31	848	57	942
8	Damoh	10	20	890	35	955
9	Chindwara	3	37	922	60	1022
10	Hoshangabad	7	37	1185	66	1295
11	Betul	7	37	1185	66	1295
12	Raisen	4	8	900	42	954
13	Sehore	6	30	872	54	964

Sl. No.	District	Seasonal Average Rainfall(mm)				Total
		Winter Monsoon (Jan-Feb)	Pre-Monsoon (March-May)	South-West Monsoon (June-Sept)	Post Monsoon (Oct-Dec)	Annual Average Rainfall
14	Khandwa	1	17	730	40	788
15	Khargone	1	11	744	37	792
16	Dewas	0	0	4112	152	4264
17	Indore	11	122	4286	370	4789
18	Dhar	0	5	851	42	897
19	Jhabua	0	3	883	30	915
20	Dhule	0	2	597	66	665
21	Vadodara	0	0	1009	17	1026
22	Bharuch	0	1	780	18	799

Source: Website of Indian Meteorological Department (District rainfall for five years -Hydromet Division)

From the above Table 2-6 and Table2-7 it can be observed that the pattern of the precipitation in the basin is almost similar to the past pattern, major portion of the rainfall being taking place during the southwest monsoon. The post monsoon and pre-monsoon account for small parts of the precipitation whereas the winter monsoon has still lesser or no contribution towards the total precipitation. The average rainfall in the basin during the last five years has decreased at some places (the maximum decrease being about 35% for Shahdol district) while it has increased at other places (the maximum increase being about 391% for Indore district) as compared to the average past rainfall for the period of 1901-1950. This change in average rainfall may be due to climate change and human activities (like land use change).

Figure 2-5 gives the isohyets map of the Narmada Basin. The rainfall is higher in the upper and lower basin, but marginally less in the lower middle and middle basin. The general pattern of the basin is that the rainfall increases from west to east.

From the data of fifty years on intensity of rainfall during a 24 hours period as compiled by the Central Water Commission, it can be concluded that the most intense rain occurs in the southern section of the upper Narmada basin, where 24-hour rainfall is about 360 mm. The least intense rainfall is between Jhabua & Dhar where the 24 hours rainfall is less than 260 mm. Details are shown in Figure 2-6.

2.3.3 Wind

The wind speed data of the basin is given in Table 2-8. The average monthly wind speed in the Narmada Basin varies between about 1.4 km/h and 16 km/h in the post - monsoon & pre monsoon seasons, the wind speed is generally higher. The maximum percentage of calm occurs between October & December. The predominant wind direction is NW followed by SW and W.

Table 2-8 Wind Speed and Direction Data for Narmada Basin

Month/	Average Wind Speed km/h)						Calm Period %						Dominant Direction					
Location	HO	PAC	KHN	JA	PEN	VA	HO	PAC	KHN	JA	PEN	VA	HO	PAC	KHN	JA	PEN	VA
January	4.2	3.3	5.7	3.4	5.3	7.1	29	29	22	31	20	17	E/NE/SE	NW/N/N	NE/NW/N	SE/NE/N	N/S	N/NW
February	4.2	4.2	6.4	4.0	6.1	6.5	27	20	21	28	18	13	E/NE	NW/W/N	NW/N/NE	SE/NE/N	N/WW	N/NW
March	4.6	4.5	7.4	4.6	7.0	6.7	31	17	15	23	14	13	E/SW/W	NW/W	NW/W	SE/NW/N	N/WW	NW/NW
April	5.2	5.1	9.6	5.5	7.5	7.3	31	12	6	20	11	8	W/SW	NW/W	NW/W	SE/NW	N/S/NW	NW/N/SW
May	6.4	6.8	14.1	7.1	9.3	12.1	16	6	1	11	7	2	W/SW	NW/N	NW/N	SW/W/NW	N/S/NW	SW/W
June	6.8	7.2	15.8	8.6	9.5	15.6	14	7	2	9	8	2	W/SW	NW/N	NW/W/SW	SW/W	WES/NW	SW/W/W
July	6.1	9.0	14.0	8.2	8.0	13.0	17	7	2	13	14	2	W/WS	NW/W	W/SW	SW/W	S/SW	SW/SW
August	5.4	8.3	12.4	7.6	6.8	10.7	23	8	2	14	15	4	W/SW	NW/W	W/SW	SW/W	S/NW	SW/W
September	1.4	6.2	9.6	5.7	5.8	7.9	29	10	4	19	12	8	W/SW	NW/W	W/SW	SW/W	N/S/NW	SW/W
October	3.1	3.6	5.3	3.5	4.1	6.4	44	27	17	29	25	26	E/NE	NE	N/NE	SE/NE	N/NW	N/NE/NW
November	3.0	2.8	4.3	2.8	3.7	6.5	42	36	3	32	31	14	E/NE	NE/N	N/NE	SE/NE	N/NW	N/NE/NW
December	3.5	2.7	4.3	2.7	4.1	6.1	36	38	28	35	29	15	E/NE	NE/N	N/NE	SE/NE	N/NW	N/NE/NW
	4.7	5.3	9.1	5.3	6.4	8.8	28	18	12	22	17	9	EW/SW	NW/W	W/NW	SE/SW/NE	N/S/NW	SW/NW/W

HO: Hoshangabad

PAC: Pachmarhi

KHN: Khandwa

JA: Jabalpur

PEN: Pendra Road

VA: Vadodara

Source: Basin Sub-basin Inventory of Water Pollution- The Narmada Basin, CPCB, Delhi March 1994.

2.3.4 Evaporation

The process of evaporation depends upon wind velocity, altitude, temperature and humidity. In summer, evaporation loss in the upper Zone of Narmada is between 6.0-10.0 mm/d. In Jabalpur region monitored at Jamtara, evaporation loss is considerably less i.e. between 4.0-7.0 mm/d. It is due to increase of humidity level by nearby Bargi Reservoir. Evaporation loss immediately increases at Barmanghat (Narsinghpur region) where it is between 6.0-12.0 mm/d. In middle zone monitored at Hoshangabad, evaporation loss is also less and is between 4.0-7.0 mm/d. Tawa reservoir and Barna dam are nearer to this place. Evaporation loss is more in lower Zone of Narmada monitored at Rajghat near Barwani. It is between 12.0-28.0 mm/d. In winter, evaporation loss is less in upper and middle Zone of Narmada and is between 1.0-3.0 mm/d. In lower Zone, evaporation loss is between 6.0-9.0 mm/d in winter season.

2.3.5 Humidity

The relative humidity in basin varies between 92% and 27% in the morning and between 88% and 15% in evening, depending upon the season. The relative humidity is naturally maximum during the monsoon months and is around 80% to 90%. In the winter months of December and January, the relative humidity comes down to around 30%. The variation in relative humidity between upper, middle and lower sections of the basin is not very pronounced. The relative humidity at various IMD station representative of the Narmada Basin is given in **Table 2-9**.

Table 2-9 Relative Humidity Data for Narmada Basin

Month/	Relative Humidity in Morning (%)						Relative Humidity in Evening (%)					
Location	HO	PAC	KHN	JA	PEN	VA	HO	PAC	KHN	JA	PEN	VA
January	62	65	56	74	64	60	37	49	29	43	48	31
February	51	54	44	64	55	47	25	37	23	32	38	20
March	37	36	32	44	39	48	17	25	17	23	28	20
April	28	29	29	30	30	46	15	22	16	18	23	17
May	30	33	41	27	31	59	17	23	18	17	24	25
June	62	86	66	57	60	75	44	55	44	45	55	52
July	87	91	83	85	86	87	78	87	71	79	83	74
August	89	92	84	87	87	89	78	88	73	80	85	75
September	85	86	82	82	84	83	70	82	66	71	80	63
October	69	64	64	73	70	68	48	56	41	52	63	43
November	64	58	58	68	57	55	38	50	35	44	49	34
December	62	65	58	723	60	58	37	47	32	43	47	32
Annual Mean	61	62	58	64	60	65	42	52	39	46	52	41

HO: Hoshangabad

PAC: Pachmarhi

KHN: Khandwa

JA: Jabalpur

PEN: Pendra Road

VA: Vadodara

Source: Basin Sub-basin Inventory of Water Pollution- The Narmada Basin, CPCB, Delhi March 1994

2.4 Geology

About 270 million years ago, the continents existed in two large masses and India was a part of the southern continental mass commonly known as GondwanaLand. Between the two continents, a large sea, Tethys existed. Presently the Himalayas and the Tibetan Plateau have taken the position of the ancient TethyanSea. The GondwanaLand was intruded by few large marine transgressions. A deep gulf or sea existed along the Sindh-Beluchisthan and the Kutchh. At one time, a marine ravine penetrated the very centre of Peninsular India through a narrow inlet along the present valley of Narmada. During this time India was divided into two halves by narrow strips of marine transgressions and there was no land communication between the Peninsular and northern India.

Along the Narmada Valley, several patches of sediments have been deposited which contains ancient remains of animals. These fossils are similar to those found along the tracts of Tapi river. Such similarity probably suggests that even about 3 million years ago, Narmada and Tapi were confluent and the separate fate of these two rivers was decided by recent earth movements. The Bheraghat falls of Narmada, near Jabalpur, was probably created during one such movement which appears to be a recent one.

The geological sequence in the basin is presented in **Table 2-10**. The Archaean group of rocks in the Narmada basin is represented by the Chilpighat series. These rocks wedge in at the eastern end between the Vindhya and granitic gneisses and expand in the Narmada valley in strips. The Dharwad rocks consisting mainly of quartzites, feldspar grits, shales and slates with intercalated traps occur in Balaghat, Chhindwara, Jabalpur districts of Narmada valley. In Jabalpur area, the series is distinguished by perfectly crystalline dolomitic limestone. The famous "marble rocks" of Jabalpur belong to this series.

Table 2-10 Geological Sequence in Narmada Basin

Major Groups	Dominant Rocks	Age in Million Years.
Recent Alluvium	Alluvium	2-3
Deccan trap	Basalt	60-135
Lametas	Limestone, Sandstone	135-150
Gondwanas	Sandstone, Volcanics	150-400
Vindhya	Sandstone, Shales	600-4500
Bijawars	Quartzites, Sandstone	600-4500
Archaean	Quartzites, Shales, Slates	600-4500

On the upturned edges of the Archaean, the Cuddapahs were deposited and the Narmada Valley is represented by Bijawars. The Bijawars occur in series of outcrops extending from Bundelkhand to the south of Narmada and has thickness of less than 240m at some places. These rocks are generally characterised by quartzites, sandstones and sometimes conglomerates. Bijawars are found in Dhar and Jabalpur

districts. In Jabalpur, however, Bijawars are represented by somewhat different rock assemblages like phyllites, mica, schists, calcitic and dolomitic marbles. There is, however, some controversy over the age of the rocks and some geologists feel that they are older than Cuddapahs and should be classified along with upper Archaeans i.e. Dharwadian rocks.

The Cuddapahs were succeeded by rocks of Vindhyan system after a time interval marked by earth movement and erosion. The Vindhyan rock characterised by Bhandar Sandstones, shales, limestones and Ganurgarh shales are exposed in the north of Hoshangabad town and extends upto Bhopal. Between Dewas and Khandwa in Parnakheri, thick Vindhyans are exposed along the banks of Narmada mainly characterised by Bhandar group of rocks and unclassified upper Vindhyan.

After the deposition of Vindhyan rocks and their uplift, there was a great hiatus in the stratigraphical history of the peninsula. At the end of Palaeozoic era, a series of changes took place which were also responsible for the mountain building movements called the Hereynian or Variscan orogeny. Due to this movement, the continents separated to the present configuration. The deposits during this period are called Gondwana and is exposed in the south of Hoshangabad. Thick Gondwana sediments are also found near Jabalpur, Rewa, Pachmarhi etc. The Gondwana formation ended in Cretaceous era i.e. about 135 million years ago. The end of Cretaceous was marked by enormous lava flows which spread over vast areas of central and eastern India. These lavas of basaltic composition are found in the Khandwa, Khargone, Dhar, Dhule areas till practically up to the lower Narmada region. The interesting geological episode in the Narmada valley are the Lameta beds, which occur in Lameta ghats near Jabalpur. The Lameta beds represent the fluvial or estuarine deposits just below the trap basalts. The mouth of the Narmada witnesses thick sedimentary deposits of recent age. These sediments are often saline but otherwise support bumper crops.

2.5 Soils

Although no detailed soil survey has been carried out in the basin, periodically some soil surveys have been carried out in different parts of the basin under different schemes and for different purposes. In 1950, the Central Water Commission conducted soil surveys in the command areas of various projects and produced some maps on a 1:2,50,000 scale. Some of the projects covered are given in **Table 2-11**.

Table 2-11 Soil Surveys carried out by the Central Water Commission in Various Projects in Narmada Basin

S.No.	Project	Districts	Area in lakh ha.
1	Tawa	Hoshangabad	3.70
2	Bargi	Jabalpur, Narsinghpur	3.60
3	Kolar	Sehore	0.75
4	Punasa	Khandwa, Khargone	0.60
5	Barwah	Khargone, Dhar	1.60

As per the demand of Narmada Water Disputes Tribunal, a reconnaissance survey of the Narmada Sagar command area was taken up in 1975. Nearly 256 soil profiles were studied. Again during 1982-83, an area of about 2.8 lakh ha, falling within the Khandwa and Khargone districts, was surveyed by the department of Agriculture, MP to appraise the land irrigability in connection with project. Aerial photo surveys were carried out, and 366 profiles and 2,780 auger bores were examined.

The soil map of the area is given in **Figure 2-7**. In the upper basin, the majority of the soil are characterised by shallow black soils. These soils are erosional products of trap basalts. The black soils are rich in smectite clays having a high water holding capacity. These clay lattices expand when they absorb water and thus reduce the water drainage. The organic matter is generally less than 5% in black soils. The black soil in the upper basin is generally in-situ kor colloidal. These soils are often inter spread with red sandy or laterite soils. The profile is generally shallow and mainly covers the hilltops and plateau regions. The red soils are the result of intense chemical leaching of basalts whereby all the minerals in the rock are leached out except the oxides of silica, iron and aluminium. Due to intense leaching, these soils have a reasonably good drainage but lacking in nutrients essential for plant growth.

The soils in the Vindhyan and Satpura plateau region of the middle basin range from shallow black soils to medium black soils. Around Hoshangabad, recent alluviums with varied thickness can be witnessed. These soils are extremely fertile and supports cotton, Jawar and wheat.

In the lower part of the basin, the major soils of the valley and southern plateau are medium deep black soils. On the other hand mixed red and black soils occur in the northern plateau. In the mouth of the Narmada, Pliocene rocks along with recent alluviums are seen. These alluvial soils are mostly sandy looms with good drainage. They are extremely fertile and support good crops.

2.6 Minerals

The minerals found in the basin are bauxite, clay, coal, dolomite, graphite, iron ore, manganese, talc, limestone etc. The mineral map of Narmada Basin is given in **Figure 2-8**.

2.7 Ground Water

The occurrence of ground water generally depends upon the rainfall, drainage, topography and the geological conditions of the area. The ground water in upper, middle and lower basin occurs in distinct horizons with characteristic aquifers.

In the upper basin, the geological formation is mainly the older rocks belonging to the Archaeans and Vindhyan and are characterised by good water potential. The ground water within part of the basin occurs mainly in the weathered zones of the rocks. The quality and quantity of the ground water is reasonably good.

In the middle part of the basin where Gondwana rocks are predominant, the ground water occurs in varied quantities in the pores of sandstones. The occurrence mainly depends on the grain size of the rocks. In the coarse grained rocks, the ground water availability is substantial. However, in the sections of the basin where the trap rocks are exposed, the ground water conditions are rather erratic. In the trap basalts, ground water occurs in patchy aquifers and often these aquifers are not interconnected.

A significant part of the lower basin is occupied by trap basalts where the ground water occurs in patchy aquifers. However, near the mouth of the river, the coastal alluvials are predominant. The coastal alluvials contain highly permeable aquifers with good quantities of water. Their yield is generally excellent, with good recharge characteristics. The ground water in this area occurs mainly in unconfined aquifers with varying depths. However, ground water in alluvials is susceptible to seasonal water table fluctuations. In thickly populated areas, these aquifers are often contaminated.

Table 2-12 gives the ground water recharge and draft characteristics. The data suggests that the average ground water utilisation in the Narmada basin is about 45%. The draft in Sehore, Khandwa, Damoh, Dhar, Dewas, Raisen, Sagar, and Khargone is above 50%. In fact, these districts account for major ground water draft in the basin. In the rest of the area, the ground water remains under-utilised, and there is scope for further ground water development.

Table 2-12 Ground Water Recharge and Draft Characteristics in the Districts of Narmada Basin

Sl. No.	District	Net Ground Water availability (ham)	Total Annual Ground Water Draft (ham)	Net Ground Water availability for Future Irrigation (ham)
1	Sehore	77172	57394	18664
2	Hoshangabad	201888	35617	164889
3	Rajnandagaon	1123.84	50.1	1073.74
4	Shahdol	63909	4083	59067
5	Mandla	53779	8205	44658
6	Chhindwara	138594	71239	65615
7	Balaghat	91248	13361	77083
8	Betul	113970	53622	59227
9	Khandwa	76949	47583	27417
10	Raisen	75209	38165	35863
11	Sagar	112807	66079	44859
12	Damoh	36385	22000	13305
13	Dhar	97163	80451	15212
14	Seoni	79239	20456	57784
15	Khargone	77219	55848	19999
16	Dewas	79141	63383	14849
17	Jhabua	20134	9305	10051

Source: Dynamic Ground Water Resources of Madhya Pradesh (As on March 2009) published by State Ground Water Survey and Central Ground Water Board North Central Region, February 2012

2.8 Description of Water Storage / Diversion Projects

A Master Plan of the Narmada basin has been prepared for the development of water resources of the Narmada basin. The Master Plan envisages the construction of 30 major dams, 135 medium dams and 3000 minor dams to irrigate about 46.3 lakh ha of land in Madhya Pradesh (27.55 lakh ha), Gujarat (18 lakh ha), and Rajasthan (0.75 lakh ha). The major and important medium projects are listed in **Table 2-13** and **Table 2-14** respectively. **Figure 2-2** gives location of important projects along with their utilisation (withdrawals).

At present, there are four major hydroelectric cum irrigation project namely *Bargi*, *Indira Sagar*, *Omkareshwar* & *Sardar Sarovar* Projects on main Narmada river which are almost completed and eight completed projects on different tributaries namely Matiyari, Barna, Tawa, Kolar, Sukta, Man, Jobat and Karjan. The salient features of these projects are given below:

PROJECTS ON MAIN RIVER

Rani Awanti Bai Sagar Project (Bargi): This project is located on the main river Narmada near Jabalpur. The project was constructed at a cost of Rs 98,361 lakh. It is a multipurpose project. The total catchment area of the project is 14,556 Sq km. The gross and dead storage of the reservoir is 3920 hm³ and 740 hm³ respectively. The 135.00 km length of left bank canal of this project irrigate 1.92 lakh ha. This project has 2 units of 45 MW each on its left bank and other 2 units of 7.5 MW each on right bank. The project was initially started during the year 1985 and Head Works were completed in the year 1987.

Indira Sagar Project: The Indira Sagar Project is a multipurpose river valley project across river Narmada in Khandwa Distt. of Madhya Pradesh at a distance of 200 km from Bhopal. It has a CCA of 1,69,000 ha at 138% intensity on the left bank of Narmada river and generate 1000 MW of hydropower. The project also envisage supply of 74 MCM of drinking water to rural areas. The revised cost of the project at 1998 price level is Rs. 5150 crores.

Omkareshwar Project: The Omkareshwar multipurpose project is constructed across river Narmada near village Mandhata of Khandwa distt. in Madhya Pradesh. The dam site is located at a distance of 77 km from Indore. The project envisage construction of 73 m high concrete dam with a gated spillway to irrigate 1,46,800 ha CCA and to generate 520 MW power. The estimated cost of project is Rs. 1846.77 crores as in 2001.

Sardar Sarovar Project: The Sardar Sarovar dam is constructed across river Narmada and is located at 170 km U/S from Gulf of Khambat in Gujarat State. It is 1210 m long and 129.5 m high dam from river bed level. SSP proposes to irrigate a command area of 1.8 million ha of Gujarat and Rajasthan States and have an installed power generation capacity of 1450 MW. The project also provide the domestic water supply to 2.35 million people of Gujarat state. Almost 90% of the work at dam site has been completed. The revised estimated cost for the project was Rs. 39240.44 crores as in 2008-09 P.L.

Table 2-13 Major Projects (Completed, On-going & Proposed) in Narmada Basin

Sl. No	Name of Project	River	Status	Capacity Gross/ Live (hm ³)	Utilisation (hm ³)
1	Karjan	Karjan	Completed	630	NA
2	Sardar Sarovar	Narmada	Completed *		7475.4
3	Jobat	Hathni	Completed *	77.84/70.04	47.77
4	Lower Goi	Goi	Ongoing	-	-
5	Man	Man	Completed *	145.03/126.87	114.43
6	Upper Beda	Beda	Ongoing	91.82/76.24	7.58

Sl. No	Name of Project	River	Status	Capacity Gross/ Live (hm ³)	Utilisation (hm ³)
7	Maheshwar	Narmada	Ongoing	-	-
8	Omkareshwar	Narmada	Completed *	987/299	-
9	Indira Sagar	Narmada	Completed *	12220/9750	354.11
10	Sukta	Sukta	Completed	89.5/78.05	76.21
11	Ganjal	Ganjal	Proposed	-	-
12	Morand	Morand	Proposed	-	-
13	Kolar	Kolar	Completed	270/265	209.29
14	Tawa	Tawa	Completed	2310/2050.5	1673.49
15	Barna	Barna	Completed	539/455.78	372.79
16	Dudhi	Dudhi	Proposed	-	-
17	Sitareva	Sitareva	Proposed	-	-
18	Sakkar	Sakkar	Proposed	-	-
19	Machreva	Machreva	Proposed	-	-
20	Sher	Sher	Proposed	-	-
21	Chinki	Narmada	Proposed	-	-
22	Ataria	Hiran	Proposed	-	-
23	Rani Awanti Bai Sagar (Bargi)	Narmada	Completed	3920/3180	335.8
24	Matiyari	Matiyari	Completed	56.8/51.12	17.4
25	Basania	Narmada	Proposed	-	-
26	Halon	Halon	Proposed	-	-
27	Upper Burner	Burner	Proposed	-	-
28	Roosira	Narmada	Proposed	-	-
29	Raghavpur	Narmada	Proposed	-	-
30	Upper Narmada	Narmada	Proposed	-	-
* : Though the Head work in project(s) is(are) complete, Fully Designed irrigation potential is yet to be developed. As the reservoir is ready, the projects are stated as complete for water year book purpose.					

Source: Annual Water Account of Narmada Basin up to Sardar Sarovar Dam site, Water Year 2011-12, Published by NCA.

PROJECTS ON TRIBUTARIES

Matiyari Project: This project is located on river Matiyari, a sub-tributary of Narmada near village Simariya in Mandla District. The project is constructed at a cost of Rs. 1558.40 lakh. It is mainly an irrigation project. The total catchment area of the project is 158.75 sq km. The gross and dead storage of the reservoir is 58.80 hm³ and 5.68 hm³ respectively. About 10120 ha of land is being irrigated through 78 km length of canal.

Barna Project: This project is located on river Barna, a tributary of river Narmada about 20 km from Bareli in Raisen District. The project is constructed at a cost of Rs. 153.7 lakh. It is mainly an irrigation project. The total catchment area of the project is 1,176 sq km. The gross and dead storage of the reservoir are 538.3 hm³ and 83.15 hm³ respectively. About 54,915 ha of land is being irrigated through 39.05 km length of canal. The project was commissioned during 1973.

Tawa Project: This project is located on river Tawa, a tributary of river Narmada, 9 km from Bagra Tawa railway station in Hoshangabad District. The project is constructed at a cost of Rs. 9,142 lakh. It is mainly an irrigation project. The total catchment area of the project is 5,983 km². The gross and dead storage of the reservoir is 2,248.8 hm³ and 255.6 hm³ respectively. About 2.47 lakh ha of land is being irrigated through 187 km length of canal. The project was commissioned during 1977.

Kolar Project: This project is located on river Kolar a tributary of river Narmada near village Lavakhedi (Birpur) about 32 km southwest of Bhopal. The estimated cost of the project is Rs 139.14 Crore as approved by TAC. Catchment area up to the dam site is 508 sq km. GCA, CCA and annual irrigation of the project are 62,752 ha, 45,087 ha and 60,868 ha respectively. In addition to irrigational facilities, the project also provides 56.75 hm³ (34 MGD) drinking water to the Bhopal city. Gross and live storage capacities of the project are 270 hm³ and 265 hm³ respectively.

Sukta Project: This project is located on river Sukta, a tributary of river Narmada near village Khirala about 40 km from Khandwa (in Khandwa District). The project is constructed at a cost of Rs. 1,189.65 lakh. It is mainly irrigation cum domestic water supply project. The total catchment area of the project is 469 sq km. The gross and dead storage of reservoir is 96.85 hm³ and 11.30 hm³ respectively. About 16,599 ha of land is being irrigated through 23.48 km length of canal. The project was commissioned during 1980 and finally completed during 1984.

Man Project: Man Irrigation Project in Dhar Distt. of Madhya Pradesh envisage construction of a composite dam across river Man (a tributary of river Narmada) near village Jeerabad of Gandhwani Tehsil. It is located on Dhar – Manawar state highway at a distance of 60 km from Dhar and 320 km from Bhopal. The project has partially lined canal system taking off from both flanks of the dam to provide irrigation in a CCA of 15,000 ha with annual irrigation of 19,200 ha. The estimated cost of project was 176.75 crores in 2004.

Jobat Project: Jobat irrigation project in Madhya Pradesh envisage construction of a composite dam across river Hathni (a tributary of river Narmada) near village Waskal, 24 km away from Kukshi town and 400 km from Bhopal. A 29.73 km long main canal is proposed with distribution network to provide irrigation to 9,848 ha of CCA on the left bank of river Hathani to benefit 27 villages of Kukshi Tehsil in Dhar Distt. Work pertains to Head works is completed in all respect and at an average 90% work pertains to canal system is also completed.

Karjan Project: This project is located on river Karjan a tributary of river Narmada near village Jitgadhi in district Bharuch (Rajpipla narrow gauge Railway station is 10 km from dam site). The project is constructed at a cost of Rs. 13,861.3 lakh. It is a major irrigation project. The catchment area of the project is 1,403.78 sq km. The gross and dead storage of the reservoir is 630.0 hm³ and 49.0 hm³ respectively. About 56,200 ha of land is being irrigated through 63.605 km length of canal. The project was commissioned during June 1987.

Table 2-14 Medium Projects in Narmada Basin (Completed & On-going & Proposed)

Sl. No.	Name of project	River/Tributary	Status	Capacity Gross/Live (hm ³)	Utilisation (hm ³)
1	Jalgaon	Banjar/Local Nalla	Completed	2.33/2.17	1.69
2	Banjar	Banjar/Gahra Nalla	Completed	14.76/13.71	5.72
3	Bohribund tank	Bhuta Nalla/Hiran	Completed	36.93/34.47	54.24
4	Bichhia tank	Kolar Nalla/Banjar	-do-	7.87/7.23	6.37
5	Dhuandhar tank	Dhuandhar Nalla/Banjar	-do-	5.26/5.11	4.62
6	Mehgaontola tank	Bidri Nalla/Gour	-do-	11.62/10.51	5.02
7	Barnoo tank	Barnoo Nalla	-do-	10.32/8.96	6.39
8	Madai tank	Madai Nall	-do-	8.70/8.39	6.32
9	Pariyat tank	Pariyat Nalla	-do-	20.30/18.47	19.33
10	Dukrikheda tank	Ghogra Nalla/ Sukhri	-do-	12.25/11.50	6.18
11	Chandra Keshar tank	Chandra Keshar	-do-	31.65/30.06	19.33
12	Paras tank	Paras	-do-	7.53/6.10	6.09
13	Sampna tank	Sampna	-do-	16.92/14.32	14.31
14	Upper Beda	Beda	Ongoing	91.82/76.24	-
15	Choral Nakheri tank (Choral)	Choral Nakheri	-do-	23.92/19.23	38.42
16	Choral Nakheri tank (Nakheri)	Choral Nakheri	-do-	Feeder Tank	-
17	Segwal tank	Sazar Nalla/Borad	Completed	8.96/8.62	8.12
18	Satak tank	Satak	Completed	19.79/18.37	16.23
19	Dejla Dewada tank	Kundi	Completed	56.35/50.29	50.29
20	Kunda tank	Buti Nalla	Completed	8.50/8.10	8.10
21	Sukalda tank	Chiri & Khug Nalla	Completed	15.56/12.69	11.68
Source: Annual Water Account of Narmada Basin up to Sardar Sarovar Dam site, Water Year 2011-12, Published by NCA.					

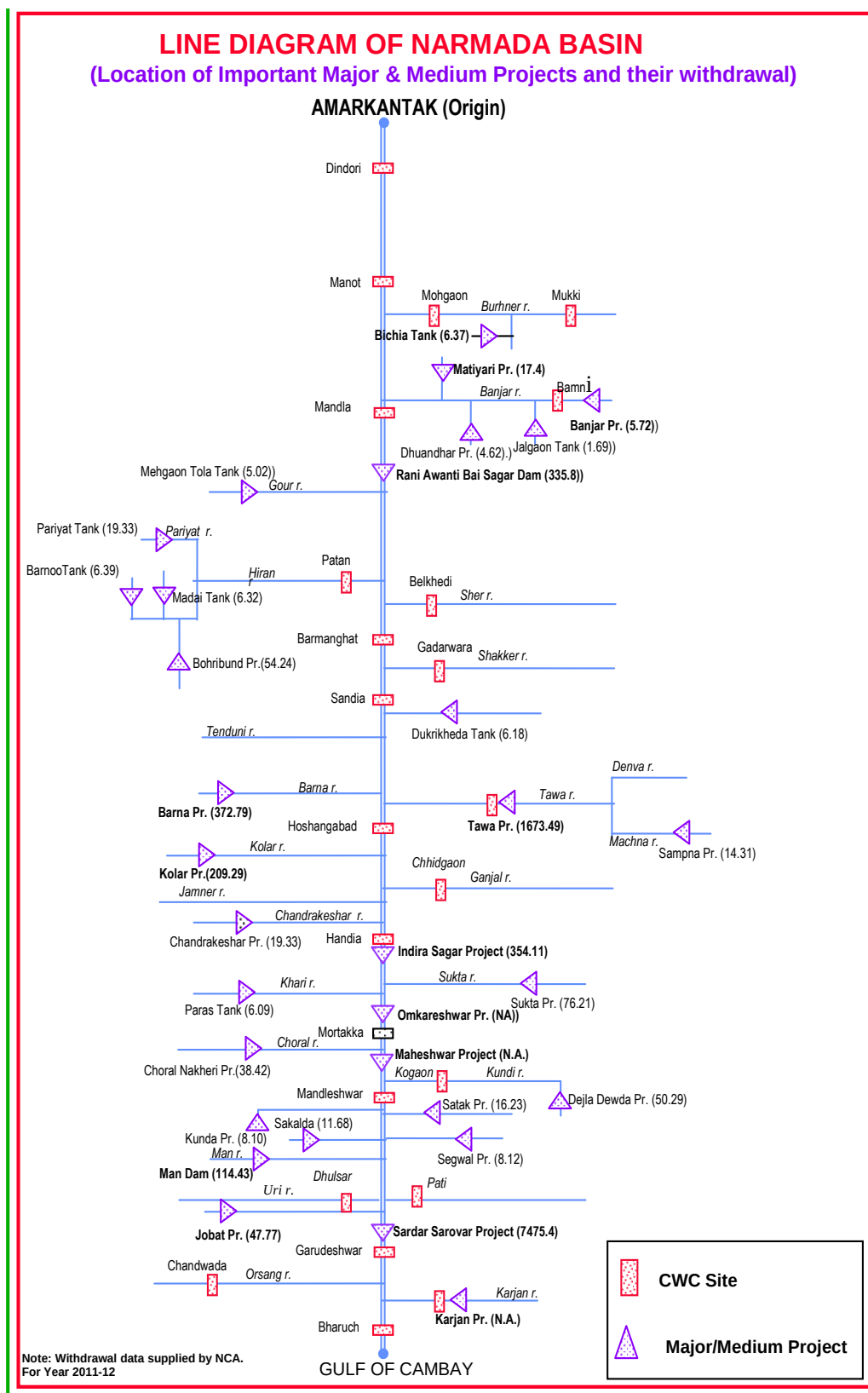


Figure 2-2 Line Diagram of Narmada Basin (Location of Major & Medium Projects and their Withdrawal)

Note: Withdrawal in case of Bargi, I.S.P., O.S.P & S.S.P consists of utilisation for irrigation through canals in addition to spillway/power house release. Figure in the bracket against the project shows the Withdrawal from project in MCM

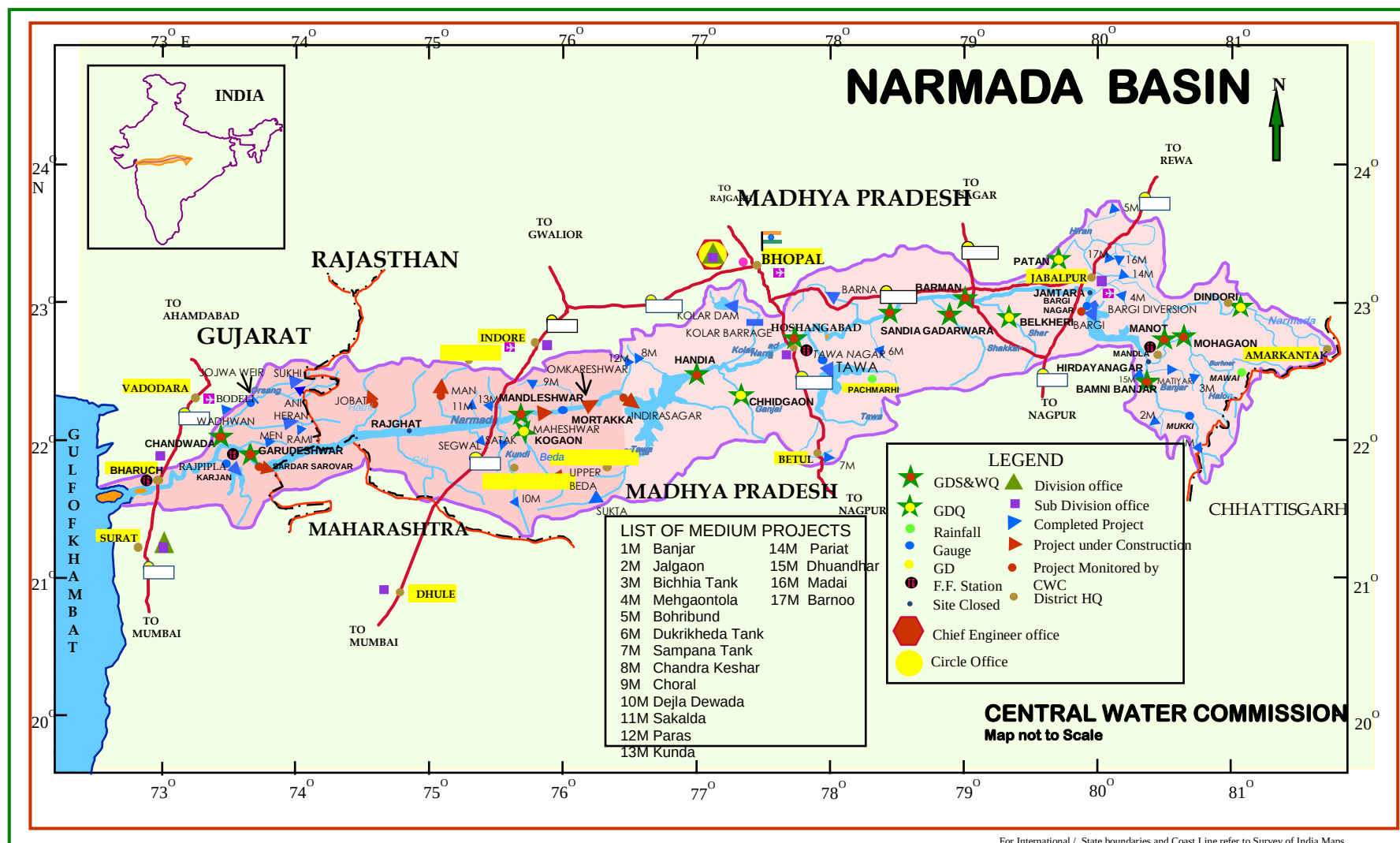


Figure 2-3 Narmada Basin

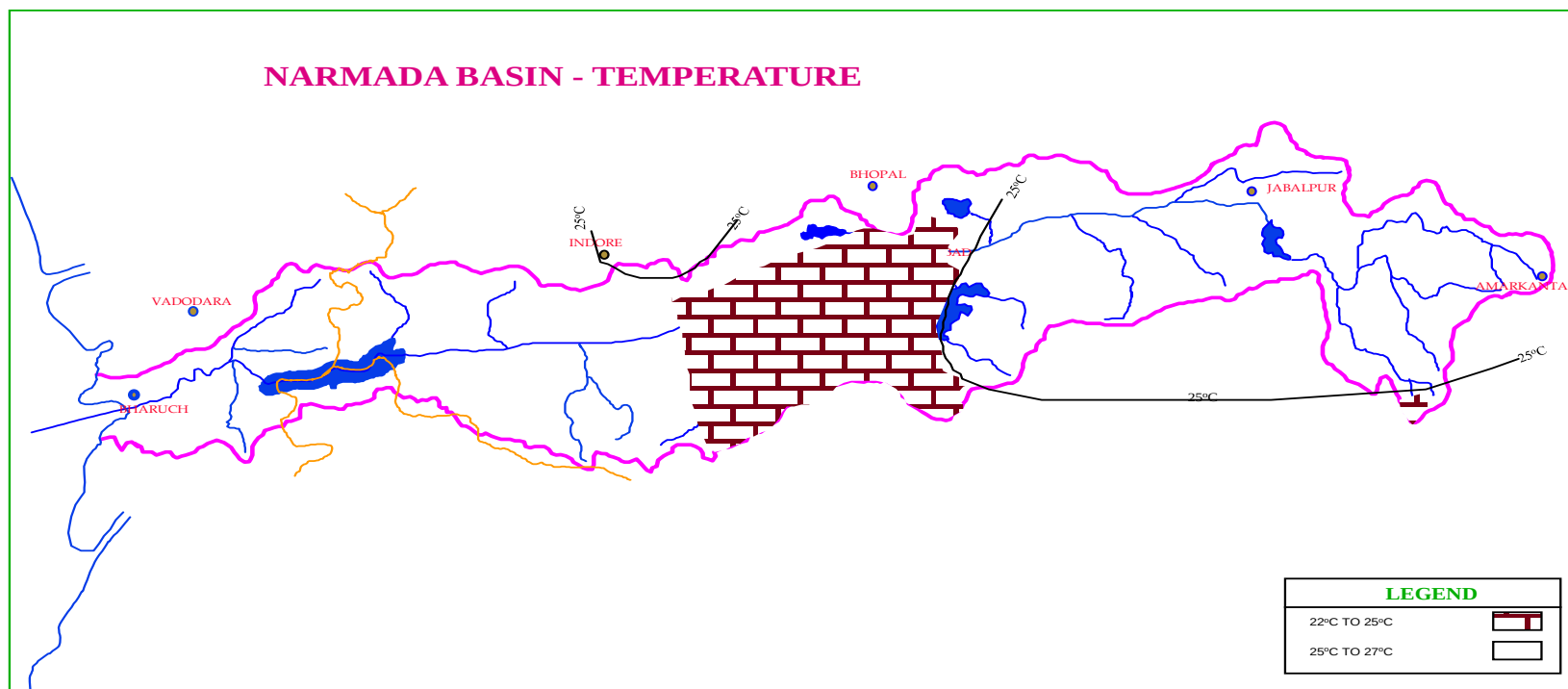


Figure 2-4 Narmada Basin - Temperature

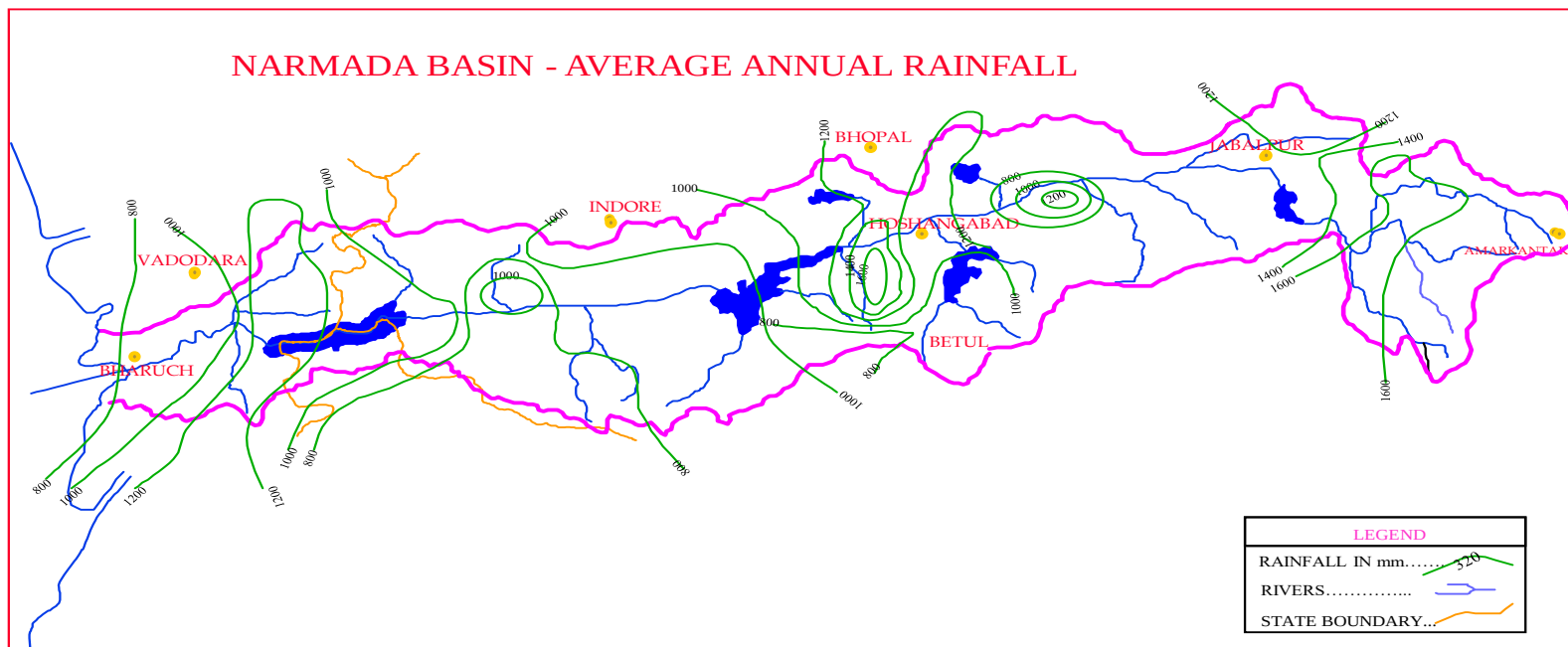


Figure 2-5 Narmada Basin – Average Annual Rainfall

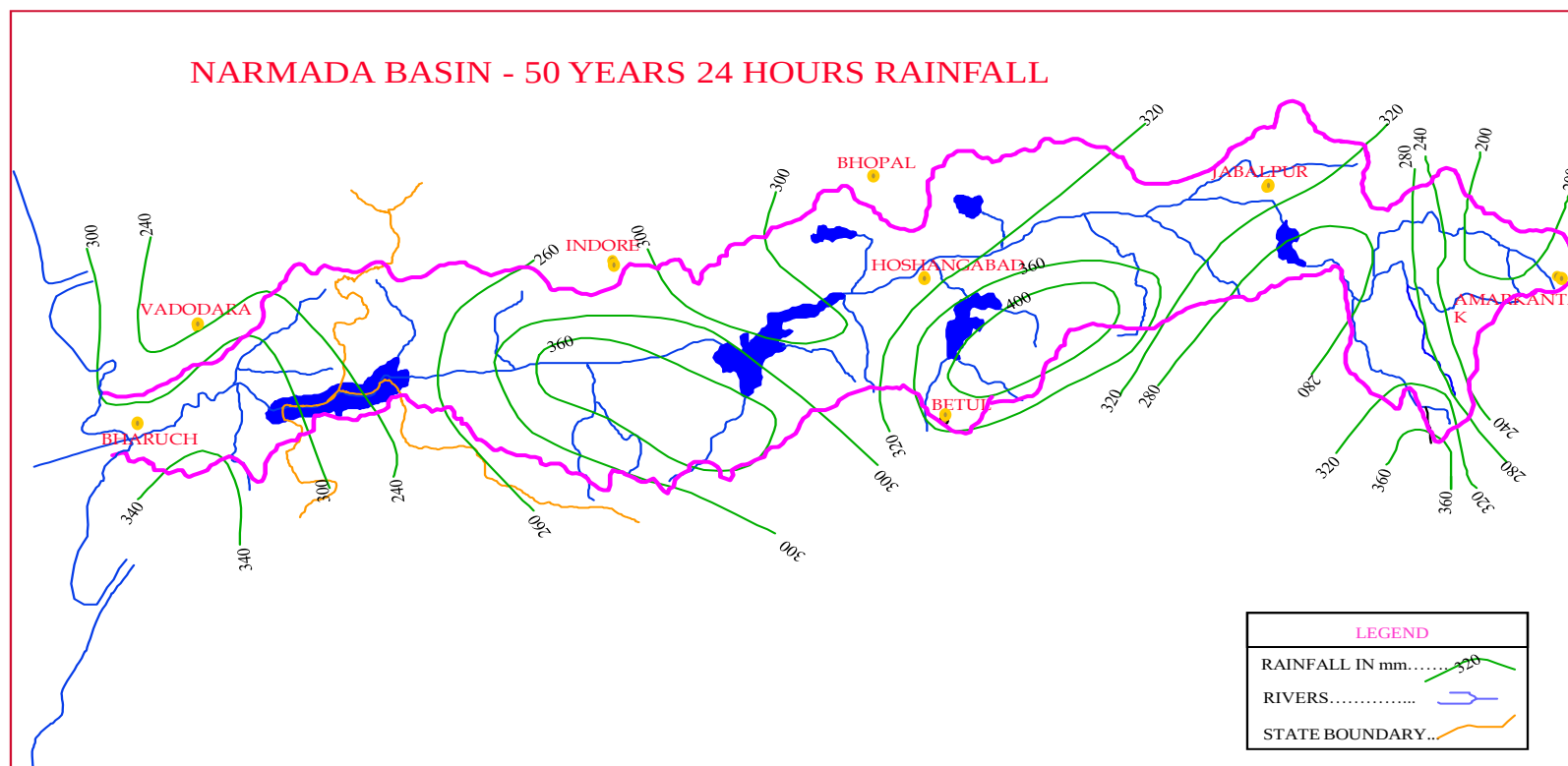


Figure 2-6 Narmada Basin – 50 Years 24 Hours Rainfall

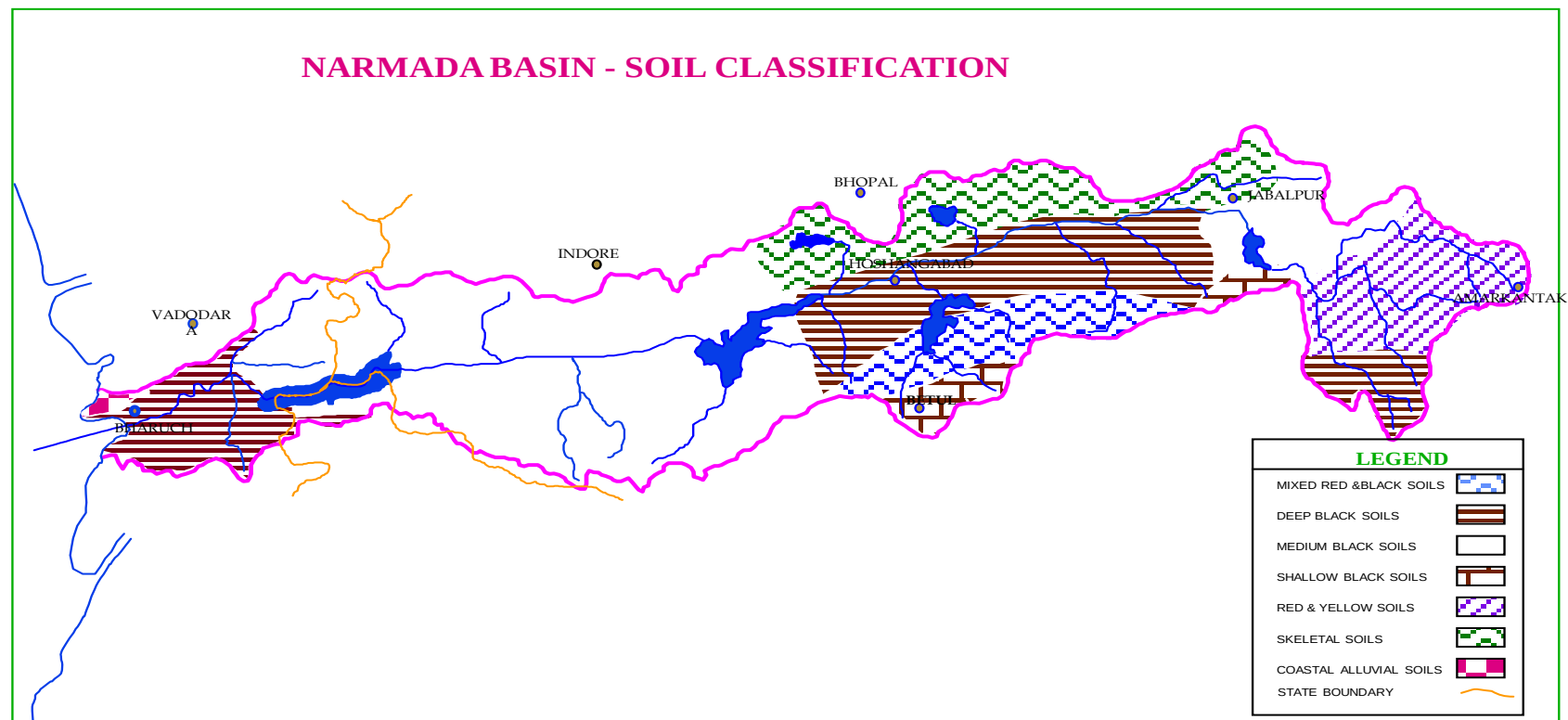


Figure 2-7 **Narmada Basin – Soil Classification**

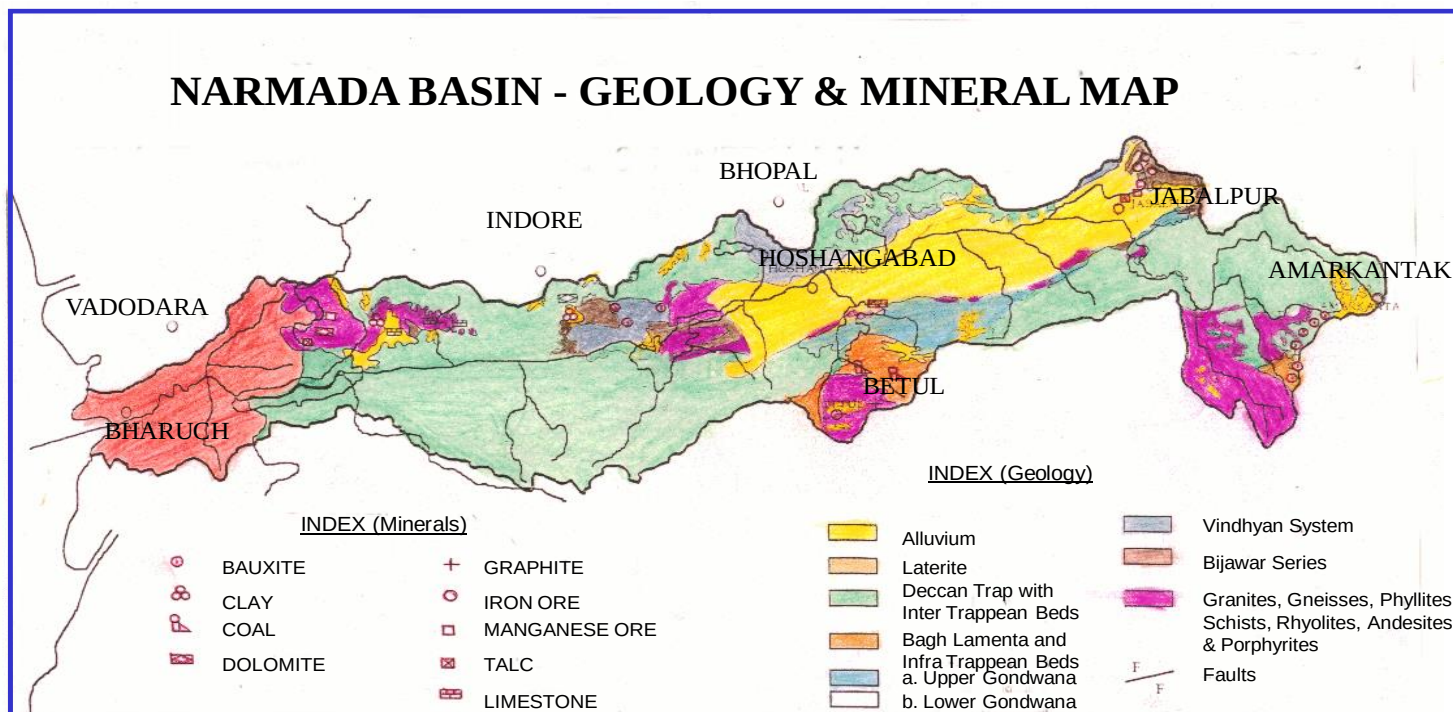


Figure 2-8 Narmada Basin – Geology & Mineral Map

3 Stream Flow Data

3.1 Methodology

3.1.1 Gauge Measurement

Water level or stage of river is measured as its elevation above the G.T.S. datum. Water level measurement is conducted by reading non-recording gauges as specified in IS 4080-1967. Series of vertical staff gauges have been fixed at three sections at every site. The gauge posts are generally of wood or concrete with cut and ease water arrangement and fixed securely in vertical position by anchoring them in M-15 concrete base of suitable size. Enamelled vertical gauge plates with metric markings are fixed on the gauge posts so that the gauges can be read up to 0.005 m.

Out of the three gauge lines the Central one is used as Station Gauge line and the readings of other two gauge lines are used for calculation of water surface slope. During non-monsoon season, gauges are read thrice daily (0800, 1300 and 1800 hrs) and during monsoon, gauges are read hourly at the station gauge line.

3.1.2 Discharge Observations

Discharge is observed once a day starting from 0800 hrs at all the sites by area velocity method except on Sundays and holidays. For non-observation days, the discharge values are computed from the Stage and Discharge relation prepared from the observed data for the water year 2016-17.

The stream width is divided into 15 to 25 segments based on the degree of accuracy as outlined in IS 1192-1981. The width of the river is measured by steel tape/ metallic tape or wire/nylon rope stretched across the river with markings indicated there on, when the river width and depth permitted wading. For large width and deep flow conditions segmentation is done using simple trigonometric method for which pivot point and segment blocks have been constructed at each site.

The depth is measured by using sounding rod 3 to 6 metre long adopting specifications given in IS 3912-1966. When the river flow is very deep and swift, lead lines/ echo sounders are used. Necessary Airline correction and Wet line corrections are made to the sounding observation as provided in IS 1192-1981. The velocity is measured as per IS 3918-1966 by using a cup type current meter conforming to specifications given in IS 3910-1966. The current meter is lowered at the requisite depth (0.6d) vertically at every segment by suspension arrangement as specified in IS 6064-1971. In high velocities, boats fitted with power engines or motor launches are used. Drift is measured and correction for the same is made. Where observations by boat or launch are not possible, measurement of velocity is conducted from bridge or cableway.

When the above procedures are not possible then velocity is measured by float observations. The observations are recorded in a standard format for calculation of total river flow.

3.2 Data Availability

Data availability at various sites in Narmada basin is given in **Table 3-1**.

Table 3-1 Data Availability at CWC Sites

Sl. No.	Station Name	Type	Data Available		Station code No.
			From (Year)	To (Year)	
1	Narmada at Dindori	G/D/Q	88/88/90	2017	01 02 15 001
2	Narmada at Manot	G/D/S/Q	76/76/79/80	2017	01 02 15 002
3	Narmada at Aamgaon	G/D	99/01	2006	NCA
3	Burhner at Mohgaon	G/D/S/Q	77/77/92/86	2017	01 02 15 004
4	Banjar at Bamni	G/D	99/99	2017	-
5	Banjar at Mukki	G	88	2017	01 02 15 005
6	Banjar at Hirdayanagar	G/D/S/Q	76/76/92/86	2002	01 02 15 006
7	Narmada at Mandla	G	75	2017	01 02 15 007
8	Narmada at Jamtara	G/D/S/Q	71/72/72/79	2001	01 02 15 008
9	Hiran at Patan	G/D/Q	79/79/86	2017	01 02 15 009
10	Sher at Belkheri	G/D/Q	77/77/86	2017	01 02 15 010
11	Narmada at Barmanghat	G/D/S/Q	70/71/72/79	2017	01 02 15 011
12	Shakkar at Gadarwara	GDSQ	77/77/78/79	2017	01 02 15 012
13	Narmada at Sandia	G/D/S/Q/R	78/78/78/79	2017	01 02 15 013
14	Tendoni at Maheshwar	G/D	84/84	1993	01 02 15 014
15	Barna at Bareli	G/D	84/84	1993	01 02 15 015
16	Tawa at Tawa Dam	G	74	2017	01 02 15 017
17	Tawa at Manegaon	G/D/Q	76 /76/76	1991	01 02 15 018
18	Tawa at Tawakati	G/D	99/01	2006	NCA
19	Machna at Shahpur	G/D	99/00	2006	NCA
20	Narmada at Hoshangabad	G/D/S/Q	72/72/72/79	2017	01 02 15 019
21	Ganjal at Chhidgaon	G/D/Q	76/76/86	2017	01 02 15 020
22	Jamner at Sandalpur	G/D	87/87	1993	01 02 15 021
23	Narmada at Handia	G/D/S/Q	77/77/77/79	2017	01 02 15 022

Sl. No.	Station Name	Type	Data Available		Station code No.
			From (Year)	To (Year)	
24	Chhota tawa at Ginnore	G/D/Q	71/71/72/79	1999	01 02 15 023
25	Narmada at Mortakka	G/D/Q	99/99/99	2015/2007/2007	01 02 15 024
26	Kundi at Kogaon	G/D/Q	78/78/86	2017	01 02 15 025
27	Narmada at Mandleshwar	G/D/S/Q	70/71/72/79	2017	01 02 15 026
28	Man at Ajandiman	G/D	84/84	1993	01 02 15 027
29	Narmada at Rajghat	G/D/S/Q	71/72/72/79	2007	01 02 15 028
30	Uri at Dhulsar	G/D	99/99	2017	NCA
31	Goi at Pati	G/D	99/99	2017	NCA
32	Hathni at Jobat	G/D	2000	2006	NCA
33	Hathni at Tikola	G/D	84/84	2002	01 02 15 029
34	Narmada at Garudeshwar	G/D/S/Q	71/72/73/77	2017	01 02 15 030
35	Orsang at Chandwada	G/D/S/Q	79/79/88/80	2017	01 02 15 032

3.2.1 Explanatory Notes

The explanatory notes given here under are designed to assist in the interpretation of hydrological parameters contained in the data presented. The notes are therefore applicable in so far as the data presented in this book.

1. Water year covers the period from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.
2. Discharge is given in cubic metre per second.
3. Discharges given are actual observed/computed discharges.
4. The zero of gauge is datum level/R.L. fixed for a given site, which is kept 1 m 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.
5. Maximum and minimum discharges are taken from the daily observed flows.
6. Runoff in "mm" is the notional depth of water in millimetres over the catchment area equivalent to annual runoff calculated at the discharge measurement station. It is computed using the relation.

$$Runoff (mm) = \frac{Annual\ flow\ (hm^3)}{Catchment\ area\ (km^2)} \times 100$$

7. Peak and lowest flow correspond to the highest and lowest water levels recorded during the period of record.
8. Measuring authority refers to the field Division responsible for the operation of the gauging station.
9. The gauging station code number is a unique nine column numeric reference number which facilitates storage and retrieval of flow data in data banks. The first two columns are identifier of measuring authority. Third and fourth columns are for zone/basin. Fifth and sixth columns are for independent river and last three i.e. seventh, eighth and ninth columns are for station numbers.
10. The month and the year from which data are available in the data bank is indicated in **Table 3-1**.

3.2.2 Method of Presentation

The data presented in this book are processed discharge data obtained from application of SWDES and e-SWIS.

In the following pages, station wise hydrological data are presented comprising history sheet, daily flow table and pictorial summary. The sequence of hydrological stations is arranged from its origin to its outfall giving inter-priority to an intermediate tributary station in a similar fashion.

History sheets give concise description of the hydrological station. The flow tables present daily observed flows together with 10 daily, monthly and annual summaries. The pictorial summary shows monthly hydrograph of the current year for each individual gauging station which is superimposed on the corresponding maximum, minimum and mean values for the period of record i.e. up to the previous year. Thus maximum represents monthly maximum average discharge, minimum represents monthly minimum average discharge and mean represents mean of the 10 daily average discharges for the period of past record. The period of data considered is from inception of the site to the previous water year. Flow below 0.1 cumec is not represented in the pictorial summary because log scale has been used for plotting hydrographs.

The hydrological data presented here mainly consists of the following :

- 1 **History sheet:** It mainly consists of some salient features of the particular site as its location ,its drainage area, tributary, opening dates and the maximum and minimum discharge values and their corresponding water levels with the exact dates of their occurrence.
- 2 **Stage discharge curve:** It gives a relationship between the stage of the river at a given time and the corresponding discharge.
- 3 **Stage discharge sheet:** It consists of the stage-discharge data (both observed and that calculated from the stage discharge curve) for all the days of the current water year, peak observed and computed discharge, lowest observed discharge and the total runoff for the current water year.
- 4 **Histogram hydrograph:** It is a discharge –time graph which shows the mean monthly discharge based on the historical data ,mean monthly discharge for the current water year, minimum and maximum discharge based on the historical data.

- 5 **Annual Runoff:** It gives the values of the annual runoff (in MCM) for all the years from the opening of the site upto the current year.
- 6 **Monthly Average Runoff:** This chart shows the monthwise distribution of runoff based on the historical data of the site.
- 7 **Monthly Runoff:** This chart shows the monthwise distribution of runoff for the current water year.
- 8 **Pre-Monsoon & Post-Monsoon X-Section for Water Year :** It gives the pre-monsoon & post-monsoon cross sectional profile of the river ,maximum and minimum water levels occurred during the current year with the date of their occurrence.
- 9 **Water Level vs. Time - Graph** of Highest Flood Peak during the current Year
- 10 **Water Level vs. Time - Graph** of 2nd Highest Flood Peak during the current Year
- 11 **Water Level vs. Time - Graph** of 3rd Highest Flood Peak during the current Year

4 Hydrological Data

In the following pages, station wise hydrological data are presented comprising history sheet, daily flow table and pictorial summary. The sequence of hydrological stations is arranged from its outfall to its origin giving inter-priority to an intermediate tributary station in a similar fashion. Data of following stations are given in the following pages

- **Orsang at Chandwada**
- **Narmada at Garudeshwar**
- **Goi at Pati**
- **Uri at Dhulsar**
- **Narmada at Mandleshwar**
- **Kundi at Kogaon**
- **Narmada at Handia**
- **Ganjal at Chhidgaon**
- **Narmada at Hoshangabad**
- **Narmada at Sandia**
- **Shakkar at Gadarwara**
- **Narmada at Barmanghat**
- **Sher at Belkheri**
- **Hiran at Patan**
- **Banjar at Bamni**
- **Burhner at Mohgaon**
- **Narmada at Manot**
- **Narmada at Dindori**
- **Narmada at Bijora**

4.1 Orsang at Chandwada

History Sheet

[illegible]

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1999-2000	16.04	19.23	01/10/1999	0	18.68	01/07/1999
2000-2001	255	20.4	14/07/2000	0.01	18.8	31/08/2000
2001-2002	2790	23.8	05/08/2001	0.02	18.56	26/10/2001
2002-2003	2420	26.8	04/09/2002	0.01	18.64	30/10/2002
2003-2004	2050	25.5	25/06/2003	0.25	18.85	09/12/2003
2004-2005	4800	28.8	14/08/2004	0.36	18.65	03/07/2004
2005-2006	2379.72	23.2	04/07/2005	1.61	18.17	29/06/2005
2006-2007	6125.55	31.2	07/08/2006	0.92	18.655	03/07/2006
2007-2008	4085.92	27	02/07/2007	1.61	18.17	29/06/2007
2008-2009	2135.29	23.2	12/08/2008	1.27	18.43	25/07/2008
2009-2010	27.54	18.9	01/09/2009	2.62	18.38	21/10/2009
2010-2011	162.88	19.8	01/08/2010	2.8	18.4	01/11/2010
2011-2012	302.92	19.7	01/09/2011	1.95	18.4	01/12/2011
2012-2013	150.45	19.02	01/09/2012	0.99	18.26	01/08/2012
2013-2014	414.32	20.1	01/10/2013	1.62	18.1	01/05/2014
2014-2015	113.69	18.795	01/09/2014	0.81	18.28	01/01/2015
2015-2016	470.64	20.7	28/07/2015	2.02	18.15	12/09/2015
2016-2017	475.18	19.6	11/08/2016	0	18.01	03/01/2017

Stage Discharge Sheet for Orsang at Chandwada for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	0	0	19.35	18.1	91.16	18.850	42.02	18.38	9.14	18.27
2	0	0	0	0	58.32	18.55	54.16	18.815	4.77	18.37	9.12	18.27
3	0	0	0	0	296.4	19.15	82.05	18.700	40.47	18.37	9.08	18.27
4	0	0	0	0	90.84	18.7	82.16	18.700	43.93	18.55	8.68	18.26
5	0	0	0	0	127.35	18.8	46.49	18.50	59.25	18.62	8.63	18.26
6	0	0	0	0	52.42	18.4	45.35	18.47	60.29	18.7	7.26	18.25
7	0	0	0	0	144.4	18.59	42.5	18.46	56.6	18.6	4.53	18.23
8	0	0	0	0	144.36	18.7	41.62	18.37	55.31	18.59	4.43	18.22
9	0	0	0	0	190.06	18.79	41.04	18.39	57.01	18.62	4.26	18.21
10	0	0	0	0	322.43	19	28.59	18.34	45.63	18.42	4.17	18.2
11	0	0	0	0	475.18	19.6	24.35	18.33	64.14	18.59	4.16	18.2
12	0	0	0	0	245.6	19	23.5	18.32	48.38	18.55	3.66	18.19
13	0	0	125.58	19.04	149.88	18.75	22.88	18.31	28.67	18.5	3.52	18.18
14	0	0	47.91	18.5	71.95	18.55	22.27	18.31	27.93	18.48	3.37	18.17
15	0	0	13.99	18.25	49.95	18.45	22.36	18.56	27.24	18.47	3.09	18.15
16	0	0	7.58	18.2	34.55	18.38	17.44	18.55	26.74	18.46	2.94	18.13
17	0	0	0.052	18.15	32.56	18.37	26.05	18.74	25.25	18.43	2.48	18.11
18	0	0	2.52	18.1	24	18.36	39.32	18.66	19.46	18.41	2.08	18.1
19	0	0	2.52	18.1	24.05	18.36	34.08	18.64	18.63	18.39	2.01	18.1
20	0	0	1.84	18.08	85.69	18.7	33.15	18.25	18.32	18.37	2.00	18.1
21	0	0	0	18.05	85.79	18.7	62.03	18.70	18.32	18.37	2.01	18.1
22	0	0	0	18.05	101.15	18.76	56.35	18.79	17.04	18.34	2	18.1
23	0	0	0	18.05	60.09	18.66	60.39	18.62	17.01	18.34	1.98	18.1
24	0	0	0	18.05	85.8	18.7	41.45	18.80	10.41	18.32	1.95	18.1
25	0	0	0	18.04	85.83	18.7	88.18	18.85	10.01	18.29	1.66	18.09
26	0	0	0	18.04	85.85	18.7	88.18	18.66	9.69	18.27	1.65	18.09
27	0	0	0	18.04	91.8	18.71	46.1	18.55	9.52	18.27	1.61	18.09
28	0	0	0	18.04	100.8	19	42.29	18.43	9.33	18.28	1.59	18.08
29	0	0	58.42	18.55	66.09	18.8	45.87	18.39	9.3	18.28	1.58	18.08
30	0	0	24.21	18.3	65.86	18.75	43.25	18.27	9.28	18.27	1.57	18.08
31	0	0		18.15	66.54	18.8		18.28	9.27	18.28		
Ten-Daily Mean	0	0										
I Ten-Daily	0	0	0	0	130.15	18.68	47.3	0	40.35	18.52	6.2	18.24
II Ten-Daily	0	0	20.19	14.64	82.59	18.65	17.89	0	16.55	18.46	2.04	18.14
III Ten-Daily	0	0	7.51	18.12	56.65	18.75	48.59	0	9.35	18.3	1.6	18.09
Min.	0	0	1.84	18.04	19.35	18.1	17.44	0	9.27	18.27	1.57	18.08
Max.	0	0	125.58	18.04	475.18	18.1	91.16	0	60.29	18.27	9.14	18.08
Mean	0	0	9.24	10.92	89.8	18.69	37.93	0	22.08	18.43	3.28	18.16

Annual Runoff (MCM) = 542 Annual Runoff (mm) =141

Peak Observed Discharge = 475.2 on 11/08/2016 Corres. Water Level :19.6

Lowest Observed Discharge = 0.667 on 23/12/2016 Corres. Water Level :18.03

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m

*:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Stage Discharge Sheet for Orsang at Chandwada for the period 2016-17

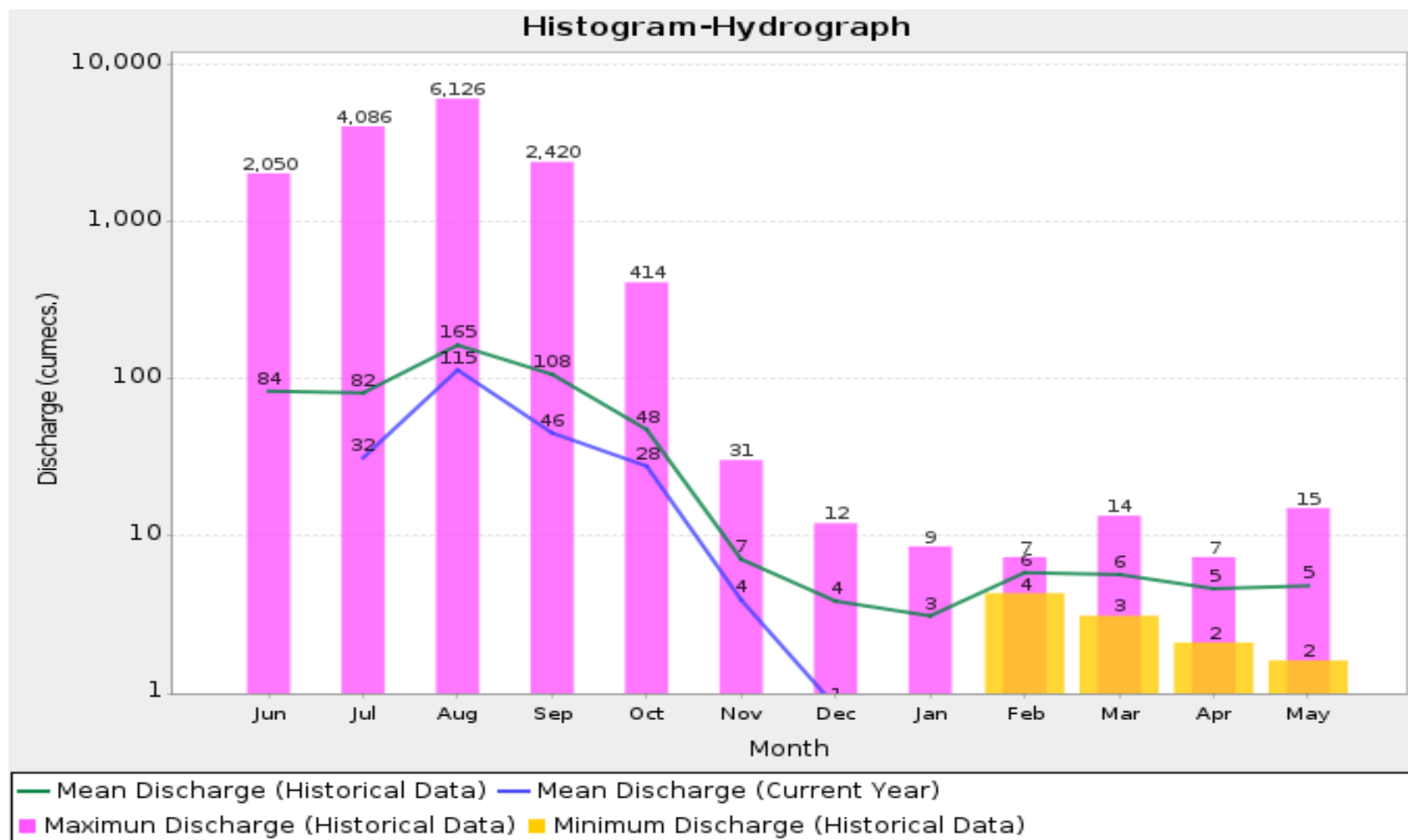
Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	1.57	18.08	0	18.01	0	0	0	0	0	0	0	0
2	1.56	18.08	0	18.01	0	0	0	0	0	0	0	0
3	1.56	18.08	0	18.01	0	0	0	0	0	0	0	0
4	1.15	18.08	0	0	0	0	0	0	0	0	0	0
5	0.76	18.07	0	0	0	0	0	0	0	0	0	0
6	0.75	18.07	0	0	0	0	0	0	0	0	0	0
7	0.75	18.07	0	0	0	0	0	0	0	0	0	0
8	0.74	18.07	0	0	0	0	0	0	0	0	0	0
9	0.74	18.07	0	0	0	0	0	0	0	0	0	0
10	0.72	18.07	0	0	0	0	0	0	0	0	0	0
11	0.72	18.07	0	0	0	0	0	0	0	0	0	0
12	0.72	18.07	0	0	0	0	0	0	0	0	0	0
13	0.73	18.07	0	0	0	0	0	0	0	0	0	0
14	0.73	18.07	0	0	0	0	0	0	0	0	0	0
15	0.73	18.07	0	0	0	0	0	0	0	0	0	0
16	0.73	18.07	0	0	0	0	0	0	0	0	0	0
17	0.75	18.06	0	0	0	0	0	0	0	0	0	0
18	0.72	18.06	0	0	0	0	0	0	0	0	0	0
19	0.7	18.04	0	0	0	0	0	0	0	0	0	0
20	0.69	18.04	0	0	0	0	0	0	0	0	0	0
21	0.68	18.03	0	0	0	0	0	0	0	0	0	0
22	0.68	18.03	0	0	0	0	0	0	0	0	0	0
23	0.07	18.03	0	0	0	0	0	0	0	0	0	0
24	0	18.02	0	0	0	0	0	0	0	0	0	0
25	0	18.02	0	0	0	0	0	0	0	0	0	0
26	0	18.02	0	0	0	0	0	0	0	0	0	0
27	0	18.02	0	0	0	0	0	0	0	0	0	0
28	0	18.02	0	0	0	0	0	0	0	0	0	0
29	0	18.02	0	0	0	0	0	0	0	0	0	0
30	0	18.02	0	0	0	0	0	0	0	0	0	0
31	0	18.02	0	0	0	0	0	0	0	0	0	0
Ten-Daily Mean												
I Ten-Daily	0.92	18.07	0	5.4	0	0	0	0	0	0	0	0
II Ten-Daily	0.51	18.06	0	0	0	0	0	0	0	0	0	0
III Ten-Daily	0.13	18.02	0	0	0	0	0	0	0	0	0	0
Monthly												
Min.	0.07	18.02	0	18.01	0	0	0	0	0	0	0	0
Max.	1.57	18.02	0	18.01	0	0	0	0	0	0	0	0
Mean	0.52	18.05	0	1.8	0	0	0	0	0	0	0	0

PeakComputed Discharge = 245.6 on 12/08/2016Corres. Water Level :19

Lowest Computed Discharge = 0.724 on 11/12/2016 Corres. Water Level :18.07

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

Histogram - Hydrograph for Water Year: 2015-2016 (Data considered: 1981-2017)



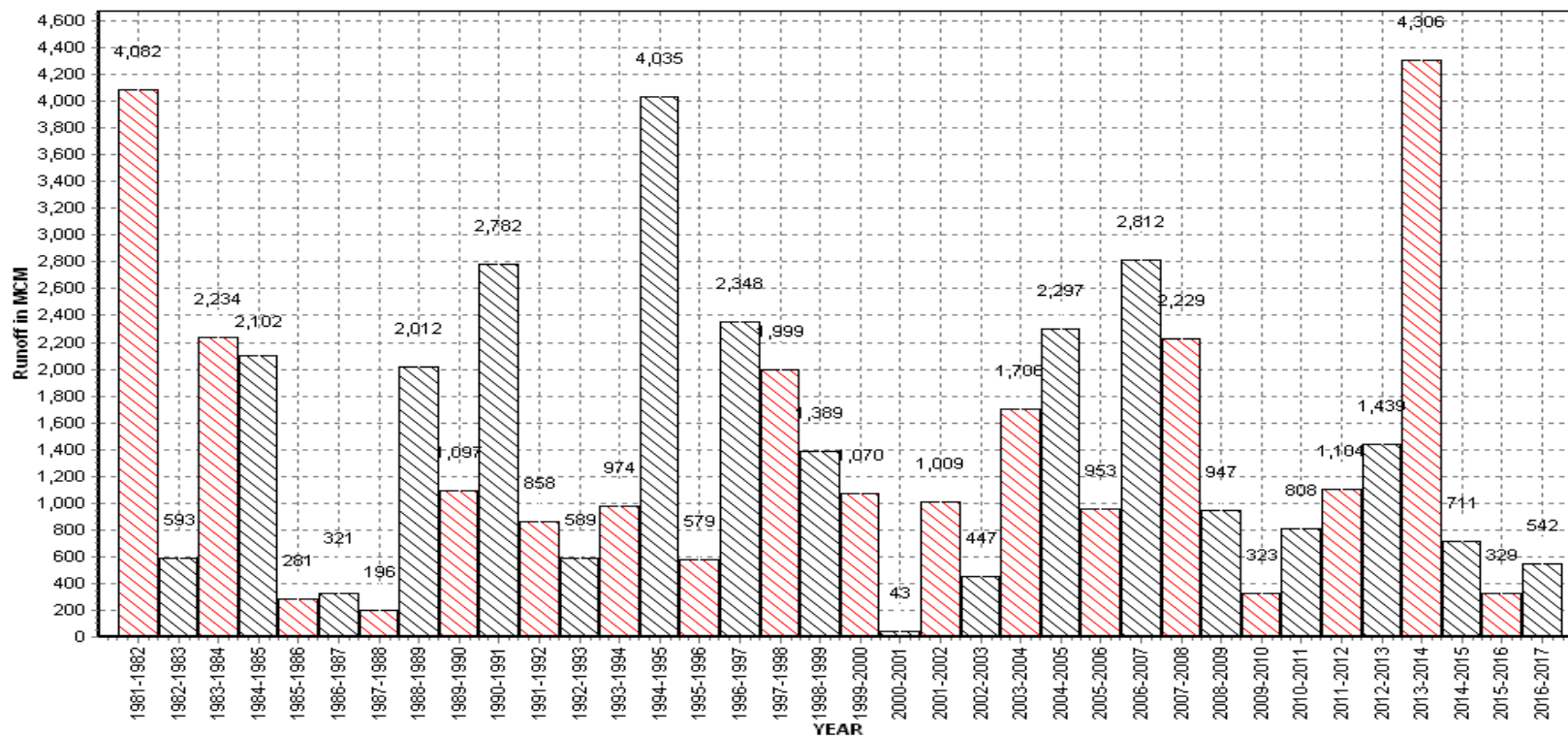
Annual Runoff Values for the period (1981 – 2017)

Station Name: Orsang at Chandwada (01 02 15 032)

Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch



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

Monthly Average Runoff based on period (1981 – 2017)

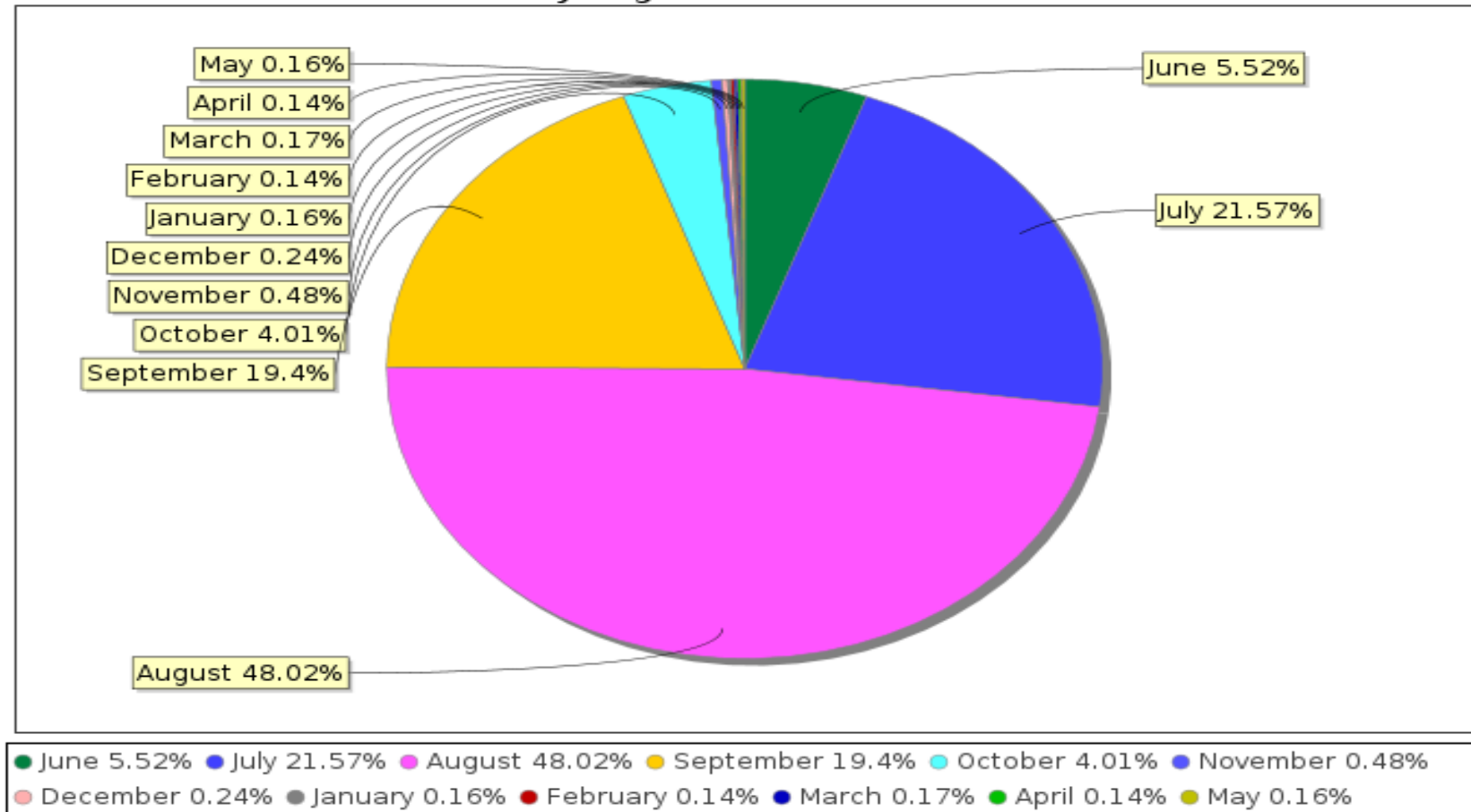
Station Name: Orsang at Chandwada (01 02 15 032)

Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch

Monthly Avg Runoff Historical Data



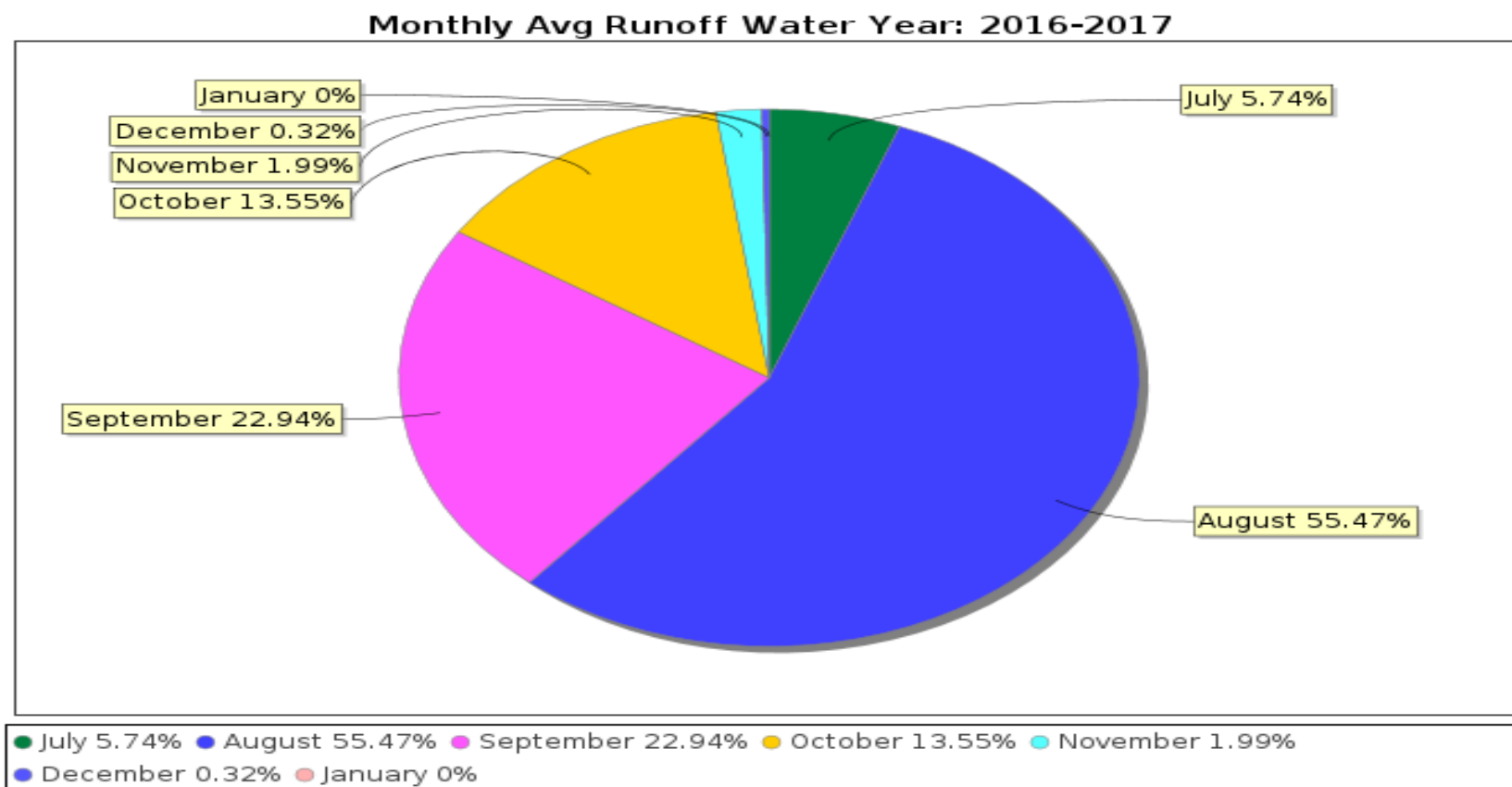
Monthly Runoff for the Year (2016-2017)

Station Name: Orsang at Chandwada (01 02 15 032)

Local River: Orsang

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-2017)

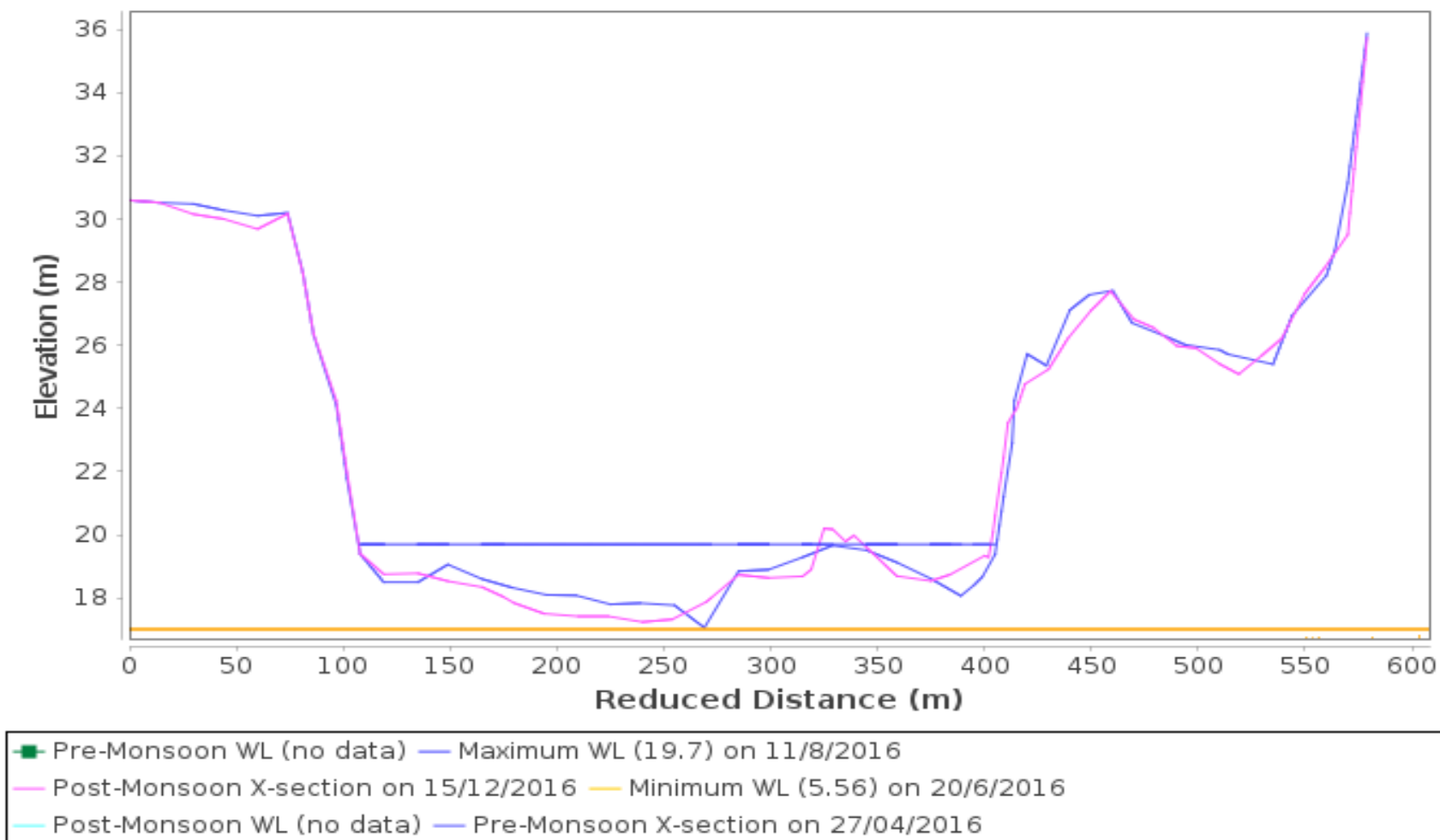
Station Name: Orsang at Chandwada (01 02 15 032)

Local River: Orsang

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch

X-Section



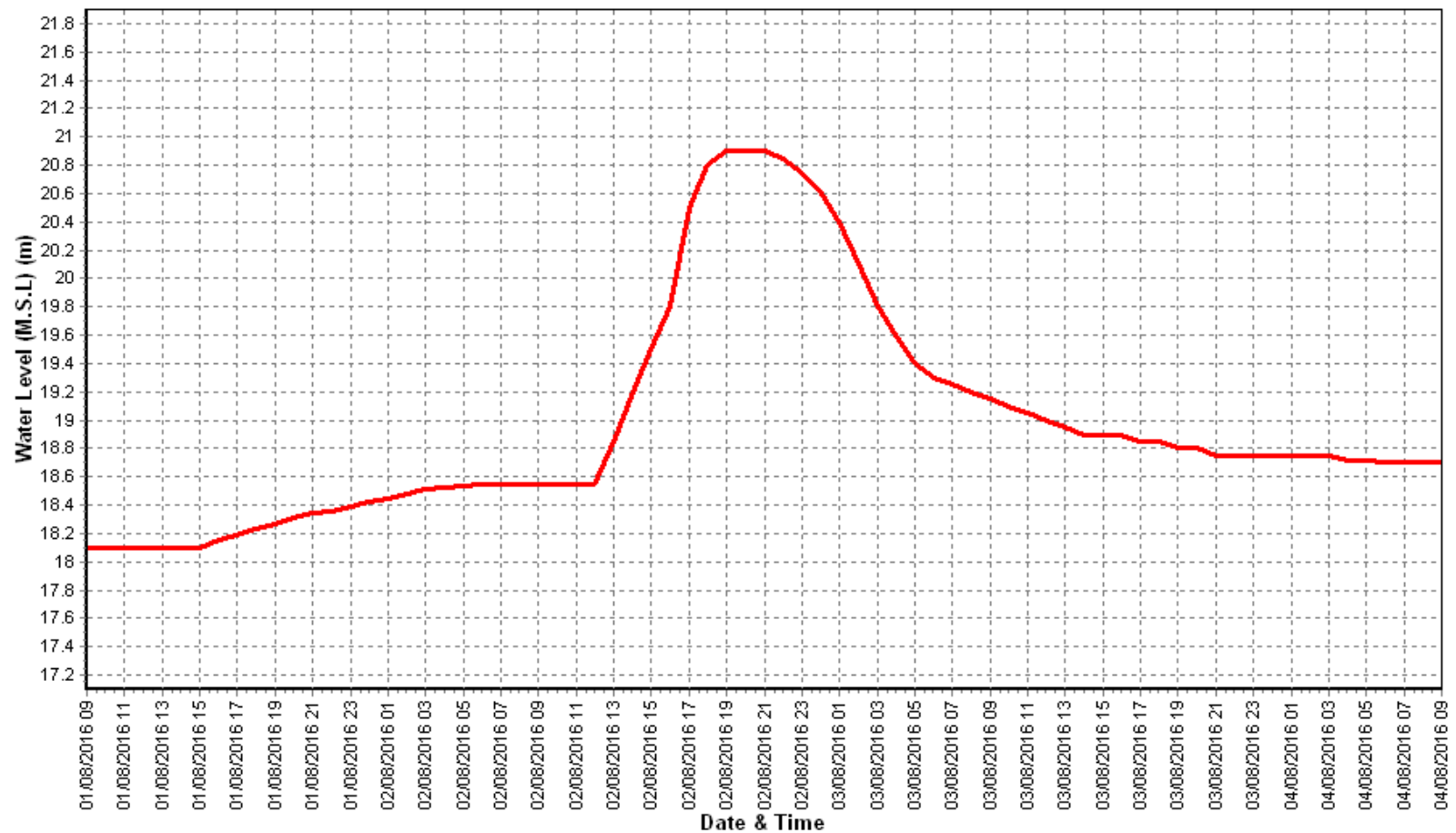
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-2017)

Station Name: Orsang at Chandwada (01 02 15 032)

Local River: Orsang

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



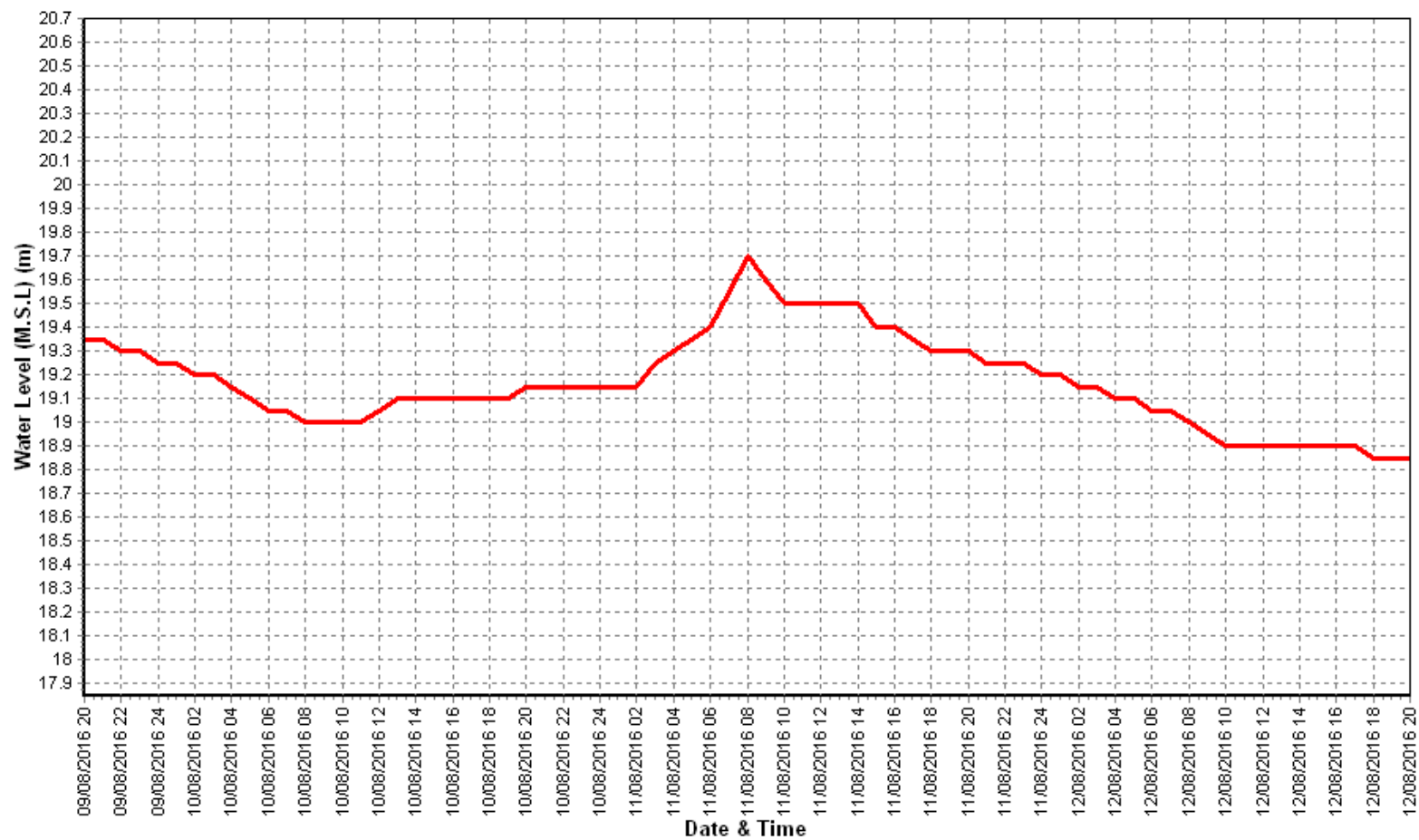
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-2017)

Station Name: Orsang at Chandwada (01 02 15 032)

Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch



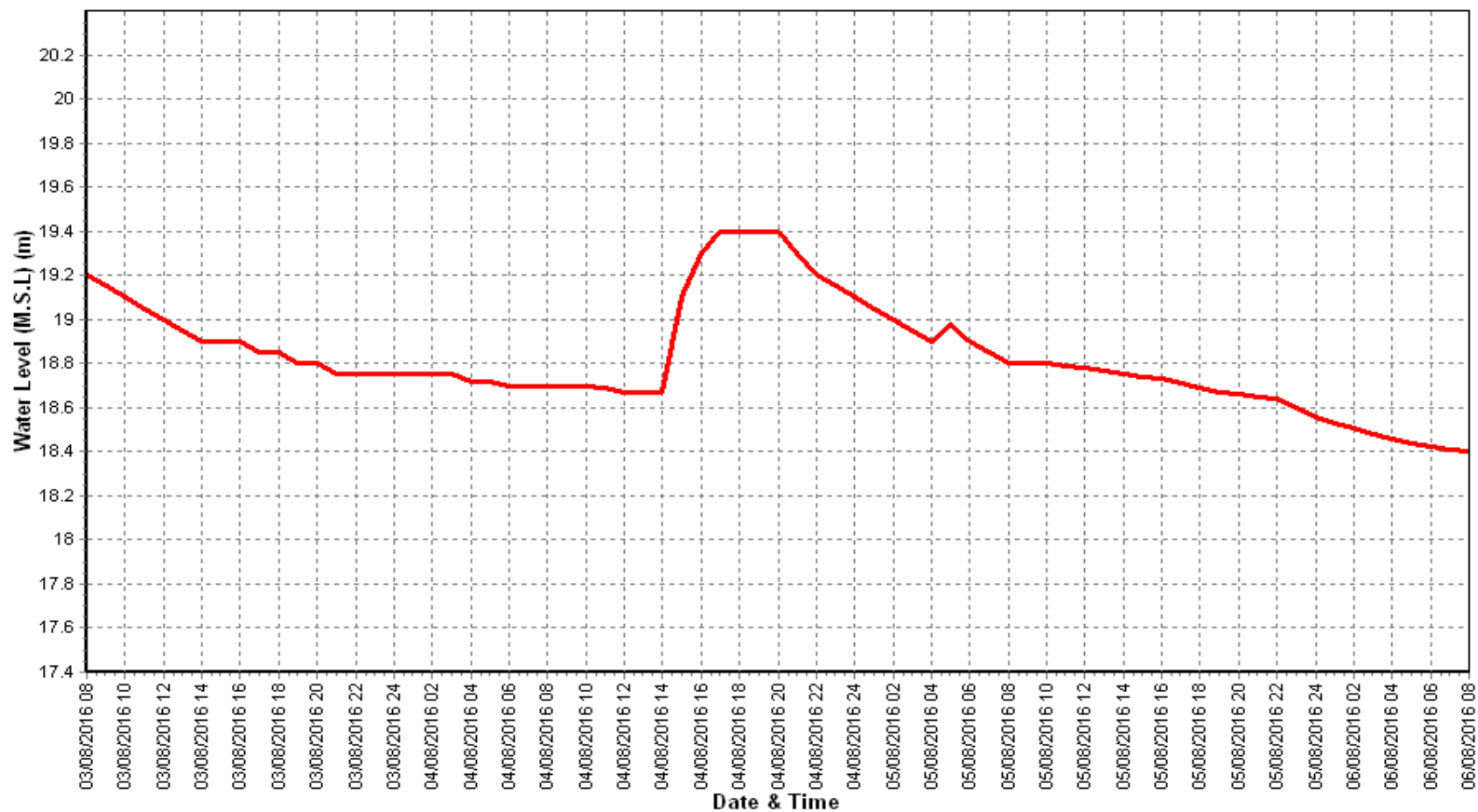
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year 2016-2017)

Station Name: Orsang at Chandwada (01 02 15 032)

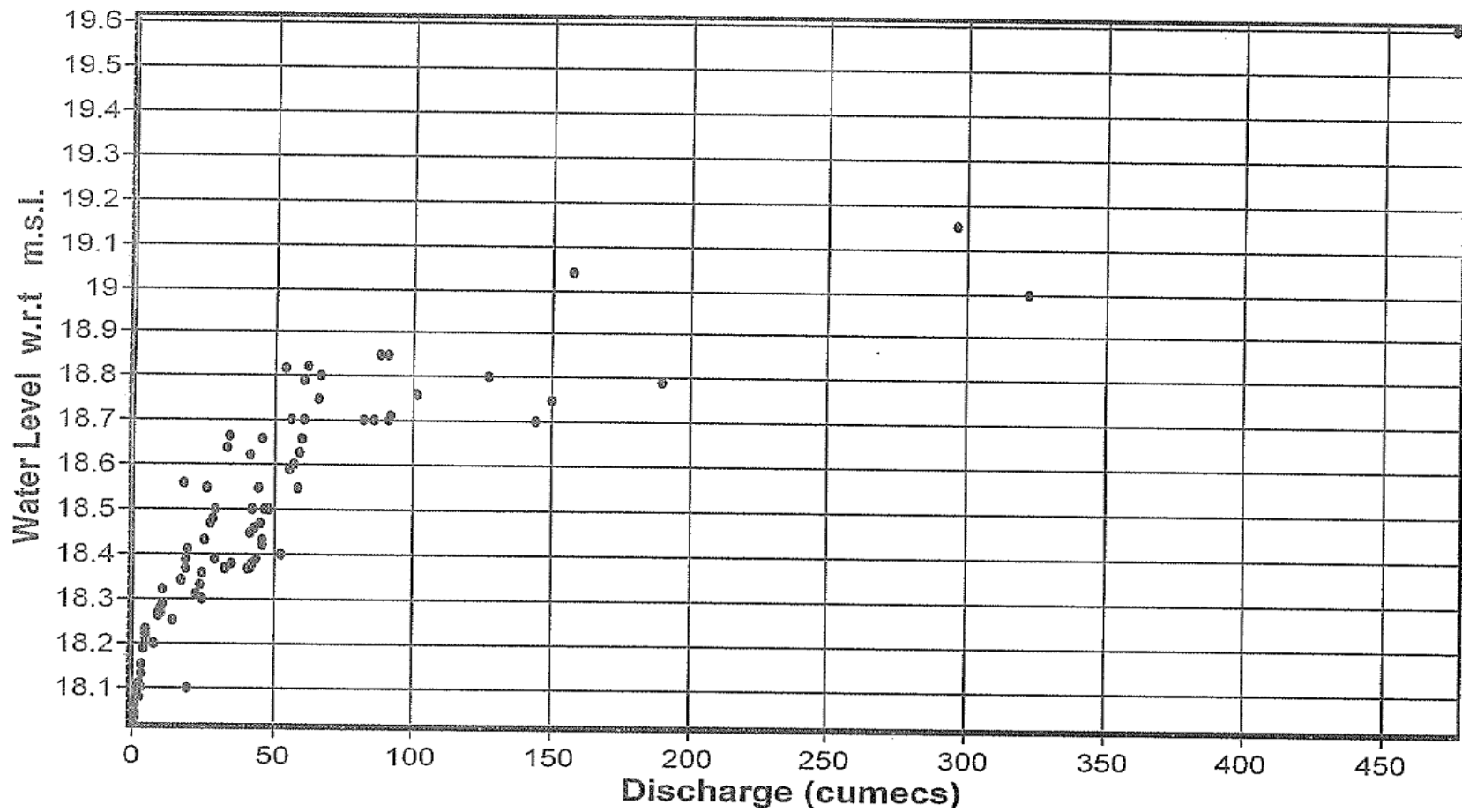
Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch



Plot of Stage Discharge Data at Orsang at Chandwada (01 02 15 032): 2016 - 2017



4.2 Narmada at Garudeshwar

History Sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)			
		Water Year	: 2016 - 2017
Site	: Garudeshwar	Code	: 003-TDSURAT
State	: Gujarat	District	: Narmada
Basin	: NARMADA	Independent River	: Narmada
Tributary	: -	Sub Tributary	: -
Sub-Sub Tributary	: -	Local River	: Narmada
Division	: Executive Engineer, Tapi Division, Surat	Sub-Division	: Lower Narmada Sub-Division, Bharuch
Drainage Area	: 87892 Sq. Km.	Bank	: Right
Latitude	: 22°01'48"	Longitude	: 73°25'30"
Current Zero of Gauge (m)	: 10.000		
CATEGORY	Opening Date	Closing Date	
Gauge	: 22/12/1971		
Discharge	: 23/03/1972		
Sediment	: 21/03/1973		
Water Quality	: 15/06/1977		
Reduced Level	Opening Date	Closing Date	
10.0	22/12/1971	04/06/2014	
10.0	31/05/2015	-	
10.0	04/06/2014	31/05/2015	

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	41.1	14.175	01/05/1972	38	14.18	01/04/1972
1972-1973	694.5	15.883	01/10/1972	25.8	14.11	01/06/1972
1973-1974	37577.1	38.795	01/09/1973	24.4	14.4	01/06/1973
1974-1975	2375.2	17.668	01/09/1974	35.6	14.325	01/05/1975
1975-1976	4543.1	18.878	01/08/1975	23.2	14.278	01/06/1975
1976-1977	10400	22.87	01/08/1976	40.2	14.025	01/05/1977
1977-1978	20200	26.3	01/09/1977	56.5	14.1	01/06/1977
1978-1979	16505	26.6	01/09/1978	38.1	14.1	01/06/1978
1979-1980	1480.4	16.8	01/08/1979	19.3	14.4	01/05/1980
1980-1981	20500	27.375	01/09/1980	14.8	14.315	01/06/1980
1981-1982	2118.5	17.463	01/08/1981	35	14.36	01/06/1981
1982-1983	3704	19.43	01/09/1982	30.8	14.505	01/06/1982
1983-1984	2408.8	17.6	01/09/1983	19.1	14.15	01/06/1983
1984-1985	3755	19.115	01/09/1984	21.7	14.185	01/06/1984
1985-1986	14440.6	26.63	01/09/1985	22.4	14.28	01/06/1985
1986-1987	3893.3	19.18	01/08/1986	22	14.235	01/06/1986
1987-1988	7139	20.72	01/09/1987	29.5	14.18	01/06/1987
1988-1989	3996	19.09	01/09/1988	30.45	14.05	01/06/1988
1989-1990	4319	19.4	01/09/1989	26.37	14.05	01/06/1989
1990-1991	12723	25.175	01/09/1990	190	14.47	01/03/1991
1991-1992	10507	23.4	01/08/1991	76	13.81	01/05/1992
1992-1993	3689	18.88	01/08/1992	92.8	13.91	01/06/1992
1993-1994	7114	22.24	01/10/1993	25.5	13.68	01/03/1994
1994-1995	23305	30.85	01/09/1994	131.2	14.07	01/06/1994
1995-1996	2722	17.46	01/08/1995	44.29	13.37	01/07/1995
1996-1997	2957	17.31	01/09/1996	81.11	13.68	01/07/1996
1997-1998	7631	21.63	01/09/1997	165	14.01	01/06/1997
1998-1999	1650	16.82	01/10/1998	79.85	13.5	01/05/1999
1999-2000	3569	17.805	01/10/1999	96.89	13.85	01/06/1999
2000-2001	4460	18.68	01/08/2000	6.32	13.35	01/05/2001
2001-2002	2339	16.765	01/09/2001	6.17	13.38	01/05/2002
2002-2003	4650	18.6	01/09/2002	5.92	13.43	01/05/2003
2003-2004	5517	19.785	01/10/2003	3.2	13.31	01/06/2003
2004-2005	4497	18.78	01/09/2004	16	13.77	01/08/2004
2005-2006	2221.93	16.595	01/08/2005	6.25	13.52	01/06/2005
2006-2007	1894.78	16.5	01/09/2006	50.39	13.9	01/03/2007

2007-2008	1741.34	16.62	01/08/2007	24.21	13.9	01/03/2008
2008-2009	280.85	14.7	01/09/2008	46.69	13.935	01/04/2009
2009-2010	290.66	14.625	01/09/2009	17.4	13.68	01/12/2009
2010-2011	1618.18	16.13	01/10/2010	22.13	13.96	01/07/2010
2011-2012	5288.55	20.37	01/09/2011	39.79	13.69	01/05/2012
2012-2013	1361.16	16.05	01/09/2012	29.25	13.47	01/03/2013
2013-2014	4851.38	19.33	01/08/2013	39.79	13.6	01/06/2013
2014-2015	1206.87	15.77	01/08/2014	19.35	13.24	01/11/2014
2015-2016	4804.96	18.74	07/08/2015	17.93	13.54	07/07/2015
2016-2017	8995.63	21.975	10/08/2016	0	13.68	28/01/2017

Stage Discharge Sheet for Narmada at Garudeshwar for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	40.69	13.9	46.44	13.97	1373.02	15.98	2253.28	16.97	935.44	15.38	40.31	13.84
2	40.62	13.9	108.68	14.01	1313.44	15.91	2061.37	16.74	1302	15.86	40.49	13.87
3	26.66	13.8	139.8	14.04	1276.22	15.89	1867.83	16.47	1271.17	15.82	36.22	13.73
4	47.59	13.97	46.42	13.95	1328.74	15.95	1612	16.22	1309.69	15.87	34.23	13.69
5	36.89	13.64	45.46	13.9	1320.81	15.95	1509.46	16.12	1552.88	16.18	36	13.71
6	46.48	13.98	43.15	13.91	1539.8	16.06	1450.26	16.06	1625.14	16.26	36.71	13.74
7	106.81	14.05	47.08	13.94	4794	18.06	1307.23	15.94	1645.01	16.18	36.47	13.73
8	106.36	14.06	48.55	13.97	7074.54	20.92	1249.99	15.83	1359.84	15.93	36.95	13.75
9	106.19	14.05	25.99	13.82	8116.91	21.52	1310.8	15.94	1265	15.82	35.6	13.74
10	99.06	14	25.54	13.77	8995.63	21.98	1300.44	15.9	1264.74	15.82	36.47	13.74
11	111.12	14.08	26.08	13.81	8328.38	21.68	1280	15.87	1280	15.84	37.83	13.75
12	69.05	15.62	47.6	13.97	6525	20.52	1043.54	15.52	1265	15.82	37.81	13.75
13	253.34	14.44	50.95	13.98	4354.22	18.86	514.2	14.3	1272.13	15.83	43.22	13.76
14	278.12	14.59	1551.65	16.05	3260	18.2	40.65	13.81	560.54	14.8	882.7	15.31
15	273.99	14.6	1549.7	16.04	2563	17.38	36.73	13.64	42.9	13.89	879.7	15.31
16	276.5	14.6	1531.95	15.8	1900.4	16.6	36.51	13.64	1299	15.82	761.75	15.06
17	272.12	14.6	15.24	15.79	1640.54	16.26	33.86	13.63	1314.91	15.85	614.14	14.83
18	268.6	14.58	1515.23	15.82	1476.34	16.08	637.6	16.67	249.25	14.28	522.54	14.67
19	86.15	13.93	1474.94	15.8	1538.2	16.16	238.46	14.34	39.38	13.69	36.04	13.71
20	237.73	14.47	1410.24	15.56	1521.64	16.04	751.96	15.08	895.53	15.34	33.95	13.67
21	248.4	14.51	1400.39	15.55	1508	16.02	812.18	15.21	47.83	13.95	32.38	13.64
22	178.29	14.13	1021.27	15.39	1849.82	16.51	41.04	13.83	563.38	14.92	32.06	13.66
23	110.67	14.08	950.87	15.35	2142.87	16.85	41.22	13.83	80.76	13.84	33.48	13.68
24	104.8	13.99	15.03	15.03	2466.76	17.18	42.53	13.78	36.07	13.74	29.56	13.64
25	46.13	13.95	902.04	15.23	2689	17.41	41.53	13.73	36.78	13.78	31.19	13.66
26	44.39	13.9	1450.42	15.79	2718.38	17.44	40.53	13.68	48.85	13.94	33.42	13.69
27	46.65	13.97	1196	15.76	2364.39	7070	38.51	13.66	39.54	13.86	32.51	13.67
28	46.8	13.96	1441.96	16.04	2257	16.94	39.66	13.68	39.25	13.8	34.33	13.71
29	46.13	13.96	1436.01	16.04	2539.42	17.25	293.98	14.36	39.83	13.82	33.25	13.69
30	46.59	13.96	1433.51	16.04	2680.45	17.4	741.83	15.09	44.62	13.89	32.95	13.69
31				15.98	2459.24	17.19			37.78	13.79		
Ten-Daily Mean												
I Ten-Daily	62.05	13.93	36.86	13.93	3233.91	17.82	1431.07	16.22	1096.39	15.91	33.27	13.75
II Ten-Daily	197.15	14.55	915.83	15.26	2728.47	17.78	218.17	14.65	437.46	15.11	288.98	14.38
III Ten-Daily	87.45	14.04	1021.13	15.65	1747.39	658.2	209.15	14.08	80.85	13.94	29.26	13.67
Monthly												
Min.	26.66	13.64	25.99	13.77	1276.22	15.89	33.86	13.63	36.07	13.69	29.56	13.64
Max.	278.12	13.64	1551.65	13.77	8995.63	15.89	2253.28	13.63	1645.01	13.69	879.7	13.64
Mean	115.55	14.18	657.94	14.95	2569.93	231.27	619.46	14.98	538.23	14.99	117.17	13.94

Annual Runoff in MCM = 15989 Annual Runoff in mm = 182

Peak Observed Discharge = 8996 cumecs on 10/08/2016 Corres. Water Level :21.975 m

Lowest Observed Discharge = 24.97 cumecs on 23/02/2017 Corres. Water Level :13.58 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
 #:Discarded Discharge (values changed as per rating curve)
 Note:Missing values ignored while arriving at Annual Ru

Stage Discharge Sheet for Narmada at Garudeshwar for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	33.39	13.79	18.32	13.6	32.53	13.69	619.75	22.92	26.82	13.71	55.42	13.97
2	32.98	13.72	30.53	13.6	31.4	13.69	32.68	13.72	26.70	13.710	29.5	10
3	32.43	13.72	20.94	13.69	26.21	13.61	26.21	13.61	26.65	13.71	29.07	13.76
4	32.79	13.73	20.97	13.71	30.8	13.64	30.42	13.66	26.58	13.71	54.54	13.94
5	32.65	13.72	21.42	13.7	30.74	13.65	27.30	13.65	26.75	13.72	59.42	13.99
6	33	13.74	20.29	13.68	30.8	13.65	27.31	13.65	25.72	13.7	236.13	14.3
7	37.83	13.74	20.48	13.69	34.17	13.68	297.67	14.41	27.32	13.72	236.2	14.29
8	38.1	13.74	33.47	13.65	30.66	13.64	30.85	13.7	28.68	13.76	54.25	13.94
9	38.24	13.75	17.66	13.61	33.62	13.69	30.46	13.69	28.95	13.78	31.04	13.79
10	37.11	13.73	29.82	13.64	30.91	13.65	30.97	13.72	28.82	13.76	29.12	13.780
11	36.26	13.72	33.66	13.67	30.64	13.66	30.51	13.7	29.64	13.79	27.22	13.7
12	32.86	13.68	31.2	13.66	43.74	13.66	33.30	13.970	33.36	13.97	27.3	13.69
13	32.86	13.68	31	13.65	33.28	13.72	29.04	13.77	29.07	13.77	245.48	14.27
14	29.58	13.63	30.41	13.64	30.36	13.65	28.65	13.67	29.04	13.77	160	13.910
15	29.04	13.63	30.29	13.63	31.74	13.7	28.51	13.61	252.99	14.3	54.6	13.94
16	27.21	13.59	30.49	13.64	36.41	13.76	29.7	13.63	262.5	14.340	57.6	10
17	26.64	13.57	30.24	13.61	43.14	13.79	29.4	13.61	266.03	14.35	56.48	13.97
18	27.20	13.61	34.4	13.7	29.86	13.64	29.03	13.61	271	14.4	59	13.99
19	26.5	13.58	35.9	13.7	28.98	13.60	252	14.385	251.91	14.39	57.34	13.94
20	27.17	13.61	32.26	13.69	25.69	13.59	28.67	13.63	56.02	13.99	57.74	13.95
21	30.59	13.59	31.58	13.69	26.29	13.6	28.63	13.6	54.5	13.93	44.67	13.740
22	29.84	13.56	30.52	30.25	26.25	1811.8	52.61	13.290	51.5	13.92	30.26	13.82
23	30.59	13.59	30.55	13.67	25.06	13.58	53.46	13.90	53.46	13.90	30.26	13.82
24	31.04	13.61	30.73	13.66	40.36	13.63	53.53	13.920	53.66	13.92	32.23	13.82
25	30.67	13.6	30.38	13.66	29.81	13.68	28.39	13.64	56.98	13.97	30.44	13.84
26	30.67	13.6	30.56	30.56	651.1	14.85	56.61	13.97	56.45	13.96	57.46	13.99
27	30.53	13.63	30.6	13.67	607.36	14.89	29.28	13.66	63.52	13.95	60.83	14.06
28	30.51	13.6	33.56	13.68	571.28	14.82	25.96	13.66	58.99	13.98	61.17	14.07
29	30.05	13.6	32.54	13.68			25.84	13.67	57.42	13.98	59.92	14.03
30	31.06	13.62	32.57	13.68			26.75	13.71			59.9	14.03
31			33.34	13.7			27.67	13.71			57.32	14.03
Ten-Daily Mean												
I Ten-Daily	31.57	13.74	20.04	12.29	28.11	12.29	112.63	13.31	21.73	10.98	54.94	10.77
II Ten-Daily	19.9	13.63	28.95	12.3	26.11	10.95	20.45	9.55	119	11.3	64.27	12.15
III Ten-Daily	24.99	12.36	19.98	9.95	160.76	235.3	17.5	8.7	45.3	11.16	32.61	10.13
Monthly												
Min.	26.5	13.56	0	13.6	25.06	13.58	25.84	13.6	25.72	13.7	27.22	10
Max.	38.24	13.56	35.9	13.6	607.36	13.58	619.75	13.6	271	13.7	245.48	10
Mean	25.49	13.24	22.99	11.51	71.66	86.18	50.19	10.52	62.01	11.15	50.61	11.01

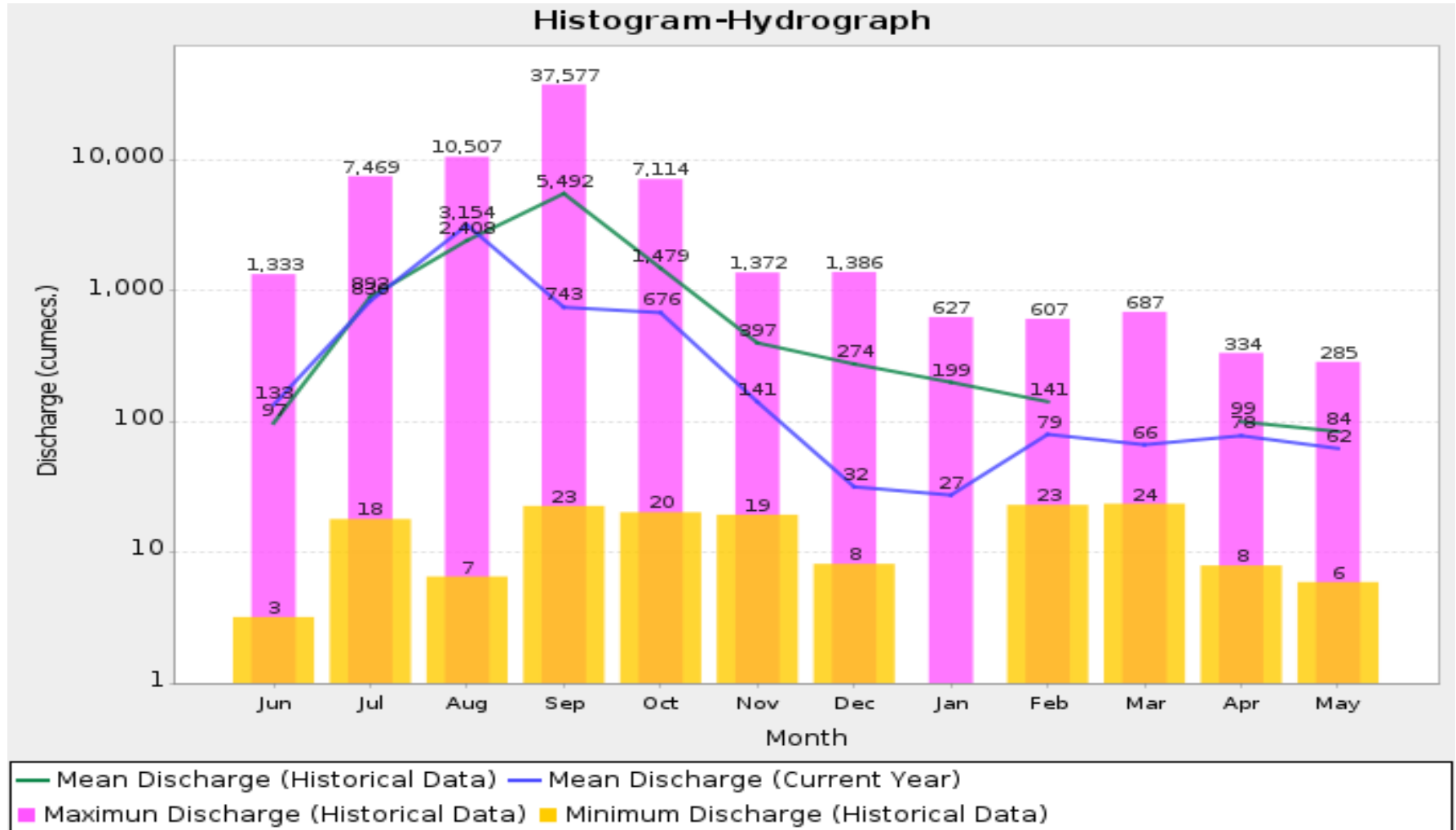
Peak Computed Discharge = 4794 cumecs on 07/08/2016 Corres. Water Level :18.06 m

Lowest Computed Discharge = 25.54 cumecs on 10/07/2016 Corres. Water Level :13.77 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Histogram - Hydrograph for Water Year: 2016-2017 (Data considered: 1972-2016)



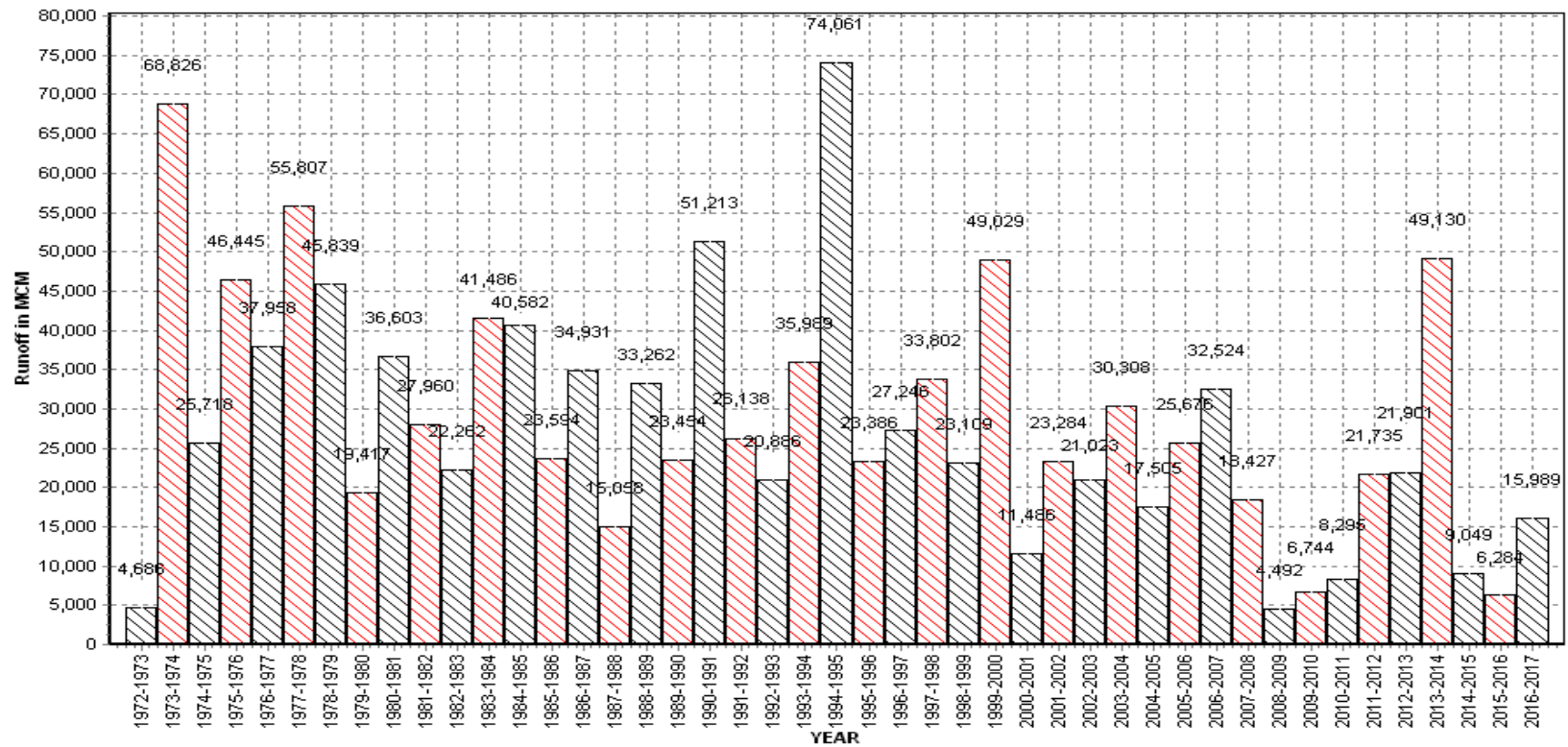
Annual Runoff Values for the period (1972 – 2017)

Station Name: Narmada at Garudeshwar (01 02 15 030)

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWBharuch



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

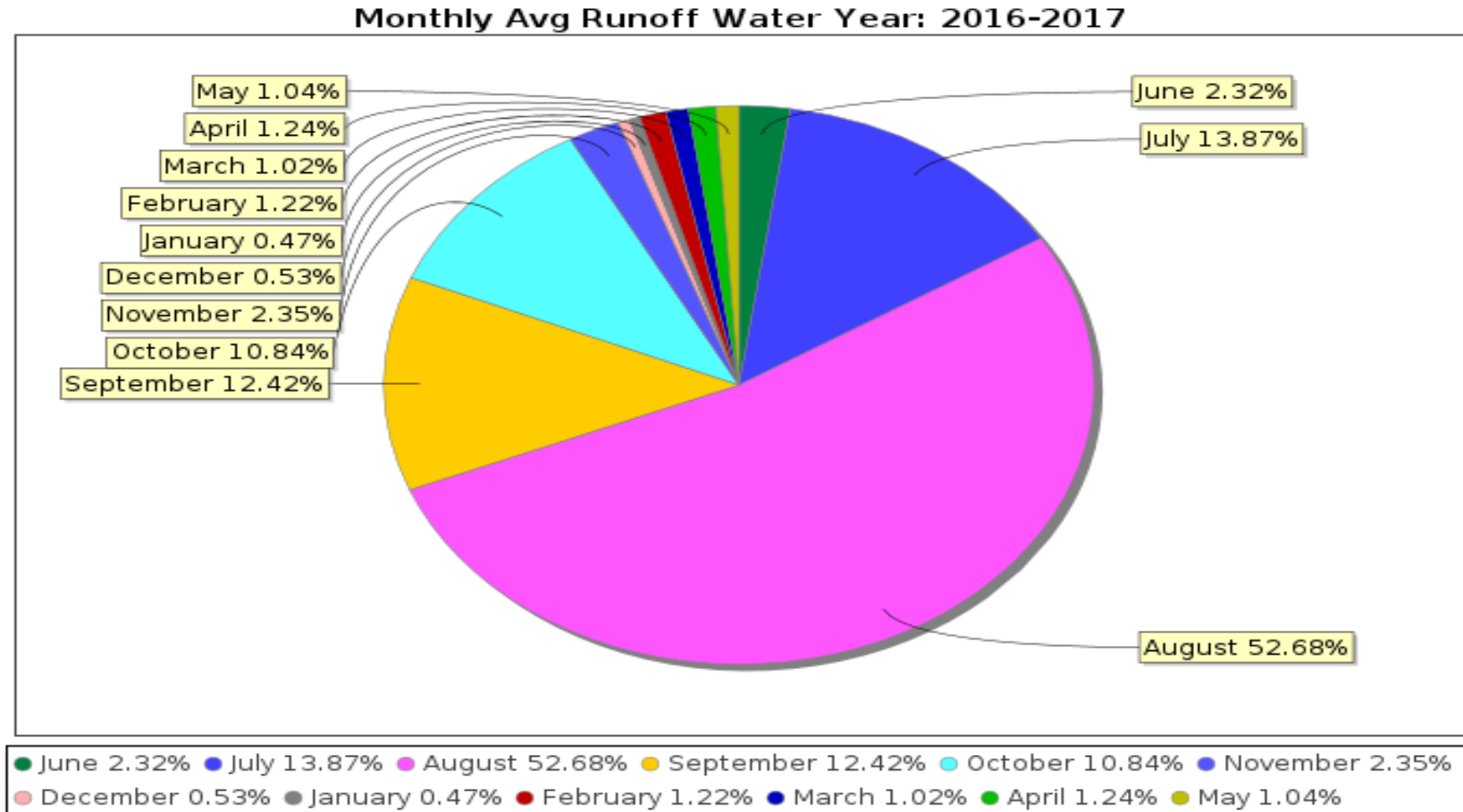
Monthly Average Runoff based on period (1972 – 2017)

Station Name: Narmada at Garudeshwar (01 02 15 030)

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



Monthly Runoff for the Year(2016-17)

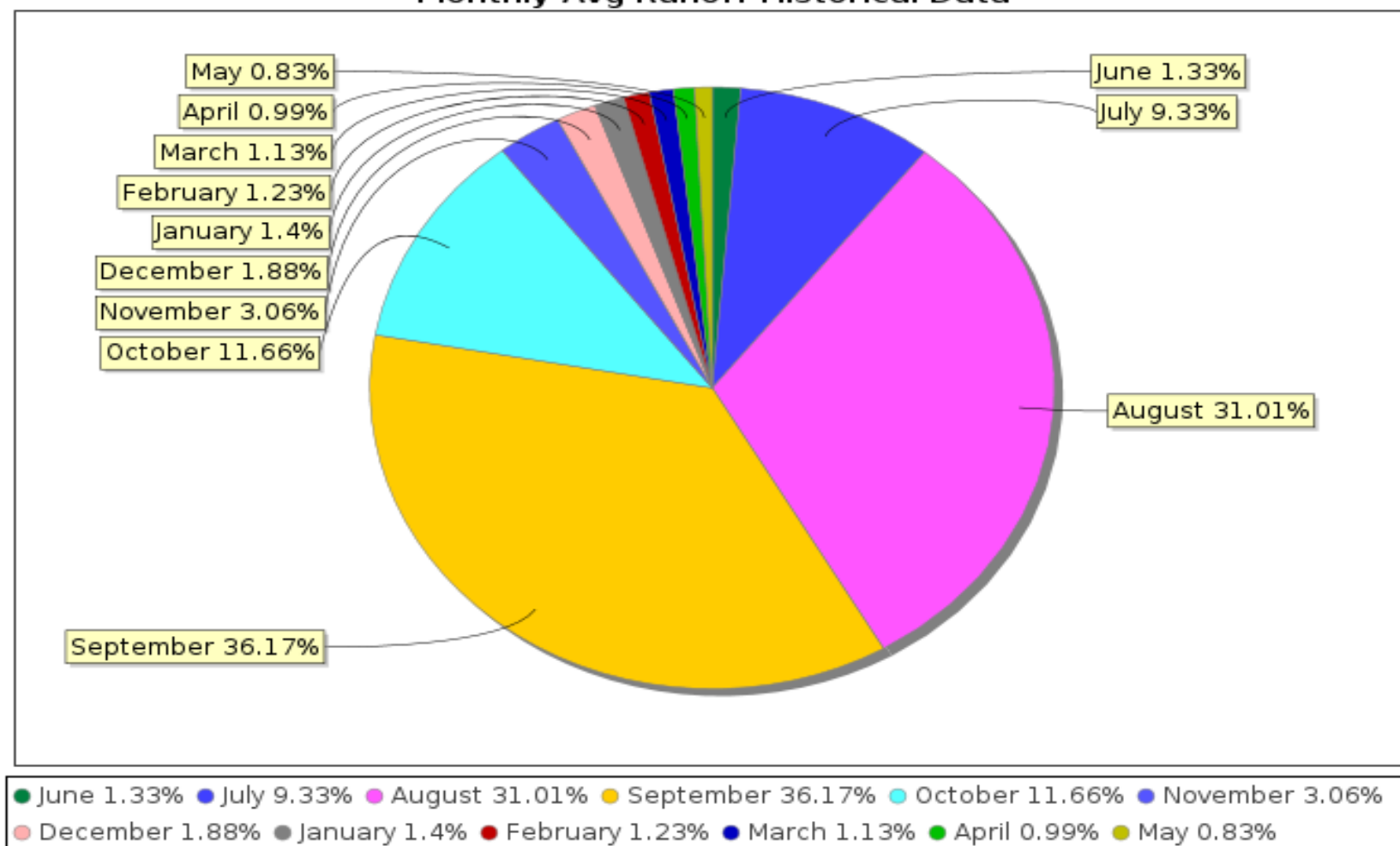
Station Name : Narmada at Garudeshwar (01 02 15 030)

Division : Tapi Division, Surat

Local River : Narmada

Sub-Division : LNSD, CWC Bharuch

Monthly Avg Runoff Historical Data



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-2017)

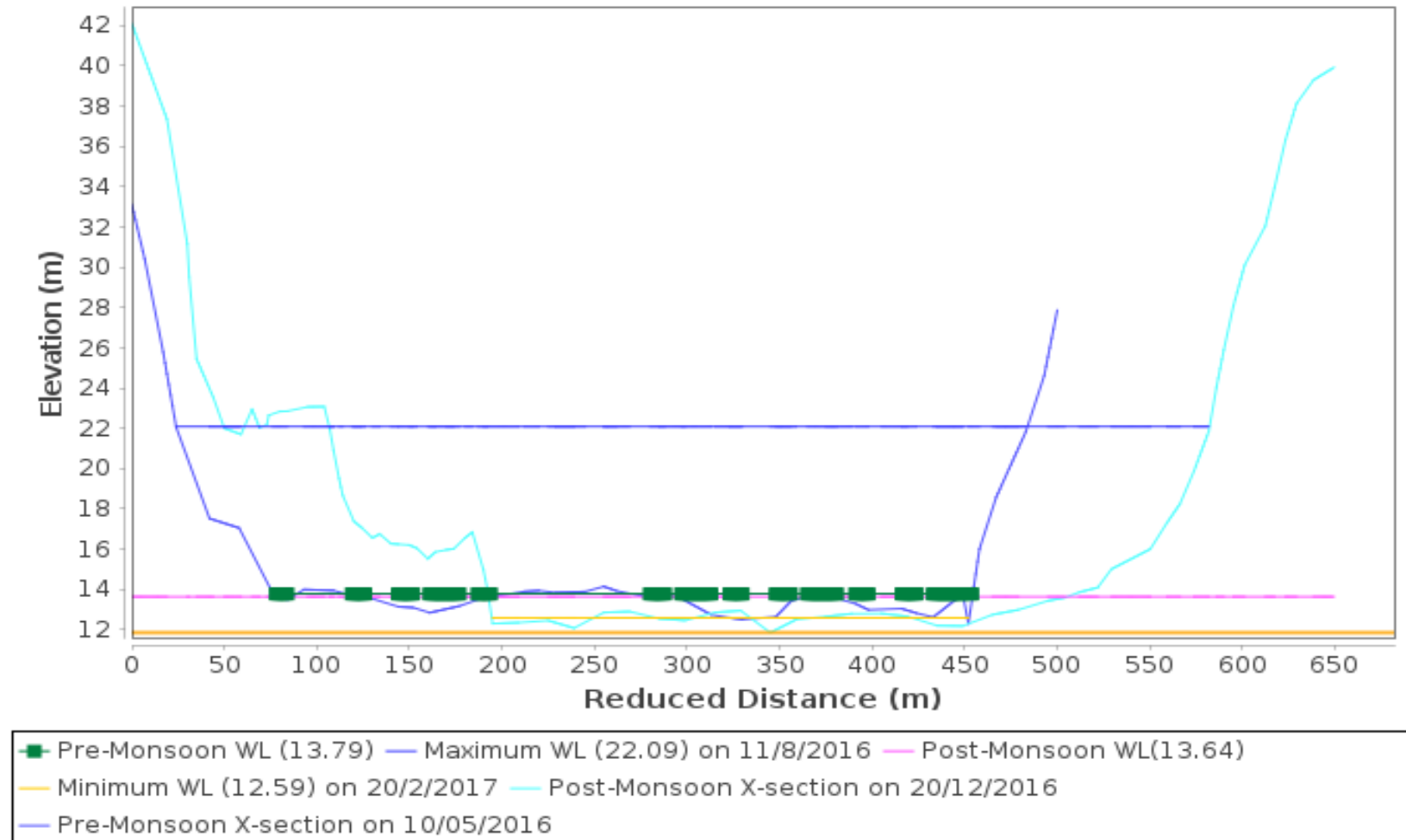
Station Name: Narmada at Garudeshwar (01 02 15 030)

Local River: Narmada

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch

X-Section



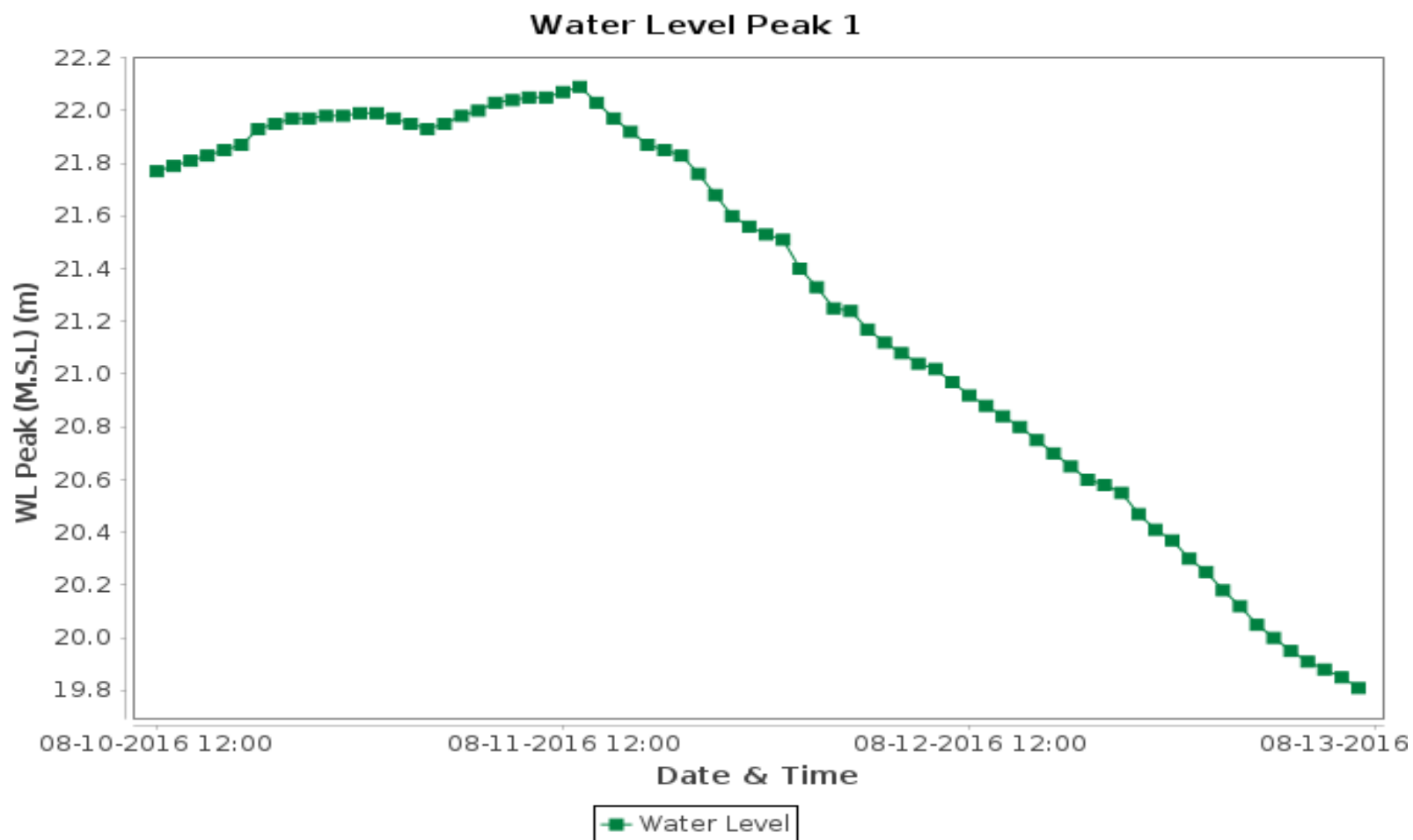
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-2017)

Station Name: Narmada at Garudeshwar (01 02 15 030)

Local River: Narmada

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



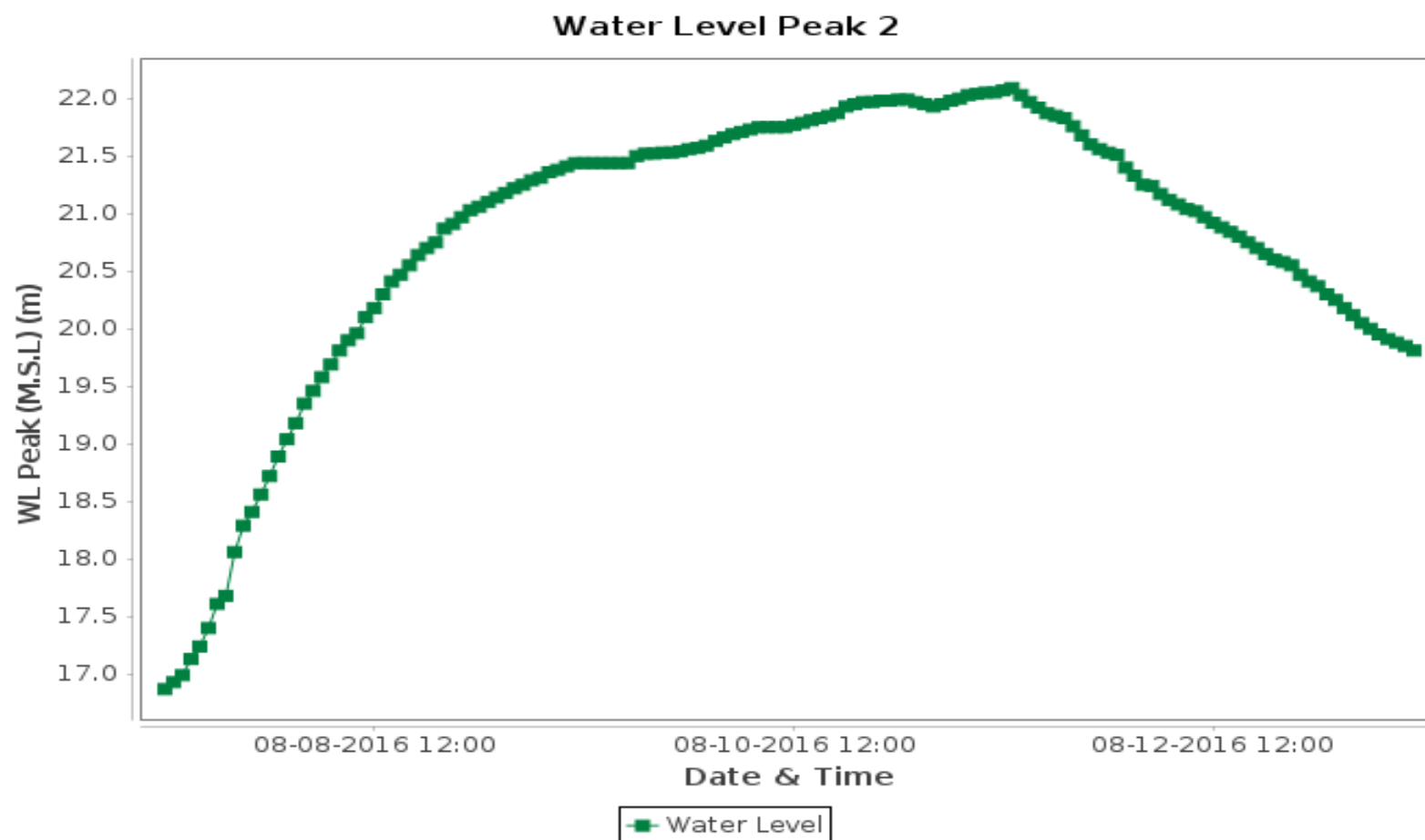
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-2017)

Station Name: Narmada at Garudeshwar (01 02 15 030)

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



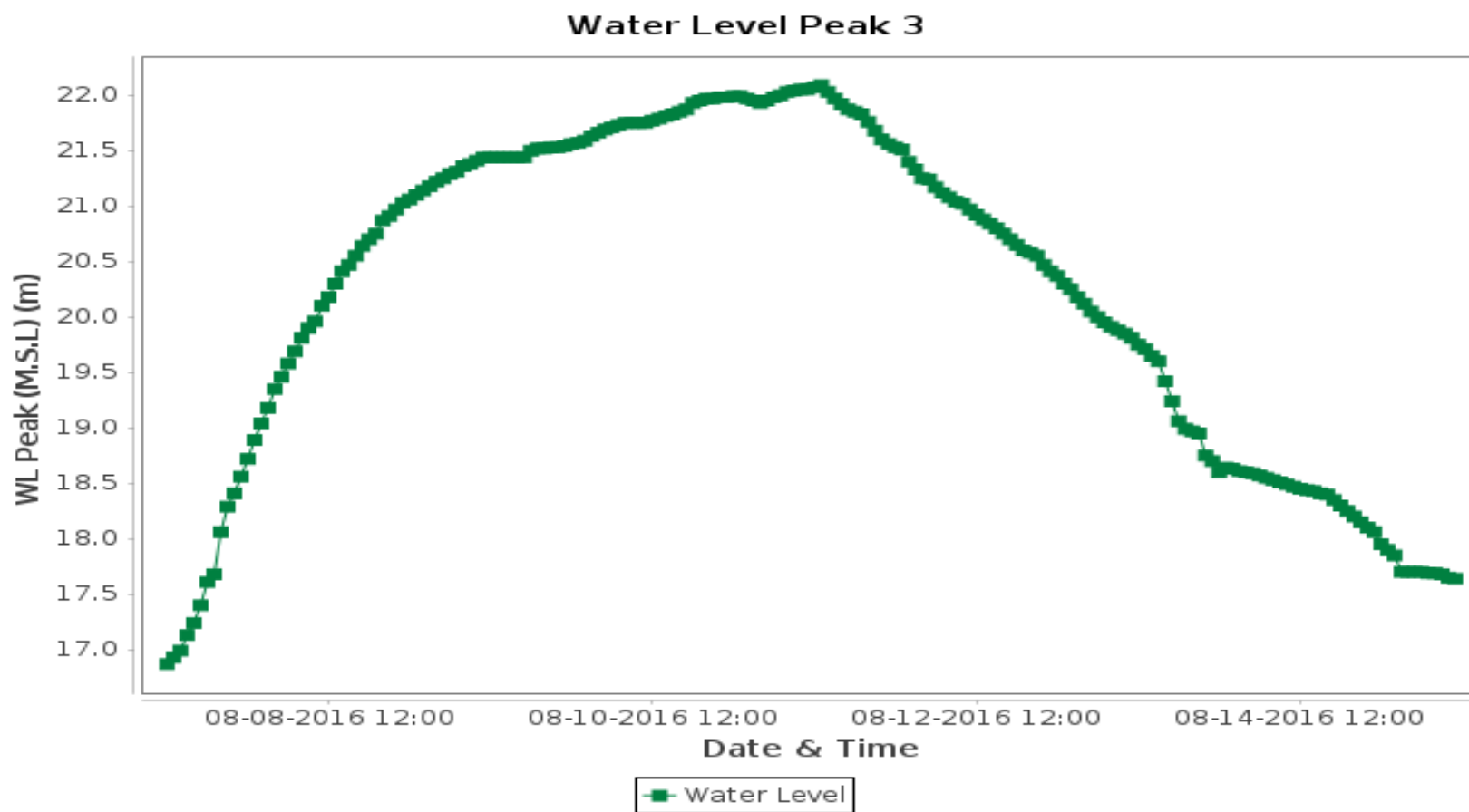
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-2017)

Station Name: Narmada at Garudeshwar (01 02 15 030)

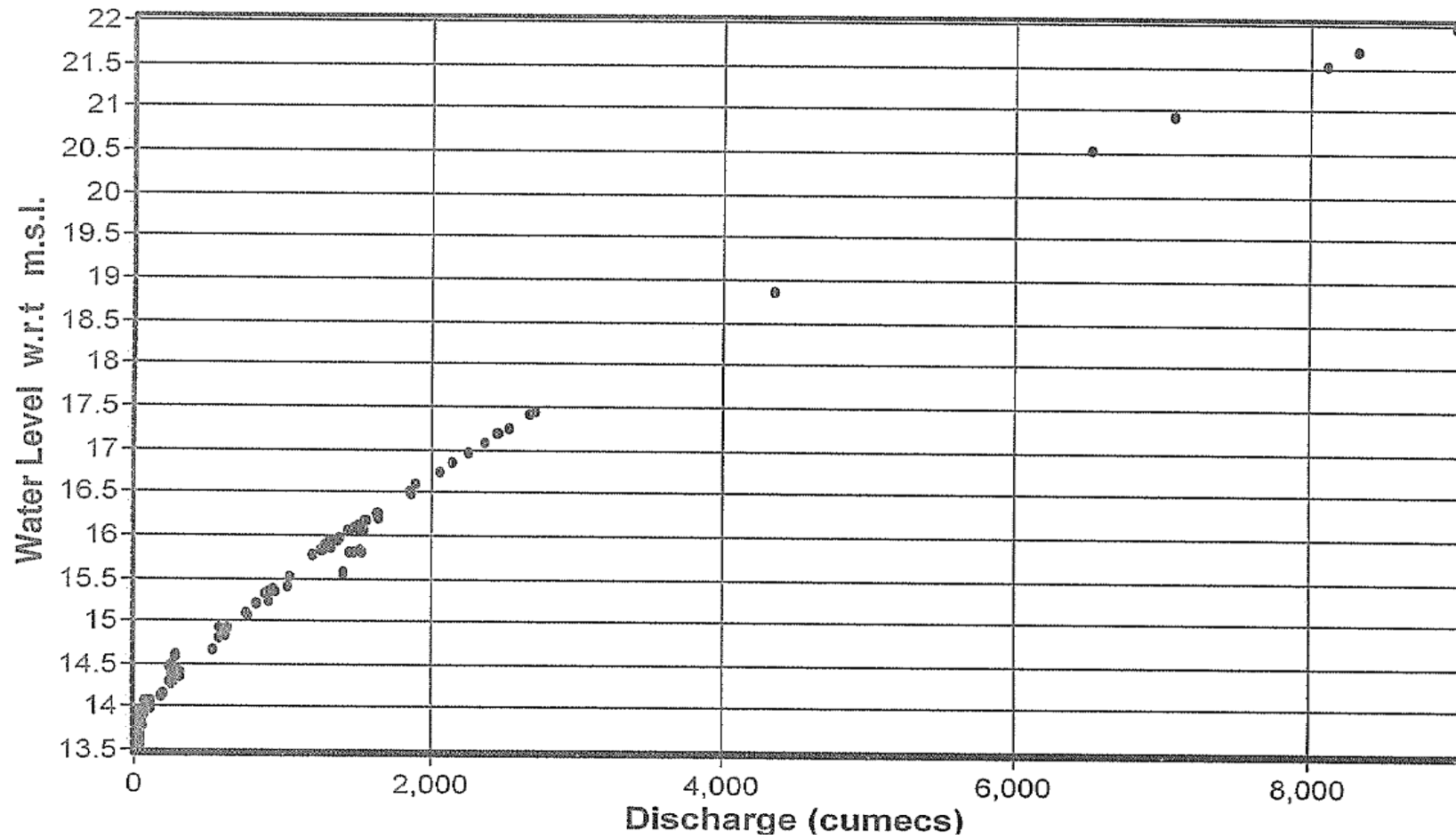
Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



Plot of Stage Discharge Data at Narmada at Garudeshwar (01 02 15 030): 2016 - 2017



4.2 Goi at Pati

History sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
Site : Pati				Water Year : 2016 - 2017		
State : Madhya Pradesh				Code : 005-NDBHP		
				District : Khargone		
Basin : NARMADA				Independent		
Tributary : -				River : Narmada		
Sub-Sub Tributary : -				Sub Tributary : -		
				Local River : Goi		
Division : Narmada Division(ND), Bhopal				Sub-Division : Middle Narmada Sub-Division-III, Indore		
Drainage Area : 2151.0 Sq. Km.				Bank : Right		
Latitude : 21°56'37"				Longitude : 74°44'42"		
Current Zero of Gauge (m) : 187.000						
CATEGORY		Opening Date		Closing Date		
Gauge	:	15/06/2008				
Discharge	:	15/06/2008				
Sediment	:					
Water Quality	:					
Reduced Level		Opening Date		Closing Date		
187.0		23/02/1999		13/10/2016		
187.0		05/01/2017		-		
187.0		14/10/2016		05/01/2017		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1998-1999	0	0	01/02/1999	0	0	01/02/1999
1999-2000	530	192.19	18/06/1999	0	188.92	01/06/1999
2000-2001	2110	195.61	13/07/2000	0	188.99	01/06/2000
2001-2002	2250	195.85	05/08/2001	0	0	01/06/2001
2002-2003	1250	193.85	03/09/2002	0	0	01/06/2002
2003-2004	1013	193	29/09/2003	0	0	01/06/2003
2004-2005	945	193.2	05/08/2004	0	188.94	01/07/2004
2005-2006	83.15	190.15	02/08/2005	0	0	01/06/2005
2008-2009	300.94	191.1	20/09/2008	0	189.49	21/06/2008
2009-2010	230.14	191.83	05/09/2009	0	189.43	01/07/2009
2010-2011	2395.03	195.15	09/09/2010	0	0	12/04/2011
2011-2012	227.01	191.25	01/09/2011	0	0	01/06/2011
2012-2013	117.57	190.665	07/09/2012	0	0	01/06/2012
2013-2014	484.66	192.375	23/09/2013	0	0	01/06/2013
2014-2015	242.71	191.565	09/09/2014	0	0	12/01/2015
2015-2016	98.99	190.54	19/09/2015	0.76	188.97	06/07/2015
2016-2017	93.87	190.46	19/09/2016	1.1	189.16	17/06/2016

Stage Discharge Sheet for Goi at Pati for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	1.83	189.21	3.58	189.4	29.22	189.87	30.13	189.86	46.7	190.07	7.19	189.44
2	1.8	189.21	3.34	189.41	32.51	189.9	30.61	189.88		190.05	6.44	189.42
3	1.83	189.21	3.19	189.37	31.88	190.01	27.78	189.83	39.37	190.04	5.37	189.41
4	1.66	189.2	33.61	189.76	41.42	190.4	25.66	189.8	33.8	190.04	5.34	189.4
5	1.64	189.2	8.15	189.51	37.62	190	25.64	189.77	42.53	190.07	5.05	189.39
6	1.65	189.2	5.7	189.45	47.6	190.05	21.43	189.74	53.11	190.09	5.05	189.39
7	1.8	189.21	4.94	189.43	41.42	190	19.48	189.71	32.98	190.04	4.51	189.38
8	1.79	189.21	4.56	189.42	42.65	190	18.3	189.69	32.54	190	4.19	189.38
9	1.66	189.2	4.89	189.42	41.11	190.05	16.97	189.67	30.03	190.05	4.19	189.38
10	1.63	189.19	9.40	189.53	40.58	190.02	15.46	189.65	30.03	190.05	4.08	189.37
11	1.66	189.19	6.12	189.45	44.18	190.05	14.05	189.63	30.03	190.05	3.65	189.36
12	1.65	189.19	39.11	189.85	46.58	190.09	11.94	189.6	29.61	190	3.71	189.37
13	1.67	189.19	54.66	190.1	44.73	190.05	11.25	189.57	31.2	189.91	3.70	189.37
14	1.24	189.17	32.29	190.02	43.76	190.04	10.34	189.53	28.55	189.86	3.65	189.37
15	1.49	189.18	31.15	189.86	40.25	190.01	12.93	189.57	25.63	189.82	3.84	189.37
16	1.46	189.18	23.69	189.76	34.09	189.93	11.83	189.6	23.61	189.78	3.15	189.37
17	1.1	189.16	19.61	189.7	32.47	189.88	52.51	190.24	21.58	189.74	3.65	189.37
18	1.26	189.16	16.22	189.65	29.34	189.84	84.60	189.79	18.46	189.7	3.75	189.37
19	1.56	189.19	16.94	189.63	26.7	189.82	93.87	190.46	14.97	189.64	3.34	189.37
20	1.43	189.18	16.82	189.64	25.71	189.79	54.32	190.18	13.24	189.61	3.15	189.37
21	4	189.34	15.67	189.63	28.03	189.82	40.22	190.05	13.26	189.6	2.99	189.37
22	6.33	189.43	14.1	189.61	28.03	189.82	38.74	190.04	11.23	189.56	3.05	189.35
23	2.65	189.25	13.49	189.6	27.37	189.83	36.27	189.95	10.71	189.54	3.5	189.37
24	2.74	189.3	13.40	189.59	39.24	189.87	34.51	189.98	10.45	189.53	2.96	189.36
25	2.38	189.26	13.85	189.64	34.07	189.9	35.52	190	9.27	189.5	2.62	189.35
26	2.29	189.19	13.15	189.63	29.57	189.85	28.91	189.87	9.28	189.5	2.87	189.35
27	1.69	189.18	22.57	189.76	26.83	189.81	41.86	189.95	9.43	189.49	2.623	189.35
28	1.62	189.17	29.79	189.87	36.48	189.92	29.4	189.91	8.67	189.48	2.53	189.34
29	31.93	189.63	27.16	189.84	31.22	189.86	27.2	189.86	7.71	189.47	2.6	189.35
30	6.05	189.48	29.27	189.84	27.99	189.83	25.17	189.8		189.46	2.47	189.34
31				189.87	25.65	189.79			7.47	189.44		
Ten-Daily Mean												
I Ten-Daily	1.57	189.2	6.38	189.47	34.46	190.03	18.02	189.76	31.11	190.05	4.63	189.4
II Ten-Daily	1.13	189.18	23.7	189.77	28.38	189.95	24.77	189.82	15.36	189.81	2.51	189.37
III Ten-Daily	5.94	189.32	16.28	189.72	24.54	189.85	30.23	189.94	7.89	189.51	2.56	189.35
Monthly												
Min.	1.1	189.16	3.34	189.37	25.65	189.79	10.34	189.53	7.47	189.44	2.47	189.34
Max.	31.93	189.16	54.66	189.37	47.6	189.79	93.87	189.53	53.11	189.44	7.19	189.34
Mean	2.88	189.24	15.45	189.65	29.13	189.94	24.34	189.84	18.12	189.79	3.23	189.37

Annual Runoff (MCM) = 303 Annual Runoff (mm) = 141

Peak Observed Discharge = 93.87 cumecs on 19/09/2016 Corres. Water Level :190.46 m

Lowest Observed Discharge = 1.098 cumecs on 17/06/2016 Corres. Water Level :189.16 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Goi at Pati for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	3.18	189.37	2.2	189.3	1.99	189.29	2.67	189.33	0	0	0	0
2	2.79	189.35	2.24	189.3	2.14	189.29	2.5	189.33	0	0	0	0
3	2.72	189.35	2.42	189.3	1.99	189.29	1.64	189.33	0	0	0	0
4	2.72	189.37	2.42	189.31	2.43	189.3	1.98	189.33	0	0	0	0
5	2.56	189.34	2.28	189.3	2.26	189.3	1.92	189.33	0	0	0	0
6	2.62	189.34	2.35	189.3	2.11	189.3	1.96	189.33	0	0	0	0
7	2.49	189.34	2.3	189.3	2.1	189.3	2.01	189.33	0	0	0	0
8	2.53	189.33	2.16	189.3	2.04	188.8	1.97	189.32	0	0	0	0
9	2.59	189.33	2.21	189.3	2.14	189.3	1.94	189.32	0	0	0	0
10	2.56	189.33	2.13	189.3	2.48	189.31	1.93	189.32	0	0	0	0
11	2.56	189.33	2.26	189.3	2.17	189.31	1.92	189.32	0	0	0	0
12	2.56	189.33	2.21	189.3	2.05	189.31	1.9	189.32	0	0	0	0
13	2.29	189.32	2.2	189.3	2.02	189.31	1.84	189.31	0	0	0	0
14	2.19	189.32	2.17	189.3	2.15	189.32	1.68	189.31	0	0	0	0
15	2.35	189.32	2.16	189.3	2.12	189.32	1.75	189.3	0	0	0	0
16	2.23	189.31	2.29	189.3	2.08	189.31	1.58	189.3	0	0	0	0
17	2.34	189.31	1.96	189.29	2.46	189.33	1.71	189.29	0	0	0	0
18	2.12	189.31	1.96	189.29	1.99	189.31	1.68	189.29	0	0	0	0
19	2.13	189.3	2.03	189.29	2.07	189.31	1.66	189.29	0	0	0	0
20	2.22	189.3	2.25	189.29	2.36	189.32	1.7	189.29	0	0	0	0
21	2.31	189.3	2.08	189.29	2.88	189.33	1.53	189.29	0	0	0	0
22	2.6	189.31	2	189.29	2.64	189.33	1.55	189.28	0	0	0	0
23	2.03	189.3	2.08	189.29	2.6	189.33	1.7	189.28	0	0	0	0
24	2.36	189.3	2.01	189.29	2.6	189.33	1.53	189.27	0	0	0	0
25	2.36	189.3	2.07	189.29	2.67	189.33	1.66	189.28	0	0	0	0
26	2.48	189.31	2.02	189.29	2.55	189.33	1.52	189.27	0	0	0	0
27	2.41	189.31	2.02	189.29	2.22	189.32	1.41	189.27	0	0	0	0
28	2.33	189.3	2.18	188.79	2.72	189.33	1.59	189.27	0	0	0	0
29	2.27	189.3	2.06	189.29			1.49	189.27	0	0	0	0
30	2.4	189.3	2.08	189.29			1.33	189.26	0	0	0	0
31	2.36	189.3	2.13	189.29			1.24	189.26			0	0
Ten-Daily Mean												
I Ten-Daily	2.68	189.34	2.27	189.3	2.17	189.25	2.05	189.33	0	0	0	0
II Ten-Daily	2.3	189.32	2.15	189.3	2.15	189.32	1.74	189.3	0	0	0	0
III Ten-Daily	2.36	189.3	2.07	189.24	2.61	189.33	1.5	189.27	0	0	0	0
Monthly												
Min.	2.03	189.3	1.96	188.79	1.99	188.8	1.24	189.26	0	0	0	0
Max.	3.18	189.3	2.42	188.79	2.88	188.8	2.67	189.26	0	0	0	0
Mean	2.44	189.32	2.16	189.28	2.31	189.3	1.77	189.3	0	0	0	0

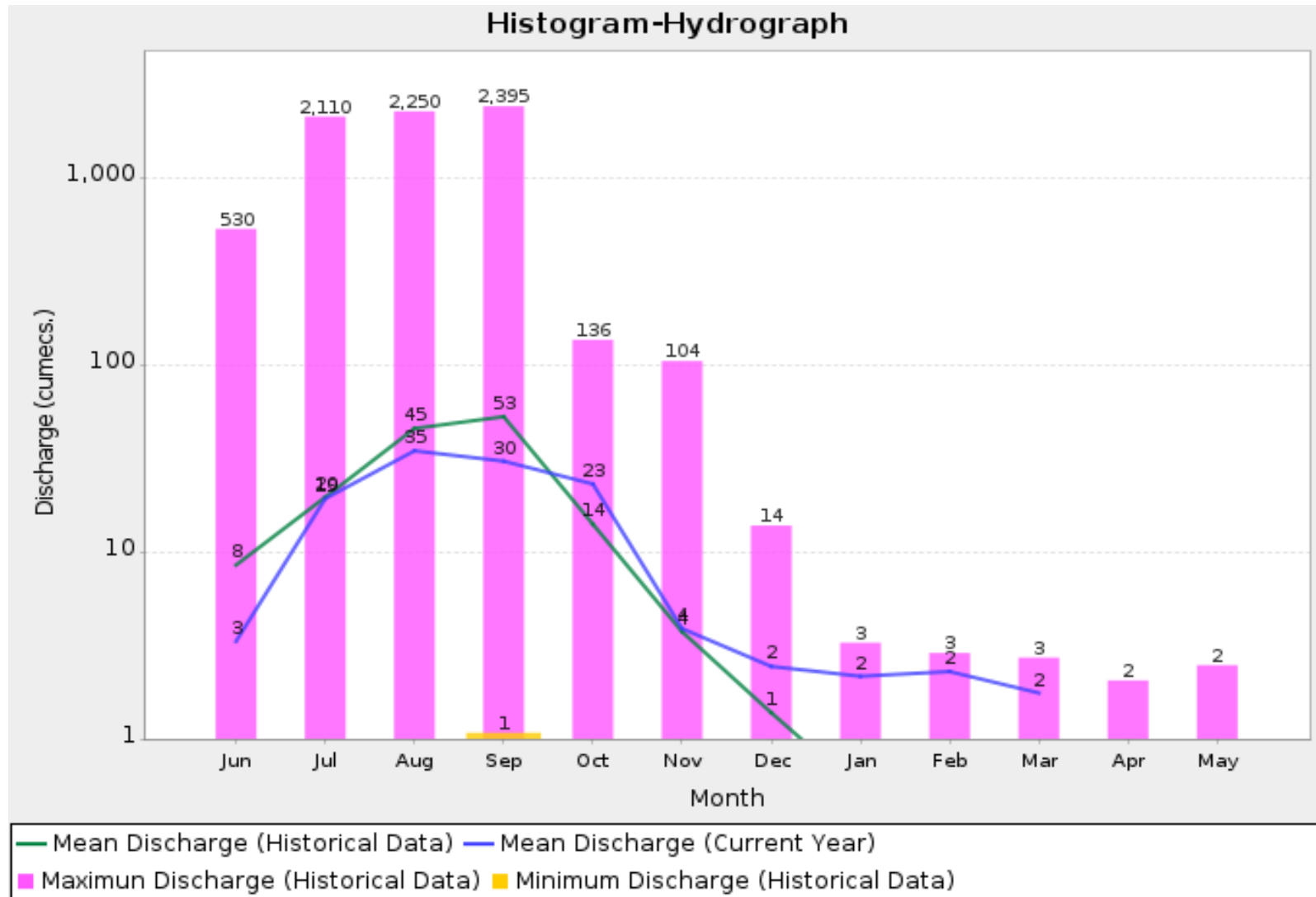
Peak Computed Discharge = 2.72 cumecs on 4/12/2016 Corres. Water Level 189.37 m

Lowest Computed Discharge = 2.02cumecs on 26/1/2017 Corres. Water Level 189.29 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1999-2017)



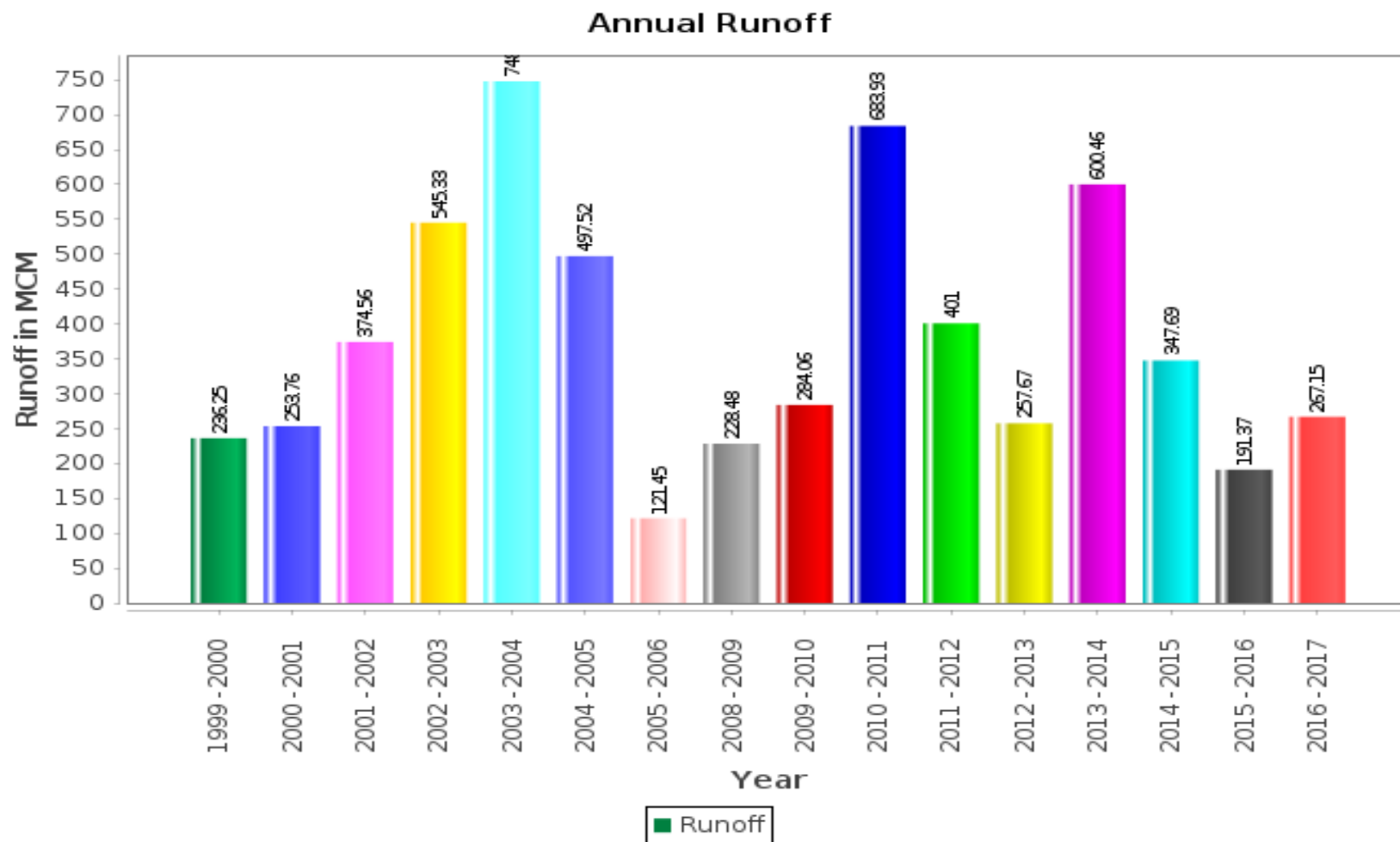
Annual Runoff Values for the period (1999 – 2017)

Station Name : Goi at Pati (N.C.A. PATI)

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division : MNSD III, CWC Indore



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

Monthly Average Runoff based on period (1999 – 2017)

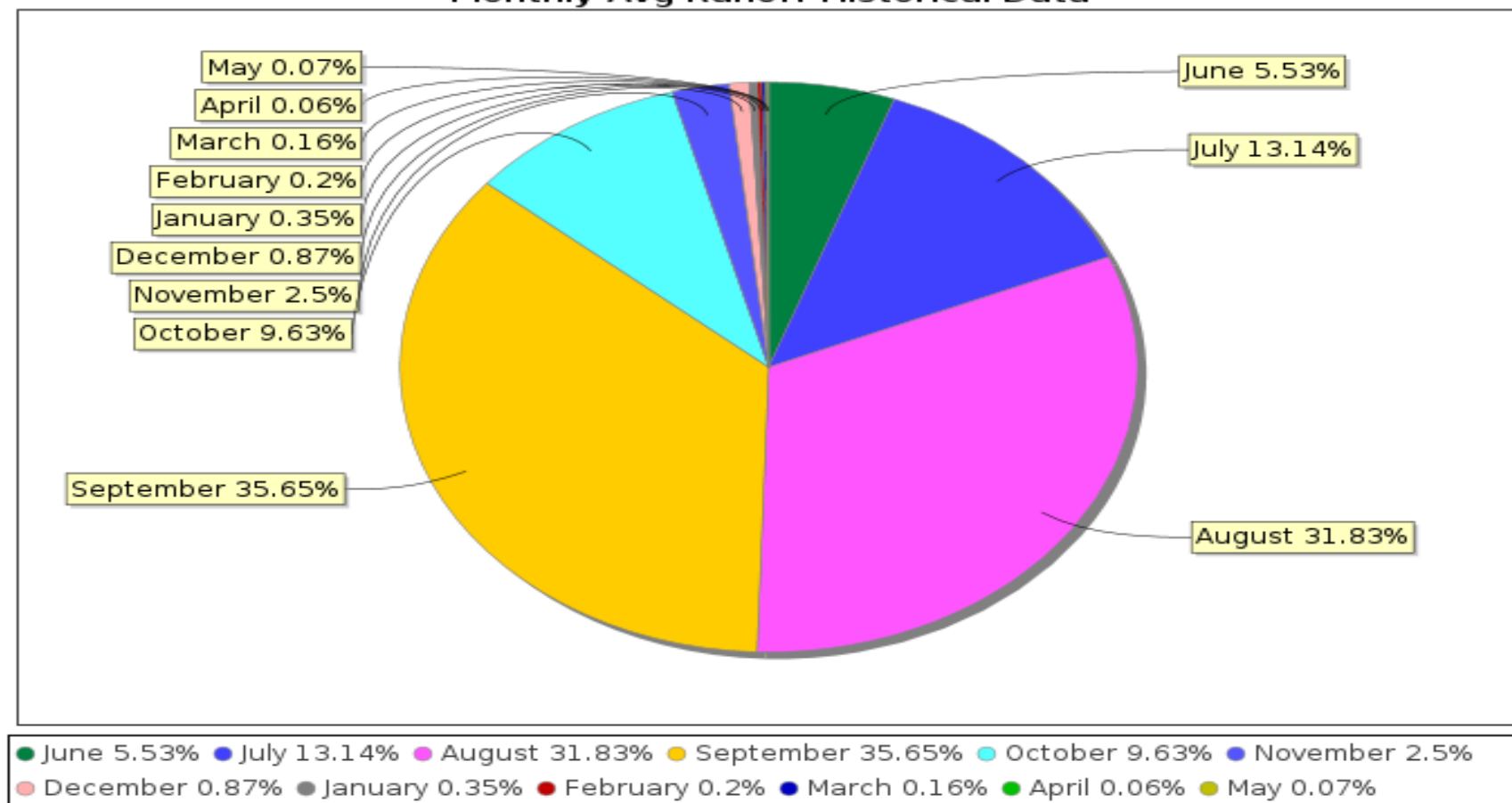
Station Name : Goi at Pati (N.C.A. PATI)

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

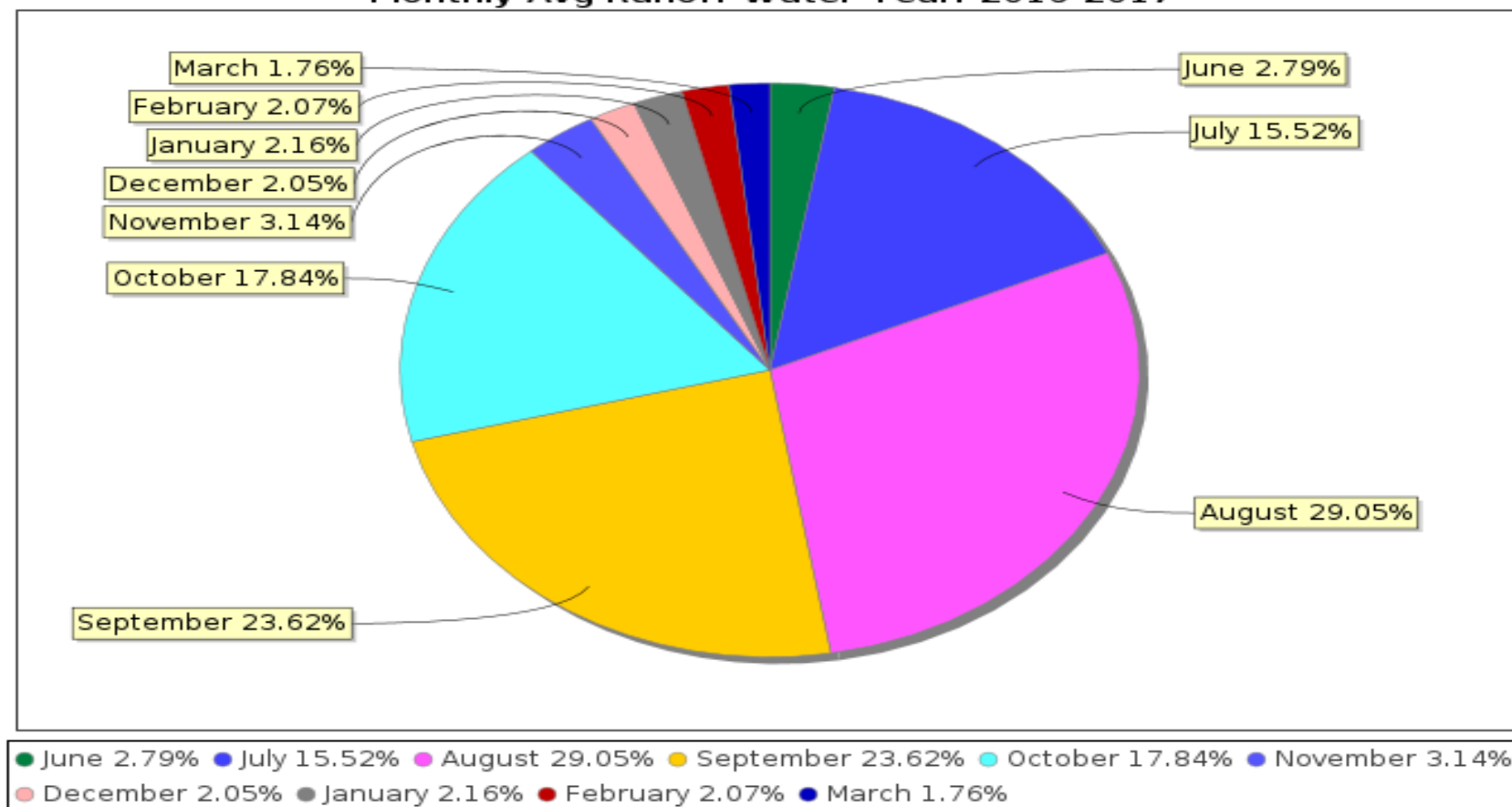
Station Name : Goi at Pati (N.C.A. PATI)

Local River : Goi

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

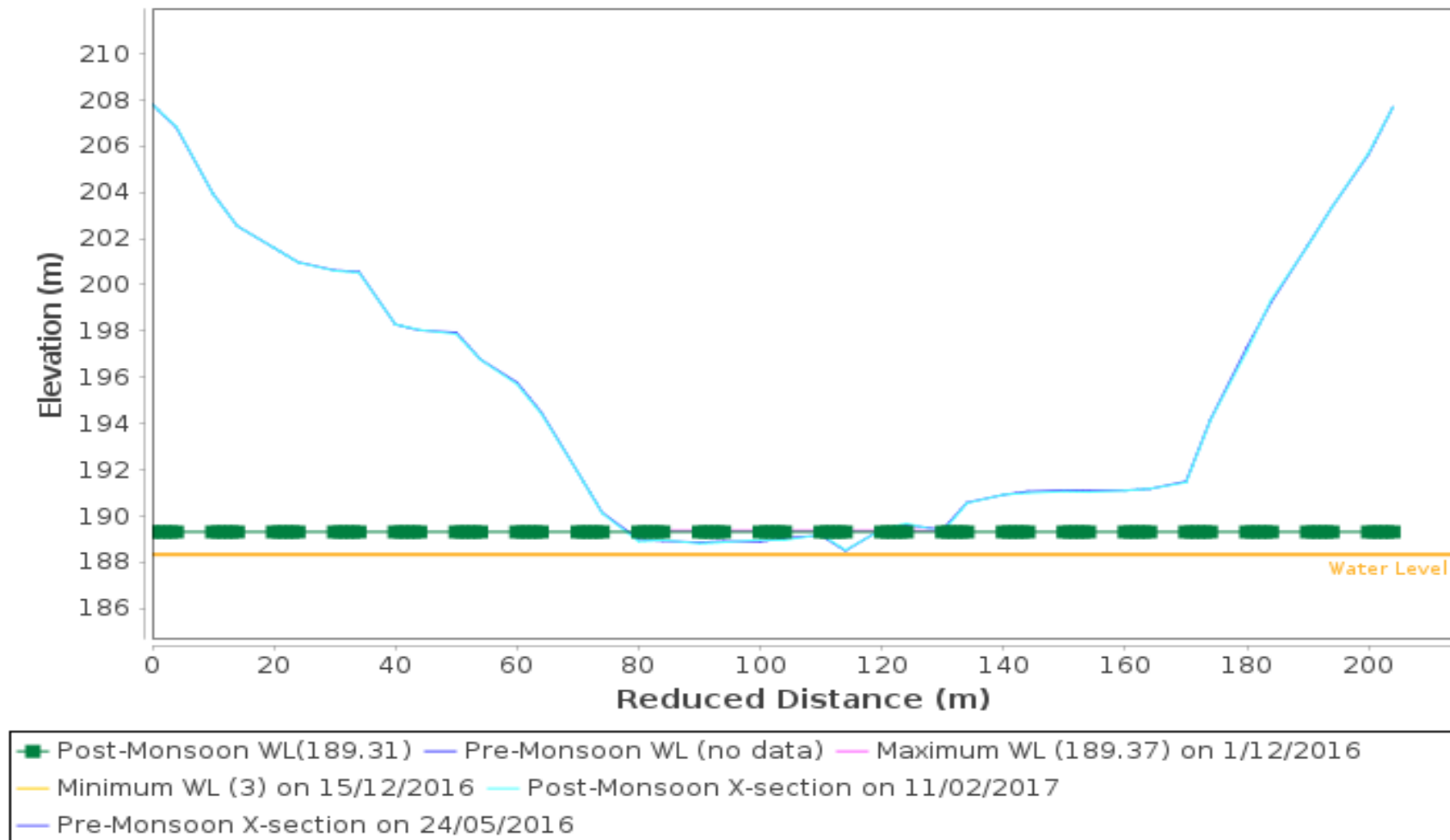
Station Name : Goi at Pati (N.C.A. PATI)

Local River : Goi

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore

X-Section



Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Goi at Pati (N.C.A. PATI)

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



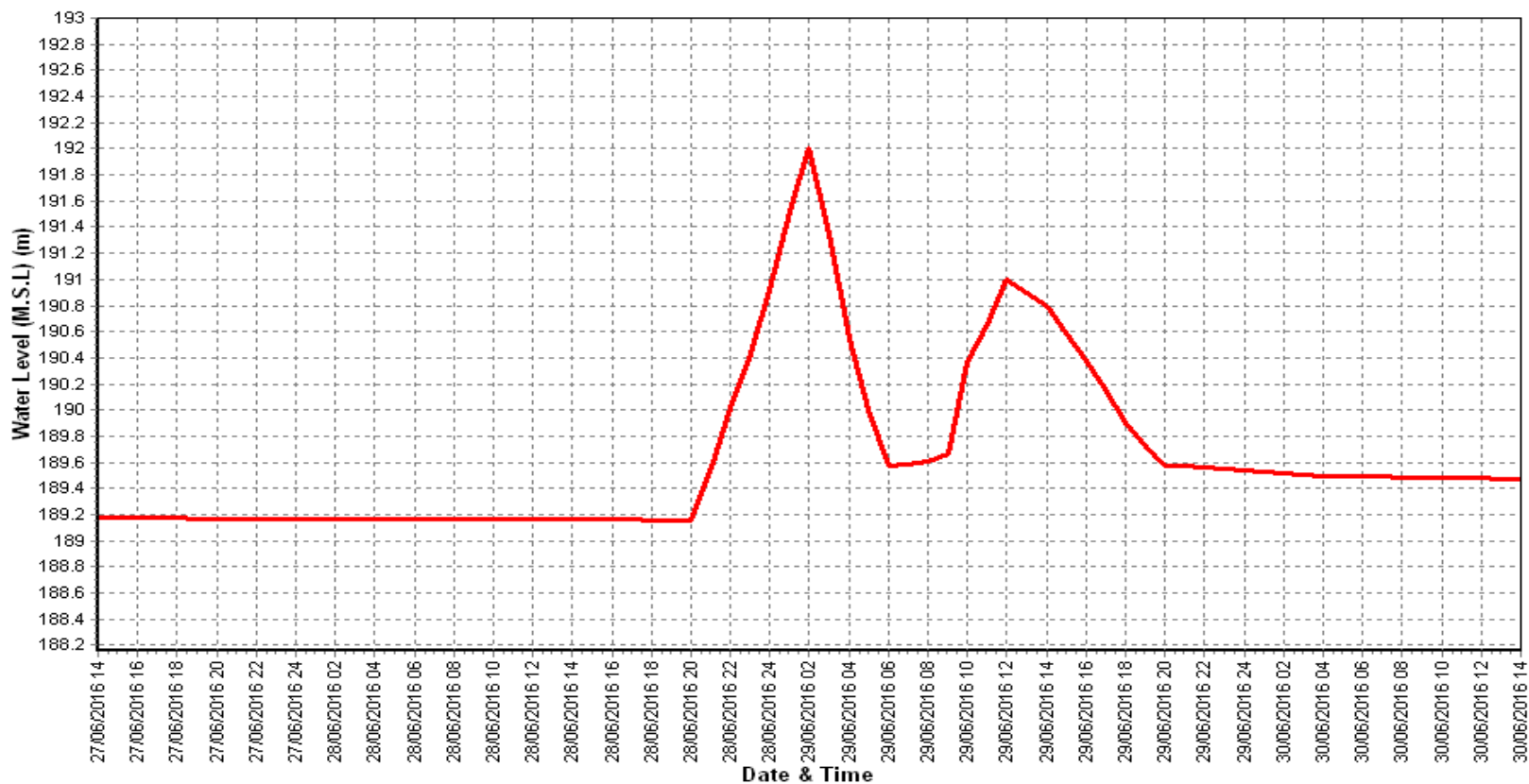
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Goi at Pati (N.C.A. PATI)

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



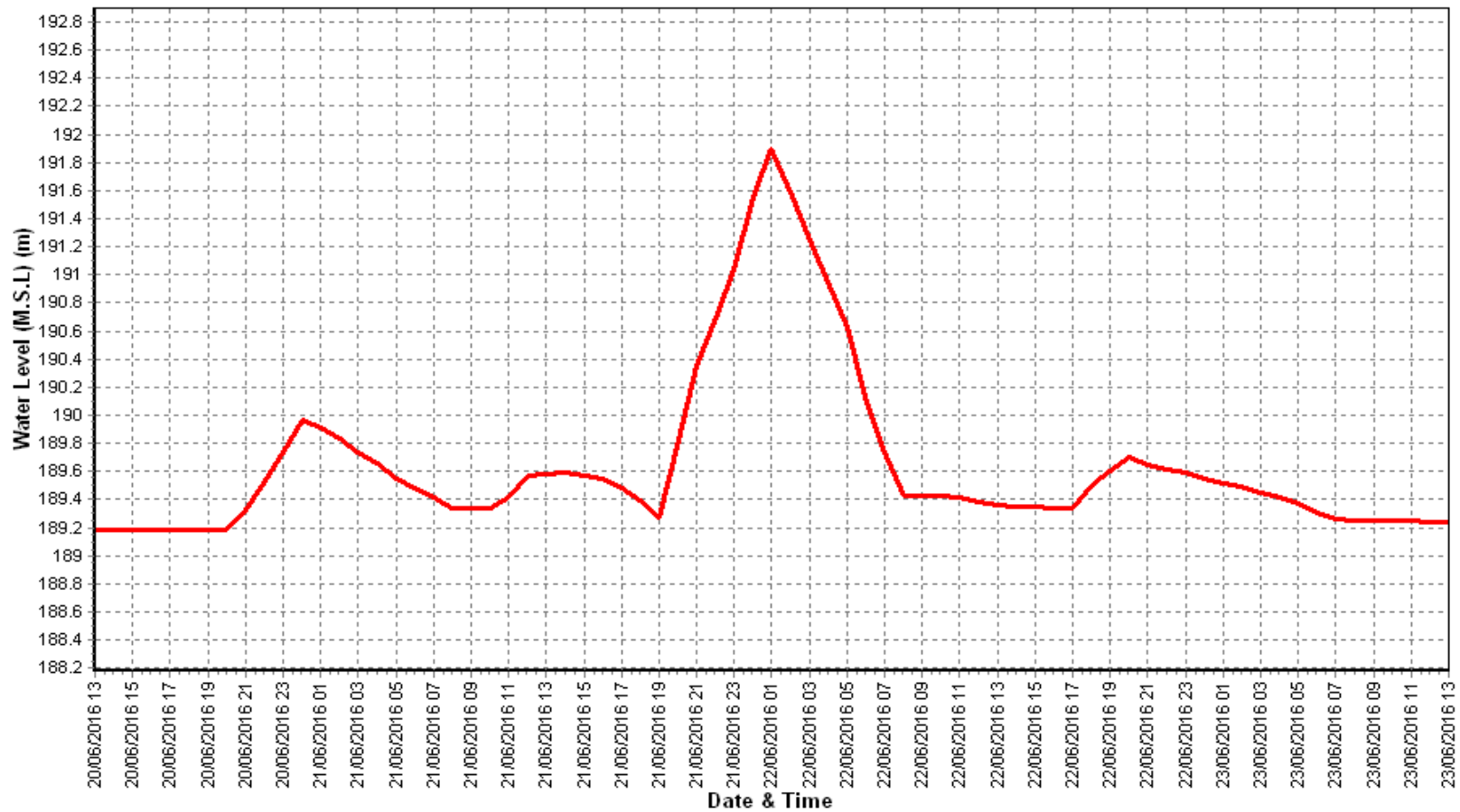
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Goi at Pati (N.C.A. PATI)

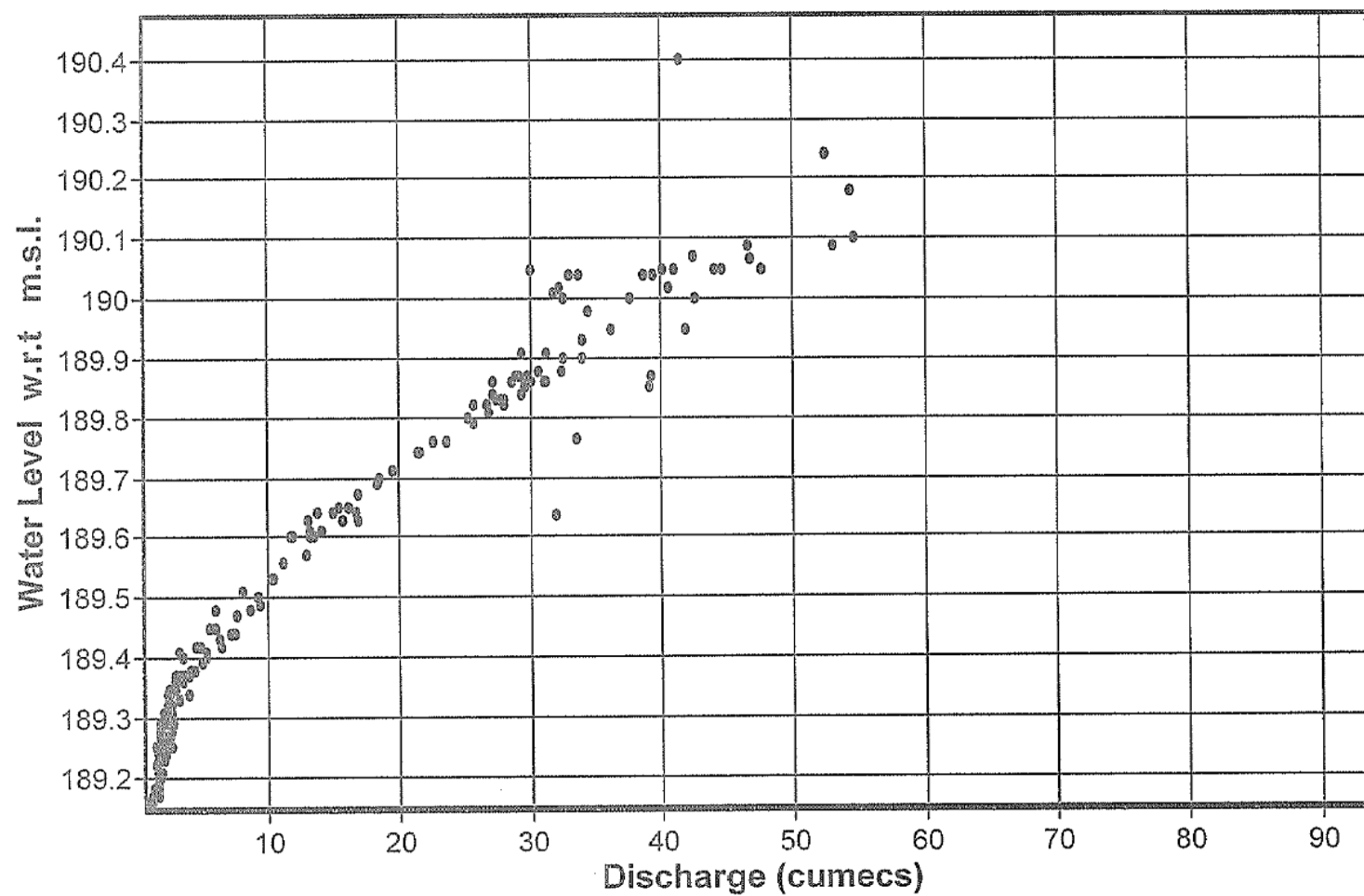
Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



Plot of Stage Discharge Data at Goi at Pati (N.C.A. PATI): 2016 - 2017



4.3 Uri at Dhulsar

History sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
				Water Year	: 2016 - 2017	
Site	:	Dhulsar		Code	: 021-NDBHP	
State	:	Madhya Pradesh		District	: Dhar	
				Independent		
Basin	:	NARMADA		River	: Narmada	
Tributary	:	Uri		Sub Tributary	: -	
Sub-Sub Tributary	:	-		Local River	: Uri	
					Middle Narmada Sub-	
Division	:	Narmada Division(ND), Bhopal		Sub-Division	: Division-III, Indore	
Drainage Area	:	787.0 Sq. Km.		Bank	: Right	
Latitude	:	22°12'20"		Longitude	: 74°51'06"	
Current Zero of Gauge (m)	:	151.000				
CATEGORY	Opening Date		Closing Date			
Gauge	:	15/06/2008				
Discharge	:	15/06/2008				
Sediment	:					
Water Quality	:	01/08/2008				
Reduced Level	Opening Date		Closing Date			
151.0	05/01/2017		-			
151.0	15/03/1999		03/06/2014			
151.0	03/06/2014		05/01/2017			
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1999-2000	3.77	151.55	01/10/1999	0	0	01/06/1999
2000-2001	40	152.45	01/07/2000	0	0	07/08/2000
2001-2002	0.45	151.85	01/08/2001	0	0	01/06/2001
2002-2003	12	152.13	01/09/2002	0	0	10/02/2003
2003-2004	30	152.35	01/10/2003	0	0	01/06/2003
2004-2005	23.07	152.135	01/09/2004	0	0	05/11/2004
2005-2006	14.63	152.02	01/08/2005	0	0	01/06/2005
2008-2009	2.9	151.71	01/10/2008	0	0	01/06/2008
2009-2010	3.83	151.77	01/09/2009	0	0	01/06/2009
2010-2011	42.97	152.25	11/09/2010	0	0	01/06/2010
2011-2012	35.02	152.18	01/09/2011	0	0	01/06/2011
2012-2013	71.14	152.38	01/09/2012	0	0	01/06/2012
2013-2014	175.45	152.95	27/07/2013	0	0	01/06/2013
2014-2015	1094.27	155.1	08/09/2014	0	0	01/06/2014
2015-2016	184.41	153.02	27/07/2015	0.46	151.53	10/09/2015
2016-2017	115.84	152.46	20/09/2016	0	0	01/06/2016

Stage Discharge Sheet for Uri at Dhulsar for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	2.51	151.65	9.03	151.76	16.98	151.9	37.18	152.16	0	0
2	0	0	0.84	151.57	8.6	151.75	25.77	152.02	40.96	152.21	0	0
3	0	0	0.65	151.52	16.84	151.93	18.79	151.94	29.62	152.06	0	0
4	0	0	18.27	151.93	54.97	152.26	17.64	151.92	26.91	152.03	0	0
5	0	0	2.75	151.68	18.33	151.94	14.77	151.87	24.85	151.99	0	0
6	0	0	0.91	151.59	18.66	151.94	11.9	151.82	26.02	152	0	0
7	0	0	0.85	151.55	20.96	151.96	10.28	151.79	21.88	151.95	0	0
8	0	0	0.55	151.51	19.36	151.95	9.97	151.77	21.13	151.93	0	0
9	0	0	0.71	151.5	21.72	151.98	8.48	151.75	26.35	152.05	0	0
10	0	0	0.53	151.51	23.51	152	8.22	151.74	23.54	151.98	0	0
11	0	0	0.54	151.52	23.58	152.11	6.50	151.72	20.50	151.9	0	0
12	0	0	7.47	151.73	23.44	152	4.78	151.7	14.92	151.86	0	0
13	0	0	19.02	151.98	25.81	152.02	3.924	151.68	14.42	151.86	0	0
14	0	0	10.35	151.76	151.96	151.96	2.64	151.65	13.27	151.84	0	0
15	0	0	5.71	151.71	18.85	151.92	2.58	151.64	12.49	151.83	0	0
16	0	0	3.08	151.68	15.91	151.88	10.78	151.79	12.28	151.81	0	0
17	0	0	2.44	151.65	14.77	151.85	12.2	151.81	12.06	151.79	0	0
18	0	0	2.12	151.64	13.91	151.83	18.23	151.98	10.62	151.77	0	0
19	0	0	2.31	151.65	12.78	151.8	30.64	152.07	10	151.76	0	0
20	0	0	3.17	151.68	12.76	151.8	115.84	152.46	8.08	151.72	0	0
21	0	0	2.29	151.65	61.17	152.45	29.03	152.04	8.08	151.72	0	0
22	0	0	1.48	151.63	44.04	152.22	33.99	152.11	7.59	151.71	0	0
23	0	0	1.56	151.62	41.72	152.18	34	152.12	5.41	151.69	0	0
24	0	0	1.45	151.61	37.05	152.14	25.75	152	3.24	151.67	0	0
25	0	0	1.35	151.6	31	152.08	50.48	152.90	3.21	151.65	0	0
26	0	0	1.3	151.6	29.73	152.04	24.98	151.99	3.21	151.65	0	0
27	0	0	11.92	151.81	27.46	152	24.97	151.99	2.92	151.64	0	0
28	0	0	24.75	152.01	35.20	152.11	53.95	152.25	2.79	151.63	0	0
29	0	0	12.65	151.83	21.06	151.98	28.13	152.03	2.66	151.62	0	0
30	0	0	9.25	151.76	19.38	151.95	21.81	151.95	2.66	151.62	0	0
31				151.79	18.58	151.93			2.58	151.62		
Ten-Daily Mean												
I Ten-Daily	0	0	2.53	151.6	19.1	151.95	11.04	121.47	21.11	152.04	0	0
II Ten-Daily	0	0	5.32	151.7	11.94	151.92	17.95	106.31	8.09	151.81	0	0
III Ten-Daily	0	0	6.05	151.72	24.55	152.1	27.66	136.85	3.01	151.66	0	0
Monthly												
Min.	0	0	0.84	151.5	8.6	151.75	2.58	151.64	2.58	151.62	0	0
Max.	0	0	24.75	151.5	54.97	151.75	115.84	151.64	37.18	151.62	0	0
Mean	0	0	4.63	151.67	18.53	151.99	18.88	121.54	10.74	151.84	0	0

Annual Runoff (MCM) = 177 Annual Runoff (mm) = 225

Peak Observed Discharge = 115.84 cumecs on 20/09/2016 Corresp. Water Level = 152.46 m

Lowest observed discharge = 0 cumecs on 01/06/2016 Corresp. water level = 0 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Uri at Dhulsar for the period 2017-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Ten-Daily Mean	0	0	0	0	0	0	0	0	0	0	0	0
I Ten-Daily	0	0	0	0	0	0	0	0	0	0	0	0
II Ten-Daily	0	0	0	0	0	0	0	0	0	0	0	0
III Ten-Daily	0	0	0	0	0	0	0	0	0	0	0	0
Monthly	0	0	0	0	0	0	0	0	0	0	0	0
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0

Peak Computed Discharge = 61.17 cumecs on 21/08/2016 Corres. Water

Level = 152.45 m

Lowest Computed Discharge = 0.54 cumecs on 10/07/2016 Corres. Water

Level =151.51 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

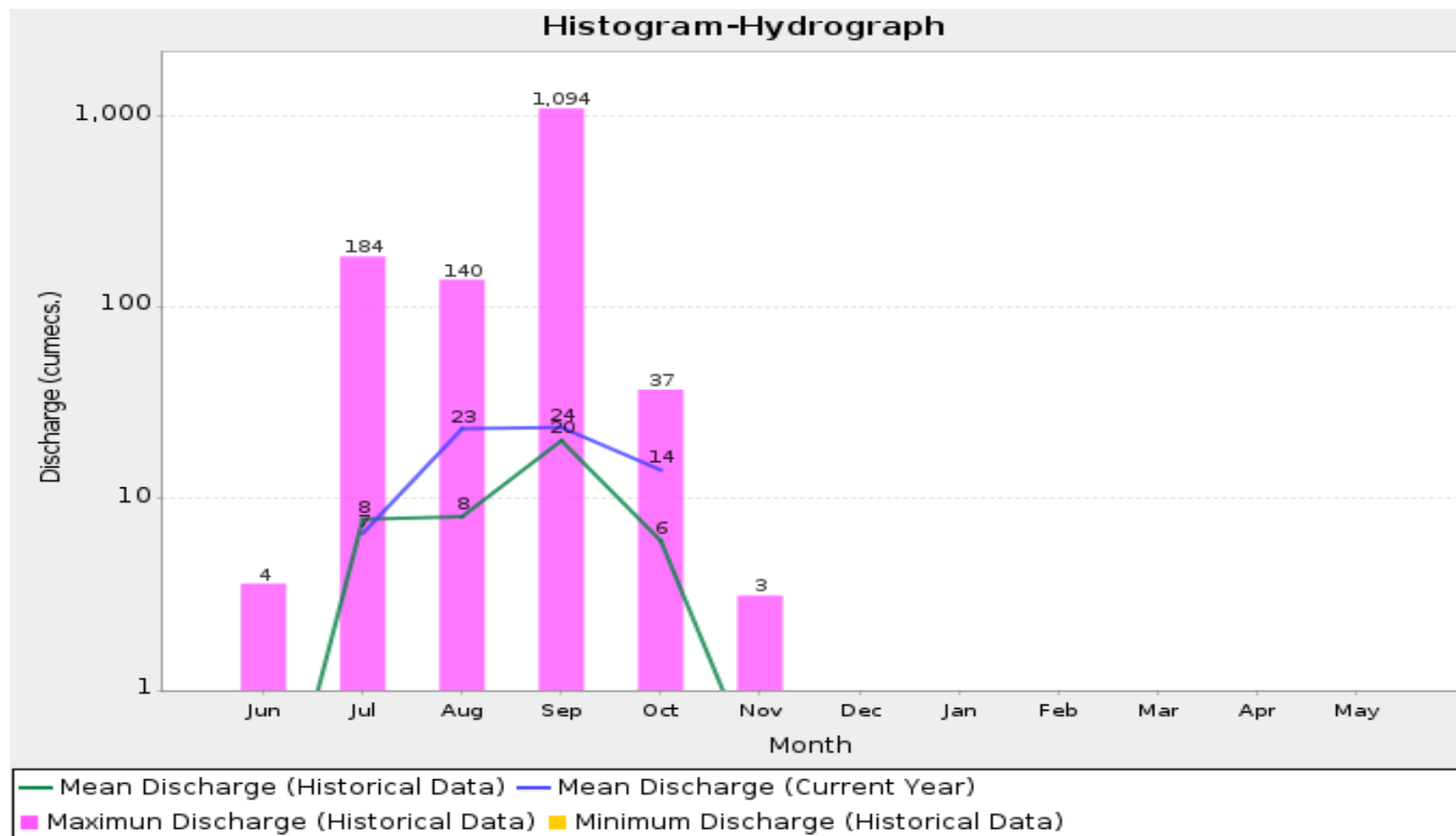
Histogram- Hydrograph for Water Year 2016-17(Data considered : 1999-2017)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



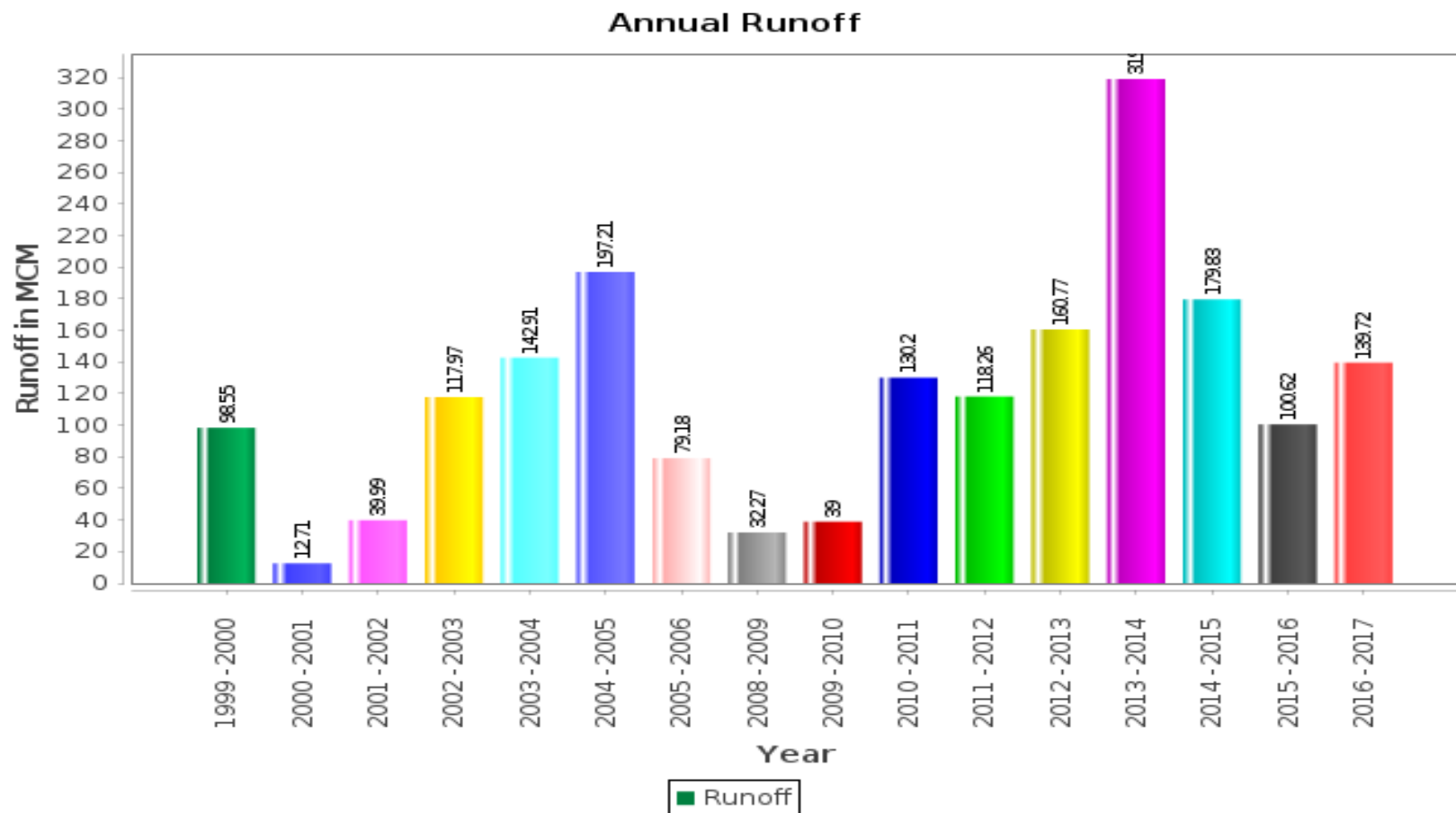
Annual Runoff Values for the period (1999 – 2017)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



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

Monthly Average Runoff based on period (1999-2017)

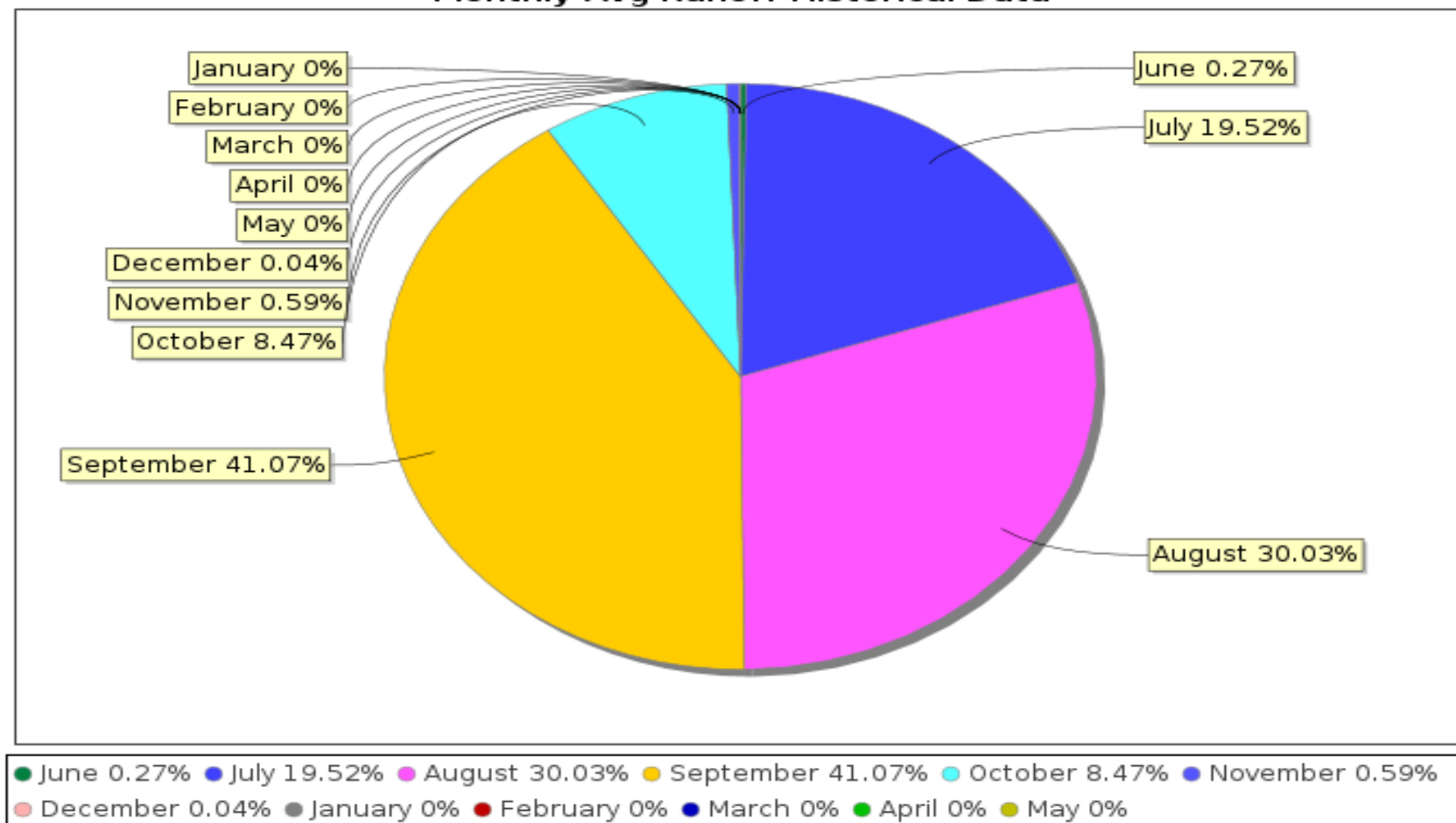
Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

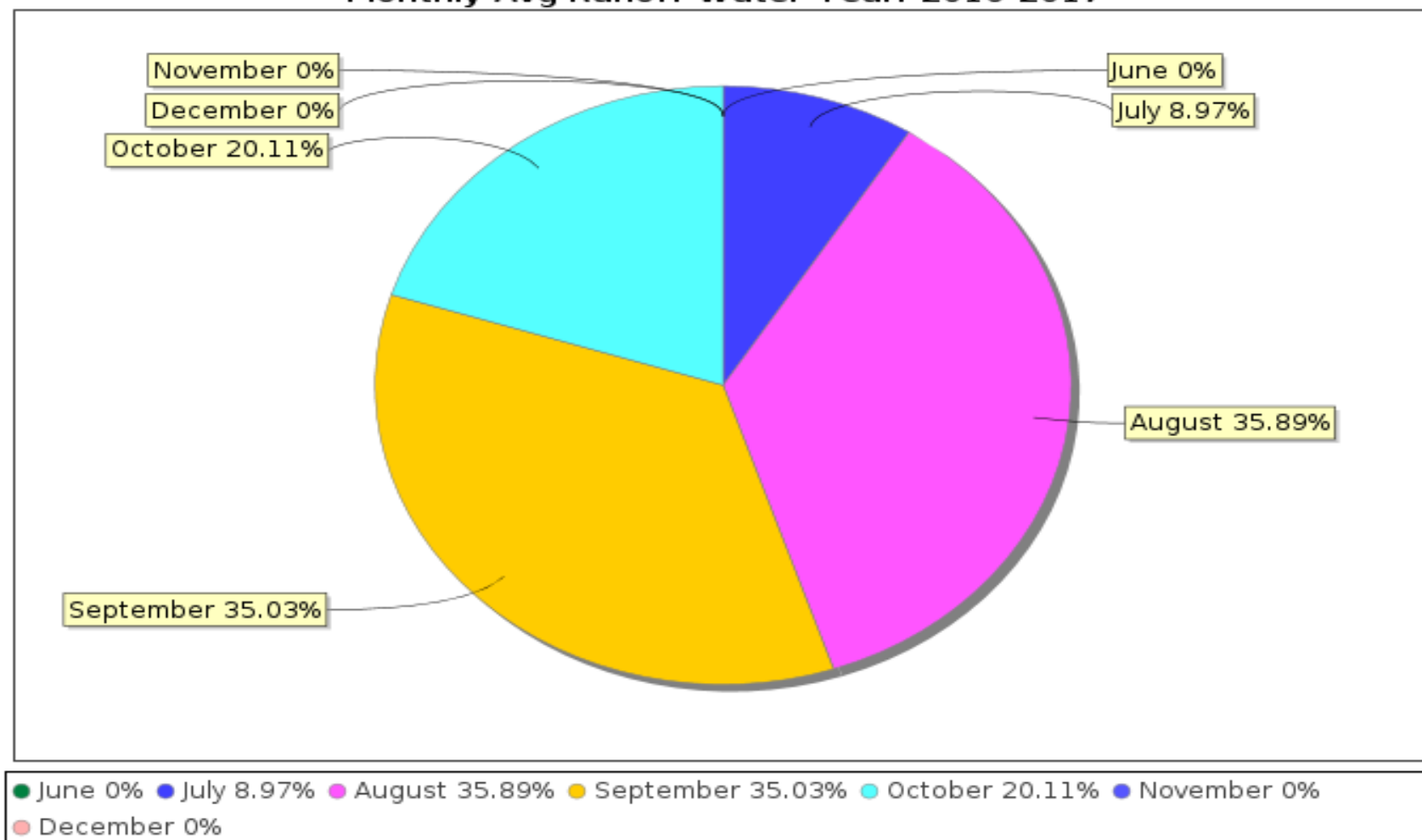
Station Name : Uri at Dhulsar (NCA DHULSAR)

Local River : Uri

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

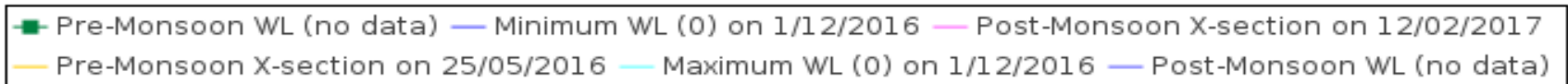
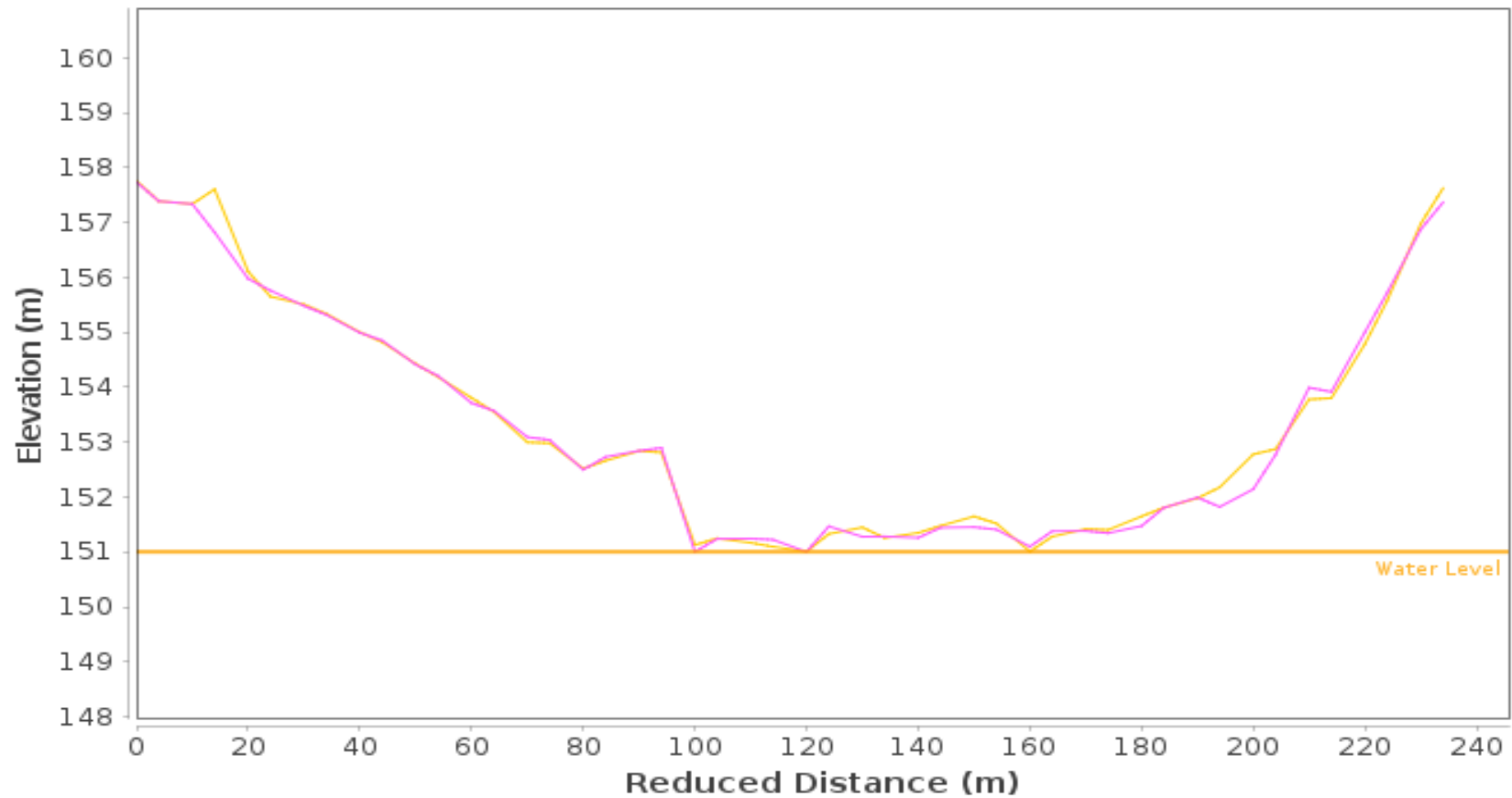
Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore

X-Section



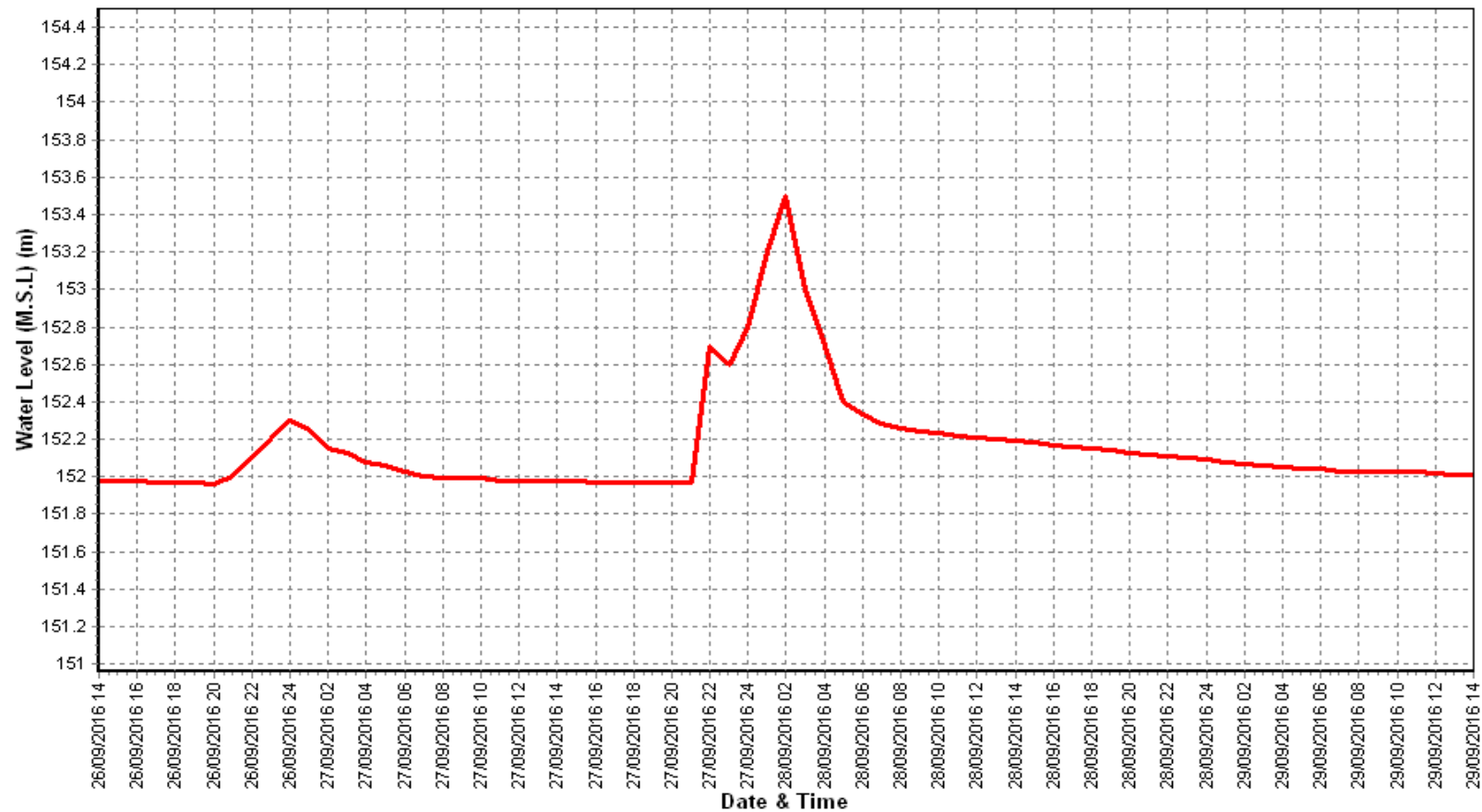
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division : MNSD III, CWC Indore



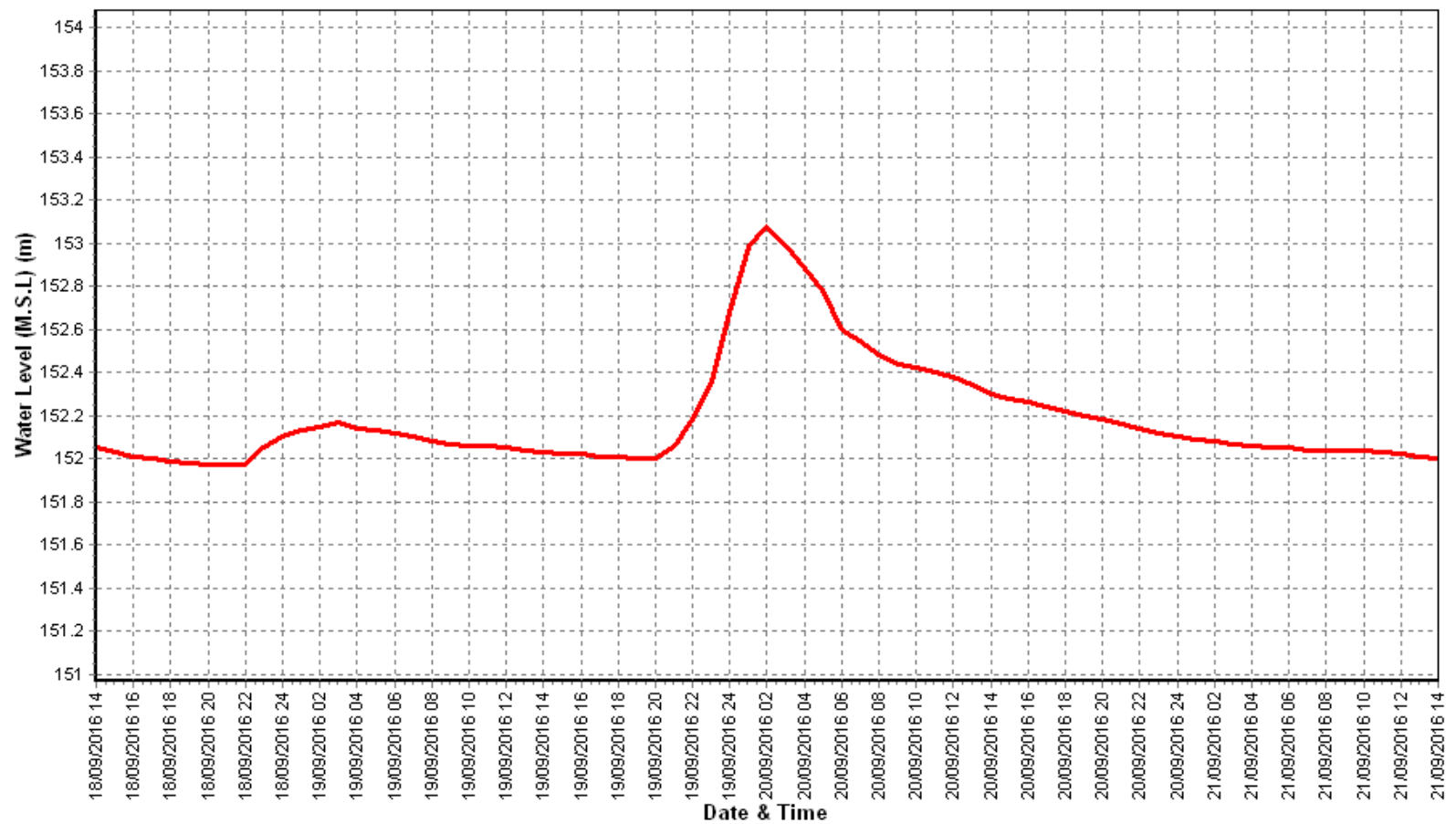
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



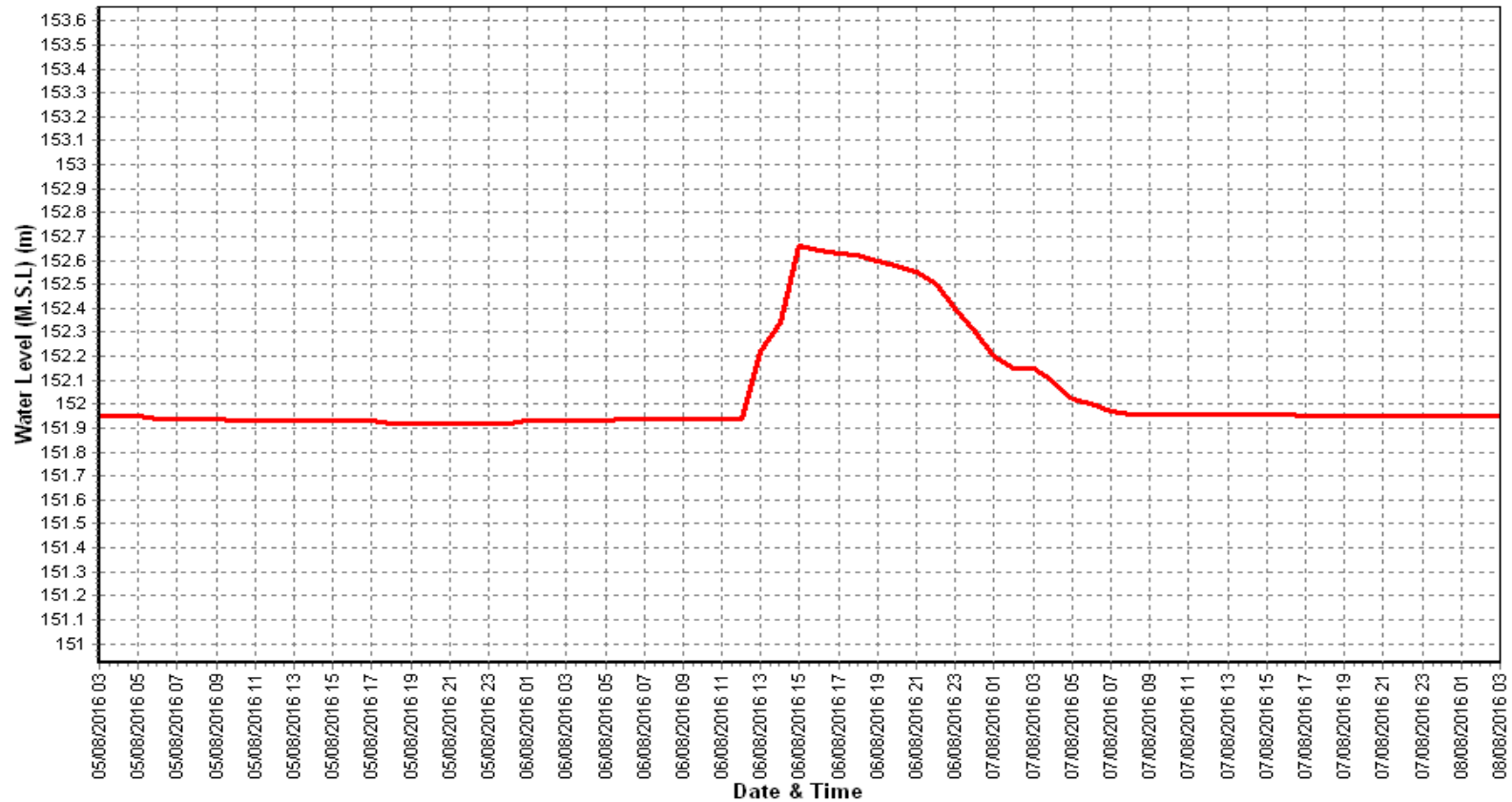
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Uri at Dhulsar (NCA DHULSAR)

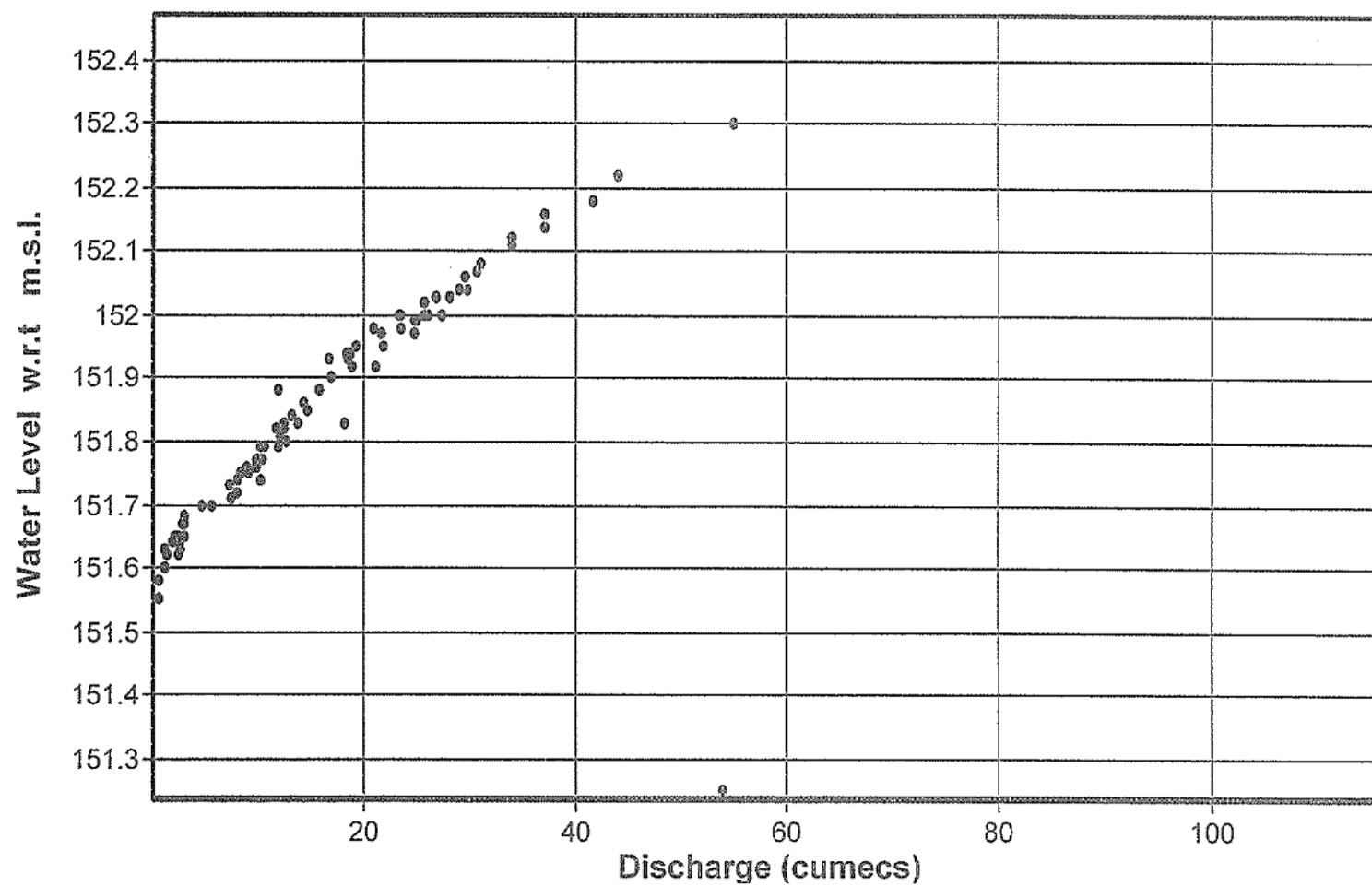
Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



Plot of Stage Discharge Data at Uri at Dhulsar (NCA DHULSAR): 2016 - 2017



4.4 Narmada at Mandleshwar

History Sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
				Water Year	: 2016 - 2017	
Site	:	Mandleshwar	Code		: 017-NDBHP	
State	:	Madhya Pradesh	District		: Khargone	
Basin	:	NARMADA	Independent River		: Narmada	
Tributary	:	-	Sub Tributary		: -	
Sub-Sub Tributary	:	-	Local River		: Narmada Middle Narmada Sub-	
Division	:	Narmada Division(ND), Bhopal	Sub-Division		: Division-III, Indore	
Drainage Area	:	72809.0 Sq. Km.	Bank		: Right	
Latitude	:	22°10'18"	Longitude		: 75°39'39"	
Current Zero of Gauge (m)	:	138.000				
CATEGORY	Opening Date		Closing Date			
Gauge	:	16/12/1970				
Discharge	:	28/08/1971				
Sediment	:	14/04/1972				
Water Quality	:	18/06/1979				
Reduced Level	Opening Date		Closing Date			
138.0	14/10/2016		05/01/2017			
138.0	05/01/2017		-			
138.0	16/12/1970		14/10/2016			
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1972-1973	16000	149.233	01/09/1972	34.3	139.19	01/06/1972
1973-1974	37250	154.8	01/09/1973	31.5	139.14	01/06/1973
1974-1975	1485.6	141.613	01/09/1974	41.6	139.19	01/05/1975
1975-1976	3786.5	143.3	01/09/1975	39.3	139.178	01/06/1975
1976-1977	3790.4	143.07	01/09/1976	33.7	139.205	01/05/1977
1977-1978	19883.8	148.688	01/09/1977	79	139.325	01/05/1978
1978-1979	7940.7	145.028	01/09/1978	58.6	139.23	01/06/1978
1979-1980	930.9	140.935	01/08/1979	43.5	139.165	01/05/1980
1980-1981	18929.2	148.68	01/09/1980	50	139.38	01/06/1980

Water Year Book 2016-2017

Annual Maximum / Minimum discharge with corresponding Water Level (M.S.L)

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1981-1982	4123.2	140.212	01/02/1982	48.9	139.295	01/05/1982
1982-1983	3546.6	143.185	01/09/1982	40	139.27	01/05/1983
1983-1984	3945.7	143.25	01/09/1983	42.3	139.24	01/06/1983
1984-1985	2946.4	142.435	01/09/1984	41.2	139.25	01/05/1985
1985-1986	5125	143.972	01/08/1985	36.8	139.19	01/06/1985
1986-1987	3601.1	143.01	01/08/1986	33.9	139.23	01/06/1986
1987-1988	5431	143.76	01/09/1987	26.5	139.195	01/05/1988
1988-1989	3038	142.54	01/09/1988	15.96	139.115	01/06/1988
1989-1990	3459	142.925	01/09/1989	16.45	139.1	01/06/1989
1990-1991	7117	144.78	01/09/1990	160	139.71	01/05/1991
1991-1992	5776	143.59	01/09/1991	69.7	139.44	01/05/1992
1992-1993	3093	142.84	01/08/1992	82	139.55	01/06/1992
1993-1994	5810	144.11	01/10/1993	73.25	139.45	01/06/1993
1994-1995	17312	149	01/09/1994	134.6	139.68	01/05/1995
1995-1996	3281	142.92	01/08/1995	108.4	139.66	01/06/1995
1996-1997	2850	142.39	01/09/1996	101.5	139.75	01/06/1996
1997-1998	9705	145.87	01/08/1997	86	139.44	01/06/1997
1998-1999	1818	141.45	01/08/1998	74.44	139.43	01/05/1999
1999-2000	5300	143.91	01/08/1999	49.67	139.28	01/06/1999
2000-2001	5324	143.715	01/08/2000	69.38	139.45	01/05/2001
2001-2002	2138	141.71	01/09/2001	56.88	139.38	01/06/2001
2002-2003	9000	145.8	01/09/2002	69.09	139.46	01/05/2003
2003-2004	4850	143.7	01/10/2003	64	139.42	01/06/2003
2004-2005	3398	143.12	01/09/2004	84.84	139.36	01/06/2004
2005-2006	3103.01	142.63	01/08/2005	117.64	139.62	01/06/2005
2006-2007	7750.67	144.825	01/09/2006	198.33	139.93	01/05/2007
2007-2008	5153.3	143.97	01/07/2007	256.71	139.91	01/03/2008
2008-2009	1006.69	141.24	01/05/2009	273.1	140.1	01/03/2009
2009-2010	1111.1	140.84	01/10/2009	198.97	139.95	01/07/2009
2010-2011	1817.42	141.62	01/10/2010	363.13	140.09	01/08/2010
2011-2012	5064.59	143.6	01/09/2011	455.47	140.38	01/12/2011
2012-2013	4467.31	143.36	01/09/2012	214.21	139.9	01/07/2012
2013-2014	46398.29	154.575	24/08/2013	214.02	139.575	12/05/2014
2014-2015	10407.92	145.75	08/09/2014	3.17	139.09	11/07/2014
2015-2016	2311.07	142.12	17/08/2015	138.94	139.42	30/05/2016
2016-2017	10200	146.07	09/08/2016	106.3	139.51	29/06/2016

Stage Discharge Sheet for Narmada at Mandleshwar for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	743.11	140.65	669.9	140.55	2235.19	141.99	2619.35	142.3	1165.51	141.06	146.92	139.65
2	846.07	140.74	179.86	139.71	2251.61	142.01	2229.67	141.96	1450	141.3	257.23	139.92
3	354.15	140.15	185	139.74	2270.53	142.03	2186.98	141.94	2241.04	142	377.33	140.17
4	539.36	140.41	192.67	139.77	2367.1	142.11	2205	141.94	2915.06	142.43	429.13	140.25
5	706	140.6	434.95	140.27	5034.25	143.54	2187	141.93	2567.07	142.23	521.83	140.37
6	590.59	140.47	305.21	140.02	5539.68	144.05	2180.17	141.92	2255.03	142	950	140.85
7	178.39	139.65	175	139.7	10000	146	2164.08	141.91	1448.04	141.31	915.19	140.82
8	120.51	139.37	527.42	140.37	10000	146	2166.26	141.91	1435.09	141.4	703.79	140.57
9	122.52	139.38	930.23	140.81	10200	146.07	1843.09	141.68	1680	141.5	871.12	140.76
10	295.21	140	298	140.2	9820	145.9	1291.03	141.16	1544.44	141.39	914.26	140.52
11	174.32	139.62	434.63	140.27	7200	144.82	1060	140.93	1790	141.6	853.71	140.74
12	245	139.89	1491.49	141.32	5387.23	143.94	720.08	140.47	1165	141.06	1175.3	141.06
13	346.27	140.13	2468.04	142.18	5393.17	143.94	650	140.46	921.39	140.81	910	140.8
14	199.32	139.67	2257.52	142.08	5050	143.56	903.86	140.8	696.25	140.53	870	140.76
15	160.42	139.55	2213.34	142.07	2187	141.93	705.09	140.51	1693.5	141.53	856.22	140.74
16	173.7	139.62	2173.85	142.06	2191.03	141.93	819.45	140.7	1450	141.36	390.77	140.19
17	429.08	140.36	2152	142.04	2163.13	141.91	728.5	140.61	545.71	140.39	494.72	140.34
18	156.3	139.52	2142.8	142.03	2167.15	141.91	670	140.56	666.21	140.47	458.75	140.3
19	205	139.72	2137.69	142.02	2075.43	141.83	361.12	140.14	905.3	140.81	812.73	140.74
20	222.58	139.81	2139.9	142.02	2205.8	141.94	381.18	140.19	707.77	140.56	790	140.67
21	325.93	140.05	2133.22	142.01	3298	142.7	318.61	140.05	373.13	140.15	466.95	140.31
22	457.4	140.28	2121.24	142	3300.25	142.7	222.33	139.87	730.12	140.61	575.86	140.42
23	151.63	139.64	2114.43	142.49	4997.12	143.43	170.21	139.71	540	140.38	538.98	140.39
24	244.96	139.9	2109	141.98	4359.23	143.3	196.78	139.74	738.94	140.62	441.86	140.27
25	160.63	139.65	2111.55	141.98	4356.34	143.3	193	139.73	473.48	140.32	305.6	140
26	141	139.64	2111.37	141.98	3316.37	142.75	137.5	139.61	510.18	140.36	643.2	140.49
27	174.3	139.69	2195	142.06	3393.86	142.75	304.9	140.02	366.01	140.15	870	140.76
28	129.99	139.61	2785.98	142.39	4465	143.34	448.18	140.3	856.19	140.74	723.92	140.6
29	106.3	139.51	2299.62	142.07	4500.05	143.4	824.06	140.74	809.79	140.69	872.89	140.76
30	459.96	140.31	2243.35	141.99	3949.1	143.1	1567.47	141.41	308	140.03	501.03	140.33
31			2241	141.99	3090.25	142.64			396.81	140.2		
Ten-Daily Mean												
I Ten-Daily	449.59	140.14	389.82	140.11	5971.84	143.97	2107.26	141.87	1870.13	141.66	608.68	140.39
II Ten-Daily	231.2	139.79	1961.13	141.81	3602	142.77	699.93	140.54	1054.11	140.91	761.22	140.63
III Ten-Daily	235.21	139.83	2224.16	142.09	3911.42	143.04	438.3	140.12	554.79	140.39	594.03	140.43
Monthly												
Min.	106.3	139.37	175	139.7	2075.43	141.83	137.5	139.61	308	140.03	146.92	139.65
Max.	846.07	139.37	2785.98	139.7	10200	141.83	2619.35	139.61	2915.06	140.03	1175.3	139.65
Mean	305.33	139.92	1525.04	141.34	4495.08	143.26	1081.83	140.84	1159.68	140.99	654.64	140.49

Annual Runoff in MCM :33674.57

Annual Runoff in mm :462.51

Peak Observed Discharge = 5539.68 cumecs on 6/8/2016 Corres. Water Level = 144.05 m

Lowest Observed Discharge = 106.3cumecs on 29/6/2016 Corres. Water Level = 139.51 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Narmada at Mandleshwar for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	531.69	140.38	642	140.49	497.05	140.34	742.96	140.62	275.02	139.95	227.6	139.82
2	549.69	140.4	607.27	140.46	880.69	140.77	448.08	140.28	640	140.51	621.01	140.48
3	987.26	140.88	449.37	140.29	566.05	140.41	397.44	140.19	589.11	140.45	715.92	140.59
4	652	140.52	807.58	140.69	601.43	140.48	579.52	140.44	679.85	140.55	238.76	139.85
5	869.83	140.75	950.22	140.83	778	140.69	570	140.42	669.8	140.54	366.53	140.13
6	1125.74	141.03	523.81	140.37	395.5	140.2	369.01	140.14	245.59	139.88	653.61	140.52
7	618.85	140.47	533.2	140.38	494.69	140.34	423.98	140.22	472.04	140.31	371	140.15
8	705.2	140.58	450	140.27	650.82	140.52	727.23	140.78	644.26	140.51	337.44	140.07
9	616.28	140.47	594.46	140.45	444.53	140.28	551.99	140.4	1500	141.24	463.14	140.29
10	447.5	140.29	436.88	140.27	490.24	140.33	391.12	140.18	419.07	140.22	891	140.78
11	413	140.23	606.63	140.46	301	140.29	357.29	140.12	1561.34	140.9	598.61	140.46
12	334	140.07	638.32	140.51	301	140.2	742	140.62	992.96	140.88	471.29	140.3
13	430.3	140.25	676.93	140.55	467.95	140.31	636	140.51	986.53	140.84	795.33	140.67
14	521.32	140.37	789.47	140.67	530.6	140.38	580.98	140.44	244	139.89	981	140.85
15	303.02	140	532	140.38	1061.11	140.95	356.06	140.12	438.44	140.26	399.96	140
16	427.16	140.23	421.8	140.19	835.42	140.72	429.44	140.24	588	140.45	220.72	139.79
17	387.79	140.22	690.07	140.56	649.52	140.5	680.44	140.55	420.42	140.22	880.99	140.76
18	457	140.28	446.58	140.28	574.2	140.44	552.45	140.4	390.94	140.18	446.18	140.27
19	382.91	140.18	311.55	140.01	585	140.45	586	140.45	317.69	140.02	519.79	140.37
20	398.68	140.2	567.22	140.41	628.9	140.5	445.11	140.27	324.42	140.05	596.85	140.46
21	471.75	140.32	708.85	140.58	424.3	140.25	1003.51	140.9	271.65	139.94	1510	140.35
22	512.77	140.36	708	140.51	449.22	140.29	991.91	140.88	202.48	139.75	1064.49	140.95
23	521.35	140.37	580.02	140.43	945.7	140.84	552.51	140.4	168	139.6	1753.7	141.4
24	434.04	140.27	576.1	140.44	945	140.84	318.01	140.03	304.48	140	1098.57	140.98
25	441	140.26	413.64	140.22	945.47	140.84	337.34	140.07	524.75	140.37	491.95	140.34
26	494.93	140.34	574	140.44	441.99	140.26	637	140.52	596.86	140.46	479.74	140.32
27	363.29	140.15	492.12	140.34	441.7	140.26	836.89	140.72	501.6	140.35	455.54	140.28
28	510.25	140.36	466.8	140.31	740.85	140.61	580.47	140.44	741.46	140.62	352	140.1
29	654.38	140.52	770	140.65			594.24	140.46	472.59	140.31	578.9	140.45
30	501.86	140.35	572.7	140.44			669.72	140.56	456	140.29	900.72	140.78
31	457.07	140.3	593.62	140.47			418.56	140.22			1063.49	140.95
Ten-Daily Mean												
I Ten-Daily	710.4	140.58	599.48	140.45	579.9	140.44	520.13	140.37	613.47	140.42	488.6	140.27
II Ten-Daily	405.52	140.2	568.06	140.4	593.47	140.47	536.58	140.37	626.47	140.37	591.07	140.39
III Ten-Daily	487.52	140.33	586.9	140.44	666.78	140.52	630.92	140.47	423.99	140.17	886.28	140.63
Monthly												
Min.	303.02	140	311.55	140.01	301	140.2	318.01	140.03	168	139.6	220.72	139.79
Max.	1125.74	140	950.22	140.01	1061.11	140.2	1003.51	140.03	1561.34	139.6	1753.7	139.79
Mean	534.48	140.37	584.81	140.43	613.38	140.48	562.54	140.4	554.65	140.32	655.32	140.43

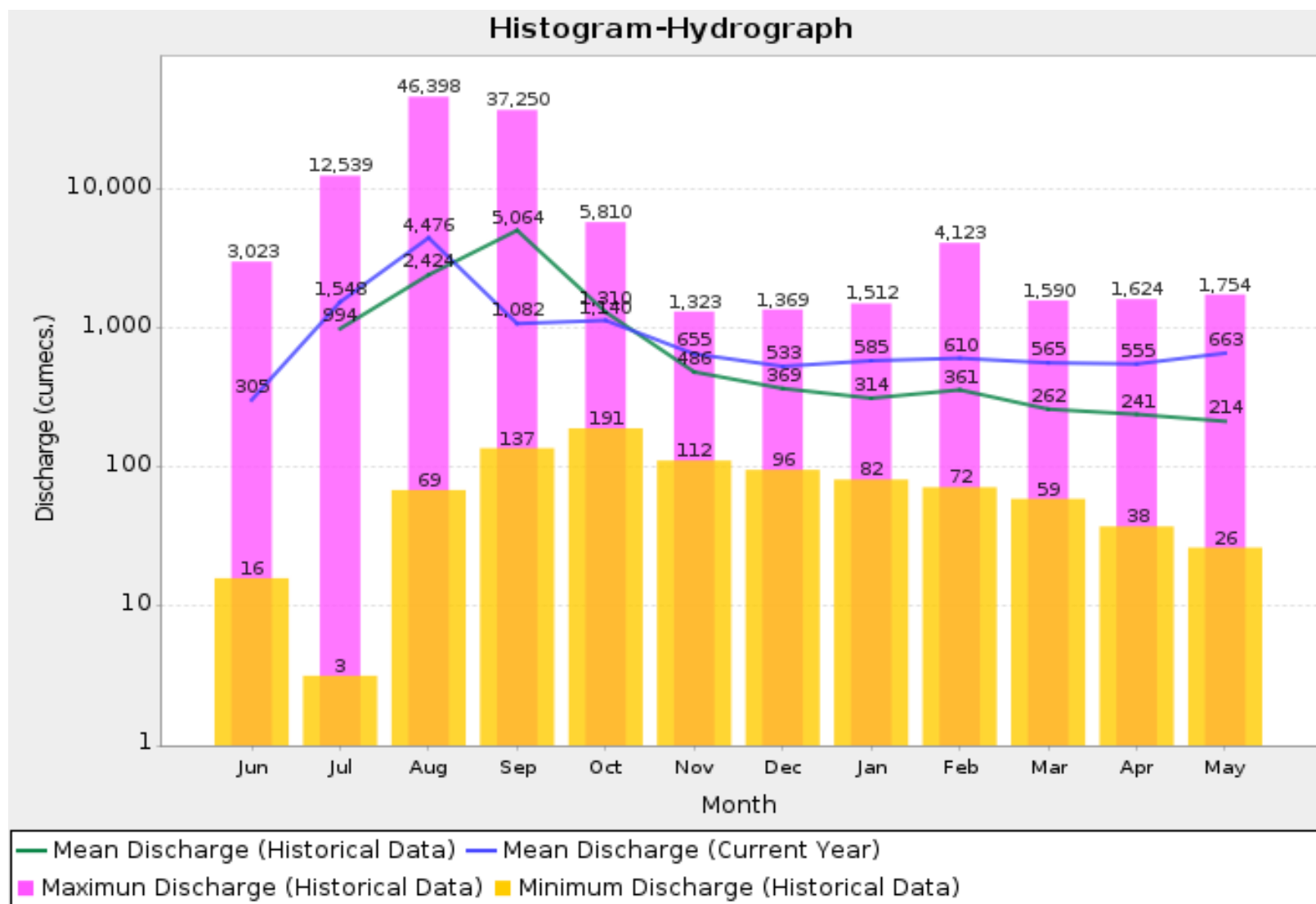
Peak Computed Discharge = 10200 cumecs on 9/8/2017

Corres. Water Level = 146.07 m

Lowest Computed Discharge = 141cumecs on 26/6/2017Corres. Water Level = 139.64 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

Histogram- Hydrograph for Water Year : 2016-17(Data considered : 1972-2017)



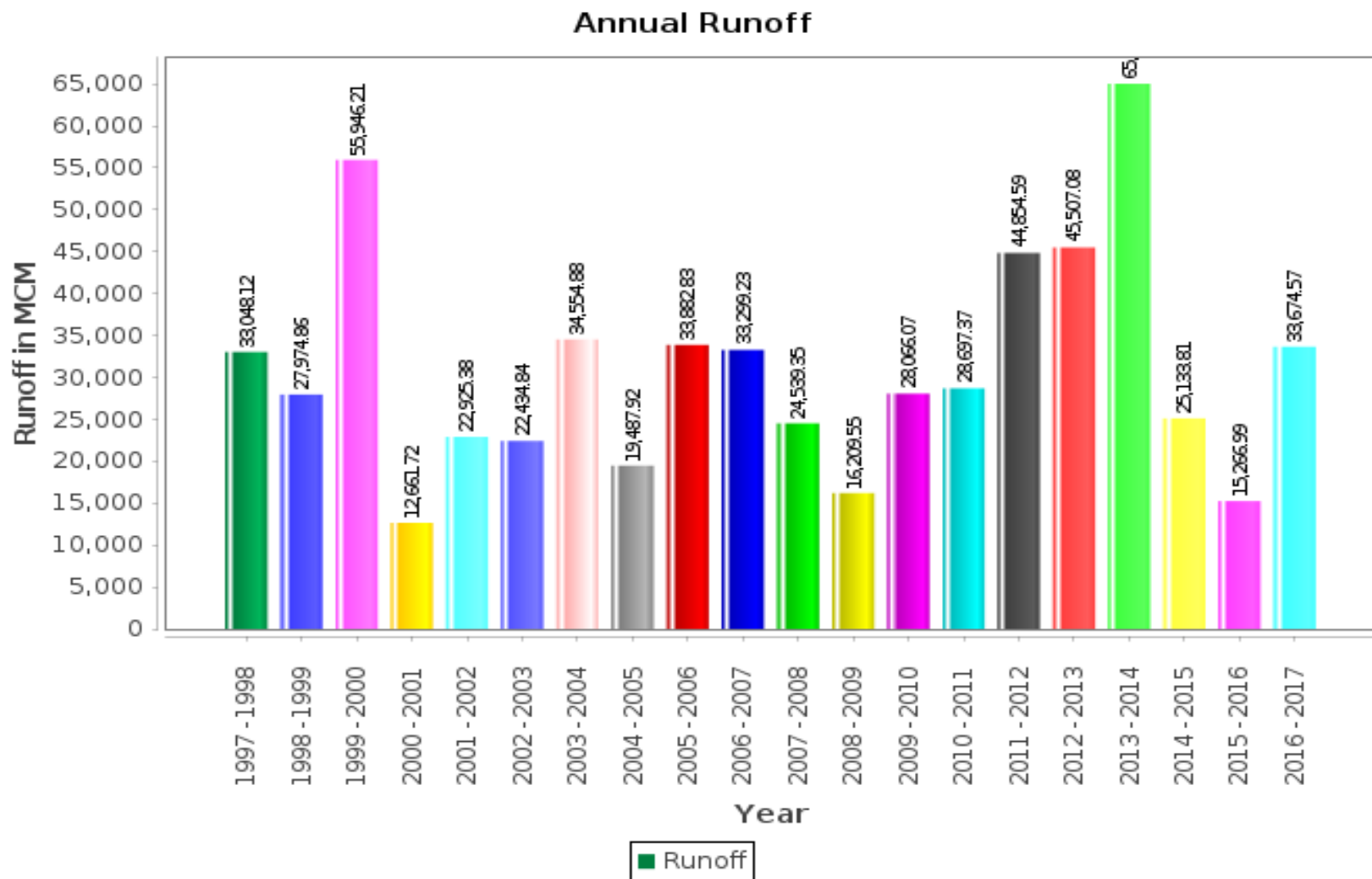
Annual Runoff Values for the period (1972 – 2017)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



Monthly Average Runoff based on period (1972 – 2017)

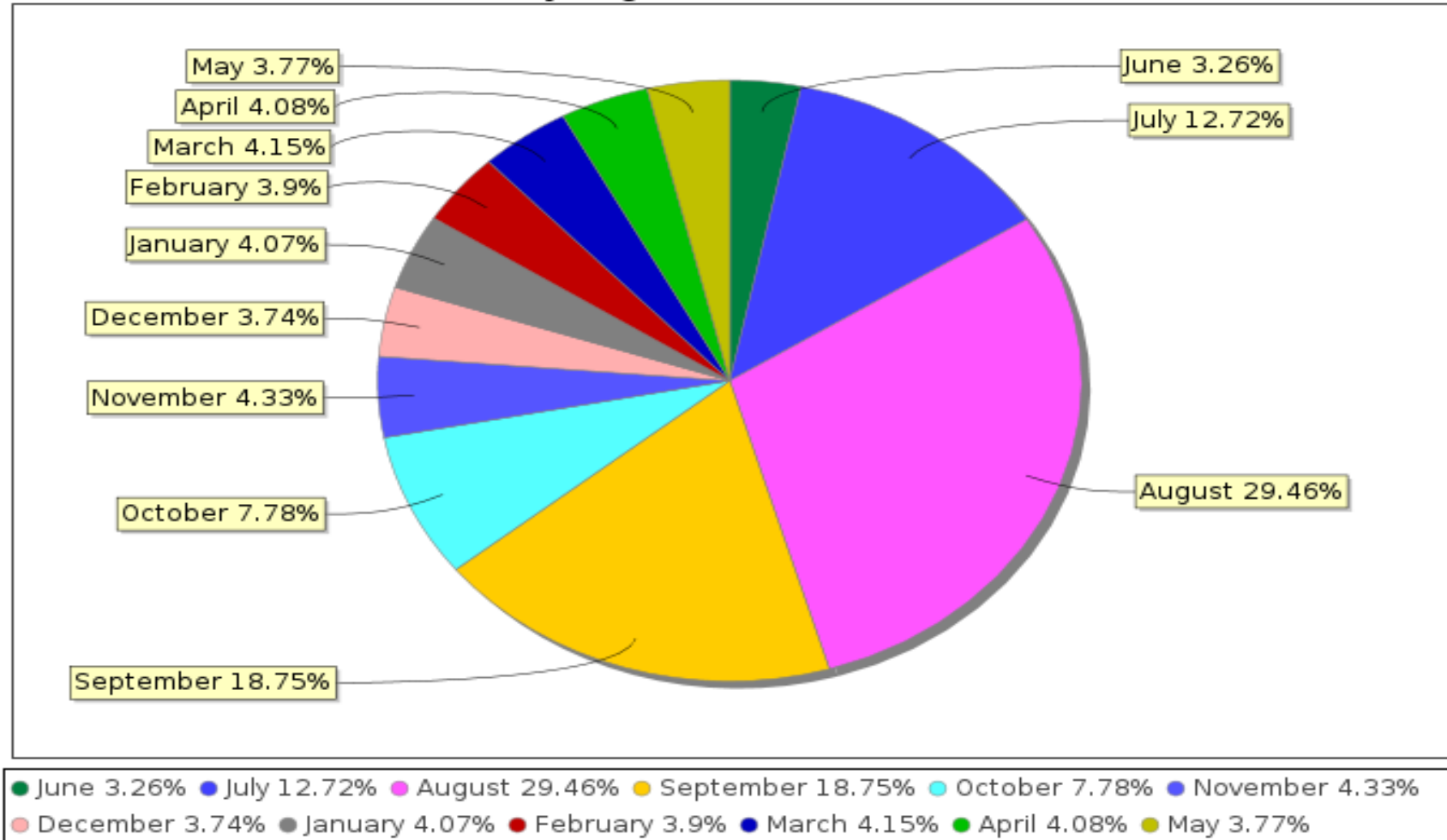
Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

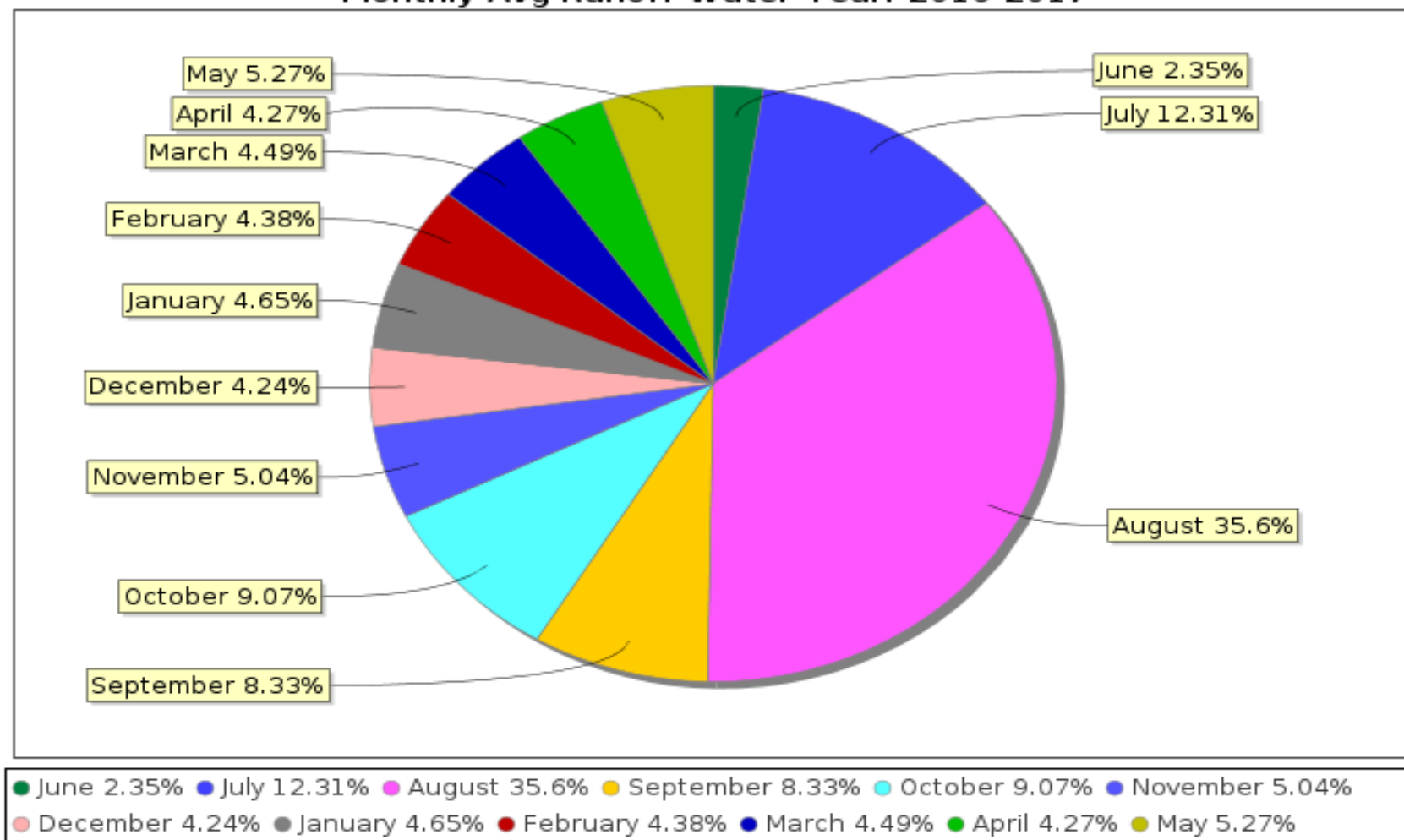
Station Name : Narmada at Mandleshwar (010215026)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

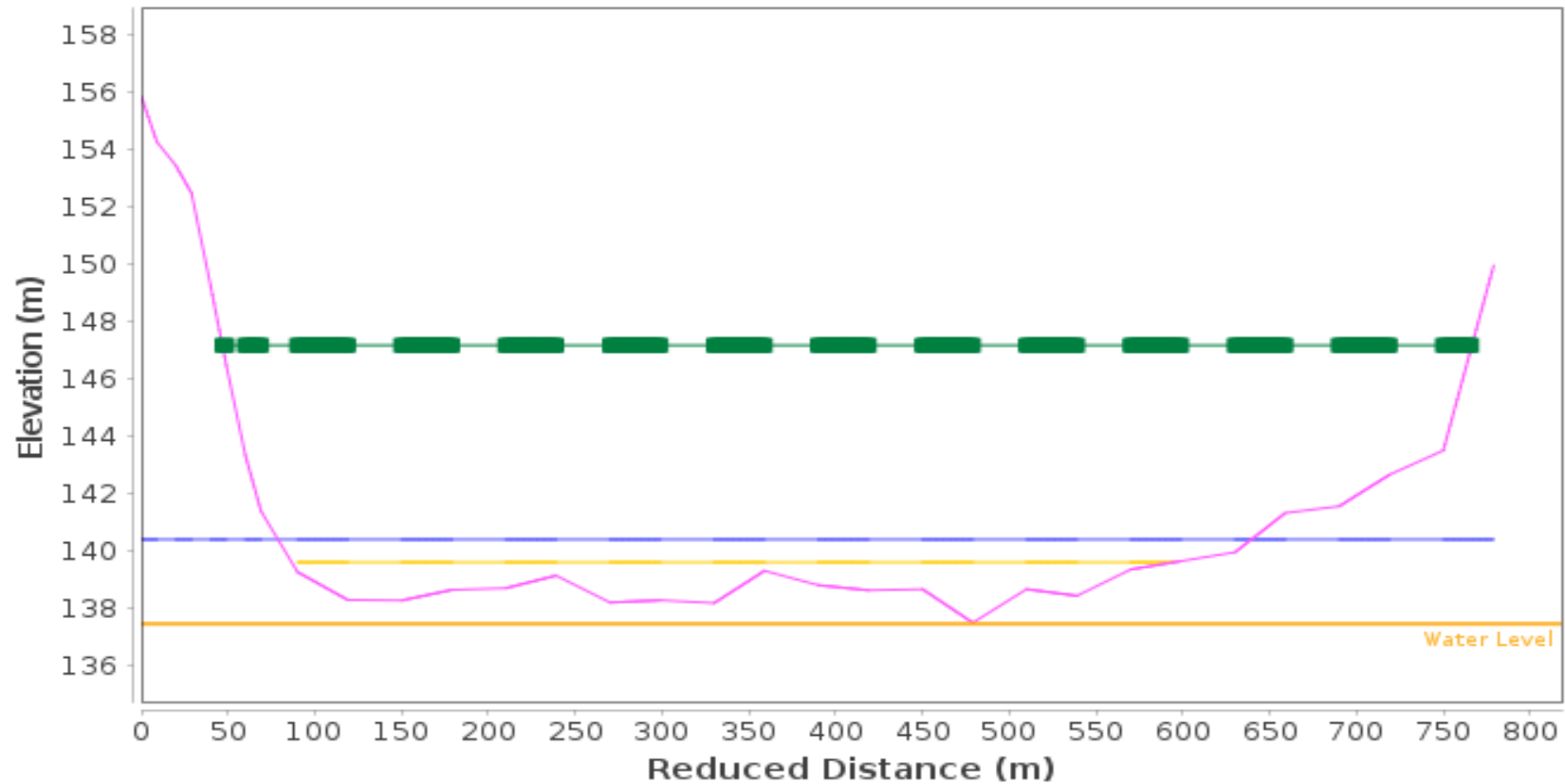
Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore

X-Section



- Maximum WL (147.18) on 19/12/2016
- Pre-Monsoon WL (no data)
- Post-Monsoon X-section on 14/02/2017
- Minimum WL (139.6) on 23/4/2017
- Pre-Monsoon X-section on 22/05/2016
- Post-Monsoon WL(140.4)

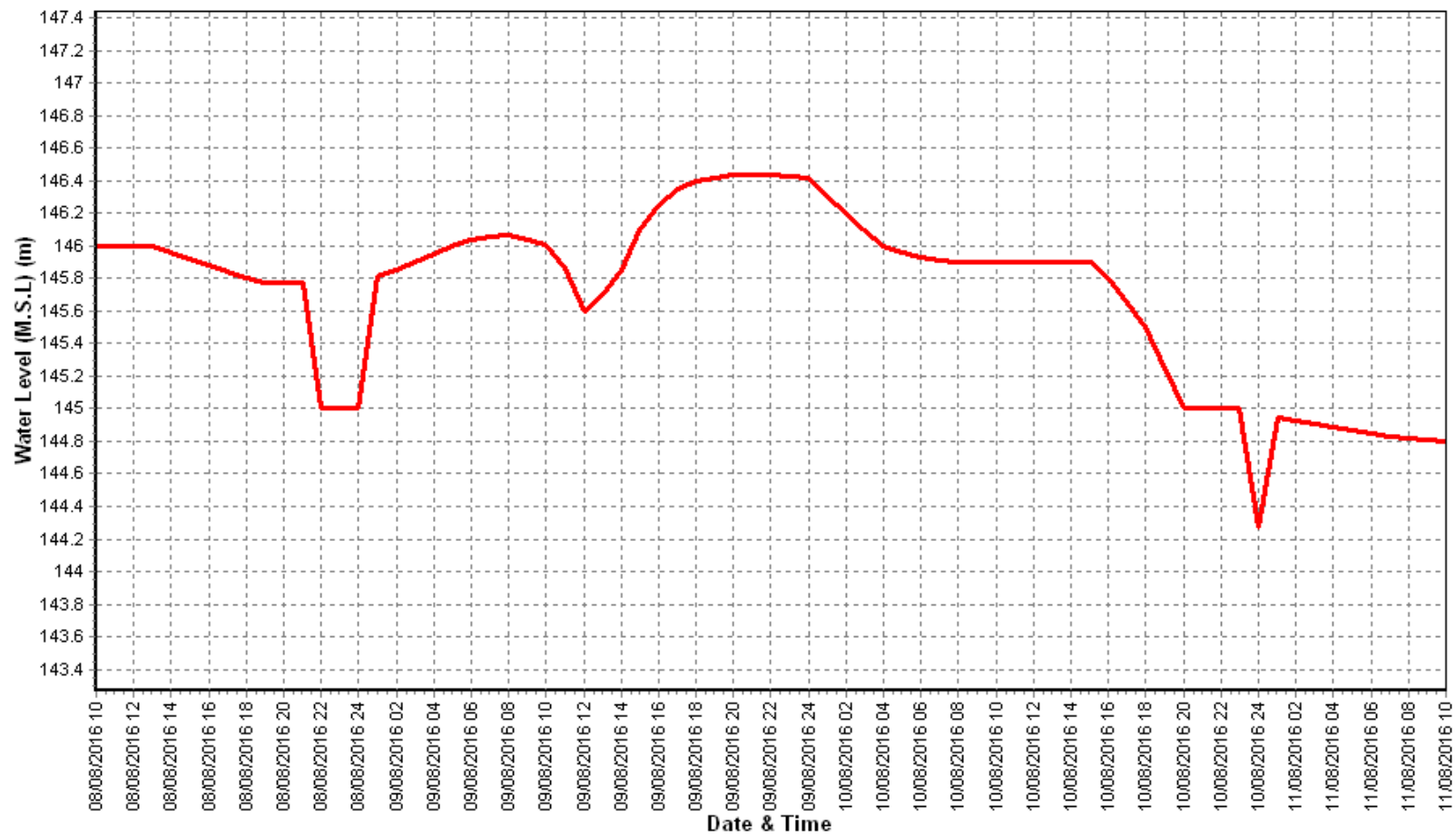
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



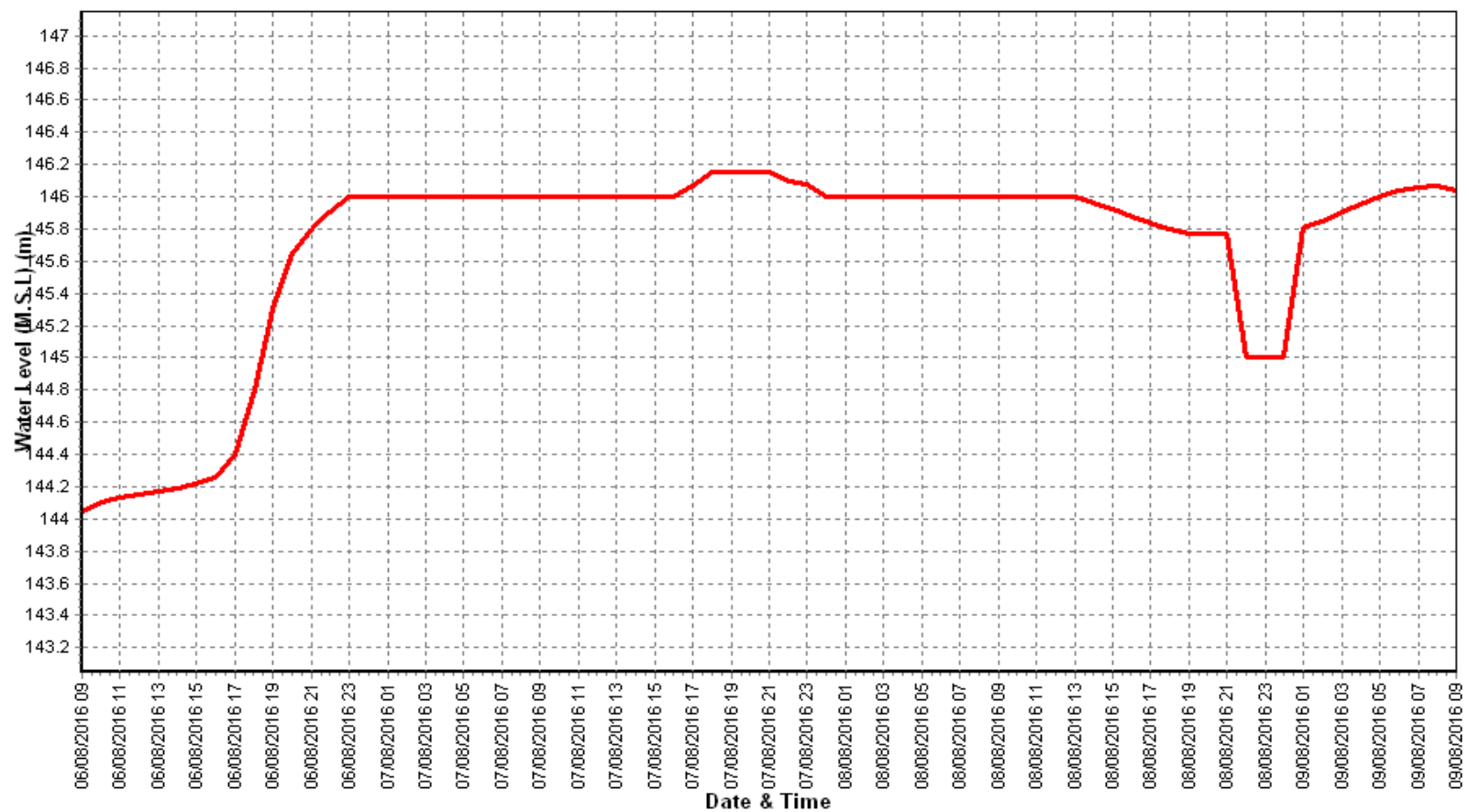
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



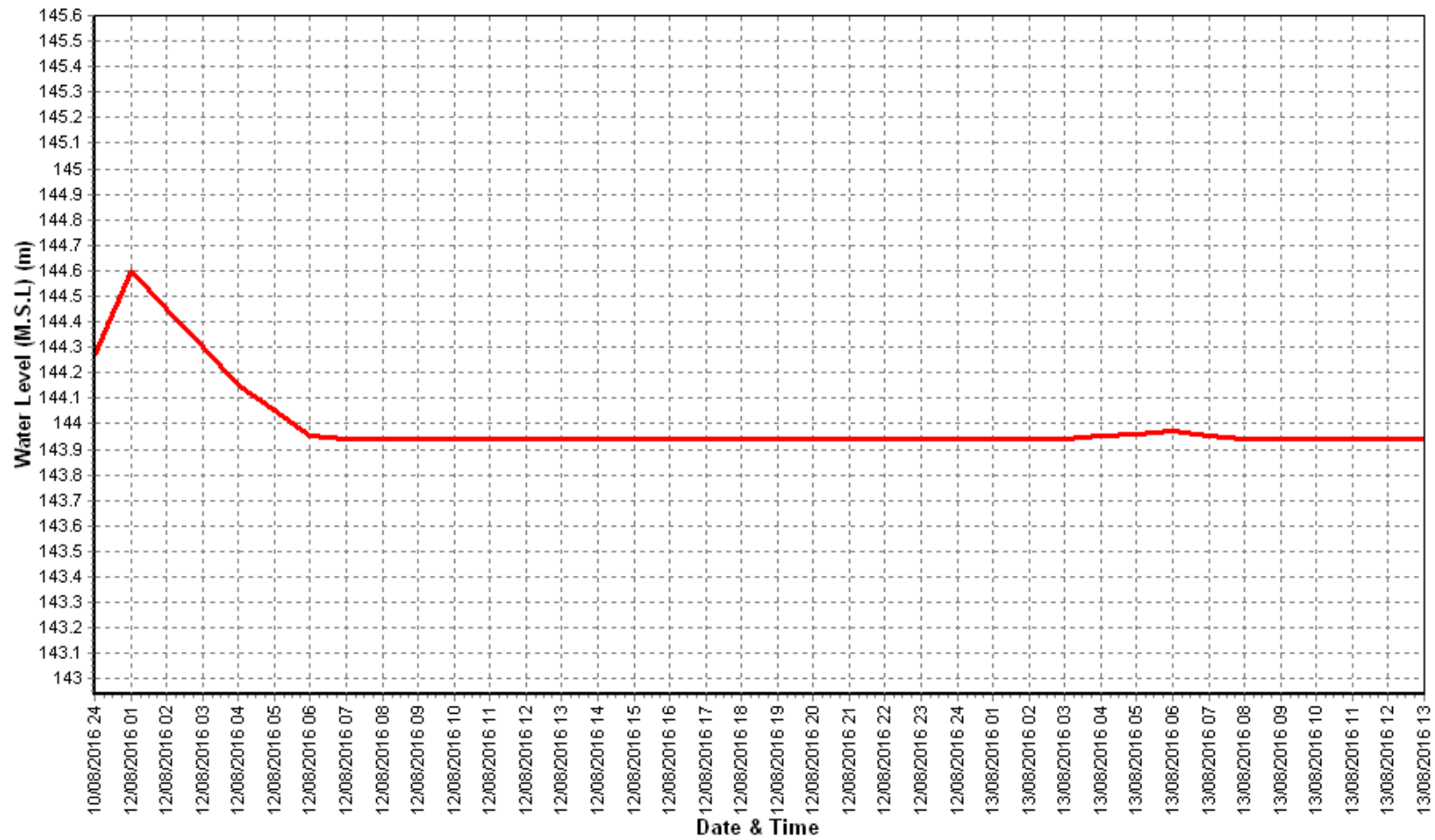
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Mandleshwar (010215026)

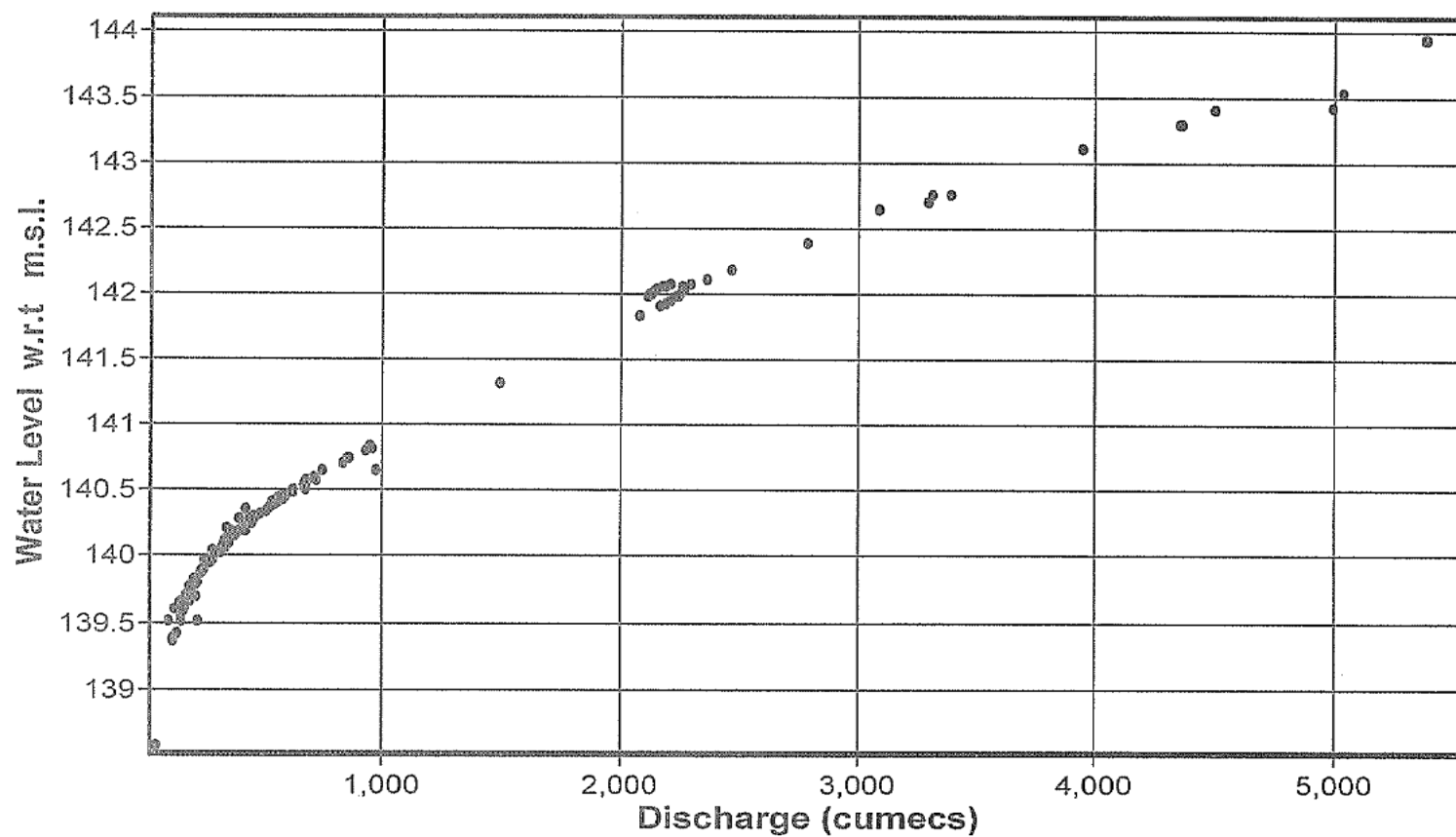
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



Plot of Stage Discharge Data at Narmada at Mandleshwar (010215026): 2016 - 2017



4.5 Kundi at Kogaon

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
				Water Year	: 2016 - 2017	
Site	:	kogaon		Code	: 007-NDBHP	
State	:	Madhya Pradesh		District	: Khargone	
Basin	:	NARMADA		Independent River	: Narmada	
Tributary	:	Kundi		Sub Tributary	: -	
Sub-Sub Tributary	:	-		Local River	: Kundi	
				Middle Narmada Sub-Division-		
Division	:	Narmada Division(ND), Bhopal		Sub-Division	: III, Indore	
Drainage Area	:	3919.0 Sq. Km.		Bank	:	
Latitude	:	22°06′06"		Longitude	: 75°41'02"	
Current Zero of Gauge (m)	:	151.000				
CATEGORY	Opening Date			Closing Date		
Gauge	:					
Discharge	:					
Sediment	:					
Water Quality	:					
Reduced Level	Opening Date			Closing Date		
151.0	05/01/2017			-		
151.0	30/10/2015			05/01/2017		
151.0	03/02/1978			30/10/2015		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
		Maximum			Minimum	
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1978-1979	733.7	155.17	01/09/1978	0	0	01/06/1978
1979-1980	68.3	153.595	01/08/1979	0	152.64	01/06/1979
1980-1981	36	153.47	01/09/1980	0.2	152.635	01/05/1981
1981-1982	1075	156.7	01/11/1981	0.4	152.58	01/06/1981
1982-1983	16.4	153.05	01/09/1982	0	152.605	01/02/1983
1983-1984	965	157.9	01/07/1983	0	152.425	01/06/1983
1984-1985	69.5	153.46	03/09/1984	0.1	152.51	01/06/1984
1985-1986	17.2	153.108	01/08/1985	0	152.505	01/03/1986
1986-1987	39	153.33	02/09/1986	0	0	01/03/1987
1987-1988	14.38	153.038	01/09/1987	0	152.445	01/06/1987
1988-1989	183.6	153.84	01/10/1988	0	0	01/06/1988
1989-1990	856.4	155.243	01/09/1989	0	0	01/06/1989
1990-1991	284.3	154.15	01/09/1990	0.2	152.6	01/05/1991
1991-1992	360	154.26	01/08/1991	0	151	01/06/1991
1992-1993	9.77	152.94	01/09/1992	0	152.545	01/06/1992
1993-1994	321.1	154.7	01/08/1993	0	0	01/06/1993
1994-1995	801.7	154.975	01/09/1994	0	0	01/06/1994
1995-1996	26.19	153.15	01/09/1995	0	152.54	11/01/1996

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1996-1997	185	153.78	01/09/1996	0	151.92	01/06/1996
1997-1998	173.8	153.89	01/09/1997	0	152.28	01/06/1997
1998-1999	220	153.83	01/10/1998	0	151	01/06/1998
1999-2000	18.73	153.04	01/10/1999	0	152.32	01/01/2000
2000-2001	26.56	153.08	01/07/2000	0	151.8	01/06/2000
2001-2002	0.55	152.58	01/09/2001	0	152.31	01/06/2001
2002-2003	200	153.98	01/09/2002	0.57	152.57	01/11/2002
2003-2004	290	154.4	01/10/2003	1.51	152.69	01/01/2004
2004-2005	50	153.35	01/08/2004	0	152.07	01/07/2004
2005-2006	10.62	152.99	01/09/2005	0	0	01/06/2005
2006-2007	148.77	153.76	01/08/2006	0	0	01/06/2006
2007-2008	1255.14	156.7	01/07/2007	0	0	01/06/2007
2008-2009	11.73	152.86	01/10/2008	0	0	01/06/2008
2009-2010	41.72	153.24	01/09/2009	0	0	01/06/2009
2010-2011	277.83	154.06	01/09/2010	0	0	01/06/2010
2011-2012	357.39	154.44	01/09/2011	0	0	01/06/2011
2012-2013	251.85	154.05	01/09/2012	0	0	01/06/2012
2013-2014	1314.3	156	04/07/2013	0	0	01/06/2013
2014-2015	3753.29	160.2	08/09/2014	0	0	01/06/2014
2015-2016	1274.15	156.05	06/08/2015	1.77	152.58	17/10/2015
2016-2017	720	155.2	18/09/2016	1.77	152.58	02/07/2016

Stage Discharge Sheet for Kundi at Kogaon for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0		152.46	23	152.98	67.2	153.35	267.58	154.2	19.66	152.92
2	0	0	1.77	152.58	22.08	152.98	30.13	153.09	100	153.58	20.25	152.92
3	0	0	5	152.73	61.11	153.21	27.9	153.04	63.96	153.43	20	152.9
4	0	0	4.75	152.72	66.26	153.22	29.9	153.08	185.28	153.85	19.9	152.9
5	0	0	3.47	152.66	60.79	153.2	23.5	153	152.38	153.79	19.7	152.89
6	0	0	3.21	152.64	55.61	153.17	17.43	152.96	99.26	153.44	19.6	152.88
7	0	0	3.5	152.62	113	153.41	14.02	152.89	64.48	153.36	19.89	152.88
8	0	0	2.34	152.59	77.25	153.26	11.56	152.85	62.6	153.35	18.35	152.87
9	0	0	2.36	152.59	61.22	153.2	17.99	152.96	240	154.1	18.36	152.87
10	0	0	2.09	152.58	54.11	153.16	12.88	152.89	66.6	153.48	17.26	152.86
11	0	0	3.16	152.64	50.87	153.13	11.5	153.85	64.7	153.37	16.51	152.86
12	0	0	113.9	153.41	52.96	153.14	10.54	152.82	61.1	153.31	16.34	152.85
13	0	0	136.1	153.61	52.55	153.14	5.5	152.75	61.74	153.33	16.3	152.85
14	0	0	60.7	153.2	49.5	153.12	4.61	152.7	61.46	153.31	16.1	152.9
15	0	152.44	23.48	152.99	30.1	153.08	3.69	152.65	61.45	153.33	16.06	152.9
16	0	152.48	16.88	153.04	28.39	153.05	3.81	152.67	55.1	153.27	17.33	152.87
17	0	152.48	15.5	152.89	28.02	153.04	15.04	152.93	60.9	153.3	18.68	152.89
18	0	152.44	11.72	152.87	29.51	153.07	720	155.2	61.54	153.31	18.35	152.87
19	0	152.42	10.67	152.86	28.36	153.05	262.72	154.18	50.84	153.24	16.4	152.86
20	0	152.46	17.68	152.95	26.66	153.03	68.87	153.41	60.28	153.3	16.3	152.85
21	0	152.48	11.31	152.88	29.5	153.07	347.71	154.34	33.88	153.14	16.25	152.85
22	0	152.48	10.73	152.85	29.58	153.07	69.1	153.45	49.82	153.21	16.2	152.85
23	0	152.42	10.55	152.85	28.36	153.06	64.96	153.43	35	153.15	16.16	152.84
24	0	152.4	10	152.8	29.82	153.08	53.51	153.35	30.78	153.05	16.1	152.8
25	0	152.42	10.29	152.81	29.83	153.08	59	153.38	31.42	153.07	16	152.72
26	0	152.42	13.19	152.88	27.74	153.03	53.53	153.28	27.86	153.05	15.9	152.72
27	0	152.38	23.53	152.96	19.41	153	57.18	153.29	24.72	153.02	15.8	152.7
28	0	152.36	23.73	152.99	29.5	153.07	51.58	153.25	23.62	153	15.65	152.68
29	0	152.35	22.52	152.98	66.81	153.35	208.1	153.89	22.54	152.98	15.62	152.68
30	0	152.48	16.79	152.95	45.76	153.15	64.62	153.43	21	152.94	15.62	152.68
31	0		25.4	153.02	28.48	153.06			20.45	152.93		
Ten-Daily Mean	0											
I Ten-Daily	0	0	2.85	152.62	59.44	153.18	25.25	153.01	130.21	153.66	19.3	152.89
II Ten-Daily	0	91.47	40.98	153.04	37.69	153.09	110.63	153.32	59.91	153.31	16.84	152.87
III Ten-Daily	0	152.42	16.19	152.91	33.16	153.09	102.93	153.51	29.19	153.05	15.93	152.75
Monthly	0											
Min.	0	152.35	1.77	152.46	19.41	152.98	3.69	152.65	20.45	152.93	15.62	152.68
Max.	0	152.35	136.1	152.46	113	152.98	720	152.65	267.58	152.93	20.25	152.68
Mean	0	81.3	20	152.86	43.43	153.12	79.6	153.28	73.11	153.34	17.35	152.84

Annual Runoff in MCM

: 695.3

Peak Observed Discharge = 347.71 cumecs on 21/9/2016

= 154.34 m

Lowest Observed Discharge = 1.77cumecs on 2/7/2016

Corres. Water Level = 152.58 m

Annual Runoff in mm

: 177.42

Corres. Water Level

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Kundi at Kogaon for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	10.75	152.68	13.3	152.82	11.79	152.8	0	0	0	0	0	0
2	11.89	152.7	13.79	152.8	12.02	152.77	0	0	0	0	0	0
3	11.22	152.7	13.84	152.83	10.1	152.64	0	0	0	0	0	0
4		152.75	13.6	152.83	9.55	152.62	0	0	0	0	0	0
5	11.39	152.7	13.28	152.83	9.5	152.6	0	0	0	0	0	0
6	11.32	152.7	13.43	152.83	9.17	152.6	0	0	0	0	0	0
7	10.78	152.68	13.64	152.84	9.13	152.59	0	0	0	0	0	0
8	10.76	152.7	13.5	152.85	9.33	152.58	0	0	0	0	0	0
9	11.64	152.72	13.68	152.85	8.73	152.57	0	0	0	0	0	0
10	11.74	152.72	14.66	152.87	8.63	152.56	0	0	0	0	0	0
11		152.72	14.82	152.87	8.22	152.55	0	0	0	0	0	0
12	10.64	152.7	14.9	152.88	8.2	152.55	0	0	0	0	0	0
13		152.7	14.81	152.88	21.11	153	0	0	0	0	0	0
14	11.31	152.75	18.02	152.94	20.86	153	0	0	0	0	0	0
15	11.7	152.75	15.9	152.93	18.64	152.9	0	0	0	0	0	0
16	12.09	152.77	15.4	152.93	11.34	152.75	0	0	0	0	0	0
17	12.02	152.77	15.29	152.92	9.34	152.6	0	0	0	0	0	0
18		152.8	15.08	152.9	0	0	0	0	0	0	0	0
19	15.19	152.85	14.96	152.9	0	0	0	0	0	0	0	0
20	15.2	152.85	14.52	152.87	0	0	0	0	0	0	0	0
21	14.02	152.84	14.18	152.86	0	0	0	0	0	0	0	0
22	14.07	152.84	14.1	152.85	0	0	0	0	0	0	0	0
23	13.99	152.84	13.79	152.84	0	0	0	0	0	0	0	0
24	14.76	152.86	13.5	152.83	0	0	0	0	0	0	0	0
25		152.86	13.29	152.82	0	0	0	0	0	0	0	0
26	14.9	152.87	13.25	152.8	0	0	0	0	0	0	0	0
27	14.64	152.87	12.86	152.8	0	0	0	0	0	0	0	0
28	15.32	152.85	12.99	152.8	0	0	0	0	0	0	0	0
29	14.43	152.85	13	152.82	0	0	0	0	0	0	0	0
30	13.35	152.8	12.48	152.84	0	0	0	0	0	0	0	0
31	13.3	152.8	12.07	152.82	0	0	0	0	0	0	0	0
Ten-Daily Mean							0	0	0	0	0	0
I Ten-Daily	10.15	152.7	13.67	167.91	9.8	152.63	0	0	0	0	0	0
II Ten-Daily	8.82	152.77	15.37	152.9	9.77	106.94	0	0	0	0	0	0
III Ten-Daily	12.98	152.84	13.23	152.83	0	0	0	0	0	0	0	0
Monthly							0	0	0	0	0	0
Min.	10.64	152.68	12.07	152.8	8.2	152.55	0	0	0	0	0	0
Max.	15.32	152.68	18.02	152.8	21.11	152.55	0	0	0	0	0	0
Mean	10.65	152.77	14.09	157.88	6.52	86.52	0	0	0	0	0	0

Peak Computed Discharge = 720 cumecs on 18/9/2016 Corres. Water

Level = 155.2 m

Lowest Computed Discharge = 2.09cumecs on 10/7/2016 Corres. Water Level =
152.58 m

Lowest Computed Discharge = 0.000 cumecs on 06-01-2016

Corres. Water Level :152.4 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

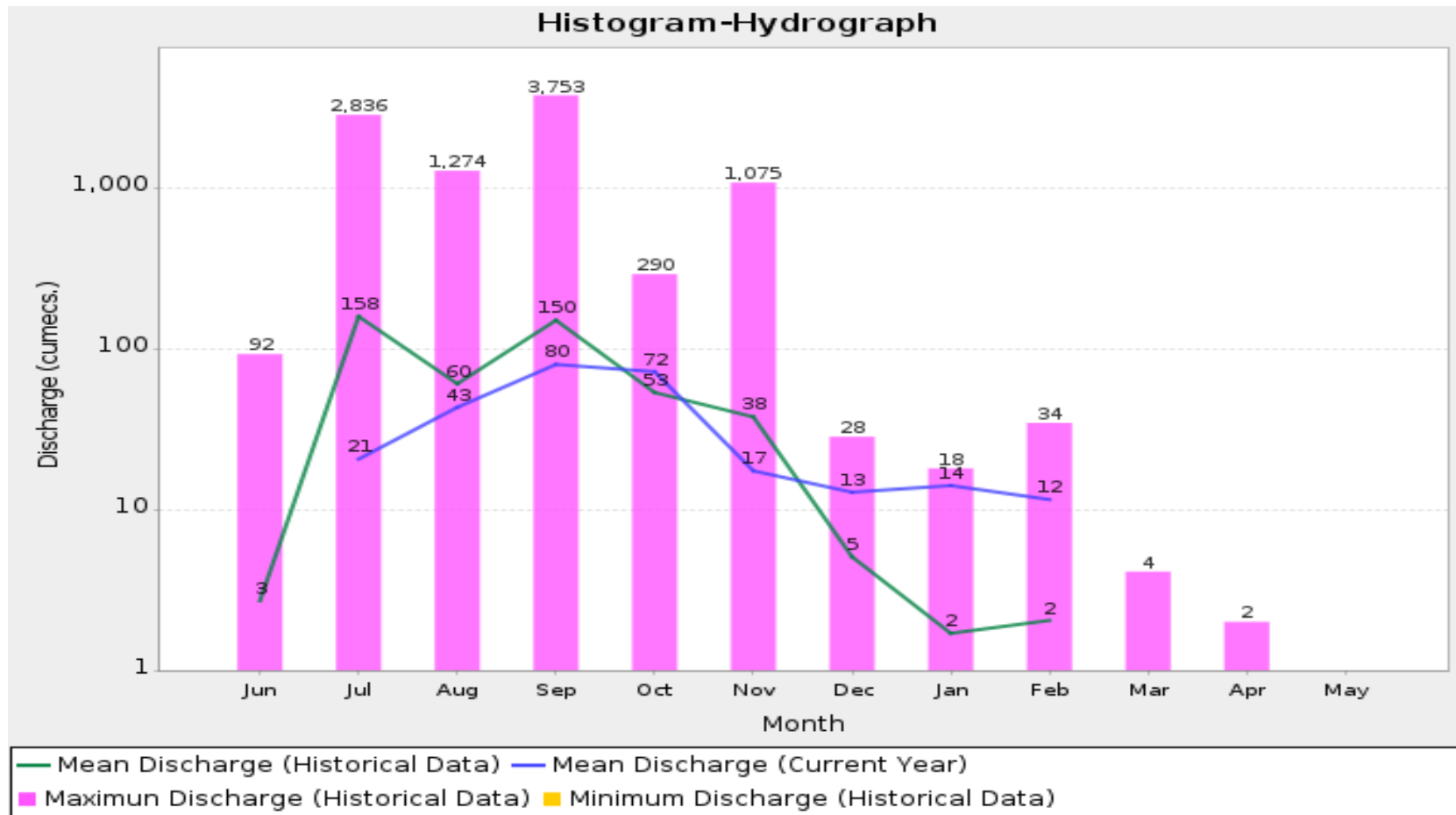
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1978-2017)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore



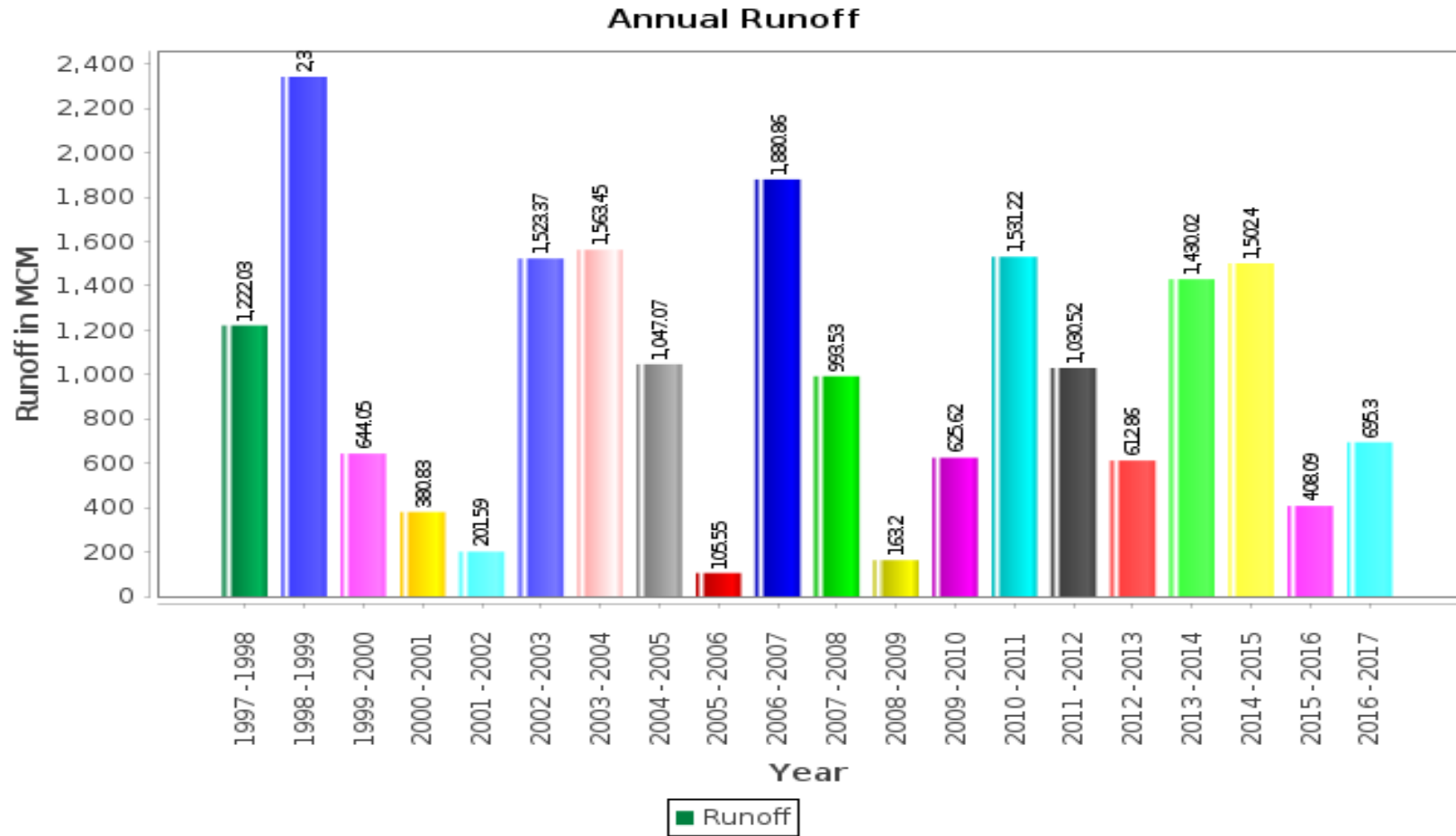
Annual Runoff Values for the period (1978 – 2017)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division : MNSD III, CWC Indore



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

Monthly Average Runoff based on period (1978 – 2017)

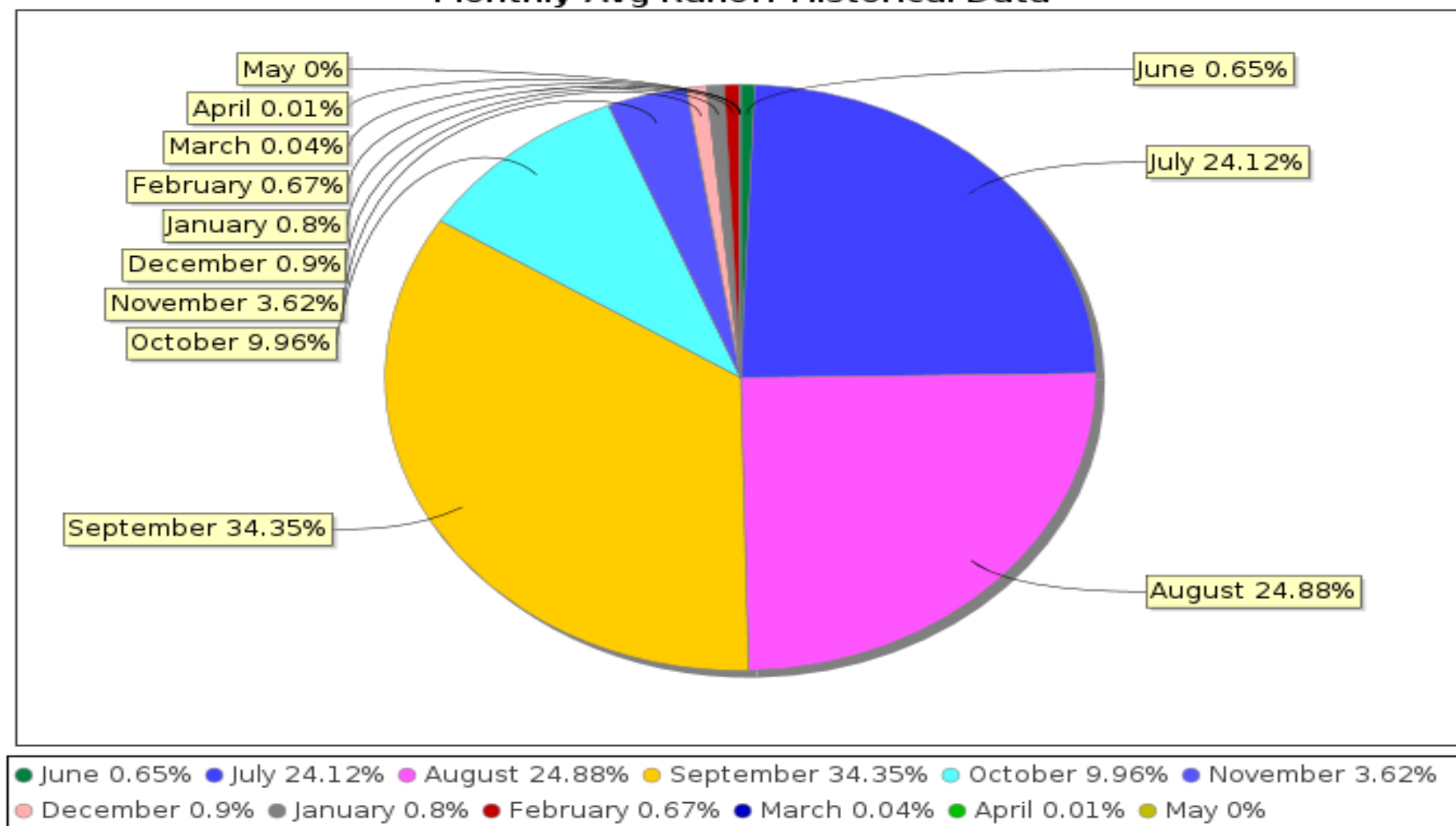
Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

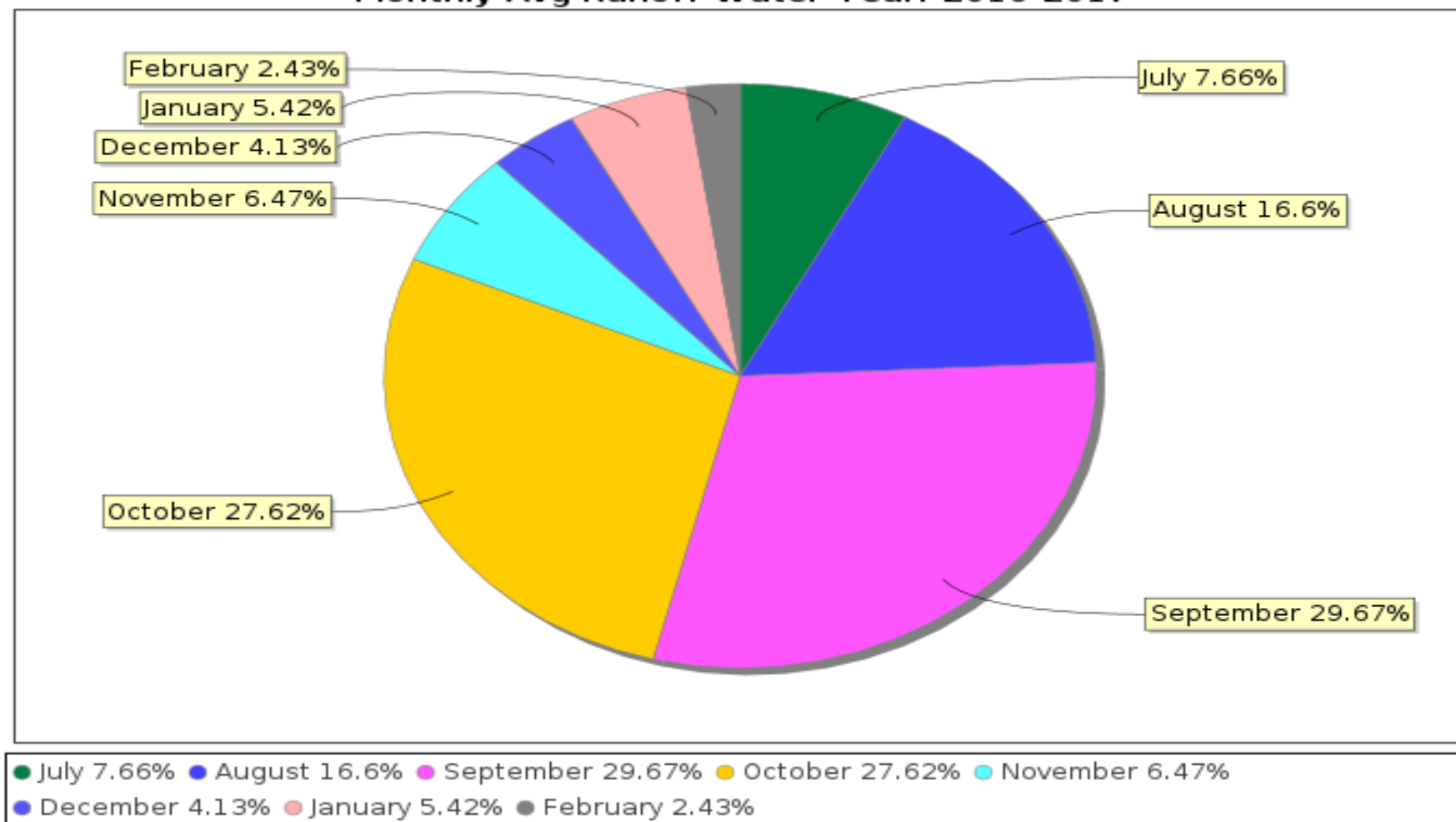
Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

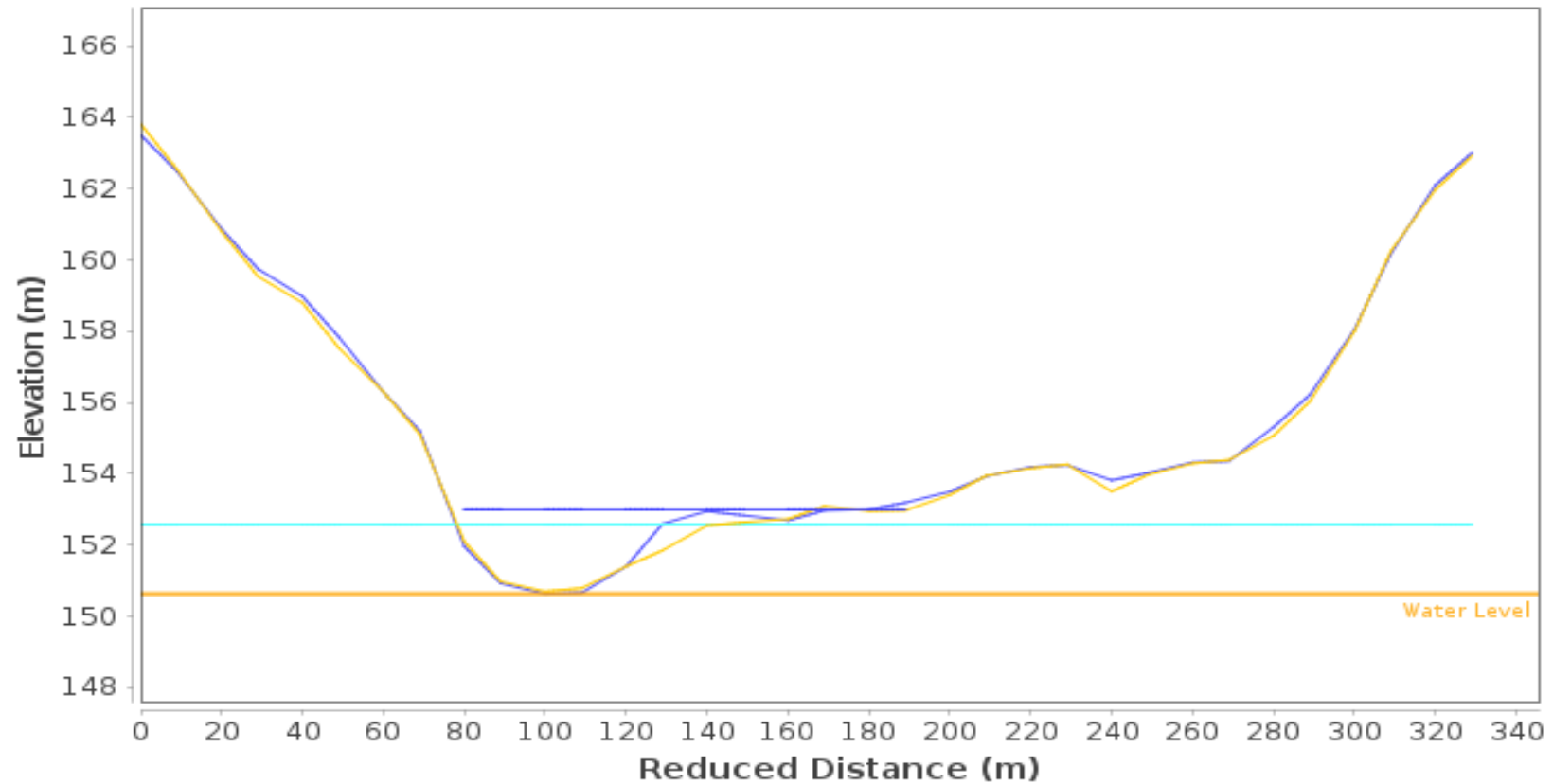
Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division : MNSD III CWC Indore

X-Section



■ Pre-Monsoon WL (no data) — Maximum WL (153) on 13/2/2017 — Minimum WL (6) on 14/12/2016
— Post-Monsoon X-section on 07/02/2017 — Post-Monsoon WL(152.58)
— Pre-Monsoon X-section on 25/05/2016

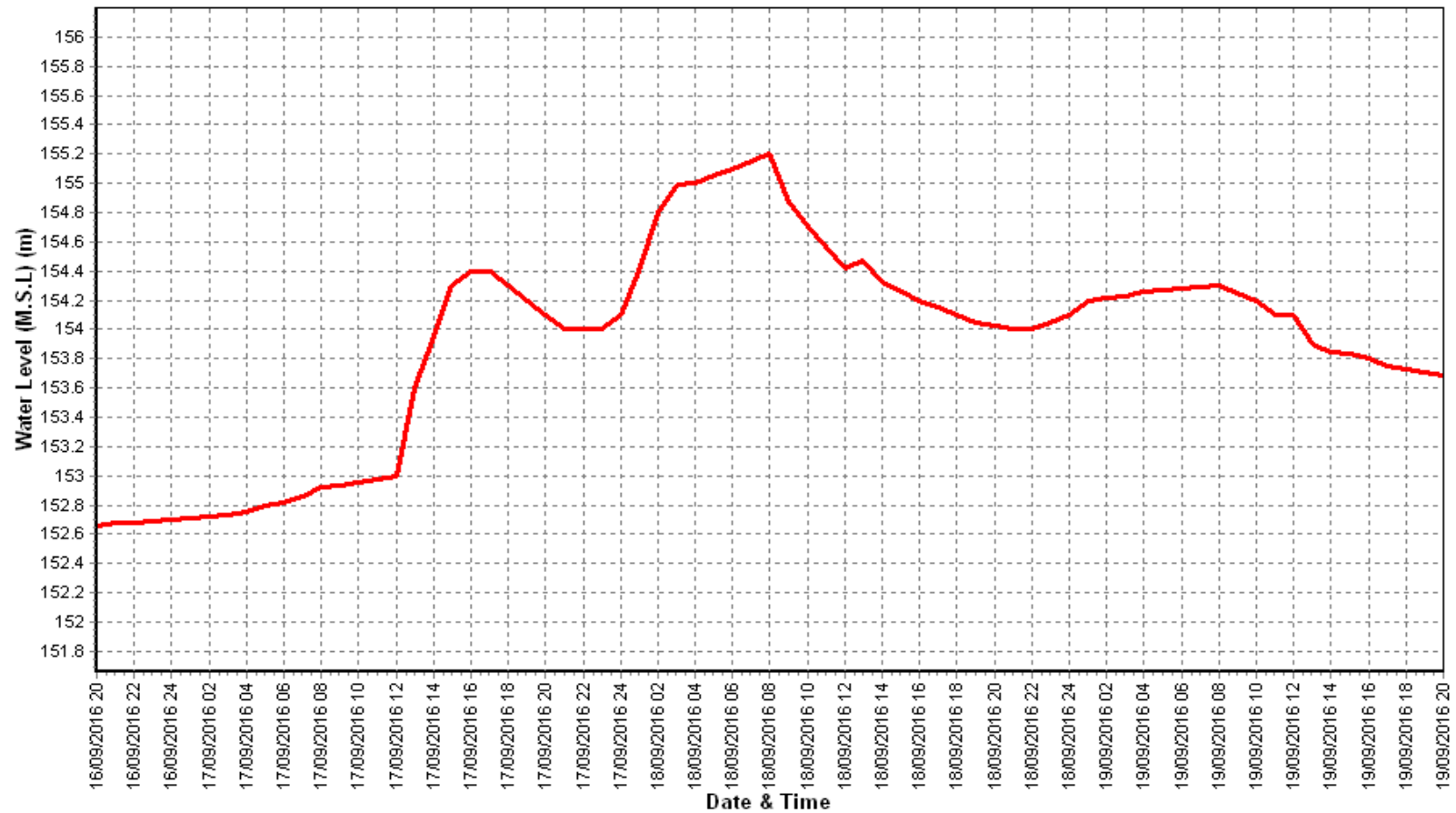
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division : MNSD III, CWC Indore



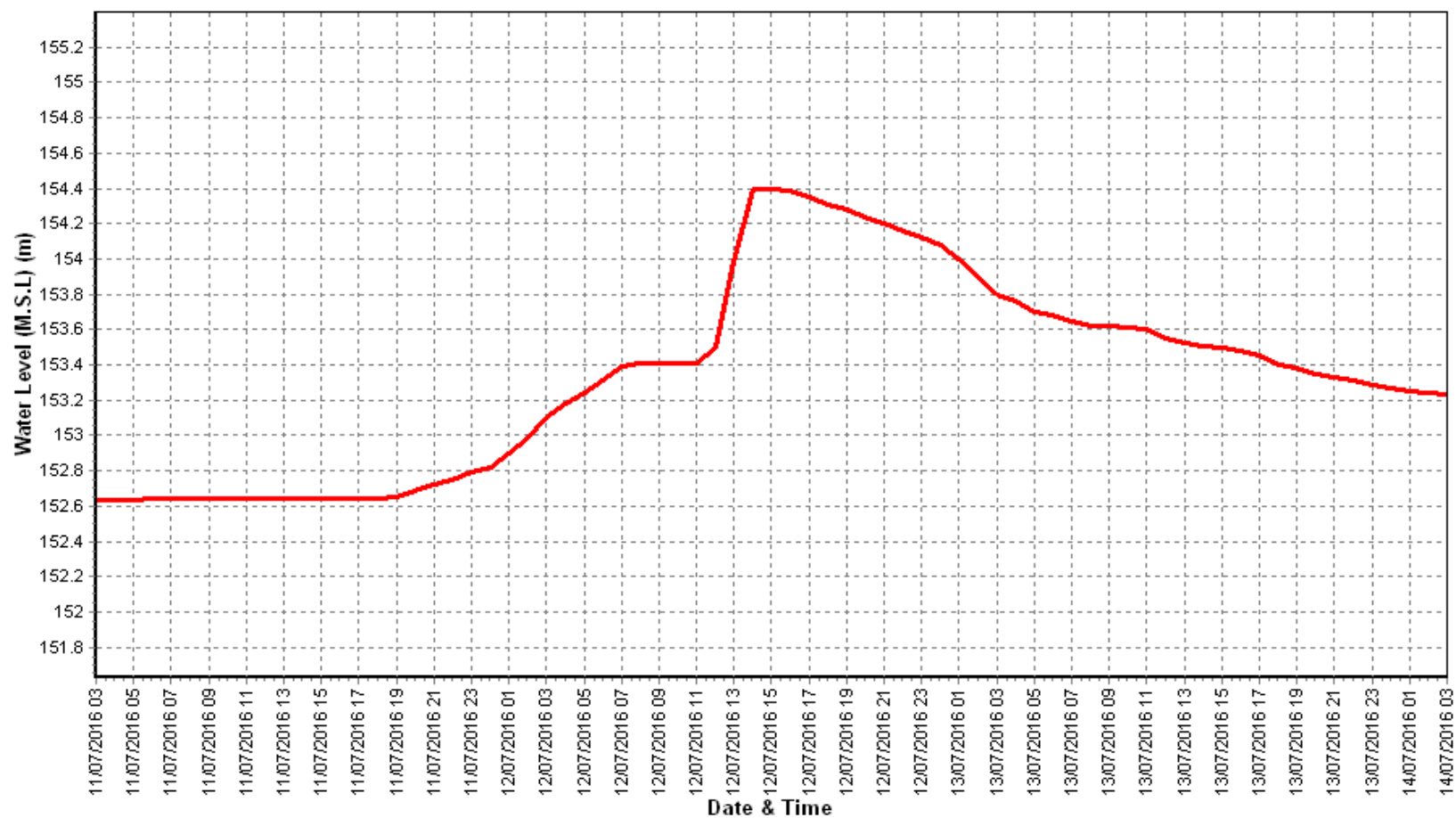
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division : MNSD III, CWC Indore



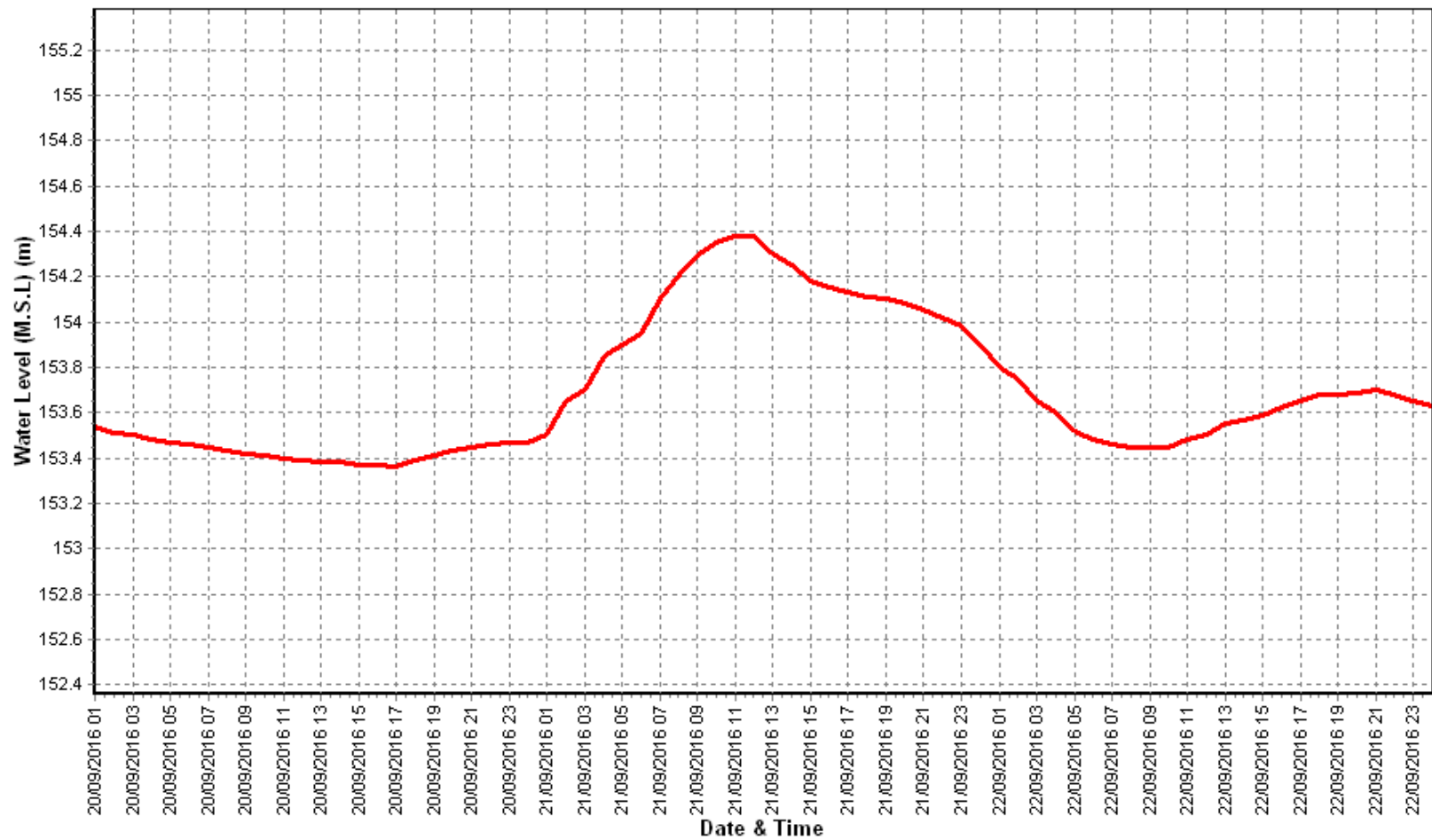
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Kundi at Kogaon (010215025)

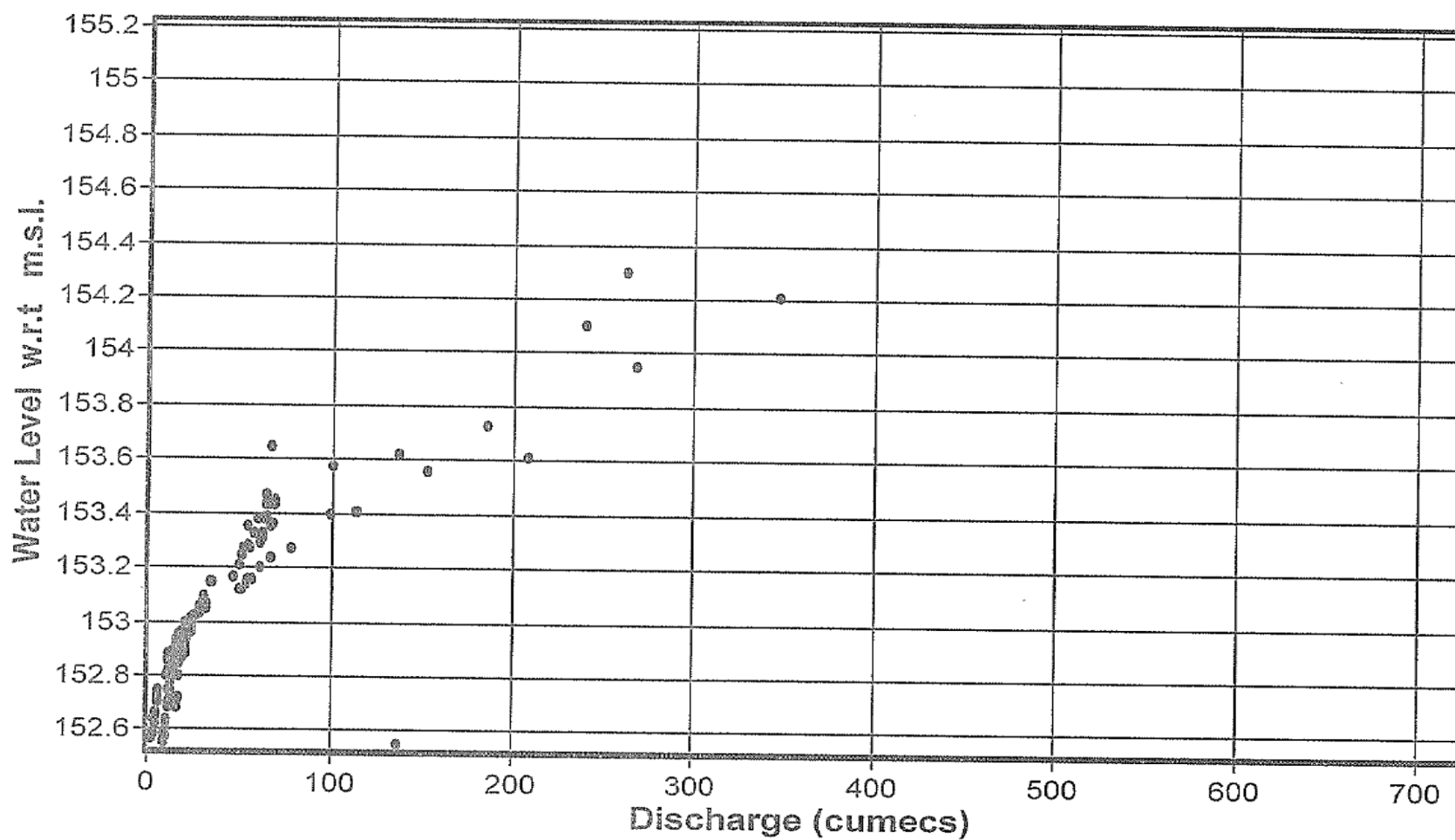
Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division : MNSD III, CWC Indore



Plot of Stage Discharge Data at Kundi at Kogaon (010215025): 2016 - 2017



4.6 Narmada at Handia

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
Site : Handia				Water Year : 2016 - 2017		
State : Madhya Pradesh				Code : 014-NDBHP		
				District : Hoshangabad		
Basin : NARMADA				Independent		
Tributary : -				River : Narmada		
Sub-Sub Tributary : -				Sub Tributary : -		
				Local River : Narmada		
				Middle Narmada Sub-		
Division : Narmada Division(ND), Bhopal				Sub-Division : Division-II, Bhopal		
Drainage Area : 54027.0 Sq. Km.				Bank : Left		
Latitude : 22°29'25"				Longitude : 76°59'37"		
Current Zero of Gauge (m) : 258.000						
CATEGORY		Opening Date		Closing Date		
Gauge	:	09/02/1977				
Discharge	:	26/04/1977				
Sediment	:	11/12/1977				
Water Quality	:					
Reduced Level		Opening Date		Closing Date		
258.0		05/01/2017		-		
258.0		09/02/1977		14/10/2016		
258.0		14/10/2016		05/01/2017		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	11000	269	15/09/1977	17.4	258.985	02/06/1977
1978-1979	19220	269.74	17/08/1978	33.6	259.24	07/06/1978
1979-1980	14350	268.48	11/08/1979	16.5	260.445	25/05/1980
1980-1981	20157.3	271.555	30/08/1980	20	260.54	01/06/1980
1981-1982	10199.2	267.545	10/08/1981	25.8	260.585	15/06/1981
1982-1983	17060	270.25	23/08/1982	30	260.57	12/06/1982
1983-1984	19950	270.76	10/09/1983	31.3	260.595	30/05/1984
1984-1985	26240	273.58	19/08/1984	23	260.555	26/05/1985
1986-1987	23060	272.58	24/07/1986	28.8	260.54	16/06/1986
1987-1988	13661	269.83	28/08/1987	18.47	260.45	29/06/1987
1988-1989	20500	271.6	06/08/1988	12.12	260.44	31/05/1989
1989-1990	13200	268.52	08/08/1989	11.96	260.44	01/06/1989
1990-1991	18000	270.31	23/08/1990	37.66	260.68	12/06/1990
1991-1992	20780	270.685	26/08/1991	57.05	260.71	15/05/1992
1992-1993	9800	267.68	14/09/1992	53.2	260.695	17/03/1993
1993-1994	12300	269.15	06/08/1993	45.2	260.6	12/06/1993
1994-1995	24040	271.75	06/09/1994	100.8	261.035	22/01/1995
1995-1996	10200	267.88	12/08/1995	70.5	260.8	26/05/1996
1996-1997	14300	269.82	27/07/1996	45	260.73	23/06/1996
1997-1998	15000	270.22	26/07/1997	47.4	260.7	14/06/1997
1998-1999	18500	271.56	15/09/1998	65.2	260.68	29/05/1999
1999-2000	29250	272.78	20/09/1999	66	260.85	20/05/2000
2000-2001	5450	266.18	30/07/2000	99.01	260.95	07/06/2000
2001-2002	5950	266.5	16/08/2001	114	260.69	06/04/2002
2002-2003	14800	269.65	19/08/2002	60.41	260.76	30/05/2003
2003-2004	13240	270.08	28/07/2003	60	260.76	01/06/2003
2004-2005	14625	271	23/08/2004	53.5	260.85	23/05/2005
2005-2006	11761.64	268.935	06/07/2005	47.56	260.8	12/06/2005

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2006-2007	21341	271.06	15/08/2006	56.52	260.68	29/06/2006
2007-2008	10883.78	268.685	09/07/2007	42.52	260.51	20/05/2008
2008-2009	6246	266.57	03/08/2008	32.41	261.27	01/02/2009
2009-2010	20785.61	271.21	11/09/2009	100.52	260.66	09/04/2010
2010-2011	6586.8	266.66	06/09/2010	77.58	260.76	06/06/2010
2011-2012	8044.14	267.85	24/07/2011	69.25	260.71	27/05/2012
2012-2013	21415	273.16	07/08/2012	45.3	260.61	08/06/2012
2013-2014	31879.9	274.15	24/08/2013	113.76	260.8	18/05/2014
2014-2015	4908.59	266.255	08/09/2014	65.63	261.98	31/08/2014
2015-2016	5371.43	266.625	21/01/2016	72.8	260.7	04/04/2016
2016-2017	14900.8	270.09	13/07/2016	0	260.61	02/05/2017

Stage Discharge Sheet for Narmada at Handia for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	140	261	128	260.84	1600	263.38	3417.9	264.97	930	262.79	690.5	262.36
2	144	261.02	136	260.9	4794.9	265.88	3332.6	264.86	1300	263.16	687.4	262.35
3	150	261.04	148	260.94	5466.5	266.65	3409.7	264.98	2249.6	263.99	686	262.35
4	142	261.2	160	260.09	4385.8	265.7	3100	264.46	2315.4	264.07	693.6	262.36
5	140	261.49	300	260.99	3065.7	264.5	2600	264.19	2137.1	263.79	678.9	262.35
6	120	261.9	510	260.92	3118.8	264.38	2100	263.8	1765.1	263.31	690	262.35
7	112	261.86	1750	260.33	7000	266.92	1400	263.34	1437	263.16	680	262.34
8	104	261.75	3405	265.06	7500	267.18	1250	263.08	1200	263.07	682.6	262.34
9	101	261.7	2950	264.6	6500	266.76	900	262.76	1180	263.05	668.3	262.3
10	102	261.7	12500	269.12	6300	266.59	750	262.58	1170	263.03	643.2	262.2
11	105	260.72	4476.7	265.82	4700	265.92	740	262.44	1150	262.95	550	262.13
12	110	260.78	10900	268.93	3264.8	264.62	872	262.37	1100	263.94	543	262.06
13	112	260.8	14900.8	270.09	2400	264.01	800	262.29	1175.3	262.9	530	262
14	104	260.71	6390	266.6	2000	263.74	622	262.24	1743.3	263.03	510	261.94
15	105	260.71	2995.2	264.31	3300	264.78	603	262.2	1731.7	263	500	261.9
16	100	260.65	1800	263.62	3390.3	264.84	580	262.17	1050	262.9	470	261.84
17	100	260.65	1700	263.27	3253.6	264.65	700	262.26	992.4	262.75	430	261.78
18	118	260.72	1750	263.54	2600	264.12	650	262.24	827	262.63	410	261.72
19	120	260.79	1150	262.94	2500	264.12	850	262.36	811.4	262.61	400	261.7
20	125	260.81	800	262.62	2570	264.07	870	262.7	781.7	262.5	400	261.68
21	130	260.9	780	262.52	3500	265.15	1400	263.33	788.4	262.57	396	261.68
22	132	260.88	750	262.33	3390.3	265.07	1100	262.88	760	262.56	345	261.68
23	134	260.88	773	262.28	3000	264.38	1200	263.04	760	262.52	333	261.65
24	130	260.85	1250	263.15	2500	264.09	1100	262.88	750	262.52	335	261.62
25	138	260.84	1630	263.59	2550	264.12	1080	262.87	760	262.49	310	261.56
26	140	260.93	1570	263.46	2200	263.88	1010	262.84	740	262.46	300	261.5
27	135	260.87	1600	263.46	1833.4	263.56	1160	262.96	730	262.44	290	261.47
28	132	260.86	2517.5	264.11	4300	265.46	1160	262.96	700	262.41	310	261.45
29	137	260.88	3170.7	264.54	3137.2	264.52	1180	262.97	690	262.38	285	261.42
30	138	260.88	1780	263.66	2900	264.26	1160.4	262.88	670	262.37	266	261.39
31			1550	263.43	1920	263.7			700	262.36		
Ten-Daily Mean												
I Ten-Daily	125.5	261.47	2198.7	262.38	4973.17	265.79	2226.02	263.9	1568.42	263.34	680.05	262.33
II Ten-Daily	109.9	260.73	4686.27	265.17	2997.87	264.49	728.7	262.33	1136.28	262.92	474.3	261.88
III Ten-Daily	134.6	260.88	1579.2	263.32	2839.17	264.38	1155.04	262.96	731.67	262.46	317	261.54
Monthly												
Min.	100	260.65	128	260.09	1600	263.38	580	262.17	670	262.36	266	261.39
Max.	150	260.65	14900.8	260.09	7500	263.38	3417.9	262.17	2315.4	262.36	693.6	261.39
Mean	123.33	261.03	2821.39	263.62	3603.4	264.89	1369.92	263.06	1145.46	262.91	490.45	261.92

Annual Runoff in

MCM : 274.79.49

Peak Observed Discharge = 14900.8 cumecs on 13/7/2016 Corres.

Water Level = 270.09 m

Lowest Observed Discharge = 72cumecs on 17/5/2017 Corres. Water

Level = 260.44 m

Annual Runoff in mm

: 508.63

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Narmada at Handia for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	254	261.37	180	261.13	220	261.25	135	261.02	122	260.9	90	260.61
2	245	261.34	173	261.13	220	261.25	135	261.01	125	260.92	90	260.61
3	234	261.28	180	261.15	225	261.26	134	260.99	130	260.95	89	260.6
4	230	261.26	180	261.16	225	261.26	132	260.96	130	260.96	88	260.59
5	230	261.26	175	261.13	200	261.23	130	260.94	122	260.94	87	260.58
6	220	261.25	172	261.08	190	261.2	128	260.93	110	260.91	87	260.58
7	210	261.22	160	261.04	185	261.18	125	260.91	108	260.89	86	260.57
8	190	261.16		261.02	180	261.16	123	260.9	105	260.86	86	260.57
9	170	261.12	160	261.05	175	261.13	120	260.87	103	260.83	86	260.56
10	180	261.15	191	261.15	175	261.13	120	260.86	101	260.8	85	260.55
11	180	261.15	204	261.2	180	261.14	115	260.83	99	260.77	82	260.53
12	190	261.17	178	261.17	180	261.14	115	260.82	97	260.74	80	260.5
13	230	261.28	175	261.14	175	261.13	115	260.82			78	260.48
14	245	261.34	160	261.11	170	261.13	110	260.79	95	260.64	77	260.48
15	255	261.38	160	261.1	170	261.12	106	260.75	93	260.61	75	260.45
16	260	261.4	150	261.07	165	261.11	105	260.75	97	260.7	74	260.45
17	234	261.3	150	261.04	160	261.1	110	260.59	99	260.73	72	260.44
18	230	261.28	145	261.01	175	261.13	115	260.82	98	260.71	96	260.65
19	210	261.22	149	261.02	180	261.16	125	260.88	98	260.72	95	260.64
20	200	261.18	160	261.05	170	261.13	125	260.9	97	260.7	94	260.63
21	180	261.12	169	261.12	161	261.13	120	260.87	96	260.7	92	260.62
22	170	261.09	175	261.15	165	261.12	180	260.86	95	260.7	90	260.62
23	240	261.3	175	261.15	160	261.11	122	260.89	98	260.72	85	260.59
24	220	261.26	160	261.13	160	261.11	125	260.92	97	260.71	90	260.6
25	200	261.2	160	261.13	155	261.09	127	260.93	95	260.69	92	260.6
26	200	261.2	180	261.16	150	261.07	127	260.95	95	260.68	90	260.6
27	220	261.23	185	261.22	140	261.05	128	260.95	93	260.65	88	260.58
28	220	261.26	190	261.25	134	261.03	130	260.96	92	260.64	95	260.61
29	210	261.24	220	261.28			130	260.96	89	260.63	120	260.9
30	200	261.22	240	261.31			125	260.92	90	260.62	135	261
31	190	261.16		261.25			123	260.9			130	260.94
Ten-Daily Mean												
I Ten-Daily	216.3	261.24	157.1	261.1	199.5	261.21	128.2	260.94	115.6	260.9	87.4	260.58
II Ten-Daily	223.4	261.27	163.1	261.09	172.5	261.13	114.1	260.8	87.3	234.63	82.3	260.53
III Ten-Daily	204.55	261.21	168.55	261.2	153.12	261.09	130.64	260.92	94	260.67	100.64	260.7
Monthly												
Min.	170	261.09	145	261.01	134	261.03	105	260.59	89	260.61	72	260.44
Max.	260	261.09	240	261.01	225	261.03	180	260.59	130	260.61	135	260.44
Mean	214.75	261.24	162.92	261.13	175.04	261.14	124.31	260.88	98.97	252.07	90.11	260.6

Peak Computed Discharge = 7500 cumecs on 8/8/2016

Corres. Water Level = 267.18 m

Lowest Computed Discharge = 89cumecs on 29/4/2017

Corres. Water Level = 260.63 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

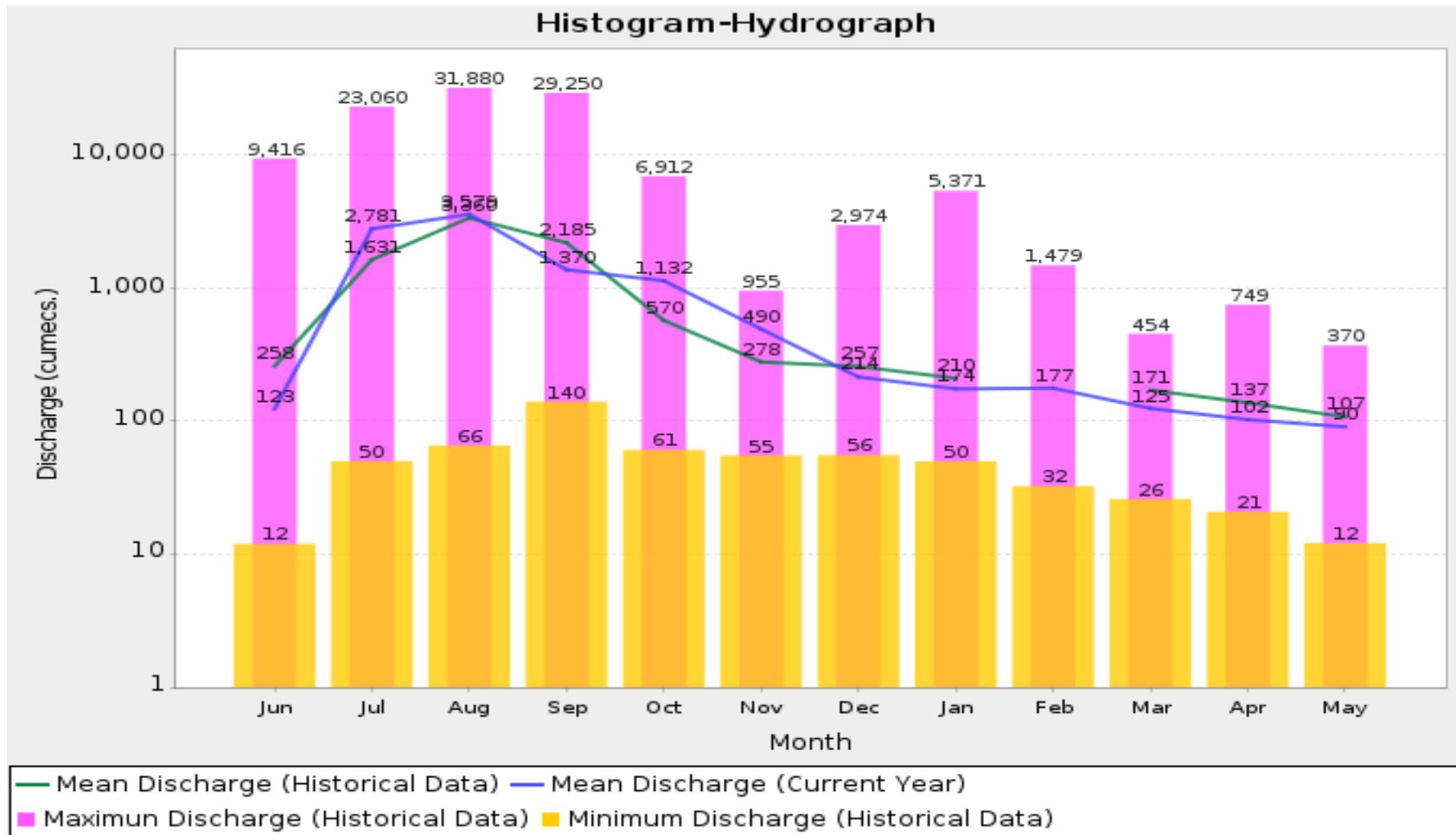
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1977-2017)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



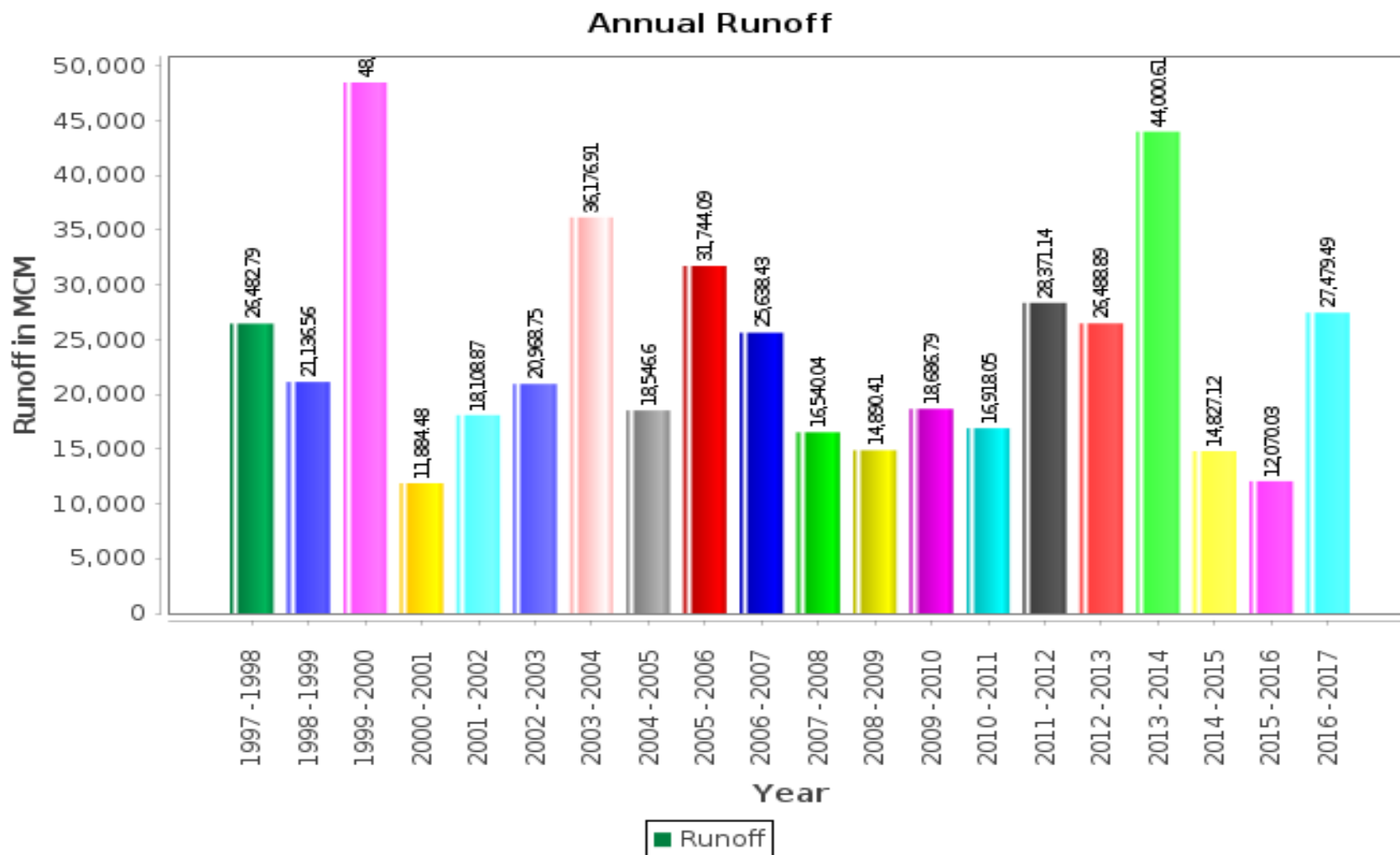
Annual Runoff Values for the period (1977 – 2017)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD II, CWC Bhopal



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

Monthly Average Runoff based on period (1977 – 2017)

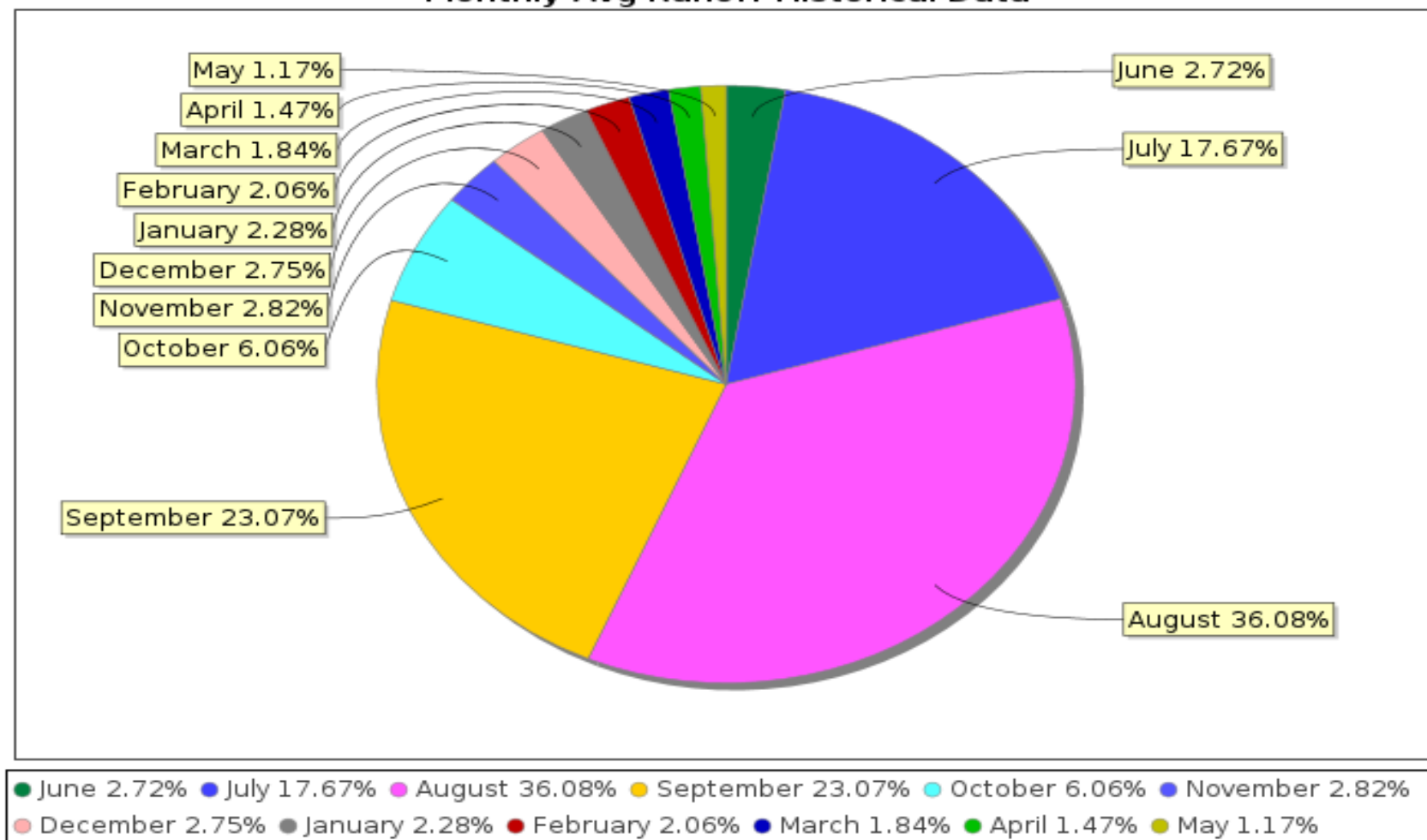
Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

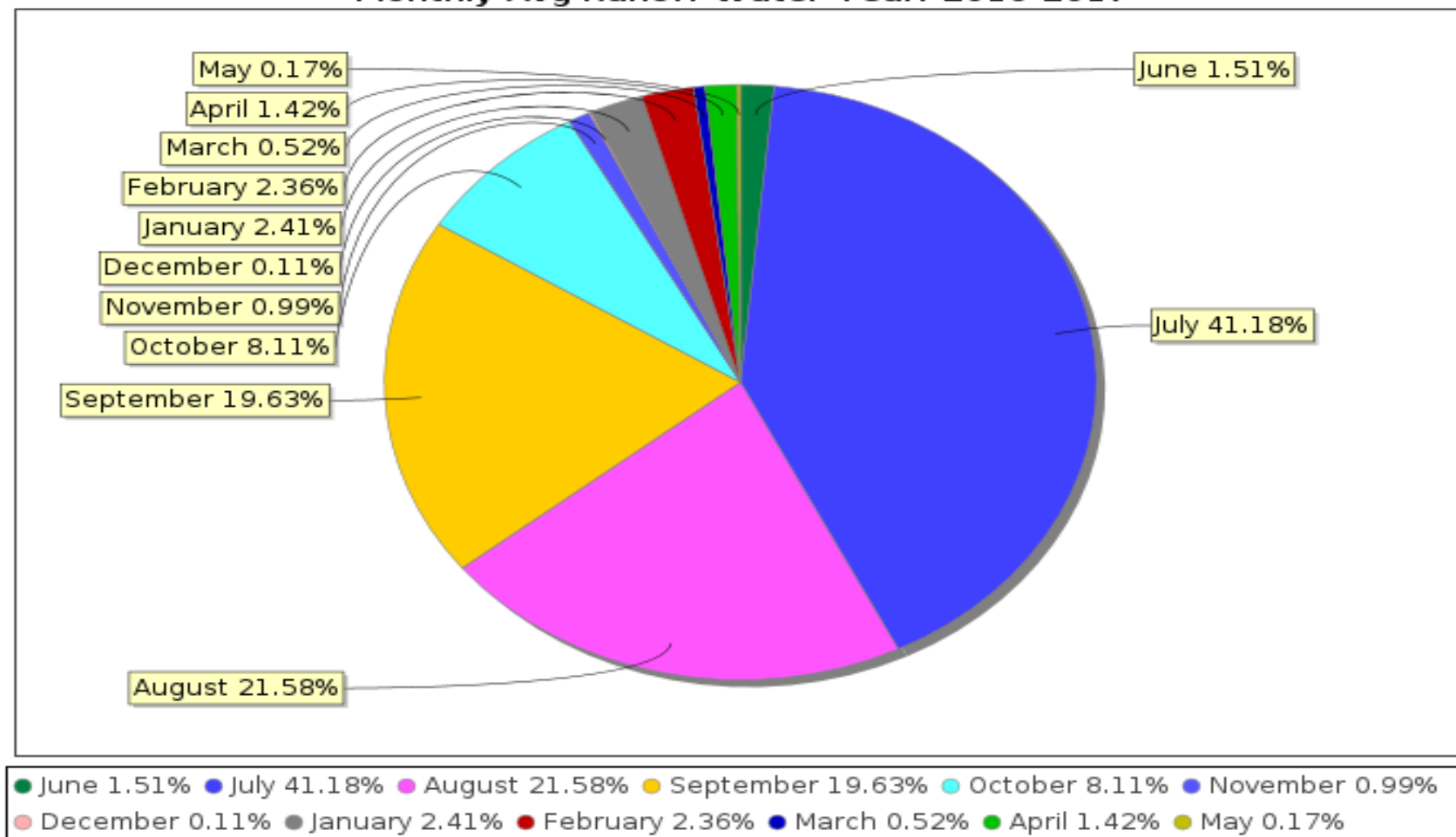
Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD II, CWC Bhopal

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

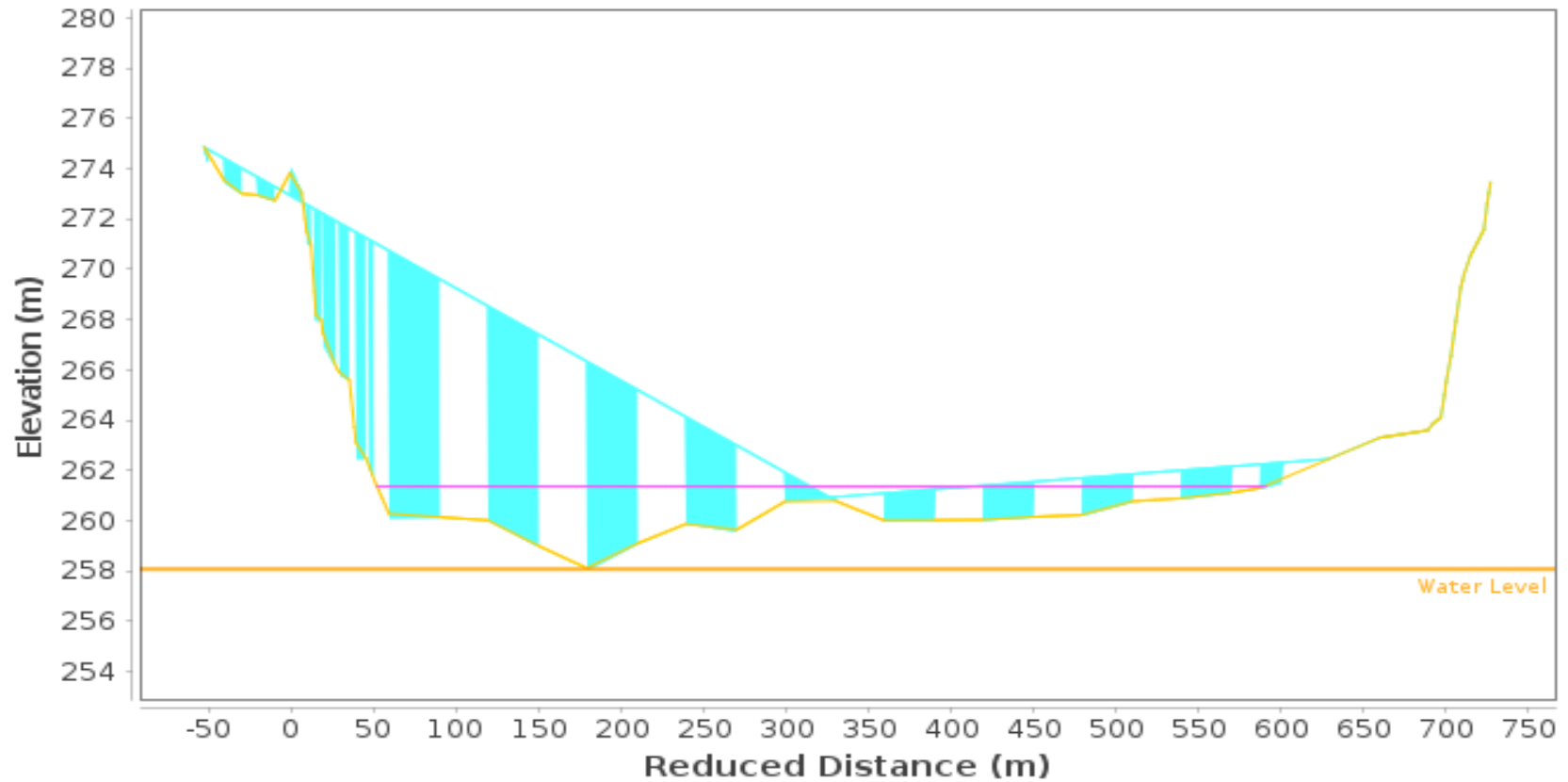
Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal

X-Section



■ Pre-Monsoon WL (no data) — Minimum WL (60.96) on 29/3/2017 — Maximum WL (261.37) on 1/12/2016
 — Post-Monsoon X-section on 21/11/2016 — Pre-Monsoon X-section on 16/05/2016
 — Post-Monsoon WL (no data)

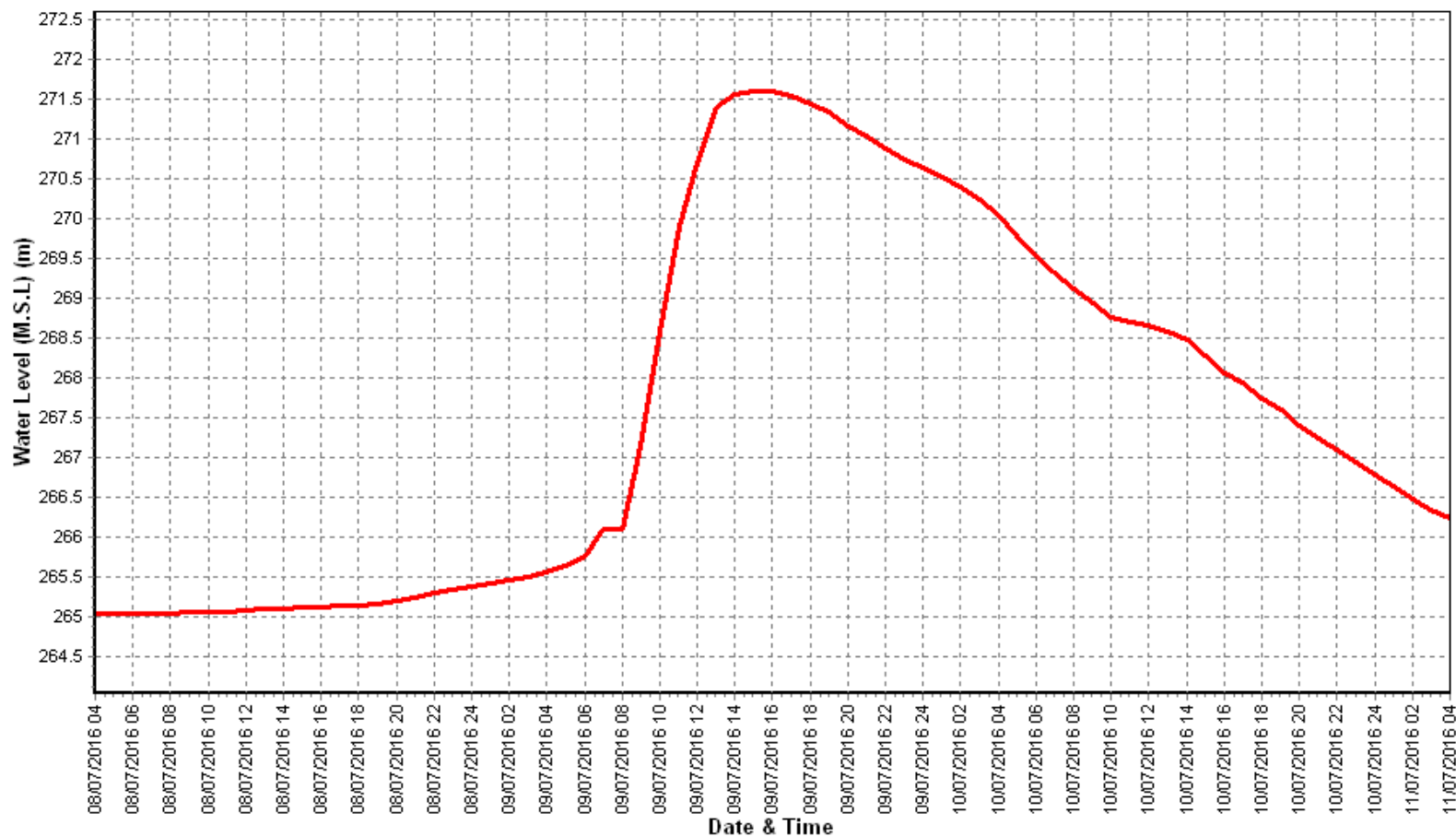
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



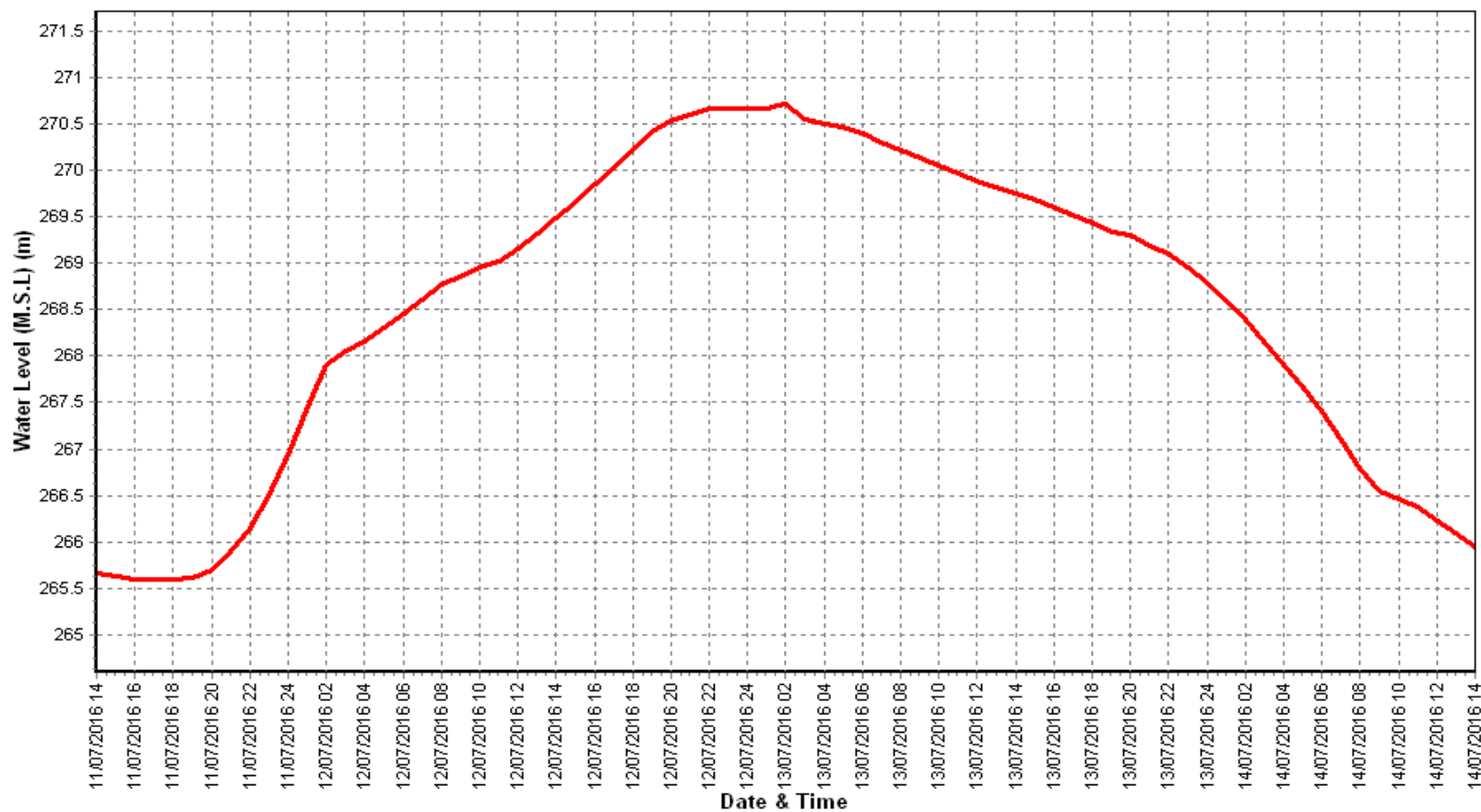
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD II, CWC Bhopal



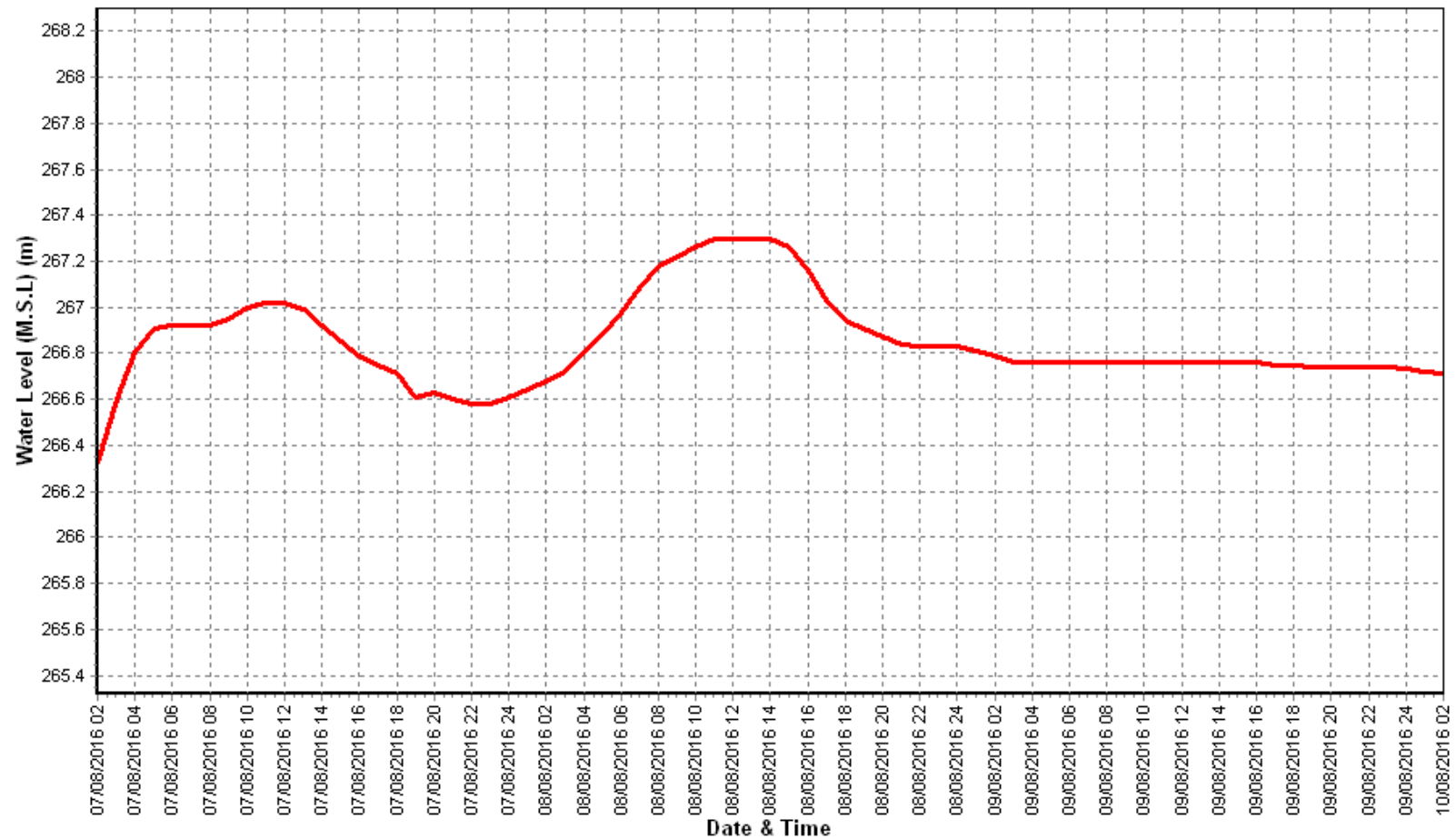
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Handia (010215022)

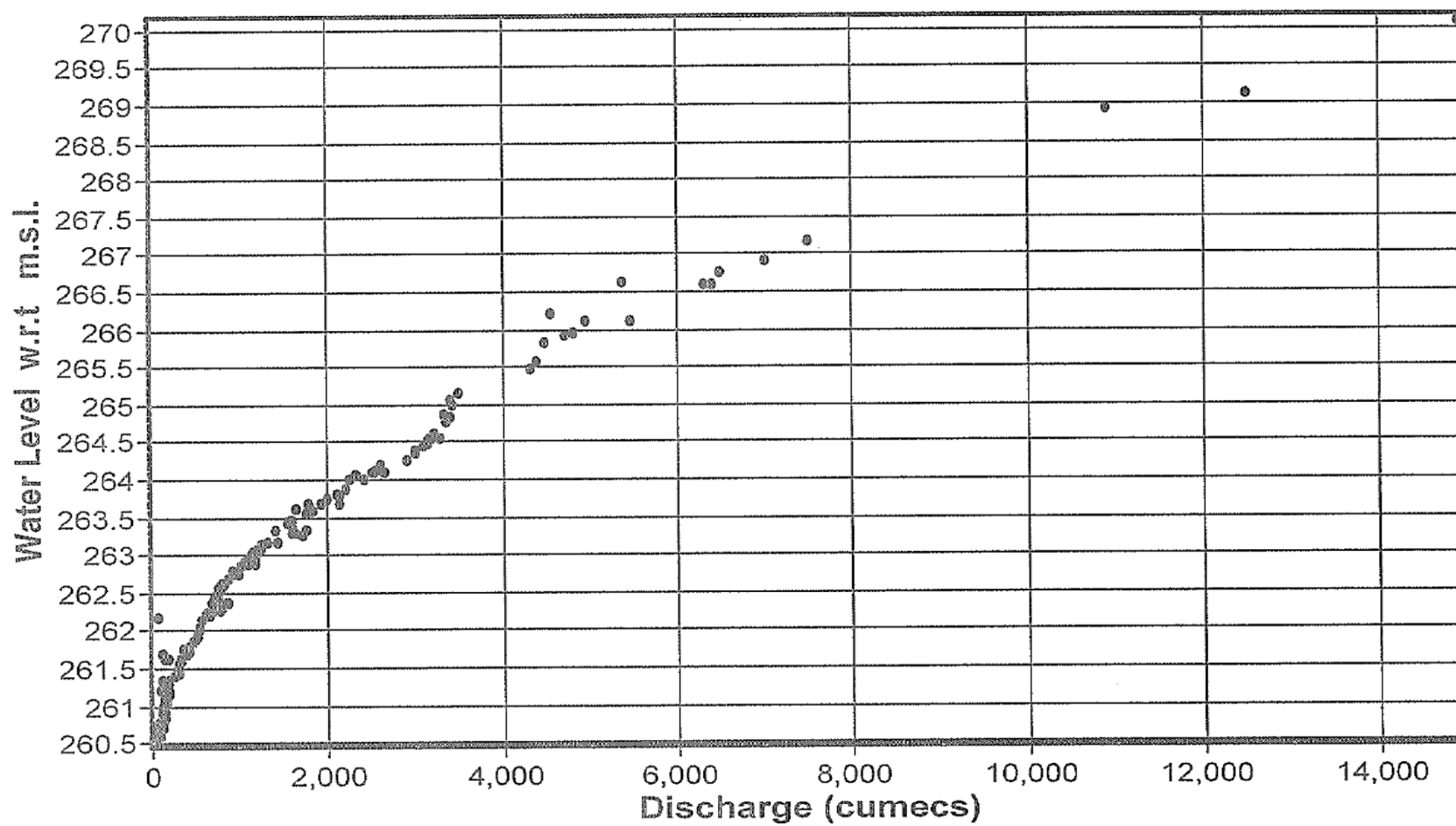
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



Plot of Stage Discharge Data at Narmada at Handia (010215022): 2016 - 2017



4.7 Ganjal at Chhidgaon

History sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
				Water Year	: 2016 - 2017	
Site	:	Chhidgaon		Code	: 004-NDBHP	
State	:	Madhya Pradesh		District	: Hoshangabad	
Basin	:	NARMADA		Independent River	: Narmada	
Tributary	:	Ganjal		Sub Tributary	: -	
Sub-Sub Tributary	:	-		Local River	: Ganjal	
Division	:	Narmada Division(ND), Bhopal		Sub-Division	: Middle Narmada Sub-Division-II, Bhopal	
Drainage Area	:	1729.0 Sq. Km.		Bank	: Left	
Latitude	:	22°24'21"		Longitude	: 77°18'28"	
Current Zero of Gauge (m)	:	287.000				
CATEGORY	Opening Date		Closing Date			
Gauge	:	22/12/1976				
Discharge	:	22/12/1976				
Sediment	:					
Water Quality	:	16/09/1986				
Reduced Level	Opening Date		Closing Date			
287.0	03/06/2014		05/01/2017			
287.0	02/12/1976		03/06/2014			
287.0	05/01/2017		-			
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	2553.8	293.3	14/09/1977	0	287.82	01/05/1978
1978-1979	3813.4	296.5	29/08/1978	0	287.8	01/06/1978

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1979-1980	1235	291.565	10/08/1979	0	287.43	01/06/1979
1980-1981	1375	295.1	03/08/1980	0.2	287.515	01/06/1980
1981-1982	490.8	290.265	10/08/1981	0.4	287.41	01/06/1981
1982-1983	876	291.26	23/08/1982	0.4	287.435	20/05/1983
1983-1984	2650	295.55	03/09/1983	0.3	287.42	06/06/1983
1984-1985	4470	299	10/08/1984	0.3	287.49	22/05/1985
1985-1986	1690	291.9	09/08/1985	0.3	287.485	01/06/1985
1986-1987	2675	295.99	15/08/1986	0.2	287.465	01/06/1986
1987-1988	1275	292.42	28/08/1987	0.36	287.17	25/05/1988
1988-1989	1300	292.54	04/08/1988	0.3	287.16	08/06/1988
1989-1990	863.5	291	29/06/1989	0.44	287.25	28/05/1990
1990-1991	3450	296.48	23/08/1990	0.1	287.35	01/06/1990
1991-1992	2060	294.2	30/07/1991	0.09	287.335	25/05/1992
1992-1993	1925	294.2	17/08/1992	0.02	287.335	01/06/1992
1993-1994	3700	297.2	16/07/1993	0.1	287.38	01/06/1993
1994-1995	5350	299.15	06/09/1994	0.38	287.34	01/06/1994
1995-1996	1320	292.505	02/09/1995	0.11	287.525	14/11/1995
1996-1997	2530	295.3	27/07/1996	0.2	287.45	05/06/1996
1997-1998	4500	298.9	26/07/1997	0.24	287.415	27/05/1998
1998-1999	6660	300.3	15/09/1998	0.17	287.415	15/06/1998
1999-2000	2490	295.62	10/08/1999	0.53	287.36	01/06/1999
2000-2001	960	291.9	13/07/2000	0.4	287.27	20/05/2001
2001-2002	1700	294	15/08/2001	0.27	287.26	26/05/2002
2002-2003	1200	292.6	23/08/2002	0.24	287.4	17/07/2002
2003-2004	2380	296.3	27/07/2003	0.31	287.295	12/06/2003
2004-2005	2170	297	22/08/2004	0.5	287.23	06/06/2004
2005-2006	926.52	292.64	01/08/2005	0.37	287.28	31/05/2006
2006-2007	5142.51	296.5	31/08/2006	0.29	287.28	18/06/2006
2007-2008	9625	301.81	08/07/2007	0.09	287.6	06/06/2007
2008-2009	810.87	291.57	11/08/2008	0.02	287.6	02/03/2009
2009-2010	1878.3	293.28	22/07/2009	0	287.5	12/05/2010
2010-2011	270.78	289.95	09/09/2010	0.35	287.37	27/05/2011
2011-2012	815.98	291.4	26/08/2011	0.27	287.31	25/05/2012
2012-2013	832.46	292	06/09/2012	0.42	287.36	06/06/2012
2013-2014	7527.57	300.75	23/08/2013	0.57	287.4	05/06/2013
2014-2015	693.32	291.3	23/07/2014	0	287.55	26/05/2015
2015-2016	1003.84	292.1	05/08/2015	0	287.4	02/03/2016
2016-2017	6050.3	298.5	12/07/2016	0	287.27	04/06/2016

Stage Discharge Sheet for Ganjal at Chhidgaon for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	6.59	287.28	1.29	287.46	133.65	288	167.08	289.55	59.78	288.1	20.36	287.9
2	6.59	287.28	1.32	287.49	143.95	288.4	495.81	290.1	58	288.09	18.3	287.85
3	6.56	287.27	2.5	287.55	894.57	291.4	134.74	288.9	88.77	288.35	13.29	287.78
4	6.56	287.27	4.5	287.6	522.03	290.6	112.5	288.8	61	288.13	13.28	287.77
5	6.55	287.26	4.8	287.6	351.77	289.5	108.04	288.7	60.92	288.1	13.27	287.77
6	6.54	287.26	8.97	288.68	333.29	289.15	104.69	288.6	59.84	288.08	13	287.76
7	6.59	287.26	100	288.82	650	291.3	99.7	288.5	58.2	288.06	12.25	287.75
8	6.52	287.26	103.4	288.21	459.71	289.7	95.1	288.4	57.84	288.04	12.23	287.73
9	6.5	287.27	2450.4	293	438.44	289.31	95.5	288.39	70	288.28	11.2	287.73
10	6.52	287.28	120.1	289.55	419.5	289.1	87.94	288.35	72.14	288.24	11	287.72
11	6.51	287.27	118.42	289	416.2	288.9	85	288.33	67	288.21	11.9	287.7
12	6.5	287.26	6050.3	298.5	392.6	288.7	83.12	288.25	63	288.16	11.8	287.7
13	6.49	287.25	481.14	290	437.48	288.9	80	288.22	58.34	288.11	11	287.7
14	6.5	287.27	138.55	288.36	400	288.8	71.97	288.18	60.76	288.15	11	287.7
15	6.52	287.29	122.41	288.88	450	289	66.11	288.15	26.15	287.99	11.8	287.69
16	6.54	287.31	103.75	288.68	426.71	288.75	65.02	288.11	25	287.94	11.6	287.69
17	6.54	287.33	99	288.57	343.4	288.56	58.58	288.08	24.12	287.9	11.7	287.69
18	6.6	287.39	85.14	288.54	322.78	288.5	84	288.32	23.61	287.89	11.5	287.69
19	6.62	287.41	141.95	288.66	317.7	288.44	61.47	288.15	24.73	287.92	11.6	287.69
20	6.62	287.41	110.23	288.57	245.05	288.47	83.08	288.31	27.1	287.93	11	287.68
21	6.61	287.41	56.55	288.3	250	288.61	78.25	288.2	27.45	287.94	11.5	287.68
22	6.61	287.41	109.44	288.24	244.51	288.45	67.38	288.16	25.63	287.92	11.6	287.68
23	6.6	287.41	68.28	288.24	212.42	288.4	62.8	288.12	24	287.9	11.37	287.68
24	6.58	287.39	70	288.37	234.18	288.56	58.86	288.05	22.7	287.89	11.6	287.68
25	6.7	287.5	95.24	288.55	244	288.45	77	288.28	20.7	287.88	11.8	287.67
26	6.8	287.47	189.47	288.8	118.76	288.55	75.34	288.21	20.32	287.87	11.6	287.67
27	6.5	287.44	187.85	288.5	158.74	289	60.93	288.11	22.16	287.89	11.5	287.67
28	6.66	287.45	174.56	288.8	180	289.5	56.59	288.05	22.41	287.9	11.4	287.67
29	6.66	287.46	98.95	288.58	169.88	289.1	60.18	288.1	23.5	287.91	11.3	287.67
30	6.65	287.46	69.01	288.45	119.3	288.8	58.4	288.07	20	287.9	11.2	287.67
31			66	288.38	106.7	288.65			21.92	287.9		
Ten-Daily Mean												
I Ten-Daily	6.55	287.27	279.73	288.6	434.69	289.65	150.11	288.83	64.65	288.15	13.82	287.78
II Ten-Daily	6.54	287.32	745.09	289.78	375.19	288.7	73.83	288.21	39.98	288.02	11.49	287.69
III Ten-Daily	6.64	287.44	107.76	288.47	185.32	288.73	65.57	288.13	22.8	287.9	11.49	287.67
Monthly												
Min.	6.49	287.25	1.29	287.46	106.7	288	56.59	288.05	20	287.87	11	287.67
Max.	6.8	287.25	6050.3	287.46	894.57	288	495.81	288.05	88.77	287.87	20.36	287.67
Mean	6.58	287.34	377.53	288.95	331.73	289.03	96.51	288.39	42.48	288.02	12.26	287.71

Annual Runoff in

MCM : 2274.77

Peak Observed Discharge = 6050.3 cumecs on 12/7/2016 Corres. Water

Level = 298.5 m

Lowest Observed Discharge = 0cumecs on 3/3/2017 Corres. Water Level = 287.61 m

Annual Runoff in mm

: 1315.66

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

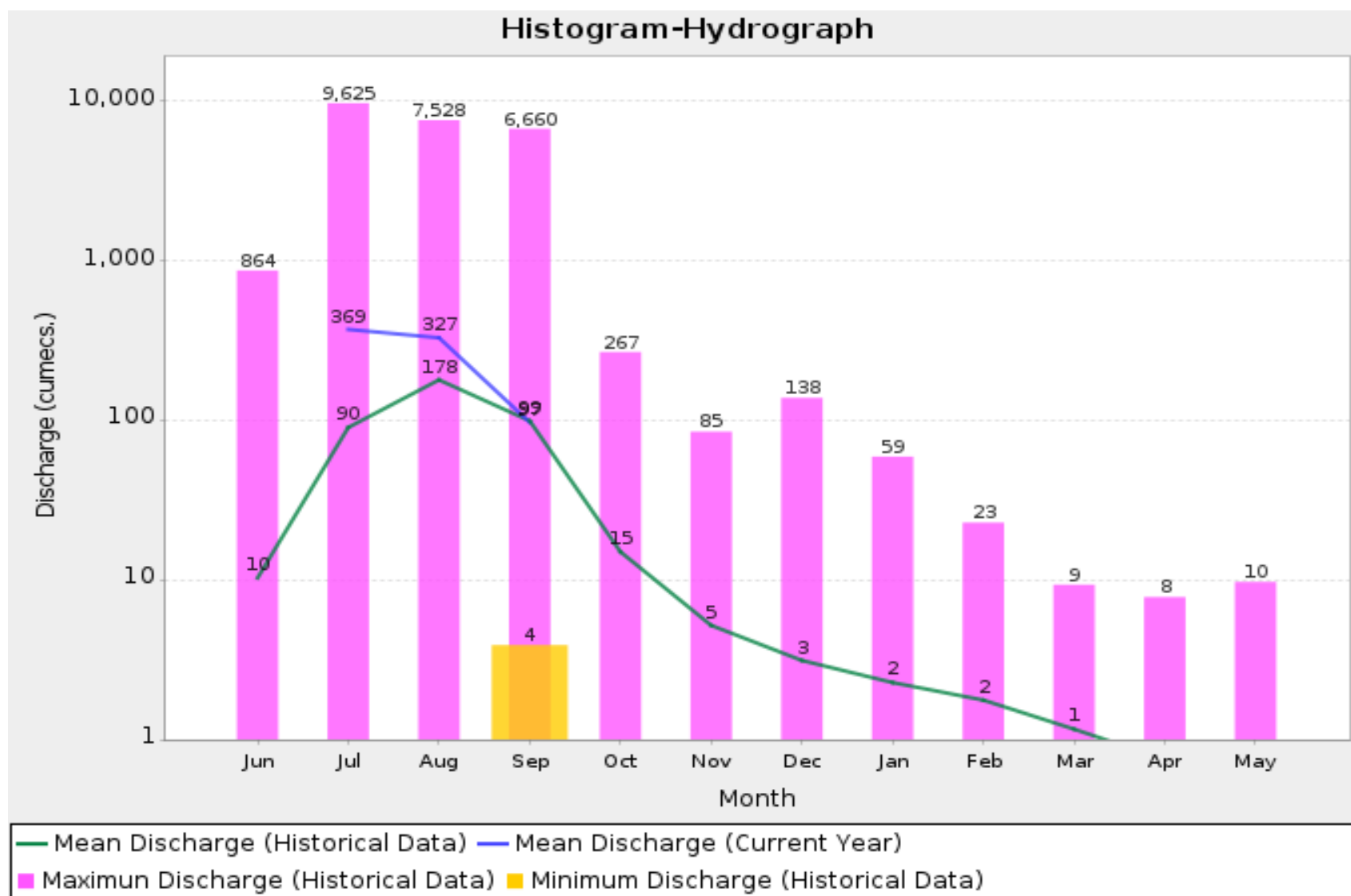
Stage Discharge Sheet for Ganjal at Chhidgaon for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	287.66	0	287.62	0	287.64	0	287.61	0	287.55	0	287.5
2	0	287.66	0	287.62	0	287.64	0	287.61	0	287.55	0	287.5
3	0	287.66	0	287.62	0	287.64	0	287.61	0	287.55	0	287.5
4	0	287.66	0	287.62	0	287.63	0	287.6	0	287.55	0	287.5
5	0	287.66	0	287.62	0	287.62	0	287.6	0	287.54	0	287.49
6	0	287.66	0	287.61	0	287.62	0	287.6	0	287.54	0	287.49
7	0	287.66	0	287.61	0	287.62	0	287.6	0	287.54	0	287.49
8	0	287.66	0	287.61	0	287.62	0	287.59	0	287.54	0	287.49
9	0	287.66	0	287.61	0	287.62	0	287.59	0	287.53	0	287.49
10	0	287.66	0	287.61	0	287.62	0	287.59	0	287.53	0	287.49
11	0	287.65	0	287.61	0	287.62	0	287.57	0	287.52	0	287.49
12	0	287.65	0	287.61	0	287.61	0	287.54	0	287.52	0	287.49
13	0	287.65	0	287.6	0	287.61	0	287.55	0	287.52	0	287.48
14	0	287.65	0	287.6	0	287.61	0	287.54	0	287.52	0	287.48
15	0	287.65	0	287.6	0	287.61	0	287.53	0	287.52	0	287.48
16	0	287.64	0	287.6	0	287.62	0	287.53	0	287.52	0	287.48
17	0	287.64	0	287.6	0	287.62	0	287.54	0	287.52	0	287.48
18	0	287.64	0	287.6	0	287.62	0	287.54	0	287.52	0	287.48
19	0	287.64	0	287.6	0	287.62	0	287.53	0	287.51	0	287.48
20	0	287.64	0	287.59	0	287.62	0	287.52	0	287.51	0	287.48
21	0	287.63	0	287.59	0	287.61	0	287.52	0	287.51	0	287.47
22	0	287.63	0	287.59	0	287.61	0	287.53	0	287.51	0	287.47
23	0	287.63	0	287.59	0	287.61	0	287.52	0	287.51	0	287.47
24	0	287.63	0	287.62	0	287.61	0	287.52	0	287.51	0	287.47
25	0	287.63	0	287.63	0	287.61	0	287.52	0	287.51	0	287.47
26	0	287.63	0	287.59	0	287.61	0	287.53	0	287.51	0	287.47
27	0	287.63	0	287.59	0	287.61	0	287.53	0	287.5	0	287.5
28	0	287.62	0	287.67	0	287.61	0	287.54	0	287.5	0	287.5
29	0	287.62	0	287.61	0	0	0	287.54	0	287.5	0	287.51
30	0	287.62	0	287.62	0	0	0	287.55	0	287.5	0	287.52
31	0	287.62	0	287.63	0	0	0	287.55	0	0	0	287.53
Ten-Daily Mean												
I Ten-Daily	0	287.66	0	287.61	0	287.63	0	287.6	0	287.54	0	287.49
II Ten-Daily	0	287.65	0	287.6	0	287.62	0	287.54	0	287.52	0	287.48
III Ten-Daily	0	287.63	0	287.61	0	287.61	0	287.53	0	287.51	0	287.49
Monthly												
Min.	0	287.62	0	287.59	0	287.61	0	287.52	0	287.5	0	287.47
Max.	0	287.62	0	287.59	0	287.61	0	287.52	0	287.5	0	287.47
Mean	0	287.64	0	287.61	0	287.62	0	287.56	0	287.52	0	287.49

Peak Computed Discharge = 894.6 cumecs on 03/08/2016 Corres. Water
Level = 297.4 m
Lowest Computed Discharge = 6.490 cumecs on 13/06/2016 Corres. Water
Level = 287.2 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

Histogram – Hydrograph for Water Year : 2016-17 (Data considered : 1977-2017)



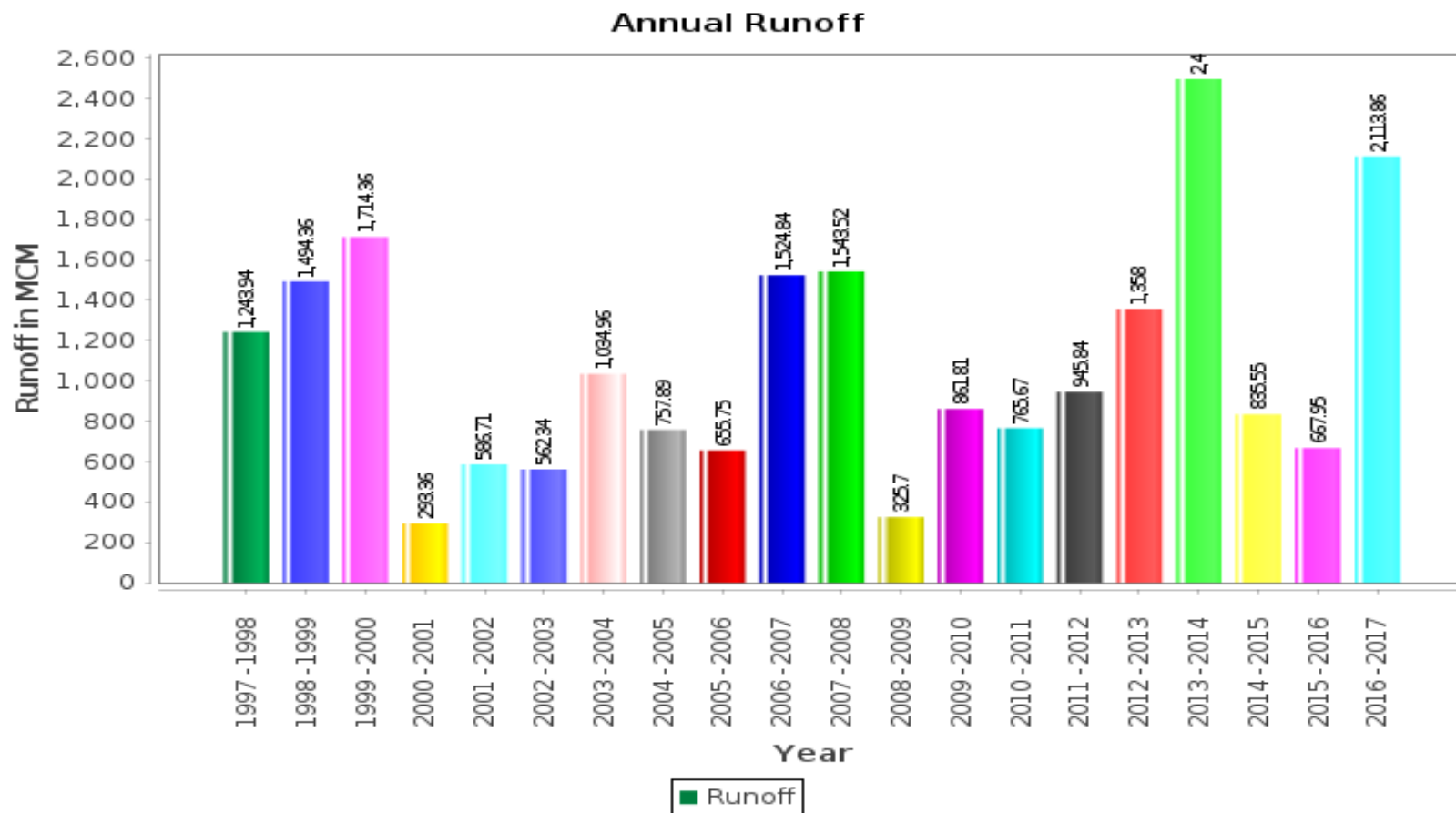
Annual Runoff Values for the period (1979 – 2017)

Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division :MNSD II, CWC Bhopal



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

Monthly Average Runoff based on period (1977 – 2017)

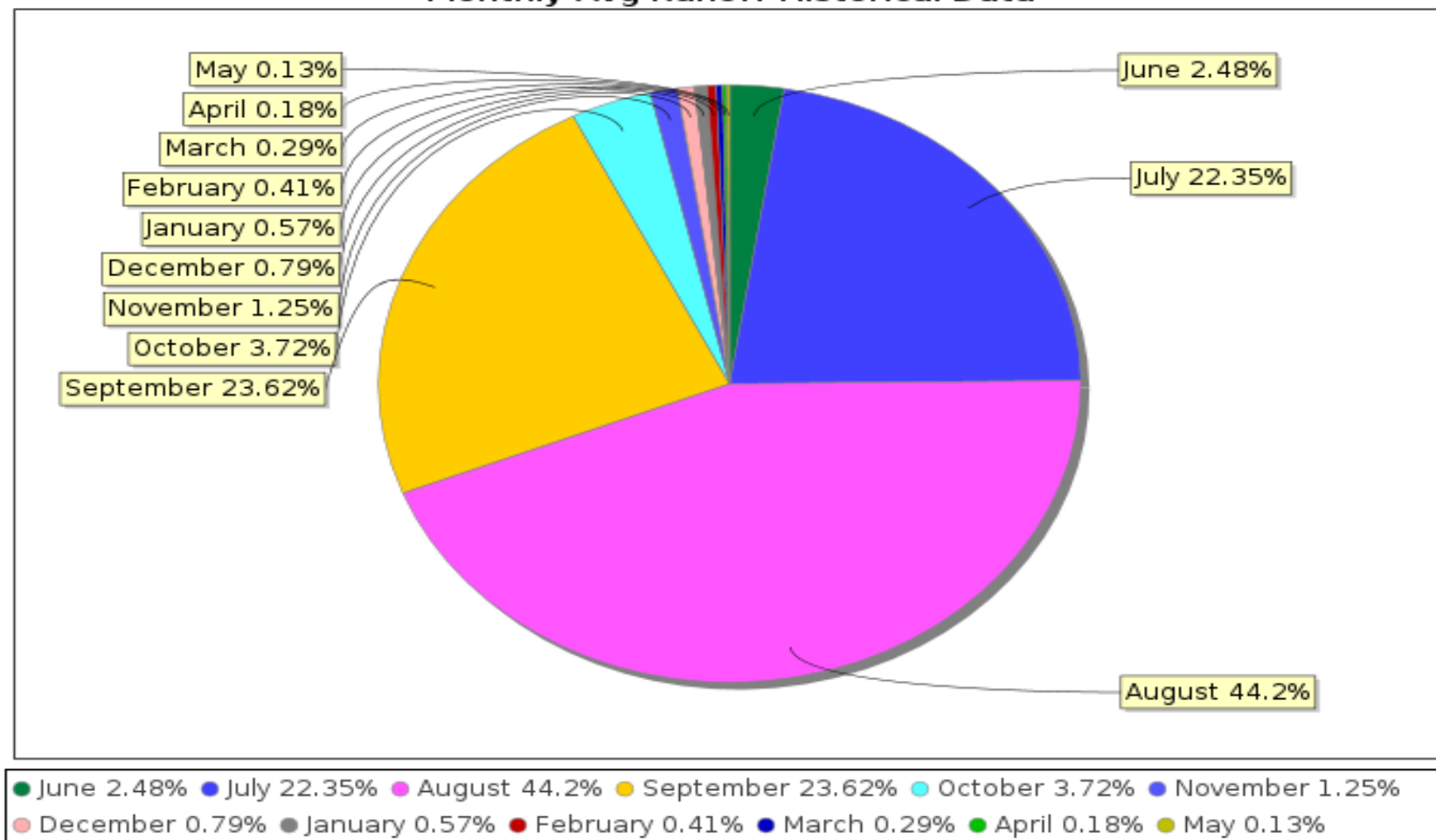
Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division :MNSD II, CWC Bhopal

Monthly Avg Runoff Historical Data



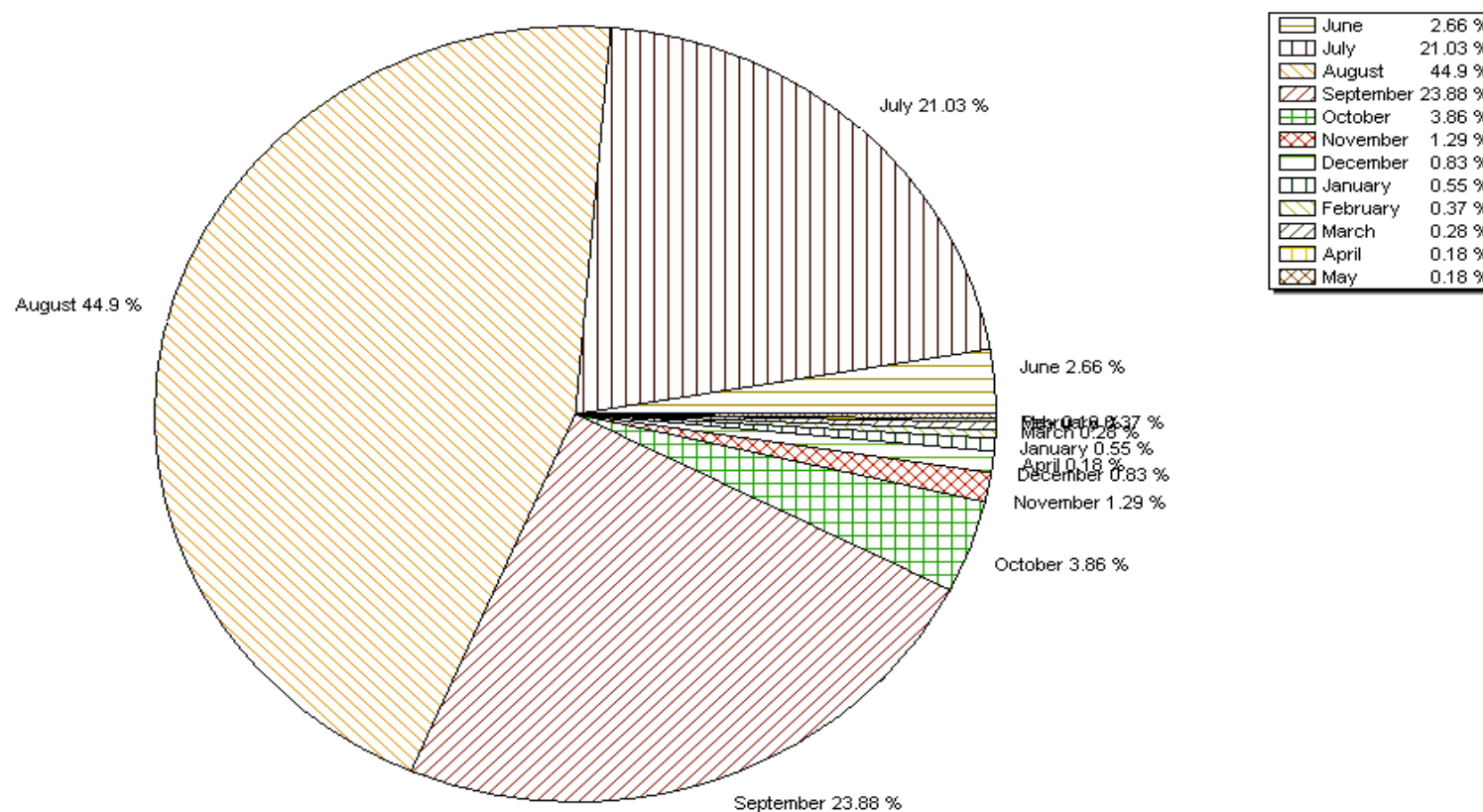
Monthly Runoff for the Year (2016-17)

Station Name : Ganjal at Chhidgaon (010215020)

Local River : Ganjal

Division : Narmada Division, Bhopal

Sub-Division : MNSD II, CWC Bhopal



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

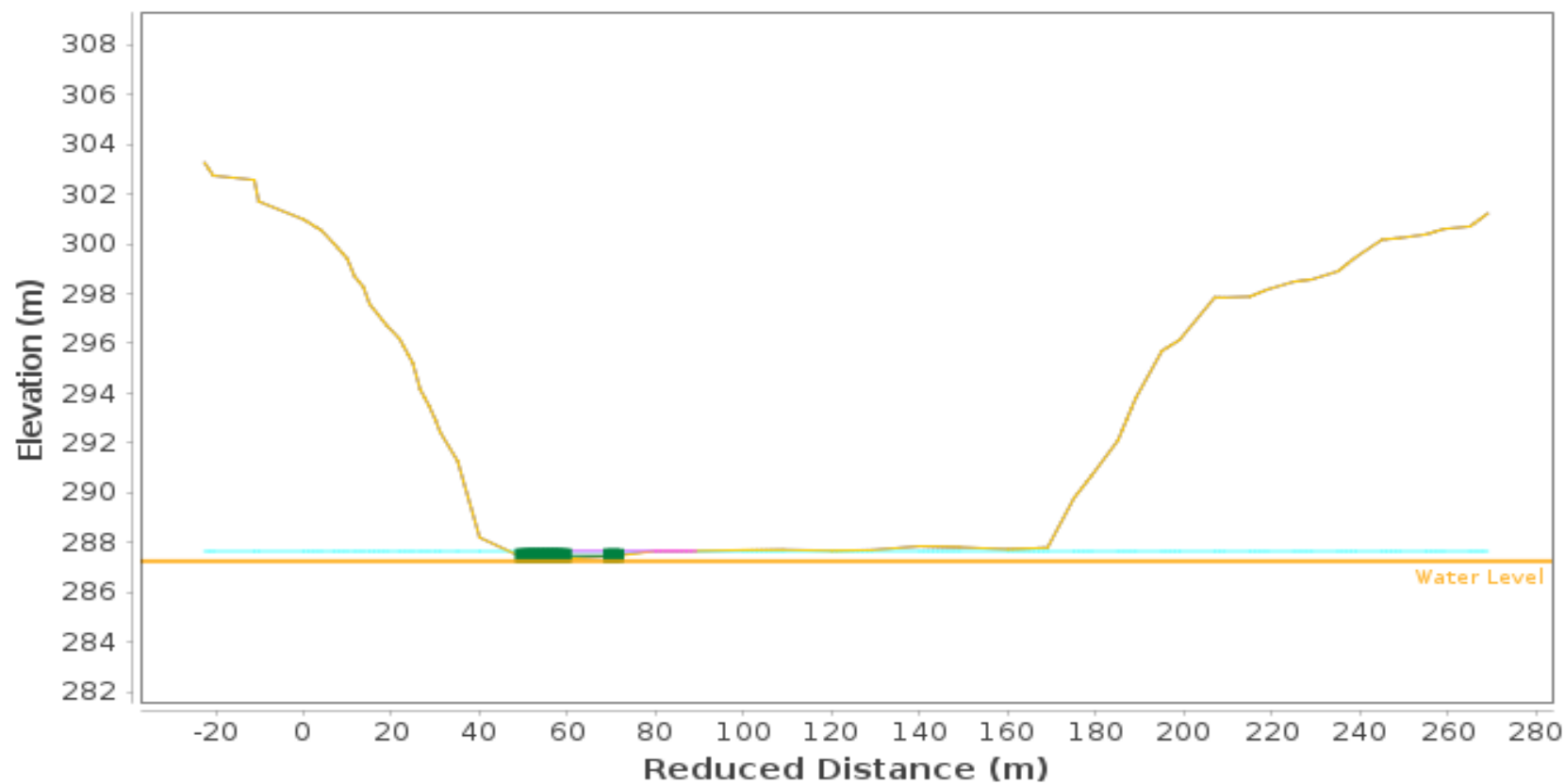
Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division :MNSD II, CWC Bhopal

X-Section



■ Minimum WL (287.47) on 20/5/2017 — Pre-Monsoon WL (no data)
 ■ Maximum WL (287.66) on 1/12/2016 — Post-Monsoon X-section on 11/12/2016
 ■ Post-Monsoon WL(287.65) — Pre-Monsoon X-section on 28/04/2016

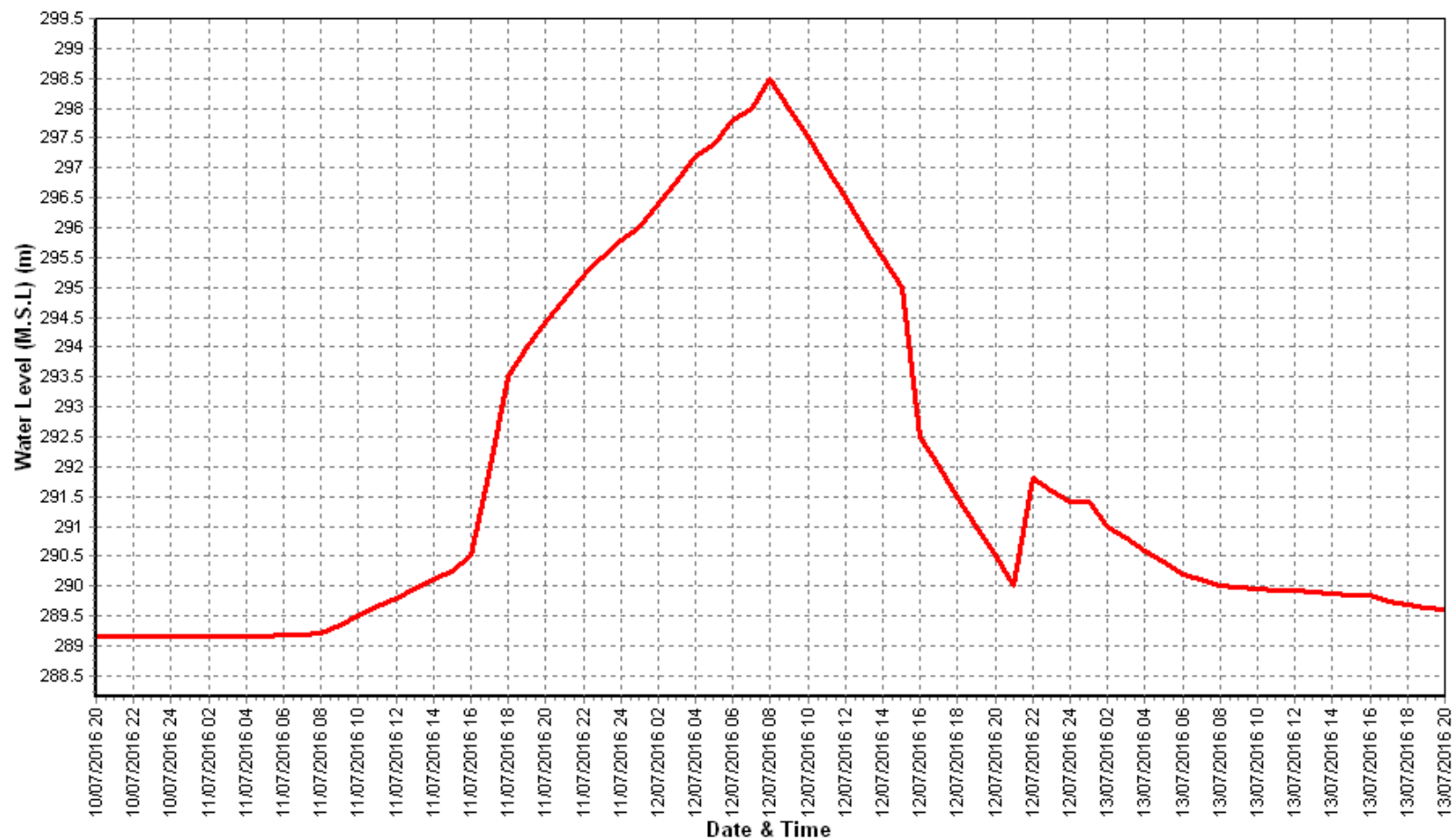
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Ganjal at Chhidgaon (010215020)

Local River : Ganjal

Division : Narmada Division, Bhopal

Sub-Division :MNSD II, CWC Bhopal



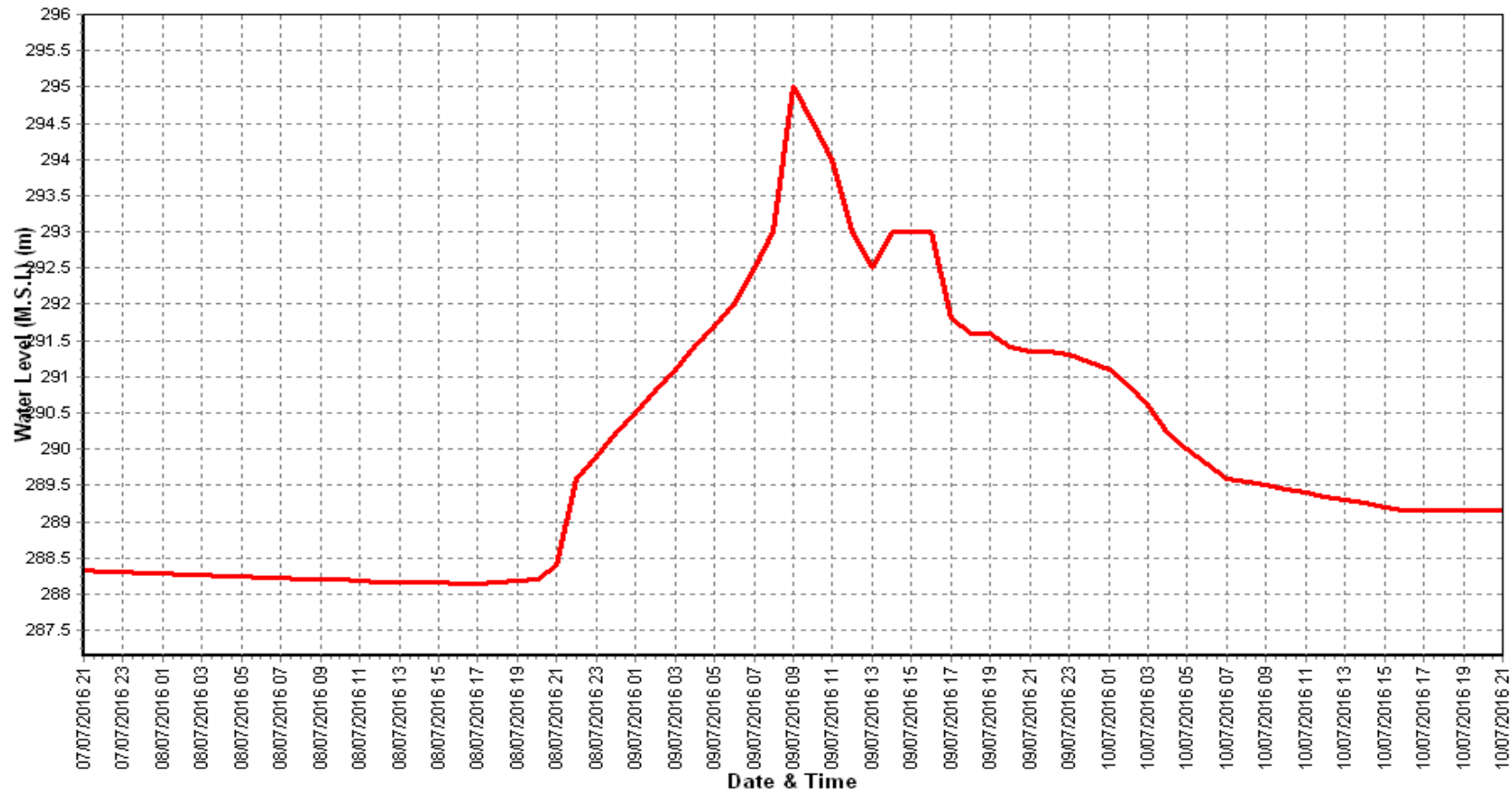
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division : MNSD II, CWC Bhopal



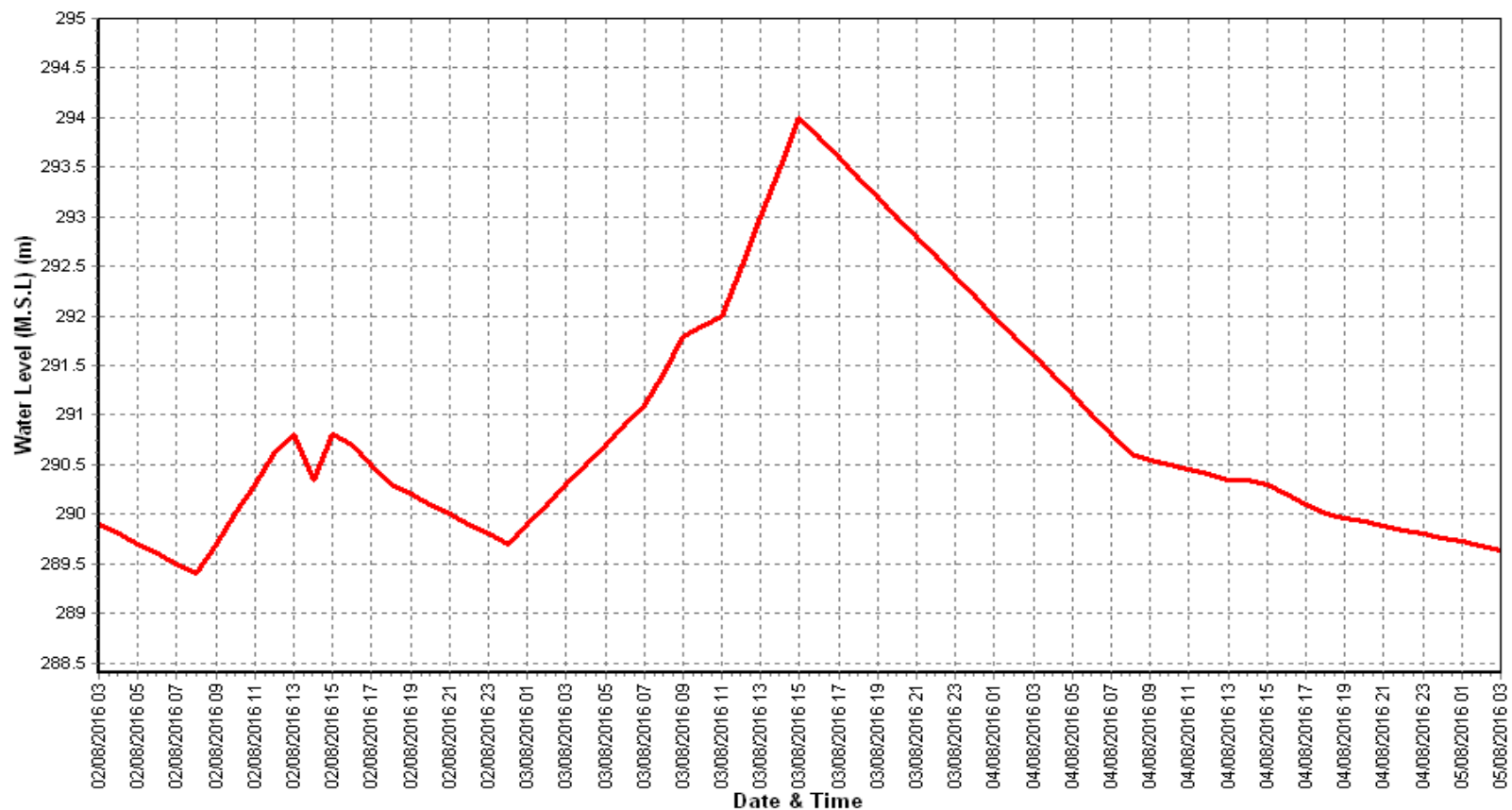
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Ganjal at Chhidgaon (010215020)

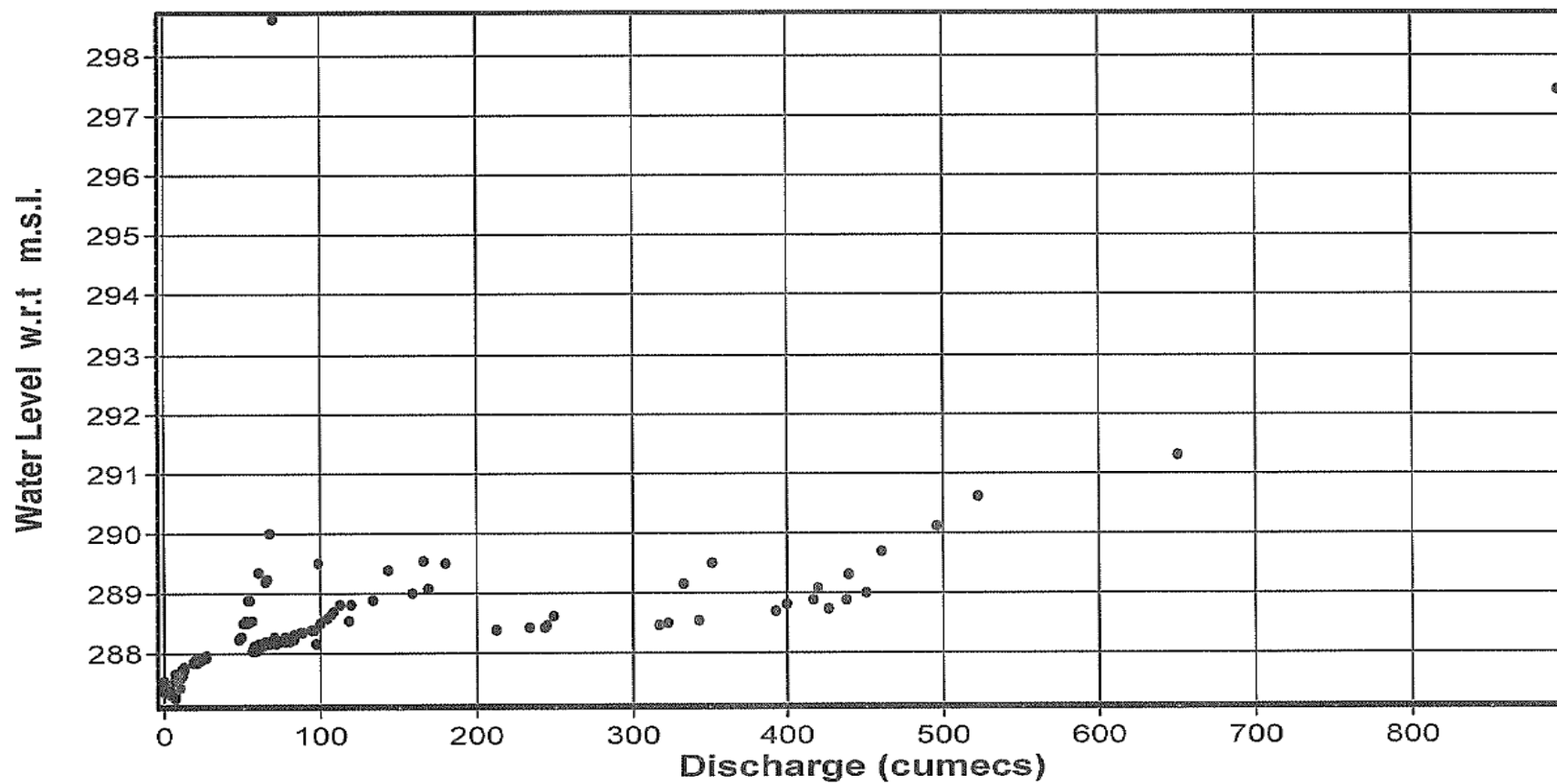
Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division : MNSD II, CWC Bhopal



Plot of Stage Discharge Data at Ganjal at Chhidgaon (010215020): 2016 - 2017



4.8 Narmada at Hoshangabad

History sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
Site : Hoshangabad				Water Year : 2016 - 2017		
State : Madhya Pradesh				Code : 016-NDBHP		
				District : Hoshangabad		
Basin : NARMADA				Independent		
Tributary : -				River : Narmada		
Sub-Sub Tributary : -				Sub Tributary : -		
				Local River : Narmada		
				Middle Narmada Sub-		
Division : Narmada Division(ND), Bhopal				Sub-Division : Division-I, Hosangabad		
Drainage Area : 44548.0 Sq. Km.				Bank :		
Latitude : 22°45'21"				Longitude : 77°43'58"		
Current Zero of Gauge (m) : 282.000						
CATEGORY		Opening Date		Closing Date		
Gauge :		21/05/1972				
Discharge :		16/09/1972				
Sediment :		29/12/1972				
Water Quality :		15/07/1979				
Reduced Level		Opening Date		Closing Date		
282.0		05/01/2017		-		
282.0		01/01/2013		-		
282.0		21/05/1972		25/04/2014		
282.0		25/04/2014		05/01/2017		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1973-1974	27700	299.275	01/09/1973	26.9	284.13	01/06/1973
1974-1975	1950	287.67	27/08/1974	29.3	283.84	01/05/1975
1975-1976	3000	288.21	01/09/1975	20	283.81	01/06/1975
1976-1977	2390.6	287.26	01/09/1976	19.4	283.805	01/05/1977
1977-1978	11900	294	01/09/1977	17.5	282.78	01/06/1977
1978-1979	3268.8	288.8	01/07/1978	27.3	283.885	01/06/1978
1979-1980	370.3	285.025	01/07/1979	19	283.81	01/05/1980
1980-1981	17193.3	295.04	01/09/1980	46.2	284.12	01/05/1981

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1981-1982	1362	287.083	01/08/1981	26.6	283.92	01/06/1981
1982-1983	3770.9	288.81	01/09/1982	27.9	283.95	01/06/1982
1983-1984	2577.9	288.048	01/10/1983	29.3	284.185	01/06/1983
1984-1985	2441.5	287.542	01/09/1984	30	284.025	01/06/1984
1985-1986	2383.1	287.832	01/08/1985	31.1	283.97	01/06/1985
1986-1987	1691.9	287.24	01/08/1986	28	284.01	01/05/1987
1987-1988	3430	287.927	01/09/1987	19.62	283.95	01/06/1987
1988-1989	2016	286.945	01/07/1988	15.49	283.895	01/06/1988
1989-1990	4930	289.335	01/09/1989	19.5	283.93	01/06/1989
1990-1991	2599	287.69	10/09/1990	50	284.17	01/06/1990
1991-1992	9600	292.265	01/09/1991	82.9	284.405	01/02/1992
1992-1993	1206	286.32	01/09/1992	72.07	284.35	01/07/1992
1993-1994	2996	288.085	01/10/1993	77.6	284.38	01/02/1994
1994-1995	8063	291.53	01/09/1994	124.4	284.49	01/02/1995
1995-1996	2247	287.425	01/08/1995	111.5	284.48	01/06/1995
1996-1997	925	286.04	01/09/1996	126.5	284.52	01/07/1996
1997-1998	4484	289.015	01/08/1997	120	284.28	01/06/1997
1998-1999	750	285.83	01/10/1998	62.8	284.36	01/05/1999
1999-2000	2480	287.74	01/10/1999	53.85	284.23	01/06/1999
2000-2001	5600	290.32	29/07/2000	70	284.24	11/04/2001
2001-2002	6280	290.19	16/07/2001	67.81	284.25	04/06/2001
2002-2003	14560	294.2	19/08/2002	85.42	284.41	30/05/2003
2003-2004	12539	292.7	28/07/2003	72.78	284.36	19/05/2004
2004-2005	12500	293.31	23/08/2004	64.7	284.29	07/06/2004
2005-2006	14279.56	294	06/07/2005	18.5	284.19	12/06/2005
2006-2007	14924	294.69	01/09/2006	62.42	284.19	25/06/2006
2007-2008	9373.05	291.8	09/07/2007	9.55	284	08/07/2007
2008-2009	6239.87	289.99	02/08/2008	76.04	284.31	23/01/2009
2009-2010	20983.97	296.89	10/09/2009	48.93	284.21	04/07/2009
2010-2011	4784.35	289.5	05/09/2010	65.88	284.33	06/12/2010
2011-2012	9075.81	291.5	24/07/2011	42.86	284.16	31/05/2012
2012-2013	16972.88	295.55	07/08/2012	38.96	284.13	07/06/2012
2013-2014	30000	298.78	24/08/2013	20	295.8	21/08/2013
2014-2015	513.29	285.29	01/09/2014	103.2	284.37	01/06/2014
2015-2016	4100	288.85	15/08/2015	86.01	284.32	20/11/2015
2016-2017	8000	291.7	09/07/2016	10.9	291	10/07/2016

Stage Discharge Sheet for Narmada at Hoshangabad for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	182.2	284.66	156.9	284.5	1450	286.65	2291	287.47	990	286.04	382.8	284.95
2	180.1	284.65	185.8	284	3627	288.61	2391	287.7	1680	286.82	380.8	284.94
3	164.3	284.58	333	284	4501	289.13	2505	287.81	1707.5	286.9	377.1	284.94
4	158.2	284.55	433	285.15	1841	287.17	1858	287.2	1645.6	286.82	380.9	284.95
5	144	284.5	488	285.32	1826	287.13	1530	287.8	1056.2	286.18	383.4	284.97
6	134.7	284.45	555.8	285.46	2285	287.46	1282	286.34	826.1	286.93	384	284.97
7	125	284.4	3378	288.36	4000	288.77	994	286.05	759.1	286.76	262.1	284.92
8	134.3	284.45	3396	290.82	7400	290.5	767.9	285.78	711.3	286.74	356.5	284.91
9	140.8	284.48	8000	291.7	7370	290.5	661.5	285.6	700	286.68	355.8	284.91
10	143.8	284.5	10.9	291	6280	290.06	560.3	285.47	708.3	286.93	354.2	284.91
11	136.8	284.46	434	288.95	3571	288.53	530	285.41	710	285.68	381.8	284.96
12	126	284.41	782	291.7	1742	286.95	499.4	285.34	730	285.72	382.2	284.96
13	108.4	284.34	14.18	293.88	1340	286.46	485	285.31	775.3	285.79	382	284.96
14	104	284.32	3602.4	288.58	1820	287.12	475.9	285.28	760.2	285.76	375	284.94
15	112.3	284.36	1452.4	286.65	2380	287.68	465.8	285.26	674.5	285.64	374.6	284.94
16	123.1	284.39	1019	286.1	2372	287.67	489.7	285.32	510	285.36	379.9	284.95
17	125.4	284.4	1035	4422	1816	287.11	481.2	285.3	474.7	285.28	378.7	284.95
18	136.9	284.46	883.8	285.98	1804	287.08	476	285.28	457.6	285.24	374.7	284.94
19	144	284.5	600.1	285.6	1776	287.03	652.9	285.59	449.1	285.2	382.2	284.96
20	137.4	284.46	573.1	285.53	1767	287.01	807.8	285.88	447.2	285.19	375	284.94
21	134.4	284.45	529.6	285.41	3506	288.4	674.7	285.64	445.1	285.18	376.7	284.95
22	139.9	284.47	512.9	285.35	2319	287.52	804.2	285.87	440.9	285.16	377.4	284.95
23	134.2	284.45	626.7	285.57	1781	287.03	698.2	285.7	427	285.13	270.7	284.84
24	134.3	284.45	1340	286.47	1768	287.01	682.7	285.66	408.8	285.07	271.6	284.84
25	156.3	284.54	1316.5	286.41	1701	286.88	667	285.62	407.2	312.06	256.9	284.79
26	160	284.56	1040.4	286.14	1349	286.48	700.9	285.71	398.4	285.03	235.4	284.72
27	152.6	284.52	970.5	286	1835	287.15	762.4	285.77	394.7	285.01	230	284.72
28	137	284.46	2320.5	286.52	2350	287.62	707.8	285.73	392.7	285	193	284.66
29	160	284.56	1702.3	286.89	1873	287.23	671.6	285.63	393.4	285	172.6	284.63
30	143.9	284.5	1315	286.41	1419	286.6	570	285.5	390	284.98	184.6	284.65
31			1275	286.33	1500	286.75			384.8	284.96		
Ten-Daily Mean												
I Ten-Daily	150.74	284.52	1693.74	287.03	4058	288.6	1484.07	286.72	1078.41	286.68	361.76	284.94
II Ten-Daily	125.43	284.41	1039.6	701.5	2038.8	287.26	536.37	285.4	598.86	285.49	378.61	284.95
III Ten-Daily	145.26	284.5	1177.22	286.14	1945.55	287.15	693.95	285.68	407.55	287.51	256.89	284.78
Monthly												
Min.	104	284.32	10.9	284	1340	286.46	465.8	285.26	384.8	284.96	172.6	284.63
Max.	182.2	284.32	8000	284	7400	286.46	2505	285.26	1707.5	284.96	384	284.63
Mean	140.48	284.48	1303.52	424.89	2680.78	287.67	904.8	285.93	694.94	286.56	332.42	284.89

Annual Runoff in MCM : 19521.88

Peak Observed Discharge = 4501 cumecs on 3/8/2016 Annual Runoff in mm :

Corres. Water Level = 289.13 m 438.22

Lowest Observed Discharge = 87.2 cumecs on 12/5/2017 Corres. Water Level
= 284.3 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Narmada at Hoshangabad for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	233.4	284.73	268	284.83	276.5	284.85	153.5	284.59	227	284.71	124.8	284.5
2	232.9	284.73	264.5	284.82	276.2	284.84	154	284.59	224	284.7	139.2	284.55
3	237.1	284.75	251.4	284.78	272.5	284.78	163.1	284.63	224.7	284.7	139.7	284.55
4	243	284.85	250.4	284.78	267.9	284.73	162.7	284.63	227	284.71	136.7	284.54
5	255.9	284.79	233	284.74	272	284.84	151	284.58	231.7	284.72	124.8	284.5
6	231.8	284.72	191.3	284.66	272.5	284.84	133.8	284.53	158.2	284.6	105.8	284.44
7	1831	284.65	166.8	284.62	267.9	284.83	130.4	284.52	152.3	284.58	98	284.38
8	235.4	284.74	371	284.93	268.2	284.83	139.2	284.55	124.8	284.5	94.4	284.36
9	236	284.75	380.2	284.96	263.4	284.82	145.9	284.57	117	284.48	98	284.38
10	257.8	284.8	289.5	284.9	256.7	284.81	137.3	284.54	114.3	284.47	92	284.35
11	270	284.82	276	284.85	257.2	284.81	127.9	284.51	111.2	284.46	91.2	284.32
12	300	284.88	229.9	284.71	277	284.86	110	284.46	117.9	284.48	87.2	284.3
13	383	284.97	169.2	284.64	277.2	284.86	107	284.44	191.4	284.66	91.8	284.32
14	392.9	285.01	166.8	284.62	272.5	284.84	134.2	284.53	224	284.7	99	284.41
15	396.9	285.03	164	284.61	272.8	284.84	188.3	284.65	224.7	284.7	126.4	284.49
16	374.2	284.94	226.6	284.7	275.9	284.85	195.2	284.67	227	284.71	131.5	284.51
17	350.6	284.91	252.7	284.79	267.9	284.83	224.7	284.7	231.7	284.72	123.4	284.48
18	220	284.7	256.7	284.81	277.2	284.86	219	284.69	233.4	284.73	123.2	284.48
19	258.8	284.81	272.5	284.84	277	284.86	160	284.61	227	284.71	102.9	284.4
20	282.2	284.96	268.1	284.83	275.9	284.85	160.9	284.61	229.9	284.71	100.9	284.39
21	374.7	284.94	263.4	284.82	267.7	284.83	183.3	284.64	219.5	284.7	135	284.58
22	382.2	284.96	272	284.84	230	284.71	248	284.78	226.2	284.7	141	284.54
23	273.8	284.84	276	284.85	191.3	284.66	241.3	284.77	226	284.7	103.8	284.22
24	255.2	284.8	277.5	284.86	169	284.64	252.7	284.79	221.8	284.69	103.8	284.4
25	275	284.85	278.3	284.86	160.9	284.61	238.2	284.76	158.2	284.6	93	284.36
26	284.2	284.97	276	284.85	160	284.61	248	284.78	149.3	284.57	112.2	284.43
27	370.1	284.94	278.1	284.86	236.6	284.75	241.3	284.77	195.2	284.67	257.3	284.79
28	285.2	284.88	277.2	284.86	219.5	284.68	183.3	284.64	221.8	284.69	269	284.83
29	255.2	284.8	277	284.86	0	0	179.5	284.63	129.3	284.52	236.7	284.72
30	273.8	284.84	282	284.87	0	0	158.2	284.6	113	284.47	153.2	284.58
31	277.5	284.86	275.9	284.85	0	0	221.8	284.69	0	0	129.1	284.5
Ten-Daily Mean												
I Ten-Daily	399.43	284.75	266.61	284.8	269.38	284.82	147.09	284.57	180.1	284.62	115.34	284.45
II Ten-Daily	322.86	284.9	228.25	284.74	273.06	284.85	162.72	284.59	201.82	284.66	107.75	284.41
III Ten-Daily	300.63	284.88	275.76	284.85	204.38	284.69	217.78	284.71	186.03	284.63	157.65	284.54
Monthly												
Min.	220	284.65	164	284.61	160	284.61	107	284.44	111.2	284.46	87.2	284.22
Max.	1831	284.65	380.2	284.61	277.2	284.61	252.7	284.44	233.4	284.46	269	284.22
Mean	340.97	284.84	256.87	284.8	248.94	284.78	175.86	284.62	189.32	284.64	126.91	284.47

Peak Computed Discharge = 8000 cumecs on 9/7/2016 Corres.

Water Level = 291.7 m

Lowest Computed Discharge = 10.9cumecs on 10/7/2016 Corres.

Water Level = 291 m

Q: Observed/Computed Discharge in cumecs **WL:**Corresponding Mean Water Level(M.S.L) in m *****:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

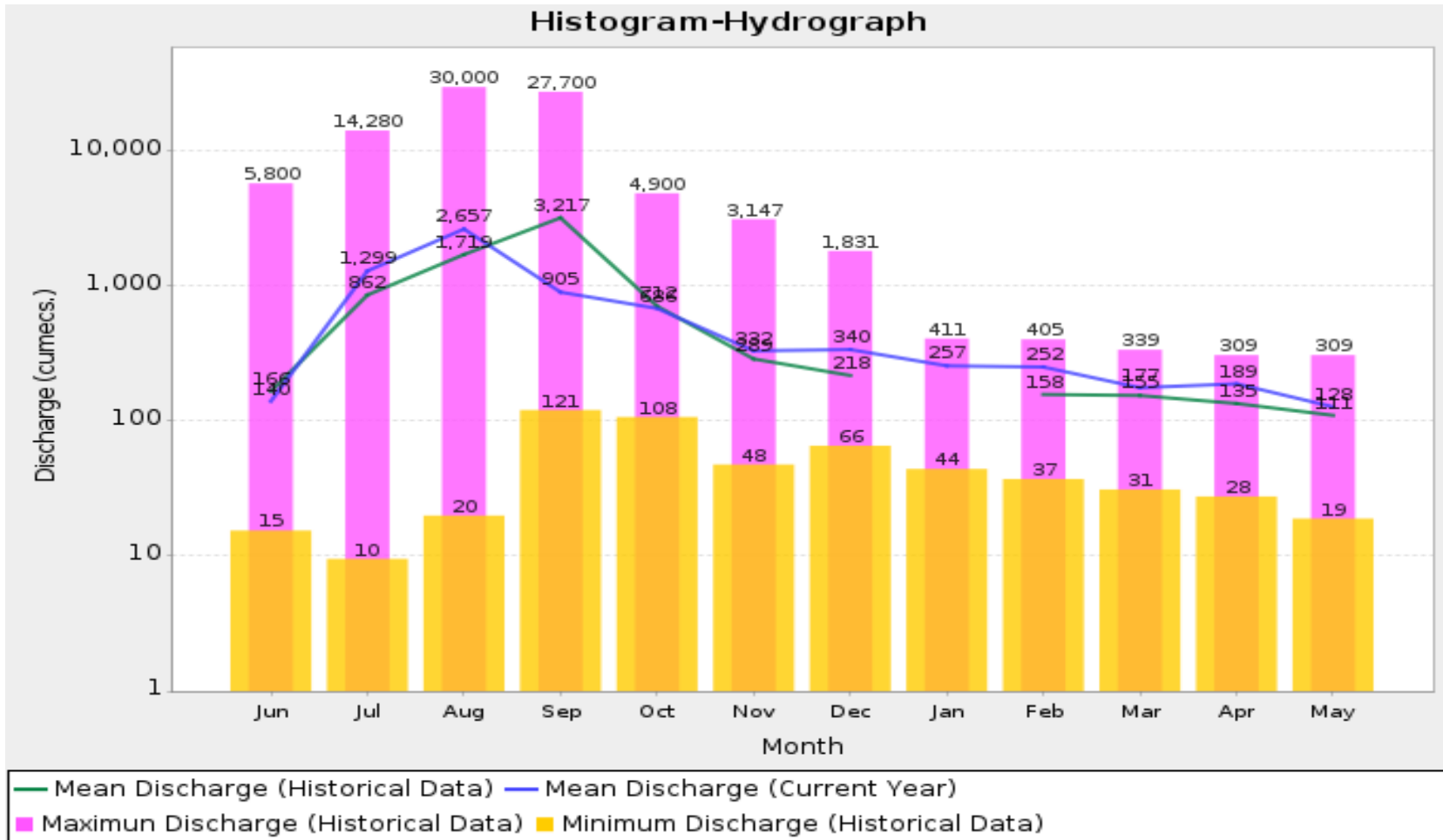
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1973-2017)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



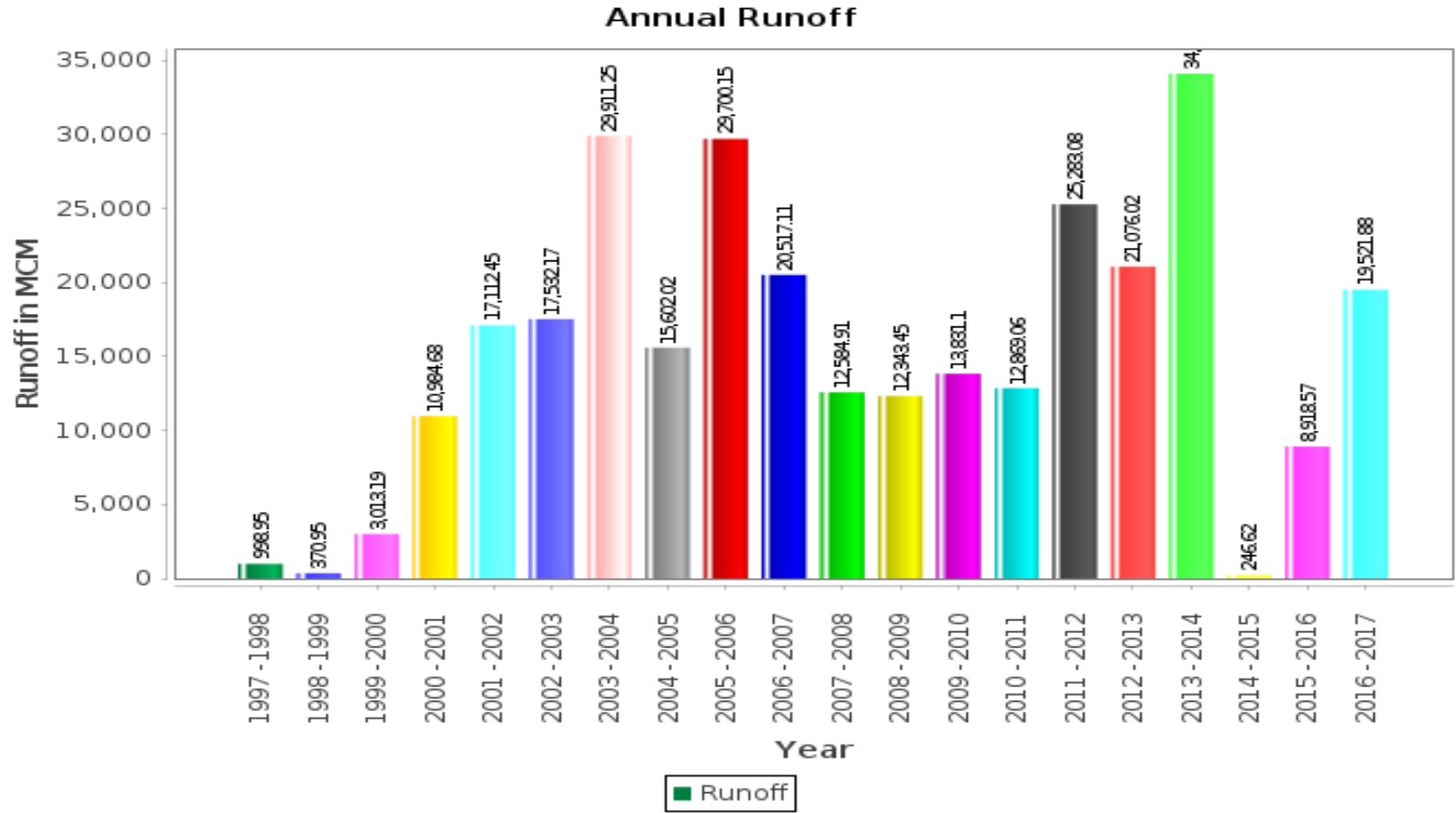
Annual Runoff Values for the period (1973 – 2017)

Station Name : Narmada at Hoshangabad (010215019)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



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

Monthly Average Runoff based on period (1973-2017)

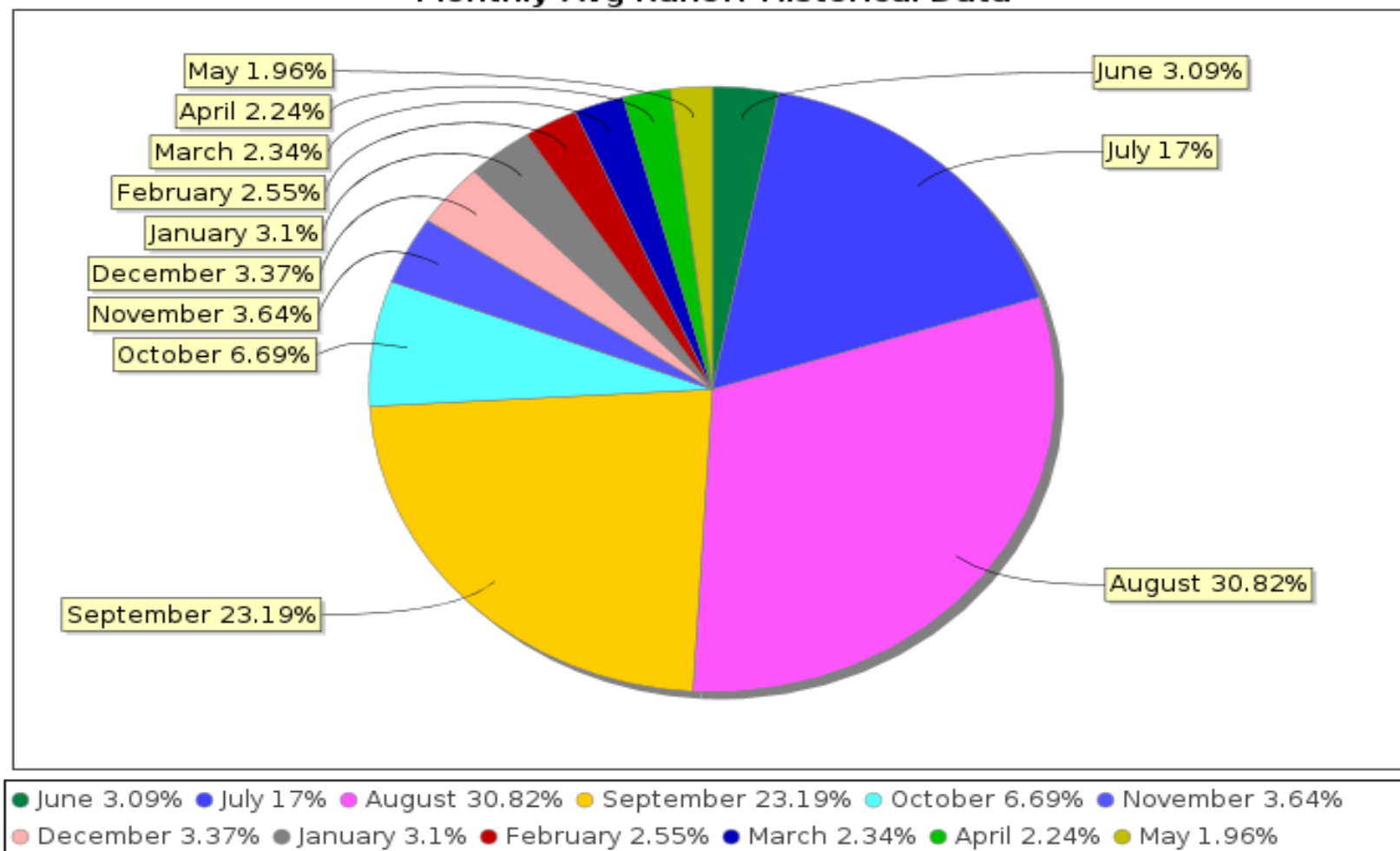
Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

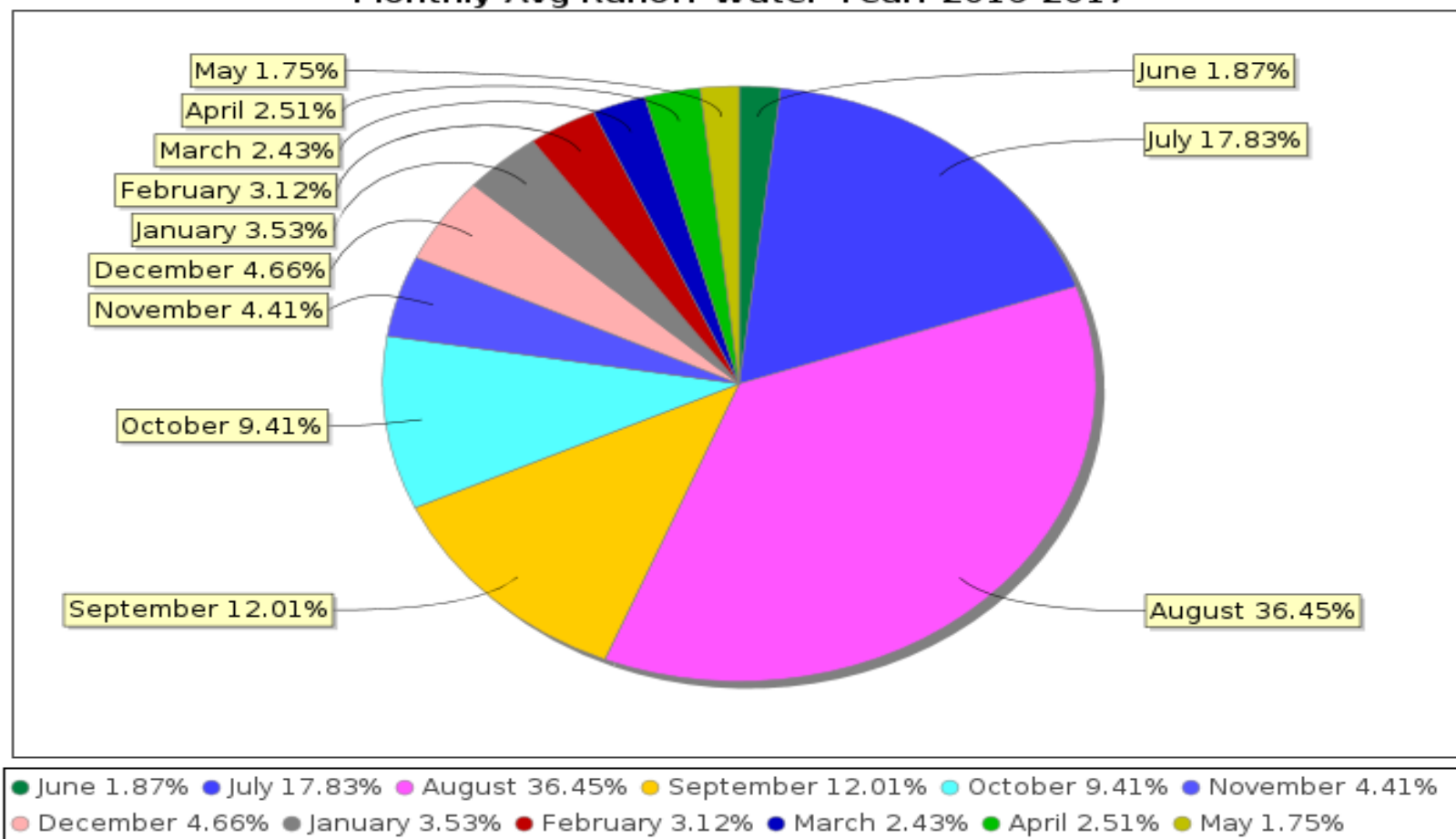
Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

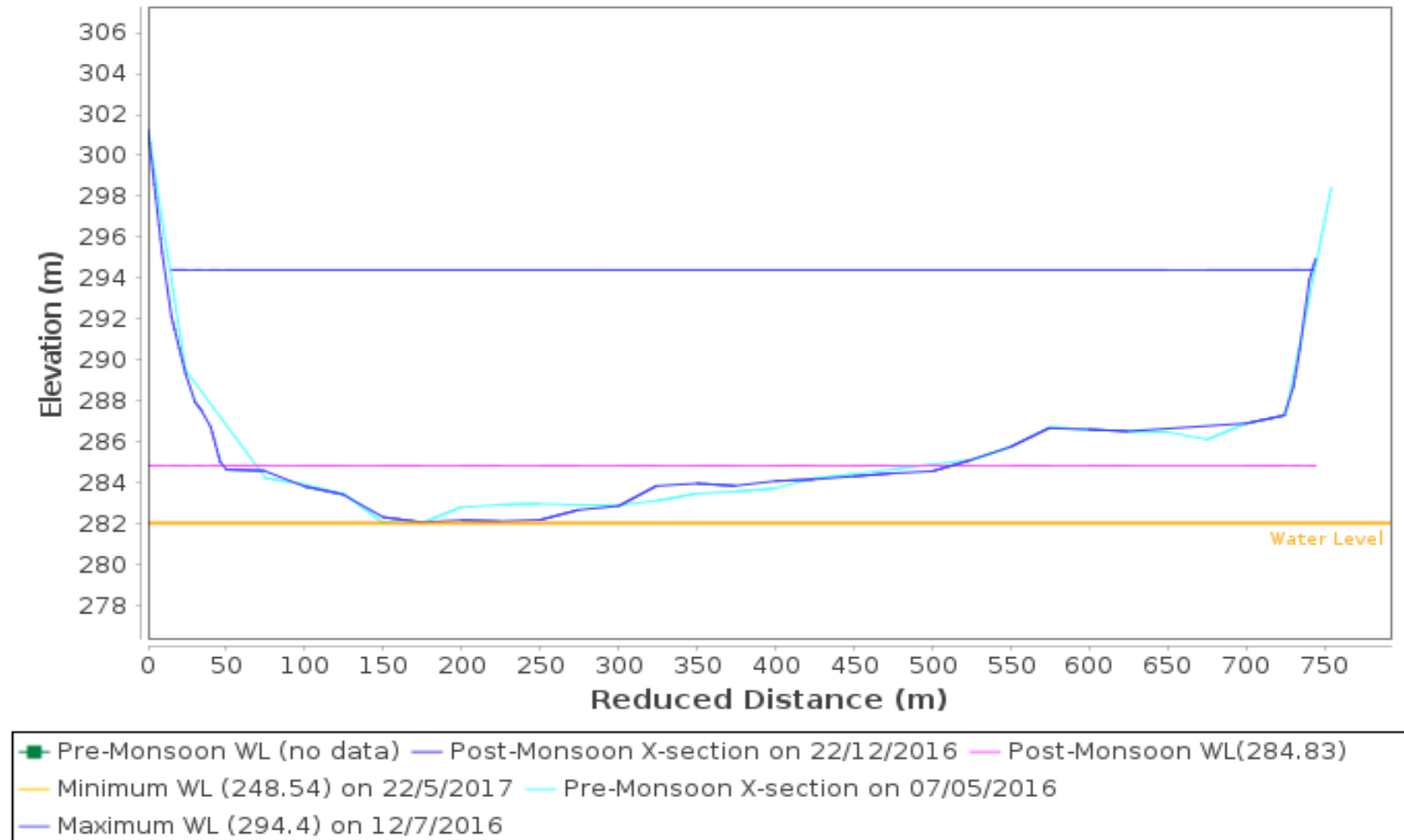
Station Name : Narmada at Hoshangabad (010215019)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad

X-Section



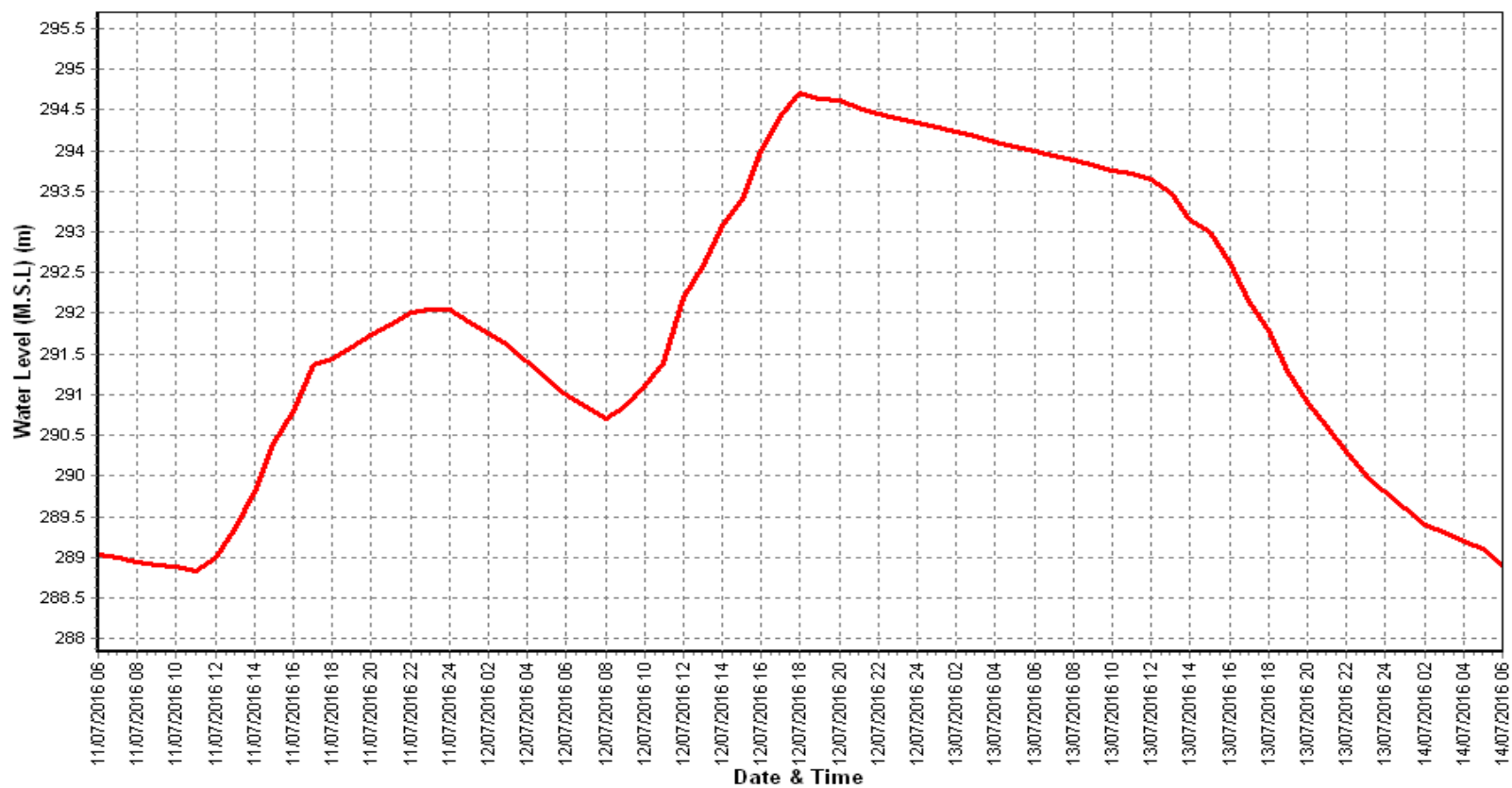
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Hoshangabad (010215019)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



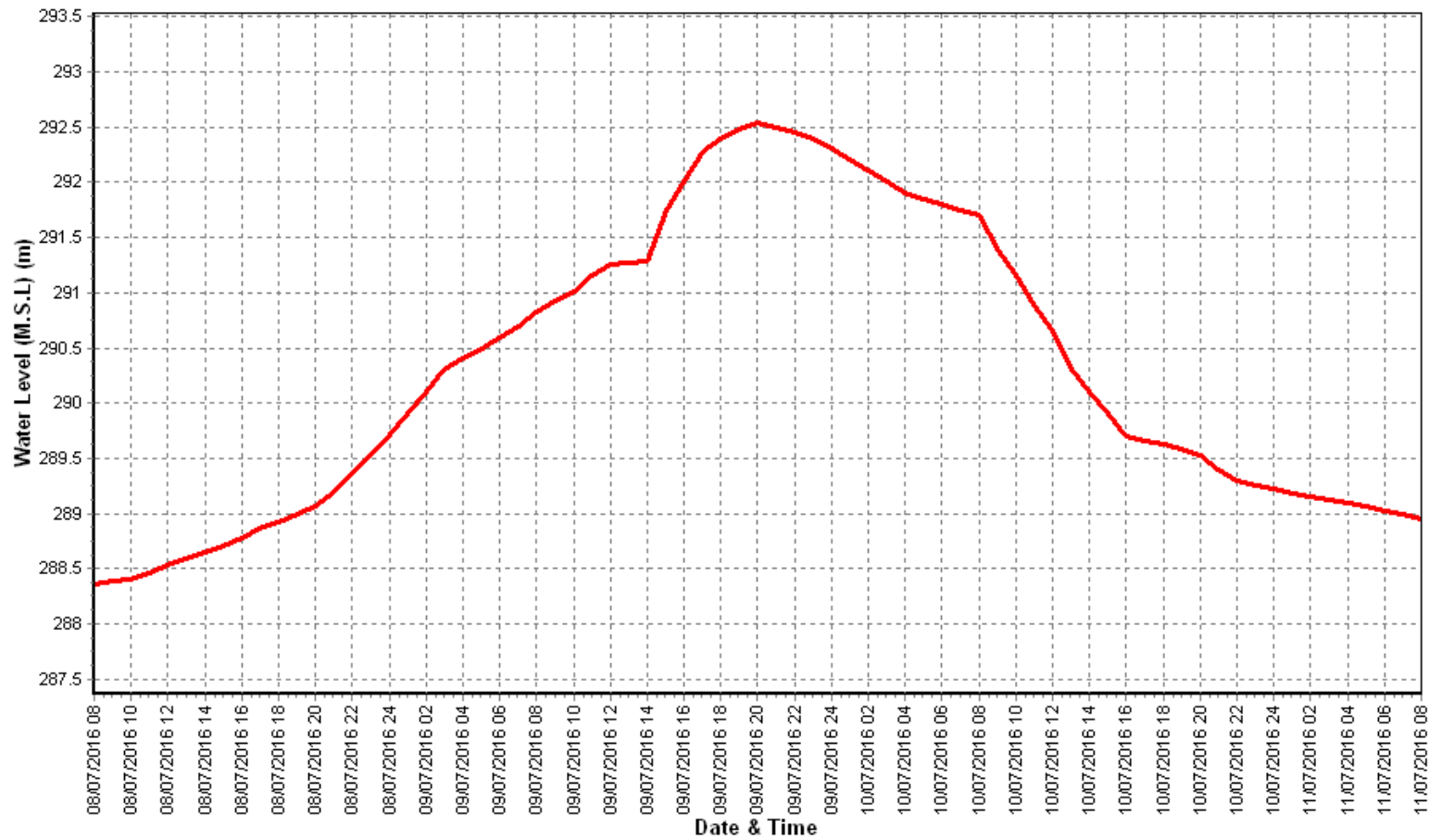
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



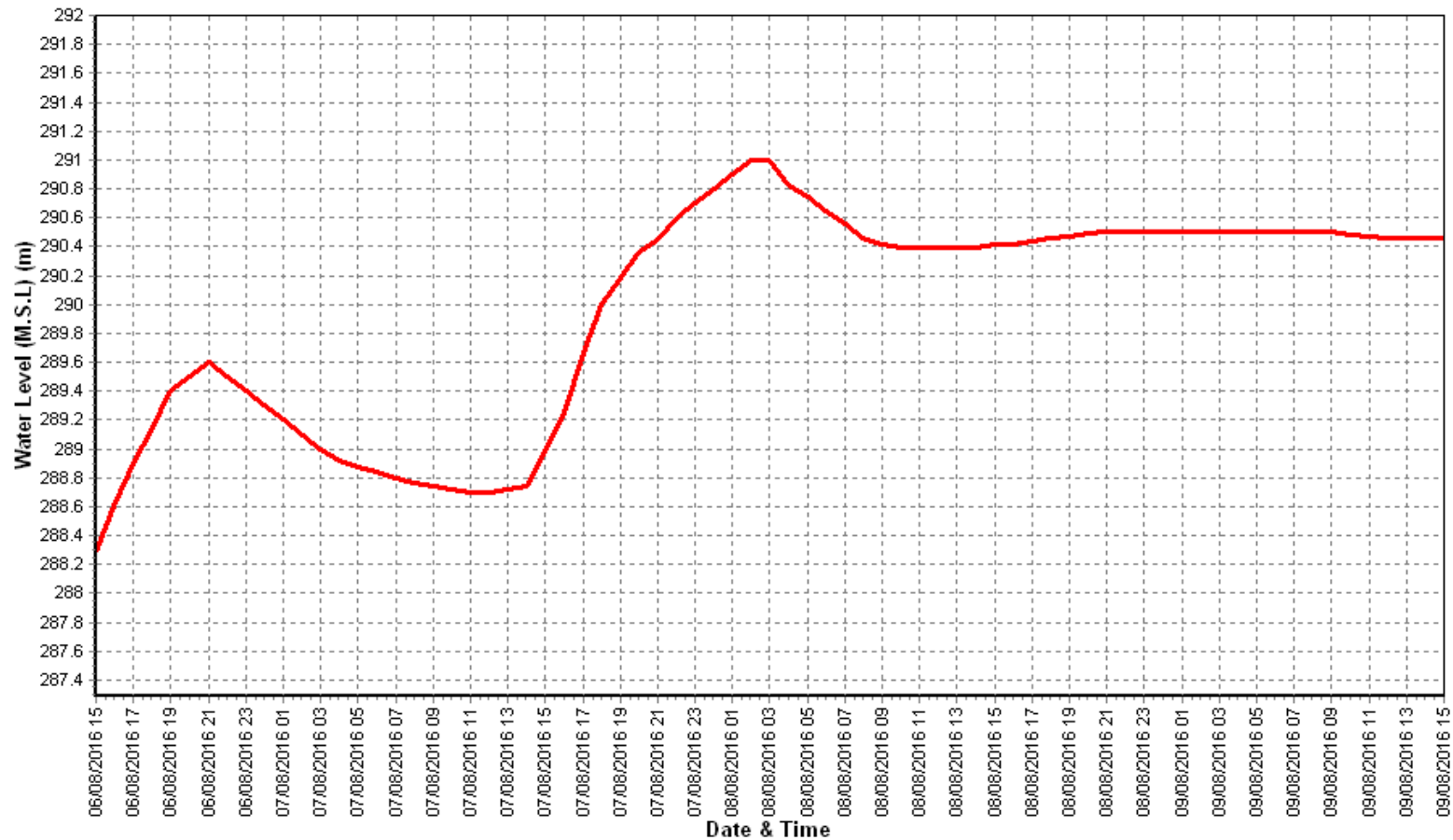
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Hoshangabad (010215019)

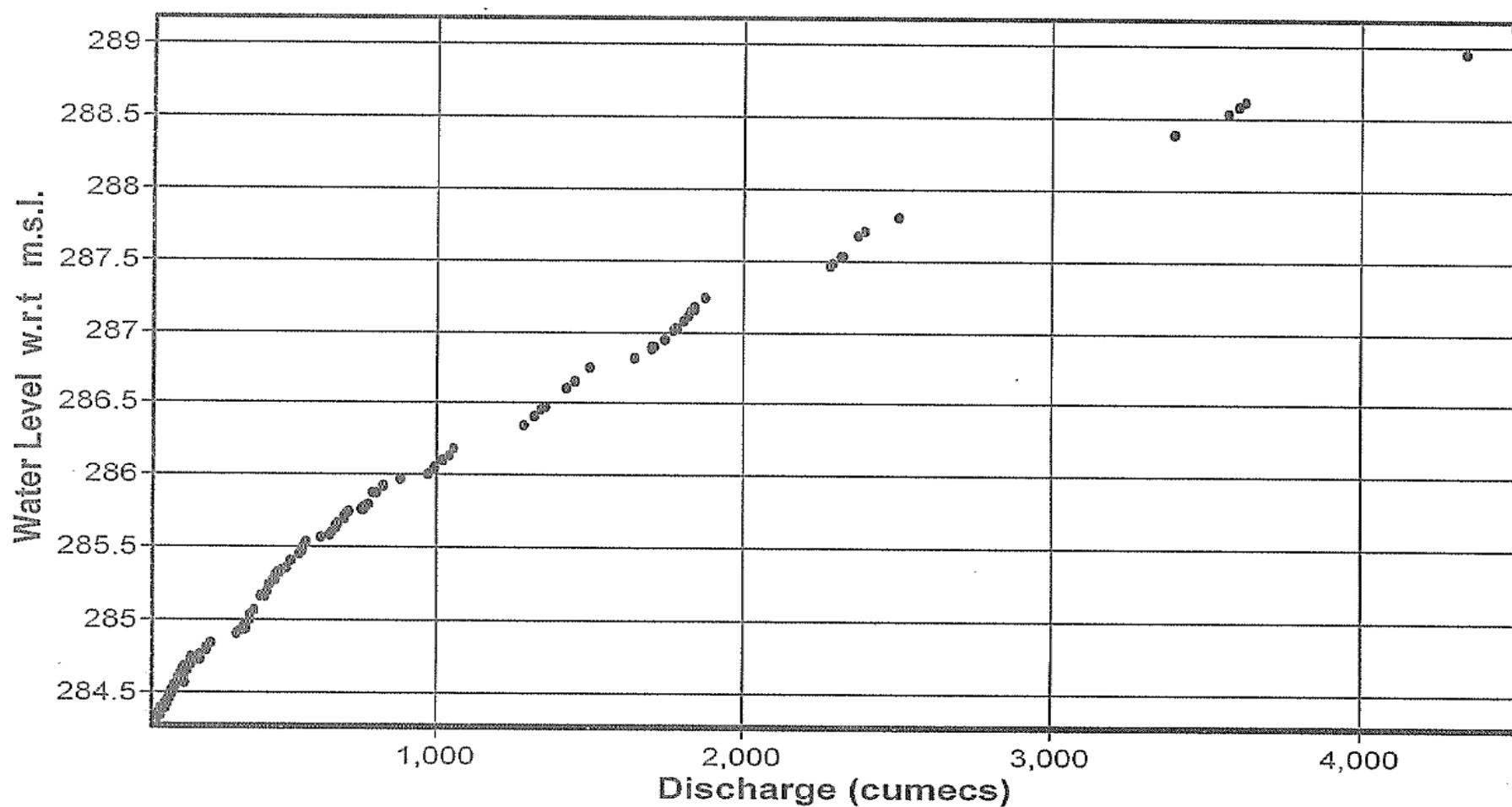
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



Plot of Stage Discharge Data at Narmada at Hoshangabad (010215019): 2016 - 2017



4.9 Narmada at Sandia

History sheet

[illegible]

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1978-1979	2190	303.77	01/07/1978	24.7	299.54	01/06/1978
1979-1980	315.5	300.815	01/08/1979	11.4	299.43	01/05/1980
1980-1981	8023.2	308.575	01/09/1980	10.7	299.42	01/06/1980
1981-1982	1025	302.42	01/10/1981	10.3	299.39	01/06/1981
1982-1983	2458.9	304.85	01/09/1982	15.3	299.225	01/06/1982
1983-1984	1842.7	304.005	01/10/1983	18	299.215	01/06/1983
1984-1985	1483.5	303.81	01/09/1984	16	299.215	01/05/1985
1985-1986	1534	303.69	01/08/1985	16.8	299.26	01/06/1985
1986-1987	1077.9	302.93	01/08/1986	18	299.195	01/06/1986
1987-1988	1221	303.587	01/09/1987	15.33	299.105	01/07/1987
1988-1989	1591	303.14	01/08/1988	12.1	298.985	01/06/1988
1989-1990	934.9	301.955	01/09/1989	11.74	298.95	01/06/1989
1990-1991	1507	302.805	01/09/1990	81.7	299.331	01/06/1990
1991-1992	6254	308.05	01/09/1991	91.23	299.74	01/06/1991
1992-1993	849.1	301.895	01/09/1992	52.36	299.25	01/07/1992
1993-1994	1889	303.385	01/10/1993	46.8	299.24	01/02/1994
1994-1995	4266	306.58	01/09/1994	92.33	299.59	01/06/1994
1995-1996	3743	305.295	01/08/1995	110.4	299.77	01/06/1995
1996-1997	760	301.575	01/09/1996	94.16	299.55	01/06/1996
1997-1998	2416	304.025	01/08/1997	64.39	299.41	01/07/1997
1998-1999	550	300.945	01/10/1998	52.73	299.36	01/05/1999
1999-2000	1970	303.355	01/10/1999	26.53	299.2	01/06/1999
2000-2001	2586	304.345	01/08/2000	57.77	299.45	01/01/2001
2001-2002	652.6	301.38	01/08/2001	52.27	299.57	01/06/2001
2002-2003	1460	302.93	01/09/2002	55.59	299.4	01/04/2003
2003-2004	4300	306.135	01/09/2003	68	299.45	01/06/2003
2004-2005	900	301.9	01/08/2004	85.55	299.48	01/06/2004
2005-2006	8834.88	309.65	01/08/2005	101.96	299.62	01/07/2005
2006-2007	6499.59	308.325	01/09/2006	64.63	299.57	01/04/2007
2007-2008	565.6	301.415	01/08/2007	46.04	299.62	09/05/2008
2008-2009	1287.43	302.68	01/07/2008	82.71	299.83	05/02/2009
2009-2010	2903.76	304.44	22/07/2009	66.04	299.59	01/04/2010
2010-2011	1161.63	302.6	16/08/2010	79.91	299.24	01/05/2011
2011-2012	1650.19	303.2	01/09/2011	73.97	299.24	01/06/2011
2012-2013	1627.07	303.02	01/09/2012	37.83	299.15	01/06/2012
2013-2014	16259.29	314.05	23/08/2013	65.45	299.3	15/05/2014
2014-2015	4602.13	306.91	08/08/2014	75.02	299.325	18/06/2014
2015-2016	2982.3	305.32	05/08/2015	40.26	299.25	03/03/2016
2016-2017	6517.6	307.58	09/08/2016	57	299.29	12/06/2016

Stage Discharge Sheet for Narmada at Sandia for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	124.2	299.65	124.9	299.66	1241.8	302.64	1894.3	303.49	1516.7	302.83	257.3	300.2
2	110.2	299.53	154	299.79	1789.4	302.95	2172.7	304.02	1750	303.28	255.2	300.19
3	93.7	299.39	142	299.76	1868.2	303.6	1901.7	303.53	1823.6	303.39	252.4	300.19
4	58.6	299.3	234.4	300.22	1194.3	302.45	1530	302.89	1085.9	302.3	249.6	300.18
5	80	299.36	264.5	300.34	1712.5	303.05	1150	302.38	846.6	301.71	250	300.18
6	89.7	299.46	1754.1	303.17	1247.8	302.66	899.4	301.87	775	301.55	227	300.13
7	93.3	299.5	1850	303.56	1740	303.2	776.9	301.54	754.4	301.37	227.1	300.13
8	94.2	299.51	1748.2	303.2	4574.1	303.85	630.1	301.09	740.9	301.41	209.6	300.06
9	94.1	299.52	2673.6	304.8	6517.6	307.58	610.7	301.02	720	301.46	231.3	300.09
10	89.1	299.47	2630	304.73	5585.8	306.8	584.4	300.96	753.4	301.46	249.6	300.16
11	74.1	299.36	2325.7	304.37	2038.8	303.9	570	300.91	708	301.44	247.6	300.15
12	57	299.29	2867.5	305.16	1101.9	302.24	554	300.82	725	301.64	245.6	300.14
13	88.6	299.47	2708.6	304.9	1351.9	302.8	550	300.8	772.2	301.67	236	300.13
14	81.4	299.42	1536	302.89	1800	303.31	537	300.76	749.2	301.6	227	300.14
15	78	299.4	795.1	301.58	1870	303.47	549.7	300.79	561.7	300.94	236.4	300.1
16	89.1	299.47	652.2	301.14	1817.7	303.4	553.9	300.82	470	300.76	230.1	300.1
17	92.8	299.5	632	301.01	1718.4	303.12	539.5	300.77	457.7	300.72	233	300.13
18	81.9	299.43	553	300.8	1856.6	303.43	535	300.75	432	300.55	235.8	300.12
19	80	299.43	545.7	300.78	1675.1	303.06	834	301.65	420.3	300.51	235.1	300.1
20	86.3	299.46	504.7	300.66	2126.7	303.8	555	300.82	417.9	300.5	230	299.93
21	79	299.41	346.7	300.49	2150	304	588.3	300.92	415.8	300.49	187.1	299.9
22	71.7	299.34	404.7	300.68	1786.7	303.29	619.5	301.01	336.5	300.44	182.7	299.93
23	86.9	299.46	923.7	301.94	1278.4	302.7	659	301.15	325	300.41	177.4	299.9
24	85.1	299.45	920	301.94	1740.3	303.13	661.2	301.17	317.1	300.41	166.6	299.85
25	95.8	299.51	905.2	301.88	1149.4	302.47	630	301.08	298.9	300.37	152.8	299.78
26	80	299.42	773.2	301.51	1120.2	302.3	623.4	301.05	288.7	300.31	149.9	299.68
27	78.9	299.38	882.3	301.8	2312	304.42	711.9	301.32	286.3	300.3	135	299.68
28	78.8	299.39	1691.7	303.04	1850	303.41	684.5	301.24	286	300.3	125.4	299.54
29	82.8	299.41	1091.2	302.23	1530.1	302.9	627.2	301.08	276.2	300.27	135	299.6
30	92.3	299.47	1095.4	302.23	1116.7	302.3	692.1	301.22	270	300.26	136.2	299.62
31			1010		1790.8	303.3			260.6	300.21		
Ten-Daily Mean												
I Ten-Daily	92.71	299.47	1157.57	301.92	2747.15	303.88	1215.02	302.28	1076.65	302.08	240.91	300.15
II Ten-Daily	80.92	299.42	1312.05	302.33	1735.71	303.25	577.81	300.89	571.4	301.03	235.66	300.1
III Ten-Daily	83.13	299.42	913.1	274.34	1620.42	303.11	649.71	301.12	305.55	300.34	154.81	299.75
Monthly												
Min.	57	299.29	124.9	299.66	1101.9	302.24	535	300.75	260.6	300.21	125.4	299.54
Max.	124.2	299.29	2867.5	299.66	6517.6	302.24	2172.7	300.75	1823.6	300.21	257.3	299.54
Mean	85.59	299.44	1127.57	292.86	2034.43	303.41	814.18	301.43	651.2	301.15	210.46	300

Annual Runoff in MCM : 15068.69

Annual Runoff in mm : 443.8

Peak Observed Discharge = 6517.6 cumecs on 9/8/2016 Corres. Water Level = 307.58 m

Lowest Observed Discharge = 58.6 cumecs on 4/6/2016 Corres. Water Level = 299.3 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
 #:Discarded Discharge (values changed as per rating curve)
 Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Narmada at Sandia for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	145.1	299.68	157	299.72	163.9	299.77	118.4	299.48	125.4	299.6	90.8	299.98
2	168.6	299.8	152.9	299.7	164	299.77	126.9	299.55	125	299.6	99.3	299.45
3	174.8	299.83	154.4	299.7	163.7	299.77	118.3	299.48	111.6	299.49	93.1	299.42
4	150	299.73	144.3	299.62	157.6	299.74	113.2	299.44	100.1	299.43	83.3	299.33
5	137	299.61	129.5	299.52	157	299.74	115	299.46	99.2	299.41	73	299.23
6	131.8	299.57	158.8	299.73	151.2	299.72	109.8	299.42	91.9	299.37	72.7	299.23
7	151.7	299.7	200.4	299.95	151	299.72	114.9	299.45	95.8	299.39	73	299.24
8	150.9	299.7	185	299.9	150.3	299.72	111.6	299.43	81.8	299.33	74.8	299.24
9	166.1	299.8	178.2	299.85	148.9	299.71	103.8	299.39	75	299.28	69.8	299.21
10	162.2	299.78	152.1	299.7	158.3	299.75	86	299.31	77.3	299.29	69	299.2
11	182	299.9	130.3	299.55	156.4	299.74	79	299.27	111.1	299.5	64.1	299.16
12	190	299.96	127.3	299.3	156	299.74	92	299.35	115.3	299.52	72.2	299.23
13	216.7	300.05	124.1	299.51	156.4	299.74	110	299.45	121.4	299.57	86.4	299.35
14	194.9	299.98	132.6	299.58	158.7	299.75	130.4	299.6	120	299.57	90	299.38
15	185.2	299.89	145	299.64	161.9	299.77	129.8	299.6	124.5	299.59	85.7	299.33
16	157.4	299.67	172.3	299.81	160.6	299.77	132.9	299.63	125	299.59	86.5	299.35
17	147.4	299.64	163.8	299.77	159.9	299.76	120.9	299.53	124.3	299.59	76.1	299.25
18	152	299.72	162.5	299.76	159.4	299.76	106.8	299.43	124.3	299.59	77	299.25
19	219.4	300.05	162.6	299.76	150	299.7	120	299.55	196.9	299.6	92.9	299.43
20	200.5	299.95	160.3	299.75	133.8	299.6	141.7	299.68	126.4	299.6	94.6	299.44
21	181.2	299.88	162.1	299.76	141.6	299.62	140.4	299.68	125.5	299.59	75	299.25
22	165	299.76	160	299.76	120.2	299.51	135	299.66	125.5	299.59	69	299.18
23	168.6	299.8	158.4	299.74	119.4	299.5	130.8	299.64	115	299.53	66.8	299.15
24	172.1	299.83	160.1	299.75	117	299.46	128.4	299.63	98.3	299.42	78.7	299.25
25	172	299.83	160.7	299.75	118.8	299.48	136.5	299.67	108.4	299.5	101.4	299.47
26	185.8	299.9	160	299.75	145	299.65	132	299.62	115.6	299.55	168.4	299.81
27	165	299.75	161.1	299.75	118.6	299.48	106.3	299.45	97	299.41	126.4	299.6
28	158.8	299.72	161.3	299.75	110.6	299.43	98.8	299.41	80.4	299.32	115	299.55
29	173.5	299.82	160	299.75			125.7	299.6	82.7	299.33	86.4	299.35
30	166.2	299.78	165	299.77			127.7	299.61	85	299.34	74.6	299.28
31	164	299.77	164.2	299.77			126.1	299.61			71	299.26
Ten-Daily Mean												
I Ten-Daily	153.82	299.72	161.26	299.74	156.59	299.74	111.79	299.44	98.31	299.42	79.88	299.35
II Ten-Daily	184.55	299.88	148.08	299.64	155.31	299.73	116.35	299.51	128.92	299.57	82.55	299.32
III Ten-Daily	170.2	299.8	161.17	299.75	123.9	299.52	126.15	299.6	103.34	299.46	93.88	299.38
Monthly												
Min.	131.8	299.57	124.1	299.3	110.6	299.43	79	299.27	75	299.28	64.1	299.15
Max.	219.4	299.57	200.4	299.3	164	299.43	141.7	299.27	196.9	299.28	168.4	299.15
Mean	169.52	299.8	156.84	299.71	145.27	299.66	118.1	299.52	110.19	299.48	85.44	299.35

Peak Computed Discharge = 2630 cumecs on 10/7/2016

Corres. Water Level = 304.73 m

Lowest Computed Discharge = 57cumecs on 12/6/2016

Corres. Water Level = 299.29 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

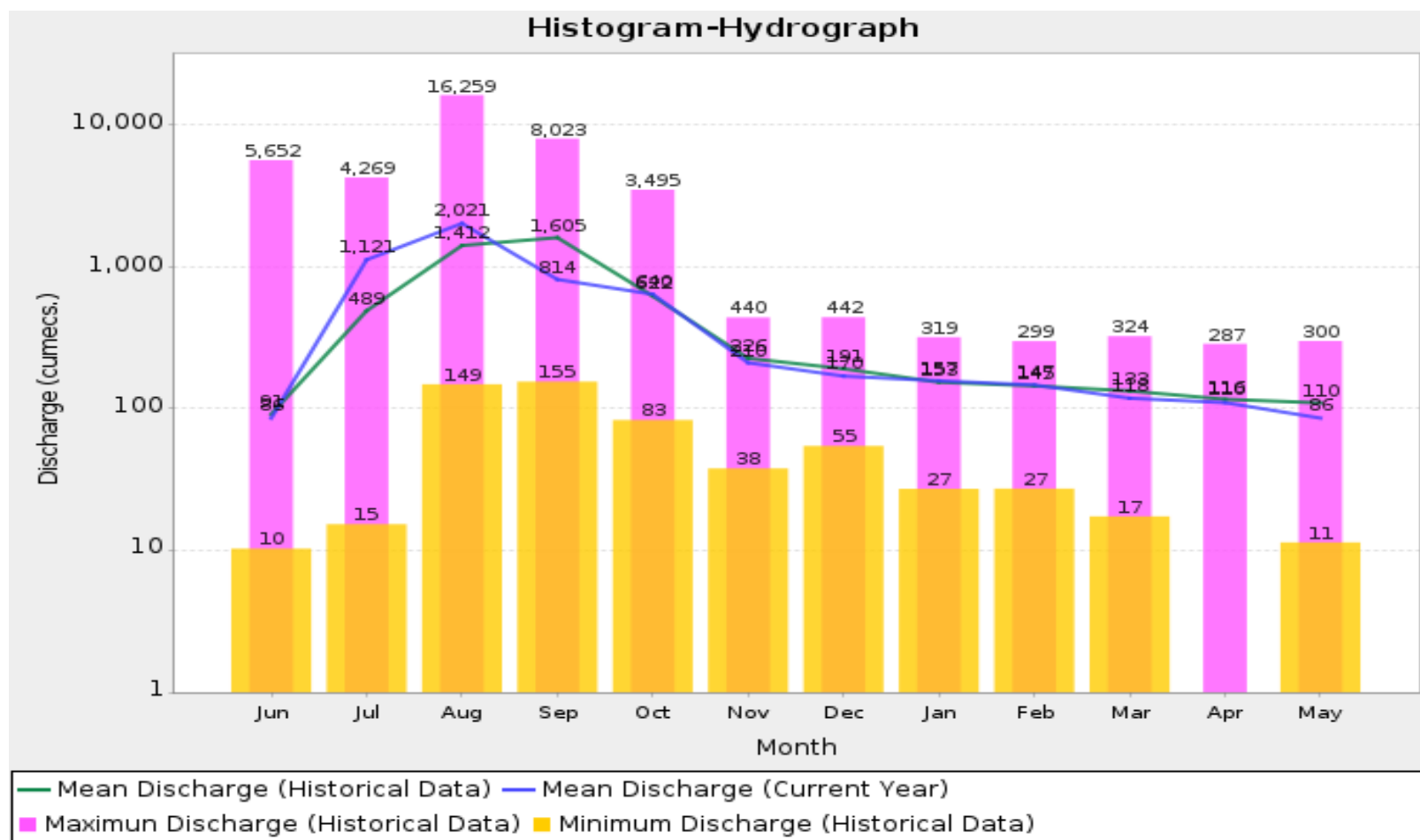
Histogram - Hydrograph for Water Year : 2016-17 (Data considered : 1978-2017)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



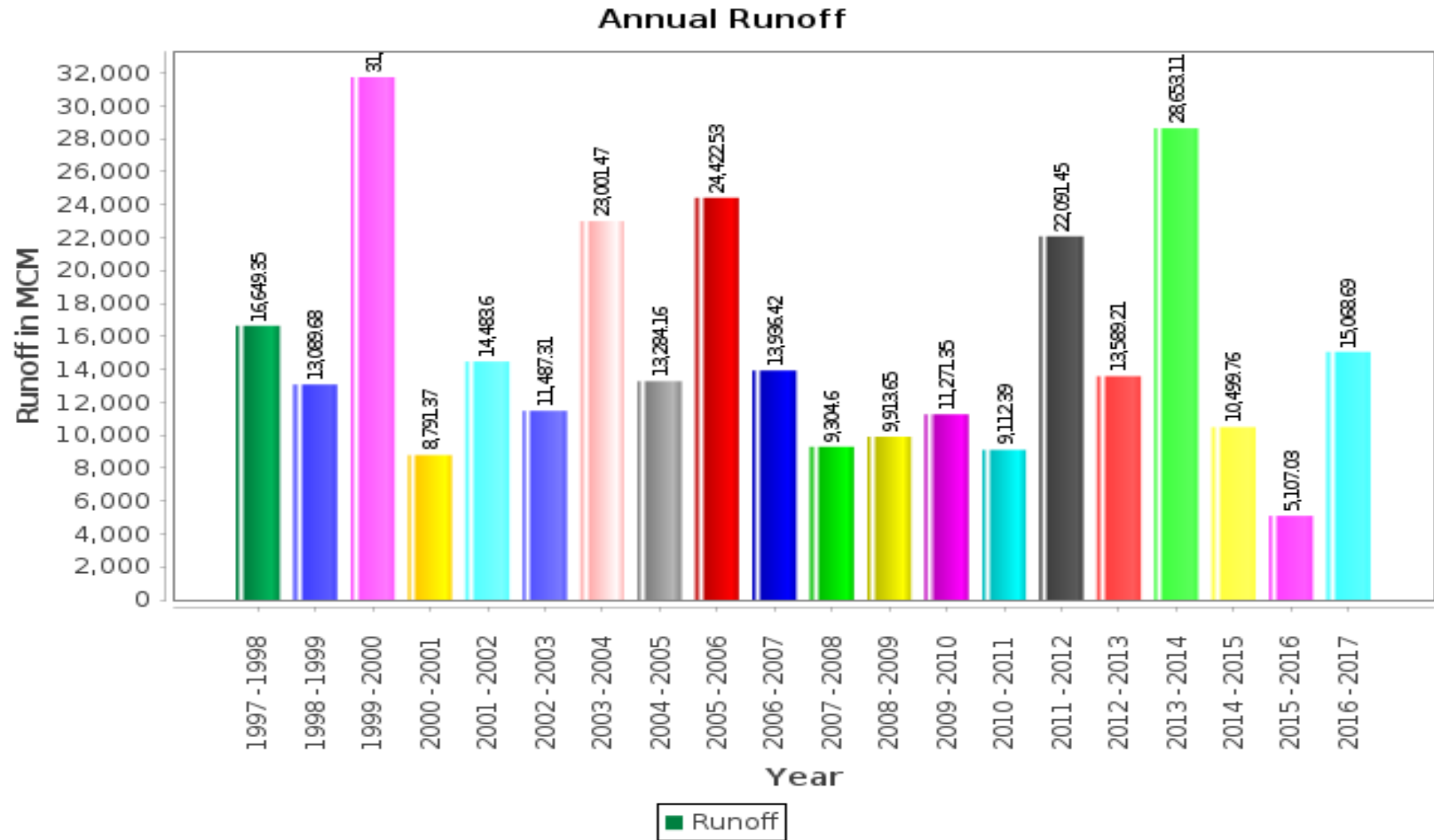
Annual Runoff Values for the period (1978 – 2017)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



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

Monthly Average Runoff based on period (1978-2017)

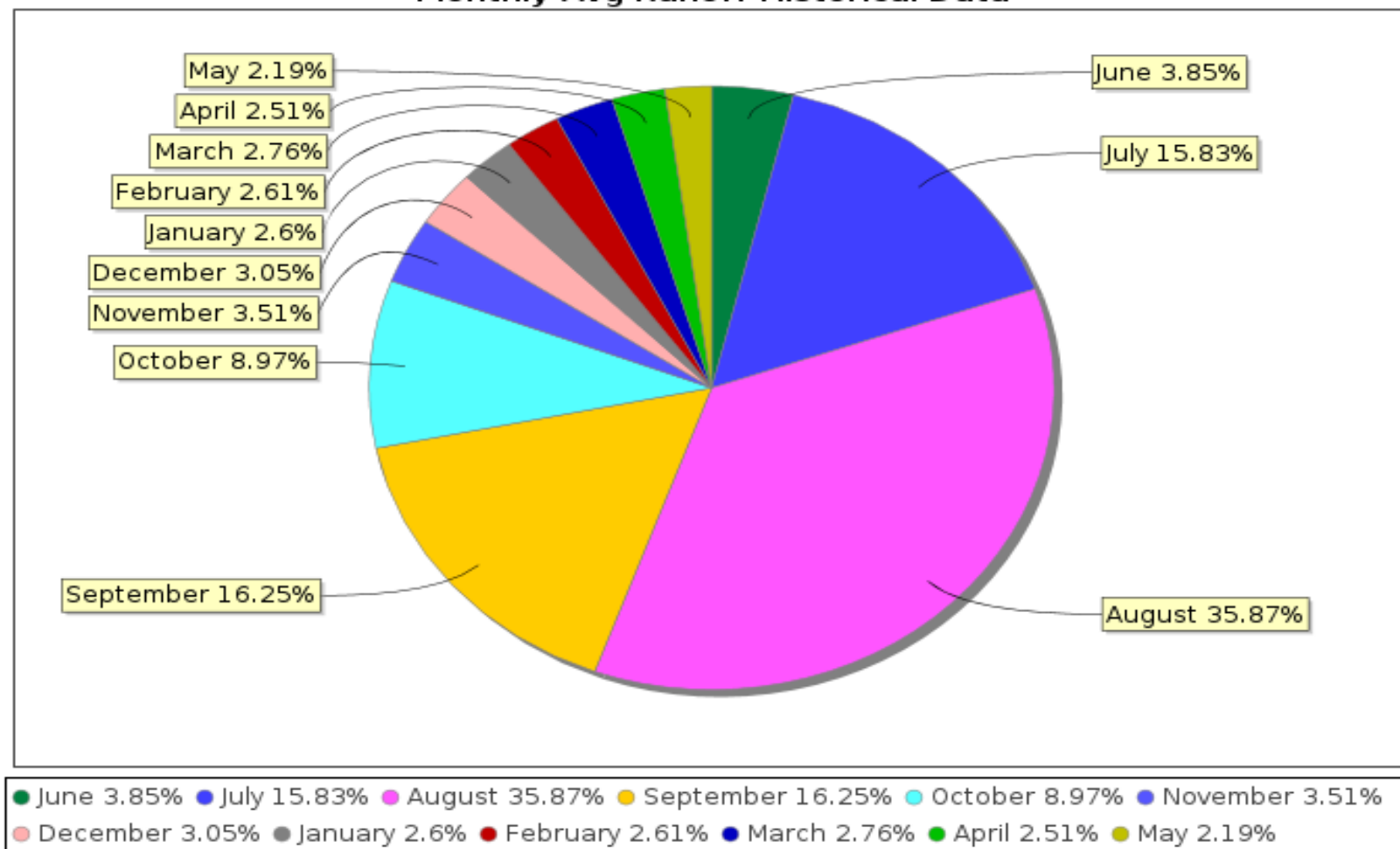
Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

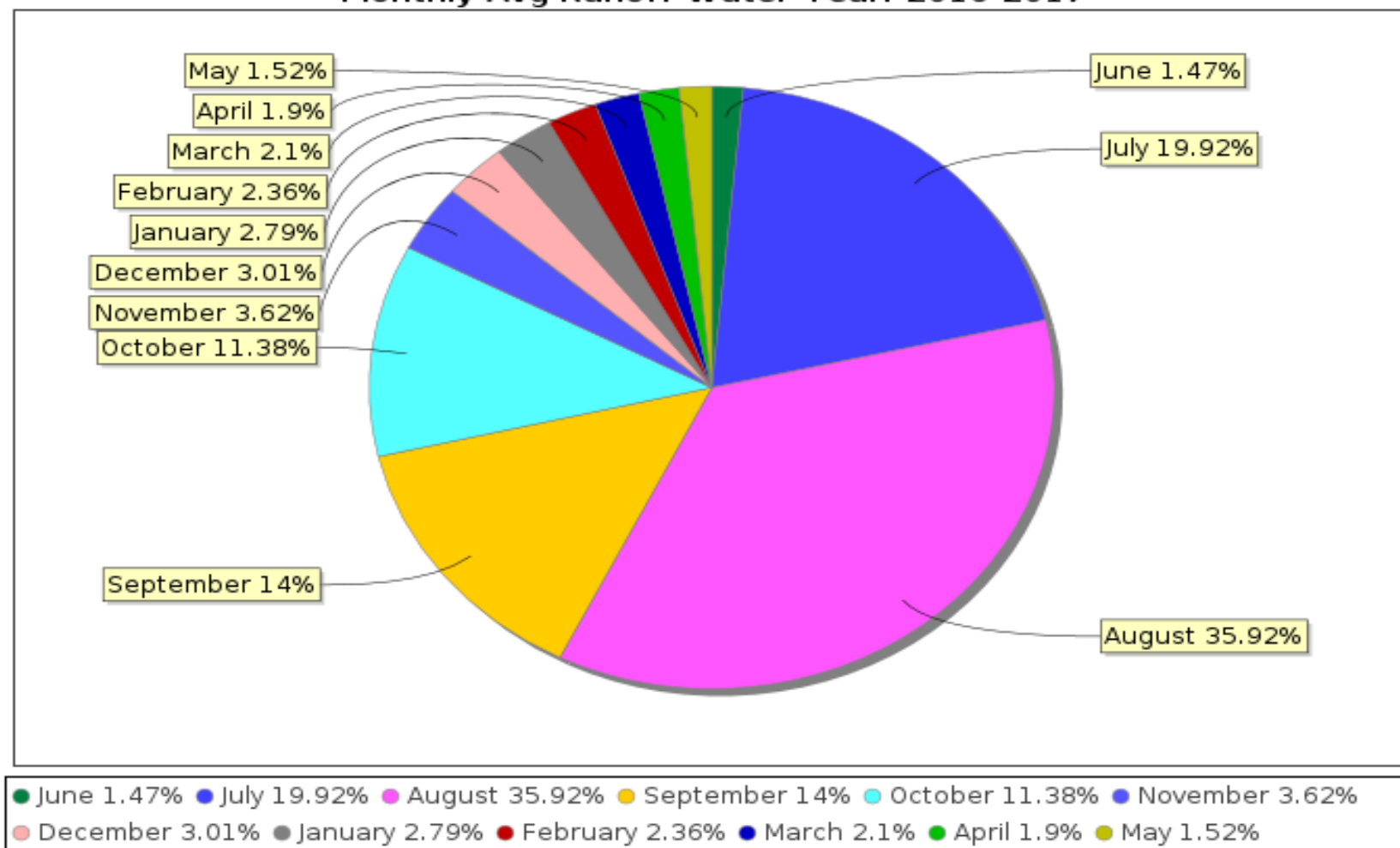
Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

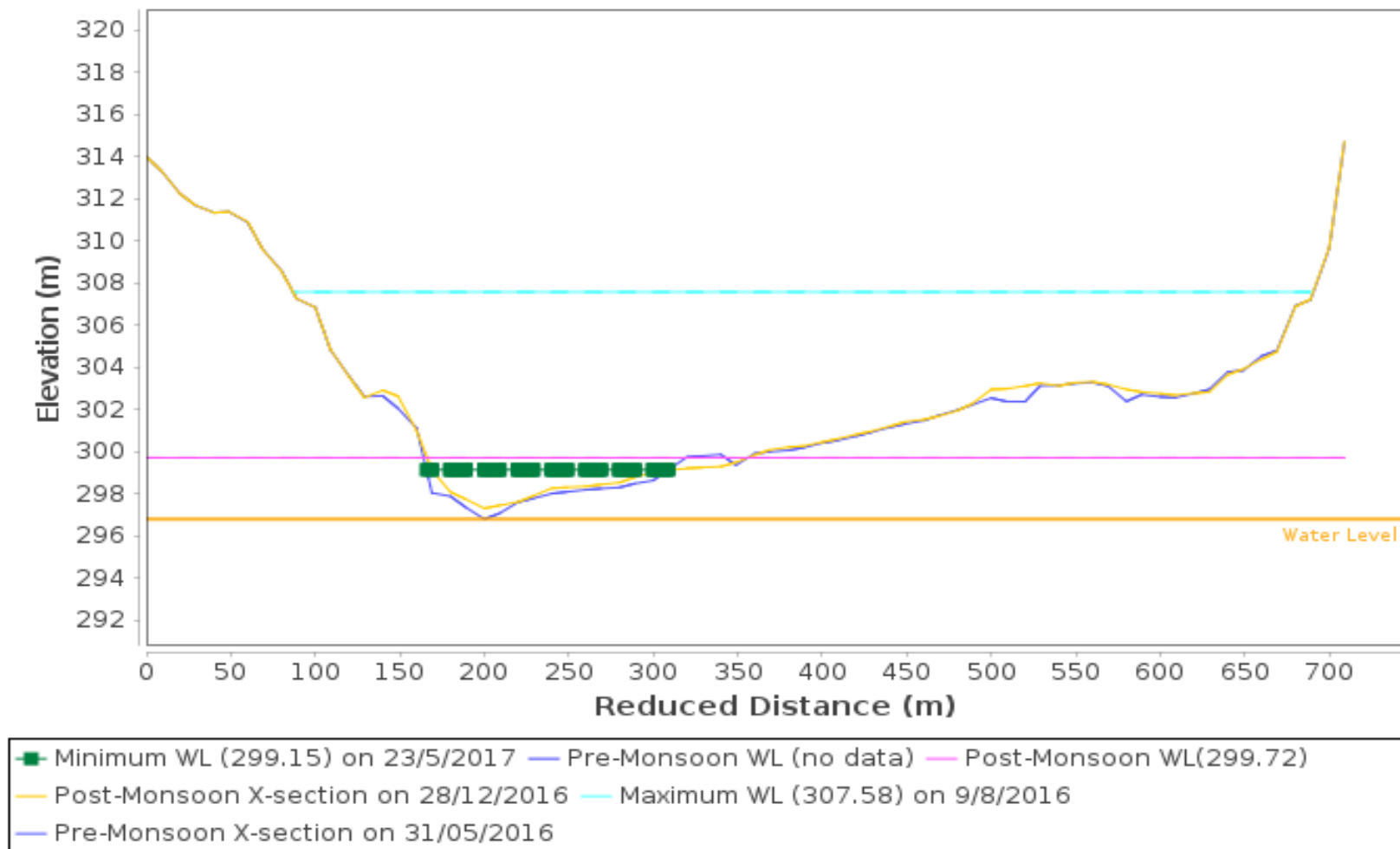
Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

X-Section



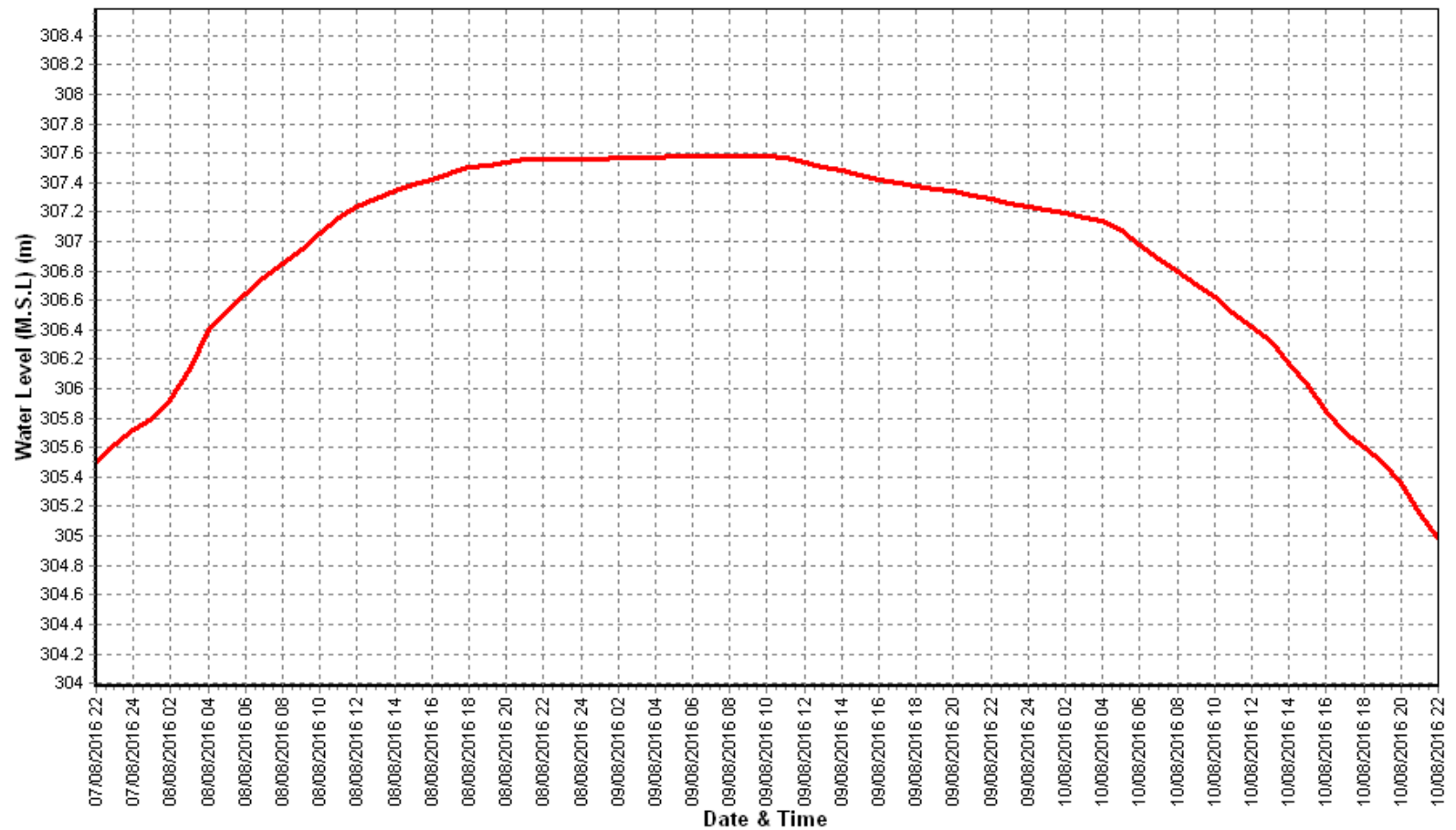
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



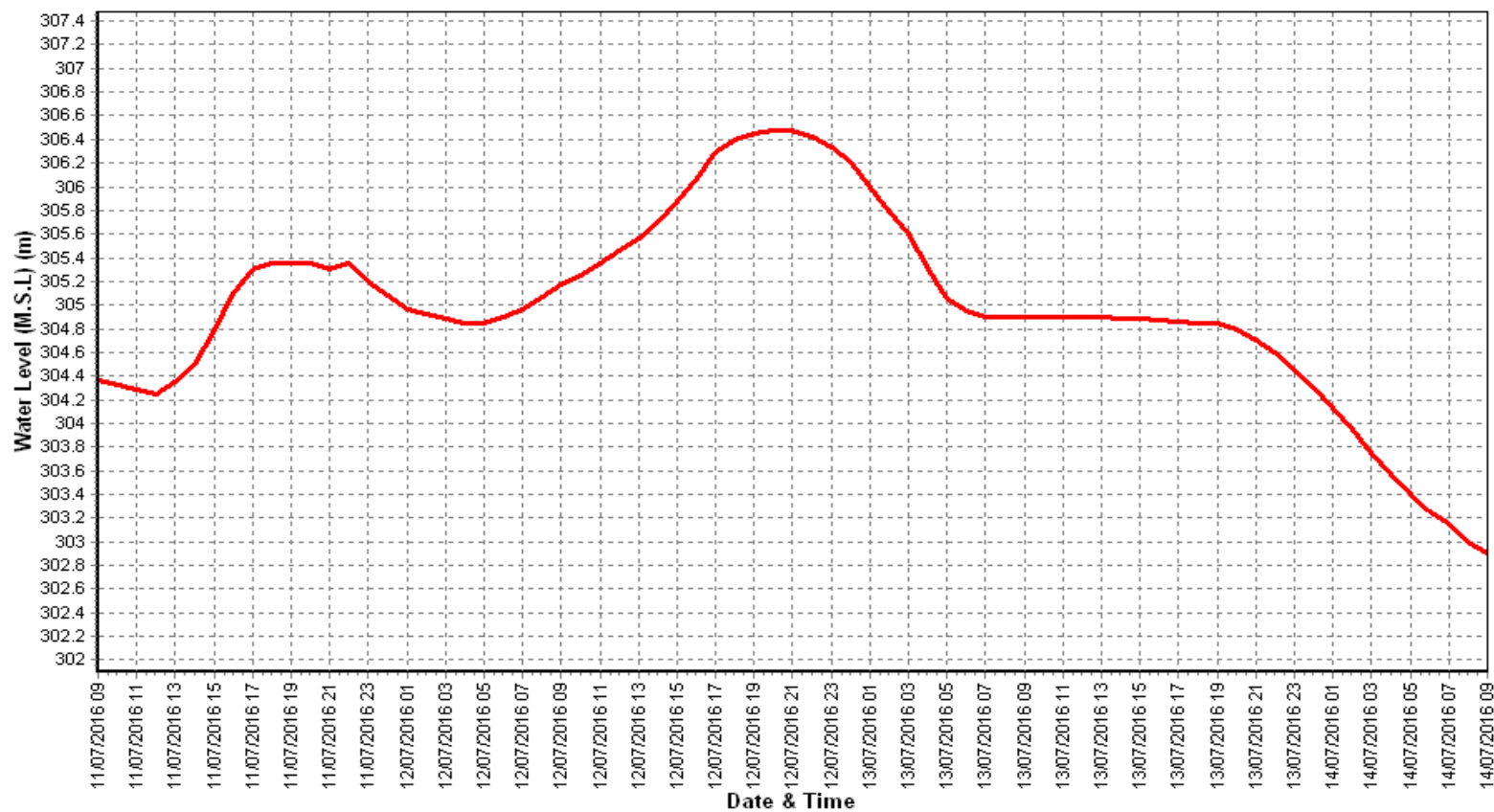
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



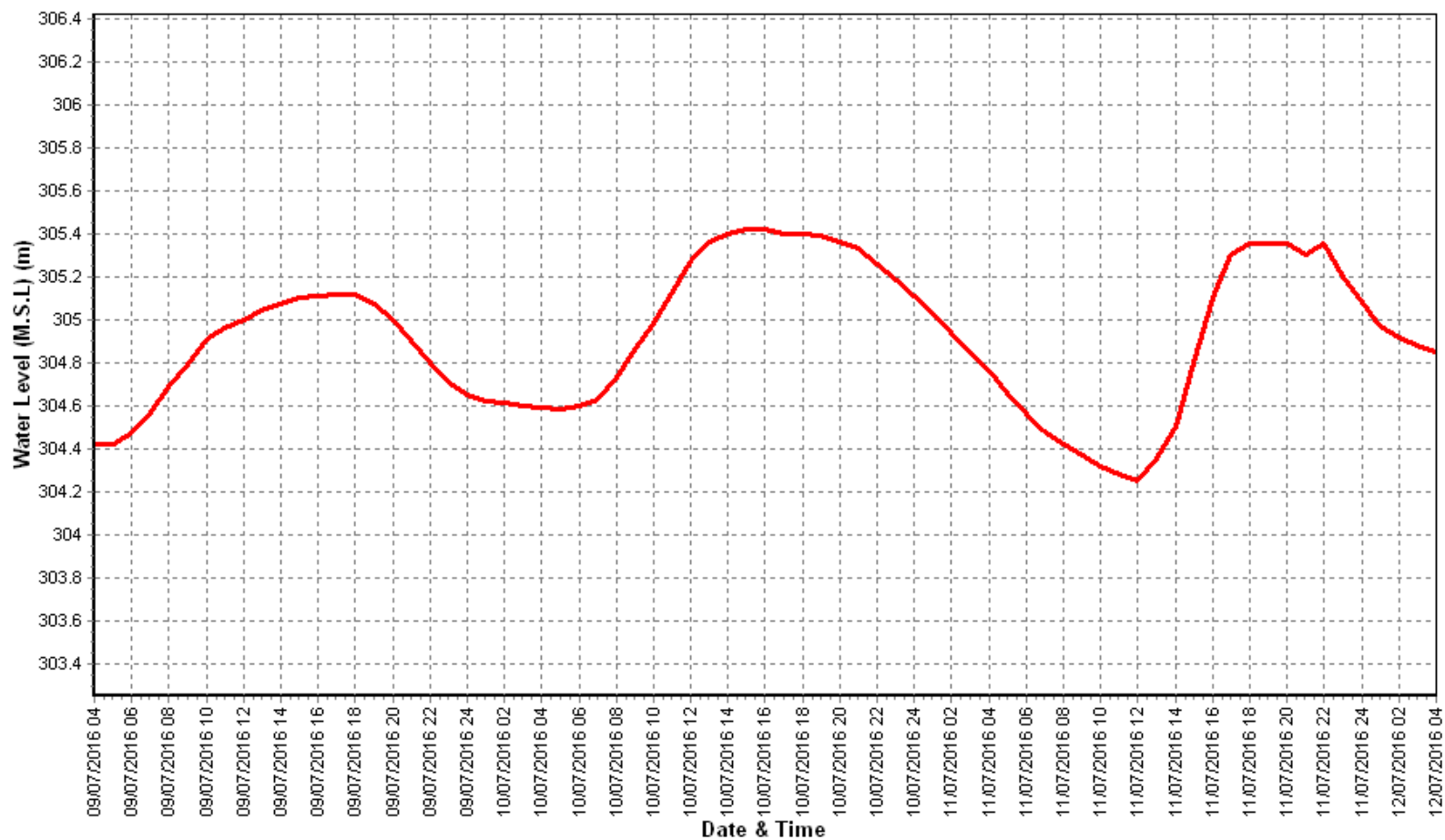
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Sandia (010215013)

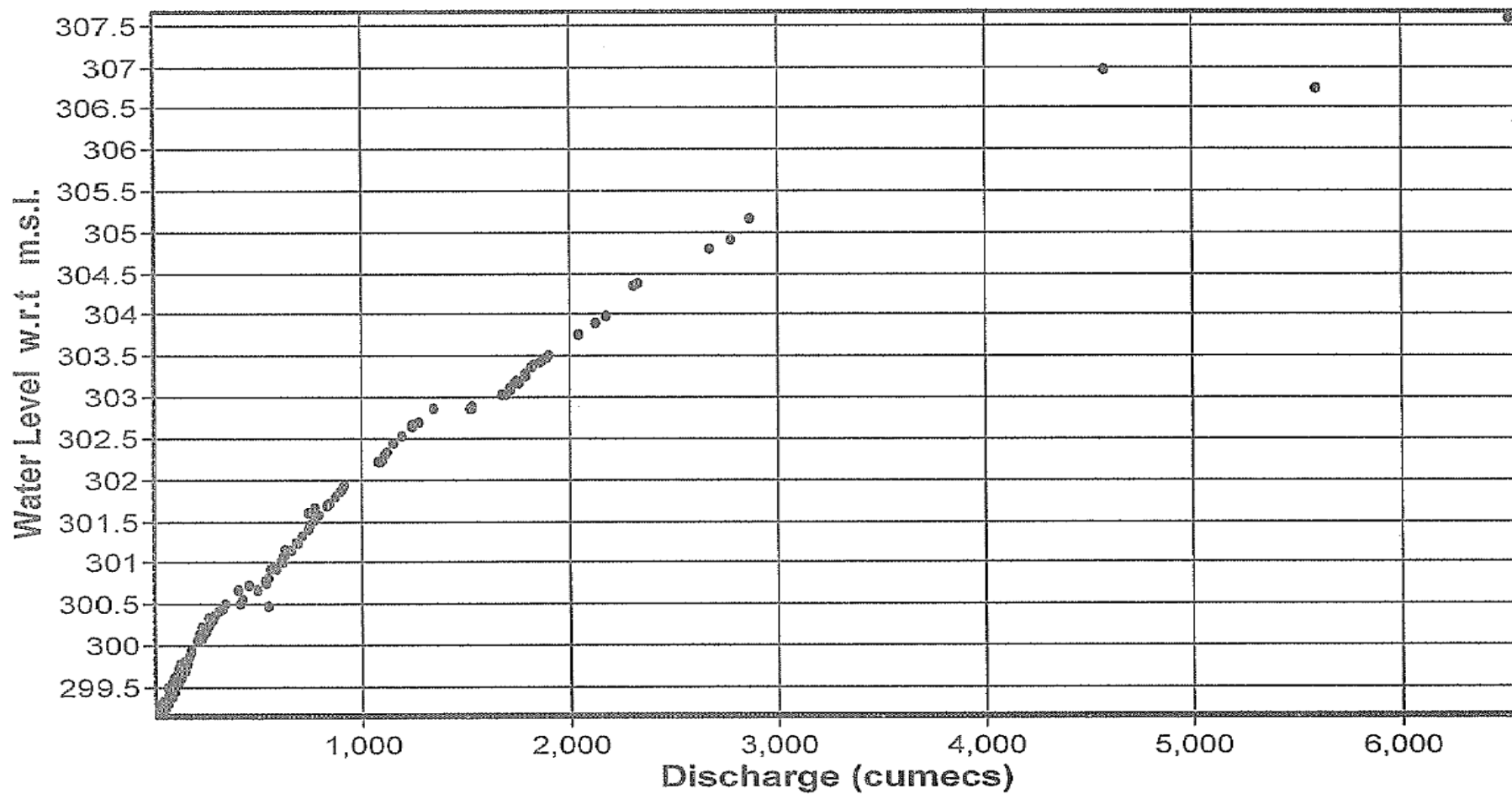
Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



Plot of Stage Discharge Data at Narmada at Sandia (010215013): 2016 - 2017



4.10 Shakkar at Gadarwara

History sheet

[illegible]

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	2734.6	328.175	07/08/1977	1.6	322.59	01/06/1977
1978-1979	2890	328.58	16/08/1978	2.4	322.85	31/05/1979
1979-1980	1430.8	327.41	09/08/1979	1	322.62	04/04/1980
1980-1981	2822.9	328.81	29/08/1980	0.9	322.635	30/11/1980
1981-1982	724	325.47	24/06/1981	1.2	322.695	17/06/1981
1982-1983	3031	328.745	20/08/1982	1.2	322.82	11/06/1982
1983-1984	2335	328.82	08/09/1983	1.6	322.875	08/06/1983
1984-1985	2850	329.6	18/08/1984	1.2	322.92	30/05/1985
1985-1986	1930	327.85	08/08/1985	1	322.86	23/06/1985
1986-1987	2680	329.8	14/08/1986	1.6	322.89	19/06/1986
1987-1988	1450	326.985	08/09/1987	1	322.93	30/05/1988
1988-1989	2400	328.81	03/08/1988	0.94	322.85	31/05/1989
1989-1990	1605	327.3	16/08/1989	0.8	322.84	12/06/1989
1990-1991	2300	328.4	05/09/1990	1.08	322.995	11/06/1990
1991-1992	1046	326.32	19/08/1991	1.06	322.925	08/07/1991
1992-1993	1590	327.4	20/08/1992	1.2	322.92	10/07/1992
1993-1994	1880	328.15	16/07/1993	1.73	322.915	11/06/1993
1994-1995	2720	330.18	19/08/1994	1.7	322.96	31/05/1995
1995-1996	1160	326.65	25/07/1995	0.25	322.62	31/05/1996
1996-1997	608	325.15	27/07/1996	0	322.43	01/05/1997
1997-1998	1732	328	25/07/1997	0	0	01/06/1997
1998-1999	836	326	05/07/1998	0.25	323.05	28/06/1998
1999-2000	5850	332.47	18/09/1999	0.15	322.81	21/05/2000
2000-2001	1310	327.1	28/07/2000	0.85	322.81	06/06/2000
2001-2002	1030	326.48	19/07/2001	0.5	322.63	27/05/2002
2002-2003	2750	328.85	06/09/2002	0.3	322.9	30/05/2003
2003-2004	2700	328.45	24/07/2003	0.21	322.87	15/06/2003
2004-2005	940	327.1	22/08/2004	0.11	322.77	29/05/2005
2005-2006	1828.4	326.25	01/08/2005	0.02	322.72	19/06/2005
2006-2007	4650.38	329	14/08/2006	0.01	323.13	19/05/2007
2007-2008	3279.69	329	08/07/2007	0	0	28/05/2008
2008-2009	237.39	324.25	05/08/2008	0.04	322.79	02/02/2009
2009-2010	3278.58	329.88	09/09/2009	0	0	01/06/2009
2010-2011	901.36	325.7	07/08/2010	0	0	03/06/2010
2011-2012	736.19	324.6	15/07/2011	0	0	09/06/2011
2012-2013	2946.5	9.66	27/01/2013	0.03	322.68	04/07/2012
2013-2014	387.25	3.34	27/06/2013	0.55	322.42	25/05/2014
2014-2015	554.43	325.23	23/07/2014	0.16	322.33	31/05/2015
2015-2016	493.83	324.54	14/08/2015	0.01	322.23	03/03/2016
2016-2017	10138	323.72	26/10/2016	0	0	01/05/2017

Stage Discharge Sheet for Shakkar at Gadarwara for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	52.41	323.37	186.8	323.87	362.51	323.2	55.93	323.39	8.71	322.62
2	0	0	52.22	323.37	198.33	323.94	203.89	323.95	56.5	323.39	8.71	322.62
3	0	0	45.5	323.35	235.99	323	156.18	323.74	56.47	323.39	7.93	322.6
4	0	0	179.7	323.85	377.8	323.23	101	323.57	52.77	323.38	7.98	322.6
5	0	0	162.71	323.8	186.88	323.87	79.14	323.51	51.31	323.37	7.99	322.6
6	0	0	245.5	324.02	188.18	323.88	144.83	323.7	156.84	323.74	7.97	322.6
7	0	0	370.5	324.22	235.68	324	97.97	323.56	187.06	323.87	7.8	322.58
8	0	0	376.01	324.23	180.3	323.85	90.87	323.53	145.94	323.7	7.82	322.58
9	0	0	387.62	324.33	172.04	323.83	85.71	323.52	115.5	323.63	7.5	322.56
10	0	0	380	324.27	160.84	323.79	76.38	323.5	127.41	323.66	7.49	322.56
11	0	0	488.38	324.56	177.61	323.84	70.23	323.48	120.5	323.64	7.46	322.56
12	0	0	567.16	353.35	156.67	323.74	73.11	323.49	105	323.58	7.14	322.54
13	0	0	510.17	324.81	151.2	323.71	66.8	323.47	49.24	323.36	7.15	322.54
14	0	0	220.42	324	158.8	323.78	67	323.4	48.36	323.36	7.15	322.54
15	0	0	196.69	323.94	156.76	323.74	70.89	323.48	19.87	323.26	7.16	322.54
16	0	0	176.16	323.84	198.79	323.94	65.96	323.47	17	323.25	6.71	322.52
17	0	0	182.5	323.86	153.75	323.73	63.85	323.46	15.06	323.2	6.72	322.52
18	0	0	177.18	323.84	137.45	323.69	71	323.48	14.79	323.2	6.54	322.51
19	0	0	162.93	323.8	95.48	323.55	71.31	323.48	13.91	323.18	6.51	322.51
20	0	0	156.76	323.74	102.17	323.58	64.43	323.46	13.47	323.16	6.35	322.5
21	0	0	85.54	323.52	98.5	323.56	74.34	323.49	13.39	323.16	6.18	322.49
22	0	0	197.43	323.94	79.14	323.51	77.48	323.5	12.7	323.13	6.14	322.49
23	0	0	386.82	324.33	74.92	323.49	85.61	323.52	11.5	323.1	6.12	322.49
24	0	0	383.5	324.32	107.16	323.6	78.45	323.51	10.75	323.87	5.93	322.48
25	0	0	197.62	323.94	97.21	323.56	85.7	323.52	10.5	323.76	5.94	322.48
26	0	0	179.78	323.85	471.74	323.54	112.08	323.62	10138	323.72	5.94	322.48
27	0	0	516.62	324.81	201.27	323.95	182.03	323.86	9.82	323.69	5.93	322.48
28	0	0	387.34	324.33	174.5	323.83	163.22	323.8	9.51	323.66	5.76	322.47
29	97.87	323.55	485.89	324.56	179.91	323.85	51.44	323.37	9.3	323.64	5.78	322.47
30	90.67	323.53	206.36	323.96	197.88	323.94	49.11	323.36	8.72	323.62	5.76	322.47
31			179.78	323.85	471.8	323.54			8.72	323.62		
I Ten-Daily	0	0	225.22	323.88	212.28	323.73	139.85	323.58	100.57	323.55	7.99	322.59
II Ten-Daily	0	0	283.84	326.97	148.87	323.73	68.46	323.47	41.72	323.32	6.89	322.53
III Ten-Daily	18.85	64.71	291.52	324.13	195.82	323.67	95.95	323.55	931.17	323.54	5.95	322.48
Monthly												
Min.	90.67	323.53	45.5	323.35	74.92	323	49.11	323.2	8.72	323.1	5.76	322.47
Max.	97.87	323.53	567.16	323.35	471.8	323	362.51	323.2	10138	323.1	8.71	322.47
Mean	6.28	21.57	266.86	324.99	185.66	323.71	101.42	323.53	357.82	323.47	6.94	322.53

Annual Runoff in MCM : 2542.2

Annual Runoff in mm : 1119.91

Peak Observed Discharge = 10138 cumecs on 26/10/2016 Corres. Water Level = 323.72 m

Lowest Observed Discharge = 0cumecs on 1/5/2017 . Corres. Water Level = 322.12 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Shakkar at Gadarwara for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	5.57	322.46	4.01	322.37	0.97	322.26	0.7	322.21	0.06	322.13	0	0
2	5.56	322.46	3.9	322.36	0.97	322.26	0.71	322.21	0.06	322.13	0	0
3	5.55	322.46	3.88	322.26	0.92	322.25	0.71	322.21	0.04	322.12	0	0
4	5.54	322.46	3.89	322.36	0.91	322.25	0.7	322.21	0.01	322.11	0	0
5	5.54	322.46	3.77	322.35	0.92	322.25	0.7	322.21	0.01	322.11	0	0
6	5.41	322.45	3.77	322.35	0.92	322.25	0.62	322.2	0.01	322.1	0	0
7	5.4	322.45	3.65	322.34	0.92	322.25	0.62	322.2	0.01	322.1	0	0
8	5.4	322.45	3.65	322.34	0.88	322.24	0.62	322.2	0.01	322.09	0	0
9	5.38	322.45	3.65	322.34	0.86	322.24	0.57	322.19	0.01	322.09	0	0
10	5.13	322.43	3.52	322.33	0.86	322.24	0.57	322.19	0.01	322.09	0	0
11	5.12	322.43	3.53	322.33	0.8	322.23	0.56	322.19	0.01	322.08	0	0
12	5.12	322.43	3.27	322.32	0.8	322.23	0.56	322.19	0.01	322.07	0	0
13	5.11	322.43	3.19	322.32	0.82	322.23	0.56	322.19	0.01	322.07	0	0
14	4.98	322.42	2.75	322.3	0.8	322.23	0.42	322.18	0.01	322.06	0	0
15	4.99	322.42	1.8	322.29	0.8	322.33	0.41	322.18	0.01	322.06	0	0
16	4.97	322.42	1.36	322.28	0.88	322.24	0.4	322.18	0	0	0	0
17	4.94	322.42	1.21	322.27	0.87	322.24	0.26	322.17	0	0	0	0
18	4.75	322.41	0.97	322.26	0.87	322.24	0.25	322.17	0	0	0	0
19	4.64	322.4	0.97	322.26	0.87	322.24	0.26	322.17	0	0	0	0
20	4.64	322.4	0.96	322.26	0.82	322.23	0.24	322.17	0	0	0	0
21	4.63	322.4	0.92	322.25	0.81	322.23	0.19	322.16	0	0	0	0
22	4.62	322.4	0.92	322.25	0.81	322.23	0.19	322.16	0	0	0	0
23	4.43	322.39	0.91	322.25	0.75	322.22	0.19	322.16	0	0	0	0
24	4.43	322.39	0.96	322.26	0.75	322.22	0.16	322.15	0	0	0	0
25	4.43	322.39	0.96	322.26	0.75	322.22	0.15	322.15	0	0	0	0
26	4.24	322.38	0.96	322.26	0.75	322.22	0.16	322.15	0	0	0	0
27	4.23	322.38	0.97	322.26	0.75	322.22	0.1	322.14	0	0	0	0
28	4.22	322.38	1.22	322.27	0.75	322.21	0.09	322.14	0	0	0	0
29	4.04	322.37	1.23	322.27			0.09	322.14	0	0	0	0
30	4.03	322.37	1.2	322.27			0.06	322.13	0	0	0	0
31	4.02	322.37	0.98	322.26			0.06	322.13	0	0	0	0
Ten-Daily Mean												
I Ten-Daily	5.45	322.45	3.77	322.34	0.91	322.25	0.65	322.2	0.02	322.11	0	0
II Ten-Daily	4.92	322.42	2	322.29	0.83	322.24	0.39	322.18	0	161.03	0	0
III Ten-Daily	4.3	322.38	1.02	322.26	0.77	322.22	0.13	322.15	0	0	0	0
Monthly												
Min.	4.02	322.37	0.91	322.25	0.75	322.21	0.06	322.13	0	322.06	0	0
Max.	5.57	322.37	4.01	322.25	0.97	322.21	0.71	322.13	0.06	322.06	0	0
Mean	4.89	322.42	2.26	322.3	0.84	322.24	0.39	322.18	0.01	161.05	0	0

Peak Computed Discharge = 383.5 cumecs on 24/7/2016

Corres. Water Level = 324.32 m

Lowest Computed Discharge = 0cumecs on 15/4/2017 Corres.

Water Level = 322.06 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

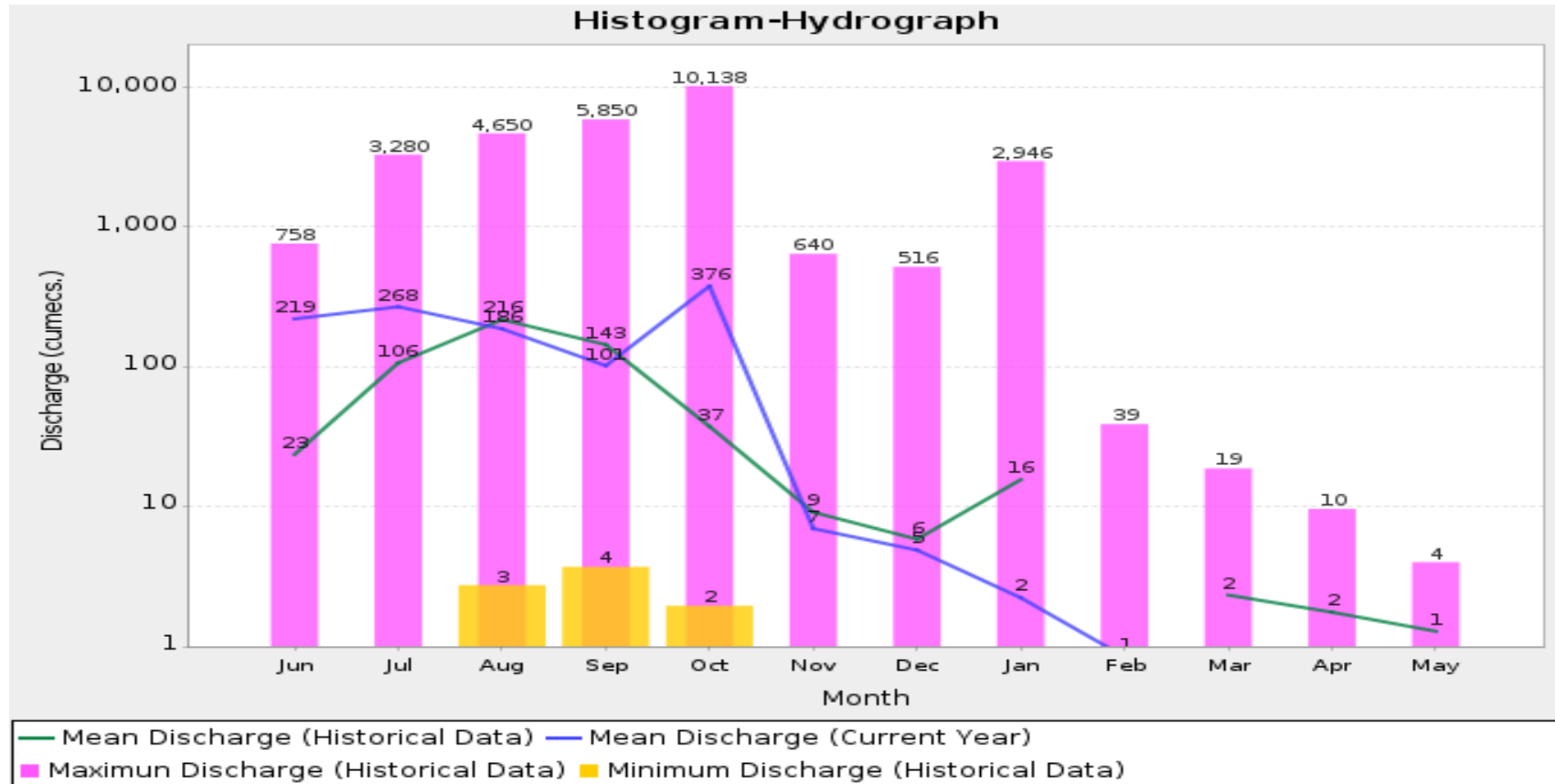
Histogram - Hydrograph for Water Year : 2016-17 (Data considered : 1977-2017)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



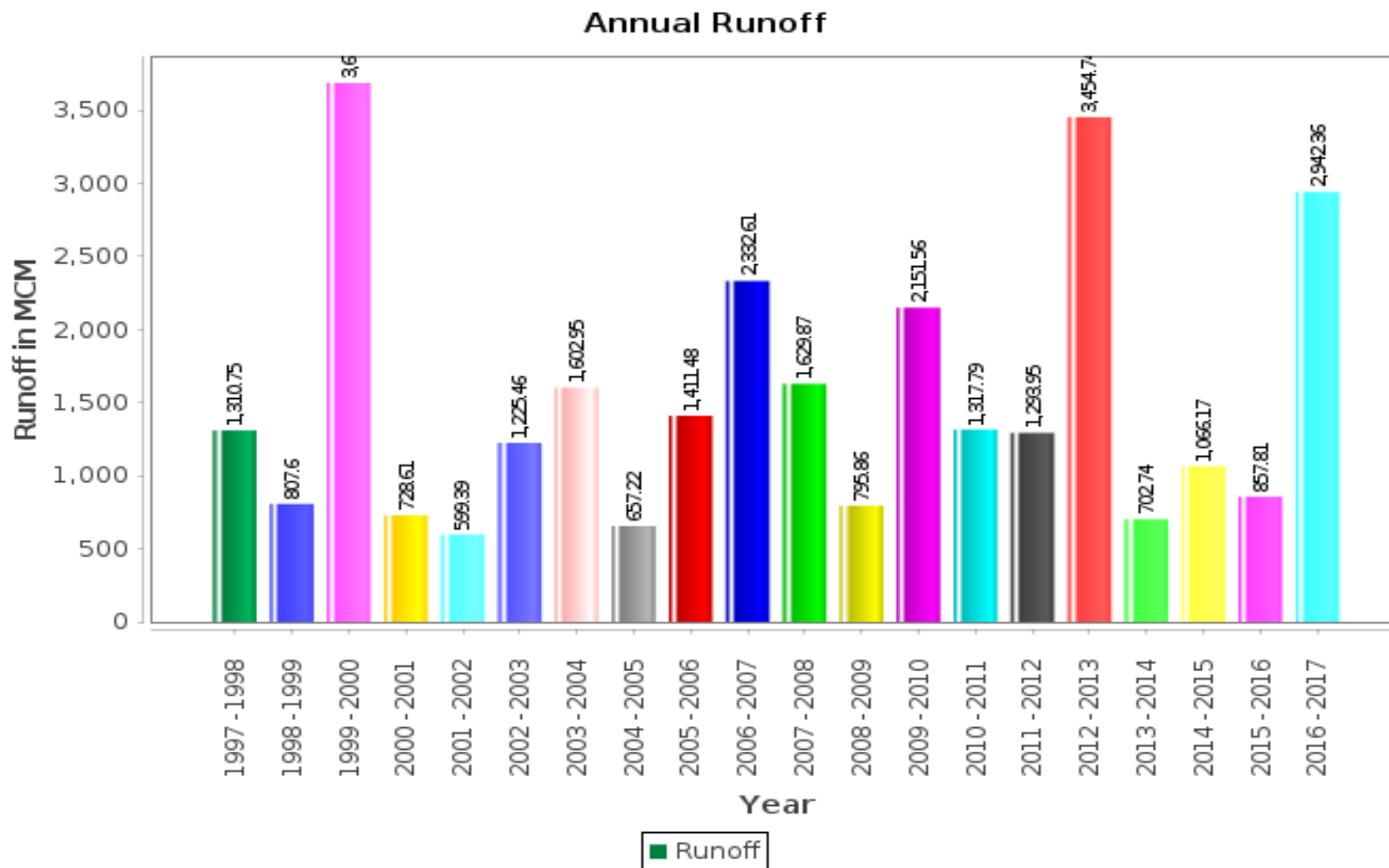
Annual Runoff Values for the period (1977 – 2017)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



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

Monthly Average Runoff based on period (1977 – 2017)

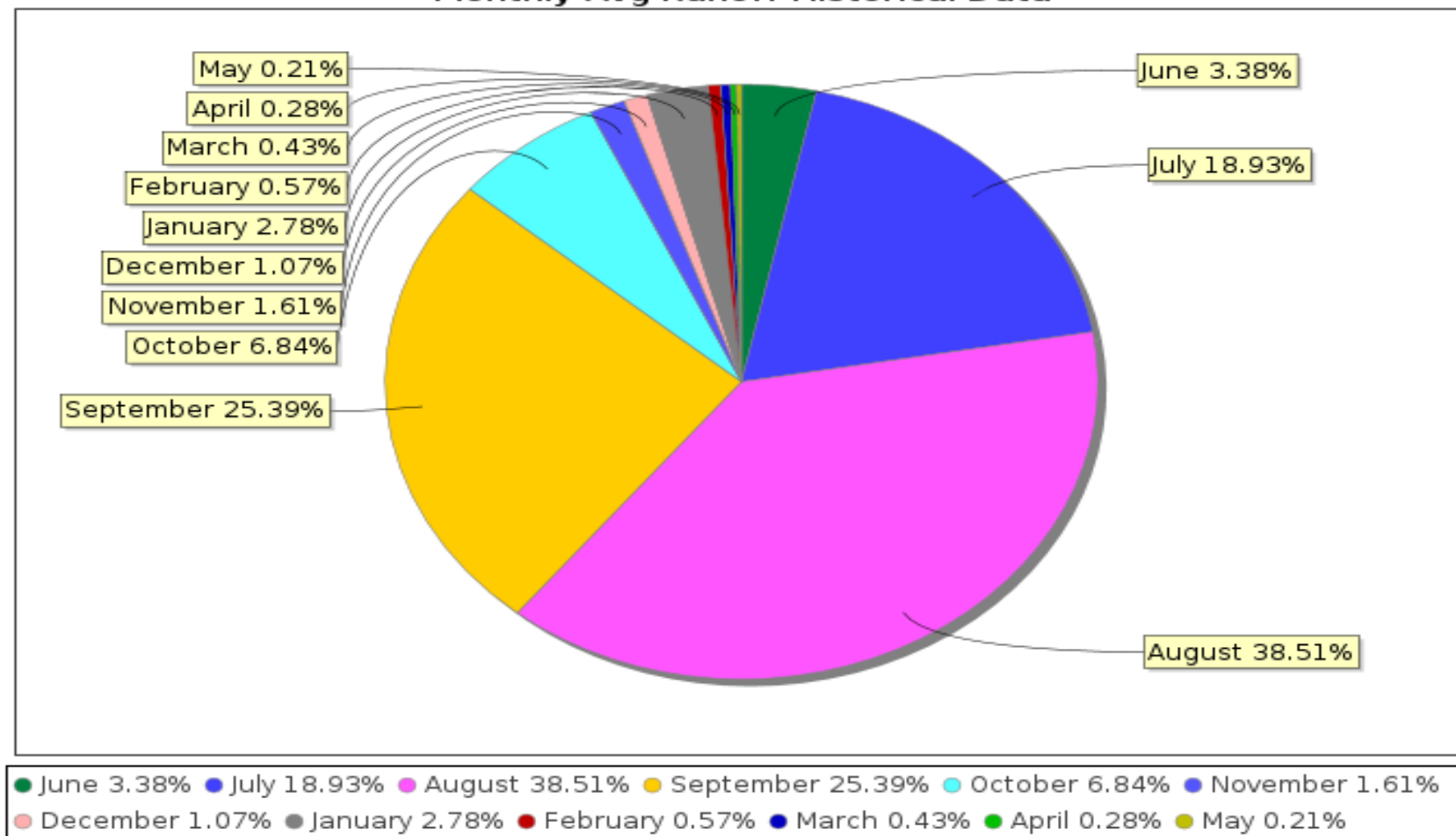
Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

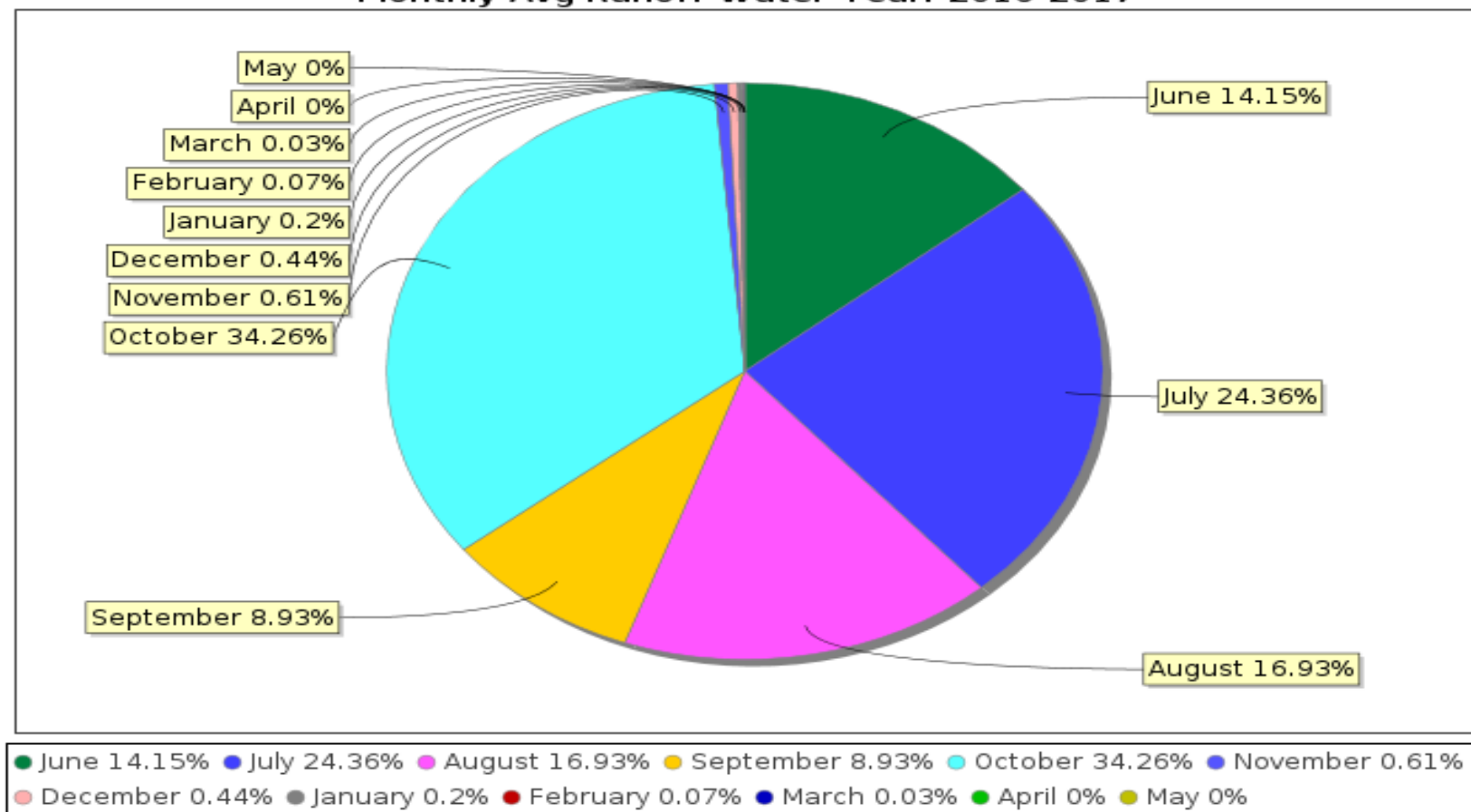
Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

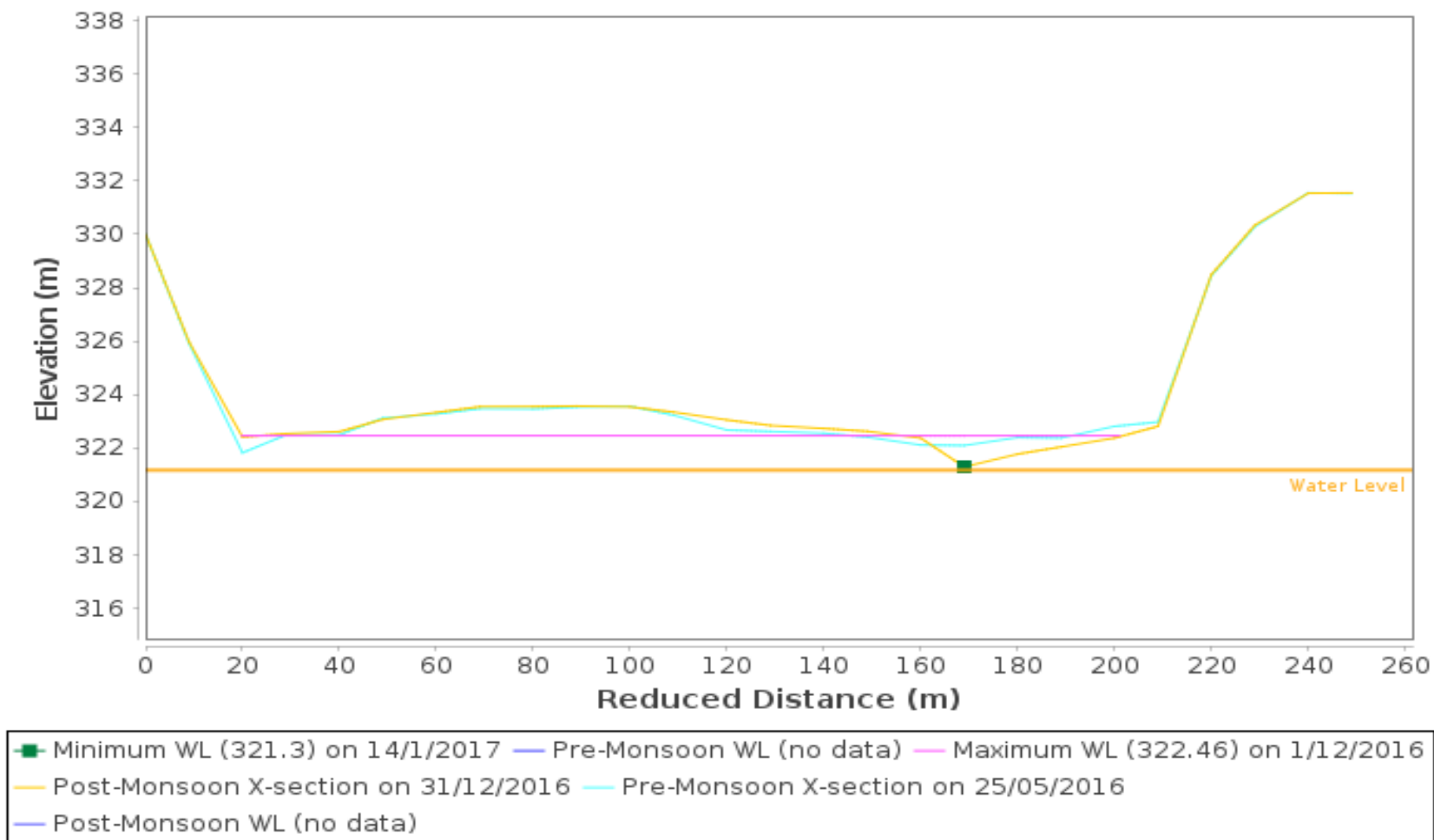
Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad

X-Section



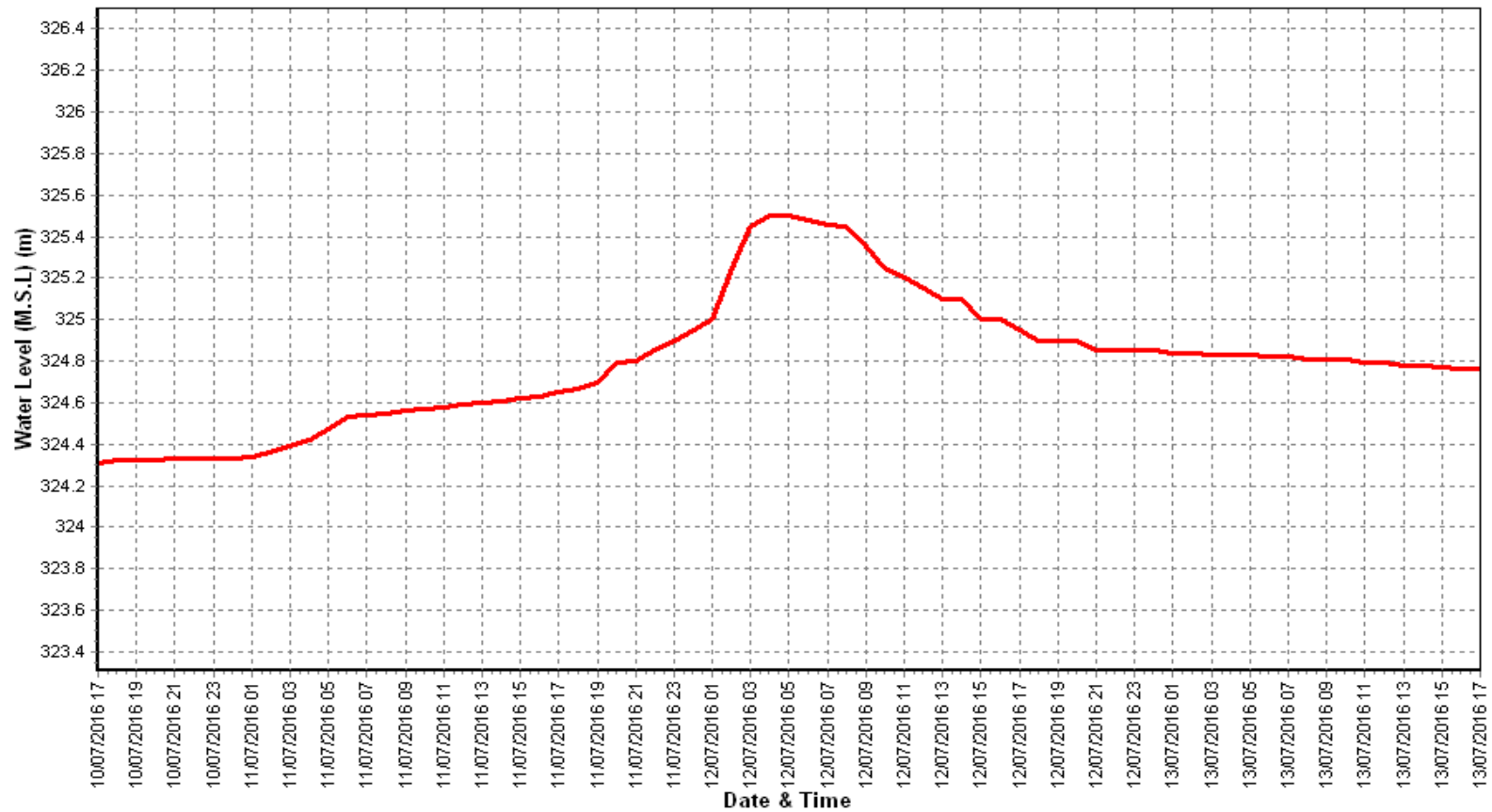
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



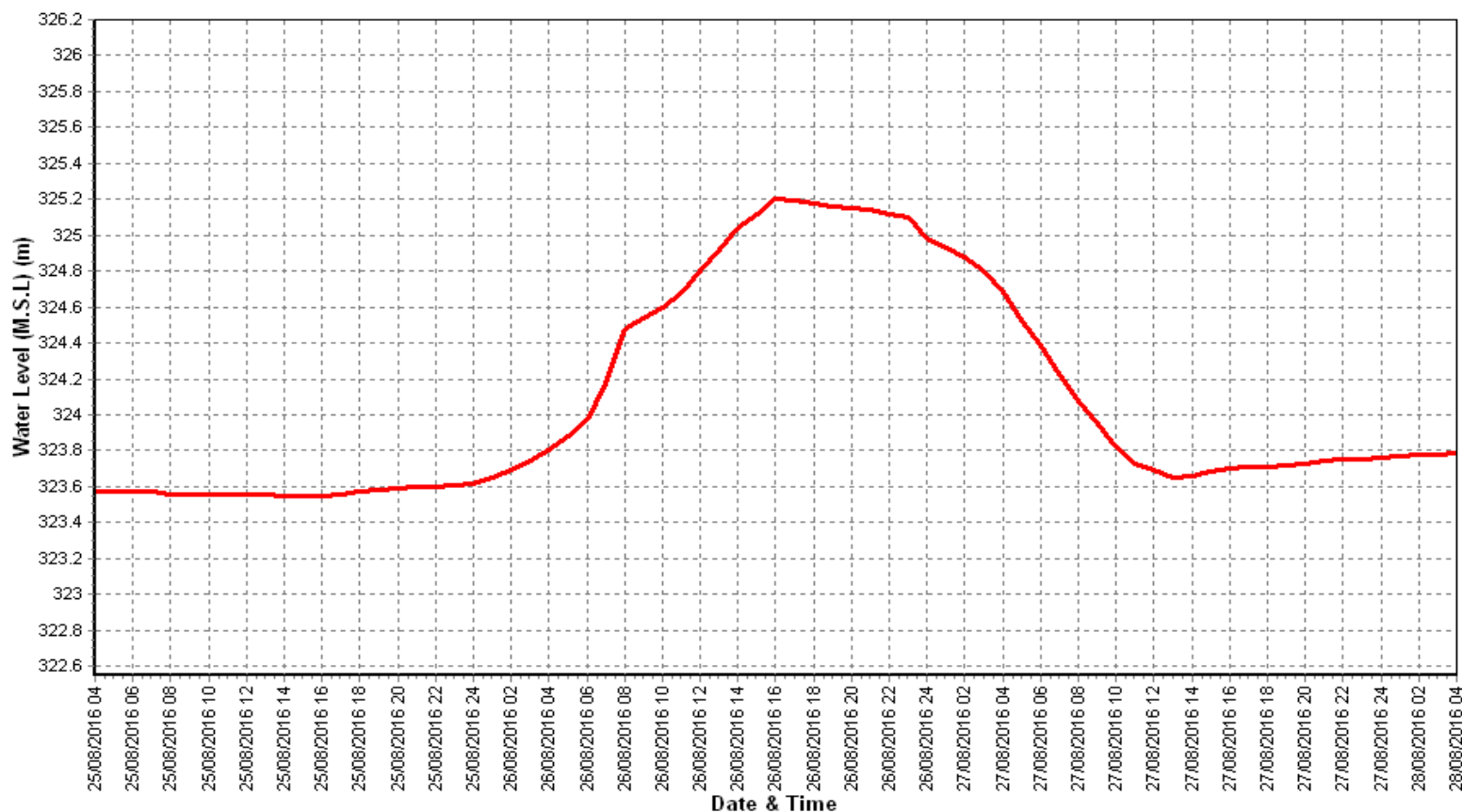
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



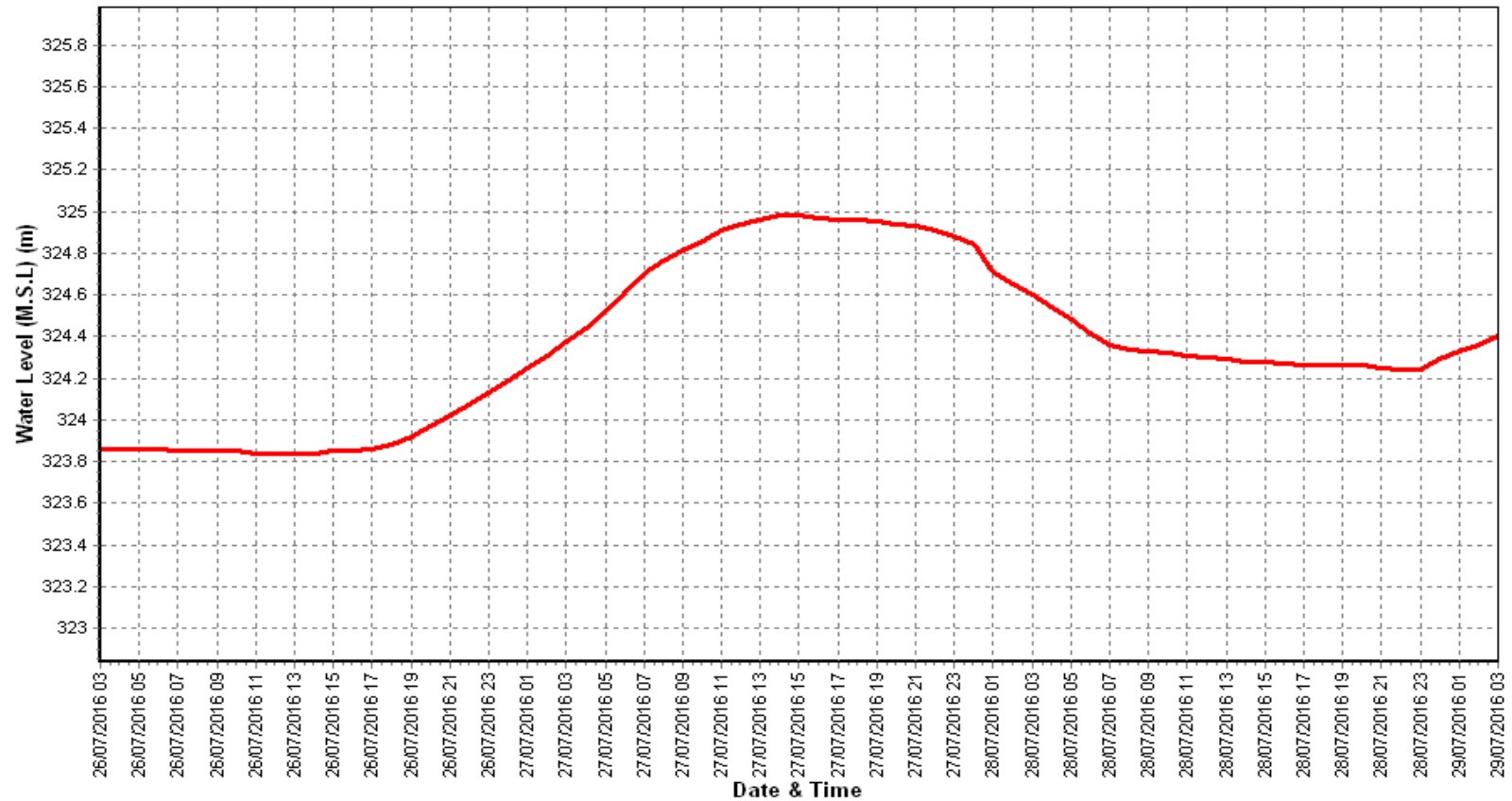
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Shakkar at Gadarwara (010215012)

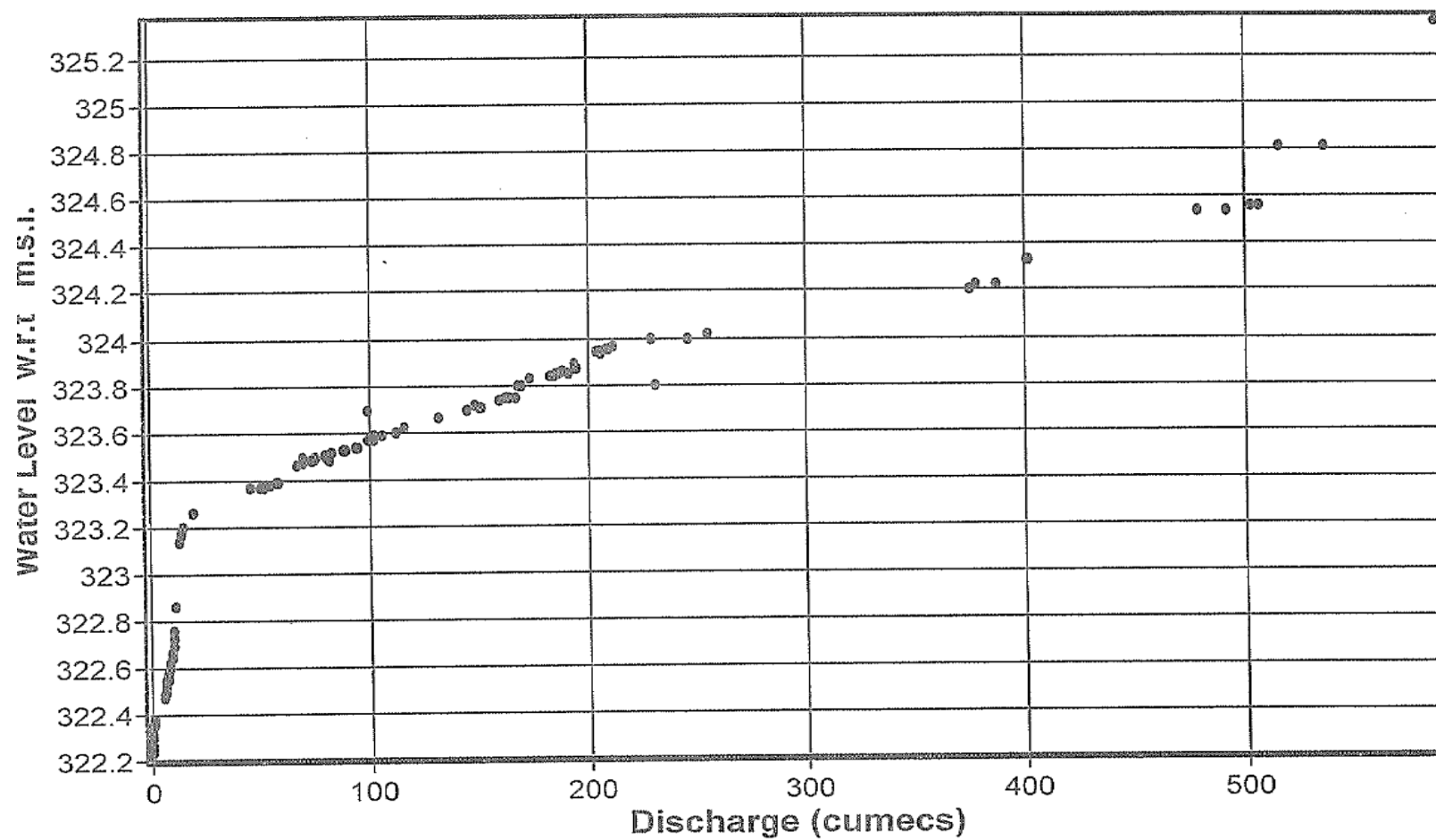
Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



Plot of Stage Discharge Data at Shakkar at Gadarwara (010215012): 2016 - 2017



4.11 Narmada at Barmanghat

History Sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
Site : Barmanghat				Water Year : 2016 - 2017		
State : Madhya Pradesh				Code : 012-NDBHP		
				District : Hoshangabad		
Basin : NARMADA				Independent		
Tributary : -				River : Narmada		
Sub-Sub				Sub Tributary : -		
Tributary : -				Local River : Narmada		
				Middle Narmada Sub-		
Division : Narmada Division(ND), Bhopal				Sub-Division : Division-I, Hosangabad		
Drainage Area : 26453.0 Sq. Km.				Bank : Right		
Latitude : 23°01'52"				Longitude : 79°00'56"		
Current Zero of Gauge (m) : 306.000						
CATEGORY		Opening Date		Closing Date		
Gauge :		09/12/1970				
Discharge :		20/11/1971				
Sediment :		27/08/1972				
Water Quality :						
Reduced Level		Opening Date		Closing Date		
306.0		01/12/2013		-		
0.0		31/05/2014		31/05/2015		
306.0		01/03/2017		-		
306.0		01/01/2015		-		
306.0		01/06/2013		31/12/2014		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1972-1973	16193.5	330.185	31/08/1972	8.7	308.125	19/06/1972
1973-1974	20658.2	330.455	30/08/1973	8	307.62	10/06/1973
1974-1975	17288.2	329.25	19/08/1974	6.1	307.56	31/05/1975
1975-1976	15847.8	328.205	23/08/1975	5.4	307.558	16/06/1975
1976-1977	3074.3	315.44	16/08/1976	5.9	307.47	17/05/1977
1977-1978	13455.2	326.838	08/08/1977	5.7	307.46	03/06/1977
1978-1979	6961.5	311.248	30/07/1978	10	307.64	09/06/1978
1979-1980	8158.1	322.175	10/08/1979	4.6	307.37	30/05/1980
1980-1981	12375	326.725	30/08/1980	4.5	307.37	01/06/1980
1981-1982	2904	315.155	29/07/1981	4	307.445	18/05/1982
1982-1983	4641.6	317.702	18/08/1982	5.5	307.425	02/06/1982
1983-1984	14890.5	325.625	09/09/1983	2.9	307.565	31/05/1984
1984-1985	12220	327.6	19/08/1984	3	307.565	04/06/1984
1985-1986	6860	321.4	09/08/1985	7.8	307.555	07/06/1985
1986-1987	3170	317.36	23/07/1986	1.2	307.52	01/06/1986
1987-1988	10800	323.715	18/09/1987	4.54	307.465	05/06/1987
1988-1989	11200	324.03	05/08/1988	3.4	307.5	27/04/1989

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1989-1990	2750	315.67	06/08/1989	5.23	307.47	03/06/1989
1990-1991	7200	320.42	20/09/1990	22.38	307.57	02/06/1990
1991-1992	19500	329.24	24/08/1991	27	307.75	17/01/1992
1992-1993	9400	323.45	12/09/1992	18.68	307.81	05/03/1993
1993-1994	7100	319.63	28/09/1993	20	307.7	08/06/1993
1994-1995	15600	327.22	21/07/1994	51	308.31	04/06/1994
1995-1996	10000	323.59	11/08/1995	46	307.92	12/11/1995
1996-1997	1750	313.17	21/08/1996	19	307.5	04/06/1996
1997-1998	5700	319.08	03/08/1997	56.63	307.9	26/06/1997
1998-1999	3900	316.15	15/09/1998	21.44	307.58	24/05/1999
1999-2000	21500	329.26	19/09/1999	19.8	307.6	06/06/1999
2000-2001	5900	318.97	28/07/2000	30.87	307.7	23/05/2001
2001-2002	6950	320.16	15/07/2001	31	307.71	31/03/2002
2002-2003	9800	323.5	18/08/2002	25.15	307.38	22/03/2003
2003-2004	6800	320.17	05/09/2003	65.14	307.93	12/05/2004
2004-2005	12300	323.8	23/08/2004	30	307.62	11/06/2004
2005-2006	10452.2	323.555	16/09/2005	18.69	307.55	25/06/2005
2006-2007	4752.72	318.38	31/08/2006	24.27	307.56	23/06/2006
2007-2008	818.66	311.48	09/07/2007	30.89	307.6	05/05/2008
2008-2009	4051.12	316.935	02/08/2008	36.02	307.7	15/01/2009
2009-2010	7727.63	321.3	09/09/2009	25.54	307.59	30/06/2009
2010-2011	2535.61	314.93	20/09/2010	37.46	307.55	20/04/2011
2011-2012	8131.4	322	09/09/2011	36.82	307.5	26/05/2012
2012-2013	4040.76	317.75	13/08/2012	29.4	307.61	08/06/2012
2013-2014	15223	326.500	13/08/2013	50.14	307.600	14/05/2014
2014-2015	236	309.15	19/03/2015	70.7	2106	30/04/2015
2015-2016	1881.21	313.94	05/08/2015	24.8	307.38	13/04/2016
2016-2017	6091	319.12	08/08/2016	7	307.88	26/06/2016

Stage Discharge Sheet for Narmada at Barmanghat for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	49.7	307.78	97.5	308.13	1015	312.18	2430	314.64	1672	313.65	222	309.12
2	31.9	307.64	108	308.3	1098	312.4	1894	313.88	1830	313.77	213	309
3	49.2	307.72	117	308.38	670.7	311.14	1534	313.36	1572	313.46	200	308.94
4	72	307.83	134	308.38	945.5	311.54	1120	312.44	734	311.38	221	309.1
5	93	308.13	154	308.66	949.9	311.96	820	311.64	656.2	311.04	196	308.9
6	75.4	307.97	1587	313.54	1020	312.1	677.5	310.16	508.4	310.68	193	308.96
7	79	308.14	460	310.44	1380	313.07	423	310.32	494.8	310.58	185	308.92
8	74.2	307.94	1075	312.05	6091	319.12	388.4	310.14	506.7	310.6	215	308.97
9	48.2	307.78	2093	314.3	6074	319.14	373.2	309.1	530	310.71	221	309.11
10	33.8	307.61	3020	315.74	3164	316.1	341	309.92	508.9	310.62	218	309.06
11	44.7	307.58	1416	313.08	1081	312.28	325	309.4	653	311.04	223	309.08
12	95	308.15	2349	314.28	947.5	311.92	319.9	309.78	675	311.14	217	309
13	42.8	307.66	1480	313.24	1669	313.64	310	309.75	654.5	311.04	214	309
14	69.6	307.84	604.2	310.94	1740	313.71	302.9	309.57	653.4	311.04	215	309.02
15	88.3	308.06	361.3	310.04	1741	313.73	299.6	309.68	307	309.74	200	308.93
16	68.7	307.88	339.3	309.92	1680	313.1	298.3	309.67	296	309.67	201	308.91
17	60.6	307.8	260	309.54	1400	313.76	294.8	309.65	286.9	309.62	216	309
18	74.8	307.86	265	309.26	1231	313.46	295	309.66	279	309.55	199	308.9
19	92	308.13	254	309.3	991.1	313.2	292.7	309.63	284.7	309.58	186	308.86
20	48.1	307.71	250	309.35	1023	313.78	304	309.71	285.9	309.6	184	308.82
21	65.2	307.78	231	309.09	1191	313.64	317.6	309.76	280.1	309.56	183	308.8
22	91.3	308.15	400.8	310.08	1343	313.02	398.4	310.2	267.4	309.5	187	308.85
23	64.4	307.81	614	311	1231	312.72	397.5	310.22	265	309.42	157	308.7
24	69.6	307.9	940	311.98	898.2	312.06	348.6	309.96	250	309.38	108	308.2
25	61.5	307.79	589.4	310.86	1325	312.14	335	309.89	250	309.21	107	308.21
26	7	307.88	481.9	310.5	1458	312.5	479.3	310.48	243	309.24	99.8	308.14
27	59	307.76	969	311.92	1343	312.98	404.1	310.26	244	309.24	98	308.14
28	72.1	307.94	973.7	311.98	1320	312.88	376	310.12	243	309.25	102	308.18
29	89.3	308.07	998.3	312.08	898.2	311.84	359.8	309.98	237	309.23	108	308.32
30	100	308.22	879.2	311.78	1325	312.84	1088	312.2	235	309.21	109	308.28
31			1180	312.54	1458	313.1			221	309.13		
Ten-Daily Mean												
I Ten-Daily	60.64	307.85	884.55	310.79	2240.81	313.88	1000.11	311.56	901.3	311.65	208.4	309.01
II Ten-Daily	68.46	307.87	757.88	310.9	1350.36	313.26	304.22	309.65	437.54	310.2	205.5	308.95
III Ten-Daily	67.94	307.93	750.66	311.26	1253.67	312.7	450.43	310.31	248.68	309.31	125.88	308.38
Monthly												
Min.	7	307.58	97.5	308.13	670.7	311.14	292.7	309.1	221	309.13	98	308.14
Max.	100	307.58	3020	308.13	6091	311.14	2430	309.1	1830	309.13	223	308.14
Mean	65.68	307.88	797.7	310.98	1614.95	313.28	584.92	310.51	529.17	310.39	179.93	308.78

Annual Runoff in MCM

11689.79

Annual Runoff in mm : 441.91

Peak Observed Discharge = 6091 cumecs on 8/8/2016 Corres. Water Level = 319.12 m

Lowest Observed Discharge = 15cumecs on 24/12/2016 Corres. Water Level = 308.58 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Narmada at Barmanghat for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	150	308.56	153	308.6	134	308.44	96	308.18	109	308.28	90.4	308.08
2	154	308.6	119	308.34	134	308.43	79.8	307.04	102	308.17	95.8	308.19
3	149	308.52	110	308.26	134	308.42	63.1	307.87	66.6	307.94	95.9	308.12
4	144	308.5	107	308.21	128	308.41	61	307.84	67.7	307.88	79.5	308.01
5	97.5	308.13	98.7	308.15	127	308.4	59	307.82	80.7	308	63.3	307.88
6	151	308.54	94.9	308.1	134	308.42	67.7	307.88	79.8	308.04	64.4	307.8
7	165	308.62	112	308.31	136	308.44	74.2	307.88	51.1	307.9	62.7	307.78
8	136	308.48	127	308.4	132	308.45	57.6	307.81	61	307.84	59	307.76
9	132	308.42	105	308.26	138	308.47	44.8	307.8	55.6	307.81	58.1	307.72
10	116	308.38	86.5	308.04	136	308.47	59	307.79	125	308.38	48.1	307.71
11	108	308.32	86	308.02	138	308.47	97.3	308	112	308.28	47.1	307.74
12	214	309	67.7	307.87	136	308.48	95.6	308.08	113	308.29	49.7	307.77
13	218	309.07	113	308.26	138	308.48	94	308.18	114	308.31	51	307.82
14	187	308.84	109	308.23	135	308.48	103	308.22	126	308.36	58	307.85
15	155	308.6	105	308.21	137	308.47	112	308.32	113	308.3	74.2	307.88
16	121	308.34	134	308.44	135	308.47	110	308.37	107	308.28	61	307.83
17	112	308.22	135	308.42	135	308.46	101	308.16	109	308.28	66.7	307.8
18	106	308.3	134	308.42	136	308.47	109	308.29	108	308.32	87.4	308.06
19	168	308.7	134	308.44	134	308.47	117	308.34	121	308.34	109	308.3
20	219	308.96	134	308.44	98	308.16	125	308.38	115	308.33	109	308.28
21	200	308.91	138	308.47	97.6	308.08	121	308.34	116	308.31	103	308.22
22	182	308.8	144	308.5	79.5	308.01	126	308.37	111	308.29	91.9	308.1
23	168	308.73	137	308.46	72.3	308.04	124	308.4	109	308.29	86	308.02
24	15	308.58	136	308.44	128	308.4	151	308.55	108	308.25	68.3	307.94
25	144	313.5	135	308.43	113	308.26	95.8	308.19	103	308.2	110	308.35
26	127	308.42	133	308.43	92.9	308.1	93.6	308.08	101	308.16	109	308.28
27	126	308.36	138	308.46	80.7	308	104	308.17	91.9	308.1	67.7	307.9
28	119	308.33	135	308.46	91.2	308.1	114	308.33	79.5	308.02	61	307.84
29	114	308.28	136	308.47			113	308.26	75.4	308	49.7	307.76
30	143	308.5	140	308.48			113	308.3	72.1	307.94	43.5	307.66
31	165	308.64	138	308.47			116	308.31			63.3	307.86
Ten-Daily Mean												
I Ten-Daily	139.45	308.48	111.31	308.27	133.3	308.44	66.22	307.79	79.85	308.02	71.72	307.9
II Ten-Daily	160.8	308.64	115.17	308.28	132.2	308.44	106.39	308.23	113.8	308.31	71.31	307.93
III Ten-Daily	136.64	309	137.27	308.46	94.4	308.12	115.58	308.3	96.69	308.16	77.58	307.99
Monthly												
Min.	15	308.13	67.7	307.87	72.3	308	44.8	307.04	51.1	307.81	43.5	307.66
Max.	219	308.13	153	307.87	138	308	151	307.04	126	307.81	110	307.66
Mean	145.63	308.7	121.25	308.33	119.97	308.33	96.06	308.11	96.78	308.16	73.54	307.94

Peak Computed Discharge = 3020 cumecs on 10/7/2016 Corres.

Water Level = 315.74 m

Lowest Computed Discharge = 7cumecs on 26/6/2016 Corres. Water

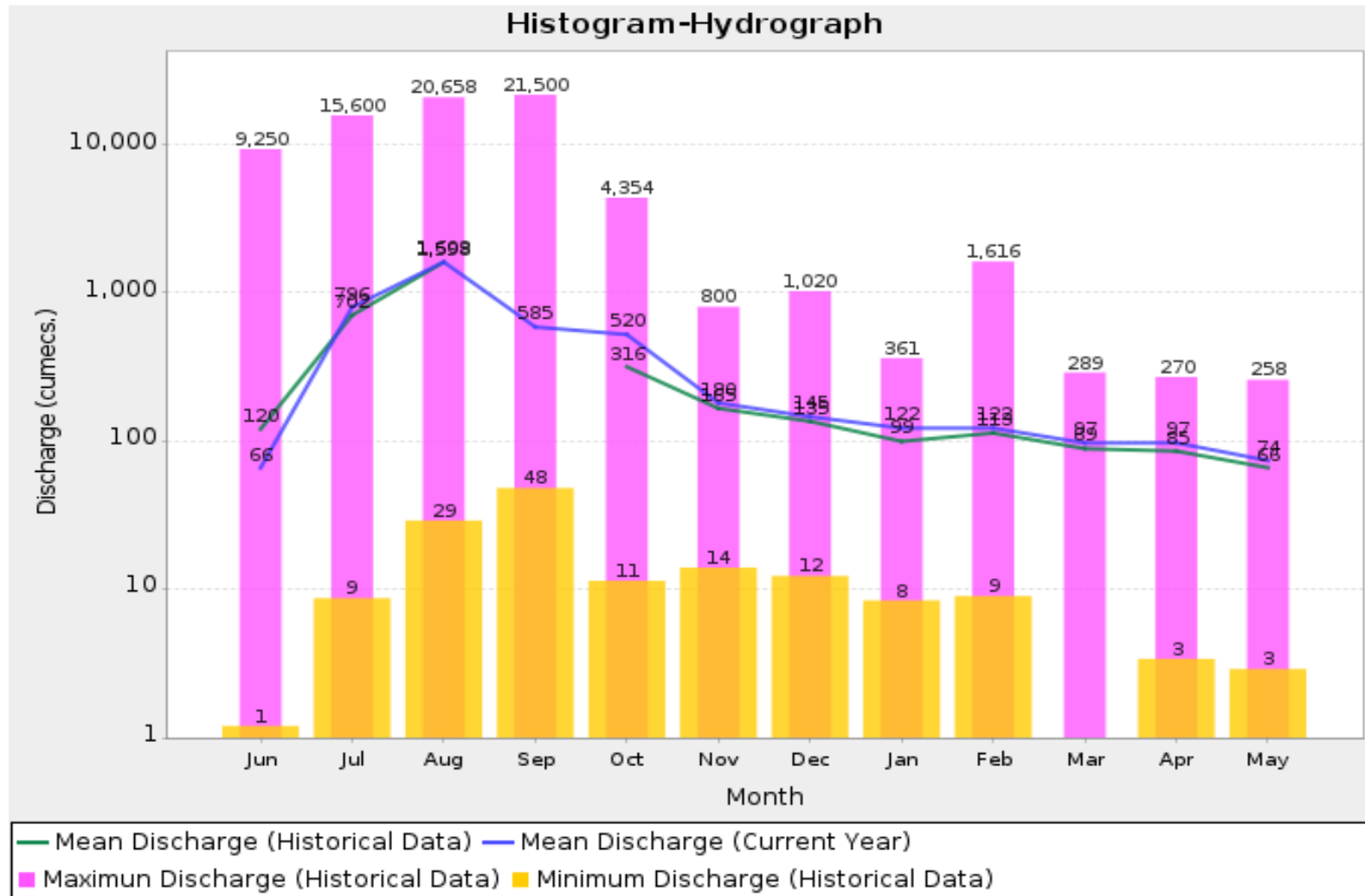
Level = 307.88 m

Q: Observed/Computed Discharge in cumecs **WL:**Corresponding Mean Water Level(M.S.L) in m *****:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1972-2017)



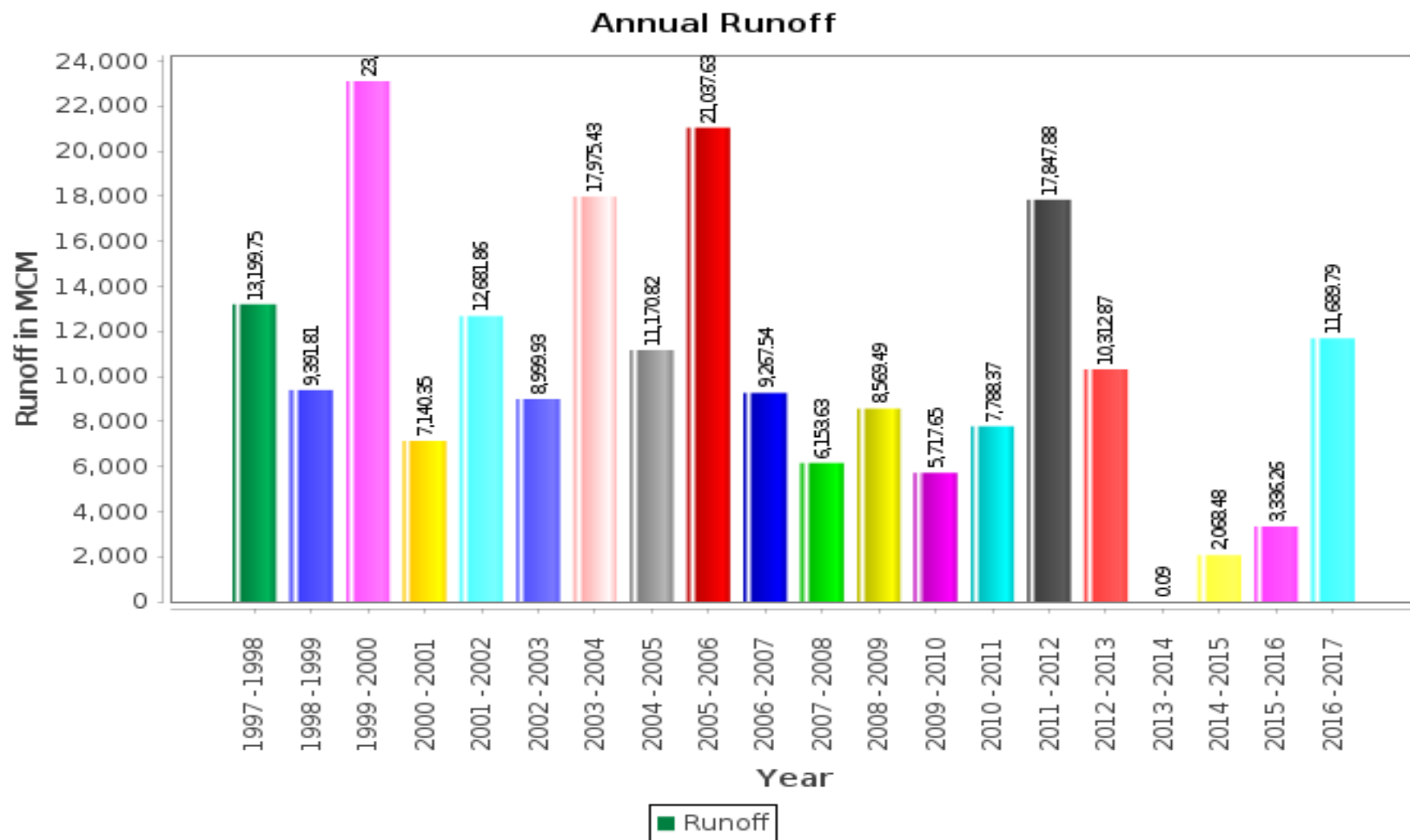
Annual Runoff Values for the period (1972 – 2017)

Station Name : Narmada at Barmanghat (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



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

Monthly Average Runoff based on period (1972 – 2017)

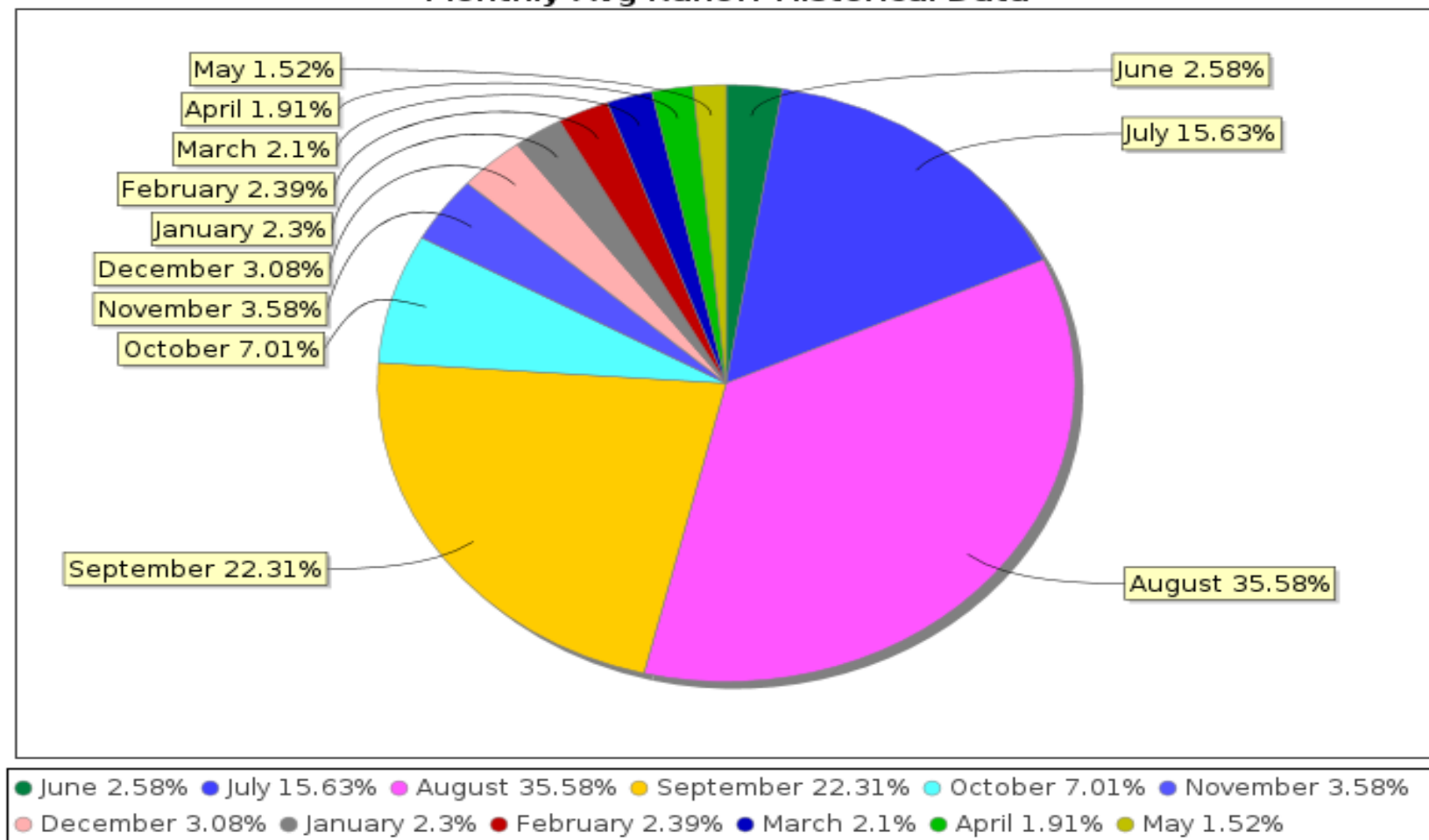
Station Name : Narmada at Barmanghat (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

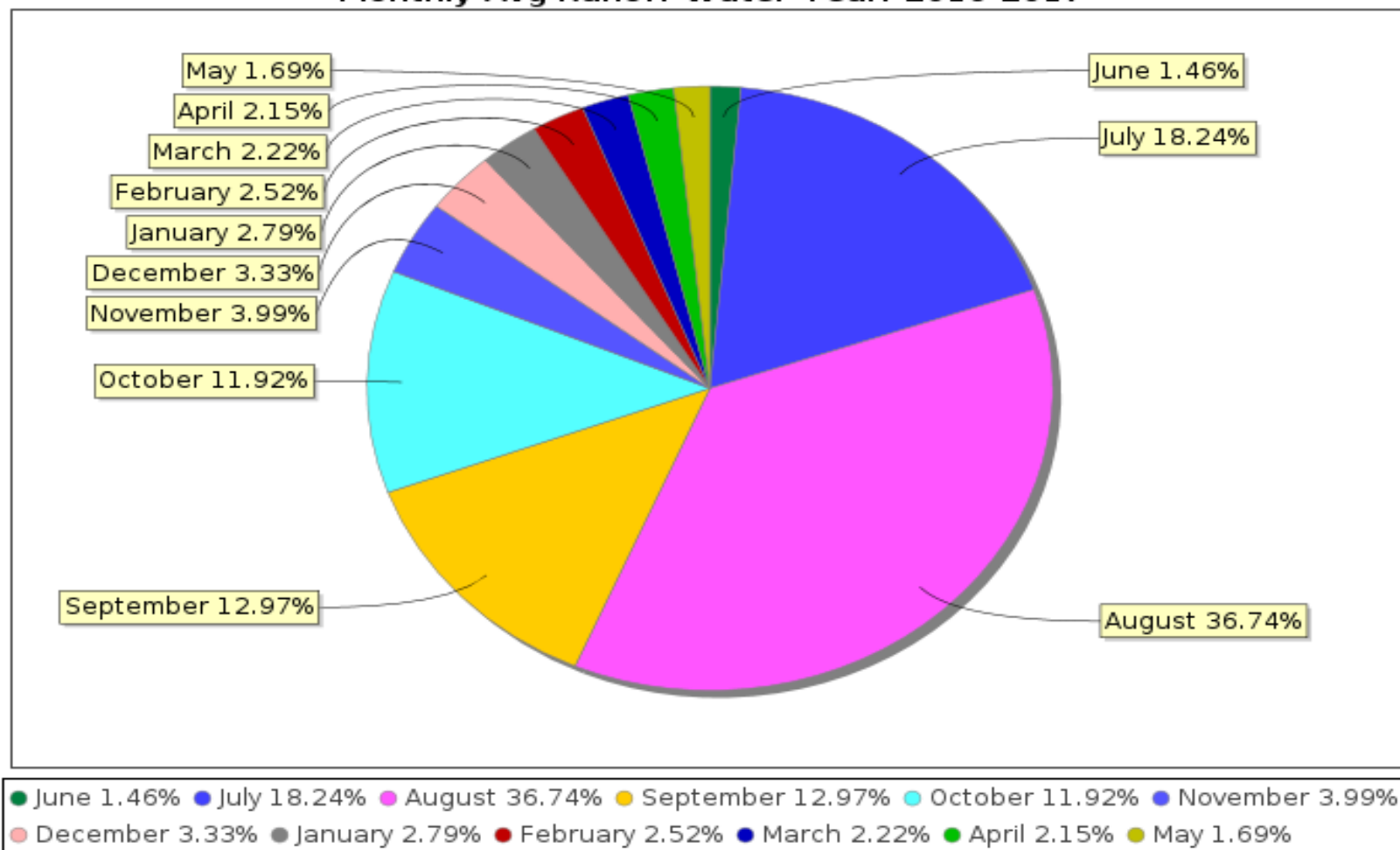
Station Name : Narmada at Barmanghat (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Water Year: 2016-2017



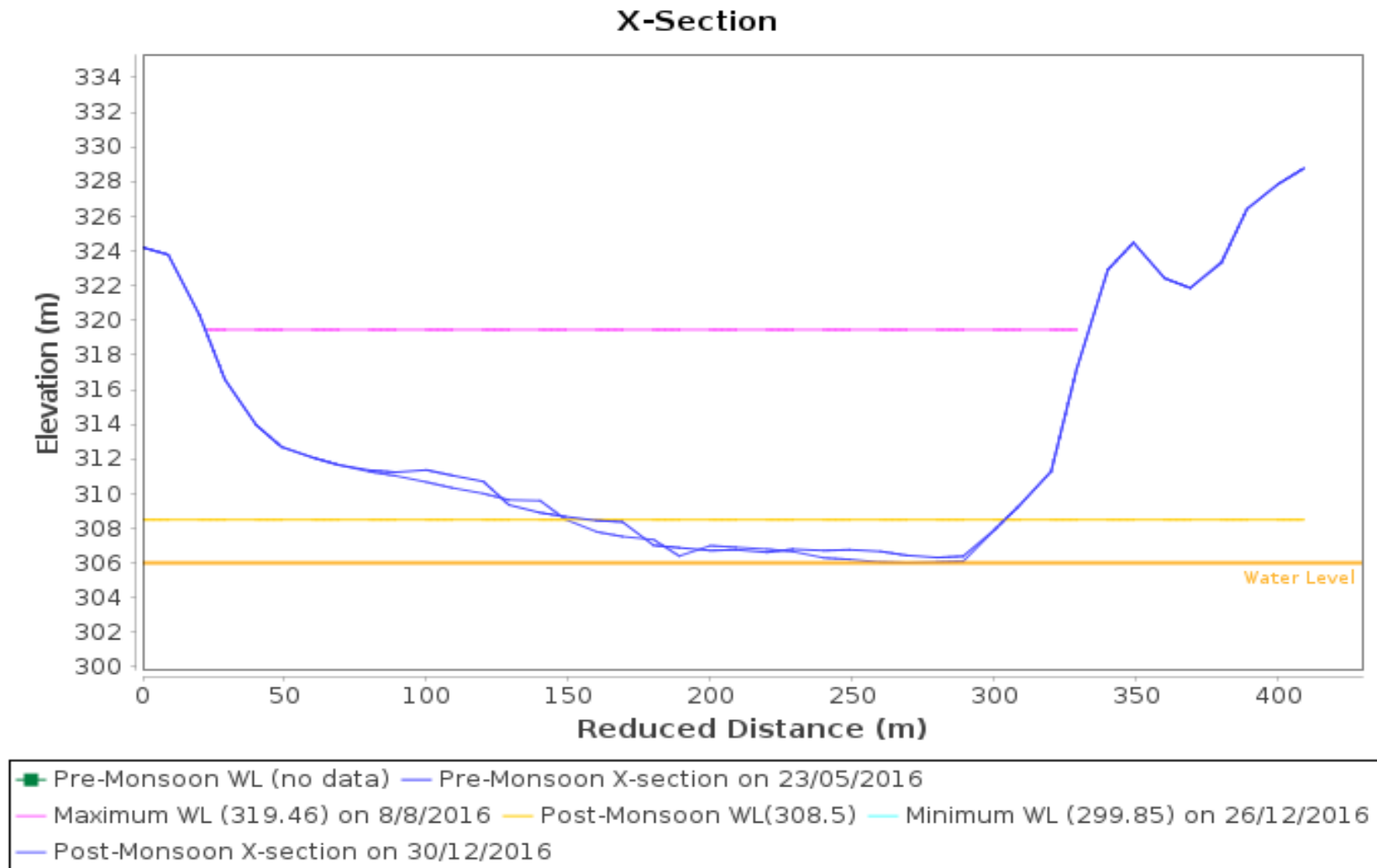
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

Station Name : Narmada at Barmanghat (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



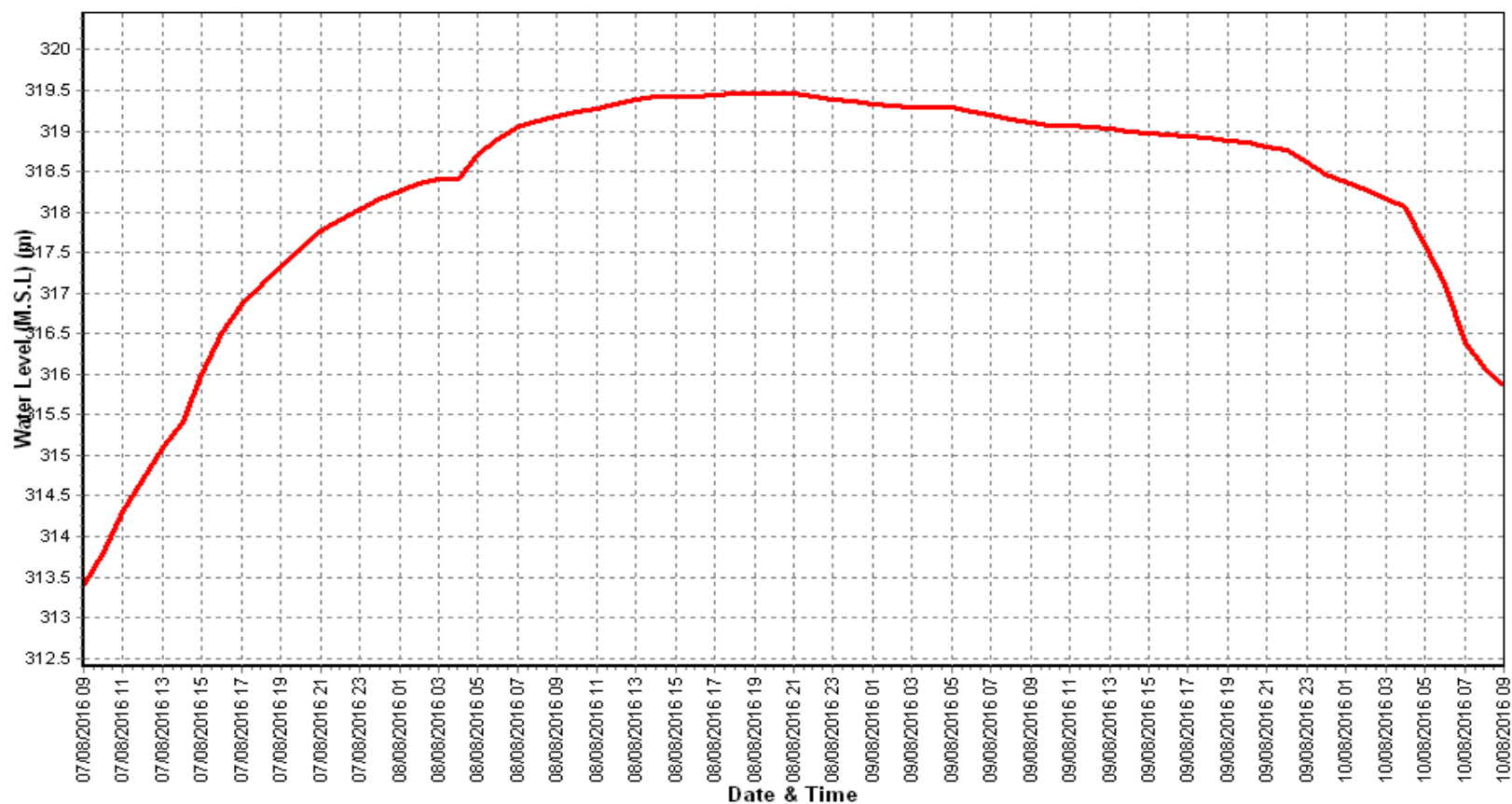
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Barmanghat (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



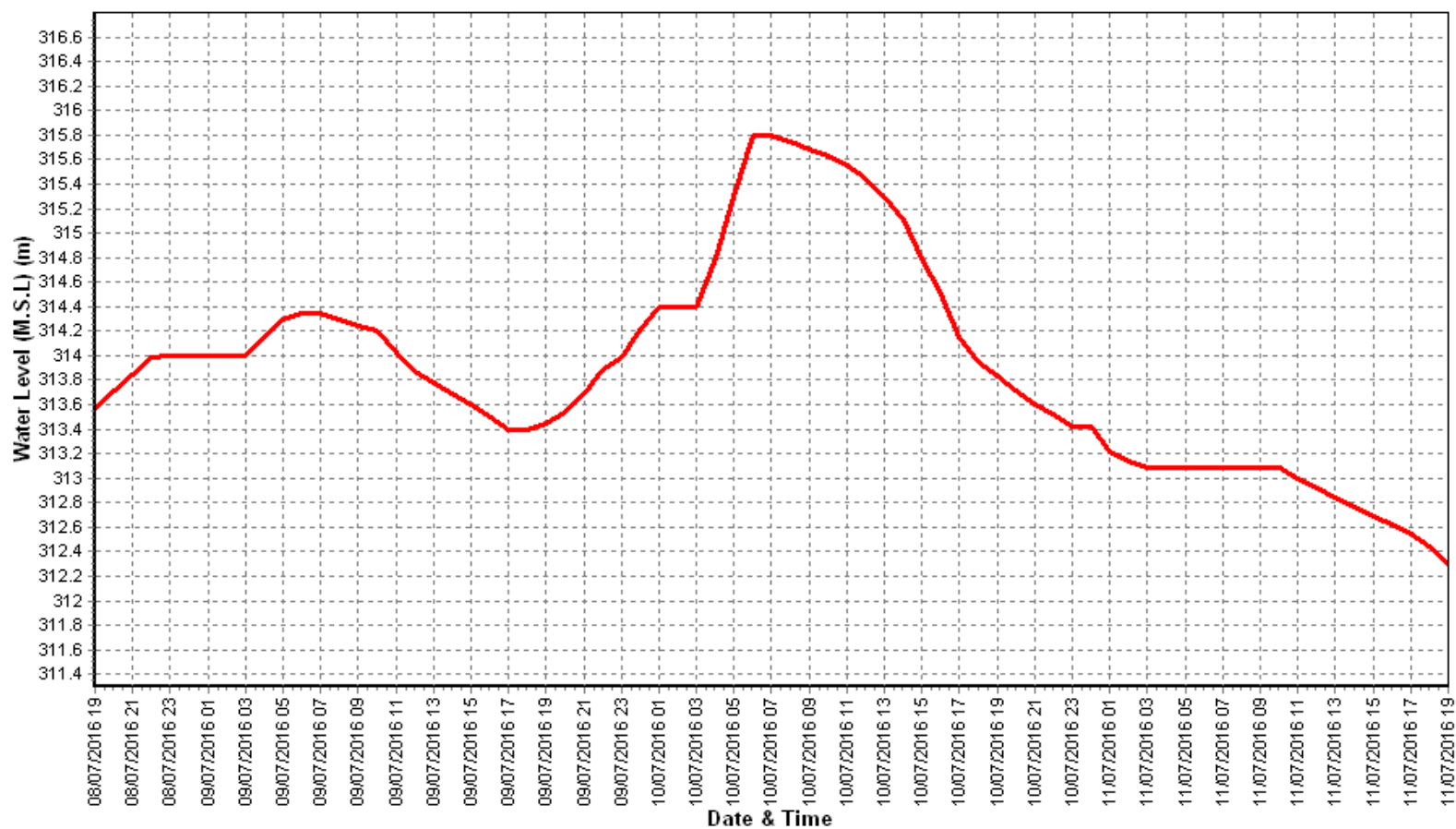
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Barmanghat (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



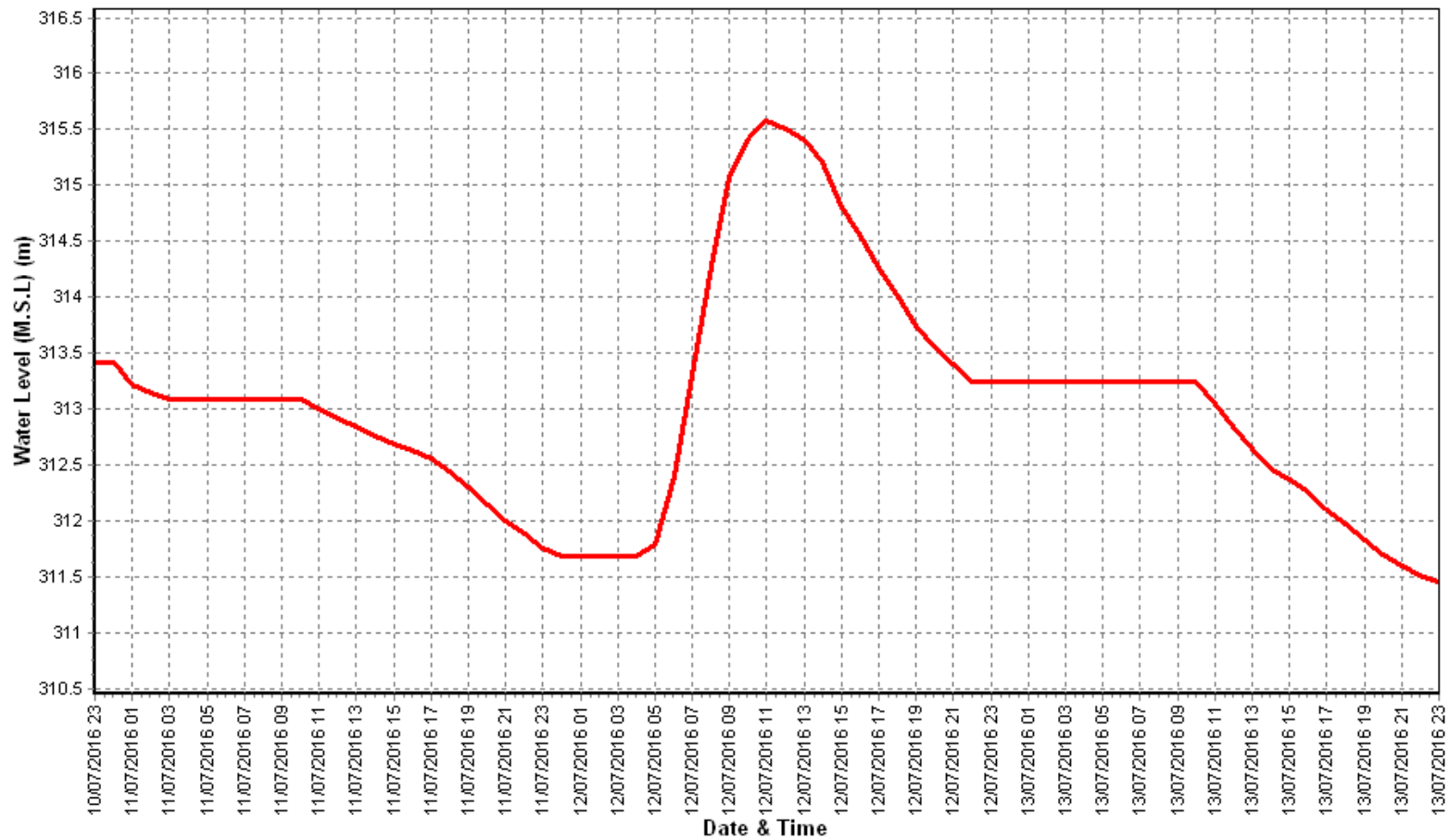
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Barmanghat (010215011)

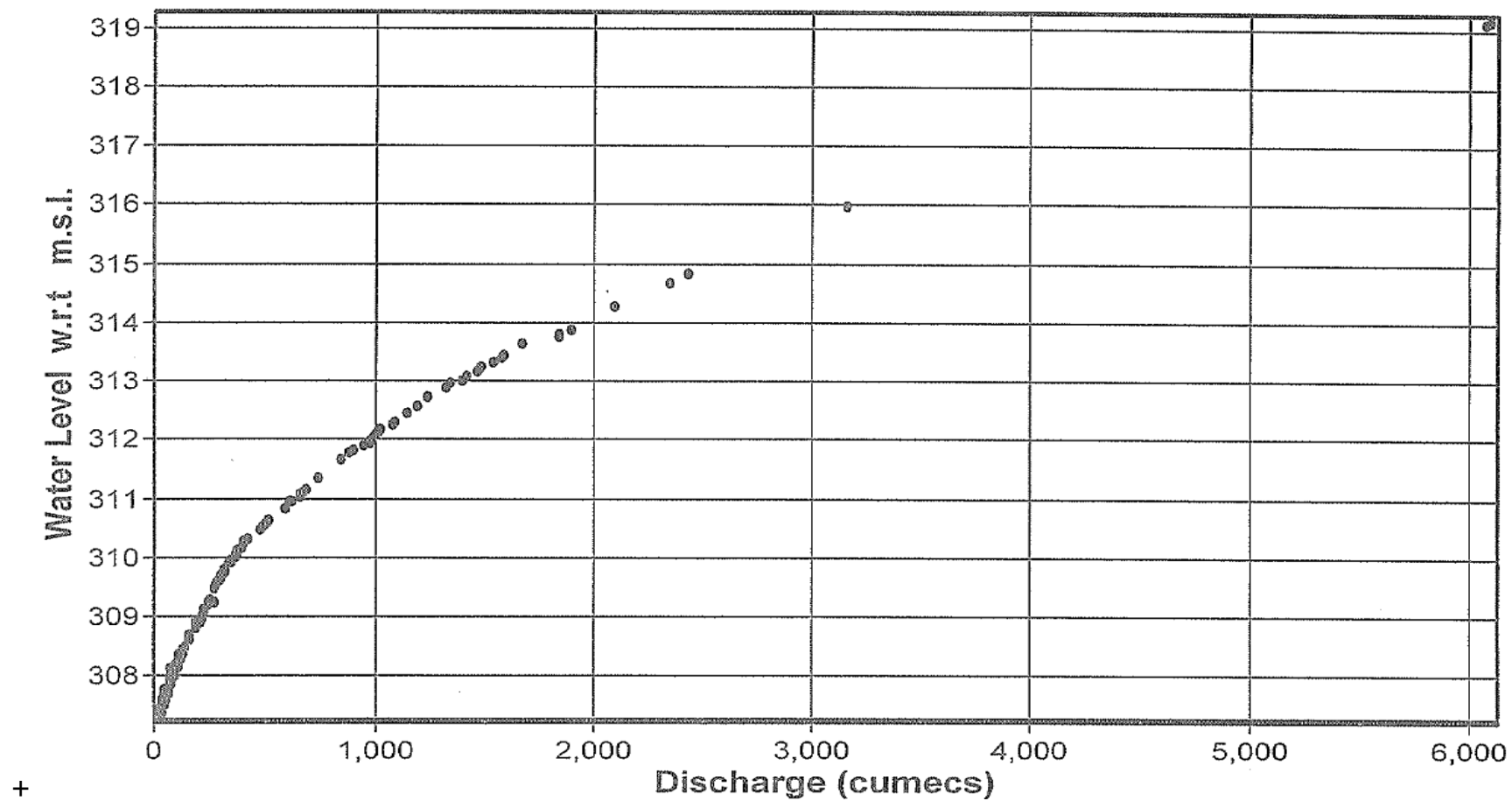
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



Plot of Stage Discharge Data at Narmada at Barman (010215011): 2016 - 2017



4.12 Sher at Belkheri

History sheet

[illegible]

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1976-1977	0.5	341.465	01/04/1977	0.2	341.44	01/05/1977
1977-1978	109.2	342.81	01/09/1977	0.3	341.44	01/06/1977
1978-1979	63.4	341.96	01/09/1978	0.7	341.17	01/06/1978
1979-1980	12.5	341.535	01/08/1979	0.5	341.28	01/05/1980
1980-1981	148	342.68	01/09/1980	0.4	341.27	01/06/1980
1981-1982	28	341.87	01/08/1981	0.4	341.31	01/06/1981
1982-1983	113.5	342.285	01/09/1982	0.4	341.52	01/05/1983
1983-1984	142.3	343.045	01/08/1983	0.3	341.515	01/06/1983
1984-1985	44.1	341.958	01/09/1984	0.5	341.5	01/06/1984
1985-1986	116.8	342.38	01/08/1985	0.4	341.29	01/05/1986
1986-1987	122	342.4	01/08/1986	0.4	341.28	01/06/1986
1987-1988	21.54	341.66	01/09/1987	0.38	341.21	01/05/1988
1988-1989	36.43	341.775	01/07/1988	0.33	341.215	01/06/1988
1989-1990	357.4	343.7	01/09/1989	0.28	341.3	01/06/1989
1990-1991	172	342.565	01/09/1990	0.65	341.425	01/05/1991
1991-1992	64.01	342.11	01/09/1991	0.44	341.33	01/04/1992
1992-1993	42.89	342	01/09/1992	0.4	341.37	01/05/1993
1993-1994	41.45	342.06	01/09/1993	0.3	341.1	01/05/1994
1994-1995	323.9	343.92	01/08/1994	0.69	341.11	01/01/1995
1995-1996	60.54	342.15	01/08/1995	0.37	340.96	01/05/1996
1996-1997	67	342.25	01/09/1996	0.27	341.08	01/04/1997
1997-1998	171.5	342.98	01/09/1997	0.25	341.085	01/06/1997
1998-1999	36.2	341.93	01/10/1998	0.25	341.1	01/04/1999
1999-2000	50.99	342.03	01/10/1999	0.17	341.04	01/07/1999
2000-2001	53.46	342.12	01/08/2000	0.4	340.95	01/04/2001
2001-2002	20.07	341.63	01/09/2001	0.36	341.01	01/05/2002
2002-2003	80	342.3	01/09/2002	0.31	340.91	01/05/2003
2003-2004	134.7	342.67	01/10/2003	0	340.85	01/12/2003
2004-2005	48	342.02	01/08/2004	0.24	341.01	01/05/2005
2005-2006	276.94	343.7	01/08/2005	0.25	341.01	01/06/2005
2006-2007	288.03	343.78	01/09/2006	0.26	341.03	01/06/2006
2007-2008	222.11	343.29	01/08/2007	0.21	341.07	01/05/2008
2008-2009	232.92	343.48	01/08/2008	0.2	341.02	01/04/2009
2009-2010	135.97	342.8	01/09/2009	0.17	341	01/07/2009
2010-2011	157.01	342.86	01/09/2010	0.15	340.94	01/06/2010
2011-2012	72.69	342.23	01/09/2011	0.1	341.03	01/05/2012
2012-2013	101.64	342.52	01/08/2012	0.08	341.02	01/06/2012
2013-2014	702.87	345.1	22/08/2013	0.34	341.05	03/06/2013
2014-2015	415.62	344.4	06/08/2014	0.34	341.38	12/05/2015
2015-2016	451.45	344.41	04/08/2015	0.24	341.04	14/05/2016
2016-2017	425	344.475	12/07/2016	0.02	341.1	02/12/2016

Stage Discharge Sheet for Sher at Belkheri for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0.27	341.04	2.61	341.21	79.15	342.21	222.3	343.26	70.81	342.24	9.22	341.46
2	0.26	341.04	2.02	341.2	245.1	343.2	146.2	342.7	46.5	342.06	8.94	341.44
3	0.26	341.04	6.1	342.45	70.84	342.35	91.67	342.38	42.81	341.95	2.56	341.22
4	0.26	341.04	99.62	342.47	171.8	342.89	69	342.23	24.24	341.81	2.51	341.19
5	0.31	341.04	40.45	341.98	95.44	342.42	58.54	342.16	15.25	341.65	2.47	341.18
6	0.26	341.04	241.5	343.43	84.08	342.31	48.5	342.1	50.46	342.23	2.3	341.19
7	0.25	341.04	93	342.4	98.5	342.46	47.46	342.05	46.87	342.08	2.43	341.16
8	0.28	341.04	237.2	343.38	84.39	342.33	38.44	341.96	43.17	341.97	2.4	341.15
9	0.27	341.04	401.4	344.15	75.81	342.17	37.39	341.95	24.14	341.8	1.92	341.15
10	0.26	341.04	284	343.76	46.77	342.04	27.34	341.85	15.36	341.04	1.88	341.14
11	0.27	341.04	138.9	342.69	47.39	342.02	26.43	341.84	11.7	341.54	1.67	341.17
12	0.31	341.04	425	344.48	46.14	342.05	26.91	341.85	8	341.52	1.63	341.16
13	0.27	341.04	212.3	343.38	42.48	341.95	24.14	340.8	6.26	341.48	1.63	341.16
14	0.26	341.04	143.6	342.77	69	342.23	19.97	341.78	8.82	341.43	1.63	341.14
15	0.26	341.04	95.25	342.41	56.5	342.2	19.64	341.75	8.65	341.42	1.66	341.15
16	0.25	341.04	89.25	342.36	56.13	342.17	27.6	341.87	5	341.4	1.53	341.13
17	0.26	341.04	86	342.35	70.66	342.35	23.32	341.79	9.87	341.36	1.49	341.13
18	0.26	341.04	91.3	342.45	56.41	342.17	19	341.76	9.65	341.34	1.44	341.12
19	0.31	341.04	82.39	342.23	42.89	341.26	24.29	341.81	7.96	341.32	1.47	341.13
20	0.26	341.04	54.58	342.15	33.58	341.86	23.67	341.78	7.72	341.29	1.48	341.12
21	0.26	341.04	40.38	342.04	20.3	341.78	32.99	341.93	7.62	341.27	1.44	341.12
22	0.25	341.04	80.49	342.2	22.52	341.85	90.32	342.33	7.53	341.24	1.43	341.12
23	0.26	341.04	84.06	342.3	22.29	341.82	36.54	341.94	3.1	341.24	1.42	341.12
24	0.25	341.04	77	342.27	152.3	342.77	20.25	341.76	7.36	341.22	1.32	341.1
25	0.26	341.04	56.21	342.17	178	342.93	134	342.64	4.97	341.3	1.39	341.12
26	0.31	341.04	78.26	342.29	421	342.99	68.34	342.29	15.13	341.64	1.36	341.11
27	0.25	341.04	254.5	343.52	146.6	342.73	45.25	342.04	14.57	341.62	1.37	341.11
28	7.22	341.42	84.79	342.24	134	342.64	49.69	342.11	13.25	341.58	1.11	341.1
29	47.88	342.07	62.46	342.23	70.68	342.29	25.97	341.83	12.25	341.53	1.08	341.1
30	7.72	341.52	69.28	342.35	188.6	343.08	70.88	342.26	8	341.52	1.1	341.1
31			150.9	342.72	156.4	342.83			10.52	341.51		
Ten-Daily Mean												
I Ten-Daily	0.27	341.04	140.79	342.64	105.19	342.44	78.68	342.27	37.96	341.88	3.66	341.23
II Ten-Daily	0.27	341.04	141.86	342.73	52.12	342.03	23.5	341.7	8.36	341.41	1.56	341.14
III Ten-Daily	6.47	341.23	94.39	342.39	137.52	342.52	57.42	342.11	9.48	341.42	1.3	341.11
Monthly												
Min.	0.25	341.04	2.02	341.2	20.3	341.26	19	340.8	3.1	341.04	1.08	341.1
Max.	47.88	341.04	425	341.2	421	341.26	222.3	340.8	70.81	341.04	9.22	341.1
Mean	2.34	341.1	125.68	342.59	98.27	342.33	53.2	342.03	18.6	341.57	2.18	341.16

Annual Runoff in

MCM : 809.1

Peak Observed Discharge = 425 cumecs on 12/7/2016 Corres.

Water Level 344.48 m

Lowest Observed Discharge = 0.02cumecs on 2/12/2016 Corres.

Water Level 341.1 m

Annual Runoff in

mm : 536.54

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Stage Discharge Sheet for Sher at Belkheri for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	1.09	341.1	0.86	341.09	0.76	341.08	0.63	341.06	0.49	341.04	0.45	341.04
2	0.02	341.1	0.84	341.09	0.73	341.07	0.63	341.06	0.45	341.04	0.44	341.04
3	1.02	341.1	0.84	341.09	0.72	341.07	0.61	341.06	0.49	341.04	0.45	341.04
4	1.02	341.1	0.84	341.09	0.71	341.07	0.62	341.06	0.48	341.04	0.43	341.04
5	1.01	341.1	0.84	341.09	0.65	341.07	0.6	341.06	0.47	341.04	0.42	341.04
6	0.99	341.1	0.79	341.08	0.69	341.06	0.6	341.05	0.45	341.04	0.44	341.04
7	0.98	341.1	0.78	341.08	0.68	341.06	0.59	341.05	0.47	341.04	0.45	341.04
8	0.96	341.1	0.75	341.08	0.66	341.06	0.6	341.05	0.45	341.04	0.43	341.04
9	0.97	341.1	0.82	341.09	0.64	341.06	0.57	341.05	0.45	341.04	0.42	341.04
10	0.98	341.1	0.81	341.09	0.63	341.06	0.61	341.05	0.46	341.04	0.45	341.04
11	1.22	341.1	0.79	341.09	0.65	341.06	0.6	341.05	0.45	341.04	0.42	341.03
12	0.96	341.1	0.8	341.09	0.6	341.06	0.55	341.05	0.46	341.04	0.42	341.03
13	1.02	341.1	0.79	341.09	0.64	341.06	0.55	341.05	0.46	341.04	0.42	341.03
14	0.98	341.1	0.79	341.09	0.64	341.06	0.6	341.05	0.45	341.04	0.4	341.03
15	0.96	341.1	0.75	341.09	0.63	341.06	0.59	341.05	0.46	341.04	0.41	341.03
16	0.98	341.1	0.78	341.09	0.68	341.06	0.57	341.05	0.45	341.04	0.41	341.03
17	0.98	341.1	0.77	341.08	0.64	341.06	0.57	341.05	0.45	341.04	0.4	341.03
18	1.02	341.1	0.82	341.09	0.66	341.06	0.59	341.05	0.45	341.04	0.4	341.03
19	0.96	341.1	0.82	341.09	0.6	341.06	0.55	341.05	0.44	341.04	0.41	341.03
20	0.93	341.1	0.81	341.09	0.64	341.06	0.58	341.05	0.43	341.04	0.39	341.02
21	0.94	341.1	0.81	341.09	0.64	341.06	0.56	341.05	0.44	341.04	0.35	341.02
22	0.94	341.1	0.75	341.09	0.65	341.06	0.56	341.05	0.43	341.04	0.39	341.02
23	0.92	341.1	0.8	341.09	0.63	341.06	0.56	341.05	0.45	341.04	0.38	341.02
24	0.91	341.1	0.79	341.09	0.64	341.06	0.55	341.05	0.46	341.04	0.36	341.02
25	1.02	341.1	0.79	341.09	0.66	341.06	0.55	341.05	0.46	341.4	0.36	341.02
26	0.98	341.1		341.08	0.6	341.06	0.55	341.05	0.45	341.04	0.36	341.02
27	0.93	341.1	0.79	341.08	0.62	341.06	0.56	341.05	0.44	341.04	0.36	341.02
28	0.87	341.1	0.76	341.08	0.63	341.06	0.55	341.05	0.45	341.04	0.35	341.02
29	0.86	341.1	0.7	341.08			0.53	341.05	0.44	341.04	0.36	341.02
30	0.85	341.1	0.75	341.08			0.54	341.05	0.45	341.04	0.36	341.02
31	0.82	341.1	0.74	341.08			0.52	341.05			0.36	341.02
Ten-Daily Mean												
I Ten-Daily	0.9	341.1	0.82	341.09	0.69	341.07	0.61	341.05	0.47	341.04	0.44	341.04
II Ten-Daily	1	341.1	0.79	341.09	0.64	341.06	0.57	341.05	0.45	341.04	0.41	341.03
III Ten-Daily	0.91	341.1	0.7	341.08	0.63	341.06	0.55	341.05	0.45	341.08	0.36	341.02
Monthly												
Min.	0.02	341.1	0.7	341.08	0.6	341.06	0.52	341.05	0.43	341.04	0.35	341.02
Max.	1.22	341.1	0.86	341.08	0.76	341.06	0.63	341.05	0.49	341.04	0.45	341.02
Mean	0.94	341.1	0.77	341.09	0.65	341.06	0.58	341.05	0.45	341.05	0.4	341.03

Peak Computed Discharge = 284 cumecs on 10/7/2016 Corres. Water

Level = 343.76 m

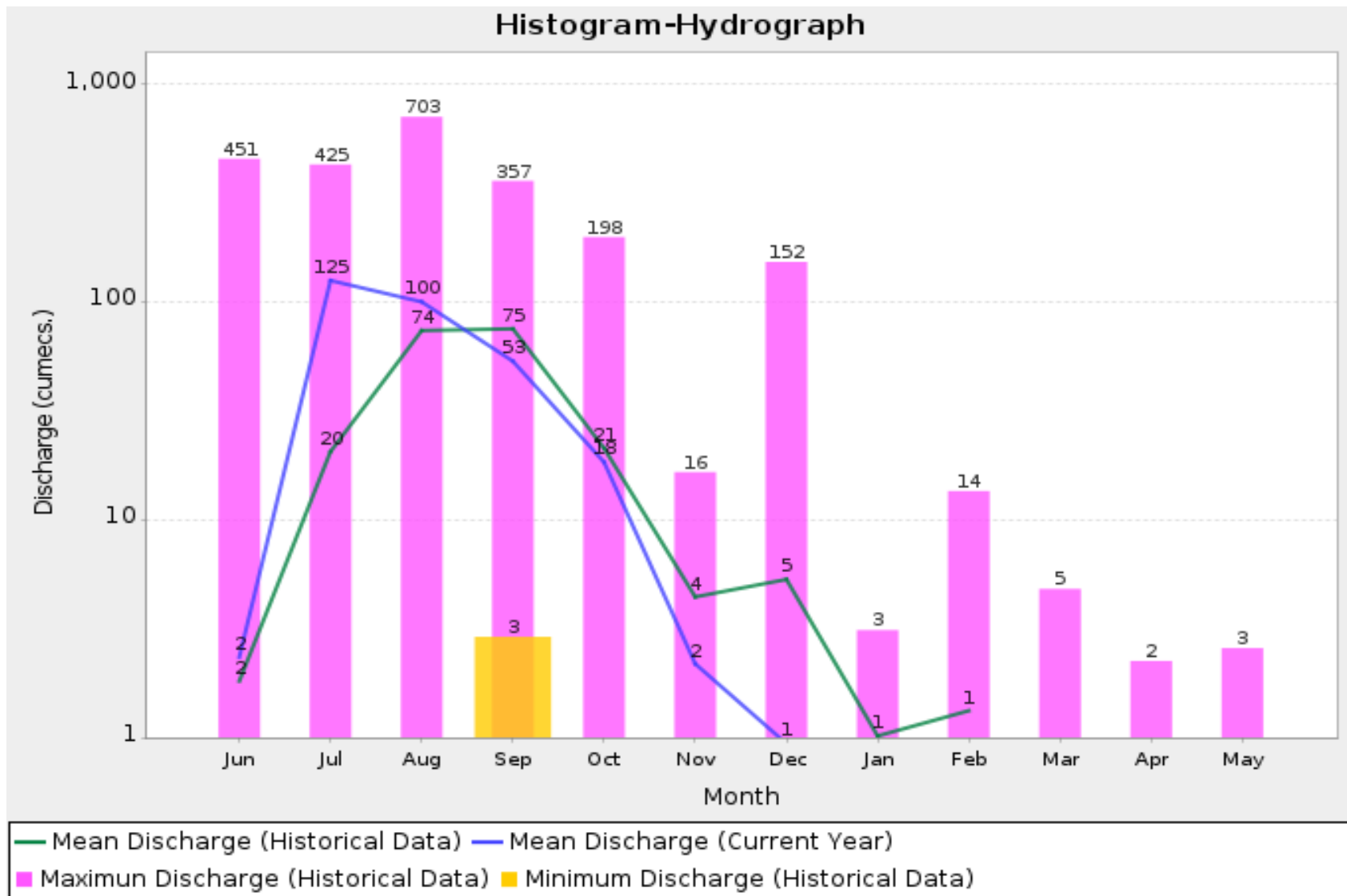
Lowest Computed Discharge = 0.31cumecs on 26/6/2016 Corres. Water Level =
341.04 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1977-2017)



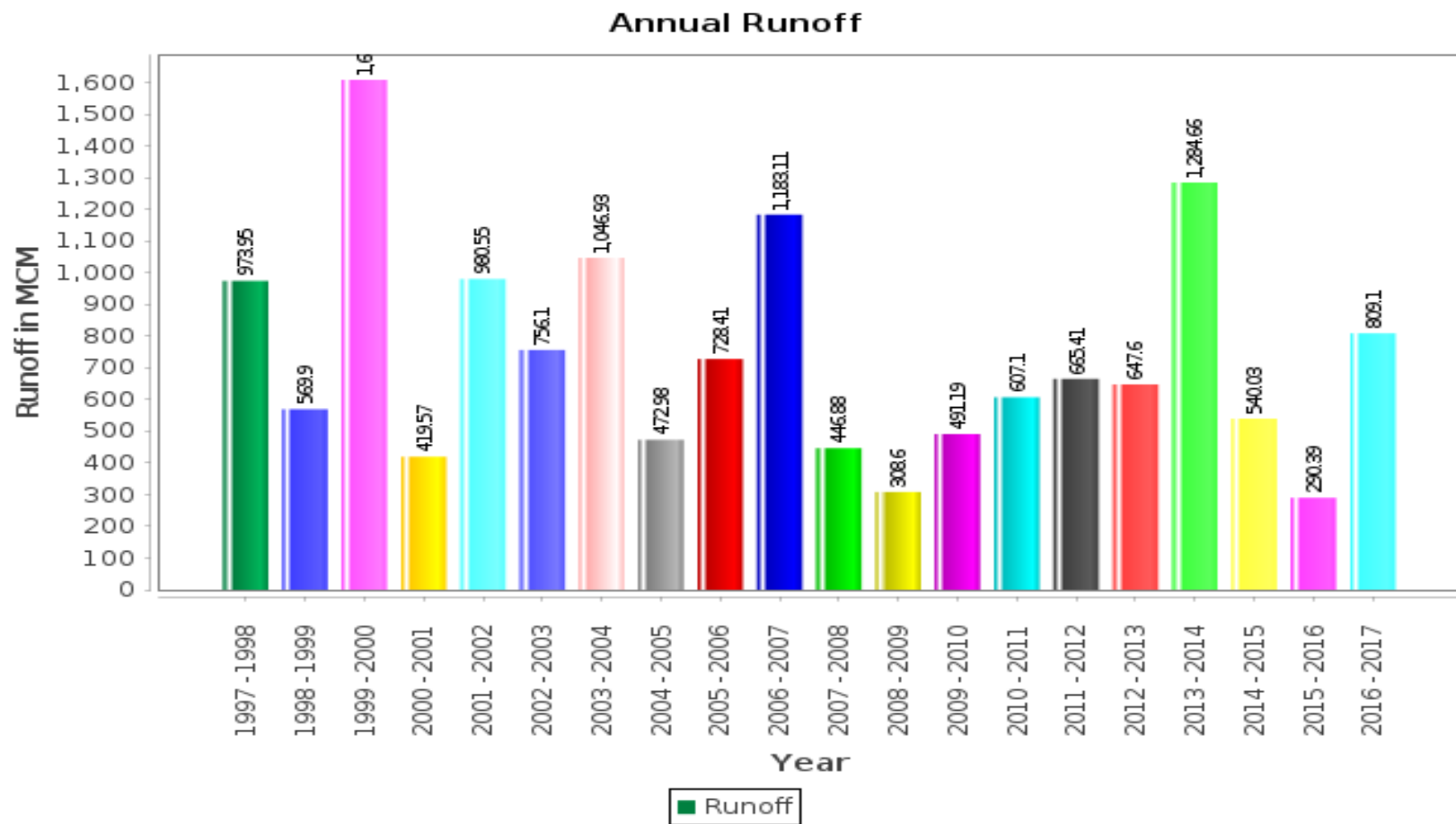
Annual Runoff Values for the period (1977 – 2017)

Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



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

Monthly Average Runoff based on period (1977-2017)

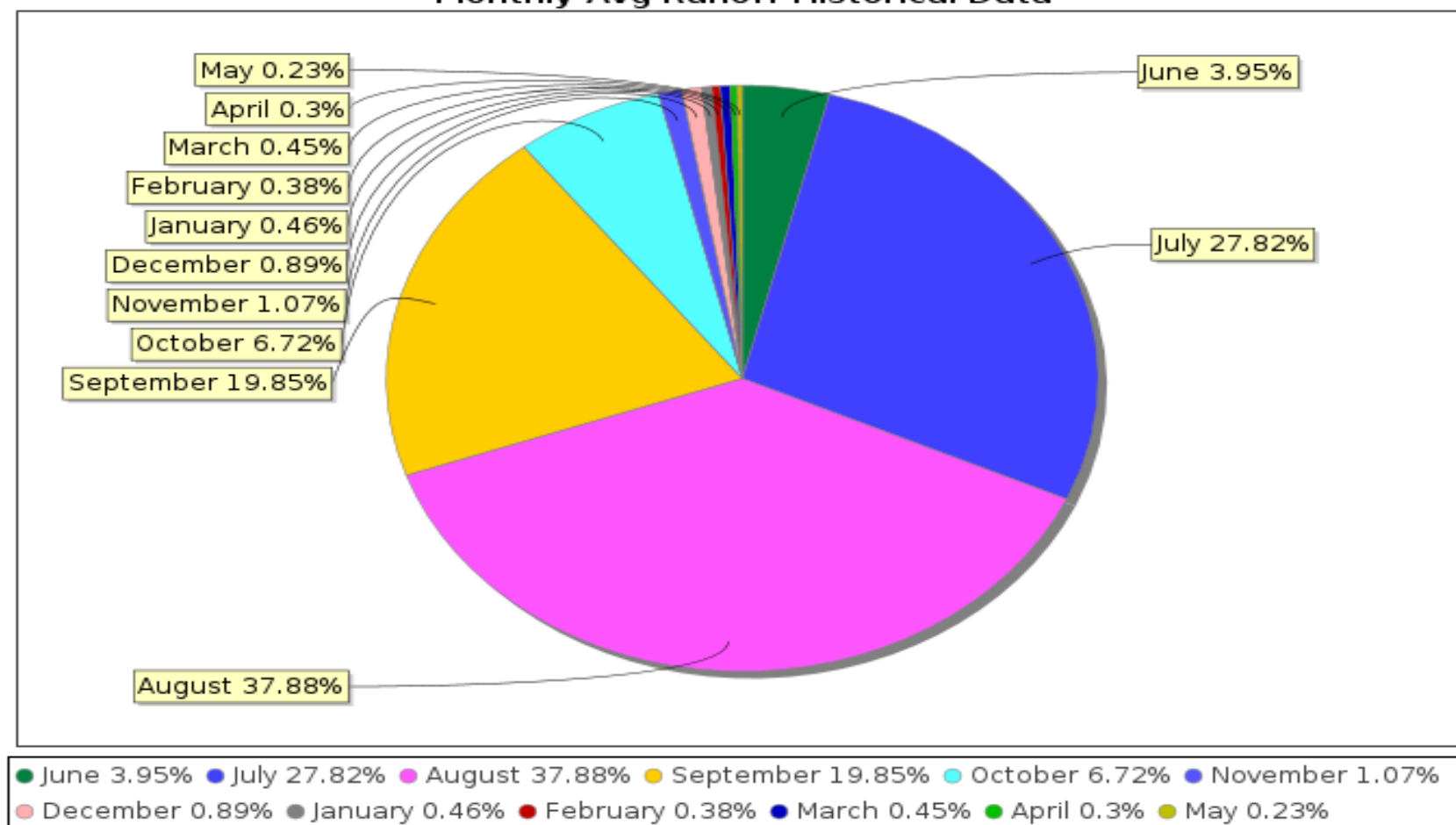
Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

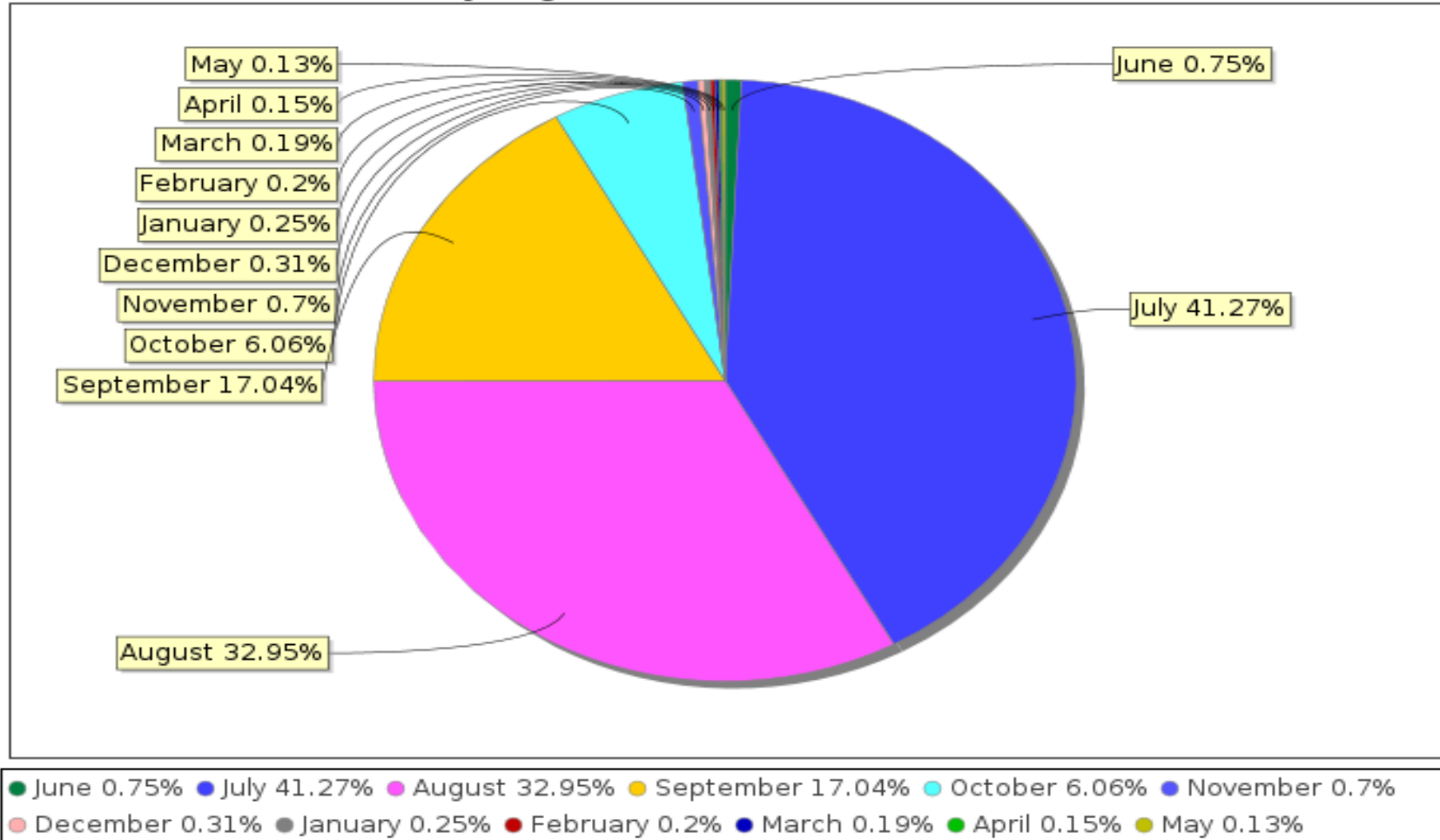
Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

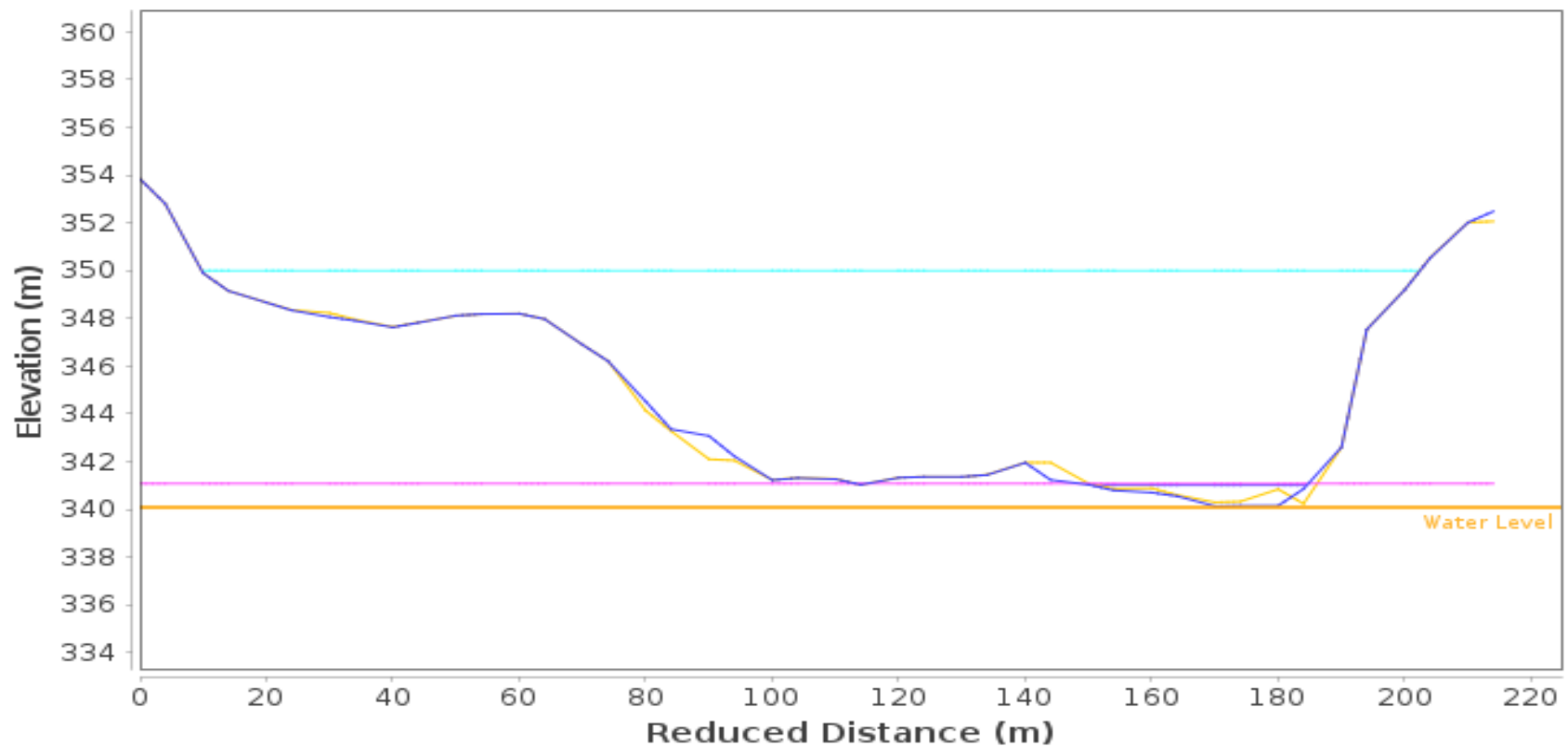
Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad

X-Section



■ Pre-Monsoon WL (no data) — Pre-Monsoon X-section on 28/05/2016 — Post-Monsoon WL(341.09)
— Post-Monsoon X-section on 18/01/2017 — Maximum WL (350) on 12/7/2016
— Minimum WL (341.02) on 20/5/2017

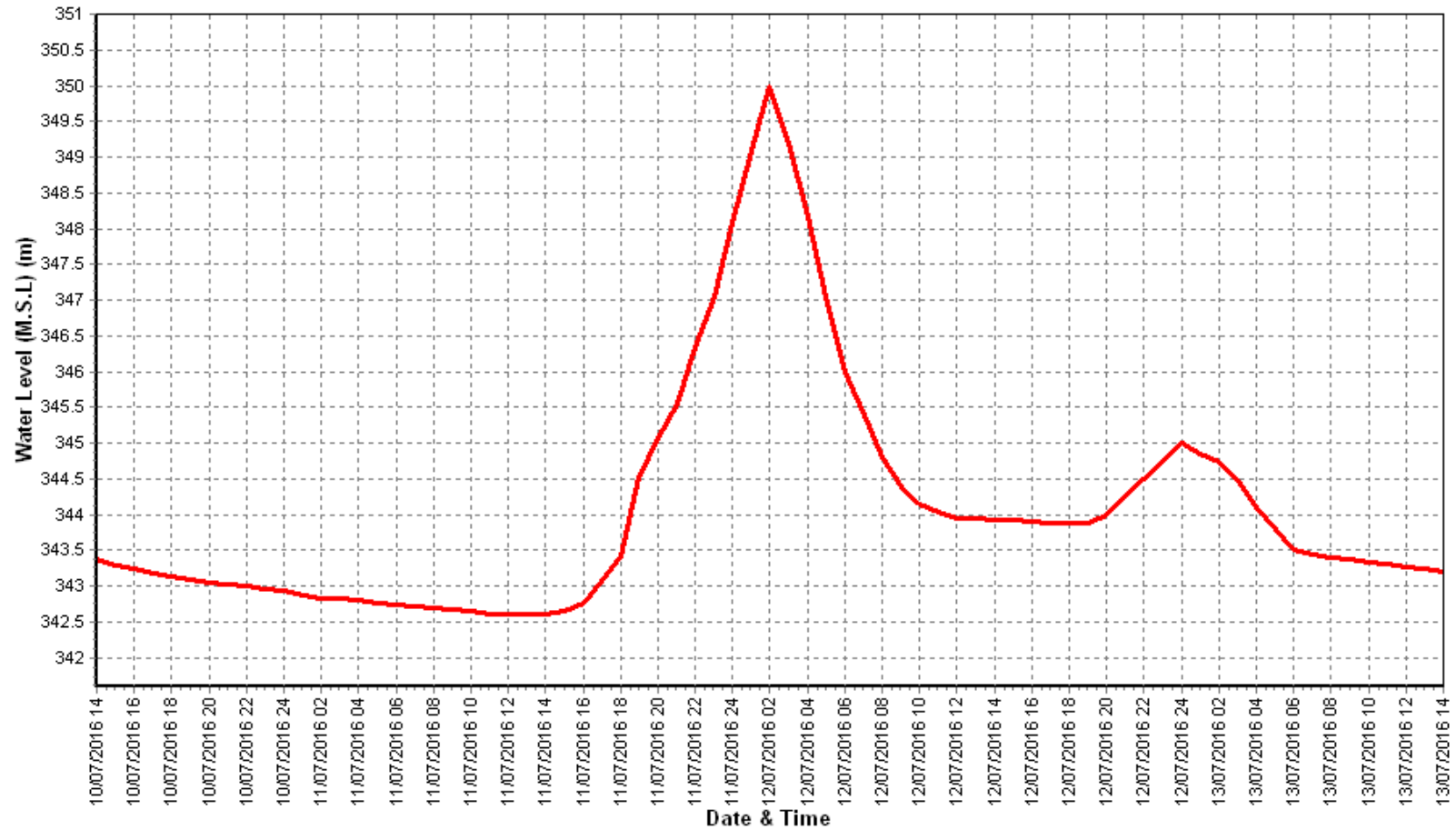
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



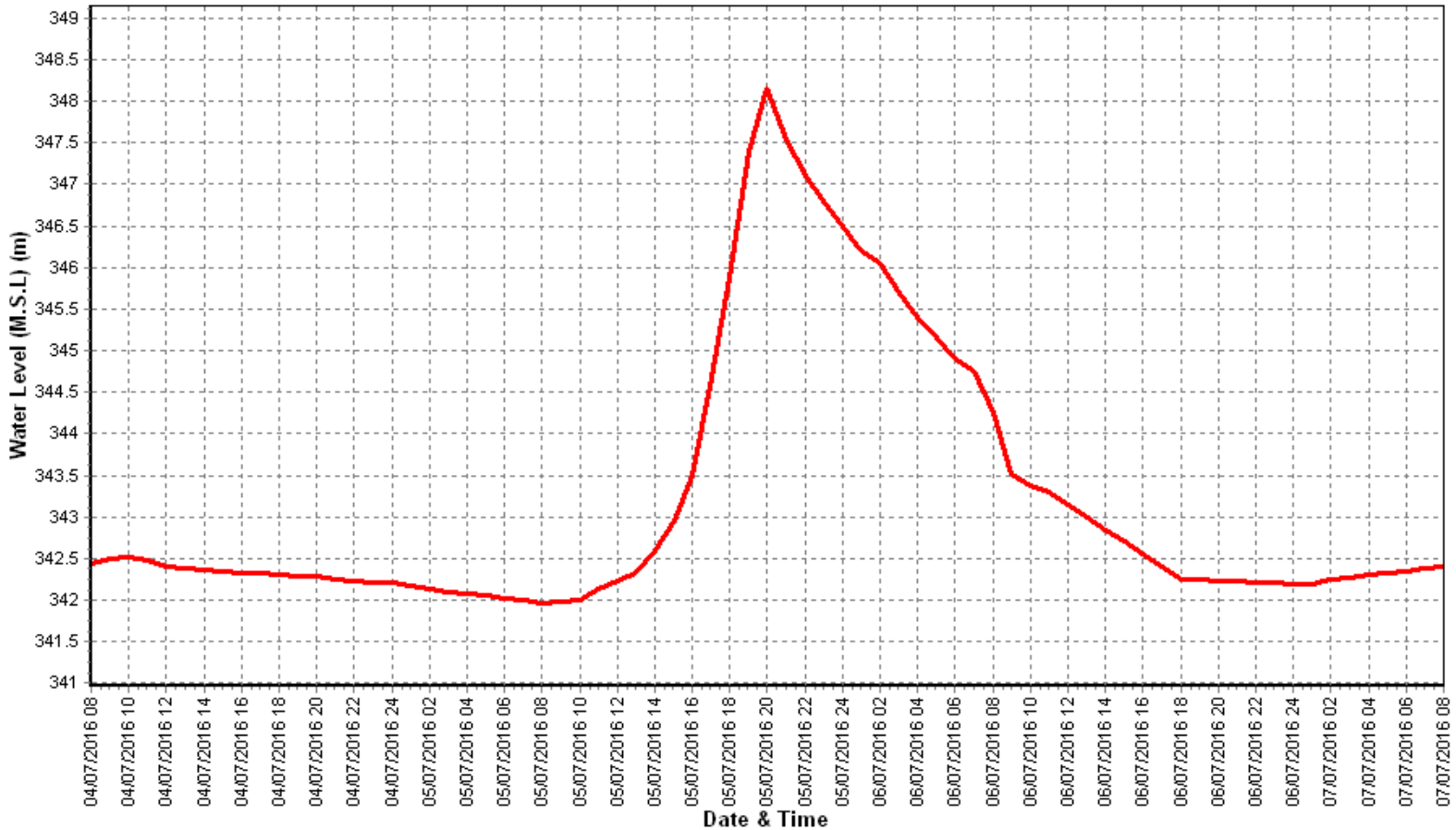
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



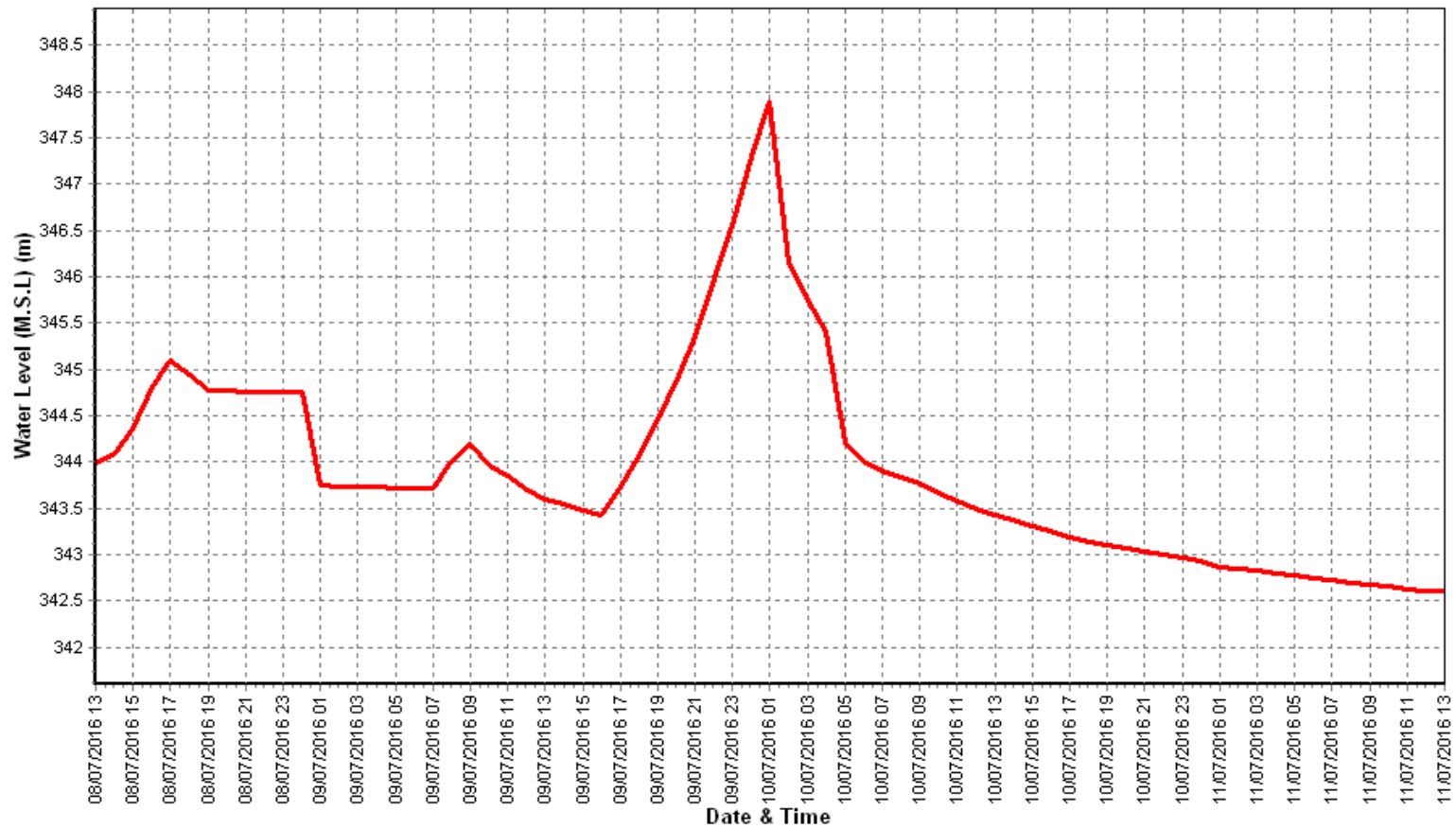
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Sher at Belkheri (010215010)

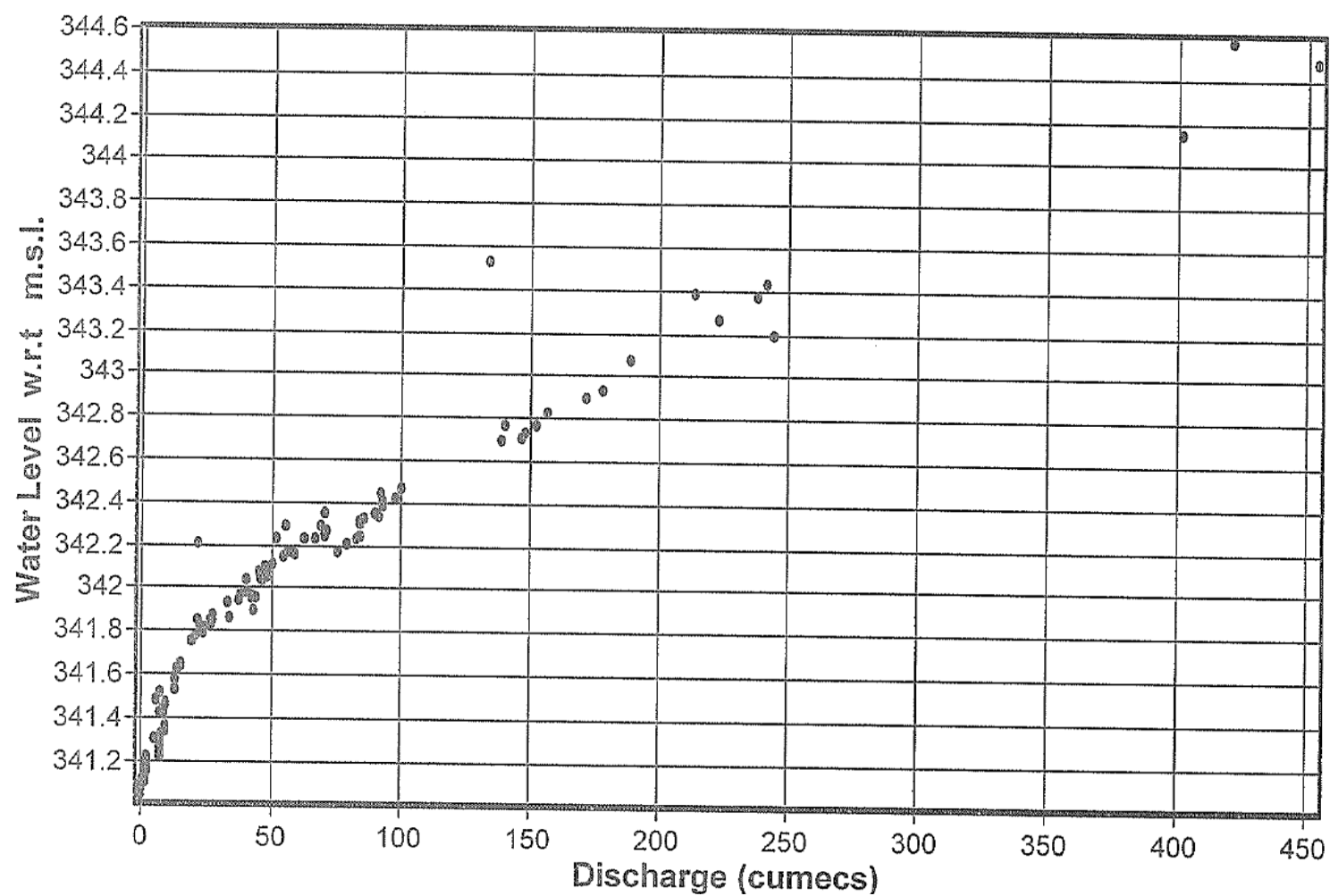
Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



Plot of Stage Discharge Data at Sher at Belkheri (010215010): 2016 - 2017



4.13 Hiran at Patan

History sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
				Water Year	: 2016 - 2017	
Site	: Patan			Code	: 006-NDBHP	
State	: Madhya Pradesh			District	: Jabalpur	
Basin	: NARMADA			Independent River : Narmada		
Tributary	: Heran			Sub Tributary	: -	
Sub-Sub Tributary	: -			Local River	: Heran	
Division	: Narmada Division(ND), Bhopal			Sub-Division	Upper Narmada Sub-Division, : Jabalpur	
Drainage Area	: 3950.0 Sq. Km.			Bank	: Left	
Latitude	: 23°18'42"			Longitude	: 79°39'46"	
Current Zero of Gauge (m)	: 341.500					
CATEGORY	Opening Date			Closing Date		
Gauge	:	30/08/1979				
Discharge	:	30/08/1979				
Sediment	:					
Water Quality	:					
Reduced Level	Opening Date			Closing Date		
341.5	30/08/1979			31/12/2020		
341.5	14/10/2016			-		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1979-1980	12.2	342.355	01/12/1979	0	0	01/06/1979
1980-1981	1666	355.66	30/08/1980	0.4	341.855	01/06/1980
1981-1982	202	346.19	08/08/1981	0.8	341.84	19/06/1981
1982-1983	1981	354.313	10/08/1982	1.3	342.07	30/05/1983

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1983-1984	1640	355.67	10/09/1983	1.2	342.54	06/06/1983
1984-1985	1275	352.85	24/08/1984	1.3	342.34	31/05/1985
1985-1986	1118	351.35	09/08/1985	1.3	342.34	01/06/1985
1986-1987	440	347.44	06/08/1986	1.6	342.29	22/05/1987
1987-1988	1200	352.37	17/09/1987	1.06	342.32	01/07/1987
1988-1989	1200	352.35	05/08/1988	1.29	342.31	31/05/1989
1989-1990	310	346.4	15/08/1989	0.37	342.795	14/05/1990
1990-1991	1270	351.27	20/09/1990	1.64	342.93	01/06/1990
1991-1992	1680	354.95	25/08/1991	1.6	342.36	07/06/1991
1992-1993	1880	356.08	13/09/1992	1.29	342.485	29/06/1992
1993-1994	1086	351.6	10/09/1993	1.5	342.25	12/06/1993
1994-1995	1660	354.7	02/08/1994	2.32	342.17	31/05/1995
1995-1996	1415	353.605	11/08/1995	1.05	342.25	31/05/1996
1996-1997	234	345.62	18/08/1996	0	0	01/04/1997
1997-1998	1295	351.85	07/08/1997	0	341.925	01/06/1997
1998-1999	488	347.65	07/08/1998	0.73	342.21	19/05/1999
1999-2000	1620	353.23	09/08/1999	0.9	342.19	15/06/1999
2000-2001	756	349.6	20/07/2000	0.05	341.8	26/05/2001
2001-2002	580	347.75	27/07/2001	0.25	341.8	01/06/2001
2002-2003	1302	352.5	19/08/2002	1.07	342.2	03/06/2002
2003-2004	1360	352.62	16/09/2003	0.56	342.16	11/06/2003
2004-2005	1175	352.25	23/08/2004	1.24	342.06	31/05/2005
2005-2006	1930	356.8	06/07/2005	0.39	341.97	26/06/2005
2006-2007	254.94	347.05	25/08/2006	0.15	341.7	31/05/2007
2007-2008	663.16	348.61	22/08/2007	0	0	01/05/2008
2008-2009	945.33	350.3	08/07/2008	0.59	341.65	30/05/2009
2009-2010	937.53	350.65	11/09/2009	0.06	341.72	21/05/2010
2010-2011	866.13	350.025	26/07/2010	0	341.71	01/07/2010
2011-2012	1444.59	352.51	24/07/2011	0	341.75	07/06/2011
2012-2013	531.3	347.72	11/08/2012	0	0	19/05/2013
2013-2014	2202.29	355.14	20/08/2013	0	0	02/06/2013
2014-2015	779.82	349.2	06/08/2014	0.5	341.51	20/05/2015
2015-2016	380.45	347.18	04/08/2015	0.06	341.51	11/04/2016
2016-2017	838	349.74	20/08/2016	0	0	02/06/2016

Stage Discharge Sheet for Hiran at Patan for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	8.24	341.9	227.9	345.37	218.6	345.24	95.47	343.77	17	342.1
2	0	0	15.36	342.18	186.4	344.83	155.9	344.77	92	343.75	16	342.07
3	0	0	24	342.65	135.4	344.5	137.5	344.45	81.26	343.65	15.5	342.04
4	0	0	27.79	342.7	199	344.97	120	344.22	77.74	343.58	15	342.01
5	0	0	16.24	342.27	293.8	345.97	117.5	344.2	82.66	343.66	14.5	341.98
6	0	0	53.21	343.06	441.7	347.28	81.33	343.65	81.49	343.65	14	341.95
7	0	0	250	345.08	420	346.94	70.85	343.53	69.33	343.51	13.18	341.92
8	0	0	599.8	347.88	566.4	347.61	51.2	343.26	70.03	343.5	13	341.9
9	0	0	299.4	346.09	378.3	346.45	50.74	343.12	84.5	343.67	14	341.96
10	0	0	300	346.1	269.3	345.58	44.9	343.04	96.86	343.79	15	342
11	0	0	147.95	344.6	201.1	344.99	39	342.96	77.5	343.58	14	341.95
12	0	0	155.95	344.78	129.8	344.4	33.08	342.88	70.65	343.53	13.18	341.92
13	0	0	93.01	343.89	92.24	344.88	32.77	342.84	68.42	343.49	13	341.9
14	0	0	84.79	343.78	87.25	343.65	32.46	342.8	62.27	343.42	12	341.88
15	0	0	61.52	343.18	320	346.05	32.36	342.8	58.2	343.3	10.38	341.82
16	0	0	41.47	342.82	439.4	346.72	33.81	342.89	50.1	343.24	9	341.78
17	0	0	33.04	342.55	585.3	347.8	42.17	342.94	49.51	343.1	8	341.74
18	0	0	24.6	342.43	410.2	346.62	32.6	342.84	44.79	343.04	7	341.7
19	0	0	29.67	342.15	448.1	347.55	31.06	342.8	34.18	342.9	7	341.7
20	0	0	26.91	342.46	838	349.74	44.63	343.04	32.71	342.8	7	341.7
21	0	0	23.59	342.41	615	348.07	53.35	343.23	31.94	342.79	6.47	341.69
22	0	0	200.3	345.04	520.5	347.44	79.04	343.63	29.94	342.76	6.47	341.69
23	0	0	108.9	344.07	418.6	346.7	56.3	343.27	29.2	342.69	6.47	341.69
24	0	0	158	344.92	324.3	346.2	51.63	343.2	27.09	342.53	6.47	342.69
25	0	0	104.4	344.01	329.7	346.23	64.4	343.45	26.71	342.47	6.55	341.7
26	0	0	88.95	343.69	493	347.24	71.83	343.54	26.98	342.51	6.55	341.7
27	0	0	64.91	343.31	612	348.16	70.87	343.53	26.88	342.5	6.62	341.71
28	0	0	63.05	343.22	475	347.08	64.9	343.45	23.81	342.35	6.55	341.7
29	0	0	69.58	343.35	335.6	346.26	60.73	343.35	19.85	342.24	6.3	341.66
30	0	0	70.98	343.37	247.1	345.52	78.85	343.59	18.4	342.19	6.22	341.65
31			79.75	343.56	279.9	345.07			17.05	342.13		
Ten-Daily Mean												
I Ten-Daily	0	0	159.4	343.99	311.82	345.95	104.85	343.95	83.13	343.65	14.72	341.99
II Ten-Daily	0	0	69.89	343.26	355.14	346.24	35.39	342.88	54.83	343.24	10.06	341.81
III Ten-Daily	0	0	93.86	343.72	422.79	346.72	65.19	343.42	25.26	342.47	6.47	341.79
Monthly												
Min.	0	0	8.24	341.9	87.25	343.65	31.06	342.8	17.05	342.13	6.22	341.65
Max.	0	0	599.8	341.9	838	343.65	218.6	342.8	96.86	342.13	17	341.65
Mean	0	0	107.72	343.66	363.25	346.3	68.48	343.42	54.41	343.12	10.41	341.86

Annual Runoff in MCM

: 1744.78

Annual Runoff in mm

: 441.72

Peak Observed Discharge = 838 cumecs on 20/8/2016 Corres. Water Level = 349.74 m

Lowest Observed Discharge = 0 cumecs on 2/6/2016 Corres. Water Level = 0 m

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

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Hiran at Patan for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	6.22	341.65	9.75	341.8	10.98	341.84	5.5	342.66	8.5	341.76	0	0
2	6.22	341.65	10.97	341.84	10.98	341.84	13.5	341.94	7	341.7	0	0
3	6	341.64	12	341.88	10.35	341.82	13.5	341.94	4.89	341.6	0	0
4	6	341.64	13	341.9	10.35	341.82	14.2	341.96	3.9	341.58	0	0
5	10.7	341.84	10.98	341.84	10.25	341.81	14.9	342	3.2	341.57	0	0
6	14.9	342	9.94	341.8	9.94	341.8	14.97	342	2.1	341.56	0	0
7	14.6	341.98	9	341.78	9.37	341.79	14.5	341.98	1.05	341.54	0	0
8	14.2	341.96	9.75	341.8	10.35	341.82	14.9	342	1.05	341.54	0	0
9	14.2	341.96	11.25	341.85	11.25	341.85	14.9	342	1.05	341.54	0	0
10	14.2	341.96	13	341.9	11.75	341.87	15.3	342.03	1.06	341.54	0	0
11	14.2	341.96	10.68	341.83	10.98	341.84	16	342.07	0	341.5	0	0
12	14.2	341.96	10.68	341.83	10.25	341.81	16.82	342.12	0	341.5	0	0
13	14.03	341.95	11.25	341.85	10.33	341.82	16.33	342.08	0	341.5	0	0
14	14	341.95	11.75	341.87	11.25	341.85	17.12	342.1	0	341.5	0	0
15	14	341.95	10.98	341.84	11.5	341.86	16.66	342.09	0	341.5	0	0
16	14	341.95	10.96	341.84	13	341.9	15.85	342.06	0	341.5	0	0
17	14.5	341.98	11.75	341.87	12	341.88	15.3	342.03	0	341.5	0	0
18	15.3	342.03	11.75	341.87	11.25	341.85	15.85	342.06	0	341.5	0	0
19	14.7	341.99	11.5	341.86	11.5	341.86	17	342.1	0	341.5	0	0
20	14	341.95	11.25	341.85	12.58	341.89	18.69	342.17	0	341.5	0	0
21	13.5	341.94	11.25	341.85	18.7	342.2	17.85	342.15	0	341.5	0	0
22	12.5	341.89	10.35	341.82	17.75	342.16	17	342.1	0	341.5	0	0
23	12	341.84	9.4	341.79	17	342.1	15.85	342.06	0	341.5	0	0
24	10.5	341.81	8.68	341.77	14.5	341.98	15	342.01	0	341.5	0	0
25	9.75	341.8	9.39	341.79	13.18	341.92	14.2	342.96	0	341.5	0	0
26	9.75	341.8	10.35	341.82	13.18	341.92	13	341.9	0	341.5	0	0
27	9.37	341.79	10.98	341.84	14.5	342.01	11.28	341.85	0	341.5	0	0
28	9	341.78	11.75	341.87	15	342.01	10.35	341.82	0	341.5	0	0
29	8.68	341.77	10.75	341.87			9.37	341.79	0	341.5	0	0
30	9	341.78	12	341.88			9.37	341.79	0	341.5	0	0
31	9.37	341.79	11.72	341.87			9	341.78			0	0
Ten-Daily Mean												
I Ten-Daily	10.72	341.83	10.96	341.84	10.56	341.83	13.62	342.05	3.38	341.59	0	0
II Ten-Daily	14.29	341.97	11.26	341.85	11.46	341.86	16.56	342.09	0	341.5	0	0
III Ten-Daily	10.31	341.82	10.6	341.83	15.48	299.29	12.93	342.02	0	341.5	0	0
Monthly												
Min.	6	341.64	8.68	341.77	9.37	341.79	5.5	341.78	0	341.5	0	0
Max.	15.3	341.64	13	341.77	18.7	341.79	18.69	341.78	8.5	341.5	0	0
Mean	11.78	341.87	10.94	341.84	12.5	327.66	14.37	342.05	1.13	341.53	0	0

Peak Computed Discharge = 18.7 cumecs on 21/2/2017 Corres. Water Level = 342.2 m

Lowest Computed Discharge = 1.05 cumecs on 7/4/2017 Corres. Water Level = 341.54 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
 #:Discarded Discharge (values changed as per rating curve)
 Note:Missing values ignored while arriving at Annual Runoff

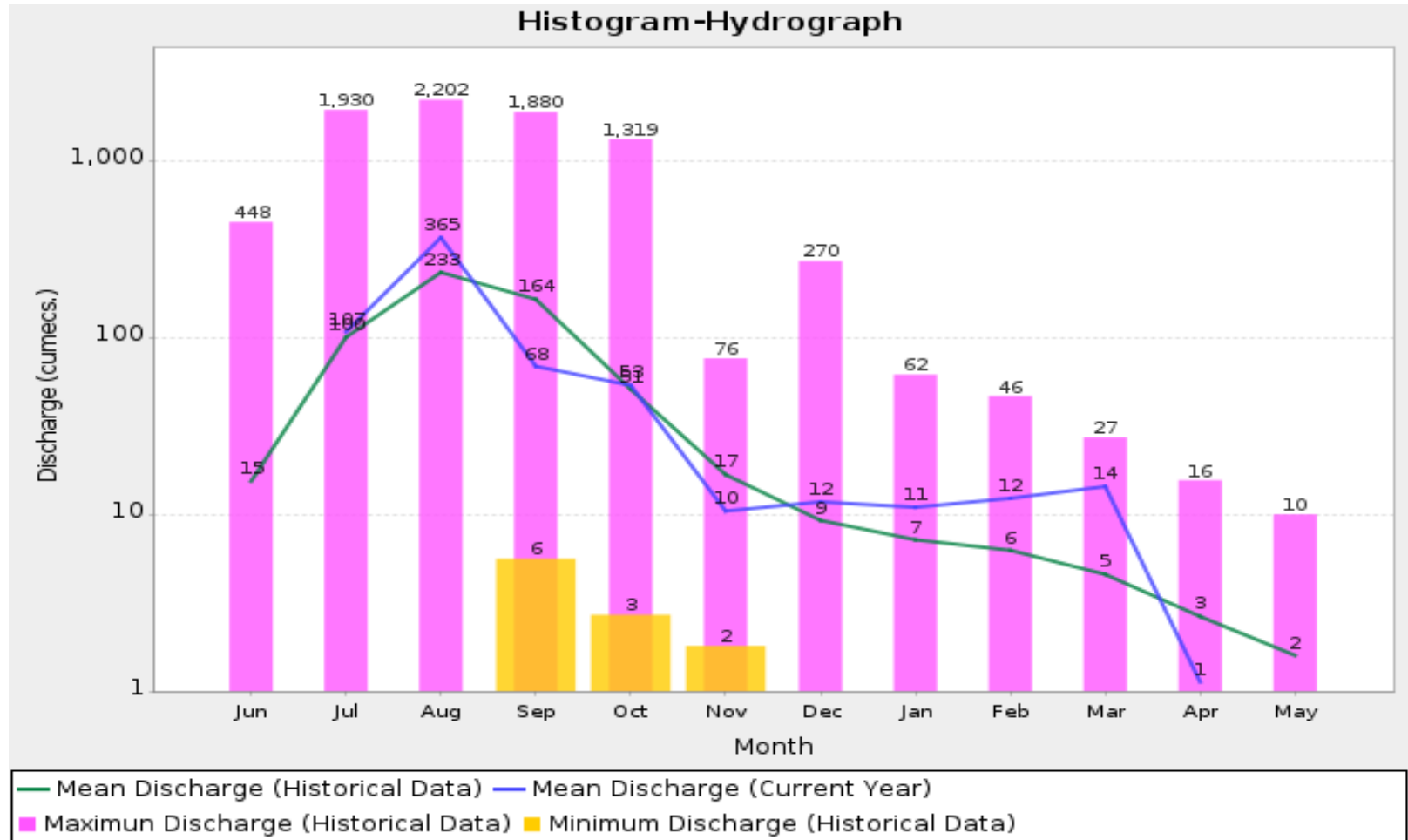
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1979-2017)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



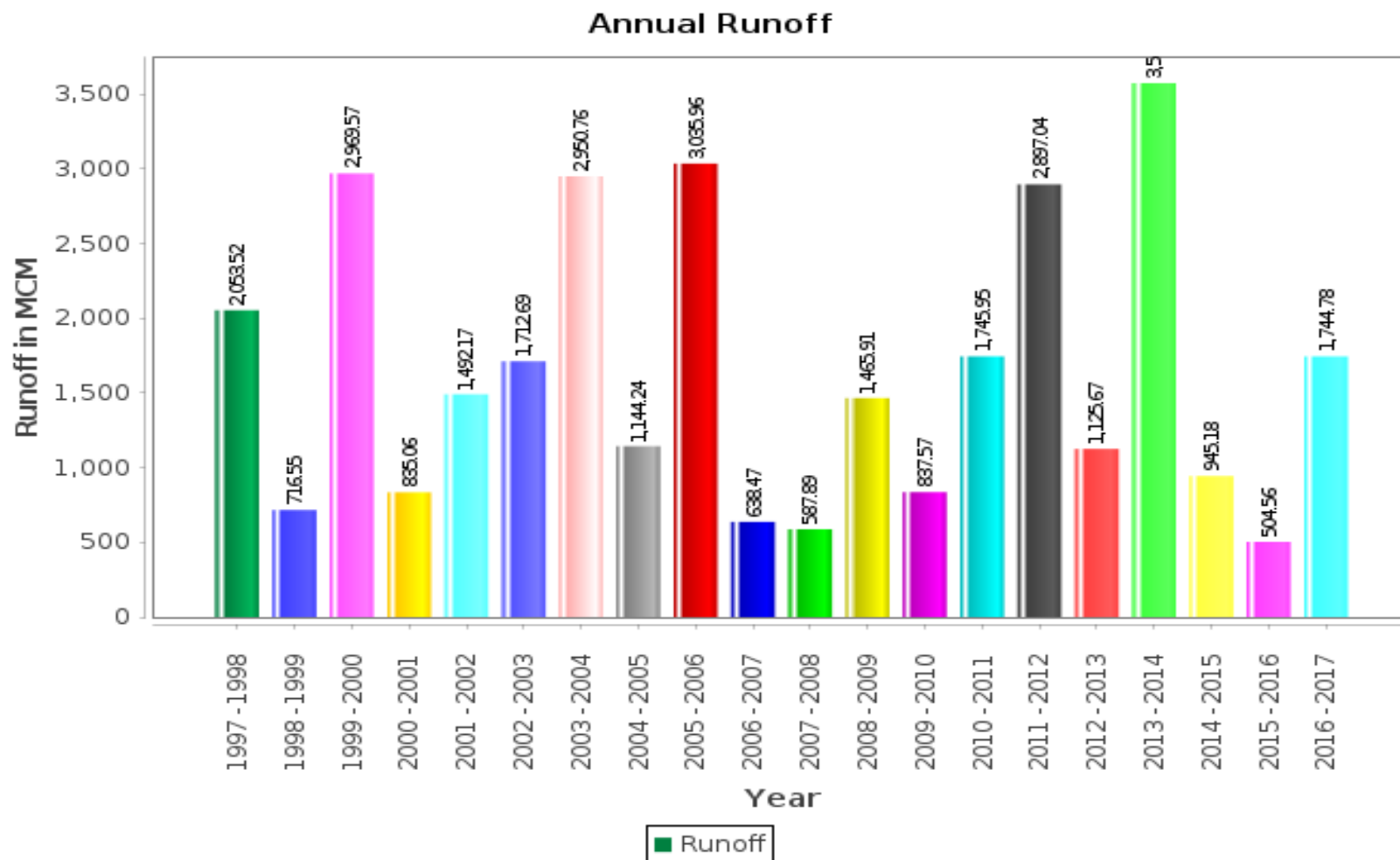
Annual Runoff Values for the period (1979 – 2017)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



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

Monthly Average Runoff based on period (1979 – 2017)

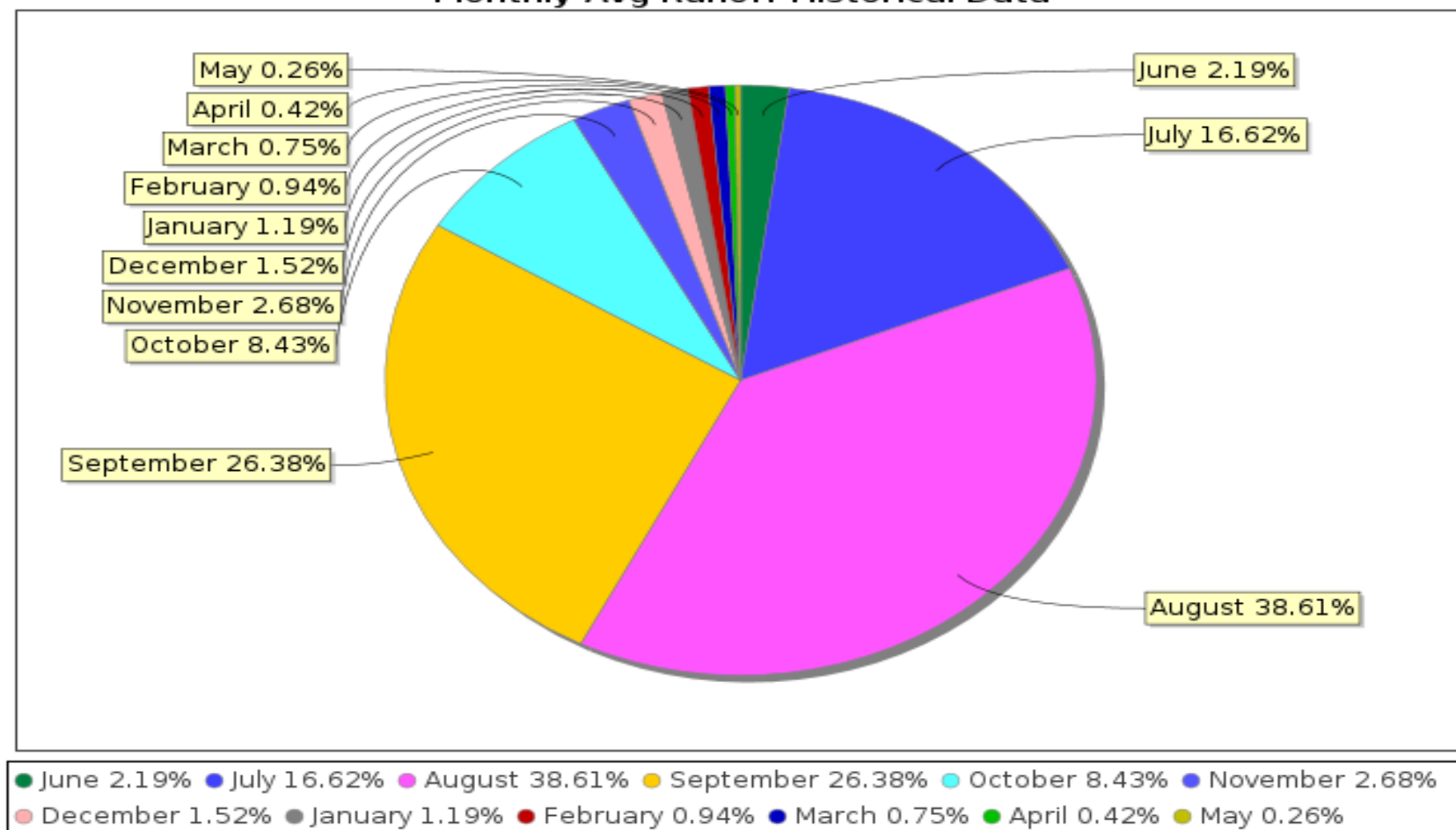
Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

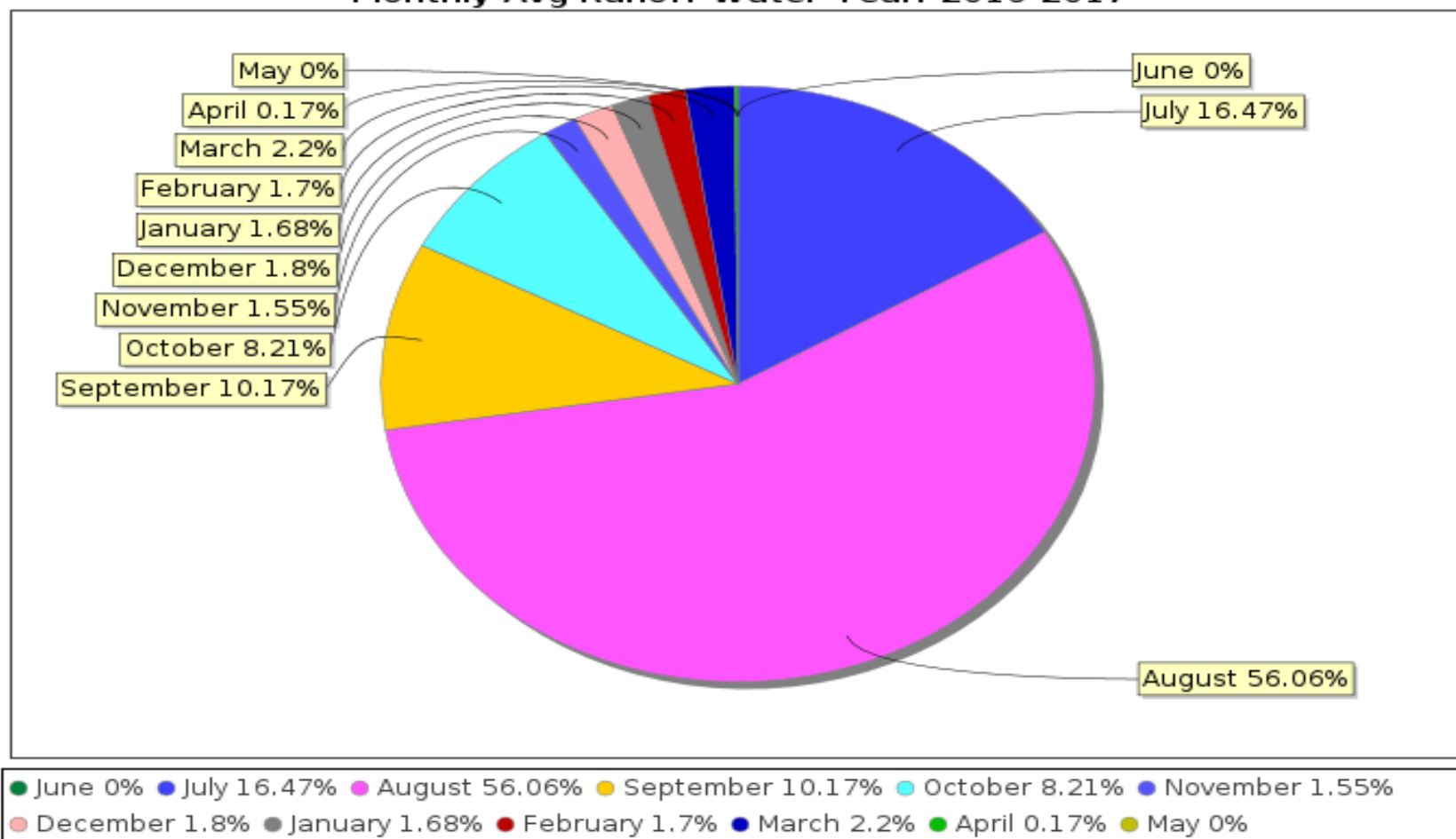
Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Water Year: 2016-2017



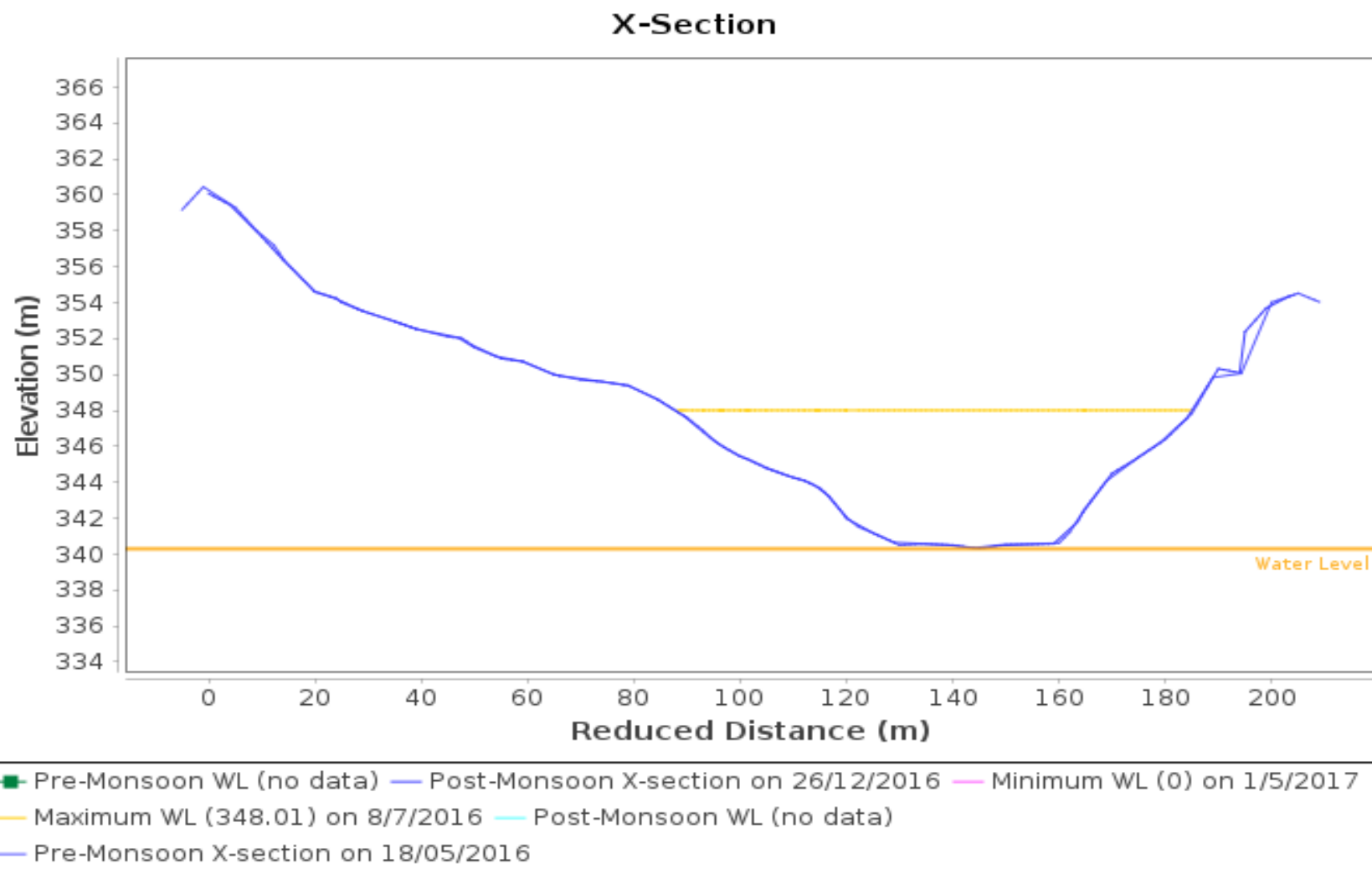
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

Station Name : Hiran at Patan (010215009)

Local River : Hiran

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



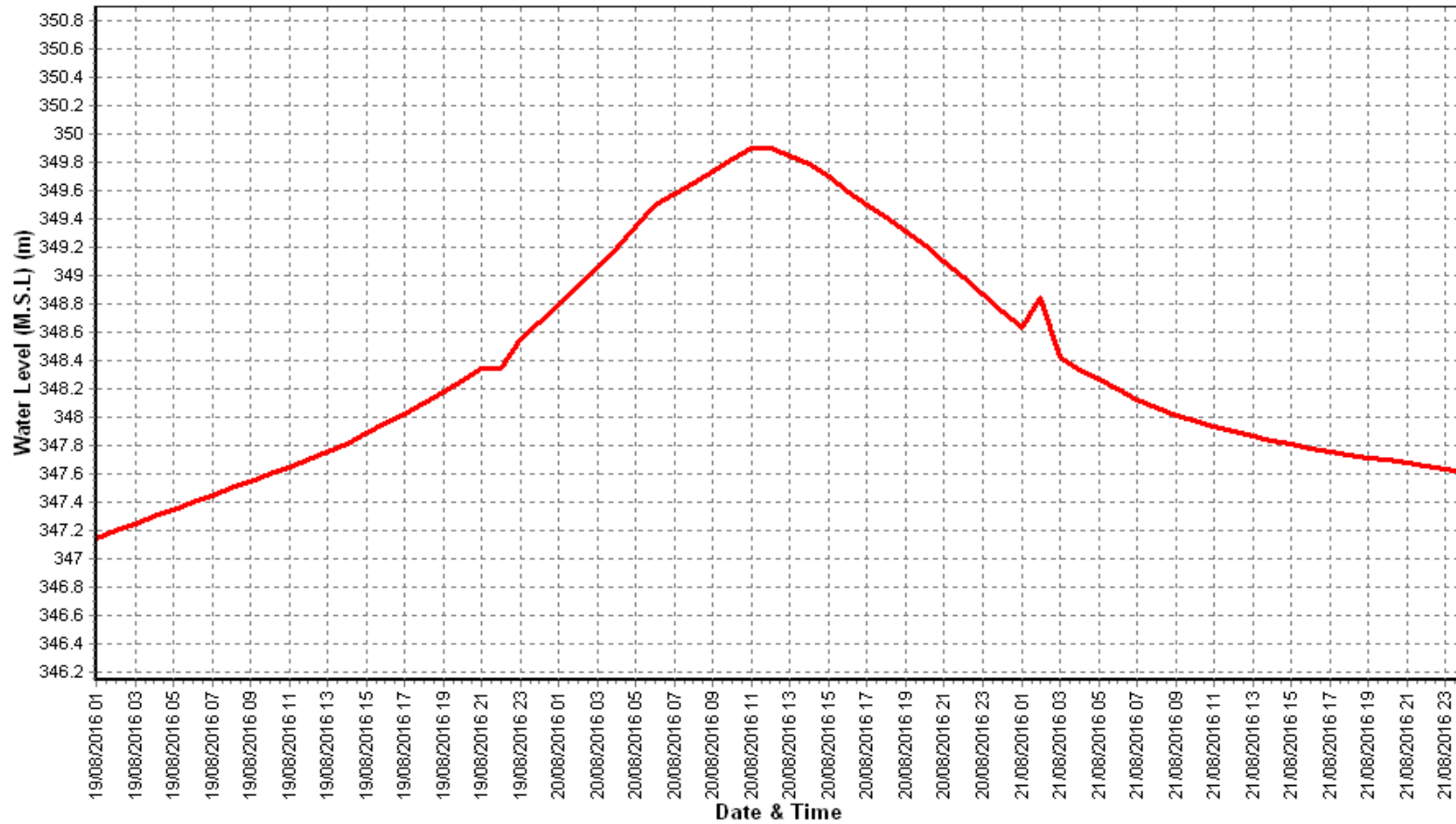
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



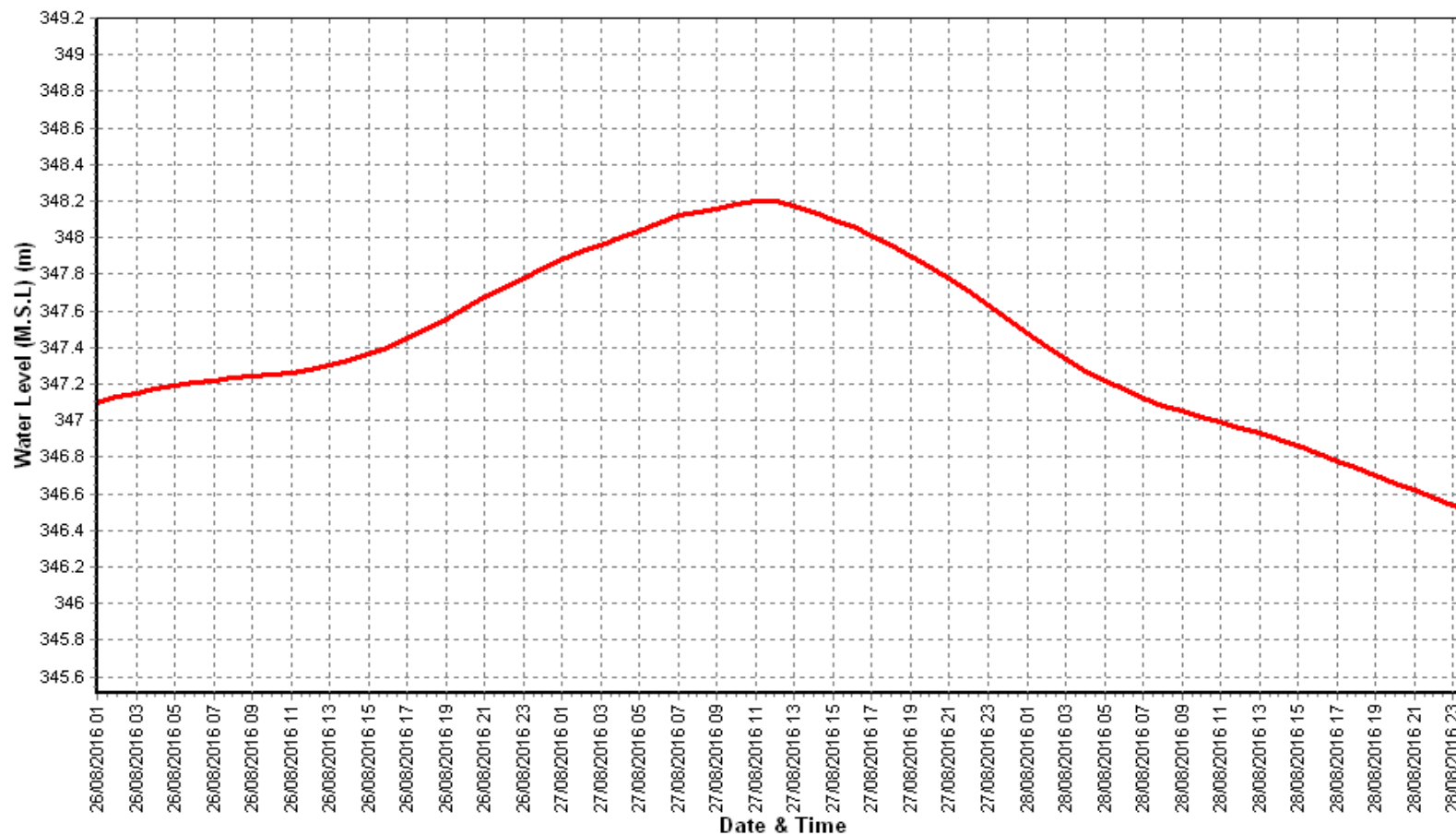
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



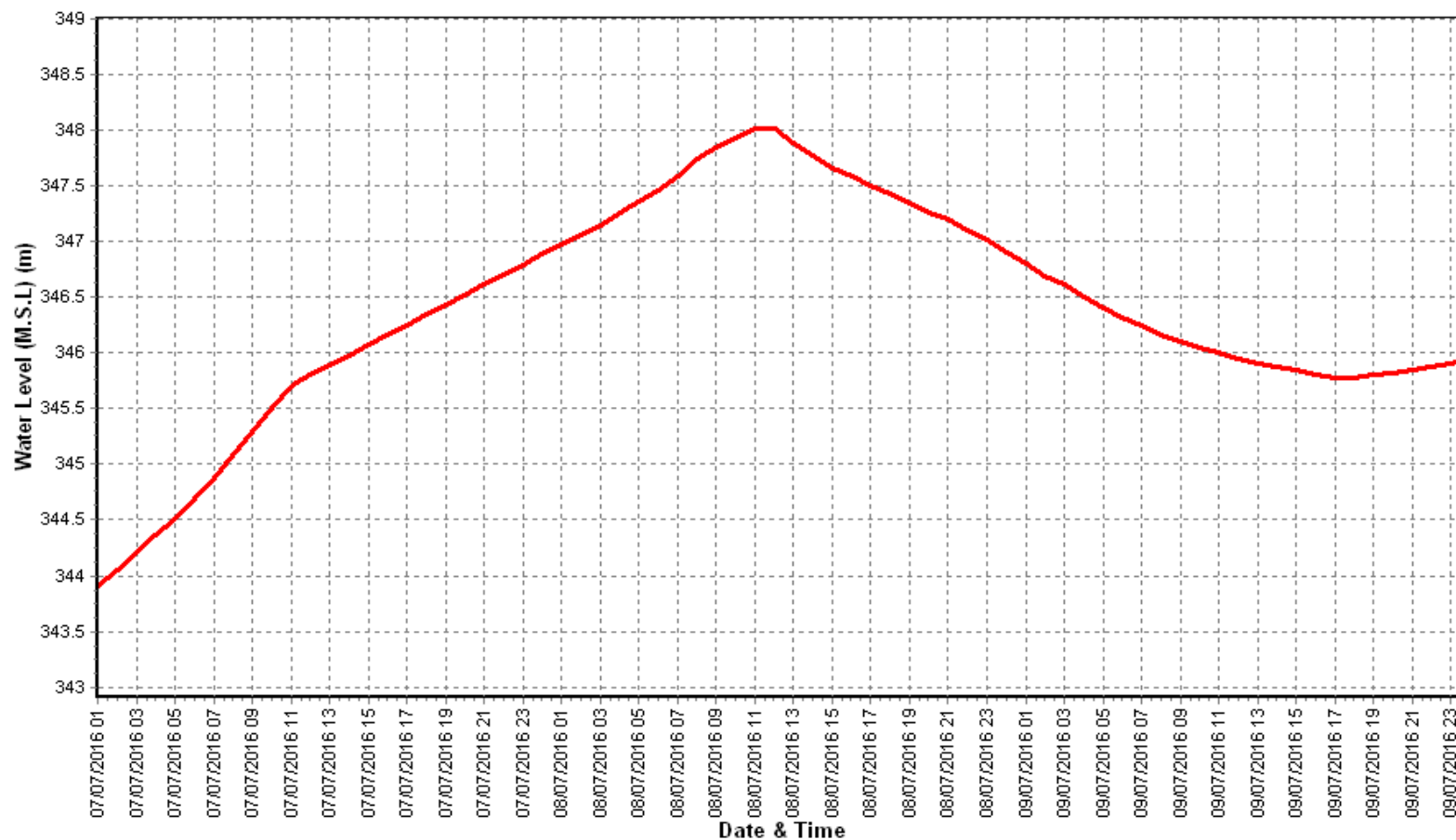
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Hiran at Patan (010215009)

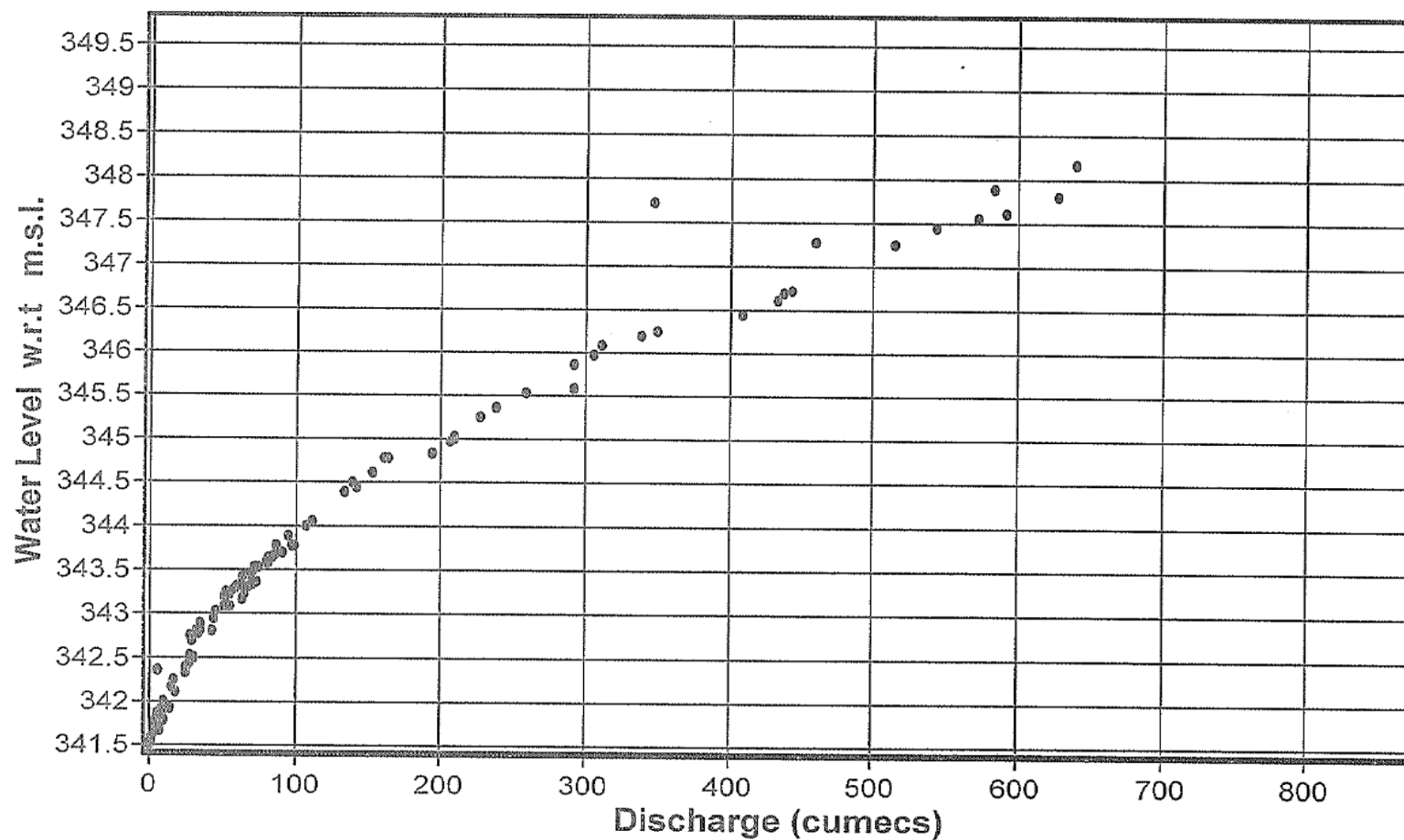
Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



Plot of Stage Discharge Data at Hiran at Patan (010215009): 2016 - 2017



4.14 Banjar at Bamni

History sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
Site	: Bamni	Water Year	: 2016 - 2017	Code	: 002-NDBHP	
State	: Madhya Pradesh	District	: Mandla	Independent		
Basin	: NARMADA	River	: Narmada	Sub Tributary	: -	
Tributary	: -	Local River	: Narmada			
Sub-Sub Tributary	: -		Upper Narmada Sub-			
Division	: Narmada Division(ND), Bhopal	Sub-Division	: Division, Jabalpur			
Drainage Area	: 1864.0 Sq. Km.	Bank	: Right			
Latitude	: 22°29'06"	Longitude	: 80°22'58"			
Current Zero of Gauge (m)	: 440.000					
CATEGORY	Opening Date		Closing Date			
Gauge	: 20/06/1999					
Discharge	: 30/11/1999					
Sediment	: 01/07/2002					
Water Quality	: 01/07/2002					
Reduced Level	Opening Date		Closing Date			
440.0	24/05/2014		03/06/2014			
440.0	14/10/2016		-			
440.0	26/06/1999		24/05/2014			
440.0	03/06/2014		14/10/2016			
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2001-2002	0	0	25/01/2002	0	0	25/01/2002
2002-2003	0	0	24/08/2002	0	0	24/08/2002
2012-2013	0	0	30/04/2013	0	0	30/04/2013
2013-2014	517.65	444.12	22/08/2013	0	440.22	01/03/2014
2014-2015	524.67	444.18	23/07/2014	0	0	01/06/2014
2015-2016	301.19	443.22	05/08/2015	0	440.06	01/05/2016
2016-2017	550.5	444.43	07/08/2016	0	0	06/03/2017

Stage Discharge Sheet for Banjar at Bamni for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	0	0	53.6	440.77	96.73	441.06	177	441.72	32.2	440.58
2	0	0	0	0	62.43	440.85	104.6	441.08	171.5	440.96	30.75	440.57
3	0	0	0	0	73.93	440.99	71.54	440.96	66.65	440.9	29.33	440.57
4	0	0	0	0	76.59	441.04	67.65	440.91	63.79	440.87	29	440.56
5	0	0	0	0	73.19	440.98	64.5	440.88	62.03	440.85	28.1	440.55
6	0	0	0	0	257.1	442.15	62.78	440.86	61	440.84	28	440.55
7	0	0	0	0	550.5	444.43	61.05	440.84	60.05	440.83	26.86	440.54
8	0	0	29.84	440.48	405.9	443.13	59.31	440.82	59	440.82	26.66	440.54
9	0	0	364.6	442.82	250.4	442.13	57.98	440.81	60	440.83	25.18	440.53
10	0	0	74.5	441.02	130.2	441.41	57.03	440.8	70.49	440.95	24.68	440.53
11	0	0	160.9	441.56	110	441.24	55.8	440.79	66.5	440.9	23.5	440.52
12	0	0	107.9	441.12	125	441.38	54.62	440.78	64.5	440.8	23	440.52
13	0	0	68.15	440.92	108.3	441.15	54.5	440.78	63.52	440.87	21.5	440.51
14	0	0	62.46	440.86	62.5	440.85	59.73	440.83	62.61	440.86	21	440.51
15	0	0	60.13	440.83	55.6	440.79	105.5	441.1	61.99	440.85	19.5	440.5
16	0	0	57.66	440.81	53.06	440.77	63.93	440.88	60.95	440.84	19	440.5
17	0	0	61.15	440.84	52.56	440.75	54.23	440.77	59.92	440.83	17.5	440.49
18	0	0	62.17	440.85	51.84	440.74	51.5	440.74	57.53	440.81	17	440.49
19	0	0	244.6	442.04	50.92	440.73	50.3	440.73	55.5	440.79	15.4	440.48
20	0	0	71.38	440.96	55.77	440.79	48.92	440.72	53	440.77	15.05	440.48
21	0	0	61.65	440.84	54.3	440.78	48.42	440.72	51.95	440.75	14.72	440.47
22	0	0	72.19	440.97	52.8	440.76	47.32	440.71	50.22	440.73	14.3	440.47
23	0	0	120.2	441.34	53.97	440.77	47.09	440.71	47	440.71	13.91	440.46
24	0	0	110.5	441.16	73.59	440.98	46.24	440.7	45.83	440.69	13.17	440.46
25	0	0	70.78	440.95	70.35	440.95	46.5	440.7	43.55	440.67	12.01	440.45
26	0	0	64.48	440.88	75	441.02	50.78	440.73	41.52	440.65	11.51	440.45
27	0	0	66.54	440.9	69.63	440.93	63.64	440.87	40.22	440.64	11.02	440.5
28	0	0	62.87	440.86	64.5	440.88	76.98	441.04	39.16	440.63	10.52	440.44
29	0	0	59.09	440.82	70.96	440.95	109.2	441.15	37.53	440.62	10.16	440.44
30	0	0	56.75	440.8	71.81	440.96	76.75	441.04	35.64	440.61	9.35	440.43
31	0	0	54.5	440.78	126.9	440.39			33.75	440.59		
Ten-Daily Mean												
I Ten-Daily	0	0	46.89	132.43	193.38	441.79	70.32	440.9	85.15	440.96	28.08	440.55
II Ten-Daily	0	0	95.65	441.08	72.55	440.92	59.9	440.81	60.6	440.83	19.24	440.5
III Ten-Daily	0	0	72.69	440.94	71.26	440.85	61.29	440.84	42.4	440.66	12.07	440.46
Monthly												
Min.	0	0	29.84	440.48	50.92	440.39	46.24	440.7	33.75	440.59	9.35	440.43
Max.	0	0	364.6	440.48	550.5	440.39	109.2	440.7	177	440.59	32.2	440.43
Mean	0	0	71.74	338.15	112.4	441.19	63.84	440.85	62.72	440.82	19.8	440.5

Annual Runoff in

MCM : 888.59

Annual Runoff in mm : 476.71

Peak Observed Discharge = 550.5 cumecs on 7/8/2016

Corres. Water Level = 444.43 m

Lowest Observed Discharge = 0.36cumecs on 18/2/2017 Corres.

Water Level 440.21 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge

#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Banjar at Bamni for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	8.85	440.43	1.99	440.31	0.57	440.23	0	0	0	0	0	0
2	8.23	440.42	1.9	0.31	0.56	440.23	0	0	0	0	0	0
3	7.94	440.42	1.78	440.3	0.56	440.23	0	0	0	0	0	0
4	7.7	440.42	1.72	440.3	0.54	440.23	0	0	0	0	0	0
5	7.47	440.41	1.67	440.3	0.52	440.23	0	0	0	0	0	0
6	7.17	440.41	1.61	440.3	0.49	440.22	0	0	0	0	0	0
7	6.65	440.4	1.46	440.29	0.48	440.22	0	0	0	0	0	0
8	6.37	440.4	1.44	440.29	0.47	440.22	0	0	0	0	0	0
9	5.77	440.39	1.43	440.29	0.46	440.22	0	0	0	0	0	0
10	5.5	440.39	1.21	440.28	0.46	440.22	0	0	0	0	0	0
11	5.22	440.39	1.16	440.28	0.43	440.22	0	0	0	0	0	0
12	4.95	440.38	1.11	440.28	0.42	440.22	0	0	0	0	0	0
13	4.94	440.38	0.97	440.27	0.42	440.21	0	0	0	0	0	0
14	4.7	440.38	0.94	440.27	0.4	440.21	0	0	0	0	0	0
15	4.16	440.37	0.92	440.27	0.4	440.21	0	0	0	0	0	0
16	4.01	440.37	0.9	440.26	0.38	440.21	0	0	0	0	0	0
17	3.38	440.37	0.86	440.2	0.37	440.21	0	0	0	0	0	0
18	3.67	440.36	0.84	440.26	0.36	440.21	0	0	0	0	0	0
19	3.52	440.36	0.8	440.26	0	440.2	0	0	0	0	0	0
20	3.35	440.36	0.78	440.25	0	440.2	0	0	0	0	0	0
21	3.12	440.35	0.76	440.25	0	440.2	0	0	0	0	0	0
22	3.03	440.35	0.75	440.25	0	440.2	0	0	0	0	0	0
23	2.8	440.35	0.73	440.25	0	440.2	0	0	0	0	0	0
24	2.74	440.34	0.71	440.25	0	440.2	0	0	0	0	0	0
25	2.72	439.34	0.7	440.24	0	440.2	0	0	0	0	0	0
26	2.7	440.33	0.68	440.24	0	440.2	0	0	0	0	0	0
27	2.63	440.33	0.66	440.24	0	440.19	0	0	0	0	0	0
28	2.5	440.33	0.64	440.2	0	440.19	0	0	0	0	0	0
29	2.28	440.32	0.62	440.24	0	0	0	0	0	0	0	0
30	2.19	440.32	0.6	440.23	0	0	0	0	0	0	0	0
31	2.1	440.32	0.58	440.23	0	0	0	0	0	0	0	0
Ten-Daily Mean												
I Ten-Daily	7.17	440.41	1.62	396.3	0.51	440.23	0	0	0	0	0	0
II Ten-Daily	4.19	440.37	0.93	440.26	0.32	440.21	0	0	0	0	0	0
III Ten-Daily	2.62	440.24	0.68	440.24	0	440.2	0	0	0	0	0	0
Monthly												
Min.	2.1	439.34	0.58	0.31	0.36	440.19	0	0	0	0	0	0
Max.	8.85	439.34	1.99	0.31	0.57	440.19	0	0	0	0	0	0
Mean	4.66	440.34	1.08	425.6	0.28	440.21	0	0	0	0	0	0

Peak Computed Discharge = 0.92 cumecs on 15/1/2017 Corres. Water Level = 440.27 m

Lowest Computed Discharge = 0.52 cumecs on 5/2/2017 Corres. Water Level = 440.23 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
 #:Discarded Discharge (values changed as per rating curve)
 Note:Missing values ignored while arriving at Annual Runoff

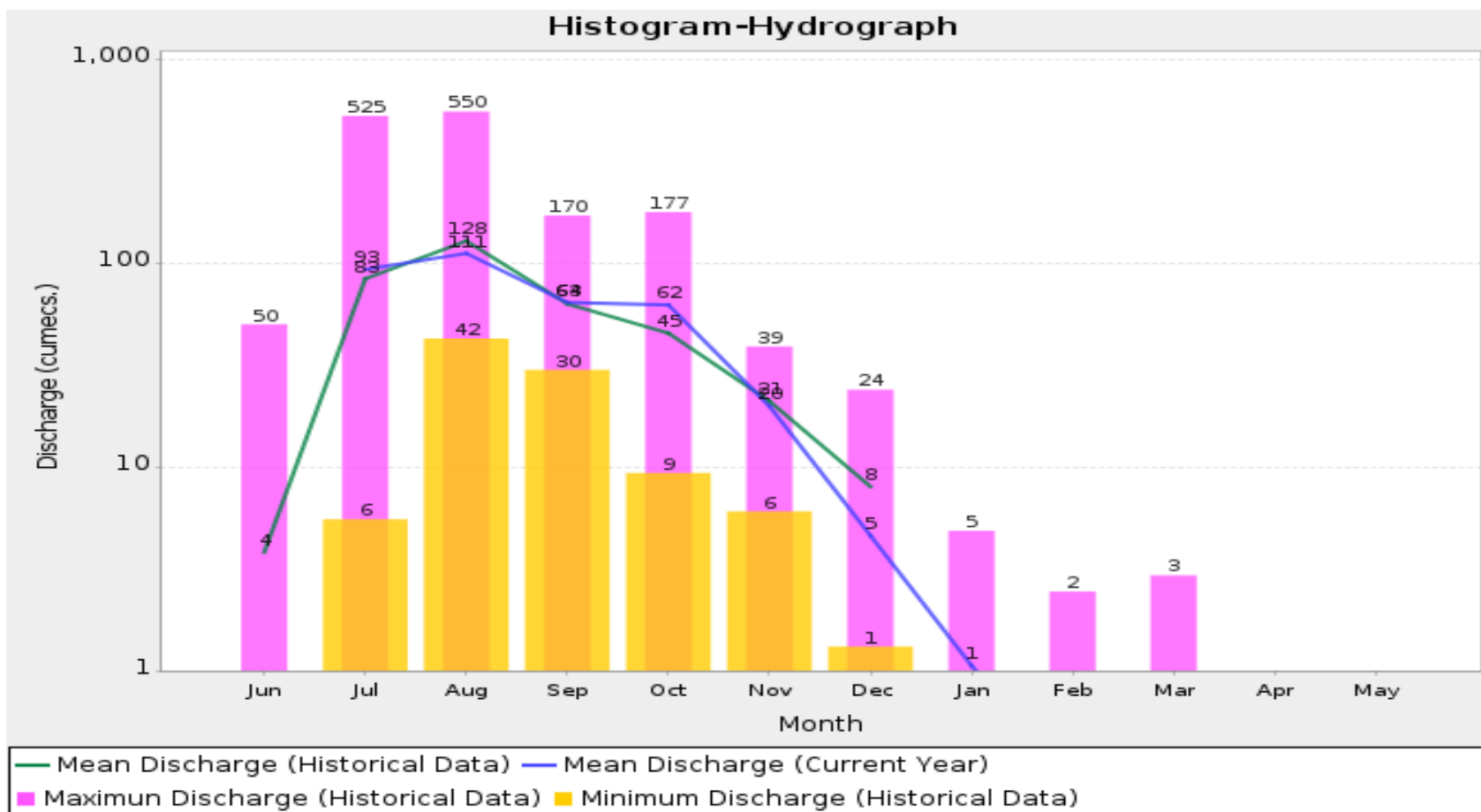
Histogram- Hydrograph for Water Year : 2016-17(Data considered : 2000-2017)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



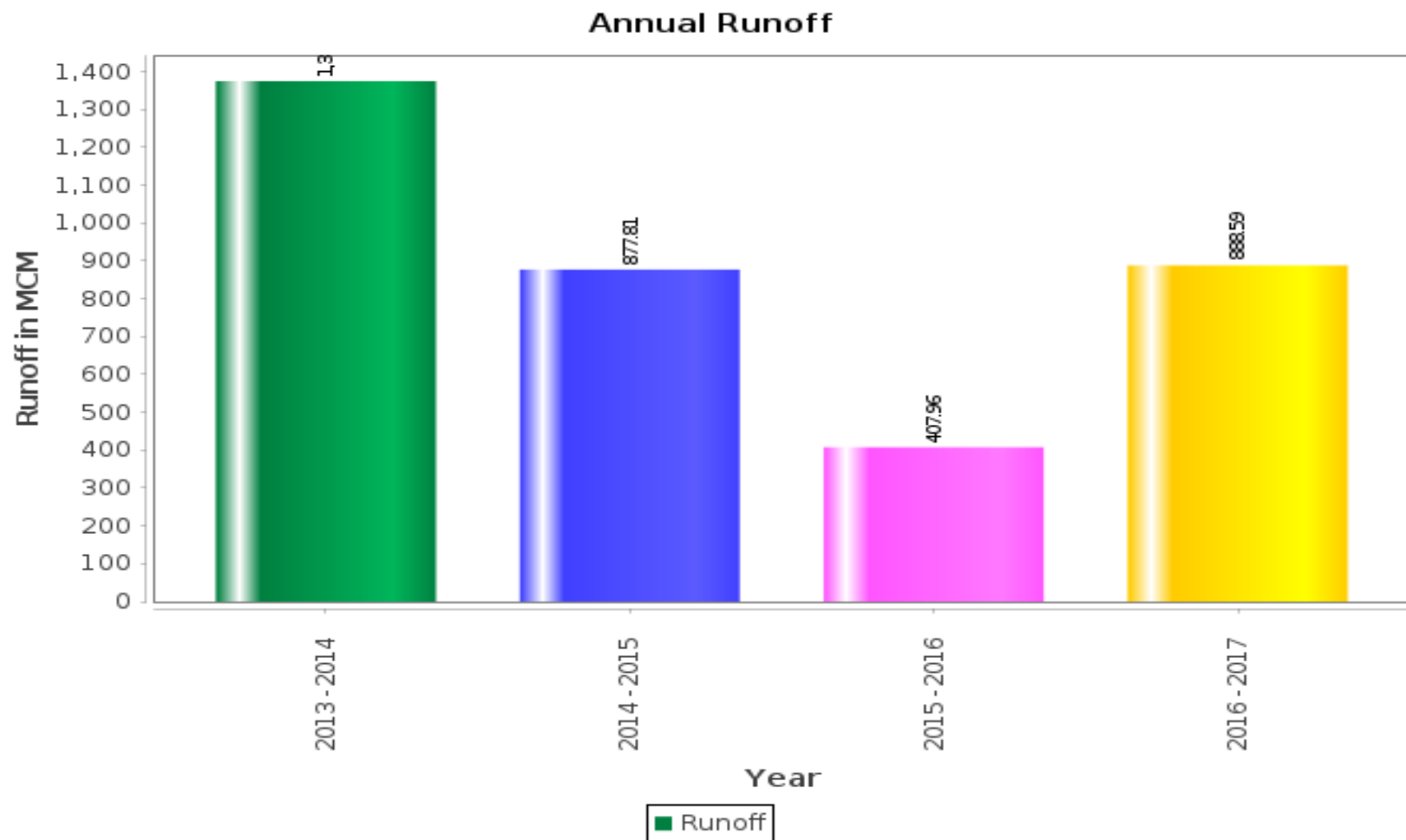
Annual Runoff Values for the period (2000-2017)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



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

Monthly Average Runoff based on period (2000– 2017)

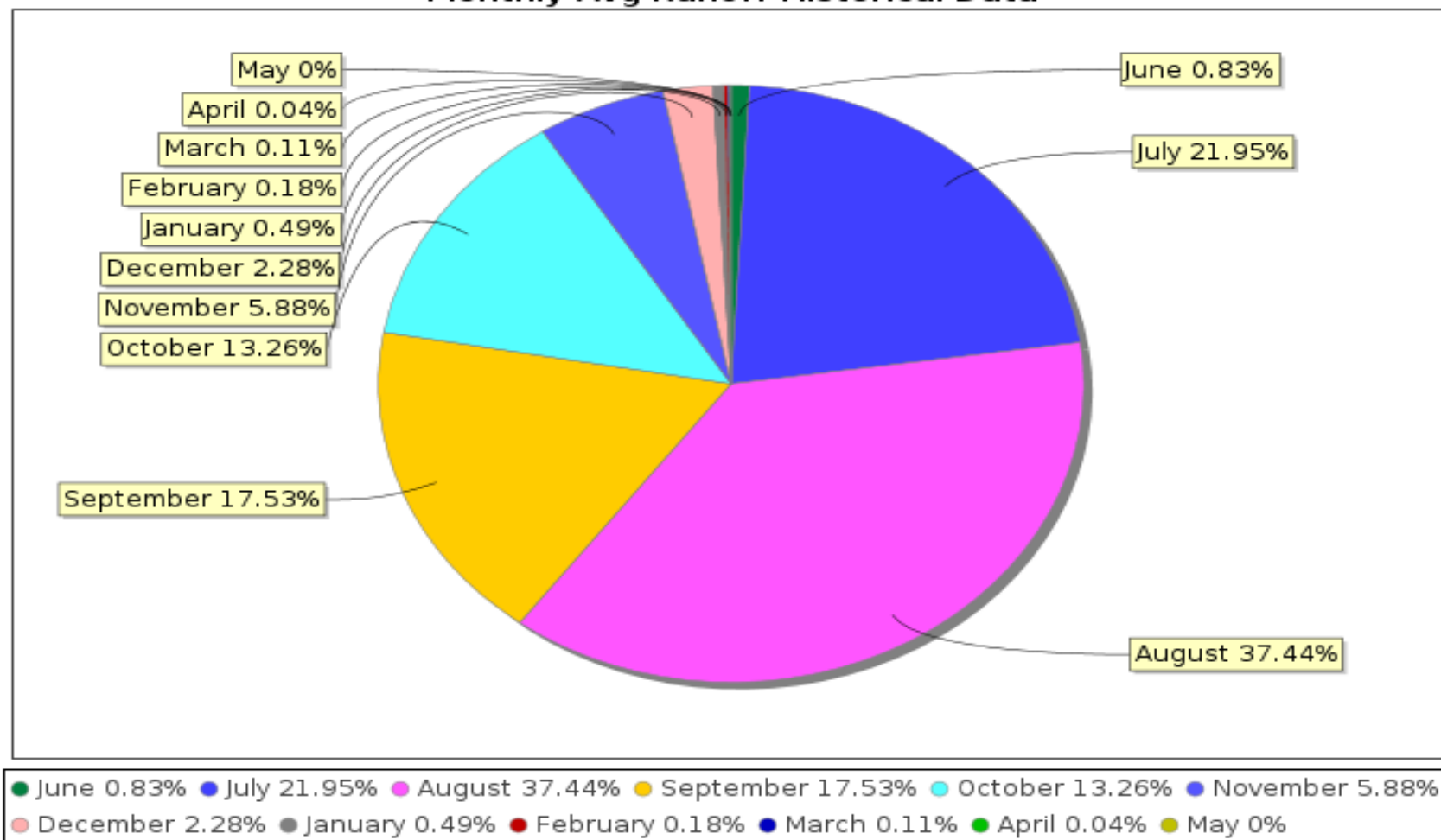
Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

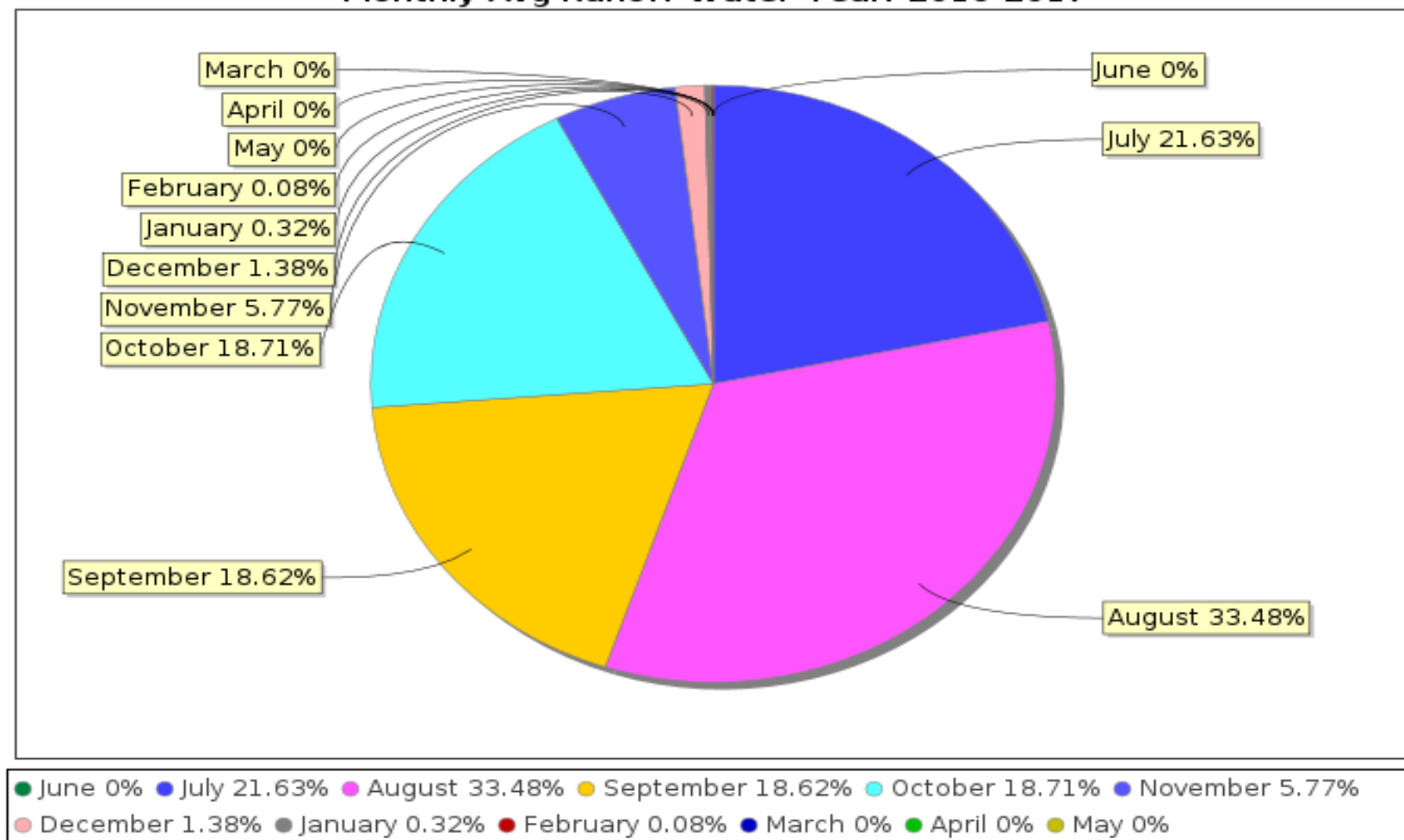
Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

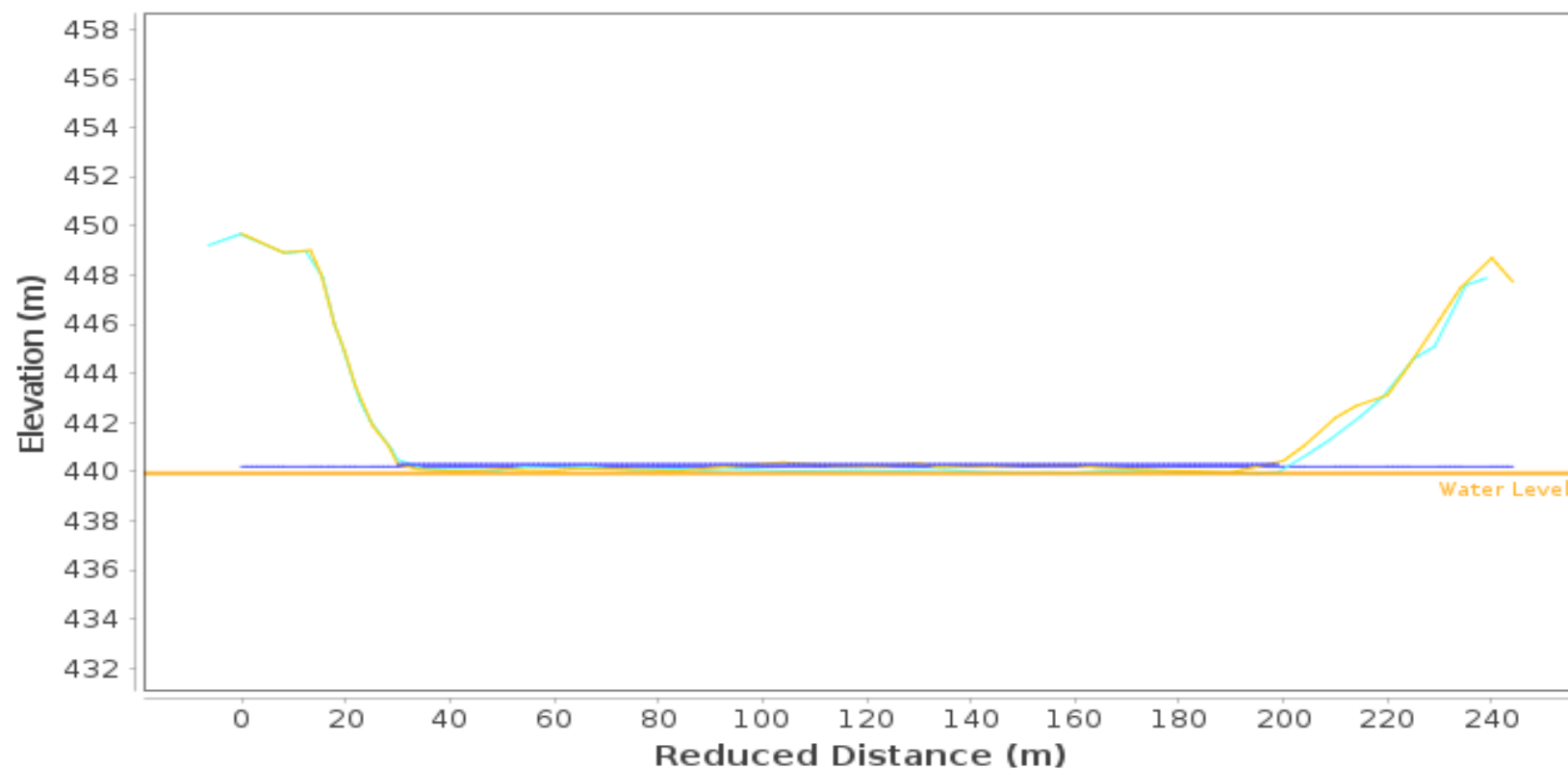
Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur

X-Section



■ Pre-Monsoon WL (no data) ■ Maximum WL (440.31) on 1/1/2017 ■ Minimum WL (0) on 5/5/2017
 ■ Post-Monsoon X-section on 17/02/2017 ■ Pre-Monsoon X-section on 12/05/2016
 ■ Post-Monsoon WL(440.21)

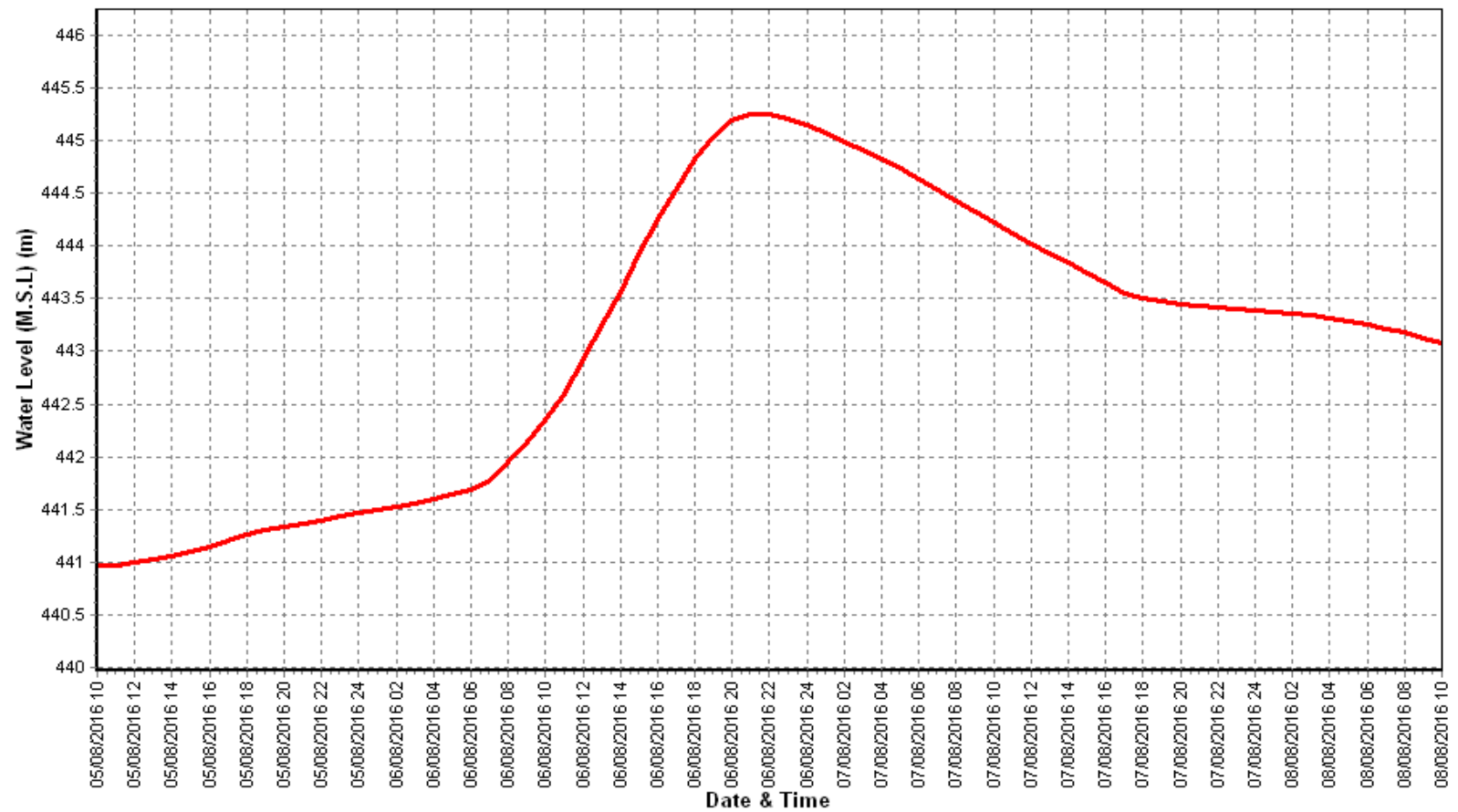
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



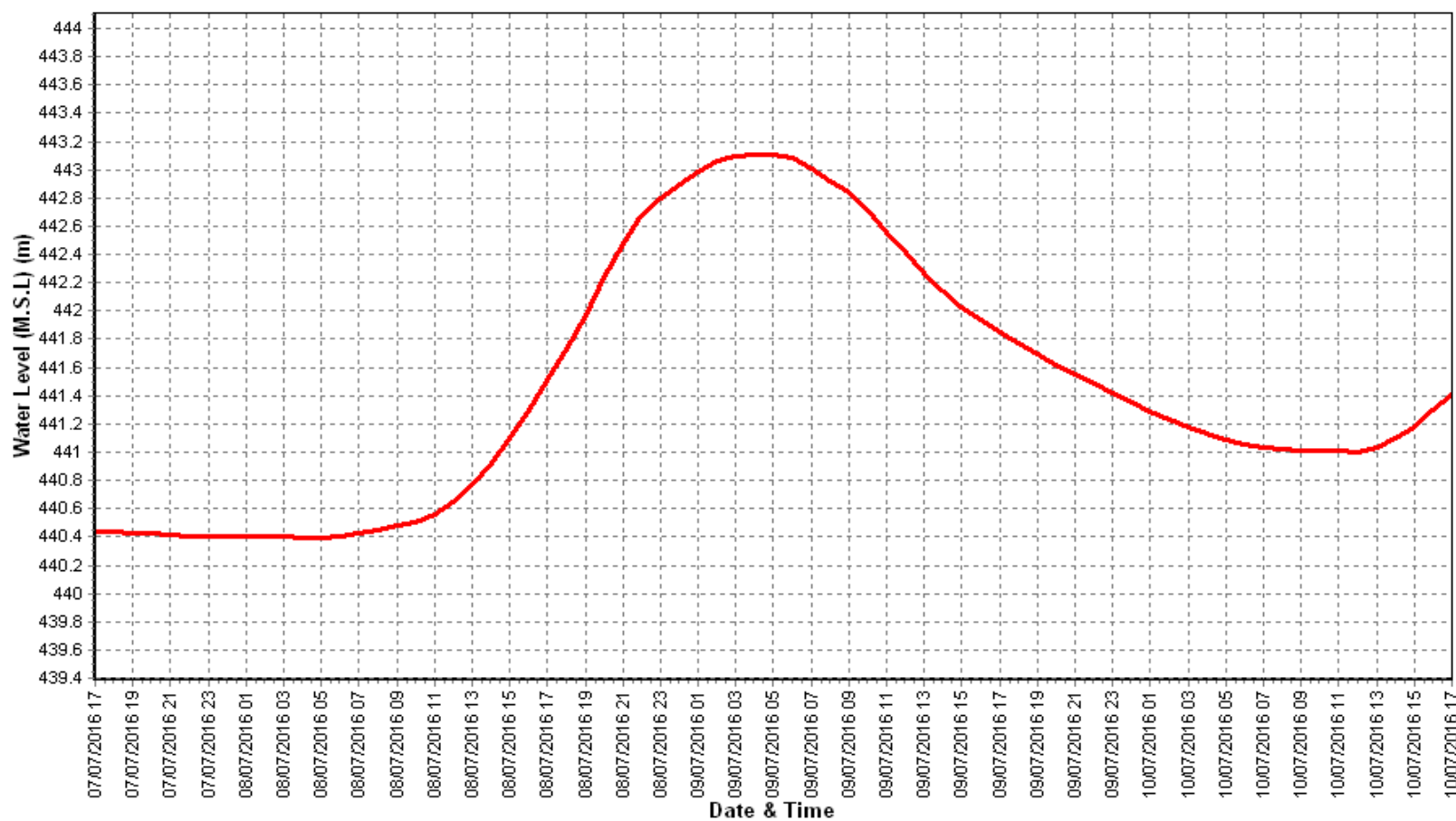
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



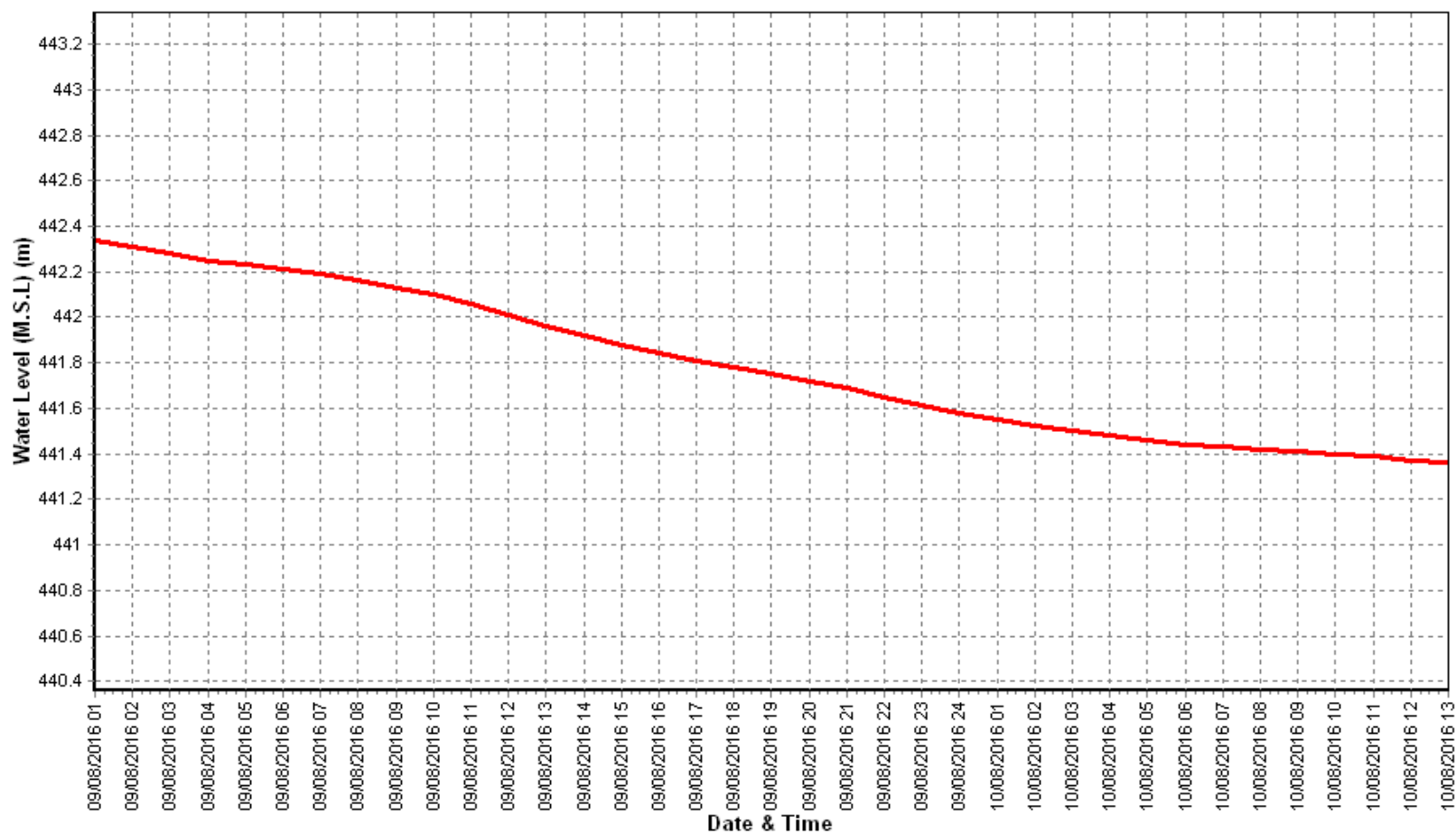
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Banjar at Bamni (NCA SITE)

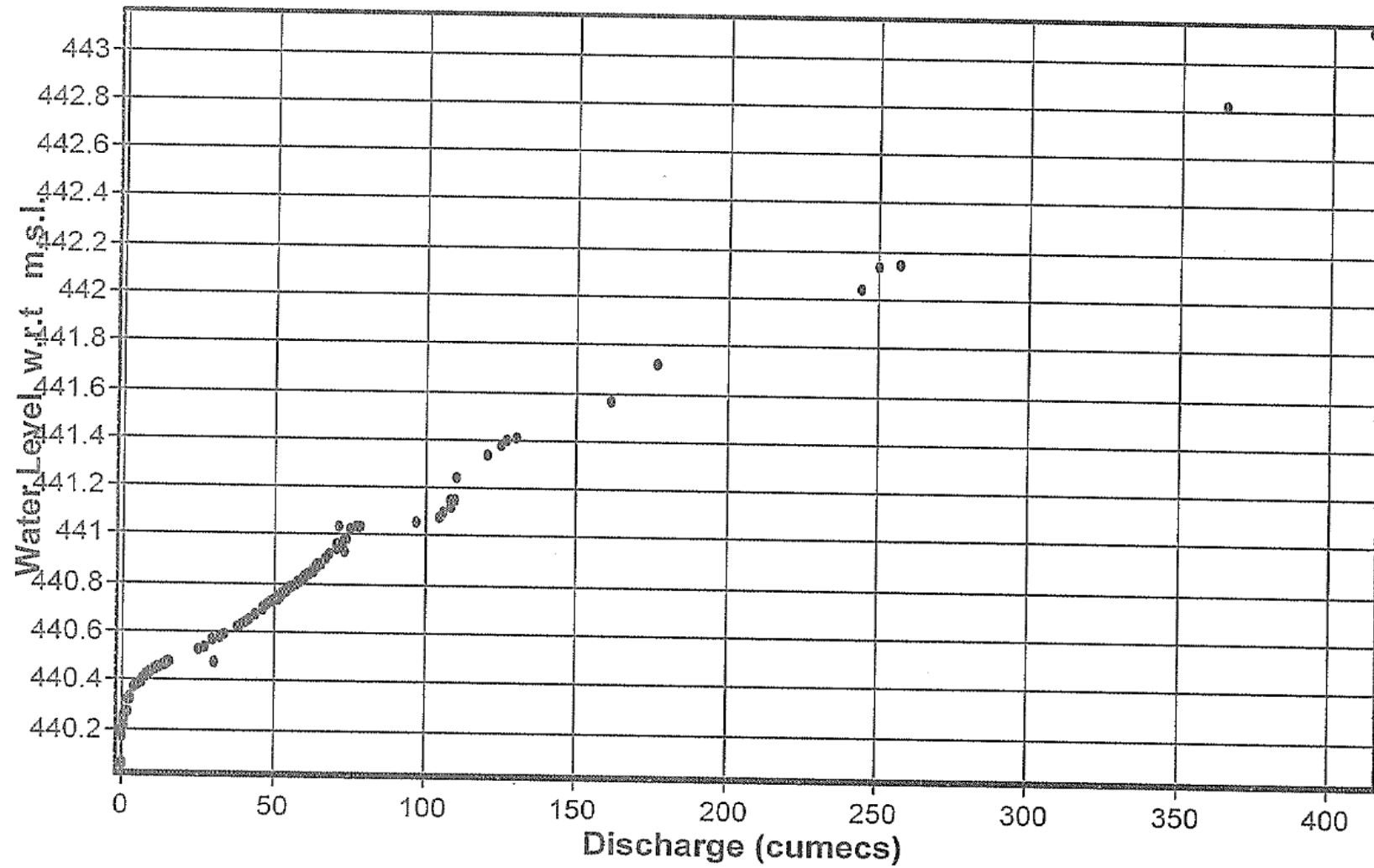
Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



Plot of Stage Discharge Data at Banjar at Bamni (NCA SITE): 2016 - 2017



4.15 Burhner at Mohgaon

History Sheet

[illegible]

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	20.3	449.565	05/02/1978	0	448.75	24/05/1978
1978-1979	730.5	455.08	05/08/1978	0	448.515	29/05/1979
1979-1980	914	458.03	09/08/1979	0	448.705	01/04/1980
1980-1981	1370	457.39	16/07/1980	0	448.645	01/06/1980
1981-1982	691.8	453.33	02/07/1981	0	449.135	01/05/1982
1982-1983	2120	455.315	16/08/1982	0	449.125	01/06/1982
1983-1984	1020	455.05	08/09/1983	0	449.13	01/06/1983
1984-1985	9000	462.9	18/08/1984	0.1	449.065	01/06/1984
1985-1986	5700	461.85	08/08/1985	0.1	449.295	01/06/1985
1986-1987	3690	460.3	08/07/1986	0.1	449.195	01/06/1986
1987-1988	3022	458.58	15/09/1987	0.04	449.155	26/05/1988
1988-1989	2850	458.65	04/08/1988	0	449.145	11/06/1988
1989-1990	1085	454.1	12/09/1989	0.03	449.255	29/04/1990
1990-1991	4100	459.2	25/06/1990	0.05	449.23	30/05/1991
1991-1992	7184	463.62	23/08/1991	0.08	449.16	17/05/1992
1992-1993	3688	459.7	11/09/1992	0.01	449.38	12/05/1993
1993-1994	1900	456.21	26/09/1993	0.04	449.385	10/06/1993
1994-1995	3950	459.78	20/07/1994	0.17	449.265	05/06/1994
1995-1996	2960	458.4	09/08/1995	0.13	449.265	14/06/1995
1996-1997	902	453.96	05/08/1996	0.1	449.2	30/05/1997
1997-1998	2185	456.65	29/07/1997	0.07	449.205	16/06/1997
1998-1999	1750	456	06/07/1998	0.09	449.15	31/05/1999
1999-2000	2600	457.67	23/06/1999	0.08	449.165	09/06/1999
2000-2001	2750	457.08	27/07/2000	0.09	449.21	29/05/2001
2001-2002	2860	458.02	13/07/2001	0.07	449.21	26/05/2002
2002-2003	1725	455.95	18/08/2002	0.01	449.095	25/05/2003
2003-2004	6469	462.82	29/08/2003	0.01	449.04	14/06/2003
2004-2005	11600	467.3	08/08/2004	0.1	449.21	08/06/2004
2005-2006	5400.36	461.6	06/08/2005	0.09	449.4	03/06/2005
2006-2007	6723	462.34	31/07/2006	0.11	449.25	16/05/2007
2007-2008	1084.79	454.5	08/07/2007	0.04	449.16	21/05/2008
2008-2009	939.79	454.08	01/08/2008	0.13	449.095	10/05/2009
2009-2010	364.07	451.92	21/07/2009	0	449.22	01/05/2010
2010-2011	2890.09	456.85	02/09/2010	0	449.16	06/06/2010
2011-2012	1863.79	456.39	07/09/2011	0.03	449.17	08/06/2011
2012-2013	1864	454.05	09/07/2012	0	449.13	09/06/2012
2013-2014	1180	454.050	03/05/2014	0	0	03/05/2014
2014-2015	2149	457.350	28/05/2015	0	0	28/05/2015
2015-2016	1805.08	455.175	04/08/2015	0.09	449.1	24/05/2016
2016-2017	1496	455.05	07/08/2016	0	449.04	22/05/2017

Stage Discharge Sheet for Burhner at Mohgaon for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0.18	449.13	25.45	449.89	542.18	452.4	172.2	451.11	327.18	451.9	32.49	449.91
2	0.18	449.13	75.88	450.41	258.17	451.36	139.6	450.76	250	451.37	32.27	449.9
3	0.16	449.12	100	450.63	475.81	452.33	130.55	450.75	224.21	451.25	31.8	449.9
4	0.15	449.12	74.83	450.39	410.57	452.08	167	451.11	141.44	450.93	31.1	449.89
5	0.12	449.11	90.3	450.51	560.68	452.74	280	451.6	111.82	450.82	30.21	449.89
6	0.12	449.11	110.49	450.61	670.25	453.04	134.16	450.77	108.16	450.73	30	449.89
7	0.19	449.13	110	450.65	1551.26	455.05	103.34	450.56	164.12	451.08	29.13	449.88
8	0.25	449.15	138.15	450.82	592.48	452.88	87.46	450.46	123	450.86	27.77	449.86
9	0.25	449.15	295.42	451.57	336.18	451.82	84.76	450.41	123	450.87	26.87	449.85
10	0.21	449.14	780	453.45	1084.41	453.83	91.43	450.49	142.16	450.91	25.79	449.84
11	0.18	449.13	583.55	452.83	407.17	452.25	78	450.36	140	450.94	25.02	449.83
12	0.18	449.13	277.06	451.42	322.04	452	76.8	450.31	100	450.55	24.35	449.82
13	0.16	449.12	274.08	451.41	273.56	451.57	80	450.38	87.68	450.46	24.3	449.82
14	0.21	449.14	176.64	451	240	451.28	84.83	450.42	82.15	450.39	23.7	449.81
15	0.25	449.15	116.72	450.68	250	451.35	155.04	451.03	77.4	450.34	23.71	449.81
16	0.2	449.14	258.36	451.36	224.85	451.23	113.66	450.64	69	450.3	22.92	449.8
17	0.18	449.13	300	451.68	237.07	451.25	97.73	450.49	58.76	450.25	22.66	449.8
18	0.33	449.17	399.93	452.61	280.4	451.57	76	450.33	51.05	450.21	21.5	449.79
19	1.4	449.35	312.05	451.83	256.42	451.36	114.19	450.81	46.15	450.17	21.36	449.79
20	10.9	449.59	235.22	451.24	233.07	451.24	88.86	450.47	44.66	450.14	20.5	449.79
21	9.19	449.57	141.41	450.78	170	451.1	142.6	450.93	42.14	450.11	19.91	449.78
22	8.91	449.59	303.1	451.4	113.82	450.9	103.6	450.63	40.94	450.07	19.41	449.77
23	5.15	449.52	292.9	451.64	149.58	450.98	81.11	450.39	40	450.04	18.82	449.76
24	85.75	450.34	230	451.25	402.34	452.07	74.28	450.31	39.22	450.01	18.58	449.76
25	22.06	449.82	131.69	450.8	220.68	451.22	85	450.46	37.87	449.99	17.94	449.69
26	16	449.76	142.23	450.84	446.07	452.35	247.78	451.3	36.54	449.97	16.74	449.68
27	9.95	449.65	327.62	451.92	477.86	452.34	545.34	452.4	35.41	449.95	16.5	449.68
28	25.6	449.89	256.81	451.3	250	451.5	332.47	451.92	34.33	449.93	16.02	449.67
29	230.94	451.42	107.46	450.65	155.57	451.01	541.41	452.4	33.76	449.92	15.76	449.67
30	61.58	450.26	83.7	450.49	159.46	451.04	874.86	453.3	33.5	449.92	14.69	449.66
31			190	451.1	141.17	450.92			32.82	449.91		
Ten-Daily Mean												
I Ten-Daily	0.18	449.13	180.05	450.89	648.2	452.75	139.05	450.8	171.51	451.07	29.74	449.88
II Ten-Daily	1.4	449.21	293.36	451.61	272.46	451.51	96.51	450.52	75.69	450.38	23	449.81
III Ten-Daily	47.51	449.98	200.63	451.11	244.23	451.4	302.84	451.4	36.96	449.98	17.44	449.71
Monthly												
Min.	0.12	449.11	25.45	449.89	113.82	450.9	74.28	450.31	32.82	449.91	14.69	449.66
Max.	230.94	449.11	780	449.89	1551.26	450.9	874.86	450.31	327.18	449.91	32.49	449.66
Mean	16.36	449.44	224.68	451.2	388.3	451.89	179.47	450.91	94.72	450.48	23.39	449.8

Annual Runoff in MCM : 2506.34

Annual Runoff in mm :639.21

Peak Observed Discharge = 1551.26 cumecs on 7/8/2016 Corres. Water Level 455.05 m

Lowest Observed Discharge = 0cumecs on 22/5/2017 Corres. Water Level 449.04 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Burhner at Mohgaon for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	13.99	449.65	7.3	449.53	5.12	449.42	3.43	449.36	1.2	449.26	0.23	449.18
2	13.94	449.65	7.24	449.52	5.08	449.42	3.4	449.36	1.2	449.26	0.22	449.18
3	13.22	449.64	7.14	449.51	5.05	449.42	3.35	449.36	1.16	449.26	0.22	449.18
4	13	449.64	6.77	449.5	5.03	449.42	3.28	449.35	1.14	449.26	0.18	449.17
5	12.44	449.63	6.71	449.5	5	449.42	3.2	449.35	1.09	449.25	0.14	449.17
6	12.33	449.63	6.54	449.49	4.86	449.41	3.09	449.34	1.07	449.25	0.11	448.67
7	12.22	449.63	6.51	449.49	4.79	449.41	3.06	449.34	1.04	449.25	0.1	449.16
8	11.49	449.62	6.5	449.49	4.73	449.41	2.98	449.34	0.98	449.24	0.08	449.15
9	11.44	449.62	6.39	449.48	4.69	449.41	2.78	449.33	0.98	449.24	0.08	449.14
10	11.36	449.62	6.4	449.48	4.5	449.4	2.73	449.33	0.93	449.24	0.08	449.14
11	11.3	449.62	6.36	449.48	4.42	449.4	2.68	449.33	0.9	449.23	0.07	449.13
12	10.5	449.61	6.18	449.47	4.4	449.4	2.6	449.33	0.88	449.23	0.07	449.13
13	10.49	449.61	6.14	449.47	4.35	449.4	2.6	449.33	0.84	449.23	0.06	449.12
14	10.32	449.61	6.12	449.47	4.16	449.39	2.48	449.32	0.81	449.23	0.05	449.11
15	9.69	449.6	6.1	449.47	4.1	449.39	2.45	449.32	0.78	449.23	0.04	449.09
16	9.59	449.6	5.91	449.46	4.05	449.39	2.38	449.32	0.73	449.22	0.04	449.09
17	9.56	449.6	5.87	449.46	4	449.39	2.31	449.31	0.7	449.22	0.03	449.08
18	9.5	449.6	5.84	449.46	3.88	449.38	2.26	449.31	0.66	449.22	0.03	449.07
19	8.96	449.59	5.73	449.45	3.87	449.38	2.2	449.38	0.61	449.22	0.02	449.06
20	8.92	449.59	5.67	449.45	3.85	449.38	2.18	449.3	0.69	449.22	0.02	449.05
21	8.9	449.59	5.64	449.45	3.85	449.38	2.12	449.3	0.51	449.21	0.02	449.05
22	8.72	449.58	5.6	449.45	3.77	449.38	1.81	449.29	0.36	449.2	0	449.04
23	8.83	449.58	5.52	449.44	3.78	449.38	1.77	449.29	0.43	449.21	0	449.04
24	8.6	449.58	5.49	449.44	3.7	449.37	1.72	449.29	0.41	449.21	0	449.03
25	8.5	449.57	5.48	449.44	3.68	449.37	1.68	449.29	0.36	449.2	0	449.03
26	8.47	449.57	5.45	449.44	3.6	449.37	1.5	449.28	0.34	449.2	0	449.03
27	8.45	449.57	5.32	449.43	3.58	449.37	1.48	449.28	0.32	449.2	0	449.02
28	8.31	449.56	5.3	449.43	3.53	449.37	1.43	449.28	0.3	449.19	0	449.02
29	7.94	449.55	5.3	449.43			1.4	449.28	0.28	449.19	0	449.02
30	7.66	449.54	5.29	449.43			1.27	449.27	0.28	449.19	0	449.03
31	7.35	449.53	5.25	449.43			1.19	449.27			0	449.03
Ten-Daily Mean												
I Ten-Daily	12.54	449.63	6.75	449.5	4.88	449.41	3.13	449.35	1.08	449.25	0.14	449.11
II Ten-Daily	9.88	449.6	5.99	449.46	4.11	449.39	2.41	449.32	0.76	449.23	0.04	449.09
III Ten-Daily	8.34	449.57	5.42	449.44	3.69	449.37	1.58	449.28	0.36	449.2	0	449.03
Monthly												
Min.	7.35	449.53	5.25	449.43	3.53	449.37	1.19	449.27	0.28	449.19	0	448.67
Max.	13.99	449.53	7.3	449.43	5.12	449.37	3.43	449.27	1.2	449.19	0.23	448.67
Mean	10.26	449.6	6.05	449.47	4.23	449.39	2.37	449.32	0.73	449.23	0.06	449.08

Peak Computed Discharge = 7.3 cumecs on 1/1/2017 Corres. Water Level = 449.53 m
Lowest Computed Discharge = 0.02cumecs on 21/5/2017 Corres. Water Level 449.05 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

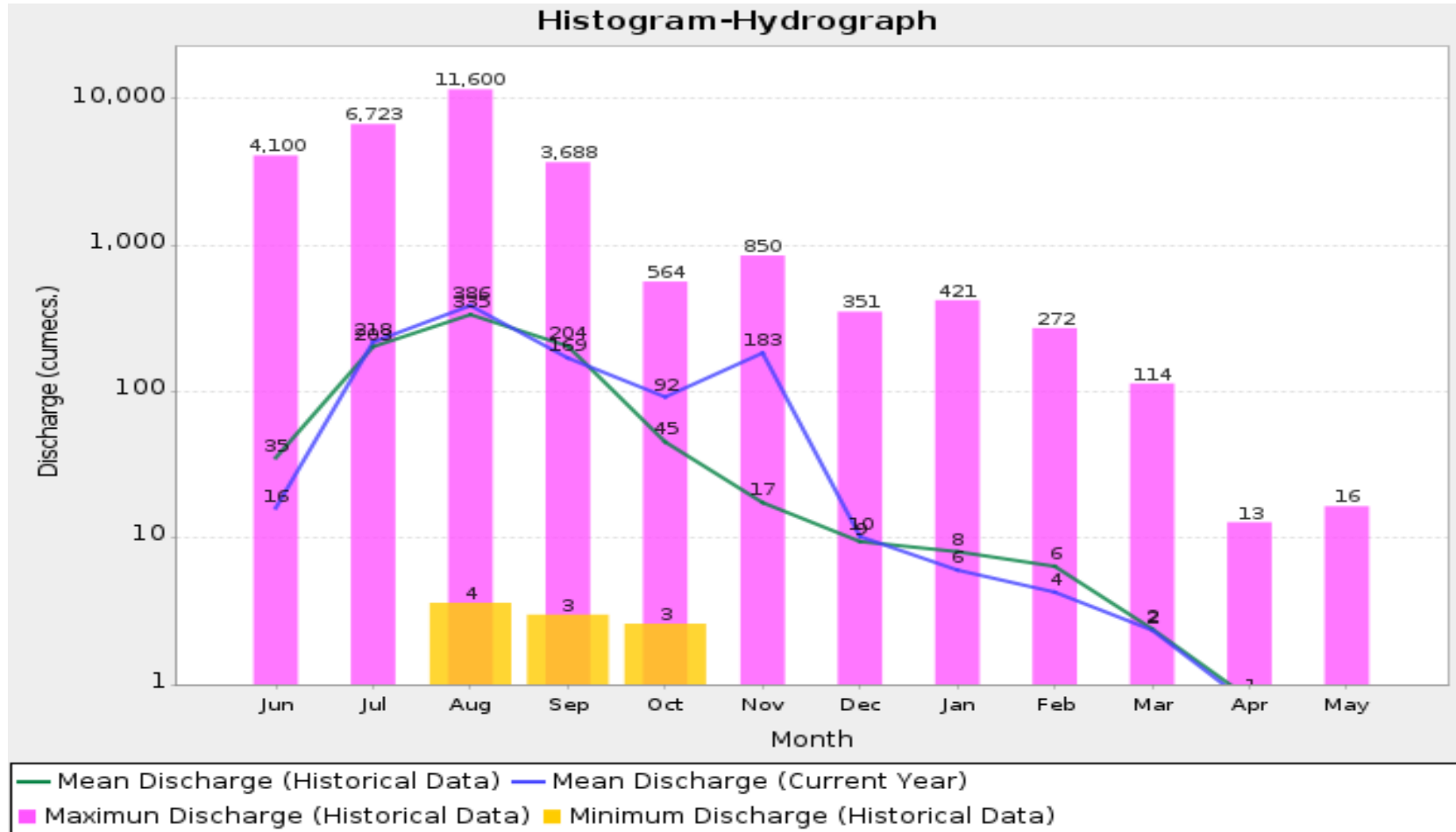
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1977-2017)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



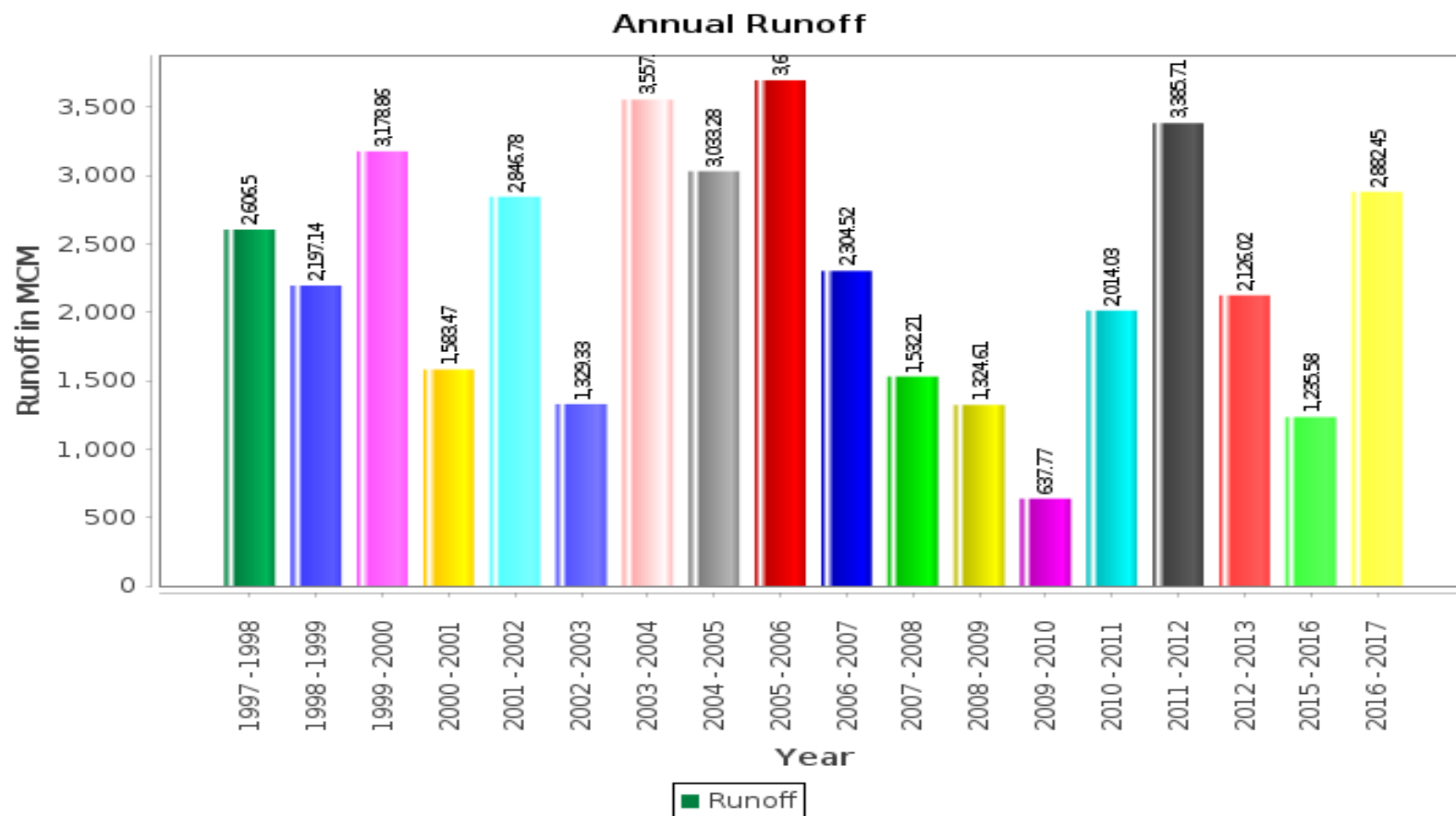
Annual Runoff Values for the period (1977– 2017)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



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

Monthly Average Runoff based on period (1977– 2017)

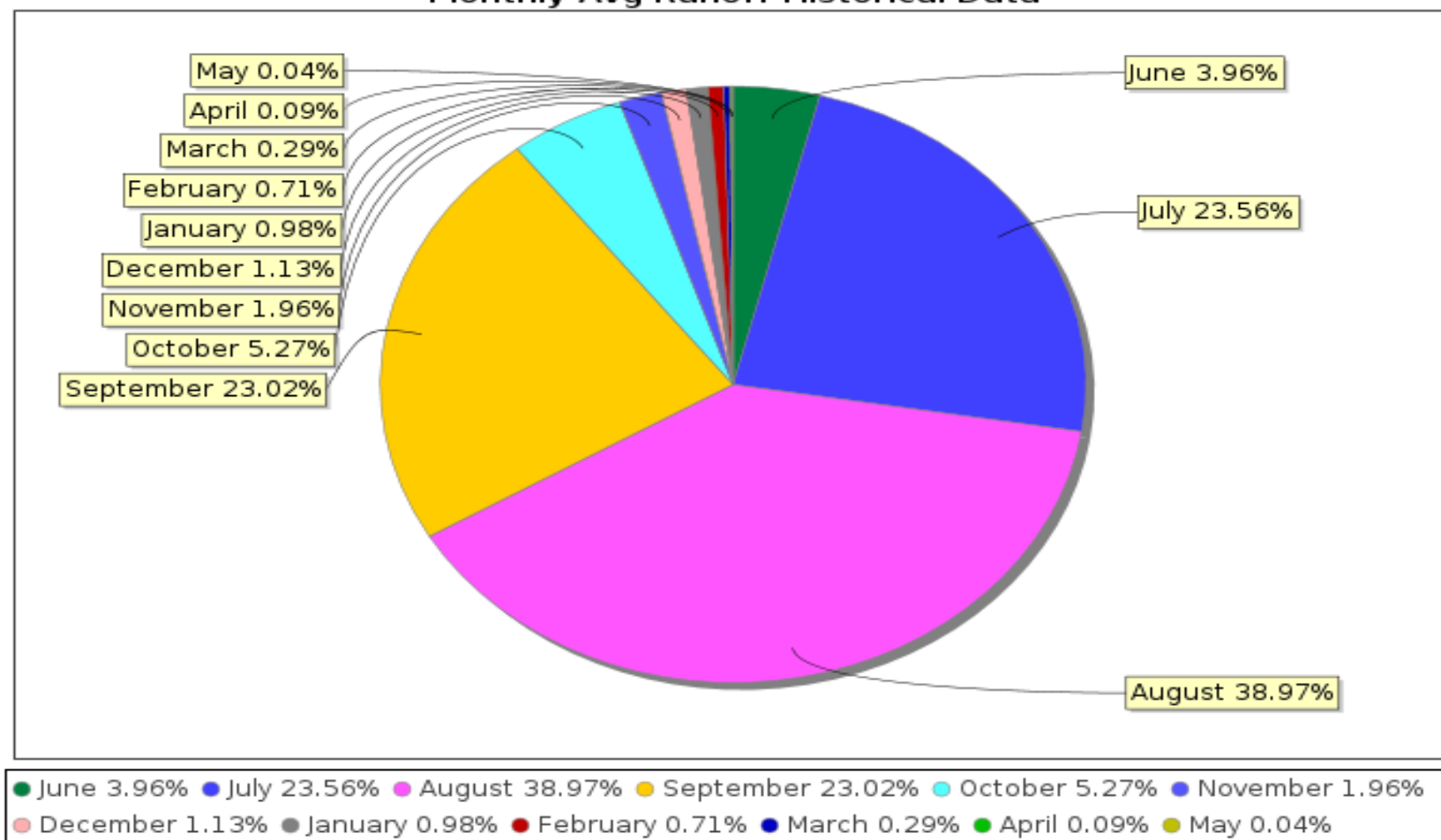
Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

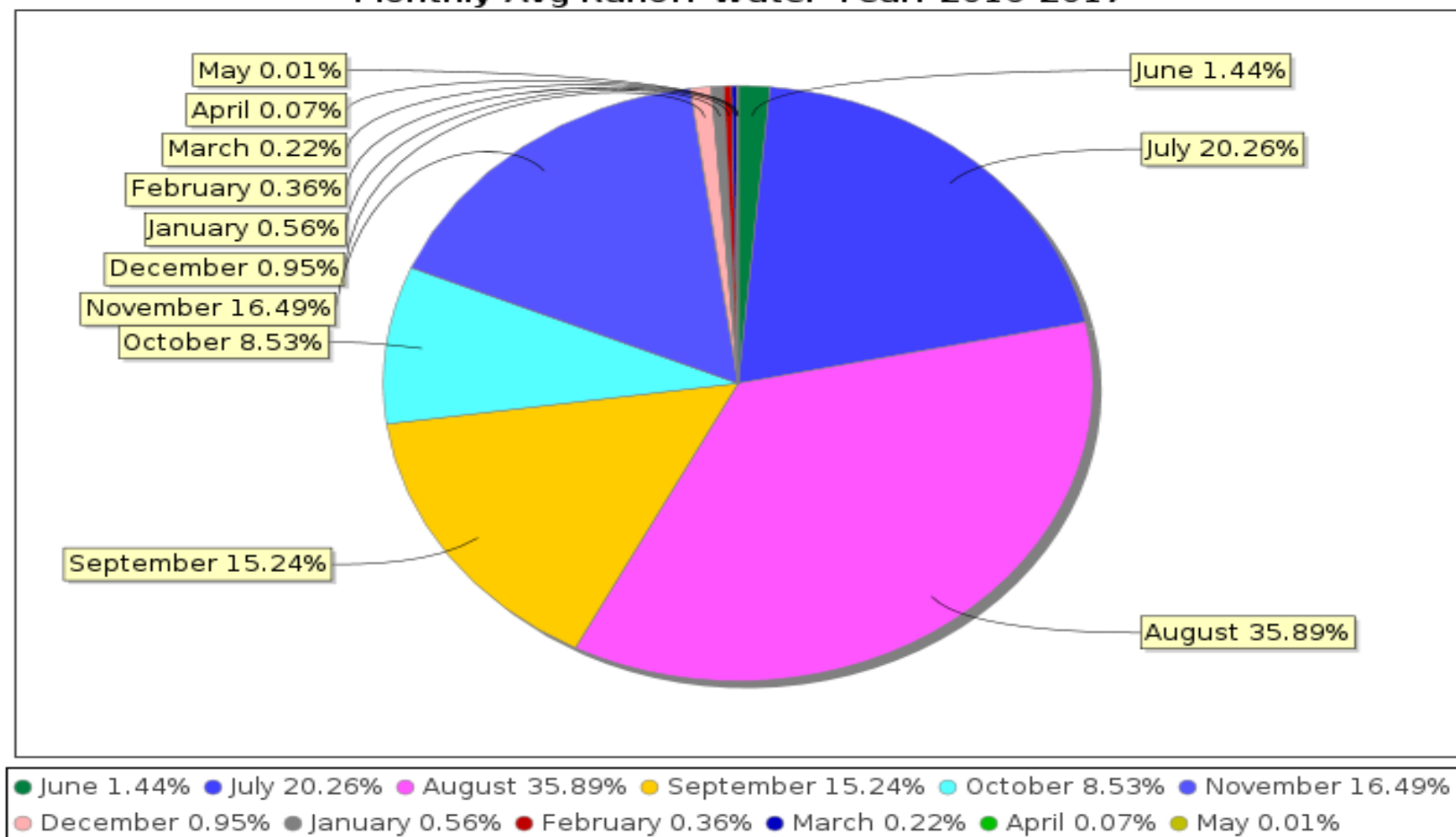
Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

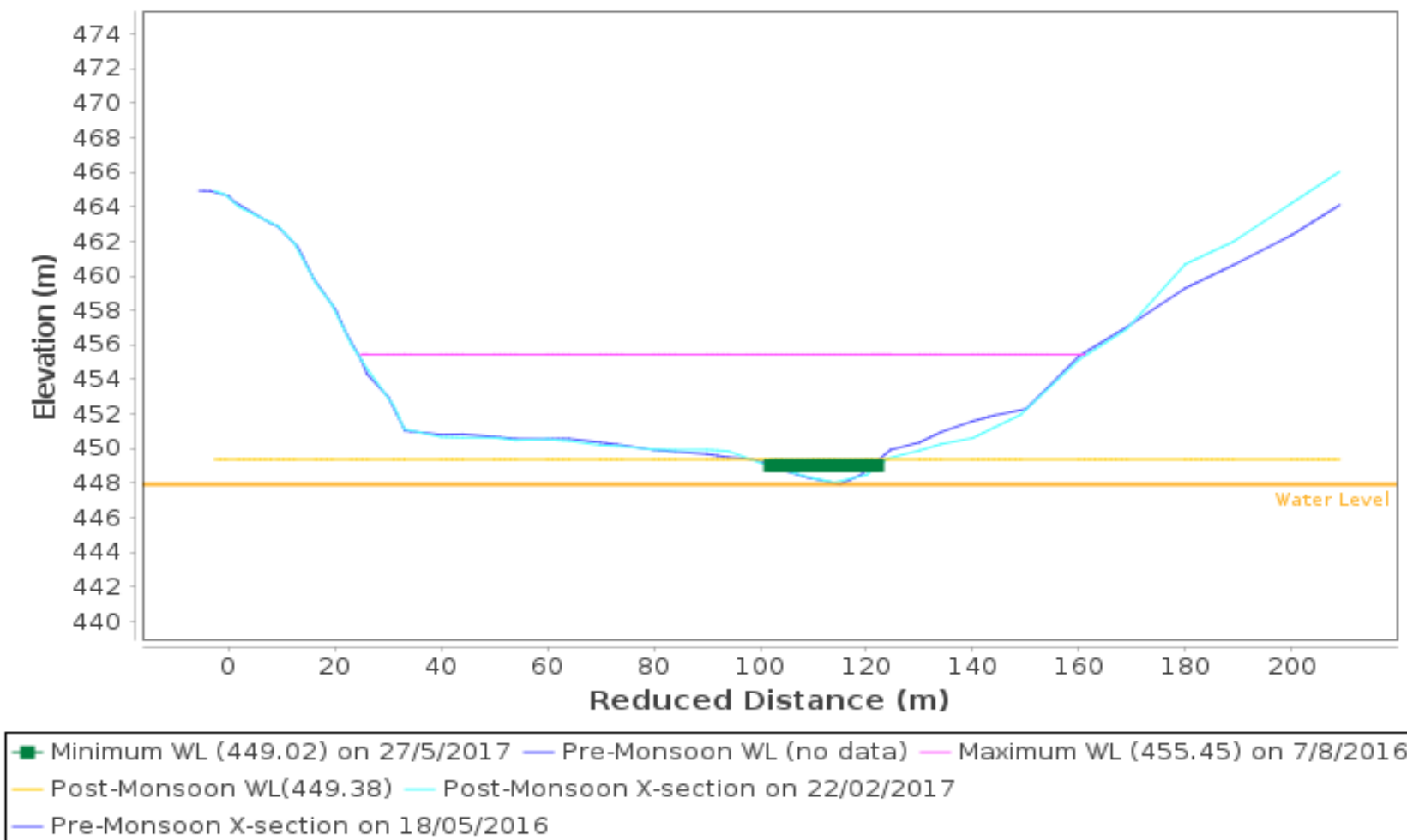
Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur

X-Section



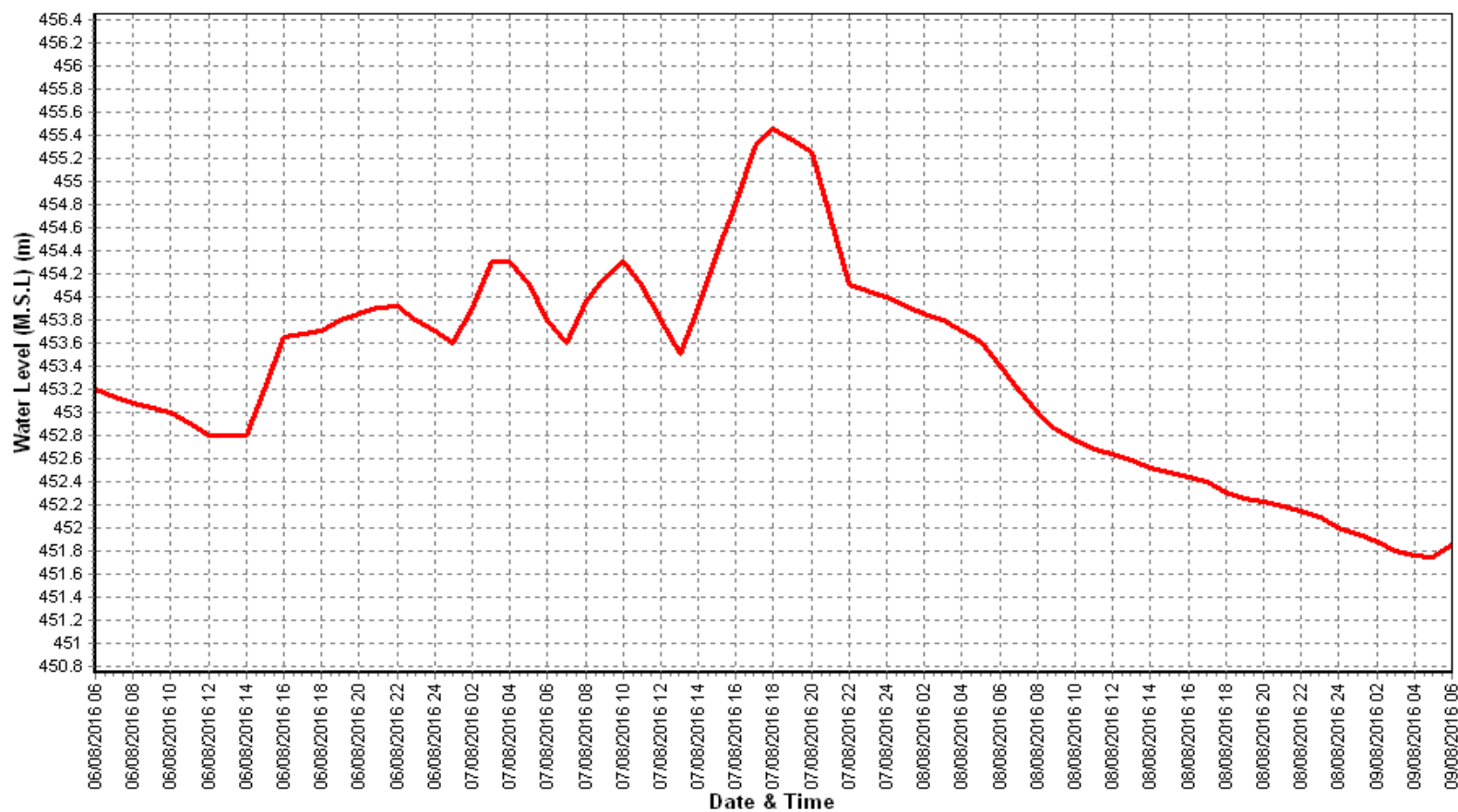
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



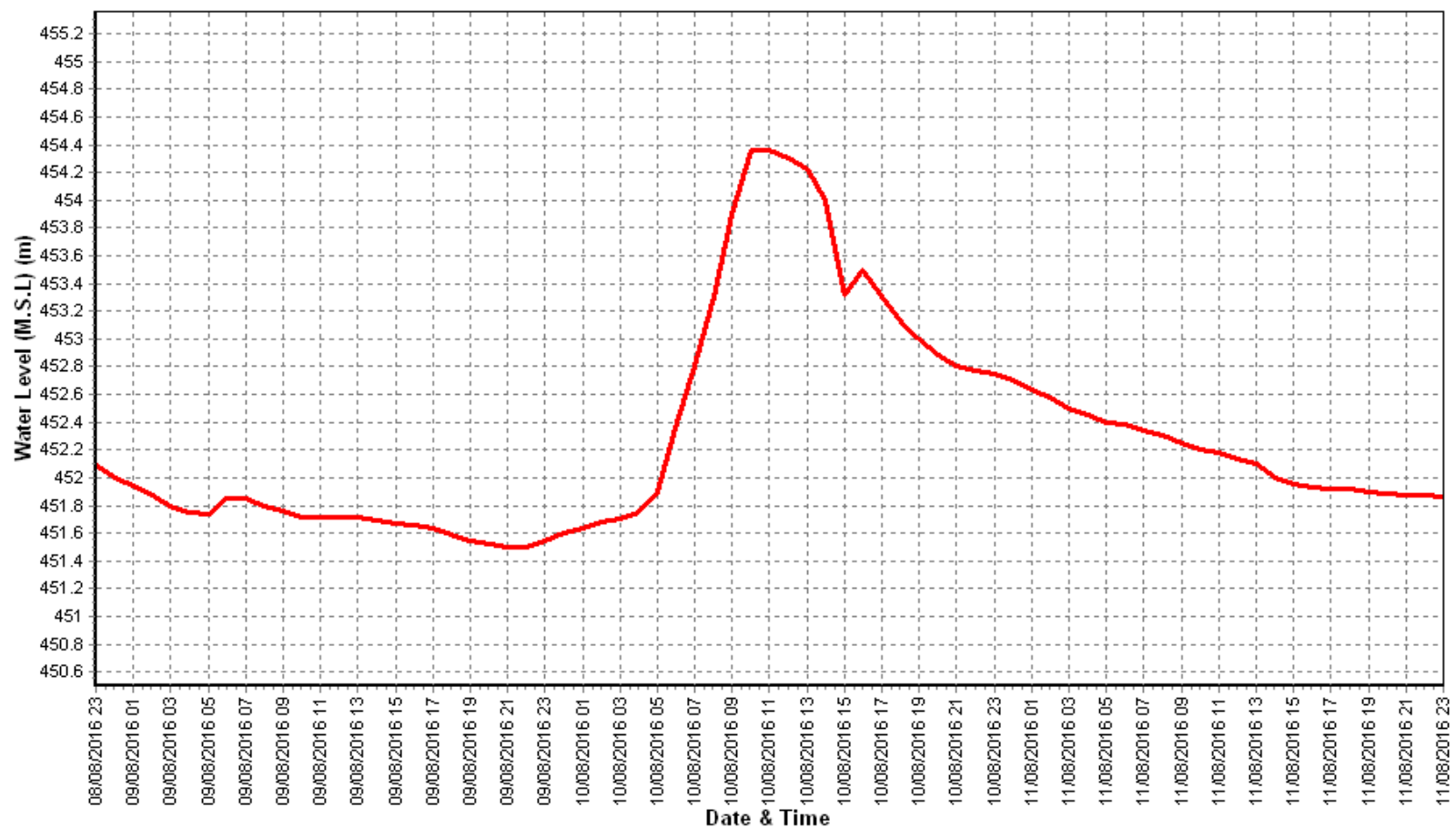
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur

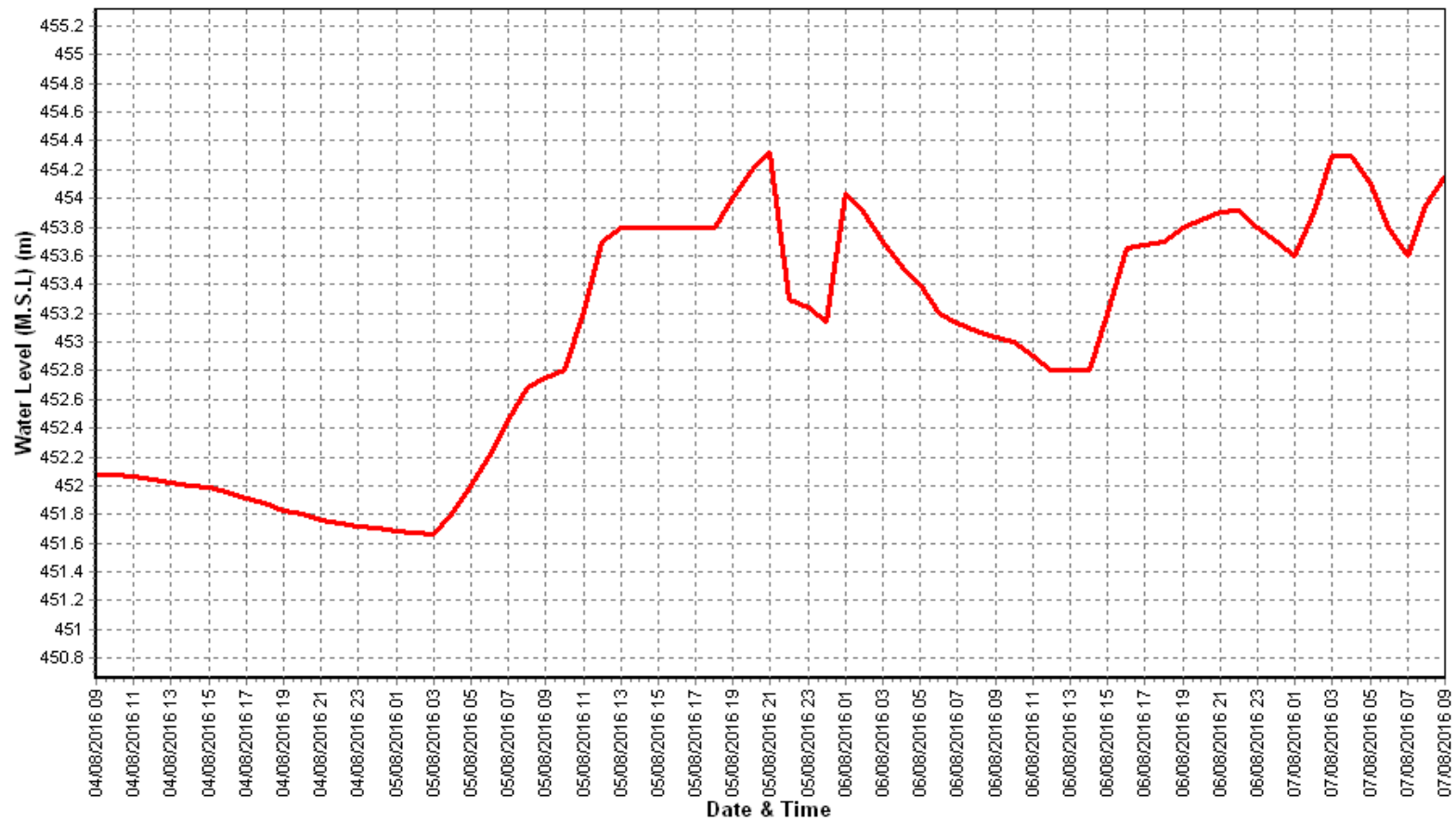


Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

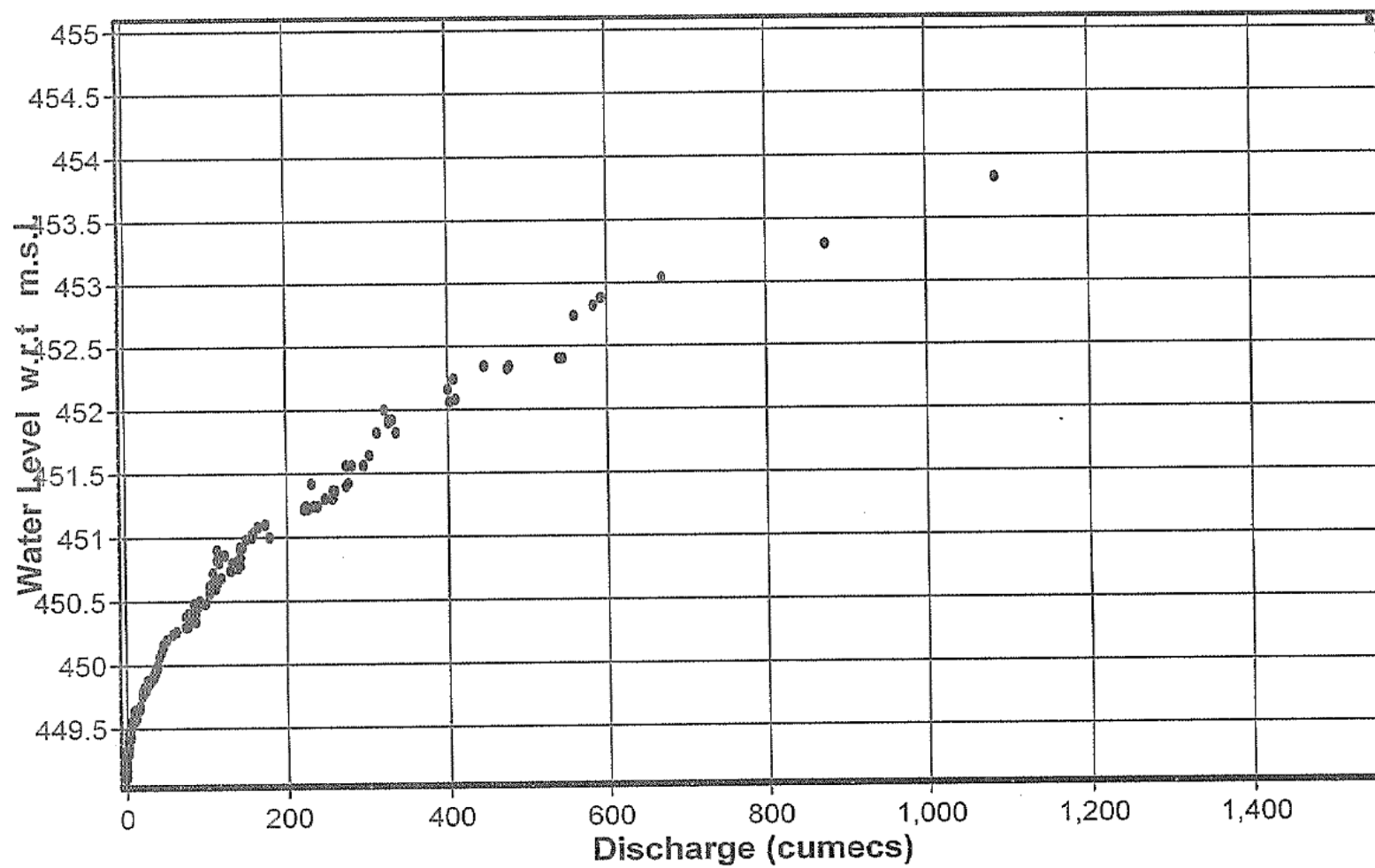
Station Name : Burhner at Mohgaon (010215004) Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



Plot of Stage Discharge Data at Burhner at Mohgaon (010215004): 2016 - 2017



4.16 Narmada at Manot

History Sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)						
				Water Year	:	2016 - 2017
Site	:	Manot				
				Code	:	009-ndbhp
State	:	Madhya Pradesh				
				District	:	Mandla
Basin	:	NARMADA				
				Independent River	:	Narmada
Tributary	:	-				
				Sub Tributary	:	-
Sub-Sub Tributary	:	-				
				Local River	:	Narmada
Division	:	Narmada Division(ND), Bhopal				
				Sub-Division	:	Upper Narmada Sub-Division, Jabalpur
Drainage Area	:	4667.0 Sq. Km.				
				Bank	:	Right
Latitude	:	22°44'08"				
				Longitude	:	80°30'44"
Current Zero of Gauge (m)	:	442.000				
CATEGORY		Opening Date		Closing Date		
Gauge	:	16/12/1976				
Discharge	:	16/12/1976				
Sediment	:	09/11/1979		31/12/2050		
Water Quality	:					
Reduced Level		Opening Date		Closing Date		
442.0		01/01/2013		-		
442.0		04/08/2015		31/05/2050		
442.0		16/12/1976		04/08/2015		
442.0		16/06/1976		16/12/1976		
Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
		Maximum			Minimum	
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	450	444.68	01/09/1977	0.5	442.785	01/06/1977
1978-1979	694	445.315	01/07/1978	0.7	442.75	01/05/1979
1979-1980	88.5	443.46	01/08/1979	0	442.36	23/05/1980

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1980-1981	735	446.62	01/08/1980	0	442.73	01/06/1980
1981-1982	400.1	444.87	01/07/1981	0.3	442.785	01/06/1981
1982-1983	275	444.96	01/08/1982	0.7	442.88	01/06/1982
1983-1984	1535	448.4	01/08/1983	0.1	442.75	01/06/1983
1984-1985	512.7	445.13	05/09/1984	0.3	442.8	01/06/1984
1985-1986	274.2	444.5	01/08/1985	0.2	442.785	01/06/1985
1986-1987	238.8	444.51	01/07/1986	0.3	442.86	01/06/1986
1987-1988	245.4	444.36	01/09/1987	0.74	442.92	01/06/1987
1988-1989	2182	450.685	01/08/1988	0.3	442.78	01/06/1988
1989-1990	381.1	444.985	01/09/1989	0.19	442.725	01/06/1989
1990-1991	281.5	444.9	01/08/1990	1.32	443.005	01/05/1991
1991-1992	509.3	445.465	01/09/1991	0.61	442.9	01/06/1991
1992-1993	134.9	444.37	01/09/1992	0.65	443.05	01/06/1992
1993-1994	254.6	444.82	01/10/1993	0.05	442.99	01/06/1993
1994-1995	1598	450.95	01/08/1994	0.5	442.98	01/06/1994
1995-1996	295.1	444.795	01/09/1995	0.85	443.09	01/06/1995
1996-1997	237.6	444.8	01/08/1996	0.39	442.99	01/06/1996
1997-1998	3160	451.6	01/08/1997	0.5	442.99	01/06/1997
1998-1999	165.9	444.39	01/09/1998	1.48	443.125	01/05/1999
1999-2000	1451	448.04	01/09/1999	0.97	443.1	01/05/2000
2000-2001	192	444.46	01/08/2000	2.32	443.15	01/05/2001
2001-2002	1240	447.8	01/07/2001	0.88	443.06	01/05/2002
2002-2003	300	444.85	01/09/2002	0.43	442.94	01/05/2003
2003-2004	549.6	445.575	01/07/2003	0.3	442.71	01/06/2003
2004-2005	220	444.65	01/08/2004	1.16	443.04	01/06/2004
2005-2006	1011.34	447.41	01/08/2005	0.02	442.88	01/06/2005
2006-2007	1475.61	447.725	01/08/2006	1.55	443	01/05/2007
2007-2008	142.74	444.525	01/10/2007	0.02	442.84	01/06/2007
2008-2009	1264.66	447.45	01/08/2008	0.19	442.83	01/06/2008
2009-2010	383.59	445.09	01/09/2009	0.19	442.71	01/05/2010
2010-2011	196.12	444.525	02/08/2010	0.65	442.92	17/05/2011
2011-2012	374.67	445.48	01/07/2011	0.16	442.87	01/06/2011
2012-2013	220	444.82	01/09/2012	0.55	442.92	01/06/2012
2013-2014	1572.52	449.2	09/08/2013	0.52	442.855	25/05/2014
2014-2015	3474.62	453.19	06/08/2014	0.27	442.78	15/06/2014
2015-2016	1178.44	448.99	04/08/2015	0.01	442.61	27/05/2016
2016-2017	950	448.05	07/08/2016	0	442.66	29/05/2017

Stage Discharge Sheet for Narmada at Manot for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	0	0	27.68	443.62	287.2	445.57	228.4	444.95	268	445.4	32.49	443.72
2	0	0	16.32	443.51	228	444.94	161.3	444.69	229	445.02	30.4	443.71
3	0	0	14	443.45	256.1	445.22	159.5	444.67	197.6	444.81	28.84	443.7
4	0	0	31.46	443.68	296.7	445.62	145	444.46	164.8	444.7	28.45	443.69
5	0	0	48.15	443.87	349	446.5	209	444.86	196.4	444.8	27.81	443.68
6	0	0	231.7	445.02	900.3	447.15	157.3	444.62	162	444.73	26	443.66
7	0	0	170	444.81	950	448.05	128.5	444.29	165.3	444.77	25.77	443.64
8	0	0	153.3	444.56	918.9	447.32	101.6	444.2	214.7	444.89	25.18	443.62
9	0	0	132.9	443.45	295.4	445.6	98.06	444.15	143	444.47	24.77	443.61
10	0	0	270	445.5	327.6	446.17	96.93	444.12	141.9	444.45	24.39	443.6
11	0	0	268.8	445.4	308.2	445.88	96	444.1	129	444.3	23.62	443.58
12	0	0	137	444.38	229.6	445.01	95.7	444.07	101	444.22	23.27	443.57
13	0	0	127.9	444.29	209.5	444.86	91	444.04	98.55	444.15	22	443.55
14	0	0	96.64	444.07	190	444.83	92.44	444.05	14	444.12	21.5	443.55
15	0	0	90.88	444.05	228	444.96	153.4	444.54	96.74	444.1	21.02	443.52
16	0	0	89.38	444.02	228.7	444.96	152.6	444.53	95.28	444.09	20.69	443.51
17	0	0	125	444.24	229.1	444.98	139.2	444.4	94	444.06	19.71	443.49
18	0	0	263.7	445.32	287.8	445.57	138	444.38	93.74	443.99	19.29	443.48
19	0	0	252.2	445.19	259.7	445.23	138.1	444.38	67.93	443.93	18.94	443.47
20	0	0	150.6	444.51	245.9	445.15	145.6	444.47	65.44	443.91	18.6	443.46
21	1.27	442.92	149.6	444.5	209	444.86	263.6	445.25	52.94	443.89	18.3	443.45
22	7.87	443.21	160.7	444.73	157.6	444.62	212.6	444.88	49.56	443.88	18.21	443.45
23	12.57	443.4	261.8	445.29	152.2	444.52	158.1	444.65	48	443.87	17.94	443.44
24	15.2	443.47	235	445.08	164.3	444.76	129.3	444.31	46.6	443.84	17.66	443.43
25	14.3	443.45	152.5	444.52	154	444.55	129	444.3	42.03	443.82	17.6	443.43
26	16	443.5	154.3	444.53	226.6	444.93	288.8	445.49	39.88	443.79	17.4	443.42
27	15.42	443.48	138.4	444.38	322.6	446.09	320.4	445.98	37.12	443.77	17.4	443.42
28	29.26	443.65	141.7	444.45	245	445.16	285.9	445.56	35.08	443.75	17.2	443.41
29	26.44	443.59	136.9	444.37	161.5	444.73	250.5	445.18	34.32	443.74	17.01	443.41
30	29.23	443.65	96.61	444.1	154.6	444.55	363.6	446.63	34	443.74	16.78	443.4
31			90	444.02	224.9	444.92			33.17	443.73		
Ten-Daily Mean												
I Ten-Daily	0	0	109.55	444.15	480.92	446.21	148.56	444.5	188.27	444.8	27.41	443.66
II Ten-Daily	0	0	160.21	444.55	241.65	445.14	124.2	444.3	85.57	444.09	20.86	443.52
III Ten-Daily	16.76	443.43	156.14	444.54	197.48	444.88	240.18	445.22	41.15	443.8	17.55	443.43
Monthly												
Min.	1.27	442.92	14	443.45	152.2	444.52	91	444.04	14	443.73	16.78	443.4
Max.	29.26	442.92	270	443.45	950	444.52	363.6	444.04	268	443.73	32.49	443.4
Mean	5.59	147.81	141.97	444.41	306.68	445.41	170.98	444.67	105	444.23	21.94	443.54

Annual Runoff in MCM : 2075.72

Annual Runoff in mm : 444.76

Peak Observed Discharge = 950 cumecs on 7/8/2016 Corres. Water Level 448.05 m

Lowest Observed Discharge = 0cumecs on 29/5/2017 Corres. Water Level 442.66 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Note:Missing values ignored while arriving at Annual Runoff

Stage Discharge Sheet for Narmada at Manot for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	16.7	443.4	11.45	443.25	6.12	443.17	5.52	443.16	2.65	443.04	0.8	442.84
2	16.6	443.39	11.36	443.25	6.01	443.17	5.36	443.15	2.61	443.03	0.74	442.83
3	16.6	443.39	11.34	443.25	5.9	443.17	5.29	443.15	2.53	443.03	0.69	442.82
4	16.5	443.38	11.06	443.25	5.62	443.16	5.14	443.14	2.49	443.03	0.62	442.81
5	16.3	443.38	10.75	443.24	5.54	443.16	5.1	443.14	2.39	443.02	0.57	442.8
6	16.09	443.37	10.52	443.24	5.44	443.16	4.97	443.14	2.33	443.02	0.51	442.79
7	15.93	443.36	10.38	443.24	5.33	443.16	4.82	443.13	2.19	443.01	0.46	442.78
8	15.82	443.36	10.3	443.24	5.17	443.15	4.73	443.13	2.05	443	0.4	442.77
9	15.56	443.35	10.04	443.23	5.08	443.15	4.58	443.12	1.98	442.99	0.35	442.76
10	15.29	443.34	9.9	443.23	4.99	443.15	4.45	443.12	1.86	442.98	0.3	442.75
11	15.2	443.34	9.77	443.23	4.88	443.14	4.44	443.12	1.79	442.97	0.25	442.74
12	15.1	443.33	9.38	443.22	4.8	443.14	4.4	443.11	1.74	442.97	0.2	442.73
13	14.82	443.32	9.42	443.22	4.73	443.14	4.35	443.11	1.68	442.96	0.41	442.77
14	14.71	443.32	9.09	443.22	4.66	443.14	4.18	443.1	1.65	442.96	0.17	442.72
15	14.62	443.32	9	443.22	5.58	443.16	4.1	443.1	1.6	442.95	0.16	442.7
16	14.34	443.31	8.81	443.21	5.93	443.17	4.04	443.1	1.56	442.95	0.16	442.7
17	14.18	443.31	8.64	443.21	7.42	443.19	3.86	443.09	1.51	442.94	0.15	442.69
18	14	443.3	8.52	443.26	7.78	443.2	3.82	443.09	1.47	442.94	0.15	442.69
19	13.77	443.29	8.38	443.21	8.5	443.21	3.7	443.08	1.44	442.94	0.14	442.68
20	13.62	443.29	8.05	443.2	9.37	443.22	3.57	443.07	1.39	442.93	0.13	442.68
21	13.43	443.29	7.88	443.2	7.39	443.19	3.48	443.07	1.49	442.93	0	442.67
22	13.12	443.28	7.78	443.2	6.65	443.18	3.31	443.06	1.29	442.92	0	442.66
23	12.92	443.28	7.46	443.19	6.68	443.18	3.16	443.06	1.25	442.91	0	442.65
24	12.73	443.28	7.33	443.19	6.2	443.18	3.17	443.06	1.19	442.9	0	442.65
25	12.6	443.28	7.21	443.19	5.2	443.17	3.02	443.05	1.17	442.9	0	442.65
26	12.29	443.27	7.1	443.19	5.7	443.17	3	443.05	1.1	442.89	0	442.65
27	12.2	443.27	6.81	443.18	5.6	443.16	2.97	443.05	1.03	442.88	0	442.64
28	12.11	443.27	6.71	443.18	5.57	443.16	2.84	443.04	0.95	442.87	0	442.64
29	11.81	443.26	6.6	443.18			2.79	443.04	0.92	442.86	0	442.66
30	11.74	443.26	6.49	443.18			2.77	443.04	0.86	442.85	0	442.66
31	11.62	443.26	6.22	443.17			2.72	443.04			0	442.67
Ten-Daily Mean												
I Ten-Daily	16.14	443.37	10.71	443.24	5.52	443.16	5	443.14	2.31	443.01	0.54	442.79
II Ten-Daily	14.44	443.31	8.91	443.22	6.36	443.17	4.05	443.1	1.58	442.95	0.19	442.71
III Ten-Daily	12.42	443.27	7.05	443.19	6.12	443.17	3.02	443.05	1.13	442.89	0	442.65
Monthly												
Min.	11.62	443.26	6.22	443.17	4.66	443.14	2.72	443.04	0.86	442.85	0	442.64
Max.	16.7	443.26	11.45	443.17	9.37	443.14	5.52	443.04	2.65	442.85	0.8	442.64
Mean	14.33	443.32	8.89	443.22	6	443.17	4.02	443.1	1.67	442.95	0.25	442.72

Peak Computed Discharge = 11.45 cumecs on 1/1/2017

Corres. Water Level = 443.25 m

Lowest Computed Discharge = 0.17 cumecs on 14/5/2017

Corres. Water Level 442.72 m

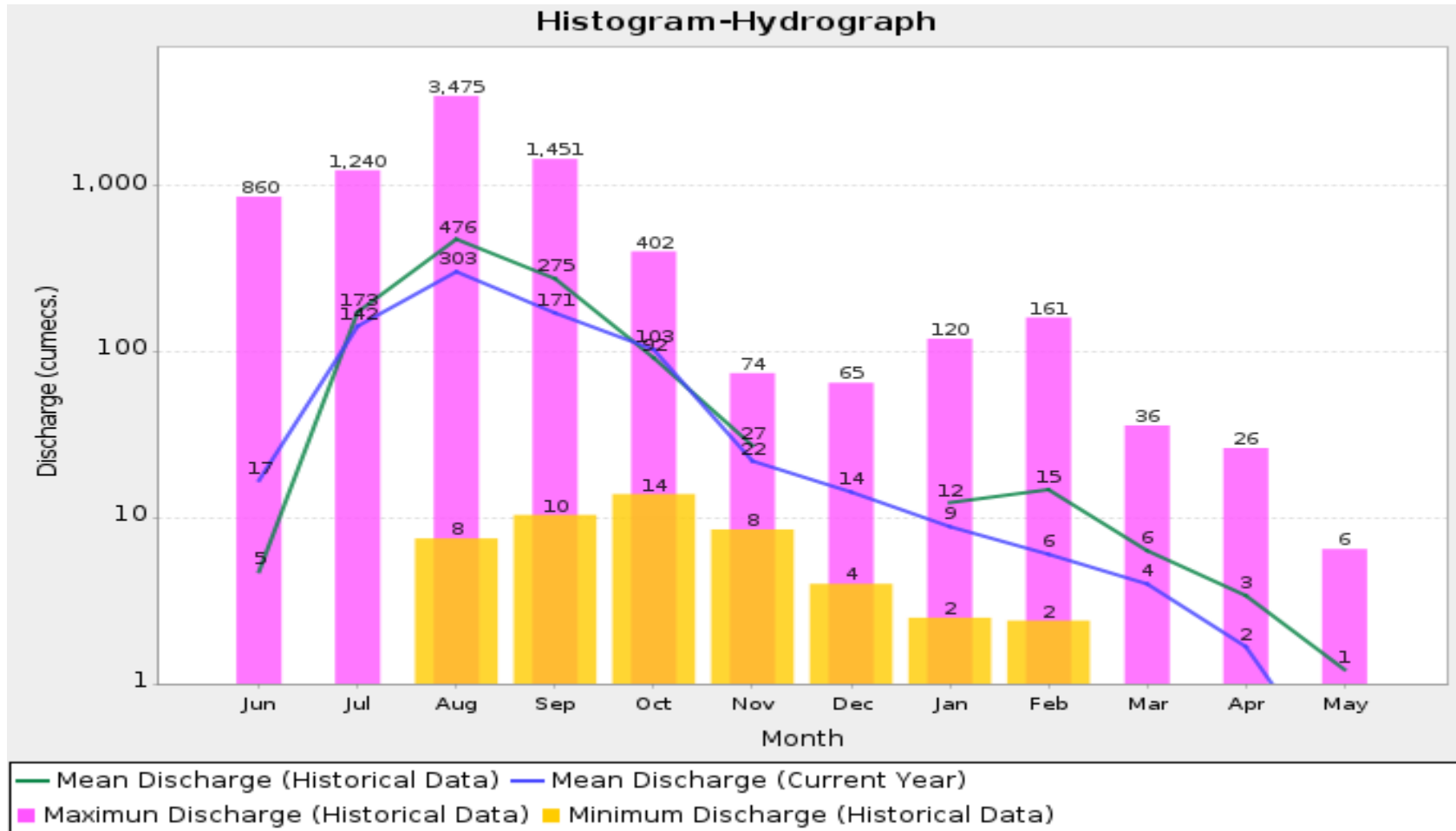
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1977-2017)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



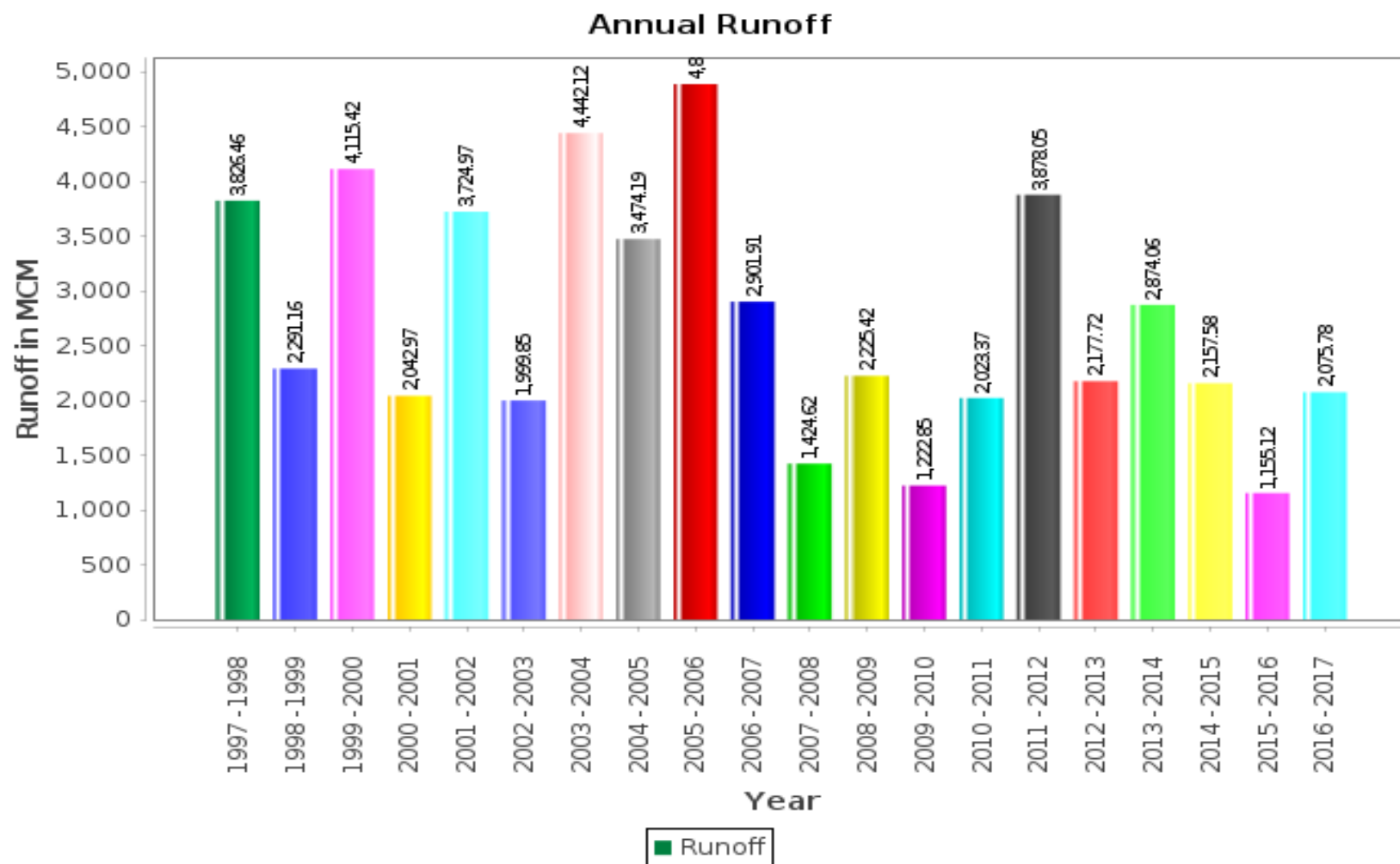
Annual Runoff Values for the period (1977– 2017)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Na

Sub-Division : UNSD, CWC Jabalpur



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

Monthly Average Runoff based on period (1977-2017)

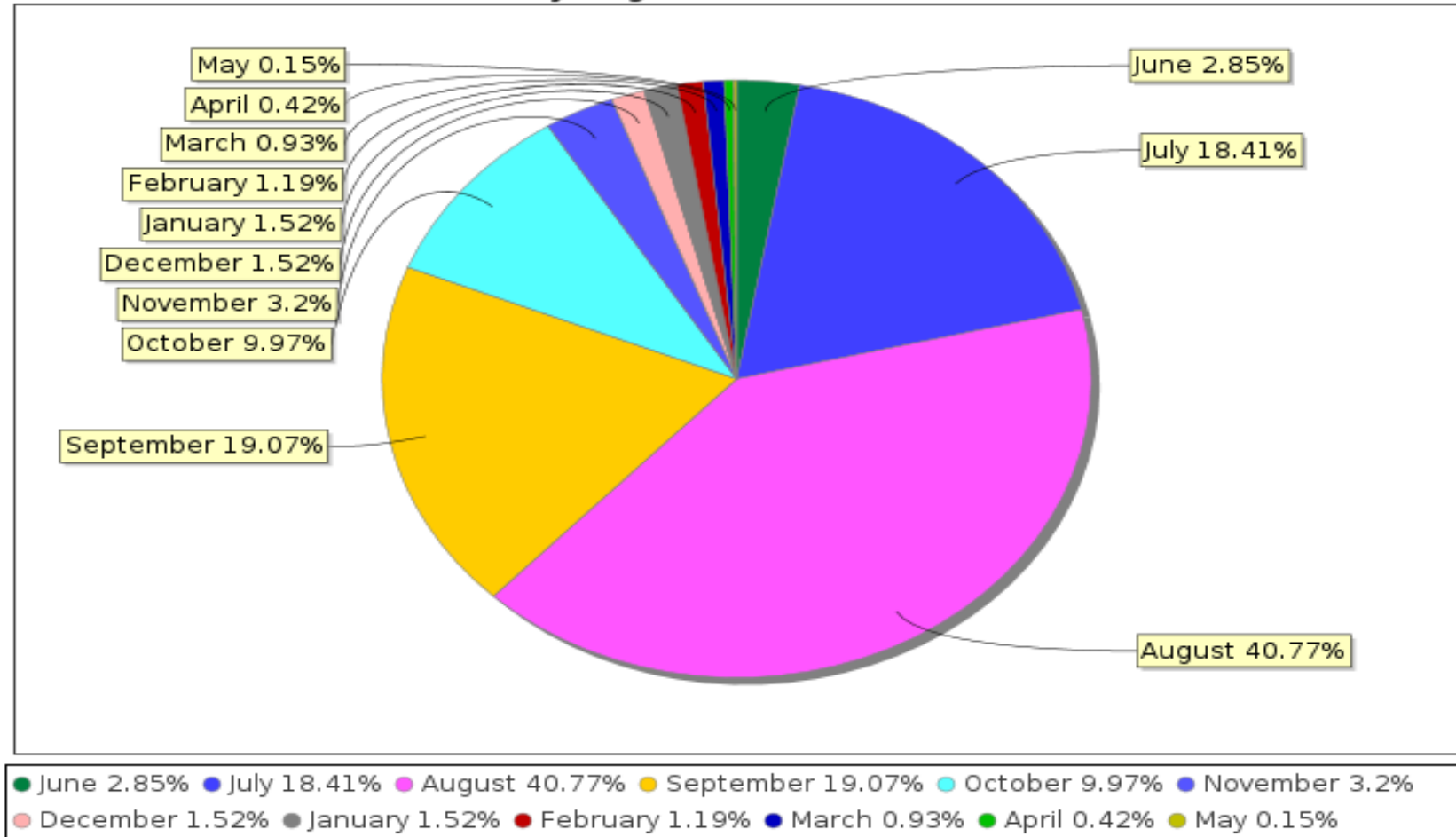
Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

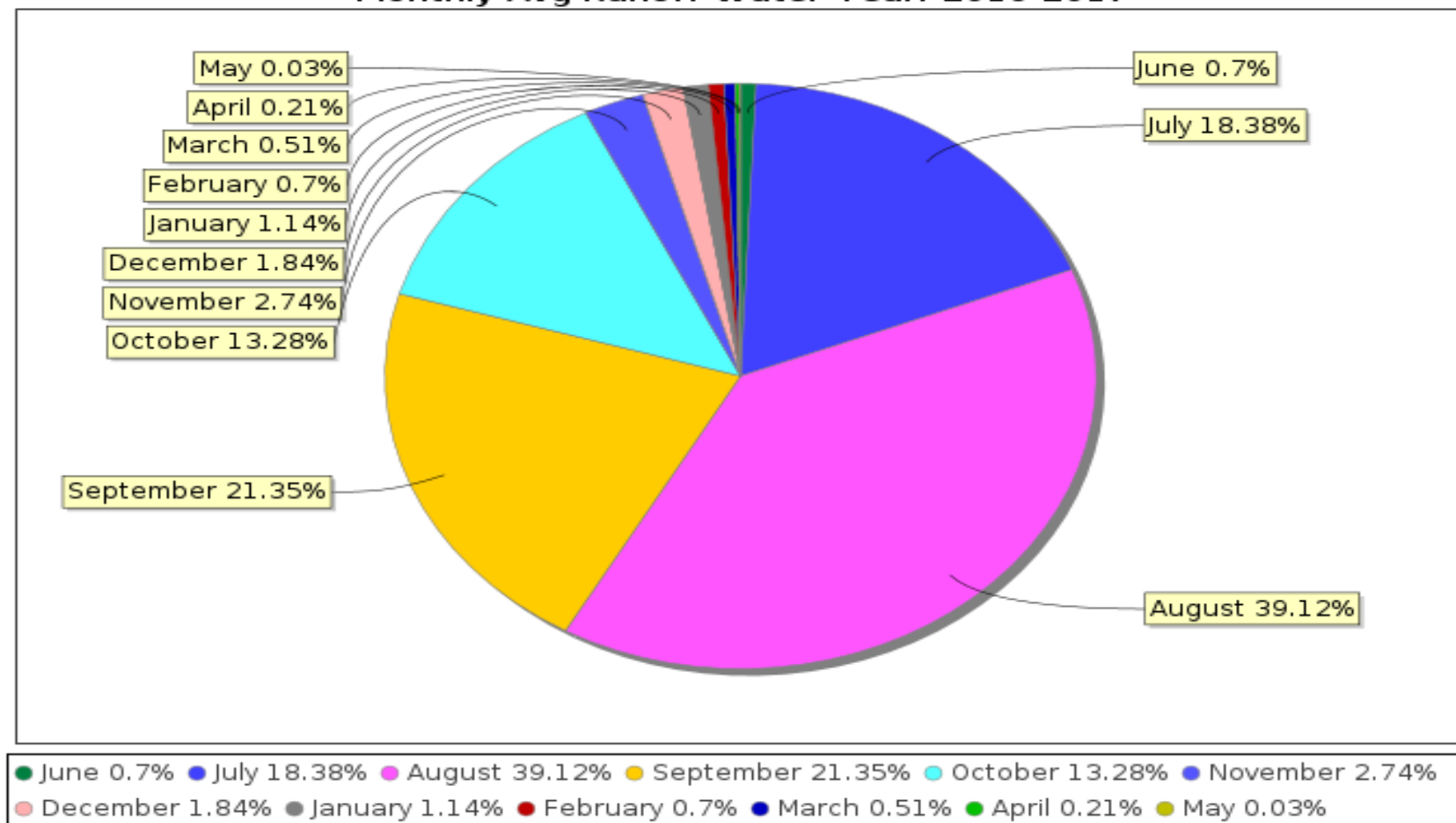
Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Water Year: 2016-2017



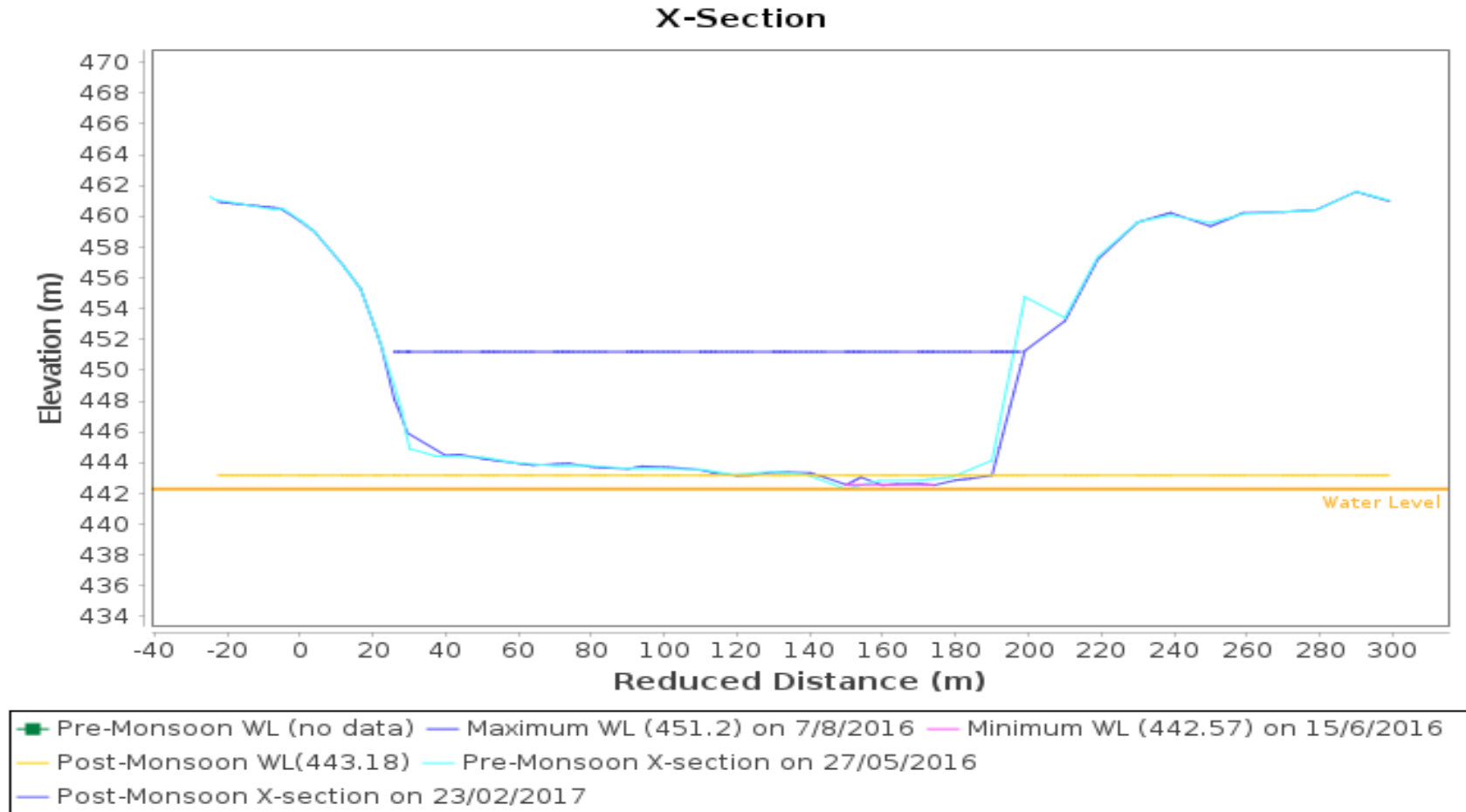
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



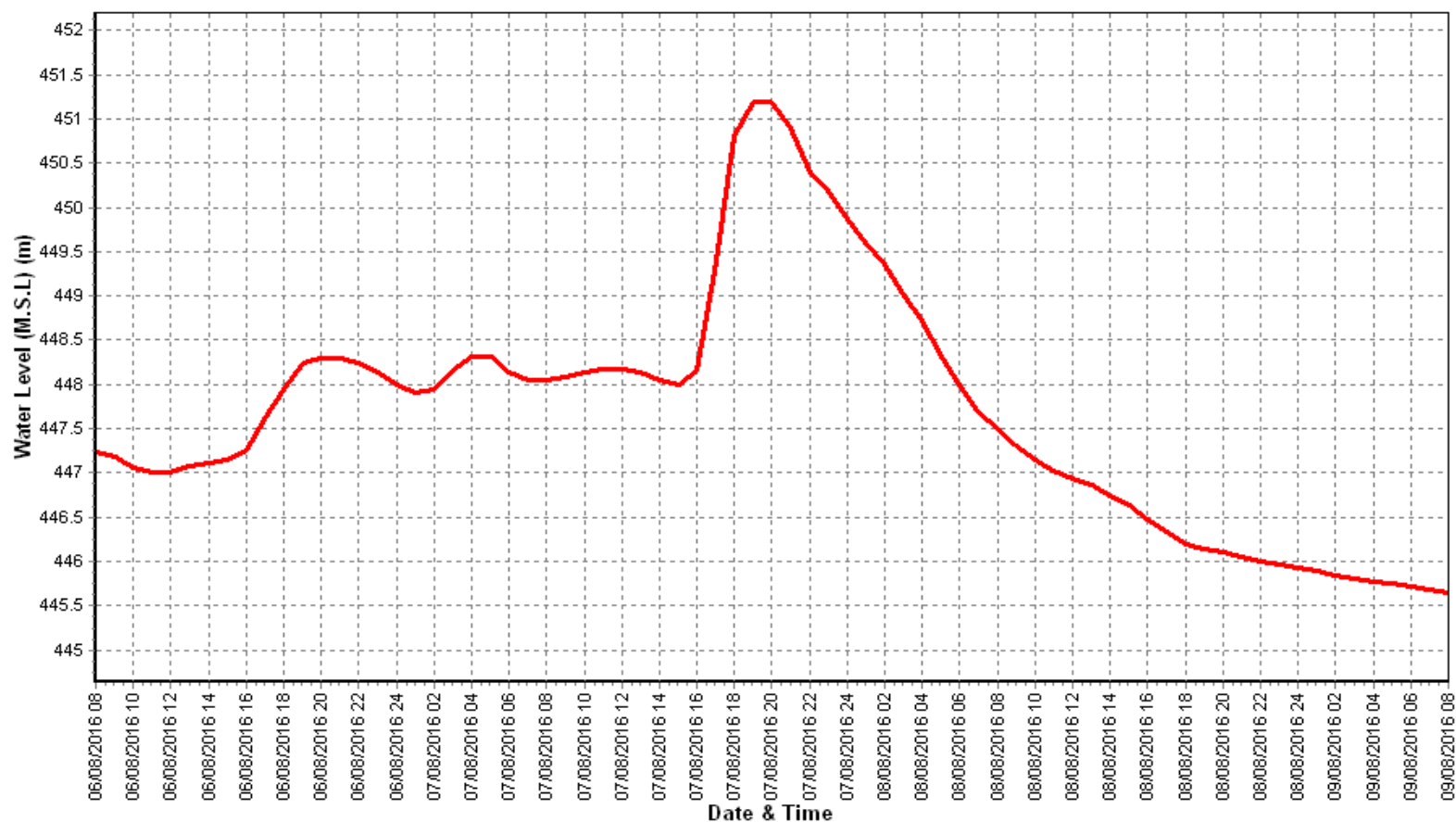
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



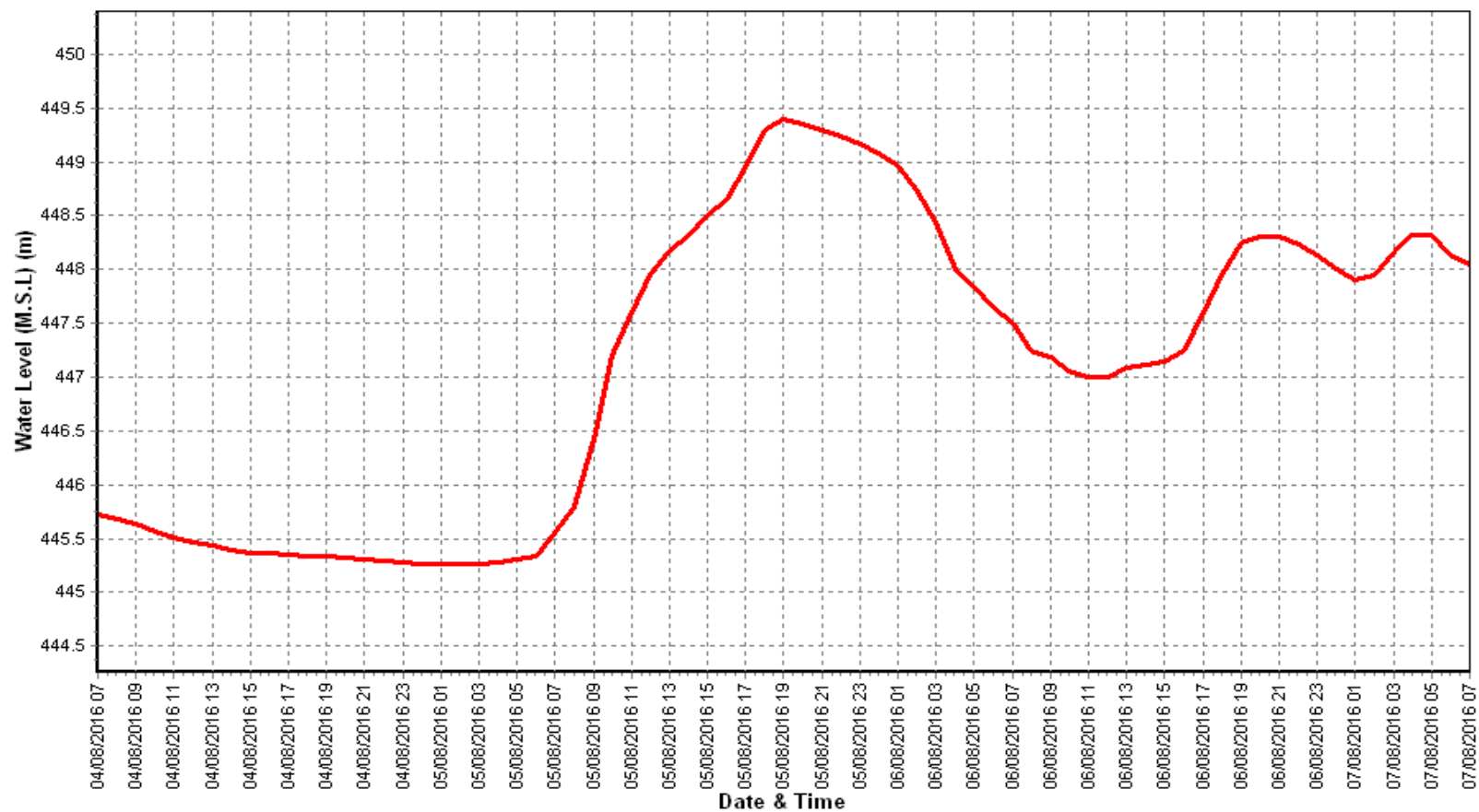
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



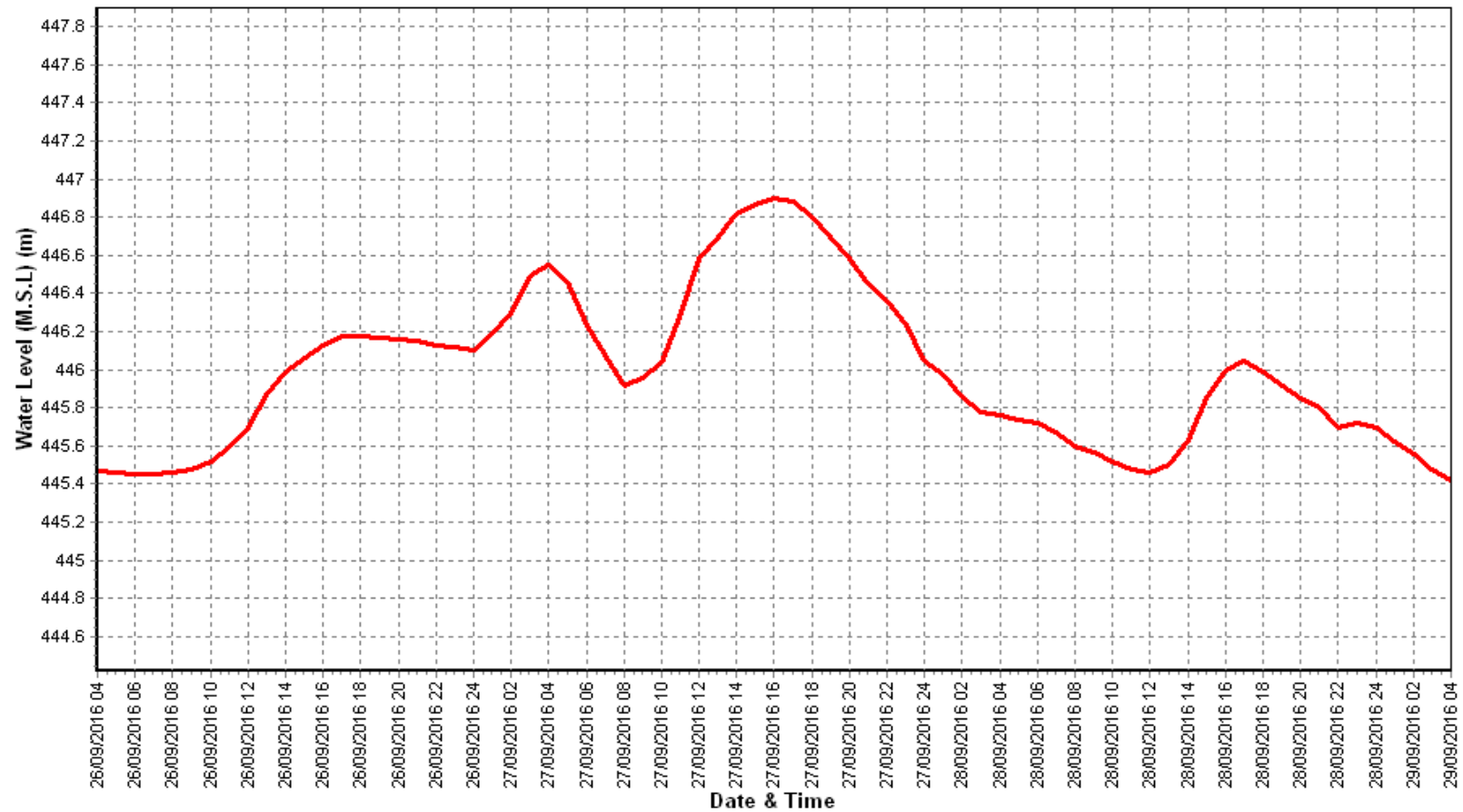
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Manot (010215002)

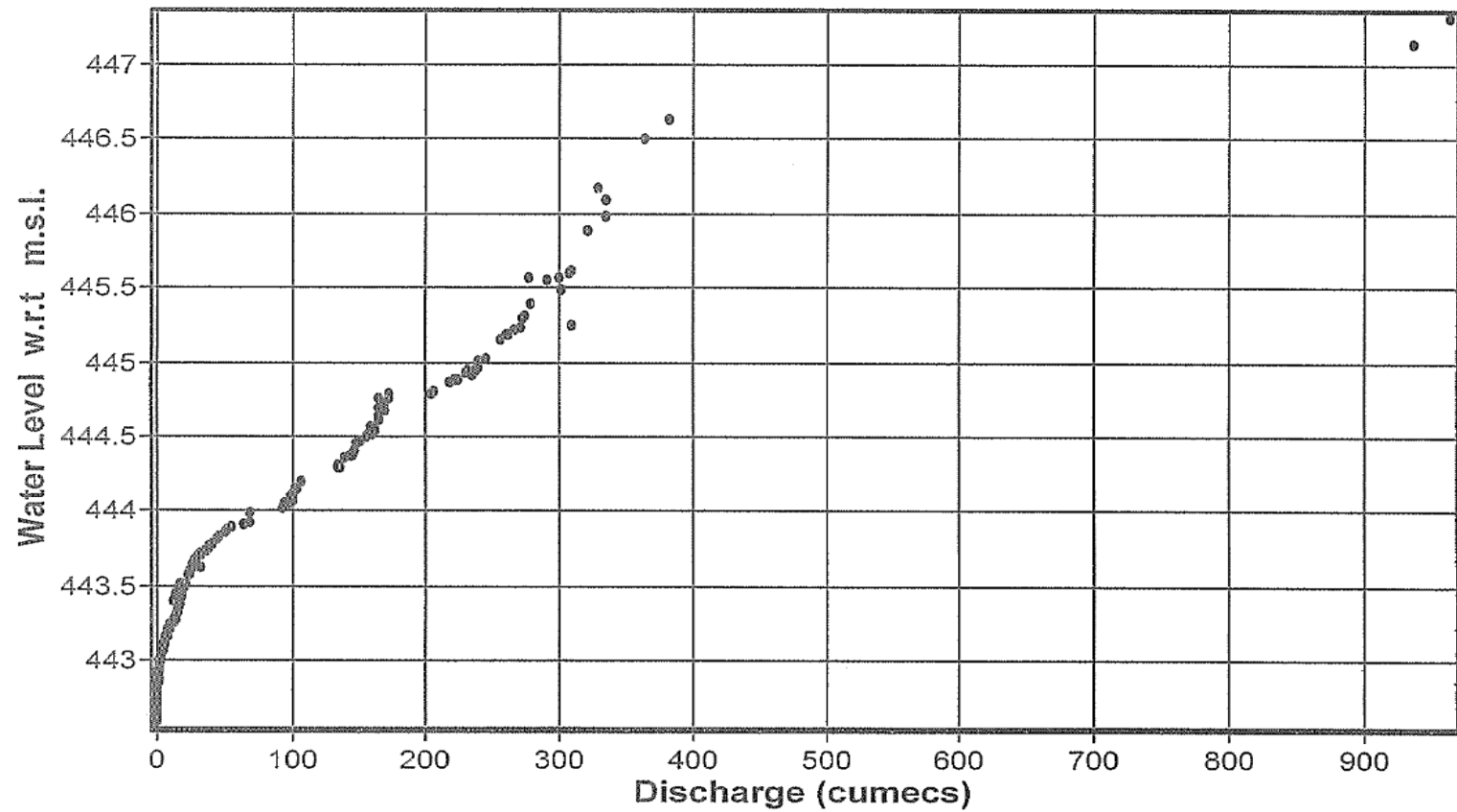
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



Plot of Stage Discharge Data at Narmada at Manot (010215002): 2016 - 2017



4.17 Narmada at Dindori

History Sheet

HISTORY SHEET (DISCHARGE AND WATER LEVEL)			
		Water Year	: 2016 - 2017
Site	: Dindori	Code	: 008-NDBHP
State	: Madhya Pradesh	District	: Mandla
Basin	: NARMADA	Independent River	: Narmada
Tributary	: -	Sub Tributary	: -
Sub-Sub Tributary	: -	Local River	: Narmada
Division	: Narmada Division(ND), Bhopal	Sub-Division	: Upper Narmada Sub-Division, Jabalpur
Drainage Area	: 2292.0 Sq. Km.	Bank	:
Latitude	: 22°56'53"	Longitude	: 81°04'34"
Current Zero of Gauge (m)	: 660.000		
CATEGORY	Opening Date	Closing Date	
Gauge	: 26/06/1988		
Discharge	: 01/08/1988		
Sediment	:		
Water Quality	: 15/03/1990		
Reduced Level	Opening Date	Closing Date	
660.0	08/06/2014	-	
660.0	26/06/1998	08/06/2014	
660.0	26/06/1988	26/06/1998	

Annual Maximum / Minimum discharge with corresponding Water Level (m.s.l)						
	Maximum			Minimum		
Year	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1988-1989	2649	669	02/08/1988	0	0	01/06/1988
1989-1990	875	665.55	13/08/1989	0.84	662.555	01/06/1989
1990-1991	2250	667.5	05/09/1990	1	662.56	19/05/1991
1991-1992	4710	669.64	23/08/1991	1.15	662.585	20/05/1992
1992-1993	3080	668.5	11/09/1992	0.5	662.57	21/05/1993
1993-1994	2560	667.9	27/09/1993	0.3	662.595	05/06/1993
1994-1995	4350	669.45	20/07/1994	0.9	662.55	30/05/1995
1995-1996	1865	667.17	08/08/1995	0.88	662.545	12/06/1995
1996-1997	1515	666.7	01/08/1996	1.03	662.555	06/06/1996
1997-1998	1085	666.11	29/07/1997	1.28	662.595	07/06/1997
1998-1999	1300	666.42	05/07/1998	1.28	662.575	12/05/1999
1999-2000	3907	669.3	31/08/1999	1.09	662.57	31/05/2000
2000-2001	980	666.25	19/07/2000	0.48	662.535	27/05/2001
2001-2002	2290	667.02	30/06/2001	0.81	662.54	24/05/2002
2002-2003	1130	666.12	24/06/2002	0.5	662.53	20/05/2003
2003-2004	2400	668	29/08/2003	0.5	662.52	11/06/2003
2004-2005	1600	667	08/08/2004	0.9	662.53	29/05/2005
2005-2006	1305.69	666.55	22/08/2005	0.3	662.505	21/05/2006
2006-2007	1881.53	667.7	31/07/2006	0.3	662.55	14/05/2007
2007-2008	347.62	664.23	21/08/2007	0.41	662.51	20/05/2008
2008-2009	1253.94	667	19/09/2008	0.71	662.48	30/04/2009
2009-2010	772.39	665.75	15/08/2009	5.01	663.52	25/08/2009
2010-2011	490.12	665.4	03/08/2010	5.34	662.64	06/02/2011
2011-2012	1044.09	666.44	12/08/2011	0	662.91	01/11/2011
2012-2013	570.48	665.5	11/08/2012	0.66	662.83	23/05/2013
2013-2014	844.63	665.75	09/08/2013	0.8	662.85	04/06/2013
2014-2015	1922.22	667.1	14/10/2014	0.73	662.51	26/05/2015
2015-2016	908.88	666.13	23/06/2015	0.61	662.56	10/05/2016
2016-2017	1211.84	664.3	28/08/2016	1.51	662.6	13/05/2017

Stage Discharge Sheet for Narmada at Dindori for the period 2016-17

Day	June		July		August		September		October		November	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	3.55	662.6	4.72	662.85	42.78	663.89	116.67	664.29	156.44	664.45	11.72	663.03
2	3.1	662.6	2.5	662.67	121.66	664.37	113.33	664.28	107.61	664.23	11.21	662.94
3	2.85	662.59	13.47	663.3	169.24	664.52	63.46	664.03	72.1	664.07	10.48	662.85
4	2.89	662.59	19.56	663.65	96.56	664.26	138.67	664.31	82.24	664.11	10.74	662.85
5	2.46	662.59	105.95	664.2	1025.84	666.85	133.3	664.29	101.28	664.23	10.16	662.85
6	2.46	662.58	191.1	664.01	240.79	664.75	69.94	664.05	73.49	664.07	10.12	662.85
7	2.94	662.58	58.09	663.97	203.32	664.65	48.99	664.95	186.49	664.61	10.07	662.85
8	2.76	662.58	37.31	663.87	165.82	664.55	43.8	663.91	101.06	664.24	9.88	662.85
9	2.74	662.58	34.95	663.83	91.88	664.72	41.31	663.89	96.56	664.21	9.76	662.85
10	2.85	662.58	30.44	663.72	187.66	664.58	38.93	663.83	80.06	664.1	9.74	662.84
11	2.48	662.57	16.28	663.37	105.65	664.24	31.89	663.7	66.74	664.03	9.64	662.83
12	2.51	662.57	34.97	663.83	85.87	664.06	17.81	663.44	55.32	663.97	9.58	662.82
13	2.55	662.63	14.39	663.17	102.79	664.2	29.11	663.39	43.9	663.91	9.39	662.81
14	2.5	662.63	14.56	663.16	88	664.09	39.89	663.84	40.42	663.88	8.83	662.78
15	2.38	662.63	13.74	663.16	118	664.34	46.47	663.94	37.44	663.82	8.08	662.74
16	2.24	662.61	9.55	663	102.53	664.2	38.54	663.83	32.81	663.74	8.08	662.74
17	2.21	662.6	85.54	663.75	127.34	664.37	35.58	663.84	25.8	663.62	8.1	662.74
18	2.02	662.6	158.6	664.47	154.91	664.42	37.03	663.85	21.98	663.51	7.9	662.73
19	2.72	662.8	85.28	664.07	106	664.24	63.21	664.03	20.15	663.43	7.8	662.73
20	3.25	662.94	46.2	663.93	100.82	664.2	99.72	664.21	19.44	663.39	7.77	662.72
21	2.98	662.79	46.57	663.9	83	664.08	59.31	664	18.08	663.35	7.73	662.72
22	4.53	662.83	46.67	663.93	66.67	663.79	79.9	664.1	17.36	663.31	7.73	662.72
23	3.97	662.72	102.4	664.22	68.6	663.97	38.39	663.86	17.12	663.29	7.31	662.72
24	4.65	663.03	93.31	664.18	65.91	664.04	37.82	663.82	116.4	663.23	7.04	662.71
25	5.74	663.11	86.96	664.02	73.36	664.04	205.36	664.53	15.56	663.2	6.98	662.71
26	3.72	662.81	67.73	664.02	162.78	664.46	337.51	665.09	14.62	663.15	6.96	662.71
27	6.38	663.13	97.12	664.18	170.48	664.52	350.07	665.16	14.08	663.12	6.66	662.7
28	19.7	663.61	68.05	664.02	1211.84	664.3	232.76	664.76	13.79	663.1	6.36	662.7
29	31.4	663.83	26.6	663.76	79.93	664.11	226.3	664.74	13.29	663.08	6.43	662.7
30	15.01	663.31	26.6	663.76	65.03	664.03	165.53	664.49	13.04	663.06	6.21	663
31			50.25	663.95	1151.17	664.39			12.92	663.05		
Ten-Daily Mean												
I Ten-Daily	2.86	662.59	49.81	663.61	234.55	664.71	80.84	664.18	105.73	664.23	10.39	662.88
II Ten-Daily	2.49	662.66	47.91	663.59	109.19	664.24	43.93	663.81	36.4	663.73	8.52	662.76
III Ten-Daily	9.81	663.12	64.75	663.99	290.8	664.16	173.3	664.45	24.21	663.18	6.94	662.74
Monthly												
Min.	2.02	662.57	2.5	662.67	42.78	663.79	17.81	663.39	12.92	663.05	6.21	662.7
Max.	31.4	662.57	191.1	662.67	1211.84	663.79	350.07	663.39	186.49	663.05	11.72	662.7
Mean	5.05	662.79	54.16	663.73	211.51	664.37	99.35	664.15	55.45	663.71	8.61	662.79

**Annual Runoff
in MCM : 1212.1**

**Annual Runoff in
mm : 528.85**

Peak Observed Discharge = 1211.84 cumecs on 28/8/2016

Corres. Water Level = 664.3 m

Lowest Observed Discharge = 1.51 cumecs on 13/5/2017

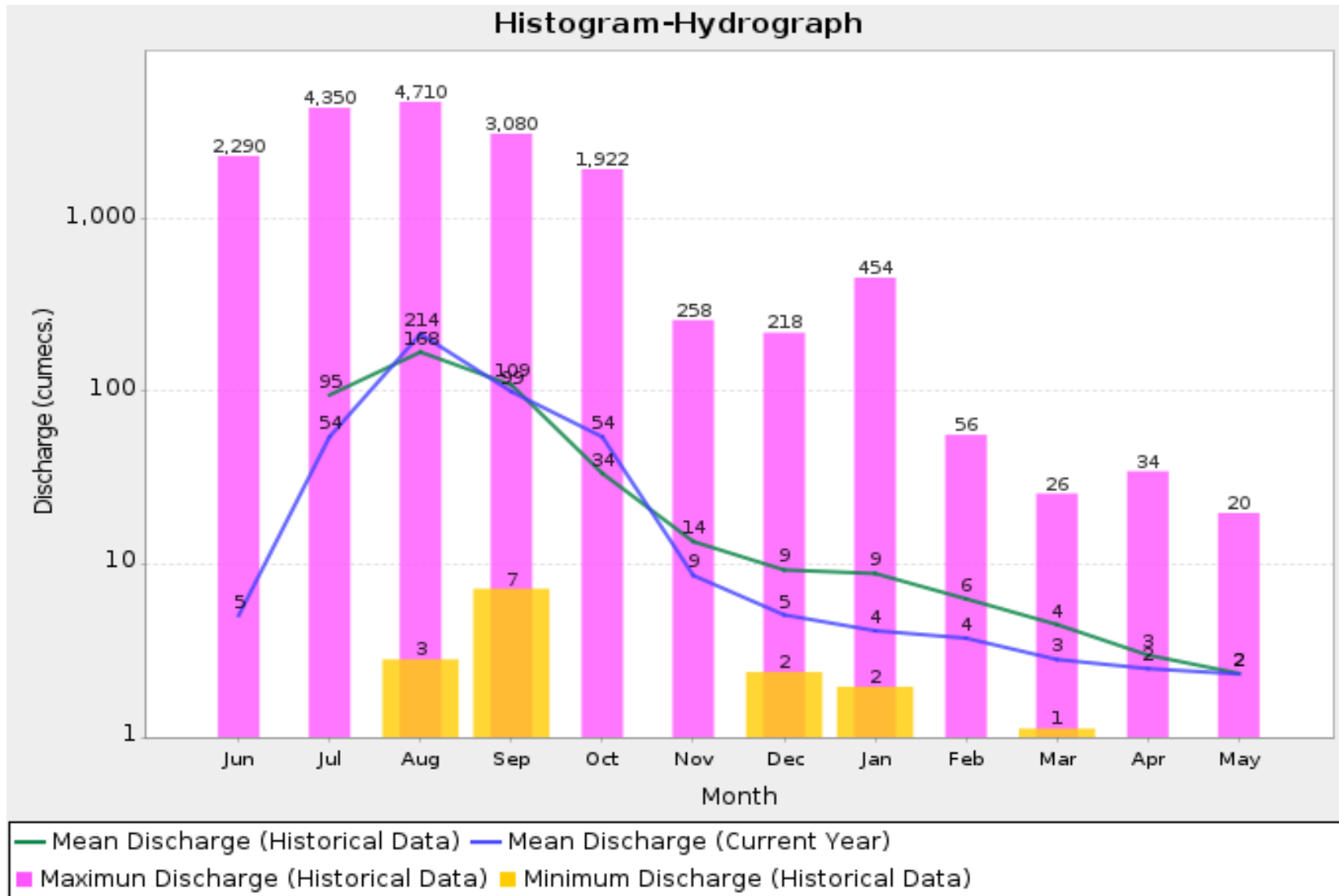
Corres. Water Level 662.6 m

Stage Discharge Sheet for Narmada at Dindori for the period 2016-17

Day	December		January		February		March		April		May	
	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L	Q	W.L
1	6.11	663	4.26	663.2	3.49	663.09	2.97	663.02	2.85	662.71	2.18	662.68
2	6.11	662.99	4.24	663.2	3.56	663.09	2.94	663.02	2.85	662.71	2.12	662.68
3	5.91	662.99	4.14	663.2	3.41	663.08	2.78	662.92	2.85	662.71	1.96	662.67
4	5.91	662.99	4.04	663.2	4.7	663.22	2.67	663.8	2.82	662.71	1.86	662.65
5	5.91	662.99	4.1	663.2	4.61	663.15	2.71	662.79	2.78	662.71	1.77	662.64
6	5.53	662.99	4.15	663.2	4.53	663.14	2.69	662.77	2.25	662.67	1.7	662.6
7	5.49	662.99	4.24	663.2	3.79	663.1	2.69	662.77	2.23	662.65	1.68	662.6
8	5.51	662.99	4.23	663.19	3.38	663.08	2.71	662.77	2.16	662.65	1.82	662.6
9	5.68	662.99	4.23	663.19	3.52	663.08	2.64	662.76	2.11	662.64	1.67	662.6
10	5.32	662.97	4.14	663.19	3.48	663.07	2.6	662.74	2.07	662.63	2.78	662.8
11	5.28	662.96	9.76	661.23	3.44	663.06	2.61	662.74	2.07	662.63	1.53	662.6
12	5.24	662.95	4.56	663.22	3.84	663.1	3.12	662.75	2.88	662.72	1.55	662.6
13	5.2	662.94	4.28	663.21	4.25	663.2	2.87	662.87	2.67	662.74	1.51	662.6
14	5.19	662.93	4.25	663.21	4.19	663.2	2.98	662.9	2.72	662.74	2.36	662.76
15	4.97	662.92	4.2	663.19	4.1	663.2	2.77	662.85	2.78	662.75	3.38	662.95
16	4.91	662.92	4.16	663.18	4.01	663.17	2.91	662.89	2.7	662.75	3.57	663.1
17	5.18	663.26	4.05	663.17	3.92	663.16	3.02	662.91	2.6	662.74	3.38	662.97
18	5.09	663.22	3.9	663.15	3.85	663.14	2.88	662.89	2.65	662.74	3.04	662.88
19	4.99	663.22	3.84	663.14	3.8	663.12	2.8	662.86	2.58	662.74	2.86	662.83
20	4.94	663.22	3.83	663.14	3.76	663.09	2.71	662.81	2.44	662.72	2.42	662.82
21	4.65	663.22	3.82	663.14	3.6	663.09	2.75	662.84	2.41	662.71	2.84	662.81
22	4.89	663.22	3.84	663.13	3.49	663.08	2.72	662.82	2.42	662.71	2.78	662.8
23	4.61	663.22	3.85	663.13	3.36	663.06	3.05	662.9	2.46	662.71	2.78	662.8
24	4.61	663.22	1.96	663.13	3.27	663.06	2.64	662.8	2.45	662.71	2.69	662.8
25	4.54	663.22	3.88	663.12	3.32	663.05	2.6	662.74	2.45	662.71	2.64	662.79
26	4.47	663.21	3.81	663.12	3.21	663.05	2.88	662.81	2.48	662.71	2.49	662.79
27	4.33	663.21	3.74	663.1	3.24	663.04	3.12	662.75	2.46	662.71	2.31	662.78
28	4.33	663.21	3.72	663.1	3.52	663.03	2.93	662.72	2.4	662.67	2.3	662.76
29	4.42	663.21	3.63	663.1			2.72	662.81	2.18	662.69	2.29	662.75
30	4.28	663.21	3.52	663.1			2.94	662.81	2.15	662.68	2.3	662.74
31	4.28	663.21	3.51	663.1			2.76	662.74			2.17	662.73
Ten-Daily Mean												
I Ten-Daily	5.75	662.99	4.18	663.2	3.85	663.11	2.74	662.94	2.5	662.68	1.95	662.65
II Ten-Daily	5.1	663.05	4.68	662.98	3.92	663.14	2.87	662.85	2.61	662.73	2.56	662.81
III Ten-Daily	4.49	663.21	3.57	663.12	3.37	663.06	2.83	662.79	2.39	662.7	2.51	662.78
Monthly												
Min.	4.28	662.92	1.96	661.23	3.21	663.03	2.6	662.72	2.07	662.63	1.51	662.6
Max.	6.11	662.92	9.76	661.23	4.7	663.03	3.12	662.72	2.88	662.63	3.57	662.6
Mean	5.11	663.09	4.14	663.1	3.71	663.1	2.81	662.86	2.5	662.7	2.34	662.75

Peak Computed Discharge = 4.61 cumecs on 5/2/2017 Corres.
Water Level = 663.15 m
Lowest Computed Discharge = 1.68cumecs on 7/5/2017 Corres.
Water Level 662.6 m

Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 1988-2017)



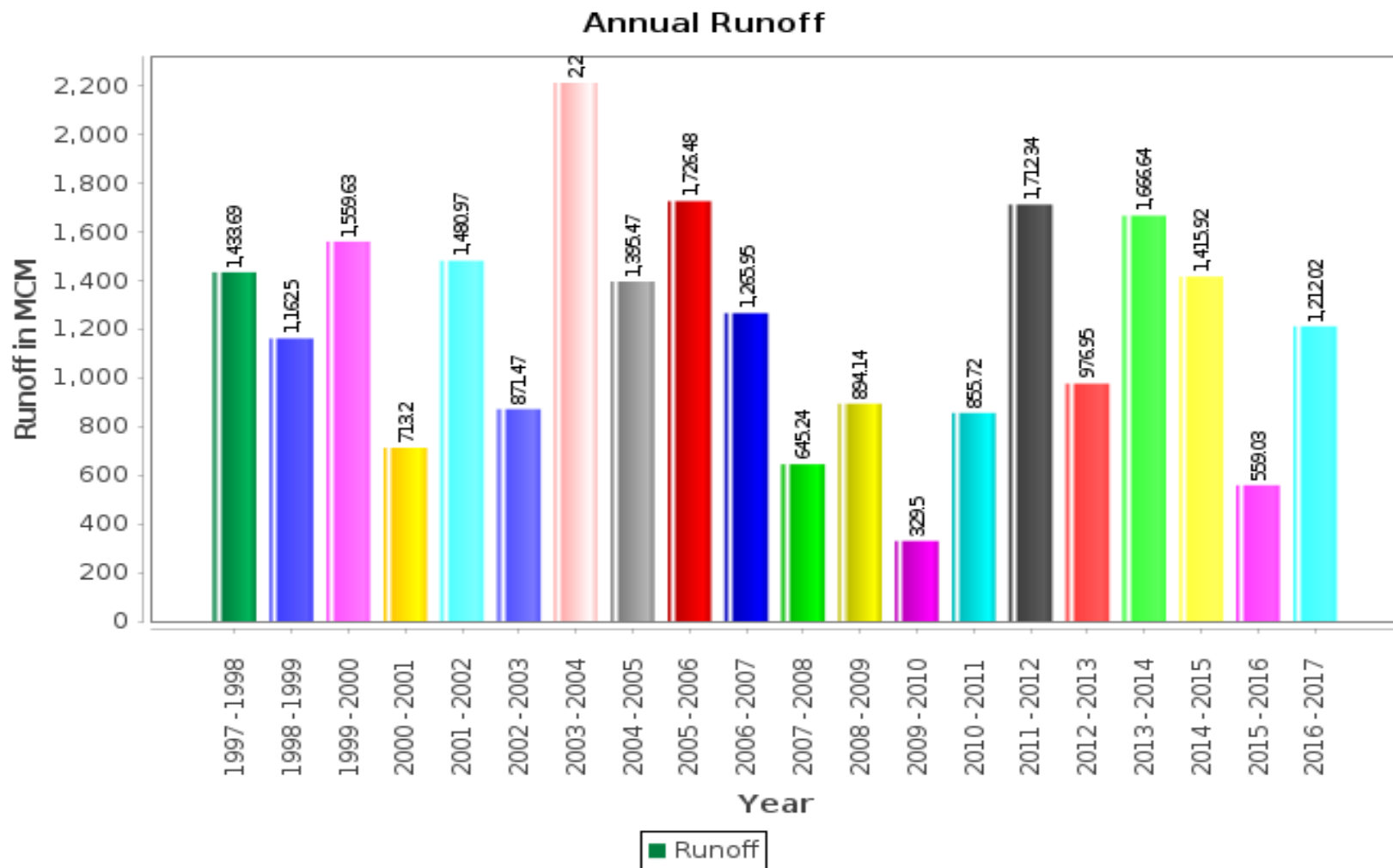
Annual Runoff Values for the period (1988– 2017)

Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



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

Monthly Average Runoff based on period (1988-2017)

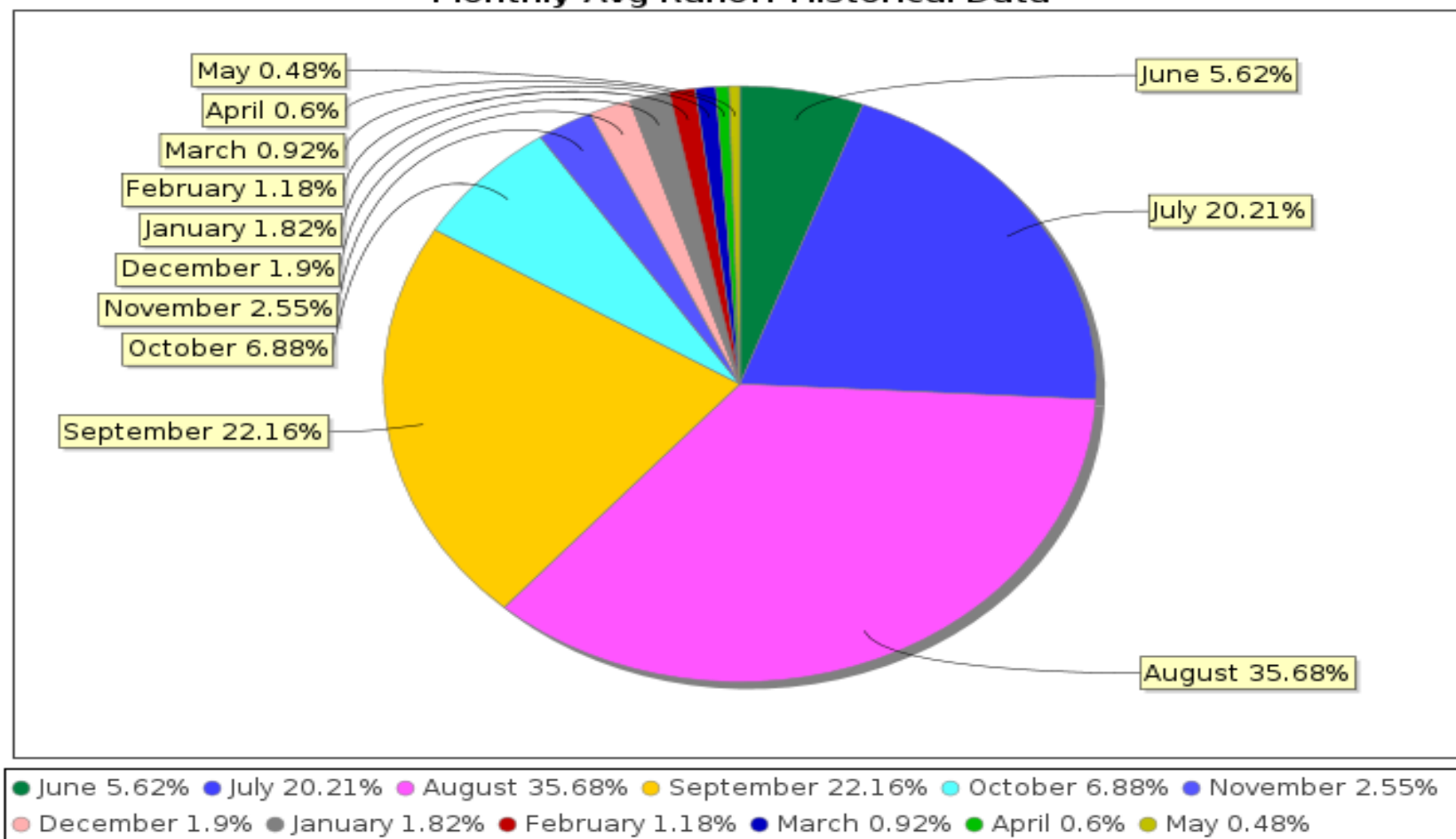
Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Historical Data



Monthly Runoff for the Year (2016-17)

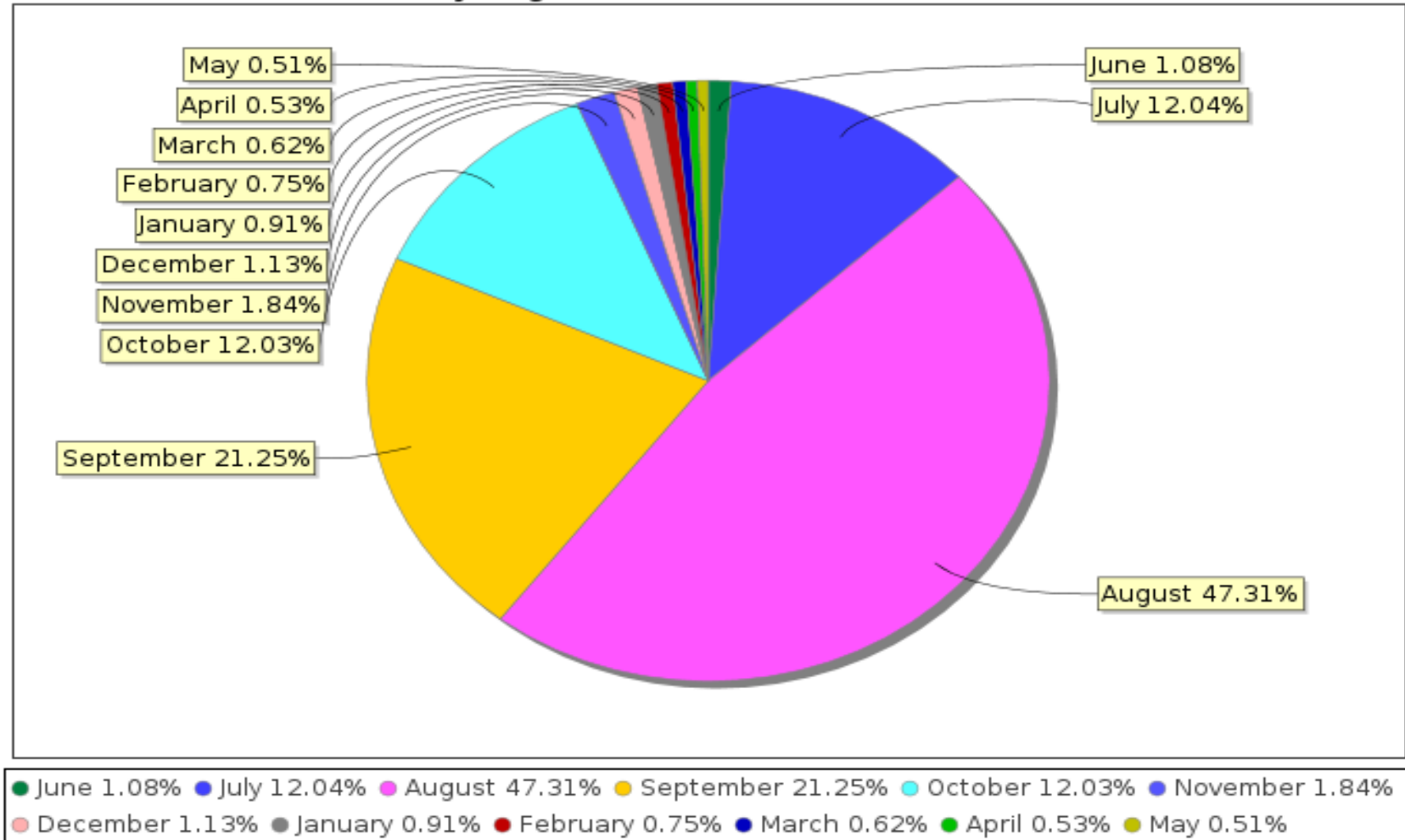
Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur

Monthly Avg Runoff Water Year: 2016-2017



Pre-Monsoon & Post-Monsoon X-Section for Water Year (2016-17)

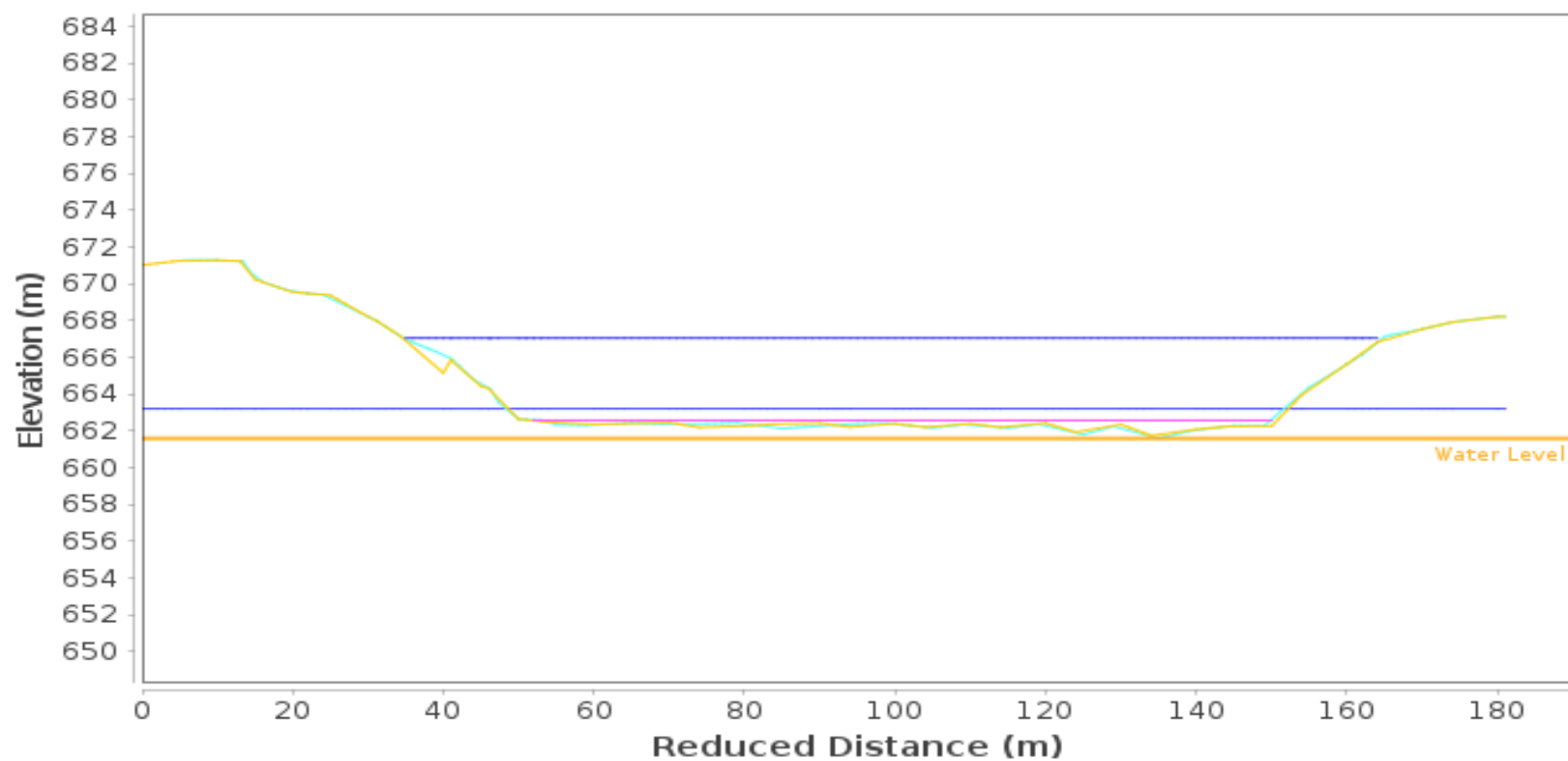
Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur

X-Section



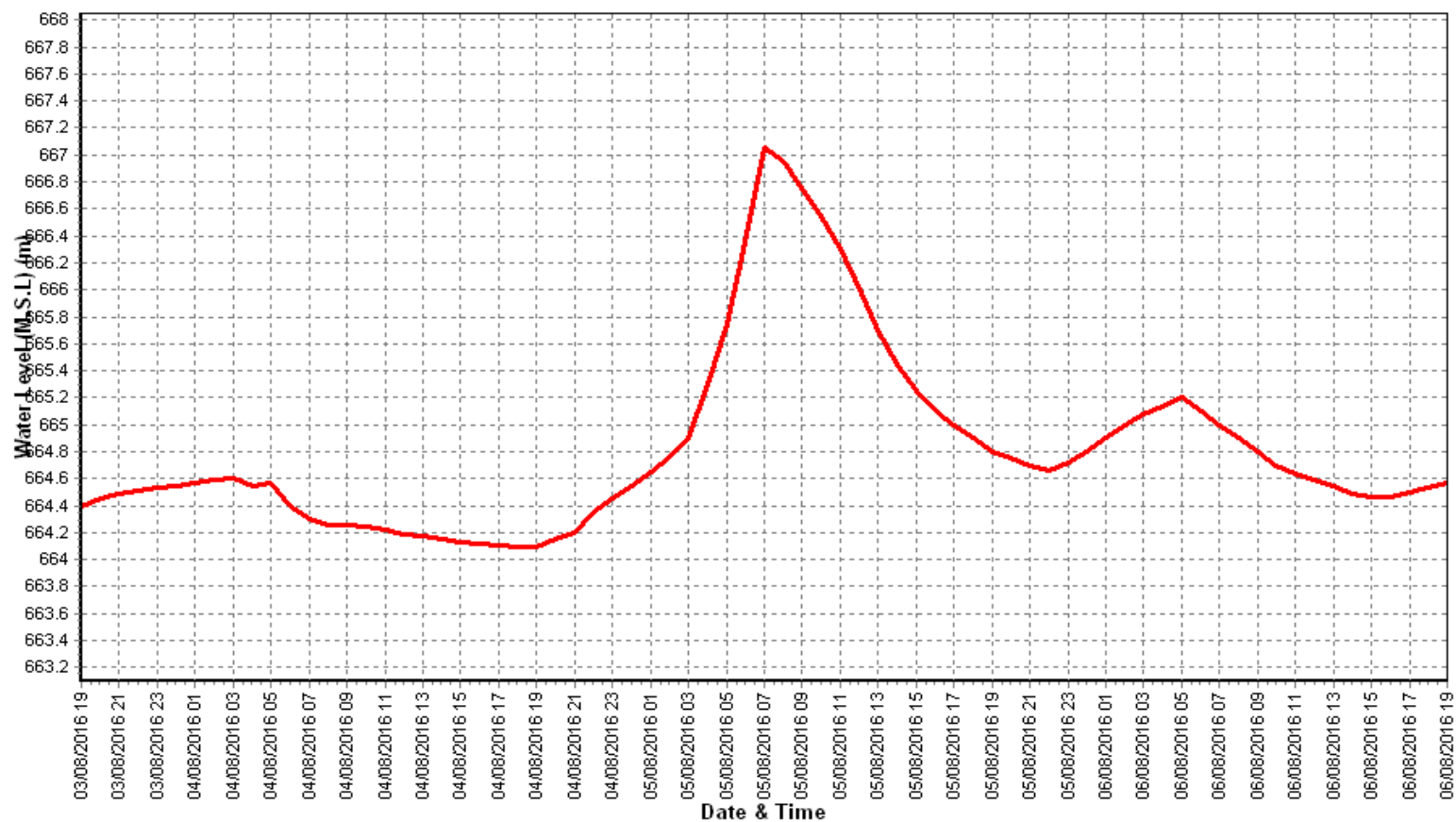
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Dindori (010215001)

Sub-Division : UNSD, CWC Jabalpur

Local River : Narmada

Division : Narmada Division, Bhopal



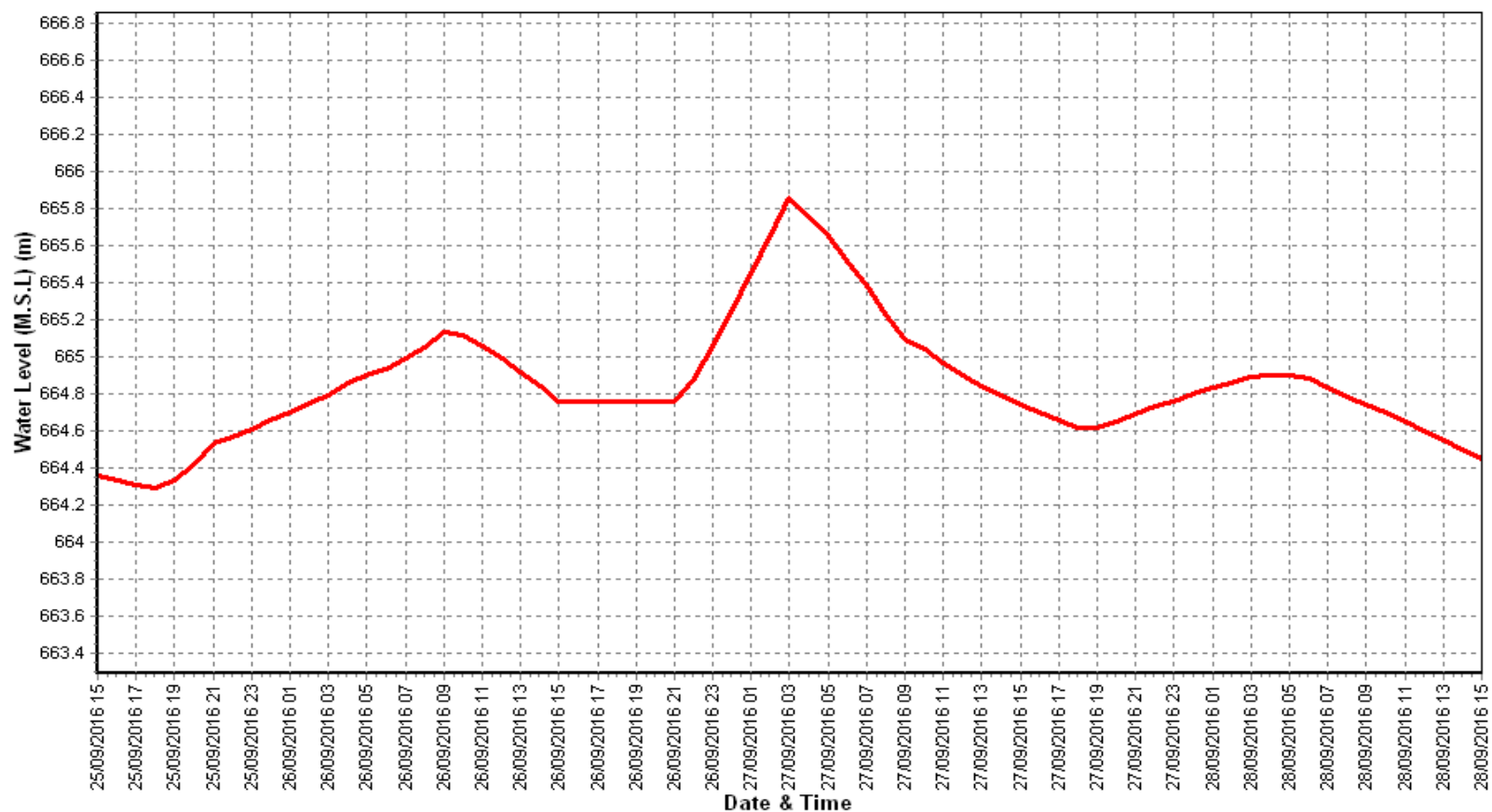
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



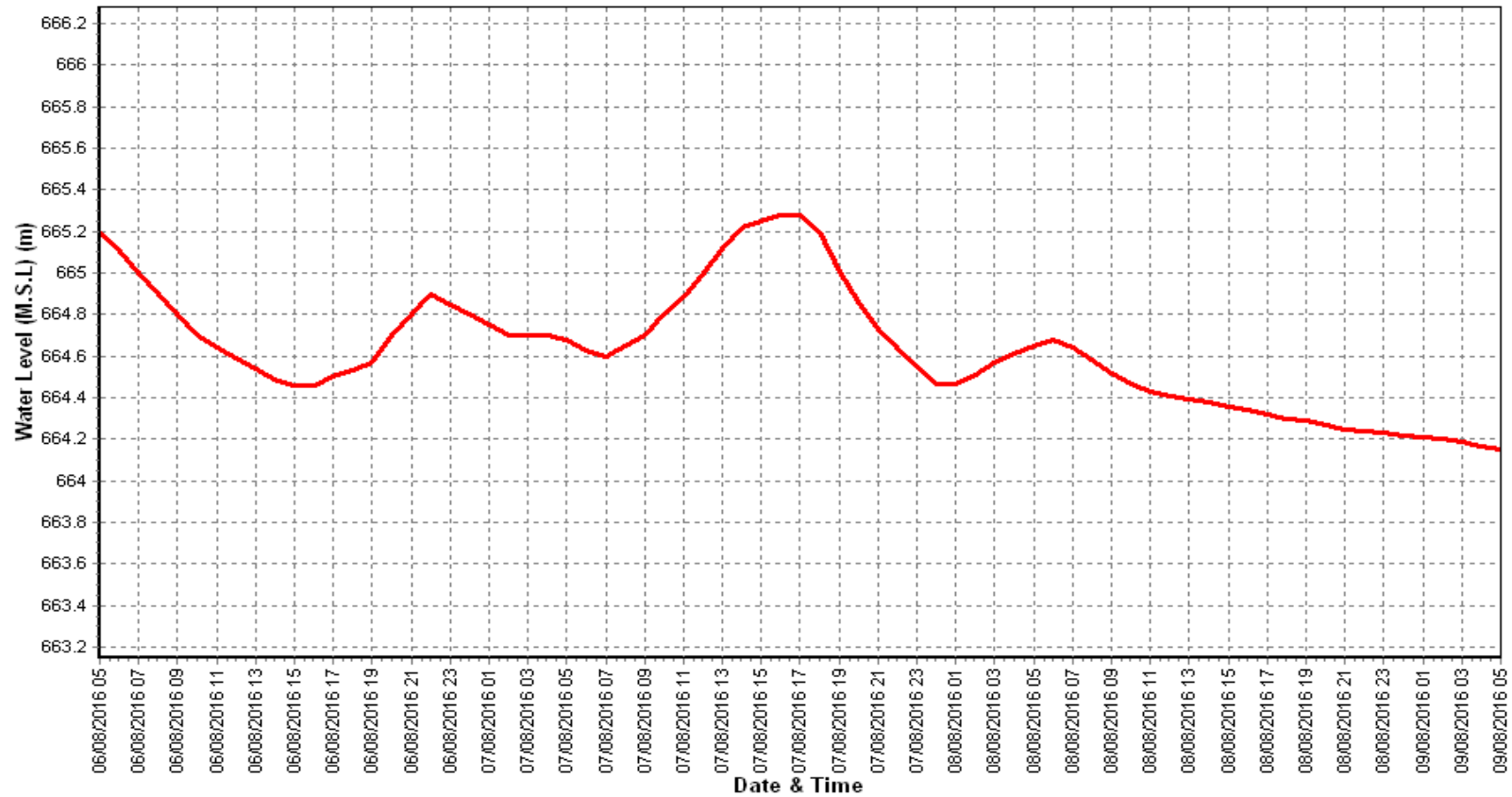
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2016-17)

Station Name : Narmada at Dindori (010215001)

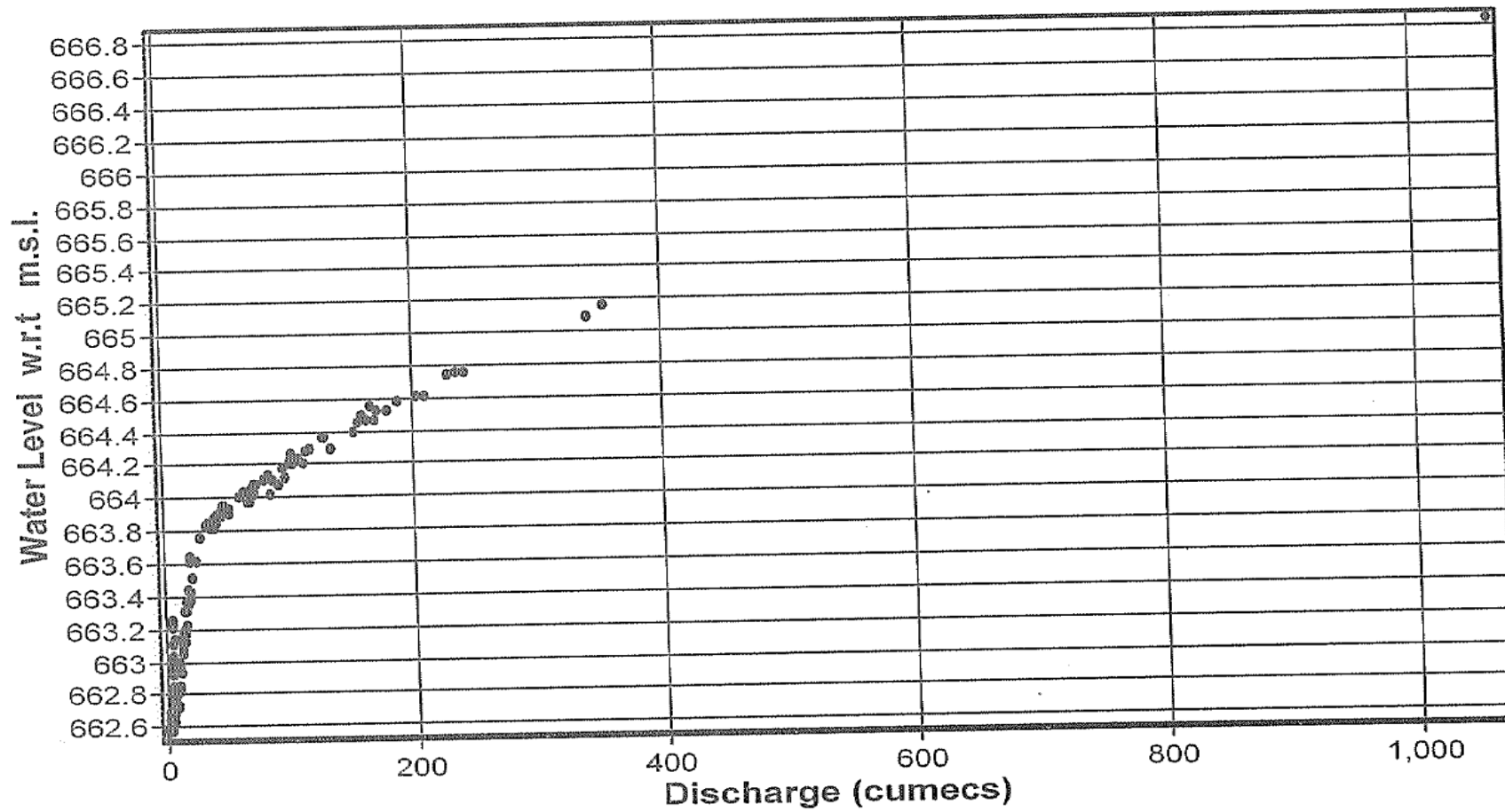
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



Plot of Stage Discharge Data at Narmada at Dindori (010215001): 2016 - 2017



4.18 Narmada at Bijora

History sheet

Site	: Narmada at Bijora	Water Year	: 2016-17
State	: Madhya Pradesh	Code	: NA
Basin	: Narmada	District	: Jabalpur
Tributary	: -	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: DDPC, Bhopal	Local River	: Narmada
Drainage Area	: 14561 Sq. Km.	Sub-Division	: SDDPC, Bhopal
Latitude	: 22°55'30"	Bank	: Left
Zero of Gauge (m)	: 366 (M.S.L.)	Longitude	: 79°55'30"
	Opening Date	01/06/1950	
Gauge	: 01/06/1950	Closing Date	
Discharge	: 01/06/1967		
Sediment	: 01/06/1980		
Water Quality	:		

Annual Maximum / Minimum discharge with corresponding Water Level (M.S.L.)

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2000-2001	1876	372.400	28/07/2000	0.000		30/01/2001
2001-2002	5776		15/07/2001	0.000		04/04/2002
2002-2003	1680	372.300	11/09/2002	0.000	368.000	08/09/2002
2003-2004	5530	373.800	31/08/2003	0.000	368.000	25/06/2003
2004-2005	4596	375.400	23/08/2004	0.000	368.000	06/10/2004
2005-2006	6845	377.000	07/08/2005	0.000	368.000	31/05/2006
2006-2007	1819	372.200	26/08/2006	0.000	368.000	27/06/2006
2007-2008	234.4	368.000	23/03/2008	0.000	368.000	15/03/2008
2008-2009	209.6	369.700	11/04/2009	4.960	368.000	11/01/2009
2009-2010	1068	368.000	04/10/2009	0.000	368.000	03/09/2009
2010-2011	1491	369.700	22/09/2010	0.000	368.000	26/10/2010
2011-2012	9358	380.500	08/09/2011	0.000	369.000	11/06/2011
2012-2013	3737	374.200	12/08/2012	71.18	368.000	30/07/2012
2013-2014	225.0	369.700	25/09/2013	95.00	369.300	17/09/2013
2014-2015	4480	374.800	07/08/2014	0.000	368.000	21/07/2014
2015-2016	216.0	368.000	26/08/15	10.42	368.000	02/06/15

Stage Discharge Sheet for Narmada at Bijora for the period 2016-17

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	368.000	57.00 *		369.300	98.00 *	369.700	202.0 *		371.500	196.0 *	371.800	188.0 *	369.700	170.0 *
2	369.000	54.00 *		369.300	98.00 *	369.700	208.0 *		371.500	187.0 *	372.000	190.0 *	369.700	187.0 *
3	368.000	101.0 *		368.000	95.00 *	369.700	206.0 *		371.200	187.0 *	370.500	190.0 *	369.700	191.0 *
4	369.000	94.86 *		369.300	98.00 *	369.300	200.0 *		370.100	192.0 *	370.500	187.0 *	369.700	185.0 *
5	369.000	99.99 *		368.000	95.99 *	369.700	173.0 *		370.000	186.0 *	370.100	196.0 *	369.700	179.0 *
6	369.000	98.99 *		368.000	0.000 *	369.700	185.0 *		369.700	188.0 *	370.100	184.0 *	369.700	183.0 *
7	368.000	94.01 *		368.000	0.000 *	375.000	196.0 *		369.700	190.0 *	370.100	194.0 *	369.700	170.0 *
8	369.000	97.98 *		368.000	0.000 *	376.900	192.0 *		369.700	193.0 *	370.100	193.0 *	369.700	190.0 *
9	369.300	97.98 *		368.000	0.000 *	375.800	182.0 *		369.700	190.0 *	370.100	192.0 *	369.700	186.0 *
10	369.300	98.99 *		368.000	0.000 *	370.700	195.0 *		369.700	190.0 *	370.500	190.0 *	369.700	192.0 *
11	368.000	98.99 *		368.000	0.000 *	370.700	198.0 *		369.700	190.0 *	370.500	190.0 *	369.700	186.0 *
12	369.300	99.99 *		368.000	95.99 *	371.800	196.0 *		369.700	190.0 *	370.500	186.0 *	369.700	172.0 *
13	369.300	95.99 *		368.000	92.03 *	371.800	185.0 *		369.700	192.0 *	369.700	191.0 *	369.700	181.0 *
14	369.300	98.99 *		369.300	102.0 *	371.800	199.0 *		369.700	194.0 *	369.700	189.0 *	369.700	178.0 *
15	369.300	98.99 *		369.300	102.0 *	370.400	204.0 *		369.700	190.0 *	369.700	191.0 *	369.700	172.0 *
16	369.300	95.99 *		368.000	105.0 *	370.400	182.0 *		369.700	171.0 *	369.700	184.0 *	369.700	178.0 *
17	369.300	96.98 *		368.000	105.0 *	370.400	196.0 *		369.700	182.0 *	369.700	172.0 *	369.700	184.0 *
18	368.000	102.0 *		369.300	102.0 *	370.400	208.0 *		369.700	179.0 *	369.700	182.0 *	369.700	178.0 *
19	368.000	98.00 *		369.300	103.0 *	370.400	205.0 *		369.700	179.0 *	369.700	191.0 *	369.700	191.0 *
20	369.300	95.99 *		369.300	102.0 *	370.300	194.0 *		369.700	185.0 *	369.700	188.4 *	369.700	184.0 *
21	369.300	98.99 *		369.300	105.0 *	370.300	198.0 *		369.700	176.0 *	369.700	186.0 *	369.300	194.0 *
22	369.300	95.99 *		369.300	102.0 *	370.300	198.0 *		369.700	174.0 *	369.700	193.0 *	369.700	187.0 *
23	369.300	103.0 *		369.300	103.0 *	369.700	204.0 *		369.700	186.0 *	369.700	187.0 *	369.700	90.98 *
24	369.300	94.01 *		370.800	96.98 *	369.700	196.0 *		369.700	188.0 *	369.700	176.0 *	369.700	95.00 *
25	368.000	98.00 *		370.800	186.0 *	369.700	194.0 *		369.700	176.0 *	369.700	178.0 *	369.300	91.01 *
26	369.300	99.99 *		370.800	205.0 *	369.300	189.0 *		369.700	176.0 *	369.700	182.0 *	369.700	91.01 *
27	369.300	92.99 *		370.800	204.0 *	369.700	194.0 *		369.700	176.0 *	369.700	186.0 *	369.700	88.01 *
28	368.000	98.00 *		370.800	205.0 *	369.700	185.0 *		369.700	181.0 *	369.700	182.0 *	369.700	95.00 *
29	368.000			370.800	207.0 *	370.500	194.0 *		371.200	187.0 *	369.700	177.0 *	369.300	95.00 *
30	369.300			370.800	203.0 *	370.500	196.0 *		369.800	190.0 *	369.700	189.0 *	369.700	95.00 *
31				370.800	202.0 *	370.500	190.0 *				369.700	191.0 *		
Ten-Daily Mean														
I Ten-Daily	368.760	89.48		368.390	48.50	371.620	193.9		370.280	189.9	370.580	190.4	369.700	183.3
II Ten-Daily	368.910	98.19		368.650	90.90	370.840	196.7		369.700	185.2	369.860	186.4	369.700	180.4
III Ten-Daily	368.910	97.62		370.391	165.4	369.991	194.4		369.860	181.0	369.700	184.3	369.580	112.2
Monthly														
Min.	368.000	54.00		368.000	0.000	369.300	173.0		369.700	171.0	369.700	172.0	369.300	88.01
Max.	369.300	103.0		370.800	207.0	376.900	208.0		371.500	196.0	372.000	196.0	369.700	194.0
Mean	368.860	94.92		369.184	103.6	370.790	195		369.947	185.4	370.035	186.9	369.660	158.6

Annual Runoff in MCM = 4424 Annual Runoff in mm = 304

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)

Stage Discharge Sheet for Narmada at Bijora for the period 2016-17

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	369.700	96.98 *	369.700	204.0 *	369.300	105.0 *	369.300	106.0 *	369.300	103.0 *	393.300	104.0 *
2	369.700	94.01 *	369.700	184.0 *	369.300	108.0 *	369.300	106.0 *	369.300	103.0 *	369.700	98.99 *
3	369.300	86.40 *	369.700	180.0 *	369.300	105.0 *	369.300	84.01 *	369.300	105.0 *	369.300	98.00 *
4	369.700	94.01 *	369.700	197.0 *	369.300	105.0 *	369.300	98.00 *	369.300	103.0 *	369.700	102.0 *
5	369.700	92.00 *	369.700	197.0 *	369.300	106.0 *	369.300	106.0 *	369.300	95.99 *	369.700	103.0 *
6	369.700	192.0 *	369.700	202.0 *	369.300	104.0 *	369.300	103.0 *	369.300	109.0 *	369.300	98.00 *
7	369.700	197.0 *	369.700	198.0 *	369.300	106.0 *	369.300	95.99 *	369.300	105.0 *	368.000	102.0 *
8	369.700	193.0 *	369.700	195.0 *	369.300	106.0 *	369.700	104.0 *	369.300	106.0 *	368.000	101.0 *
9	369.700	177.0 *	369.700	201.0 *	369.300	107.0 *	369.700	104.0 *	369.300	101.0 *	369.300	98.00 *
10	369.700	191.0 *	368.000	186.0 *	369.300	104.0 *	369.700	101.0 *	369.300	103.0 *	369.300	101.0 *
11	369.700	193.0 *	369.700	191.0 *	369.300	107.0 *	369.700	105.0 *	369.300	105.0 *	369.000	98.99 *
12	369.700	192.0 *	369.700	88.74 *	369.300	105.0 *	369.700	106.0 *	369.300	99.99 *	369.700	108.0 *
13	369.700	194.0 *	369.700	187.0 *	369.300	106.0 *	368.000	105.0 *	369.700	104.0 *	369.700	101.0 *
14	369.700	196.0 *	369.700	196.0 *	369.300	102.0 *	369.700	105.0 *	369.300	106.0 *	369.700	101.0 *
15	369.700	192.0 *	369.700	193.0 *	369.300	107.0 *	369.300	103.0 *	369.300	104.0 *	369.300	99.99 *
16	369.700	190.0 *	369.300	103.0 *	369.300	106.0 *	369.300	103.0 *	369.300	105.0 *	369.300	101.0 *
17	369.700	192.0 *	369.300	106.0 *	369.700	133.3 *	369.300	98.00 *	369.300	104.0 *	369.300	199.0 *
18	369.700	197.0 *	369.700	88.74 *	369.700	106.0 *	369.300	105.0 *	369.300	105.9 *	369.300	202.0 *
19	369.700	200.0 *	369.300	103.0 *	369.300	106.0 *	369.300	105.0 *	369.300	104.0 *	369.300	204.0 *
20	369.700	191.0 *	369.300	203.0 *	369.300	106.0 *	369.300	104.0 *	369.300	105.0 *	369.300	196.0 *
21	369.700	193.0 *	369.300	103.0 *	369.300	99.99 *	369.700	102.0 *	369.300	102.0 *	369.300	196.0 *
22	369.700	195.0 *	369.300	103.0 *	369.700	99.99 *	369.700	104.0 *	369.300	106.0 *	369.700	167.8 *
23	369.700	194.0 *	369.300	103.0 *	369.700	98.00 *	369.700	99.99 *	369.300	98.99 *	369.700	196.0 *
24	369.700	192.0 *	369.300	104.0 *	369.700	103.0 *	369.300	107.0 *	369.300	98.99 *	369.700	194.0 *
25	369.700	193.0 *	369.300	105.0 *	369.700	102.0 *	369.300	105.0 *	369.300	103.0 *	369.700	194.0 *
26	369.700	198.0 *	369.300	106.1 *	369.700	102.0 *	369.300	98.99 *	369.300	101.0 *	369.300	202.0 *
27	369.700	192.0 *	369.300	106.1 *	369.700	98.00 *	369.300	106.0 *	369.700	98.00 *	369.300	98.00 *
28	369.700	198.0 *	369.300	104.0 *	369.300	102.0 *	369.300	104.0 *	369.700	102.9 *	369.300	98.00 *
29	369.700	176.0 *	369.300	106.0 *			369.300	104.0 *	369.300	95.00 *	369.300	98.00 *
30	369.700	175.0 *	369.300	101.0 *			369.300	106.0 *	368.000	98.99 *	369.300	98.00 *
31	369.700	96.98 *	369.300	103.0 *			369.700	105.0 *			369.300	98.00 *
Ten-Daily Mean												
I Ten-Daily	369.660	141.3	369.530	194.4	369.300	105.6	369.420	100.8	369.300	103.4	371.560	100.6
II Ten-Daily	369.700	193.7	369.540	145.9	369.380	108.4	369.290	103.9	369.340	104.3	369.390	141.1
III Ten-Daily	369.700	182.1	369.300	104.0	369.600	100.6	369.445	103.8	369.250	100.5	369.445	149.1
Monthly												
Min.	369.300	86.40	368.000	88.74	369.300	98.00	368.000	84.01	368.000	95.00	368.000	98.00
Max.	369.700	200.0	369.700	204.0	369.700	133.3	369.700	107.0	369.700	109.0	393.300	204.0
Mean	369.687	172.7	369.452	146.7	369.414	105.2	369.387	102.9	369.297	102.7	370.110	130.9

Peak Computed Discharge = 208.0 cumecs on 18/08/2016 Corres. Water Level :370.4 m
Lowest Computed Discharge = 0.000 cumecs on 06/07/2016 Corres. Water Level :368 m

Q: Observed/Computed Discharge in cumecs WL:Corresponding Mean Water Level(M.S.L) in m *:Computed Discharge
#:Discarded Discharge (values changed as per rating curve)
Note:Missing values ignored while arriving at Annual Runoff

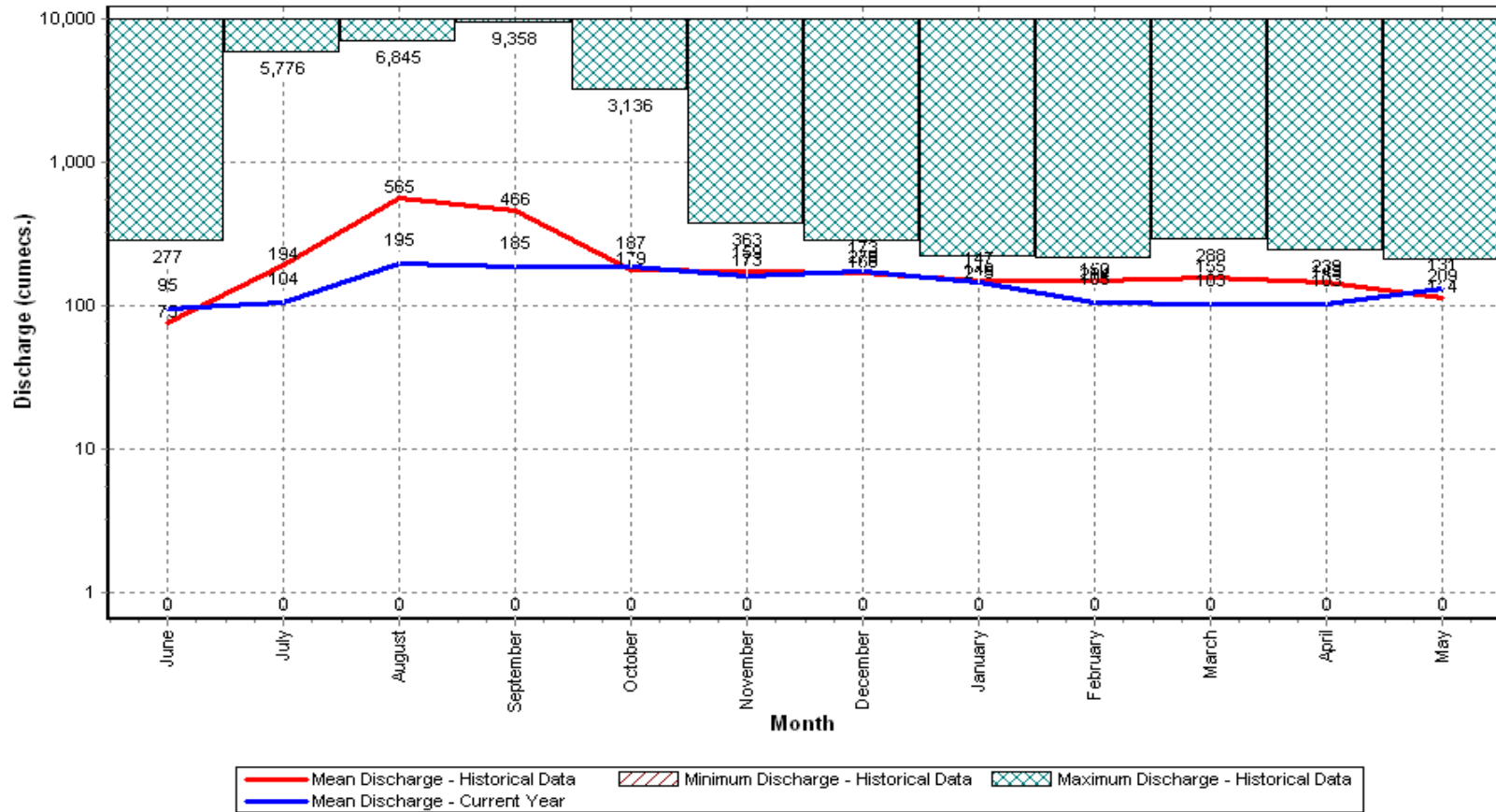
Histogram- Hydrograph for Water Year : 2016-17 (Data considered : 2000-2016)

Station Name : Narmada at Bijora (NA)

Division : DDPC, Bhopal

Local River : Narmada

Sub-Division : SDDPC, Bhopal



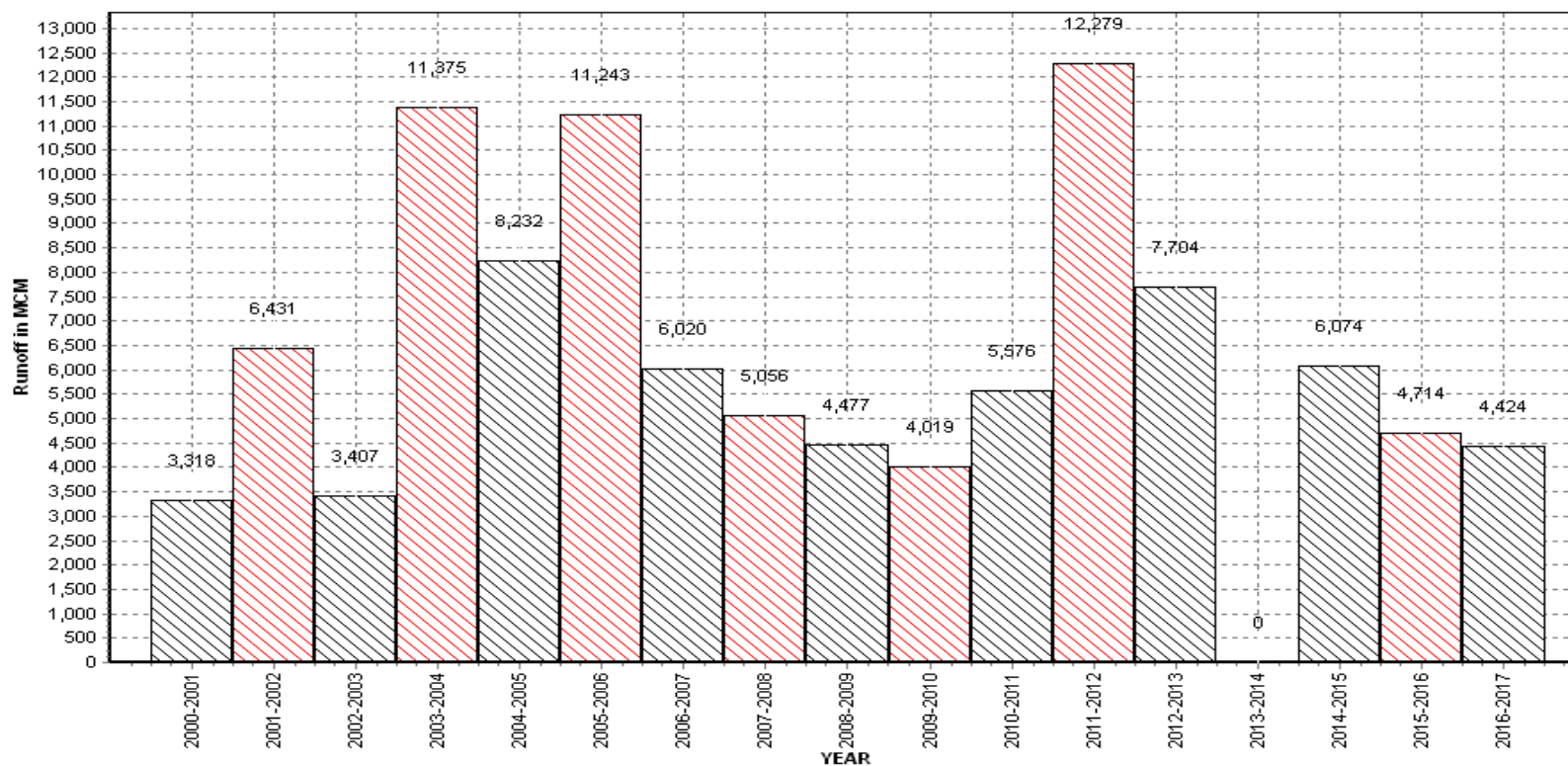
Annual Runoff Values for the period: (2000– 2016)

Station Name : Narmada at Bijora (NA)

Division : DDPC, Bhopal

Local River : Narmada

Sub-Division : SDDPC, Bhopal



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

Monthly Average Runoff for the year (2016-17)

Station Name : Narmada at Bijora (NA)

Local River : Narmada

Division : DDPC, Bhopal

Sub-Division : SDDPC, Bhopal

