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केवल शासकीय उपयोग हेतु

एकीकृत जल वर्ष पुस्तिका

INTEGRATED WATER YEAR BOOK

जून 2015 - मई 2016

JUNE 2015– MAY 2016

नर्मदा बेसिन

NARMADA BASIN



केन्द्रीय जल आयोग

Central Water Commission

नर्मदा बेसिन संगठन भोपाल

Narmada Basin Organisation,
Bhopal

अप्रैल 2017

April 2017

प्रस्तावना

जल जीवन का सबसे आवश्यक घटक है और जीविका के लिए महत्वपूर्ण है। जल वनस्पति एवम् प्राणियों के जीवन का आधार है उसी से हम मनुष्यों, पशुओं एवम् वृक्षों को जीवन मिलता है। यून तो सम्पूर्ण पृथ्वी में 75% पानी है किन्तु पीने योग्य जल मात्र 1% ही है इसलिए जल का विशेष महत्व है। भारतीय पुराण विश्व के प्राचीनतम विश्वकोष हैं, जो पारम्परिक जल संचयन और वृक्षारोपण के महत्व पर प्रकाश डालते हैं। पुराणों में कहा गया है कि कूप, कुण्ड, सरोवर, तालतलैया-वापी, झील, नदी आदि जल के संचित भण्डार सदैव भरें रहने चाहिए। देवी पुराण के अनुसार जो लोग जल संचयन के लिए तालाब, जलाशय आदि का निर्माण कराते हैं, वे पुण्य के भागी होते हैं। ग्रीष्म में जो सरोवर सदान्तरा रहते हैं उन सरोवरों के निर्माता स्वर्ग का अक्षय सुख भोगते हैं। धार्मिक भावना के कारण सेठ, महाजन, रजवाड़े आदि जल संचयन योजना के अन्तर्गत जलाशय, कूपों आदि का निर्माण कराते थे। इस अभियान के चलते हमारा देश सरोवरों, कूपों, कुण्डों आदि से भरा था। इन जलाशयों से खेतों की सिंचाई होती थी। जल संचयन के इस विकास में पुराणों की प्रेरणा थी। रामायण काल में अनेक प्राकृतिक जल संचयन के रूप में पुष्कर होते थे, जिसे ग्रामीण पोखर कहते थे। पुराणों में सप्त सरोवरों की चर्चा है।

प्राचीन काल में नगर नदियों के किनारे बसते थे ताकि जल की असुविधा न हो। जल को देवत्व प्राप्त था। जल का एक पर्याय अमृत भी है। प्राणी और प्रकृति का जीवन जल है। धार्मिक संस्कारों में जल को अधिक महत्व दिया जाता है। देवाभिषेक, शुद्धीकरण, आचमन और अर्चन में जल की अनिवार्यता बनी रहती है। शरीर की पवित्रता के लिए जलमार्जन के समय यह मंत्र पढ़ा जाता -
-है

"अपवित्रः पवित्रो वा सर्वावस्थं गतोऽपि वा"

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।

केन्द्रीय जल आयोग जल संसाधनों के विकास में संलग्न भारत सरकार, जल संसाधन, नदी विकास और 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 ।

इस पुस्तिका के आंकड़ों को SWDES व HYMOS 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 केंद्रीय 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 नियंत्रण संगठन आदि के साथ, उन सभी का आभारी हूँ, जिन्होंने इस पुस्तक से संबंधित विविध जानकारीयां उपलब्ध कराने तथा प्रकाशन में सहयोग एवं सहायता दी ।



(राकेश टोटेजा)

अधीक्षण अभियंता (समन्वय)

स्थान भोपाल

अप्रैल 2017

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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 2015-16 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

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

Sl. No.	Station Name	Type	Sl. No.	Station Name	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	G&D			

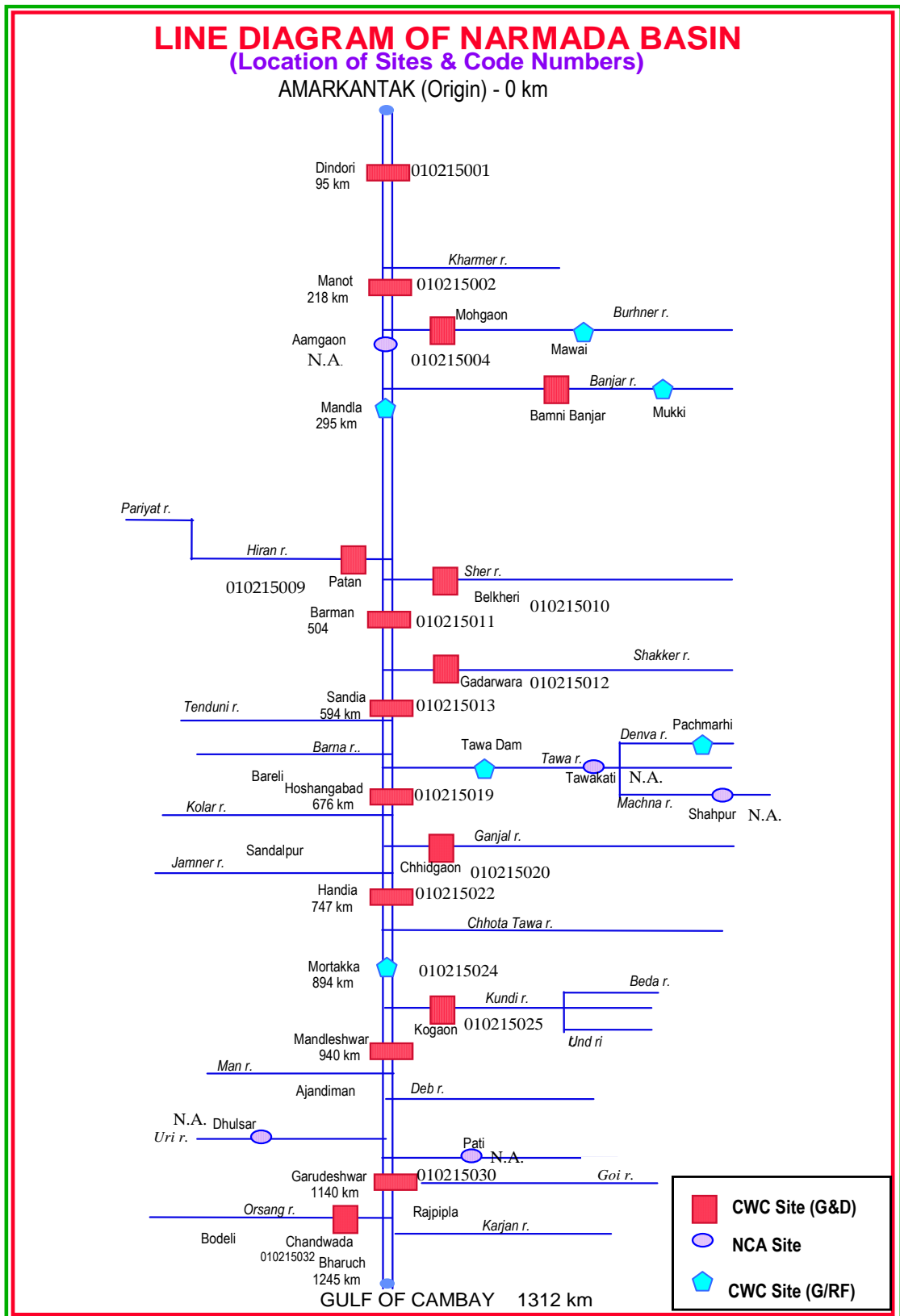


Figure 2-1 Line Diagram of Narmada Basin (Location of Sites and Code Numbers)

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 Narmada Basin 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 Narmada River. 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 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/ Location	Average Wind Speed km/h						Calm Period %						Dominant Direction					
	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/ Location	Relative Humidity in Morning (%)						Relative Humidity in Evening (%)					
	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 Gondwana Land. Between the two continents, a large sea, Tethys existed. Presently the Himalayas and the Tibetan Plateau have taken the position of the ancient Tethyan Sea. The Gondwana Land was intruded by few large marine transgressions. A deep gulf or sea existed along the Sindh-Beluchistan 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 Vindhyan and granitic gneisses and expand in the Narmada valley in strips. The Dharwadian rocks consisting mainly of quartzites, feldspar grits, shales and slates with intercaliated 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
Vindhyan	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 Jitgadh 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.

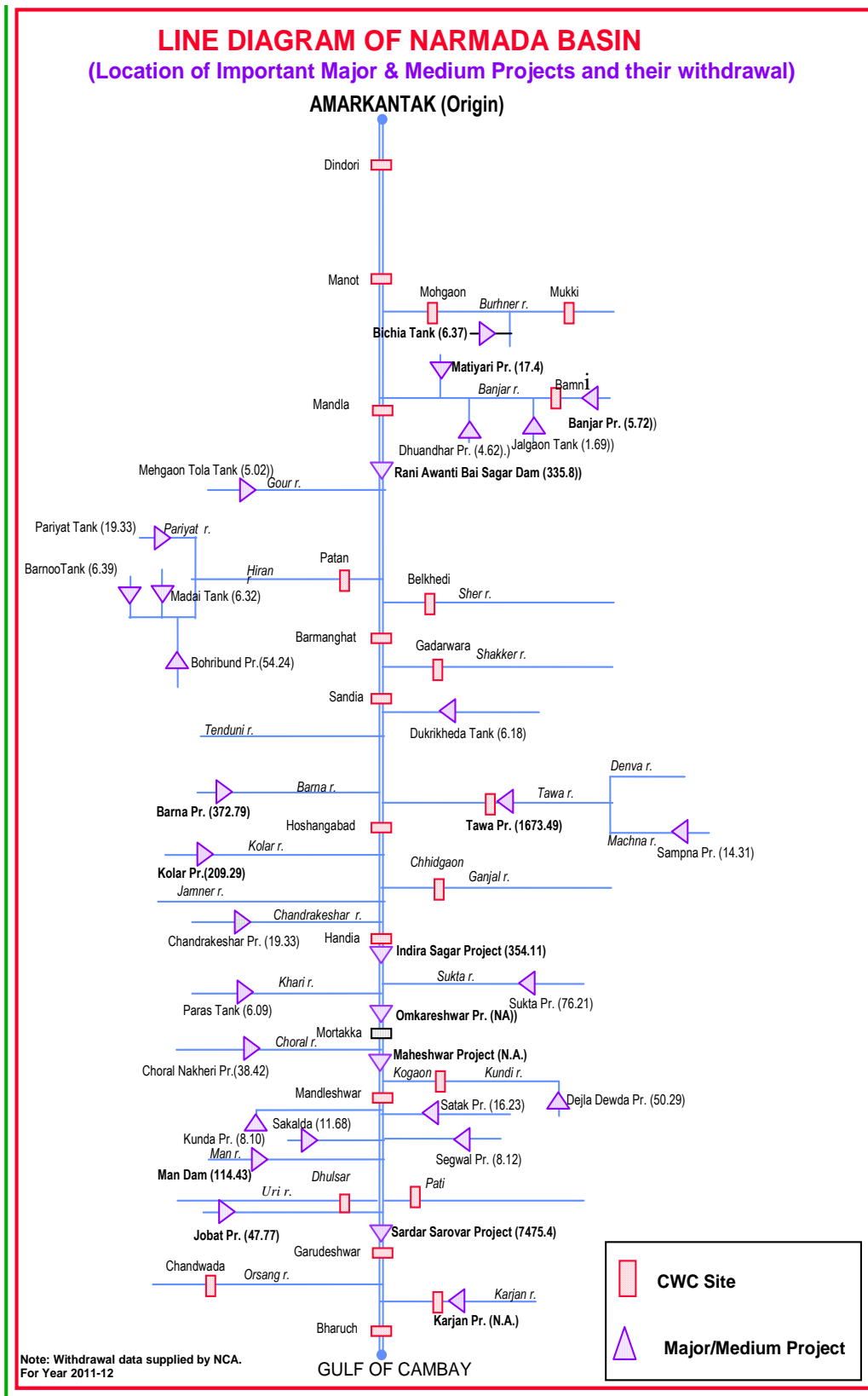


Figure 2-2 Line Diagram of Narmada Basin (Location of Major & Medium Projects and their Withdrawal)

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

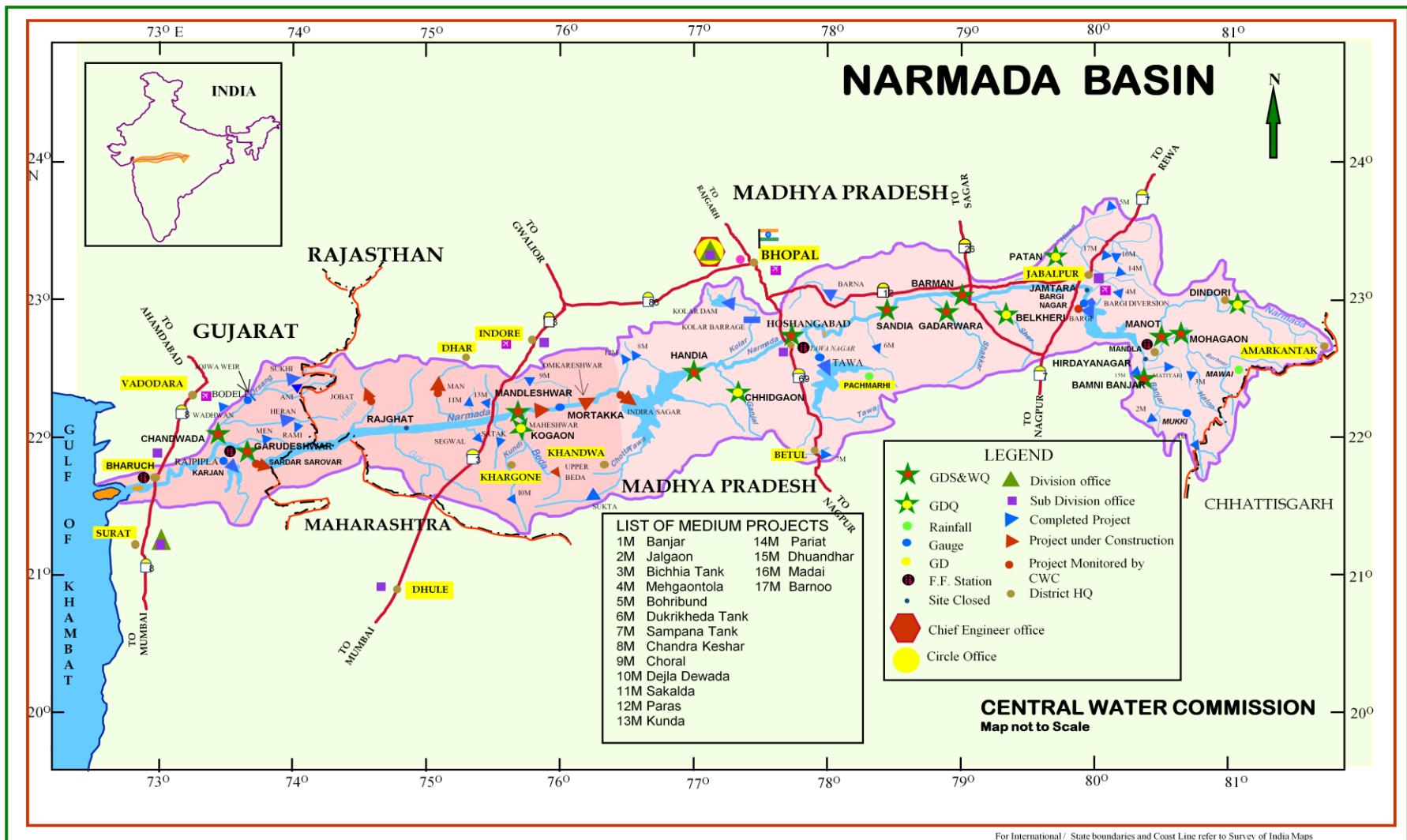


Figure 2-3 Narmada Basin

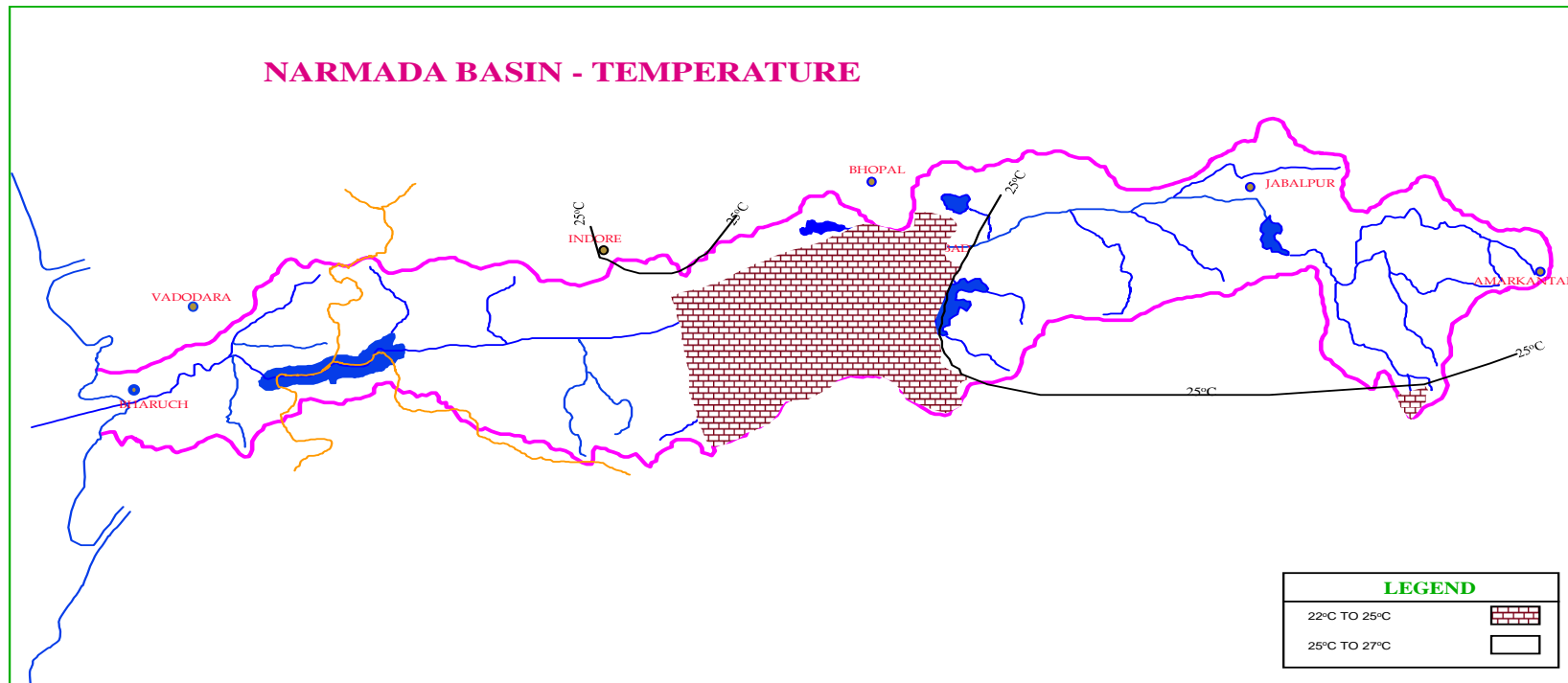


Figure 2-4 Narmada Basin - Temperature

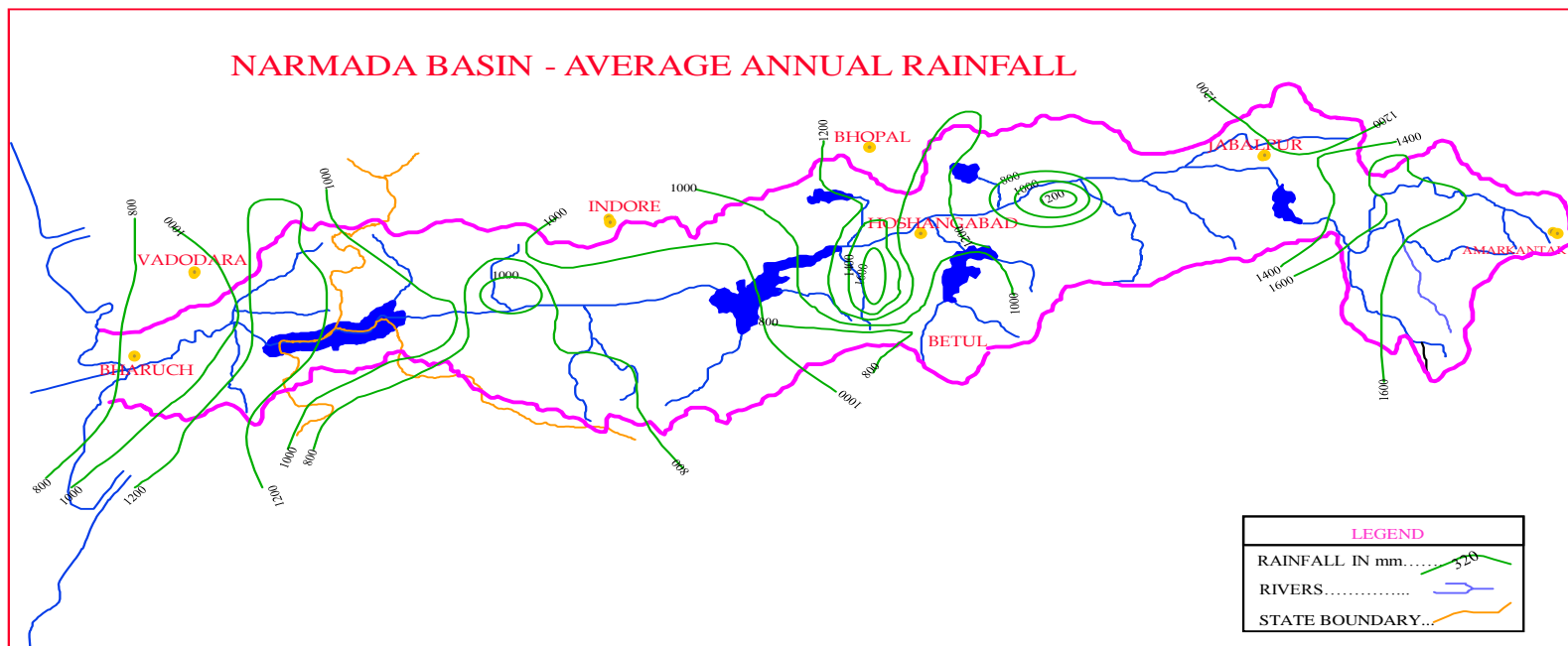


Figure 2-5 Narmada Basin – Average Annual Rainfall

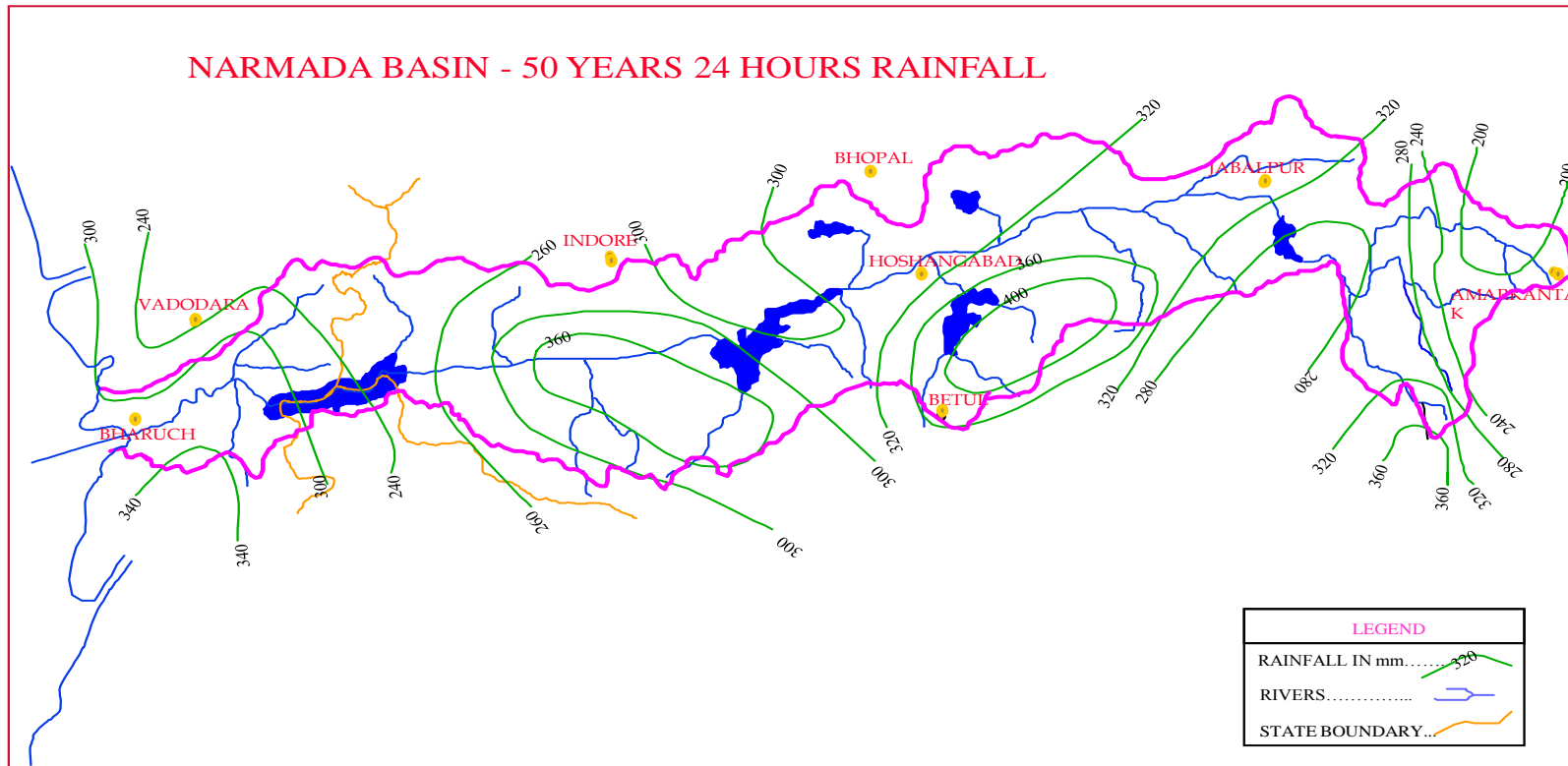


Figure 2-6 Narmada Basin – 50 Years 24 Hours Rainfall

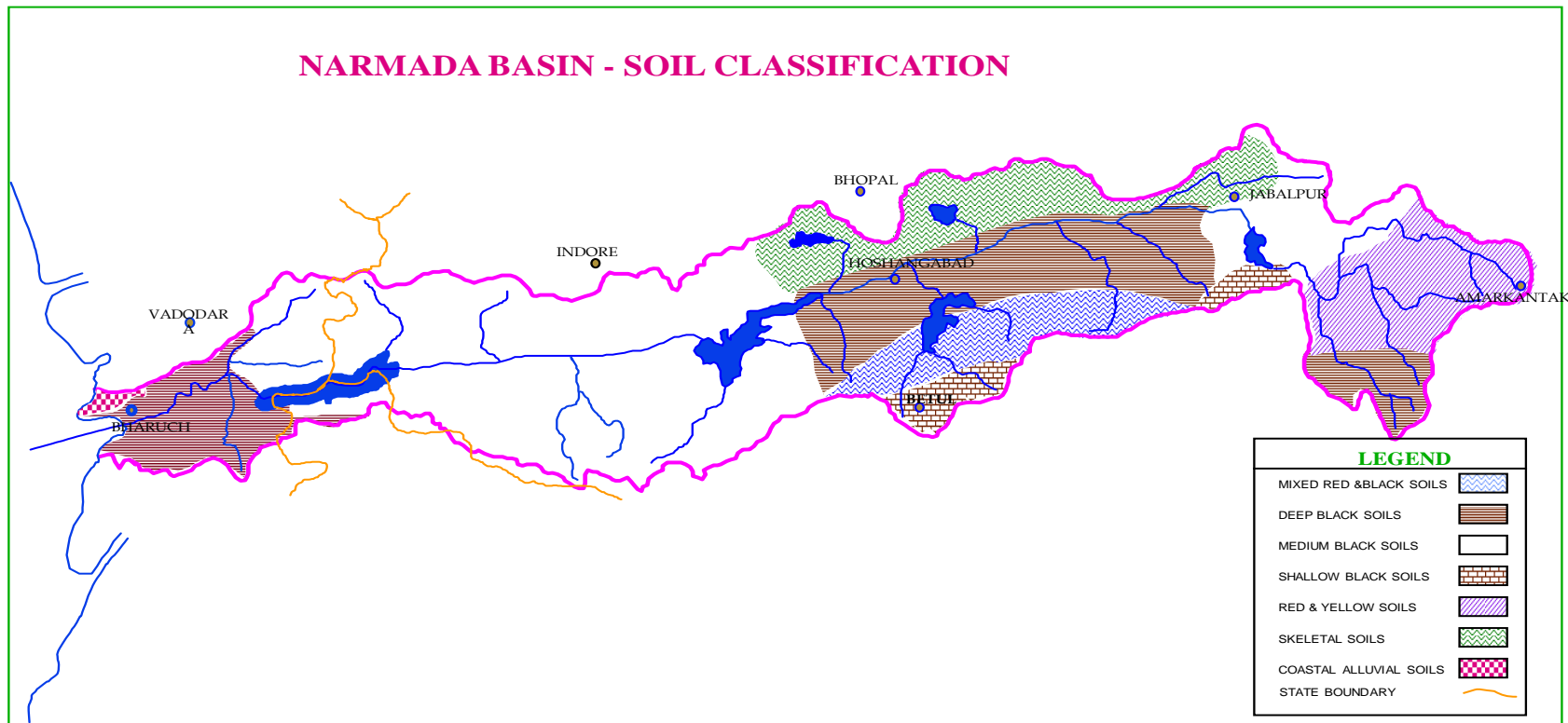


Figure 2-7 Narmada Basin – Soil Classification

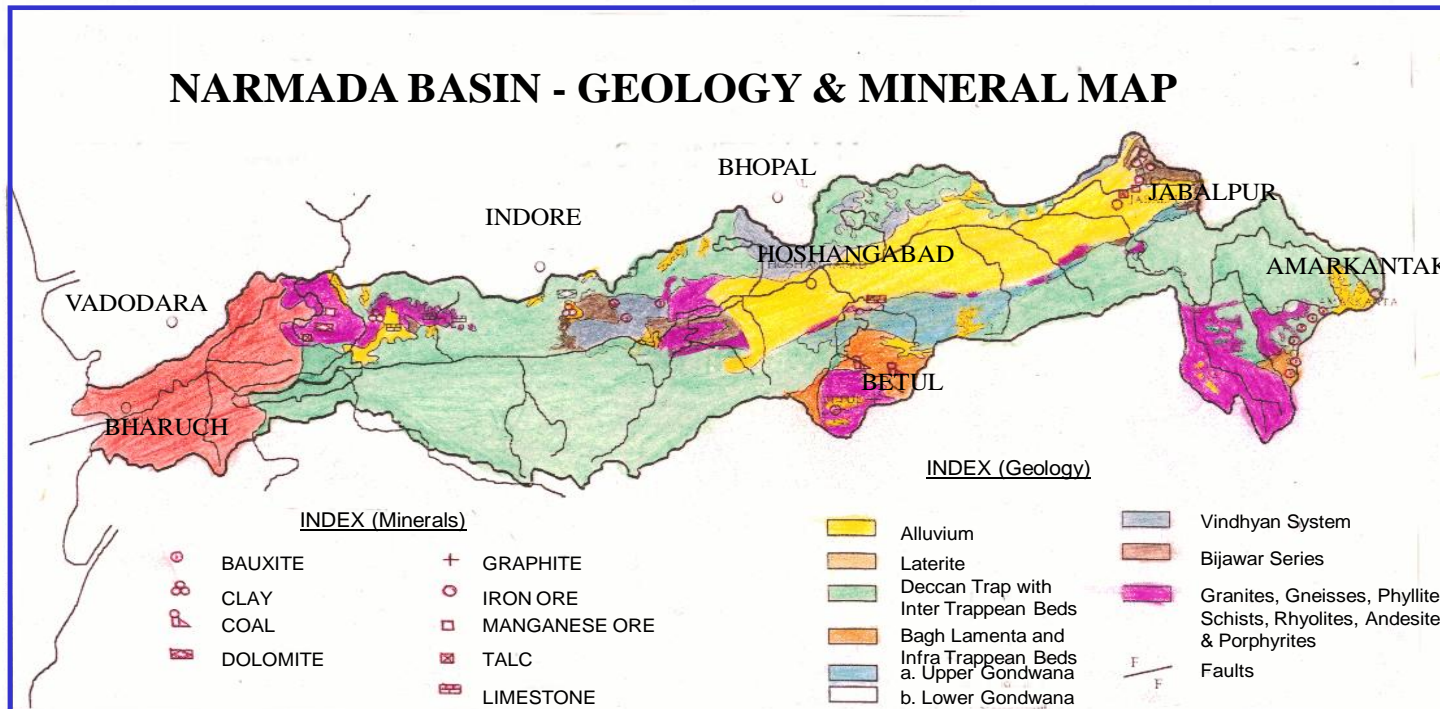


Figure 2-8 Narmada Basin – Geology & Mineral Map

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 2015-16.

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	2016	01 02 15 001
2	Narmada at Manot	G/D/S/Q	76/76/79/80	2016	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	2016	01 02 15 004
4	Banjar at Bamni	G/D	99/99	2016	-
5	Banjar at Mukki	G	88	2016	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	2016	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	2016	01 02 15 009
10	Sher at Belkheri	G/D/Q	77/77/86	2016	01 02 15 010
11	Narmada at Barmanghat	G/D/S/Q	70/71/72/79	2016	01 02 15 011
12	Shakkar at Gadarwara	GDSQ	77/77/78/79	2016	01 02 15 012
13	Narmada at Sandia	G/D/S/Q/R	78/78/78/79	2016	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	2016	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	G7D/S/Q	72/72/72/79	2016	01 02 15 019
21	Ganjali at Chhidgaon	G/D/Q	76/76/86	2016	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	2016	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	2016	01 02 15 025
27	Narmada at Mandleshwar	G/D/S/Q	70/71/72/79	2016	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	2016	NCA
31	Goi at Pati	G/D	99/99	2016	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	2016	01 02 15 030
35	Orsang at Chandwada	G/D/S/Q	79/79/88/80	2016	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 / HYMOS software.

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 base 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

		Water Year	: 2015-16
Site	: Orsang at Chandwada	Code	: 01 02 15 032
State	: Gujarat	District	: Vadodara
Basin	: Narmada	Independent River	: Narmada
Tributary	: Orsang	Sub Tributary	:
Sub-Sub Tributary	:	Local River	: Orsang
Division	: Tapi Division, Surat	Sub-Division	: LNSD Bharuch
Drainage Area	: 3846 Sq. Km.	Bank	: Right
Latitude	: 22°01'48"	Longitude	: 73°25'30"
Zero of Gauge (m)	: 18 (M.S.L.)	Opening Date	: 01/10/1979
		Closing Date	:
Gauge	: 11/01/1979		
Discharge	: 01/11/1979		
Sediment	: 01/08/1988		
Water Quality	: 15/03/1980		

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	7824	29.200	10/08/81	0.100	19.470	09/05/82
1982-1983	1210	23.585	17/08/82	0.100	19.550	02/06/82
1983-1984	4080	27.600	18/08/83	0.100	19.870	25/03/84
1984-1985	5000	28.860	20/08/84	0.100	19.980	25/02/85
1985-1986	970.0	23.165	06/08/85	0.100	20.030	18/11/85
1986-1987	585.0	25.200	16/08/86	0.100	20.160	12/09/86
1987-1988	750.0	23.500	25/08/87	0.019	20.145	01/08/87
1988-1989	4650	27.200	04/08/88	0.100	-	05/12/88
1989-1990	4100	26.950	20/08/89	0.047	-	31/10/89
1990-1991	8900	33.450	24/08/90	0.005	19.605	30/06/90
1991-1992	1890	24.300	31/07/91	0.050	19.570	10/07/91
1992-1993	1600	24.000	07/09/92	0.280	19.440	29/11/92
1993-1994	2475	25.500	17/07/93	0.010	19.285	09/11/93
1994-1995	9070	33.550	07/09/94	0.050	19.180	07/03/95
1995-1996	1265	23.600	03/09/95	0.105	19.290	06/11/95
1996-1997	4600	29.000	27/07/96	0.004	18.890	05/01/97
1997-1998	4360	28.900	01/08/97	0.004	18.920	08/02/98
1998-1999	2600	30.000	16/09/98	0.002	18.950	02/02/99
1999-2000	1675	25.940	22/09/99	0.026	18.630	04/09/99
2000-2001	255.0	20.400	14/07/00	0.014	18.800	31/08/00
2001-2002	2790	23.800	05/08/01	0.023	18.560	26/10/01
2002-2003	2420	26.800	04/09/02	0.011	18.640	31/10/02
2003-2004	2050	25.500	25/06/03	0.249	18.850	09/12/03
2004-2005	4800	28.800	14/08/04	0.357	18.650	03/07/04
2005-2006	2380	23.200	04/07/05	1.606	18.170	29/06/05
2006-2007	6126	31.200	07/08/06	0.919	18.655	03/07/06
2007-2008	4086	27.000	02/07/07	1.606	18.170	29/06/07

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2008-2009	2135	23.200	12/08/08	1.272	18.430	25/07/08
2009-2010	779.8	20.800	30/08/09	0.000	18.270	03/02/10
2010-2011	2069	23.350	05/08/10	0.000	-	25/01/11
2011-2012	11632	25.600	28/08/11	30.36	13.610	30/10/11
2012-2013	2726	25000	07/09/212	0.0		20/05/13
2013-2014	5069	29.00	25/08/2013	0.0		07/06/13
2014-2015	1426	22.800	09/09/2014	0.000		27/06/2014

Stage Discharge Sheet for Orsang at Chandwada for the period 2015-16

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	18.070	0.000 *	18.300	3.308	18.950	156.6	18.190	3.198	18.210	5.870	18.020	
2	18.070	0.000 *	18.250	2.751	18.750	58.51 *	18.180	2.825	18.170	2.301 *	18.020	
3	18.070	0.000 *	18.170	2.301 *	18.650	47.37	18.440	21.49	18.150	3.591	18.020	
4	18.070	0.000 *	18.160	1.902 *	18.600	46.13	18.350	12.93	18.130	0.000 *	18.020	
5	18.070	0.000 *	18.150	1.534 *	18.550	38.79	18.290	11.89	18.110	0.000 *	18.020	
6	18.070	0.000 *	18.130	0.000 *	18.800	50.74	18.260	7.034 *	18.100	0.000 *	18.020	
7	18.070	0.000 *	18.130	0.000 *	18.790	49.30	18.240	6.014	18.090		18.020	
8	18.070	0.000 *	18.120	0.000 *	18.730	48.12	18.220	5.644	18.090		18.010	
9	18.070	0.000 *	18.120	0.000 *	18.710	52.98 *	18.200	3.645	18.080		18.010	
10	18.070	0.000 *	18.120	0.000 *	18.700	47.39	18.170	2.924	18.080		18.010	
11	18.070	0.000 *	18.110	0.000 *	18.450	23.29	18.160	2.173	18.070		18.010	
12	18.060	0.000 *	18.110	0.000 *	18.420	22.12	18.150	2.022	18.070		18.010	
13	18.060	0.000 *	18.110	0.000 *	18.410	21.21	18.120	1.980 *	18.060		18.010	
14	18.500	27.56 *	18.110	0.000 *	18.600	46.17	18.260	11.05	18.060		18.010	
15	18.300	2.914	18.110	0.000 *	18.610	40.10 *	18.580	43.93	18.050		18.010	
16	18.300	2.895	18.110	0.000 *	18.610	40.10 *	18.460	22.83	18.050		18.010	
17	18.350	3.699	18.110	0.000 *	18.600	46.19	18.300	9.721 *	18.050		18.010	
18	18.160	1.902 *	18.100	0.000 *	18.730	48.67	18.230	13.46	18.050		18.010	
19	18.160	1.902 *	18.100	0.000 *	18.650	47.10	18.950	128.7	18.040		18.010	
20	18.350	3.715	18.950	157.6	18.700	49.15	18.700	51.63 *	18.040		18.010	
21	18.180	2.727 *	18.410	3.906	18.690	47.98	18.500	40.22	18.040		18.010	
22	18.150	1.534 *	18.250	2.990	18.650	46.99	18.400	27.87	18.040		18.010	
23	18.130	0.000 *	18.230	2.916	18.560	34.18 *	18.350	22.35	18.030		18.010	
24	18.100	0.000 *	18.210	2.734	18.280	11.25	18.330	20.67	18.030		18.010	
25	18.160	1.902 *	18.950	157.5	18.280	11.43	18.320	11.18 *	18.030		18.010	
26	18.150	1.534 *	19.800	267.3 *	18.260	10.92	18.310	20.20	18.030		18.010	
27	18.660	32.52	19.700	314.3	18.250	10.26	18.290	9.019 *	18.030			0.000
28	18.510	28.63 *	20.700	470.6	18.230	10.11	18.270	10.17	18.020			0.000
29	18.350	3.738	19.600	252.6	18.220	9.788	18.250	9.661	18.020			0.000
30	18.310	3.377	19.100	162.8	18.210	4.163 *	18.230	6.351	18.020			0.000
31			19.000	146.9	18.200	3.521			18.020			
Ten-Daily Mean												
I Ten-Daily	18.070	0.000	18.165	1.180	18.723	59.60	18.254	7.760	18.121	1.960	18.017	
II Ten-Daily	18.231	4.459	18.192	15.76	18.578	38.41	18.391	28.75	18.054		18.010	
III Ten-Daily	18.270	7.596	19.086	162.2	18.348	18.24	18.325	17.77	18.028		18.010	0.000
Monthly												
Min.	18.060	0.000	18.100	0.000	18.200	3.521	18.120	1.980	18.020	0.000	18.010	0.000
Max.	18.660	32.52	20.700	470.6	18.950	156.6	18.950	128.7	18.210	5.870	18.020	0.000
Mean	18.190	4.019	18.501	63.03	18.543	38.09	18.323	18.09	18.066	1.96	18.013	0

Annual Runoff in MCM = 329 Annual Runoff in mm = 86

Peak Observed Discharge = 470.6 cumecs on 28/07/2015 Corres. Water Level :20.7 m

Lowest Observed Discharge = 0.000 cumecs on 27/11/2015

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 Orsang at Chandwada for the period 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1		0.000		0.000		0.000		0.000		0.000		0.000
2		0.000		0.000		0.000		0.000		0.000		0.000
3		0.000		0.000		0.000		0.000		0.000		0.000
4		0.000		0.000		0.000		0.000		0.000		0.000
5		0.000		0.000		0.000		0.000		0.000		0.000
6		0.000		0.000		0.000		0.000		0.000		0.000
7		0.000		0.000		0.000		0.000		0.000		0.000
8		0.000		0.000		0.000		0.000		0.000		0.000
9		0.000		0.000		0.000		0.000		0.000		0.000
10		0.000		0.000		0.000		0.000		0.000		0.000
11		0.000		0.000		0.000		0.000		0.000		0.000
12		0.000		0.000		0.000		0.000		0.000		0.000
13		0.000		0.000		0.000		0.000		0.000		0.000
14		0.000		0.000		0.000		0.000		0.000		0.000
15		0.000		0.000		0.000		0.000		0.000		0.000
16		0.000		0.000		0.000		0.000		0.000		0.000
17		0.000		0.000		0.000		0.000		0.000		0.000
18		0.000		0.000		0.000		0.000		0.000		0.000
19		0.000		0.000		0.000		0.000		0.000		0.000
20		0.000		0.000		0.000		0.000		0.000		0.000
21		0.000		0.000		0.000		0.000		0.000		0.000
22		0.000		0.000		0.000		0.000		0.000		0.000
23		0.000		0.000		0.000		0.000		0.000		0.000
24		0.000		0.000		0.000		0.000		0.000		0.000
25		0.000		0.000		0.000		0.000		0.000		0.000
26		0.000		0.000		0.000		0.000		0.000		0.000
27		0.000		0.000		0.000		0.000		0.000		0.000
28		0.000		0.000		0.000		0.000		0.000		0.000
29		0.000		0.000		0.000		0.000		0.000		0.000
30		0.000		0.000				0.000		0.000		0.000
31		0.000		0.000				0.000				0.000
Ten-Daily Mean												
I Ten-Daily		0.000		0.000		0.000		0.000		0.000		0.000
II Ten-Daily		0.000		0.000		0.000		0.000		0.000		0.000
III Ten-Daily		0.000		0.000		0.000		0.000		0.000		0.000
Monthly												
Min.		0.000		0.000		0.000		0.000		0.000		0.000
Max.		0.000		0.000		0.000		0.000		0.000		0.000
Mean		0		0		0		0		0		0

Peak Computed Discharge = 267.3 cumecs on 26/07/2015

Corres. Water Level :19.8 m

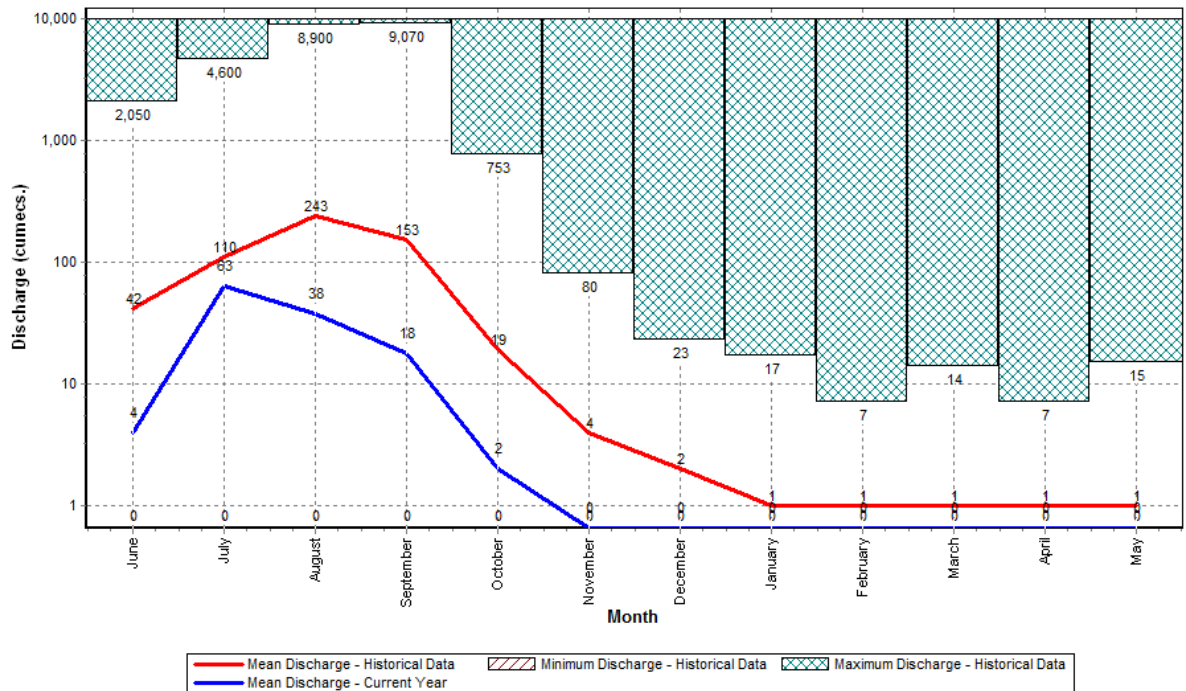
Lowest Computed Discharge = 0.000 cumecs on 01/06/2015

Corres. Water Level :18.07 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: 2015-2016 (Data considered: 1981-2016)



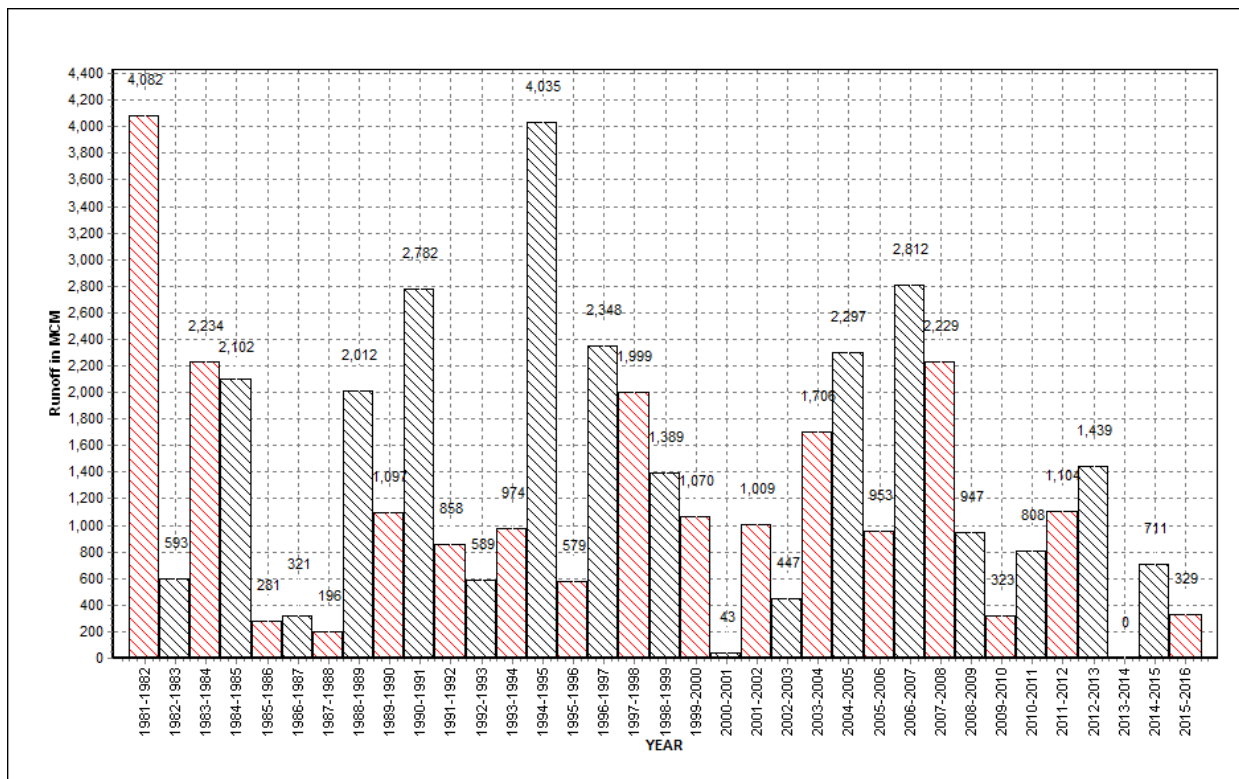
Annual Runoff Values for the period (1981 – 2016)

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

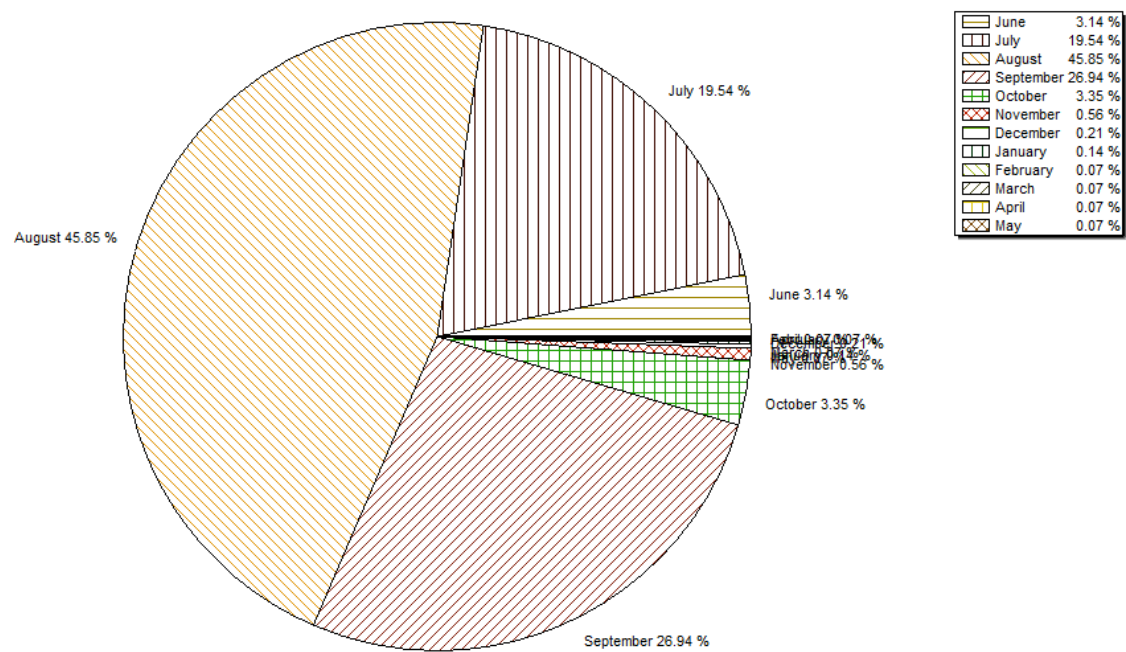
Monthly Average Runoff based on period (1981 – 2016)

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

Local River: Orsang

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



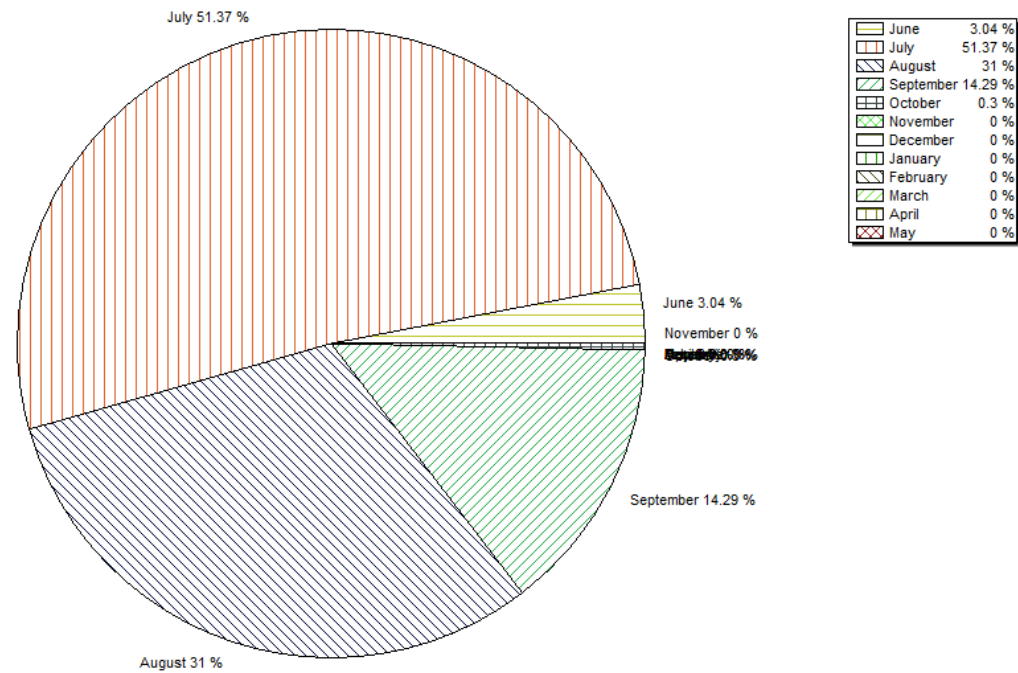
Monthly Runoff for the Year (2015-2016)

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

Local River: Orsang

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



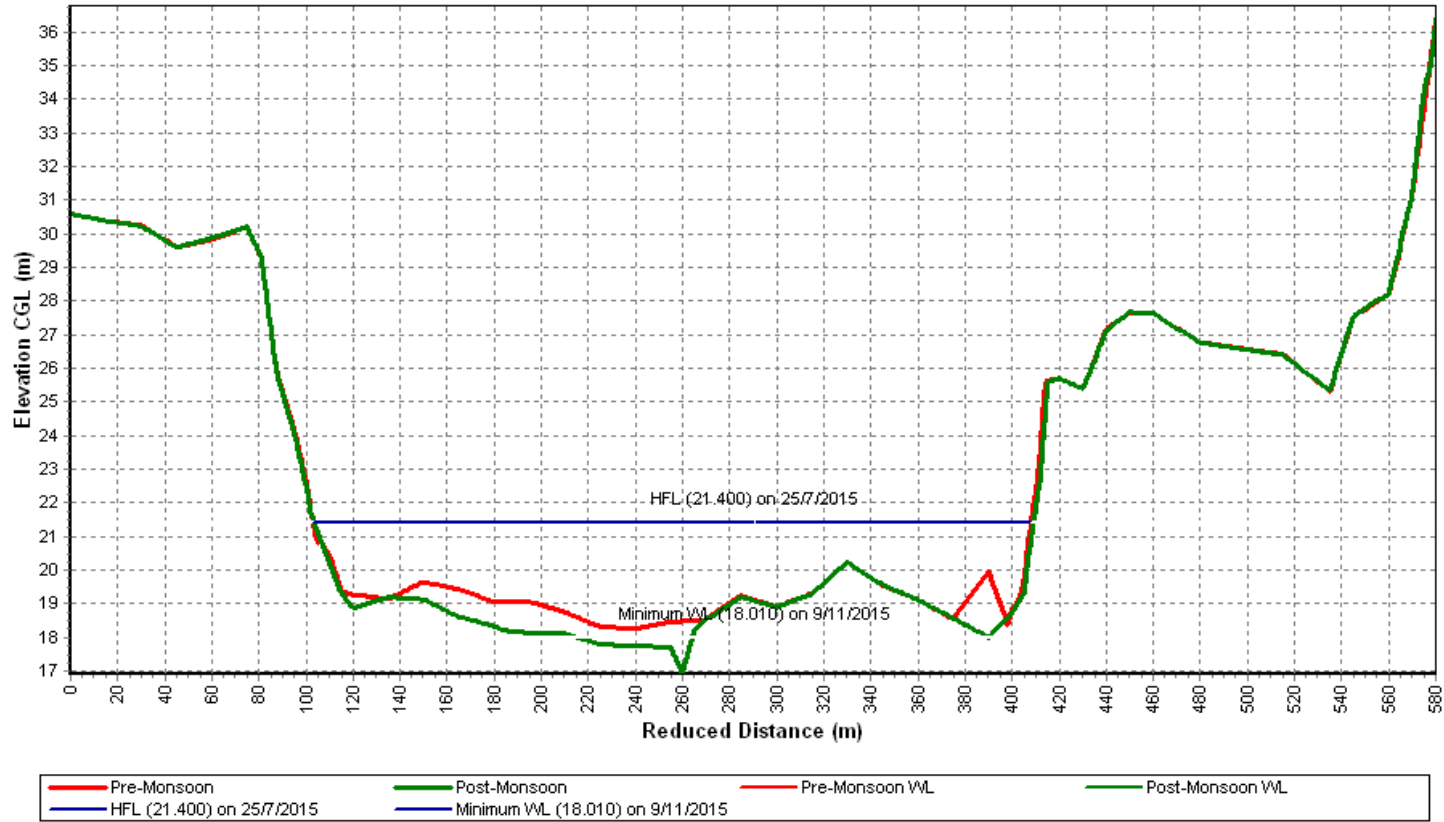
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-2016)

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

Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch



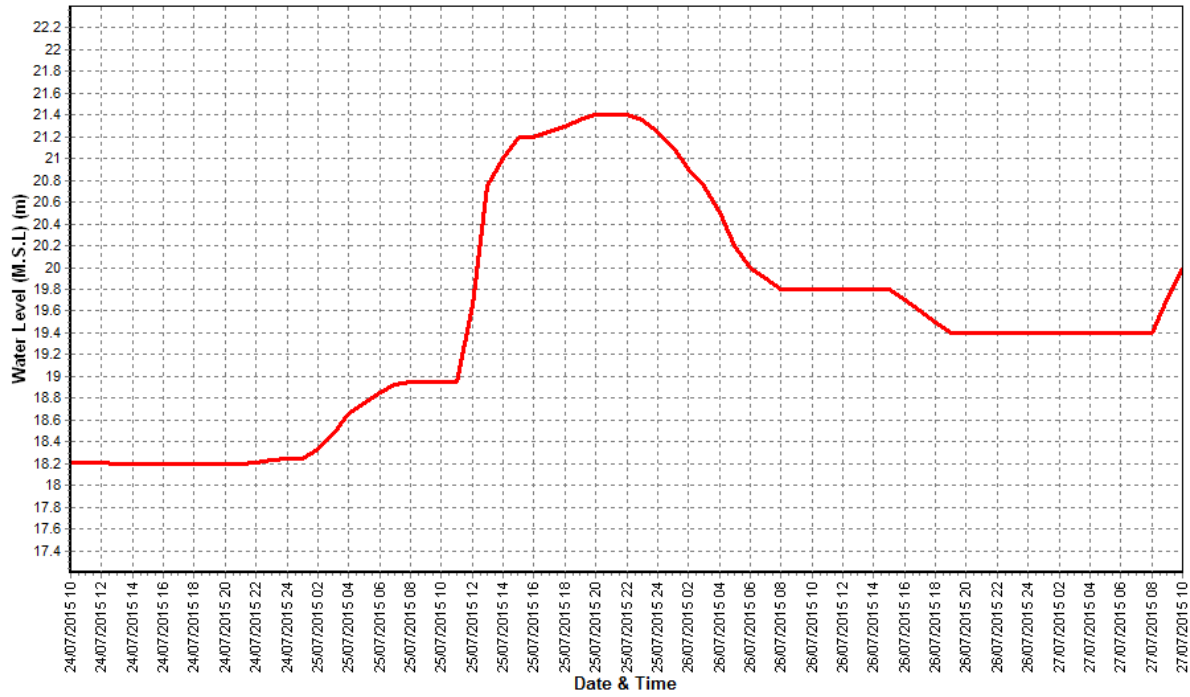
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-2016)

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

Local River: Orsang

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



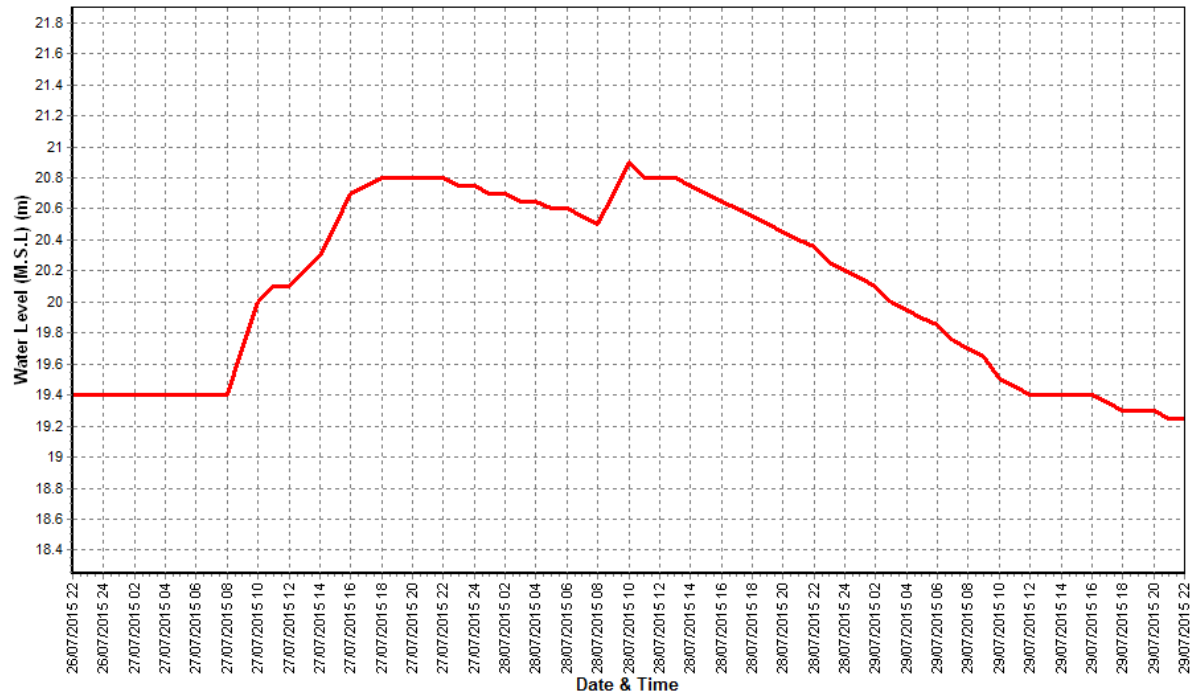
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-2016)

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

Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch



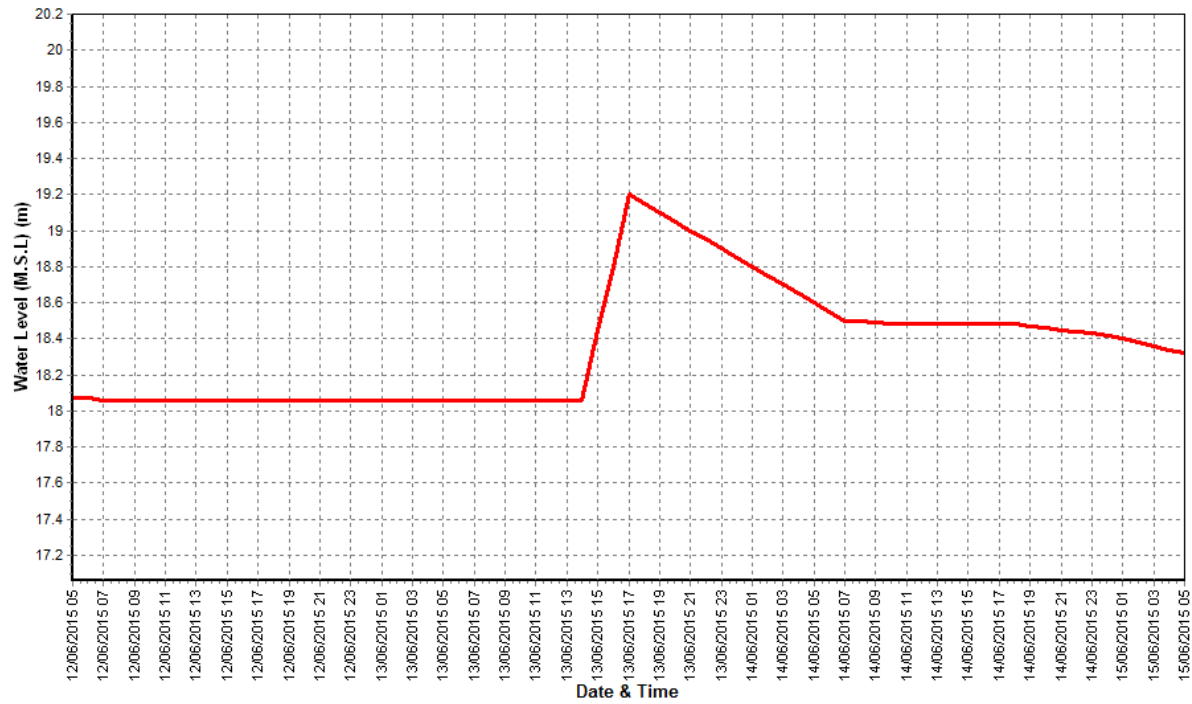
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year 2015-2016)

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

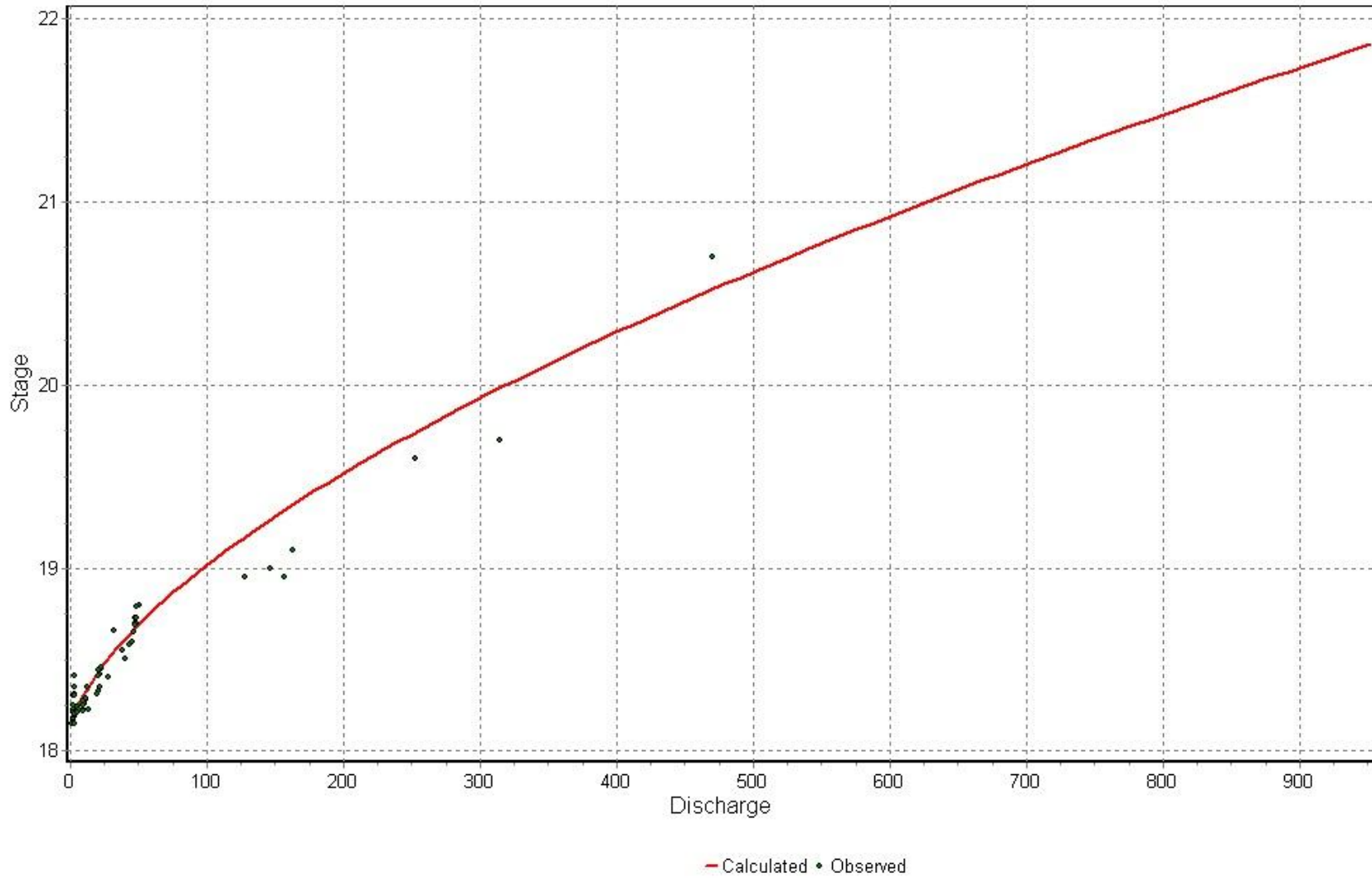
Division: Tapi Division, Surat

Local River: Orsang

Sub-Division: LNSD, CWC Bharuch



STAGE DISCHARGE CURVE OF SITE CHANDWADA 15-16



4.2 Narmada at Garudeshwar

History Sheet

		Water Year	: 2015-16
Site	: Narmada at Garudeshwar	Code	: 01 02 15 030
State	: Gujarat	District	: Bharuch
Basin	: Narmada	Independent River	: Narmada
Tributary	:	Sub Tributary	:
Sub-Sub Tributary	:	Local River	: Narmada
Division	: Tapi Division, Surat	Sub-Division	: LNSD Bharuch
Drainage Area	: 87892 Sq. Km.	Bank	: Right
Latitude	: 21°53'00"	Longitude	: 73°39'00"
Zero of Gauge (m)	: 10 (M.S.L.)	22/12/1971	Closing Date
Gauge	: 22/12/1971		
Discharge	: 23/03/1972		
Sediment	: 21/03/1973		
Water Quality	: 15/06/1977		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1972-1973	1085	16.625	24/09/72	22.30	14.370	31/05/73
1973-1974	40428	39.625	31/08/73	21.70	14.365	04/06/73
1974-1975	29905	32.195	21/08/74	24.00	14.265	31/05/75
1975-1976	30477	31.025	13/09/75	23.20	14.273	03/06/75
1976-1977	16375	26.490	05/08/76	35.50	13.950	24/05/77
1977-1978	24700	27.600	08/08/77	30.30	14.000	09/06/77
1978-1979	40745	34.212	30/08/78	32.60	14.100	07/06/78
1979-1980	27475	31.245	11/08/79	14.60	14.300	31/05/80
1980-1981	23138	28.100	31/08/80	14.50	14.310	03/06/80
1981-1982	22883	29.850	11/08/81	24.70	14.305	16/06/81
1982-1983	15722	25.803	24/08/82	19.90	14.180	28/05/83
1983-1984	18150	27.180	12/09/83	19.10	14.150	01/06/83
1984-1985	49500	35.880	20/08/84	21.70	14.185	01/06/84
1985-1986	14500	24.740	11/08/85	11.50	14.450	22/03/86
1986-1987	34700	31.010	16/08/86	22.00	14.235	08/06/86
1987-1988	10800	21.630	29/08/87	16.20	14.010	24/05/88
1988-1989	22600	27.270	05/08/88	26.60	14.070	31/05/89
1989-1990	14200	23.630	09/08/89	26.00	14.020	04/06/89
1990-1991	52000	36.100	24/08/90	122.0	14.170	17/06/90
1991-1992	22500	27.120	31/07/91	66.00	13.730	27/04/92
1992-1993	10150	22.100	19/08/92	63.50	13.730	13/06/92
1993-1994	20973	29.770	17/07/93	19.17	13.620	25/02/94
1994-1995	60642	39.780	07/09/94	88.00	13.920	31/05/95

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1995-1996	11168	24.100	04/09/95	44.21	13.810	29/06/95
1996-1997	28200	33.100	28/07/96	23.18	13.500	17/10/96
1997-1998	21849	31.160	27/07/97	107.2	13.840	23/06/97
1998-1999	25600	33.800	16/09/98	54.71	13.480	29/12/98
1999-2000	23400	30.970	21/09/99	85.23	13.780	14/06/99
2000-2001	4460	18.680	01/08/00	1.842	13.210	16/03/01
2001-2002	8200	22.160	17/08/01	5.983	13.580	29/04/02
2002-2003	18250	29.390	04/09/02	3.438	13.310	31/05/03
2003-2004	9850	22.540	30/07/03	2.883	13.350	27/12/03
2004-2005	10550	23.500	26/08/04	3.727	13.400	25/10/04
2005-2006	7550	20.820	06/08/05	5.535	13.510	11/06/05
2006-2007	22226	31.200	07/08/06	25.76	13.800	30/01/07
2007-2008	10601	21.700	09/08/07	1.275	13.640	03/02/08
2008-2009	741.1	15.600	19/06/08	16.92	13.710	16/10/08
2009-2010	10684	22.970	12/09/09	11.42	13.700	28/12/09
2010-2011	4543	18.830	10/09/10	2.148	13.720	29/06/10
2011-2012	11632	25.600	28/08/11	30.36	13.610	30/10/11
2012-2013	26586	29.350	09/08/12	17.38	13.44	03/05/13
2013-2014	32057	34.560	25/06/2013	19.37	13.5	18/05/14
2014-2015	10016	23.145	09/09/2014	0.000	13.200	04/11/14

Stage Discharge Sheet for Narmada at Garudeshwar for the period 2015-16

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	13.880	25.92	13.600	18.72	15.950	1523	13.530	24.25	14.170	200.1	13.810	29.93 *
2	13.870	28.46	13.650	19.22	14.800	413.6 *	13.540	24.34	14.040	84.44 *	13.780	27.35
3	13.840	26.21	13.650	0.000 *	15.015	682.6	13.550	24.36	13.670	20.21	13.820	29.37
4	13.600	18.37	13.650	19.20	14.820	486.2	13.520	22.59	13.780	24.63 *	13.820	29.36
5	13.640	18.71	13.600	19.10 *	15.900	1453	13.540	23.66	13.730	33.43	13.800	28.54
6	13.590	18.27	13.550	18.19	18.680	4678	13.530	23.66 *	13.720	33.32	13.810	28.57
7	13.570	15.25 *	13.540	17.93	18.740	4805	14.330	228.1	13.730	33.42	13.810	28.28
8	13.610	18.74	13.540	19.34	17.145	2920	13.780	28.65	13.750	34.15	13.820	31.80 *
9	13.650	19.33	13.530	19.23	16.280	1596 *	13.755	28.05	13.750	34.25	13.810	28.21
10	13.640	18.90	13.540	19.46	16.000	1538	14.275	225.5	13.760	33.76	13.790	27.22
11	13.640	19.83	13.500	18.01	15.960	1520	13.705	25.73	13.790	26.35 *	13.790	26.35 *
12	13.620	19.07	13.500	19.00 *	14.950	557.3	13.530	24.45	13.780	33.45	13.780	26.99
13	13.755	20.68	13.520	19.57	15.970	1514	13.540	25.00 *	13.820	35.89	13.790	26.74
14	14.750	385.6 *	13.550	19.21	16.125	1589	13.665	25.55	13.785	34.83	13.780	25.97
15	13.840	30.40	13.540	19.17	16.200	1515 *	13.800	34.55	13.795	34.66	13.760	21.35 *
16	13.840	29.95	13.540	19.04	16.400	1719 *	13.740	33.17	13.800	35.67	13.770	25.39
17	13.850	33.36	13.510	18.69	16.530	1710	13.720	15.39 *	13.845	36.81	13.760	24.14
18	13.845	32.29	13.540	18.65 *	16.450	1646	14.510	267.4	13.850	33.71 *	13.770	25.28
19	13.915	42.36	13.600	21.23 *	16.330	1603	16.060	1516	13.830	35.95	13.760	24.13
20	13.875	37.82	13.540	19.67	16.250	1595	16.040	1360 *	13.820	36.37	13.770	24.24
21	13.980	67.96 *	13.560	20.46	16.190	1584	16.000	1454	13.805	35.12	13.770	24.42
22	13.920	41.97	13.600	21.08	16.140	1576	14.405	245.4	13.830	33.71 *	13.800	28.12 *
23	13.885	38.31	14.340	236.3	16.090	1408 *	13.960	46.62	13.845	36.85	13.780	25.47
24	13.925	42.21	13.815	29.75	16.065	1513	13.780	34.23	13.810	29.93 *	13.810	28.31
25	13.910	41.96	14.655	278.0	15.980	1454	13.770	22.96 *	13.800	28.12 *	13.800	28.12 *
26	13.900	38.39	14.300	172.8 *	15.490	1401	13.755	33.97	13.810	35.41	13.820	28.38
27	15.430	1333	14.870	504.6	15.505	1393	13.760	21.35 *	13.840	36.81	13.800	27.72
28	14.100	102.4 *	16.340	1612	15.630	1482	13.740	32.93	14.235	221.4	13.810	27.82
29	13.920	42.03	16.015	1529	15.210	1176	13.770	34.73	13.915	47.03	13.810	29.93 *
30	13.630	20.26	16.020	1570	14.100	102.4 *	13.790	35.16	13.820	35.33	13.800	27.75
31			16.050	1609	13.805	32.00			13.800	34.97		
Ten-Daily Mean												
I Ten-Daily	13.689	20.82	13.585	17.04	16.333	2010	13.735	65.31	13.810	53.17	13.807	28.86
II Ten-Daily	13.893	65.13	13.534	19.22	16.117	1497	14.231	332.7	13.812	34.37	13.773	25.06
III Ten-Daily	14.060	176.9	14.870	689.3	15.473	1193	14.073	196.2	13.865	52.25	13.800	27.61
Monthly												
Min.	13.570	15.25	13.500	0.000	13.805	32.00	13.520	15.39	13.670	20.21	13.760	21.35
Max.	15.430	1333	16.340	1612	18.740	4805	16.060	1516	14.235	221.4	13.820	31.80
Mean	13.881	87.61	14.024	256.3	15.958	1554	14.013	198.1	13.830	46.78	13.793	27.18

Annual Runoff in MCM = 6284 Annual Runoff in mm = 71

Peak Observed Discharge = 4805 cumecs on 07/08/2015 Corres. Water Level :18.74 m

Lowest Observed Discharge = 17.93 cumecs on 07/07/2015 Corres. Water Level :13.54 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

Stage Discharge Sheet for Narmada at Garudeshwar for the period 2015-16

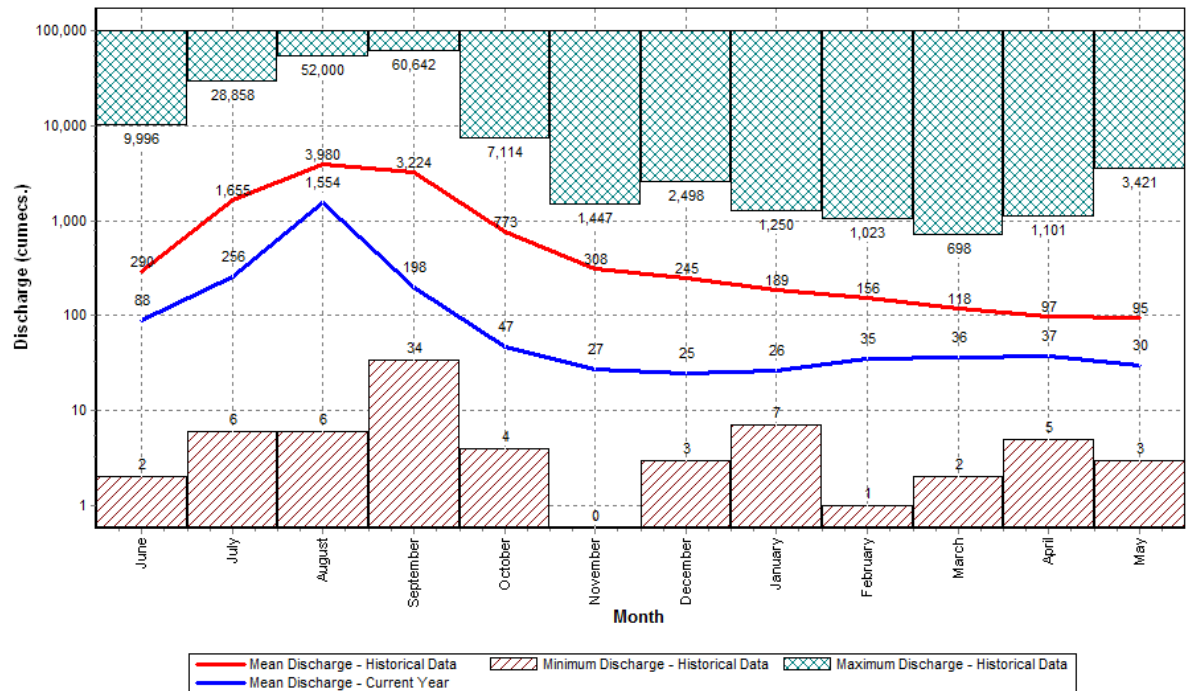
Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	13.810	27.86	13.780	23.67	13.790	25.12	13.890	42.58	13.850	40.10	13.810	29.93 *
2	13.810	27.80	13.780	23.60	13.830	30.64	13.870	41.95	13.900	41.74	13.830	25.67
3	13.800	27.53	13.780	24.63 *	13.810	26.83	13.890	42.78	13.830	33.71 *	13.840	26.59
4	13.810	27.79	13.800	27.59	13.860	42.15	13.860	41.78	13.830	26.90	13.820	25.83
5	13.810	28.03	13.790	27.09	13.840	39.55	13.870	41.65	13.820	26.47	13.830	25.58
6	13.810	29.93 *	13.790	27.17	13.780	26.66	13.850	37.68 *	13.850	39.44	13.850	26.78
7	13.810	27.78	13.780	27.20	13.790	26.35 *	13.850	40.36	13.820	26.20	13.850	26.41
8	13.810	27.73	13.770	26.36	13.740	25.36	13.860	40.87	13.850	38.88	13.830	33.71 *
9	13.800	27.36	13.770	26.38	13.830	36.05	13.850	40.45	13.820	26.10	13.860	26.89
10	13.810	27.68	13.790	26.35 *	13.810	26.68	13.870	41.09	13.900	48.43 *	13.790	24.16
11	13.800	27.53	13.820	28.07	13.810	26.51	13.860	40.01	13.850	38.34	13.850	26.84
12	13.790	27.20	13.780	24.85	13.790	25.04	13.850	40.28	13.870	38.94	13.840	26.03
13	13.750	19.78 *	13.790	24.95	13.970	45.44	13.850	37.68 *	13.840	26.77	13.830	25.49
14	13.740	23.59	13.800	28.12 *	14.080	96.27 *	13.830	26.95	13.860	39.74 *	13.850	26.85
15	13.720	23.09	13.730	23.32	13.750	25.70	13.850	40.69	13.850	27.02	13.810	29.93 *
16	13.750	23.74	13.790	25.61	13.760	26.10	13.810	26.53	13.830	25.78	13.830	25.50
17	13.740	23.90	13.810	29.93 *	13.760	25.33	13.800	26.53	13.870	41.84 *	13.840	26.35
18	13.740	23.46	13.800	26.66	13.790	26.41	13.830	26.95	13.870	37.94	13.850	26.80
19	13.720	22.56	13.770	24.50	13.810	26.65	13.800	26.67	13.810	25.78	13.810	25.54
20	13.730	16.80 *	13.800	27.13	13.860	41.93	13.890	46.19 *	13.850	37.68 *	13.800	25.34
21	13.740	22.73	13.810	26.83	13.880	43.99 *	13.830	26.80	13.830	26.09	13.810	29.93 *
22	13.750	23.58	13.790	25.28	13.860	40.98	13.830	26.51	14.150	185.7	13.820	31.80 *
23	13.790	27.42	13.790	25.05	13.820	26.79	13.870	39.24	13.830	25.91	13.820	25.23
24	13.770	26.26	13.790	26.35 *	13.860	41.01	13.840	35.67 *	13.820	31.80 *	13.800	25.35
25	13.780	24.63 *	13.780	24.46	13.860	40.90	13.760	21.35 *	13.800	24.01	13.960	40.29
26	13.750	23.59	13.770	22.96 *	13.880	41.97	13.840	26.78	13.830	24.97	13.970	42.55
27	13.800	28.12 *	13.800	26.46	13.870	41.56	13.860	39.74 *	13.830	25.84	13.960	40.30
28	13.760	23.58	13.790	25.21	13.860	39.74 *	13.820	26.59	13.830	25.62	13.970	47.19
29	13.800	27.43	13.790	25.17	13.870	41.54	13.850	40.77	13.850	27.56	13.820	31.80 *
30	13.790	27.07	13.790	25.14			13.860	41.10	13.850	26.80	13.870	26.38
31	13.770	23.64	13.790	26.35 *			13.890	41.61			13.900	40.34
Ten-Daily Mean												
I Ten-Daily	13.808	27.95	13.783	26.00	13.808	30.54	13.866	41.12	13.847	34.80	13.831	27.15
II Ten-Daily	13.748	23.16	13.789	26.32	13.838	36.54	13.837	33.85	13.850	33.98	13.831	26.47
III Ten-Daily	13.773	25.28	13.790	25.39	13.862	39.83	13.841	33.29	13.862	42.43	13.882	34.65
Monthly												
Min.	13.720	16.80	13.730	22.96	13.740	25.04	13.760	21.35	13.800	24.01	13.790	24.16
Max.	13.810	29.93	13.820	29.93	14.080	96.27	13.890	46.19	14.150	185.7	13.970	47.19
Mean	13.776	25.46	13.787	25.89	13.835	35.49	13.848	35.99	13.853	37.07	13.849	29.59

Peak Computed Discharge = 1719 cumecs on 16/08/2015 Corres. Water Level :16.4 m

Lowest Computed Discharge = 0.000 cumecs on 03/07/2015 Corres. Water Level :13.65 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: 2015-2016 (Data considered: 1972-2016)



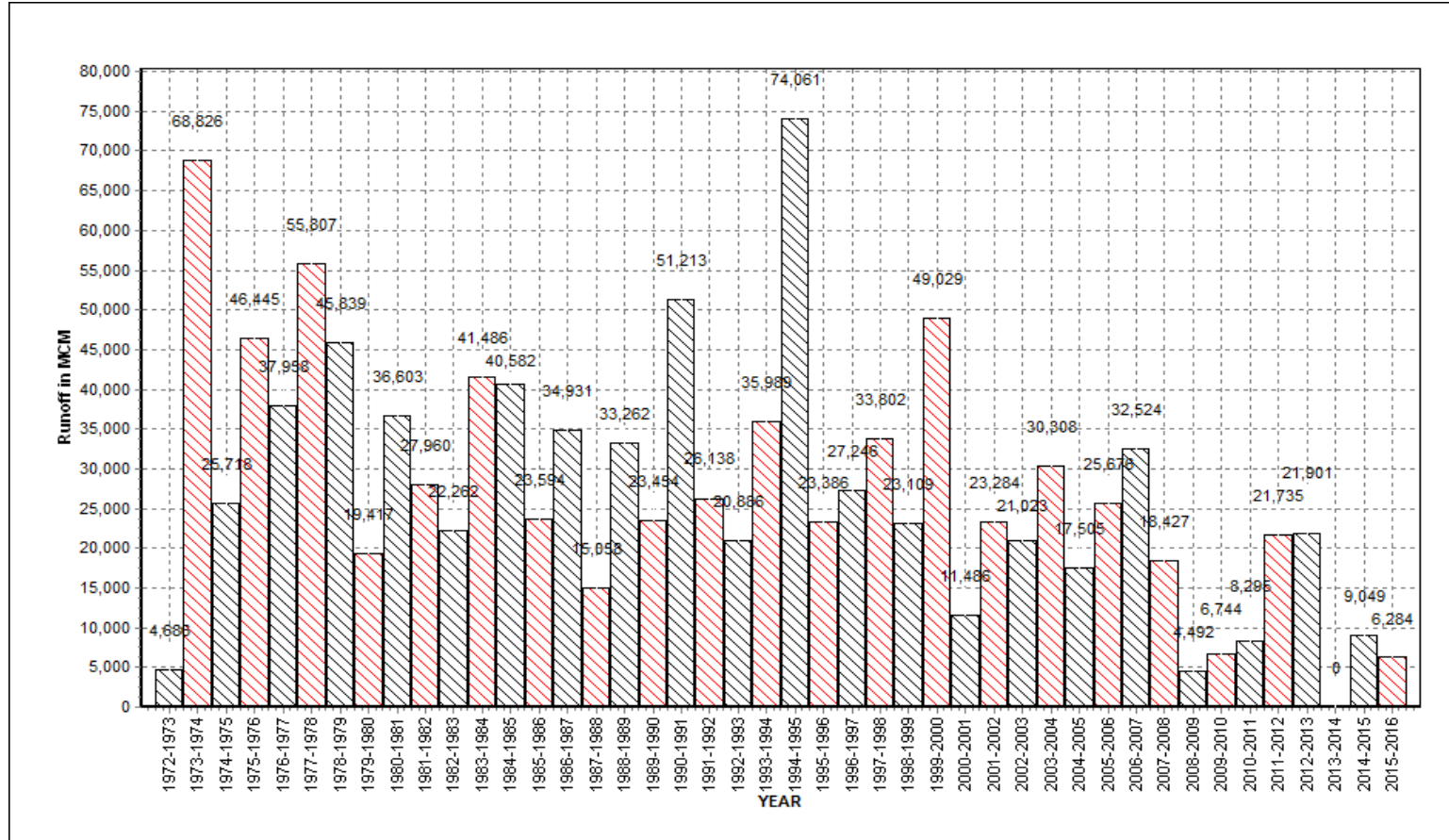
Annual Runoff Values for the period (1972 – 2016)

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

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



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

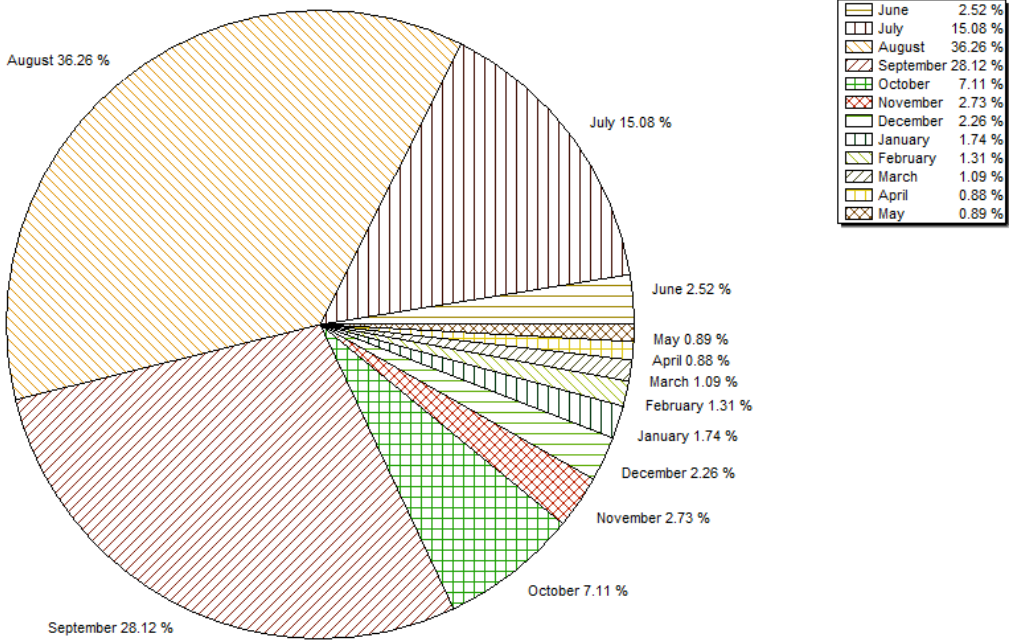
Monthly Average Runoff based on period (1972 – 2016)

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

Local River: Narmada

Division: Tapi Division, Surat

Sub-Division: LNSD, CWC Bharuch



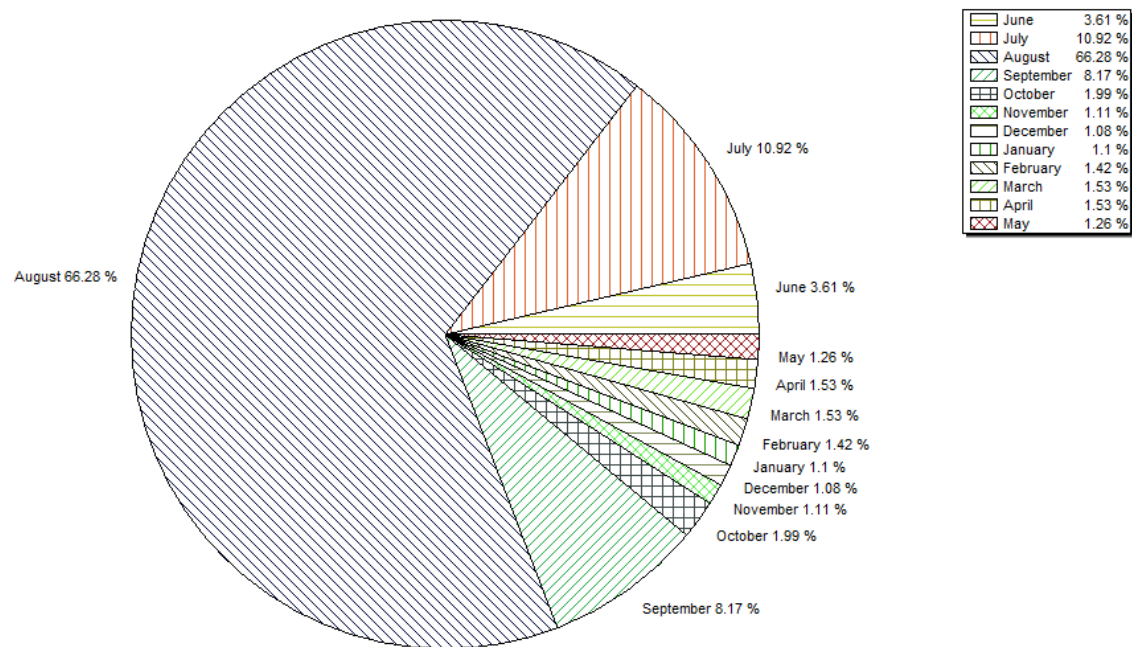
Monthly Runoff for the Year(2015-16)

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

Local River : Narmada

Division : Tapi Division, Surat

Sub-Division : LNSD, CWC Bharuch



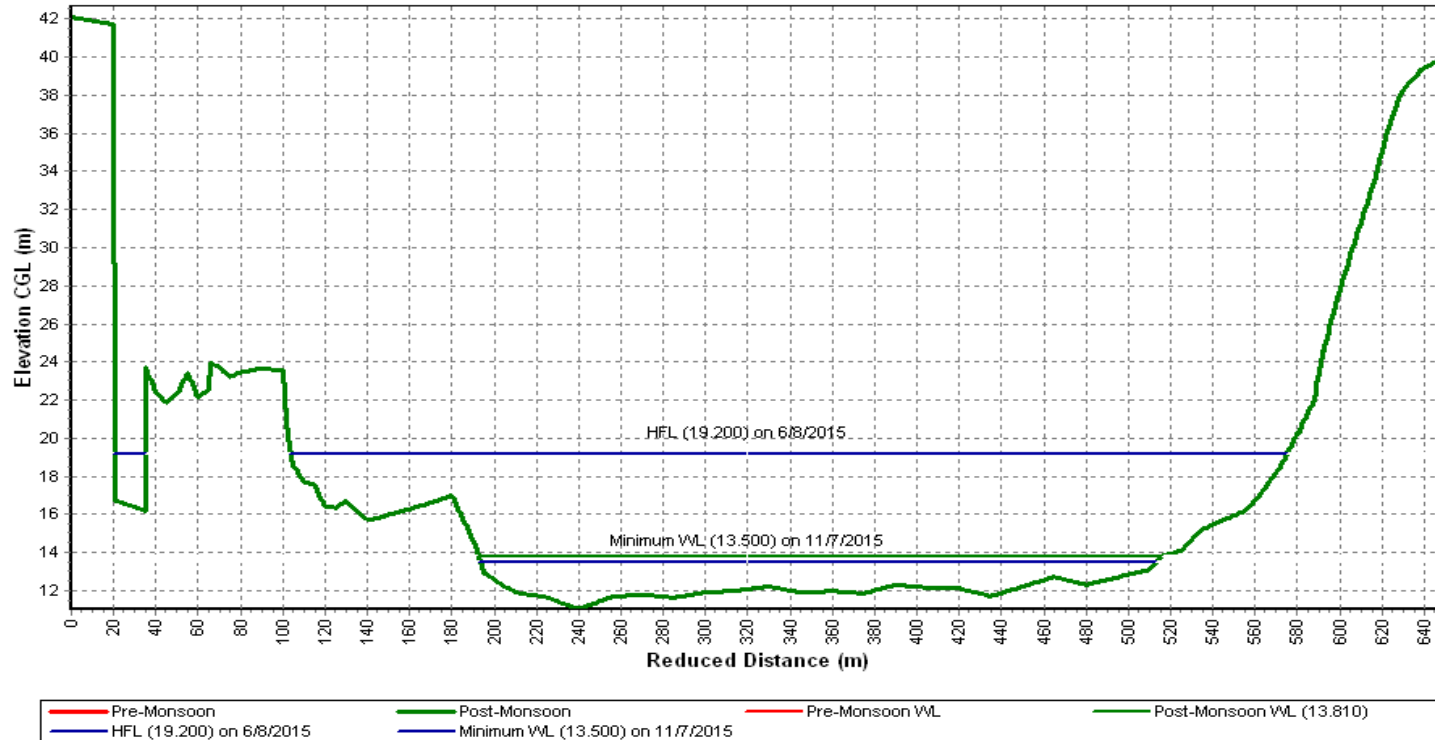
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-2016)

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

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



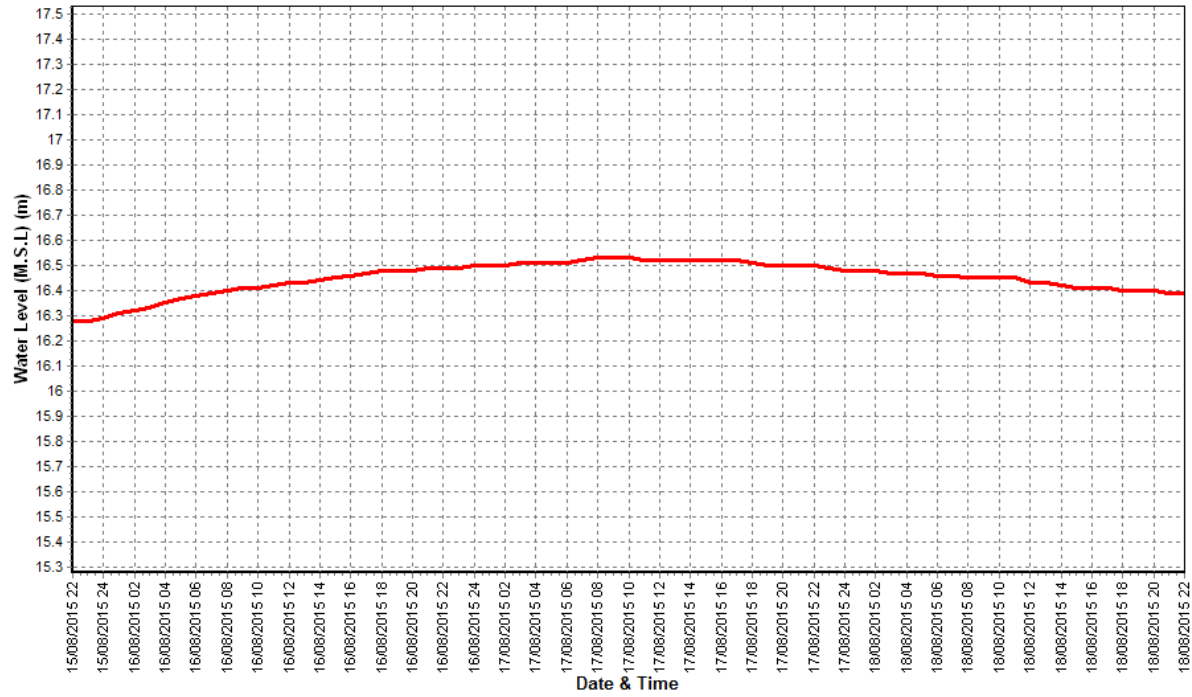
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-2016)

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

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



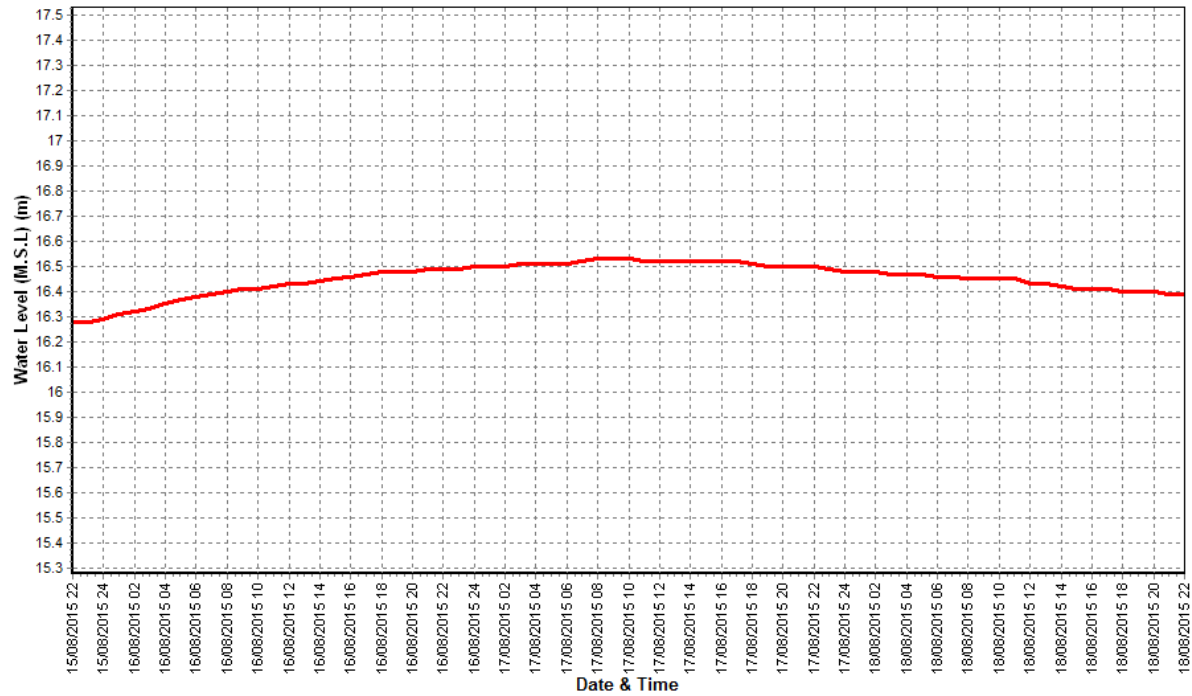
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-2016)

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

Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



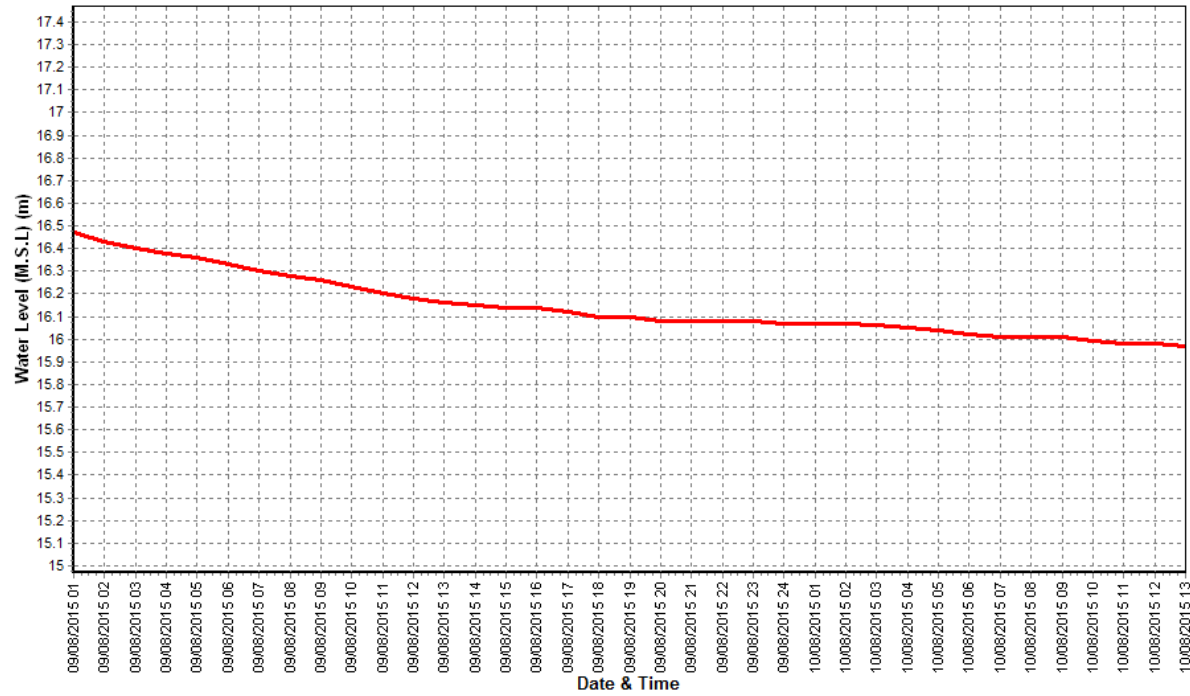
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-2016)

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

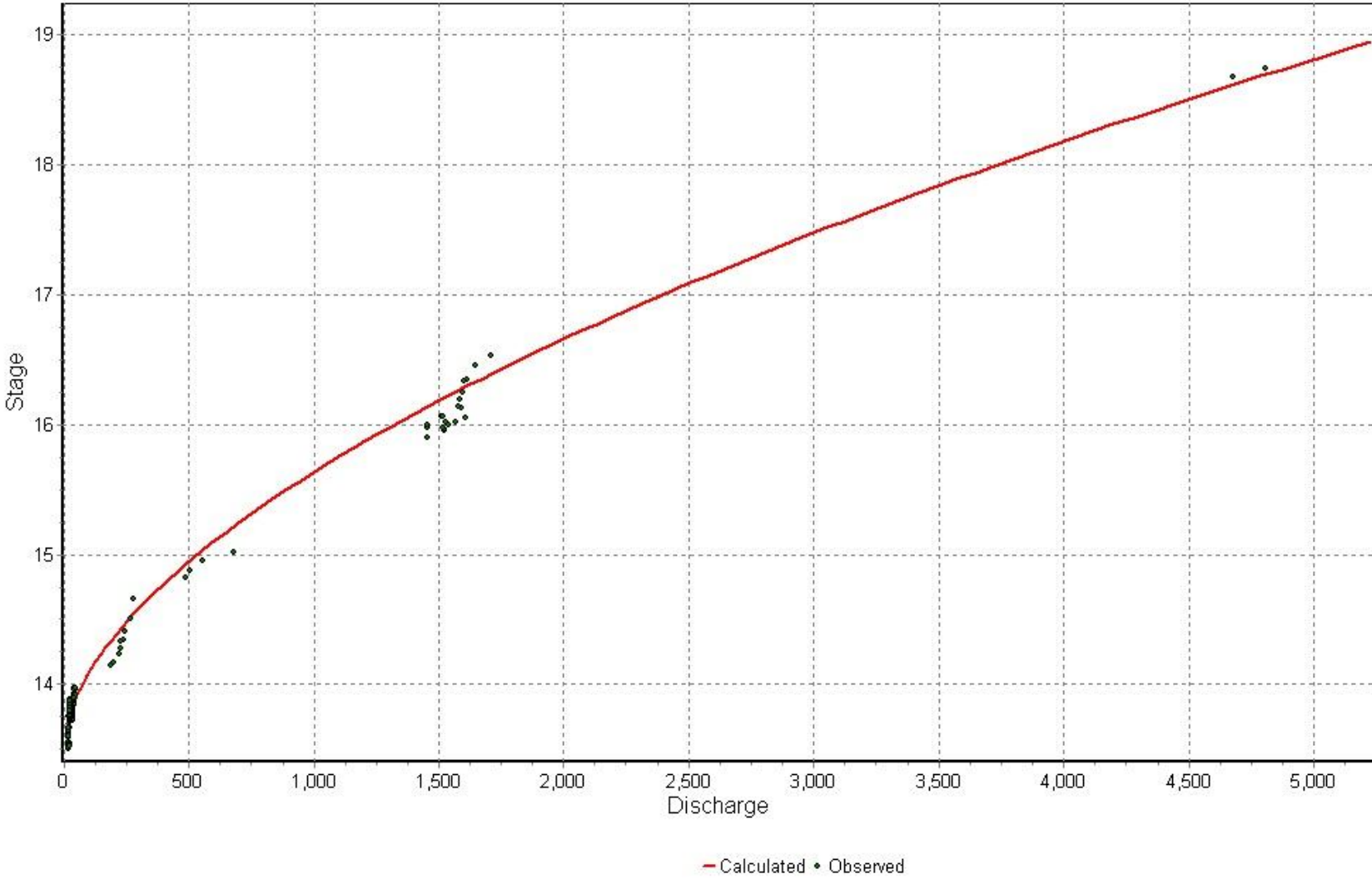
Division: Tapi Division, Surat

Local River: Narmada

Sub-Division: LNSD, CWC Bharuch



STAGE DISCHARGE CURVE OF SITE GARUDESHWAR 15-16



4.3 Goi at Pati

History sheet

Site	: Goi at Pati	Water Year	: 2015-16
	Madhya	Code	: N.C.A. PATI
State	: Pradesh	District	: Barwani
Basin	: Narmada	Independent	
Tributary	: Goi	River	: Narmada
Sub Tributary	:	Local River	: Goi
Division	: Narmada Division Bhopal	Sub-Division	: MNSD III CWC Indore
Drainage Area	: 2151 Sq. km.	Bank	: Right
Latitude	: 21°56'37"	Longitude	: 74°44'42"
Zero of Gauge (m)	: 187 (M.S.L.)	15/06/2008	
	Opening Date	Closing Date	
Gauge	: 15/06/2008		
Discharge	: 15/06/2008		
Sediment	:		
Water Quality	: 01/07/2008		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1999-2000	530.0	192.190	18/06/1999	0.000		08/01/2000
2000-2001	2110	195.610	13/07/2000	0.000		06/12/2000
2001-2002	2250	195.850	05/08/2001	0.000		09/03/2002
2002-2003	1250	193.850	03/09/2002	0.000		01/02/2003
2003-2004	1013	193.000	29/09/2003	0.000		10/04/2004
2004-2005	945.0	193.200	05/08/2004	0.000		29/04/2005
2005-2006	83.15	190.150	02/08/2005	0.000		08/02/2006
2008-2009	300.9	191.100	20/09/2008	0.000	189.550	08/05/2009
2009-2010	230.1	191.830	05/09/2009	0.000		12/04/2010
2010-2011	2395	195.150	09/09/2010	0.000		28/03/2011
2011-2012	289.0	191.325	24/08/2011	0.000		05/02/2012
2012-2013	193.3	191.120	31/08/2012	0.000		07/02/2013
2013-2014	484.7	192.375	23/09/2013	0.000		02/03/2014
2014-2015	733.8	192.900	08/09/2014	0.825	189.050	03/12/2014

Stage Discharge Sheet for Goi at Pati for the period 2015-16

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		0.000	189.040	1.454	189.950	51.16	189.690	11.98	189.800	17.64	189.350	3.697 *
2		0.000	189.020	1.126	189.890	24.07 *	189.660	10.24	189.760	16.52 *	189.340	4.682
3		0.000	189.000	0.970	189.830	31.36	189.640	8.638	189.740	14.91	189.330	4.562
4		0.000	188.990	0.932	189.750	22.81	189.610	8.361	189.720	14.60 *	189.330	4.791
5		0.000	188.970	0.410 *	190.155	54.87	189.590	6.986	189.700	12.65	189.320	4.022
6		0.000	188.970	0.764	190.050	35.53	189.560	8.537 *	189.670	12.52	189.320	4.006
7		0.000	188.970	0.410 *	189.970	32.76	189.550	5.411	189.640	12.32	189.310	3.820
8		0.000	188.970	0.410 *	189.940	28.85	189.530	5.352	189.630	12.02	189.310	3.083 *
9		0.000	188.970	0.410 *	189.900	24.74 *	189.510	4.308	189.590	10.65	189.310	3.628
10	189.010	0.000 *	188.960	0.390 *	189.850	22.92	189.510	4.897	189.580	10.92	189.300	3.237
11	190.020	36.45	188.960	0.390 *	189.810	19.66	189.630	7.631	189.550	8.235 *	189.300	2.942 *
12	189.340	8.051	188.950	0.370 *	189.770	17.95	189.550	6.059	189.530	8.447	189.290	2.991
13	189.550	19.76	188.930	0.350 *	189.740	16.23	189.570	8.848 *	189.510	9.109	189.300	3.502
14	189.310	3.083 *	188.920	0.310 *	189.720	15.81	189.630	7.815	189.480	8.118	189.300	3.491
15	189.385	9.775	188.910	0.300 *	189.690	13.27 *	189.680	9.777	189.470	8.061	189.300	2.942 *
16	189.220	5.118	188.890	0.310 *	189.860	22.13 *	189.680	9.874	189.450	7.398	189.290	3.063
17	189.090	2.094	188.890	0.310 *	189.970	28.72	189.830	20.32 *	189.430	6.756	189.290	2.974
18	189.030	1.221	188.890	0.310 *	189.980	29.63	190.285	46.41	189.410	4.784 *	189.290	3.243
19	189.220	3.446	188.910	0.310 *	189.980	26.58	190.540	98.99	189.410	6.386	189.270	2.828
20	189.640	24.97	188.990	0.477 *	189.930	27.69	190.330	69.45 *	189.400	5.673	189.280	3.259
21	189.640	11.27 *	189.000	0.514 *	189.860	22.97	190.190	47.85	189.390	5.773	189.280	3.183
22	189.680	30.08	188.980	0.442 *	189.830	19.23	190.140	45.61	189.380	4.215 *	189.280	2.675 *
23	189.650	24.14	189.140	2.350	189.790	18.07 *	190.050	44.22	189.380	5.182	189.290	3.236
24	189.620	25.54	189.130	2.088	189.770	17.30	190.030	41.91	189.370	4.036 *	189.290	3.310
25	189.680	27.78	189.725	23.27	189.740	15.58	190.010	33.09 *	189.370	4.036 *	189.290	2.806 *
26	189.560	18.71	189.410	4.784 *	189.710	14.74	189.950	36.56	189.450	7.801	189.300	3.439
27	189.330	7.183	189.920	37.55	189.690	12.82	189.910	25.43 *	189.655	14.50	189.290	3.225
28	189.240	2.195 *	190.020	42.86	189.660	11.54	189.870	25.15	189.400	5.728	189.280	3.163
29	189.110	2.487	190.330	76.39	189.690	11.06	189.860	23.34	189.400	5.520	189.280	2.675 *
30	189.070	1.741	190.130	53.97	189.700	13.70 *	189.830	20.38	189.360	4.740	189.280	2.740
31			190.040	35.69 *	189.720	13.21			189.360	4.885		
Ten-Daily Mean												
I Ten-Daily	189.010	0.000	188.986	0.728	189.928	32.91	189.585	7.471	189.683	13.47	189.322	3.953
II Ten-Daily	189.380	11.40	188.924	0.344	189.845	21.77	189.872	28.52	189.464	7.297	189.291	3.124
III Ten-Daily	189.458	15.11	189.620	25.45	189.742	15.47	189.984	34.35	189.410	6.038	189.286	3.045
Monthly												
Min.	189.010	0.000	188.890	0.300	189.660	11.06	189.510	4.308	189.360	4.036	189.270	2.675
Max.	190.020	36.45	190.330	76.39	190.155	54.87	190.540	98.99	189.800	17.64	189.350	4.791
Mean	189.400	8.836	189.191	9.375	189.835	23.13	189.814	23.45	189.516	8.843	189.300	3.374

Annual Runoff in MCM = 239 Annual Runoff in mm = 111

Peak Observed Discharge = 98.99 cumecs on 19/09/2015 Corres. Water Level :190.54 m

Lowest Observed Discharge = 0.000 cumecs on 01/06/2015

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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	189.290	3.000	189.270	2.592	189.310	2.149	189.260	1.843	189.240	1.820	189.240	2.195 *
2	189.290	2.922	189.270	2.581	189.310	2.170	189.270	2.295	189.240	1.814	189.250	1.915
3	189.300	3.295	189.270	2.548 *	189.310	2.200	189.280	2.716	189.240	2.195 *	189.240	1.806
4	189.290	2.856	189.270	2.509	189.300	2.147	189.270	2.248	189.240	1.779	189.240	2.021
5	189.290	2.638	189.270	2.513	189.320	2.434	189.260	1.926	189.240	1.834	189.250	1.900
6	189.290	2.806 *	189.270	2.564	189.300	2.218	189.260	2.426 *	189.250	2.051	189.270	2.371
7	189.300	2.942 *	189.270	2.343	189.300	2.942 *	189.260	1.925	189.240	1.778	189.260	2.476
8	189.310	3.083 *	189.270	2.533	189.300	2.056	189.240	1.916	189.250	2.020	189.260	2.426 *
9	189.310	3.083 *	189.270	2.372	189.290	2.001	189.260	2.223	189.240	1.877	189.240	2.327
10	189.310	3.083 *	189.270	2.548 *	189.290	1.904	189.260	2.433	189.240	2.195 *	189.240	2.042
11	189.300	3.275	189.290	2.799	189.290	1.871	189.240	1.900	189.240	1.871	189.230	2.080
12	189.300	3.097	189.300	2.667	189.290	1.822	189.260	2.126	189.240	1.785	189.210	1.960
13	189.300	2.942 *	189.300	2.774	189.290	1.988	189.260	2.426 *	189.240	1.862	189.210	1.946
14	189.300	2.957	189.300	2.598	189.290	2.806 *	189.250	2.164	189.240	2.195 *	189.210	1.930
15	189.300	2.942 *	189.300	2.654	189.270	1.903	189.250	2.128	189.240	2.195 *	189.210	1.880 *
16	189.300	2.942 *	189.310	2.758	189.280	1.859	189.230	1.993	189.240	1.645	189.210	1.872
17	189.300	2.942 *	189.310	3.083 *	189.290	1.827	189.240	1.878	189.240	2.195 *	189.180	1.553
18	189.290	2.806 *	189.330	3.265	189.280	1.884	189.260	2.321	189.220	1.555	189.230	1.848
19	189.290	2.806 *	189.310	2.457	189.290	2.149	189.254	2.094	189.230	1.748	189.210	1.856
20	189.290	2.806 *	189.310	2.477	189.280	1.866	189.250	2.309 *	189.230	2.086 *	189.250	1.600
21	189.290	2.633	189.310	2.573	189.280	2.675 *	189.240	2.087	189.240	1.790	189.250	2.309 *
22	189.290	2.806 *	189.320	2.769	189.270	1.883	189.240	1.981	189.240	1.715	189.250	2.309 *
23	189.290	2.806 *	189.310	2.426	189.270	1.778	189.250	2.100	189.240	1.757	189.210	1.736
24	189.280	2.675 *	189.310	3.083 *	189.270	1.799	189.250	2.309 *	189.240	2.195 *	189.210	1.952
25	189.280	2.675 *	189.310	2.756	189.270	1.790	189.250	2.309 *	189.240	1.686	189.210	1.851
26	189.280	2.675 *	189.310	3.083 *	189.260	1.930	189.260	2.030	189.240	1.573	189.210	1.710
27	189.280	2.675 *	189.310	2.293	189.260	1.785	189.260	2.426 *	189.250	1.843	189.210	1.810
28	189.280	2.492	189.300	2.276	189.260	2.426 *	189.260	1.957	189.230	1.585	189.200	1.690
29	189.280	2.675 *	189.300	2.067	189.270	2.107	189.240	1.869	189.220	1.595	189.200	1.783 *
30	189.280	2.675 *	189.310	2.352			189.250	1.846	189.240	1.760	189.200	1.705
31	189.280	2.745	189.310	3.083 *			189.240	1.851			189.210	1.886
Ten-Daily Mean												
I Ten-Daily	189.298	2.971	189.270	2.510	189.303	2.222	189.262	2.195	189.242	1.937	189.249	2.148
II Ten-Daily	189.297	2.952	189.306	2.753	189.285	1.998	189.249	2.134	189.236	1.914	189.215	1.853
III Ten-Daily	189.283	2.685	189.309	2.615	189.268	2.019	189.249	2.070	189.238	1.750	189.215	1.886
Monthly												
Min.	189.280	2.492	189.270	2.067	189.260	1.778	189.230	1.843	189.220	1.555	189.180	1.553
Max.	189.310	3.295	189.330	3.265	189.320	2.942	189.280	2.716	189.250	2.195	189.270	2.476
Mean	189.292	2.863	189.295	2.626	189.286	2.082	189.253	2.131	189.239	1.867	189.226	1.96

Peak Computed Discharge = 69.45 cumecs on 20/09/2015

Corres. Water Level :190.33 m

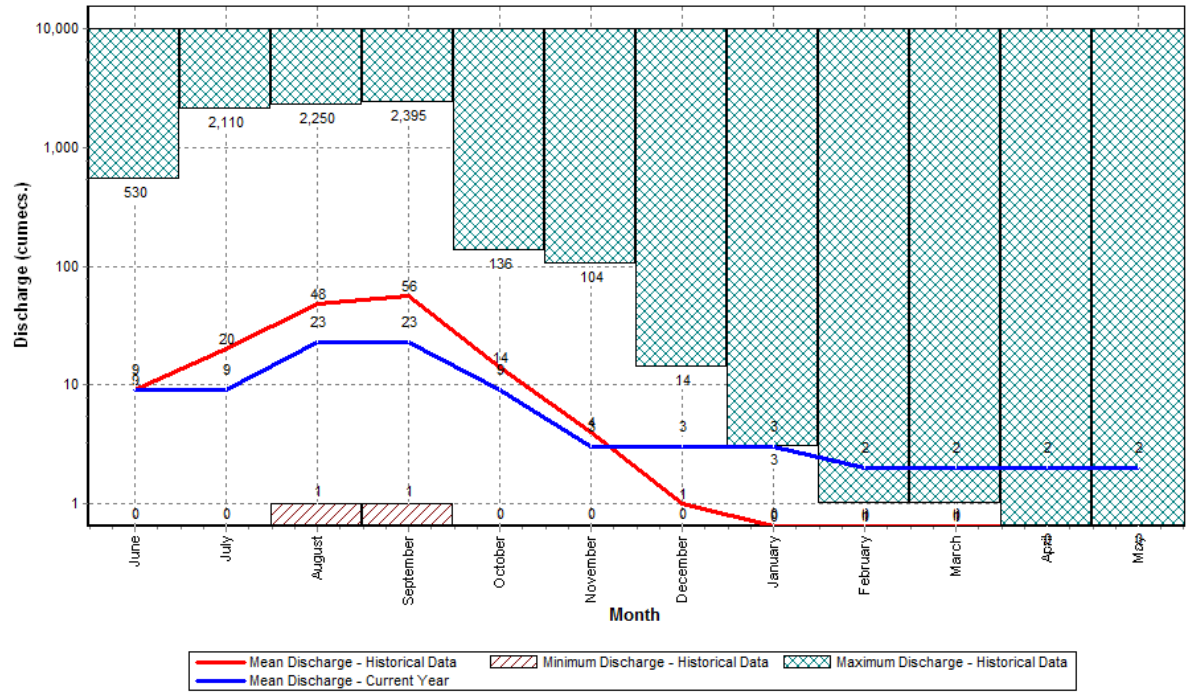
Lowest Computed Discharge = 0.000 cumecs on 10/06/2015

Corres. Water Level :189.01 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 : 2015-16 (Data considered : 1999-2016)



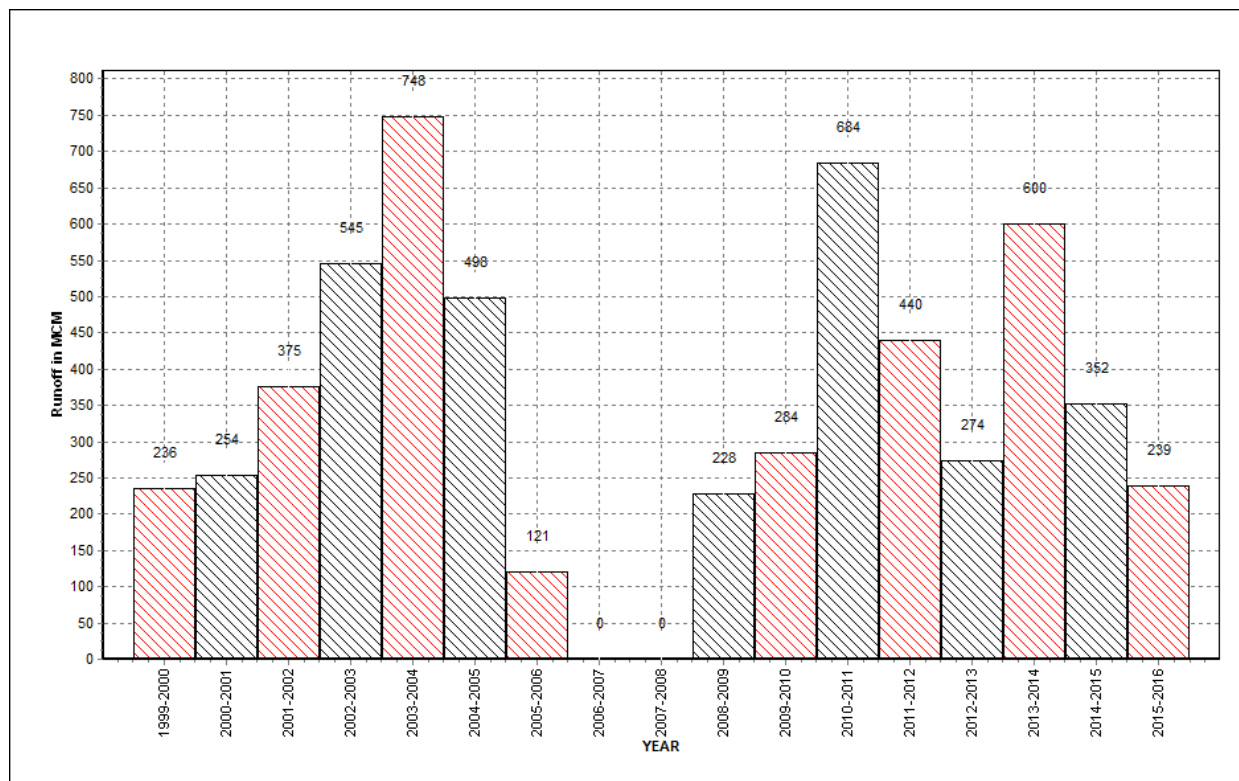
Annual Runoff Values for the period (1999 – 2016)

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

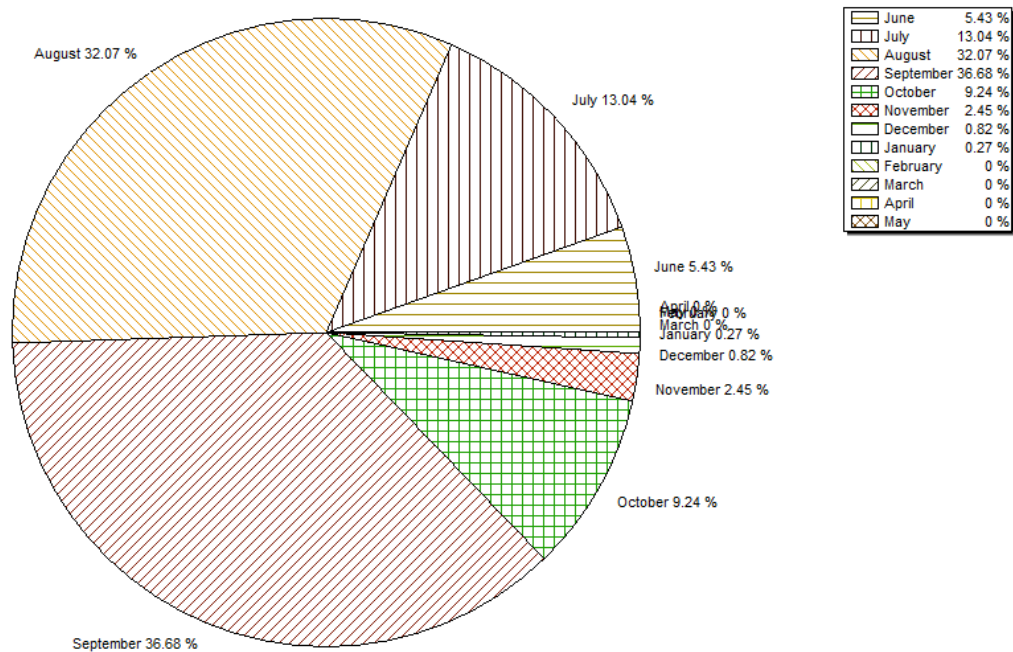
Monthly Average Runoff based on period (1999 – 2016)

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

Local River : Goi

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



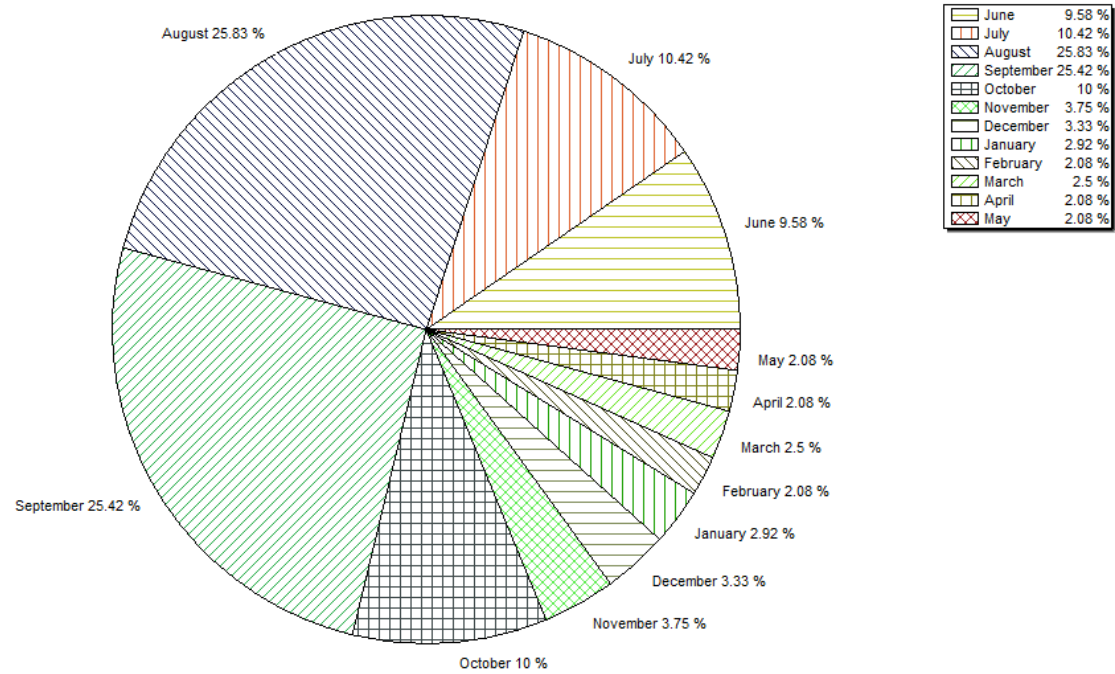
Monthly Runoff for the Year (2015-16)

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

Local River : Goi

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



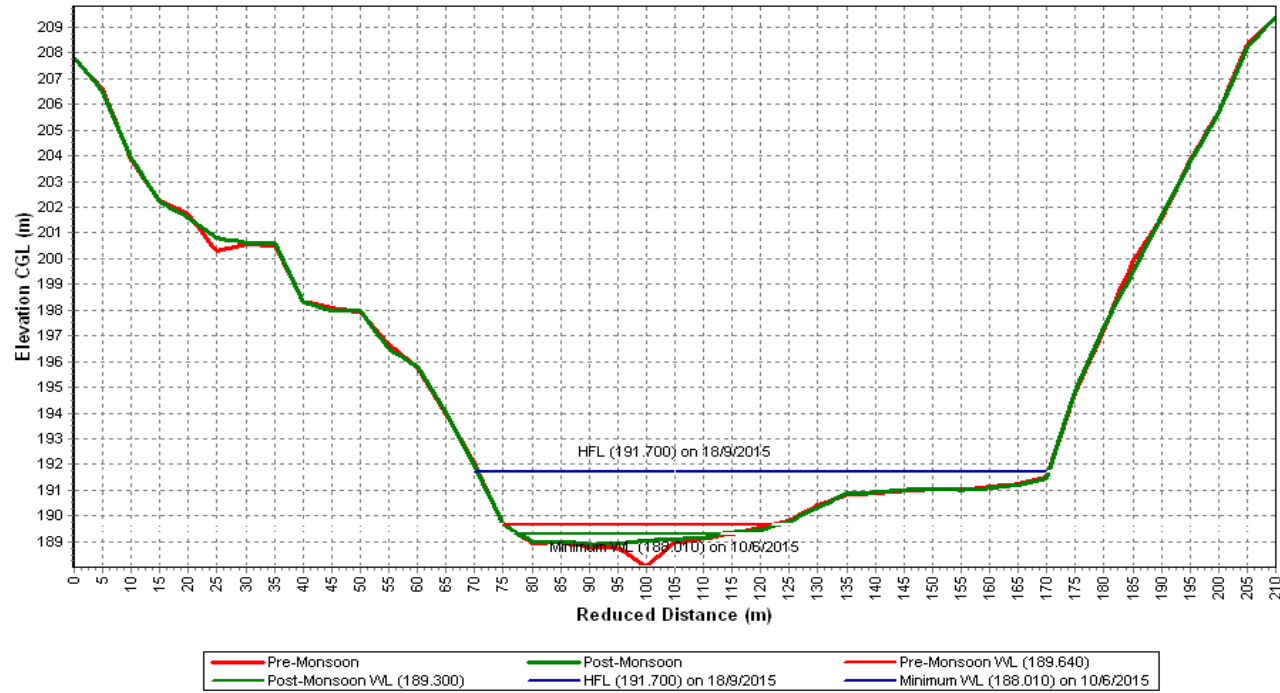
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

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

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



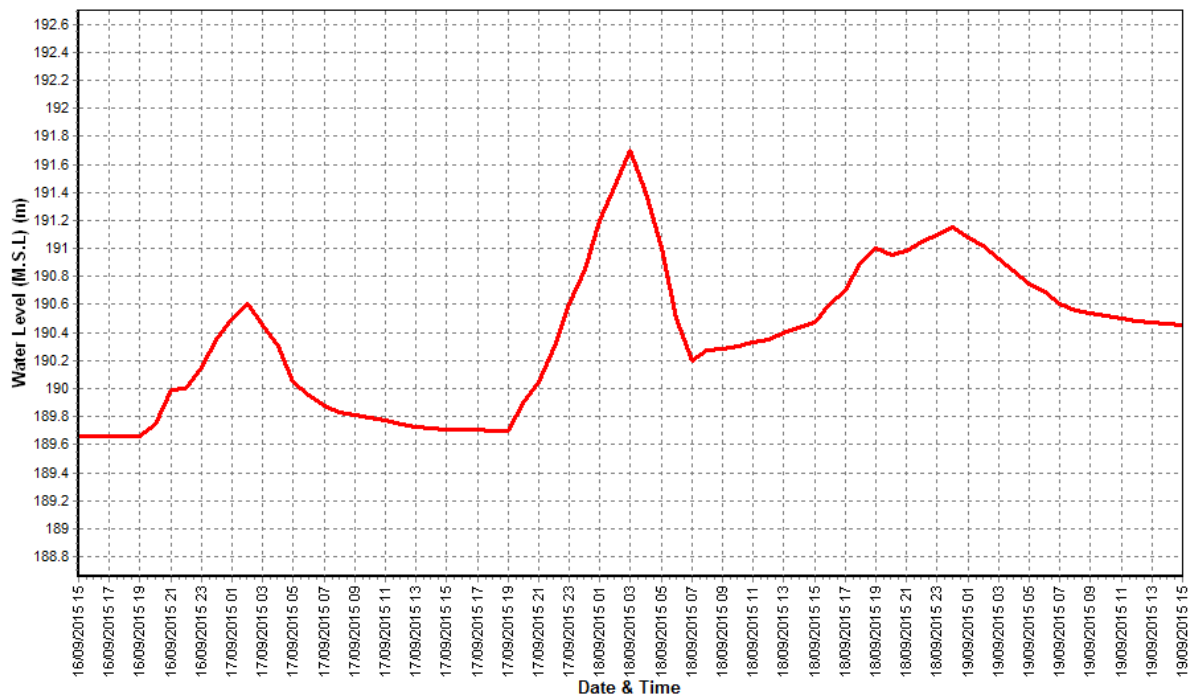
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

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

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



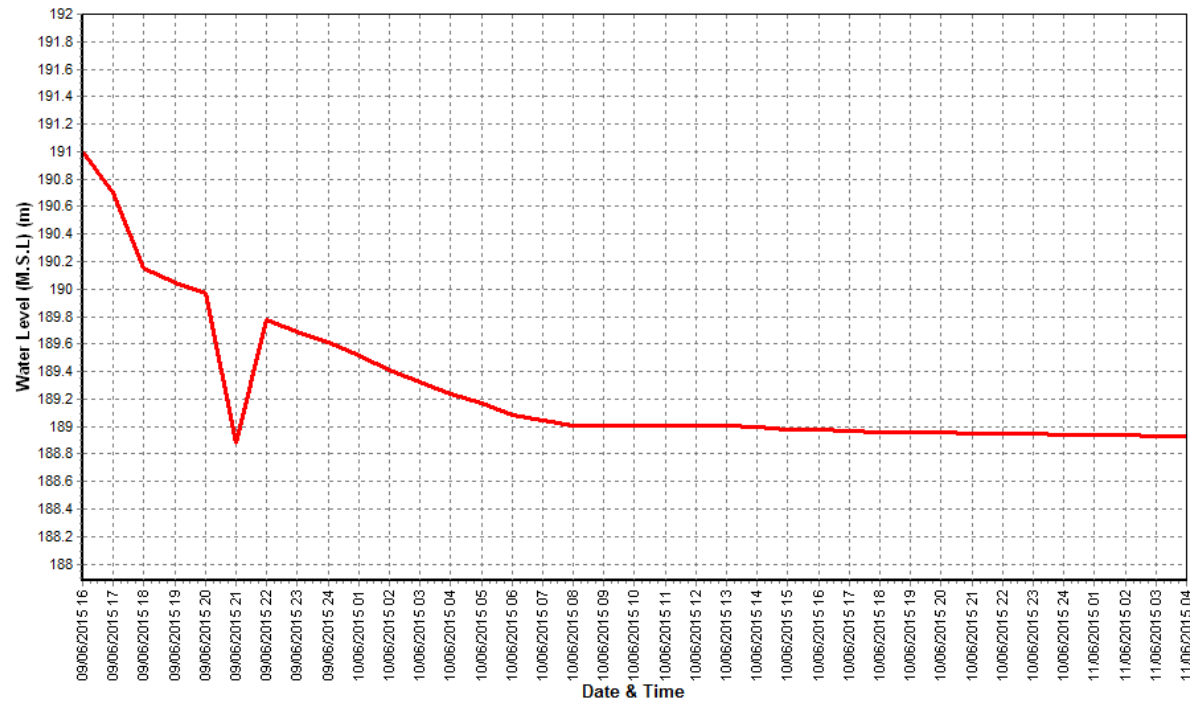
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

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

Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



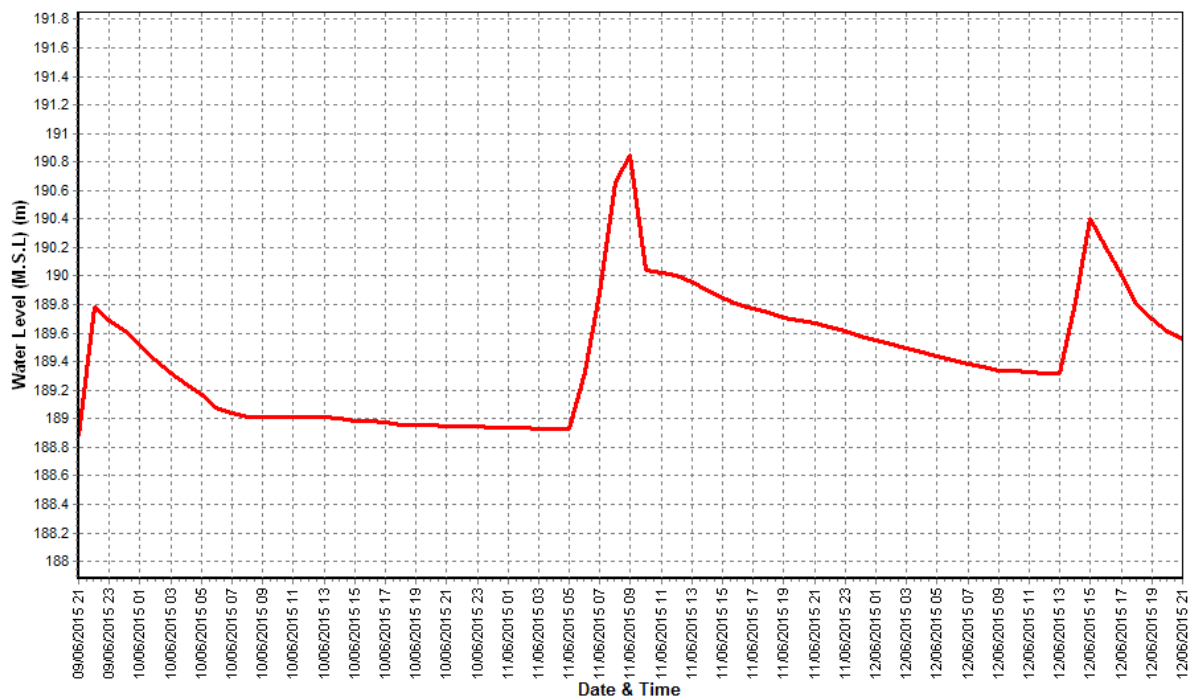
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

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

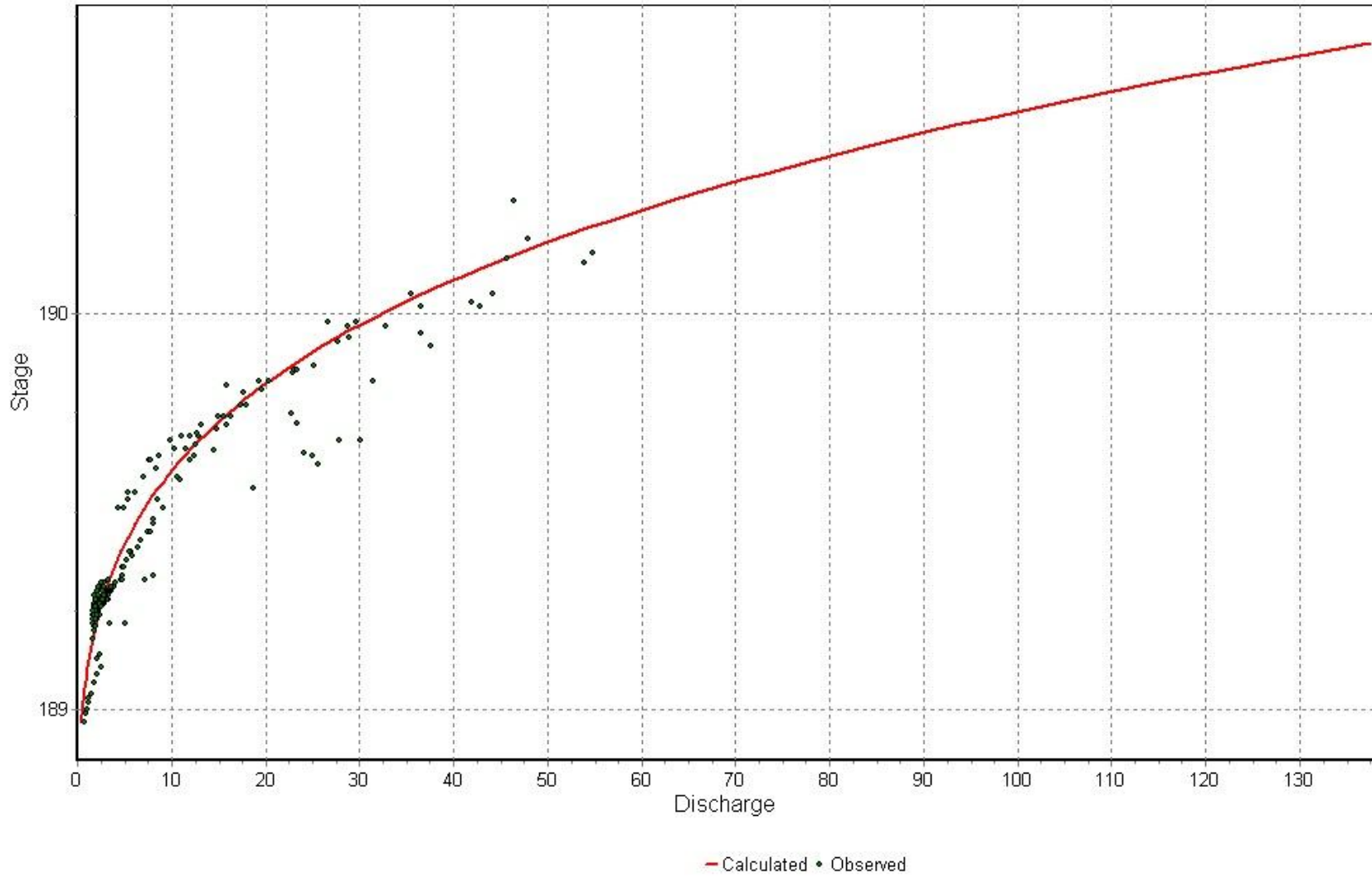
Division : Narmada Division, Bhopal

Local River : Goi

Sub-Division :MNSD III, CWC Indore



STAGE DISCHARGE CURVE OF SITE PATI 15-16



4.4 Uri at Dhulsar

History sheet

Site	: Uri at Dhulsar	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: NCA DHULSAR
		District	Dhar
		Independent	
Basin	: Narmada	River	: Narmada
Tributary	: Uri	Local River	: Uri
Division	: Narmada Division Bhopal	Sub-Division	: MNSD III CWC Indore
Drainage			
Area	: 787 Sq. Km.	Bank	: Right
Latitude	: 22°12'20"	Longitude	: 74°51'06"
Zero of Gauge (m)	: 151 (M.S.L.)		
	Opening Date	15/06/2008	Closing Date
Gauge	: 15/06/2008		
Discharge	: 15/06/2008		
Sediment	:		
Water			
Quality	: 01/08/2008		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1999-2000	510.0	153.330	19/06/1999	0.000		07/05/2000
2000-2001	40.00	152.450	01/07/2000	0.000		20/01/2001
2001-2002	200.0	153.400	18/06/2001	0.000		09/05/2002
2002-2003	377.0	154.500	24/08/2002	0.000		28/11/2002
2003-2004	385.0	154.500	24/08/2003	0.000		05/02/2004
2004-2005	616.0	155.100	05/08/2004	0.000		16/11/2004
2005-2006	223.1	153.550	28/07/2005	0.000		26/12/2005
2008-2009	20.50	152.030	14/09/2008	0.000		25/01/2009
2009-2010	40.66	152.220	07/09/2009	0.000		06/07/2009
2010-2011	298.8	153.310	09/09/2010	0.000		14/11/2010
2011-2012	91.05	152.500	13/08/2011	0.000		26/01/2012
2012-2013	422.8	153.480	06/09/2012	0.000		25/01/2013
2013-2014	175.5	152.950	27/07/2013	0.000		12/02/2014
2014-2015	1094	155.100	08/09/2014	0.428	151.400	03/11/2014

Stage Discharge Sheet for Uri at Dhulsar for the period 2015-16

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		0.000	151.390	0.497	152.100	28.73	151.700	4.771	151.630	1.764		
2		0.000	151.320	0.000 *	152.050	23.56 *	151.690	3.747	151.620	2.893 *		
3		0.000	151.290	0.000 *	152.000	19.93	151.690	3.730	151.600	1.198		
4		0.000	151.270	0.000 *	151.980	15.97	151.660	3.112	151.590	2.299 *		
5		0.000	151.250	0.000 *	152.235	50.42	151.640	1.971	151.580	0.971		
6		0.000	151.230	0.000 *	152.360	63.17	151.620	2.893 *	151.550	0.726		
7		0.000	151.220	0.000 *	152.210	34.08	151.600	1.201	151.540	0.707		
8		0.000	151.210	0.000 *	152.140	31.79	151.570	1.040	151.540	0.692		
9		0.000		0.000	152.090	26.91 *	151.550	0.742	151.530	1.356 *		
10		0.000		0.000	152.030	27.43	151.530	0.459	151.530	1.356 *		
11		0.000		0.000	151.990	24.17	151.560	0.833	151.520			
12		0.000		0.000	151.960	19.75	151.553	0.697	151.520			
13		0.000		0.000	152.035	27.29	151.540	1.491 *	151.520			
14		0.000		0.000	151.960	21.28	151.650	2.325	151.510			
15	151.480	0.794 *		0.000	151.930	15.15 *	151.950	19.80	151.500			
16	151.380	0.650 *		0.000	151.910	13.96 *	151.955	20.30	151.480			
17	151.360	0.550 *		0.000	151.880	15.82	151.980	18.37 *	151.450			
18	151.480	1.246		0.000	151.870	15.49	151.850	13.82	151.440			
19	151.440	0.749		0.000	151.850	13.50	151.850	13.94	151.400			
20	151.600	2.623	151.940	18.33	151.830	13.27	151.820	9.373 *	151.390			
21	151.450	0.450 *	151.720	8.976	151.820	12.05	151.800	11.11	151.380			
22	151.520	1.402	151.800	11.86	151.810	11.75	151.770	9.937	151.380			
23	151.470	1.105	151.740	9.084	151.790	8.091 *	151.760	9.611	151.350			
24	151.420	0.526	151.680	6.640	151.770	9.405	151.750	6.563 *	151.330			
25	151.420	0.518	151.700	8.246	151.760	9.099	151.730	5.873 *	151.310			
26	151.430	0.797	152.470		151.730	6.892	151.710	5.073	151.290			
27	151.500	1.384	153.020	184.4	151.710	5.812	151.690	4.636 *	151.270			
28	151.450	0.450 *	152.740	129.2	151.690	3.841	151.670	2.937		0.000		
29	151.410	0.503	152.450	71.91	151.680	3.698	151.650	2.483		0.000		
30	151.400	0.494	152.310	42.91	151.660	3.826 *	151.650	2.428		0.000		
31			152.180	30.06	151.700	4.344				0.000		
Ten-Daily Mean												
I Ten-Daily		0.000	151.272	0.050	152.119	32.20	151.625	2.367	151.571	1.396		
II Ten-Daily	151.457	0.661	151.940	1.833	151.921	17.97	151.771	10.10	151.473			
III Ten-Daily	151.447	0.763	152.165	50.33	151.738	7.165	151.718	6.065	151.330	0.000		
Monthly												
Min.	151.360	0.000	151.210	0.000	151.660	3.698	151.530	0.459	151.270	0.000		
Max.	151.600	2.623	153.020	184.4	152.360	63.17	151.980	20.30	151.630	2.893		
Mean	151.451	0.475	151.796	17.4	151.920	18.72	151.705	6.176	151.472	0.997		

Annual Runoff in MCM = 114 Annual Runoff in mm = 144

Peak Observed Discharge = 184.4 cumecs on 27/07/2015 Corres. Water Level :153.02 m

Lowest Observed Discharge = 0.000 cumecs on 01/06/2015

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 2015-16

	Dec		Jan		Feb		Mar		Apr		May	
	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Ten-Daily Mean												
I Ten-Daily												
II Ten-Daily												
III Ten-Daily												
Monthly												
Min.												
Max.												
Mean												

Peak Computed Discharge = 26.91 cumecs on 09/08/2015

Corres. Water Level :152.09 m

Lowest Computed Discharge = 0.000 cumecs on 02/07/2015

Corres. Water Level :151.32 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

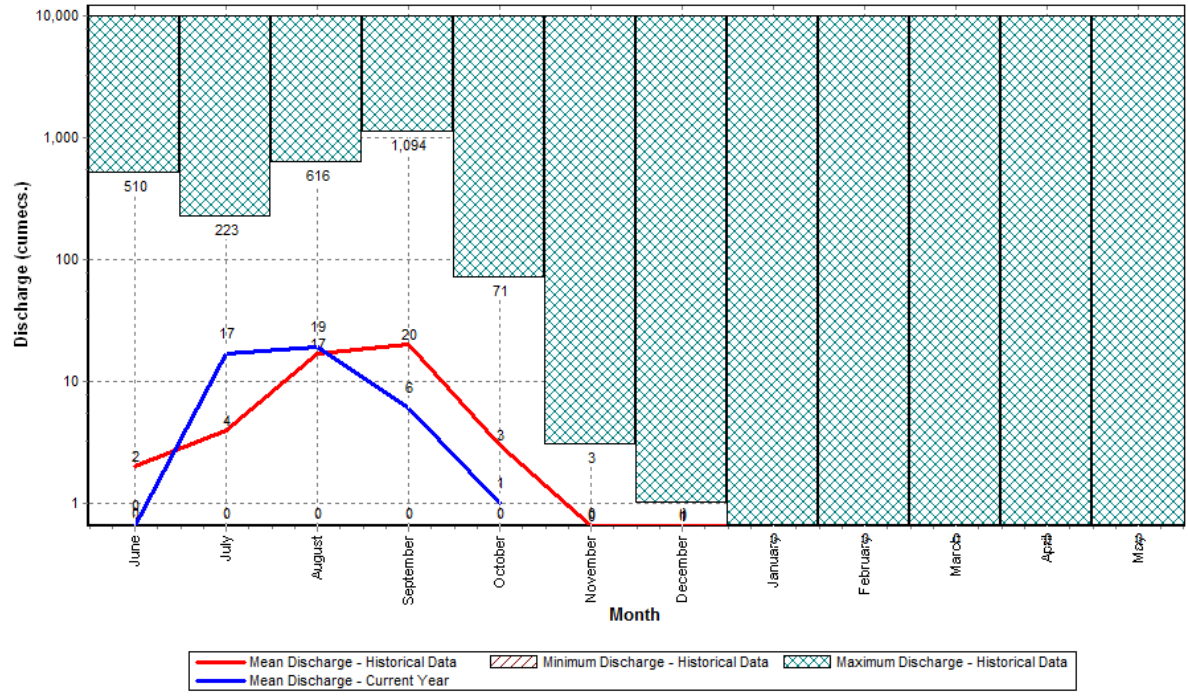
Histogram- Hydrograph for Water Year 2015-16(Data considered : 1999-2016)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



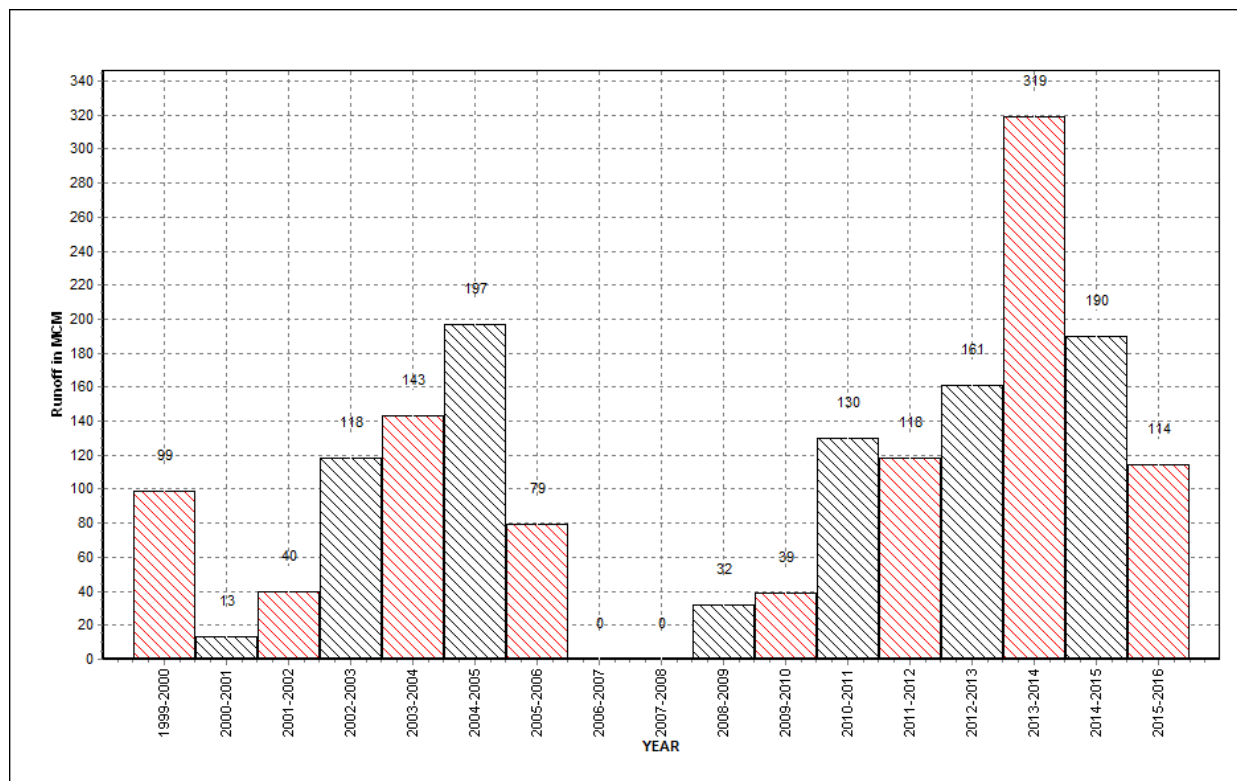
Annual Runoff Values for the period (1999 – 2016)

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

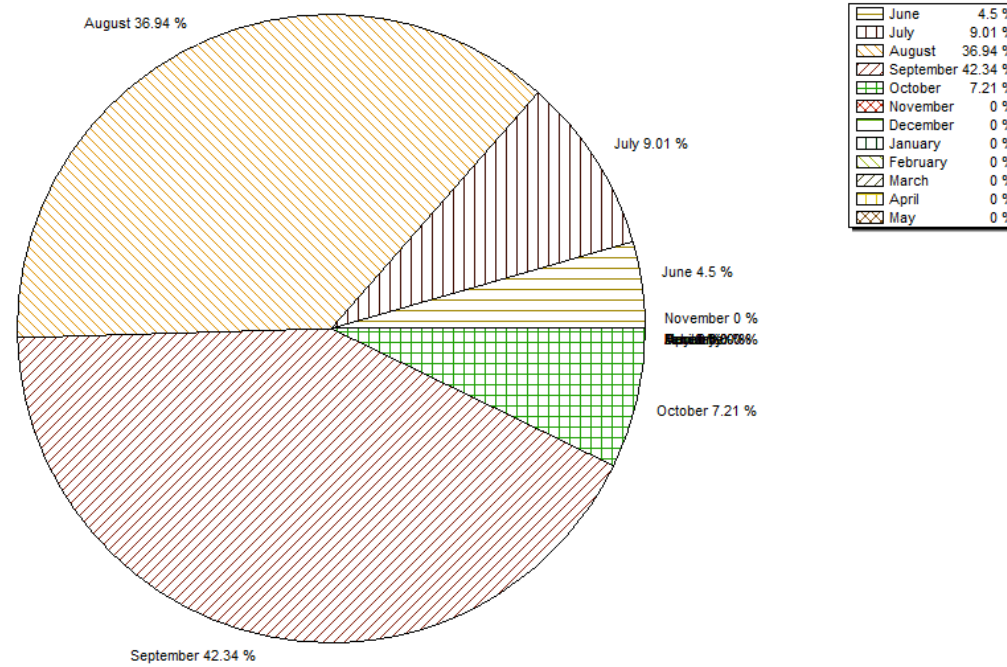
Monthly Average Runoff based on period (1999-2016)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Local River : Uri

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



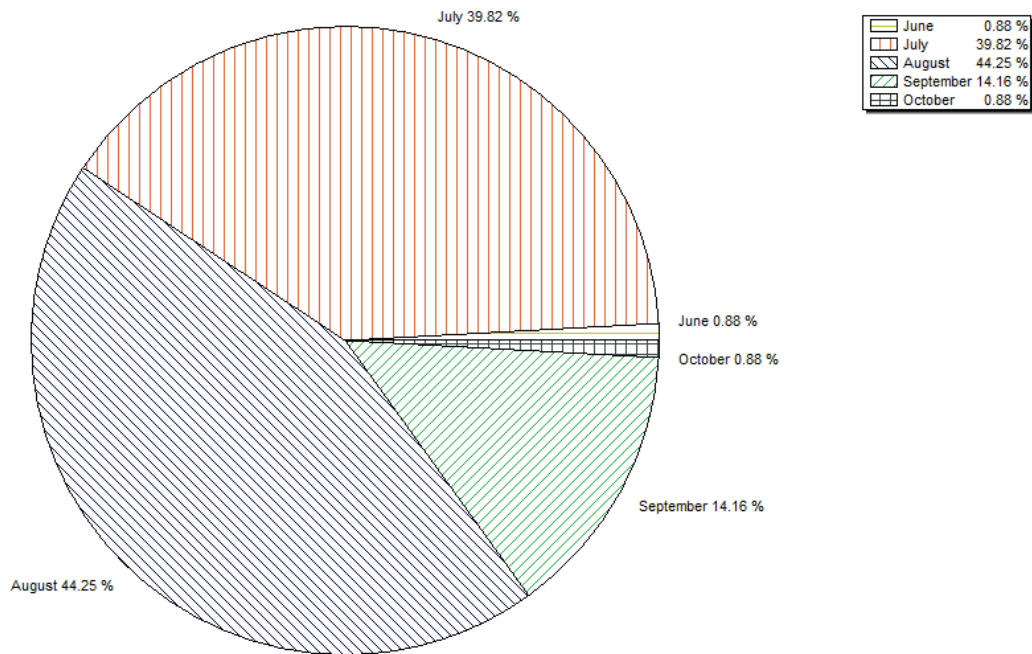
Monthly Runoff for the Year (2015-16)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Local River : Uri

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



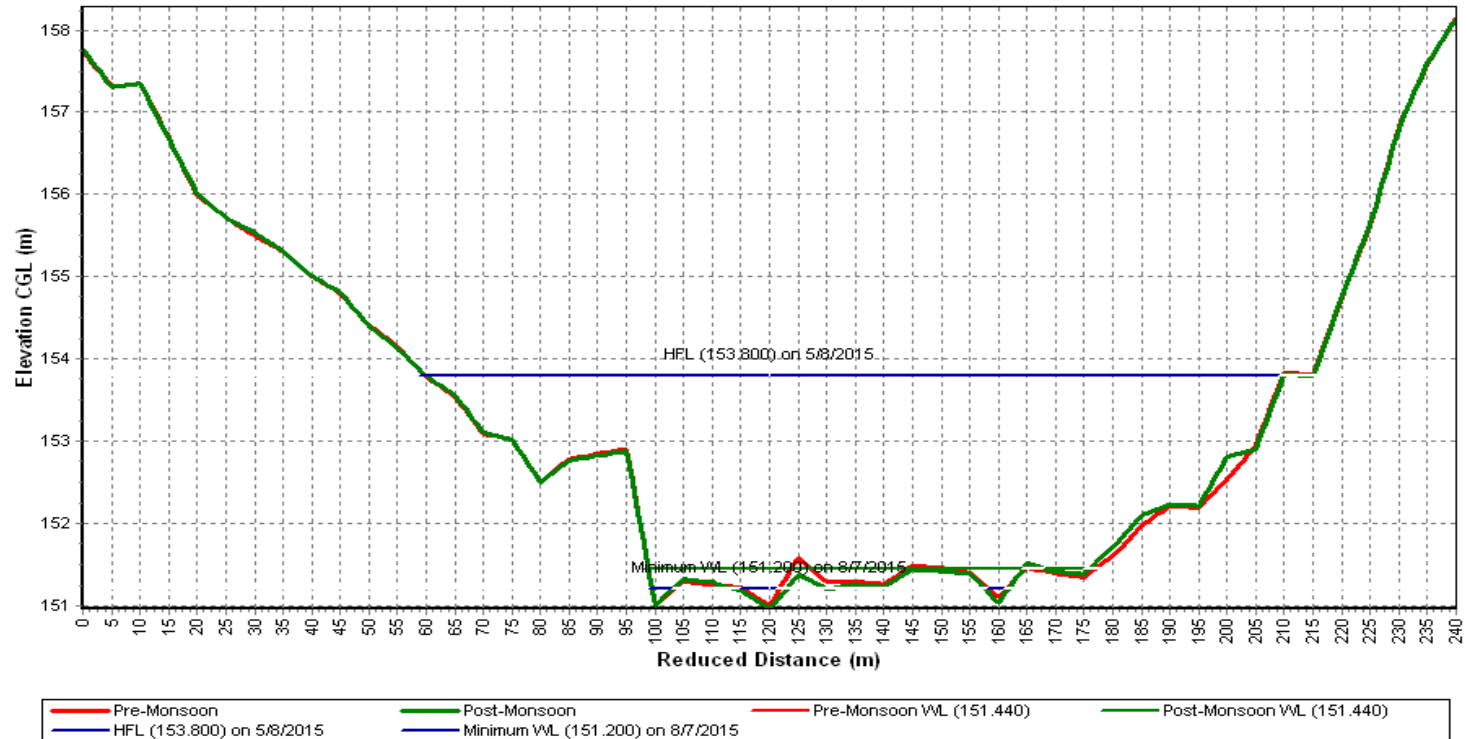
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



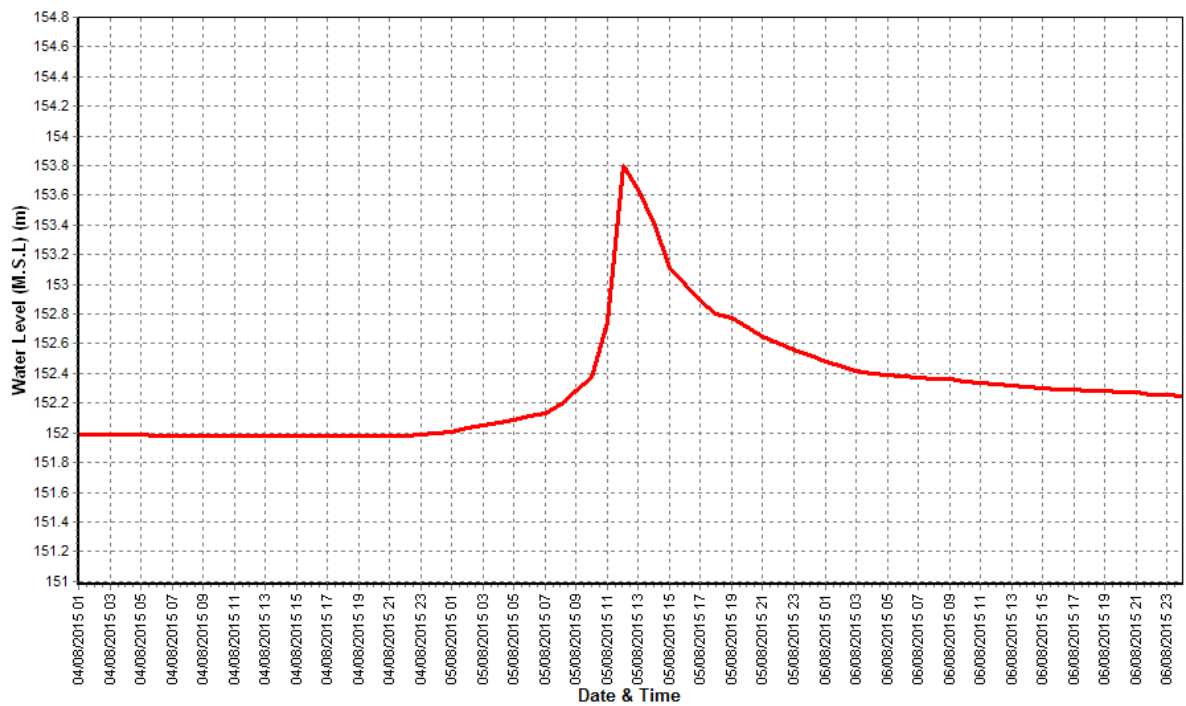
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



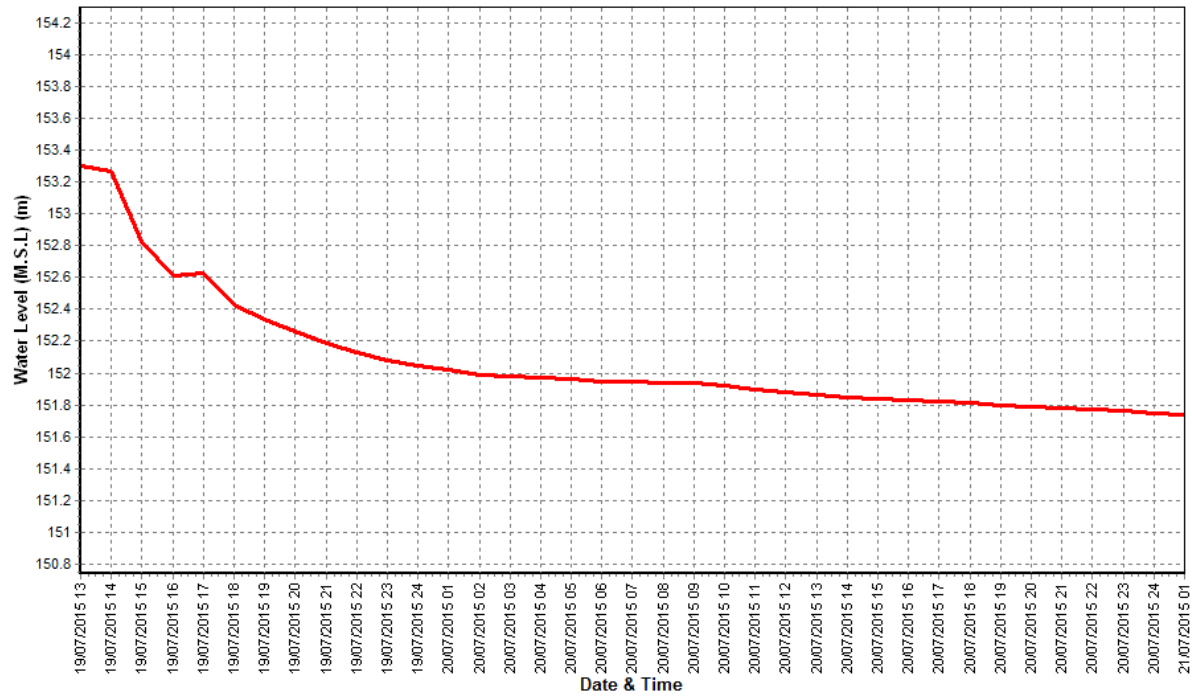
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Uri at Dhulsar (NCA DHULSAR)

Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



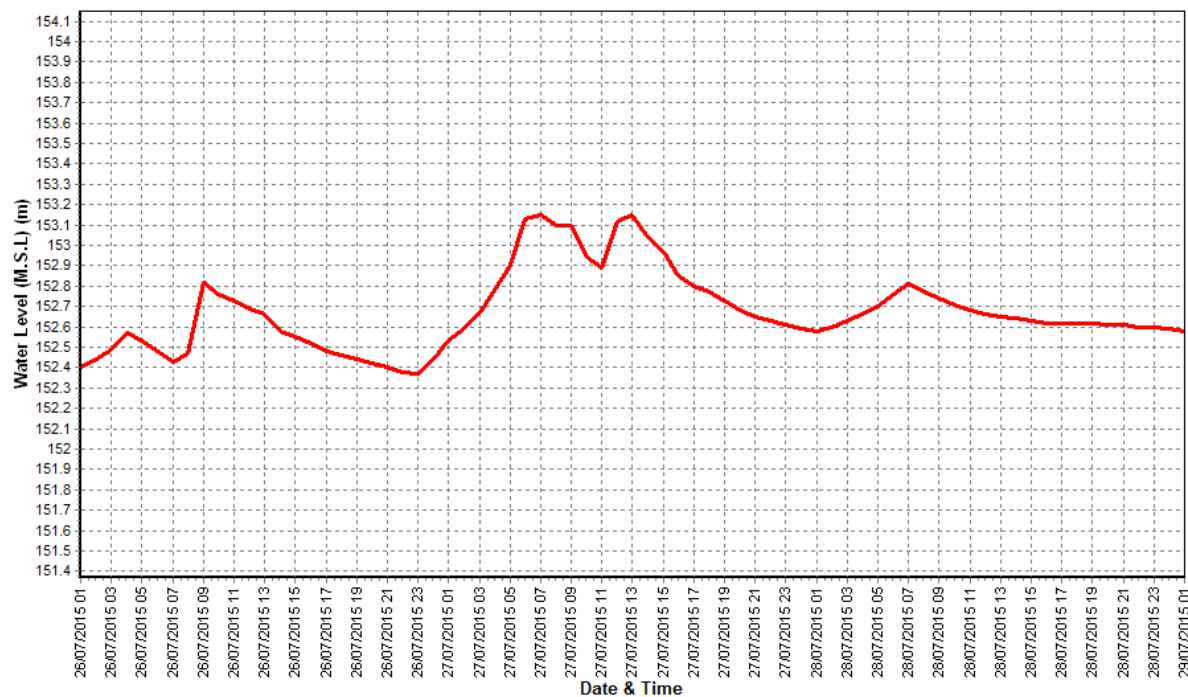
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Uri at Dhulsar (NCA DHULSAR)

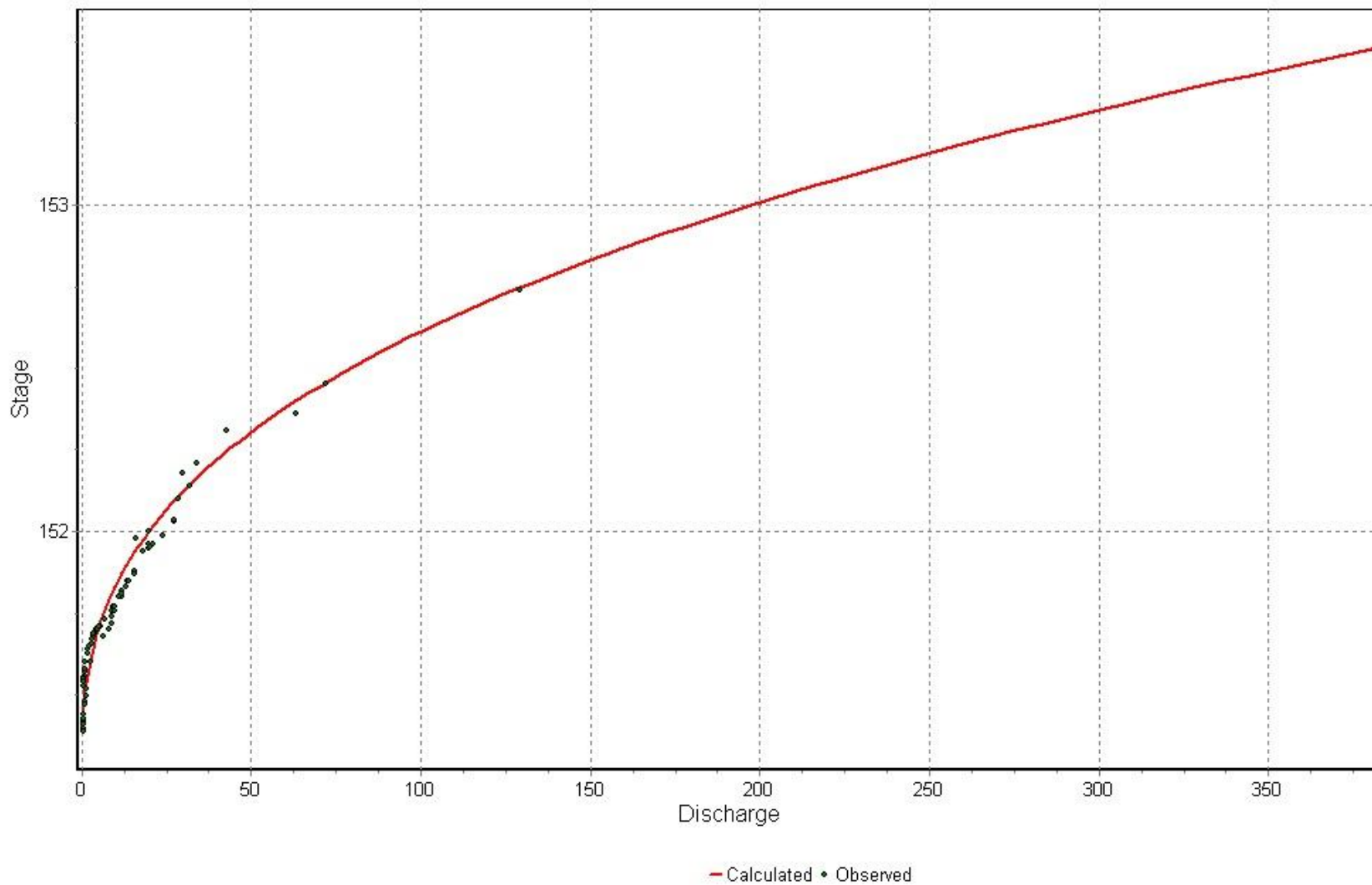
Division : Narmada Division, Bhopal

Local River : Uri

Sub-Division :MNSD III, CWC Indore



STAGE DISCHARGE CURVE OF SITE DHULSAR 15-16



4.5 Narmada at Mandleshwar

History Sheet

Site	: Narmada at Mandleshwar	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215026
Basin	: Narmada	District	: Khargone
Tributary	:	Independent	
Division	: Narmada Division Bhopal	River	: Narmada
Drainage		Local River	: Narmada
Area	: 72809 Sq. Km.	Sub-Division	: MNSD III Indore
Latitude	: 22°10'18"	Bank	: Right
Zero of Gauge (m)	: 138 (M.S.L.)	Longitude	: 75°39'39"
	Opening Date		16/12/1970
Gauge	: 16/12/1970		Closing Date
Discharge	: 28/08/1971		
Sediment	: 14/04/1972		
Water Quality	: 18/06/1979		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1972-1973	43000	156.000	18/08/1972	26.50	139.135	28/05/1973
1973-1974	44900	157.100	31/08/1973	28.20	139.225	25/05/1974
1974-1975	31454	153.215	20/08/1974	32.40	139.140	30/05/1975
1975-1976	32214	152.685	12/09/1975	19.10	139.186	16/06/1975
1976-1977	12928	147.073	06/08/1976	11.00	139.505	30/12/1976
1977-1978	24844	150.100	15/09/1977	55.40	139.245	26/05/1978
1978-1979	27373	150.575	30/08/1978	49.90	139.215	08/06/1978
1979-1980	32084	151.600	10/08/1979	34.50	139.122	31/05/1980
1980-1981	21844	149.750	30/08/1980	37.50	139.260	02/06/1980
1981-1982	27984	151.905	10/08/1981	39.20	139.275	17/05/1982
1982-1983	17050	147.935	23/08/1982	36.30	139.235	28/05/1983
1983-1984	19420	148.970	11/09/1983	24.60	139.160	10/06/1983
1984-1985	46000	155.550	19/08/1984	33.90	139.190	31/05/1985
1985-1986	13850	147.710	10/08/1985	30.20	139.235	26/05/1986
1986-1987	32600	152.550	15/08/1986	31.80	139.220	11/06/1986
1987-1988	21313	149.190	28/08/1987	16.43	139.120	31/05/1988
1988-1989	21400	149.200	05/08/1988	11.92	139.080	06/06/1988
1989-1990	13650	147.070	08/08/1989	16.00	139.100	04/06/1989
1990-1991	37750	153.200	23/08/1990	108.0	139.500	14/06/1990
1991-1992	21750	149.200	31/07/1991	22.60	139.770	08/06/1991
1992-1993	9900	145.680	18/08/1992	40.00	139.400	09/06/1992
1993-1994	29000	151.800	17/07/1993	47.15	139.290	14/06/1993
1994-1995	48200	157.230	06/09/1994	118.2	139.660	12/05/1995
1995-1996	12500	147.000	25/07/1995	58.00	139.370	26/05/1996
1996-1997	31025	152.000	28/07/1996	69.48	139.420	26/06/1996
1997-1998	33500	153.150	26/07/1997	70.00	139.370	12/06/1997
1998-1999	27900	151.150	15/09/1998	54.14	139.290	31/05/1999
1999-2000	30150	151.660	21/09/1999	39.91	139.290	10/06/1999

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	5790	143.980	31/07/2000	55.15	139.390	05/05/2001
2001-2002	11725	146.000	16/08/2001	51.69	139.360	04/06/2001
2002-2003	14950	147.980	03/09/2002	57.00	139.420	25/05/2003
2003-2004	11905	146.660	29/07/2003	3.458	138.820	27/11/2003
2004-2005	12100	146.740	25/08/2004	12.00	139.030	14/04/2005
2005-2006	8794	145.300	04/08/2005	51.53	139.380	30/03/2006
2006-2007	18483	148.550	20/08/2006	15.30	139.300	22/04/2007
2007-2008	10692	145.820	08/08/2007	69.90	139.400	20/06/2007
2008-2009	1584	141.650	20/07/2008	149.8	139.780	09/06/2008
2009-2010	15828	147.750	12/09/2009	82.57	139.780	12/11/2009
2010-2011	10258	145.990	09/09/2010	85.42	139.520	23/06/2010
2011-2012	17699	148.750	27/08/2011	266.6	139.940	08/05/2012
2012-2013	33479	153.150	06/09/2012	46.27	139.490	17/02/2013
2013-2014	46398	154.575	24/08/2013	214.0	139.575	12/05/2014
2014-2015	10408	145.750	08/09/2014	3.172	139.090	11/07/2014

Stage Discharge Sheet for Narmada at Mandleshwar for the period 2015-16

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	139.650	215.8	140.540	685.6	140.690	823.9	140.790	920.2	139.660	209.7	140.550	656.4 *
2	139.550	210.6	140.330	493.1	140.500	620.2 *	140.600	730.4	139.530	141.1 *	140.190	405.3
3	139.520	204.9	140.240	434.0	140.980	1107	140.790	920.9	140.280	455.7	140.530	665.4
4	139.900	261.1	140.595	746.0	140.710	835.9	141.010	1135	139.920	285.7 *	140.700	772.1 *
5	140.120	365.3	140.310	493.8 *	146.600	16922 *	141.100	1240	140.570	699.4	140.750	878.7
6	139.700	227.8	140.480	616.2	144.150	7122 *	141.680	1821 *	140.490	630.5	139.820	237.4
7	139.860	259.5 *	140.010	302.3	141.160	1300	140.950	1079	140.430	580.8	139.690	212.1
8	139.650	214.6	140.680	814.5	140.580	709.2	140.730	860.7	140.590	701.5	139.900	276.8 *
9	140.350	511.7	140.180	397.2	141.100	1137 *	140.220	419.2	140.090	345.7	139.930	273.4
10	139.680	215.5	139.670	215.8	141.090	1212	140.670	790.8	139.710	220.2	140.170	382.7
11	139.850	240.0	139.450	193.0	141.200	1306	139.870	242.4	139.710	200.4 *	139.960	304.0 *
12	140.050	325.9	139.620	169.2 *	141.890	2103	140.520	635.3	140.320	490.3	139.680	216.8
13	139.830	235.7	140.340	510.5	142.120	2300	140.480	606.1 *	140.400	550.1	139.830	242.1
14	140.050	347.6 *	141.030	1155	142.080	2259	139.960	285.2	141.070	1197		251.8
15	140.260	439.3	141.080	1209	142.440	3019 *	139.950	280.8	141.130	1263	139.980	313.4 *
16	140.160	380.9	141.140	1277	142.340	2840 *	140.520	656.7	141.090	1192	140.050	328.7
17	140.070	335.2	141.120	1250	142.120	2311	140.400	551.5 *	140.250	434.2	140.220	420.7
18	140.170	389.8	140.700	772.1 *	141.945	2230	141.500	1551	141.100	1137 *	140.030	318.9
19	139.970	286.7	139.710	200.4 *	141.960	2235	140.740	865.4	140.630	764.2	140.490	588.4
20	140.560	690.6	140.910	1042	141.940	2224	140.550	656.4 *	140.530	665.5	140.230	426.5
21	139.940	294.7 *	141.000	1126	141.900	2215	139.850	245.6	140.430	585.3	140.550	674.0
22	140.105	369.3	141.070	1206	141.910	2224	139.670	210.2	140.140	394.8 *	140.350	519.0 *
23	141.130	1255	141.220	1360	141.940	2191 *	140.290	470.8	140.330	494.3	140.760	882.5
24	140.140	375.6	140.640	772.0	141.390	1559	140.660	738.9	140.250	457.3 *		516.5
25	139.620	204.0	140.800	930.1	141.510	1691	140.350	519.0 *	140.600	693.7 *	140.770	830.0 *
26	140.570	689.8	140.280	475.3 *	141.150	1285	140.060	335.4	140.280	460.6	140.760	879.9
27	139.930	270.8	140.860	996.9	141.150	1287	140.050	347.6 *	139.950	280.9	140.540	649.0 *
28	140.450	585.3 *	140.890	1025	140.560	690.5	140.540	669.3	139.750	225.4	139.750	224.3
29	140.350	515.0	140.630	759.2	141.000	1126	140.380	527.9	139.490	199.3	140.460	605.5
30	140.100	355.2	140.380	534.3	140.920	962.5 *	140.300	476.6	140.000	300.6	139.870	241.6
31			140.780	909.9	141.090	1220			140.660	777.4		
Ten-Daily Mean												
I Ten-Daily	139.798	268.7	140.303	519.9	141.756	3179	140.854	991.7	140.127	427.0	140.223	476.0
II Ten-Daily	140.097	367.2	140.510	777.8	142.003	2283	140.449	633.1	140.623	789.4	140.052	341.1
III Ten-Daily	140.233	491.5	140.777	917.7	141.320	1496	140.215	454.1	140.171	442.7	140.423	602.2
Monthly												
Min.	139.520	204.0	139.450	169.2	140.500	620.2	139.670	210.2	139.490	141.1	139.680	212.1
Max.	141.130	1255	141.220	1360	146.600	16922	141.680	1821	141.130	1263	140.770	882.5
Mean	140.043	375.8	140.538	744.2	141.681	2293	140.506	693	140.303	549.5	140.232	473.1

Annual Runoff in MCM = 21095 Annual Runoff in mm = 290

Peak Observed Discharge = 2311 cumecs on 17/08/2015 Corres. Water Level :142.12 m

Lowest Observed Discharge = 138.9 cumecs on 30/05/2016 Corres. Water Level :139.42 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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	139.960	281.1	140.380	530.1	140.050	290.5	140.200	400.6	140.410	545.2	140.430	571.6 *
2	140.330	499.1	140.400	550.8	140.200	423.3	140.000	295.0	140.580	672.7	140.430	554.8
3	140.270	454.4	140.310	493.8 *	140.180	381.0	140.230	414.9	139.960	304.0 *	140.430	555.1
4	140.370	530.4	140.150	380.4	140.095	345.1	140.250	430.6	139.960	262.7	140.430	555.4
5	140.370	530.0	140.080	340.7	140.060	331.9	140.080	328.2	140.590	681.1	140.430	557.1
6	140.520	634.5 *	140.370	525.3	140.190	403.4	140.840	890.4 *	140.260	428.6	140.430	554.2
7	140.500	637.1	140.290	400.2	140.180	416.9 *	140.840	944.6	140.250	422.5	140.430	554.2
8	140.350	515.3	140.110	359.6	140.090	339.5	140.840	944.0	140.440	559.0	140.440	578.4 *
9	140.550	685.8	140.025	316.6	140.110	355.0	140.840	940.8	140.120	342.1	140.450	570.1
10	140.500	640.4	140.080	362.9 *	140.100	353.4	140.750	854.2	140.030	337.6 *	140.450	568.5
11	140.450	595.5	140.085	341.2	140.110	345.8	140.710	835.0	140.080	327.6	140.450	567.4
12	140.390	544.8	139.880	243.9	140.130	356.1	140.460	568.0	140.500	622.8	140.450	569.4
13	140.360	525.4 *	139.900	253.4	140.660	971.6	140.150	400.2 *	140.330	485.1	140.450	568.9
14	140.100	353.0	140.030	319.1	140.840	890.4 *	139.515	225.7	140.040	342.6 *	140.450	568.2
15	140.110	339.0	140.080	340.7	140.830	954.5	140.080	328.8	140.580	678.6 *	140.440	578.4 *
16	140.160	383.8	140.070	334.9	140.360	519.1	139.720	202.4	140.430	554.6	140.460	578.0
17	140.270	454.0	139.750	215.3 *	139.900	252.7	139.870	234.9	140.430	571.6 *	140.460	579.4
18	140.290	468.3	139.980	288.0	140.210	417.3	140.120	343.5	140.440	563.9	140.460	577.8
19	140.300	475.9	139.700	215.5	140.420	562.5	140.210	346.0	140.430	555.0	140.460	577.8
20	140.120	384.0 *	139.950	280.2	140.410	554.5	140.300	487.6 *	140.430	571.6 *	140.460	578.7
21	140.220	421.6	140.480	613.9	140.220	439.7 *	140.120	342.6	139.830	208.7	140.460	592.2 *
22	140.210	418.3	140.080	342.8	140.300	466.7	140.420	554.3	139.660	191.7	140.460	592.2 *
23	140.250	434.7	140.370	525.3	140.550	673.6	140.250	420.8	140.430	555.1	140.470	588.8
24	140.150	400.2 *	140.530	641.8 *	140.380	530.7	140.258	462.1 *	140.430	571.6 *	140.400	537.0
25	140.220	439.7 *	140.590	721.4	140.180	394.3	139.750	215.3 *	140.430	554.5	140.460	578.3
26	140.290	470.4	140.850	899.2 *	139.980	253.9	139.900	245.1	140.430	553.0	140.190	361.9
27	140.190	422.5 *	140.500	672.4	139.790	221.5	139.850	255.2 *	140.430	553.5	139.770	199.9
28	140.100	353.0	140.490	620.4	139.890	272.4 *	140.150	354.8	140.430	554.6	139.580	166.4
29	140.180	395.9	140.250	449.7	140.280	444.1	139.920	255.5	140.430	554.2	138.570	53.50 *
30	140.410	555.7	140.350	515.2			140.400	538.1	140.430	554.6	139.420	138.9
31	140.520	653.9	140.170	411.3 *			140.390	535.1			140.600	706.8
Ten-Daily Mean												
I Ten-Daily	140.372	540.8	140.219	426.0	140.126	364.0	140.487	644.3	140.260	455.6	140.435	562.0
II Ten-Daily	140.255	452.4	139.942	283.2	140.387	582.5	140.113	397.2	140.369	527.3	140.454	574.4
III Ten-Daily	140.249	451.5	140.424	583.0	140.174	410.8	140.128	379.9	140.293	485.2	140.035	410.5
Monthly												
Min.	139.960	281.1	139.700	215.3	139.790	221.5	139.515	202.4	139.660	191.7	138.570	53.50
Max.	140.550	685.8	140.850	899.2	140.840	971.6	140.840	944.6	140.590	681.1	140.600	706.8
Mean	140.291	480.6	140.203	435.7	140.231	453.8	140.239	470.8	140.307	489.4	140.299	512.2

Peak Computed Discharge = 16922 cumecs on 05/08/2015

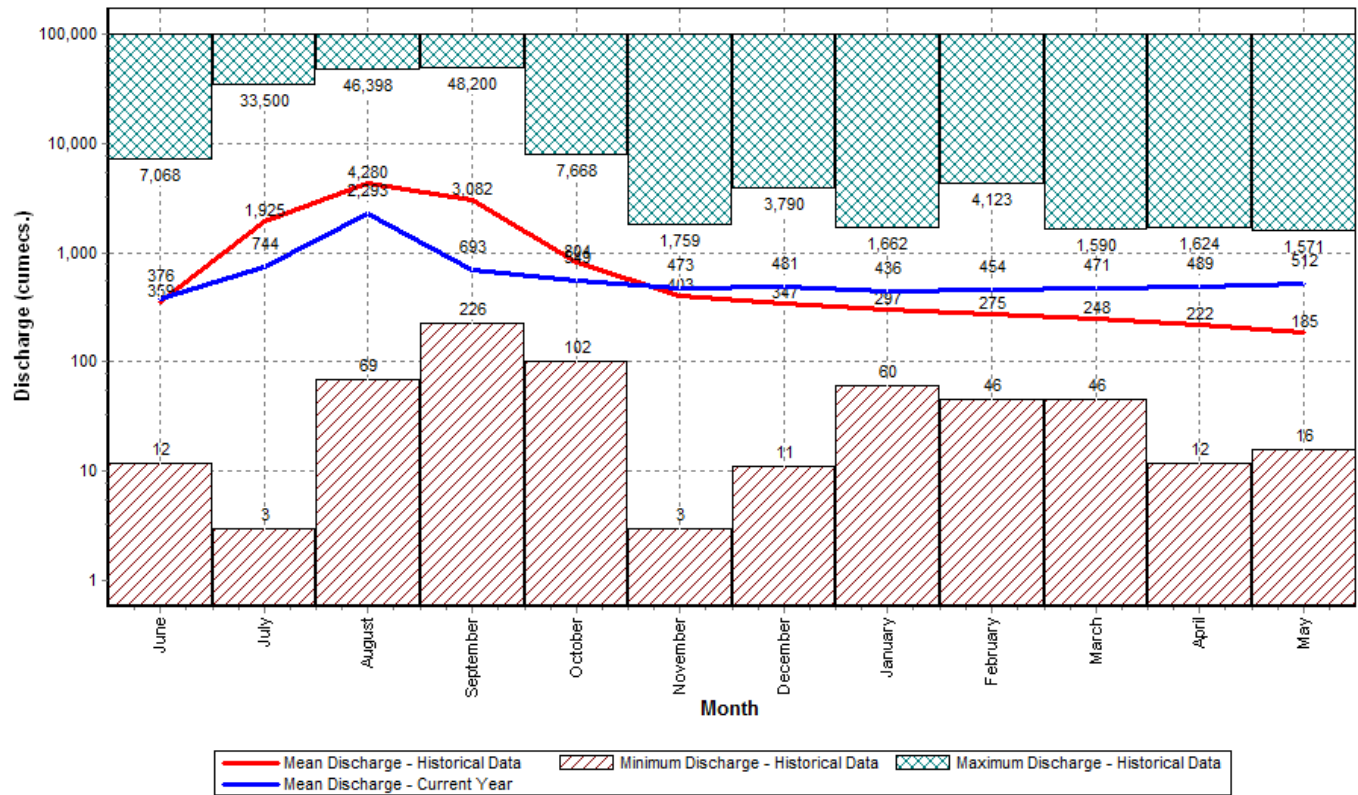
Corres. Water Level :146.6 m

Lowest Computed Discharge = 53.50 cumecs on 29/05/2016

Corres. Water Level :138.57 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 : 2015-16(Data considered : 1972-2016)



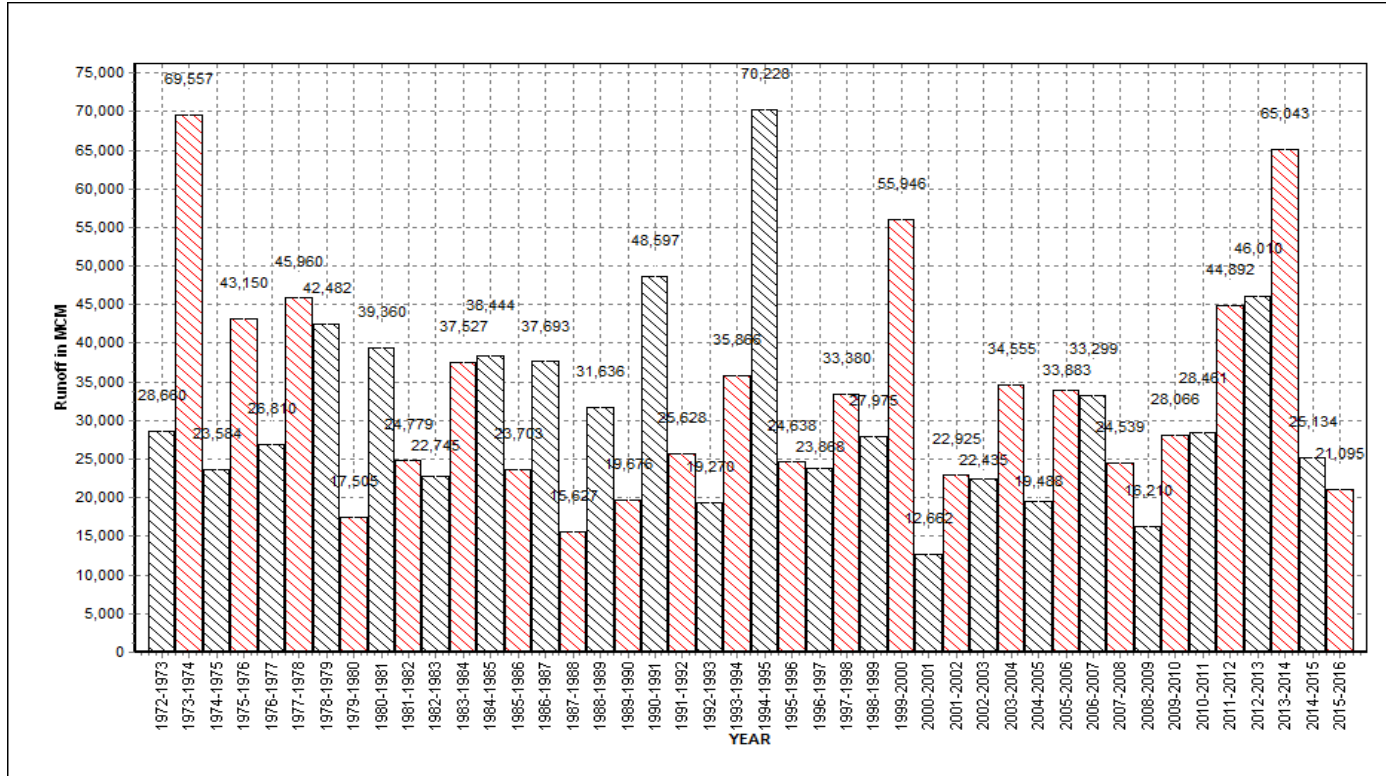
Annual Runoff Values for the period (1972 – 2016)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



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

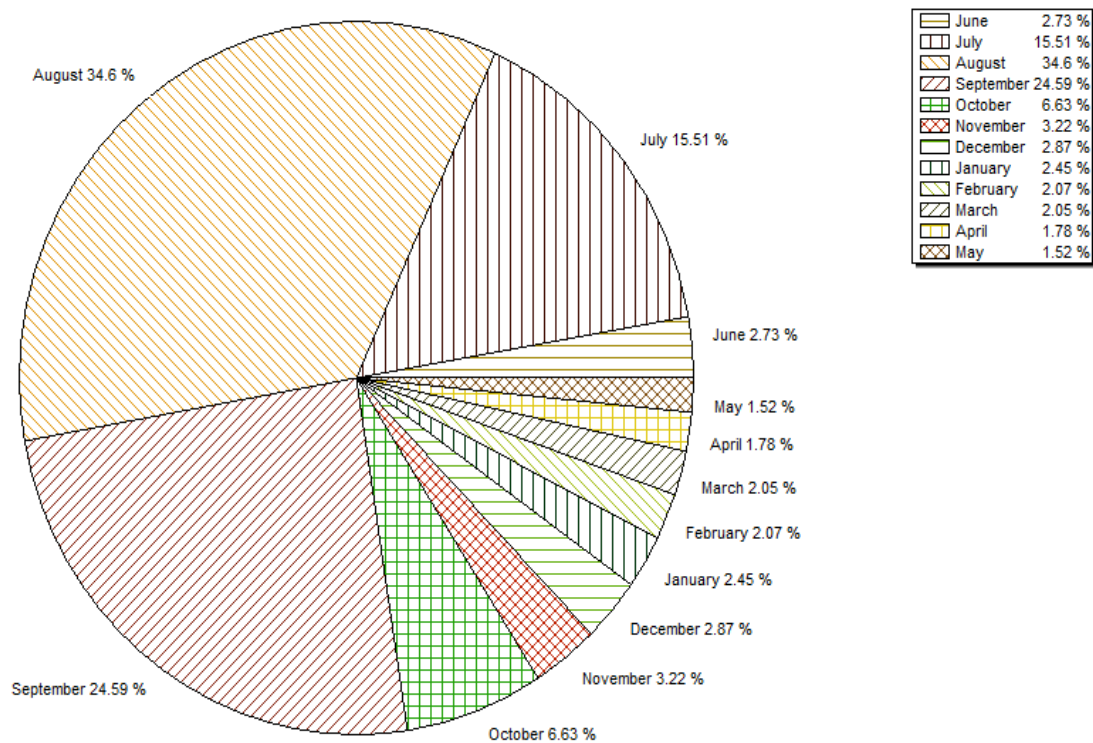
Monthly Average Runoff based on period (1972 – 2016)

Station Name : Narmada at Mandleshwar (010215026)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



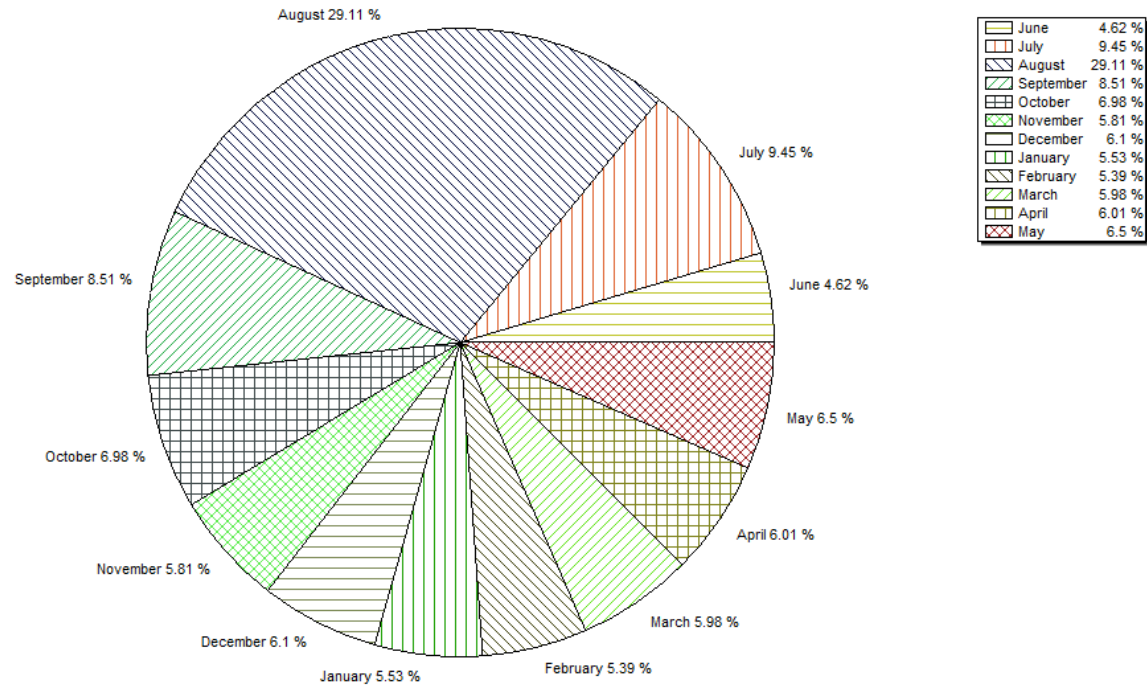
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Mandleshwar (010215026)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



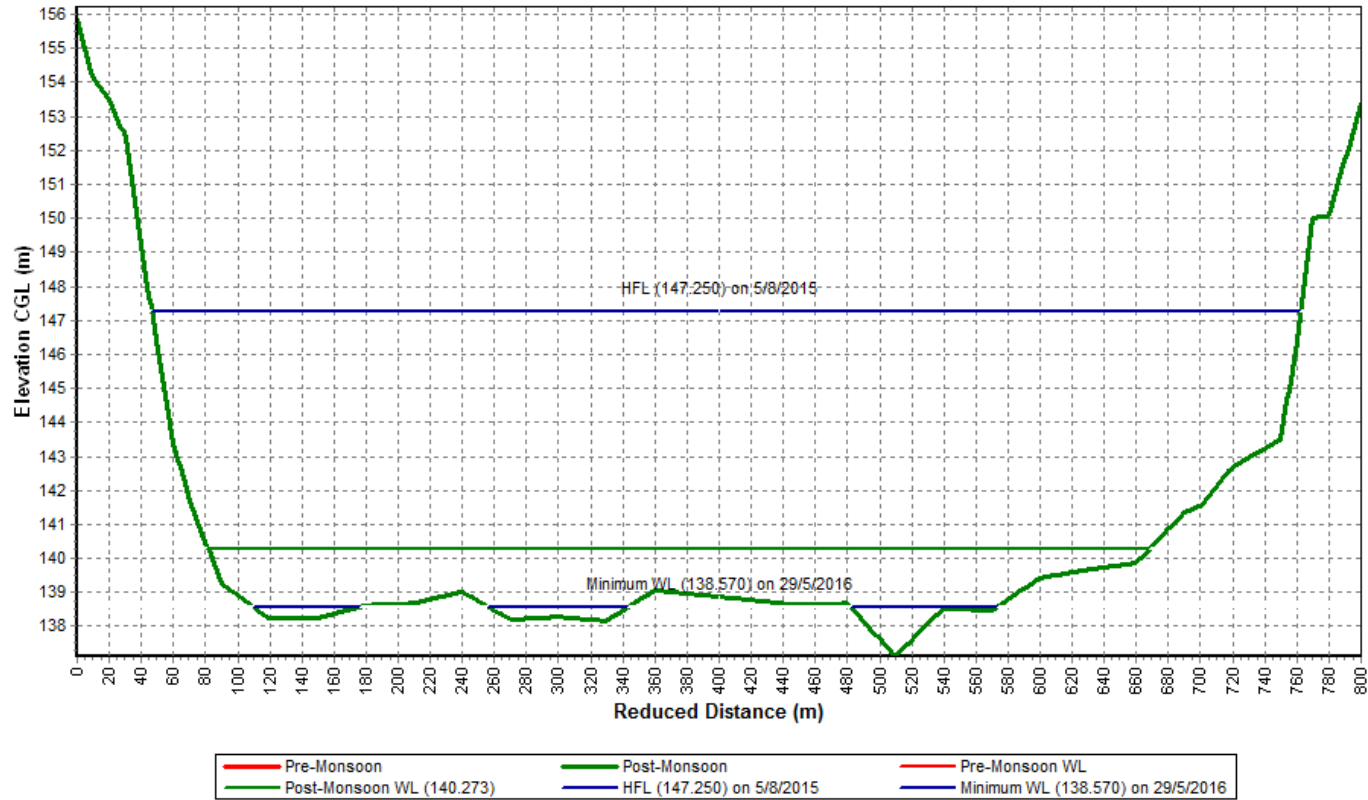
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



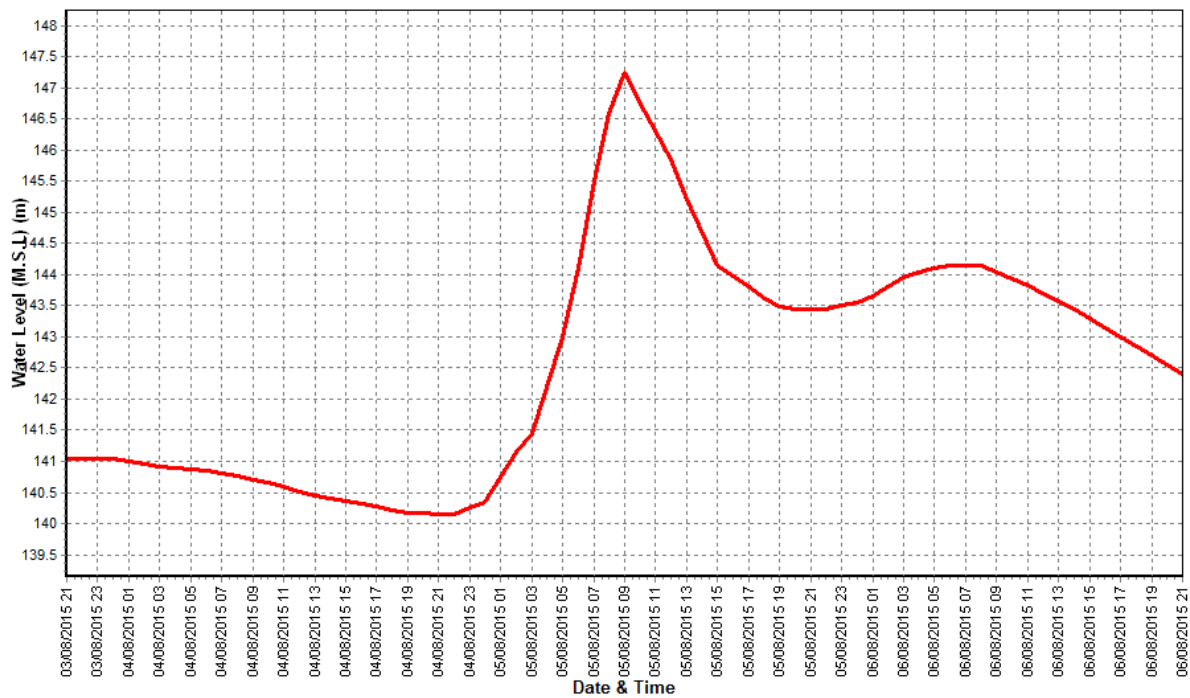
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



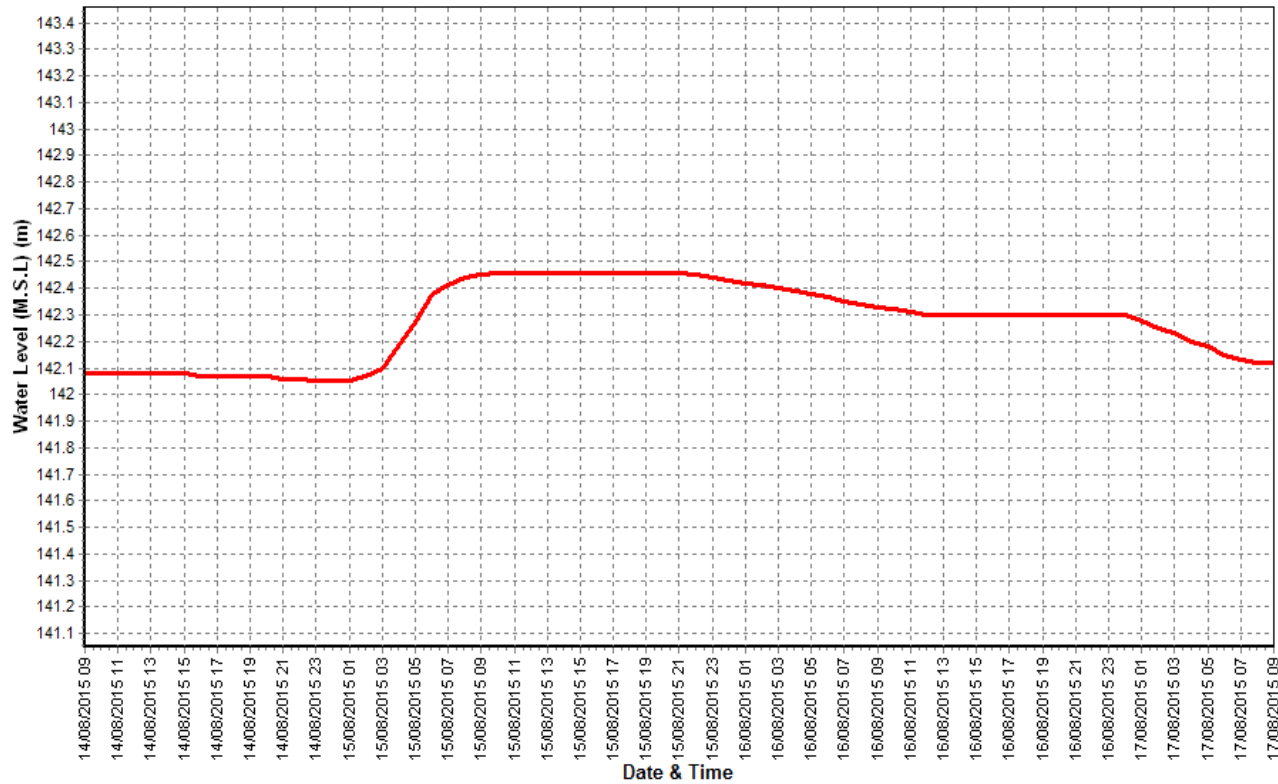
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Mandleshwar (010215026)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



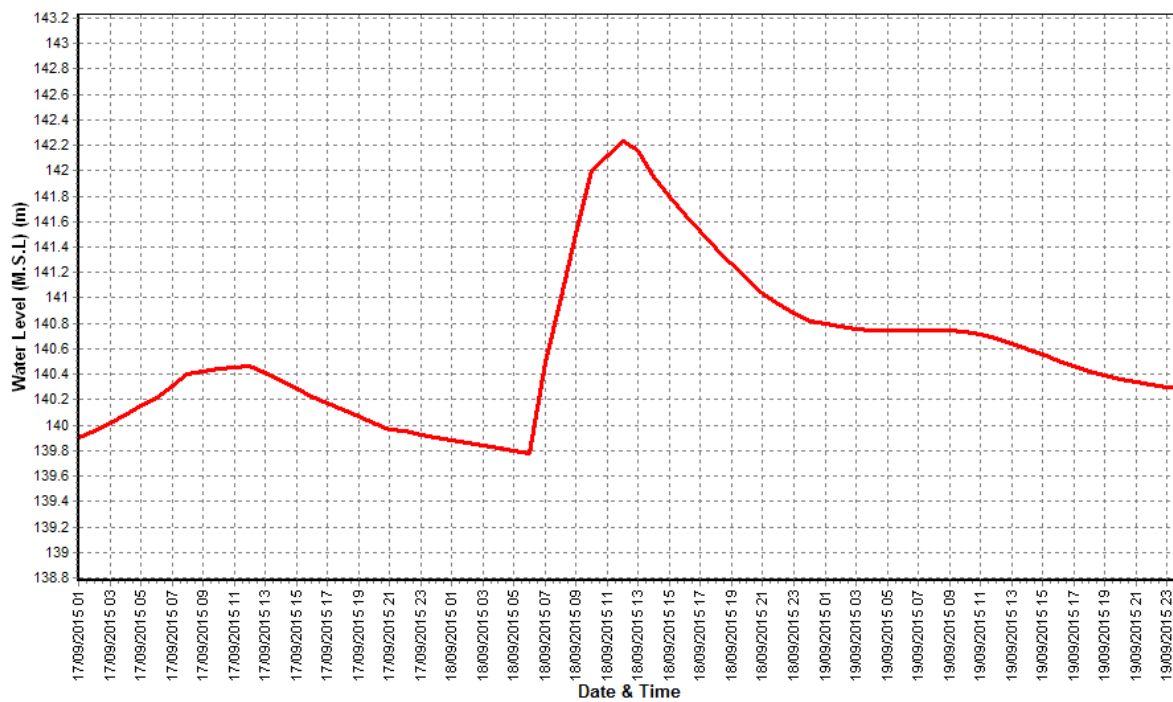
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Mandleshwar (010215026)

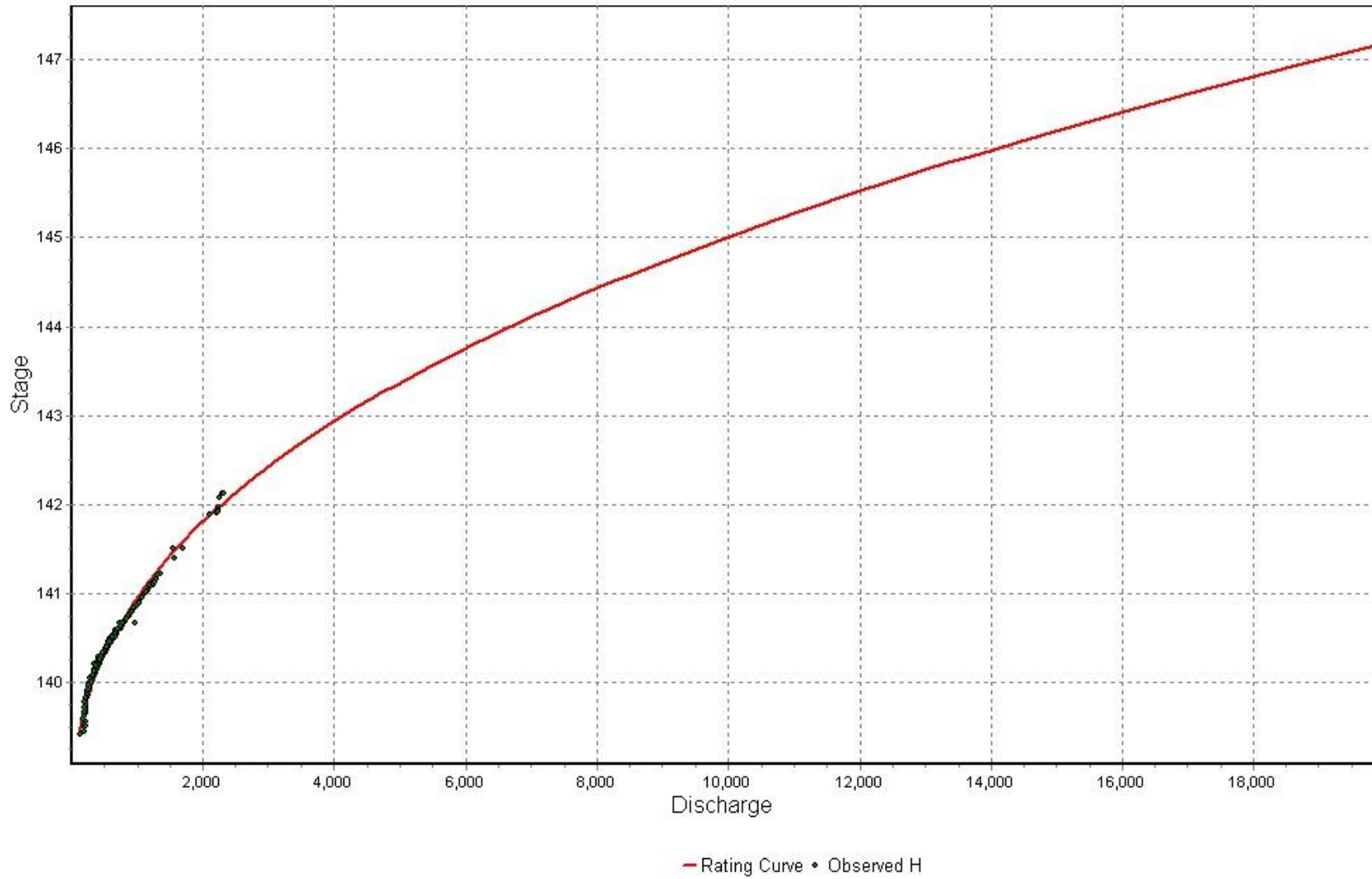
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD III, CWC Indore



STAGE DISCHARGE CURVE OF SITE MANDLESHWAR 15-16



4.6 Kundi at Kogaon

History sheet

Site	: Kundi at Kogaon	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215025
Basin	: Narmada	District	: Khargone
Tributary	: Kundi	Independent	: River
Division	: Narmada Division Bhopal	River	: Narmada
Drainage		Local River	: Kundi
Area	: 3919 Sq. Km.	Sub-Division	: MNSD III CWC Indore
Latitude	: 22°06'06"	Bank	: Right
Zero of Gauge (m)	: 151 (M.S.L.)	Longitude	: 75°41'02"
Gauge	: 03/02/1978	Opening Date	: 03/02/1978
Discharge	: 01/07/1978	Closing Date	: 01/07/1978
Sediment	:		
Water	:		
Quality	: 15/09/1986		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1978-1979	1437	156.890	29/08/1978	0.000		16/06/1978
1979-1980	2700	161.100	26/06/1979	0.000	152.640	06/06/1979
1980-1981	600.0	155.320	22/06/1980	0.000	152.555	31/05/1981
1981-1982	2550	160.770	16/08/1981	0.000	152.540	15/06/1981
1982-1983	396.0	154.660	15/08/1982	0.000	152.495	01/04/1983
1983-1984	1135	159.000	15/09/1983	0.000	152.370	13/06/1983
1984-1985	1250	158.480	10/08/1984	0.100	152.535	17/05/1985
1985-1986	1520	156.350	09/10/1985	0.000	152.505	01/03/1986
1986-1987	1600	156.960	15/08/1986	0.000		05/03/1987
1987-1988	3034	157.630	21/08/1987	0.000		28/04/1988
1988-1989	3500	158.350	03/10/1988	0.000	152.300	25/05/1989
1989-1990	4960	159.900	17/08/1989	0.000		24/02/1990
1990-1991	8300	161.550	23/08/1990	0.000	152.580	17/04/1991
1991-1992	2090	159.700	30/07/1991	0.000	151.000	04/02/1992
1992-1993	2100	157.400	22/06/1992	0.000	152.420	19/02/1993
1993-1994	2550	157.760	16/07/1993	0.000		31/05/1994
1994-1995	5500	161.850	31/08/1994	0.000	151.000	25/02/1995
1995-1996	2005	157.100	29/06/1995	0.000	152.200	26/01/1996
1996-1997	1520	156.350	16/09/1996	0.000	152.380	04/03/1997
1997-1998	3800	159.400	23/08/1997	0.000	152.280	01/03/1998
1998-1999	5600	161.100	22/09/1998	0.000	152.600	24/03/1999
1999-2000	1185	156.100	20/06/1999	0.000	152.015	16/02/2000
2000-2001	1450	155.100	30/06/2000	0.000	151.800	02/06/2000
2001-2002	725.0	155.060	18/06/2001	0.000	152.300	06/06/2001
2002-2003	5900	161.850	03/09/2002	0.050	152.080	30/11/2002
2003-2004	3500	158.760	02/07/2003	0.000	151.300	15/02/2004
2004-2005	3600	158.650	05/08/2004	0.000		03/04/2005

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2005-2006	124.8	153.950	02/08/2005	0.000		05/12/2005
2006-2007	4021	158.750	07/08/2006	0.000	152.450	03/01/2007
2007-2008	1255	156.700	01/07/2007	0.000		24/03/2008
2008-2009	226.6	153.960	11/09/2008	0.000		27/01/2009
2009-2010	657.5	155.370	03/09/2009	0.000		04/04/2010
2010-2011	3464	159.150	09/09/2010	0.000		02/03/2011
2011-2012	990.9	155.690	29/08/2011	0.000		26/01/2012
2012-2013	1458	156.325	06/09/2012	0.000	152.500	18/01/2013
2013-2014	1314	156.000	04/07/2013	0.000		29/04/2014
2014-2015	1677	155.900	28-07-2014	0.000	152.100	30-05-2015

Stage Discharge Sheet for Kundi at Kogaon for the period 2015-16

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		0.000	152.300	0.000 *	152.650	5.379	152.930	22.82	152.975	20.96	152.730	7.880 *
2		0.000	152.350	0.000 *	152.630	3.276 *	152.920	21.63	152.880	18.48 *	152.740	7.067
3		0.000	152.400	0.000 *	152.620	4.586	152.900	19.89	152.700	5.857	152.750	7.248
4		0.000	152.410	0.000 *	152.650	5.406	152.820	14.69	152.750	9.037 *	152.740	7.085
5		0.000	152.420	0.000 *	157.300	2272 *	152.800	13.99	152.720	5.988	152.710	5.828
6		0.000	152.440	0.000 *	156.050	1274	152.760	9.645 *	152.730	6.263	152.750	7.236
7		0.000	152.440	0.000 *	154.320	308.8	152.730	8.408			152.740	7.054
8		0.000	152.430	0.000 *	153.530	102.9	152.720	7.992	152.780	8.105	152.720	7.331 *
9		0.000	152.420	0.000 *	153.480	104.7 *	152.700	6.522	152.750	7.322	152.610	2.159
10		0.000	152.400	0.000 *	153.400	82.38	152.640	4.166	152.770	8.067	152.550	1.990
11		0.000	152.370	0.000 *	153.310	64.41	152.620	3.573	152.750	10.27 *	152.500	0.000 *
12		0.000	152.330	0.000 *	153.380	77.44	152.610	3.105	152.720	5.968	152.480	0.000 *
13		0.000	152.220	0.000 *	153.620	135.9	152.750	9.037 *	152.690	5.531	152.450	0.000 *
14		0.000	151.950	0.000 *	153.620	138.6	152.810	14.21	152.720	5.958	152.450	0.000 *
15		0.000	151.600	0.000 *	153.430	94.87 *	152.720	8.042	152.690	5.507	152.440	0.000 *
16		0.000		0.000	153.610	132.6 *	152.810	14.30	152.680	5.147	152.440	0.000 *
17		0.000		0.000	153.440	118.5	152.780	10.92 *	152.580	1.774	152.430	0.000 *
18		0.000		0.000	153.410	112.6	154.550	513.9	152.600	1.716 *	152.430	0.000 *
19		0.000		0.000	153.345	98.77	154.300	300.6	152.580	1.793	152.420	0.000 *
20		0.000		0.000	153.250	77.34	153.510	110.9 *	152.510	1.716 *	152.400	0.000 *
21		0.000	152.020	0.000 *	153.200	63.53	153.400	111.7	152.490	0.000 *	152.400	0.000 *
22		0.000	153.300	63.22	153.170	56.98	153.260	77.90	152.490	0.000 *	152.420	0.000 *
23		0.000	152.850	12.60	153.150	48.63 *	153.230	75.00	152.460	0.000 *	152.430	0.000 *
24		0.000	152.720	6.043	153.170	57.48	153.200	61.18	152.490	0.000 *	152.450	0.000 *
25		0.000	152.680	6.041	153.050	35.69	153.220	58.77 *	152.470	0.000 *	152.440	0.000 *
26		0.000	152.750	9.037 *	153.020	33.82	153.220	67.51	152.585	1.838	152.460	0.000 *
27		0.000	152.800	11.93	152.960	29.62	153.100	41.98 *	152.610	2.199	152.460	0.000 *
28		0.000	152.730	6.279	152.930	22.90	153.060	36.69	152.670	4.981	152.440	0.000 *
29		0.000	152.700	5.876	152.910	21.26	153.065	36.37	152.740	7.078	152.430	0.000 *
30		0.000	152.680	5.840	152.900	20.22 *	152.940	17.80	152.810	14.62	152.450	0.000 *
31			152.680	5.883	152.995	30.83			152.765	7.624		
Ten-Daily Mean												
I Ten-Daily		0.000	152.401	0.000	153.863	416.3	152.792	12.97	152.784	10.01	152.704	6.088
II Ten-Daily		0.000	152.094	0.000	153.441	105.1	153.146	98.86	152.652	4.538	152.444	0.000
III Ten-Daily		0.000	152.719	12.07	153.041	38.27	153.169	58.49	152.598	3.486	152.438	0.000
Monthly												
Min.		0.000	151.600	0.000	152.620	3.276	152.610	3.105	152.460	0.000	152.400	0.000
Max.		0.000	153.300	63.22	157.300	2272	154.550	513.9	152.975	20.96	152.750	7.880
Mean		0	152.477	4.282	153.435	181.8	153.036	56.78	152.672	5.793	152.529	2.029

Annual Runoff in MCM = 666 Annual Runoff in mm = 170

Peak Observed Discharge = 1274 cumecs on 06/08/2015 Corres. Water Level :156.05 m

Lowest Observed Discharge = 0.000 cumecs on 01/06/2015

**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 2015-16

	Dec		Jan		Feb		Mar		Apr		May	
	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Ten-Daily Mean												
I Ten-Daily												
II Ten-Daily												
III Ten-Daily												
Monthly												
Min.												
Max.												
Mean												

Peak Computed Discharge = 2272 cumecs on 05/08/2015 Corres. Water Level :157.3 m

Lowest Computed Discharge = 0.000 cumecs on 01/07/2015 Corres. Water Level :152.3 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

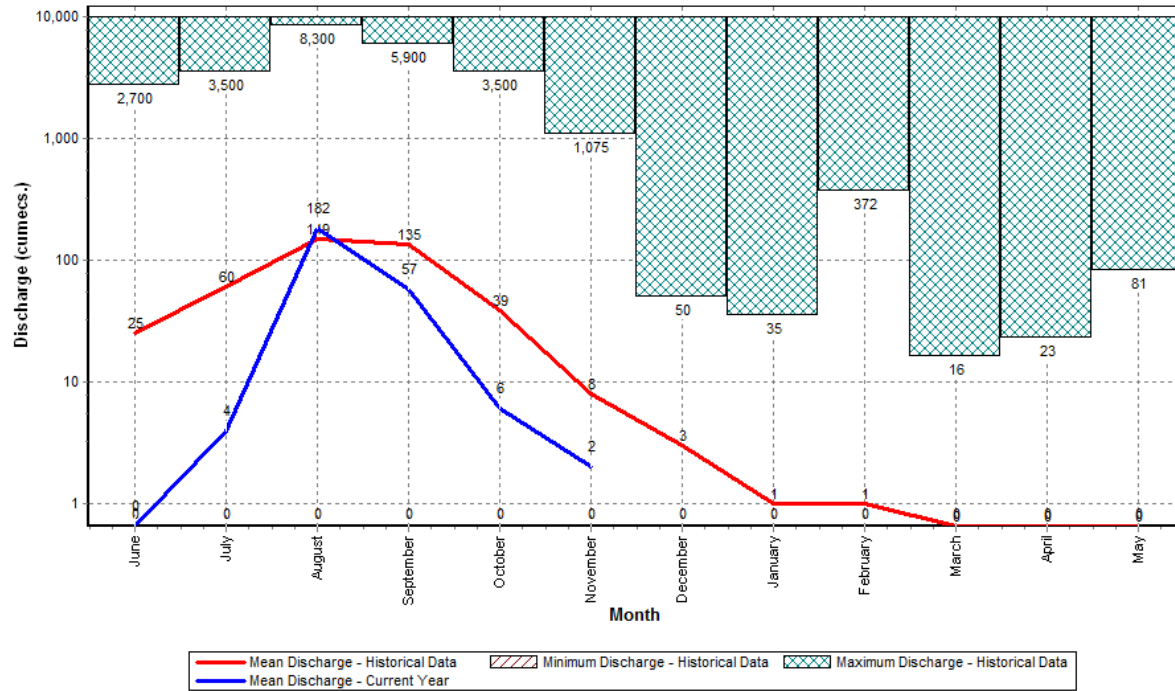
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1978-2013)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore



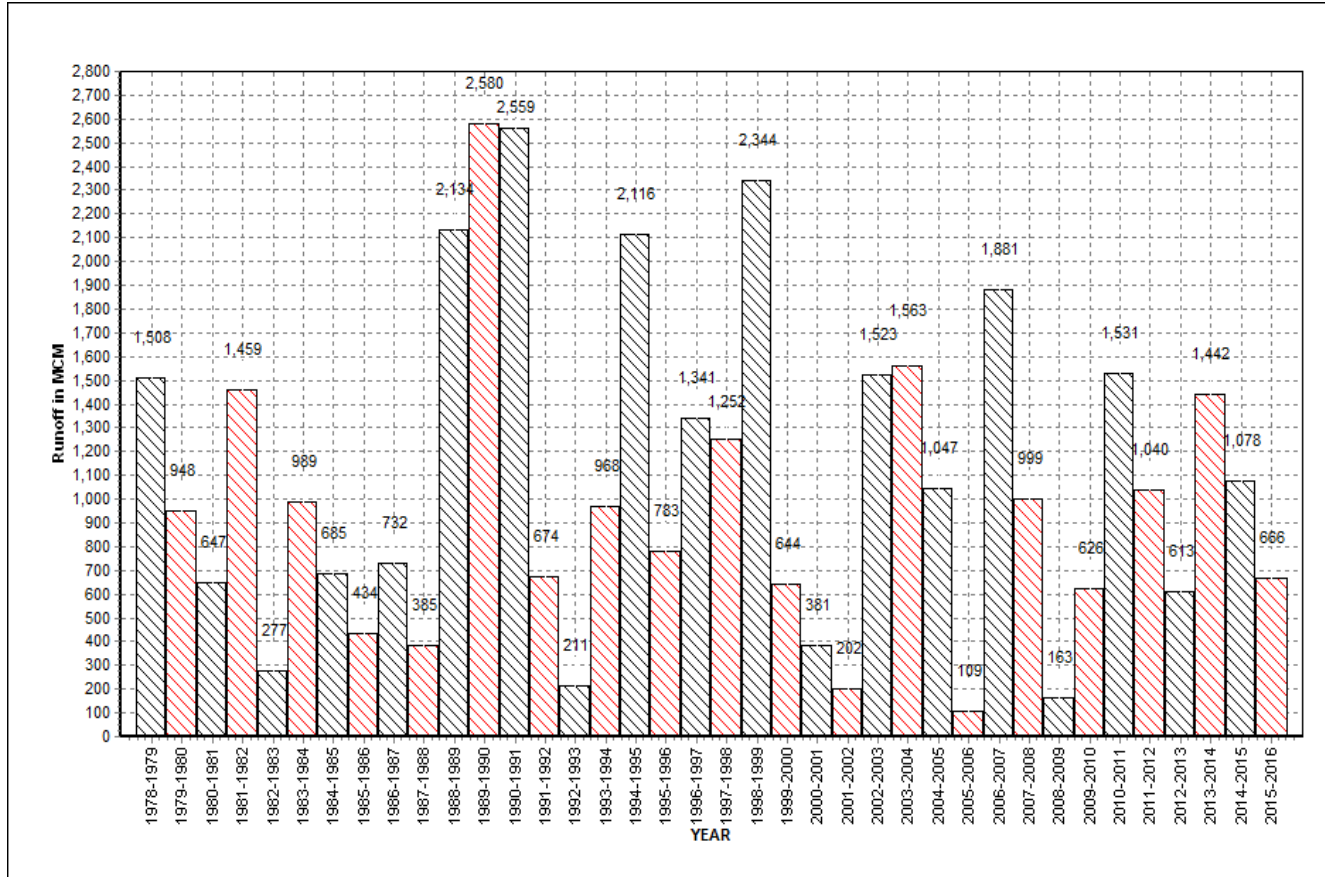
Annual Runoff Values for the period (1978 – 2016)

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

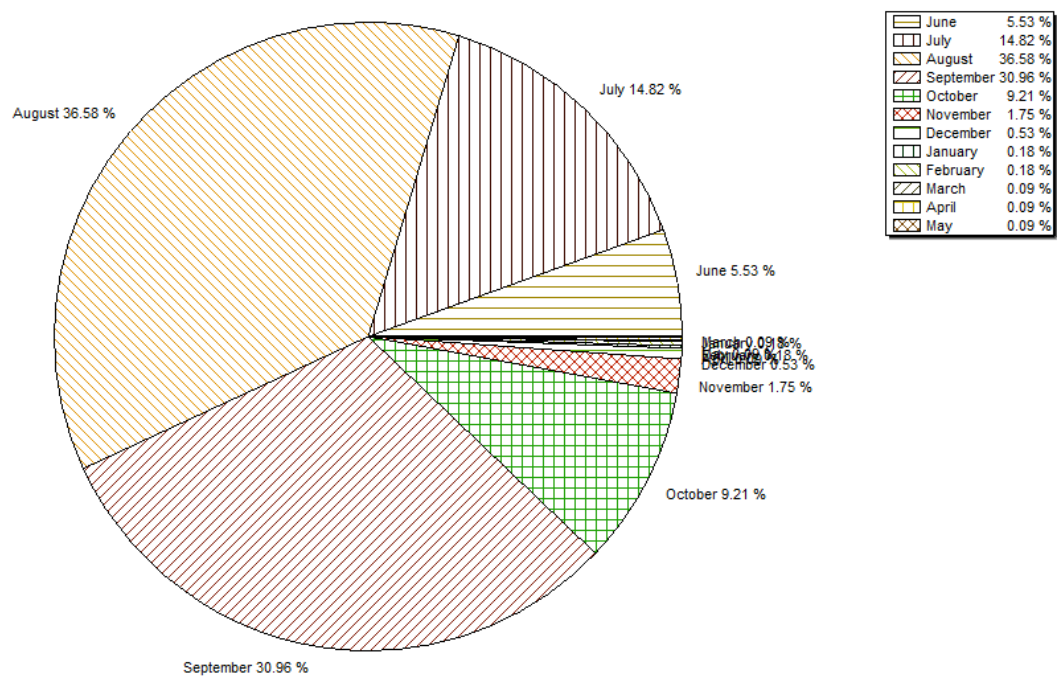
Monthly Average Runoff based on period (1978 – 2014)

Station Name : Kundi at Kogaon (010215025)

Local River : Kundi

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



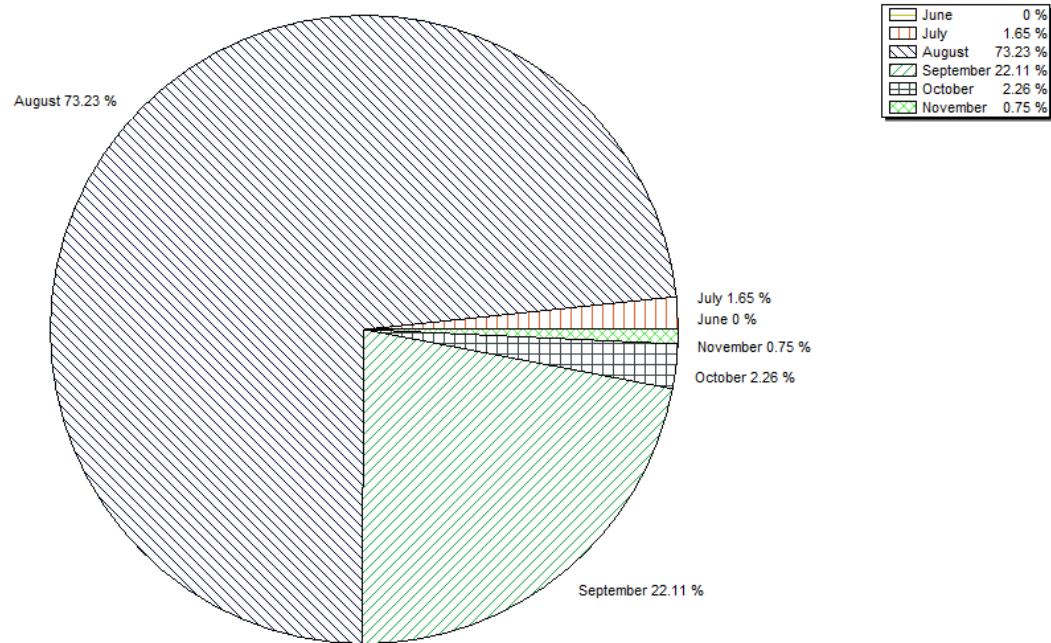
Monthly Runoff for the Year (2015-16)

Station Name : Kundi at Kogaon (010215025)

Local River : Kundi

Division : Narmada Division, Bhopal

Sub-Division :MNSD III, CWC Indore



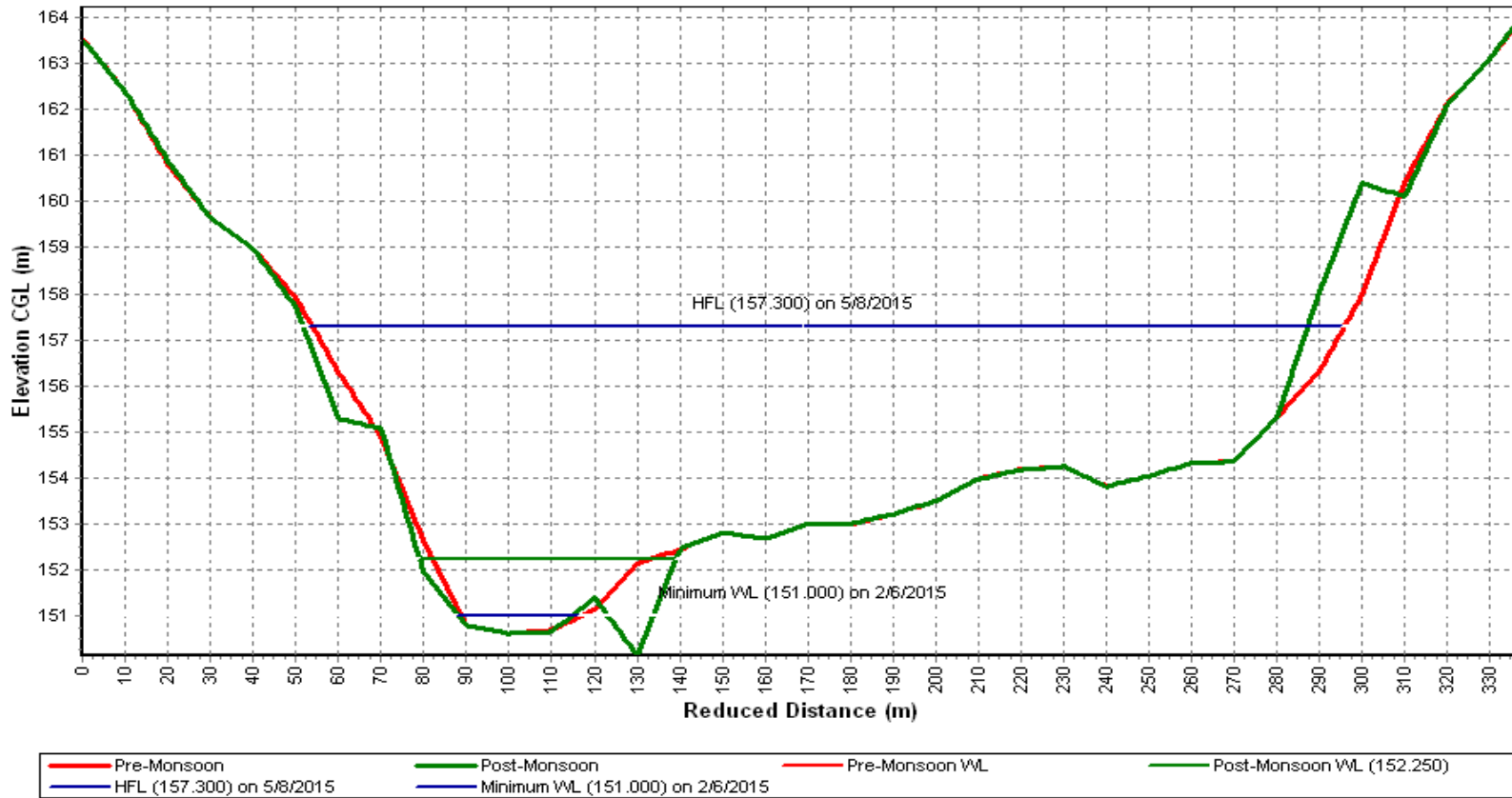
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division : MNSD III CWC Indore



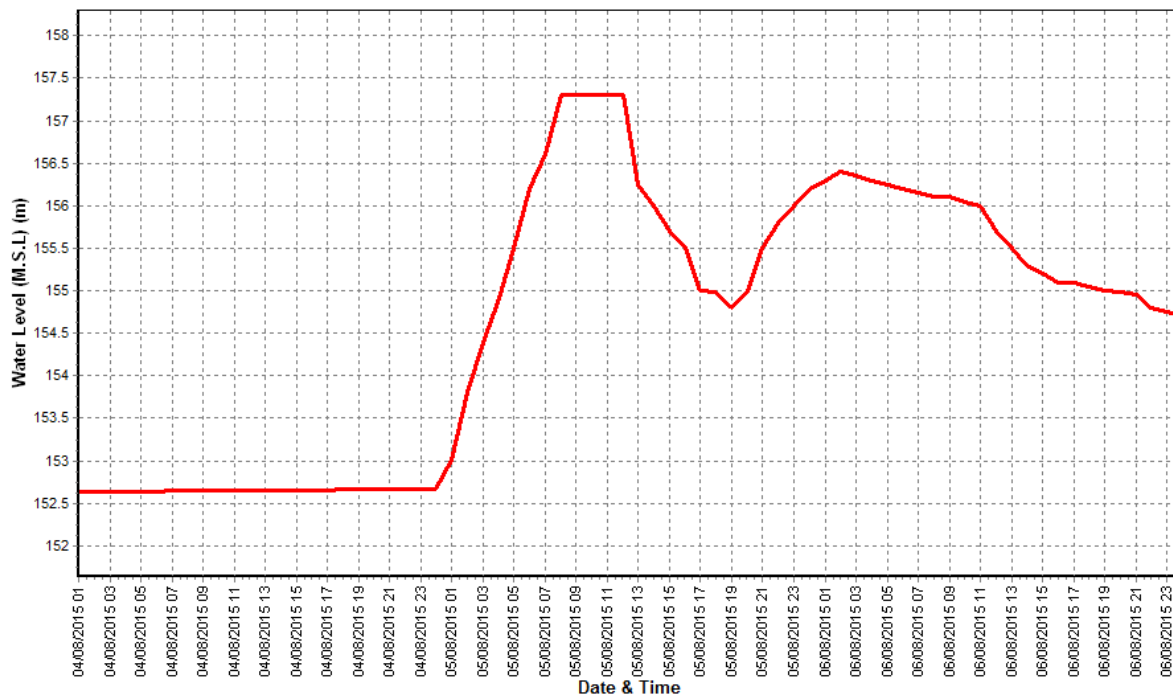
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore



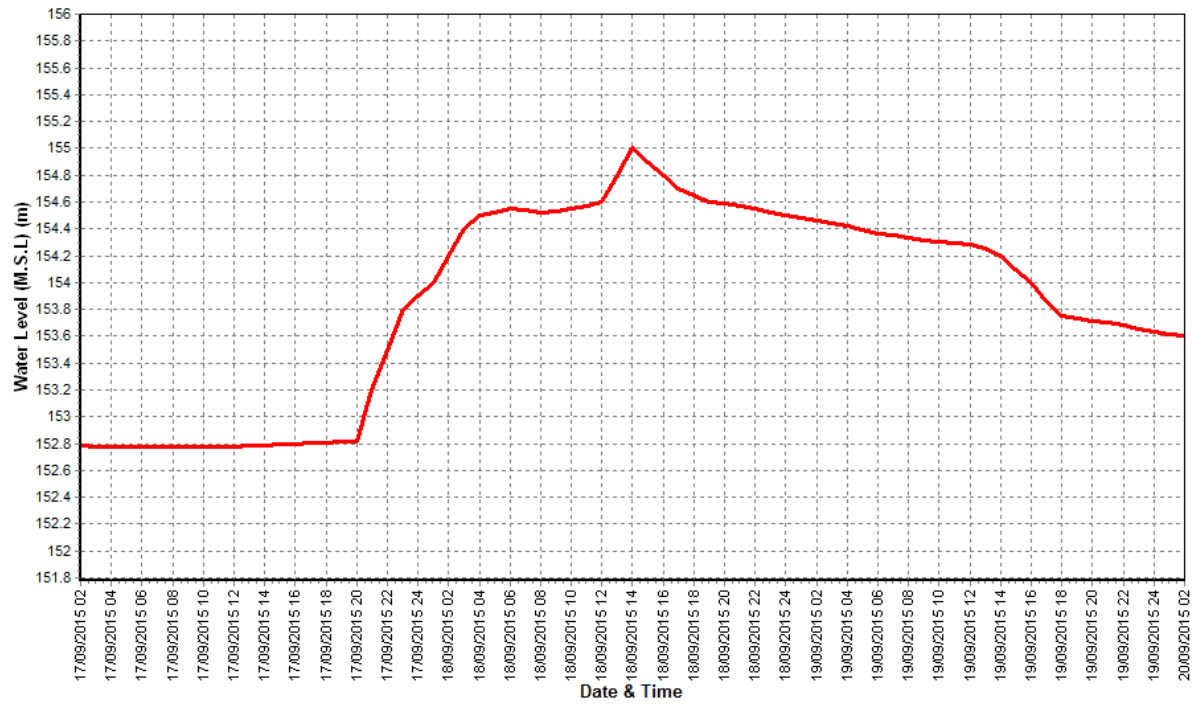
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Kundi at Kogaon (010215025)

Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore



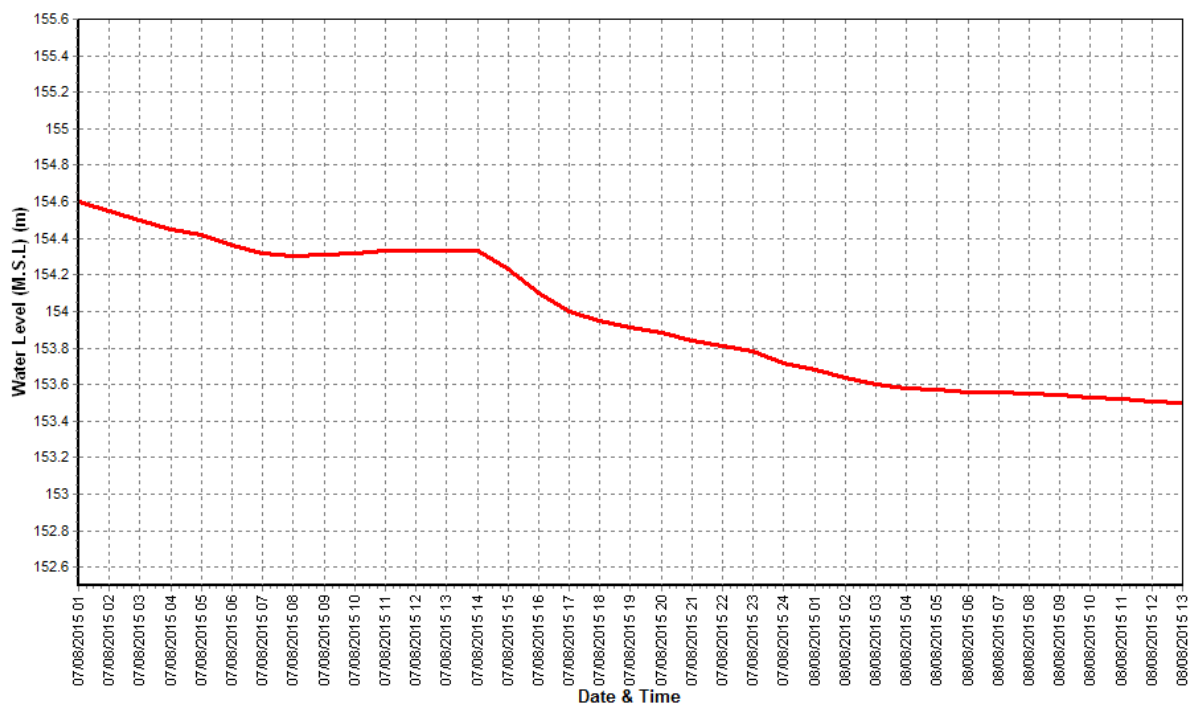
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Kundi at Kogaon (010215025)

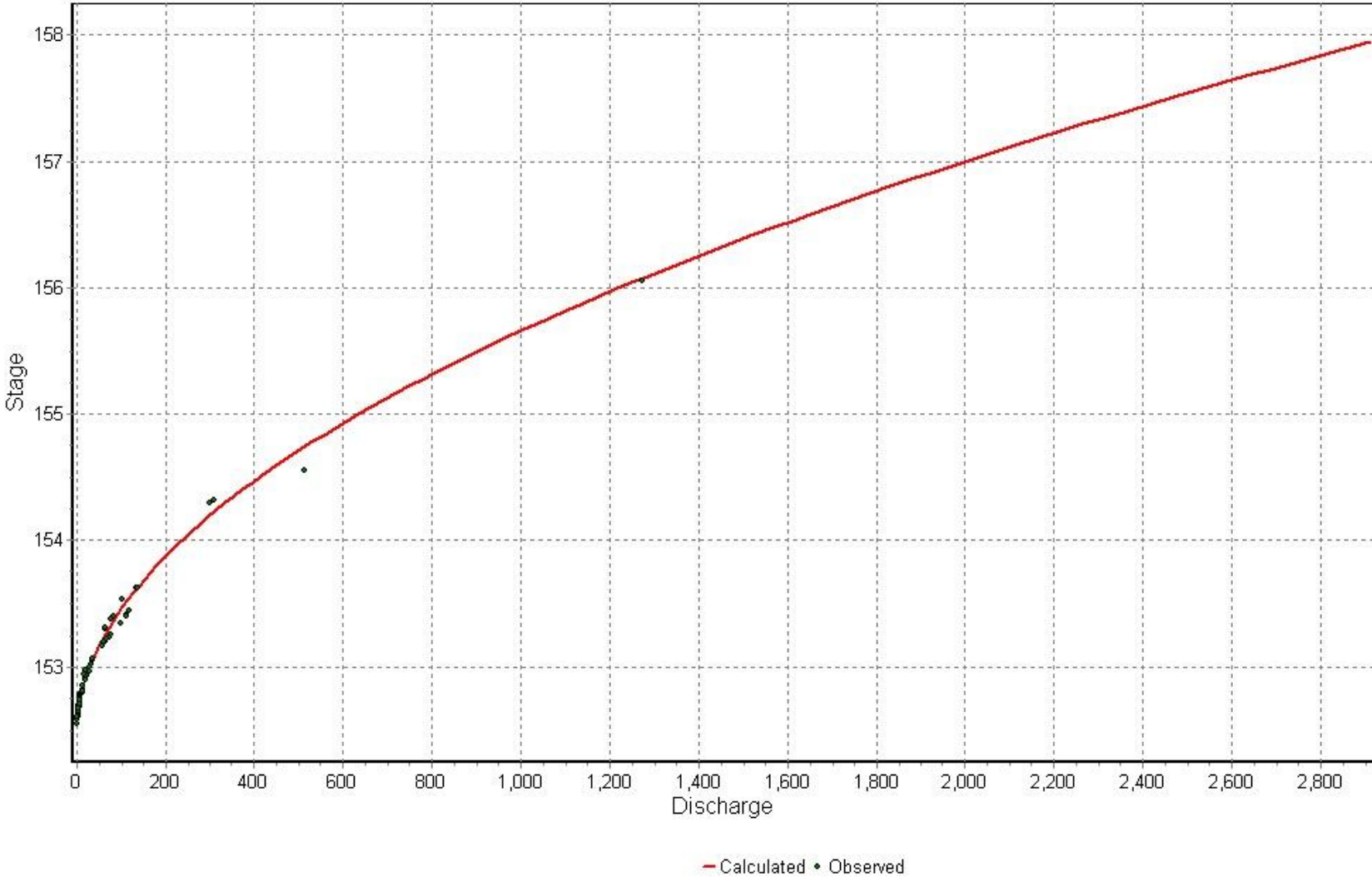
Division : Narmada Division, Bhopal

Local River : Kundi

Sub-Division :MNSD III, CWC Indore



STAGE DISCHARGE CURVE OF SITE KOGAON 15-16



4.7 Narmada at Handia

History Sheet

Site	: Narmada at Handia	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215022
Basin	: Narmada	District	: Harda
Tributary	: -	Independent River	: Narmada
Sub-Sub Tributary	: -	Sub Tributary	: -
Division	: Narmada Division, Bhopal	Local River	: Narmada
Drainage Area	: 54027 Sq. Km.	Sub-Division	: MNSD II, CWC Bhopal
Latitude	: 22°29'25"	Bank	: Left
Zero of Gauge (m)	: 258 (M.S.L.)	Longitude	: 76°59'37"
Gauge	: 09/02/1977	Opening Date	: 09/02/1977
Discharge	: 26/04/1977	Closing Date	: 09/02/1977
Sediment	: 11/12/1977		
Water Quality	: 01/08/1979		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	11000	269.000	15/09/1977	17.40	258.985	02/06/1977
1978-1979	19220	269.740	17/08/1978	33.60	259.240	07/06/1978
1979-1980	14350	269.480	11/08/1979	16.50	260.445	25/05/1980
1980-1981	20157	271.555	30/08/1980	20.00	260.540	01/06/1980
1981-1982	10199	267.545	10/08/1981	25.80	260.585	15/06/1981
1982-1983	17060	270.250	23/08/1982	30.00	260.570	12/06/1982
1983-1984	19950	270.760	10/09/1983	31.30	260.595	30/05/1984
1984-1985	26240	273.580	19/08/1984	23.00	260.555	26/05/1985
1985-1986	15600	269.740	09/08/1985	29.40	260.540	26/05/1986
1986-1987	23060	272.580	24/07/1986	28.80	260.540	16/06/1986
1987-1988	13661	269.830	28/08/1987	18.47	260.450	29/06/1987
1988-1989	20500	271.600	06/08/1988	12.12	260.440	31/05/1989
1989-1990	13200	268.520	08/08/1989	11.96	260.440	01/06/1989
1990-1991	18000	270.310	23/08/1990	37.66	260.680	12/06/1990
1991-1992	20780	270.685	26/08/1991	57.05	260.710	15/05/1992
1992-1993	9800	267.680	14/09/1992	53.20	260.695	17/03/1993
1993-1994	12300	269.150	06/08/1993	45.20	260.600	12/06/1993
1994-1995	24040	271.750	06/09/1994	100.8	261.035	22/01/1995
1995-1996	10200	267.880	12/08/1995	70.50	260.800	26/05/1996
1996-1997	14300	269.820	27/07/1996	45.00	260.730	23/06/1996
1997-1998	15000	270.220	26/07/1997	47.40	260.700	14/06/1997
1998-1999	18500	271.560	15/09/1998	65.20	260.680	29/05/1999
1999-2000	29250	272.780	20/09/1999	66.00	260.850	20/05/2000
2000-2001	5450	266.180	31/07/2000	99.01	260.950	07/06/2000
2001-2002	5950	266.500	16/08/2001	114.0	260.690	06/04/2002
2002-2003	14800	269.650	19/08/2002	60.41	260.760	30/05/2003
2003-2004	13240	270.080	28/07/2003	60.00	260.760	01/06/2003
2004-2005	14625	271.000	23/08/2004	53.50	260.850	23/05/2005
2005-2006	11762	268.935	06/07/2005	47.56	260.800	12/06/2005
2006-2007	21341	271.060	15/08/2006	56.52	260.680	29/06/2006
2007-2008	10884	268.685	09/07/2007	42.52	260.510	20/05/2008

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2008-2009	6246	266.570	03/08/2008	32.41	261.270	01/02/2009
2009-2010	20786	271.210	11/09/2009	100.5	260.660	09/04/2010
2010-2011	6587	266.660	06/09/2010	77.58	260.760	06/06/2010
2011-2012	8044	267.850	24/07/2011	69.25	260.710	27/05/2012
2012-2013	21415	273.160	07/08/2012	45.30	260.610	08/06/2012
2013-2014	31880	274.150	24/08/2013	113.8	260.800	18/05/2014
2014-2015	4909	266.255	08/09/2014	65.63	260.730	07/06/2014

Stage Discharge Sheet for Narmada at Handia for the period 2015-16

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	261.350	162.0	260.900	98.10	261.870	478.0	262.440	773.2 *	261.450	275.2 *	261.010	135.1 *
2	261.410	172.0	260.870	111.0	261.710	381.5 *	262.340	711.4 *	261.440	271.5 *	260.850	127.0
3	261.500	180.0	260.910	121.0	261.560	279.0	262.540	837.7 *	261.430	267.8 *	260.820	89.95 *
4	261.560	189.0	260.970	124.8 *	261.670	372.0	262.350	734.0	261.410	260.4 *	260.950	119.9 *
5	261.510	180.0	260.960	122.3 *	266.190	4852	262.180	617.9 *	261.400	284.0	261.000	132.5 *
6	261.460	172.0	260.970	119.0	265.260	3821	262.070	557.4 *	261.380	270.0	261.050	145.8 *
7	261.400	256.8 *	260.960	122.3 *	264.280	2588	262.030	510.0	261.350	196.0	261.030	140.4 *
8	261.400	170.0	260.920	112.0	263.860	1932 *	261.950	498.0	261.300	221.9 *	260.990	129.9 *
9	261.370	170.0	260.890	111.0	263.620	1700 *	261.890	493.0	261.280	172.0	260.990	146.0
10	261.400	180.0	260.930	122.0	264.690	3342	261.760	403.9 *	261.300	185.0	261.010	144.0
11	261.440	187.0	260.970	124.8 *	263.580	2077	261.610	338.5 *	261.430	267.8 *	260.980	127.4 *
12	261.420	183.0	263.780	1853 *	264.480	3067	261.570	362.0	261.410	260.4 *	260.980	140.0
13	261.420	180.0	263.690	2141	264.995	3854	261.450	275.2 *	261.310	225.3 *	261.000	145.0
14	261.400	256.8 *	263.000	1060	264.115	2279	261.430	284.0	261.240	202.2 *	261.010	147.0
15	261.400	167.0	262.360	723.5 *	265.090	3363 *	261.430	267.8 *	261.220	168.0	260.940	117.4 *
16	261.370	132.0	261.970	560.0	265.380	3758 *	261.430	267.8 *	261.300	213.0	260.950	142.0
17	261.280	106.0	261.570	362.0	264.360	2916	261.430	267.8 *	261.310	225.3 *	260.940	147.0
18	261.240	93.80	261.500	294.3 *	263.870	1942 *	261.900	510.0	261.340	235.5 *	260.980	117.0
19	261.240	93.60	261.530	306.1 *	263.835	2478	261.710	381.5 *	261.380	278.0	260.980	117.0
20	261.230	92.90	266.020	4678 *	263.250	1767	261.660	359.7 *	261.370	246.1 *	260.970	124.8 *
21	261.270	211.9 *	266.630	5371	262.960	1277	261.650	378.0	261.200	180.0	260.990	129.9 *
22	261.450	132.0	263.830	2269	262.430	766.9 *	261.620	344.0	261.160	177.3 *	261.000	132.5 *
23	261.560	171.0	262.610	884.3 *	262.190	623.5 *	261.570	288.0	261.100	173.0	260.970	124.8 *
24	261.800	420.0	264.750	2928 *	262.050	546.7 *	261.520	310.0	261.090	156.9 *	261.040	143.1 *
25	261.660	385.0	264.280	2376 *	261.910	475.1 *	261.500	294.3 *	261.100	159.7 *	261.120	165.5 *
26	261.440	271.5 *	263.920	1993 *	261.860	450.7 *	261.520	302.0	261.070	140.0	261.100	173.0
27	261.200	108.0	263.750	2043	261.800	422.3 *	261.520	302.1 *	261.050	115.0	261.140	180.0
28	260.980	127.4 *	263.300	1597	261.710	371.0	261.520	294.0	261.150	174.3 *	261.140	166.0
29	260.920	112.0	262.640	816.2	261.730	390.4 *	261.520	298.0	261.150	178.0	261.110	162.6 *
30	260.900	105.0	262.410	754.4 *	262.070	557.4 *	261.490	290.4 *	261.170	210.0	261.180	196.0
31			262.110	551.0	262.510	818.1 *			261.040	143.1 *		
Ten-Daily Mean												
I Ten-Daily	261.436	183.2	260.928	116.4	263.471	1975	262.155	613.6	261.374	240.4	260.970	131.1
II Ten-Daily	261.344	149.2	262.639	1210	264.295	2750	261.562	331.4	261.331	232.1	260.973	132.5
III Ten-Daily	261.318	204.4	263.657	1962	262.111	609.0	261.543	310.1	261.116	164.3	261.079	157.3
Monthly												
Min.	260.900	92.90	260.870	98.10	261.560	279.0	261.430	267.8	261.040	115.0	260.820	89.95
Max.	261.800	420.0	266.630	5371	266.190	4852	262.540	837.7	261.450	284.0	261.180	196.0
Mean	261.366	178.9	262.448	1124	263.254	1740	261.753	418.4	261.269	210.7	261.007	140.3

Annual Runoff in MCM = 13485 Annual Runoff in mm = 250

Peak Observed Discharge = 5371 cumecs on 21/07/2015 Corres. Water Level :266.63 m

Lowest Observed Discharge = 72.80 cumecs on 04/04/2016 Corres. Water Level :260.7 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 Handia for the period 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	261.200	205.0	260.980	122.0	261.140	155.0	261.020	139.0	260.770	79.59 *	261.020	137.7 *
2	261.150	164.0	260.990	120.0	261.130	168.4 *	260.990	130.0	260.750	75.63 *	261.010	135.0
3	261.130	128.0	261.030	140.4 *	261.080	154.1 *	260.980	127.0	260.720	69.88 *	261.010	138.0
4	261.130	168.4 *	261.030	140.4 *	261.080	150.0	260.890	120.0	260.700	72.80	260.980	130.0
5	261.010	135.1 *	261.030	140.4 *	261.070	151.3 *	260.800	109.0	260.750	75.10	260.980	132.0
6	260.980	127.4 *	261.080	154.1 *	261.060	148.5 *	260.760	77.60 *	260.960	122.0	261.000	140.0
7	261.020	124.0	261.170	180.3 *	261.070	151.3 *	260.700	98.00	261.020	137.7 *	260.980	133.0
8	261.070	151.3 *	261.190	186.4 *	261.080	152.0	260.640	90.00	260.930	120.0	260.980	127.4 *
9	261.050	133.0	261.160	177.3 *	261.070	151.3 *	260.600	89.00	260.900	107.8 *	261.040	143.1 *
10	261.060	131.0	261.130	168.4 *	261.070	144.0	260.570	44.56 *	260.960	122.3 *	261.030	140.4 *
11	261.060	135.0	261.100	139.0	261.050	141.0	260.660	59.06 *	261.000	141.0	261.030	140.4 *
12	261.050	132.0	261.120	165.5 *	261.050	140.0	260.780	81.61 *	261.060	160.0	261.050	145.8 *
13	261.050	145.8 *	263.690	2141	261.090	154.1 *	261.690	115.0 *	261.060	164.0	261.030	143.1 *
14	261.030	130.0	261.150	152.0	261.080	154.1 *	261.040	143.1 *	261.050	145.8 *	261.020	137.7 *
15	261.050	140.0	261.110	162.6 *	261.080	154.1 *	261.040	143.1 *	260.950	119.9 *	261.020	137.7 *
16	261.060	146.0	261.150	174.3 *	261.070	151.3 *	261.010	135.1 *	260.920	117.0	261.000	135.0
17	261.030	127.0	261.120	165.5 *	261.070	151.3 *	260.980	127.4 *	260.880	103.2 *	261.000	134.0
18	261.030	122.0	261.080	154.1 *	261.100	154.0	260.930	115.0 *	260.800	85.73 *	261.000	132.0
19	261.030	124.0	261.050	145.8 *	261.130	160.0	260.900	107.8 *	260.750	75.63 *	260.970	130.0
20	261.020	137.7 *	266.200	4537	261.200	162.0	260.800	85.73 *	261.200	87.82 *	260.970	130.0
21	260.990	109.0	266.625	5371	261.625	174.3 *	260.635	102.0	261.625	132.5 *	260.970	122.3 *
22	260.970	124.8 *	261.220	195.8 *	261.180	185.0	260.730	108.0	261.150	174.3 *	260.960	122.3 *
23	260.960	122.3 *	261.190	186.4 *	261.200	189.5 *	260.670	98.00	261.170	180.3 *	260.970	124.8 *
24	260.950	119.9 *	261.160	177.3 *	261.220	162.0	260.730	71.77 *	261.170	180.3 *	260.970	124.8 *
25	260.950	119.9 *	261.150	169.0	261.180	170.0	260.760	77.60 *	261.190	185.0	260.970	124.8 *
26	260.970	115.0	261.120	165.5 *	261.160	162.0	260.850	120.0	261.200	188.0	260.960	133.0
27	260.980	127.4 *	261.110	146.0	261.160	156.0	260.900	107.8 *	261.200	186.0	261.000	133.0
28	260.980	127.4 *	263.300	1597	261.130	162.6 *	261.300	128.0	261.300	180.0	261.300	142.0
29	260.960	122.3 *	262.635	816.2	261.135	142.0	261.335	126.0	261.335	174.0	261.235	127.4 *
30	260.960	122.3 *	261.140	154.0			260.880	103.2 *	261.030	140.4 *	260.970	134.0
31	260.980	127.4 *	261.140	171.3 *			260.810	87.82 *			260.960	129.0
Ten-Daily Mean												
I Ten-Daily	261.080	146.7	261.079	153.0	261.085	152.6	260.795	102.4	260.846	98.29	261.003	135.7
II Ten-Daily	261.041	134.0	261.877	793.7	261.092	152.2	260.983	111.3	260.967	120.0	261.009	136.6
III Ten-Daily	260.968	121.6	261.981	831.8	261.221	167.0	260.873	102.7	261.237	172.1	261.024	128.9
Monthly												
Min.	260.950	109.0	260.980	120.0	261.050	140.0	260.570	44.56	260.700	69.88	260.960	122.3
Max.	261.200	205.0	266.625	5371	261.625	189.5	261.690	143.1	261.625	188.0	261.300	145.8
Mean	261.028	133.7	261.656	600.5	261.130	156.9	260.883	105.4	261.017	130.1	261.012	133.5

Peak Computed Discharge = 4678 cumecs on 20/07/2015 Corres. Water Level :266.02 m
 Lowest Computed Discharge = 44.56 cumecs on 10/03/2016 Corres. Water Level :260.57 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

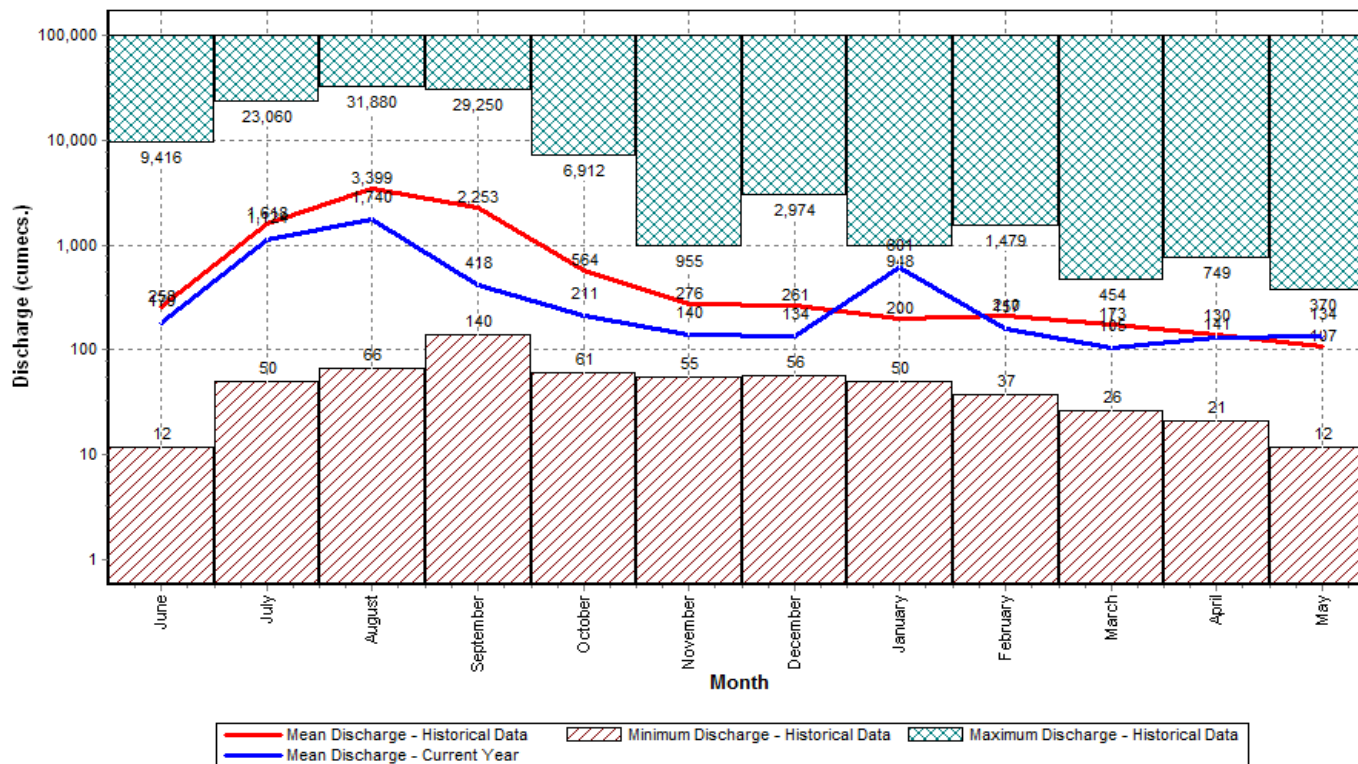
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1977-2016)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



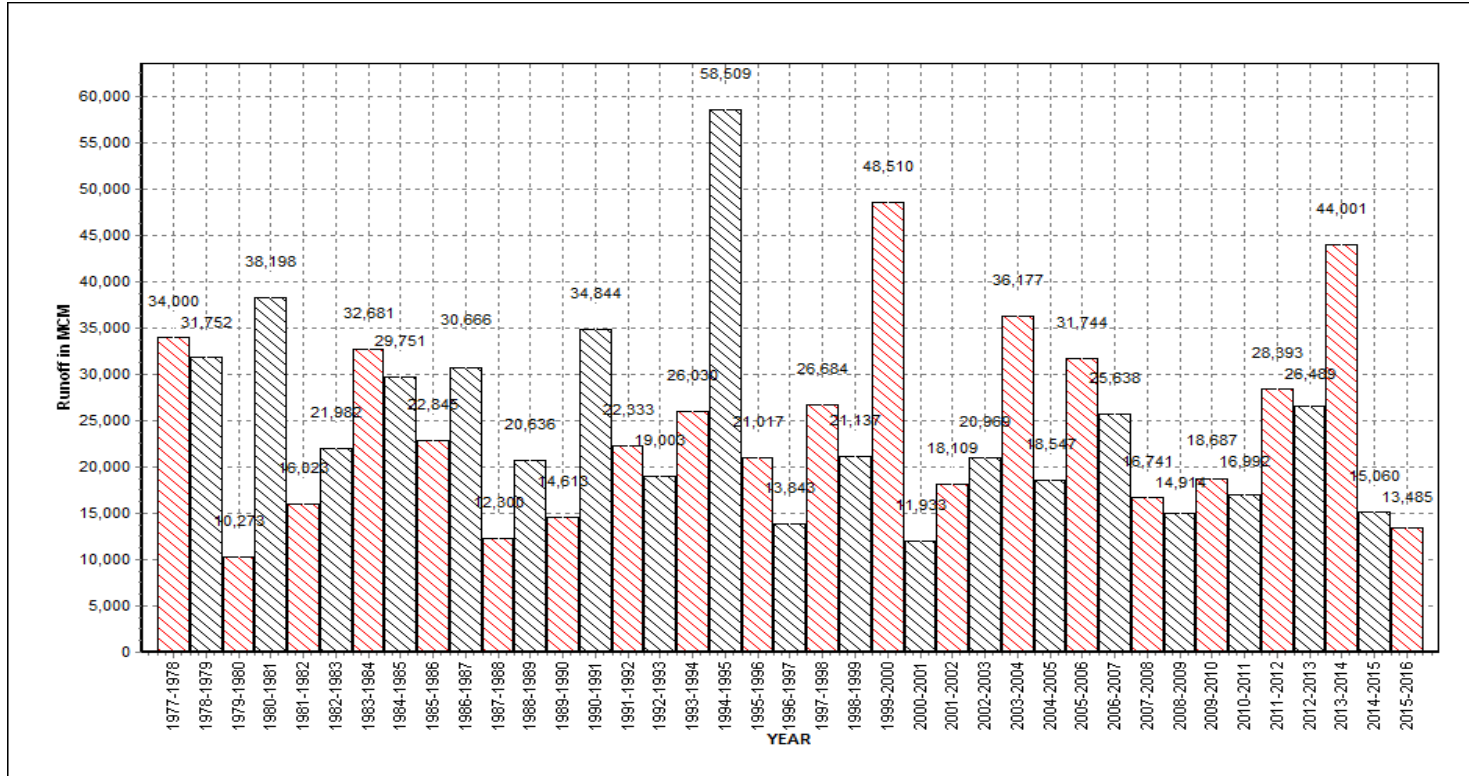
Annual Runoff Values for the period (1977 – 2016)

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

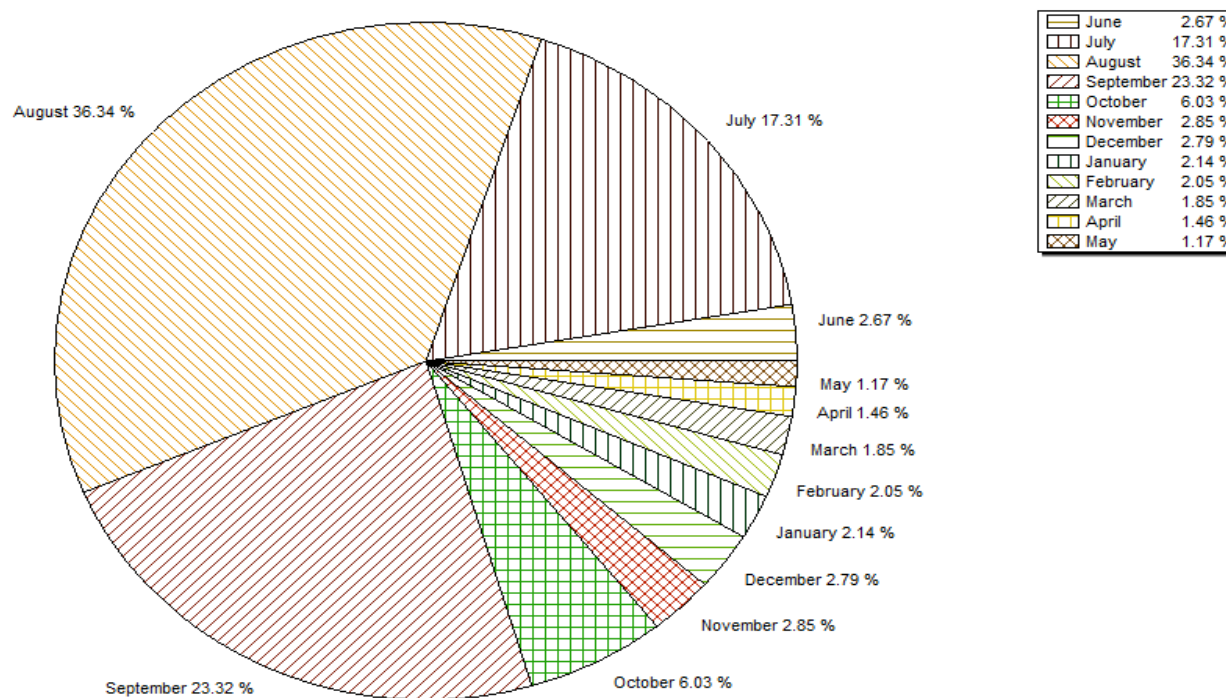
Monthly Average Runoff based on period (1977 – 2016)

Station Name : Narmada at Handia (010215022)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division :MNSD II, CWC Bhopal



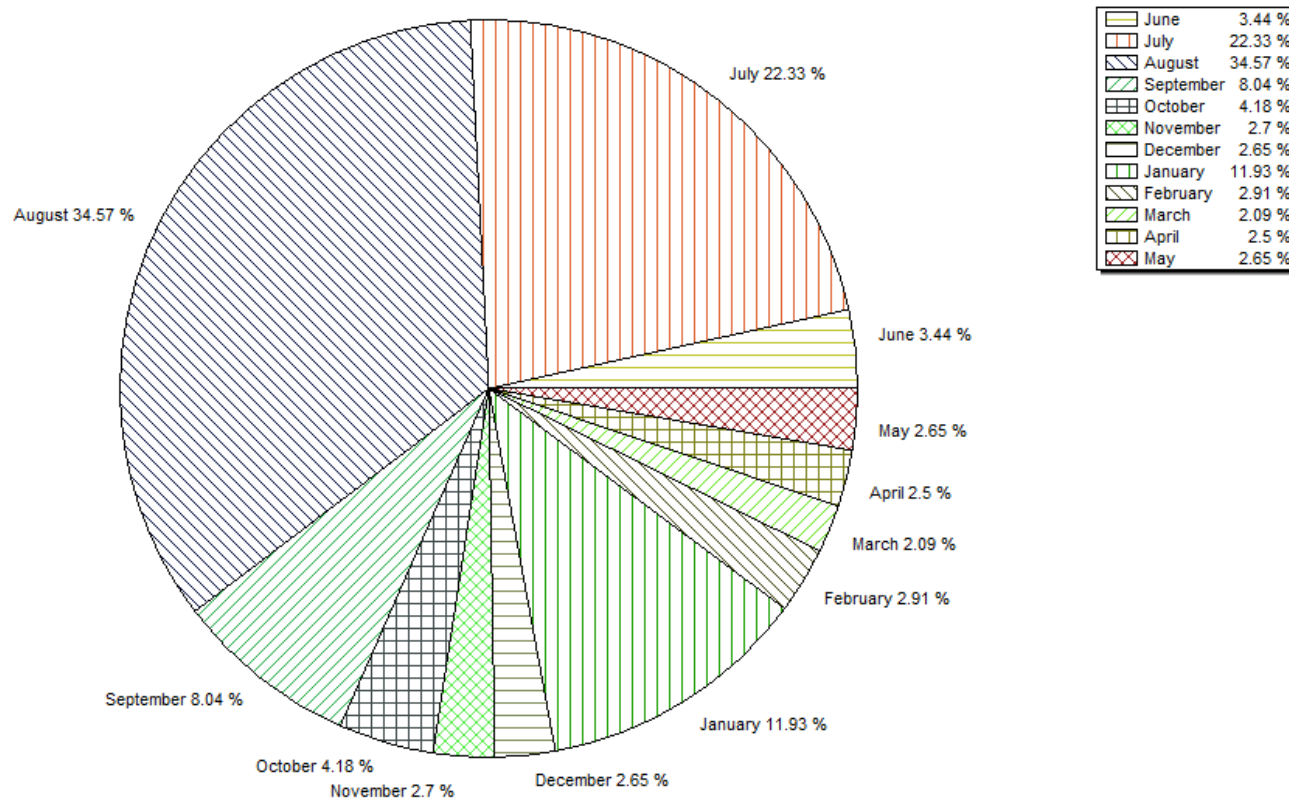
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Handia (010215022)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division :MNSD II, CWC Bhopal



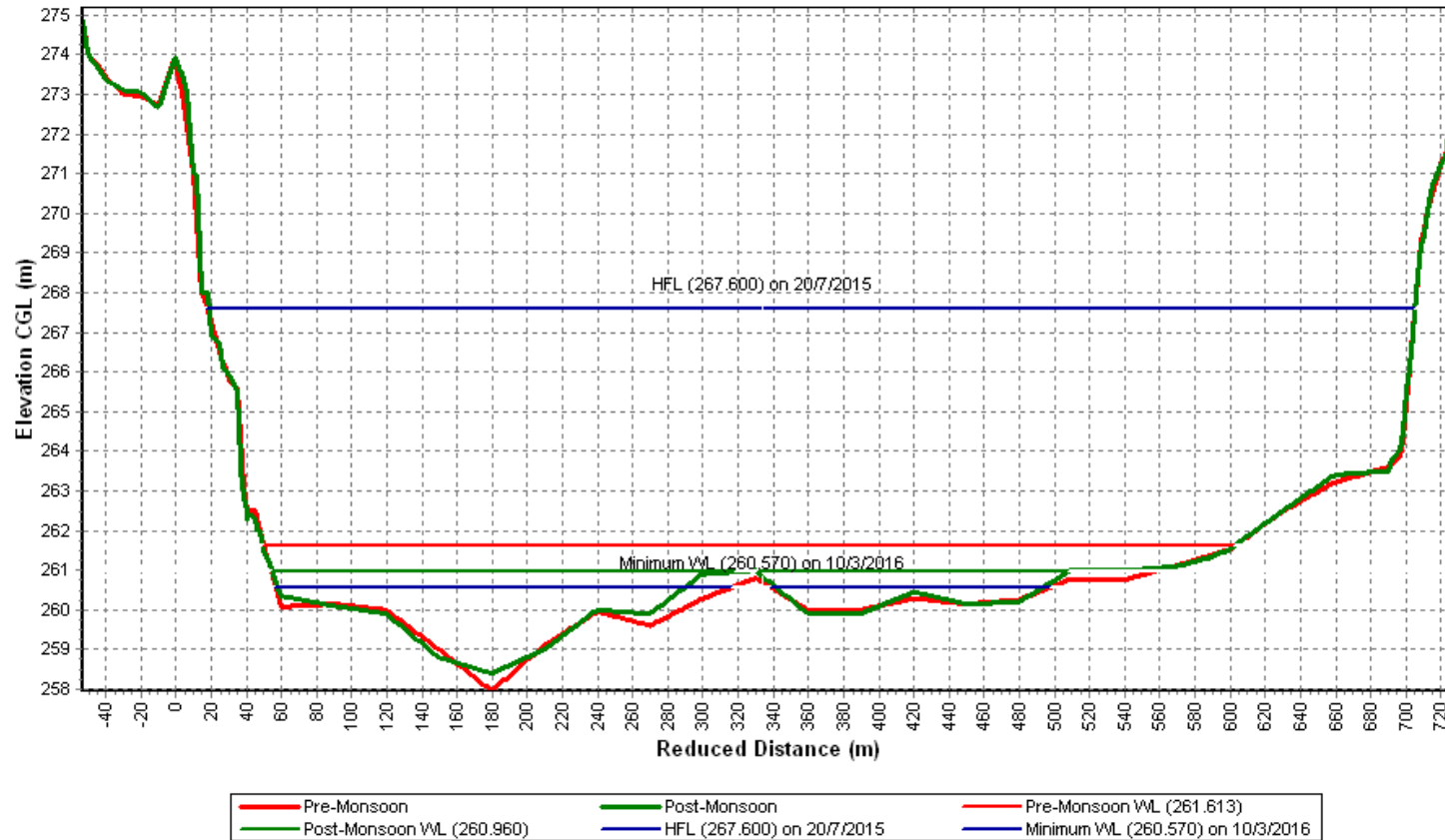
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



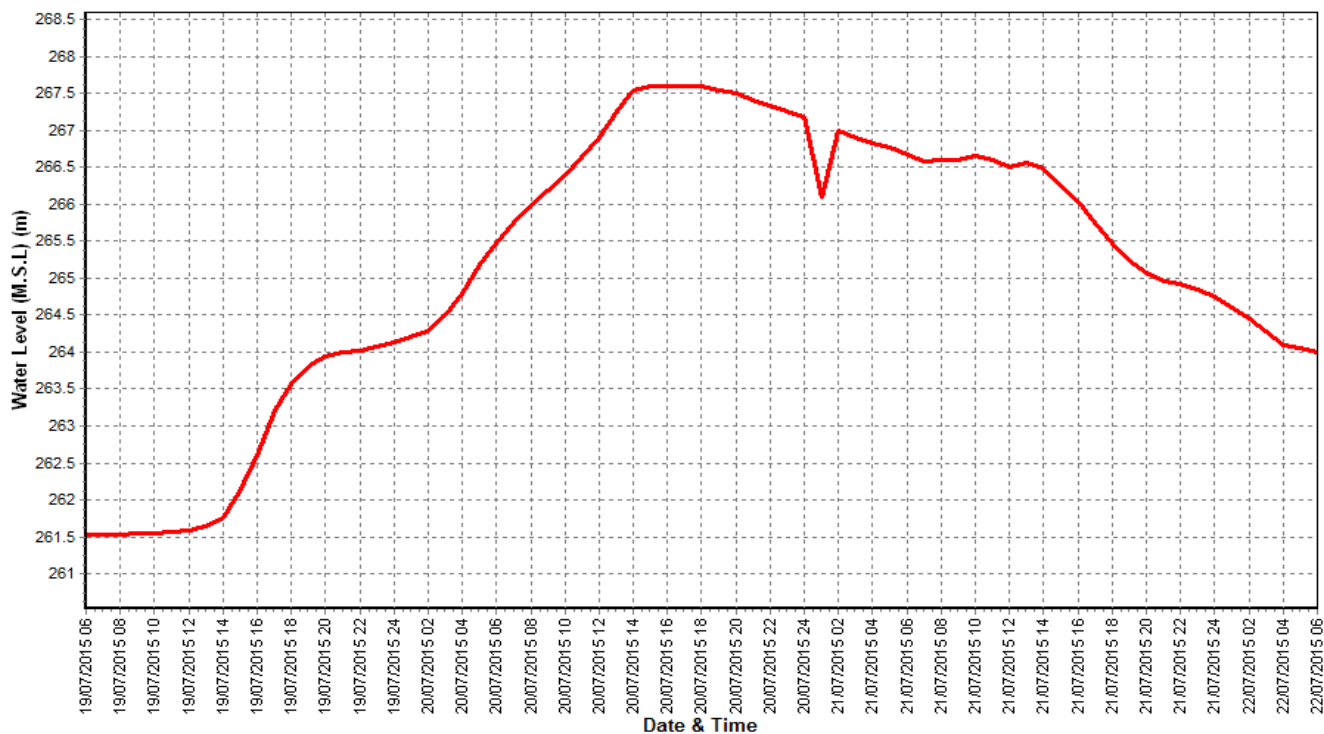
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



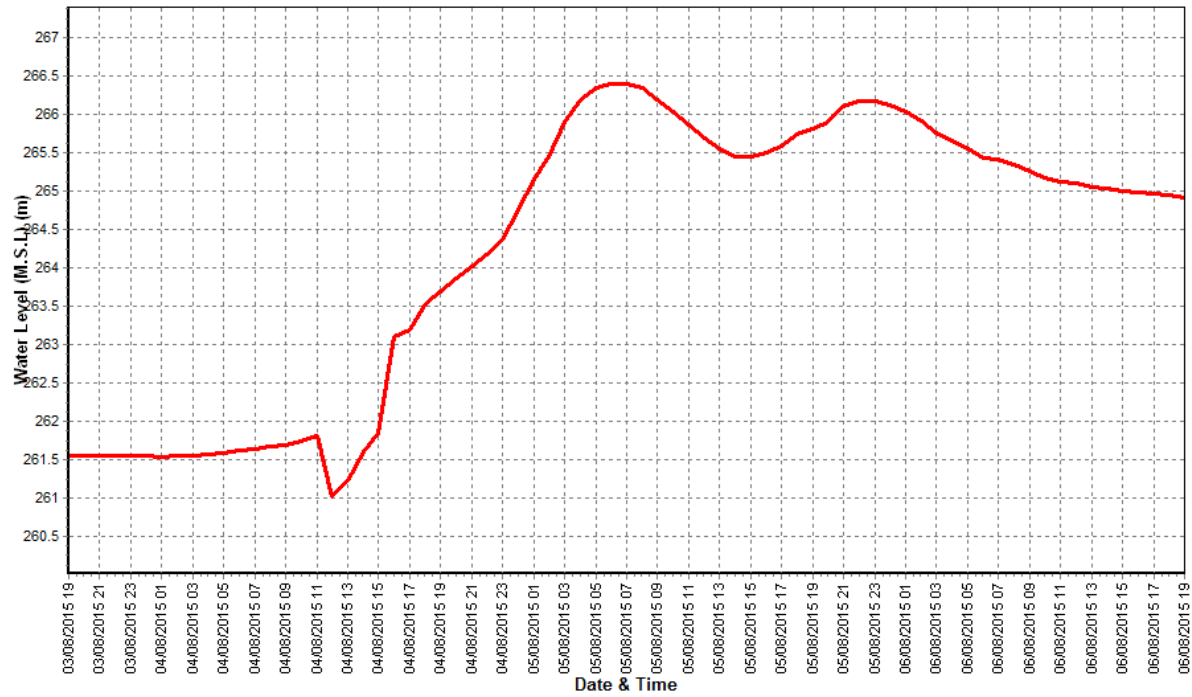
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Handia (010215022)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



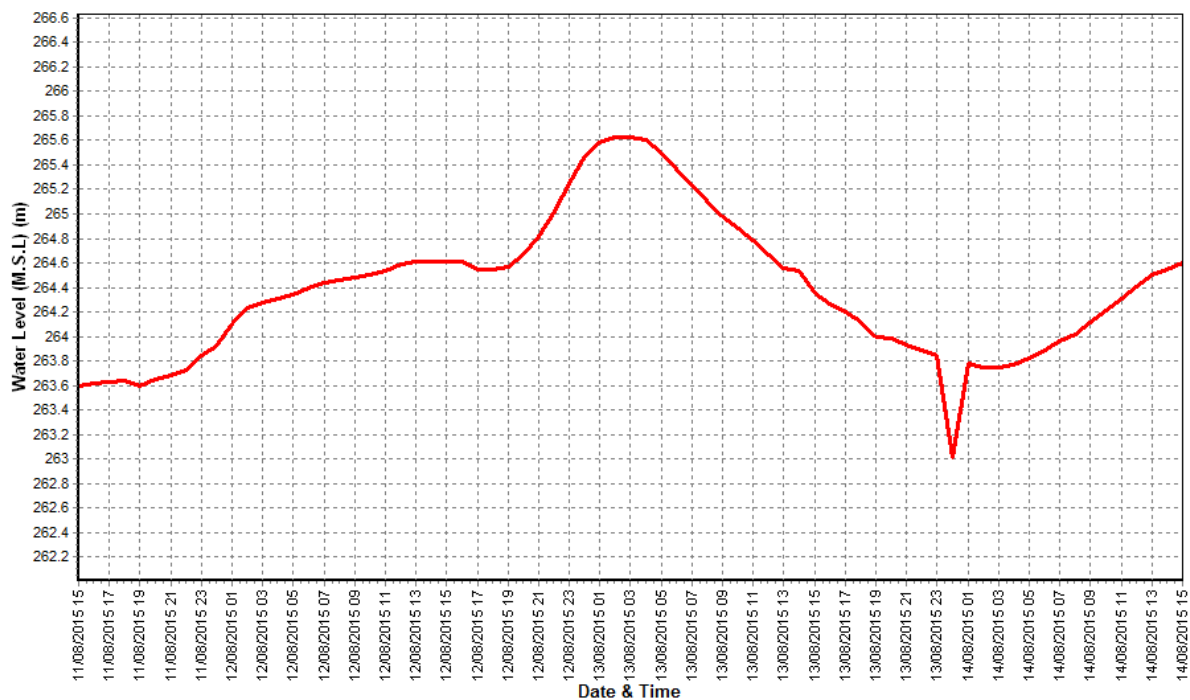
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Handia (010215022)

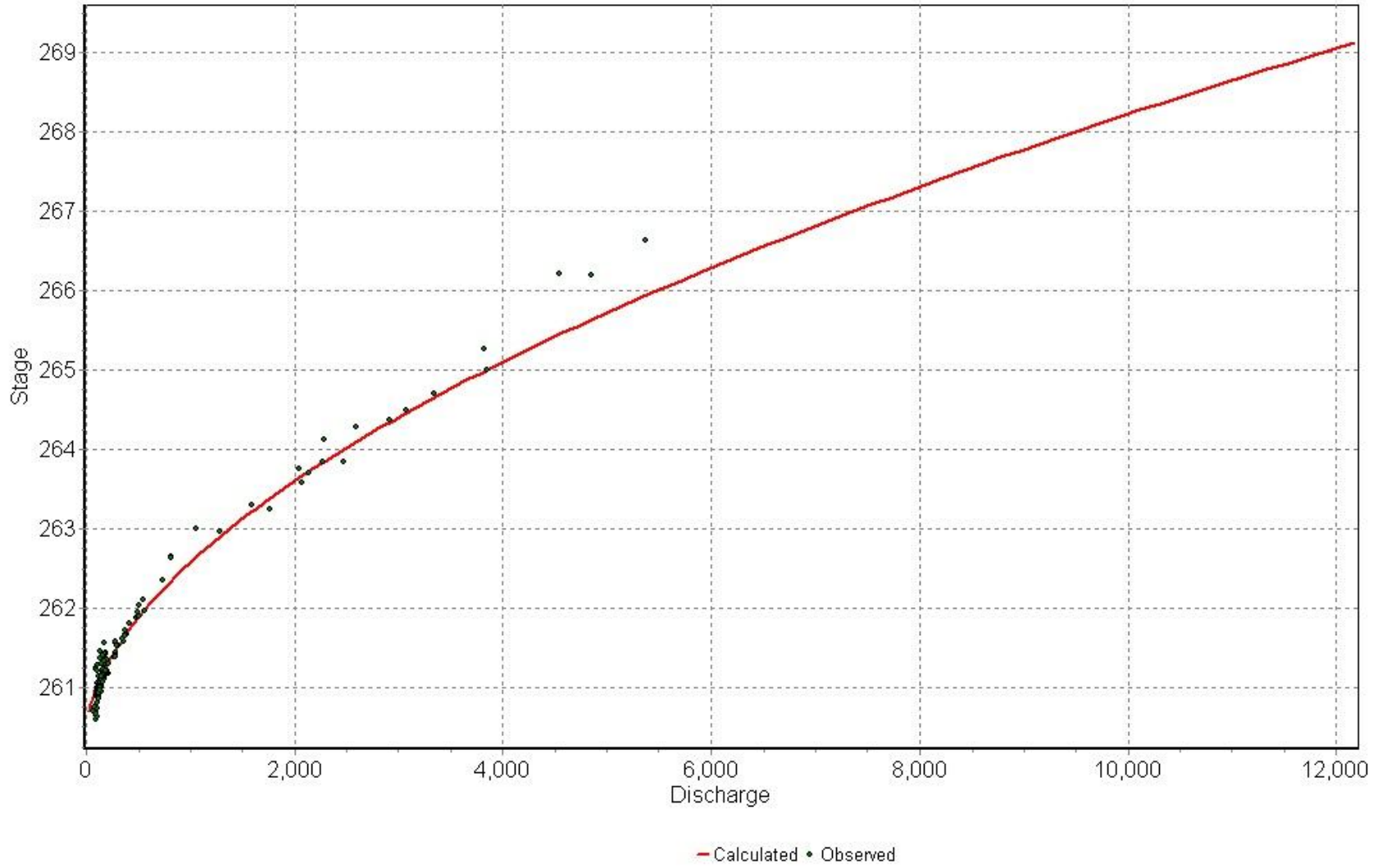
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division :MNSD II, CWC Bhopal



STAGE DISCHARGE CURVE OF SITE HANDIA 15-16



4.8 Ganjal at Chhidgaon

History sheet

Site	: Ganjal at Chhidgaon	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215020
Basin	: Narmada	District	: Harda
Tributary	: Ganjal	Independent River	: Narmada
Sub-Sub Tributary	: -	Sub Tributary	: -
Division	: Narmada Division,Bhopal	Local River	: Ganjal
Drainage Area	: 1729 Sq. Km.	Sub-Division	: MNSD II,Bhopal
Latitude	: 22°24'21"	Bank	: Left
Zero of Gauge (m)	: 287 (M.S.L)	Longitude	: 77°18'28"
	Opening Date	02/12/1976	
Gauge	: 22/12/1976	Closing Date	
Discharge	: 22/12/1976		
Sediment	:		
Water Quality	: 16/09/1986		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	2554	293.300	14/09/1977	0.000	287.815	05/05/1978
1978-1979	3813	296.500	29/08/1978	0.000	287.830	15/06/1978
1979-1980	1235	291.565	10/08/1979	0.000	287.430	12/06/1979
1980-1981	1375	295.100	03/08/1980	0.200	287.515	03/06/1980
1981-1982	490.8	290.265	10/08/1981	0.400	287.410	02/06/1981
1982-1983	876.0	291.260	23/08/1982	0.400	287.440	18/05/1983
1983-1984	2650	295.550	03/09/1983	0.300	287.420	06/06/1983
1984-1985	4470	299.000	10/08/1984	0.300	287.490	25/05/1985
1985-1986	1690	291.900	09/08/1985	0.300	287.485	02/06/1985
1986-1987	2675	295.990	15/08/1986	0.200	287.465	01/06/1986
1987-1988	1275	292.420	28/08/1987	0.361	287.170	25/05/1988
1988-1989	1300	292.540	04/08/1988	0.300	287.160	08/06/1988
1989-1990	863.5	291.000	29/06/1989	0.445	287.250	28/05/1990
1990-1991	3450	296.480	23/08/1990	0.100	287.350	01/06/1990
1991-1992	2060	294.200	30/07/1991	0.089	287.335	30/05/1992
1992-1993	1925	294.200	17/08/1992	0.020	287.330	18/06/1992
1993-1994	3700	297.200	16/07/1993	0.100	287.380	04/06/1993
1994-1995	5350	299.150	06/09/1994	0.380	287.340	08/06/1994
1995-1996	1320	292.505	02/09/1995	0.108	287.525	14/11/1995
1996-1997	2530	295.300	27/07/1996	0.197	287.450	05/06/1996
1997-1998	4500	298.900	26/07/1997	0.245	287.415	23/05/1998
1998-1999	6660	300.300	15/09/1998	0.170	287.415	15/06/1998
1999-2000	2490	295.620	10/08/1999	0.532	287.360	01/06/1999
2000-2001	960.0	291.900	13/07/2000	0.400	287.270	20/05/2001
2001-2002	1700	294.000	15/08/2001	0.270	287.260	19/05/2002
2002-2003	1200	292.600	23/08/2002	0.240	287.400	17/07/2002
2003-2004	2380	296.300	27/07/2003	0.310	287.295	08/06/2003
2004-2005	2170	297.000	22/08/2004	0.500	287.230	06/06/2004
2005-2006	926.5	292.640	01/08/2005	0.369	287.280	31/05/2006

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2006-2007	5143	296.500	31/08/2006	0.294	287.280	04/06/2006
2007-2008	9625	301.810	08/07/2007	0.087	287.600	15/06/2007
2008-2009	810.9	291.570	11/08/2008	0.015	287.600	03/05/2009
2009-2010	1878	293.280	22/07/2009	0.000	287.500	12/05/2010
2010-2011	270.8	289.950	09/09/2010	0.347	287.370	27/05/2011
2011-2012	816.0	291.400	26/08/2011	0.272	287.310	25/05/2012
2012-2013	5386	300.200	07/08/2012	0.122	287.370	10/06/2012
2013-2014	7528	300.750	23/08/2013	0.567	287.400	05/06/2013
2014-15						

Stage Discharge Sheet for Ganjal at Chhidgaon for the period 2015-16

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	287.500	1.104	287.530	1.235	288.690	94.43	288.500	96.07	287.980	22.68	287.850	8.072
2	287.500	0.994	287.520	1.169	288.480	83.57	289.800	234.0	287.970	22.60 *	287.830	8.590 *
3	287.500	0.983	287.520	1.158	288.420	65.77 *	288.680	110.8	287.960	21.87 *	287.850	8.002
4	287.510	1.068	287.520	1.129	288.300	76.48	288.565	95.08	287.950	17.29	287.840	8.273 *
5	287.515	1.107	287.520	1.121	288.320	85.61	288.345	81.78	287.940	20.44 *	287.840	7.966
6	287.520	1.136	287.520	1.073 *	288.570	102.4	288.250	73.15	287.940	20.44 *	287.830	7.959 *
7	287.520	1.145	287.560	1.244	288.520	92.17	288.180	40.27 *	287.930	14.50	287.830	7.982
8	287.520	1.273 *	287.550	1.206	288.450	78.44	290.050	470.8	287.930	14.28	287.810	7.192
9	287.510	1.083	287.540	1.142	288.340	73.20	289.210	195.5	287.920	13.70	287.800	7.037 *
10	287.510	1.072	287.530	1.072	288.260	48.16 *	288.810	118.4 #	287.910	12.65	287.790	6.558
11	287.500	1.038	287.530	1.072	288.190	54.08	288.700	102.2 #	287.910	12.40	287.780	6.159
12	287.500	1.051	287.530	1.063	288.200	61.33	288.190	58.51	287.910	18.38 *	287.770	5.441
13	287.510	1.144	287.520	2.216 *	288.190	58.55	288.590	94.55	287.910	12.32	287.760	5.346
14	287.520	1.184	287.650	2.116	288.100	47.36	288.490	74.21 *	287.900	11.36	287.750	5.903
15	287.520	1.073 *	287.620	1.604	288.050	28.80 *	288.400	75.24	287.900	11.36	287.760	6.203
16	287.530	1.186	289.400	196.7	288.090	45.99	288.810	161.7	287.890	11.22	287.760	5.854 *
17	287.530	1.192	288.450	86.77	288.040	27.99 *	288.500	85.58	287.890	10.78	287.770	6.678
18	287.530	1.305	288.140	54.03	288.000	24.85 *	288.450	81.39	287.880	10.27	287.850	8.316
19	287.540	1.325	287.910	11.89	287.990	23.77	288.700	147.2	287.880	16.42 *	287.800	6.987
20	287.540	1.312	290.900	610.4 *	287.980	23.25	288.350	78.12	287.870	9.655	287.780	6.779
21	287.530	1.253	289.050	137.4	287.970	21.93	288.370	60.00 *	287.880	9.636	287.770	6.286
22	287.530	1.273 *	288.550	96.21	287.950	20.34	288.350	73.45	287.880	9.829	287.760	7.031
23	287.520	1.156	291.300	693.3	288.450	80.33	288.200	61.95	287.880	16.42 *	287.760	5.854 *
24	287.510	1.190	289.550	207.1	288.150	37.48 *	288.190	57.15	287.880	9.828	287.760	6.976
25	287.510	1.193	289.025	144.0	288.210	61.51	288.180	56.51	287.880	9.505	287.750	6.018
26	287.510	1.163	288.960	129.8	288.190	57.01	288.170	56.11	287.870	15.79 *	287.750	5.964
27	287.500	1.104	288.800	116.9 *	287.985	25.47	288.110	47.04	287.870	9.317	287.750	5.856
28	287.500	1.101	290.350	556.6	287.890	18.48	288.100	33.02 *	287.870	9.476	287.740	5.549
29	287.510	0.889 *	289.600	264.7 *	288.350	57.77 *	287.990	23.84	287.860	8.515	287.740	5.535
30	287.530	1.192	289.005	125.7	288.335	66.53	287.990	23.13	287.860	8.482	287.740	5.280 *
31			288.900	123.1	288.200	42.19 *			287.850	8.054		
Ten-Daily Mean												
I Ten-Daily	287.510	1.096	287.531	1.155	288.435	80.02	288.839	151.6	287.943	18.04	287.827	7.763
II Ten-Daily	287.522	1.181	288.265	96.80	288.083	39.60	288.518	95.87	287.894	12.42	287.778	6.367
III Ten-Daily	287.515	1.151	289.372	235.9	288.153	44.46	288.165	49.22	287.871	10.44	287.752	6.035
Monthly												
Min.	287.500	0.889	287.520	1.063	287.890	18.48	287.990	23.13	287.850	8.054	287.740	5.280
Max.	287.540	1.325	291.300	693.3	288.690	102.4	290.050	470.8	287.980	22.68	287.850	8.590
Mean	287.516	1.143	288.421	115.3	288.221	54.36	288.507	98.89	287.902	13.53	287.786	6.722

Annual Runoff in MCM = 836 Annual Runoff in mm = 483

Peak Observed Discharge = 693.3 cumecs on 23-07-2014 Corres. Water Level :291.3 m

Lowest Observed Discharge = 0.000 cumecs on 20-05-2016

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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	287.730	5.220	287.720	4.663	287.740	5.280	287.740	5.280	287.720	4.402	287.650	3.293
2	287.730	5.089	287.750	5.876	287.740	5.257	287.800	7.863	287.720	4.721	287.650	3.233
3	287.730	5.089	287.760	6.129	287.730	4.996	287.760	6.495	287.720	4.721	287.650	2.860
4	287.730	5.051	287.810	7.342	287.730	4.935	287.750	6.126	287.720	4.346	287.640	2.607
5	287.720	4.632	287.790	7.749	287.730	4.893	287.740	5.856	287.710	4.445	287.640	3.162
6	287.720	4.591	287.770	7.264	287.720	4.724	287.740	5.280	287.710	4.213	287.630	3.004
7	287.720	4.721 *	287.750	6.445	287.720	4.674	287.730	4.935	287.700	4.010	287.630	2.993
8	287.710	4.218	287.740	6.077	287.720	4.721	287.730	4.999	287.700	3.951	287.610	2.351
9	287.710	4.182	287.730	5.876	287.720	4.532	287.720	4.634	287.690	3.674	287.600	2.112
10	287.710	4.159	287.730	5.800	287.720	4.496	287.720	4.552	287.690	3.728	287.600	1.627
11	287.710	4.121	287.730	4.999	287.760	5.959	287.710	4.314	287.680	2.636	287.590	1.964
12	287.700	3.889	287.730	5.593	287.750	5.749	287.710	4.272	287.700	4.173	287.580	1.566
13	287.700	3.840	287.720	5.183	287.750	5.627	287.730	4.902	287.730	4.027	287.570	0.958
14	287.700	4.173 *	287.720	5.093	287.750	5.633	287.740	5.068	287.820	7.796	287.570	0.833
15	287.700	3.834	287.720	5.025	287.750	5.566	287.780	6.439	287.800	7.202	287.560	0.972
16	287.700	3.800	287.720	4.965	287.750	5.589	287.760	5.409	287.780	6.634	287.560	0.629
17	287.720	4.618	287.710	4.921	287.750	5.566	287.750	5.421	287.760	5.824	287.590	1.389
18	287.720	4.682	287.710	4.445	287.750	5.436	287.790	7.190	287.750	5.407	287.590	0.498
19	287.710	4.252	287.710	4.838	287.750	5.211	287.780	6.957	287.750	5.566	287.590	0.534
20	287.710	4.195	287.710	4.609	287.740	5.088	287.770	6.385	287.740	5.187	287.58	0.000
21	287.700	4.173 *	287.730	5.253	287.740	5.044	287.770	6.306	287.740	5.150	287.57	0.000
22	287.700	3.896	287.730	5.331	287.730	4.999	287.760	4.999	287.740	4.994	287.56	0.000
23	287.720	4.602	287.730	5.263	287.720	4.644	287.760	5.535	287.750	5.248	287.56	0.000
24	287.720	4.617	287.730	5.205	287.720	4.382	287.750	5.416	287.680	3.686	287.56	0.000
25	287.720	4.721 *	287.730	4.999	287.710	4.430	287.750	5.252	287.680	3.658	287.55	0.000
26	287.720	4.519	287.730	4.999	287.710	4.403	287.750	5.140	287.680	3.638	287.55	0.000
27	287.710	4.374	287.730	4.998	287.710	4.343	287.740	5.008	287.670	3.594	287.54	0.000
28	287.700	4.173 *	287.730	4.857	287.710	4.324	287.740	4.864	287.670	3.575	287.5	0.000
29	287.710	4.265	287.740	5.370			287.720	4.721	287.660	3.516	287.46	0.000
30	287.700	4.196	287.740	5.569			287.730	4.675	287.660	3.464	287.44	0.000
31	287.700	4.076	287.740	5.376			287.720	4.421			287.43	0.000
Ten-Daily Mean												
I Ten-Daily	287.721	4.695	287.755	6.322	287.727	4.851	287.743	5.602	287.708	4.221	287.630	2.724
II Ten-Daily	287.707	4.140	287.718	4.967	287.750	5.542	287.752	5.636	287.751	5.445	287.578	0.934
III Ten-Daily	287.709	4.328	287.733	5.202	287.719	4.571	287.745	5.122	287.693	4.052		0.000
Monthly												
Min.	287.700	3.800	287.710	4.445	287.710	4.324	287.710	4.272	287.660	2.636	287.560	0.000
Max.	287.730	5.220	287.810	7.749	287.760	5.959	287.800	7.863	287.820	7.796	287.650	3.293
Mean	287.712	4.386	287.735	5.488	287.733	5.018	287.746	5.442	287.717	4.573	287.605	1.18

Peak Computed Discharge = 610.4 cumecs on 20-07-2014

Corres. Water Level :290.9 m

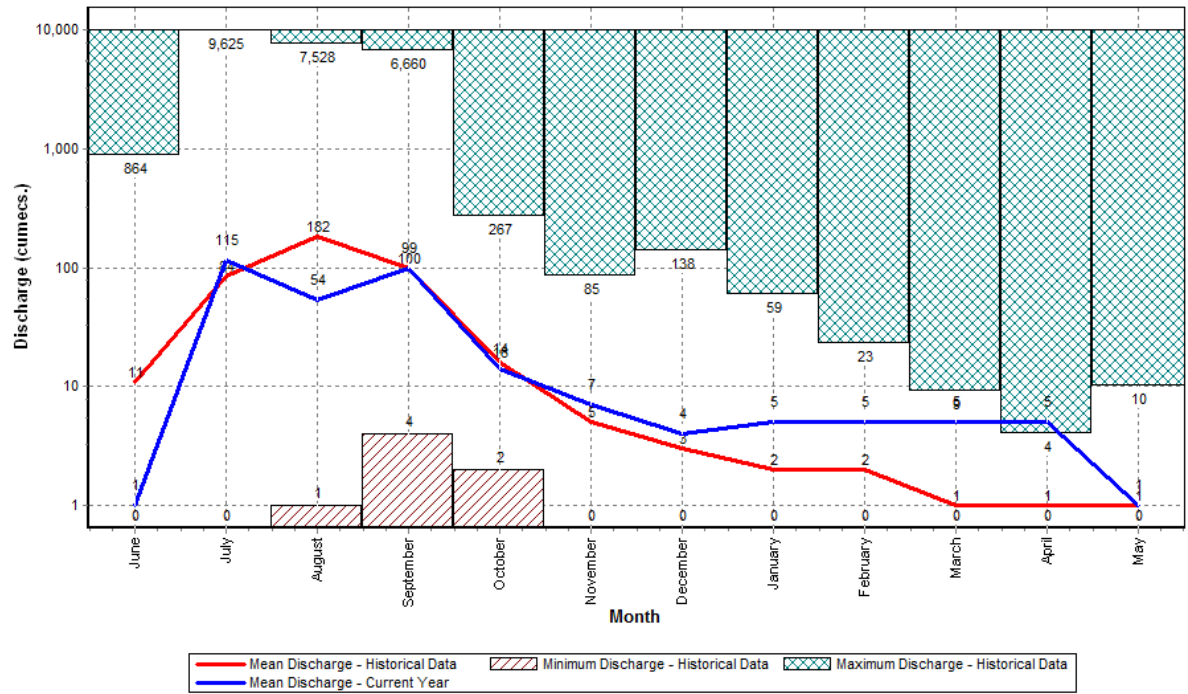
Lowest Computed Discharge = 0.889 cumecs on 29-06-2014

Corres. Water Level :287.51 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 : 2015-16 (Data considered : 1977-2014)



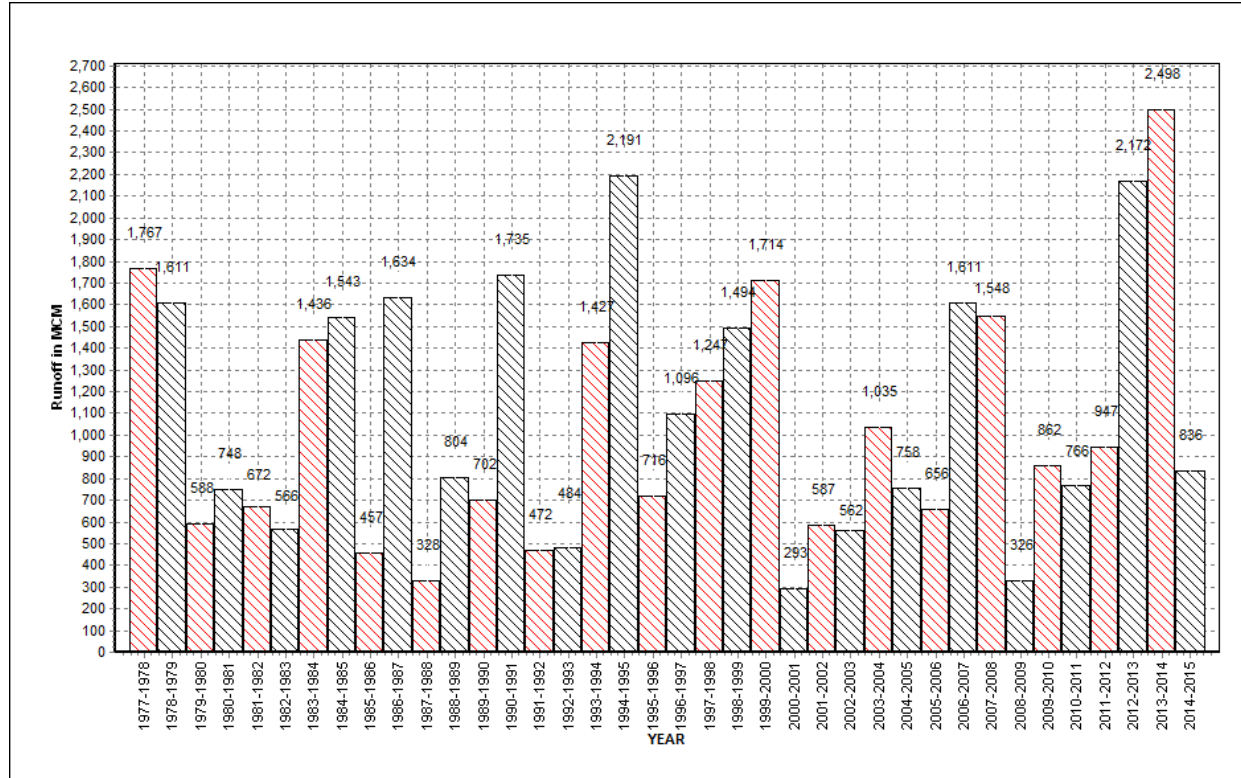
Annual Runoff Values for the period (1977 – 2014)

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

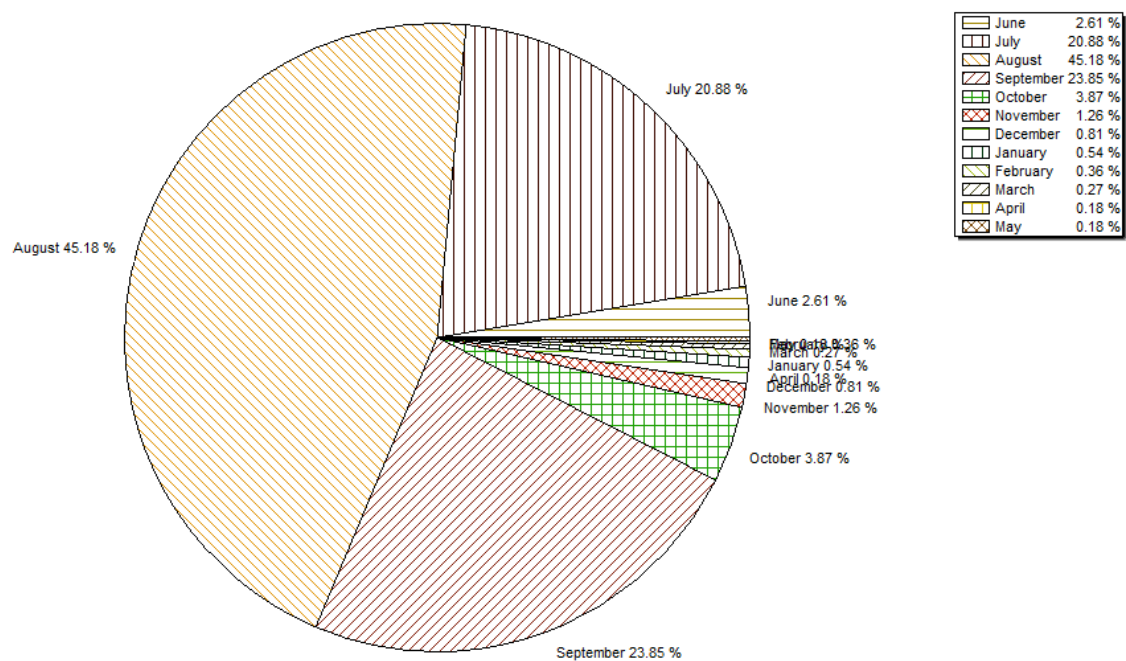
Monthly Average Runoff based on period (1977 – 2014)

Station Name : Ganjal at Chhidgaon (010215020)

Local River : Ganjal

Division : Narmada Division, Bhopal

Sub-Division :MNSD II, CWC Bhopal



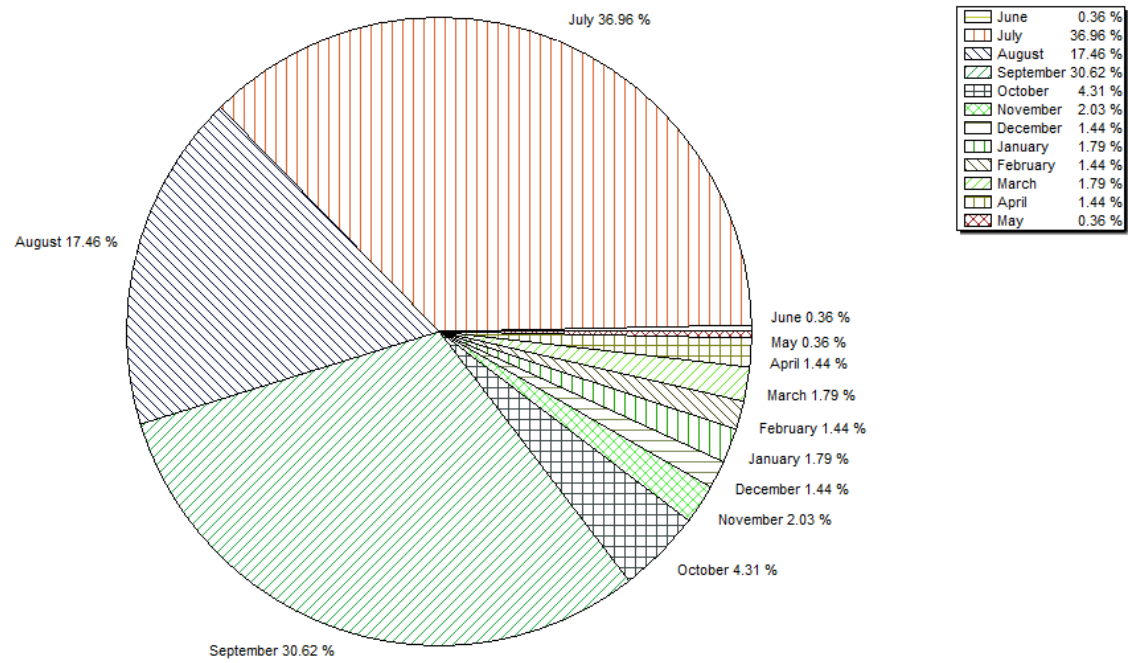
Monthly Runoff for the Year (2015-16)

Station Name : Ganjal at Chhidgaon (010215020)

Local River : Ganjal

Division : Narmada Division, Bhopal

Sub-Division :MNSD II, CWC Bhopal



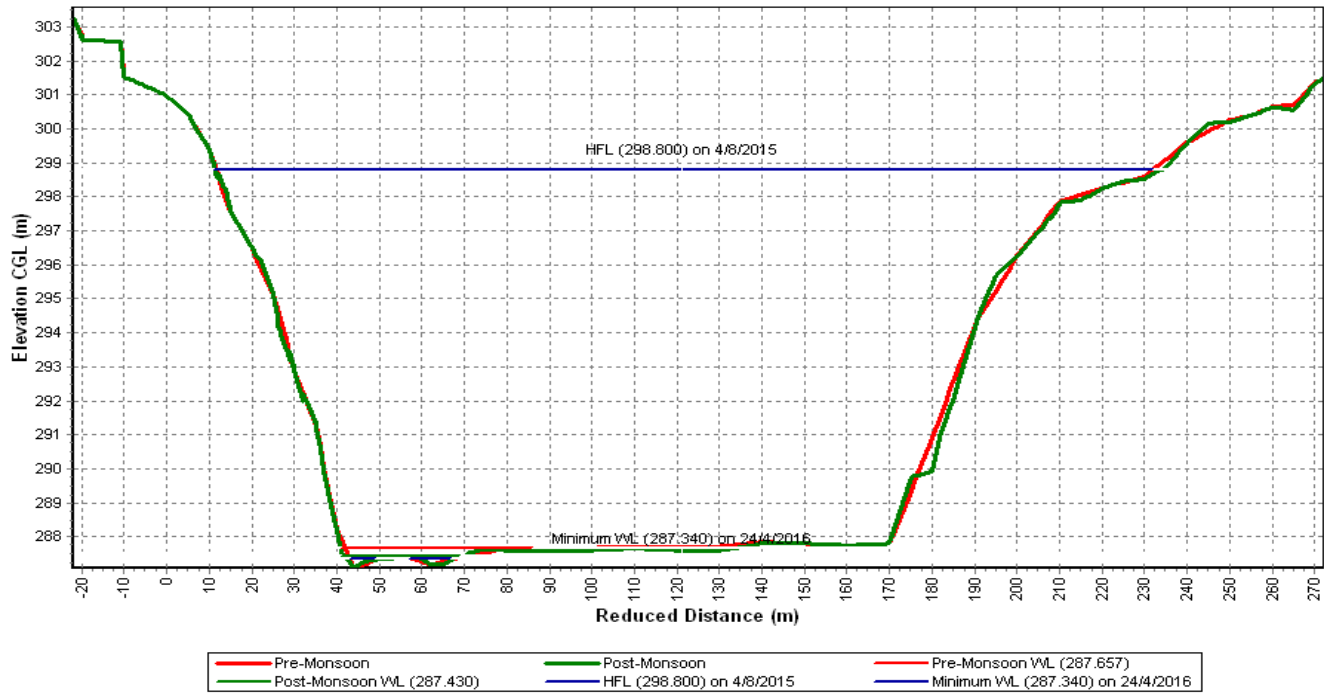
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division : MNSD II, CWC Bhopal



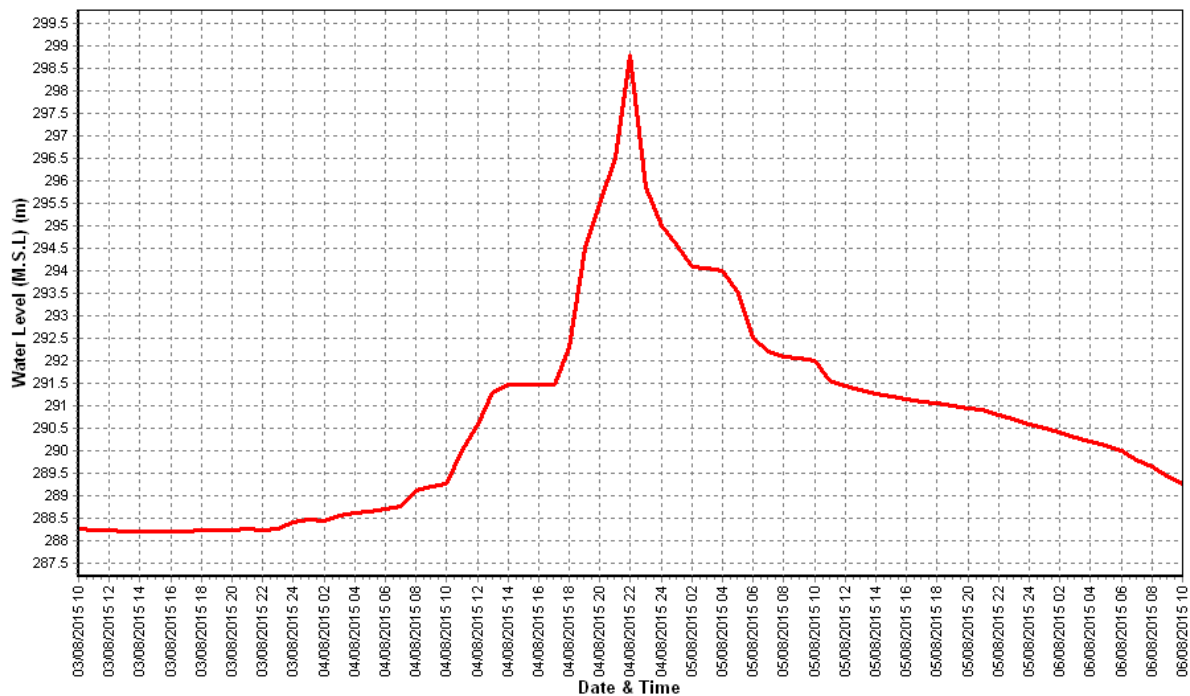
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division :MNSD II, CWC Bhopal



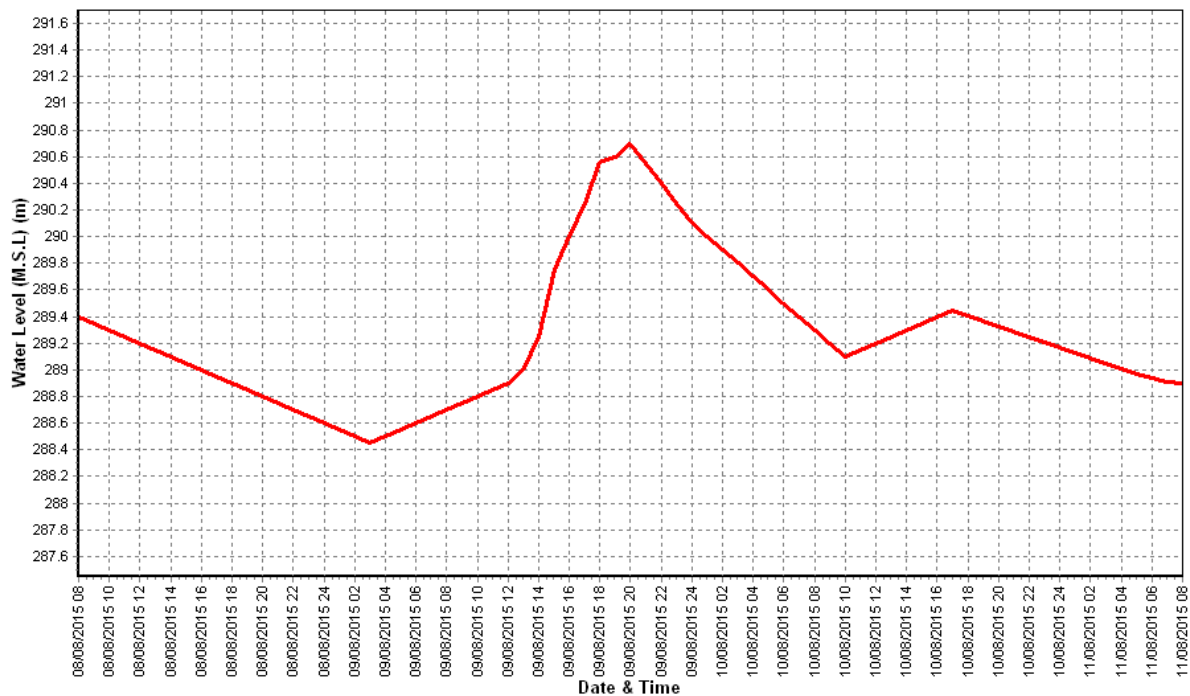
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Ganjal at Chhidgaon (010215020)

Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division :MNSD II, CWC Bhopal



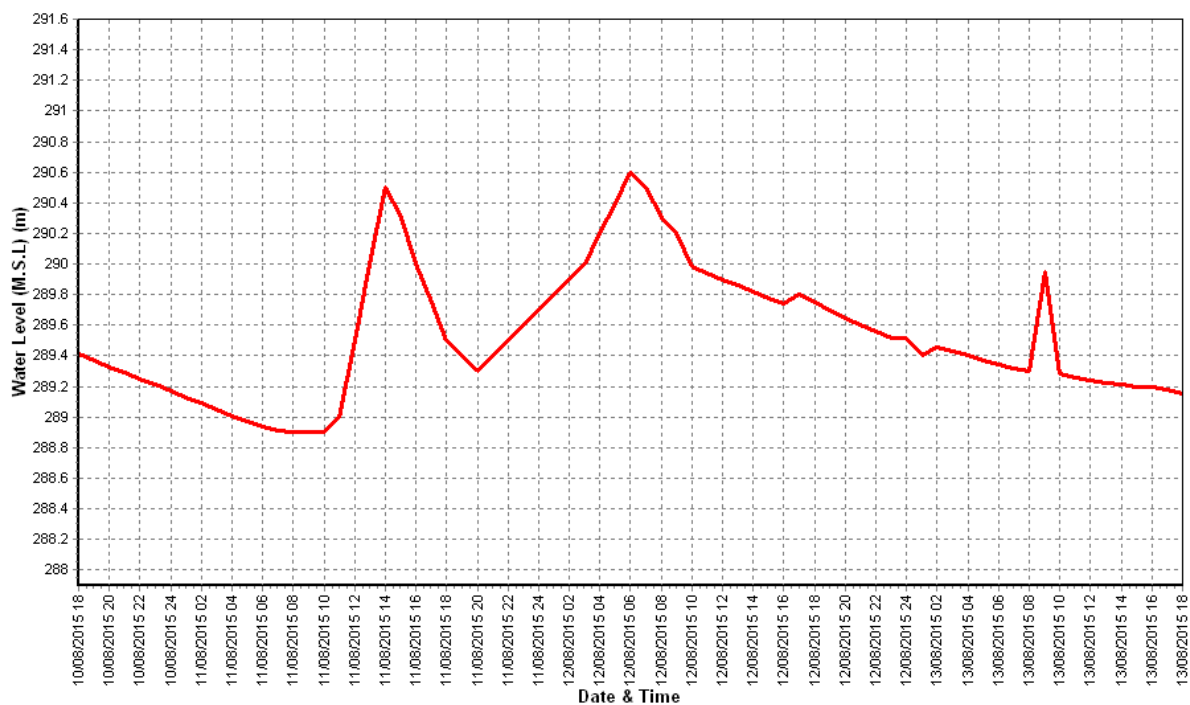
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Ganjal at Chhidgaon (010215020)

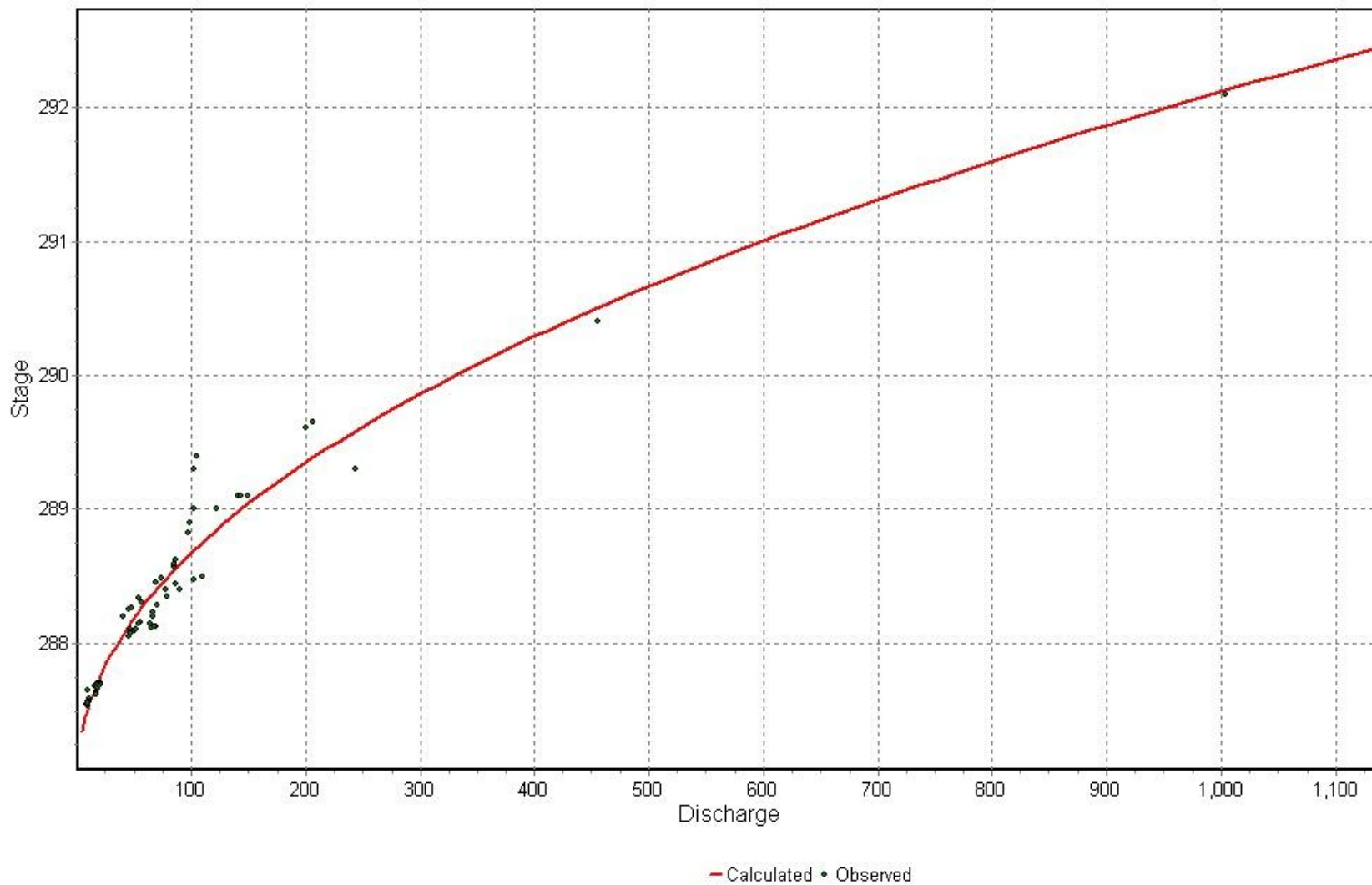
Division : Narmada Division, Bhopal

Local River : Ganjal

Sub-Division :MNSD II, CWC Bhopal



STAGE DISCHARGE CURVE OF SITE CHHIDGAON 15-16



4.9 Narmada at Hoshangabad

History sheet

Site	: Narmada at Hoshangabad	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215019
Basin	: Narmada	District	: Hoshangabad
Tributary	:	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada Division Bhopal	Local River	: Narmada
Drainage Area	: 44548 Sq. Km.	Sub-Division	: MNSD-1 CWC Hoshangabad
Latitude	: 22°45'21"	Bank	: Left
Zero of Gauge (m)	: 282 (M.S.L)	Longitude	: 77°43'58"
Gauge	: 21/05/1972	Opening Date	: 21/05/1972
Discharge	: 16/09/1972	Closing Date	:
Sediment	: 29/12/1972		
Water Quality	: 15/07/1979		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1973-1974	33593	298.136	22/07/1973	25.00	284.130	03/06/1973
1974-1975	28435	300.805	20/08/1974	22.40	283.805	30/05/1975
1975-1976	13865	295.210	25/08/1975	19.40	283.805	11/06/1975
1976-1977	10350	292.995	05/08/1976	15.00	283.775	26/05/1977
1977-1978	15437	296.045	09/08/1977	15.20	283.770	09/06/1977
1978-1979	18400	295.895	26/08/1978	27.00	283.885	02/06/1978
1979-1980	11201	294.345	10/08/1979	14.30	283.775	30/05/1980
1980-1981	21893	296.400	30/08/1980	14.90	283.770	03/06/1980
1981-1982	5854	290.475	17/08/1981	20.00	283.900	15/06/1981
1982-1983	16886	294.550	23/08/1982	21.40	284.827	26/06/1982
1983-1984	22020	296.200	10/09/1983	26.90	284.145	16/06/1983
1984-1985	28600	298.610	19/08/1984	27.90	283.930	29/05/1985
1985-1986	12470	293.690	10/08/1985	19.00	283.960	09/06/1985
1986-1987	20680	296.250	24/07/1986	20.10	283.950	30/05/1987
1987-1988	15945	294.660	18/09/1987	15.00	283.900	29/05/1988
1988-1989	16800	295.090	05/08/1988	15.07	283.895	03/06/1988
1989-1990	10800	292.530	08/08/1989	18.87	283.925	03/06/1989
1990-1991	12810	293.500	23/08/1990	12.80	284.715	03/02/1991
1991-1992	20000	296.400	25/08/1991	58.00	284.260	11/05/1992
1992-1993	9750	292.010	13/09/1992	56.58	284.220	12/07/1992
1993-1994	12100	293.370	06/08/1993	49.00	284.480	10/06/1993
1994-1995	20200	296.160	22/07/1994	100.4	284.415	21/01/1995
1995-1996	10100	292.230	12/08/1995	102.6	284.480	02/06/1995
1996-1997	3450	288.500	27/07/1996	87.39	284.190	22/06/1996
1997-1998	11860	292.050	26/07/1997	67.84	284.190	11/06/1997
1998-1999	18000	295.140	15/09/1998	49.00	284.210	30/05/1999
1999-2000	27800	299.530	19/09/1999	42.00	284.200	06/06/1999
2000-2001	5600	290.320	29/07/2000	70.00	284.240	11/04/2001
2001-2002	6280	290.190	16/07/2001	67.81	284.250	04/06/2001
2002-2003	14560	294.200	19/08/2002	85.42	284.410	30/05/2003
2003-2004	12539	292.700	28/07/2003	72.78	284.360	19/05/2004

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2004-2005	12500	293.310	23/08/2004	64.70	284.290	07/06/2004
2005-2006	14280	294.000	06/07/2005	18.50	284.190	12/06/2005
2006-2007	14924	294.690	01/09/2006	62.42	284.190	25/06/2006
2007-2008	9373	291.800	09/07/2007	9.547	284.000	08/07/2007
2008-2009	6240	289.990	02/08/2008	76.04	284.310	23/01/2009
2009-2010	20984	296.890	10/09/2009	48.93	284.210	04/07/2009
2010-2011	4784	289.500	05/09/2010	65.88	284.330	06/12/2010
2011-2012	9076	291.500	24/07/2011	42.86	284.160	31/05/2012
2012-2013	16973	295.550	07/08/2012	38.96	284.130	07/06/2012
2013-2014	23529	299.180	23/08/2013	91.14	284.250	16/05/2014
2014-2015	4752	289.100	09/08/2014	91.18	284.290	10/07/2014

Stage Discharge Sheet for Narmada at Hoshangabad for the period 2015-16

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	284.700	202.1	284.440	132.4	284.890	302.6	285.430	533.3	284.660	186.6	284.310	95.03 *
2	284.720	207.3	284.490	142.2	284.770	236.3 *	285.850	786.2	284.640	190.1 *	284.400	125.7
3	284.660	186.7	284.460	137.0	284.740	210.1	285.675	722.8	284.620	174.4	284.520	149.5
4	284.580	168.3	284.500	145.1	284.840	276.9	285.490	567.2	284.630	186.7 *	284.540	156.6
5	284.520	148.3	284.480	140.0 *	287.825	2724	285.400	521.7	284.510	166.9	284.510	146.6
6	284.500	144.7	284.430	131.5	287.785	2710	285.300	518.6 *	284.540	156.3	284.490	141.2
7	284.500	145.8 *	284.400	125.6	286.685	1485	285.300	483.2	284.570	161.4	284.480	140.9
8	284.590	169.5	284.470	139.3	286.530	1399	285.250	463.2	284.620	174.9	284.470	137.1 *
9	284.580	167.8	284.400	125.9	286.790	1579 *	285.100	402.0	284.730	210.1	284.460	137.4
10	284.560	160.0	284.530	169.0	286.315	1284	285.010	353.2	284.870	296.2	284.440	133.5
11	284.550	158.2	287.070	1782	285.820	777.7	284.970	332.5	284.670	200.3 *	284.440	115.1 *
12	284.510	145.7	286.970	1754 *	286.685	1480	284.880	298.0	284.560	160.2	284.370	117.4
13	284.490	142.1	286.250	1209	286.210	1332	284.870	275.2 *	284.580	165.5	284.360	115.0
14	284.500	145.8 *	285.585	628.7	287.990	2797	284.820	260.4	284.610	172.4	284.350	112.1
15	284.350	112.4	285.200	451.5	288.850	4132 *	284.890	301.2	284.690	197.1	284.380	102.3 *
16	284.350	111.3	284.970	346.5	287.350	2155 *	284.820	261.4	284.730	209.0	284.370	117.6
17	284.360	113.3	285.020	368.6	286.545	1410	284.730	232.6 *	284.760	216.9	284.360	114.6
18	284.370	114.9	284.970	317.0 *	286.420	1336	284.730	208.5	284.810	251.5 *	284.350	112.0
19	284.450	135.0	285.080	366.3 *	286.055	1108	284.900	305.3	284.740	211.6	284.380	120.0
20	284.480	141.2	286.900	1685 *	285.870	795.8	284.880	279.2 *	284.600	169.7	284.320	86.01
21	284.460	134.3 *	286.295	1270	285.555	613.2	284.840	277.1	284.500	145.7	284.360	112.8
22	284.410	128.4	285.360	497.7	285.370	507.5	284.760	218.9	284.460	134.3 *	284.370	109.9 *
23	284.470	140.2	285.220	450.2	285.210	429.1 *	284.770	221.4	284.450	135.4	284.500	145.5
24	284.400	134.8	285.895	799.0	285.180	436.1	284.800	255.5	284.420	123.2 *	284.470	139.7
25	284.460	153.2	286.535	1408	285.120	416.6	284.770	236.3 *	284.400	117.8 *	284.470	137.1 *
26	284.440	130.5	286.535	1531 *	285.050	383.6	284.770	221.7	284.390	123.9	284.510	147.3
27	284.400	129.5	286.125	1166	284.960	329.2	284.750	228.9 *	284.350	111.1	284.459	140.0
28	284.390	123.2 *	285.640	632.6	285.020	356.4	284.740	211.3	284.340	108.7	284.500	144.9
29	284.390	118.3	285.380	512.6	285.370	508.6	284.690	197.5	284.390	122.6	284.560	161.0 *
30	284.360	111.5	285.210	447.0	285.420	540.9 *	284.680	194.0	284.390	122.1	284.530	151.6
31			285.000	342.0	285.480	564.1			284.340	107.5		
Ten-Daily Mean												
I Ten-Daily	284.591	170.0	284.460	138.8	286.117	1221	285.381	535.1	284.639	190.4	284.462	136.4
II Ten-Daily	284.441	132.0	285.801	891.0	286.779	1732	284.849	275.4	284.675	195.4	284.368	111.2
III Ten-Daily	284.418	130.4	285.745	823.4	285.249	462.3	284.757	226.2	284.403	122.9	284.473	139.0
Monthly												
Min.	284.350	111.3	284.400	125.6	284.740	210.1	284.680	194.0	284.340	107.5	284.310	86.01
Max.	284.720	207.3	287.070	1782	288.850	4132	285.850	786.2	284.870	296.2	284.560	161.0
Mean	284.483	144.1	285.349	624.3	286.023	1117	284.995	345.6	284.567	168.1	284.434	128.9

Annual Runoff in MCM = 9173 Annual Runoff in mm = 206

Peak Observed Discharge = 2797 cumecs on 14/08/2015 Corres. Water Level :287.99 m

Lowest Observed Discharge = 86.01 cumecs on 20/11/2015 Corres. Water Level :284.32 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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	284.500	145.0	284.390	121.9	284.600	168.6	284.550	158.5	284.450	134.6	284.620	183.4 *
2	284.370	117.1	284.400	125.0	284.600	169.2	284.490	142.2	284.450	134.8	284.640	178.3
3	284.350	111.2	284.390	109.9 *	284.600	169.1	284.470	137.7	284.490	142.9 *	284.630	175.6
4	284.300	97.57	284.410	127.2	284.600	168.7	284.450	135.0	284.540	156.4	284.640	178.5
5	284.350	110.2	284.550	154.4	284.600	168.6	284.430	130.2	284.620	173.9	284.630	175.2
6	284.440	128.7 *	284.540	154.9	284.590	166.6		125.9 *	284.600	168.5	284.630	175.3
7	284.400	126.6	284.460	137.4	284.590	173.6 *	284.430	130.4	284.580	164.7	284.620	172.5
8	284.380	120.3	284.430	130.8	284.590	166.4	284.470	138.2	284.560	159.9	284.640	190.1 *
9	284.410	128.0	284.410	126.9	284.570	161.7	284.580	164.4	284.560	160.1	284.640	178.7
10	284.420	129.7	284.440	128.7 *	284.560	159.3	284.670	185.5	284.580	170.4 *	284.650	180.0
11	284.390	121.4	284.500	143.2	284.570	162.1	284.720	208.4	284.650	180.8	284.670	186.8
12	284.370	115.9	284.530	152.2	284.570	162.0	284.740	211.3	284.630	175.9	284.640	178.2
13	284.410	120.4 *	284.450	135.7	284.590	166.5		217.9 *	284.600	168.5	284.630	175.5
14	284.420	129.2	284.480	141.0	284.590	173.6 *	284.680	188.6	284.540	157.9 *	284.620	173.0
15	284.400	125.8	284.440	133.2	284.590	166.1	284.660	183.6	284.420	123.2 *	284.630	186.7 *
16	284.380	119.8	284.460	137.7	284.590	166.2	284.620	174.3	284.360	112.1	284.630	175.8
17	284.370	115.5	284.380	112.5 *	284.620	174.4	284.600	169.0	284.350	104.8 *	284.620	173.0
18	284.370	115.0	284.510	145.4	284.630	176.5	284.500	143.1	284.580	164.9	284.630	175.3
19	284.350	109.6	284.600	169.8	284.620	174.7	284.480	141.1	284.620	172.0	284.640	178.5
20	284.310	95.03 *	284.650	184.7	284.640	178.3		145.8 *	284.620	183.4 *	284.640	178.3
21	284.380	120.1	284.640	182.9	284.650	193.5 *	284.480	140.9	284.630	174.9	284.640	190.1 *
22	284.410	126.6	284.600	168.6	284.700	197.9	284.440	131.8	284.650	180.4	284.630	186.7 *
23	284.410	127.7	284.580	164.9	284.660	183.7	284.560	160.3	284.650	180.2	284.620	172.4
24	284.340	102.3 *	284.570	167.2 *	284.650	180.7		145.8 *	284.690	207.3 *	284.610	170.8
25	284.370	97.44 *	284.570	161.5	284.590	166.4		137.1 *	284.680	188.6	284.650	180.3
26	284.370	115.3	284.570	167.2 *	284.580	164.6	284.460	136.6	284.650	180.4	284.630	175.5
27	284.390	115.1 *	284.580	164.7	284.580	164.8		131.4 *	284.630	175.4	284.630	175.3
28	284.380	119.5	284.600	169.8	284.580	170.4 *	284.440	131.6	284.630	175.9	284.620	172.5
29	284.330	104.7	284.610	171.9	284.570	162.9	284.440	131.6	284.630	176.2	284.650	193.5 *
30	284.320	104.8	284.620	174.1			284.420	129.3	284.620	172.5	284.640	178.2
31	284.360	113.6	284.620	183.4 *			284.430	130.3			284.640	178.4
Ten-Daily Mean												
I Ten-Daily	284.392	121.4	284.442	131.7	284.590	167.2	284.504	144.8	284.543	156.6	284.634	178.8
II Ten-Daily	284.377	116.8	284.500	145.5	284.601	170.1	284.625	178.3	284.537	154.3	284.635	178.1
III Ten-Daily	284.369	113.4	284.596	170.6	284.618	176.1	284.459	137.0	284.646	181.2	284.633	179.4
Monthly												
Min.	284.300	95.03	284.380	109.9	284.560	159.3	284.420	125.9	284.350	104.8	284.610	170.8
Max.	284.500	145.0	284.650	184.7	284.700	197.9	284.740	217.9	284.690	207.3	284.670	193.5
Mean	284.379	117.1	284.515	150	284.602	170.9	284.528	152.8	284.575	164	284.634	178.8

Peak Computed Discharge = 4132 cumecs on 15/08/2015 Corres. Water Level :288.85 m
 Lowest Computed Discharge = 95.03 cumecs on 01/11/2015 Corres. Water Level :284.31 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**

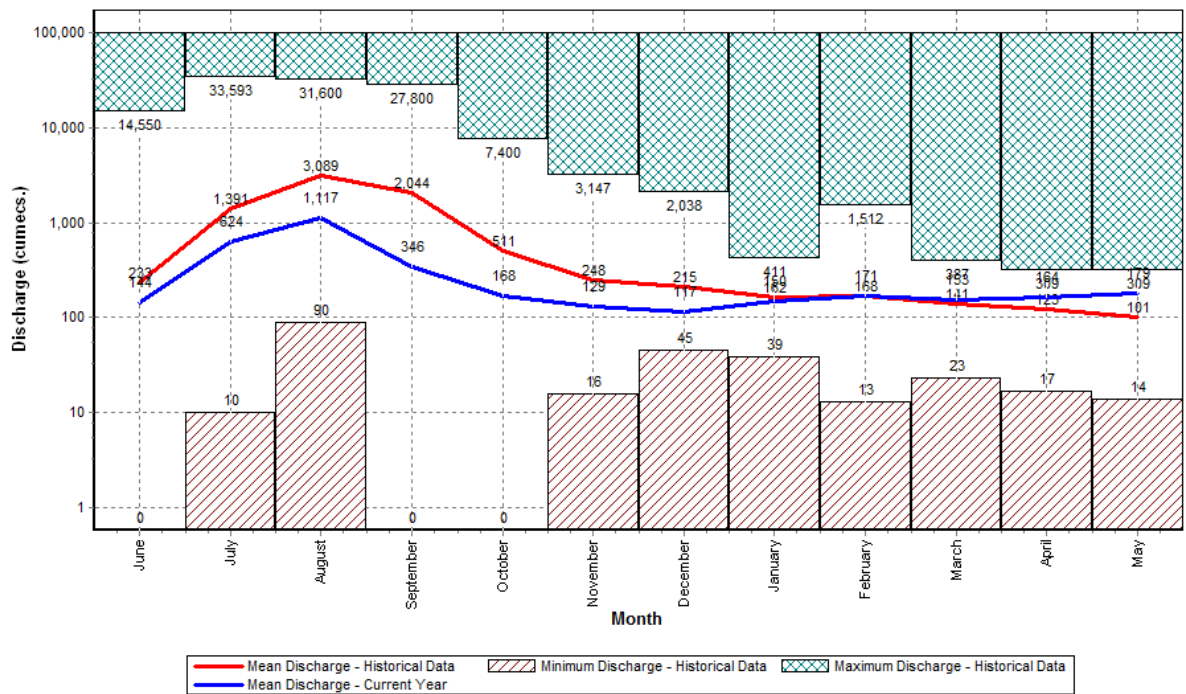
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1973-2016)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



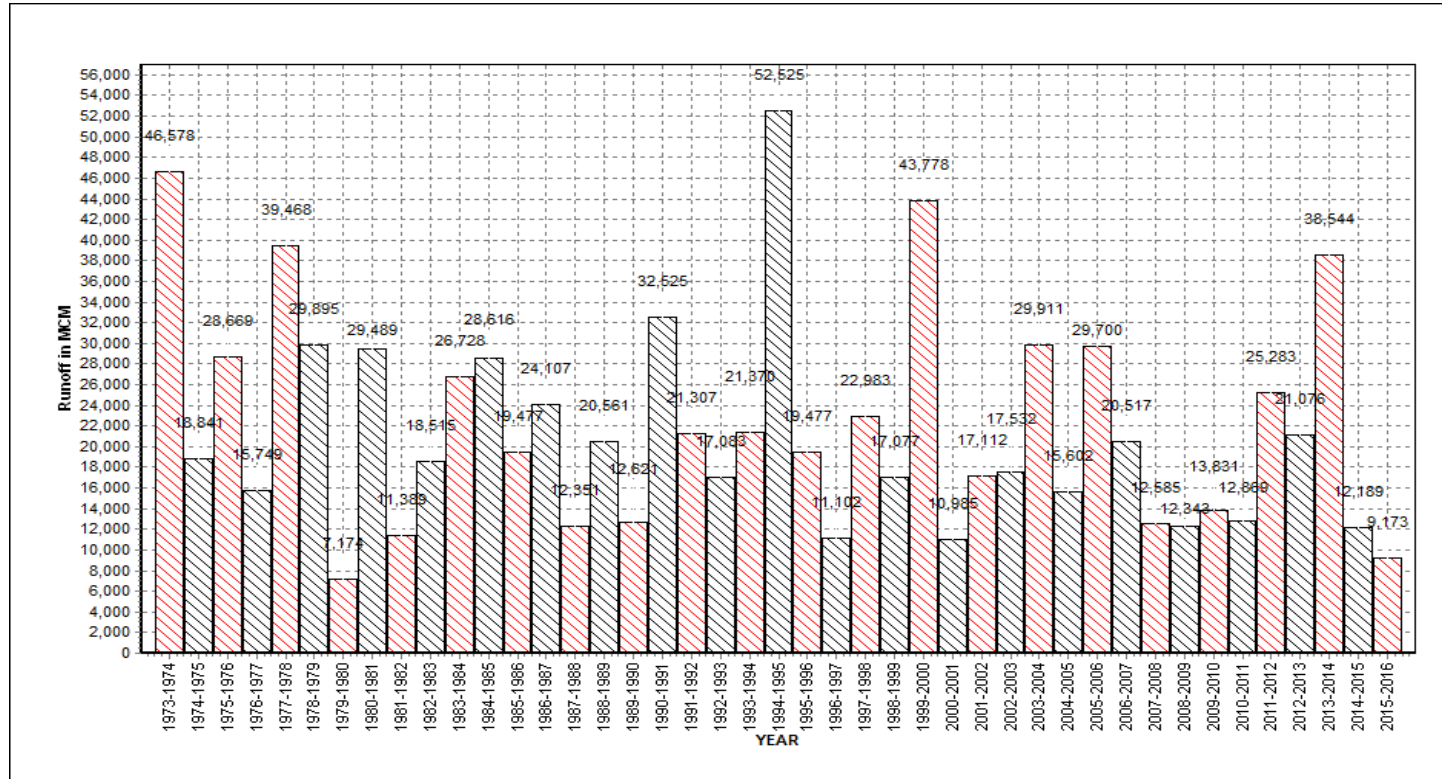
Annual Runoff Values for the period (1973 – 2016)

Station Name : Narmada at Hoshangabad (010215019)

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

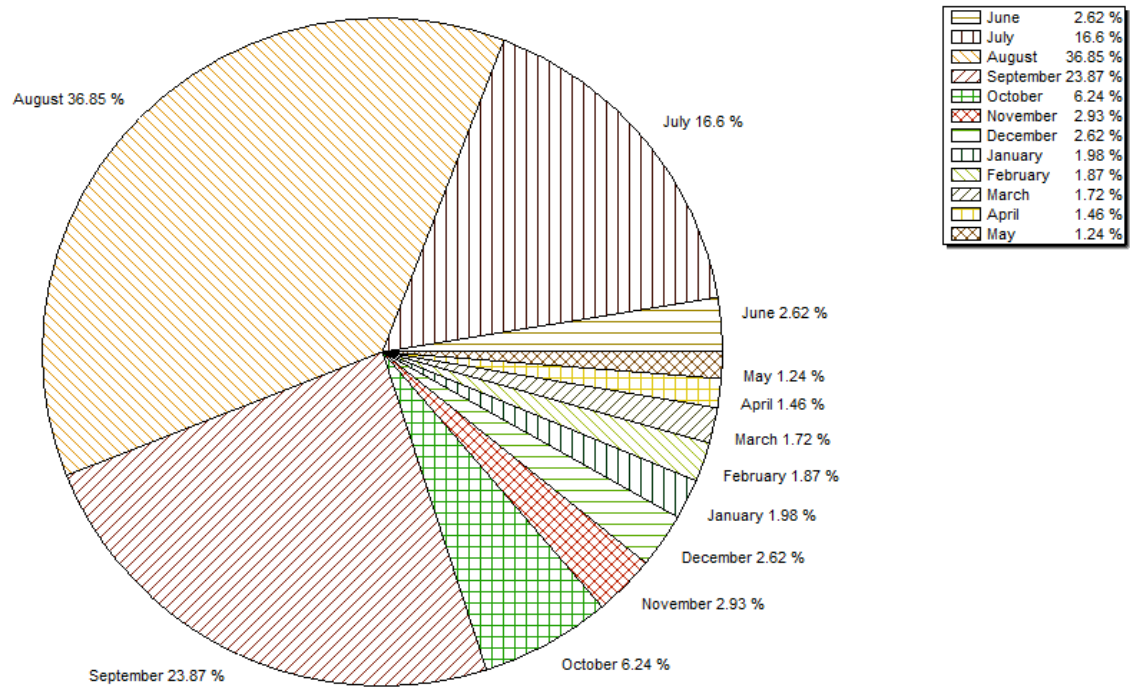
Monthly Average Runoff based on period (1973-2014)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



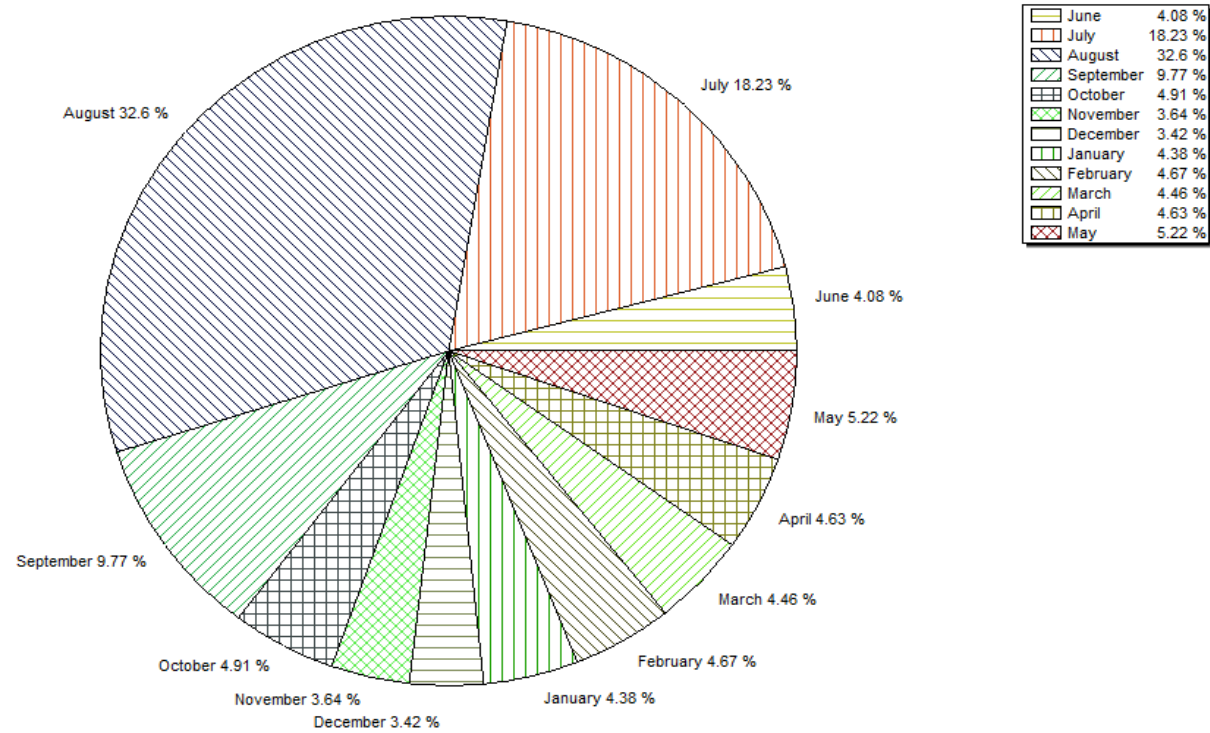
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Hoshangabad (010215019)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



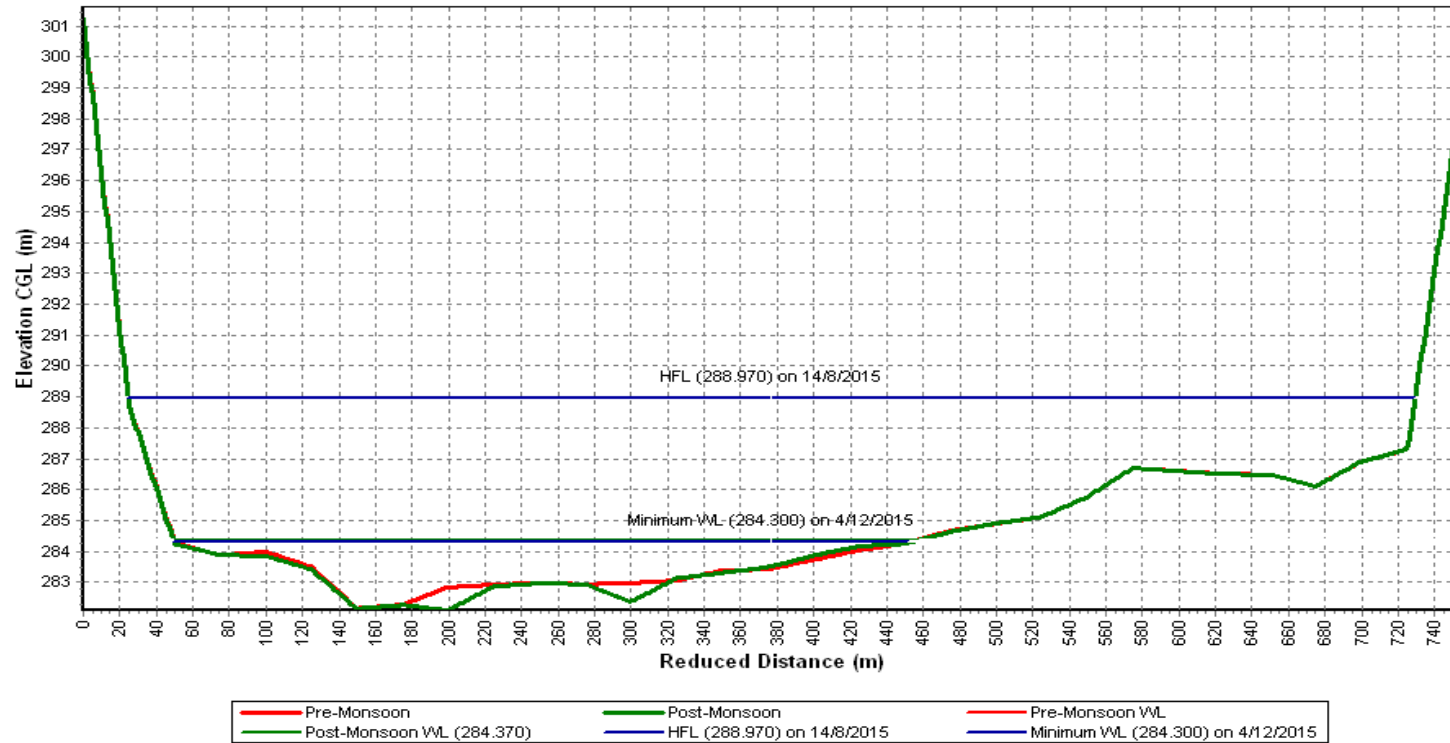
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



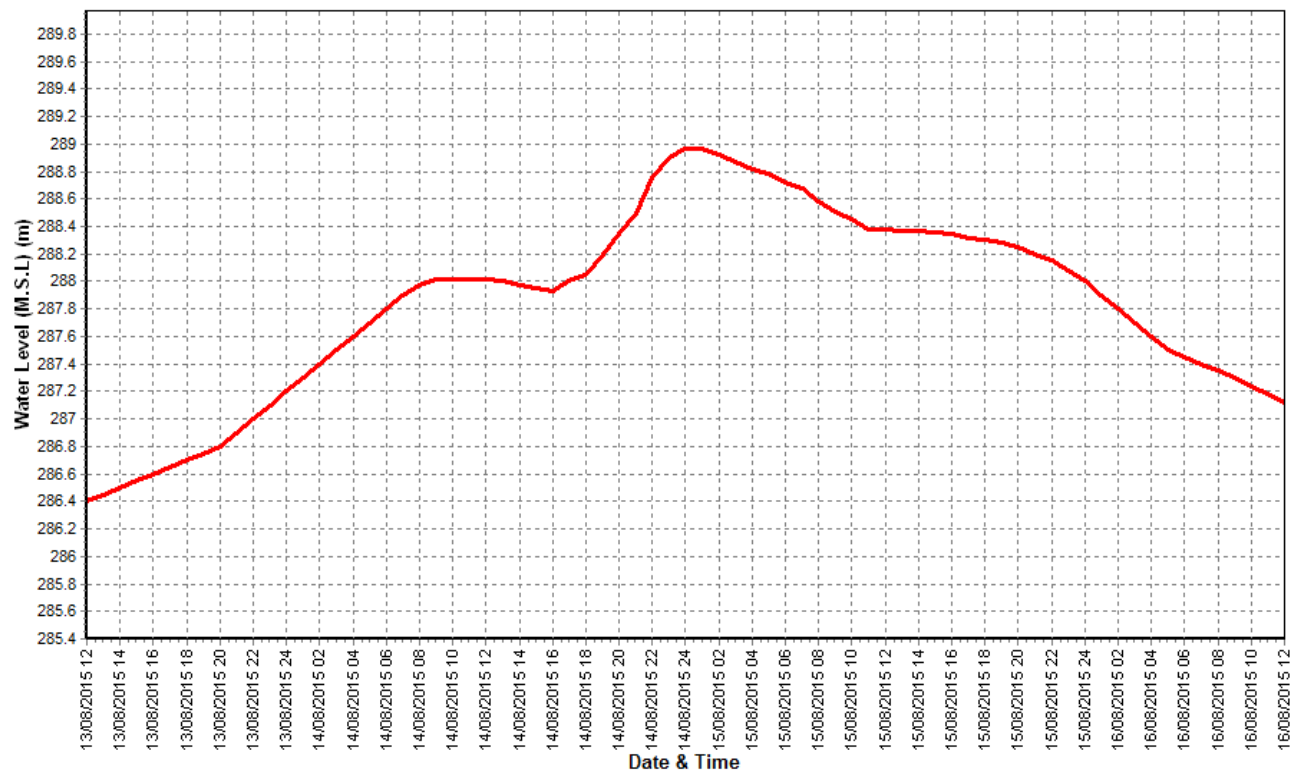
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



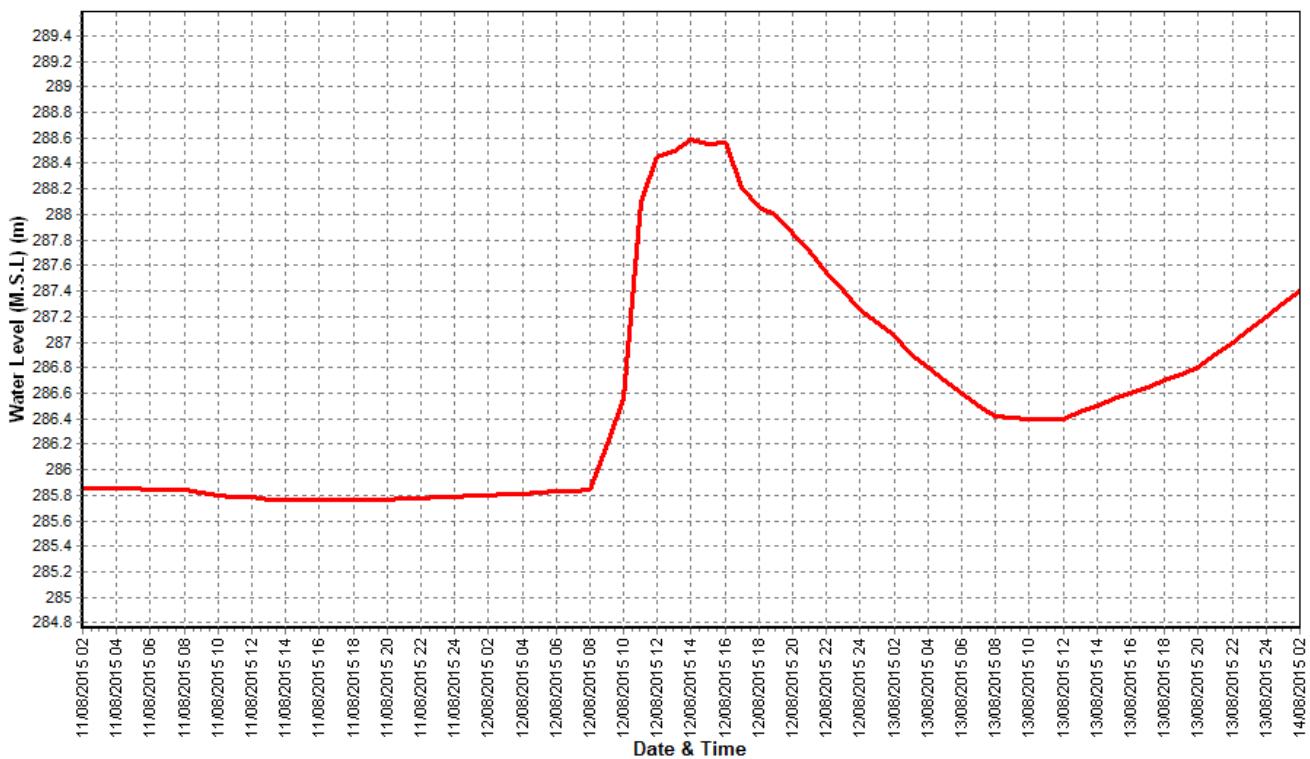
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Hoshangabad (010215019)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



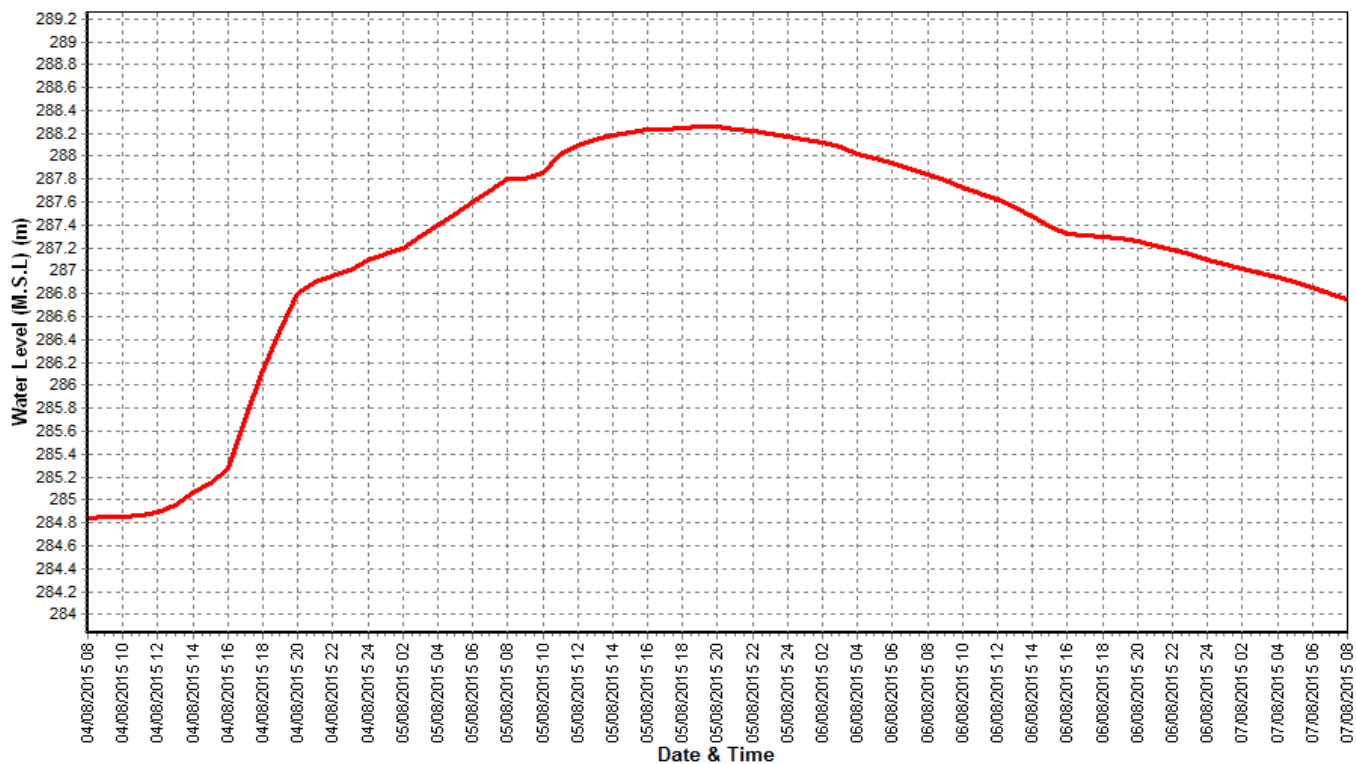
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Hoshangabad (010215019)

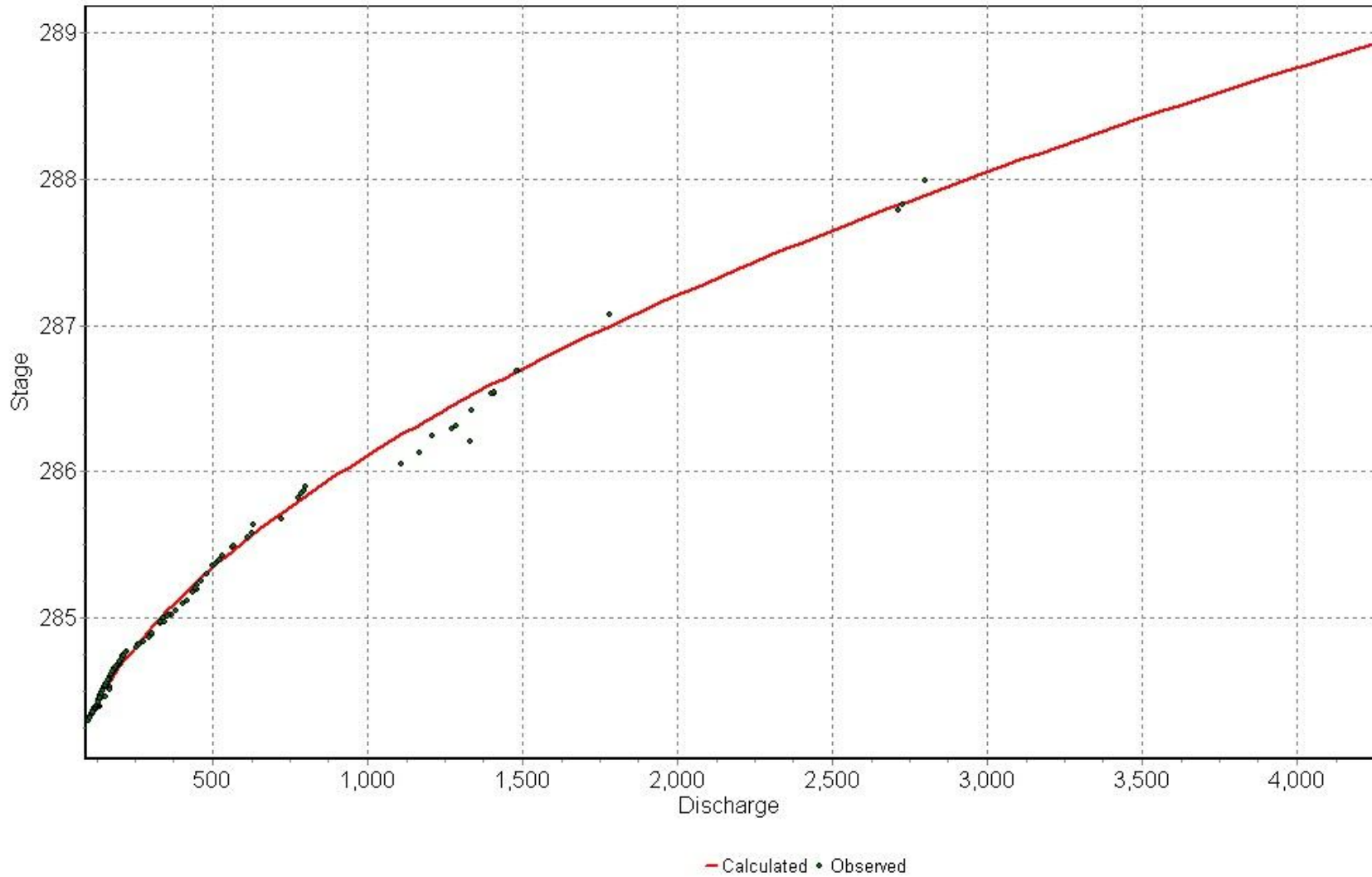
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



STAGE DISCHARGE CURVE OF SITE HOSHANGABAD 2015-16



4.10 Narmada at Sandia

History sheet

Site	: Narmada at Sandia	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215013
Basin	: Narmada	District	: Hoshangabad
Tributary	:	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada Division, Bhopal	Local River	: Narmada
Drainage Area	: 33953.5 Sq. Km.	Sub-Division	: MNSD 1, Hoshangabad
Latitude	: 22°54'57"	Bank	: Left
Zero of Gauge (m)	: 297 (M.S.L)	Longitude	: 78°20'51"
	Opening Date	01/03/1978	Closing Date
Gauge	: 01/03/1978		
Discharge	: 18/04/1978		
Sediment	: 09/08/1978		
Water Quality	: 15/09/1979		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1978-1979	8760	311.270	16/08/1978	23.50	299.530	03/06/1978
1979-1980	9375	310.440	10/08/1979	8.700	299.410	19/05/1980
1980-1981	16400	314.900	30/08/1980	10.60	299.420	04/06/1980
1981-1982	3850	306.120	16/08/1981	3.000	299.500	06/03/1982
1982-1983	6561	308.180	20/08/1982	4.500	299.280	08/07/1982
1983-1984	14500	314.250	09/09/1983	14.00	299.340	27/05/1984
1984-1985	16500	314.730	19/08/1984	12.60	299.200	03/05/1985
1985-1986	7600	310.850	09/08/1985	15.50	299.250	06/06/1985
1986-1987	5350	310.190	23/07/1986	16.30	299.075	25/05/1987
1987-1988	12466	311.567	17/09/1987	11.54	298.985	31/05/1988
1988-1989	12600	311.575	05/08/1988	9.294	298.965	09/05/1989
1989-1990	6600	307.725	07/08/1989	11.00	298.940	04/06/1989
1990-1991	7300	308.530	22/09/1990	21.40	299.480	15/06/1990
1991-1992	19700	314.140	25/08/1991	58.89	299.220	08/05/1992
1992-1993	9600	310.060	13/09/1992	44.91	299.210	10/07/1992
1993-1994	7300	308.500	16/07/1993	32.13	299.140	08/06/1993
1994-1995	17275	314.000	22/07/1994	87.67	299.570	09/06/1994
1995-1996	10040	310.030	11/08/1995	36.00	298.900	19/05/1996
1996-1997	2210	303.930	27/07/1996	37.94	299.100	08/04/1997
1997-1998	6900	308.600	25/07/1997	33.68	299.090	11/06/1997
1998-1999	4550	305.620	16/09/1998	28.01	299.210	31/05/1999
1999-2000	24500	316.890	19/09/1999	21.50	299.110	06/06/1999
2000-2001	5390	307.400	29/07/2000	38.00	299.330	21/01/2001
2001-2002	5360	307.660	15/07/2001	52.27	299.570	01/06/2001
2002-2003	11120	311.420	19/08/2002	45.00	299.300	18/04/2003
2003-2004	9440	309.670	15/09/2003	55.00	299.350	03/06/2003
2004-2005	10600	311.000	23/08/2004	71.02	299.400	16/05/2005
2005-2006	10855	311.020	06/07/2005	22.57	299.250	23/06/2005

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2006-2007	8847	309.980	14/08/2006	14.14	299.280	25/06/2006
2007-2008	4111	306.100	08/07/2007	34.29	299.520	07/04/2008
2008-2009	5499	307.570	02/08/2008	51.46	299.660	21/01/2009
2009-2010	25288	314.100	10/09/2009	47.75	299.380	04/04/2010
2010-2011	2142	304.210	21/09/2010	67.92	299.240	04/05/2011
2011-2012	8983	309.820	09/09/2011	33.35	299.110	28/05/2012
2012-2013	7422	308.425	07/08/2012	29.29	299.110	09/06/2012
2013-2014	16259	314.050	23/08/2013	65.45	299.300	15/05/2014
2014-2015	4602	306.910	08-08-2014	75.02	299.325	18/06/2014

Stage Discharge Sheet for Narmada at Sandia for the period 2015-16

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	299.900	187.5	299.570	116.5	299.850	191.0	301.460	735.8	299.880	177.7	299.690	134.8 *
2	299.835	169.9	299.515	107.2	299.820	165.9 *	301.260	652.2	299.860	175.9 *	299.750	137.4
3	299.630	141.0	299.630	132.0	299.830	187.8	300.835	549.9	299.865	172.4	299.740	131.2
4	299.520	105.7	299.555	115.6	300.525	620.1	300.830	547.3	299.780	156.0 *	299.690	126.6
5	299.490	101.8	299.470	87.89 *	305.320	2982	300.750	526.4	299.765	144.8	299.700	127.2
6	299.560	111.8	299.480	100.1	303.165	1745	300.610	402.4 *	299.750	139.9	299.650	117.4
7	299.680	132.5 *	299.605	126.4	301.740	902.9	300.545	349.6	299.825	161.1	299.640	116.2
8	299.615	137.9	299.515	107.8	301.565	790.8	300.435	289.7	300.020	215.6	299.610	116.9 *
9	299.630	141.0	299.525	108.4	301.800	625.8 *	300.240	263.8	300.120	236.4	299.550	100.9
10	299.610	138.8	303.375	1782	301.275	685.1	300.295	273.3	299.955	194.4	299.550	101.5
11	299.540	113.7	302.580	1200	300.970	596.0	300.110	231.1	299.750	148.8 *	299.510	95.85 *
12	299.480	102.1	302.540	1259 *	301.330	710.5	300.110	229.2	299.780	146.0	299.510	92.83
13	299.460	98.24	301.250	669.2	301.880	957.4	300.100	240.7 *	299.805	149.7	299.550	101.9
14	299.380	70.96 *	300.470	330.2	301.780	1031	300.040	219.6	299.860	171.3	299.530	97.83
15	299.445	97.56	300.230	261.1	303.380	1736 *	300.000	211.4	299.960	214.9	299.530	99.92 *
16	299.445	96.65	300.265	268.5	301.370	696.8 *	299.975	203.7	299.980	221.2	299.520	93.86
17	299.485	102.5	300.250	265.4	301.380	726.5	299.870	178.5 *	300.000	222.5	299.540	97.85
18	299.560	115.6	300.100	240.7 *	301.080	660.3	299.985	205.0	300.020	218.3 *	299.550	103.2
19	299.515	105.2	299.910	188.8 *	301.080	656.8	300.020	219.0	299.810	168.4	299.500	90.60
20	299.430	95.50	299.930	202.4	300.850	532.4	300.020	218.3 *	299.600	123.6	299.440	81.67
21	299.330	62.15 *	300.015	222.7	300.670	407.1	299.950	199.7	299.570	115.9	299.610	111.8
22	299.310	80.35	300.190	248.1	300.470	317.2	300.000	207.7	299.550	104.1 *	299.650	125.7 *
23	299.330	79.67	300.470	328.8	300.440	345.1 *	300.045	221.3	299.550	110.2	299.540	98.12
24	299.480	102.7	301.500	761.5	300.450	316.4	300.020	214.4	299.540	102.0 *	299.680	119.6
25	299.430	95.64	301.585	765.3	300.385	297.9	300.020	218.3 *	299.530	99.92 *	299.620	119.0 *
26	299.410	93.92	301.550	775.1 *	300.140	227.2	300.110	234.4	299.490	86.92	299.580	102.5
27	299.450	100.7	301.020	638.0	300.080	210.8	300.050	226.6 *	299.505	90.97	299.710	129.7
28	299.420	78.32 *	300.120	230.4	300.520	344.0	299.740	211.3	299.580	111.3	299.710	130.7
29	299.390	90.39	300.110	238.3	300.930	584.2	299.920	192.4	299.570	108.7	299.600	114.7 *
30	299.525	106.8	300.195	258.3	300.930	542.1 *	299.910	190.3	299.495	90.77	299.490	92.66
31			300.030	223.4	300.930	584.2			299.460	83.17		
Ten-Daily Mean												
I Ten-Daily	299.647	136.8	299.924	278.4	301.489	889.6	300.726	459.0	299.882	177.4	299.657	121.0
II Ten-Daily	299.474	99.80	300.753	488.5	301.510	830.3	300.023	215.6	299.857	178.5	299.518	95.55
III Ten-Daily	299.407	89.06	300.617	426.4	300.540	379.6	299.977	211.6	299.531	100.4	299.619	114.4
Monthly												
Min.	299.310	62.15	299.470	87.89	299.820	165.9	299.740	178.5	299.460	83.17	299.440	81.67
Max.	299.900	187.5	303.375	1782	305.320	2982	301.460	735.8	300.120	236.4	299.750	137.4
Mean	299.509	108.6	300.437	398.7	301.159	689.5	300.242	295.4	299.749	150.4	299.598	110.3

Annual Runoff in MCM = 6318 Annual Runoff in mm = 186

Peak Observed Discharge = 2982 cumecs on 05/08/2015 Corres. Water Level :305.32 m

Lowest Observed Discharge = 40.26 cumecs on 03/03/2016 Corres. Water Level :299.25 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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	299.410	78.28	299.450	81.89	299.600	109.8	299.310	61.12	299.380	75.02	299.650	121.2 *
2	299.370	70.08	299.500	91.94	299.600	110.6	299.310	44.39	299.650	126.5	299.680	134.4
3	299.450	86.95	299.600	114.7 *	299.590	108.6	299.250	40.26	299.700	125.7 *	299.660	131.5
4	299.530	100.5	299.750	137.8	299.590	102.0	299.290	49.05	299.600	116.0	299.680	134.3
5	299.550	102.7	299.580	110.0	299.580	101.8	299.300	47.83	299.480	88.96	299.680	134.8
6	299.500	93.84 *	299.510	98.09	299.580	102.5	299.300	57.07 *	299.555	101.5	299.700	136.0
7	299.510	93.40	299.490	93.83	299.580	110.4 *	299.580	102.1	299.640	120.3	299.670	132.3
8	299.520	96.70	299.480	92.43	299.560	96.34	299.685	121.3	299.660	124.0	299.670	130.2 *
9	299.500	92.76	299.540	103.7	299.570	99.48	299.735	129.5	299.670	129.0	299.720	141.7
10	299.450	82.12	299.650	125.7 *	299.560	97.17	299.770	136.9	299.680	130.2 *	299.680	134.1
11	299.480	88.29	299.660	123.3	299.590	103.1	299.750	132.4	299.580	110.1	299.650	127.0
12	299.550	105.4	299.600	111.8	299.600	104.7	299.710	125.6	299.420	85.87	299.660	127.5
13	299.500	93.84 *	299.500	96.90	299.585	101.3	299.660	139.4 *	299.320	67.13	299.660	127.8
14	299.450	82.60	299.490	95.39	299.570	108.3 *	299.680	121.3	299.240	60.44 *	299.670	131.3
15	299.480	88.89	299.440	84.46	299.630	110.4	299.560	101.1	299.240	47.43 *	299.670	130.2 *
16	299.470	84.44	299.440	83.71	299.630	110.0	299.400	79.50	299.400	92.86	299.670	130.4
17	299.430	80.80	299.650	125.7 *	299.630	111.9	299.350	72.40	299.500	74.60 *	299.670	129.5
18	299.400	74.96	299.700	125.7	299.630	112.7	299.420	83.40	299.650	127.6	299.660	128.0
19	299.440	80.95	299.700	125.2	299.665	120.9	299.370	76.99	299.650	126.3	299.680	134.4
20	299.550	104.1 *	299.640	116.4	299.710	129.4	299.310	69.16 *	299.650	125.7 *	299.640	125.7
21	299.500	96.44	299.650	118.0	299.720	141.7 *	299.520	96.87	299.660	129.8	299.640	123.5 *
22	299.440	80.78	299.630	113.1	299.650	117.8	299.520	96.42	299.690	132.8	299.660	123.5 *
23	299.400	74.64	299.610	109.4	299.630	112.6	299.520	97.31	299.740	139.8	299.670	130.3
24	299.440	82.10 *	299.600	114.7 *	299.610	108.8	299.450	97.88 *	299.700	146.4 *	299.670	129.5
25	299.500	93.84 *	299.600	107.3	299.610	108.3	299.500	84.01 *	299.670	130.6	299.650	127.2
26	299.450	81.99	299.620	119.0 *	299.610	108.9	299.500	94.51	299.660	130.3	299.650	128.2
27		76.45 *	299.620	112.3	299.580	102.8	299.400	93.84 *	299.640	124.8	299.670	130.5
28	299.380	68.91	299.630	114.2	299.450	84.01 *	299.300	52.65	299.660	131.0	299.690	134.2
29	299.460	84.28	299.630	114.5	299.370	71.12	299.320	55.47	299.650	128.6	299.690	134.8 *
30	299.490	88.33	299.610	111.6			299.410	79.83	299.630	123.8	299.680	131.9
31	299.460	83.39	299.600	114.7 *			299.310	55.47			299.680	131.4
Ten-Daily Mean												
I Ten-Daily	299.479	89.74	299.555	105.0	299.581	103.9	299.453	78.96	299.601	113.7	299.679	133.1
II Ten-Daily	299.475	88.42	299.582	108.9	299.624	111.3	299.521	100.1	299.465	91.80	299.663	129.2
III Ten-Daily	299.452	82.83	299.618	113.5	299.581	106.2	299.432	82.20	299.670	131.8	299.668	129.5
Monthly												
Min.	299.370	68.91	299.440	81.89	299.370	71.12	299.250	40.26	299.240	47.43	299.640	121.2
Max.	299.550	105.4	299.750	137.8	299.720	141.7	299.770	139.4	299.740	146.4	299.720	141.7
Mean	299.469	86.86	299.586	109.3	299.596	107.1	299.467	86.94	299.579	112.4	299.670	130.6

**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**

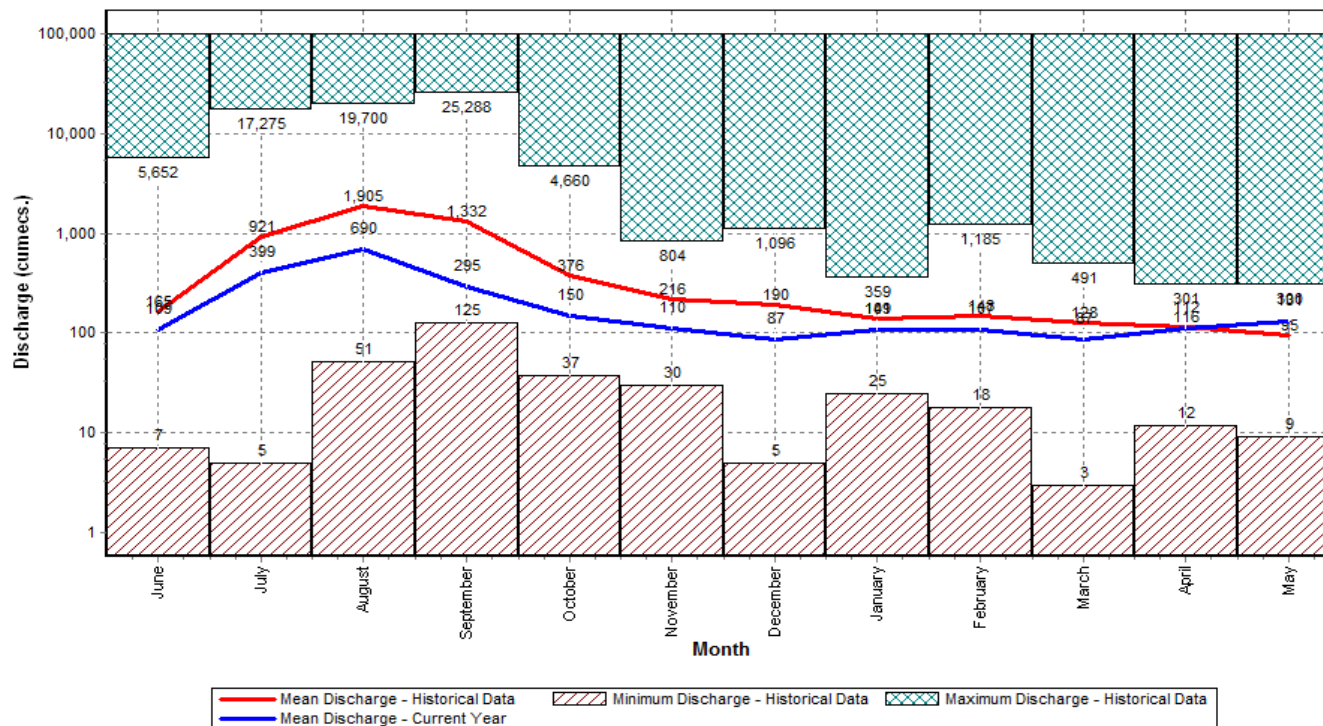
Histogram - Hydrograph for Water Year : 2015-16 (Data considered : 1978-2016)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



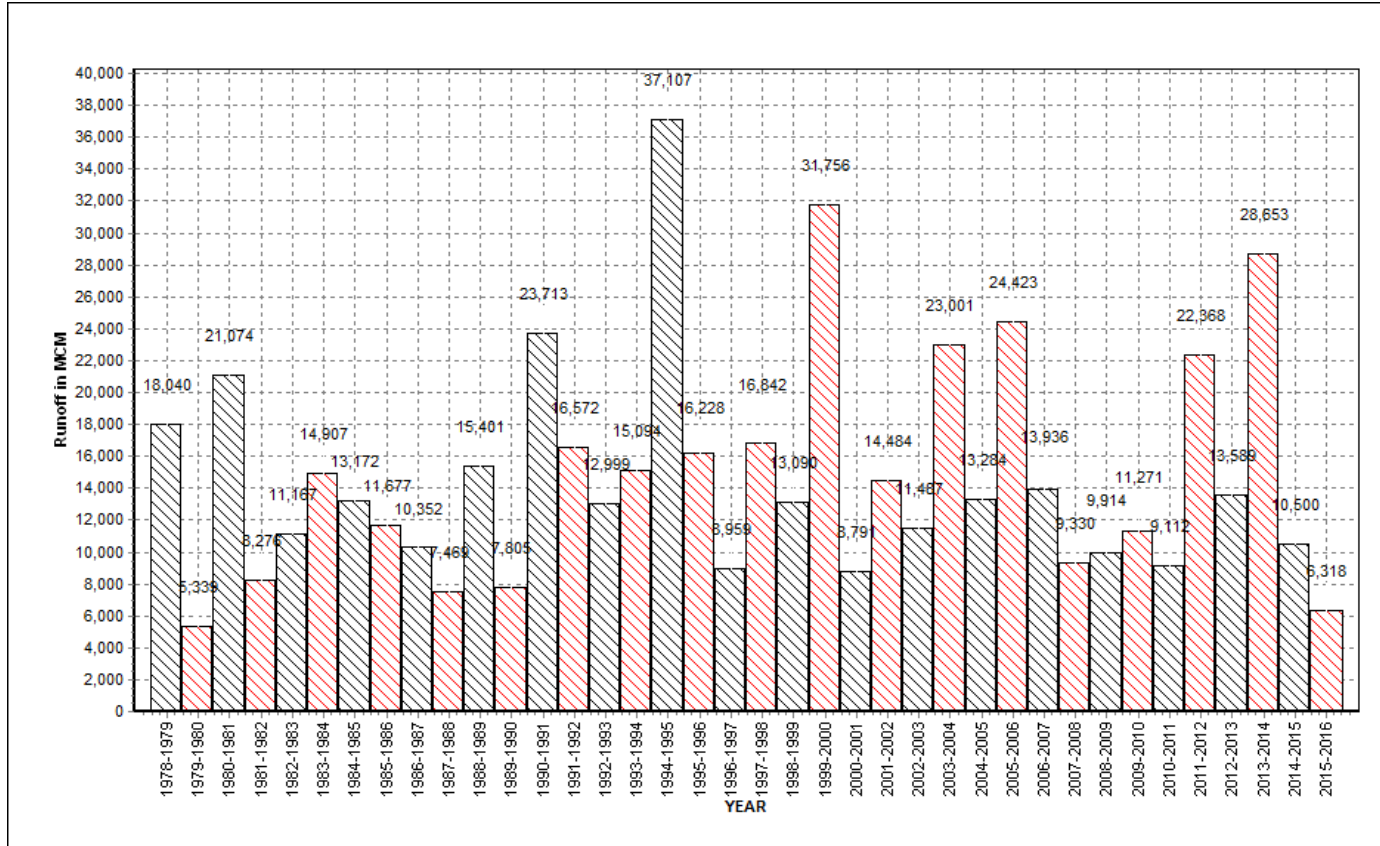
Annual Runoff Values for the period (1978 – 2016)

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

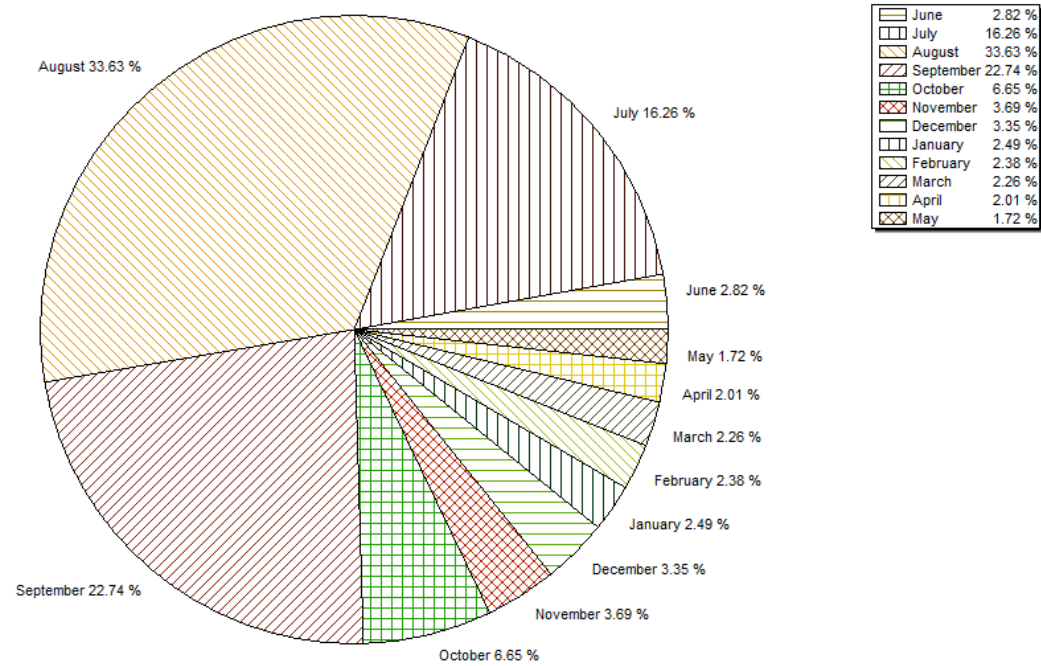
Monthly Average Runoff based on period (1978-2014)

Station Name : Narmada at Sandia (010215013)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



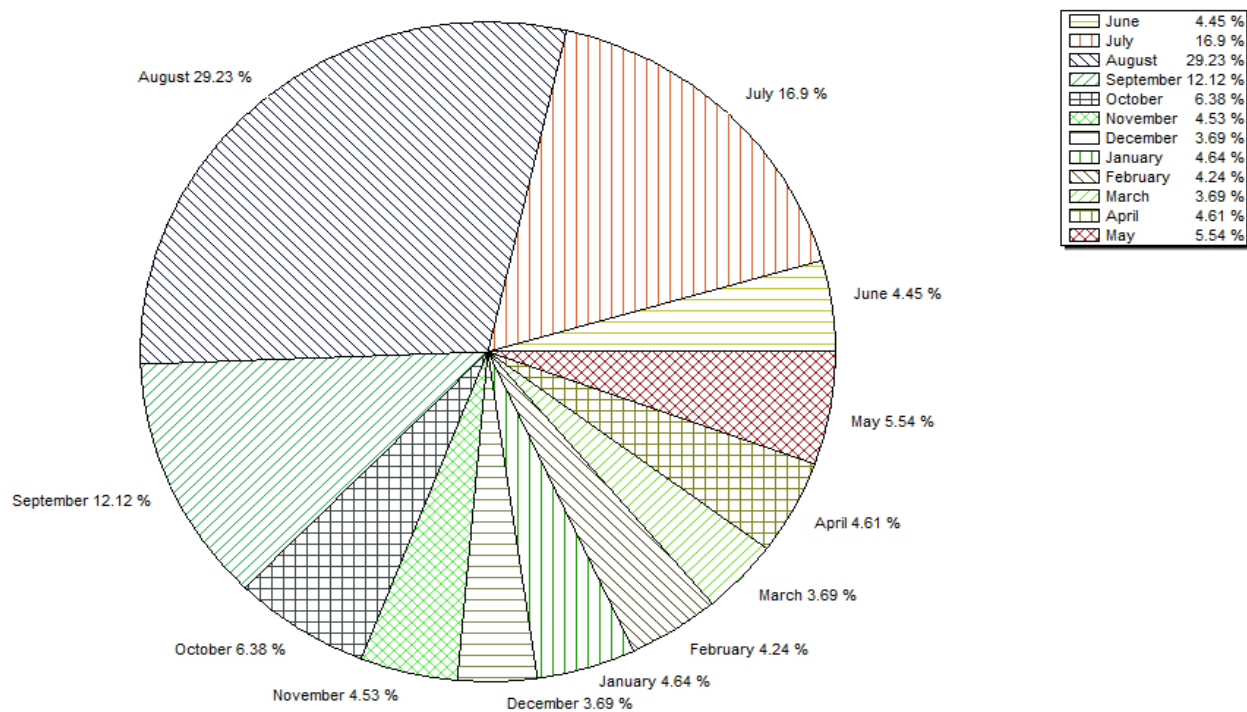
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Sandia (010215013)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



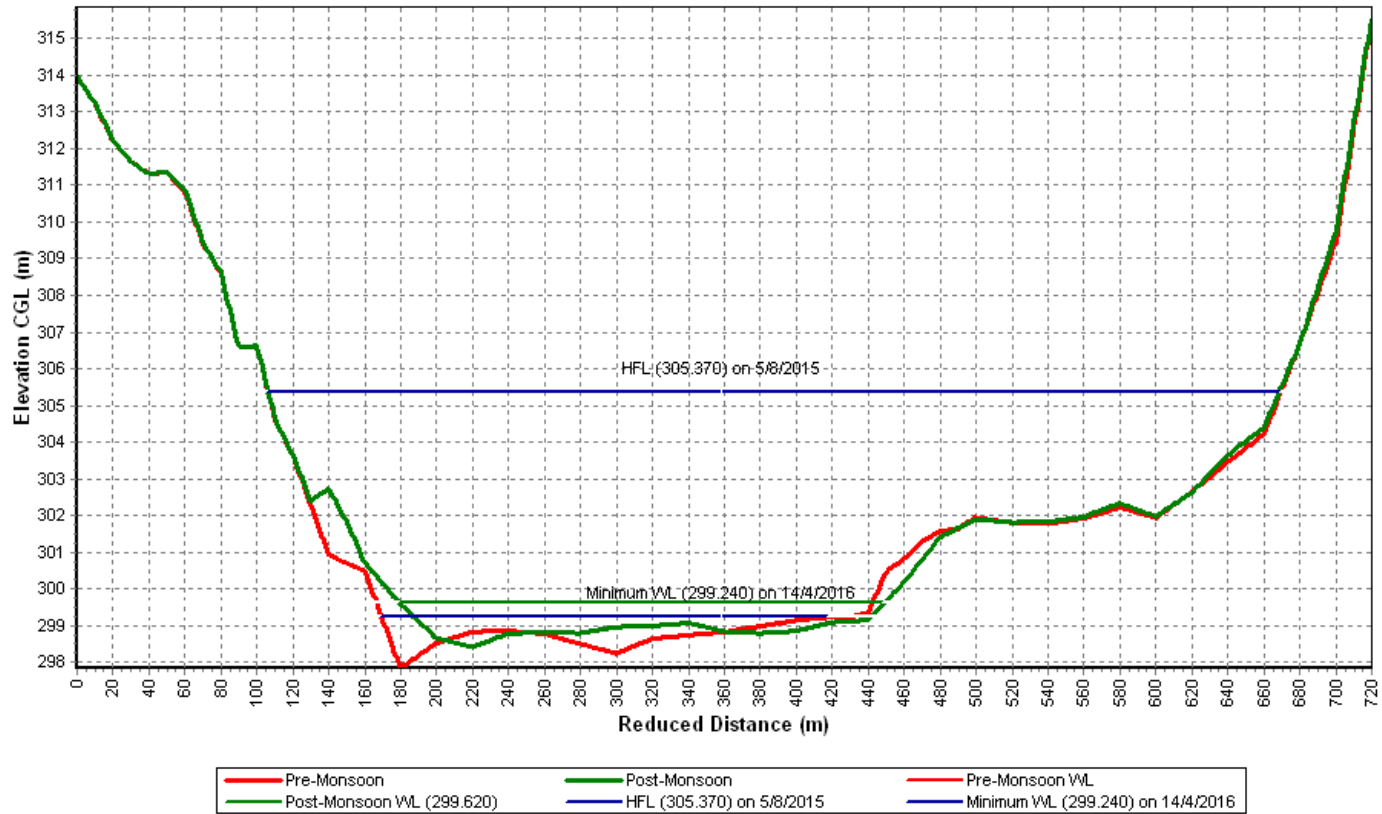
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



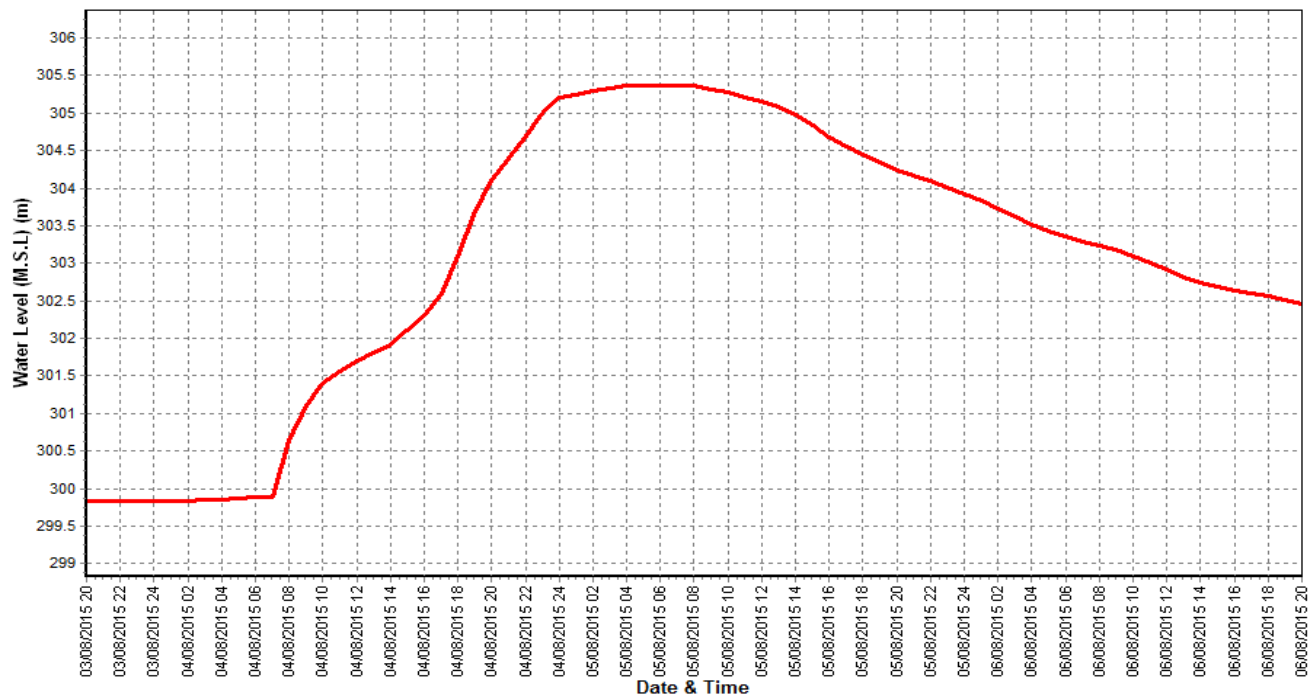
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



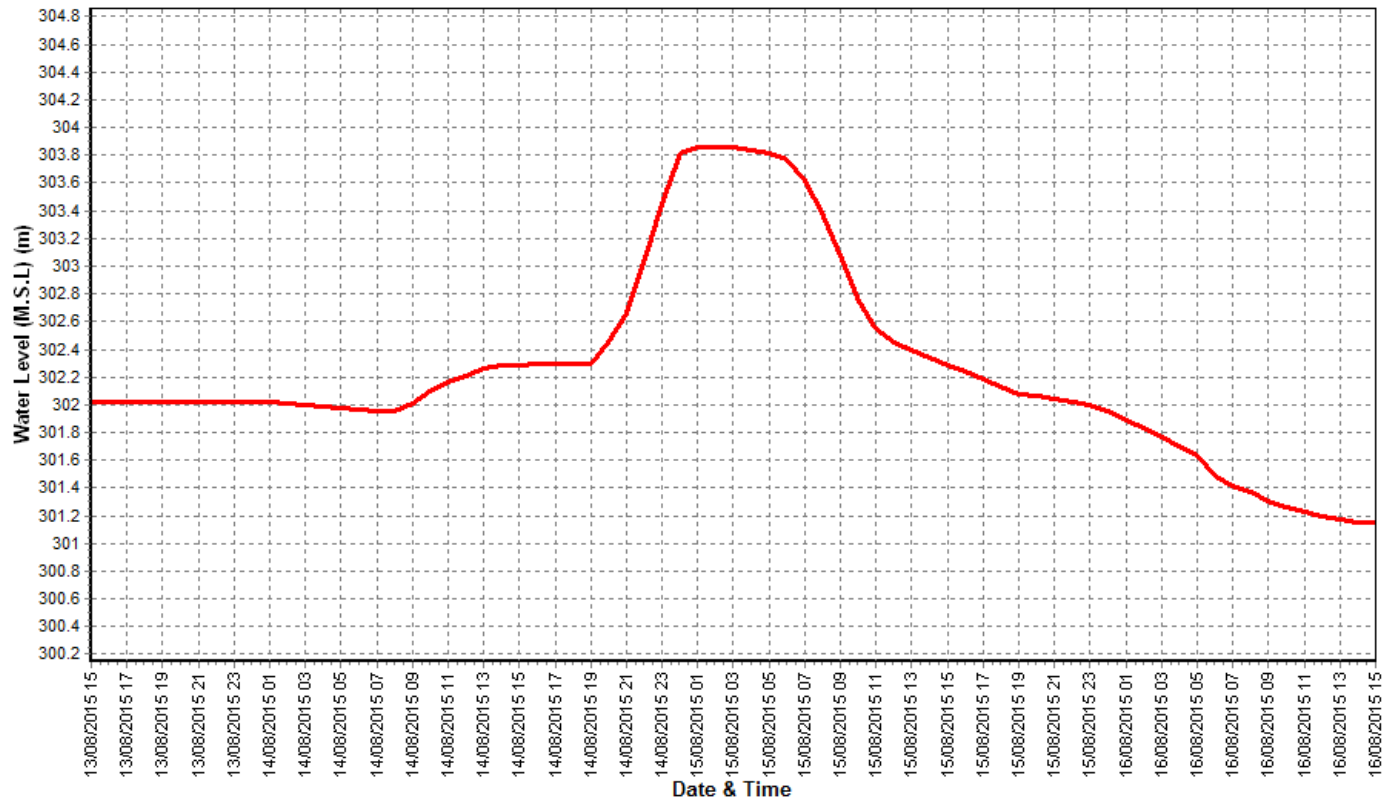
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Sandia (010215013)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



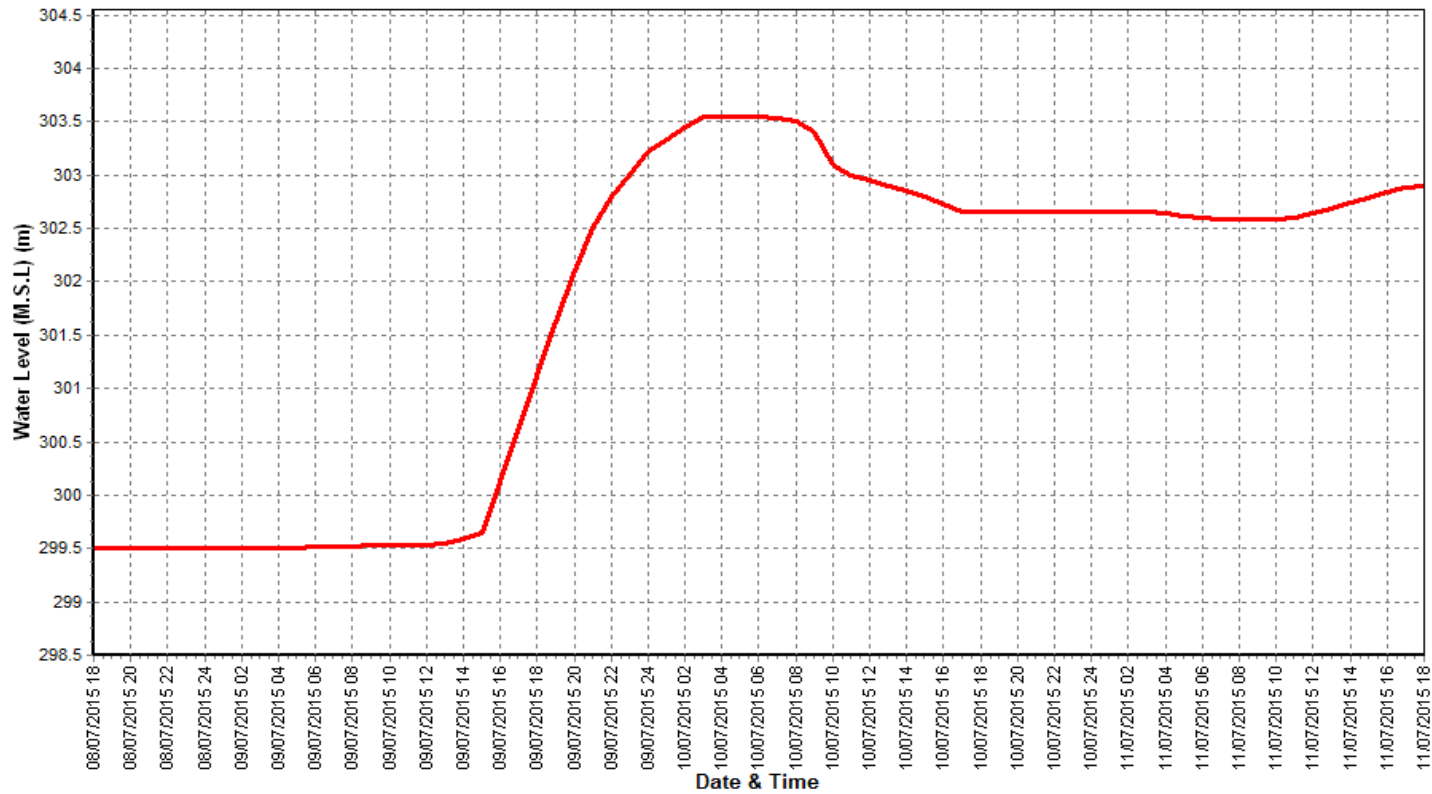
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Sandia (010215013)

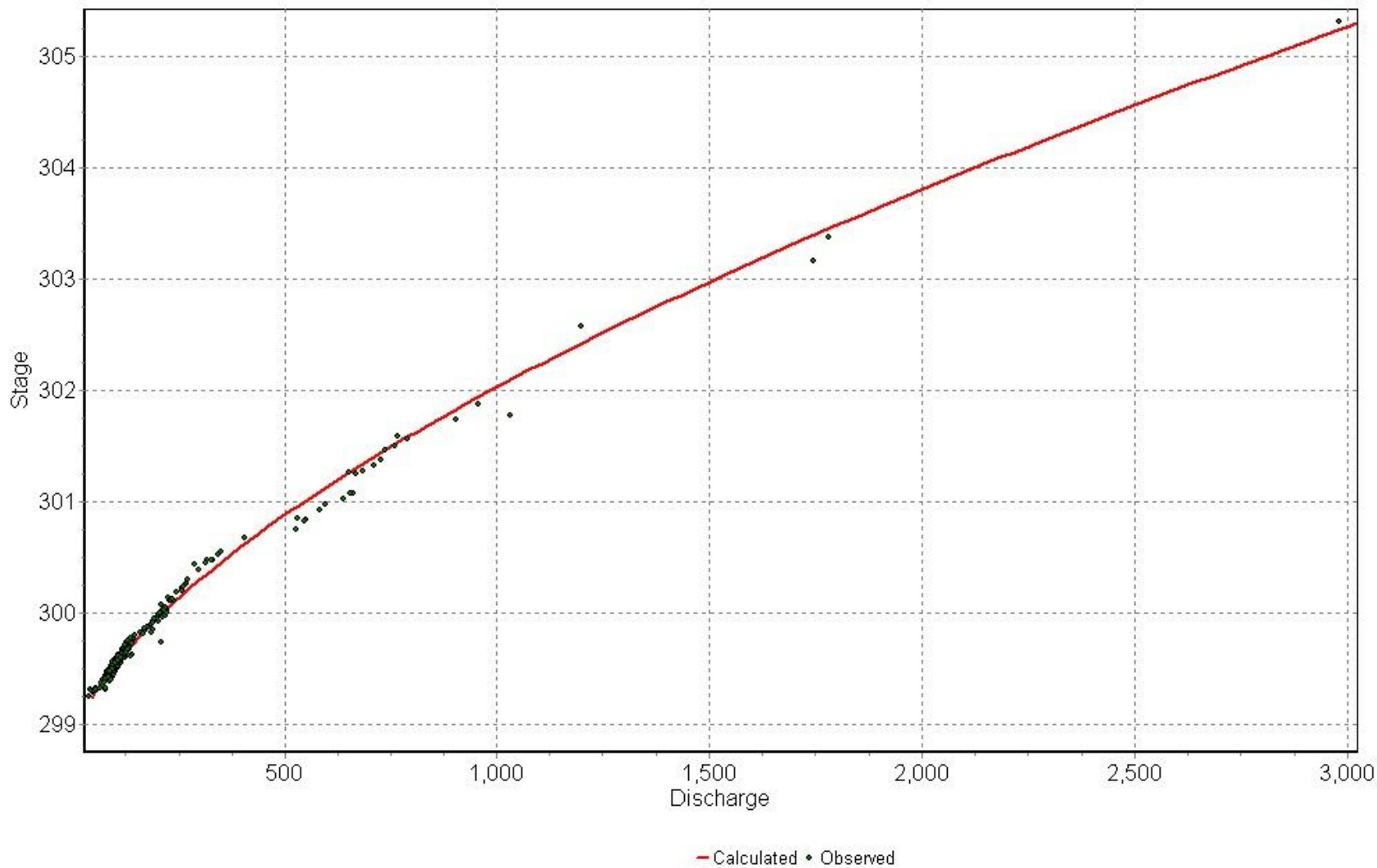
Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



STAGE DISCHARGE CURVE OF SITE SANDIA 2015-16



4.11 Shakkar at Gadarwara

History sheet

Site	: Shakkar at Gadarwara	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215012
Basin	: Narmada	District	: Narsinghpur
Tributary	: Shakkar	Independent River	: Narmada
Division	: Narmada Division Bhopal	Local River	: Shakkar
Drainage Area	: 2270 Sq. Km.	Sub-Division	: MNSD-1 Hoshangabad
Latitude	: 22°55'26"	Bank	: Left
Zero of Gauge (m)	: 321 (M.S.L.)	Longitude	: 78°47'20"
	Opening Date	01/02/1977	
Gauge	: 01/02/1977	Closing Date	
Discharge	: 01/02/1977		
Sediment	: 15/06/1978		
Water Quality	: 16/08/1979		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	2735	328.175	07/08/1977	1.600	322.590	01/06/1977
1978-1979	2890	328.580	16/08/1978	2.400	322.850	31/05/1979
1979-1980	1431	327.410	09/08/1979	1.000	322.620	04/04/1980
1980-1981	2823	328.810	29/08/1980	0.900	322.635	30/11/1980
1981-1982	724.0	325.470	24/06/1981	1.200	322.700	20/06/1981
1982-1983	3031	328.745	20/08/1982	1.200	322.820	11/06/1982
1983-1984	2335	328.820	08/09/1983	1.600	322.875	09/06/1983
1984-1985	2850	329.600	18/08/1984	1.200	322.920	30/05/1985
1985-1986	1930	327.850	08/08/1985	1.000	322.860	23/06/1985
1986-1987	2680	329.800	14/08/1986	1.600	322.890	19/06/1986
1987-1988	1450	326.985	08/09/1987	1.003	322.930	30/05/1988
1988-1989	2400	328.810	03/08/1988	0.935	322.850	31/05/1989
1989-1990	1605	327.300	16/08/1989	0.798	322.840	12/06/1989
1990-1991	2300	328.400	05/09/1990	1.083	322.995	11/06/1990
1991-1992	1046	326.320	19/08/1991	1.060	322.925	08/07/1991
1992-1993	1590	327.400	20/08/1992	1.200	322.920	10/07/1992
1993-1994	1880	328.150	16/07/1993	1.730	322.915	11/06/1993
1994-1995	2720	330.180	19/08/1994	1.700	322.960	29/05/1995
1995-1996	1160	326.650	25/07/1995	0.250	322.620	31/05/1996
1996-1997	608.0	325.150	27/07/1996	0.000	322.351	21/05/1997
1997-1998	1732	328.000	25/07/1997	0.000	-	14/06/1997
1998-1999	836.0	326.000	05/07/1998	0.250	323.050	28/06/1998
1999-2000	5850	332.470	18/09/1999	0.150	322.810	21/05/2000
2000-2001	1310	327.100	28/07/2000	0.850	322.810	06/06/2000
2001-2002	1030	326.480	19/07/2001	0.500	322.630	27/05/2002
2002-2003	2750	328.850	06/09/2002	0.300	322.900	30/05/2003
2003-2004	2700	328.450	24/07/2003	0.210	322.870	15/06/2003
2004-2005	940.0	327.100	22/08/2004	0.110	322.770	29/05/2005
2005-2006	1828	326.250	01/08/2005	0.023	322.720	19/06/2005
2006-2007	4650	329.000	14/08/2006	0.009	323.130	19/05/2007
2007-2008	3280	329.000	08/07/2007	0.000		24/05/2008
2008-2009	237.4	324.250	05/08/2008	0.040	322.790	02/02/2009
2009-2010	3279	329.880	09/09/2009	0.000		12/06/2009

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2010-2011	901.4	325.700	07/08/2010	0.000		21/03/2011
2011-2012	600.9	324.600	15/07/2011	0.000		27/03/2012
2012-2013	1866	326.350	21/08/2012	0.000		21/05/2013
2013-2014	2899	328.580	23/08/2013	0.000		12/06/2013
2014-2015	554.4	325.230	23-07-2014	0.181	322.370	10/06/2014

Stage Discharge Sheet for Shakkar at Gadarwara for the period 2015-16

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	322.330	0.264	322.420	1.075	323.720	155.6	323.490	77.58	322.760	10.94	322.570	3.236 *
2	322.320	0.232	322.430	1.090	323.700	144.3 *	323.520	90.17	322.780	10.17 *	322.570	4.379
3	322.320	0.229	322.420	0.989	323.710	150.7	323.500	78.87	322.740	10.23	322.570	4.397
4	322.300	0.178	322.410	0.894	324.020	254.3	323.480	72.96	322.730	8.025 *	322.560	4.211
5	322.290	0.150	322.400	0.804 *	324.540	488.3	323.470	69.00	322.710	9.969	322.560	4.163
6	322.290	0.152	322.410	0.898	324.220	374.7	323.450	85.20 *	322.700	9.415	322.560	4.112
7	322.290	0.195 *	322.420	0.994	324.200	374.9	323.440	64.05	322.690	9.262	322.550	3.665
8	322.280	0.123	322.430	1.220	324.150	365.2	323.430	61.66	322.680	8.957	322.550	2.827 *
9	322.210	0.095	322.450	1.780	324.200	335.1 *	323.520	97.76	322.680	8.876	322.550	3.598
10	322.250	0.075	322.660	7.333	324.150	363.9	323.520	88.50	322.670	8.568	322.540	3.211
11	322.210	0.058	324.200	277.8	324.200	375.7	323.500	87.28	322.660	5.570 *	322.540	2.638 *
12	322.240	0.056	324.000	245.7 *	324.220	384.6	323.480	69.70	322.660	8.199	322.540	3.177
13	322.250	0.073	323.850	171.4	324.270	402.6	323.450	85.20 *	322.660	8.193	322.540	3.249
14	322.280	0.165 *	323.650	124.0	324.540	493.8	323.430	61.84	322.650	7.788	322.530	3.014
15	322.260	0.096	323.580	102.3	324.250	360.5 *	323.400	58.49	322.640	7.395	322.530	2.456 *
16	322.290	0.163	323.540	100.7	324.220	345.1 *	323.370	51.19	322.640	7.171	322.530	3.032
17	322.300	0.185	323.530	96.21	323.930	198.2	323.380	72.24 *	322.600	5.260	322.530	3.318
18	322.300	0.183	323.520	99.65 *	323.850	148.9	323.390	56.30	322.590	3.682 *	322.530	2.858
19	322.320	0.240	323.510	97.49 *	323.800	171.4	323.470	71.70	322.590	5.034	322.520	2.802
20	322.420	0.952	323.550	100.7	323.600	109.2	323.500	95.36 *	322.580	4.585	322.520	2.904
21	322.420	0.983 *	323.580	101.9	323.540	97.60	323.490	76.72	322.580	4.619	322.520	2.888
22	322.410	0.892	323.650	114.2	323.520	89.90	323.440	63.49	322.570	3.236 *	322.510	2.119 *
23	322.460	1.729	324.020	255.4	323.520	99.65 *	323.400	58.23	322.570	4.179	322.500	2.615
24	322.420	0.935	323.840	161.5	323.500	79.03	323.390	56.10	322.560	3.027 *	322.500	2.507
25	322.440	1.541	323.860	169.8	323.490	76.12	323.380	72.24 *	322.560	3.027 *	322.490	1.814 *
26	322.420	0.969	323.810	177.3 *	323.490	76.69	323.370	52.78	322.550	3.472	322.480	2.181
27	322.430	1.074	323.840	166.4	323.480	73.06	323.120	35.73 *	322.550	3.411	322.480	2.176
28	322.430	1.081 *	323.880	158.1	323.520	89.83	322.870	11.55	322.540	3.219	322.480	2.154
29	322.450	1.739	323.800	157.6	323.500	78.78	322.780	10.97	322.540	3.151	322.480	1.674 *
30	322.440	1.559	323.790	167.1	323.490	93.27 *	322.760	10.61	322.570	4.165	322.470	1.986
31			323.740	146.9	323.500	78.80			322.580	4.639		
Ten-Daily Mean												
I Ten-Daily	322.288	0.169	322.445	1.708	324.061	300.7	323.482	78.57	322.714	9.442	322.558	3.780
II Ten-Daily	322.287	0.217	323.693	141.6	324.088	299.0	323.437	70.93	322.627	6.288	322.531	2.945
III Ten-Daily	322.432	1.250	323.801	161.5	323.505	84.79	323.200	44.84	322.561	3.649	322.491	2.211
Monthly												
Min.	322.210	0.056	322.400	0.804	323.480	73.06	322.760	10.61	322.540	3.027	322.470	1.674
Max.	322.460	1.739	324.200	277.8	324.540	493.8	323.520	97.76	322.780	10.94	322.570	4.397
Mean	322.336	0.545	323.329	103.5	323.872	223.5	323.373	64.78	322.632	6.369	322.527	2.979

Annual Runoff in MCM = 1075 Annual Runoff in mm = 473

Peak Observed Discharge = 493.8 cumecs on 14/08/2015 Corres. Water Level :324.54 m

Lowest Observed Discharge = 0.000 cumecs on 04/03/2016

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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	322.450	1.583	322.380	0.666	322.360	0.535	322.240	0.018		0.000		0.000
2	322.440	1.513	322.370	0.594	322.350	0.469	322.230	0.017		0.000		0.000
3	322.430	1.414	322.370	0.580 *	322.350	0.464	322.230	0.015		0.000		0.000
4	322.420	1.355	322.360	0.574	322.350	0.471		0.000		0.000		0.000
5	322.420	1.347	322.360	0.556	322.350	0.466		0.000		0.000		0.000
6	322.420	0.983 *	322.360	0.530	322.340	0.390		0.000		0.000		0.000
7	322.410	1.274	322.360	0.545	322.340	0.403 *		0.000		0.000		0.000
8	322.410	1.282	322.350	0.464	322.340	0.401		0.000		0.000		0.000
9	322.400	0.890	322.350	0.469	322.340	0.384		0.000		0.000		0.000
10	322.400	0.873	322.350	0.457 *	322.330	0.290		0.000		0.000		0.000
11	322.400	0.840	322.350	0.467	322.330	0.290		0.000		0.000		0.000
12	322.400	0.840	322.360	0.547	322.320	0.201		0.000		0.000		0.000
13	322.400	0.804 *	322.360	0.543	322.320	0.197		0.000		0.000		0.000
14	322.390	0.763	322.350	0.468	322.320	0.308 *		0.000		0.000		0.000
15	322.390	0.739	322.350	0.464	322.320	0.182		0.000		0.000		0.000
16	322.390	0.735	322.350	0.462	322.310	0.128		0.000		0.000		0.000
17	322.380	0.645	322.350	0.457 *	322.310	0.125		0.000		0.000		0.000
18	322.380	0.635	322.340	0.388	322.310	0.132		0.000		0.000		0.000
19	322.380	0.650	322.360	0.585	322.300	0.087		0.000		0.000		0.000
20	322.380	0.650 *	322.360	0.550	322.300	0.079		0.000		0.000		0.000
21	322.400	1.009	322.370	0.642	322.290	0.195 *		0.000		0.000		0.000
22	322.400	0.892	322.370	0.946	322.270	0.036		0.000		0.000		0.000
23	322.400	0.886	322.370	0.641	322.270	0.052		0.000		0.000		0.000
24	322.400	0.804 *	322.370	0.580 *	322.270	0.052		0.000		0.000		0.000
25	322.390	0.724 *	322.370	0.615	322.260	0.044		0.000		0.000		0.000
26	322.390	0.793	322.370	0.580 *	322.260	0.042		0.000		0.000		0.000
27	322.390	0.724 *	322.370	0.613	322.260	0.039		0.000		0.000		0.000
28	322.390	0.788	322.360	0.562	322.250	0.038 *		0.000		0.000		0.000
29	322.380	0.696	322.360	0.555	322.250	0.030		0.000		0.000		0.000
30	322.380	0.690	322.360	0.567				0.000		0.000		0.000
31	322.380	0.690	322.360	0.516 *				0.000				0.000
Ten-Daily Mean												
I Ten-Daily	322.420	1.251	322.361	0.544	322.345	0.427	322.233	0.005		0.000		0.000
II Ten-Daily	322.389	0.730	322.353	0.493	322.314	0.173		0.000		0.000		0.000
III Ten-Daily	322.391	0.791	322.366	0.620	322.264	0.059		0.000		0.000		0.000
Monthly												
Min.	322.380	0.635	322.340	0.388	322.250	0.030	322.230	0.000		0.000		0.000
Max.	322.450	1.583	322.380	0.946	322.360	0.535	322.240	0.018		0.000		0.000
Mean	322.400	0.92	322.360	0.554	322.309	0.225	322.233	0.002		0		0

Peak Computed Discharge = 360.5 cumecs on 15/08/2015 Corres. Water Level :324.25 m
 Lowest Computed Discharge = 0.038 cumecs on 28/02/2016 Corres. Water Level :322.25 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

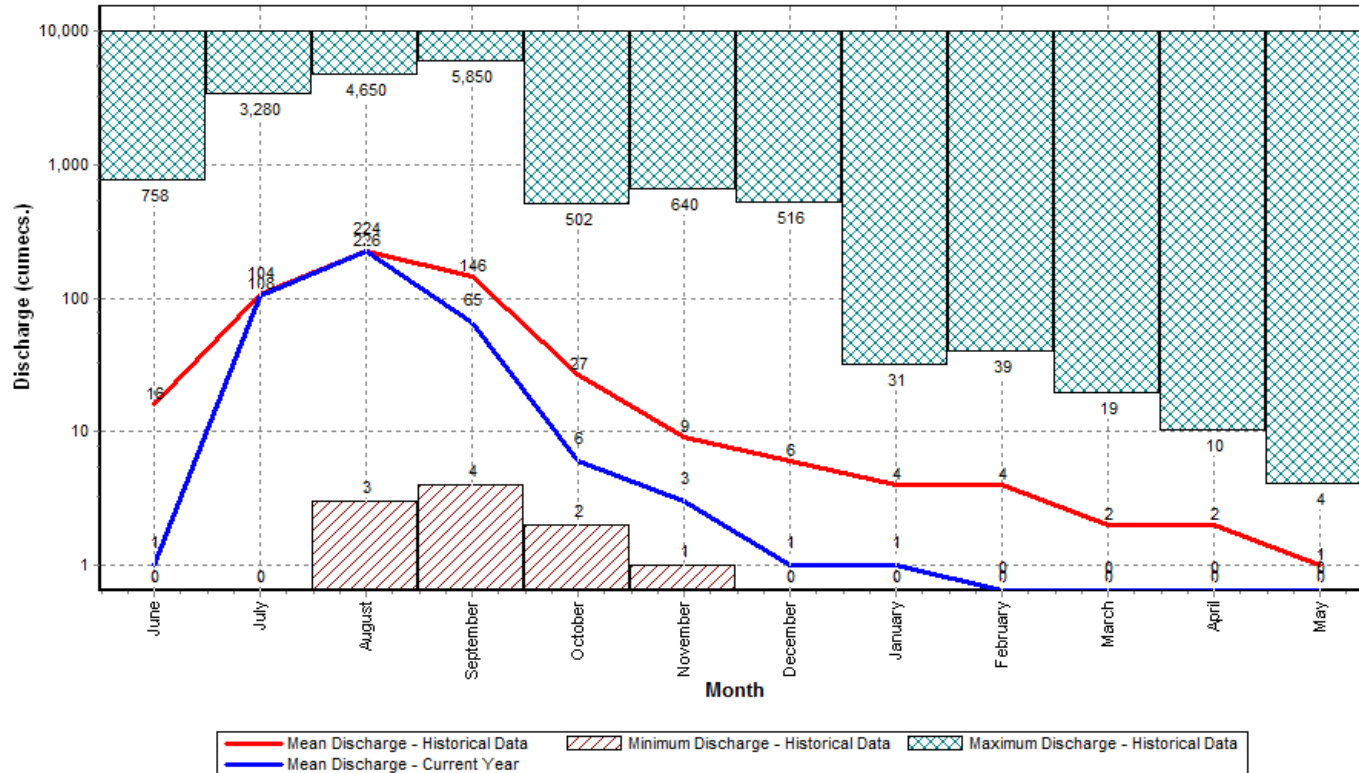
Histogram - Hydrograph for Water Year : 2015-16 (Data considered : 1977-2014)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



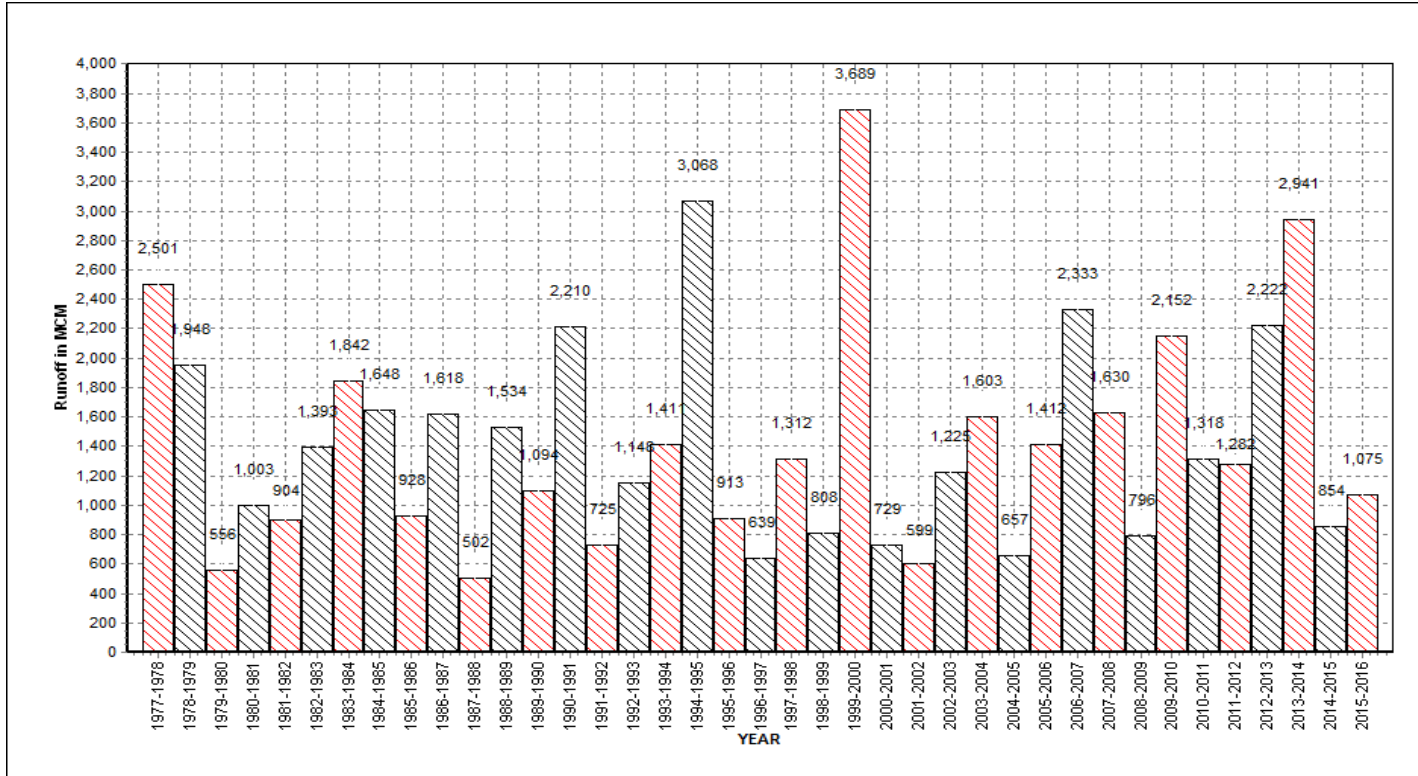
Annual Runoff Values for the period (1977 – 2016)

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

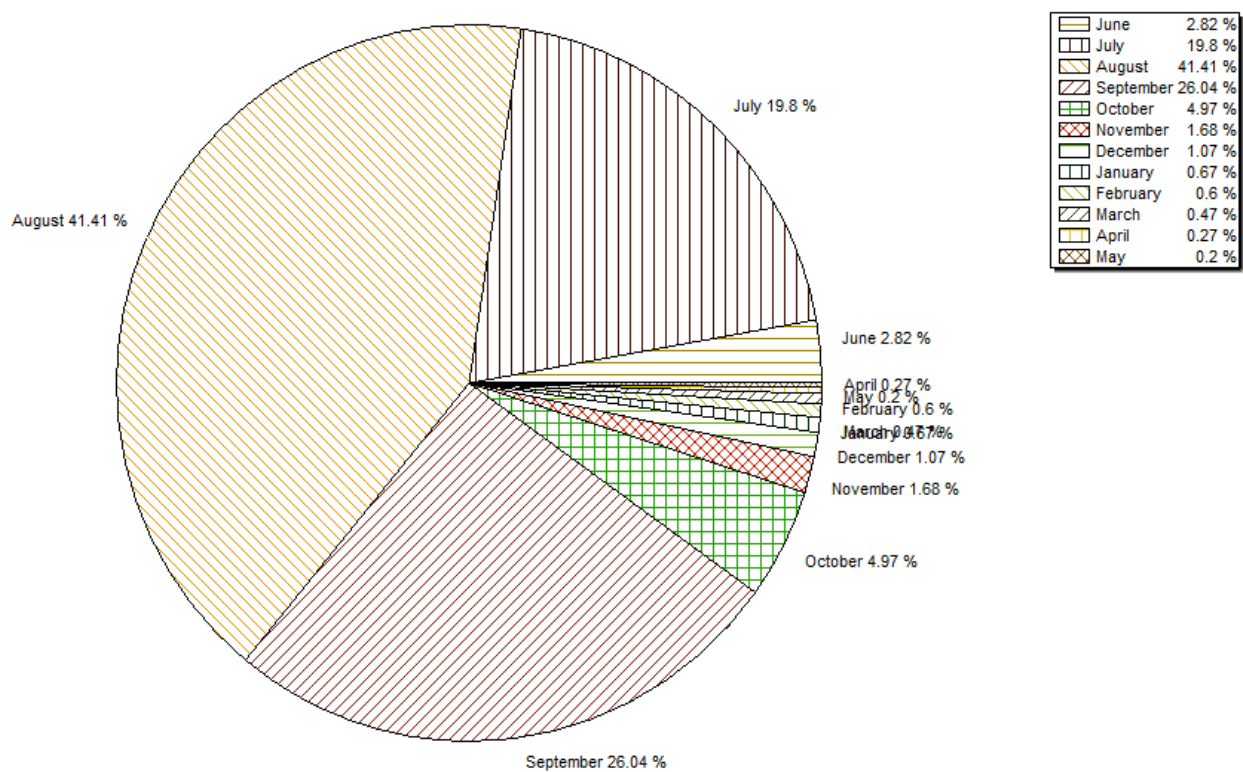
Monthly Average Runoff based on period (1977 – 2014)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



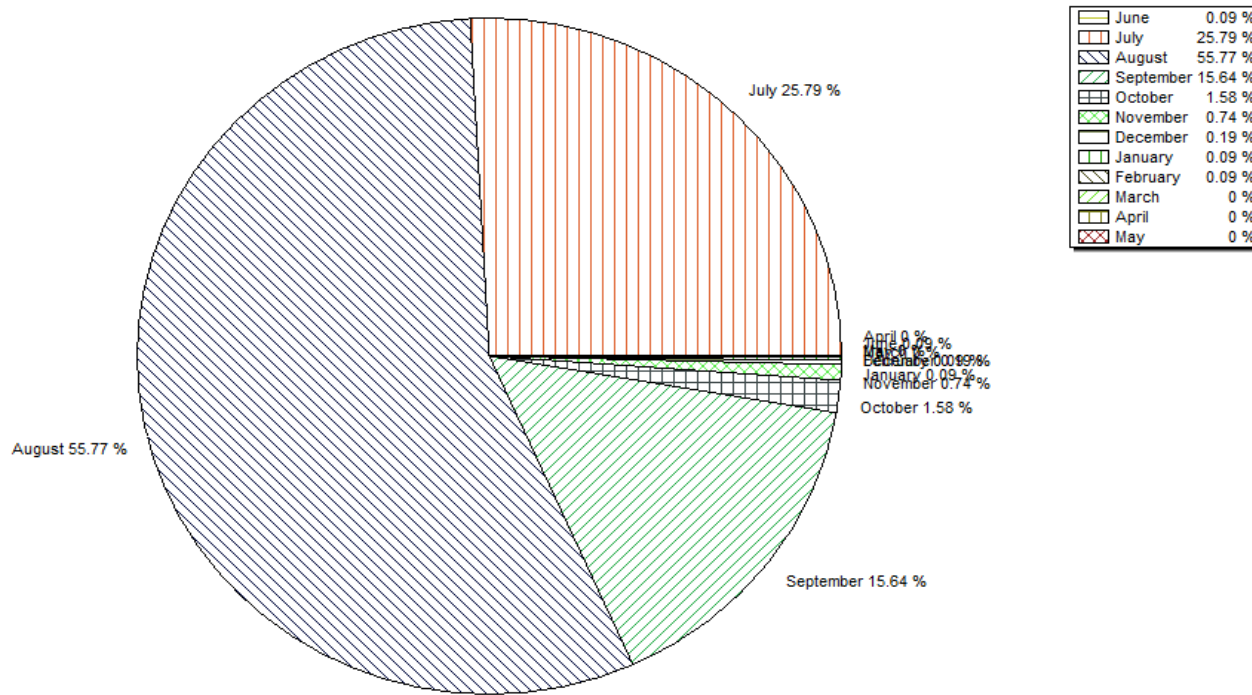
Monthly Runoff for the Year (2015-16)

Station Name : Shakkar at Gadarwara (010215012)

Local River : Shakkar

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



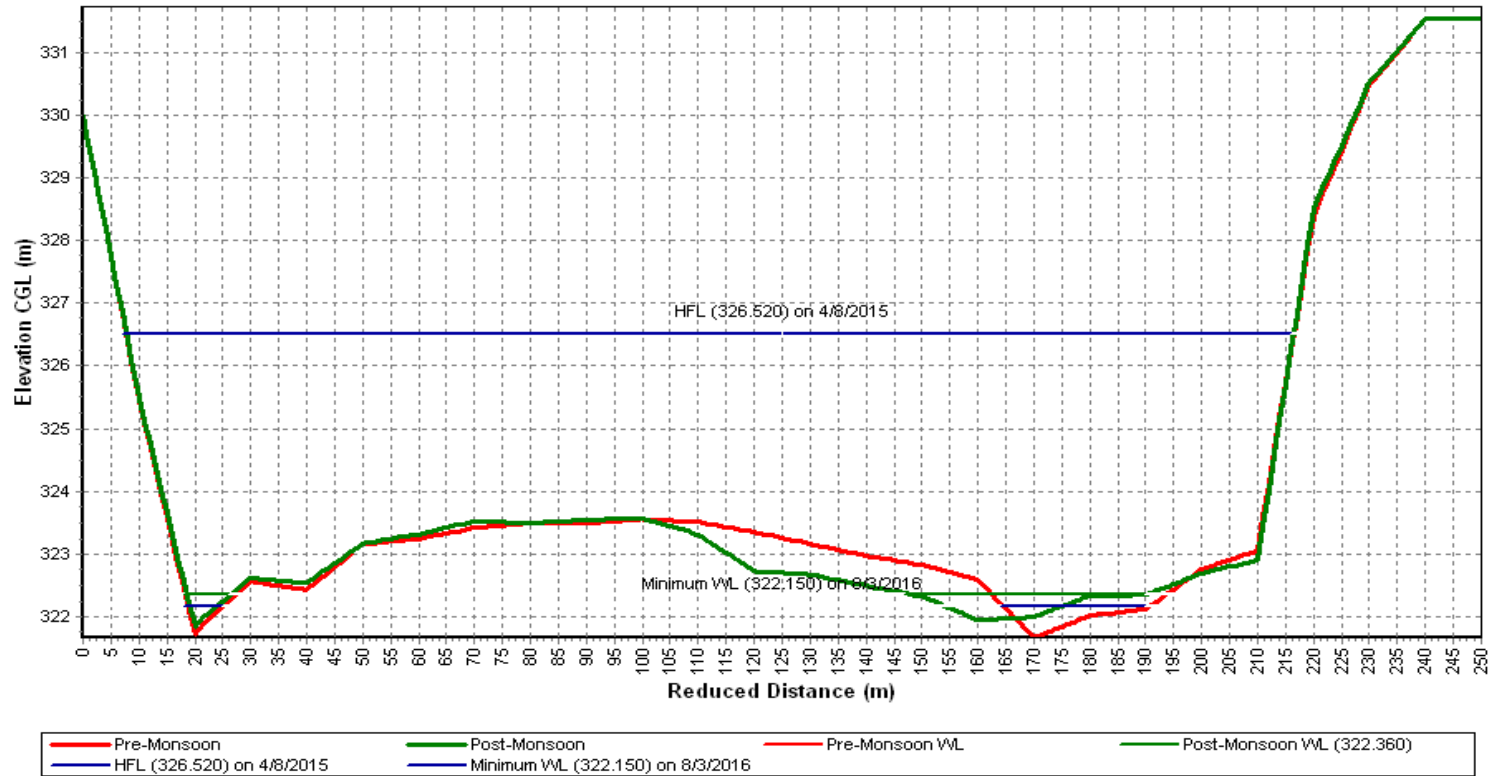
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



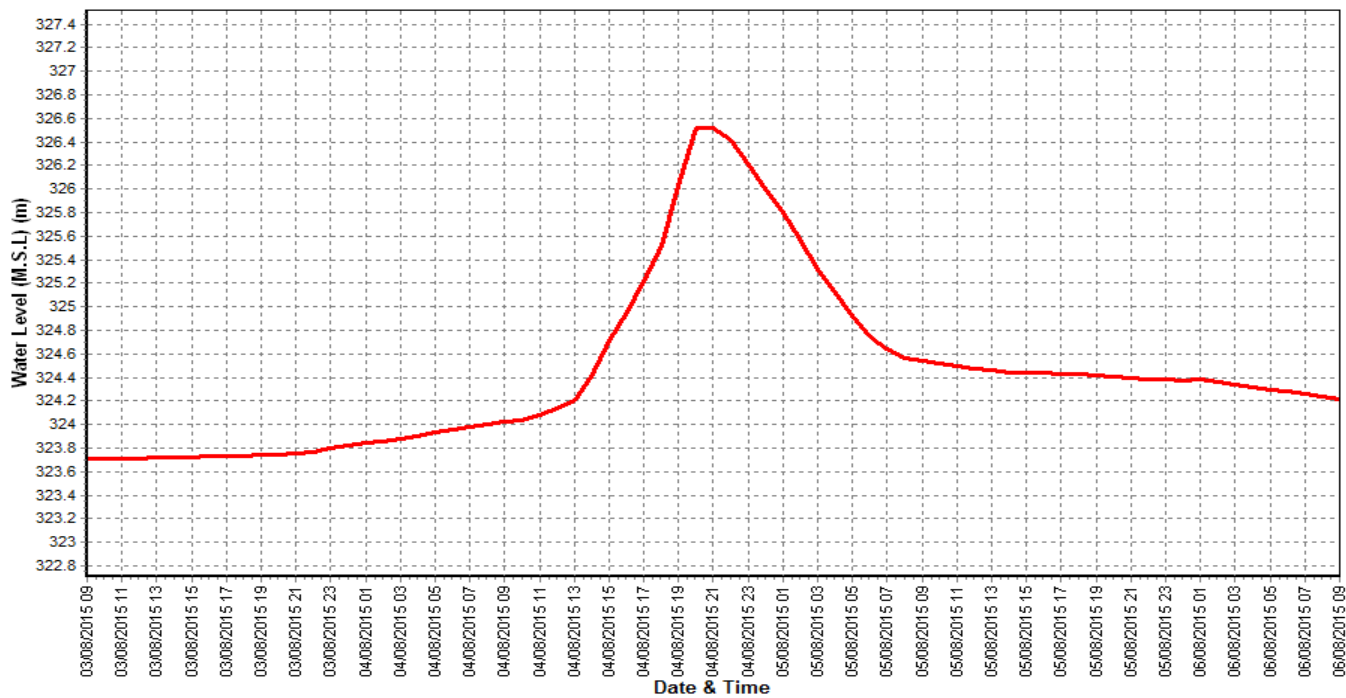
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



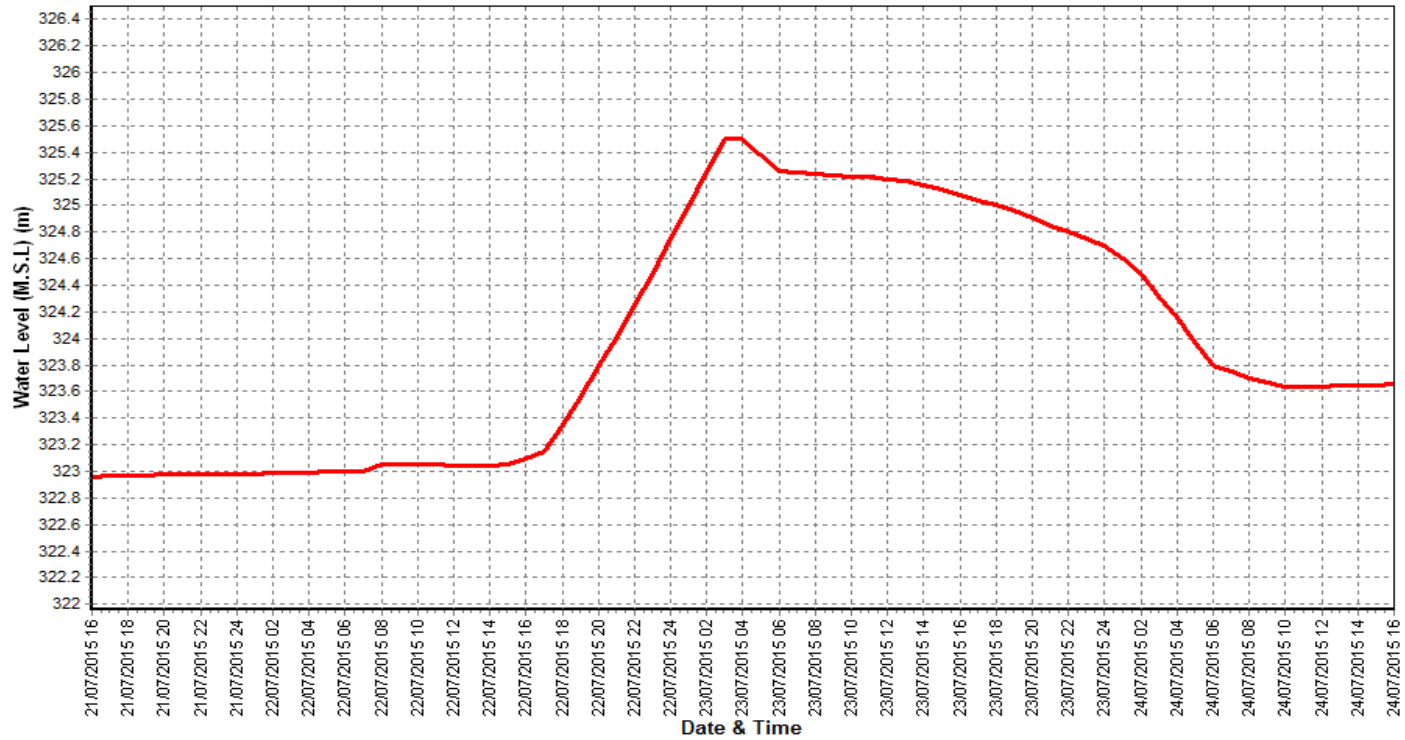
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Shakkar at Gadarwara (010215012)

Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



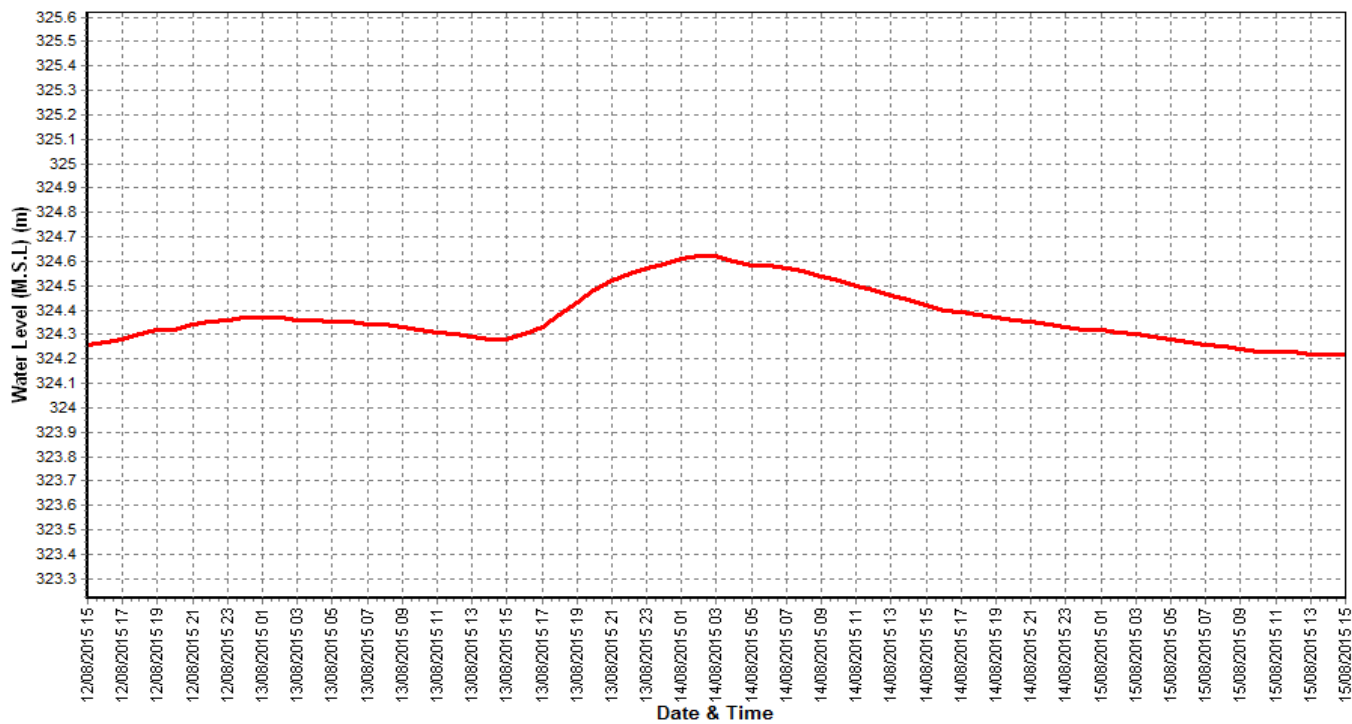
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Shakkar at Gadarwara (010215012)

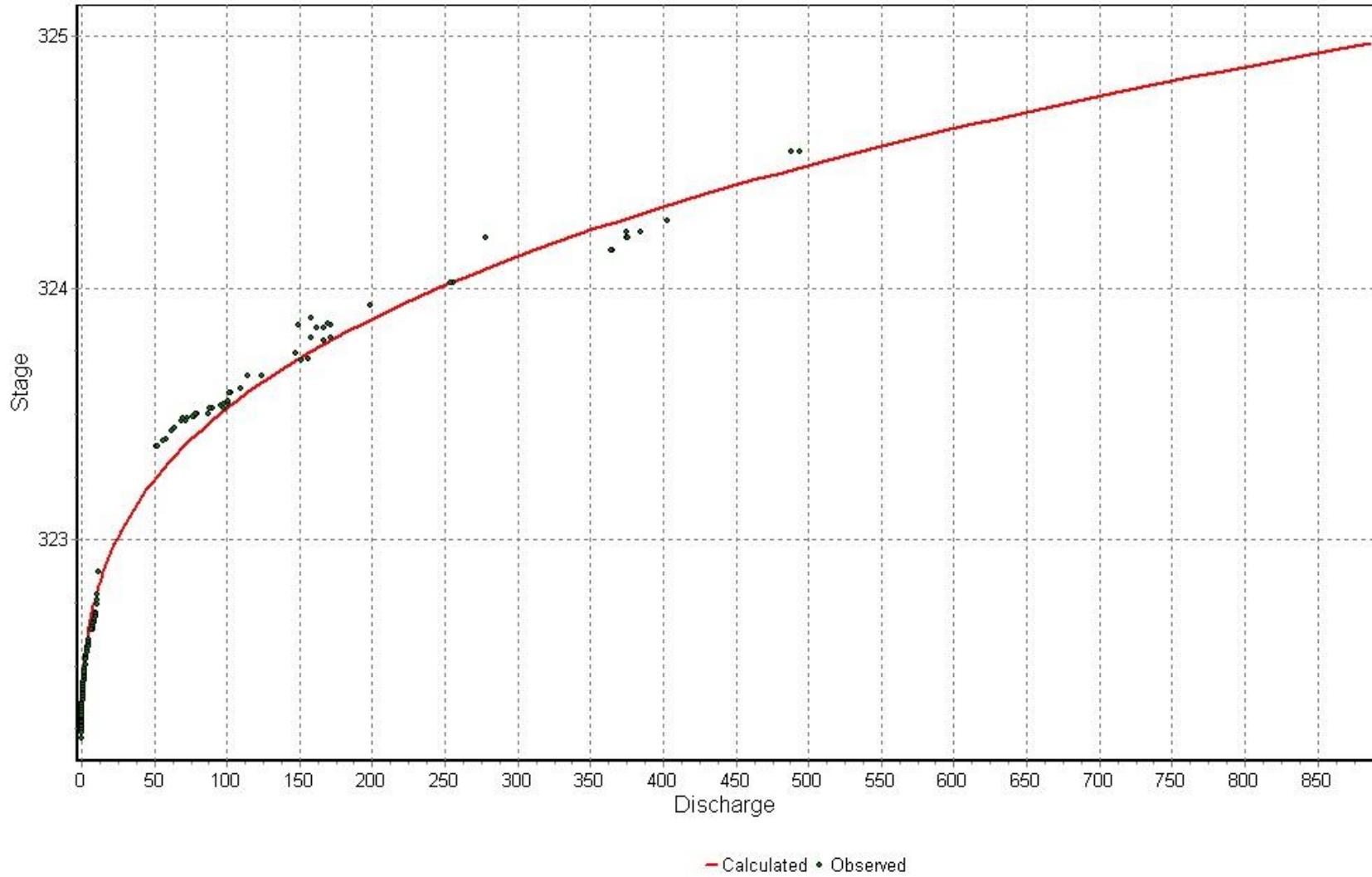
Division : Narmada Division, Bhopal

Local River : Shakkar

Sub-Division : MNSD I, CWC Hoshangabad



STAGE DISCHARGE CURVE OF SITE GADARWARA 15-16



4.12 Narmada at Barman

History Sheet

Site	: Narmada at Barman	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215011
Basin	: Narmada	District	: Narsinghpur
Tributary	:	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada division Bhopal	Local River	: Narmada
Drainage Area	: 26453 Sq. Km.	Sub-Division	: MNSD-1 CWC Hoshangabad
Latitude	: 23°01'52"	Bank	: Right
Zero of Gauge (m)	: 306 (M.S.L)	Longitude	: 79°00'56"
Gauge	: 09/12/1970	Opening Date	: 09/12/1970
Discharge	: 20/11/1971	Closing Date	:
Sediment	: 27/08/1972		
Water Quality	: 01/06/1979		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1972-1973	16194	330.185	31/08/1972	8.700	308.125	19/06/1972
1973-1974	20658	330.455	30/08/1973	8.000	307.620	09/06/1973
1974-1975	17288	329.250	19/08/1974	6.100	307.560	31/05/1975
1975-1976	15848	328.205	23/08/1975	5.400	307.558	16/06/1975
1976-1977	3074	315.440	16/08/1976	5.900	307.470	31/05/1977
1977-1978	13455	326.625	08/08/1977	5.700	307.460	03/06/1977
1978-1979	4905	318.223	06/08/1978	10.00	307.645	08/06/1978
1979-1980	8158	322.175	10/08/1979	4.600	307.375	27/05/1980
1980-1981	12375	326.725	30/08/1980	4.500	307.370	06/06/1980
1981-1982	2904	315.155	29/07/1981	4.000	307.445	18/05/1982
1982-1983	4642	317.702	18/08/1982	5.500	307.425	02/06/1982
1983-1984	14891	325.625	09/09/1983	2.900	307.565	31/05/1984
1984-1985	12220	327.600	19/08/1984	3.000	307.565	04/06/1984
1985-1986	6860	321.400	09/08/1985	7.800	307.555	07/06/1985
1986-1987	3170	317.360	23/07/1986	1.200	307.520	01/06/1986
1987-1988	10800	323.715	18/09/1987	4.545	307.465	05/06/1987
1988-1989	11200	324.030	05/08/1988	3.395	307.500	27/04/1989
1989-1990	2750	315.670	06/08/1989	5.231	307.470	03/06/1989
1990-1991	7200	320.420	20/09/1990	22.38	307.570	02/06/1990
1991-1992	19500	329.240	24/08/1991	27.00	307.750	17/01/1992
1992-1993	9400	323.450	12/09/1992	18.68	307.810	05/03/1993
1993-1994	7100	319.630	28/09/1993	20.00	307.700	08/06/1993
1994-1995	15600	327.220	21/07/1994	51.00	308.310	04/06/1994
1995-1996	10000	323.590	11/08/1995	46.00	307.920	12/11/1995
1996-1997	1750	313.170	21/08/1996	19.00	307.500	04/06/1996
1997-1998	5700	319.080	03/08/1997	56.63	307.900	26/06/1997
1998-1999	3900	316.150	15/09/1998	21.44	307.580	24/05/1999
1999-2000	21500	329.260	19/09/1999	19.80	307.600	06/06/1999
2000-2001	5900	318.970	28/07/2000	30.87	307.700	23/05/2001
2001-2002	6950	320.160	15/07/2001	31.00	307.710	31/03/2002
2002-2003	9800	323.500	18/08/2002	25.15	307.380	22/03/2003

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2003-2004	6800	320.170	05/09/2003	65.14	307.930	12/05/2004
2004-2005	12300	323.800	23/08/2004	30.00	307.620	11/06/2004
2005-2006	10452	323.555	16/09/2005	18.69	307.550	25/06/2005
2006-2007	4753	318.380	31/08/2006	24.27	307.560	23/06/2006
2007-2008	818.7	311.480	09/07/2007	30.89	307.600	05/05/2008
2008-2009	4051	316.935	02/08/2008	36.02	307.700	15/01/2009
2009-2010	7728	321.300	09/09/2009	25.54	307.590	30/06/2009
2010-2011	2536	314.930	20/09/2010	37.46	307.550	20/04/2011
2011-2012	8131	322.000	09/09/2011	36.82	307.500	26/05/2012
2012-2013	4041	317.750	13/08/2012	29.40	307.610	08/06/2012
2013-2014	15223	326.500	23/08/2013	50.14	307.600	14/05/2014
2014-2015	4134	317.735	08-08-2014	18.80	307.780	12/07/2014

Stage Discharge Sheet for Narmada at Barman for the period 2015-16

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	308.450	127.0	308.060	91.90	308.450	144.0	310.320	436.5	308.500	147.0	308.360	117.5 *
2	308.320	115.0	308.170	99.60	308.480	122.4 *	309.730	327.2	308.380	119.9 *	308.170	101.0
3	308.200	101.0	308.070	84.10	308.640	164.0	309.860	350.1	308.180	109.0	308.050	87.20
4	308.170	96.30	307.880	58.60	310.780	539.8	309.800	344.6	308.260	105.5 *	308.180	102.0
5	308.410	129.0	308.080	83.53 *	313.940	1881	309.640	309.7	308.460	137.0	308.040	80.00
6	308.590	149.0	308.080	83.30	311.660	835.4	309.470	294.2 *	308.500	144.0	308.060	87.40
7	308.270	106.7 *	308.010	79.00	310.390	448.6	309.300	250.0	308.880	195.0	307.900	68.90
8	308.230	129.0	308.220	112.0	309.850	348.2	308.920	200.0	308.920	196.0	308.000	77.44 *
9	308.440	103.0	309.290	264.0	309.850	336.8 *	308.700	157.0	308.360	118.0	307.900	63.20
10	308.320	114.0	309.570	304.8	309.250	252.0	308.650	165.0	308.150	97.60	307.820	56.10
11	307.800	56.80	310.550	494.9	309.070	245.0	308.800	182.0	308.210	99.76 *	307.800	58.84 *
12	307.700	32.00	310.080	426.0 *	309.400	267.0	308.600	154.0	308.470	143.0	307.920	67.50
13	307.950	66.50	309.340	267.0	309.880	353.2	308.540	140.6 *	308.700	164.0	307.850	58.00
14	307.960	73.51 *	309.000	219.0	309.540	294.3	308.460	138.0	308.740	177.0	307.900	66.40
15	307.900	69.50	309.350	260.0	309.760	353.8 *	308.360	118.0	308.700	164.0	307.900	67.82 *
16	307.980	74.20	309.200	237.0	309.800	362.4 *	308.200	101.0	309.000	219.0	307.950	71.30
17	308.210	99.60	308.500	140.0	309.870	352.0	308.240	103.2 *	308.500	134.0	307.920	64.80
18	308.000	77.90	308.350	116.2 *	309.660	311.7	308.420	132.0	308.170	95.29 *	307.780	49.40
19	307.870	27.70	308.520	138.0 *	309.530	292.1	308.370	126.0	308.010	77.80	307.930	65.90
20	307.890	63.20	308.180	96.70	309.240	241.0	308.300	110.2 *	308.010	79.90	308.280	117.0
21	307.780	57.12 *	307.980	74.80	308.890	196.0	308.680	165.0	307.990	74.60	308.160	96.70
22	307.740	34.40	308.740	177.0	308.980	215.0	308.570	150.0	307.970	74.49 *	308.060	83.53 *
23	307.780	43.50	308.500	141.0	309.050	217.8 *	308.600	155.0	307.910	62.40	308.380	127.0
24	307.750	34.70	310.310	438.6	308.770	171.8 *	308.630	165.0	307.900	67.82 *	308.340	119.0
25	307.880	68.70	310.280	431.9	308.420	127.0	308.800	187.1 *	307.900	67.82 *	308.210	99.76 *
26	307.990	66.90	309.800	362.4 *	308.440	135.0	308.510	144.0	307.940	74.80	308.350	122.0
27	307.750	47.10	309.320	272.0	308.400	117.0	308.480	132.7 *	307.970	73.50	308.350	124.0
28	307.960	73.51 *	309.210	233.0	309.430	281.7	308.520	149.0	307.920	53.50	307.980	76.20
29	308.080	89.60	308.850	186.0	309.800	343.7	308.400	117.0	307.850	40.60	307.950	72.55 *
30	308.040	77.70	308.350	119.0	309.280	258.2 *	308.320	119.0	307.780	63.70	307.660	47.36 #
31			308.180	101.0	310.390	447.0			308.140	97.30		
Ten-Daily Mean												
I Ten-Daily	308.340	117.0	308.207	106.2	310.129	507.2	309.439	283.4	308.459	136.9	308.048	84.07
II Ten-Daily	307.926	64.09	309.107	239.5	309.575	307.3	308.429	130.5	308.451	135.4	307.923	68.70
III Ten-Daily	307.875	59.32	309.047	230.6	309.077	228.2	308.551	148.4	307.934	68.23	308.144	96.81
Monthly												
Min.	307.700	27.70	307.880	58.60	308.400	117.0	308.200	101.0	307.780	40.60	307.660	47.36
Max.	308.590	149.0	310.550	494.9	313.940	1881	310.320	436.5	309.000	219.0	308.380	127.0
Mean	308.047	80.14	308.815	196.3	309.577	343.7	308.806	187.4	308.270	112	308.038	83.19

Annual Runoff in MCM = 4031 Annual Runoff in mm = 152

Peak Observed Discharge = 1881 cumecs on 05/08/2015 Corres. Water Level :313.94 m

Lowest Observed Discharge = 24.80 cumecs on 13/04/2016 Corres. Water Level :307.38 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 D ischarge Sheet for Narmada at Barman for the period 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	307.660	44.70	307.990	73.70	308.130	97.20	307.480	35.00	308.480	136.0	308.320	112.6 *
2	307.930	68.30	308.060	87.40	308.140	97.60	307.480	34.30	308.330	118.0	308.290	109.0
3	308.200	107.0	308.380	119.9 *	308.100	93.60	307.500	40.20	308.160	94.19 *	308.310	112.0
4	307.950	68.10	308.000	75.40	308.100	91.90	307.520	40.30	307.800	64.30	308.320	113.0
5	307.900	63.20	307.960	72.10	308.100	95.10	307.680	56.40	308.250	108.0	308.320	115.0
6	308.000	77.44 *	307.900	69.60	308.090	89.60	307.900	67.82 *	308.300	111.0	308.330	118.0
7	307.980	74.80	308.010	75.40	308.080	85.60 *	308.310	120.0	308.300	115.0	308.300	111.0
8	307.930	69.60	308.020	89.60	308.070	89.30	308.450	127.0	308.320	119.0	308.290	109.0 *
9	307.850	58.00	308.050	87.20	308.090	90.40	308.480	136.0	308.330	118.0	308.280	109.0
10	307.990	76.90	308.200	98.64 *	308.130	98.00	308.420	129.0	308.020	79.44 *	308.310	112.0
11	308.040	85.40	307.990	80.70	308.140	95.90	308.320	119.0	307.710	58.10	308.340	122.0
12	307.860	57.70	307.860	72.00	308.140	99.80	308.180	102.0	307.520	38.00	308.320	117.0
13	307.800	58.84 *	307.800	66.70	308.120	95.10	308.160	94.19 *	307.380	24.80	308.330	119.0
14	307.870	63.30	307.620	48.70	308.130	90.92 *	307.770	61.50	307.380	32.50 *	308.360	124.0
15	307.820	51.00	308.040	85.40	308.180	105.0	307.460	35.00	307.520	37.13 *	308.320	112.6 *
16	307.730	48.50	308.270	114.0	308.160	100.0	307.720	58.10	308.250	108.0	308.280	109.0
17	307.710	48.10	308.270	106.7 *	308.210	108.0	307.770	60.60	308.180	96.40 *	308.310	113.0
18	307.920	66.60	308.290	118.0	308.200	106.0	307.520	38.00	308.310	112.0	308.330	117.0
19	308.010	79.90	308.200	106.0	308.390	128.0	307.450	35.00	308.310	111.0	308.360	127.0
20	307.980	75.47 *	308.180	101.0	308.320	117.0	307.770	56.27 *	308.320	112.6 *	308.320	117.0
21	307.720	49.20	308.170	96.70	308.270	106.7 *	308.060	88.30	308.320	117.0	308.300	110.2 *
22	307.720	48.00	308.100	94.30	308.130	96.90	307.900	73.90	308.330	119.0	308.280	107.8 *
23	307.880	62.30	308.090	93.80	308.160	98.20	308.010	83.30	308.300	115.0	308.320	105.0
24	307.920	69.69 *	308.140	92.00 *	308.160	99.80	308.160	94.19 *	308.270	106.7 *	308.320	107.0
25	308.010	78.44 *	308.150	98.70	308.180	102.0	308.100	87.71 *	308.290	111.0	308.330	108.0
26	307.680	43.50	308.180	96.40 *	307.900	75.20	308.010	83.30	308.300	111.0	308.390	117.0
27	307.760	55.43 *	308.130	97.50	307.760	49.40	307.720	52.12 *	308.290	109.0	308.380	116.0
28	307.960	72.60	308.140	99.50	307.720	52.12 *	307.800	65.20	308.280	109.0	308.370	110.0
29	307.940	68.10	308.130	95.10	307.450	29.40	307.660	48.60	308.280	110.0	308.360	117.5 *
30	307.860	58.00	308.120	93.90			307.500	37.20	308.310	112.0	308.350	110.0
31	307.940	67.60	308.100	87.71 *			307.770	62.50			308.140	76.20
Ten-Daily Mean												
I Ten-Daily	307.939	70.80	308.057	84.90	308.103	92.83	307.922	78.60	308.229	106.3	308.307	112.1
II Ten-Daily	307.874	63.48	308.052	89.92	308.199	104.6	307.812	65.97	307.888	73.05	308.327	117.8
III Ten-Daily	307.854	61.17	308.132	95.06	307.970	78.85	307.881	70.57	308.297	112.0	308.322	107.7
Monthly												
Min.	307.660	43.50	307.620	48.70	307.450	29.40	307.450	34.30	307.380	24.80	308.140	76.20
Max.	308.200	107.0	308.380	119.9	308.390	128.0	308.480	136.0	308.480	136.0	308.390	127.0
Mean	307.888	65.02	308.082	90.12	308.095	92.54	307.872	71.68	308.138	97.1	308.319	112.4

Peak Computed Discharge = 426.0 cumecs on 12/07/2015

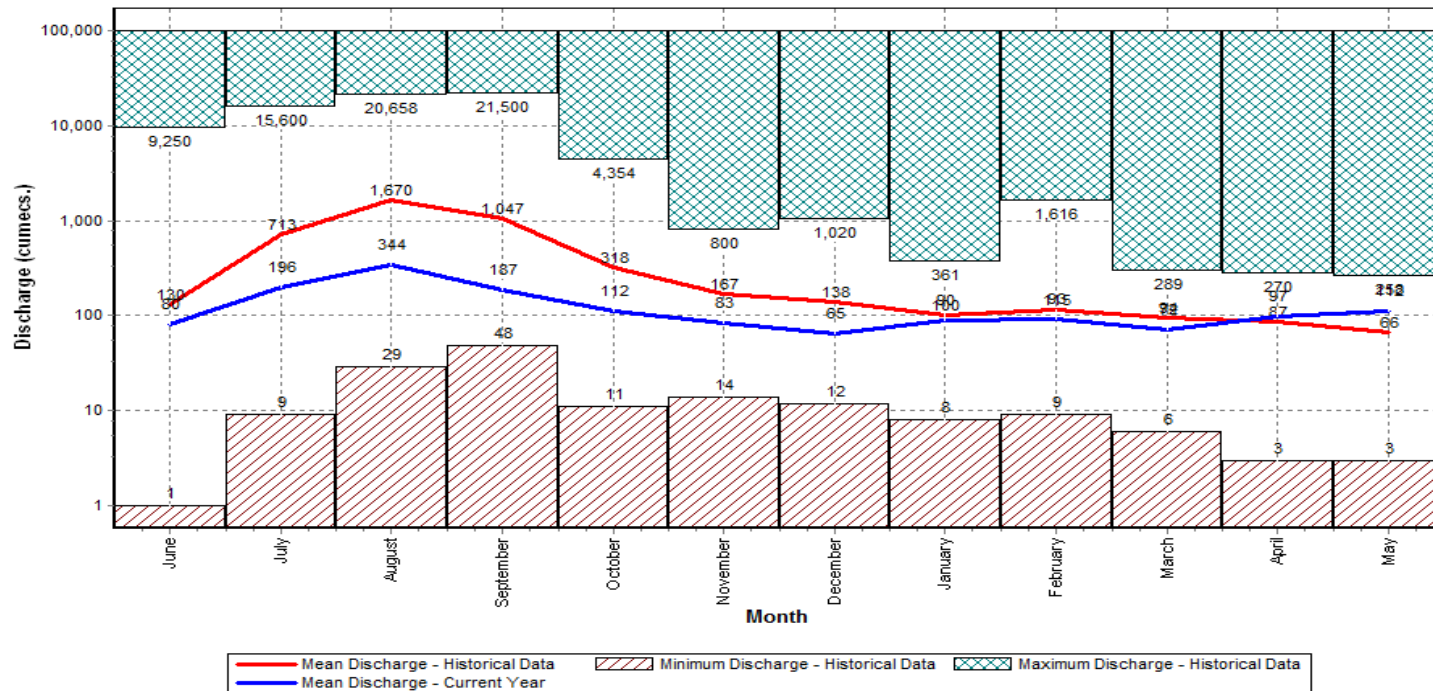
Corres. Water Level :310.08 m

Lowest Computed Discharge = 32.50 cumecs on 14/04/2016

Corres. Water Level :307.38 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 : 2015-16 (Data considered : 1972-2016)



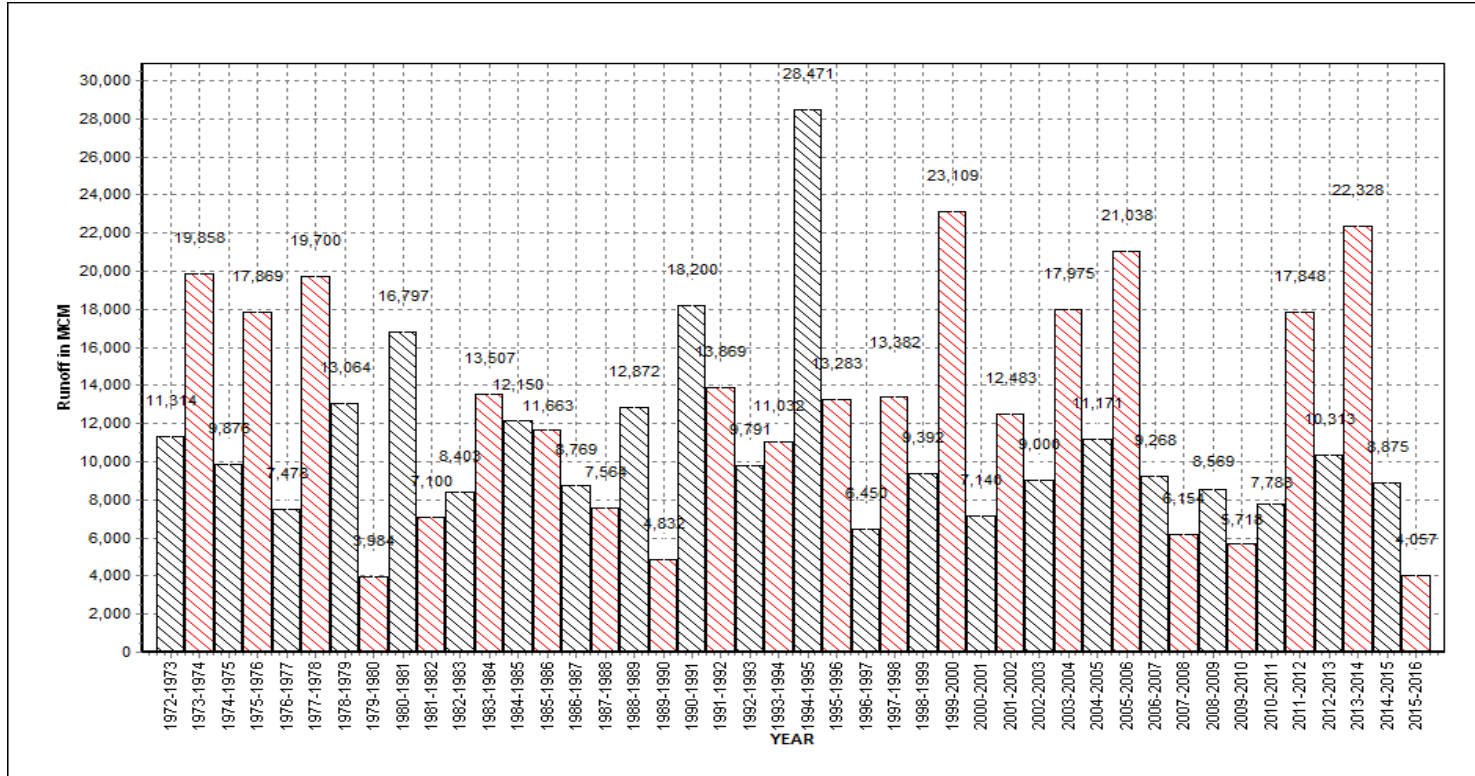
Annual Runoff Values for the period (1972 – 2016)

Station Name : Narmada at Barman (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

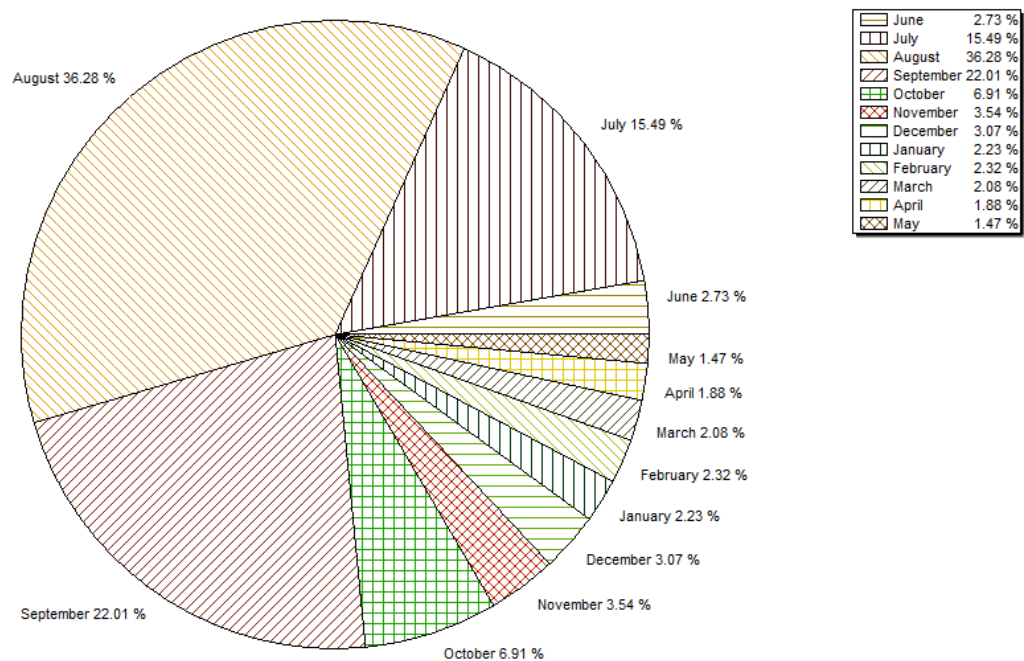
Monthly Average Runoff based on period (1972 – 2015)

Station Name : Narmada at Barman (010215011)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



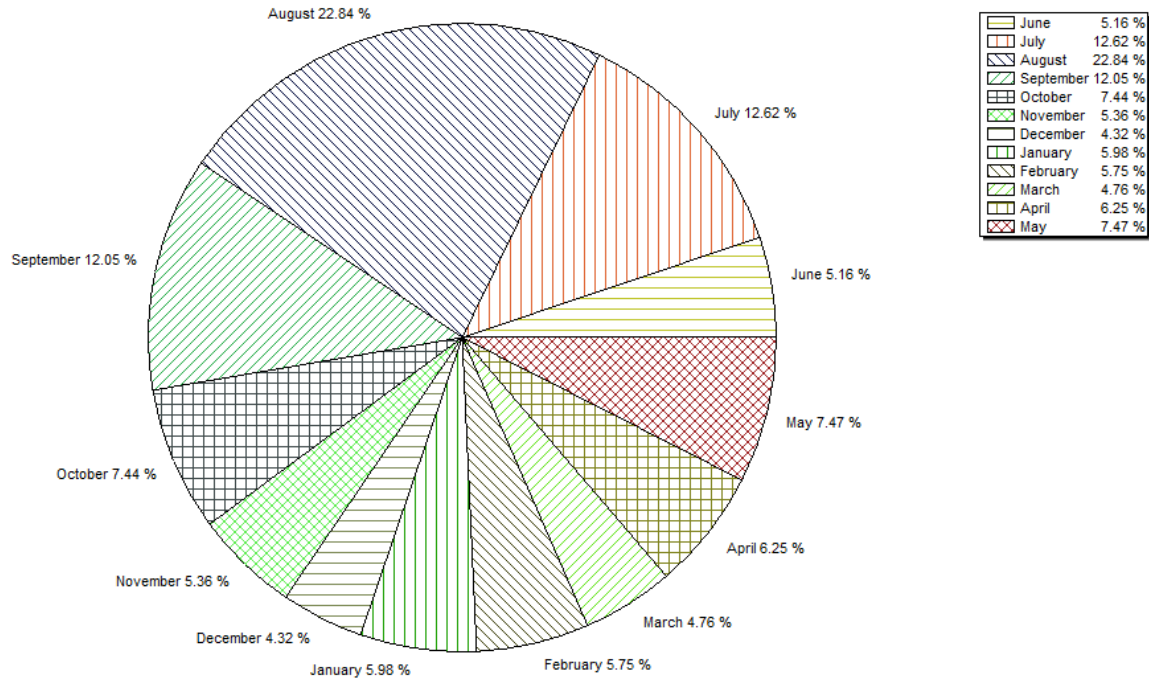
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Barman (010215011)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



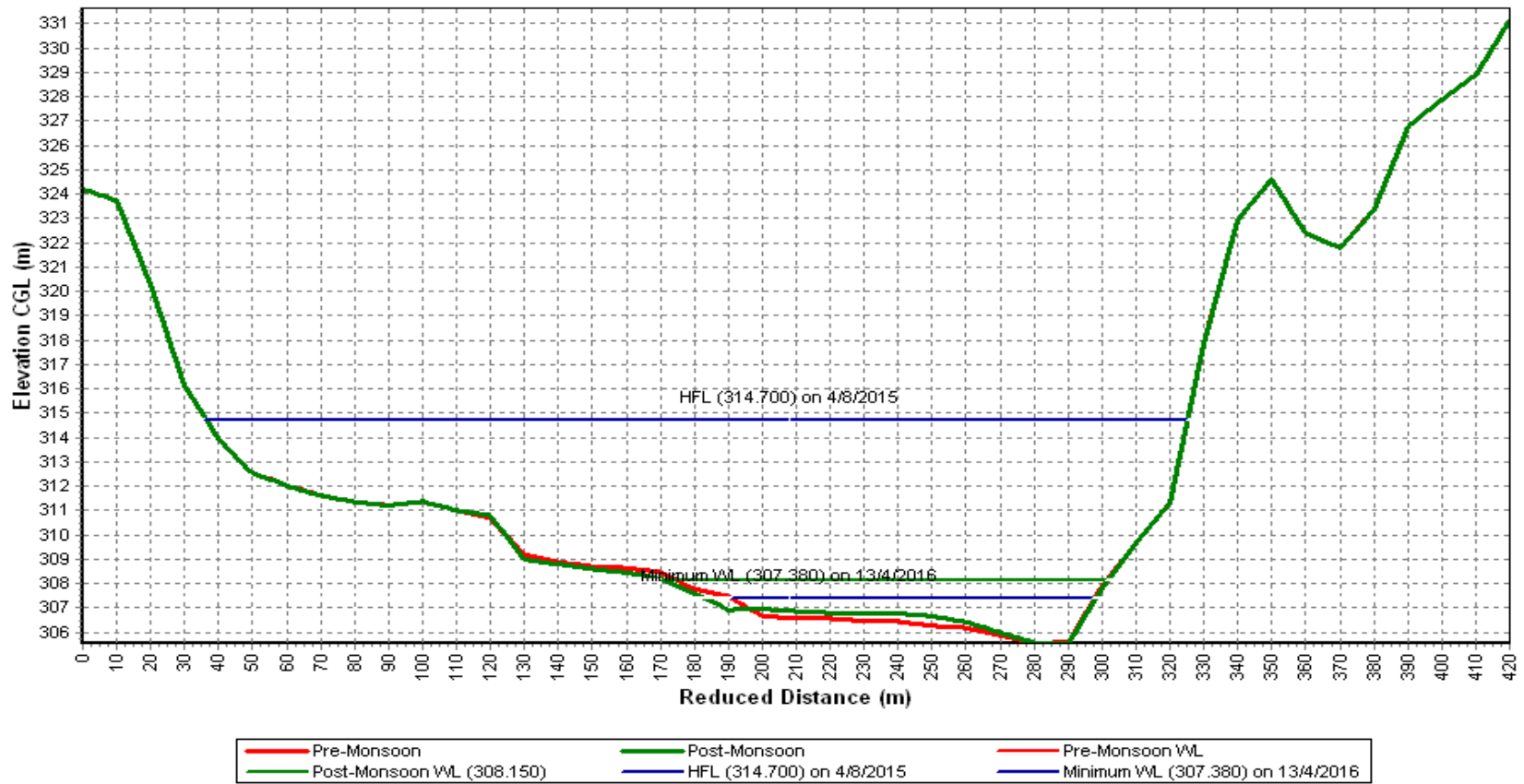
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Barman (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



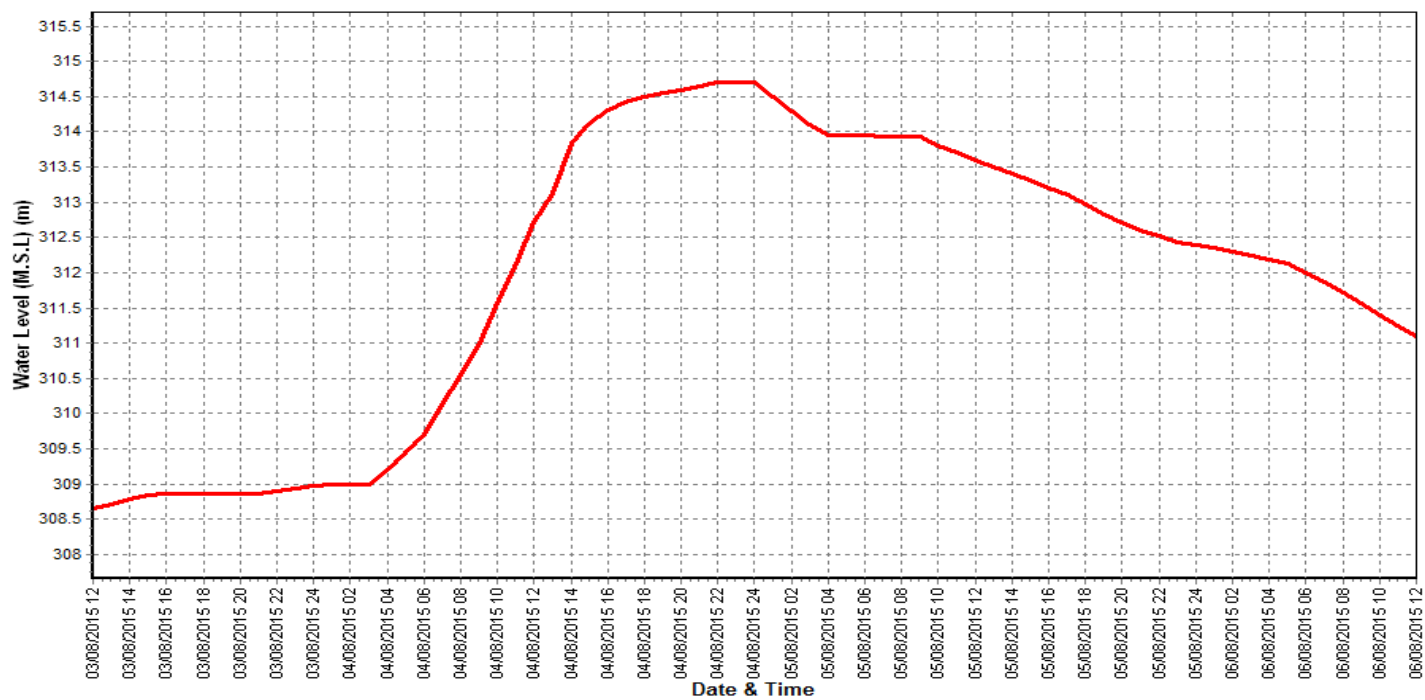
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Barman (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



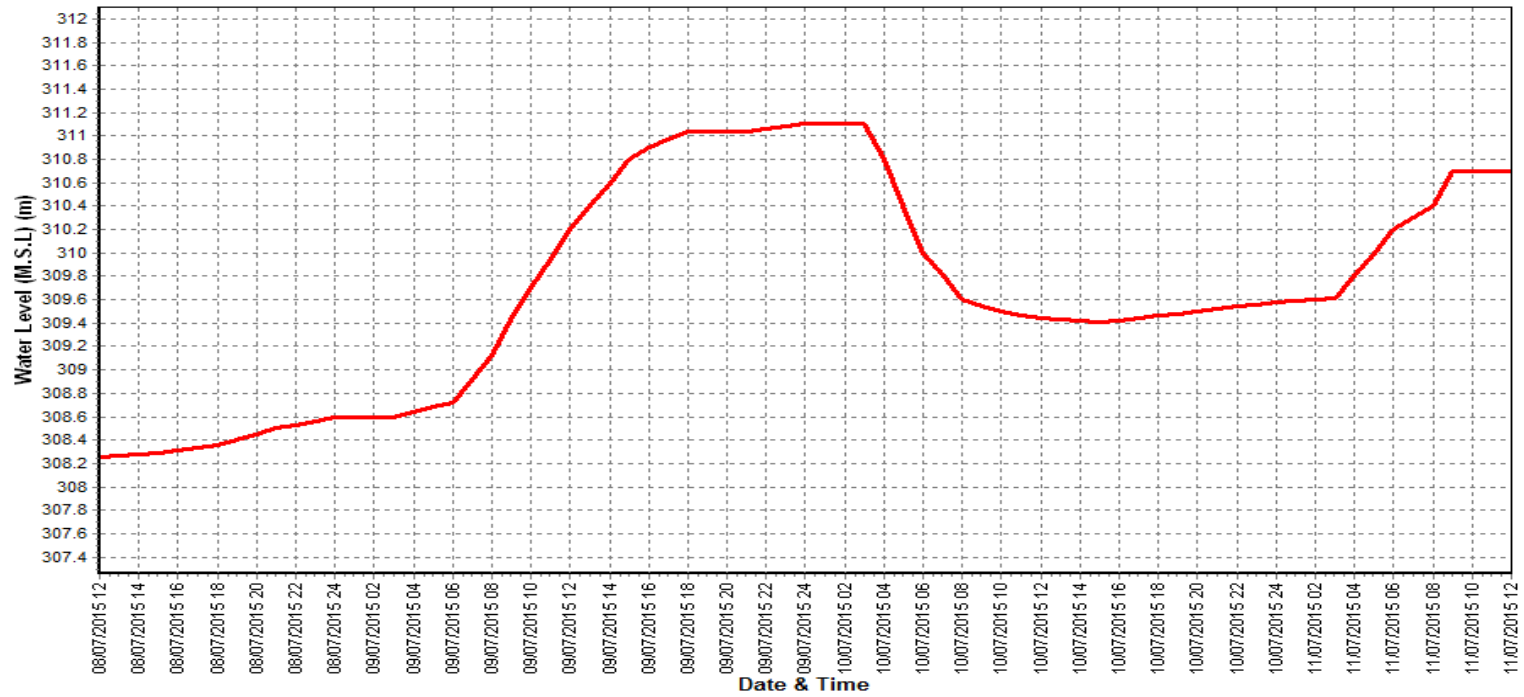
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Barman (010215011)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



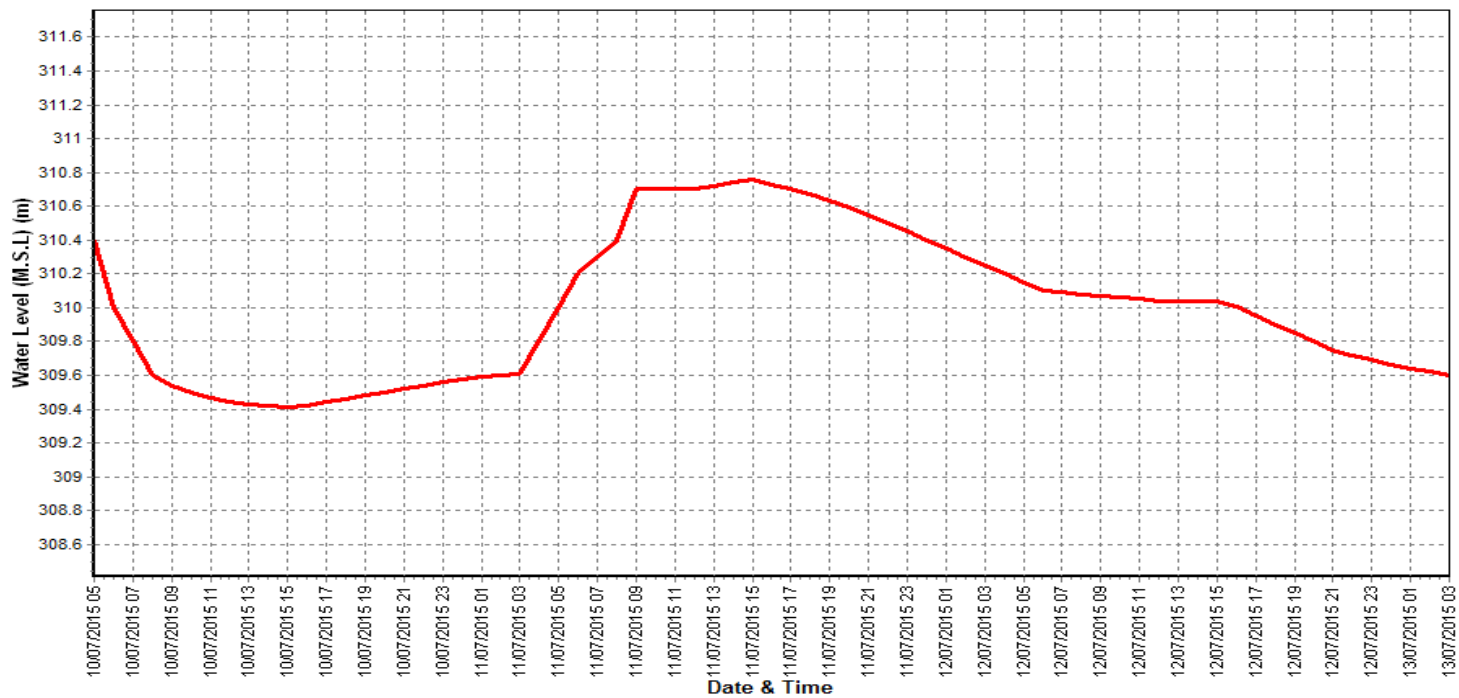
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Barman (010215011)

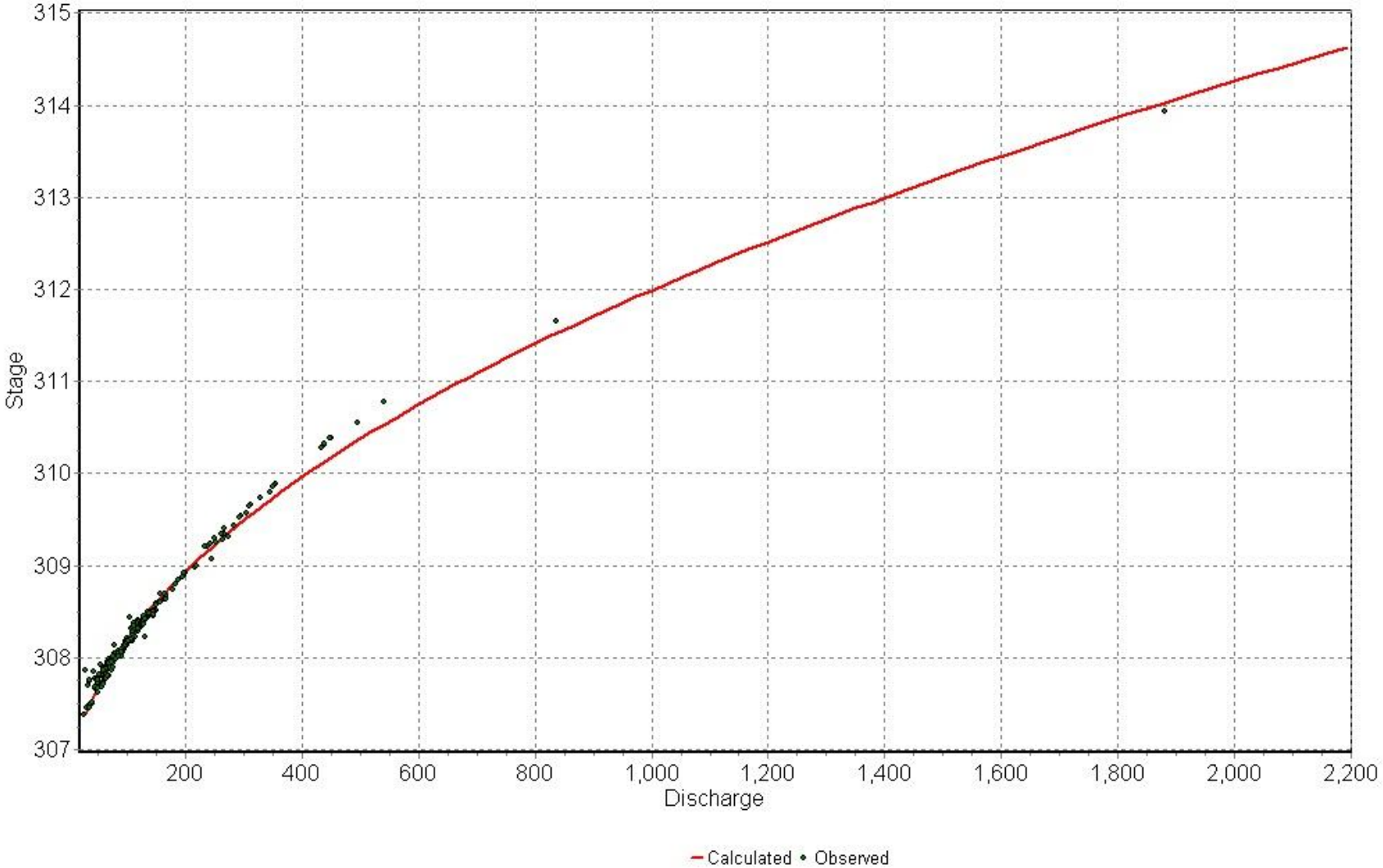
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : MNSD I, CWC Hoshangabad



STAGE DISCHARGE CURVE OF SITE BARMAN 2015-16



4.13 Sher at Belkheri

History sheet

Site	: Sher at Belkheri	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215010
Basin	: Narmada	District	: Narsinghpur
Tributary	: Sher	Independent River	: Narmada
Division	: Narmada Division Bhopal	Local River	: Sher
Drainage Area	: 1508 Sq. Km.	Sub-Division	: MNSD-1 Hoshangabad
Latitude	: 22°55'40"	Bank	: Right
Zero of Gauge (m)	: 340 (M.S.L.)	Longitude	: 79°20'23"
	Opening Date	01/02/1977	Closing Date
Gauge	: 16/03/1977		
Discharge	: 16/03/1977		
Sediment	:		
Water Quality	: 01/09/1986		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	1695	348.230	07/08/1977	0.100	341.435	07/06/1977
1978-1979	1280	346.435	15/08/1978	0.700	341.165	04/06/1978
1979-1980	2056	347.750	09/08/1979	0.400	341.280	15/05/1980
1980-1981	2712	349.100	29/08/1980	0.400	341.290	16/02/1981
1981-1982	645.0	345.150	22/09/1981	0.300	341.405	27/03/1982
1982-1983	2003	348.400	11/09/1982	0.300	341.520	08/05/1983
1983-1984	1700	348.200	08/09/1983	0.300	341.520	19/06/1983
1984-1985	6500	353.370	18/08/1984	0.400	341.015	31/05/1985
1985-1986	2150	348.650	17/08/1985	0.200	341.280	23/05/1986
1986-1987	1245	346.720	14/08/1986	0.020	341.010	21/06/1986
1987-1988	367.0	343.975	17/09/1987	0.325	341.220	29/05/1988
1988-1989	1200	347.000	04/08/1988	0.285	341.300	31/05/1989
1989-1990	1018	346.700	06/08/1989	0.254	341.300	03/06/1989
1990-1991	1300	347.000	30/08/1990	0.546	341.420	15/05/1991
1991-1992	1570	347.750	23/08/1991	0.407	341.320	20/05/1992
1992-1993	1560	347.500	20/08/1992	0.352	341.360	14/05/1993
1993-1994	2975	350.800	16/07/1993	0.260	341.090	17/05/1994
1994-1995	7600	359.950	21/07/1994	0.600	341.100	24/05/1995
1995-1996	864.0	345.800	20/07/1995	0.328	340.950	15/05/1996
1996-1997	323.0	343.800	29/08/1996	0.250	341.080	28/05/1997
1997-1998	2300	348.560	24/07/1997	0.250	341.085	08/06/1997
1998-1999	530.0	344.920	05/07/1998	0.125	341.080	13/04/1999
1999-2000	4475	353.940	15/09/1999	0.173	341.040	01/07/1999
2000-2001	1650	347.290	28/07/2000	0.312	340.940	11/04/2001
2001-2002	3900	352.920	19/07/2001	0.328	341.000	14/05/2002
2002-2003	2300	350.400	18/08/2002	0.240	340.910	15/05/2003
2003-2004	3700	352.780	14/09/2003	0.000	340.870	29/11/2003
2004-2005	1330	348.850	22/08/2004	0.181	340.960	04/06/2004
2005-2006	590.3	344.980	15/09/2005	0.110	341.000	12/06/2005
2006-2007	4803	351.200	22/07/2006	0.089	341.020	04/06/2006
2007-2008	1077	345.300	08/07/2007	0.096	341.050	17/06/2007
2008-2009	232.9	343.480	01/08/2008	0.133	341.050	03/06/2008

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2009-2010	454.4	344.450	09/09/2009	0.046	340.940	27/05/2010
2010-2011	411.7	344.050	19/09/2010	0.109	340.940	13/06/2010
2011-2012	431.1	344.360	16/07/2011	0.040	340.890	05/06/2011
2012-2013	1224	346.150	06/08/2012	0.076	341.020	13/06/2012
2013-2014	702.9	345.100	22/08/2013	0.344	341.050	03/06/2013
2014-2015	415.6	344.400	06-08-2014	0.338	341.380	12/05/2015

Stage Discharge Sheet for Sher at Belkheri for the period 2015-16

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	341.080	0.411	341.410	0.541	341.530	6.659	342.080	48.60	341.270	3.489	341.180	1.389 *
2	341.080	0.447 *	341.420	0.879	341.440	6.751 *	342.070	47.47	341.270	2.747 *	341.180	1.438
3	341.080	0.428	341.420	0.636	341.360	5.051	341.900	33.10	341.260	4.241	341.180	1.425
4	341.080	0.534	341.400	3.696	344.410	451.4	341.830	25.49	341.240	2.238 *	341.170	1.451
5	341.080	0.419	341.340	4.160 *	342.890	170.9	341.760	18.94	341.230	2.679	341.200	2.085
6	341.080	0.422	341.240	2.147	342.450	95.68	341.710	17.32 *	341.220	2.569	341.200	2.185
7	341.080	0.447 *	341.200	2.045	342.340	88.47	341.670	14.09	341.220	2.405	341.190	1.997
8	341.080	0.408	341.250	2.017	342.160	54.37	342.530	118.3	341.220	2.274	341.190	1.515 *
9	341.080	0.447 *	341.290	3.556	342.190	50.16 *	341.780	20.28	341.090	0.680	341.180	1.584
10	341.080	0.399	342.690	135.3	342.430	101.9	341.710	16.57	341.090	0.692	341.180	1.734
11	341.070	0.396	342.470	96.64	342.420	96.15	341.640	13.85	341.080	0.447 *	341.180	1.389 *
12	341.070	0.386	342.350	65.39 *	342.900	167.4	341.580	10.45	341.180	1.448	341.180	1.561
13	341.070	0.391	341.970	38.02	342.400	92.05	341.520	9.326 *	341.180	1.417	341.160	1.408
14	341.150	1.046 *	341.980	19.20	342.720	136.9	341.650	13.99	341.180	1.423	341.160	1.370
15	341.120	0.572	341.670	13.63	342.200	51.05 *	341.650	14.00	341.180	1.590	341.160	1.154 *
16	341.090	0.465	341.560	10.47	342.140	45.86 *	341.560	9.257	341.180	1.458	341.160	1.373
17	341.090	0.468	341.500	6.390	342.070	45.41	341.590	11.96 *	341.180	1.530	341.160	1.387
18	341.180	1.324	341.360	4.624 *	341.980	38.27	341.560	9.261	341.180	1.389 *	341.140	1.196
19	341.130	0.716	341.320	3.724 *	341.900	33.03	341.640	13.89	341.170	1.374	341.140	1.195
20	341.120	0.609	341.510	6.507	341.800	24.13	341.560	10.79 *	341.170	1.423	341.140	1.177
21	341.150	1.046 *	341.870	31.97	341.770	20.96	341.540	8.923	341.160	1.359	341.140	1.193
22	341.160	1.293	341.800	19.91	341.710	16.85	341.540	8.556	341.160	1.154 *	341.130	0.847 *
23	341.160	1.248	341.950	49.91	341.670	15.41 *	341.440	7.220	341.160	1.447	341.130	1.099
24	341.380	3.871	342.670	91.13	341.640	13.79	341.420	6.773	341.160	1.154 *	341.130	1.083
25	341.230	1.954	342.690	92.47	341.590	10.10	341.380	5.115 *	341.160	1.046 *	341.130	0.847 *
26	341.230	2.150	342.060	39.40 *	341.570	10.14	341.350	5.581	341.150	1.319	341.130	1.085
27	341.190	1.494	342.170	32.13	342.430	108.4	341.290	3.118 *	341.140	1.137	341.130	1.203
28	341.190	1.515 *	341.760	19.21	342.460	104.9	341.270	3.592	341.140	1.164	341.130	1.095
29	341.160	1.422	341.760	13.51	342.200	64.75	341.240	2.897	341.140	1.160	341.110	0.670 *
30	341.120	0.705	341.650	13.64	342.000	34.91 *	341.280	3.566	341.200	1.582	341.100	0.971
31			341.580	9.931	342.200	64.71			341.180	1.440		
Ten-Daily Mean												
I Ten-Daily	341.080	0.436	341.466	15.50	342.320	103.1	341.904	36.02	341.211	2.401	341.185	1.680
II Ten-Daily	341.109	0.637	341.769	26.46	342.253	73.03	341.595	11.68	341.168	1.350	341.158	1.321
III Ten-Daily	341.197	1.670	341.996	37.57	341.931	42.26	341.375	5.534	341.159	1.269	341.126	1.009
Monthly												
Min.	341.070	0.386	341.200	0.541	341.360	5.051	341.240	2.897	341.080	0.447	341.100	0.670
Max.	341.380	3.871	342.690	135.3	344.410	451.4	342.530	118.3	341.270	4.241	341.200	2.185
Mean	341.129	0.914	341.752	26.86	342.160	71.82	341.625	17.74	341.179	1.661	341.156	1.337

Annual Runoff in MCM = 327 Annual Runoff in mm = 217

Peak Observed Discharge = 451.4 cumecs on 04/08/2015 Corres. Water Level :344.41 m

Lowest Observed Discharge = 0.240 cumecs on 14/05/2016 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

Stage Discharge Sheet for Sher at Belkheri for the period 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	341.100	0.485	341.090	0.432	341.090	0.438	341.070	0.398	341.070	0.389	341.040	0.225 *
2	341.100	0.497	341.090	0.479	341.090	0.443	341.070	0.380	341.060	0.344	341.040	0.291
3	341.100	0.491	341.090	0.516 *	341.090	0.438	341.070	0.375	341.060	0.325 *	341.040	0.272
4	341.100	0.489	341.090	0.442	341.090	0.516 *	341.070	0.351	341.060	0.336	341.040	0.271
5	341.100	0.545	341.090	0.447	341.090	0.439	341.070	0.387	341.060	0.330	341.040	0.267
6	341.100	0.590 *	341.090	0.451	341.080	0.413	341.070	0.384 *	341.060	0.335	341.040	0.268
7	341.100	0.484	341.090	0.443	341.080	0.447 *	341.060	0.317	341.060	0.325	341.040	0.270
8	341.100	0.478	341.090	0.417	341.080	0.386	341.060	0.321	341.060	0.332	341.040	0.225 *
9	341.100	0.490	341.090	0.436	341.080	0.447 *	341.060	0.316	341.060	0.332	341.040	0.271
10	341.100	0.489	341.090	0.516 *	341.080	0.411	341.060	0.327	341.060	0.325 *	341.040	0.260
11	341.100	0.485	341.090	0.432	341.080	0.404	341.060	0.383	341.060	0.361	341.040	0.247
12	341.100	0.490	341.090	0.427	341.080	0.397	341.060	0.316	341.060	0.343	341.040	0.259
13	341.100	0.590 *	341.090	0.445	341.080	0.408	341.060	0.325 *	341.060	0.340	341.040	0.256
14	341.100	0.483	341.090	0.439	341.080	0.447 *	341.060	0.325	341.060	0.325 *	341.040	0.240
15	341.100	0.590 *	341.090	0.426	341.080	0.408	341.060	0.303	341.060	0.325 *	341.040	0.225 *
16	341.100	0.480	341.090	0.446	341.080	0.447 *	341.060	0.319	341.060	0.345	341.040	0.257
17	341.100	0.481	341.090	0.516 *	341.080	0.431	341.060	0.313	341.060	0.325 *	341.040	0.260
18	341.090	0.475	341.090	0.453	341.070	0.374	341.060	0.315	341.060	0.367	341.040	0.262
19	341.090	0.470	341.090	0.438	341.070	0.395	341.060	0.331	341.060	0.326	341.040	0.259
20	341.090	0.516 *	341.090	0.432	341.070	0.369	341.060	0.325 *	341.060	0.325 *	341.040	0.244
21	341.090	0.467	341.090	0.437	341.070	0.384 *	341.060	0.322	341.060	0.322	341.040	0.225 *
22	341.090	0.516 *	341.090	0.434	341.070	0.376	341.060	0.326	341.060	0.318	341.040	0.225 *
23	341.090	0.463	341.090	0.439	341.070	0.384 *	341.060	0.308	341.060	0.318	341.040	0.262
24	341.090	0.516 *	341.090	0.516 *	341.070	0.394	341.060	0.325 *	341.060	0.325 *	341.040	0.267
25	341.090	0.516 *	341.090	0.440	341.070	0.342	341.060	0.325 *	341.060	0.311	341.040	0.261
26	341.090	0.464	341.090	0.516 *	341.070	0.412	341.060	0.312	341.040	0.268	341.040	0.290
27	341.090	0.516 *	341.090	0.433	341.070	0.393	341.060	0.325 *	341.040	0.315	341.040	0.267
28	341.090	0.444	341.090	0.421	341.070	0.384 *	341.060	0.320	341.040	0.268	341.040	0.267
29	341.090	0.516 *	341.090	0.432	341.070	0.405	341.060	0.362	341.040	0.269	341.040	0.225 *
30	341.090	0.454	341.090	0.433			341.070	0.366	341.040	0.280	341.040	0.269
31	341.090	0.428	341.090	0.516 *			341.070	0.356			341.040	0.252
Ten-Daily Mean												
I Ten-Daily	341.100	0.504	341.090	0.458	341.085	0.438	341.066	0.355	341.061	0.338	341.040	0.262
II Ten-Daily	341.097	0.506	341.090	0.445	341.077	0.408	341.060	0.326	341.060	0.338	341.040	0.251
III Ten-Daily	341.090	0.482	341.090	0.456	341.070	0.386	341.062	0.332	341.050	0.300	341.040	0.256
Monthly												
Min.	341.090	0.428	341.090	0.417	341.070	0.342	341.060	0.303	341.040	0.268	341.040	0.225
Max.	341.100	0.590	341.090	0.516	341.090	0.516	341.070	0.398	341.070	0.389	341.040	0.291
Mean	341.096	0.497	341.090	0.453	341.078	0.411	341.063	0.337	341.057	0.325	341.040	0.256

Peak Computed Discharge = 65.39 cumecs on 12/07/2015

Corres. Water Level :342.35 m

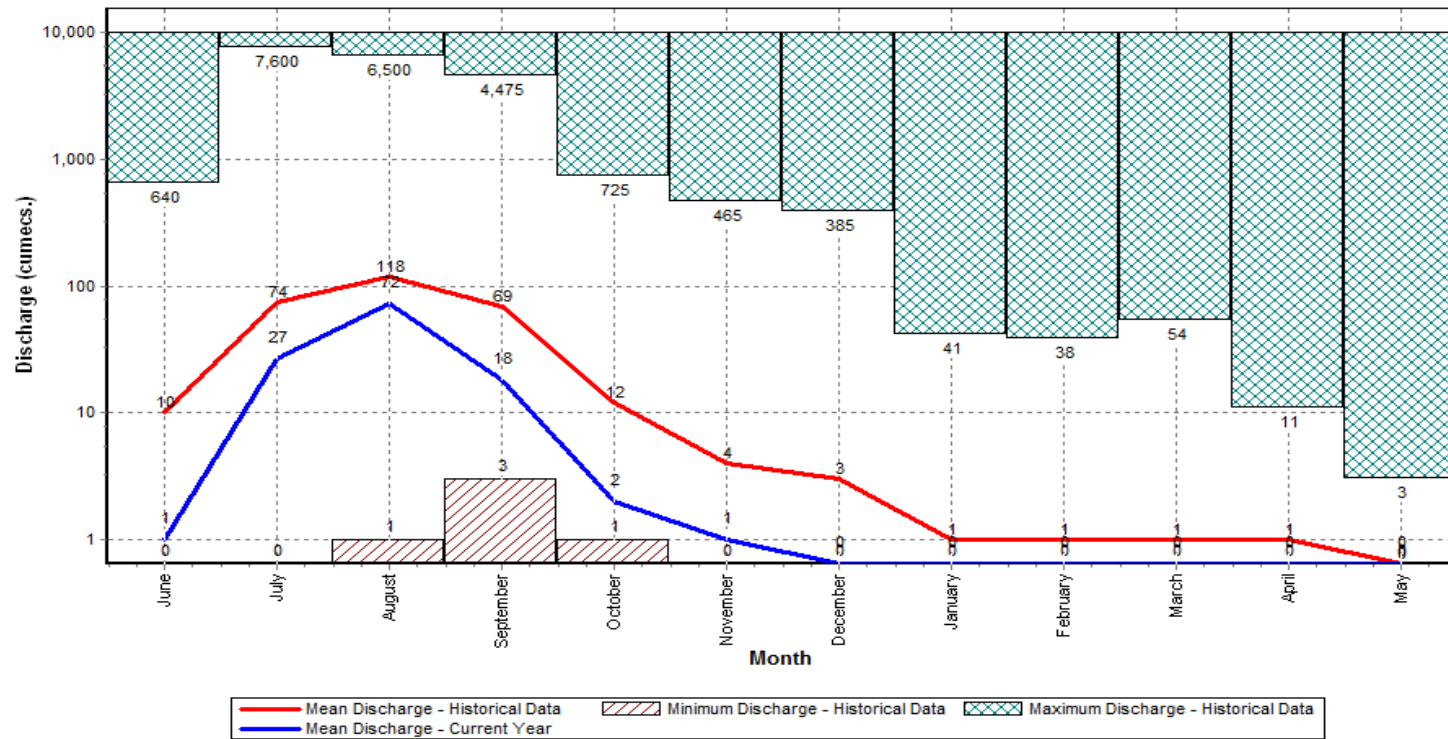
Lowest Computed Discharge = 0.225 cumecs on 01/05/2016

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 : 2015-16 (Data considered : 1977-2016)



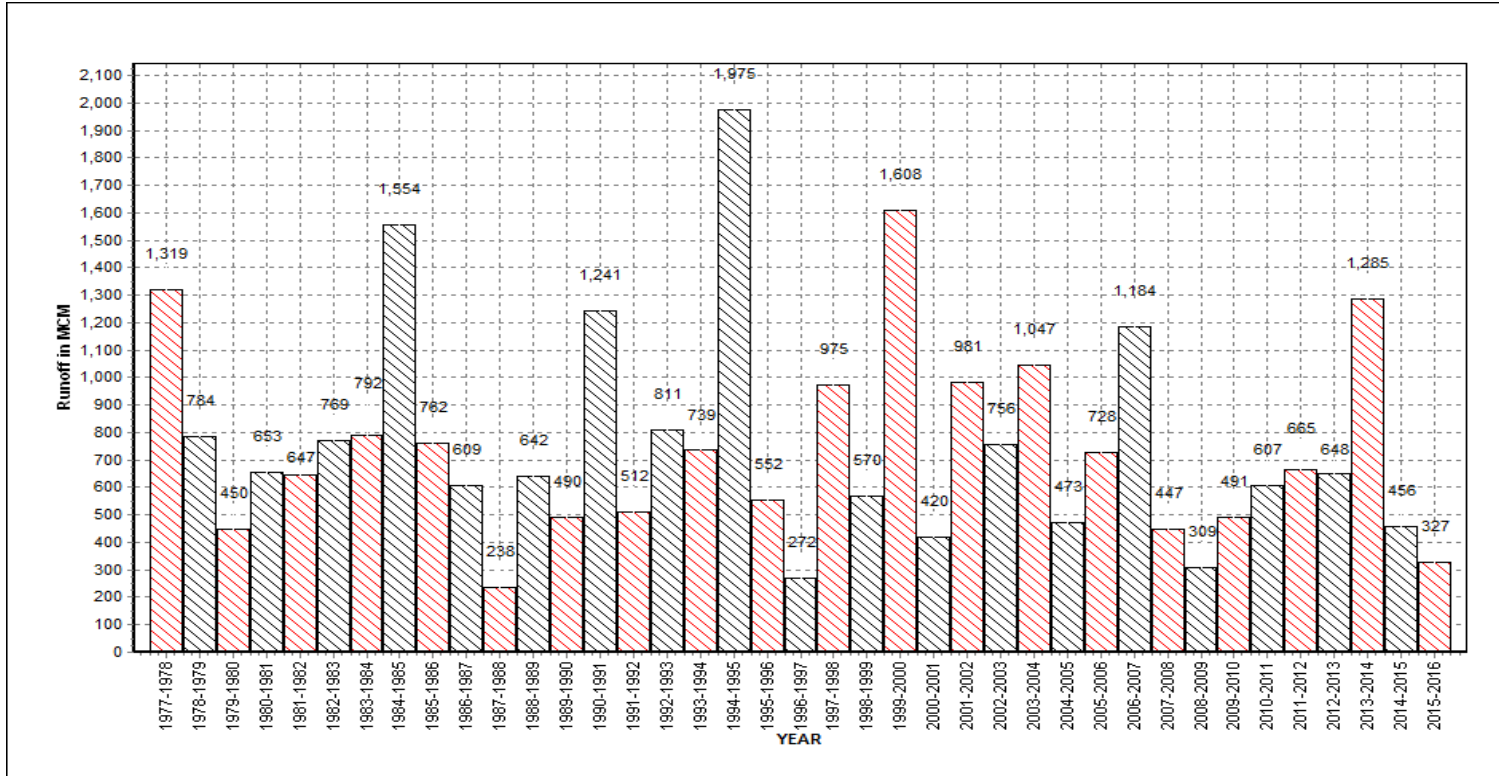
Annual Runoff Values for the period (1977 – 2016)

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

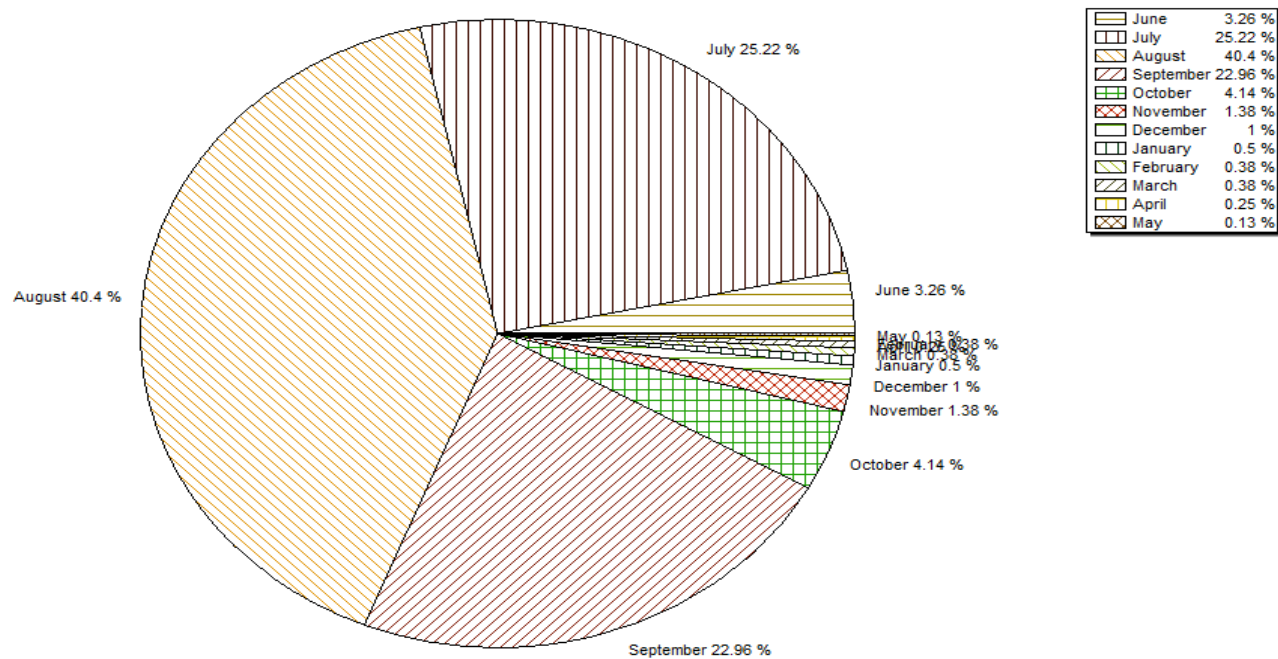
Monthly Average Runoff based on period (1977-2015)

Station Name : Sher at Belkheri (010215010)

Local River : Sher

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



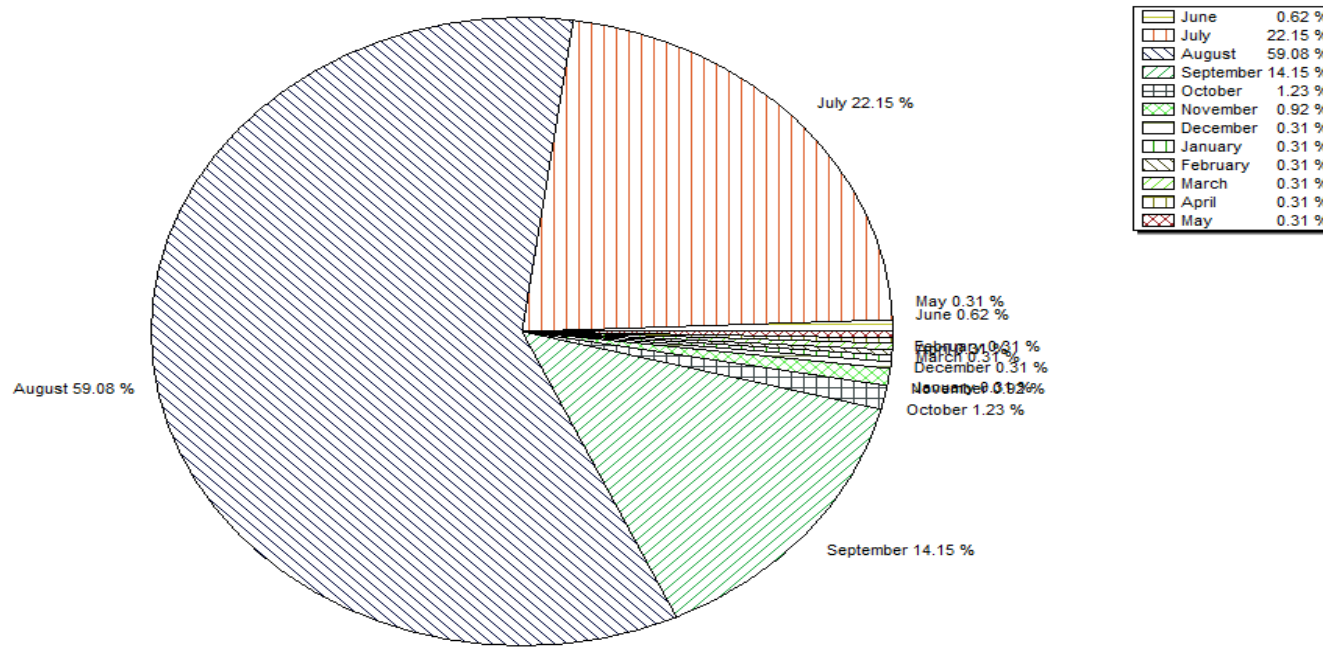
Monthly Runoff for the Year (2015-16)

Station Name : Sher at Belkheri (010215010)

Local River : Sher

Division : Narmada Division, Bhopal

Sub-Division : MNSD I, CWC Hoshangabad



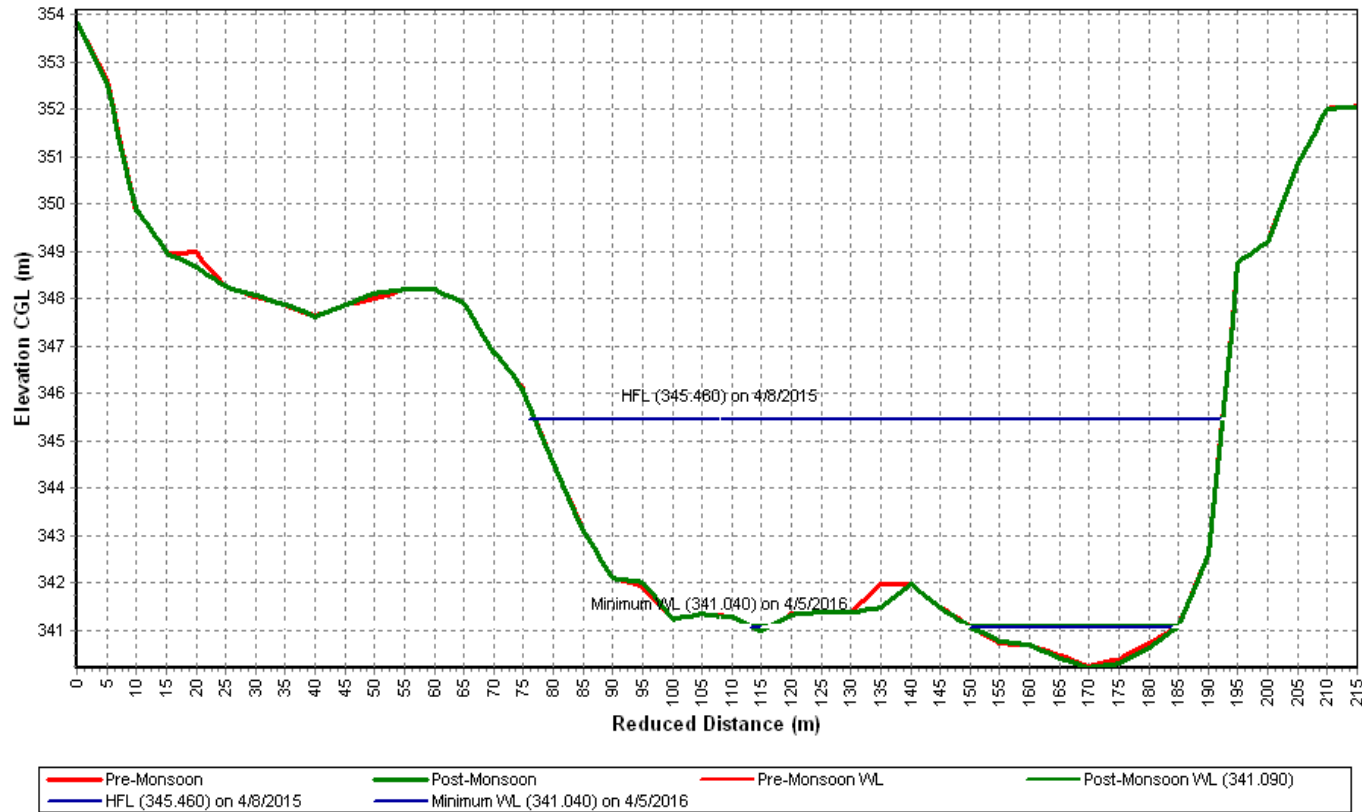
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



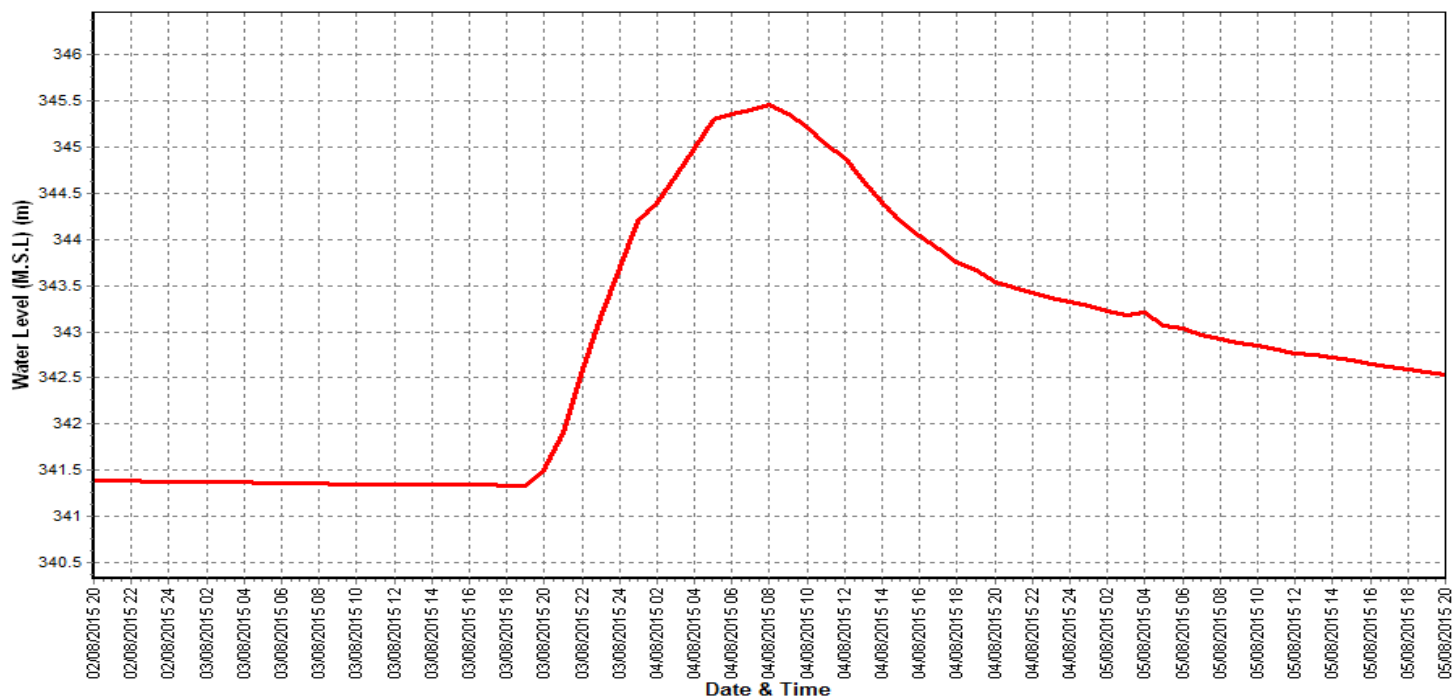
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



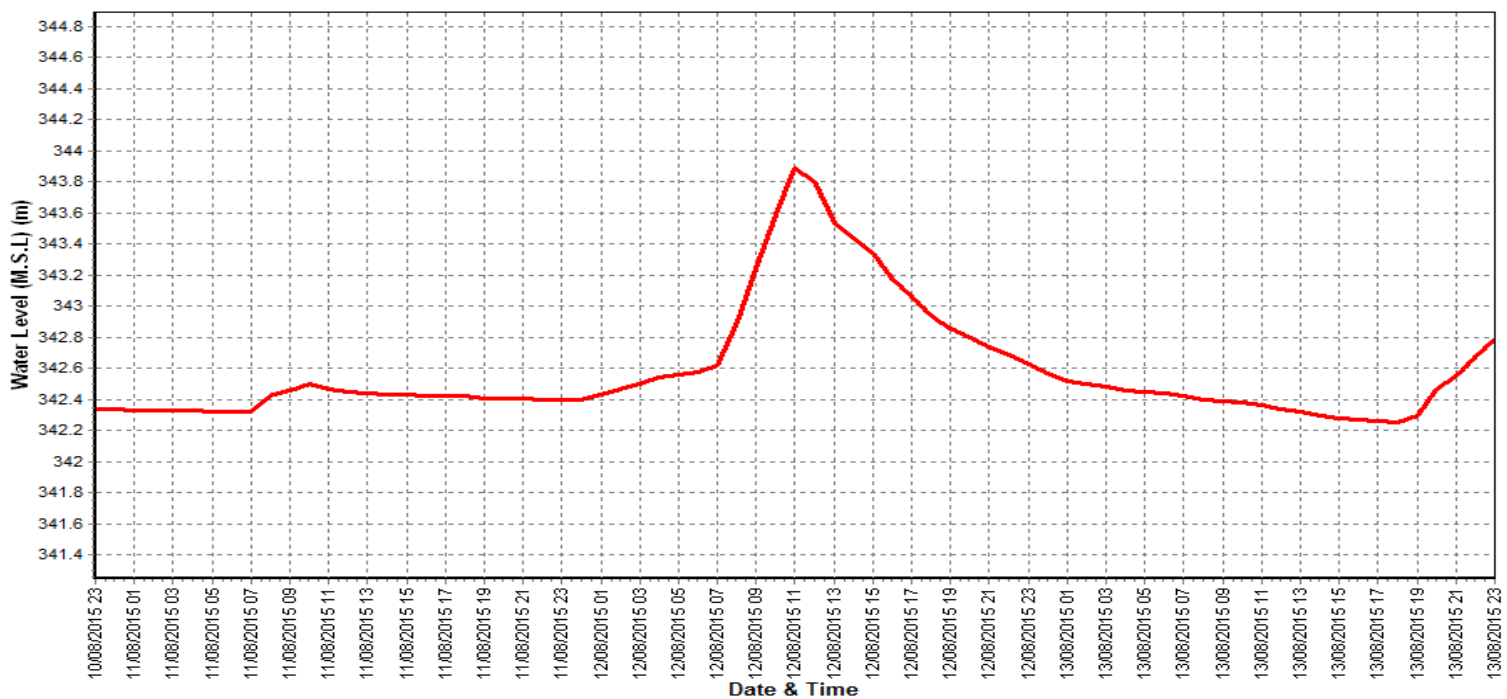
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Sher at Belkheri (010215010)

Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



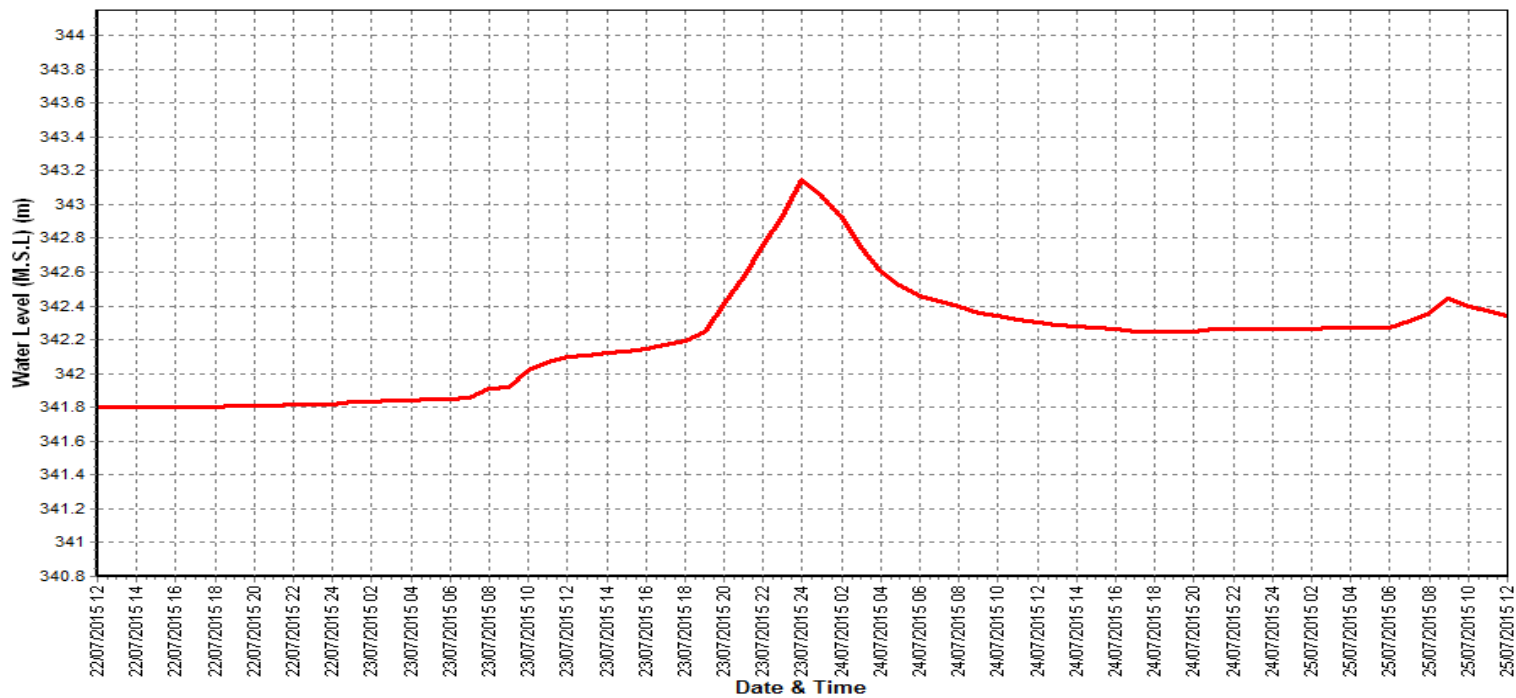
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Sher at Belkheri (010215010)

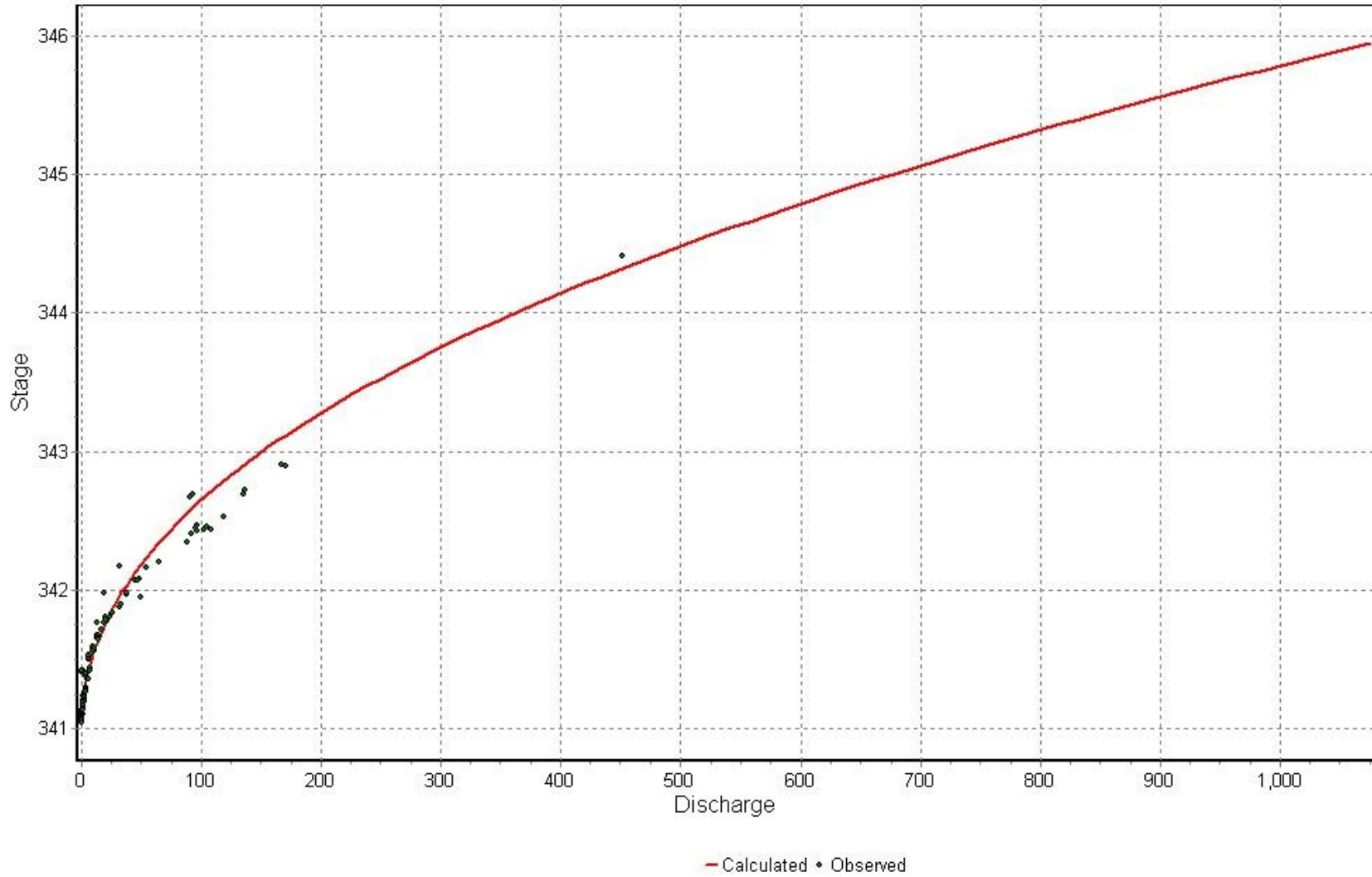
Division : Narmada Division, Bhopal

Local River : Sher

Sub-Division : MNSD I, CWC Hoshangabad



STAGE DISCHARGE CURVE OF SITE BELKHERI 15-16



4.14 Hiran at Patan

History sheet

Site	: Hiran at Patan	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215009
Basin	: Narmada	District	: Jabalpur
Tributary	: Hiran	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada Division Bhopal	Local River	: Hiran
Drainage Area	: 3950 Sq. Km.	Sub-Division	: UNSD CWC Jabalpur
Latitude	: 23°18'42"	Bank	: Left
Zero of Gauge (m)	: 341.5 (M.S.L.)	Longitude	: 79°39'46"
	Opening Date	30/08/1979	Closing Date
Gauge	: 30/08/1979		
Discharge	: 30/08/1979		
Sediment	:		
Water Quality	: 01/09/1986		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1979-1980	12.20	342.355	01/12/1979	0.000		13/07/1979
1980-1981	1666	355.660	30/08/1980	0.400	341.870	09/06/1980
1981-1982	202.0	346.190	08/08/1981	0.800	341.840	19/06/1981
1982-1983	889.9	350.465	28/08/1982	1.300	342.070	30/05/1983
1983-1984	1640	355.670	10/09/1983	1.200	342.540	06/06/1983
1984-1985	1275	352.850	24/08/1984	1.300	342.340	31/05/1985
1985-1986	1118	351.350	09/08/1985	1.300	342.340	01/06/1985
1986-1987	440.0	347.440	06/08/1986	1.600	342.290	25/05/1987
1987-1988	1200	352.370	17/09/1987	1.062	342.320	01/07/1987
1988-1989	1200	352.350	05/08/1988	1.290	342.310	31/05/1989
1989-1990	310.0	346.400	15/08/1989	0.369	342.795	14/05/1990
1990-1991	1270	351.270	20/09/1990	1.639	342.930	13/06/1990
1991-1992	1680	354.950	25/08/1991	1.600	342.360	06/06/1991
1992-1993	1880	356.080	13/09/1992	1.290	342.485	29/06/1992
1993-1994	1086	351.600	10/09/1993	1.500	342.250	13/06/1993
1994-1995	1660	354.700	02/08/1994	2.320	342.170	31/05/1995
1995-1996	1415	353.605	11/08/1995	1.050	342.250	31/05/1996
1996-1997	234.0	345.620	18/08/1996	0.000	342.020	24/05/1997
1997-1998	1295	351.850	07/08/1997	0.000	341.605	13/06/1997
1998-1999	488.0	347.650	07/08/1998	0.730	342.210	19/05/1999
1999-2000	1620	353.230	09/08/1999	0.897	342.190	15/06/1999
2000-2001	756.0	349.600	20/07/2000	0.050	341.800	30/05/2001
2001-2002	580.0	347.750	27/07/2001	0.250	341.800	01/06/2001
2002-2003	1302	352.500	19/08/2002	1.070	342.200	03/06/2002
2003-2004	1360	352.620	16/09/2003	0.560	342.160	11/06/2003
2004-2005	1175	352.250	23/08/2004	1.239	342.060	31/05/2005
2005-2006	1930	356.800	06/07/2005	0.392	341.970	26/06/2005
2006-2007	254.9	347.050	25/08/2006	0.153	341.700	31/05/2007
2007-2008	663.2	348.610	22/08/2007	0.000		26/05/2008
2008-2009	945.3	350.300	08/07/2008	0.591	341.650	31/05/2009
2009-2010	937.5	350.650	11/09/2009	0.062	341.720	21/05/2010

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2010-2011	866.1	350.025	26/07/2010	0.000	341.710	30/06/2010
2011-2012	1445	352.510	24/07/2011	0.000	341.700	12/06/2011
2012-2013	531.3	347.720	11/08/2012	0.000		24/05/2013
2013-2014	2202	355.140	20/08/2013	0.000		09/06/2013
2014-2015	779.8	349.200	06-08-2014	0.498	341.510	20/05/2015

Stage Discharge Sheet for Hiran at Patan for the period 2015-16

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	341.540	1.001	342.710	41.79	342.130	13.68	343.520	78.80	342.510	30.80	342.700	37.21 *
2	341.540	0.913	342.520	16.35	342.050	12.09 *	343.580	83.20	342.470	27.21 *	342.590	34.35
3	341.560	1.286	342.670	34.75	342.350	22.46	343.520	80.20	342.400	26.74	342.610	34.68
4	341.540	1.013	343.030	43.27	347.180	380.5	343.300	65.35	342.400	26.71	342.570	32.92
5	341.530	0.800	342.510	28.86 *	346.710	358.0	343.140	62.74	342.400	24.39 *	342.460	27.11
6	341.530	0.801	342.160	18.04	344.440	140.3	343.030	53.46 *	342.370	26.14	342.380	26.08
7	341.530	0.691 *	341.950	7.276	343.730	79.22	342.830	42.60	342.370	26.13	342.330	24.91
8	341.520	0.626	341.840	6.127	343.360	68.00	342.750	40.49	342.350	25.29	342.180	16.29 *
9	341.520	0.615	342.150	16.27	343.120	58.25 *	342.720	38.42	342.350	25.36	342.120	12.31
10	341.530	0.642	343.930	95.61	342.810	49.60	342.630	34.59	342.350	25.34	342.100	11.86
11	341.540	0.759	344.140	111.6	342.680	34.86	342.530	32.38	342.380	23.61 *	342.090	13.33 *
12	341.540	0.748	343.290	67.69 *	343.850	96.73	342.450	30.11	342.500	30.10	342.090	11.39
13	341.550	1.074	342.820	37.67	343.450	70.27	342.380	23.61 *	342.580	34.34	342.070	11.11
14	341.580	1.305 *	342.620	31.97	342.890	48.83	342.380	27.16	342.600	34.28	342.060	10.93
15	341.650	2.130	342.660	32.89	343.200	62.63 *	342.530	32.17	342.590	34.18	341.990	10.31 *
16	341.550	1.021	342.540	22.68	344.390	140.3 *	342.420	29.30	342.580	34.29	342.000	9.475
17	341.540	0.863	342.500	20.28	344.090	113.1	342.510	28.86 *	342.550	33.57	341.950	8.820
18	341.550	1.078	342.490	28.03 *	343.680	79.22	342.520	31.96	342.560	30.99 *	341.940	8.687
19	341.570	1.574	342.460	26.80 *	343.390	70.07	342.540	30.55	342.600	34.48	341.940	8.716
20	341.580	1.711	342.230	15.00	343.130	62.70	342.520	29.28 *	342.630	35.02	341.870	7.459
21	341.570	1.172 *	342.510	21.44	342.940	56.50	342.580	34.06	342.660	35.53	341.860	7.301
22	341.530	0.895	342.690	40.42	342.770	46.11	343.370	68.75	342.570	31.42 *	341.830	6.080 *
23	341.550	1.013	343.170	72.80	342.650	34.94 *	343.180	64.90	342.470	28.13	341.800	5.362
24	341.530	0.839	343.590	79.43	342.580	33.35	342.970	58.76	342.410	24.79 *	341.800	5.278
25	341.680	2.596	344.310	124.5	342.470	26.42	342.820	42.87 *	342.390	24.00 *	341.780	4.931 *
26	341.650	2.356	343.270	66.55 *	342.380	25.23	342.750	40.54	342.400	26.74	341.780	4.960
27	341.640	2.254	342.780	45.75	342.310	22.83	342.690	36.76 *	342.350	25.31	341.770	4.877
28	341.850	6.564 *	342.800	48.09	342.360	25.13	342.620	34.46	342.280	23.19	341.770	4.854
29	341.770	3.858	342.560	25.92	343.320	66.58	342.580	34.20	342.330	24.99	341.760	4.497 *
30	343.470	73.16	342.330	19.34	343.770	97.02 *	342.520	31.03	342.580	34.27	341.750	4.628
31			342.240	15.90	343.880	100.5			342.730	40.05		
Ten-Daily Mean												
I Ten-Daily	341.534	0.839	342.547	30.84	343.788	118.2	343.102	57.98	342.397	26.41	342.404	25.77
II Ten-Daily	341.565	1.226	342.775	39.46	343.475	77.86	342.478	29.54	342.557	32.48	342.000	10.02
III Ten-Daily	341.824	9.471	342.932	50.92	342.857	48.60	342.808	44.63	342.470	28.95	341.790	5.277
Monthly												
Min.	341.520	0.615	341.840	6.127	342.050	12.09	342.380	23.61	342.280	23.19	341.750	4.497
Max.	343.470	73.16	344.310	124.5	347.180	380.5	343.580	83.20	342.730	40.05	342.700	37.21
Mean	341.641	3.845	342.757	40.75	343.357	80.49	342.796	44.05	342.475	29.27	342.065	13.69

Annual Runoff in MCM = 612 Annual Runoff in mm = 155

Peak Observed Discharge = 380.5 cumecs on 04/08/2015 Corres. Water Level :347.18 m

Lowest Observed Discharge = 0.000 cumecs on 29/04/2016

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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	341.730	2.987	341.790	5.119	341.780	4.792	341.800	5.334	341.600	1.571		0.000
2	341.720	2.936	341.770	4.853	341.780	4.738	341.790	5.034	341.590	1.493		0.000
3	341.720	2.880	341.770	4.712 *	341.760	4.561	341.780	4.751	341.590	1.444 *		0.000
4	341.710	2.786	341.770	4.855	341.760	4.546	341.780	4.752	341.600	1.564		0.000
5	341.710	2.771	341.740	4.443	341.750	4.464	341.790	4.964	341.600	1.560		0.000
6	341.710	3.475 *	341.730	4.349	341.740	4.309	341.790	5.154 *	341.570	1.329		0.000
7	341.700	2.726	341.800	5.328	341.740	4.077 *	341.790	4.955	341.550	1.000		0.000
8	341.680	2.550	341.820	5.531	341.740	4.291	341.730	4.231	341.550	0.994		0.000
9	341.620	1.762	341.820	5.529	342.360	5.868	341.720	4.163	341.540	0.944		0.000
10	341.620	1.751	341.780	4.931 *	341.850	5.778	341.720	4.117	341.530	0.691 *		0.000
11	341.610	1.660	341.750	4.475	341.830	5.639	341.860	5.884	341.510	0.061		0.000
12	341.610	1.710	341.750	4.482	341.800	5.431	341.870	5.923	341.510	0.487 *		0.000
13	341.600	1.589 *	341.740	4.362	341.790	5.339	341.910	8.093 *	341.510	0.487 *		0.000
14	341.610	1.619	341.740	4.334	341.790	5.154 *	341.920	8.402	341.510	0.487 *		0.000
15	341.610	1.601	341.740	4.335	341.800	5.408	341.900	8.177	341.510	0.487 *		0.000
16	341.610	1.631	341.730	4.223	341.790	5.296	341.870	5.899	341.510	0.487 *		0.000
17	341.600	1.585	341.730	3.873 *	341.780	4.786	341.720	3.660	341.510	0.487 *		0.000
18	341.580	1.494	341.740	4.237	341.780	4.771	341.720	3.663	341.510	0.487 *		0.000
19	341.570	1.428	341.750	4.459	341.760	4.592	341.700	3.505	341.510	0.487 *		0.000
20	341.580	1.305 *	341.730	4.177	341.760	4.575	341.690	3.094 *	341.510	0.487 *		0.000
21	341.960	9.051	341.730	4.168	341.830	6.080 *	341.690	3.302	341.510	0.487 *		0.000
22	341.910	8.343	341.710	4.034	341.910	8.340	341.690	3.298	341.510	0.487 *		0.000
23	341.880	7.526	341.850	5.832	341.860	5.909	341.690	3.285	341.510	0.487 *		0.000
24	341.810	5.610 *	341.930	8.628 *	341.850	5.776	341.700	3.283 *	341.510	0.487 *		0.000
25	341.800	5.380 *	342.000	9.139	341.830	5.605	341.700	3.283 *	341.510	0.487 *		0.000
26	341.800	5.323	341.920	8.359 *	341.820	5.517	341.680	3.281	341.510	0.487 *		0.000
27	341.780	4.931 *	341.820	5.153	341.740	4.332	341.640	2.213 *	341.510	0.487 *		0.000
28	341.760	4.766	341.820	5.111	341.730	3.873 *	341.600	1.618	341.510	0.487 *		0.000
29	341.750	4.634	341.800	4.929	341.760	4.572	341.600	1.613		0.000		0.000
30	341.740	4.511	341.800	4.913			341.590	1.389		0.000		0.000
31	341.740	4.494	341.790	5.154 *			341.590	1.333				0.000
Ten-Daily Mean												
I Ten-Daily	341.692	2.662	341.779	4.965	341.826	4.742	341.769	4.745	341.572	1.259		0.000
II Ten-Daily	341.598	1.562	341.740	4.296	341.788	5.099	341.816	5.630	341.510	0.444		0.000
III Ten-Daily	341.812	5.870	341.834	5.947	341.814	5.556	341.652	2.536	341.510	0.389		0.000
Monthly												
Min.	341.570	1.305	341.710	3.873	341.730	3.873	341.590	1.333	341.510	0.000		0.000
Max.	341.960	9.051	342.000	9.139	342.360	8.340	341.920	8.402	341.600	1.571		0.000
Mean	341.704	3.446	341.786	5.098	341.809	5.118	341.743	4.247	341.532	0.698		0

Peak Computed Discharge = 140.3 cumecs on 16/08/2015 Corres. Water Level :344.39 m

Lowest Computed Discharge = 0.487 cumecs on 12/04/2016 Corres. Water Level :341.51 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

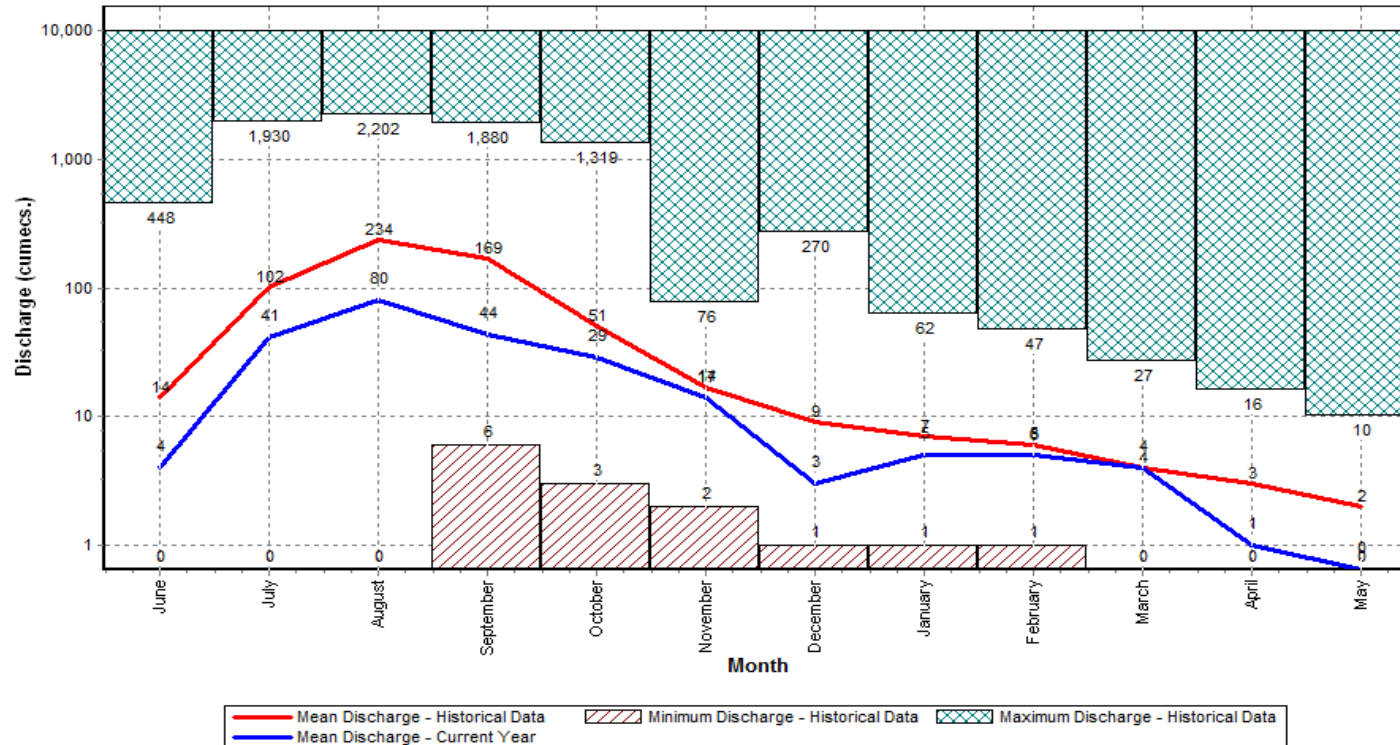
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1979-2016)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



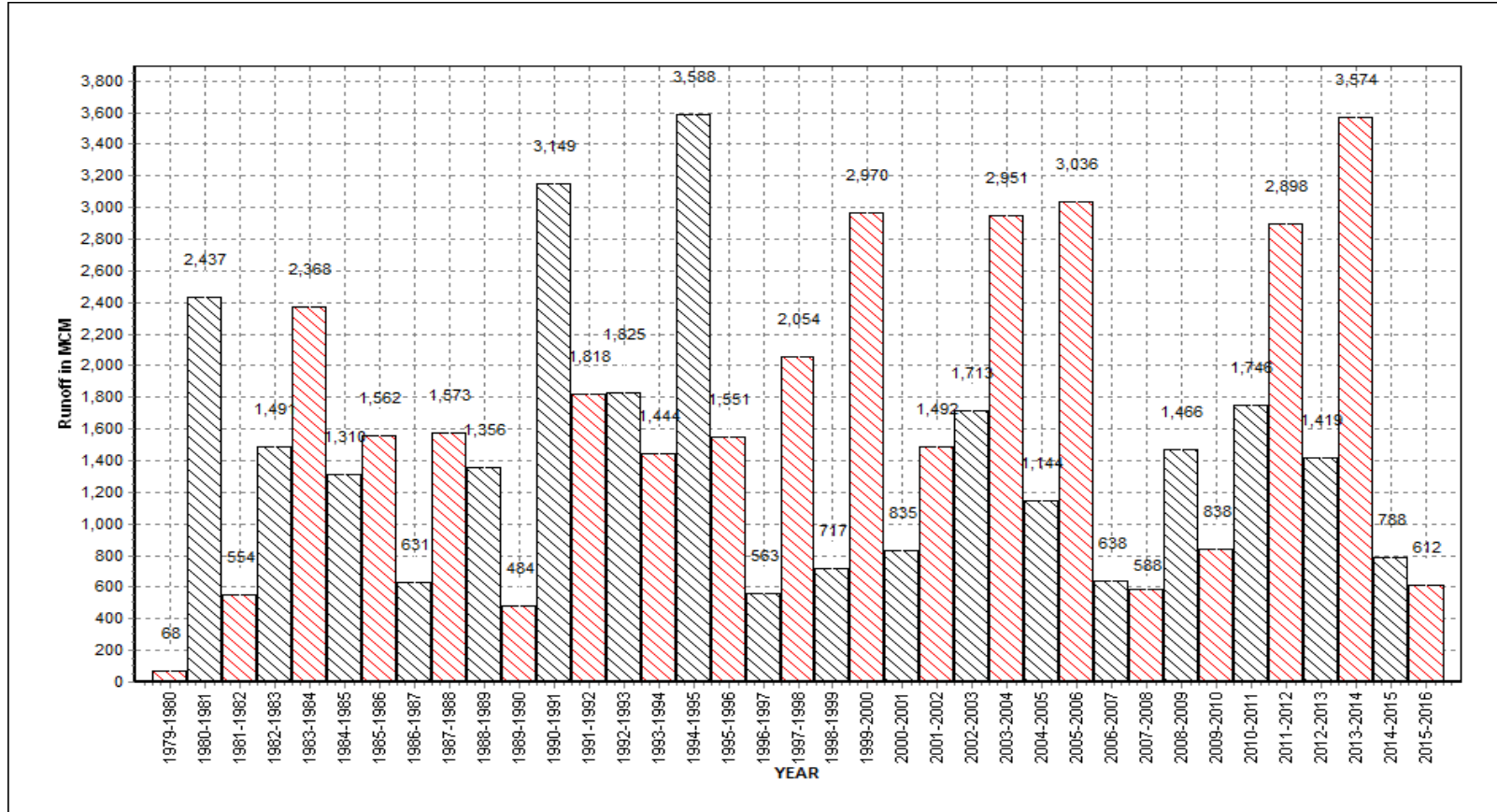
Annual Runoff Values for the period (1979 – 2016)

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

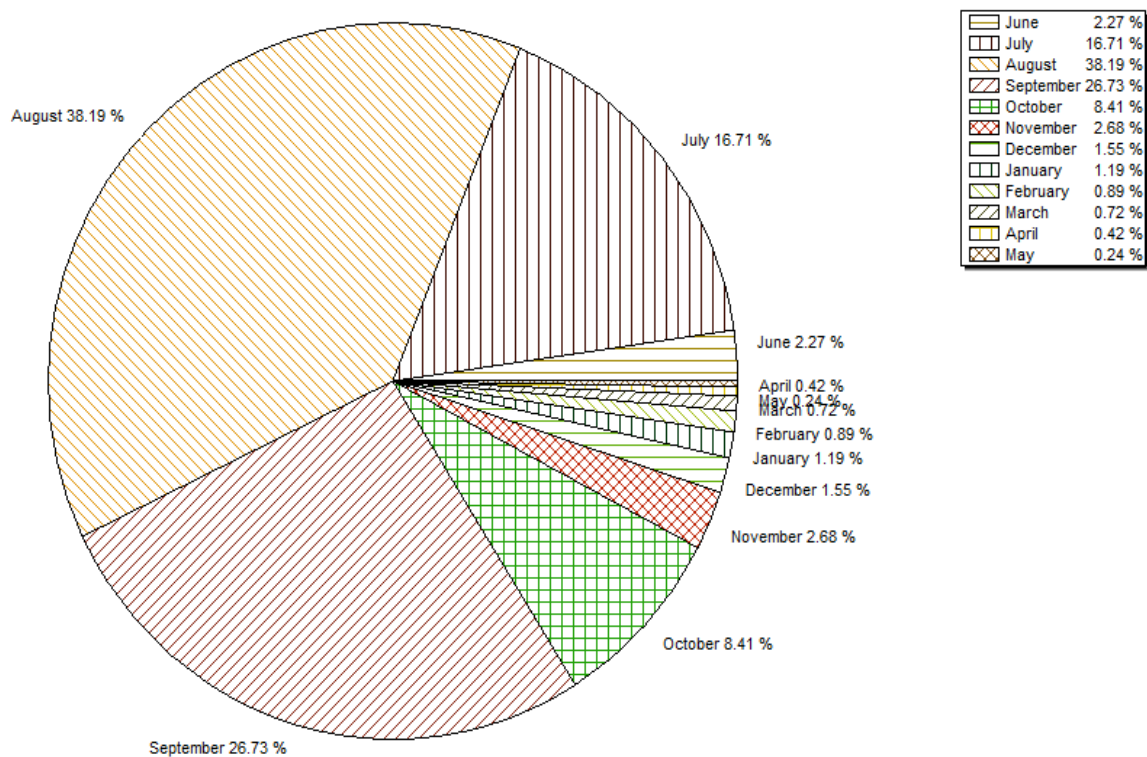
Monthly Average Runoff based on period (1979 – 2015)

Station Name : Hiran at Patan (010215009)

Local River : Hiran

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



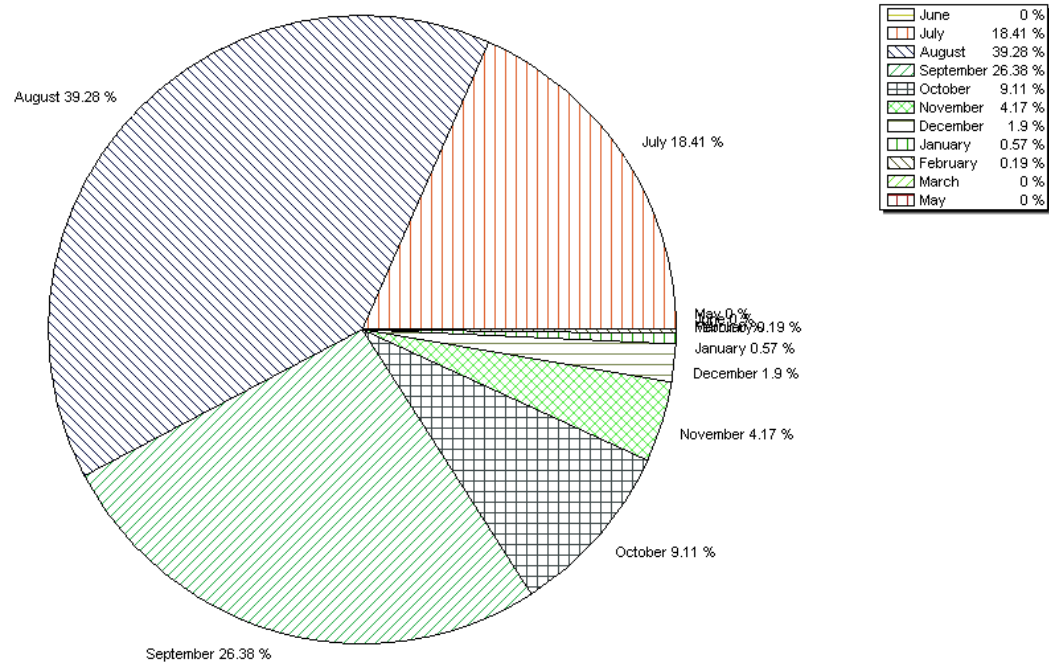
Monthly Runoff for the Year (2015-16)

Station Name : Hiran at Patan (010215009)

Local River : Hiran

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



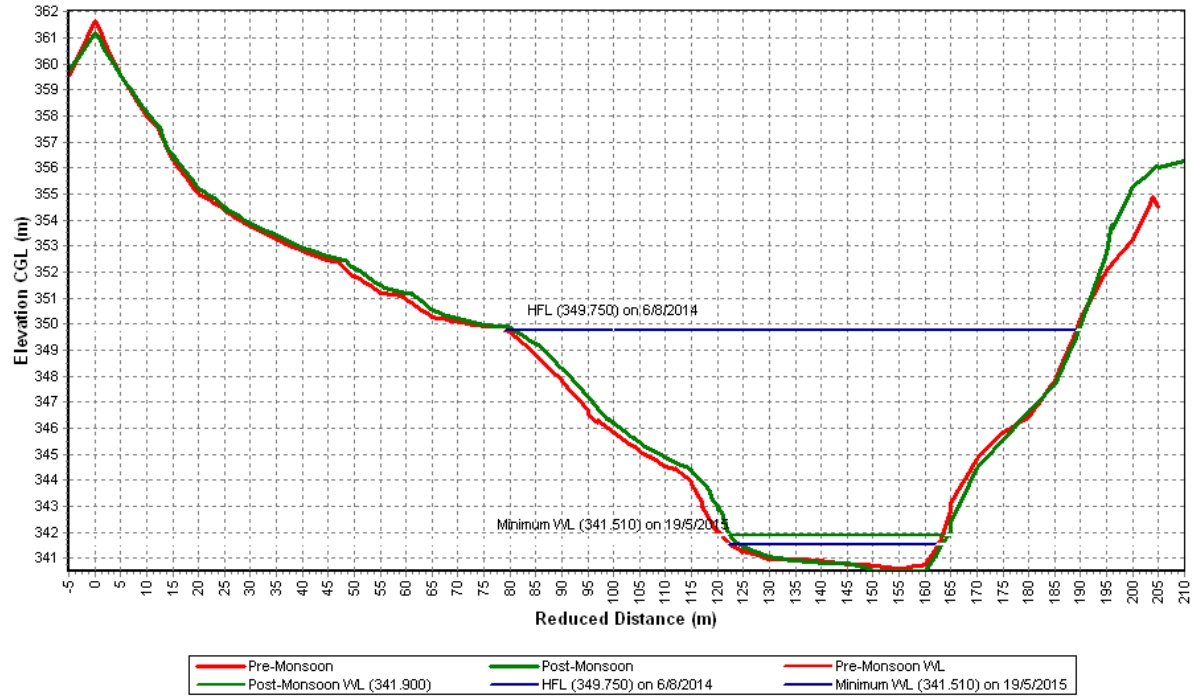
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



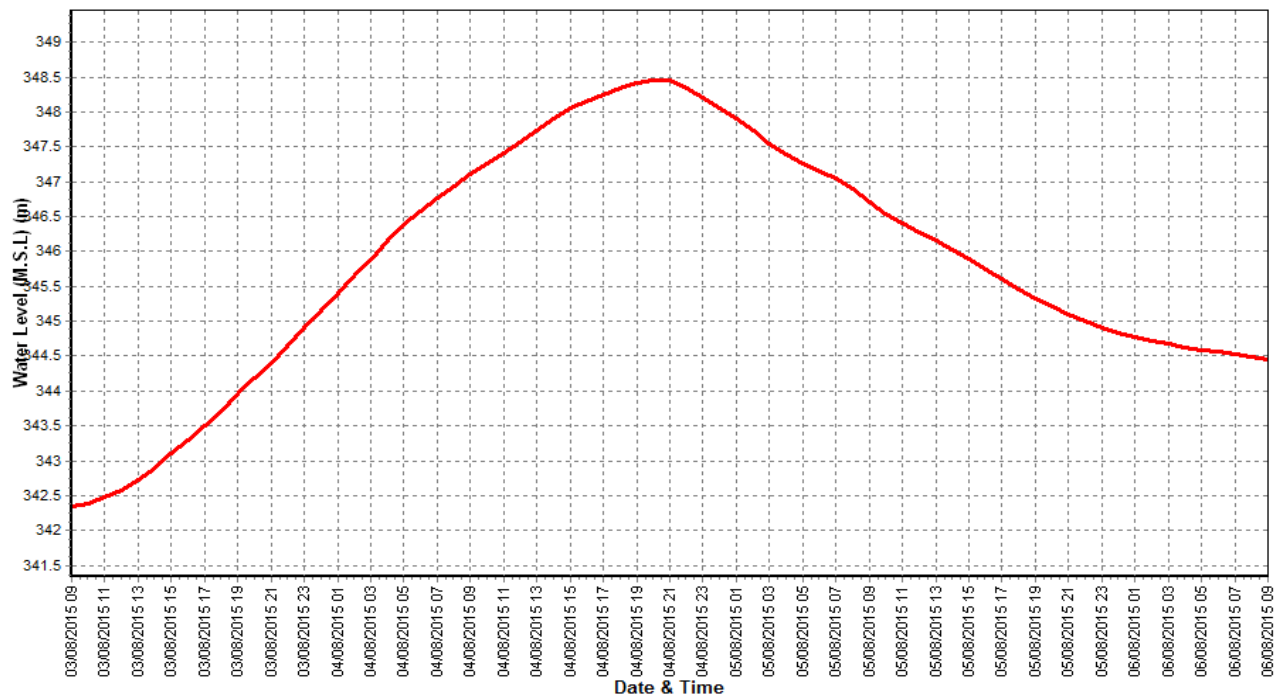
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



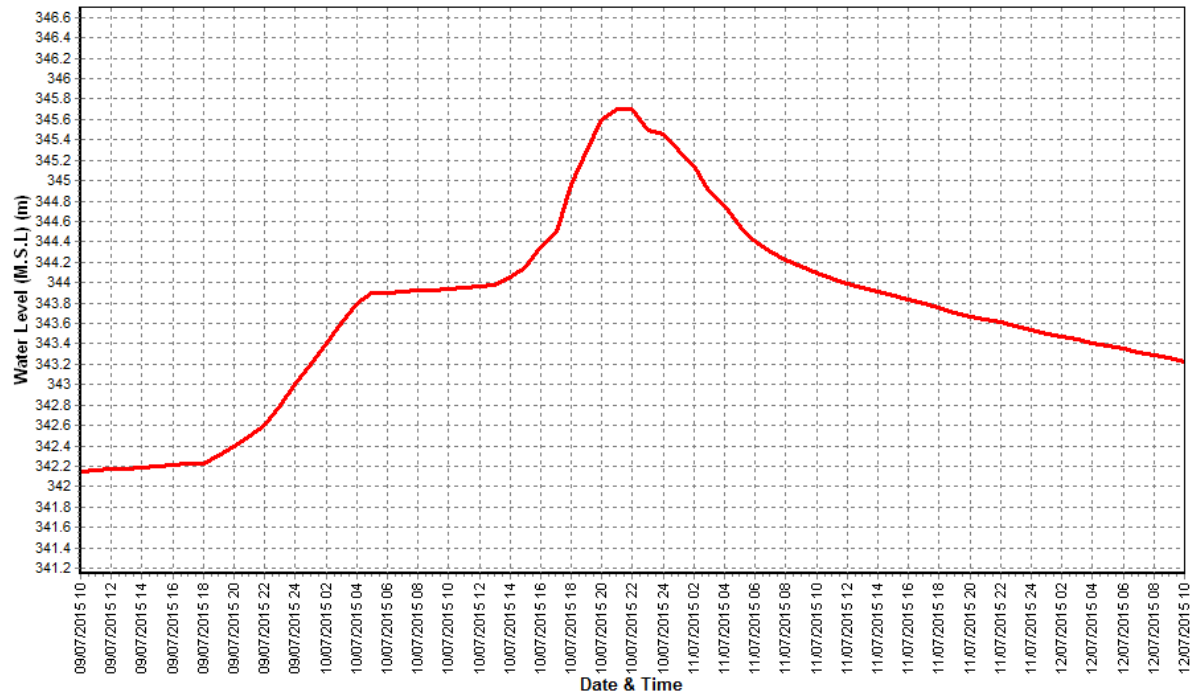
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Hiran at Patan (010215009)

Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



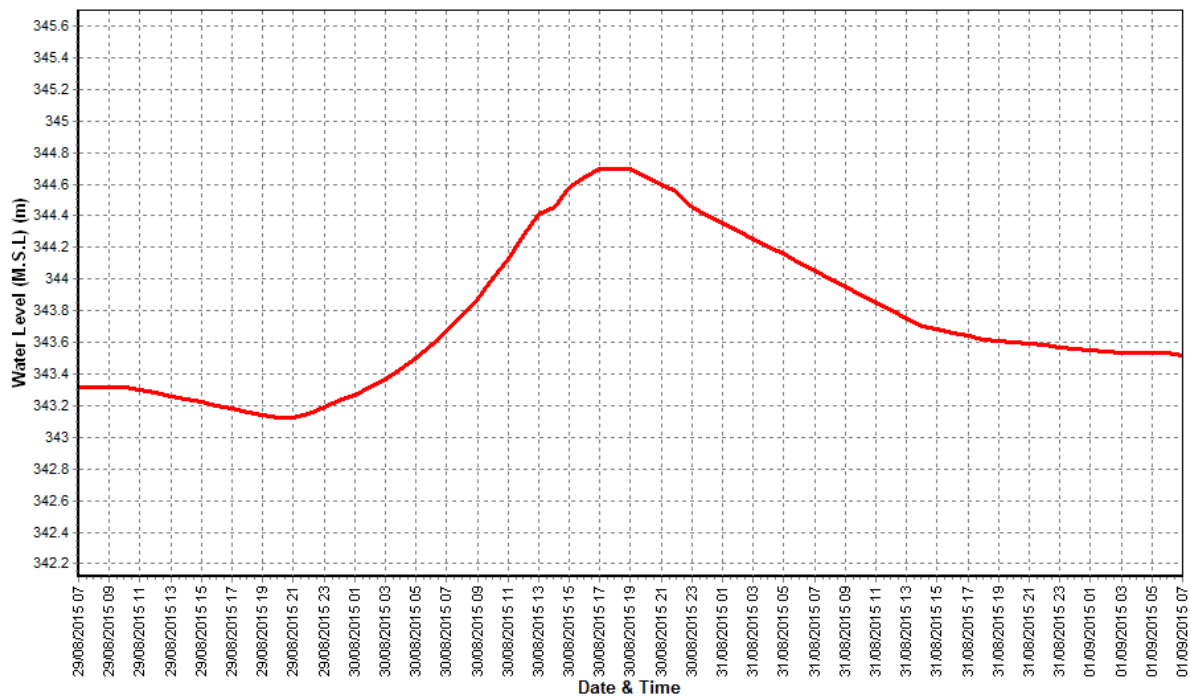
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Hiran at Patan (010215009)

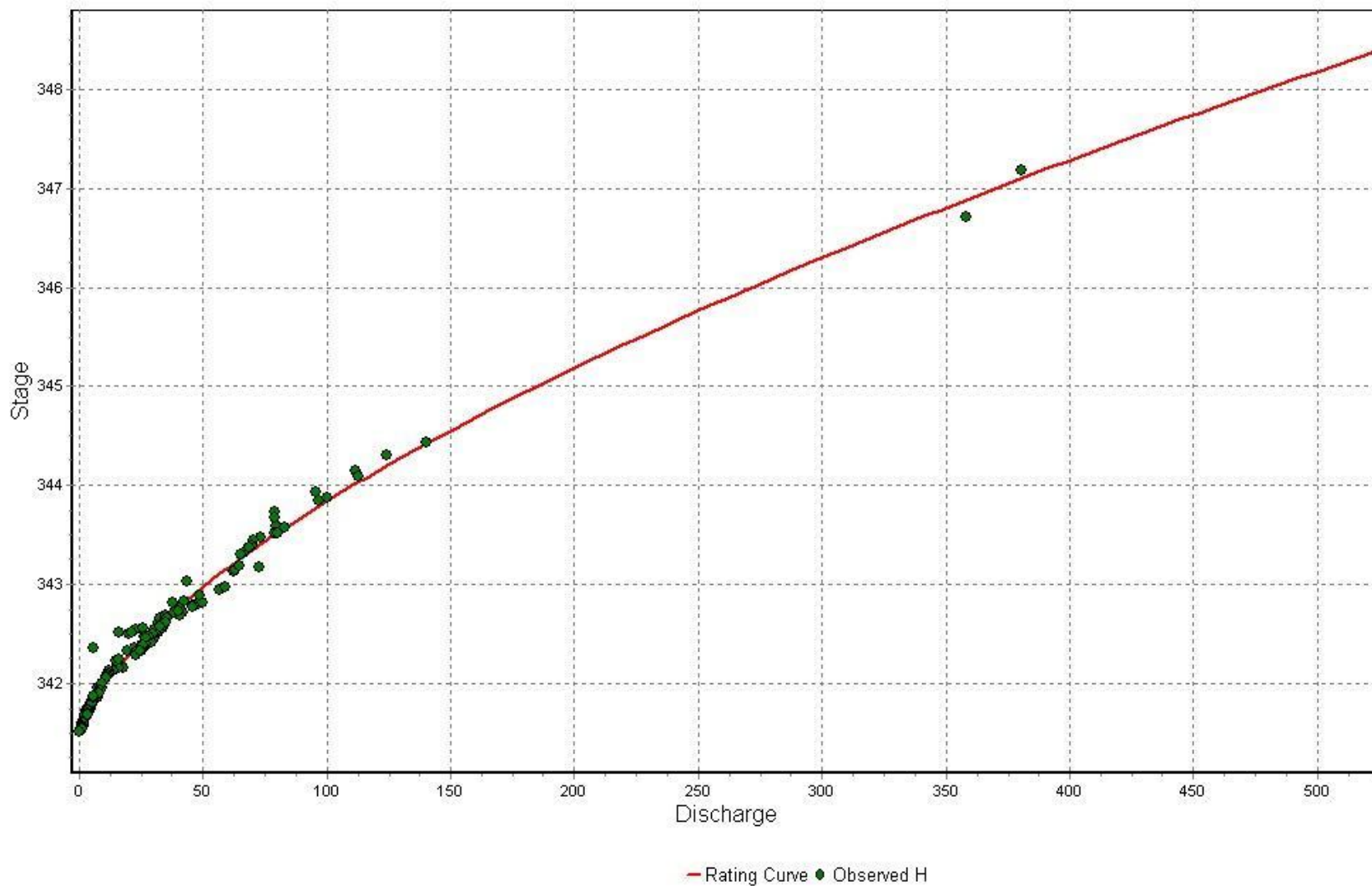
Division : Narmada Division, Bhopal

Local River : Hiran

Sub-Division : UNSD, CWC Jabalpur



STAGE DISCHARGE CURVE OF SITE PATAN 15-16



4.15 Banjar at Bamni

History sheet

		Water Year	: 2015-16
Site	: Banjar at Bamni	Code	: NCA SITE
State	: Madhya Pradesh	District	: Mandla
Basin	: Narmada	Independent River	: Narmada
Tributary	: Banjar	Sub Tributary	:
Sub-Sub Tributary	:	Local River	: Banjar
Division	: Narmada Divn Bhopal	Sub-Division	: UNSD CWC Jabalpur
Drainage Area	: 1864 Sq. Km.	Bank	: Left
Latitude	: 22°29'06"	Longitude	: 80°22'58"
Zero of Gauge (m)	: 440 (M.S.L)	Opening Date	: 20/06/1999
Gauge	: 20/06/1999	Closing Date	:
Discharge	: 30/11/1999		
Sediment	: 01/07/2002		
Water Quality	: 01/07/2002		

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

Year	Q (cumecs)	Maximum			Minimum	
		WL (m)	Date	Q (cumecs)	WL (m)	Date
2000-2001	30.32	441.710	18/09/2000	0.000	-	29/05/2001
2001-2002	660.0	445.080	14/08/2001	0.000	-	07/05/2002
2002-2003	800.0	445.500	18/08/2002	0.000	-	01/05/2003
2003-2004	900.0	444.700	27/07/2003	0.000	-	18/04/2004
2004-2005	480.0	444.260	11/08/2004	0.000	-	14/04/2005
2005-2006	1456	446.930	15/09/2005	0.000	-	27/03/2006
2006-2007	681.4	444.500	14/08/2006	0.000	-	21/06/2006
2007-2008	391.5	443.850	20/08/2007	0.000	-	08/06/2007
2008-2009	406.0	443.800	01/08/2008	0.005	440.760	15/06/2008
2009-2010	488.9	443.650	22/07/2009	0.000	-	05/06/2009
2010-2011	361.0	443.025	26/07/2010	0.000	440.670	19/02/2011
2011-2012	403.9	443.400	08/09/2011	0.000	440.320	06/05/2012
2012-2013	285.3	443.200	23/08/2012	0.000		05/05/2013
2013-2014	517.7	444.120	22/08/2013	0.000		20/05/2014
2014-2015	524.7	444.180	23/07/2014	0.000	440.140	21/05/2015

Stage Discharge Sheet for Banjar at Bamni for the period 2015-16

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		0.000	440.220	0.000 *	440.645	43.88	441.090	77.10	440.470	29.10	440.410	14.52 *
2		0.000	440.260	1.276 *	440.650	39.43 *	441.060	75.22	440.460	19.46 *	440.400	11.01
3		0.000	440.230	0.000 *	440.705	47.21	441.035	75.01	440.460	28.97	440.390	10.34
4		0.000	440.250	0.577 *	440.980	72.65	441.020	74.46	440.460	19.46 *	440.380	9.731
5		0.000	440.230	0.000 *	443.220	301.2	440.890	64.40	440.450	28.91	440.380	9.562
6		0.000	440.210	0.000 *	441.570	153.1	440.780	53.89 *	440.450	28.37	440.370	9.144
7		0.000	440.230	0.000 *	441.140	81.52	440.700	47.12	440.450	28.15	440.370	9.049
8		0.000	440.210	0.000 *	440.970	69.75	440.670	45.51	440.440	27.60	440.370	10.71 *
9		0.000	440.210	0.000 *	440.870	64.18 *	440.705	47.31	440.440	27.46	440.360	8.647
10		0.000	440.260	1.276 *	440.760	50.37	440.810	57.43	440.440	27.29	440.360	9.780 *
11		0.000	441.130	80.64	440.715	47.52	440.760	49.61	440.440	17.46 *	440.360	9.780 *
12		0.000	441.990	204.5 *	440.850	61.81	440.625	42.55	440.430	26.59	440.360	8.475
13		0.000	441.160	75.33	440.860	62.42	440.590	32.95 *	440.430	26.17	440.350	7.937
14		0.000	441.070	75.40	441.010	74.05	440.560	37.97	440.430	16.48 *	440.350	7.800
15		0.000	440.710	47.67	441.030	82.97 *	440.535	36.06	440.430	25.61	440.350	8.862 *
16		0.000	440.650	44.65	441.420	130.8 *	440.725	48.91	440.400	11.35	440.350	7.652
17		0.000	440.580	41.29	441.200	88.03	440.600	34.02 *	440.400	11.22	440.350	7.511
18		0.000	440.550	28.71 *	441.170	83.99	440.790	50.88	440.400	13.56 *	440.350	8.862 *
19		0.000	440.590	32.95 *	441.165	83.59	441.175	84.50	440.400	11.11	440.340	7.118
20		0.000	440.620	42.21	441.020	74.85	440.950	73.51 *	440.395	10.93	440.340	6.998
21		0.000	440.640	43.34	441.040	75.13	440.885	64.23	440.390	10.74	440.340	6.908
22		0.000	440.575	39.88	440.845	61.24	441.140	81.07	440.390	12.60 *	440.350	8.862 *
23		0.000	440.540	36.73	440.770	52.76 *	441.010	73.87	440.390	10.40	440.330	7.055 *
24	440.230	0.000 *	440.530	35.92	440.720	48.72	440.815	56.93	440.390	12.60 *	440.330	7.055 *
25	440.240	0.000 *	440.635	42.68	440.680	45.87	440.720	47.15 *	440.390	12.60 *	440.330	7.055 *
26	440.260	1.276 *	440.700	44.93 *	440.640	43.04	440.695	46.88	440.380	9.982	440.330	7.055 *
27	440.210	0.000 *	440.790	52.00	440.620	42.48	440.590	32.95 *	440.380	9.927	440.320	6.289
28	440.190	0.000 *	440.720	48.28	440.660	45.07	440.520	33.59	440.380	9.778	440.320	6.172
29	440.180	0.000 *	440.610	41.32	440.710	47.90	440.490	30.65	440.380	9.702	440.320	6.173 *
30	440.240	0.000 *	440.540	36.41	441.480	138.3 *	440.480	29.83	440.380	9.578	440.320	6.038
31			440.470	29.27	441.180	85.14			440.370	9.321		
Ten-Daily Mean												
I Ten-Daily		0.000	440.231	0.313	441.151	92.33	440.876	61.74	440.452	26.48	440.379	10.25
II Ten-Daily		0.000	440.905	67.33	441.044	79.00	440.731	49.10	440.415	17.05	440.350	8.099
III Ten-Daily	440.221	0.128	440.614	40.98	440.850	62.34	440.735	49.72	440.384	10.66	440.329	6.866
Monthly												
Min.	440.180	0.000	440.210	0.000	440.620	39.43	440.480	29.83	440.370	9.321	440.320	6.038
Max.	440.260	1.276	441.990	204.5	443.220	301.2	441.175	84.50	440.470	29.10	440.410	14.52
Mean	440.221	0.043	440.584	36.36	441.010	77.39	440.781	53.52	440.416	17.82	440.353	8.405

Annual Runoff in MCM = 527 Annual Runoff in mm = 283

Peak Observed Discharge = 301.2 cumecs on 05/08/2015 Corres. Water Level :443.22 m

Lowest Observed Discharge = 0.000 cumecs on 01/06/2015

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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	440.310	5.639	440.270	1.281	440.240	0.682	440.210	0.332	440.150		440.060	0.000 *
2	440.310	5.526	440.270	2.023 *	440.240	0.665	440.210	0.330 *	440.150		440.050	0.000 *
3	440.310	5.408	440.270	2.023 *	440.240	0.648	440.200	0.309	440.150			0.000
4	440.310	5.309	440.270	1.175	440.240	0.632	440.200	0.303	440.150			0.000
5	440.310	5.201	440.270	1.184	440.240	0.590	440.200	0.282	440.150			0.000
6	440.310	5.304 *	440.260	1.047	440.240	0.604	440.200	0.180 *	440.140			0.000
7	440.310	5.080	440.260	1.000	440.230	0.600 *	440.220	0.431	440.140			0.000
8	440.300	4.695	440.260	0.977	440.230	0.566	440.230	0.506	440.140			0.000
9	440.300	4.592	440.260	0.952	440.230	0.551	440.230	0.502	440.140			0.000
10	440.300	4.489	440.260	1.276 *	440.230	0.542	440.220	0.422	440.130			0.000
11	440.300	4.386	440.260	0.926	440.230	0.531	440.210	0.324	440.130			0.000
12	440.300	4.295	440.260	0.902	440.230	0.520	440.200	0.284	440.130			0.000
13	440.300	4.451 *	440.250	0.837	440.230	0.514	440.190	0.000 *	440.130			0.000
14	440.300	4.172	440.250	0.800	440.220	0.620 *	440.190	0.000 *	440.120			0.000
15	440.300	4.081	440.250	0.780	440.220	0.482	440.180	0.000 *	440.120			0.000
16	440.290	3.767	440.250	0.762	440.220	0.471	440.180	0.000 *	440.120			0.000
17	440.290	3.620 *	440.250	0.577 *	440.220	0.461	440.180	0.000 *	440.120			0.000
18	440.290	3.620 *	440.250	0.741	440.220	0.450	440.180	0.000 *	440.110			0.000
19	440.290	3.620 *	440.270	1.166	440.220	0.440	440.180	0.000 *	440.110			0.000
20	440.290	3.620 *	440.270	1.149	440.220	0.429	440.180	0.000 *	440.110			0.000
21	440.290	3.543	440.260	1.019	440.220	0.350 *	440.170	0.000 *	440.100			0.000
22	440.280	2.808 *	440.250	0.889	440.210	0.382	440.170	0.000 *	440.100			0.000
23	440.280	2.808 *	440.250	0.843	440.210	0.375	440.170	0.000 *	440.100			0.000
24	440.280	2.808 *	440.250	0.577 *	440.210	0.368	440.170	0.000 *	440.090			0.000
25	440.280	2.808 *	440.250	0.816	440.210	0.360	440.170	0.000 *	440.090			0.000
26	440.280	2.808 *	440.250	0.577 *	440.210	0.353	440.170	0.000 *	440.090			0.000
27	440.280	2.808 *	440.250	0.779	440.210	0.347	440.160	0.000 *	440.080			0.000
28	440.280	2.808 *	440.250	0.759	440.210	0.330 *	440.160	0.000 *	440.080			0.000
29	440.270	1.388	440.250	0.739	440.210	0.336	440.160	0.000 *	440.070			0.000
30	440.270	1.348	440.250	0.718			440.160	0.000 *	440.070			0.000
31	440.270	1.314	440.250	0.577 *			440.160	0.000 *				0.000
Ten-Daily Mean												
I Ten-Daily	440.307	5.124	440.265	1.294	440.236	0.608	440.212	0.360	440.144		440.055	0.000
II Ten-Daily	440.295	3.963	440.256	0.864	440.223	0.492	440.187	0.061	440.120			0.000
III Ten-Daily	440.278	2.477	440.251	0.754	440.211	0.356	440.165	0.000	440.087			0.000
Monthly												
Min.	440.270	1.314	440.250	0.577	440.210	0.330	440.160	0.000	440.070		440.050	0.000
Max.	440.310	5.639	440.270	2.023	440.240	0.682	440.230	0.506	440.150		440.060	0.000
Mean	440.293	3.81	440.257	0.964	440.224	0.49	440.187	0.136	440.117		440.055	0

Peak Computed Discharge = 204.5 cumecs on 12/07/2015 Corres. Water Level :441.99 m
 Lowest Computed Discharge = 0.000 cumecs on 24/06/2015 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**

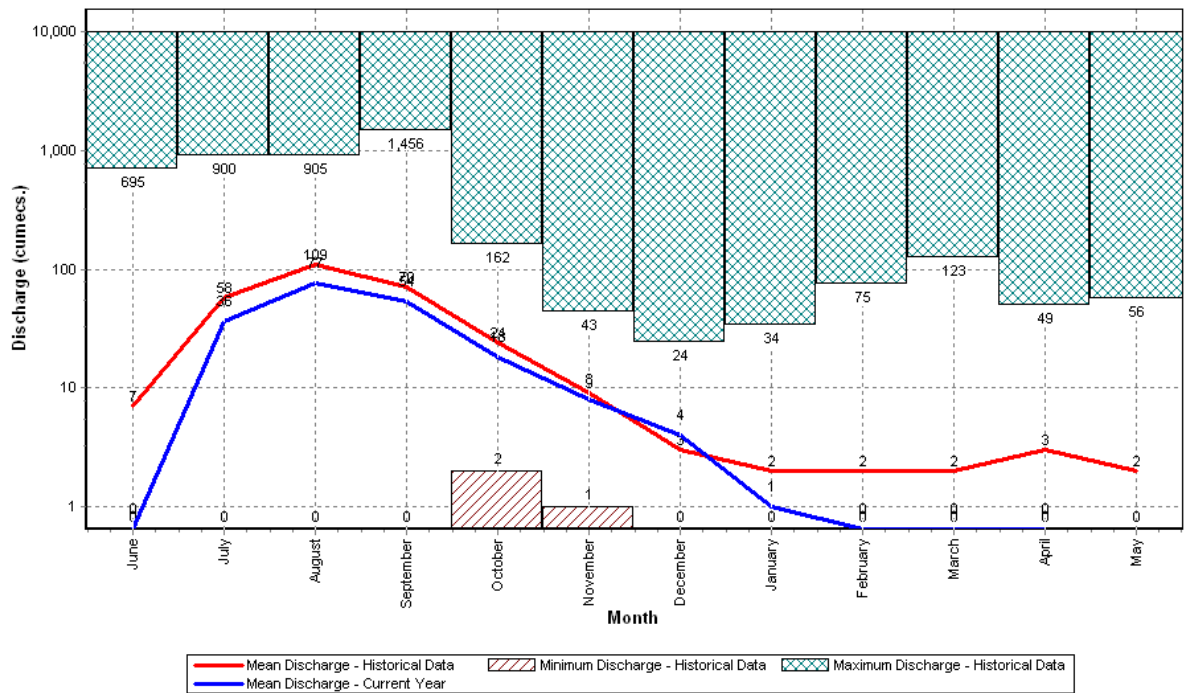
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 2000-2016)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



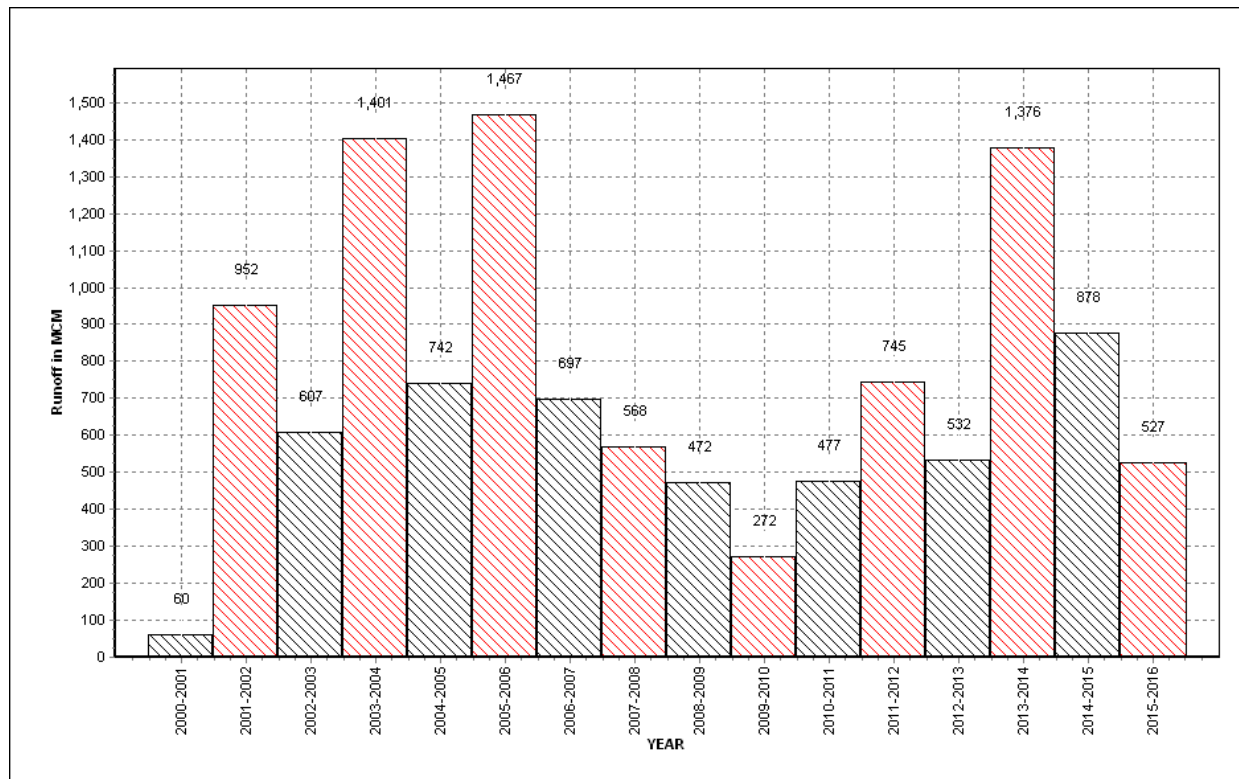
Annual Runoff Values for the period (2000-2016)

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

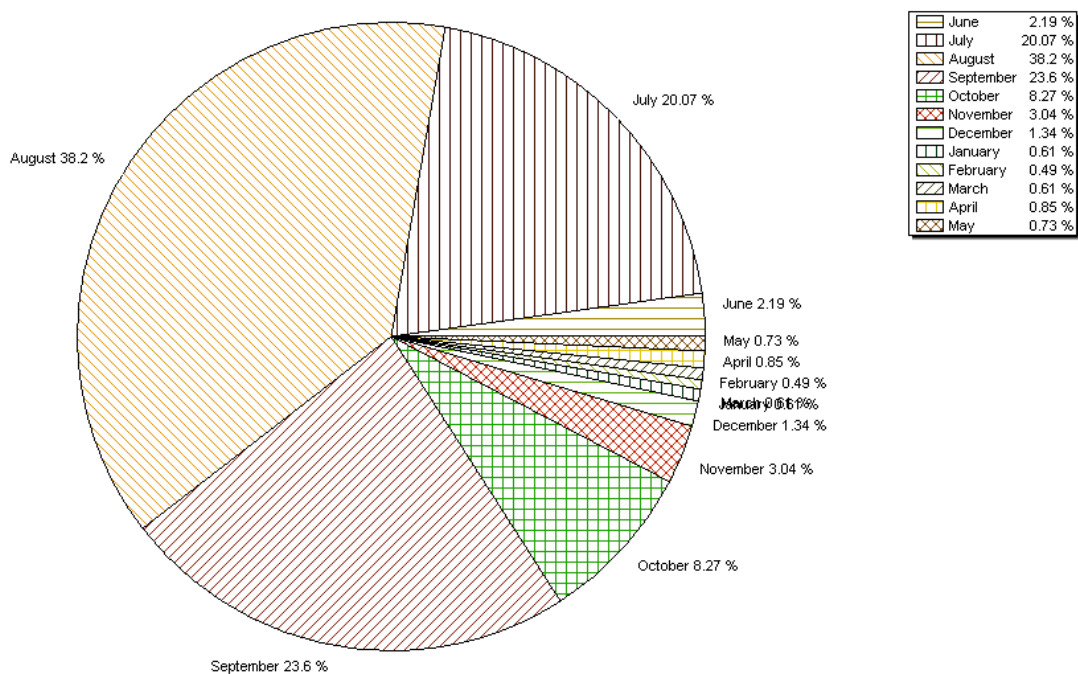
Monthly Average Runoff based on period (2000– 2013)

Station Name : Banjar at Bamni (NCA SITE)

Local River : Banjar

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



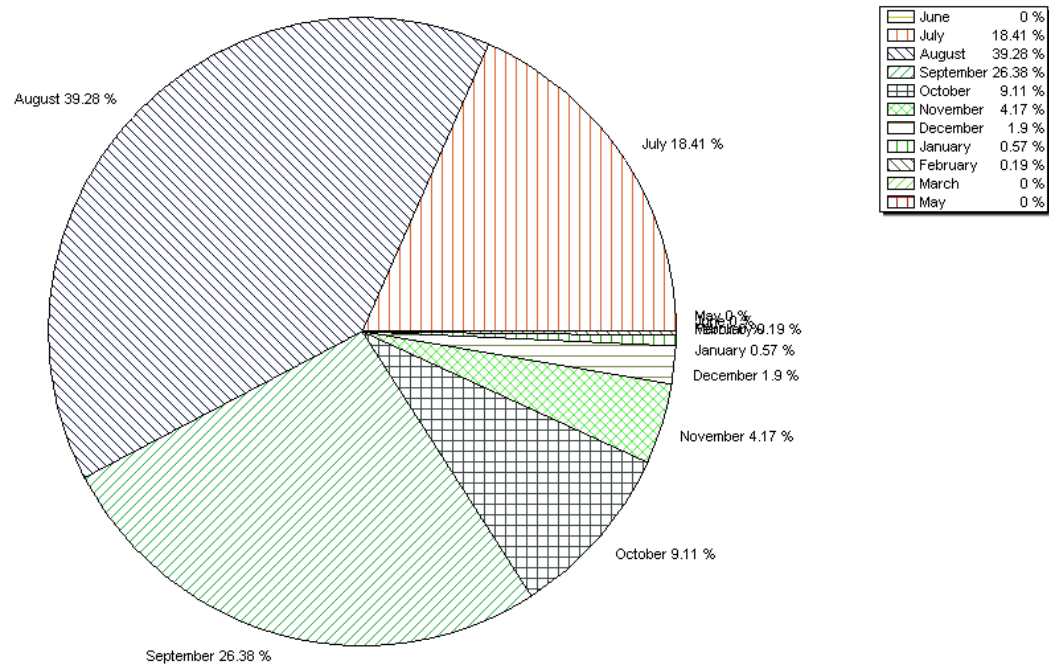
Monthly Runoff for the Year (2015-16)

Station Name : Banjar at Bamni (NCA SITE)

Local River : Banjar

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



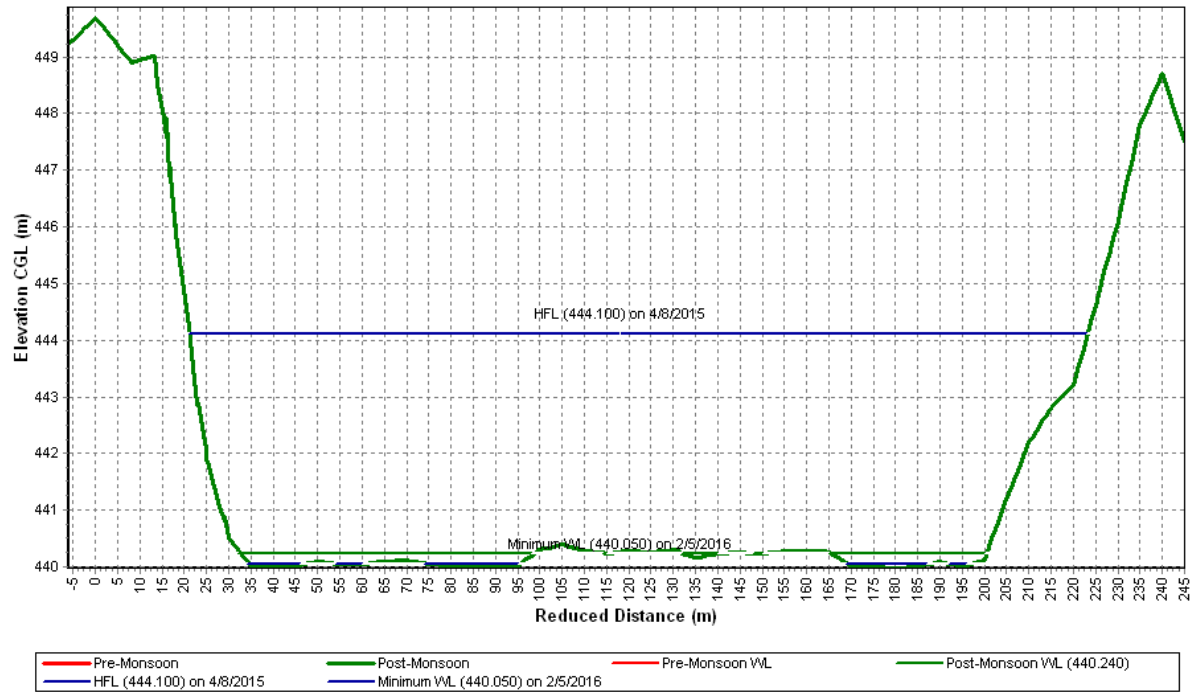
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



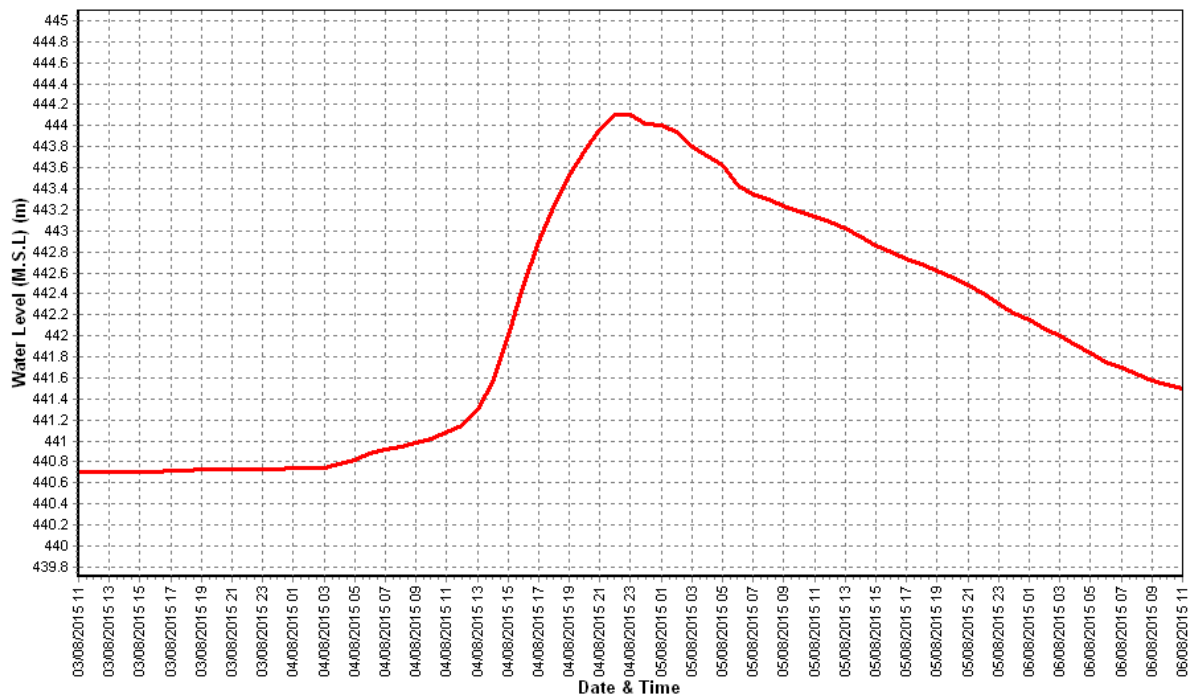
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



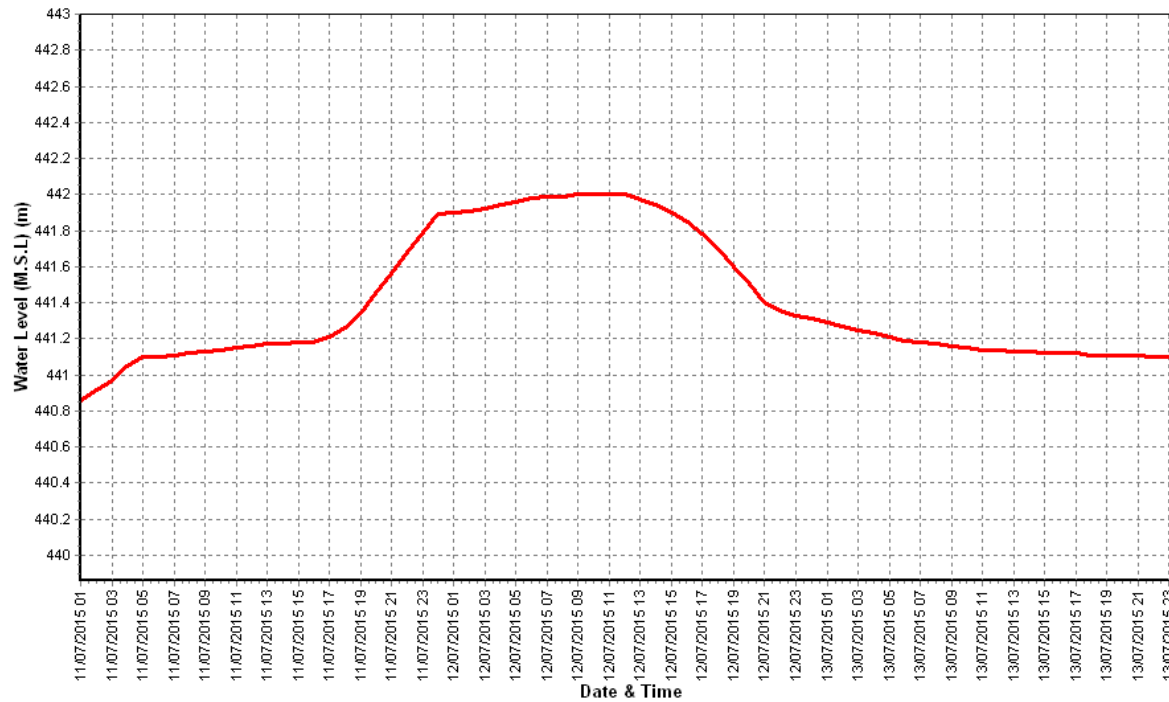
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Banjar at Bamni (NCA SITE)

Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



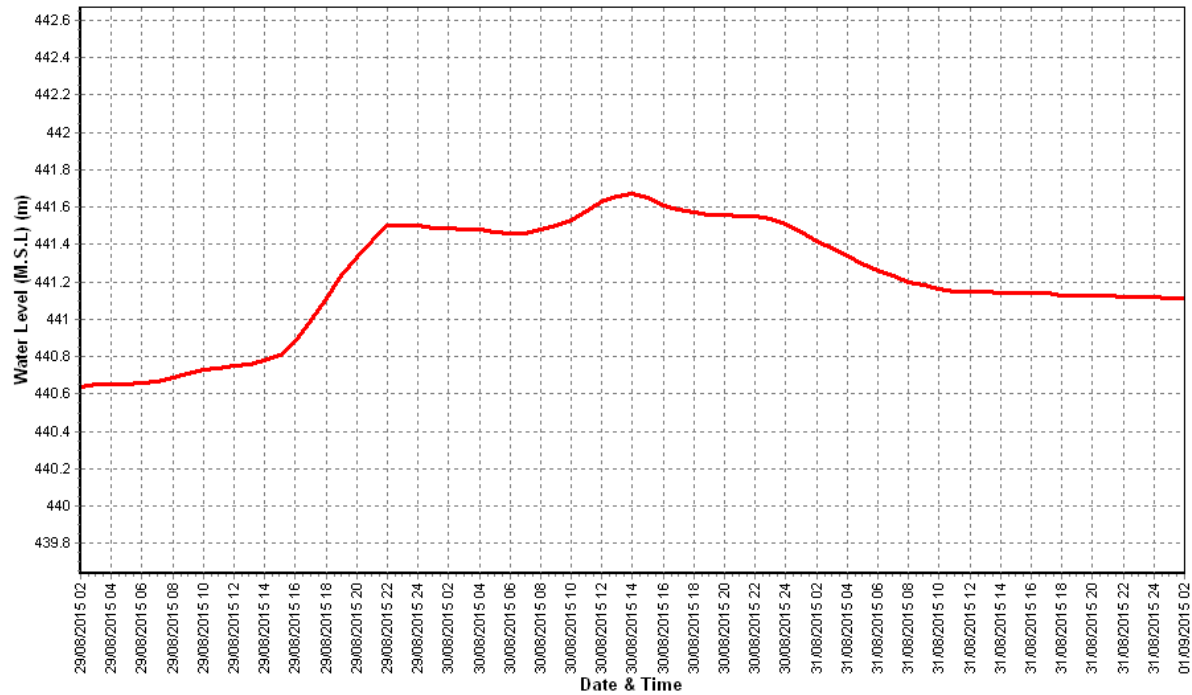
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Banjar at Bamni (NCA SITE)

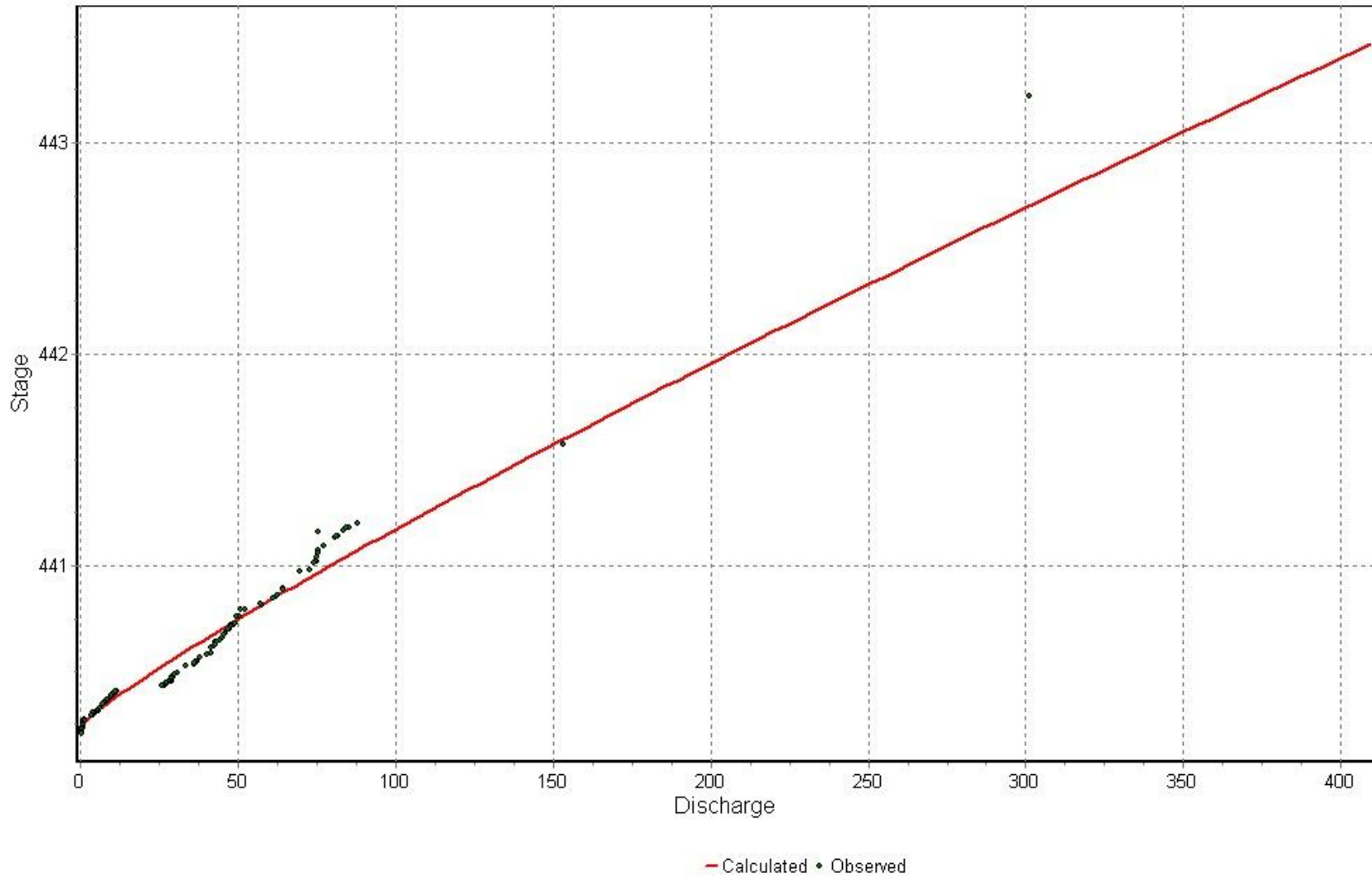
Division : Narmada Division, Bhopal

Local River : Banjar

Sub-Division : UNSD, CWC Jabalpur



STAGE DISCHARGE CURVE OF SITE BAMNI BANJAR 15-16



4.16 Burhner at Mohgaon

History Sheet

Site	: Burhner at Mohgaon	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215004
Basin	: Narmada	District	: Mandla
Tributary	: Burhner	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada Division Bhopal	Local River	: Burhner
Drainage Area	: 3919 Sq. Km.	Sub-Division	: UNSD CWC Jabalpur
Latitude	: 22°45'57"	Bank	: Right
Zero of Gauge (m)	: 447 (M.S.L)	Longitude	: 80°37'22"
Gauge	: 13/01/1977	Opening Date	: 13/01/1977
Discharge	: 13/01/1977	Closing Date	:
Sediment	: 27/08/1992		
Water Quality	: 16/09/1986		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	20.30	449.565	05/02/1978	0.000		10/11/1977
1978-1979	761.0	455.130	24/08/1978	0.000	448.515	30/05/1979
1979-1980	914.0	458.030	09/08/1979	0.000	448.660	17/05/1980
1980-1981	1370	457.390	16/07/1980	0.000	449.200	17/06/1980
1981-1982	691.8	453.330	02/07/1981	0.000	449.125	07/05/1982
1982-1983	2120	455.315	16/08/1982	0.000	449.095	10/06/1982
1983-1984	1020	455.050	08/09/1983	0.000	449.105	17/06/1983
1984-1985	9000	462.900	18/08/1984	0.100	449.305	22/05/1985
1985-1986	5700	461.850	08/08/1985	0.100	449.295	01/06/1985
1986-1987	3690	460.300	08/07/1986	0.100	449.165	28/05/1987
1987-1988	3022	458.580	15/09/1987	0.045	449.155	26/05/1988
1988-1989	2850	458.650	04/08/1988	0.000	449.135	13/06/1988
1989-1990	1085	454.100	12/09/1989	0.030	449.255	29/04/1990
1990-1991	4100	459.200	25/06/1990	0.050	449.230	30/05/1991
1991-1992	7184	463.620	23/08/1991	0.080	449.160	23/05/1992
1992-1993	3688	459.700	11/09/1992	0.010	449.380	12/05/1993
1993-1994	1900	456.210	26/09/1993	0.039	449.380	14/06/1993
1994-1995	3950	459.780	20/07/1994	0.167	449.265	05/06/1994
1995-1996	2960	458.400	09/08/1995	0.128	449.265	14/06/1995
1996-1997	902.0	453.960	05/08/1996	0.095	449.200	30/05/1997
1997-1998	2185	456.650	29/07/1997	0.066	449.205	16/06/1997
1998-1999	1750	456.000	06/07/1998	0.087	449.150	31/05/1999
1999-2000	2600	457.670	23/06/1999	0.078	449.165	09/06/1999
2000-2001	2750	457.080	27/07/2000	0.091	449.210	29/05/2001
2001-2002	2860	458.020	13/07/2001	0.069	449.210	25/05/2002
2002-2003	1725	455.950	18/08/2002	0.013	449.095	25/05/2003
2003-2004	6469	462.820	29/08/2003	0.007	449.040	14/06/2003
2004-2005	11600	467.300	08/08/2004	0.096	449.210	08/06/2004
2005-2006	5400	461.600	06/08/2005	0.091	449.400	03/06/2005
2006-2007	6723	462.340	31/07/2006	0.114	449.250	16/05/2007
2007-2008	1085	454.500	08/07/2007	0.039	449.160	21/05/2008

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2008-2009	939.8	454.080	01/08/2008	0.129	449.095	09/05/2009
2009-2010	364.1	451.920	21/07/2009	0.000	449.220	11/05/2010
2010-2011	2890	456.850	02/09/2010	0.000	449.140	19/06/2010
2011-2012	1864	456.390	07/09/2011	0.032	449.170	08/06/2011
2013-2014	1180	454.050	09/07/2012	0.000	449.130	05/06/2012
2014-2015	2149	457.350	06/08/2014	0.236	449.230	15/06/2014

Stage Discharge Sheet for Burhner at Mohgaon for the period 2015-16

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	449.260	0.526	449.900	22.03	449.870	21.90	451.360	221.1	450.040	40.52	450.300	54.72 *
2	449.250	0.492	450.640	99.75	449.840	19.95 *	451.420	230.5	450.020	31.35 *	449.860	24.57
3	449.240	0.467	450.640	106.4	449.930	24.87	451.130	175.6	450.010	37.08	449.810	21.62
4	449.230	0.442	450.780	124.9	454.850	1564 #	450.830	139.5	449.990	29.26 *	449.840	23.29
5	449.230	0.444	450.280	52.82 *	452.300	436.1	450.680	119.3	449.970	33.38	449.810	21.51
6	449.220	0.418	450.040	36.13	451.400	217.9 *	450.570	84.00 *	449.950	30.38	449.800	20.76
7	449.240	0.820 *	449.830	20.68	451.400	225.0	450.380	69.52	449.940	29.41	449.780	19.18
8	449.270	0.593	449.740	13.03	450.950	167.2	450.420	75.70	449.920	27.81	449.750	15.28 *
9	449.260	0.566	449.960	27.99	450.730	104.6 *	450.410	75.25	449.900	26.69	449.720	15.73
10	449.250	0.520	452.940	568.0	450.500	89.97	450.330	68.50	449.880	25.47	449.700	15.02
11	449.240	0.493	452.740	535.9	450.850	152.9	450.260	62.94	449.870	21.66 *	449.690	12.54 *
12	449.330	1.208	451.640	269.5 *	450.970	169.6	450.190	56.43	449.850	23.43	449.680	14.58
13	449.360	1.781	450.920	162.6	451.290	202.9	450.120	38.90 *	449.830	22.38	449.670	14.26
14	449.360	2.494 *	450.550	100.0	451.250	184.6	450.140	47.52	449.810	21.23	449.650	13.21
15	449.350	1.733	450.360	62.69	451.000	144.9 *	450.430	77.94	449.800	20.76	449.645	10.67 *
16	449.550	7.154	450.170	50.31	451.350	207.9 *	450.380	68.31	449.790	20.31	449.640	12.83
17	449.650	9.639	450.020	32.99	451.300	206.4	450.240	49.12 *	449.780	19.14	449.630	12.54
18	449.680	11.11	450.310	55.68 *	451.560	261.3	450.690	120.9	449.770	16.26 *	449.620	12.18
19	449.850	18.09	450.520	78.07 *	451.370	222.9	451.070	142.7	449.770	18.63	449.610	11.76
20	449.670	10.79	450.380	68.99	451.010	172.9	450.640	92.71 *	449.760	18.15	449.610	11.71
21	449.590	8.607 *	450.390	70.70	450.700	122.2	450.770	133.5	449.750	17.87	449.610	11.80
22	449.660	10.50	450.580	103.7	450.580	104.6	452.000	352.3	449.740	14.80 *	449.600	8.965 *
23	456.200	1160	450.730	126.1	450.500	75.76 *	450.950	158.3	449.730	17.11	449.590	10.88
24	451.160	142.0	451.090	143.0	450.390	69.59	450.620	113.7	449.720	13.87 *	449.590	8.607 *
25	450.380	66.81	450.920	130.2	450.290	65.44	450.430	67.97 *	449.710	13.42 *	449.580	8.257 *
26	450.090	36.41	450.570	84.00 *	450.150	50.93	450.330	68.69	449.710	15.89	449.580	10.05
27	449.930	23.83	450.300	81.33	450.740	132.9	450.250	50.03 *	449.700	15.19	449.570	9.242
28	449.850	20.52 *	450.200	62.08	451.520	268.0	450.170	51.81	449.700	15.23	449.570	9.117
29	449.950	25.47	450.070	38.96	451.800	346.2	450.110	44.81	449.880	26.10	449.560	7.582 *
30	449.960	26.47	449.980	29.98	454.500	514.0	450.070	42.47	449.800	20.87	449.560	8.377
31			450.910	130.7 *	452.050	362.3			449.790	20.37		
Ten-Daily Mean												
I Ten-Daily	449.245	0.529	450.475	107.2	451.177	287.2	450.753	125.9	449.962	31.14	449.837	23.17
II Ten-Daily	449.504	6.449	450.761	141.7	451.195	192.6	450.416	75.75	449.803	20.20	449.644	12.63
III Ten-Daily	450.677	152.0	450.522	90.98	450.872	159.8	450.570	108.4	449.748	17.34	449.581	9.288
Monthly												
Min.	449.220	0.418	449.740	13.03	449.840	19.95	450.070	38.90	449.700	13.42	449.560	7.582
Max.	456.200	1160	452.940	568.0	454.850	1564	452.000	352.3	450.040	40.52	450.300	54.72
Mean	449.809	53.01	450.584	112.6	451.081	213.2	450.580	103.3	449.835	22.71	449.688	15.03

Annual Runoff in MCM = 1408 Annual Runoff in mm = 359

Peak Observed Discharge = 1564 cumecs on 04/08/2015 Corres. Water Level :454.85 m

Lowest Observed Discharge = 0.094 cumecs on 24/05/2016 Corres. Water Level :449.1 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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	449.550	7.973	449.430	4.652	449.510	4.829	449.420	2.460	449.370	1.708	449.180	0.339 *
2	448.875	7.903	449.430	4.667	449.510	4.801	449.420	2.437	449.360	1.609	449.170	0.331
3	449.540	7.397	449.450	4.416 *	449.500	4.738	449.410	2.171	449.350	2.317 *	449.170	0.316
4	449.530	6.875	449.460	5.201	449.500	4.624	449.410	2.132	449.350	1.530	449.160	0.265
5	449.520	6.435	449.460	5.177	449.490	4.408	449.410	2.119	449.340	1.420	449.150	0.237
6	449.510	6.029 *	449.460	5.189	449.490	4.424	449.410	3.489 *	449.330	1.074	449.150	0.225
7	449.510	6.065	449.450	5.008	449.490	5.460 *	449.400	1.869	449.320	0.997	449.150	0.217
8	449.500	5.864	449.450	5.009	449.480	4.226	449.400	1.862	449.310	0.948	449.160	0.281 *
9	449.490	5.713	449.450	4.965	449.480	4.209	449.400	1.856	449.300	0.891	449.170	0.339
10	449.480	5.539	449.450	4.416 *	449.480	4.195	449.390	1.662	449.300	1.535 *	449.170	0.333
11	449.480	5.518	449.440	4.703	449.480	4.163	449.470	3.635	449.290	0.861	449.160	0.289
12	449.470	5.416	449.430	4.545	449.470	3.917	449.540	4.399	449.280	0.815	449.150	0.252
13	449.460	4.665 *	449.430	4.503	449.470	3.887	449.510	6.029 *	449.270	0.762	449.150	0.242
14	449.470	5.317	449.420	4.326	449.470	4.923 *	449.500	3.979	449.270	1.147 *	449.140	0.207
15	449.460	5.210	449.420	4.312	449.470	3.855	449.480	3.792	449.260	1.032 *	449.140	0.140 *
16	449.460	5.175	449.420	4.306	449.470	3.822	449.480	3.720	449.260	0.700	449.140	0.205
17	449.450	5.029	449.430	3.937 *	449.460	3.786	449.480	3.727	449.250	0.923 *	449.130	0.185
18	449.450	5.029	449.470	5.116	449.460	3.720	449.470	3.613	449.250	0.666	449.130	0.132
19	449.450	4.998	449.460	5.116	449.460	3.631	449.470	3.603	449.240	0.620	449.120	0.168
20	449.450	4.416 *	449.460	5.103	449.460	4.665 *	449.470	4.923 *	449.240	0.820 *	449.120	0.156
21	449.550	5.023	449.500	5.875	449.460	4.665 *	449.460	3.446	449.230	0.583	449.110	0.050 *
22	449.450	4.951	449.490	5.680	449.450	3.525	449.460	3.413	449.220	0.606	449.110	0.031 *
23	449.440	4.879	449.480	5.537	449.450	3.365	449.460	3.360	449.220	0.568	449.100	0.098
24	449.440	4.173 *	449.480	5.188 *	449.440	3.206	449.450	4.416 *	449.210	0.552 *	449.100	0.094
25	449.440	4.173 *	449.470	5.326	449.440	3.104	449.450	4.416 *	449.210	0.511	449.110	0.110
26	449.440	4.842	449.470	4.923 *	449.430	2.941	449.450	3.140	449.220	0.486	449.110	0.109
27	449.440	4.173 *	449.470	5.310	449.430	2.911	449.440	4.173 *	449.200	0.456	449.120	0.140
28	449.440	4.803	449.460	5.154	449.430	3.937 *	449.440	2.975	449.190	0.446	449.120	0.075 *
29	449.440	4.824	449.460	5.109	449.420	2.475	449.430	2.570	449.190	0.440	449.120	0.075 *
30	449.430	4.682	449.460	5.070			449.410	2.247	449.180	0.388	449.120	0.148
31	449.430	4.642	449.510	6.029 *			449.390	1.837			449.130	0.181
Ten-Daily Mean												
I Ten-Daily	449.451	6.579	449.449	4.870	449.493	4.591	449.407	2.206	449.333	1.403	449.163	0.288
II Ten-Daily	449.460	5.077	449.438	4.597	449.467	4.037	449.487	4.142	449.261	0.835	449.138	0.198
III Ten-Daily	449.449	4.651	449.477	5.382	449.439	3.348	449.440	3.272	449.207	0.503	449.114	0.093
Monthly												
Min.	448.875	4.173	449.420	3.937	449.420	2.475	449.390	1.662	449.180	0.388	449.100	0.031
Max.	449.550	7.973	449.510	6.029	449.510	5.460	449.540	6.029	449.370	2.317	449.180	0.339
Mean	449.453	5.411	449.455	4.963	449.467	4.014	449.445	3.209	449.267	0.914	449.137	0.193

Peak Computed Discharge = 269.5 cumecs on 12/07/2015

Corres. Water Level :451.64 m

Lowest Computed Discharge = 0.031 cumecs on 22/05/2016

Corres. Water Level :449.11 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**

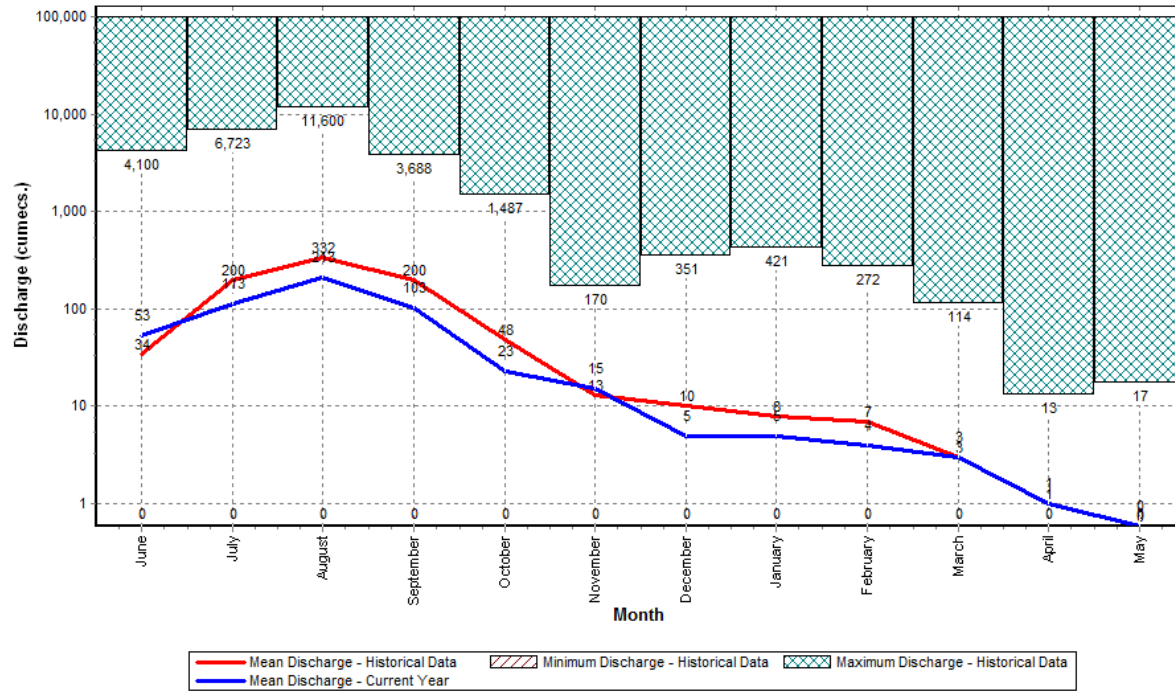
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1977-2016)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



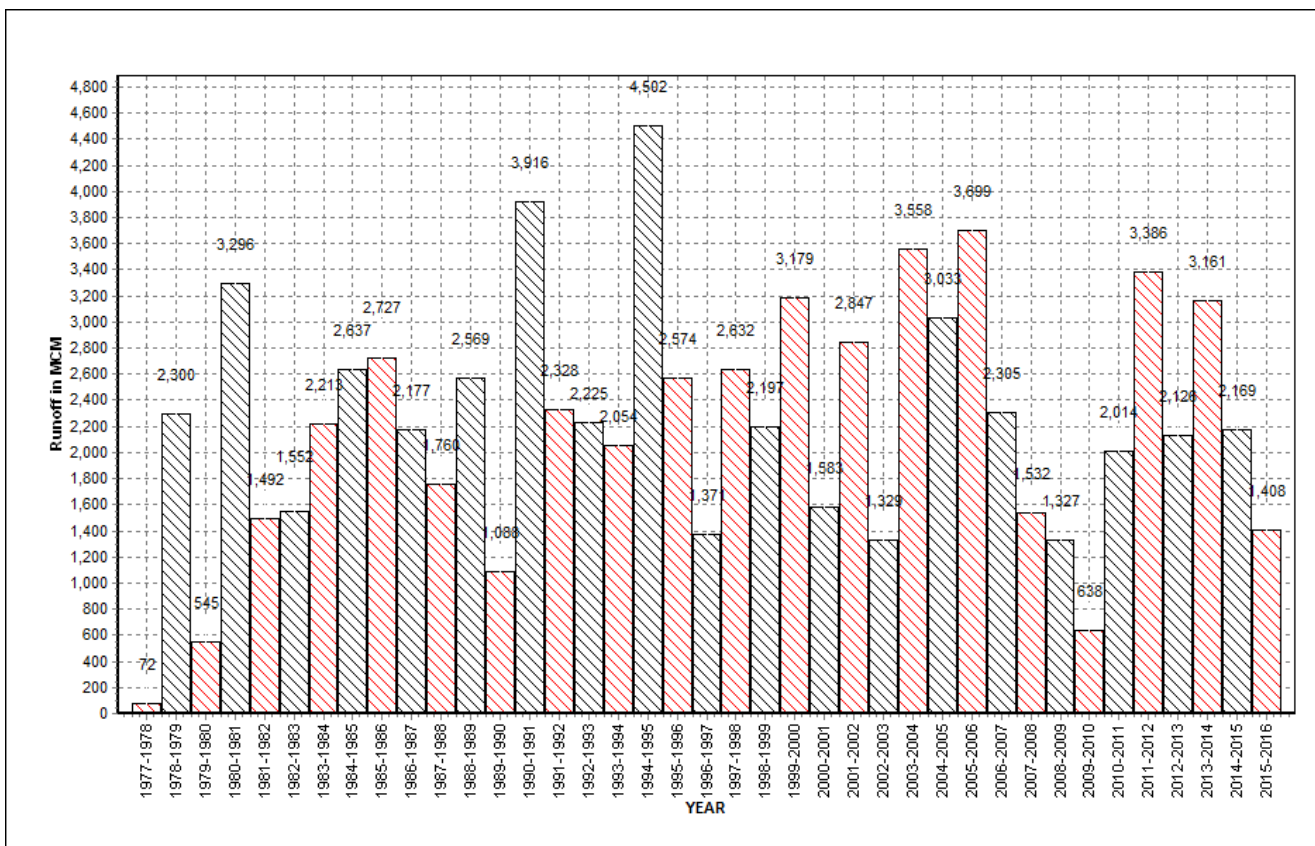
Annual Runoff Values for the period (1977– 2016)

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

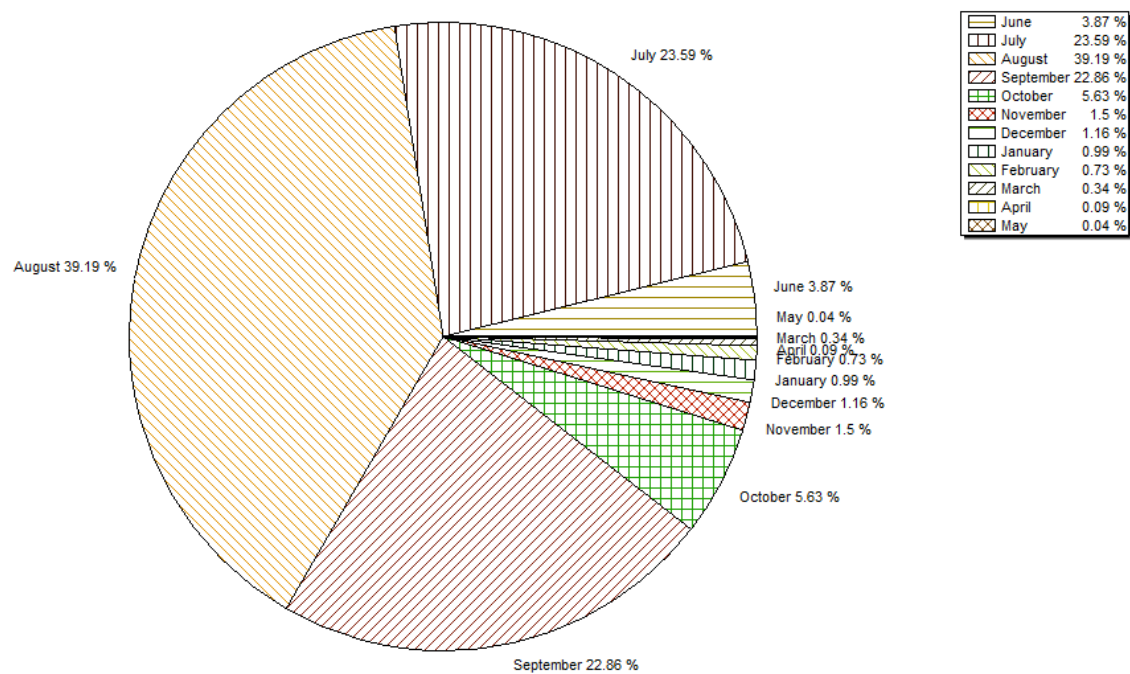
Monthly Average Runoff based on period (1977– 2014)

Station Name : Burhner at Mohgaon (010215004)

Local River : Burhner

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



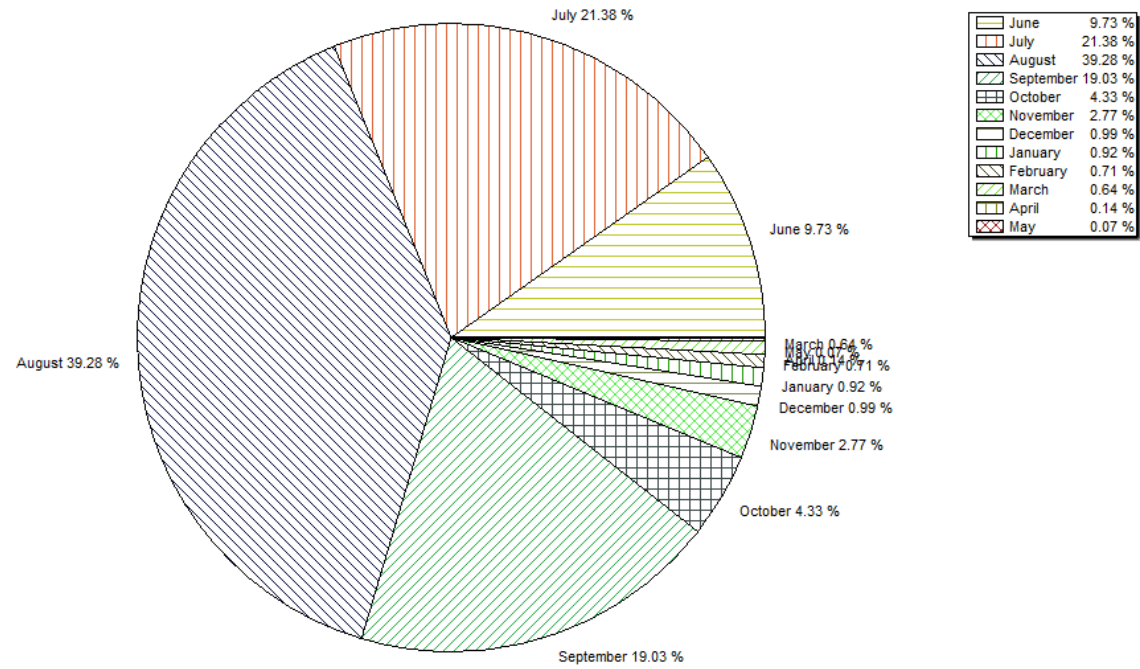
Monthly Runoff for the Year (2015-16)

Station Name : Burhner at Mohgaon (010215004)

Local River : Burhner

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



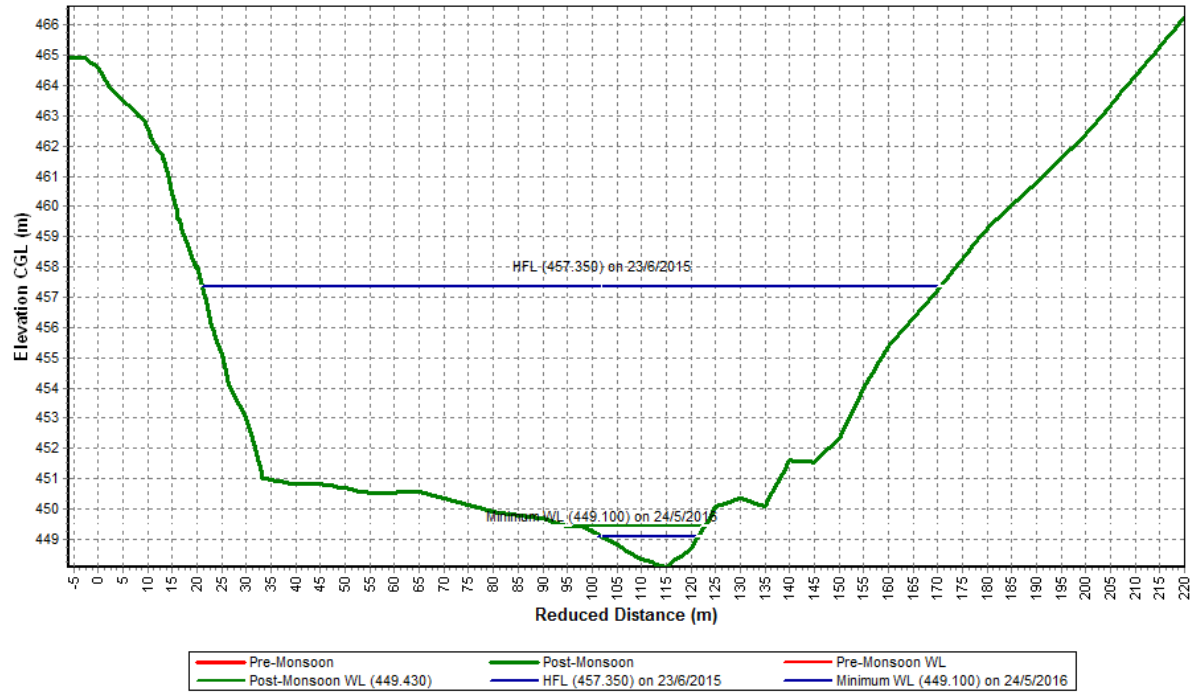
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



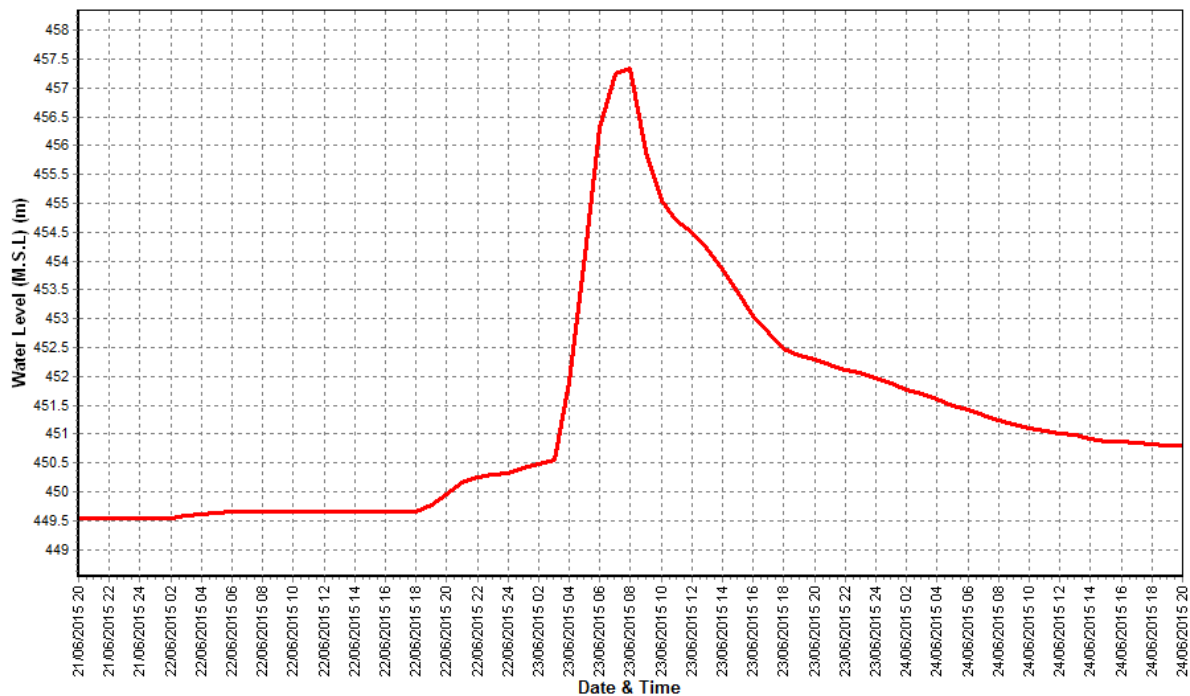
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



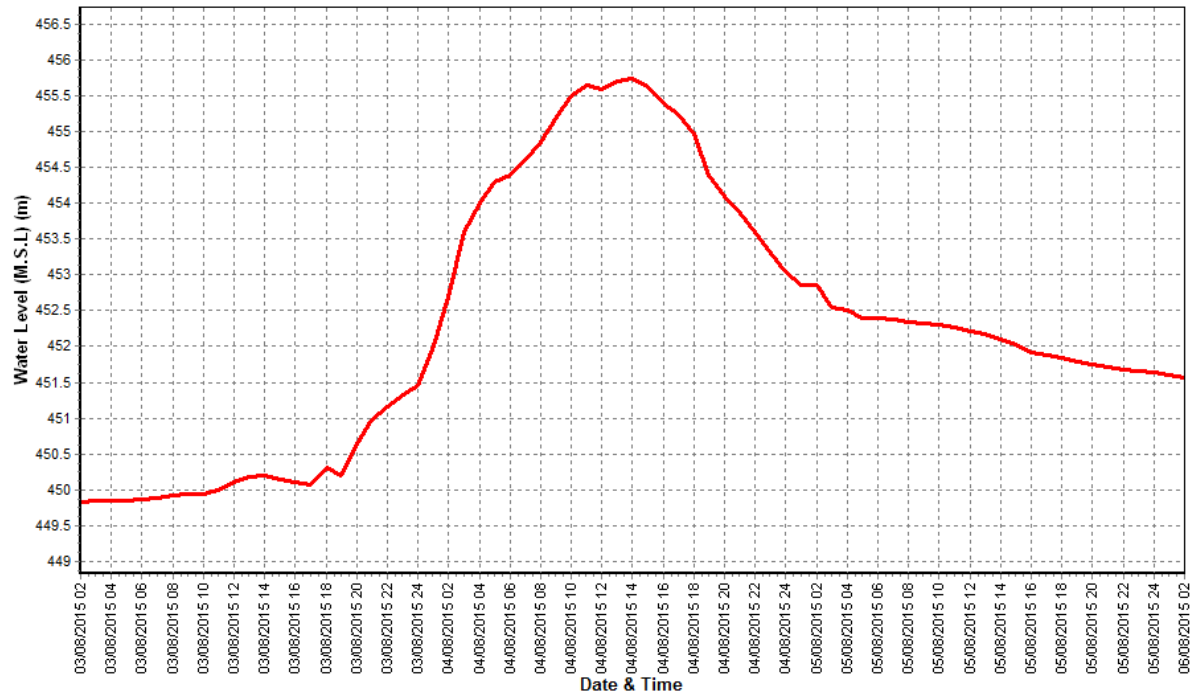
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Burhner at Mohgaon (010215004)

Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



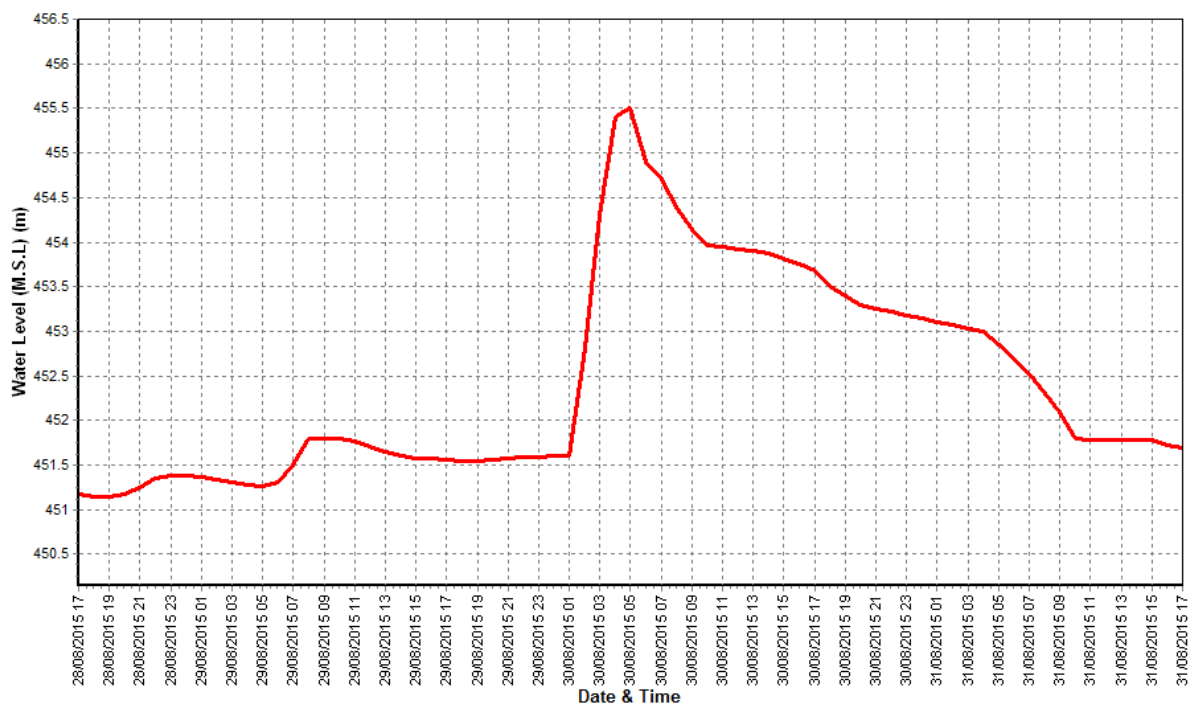
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Burhner at Mohgaon (010215004)

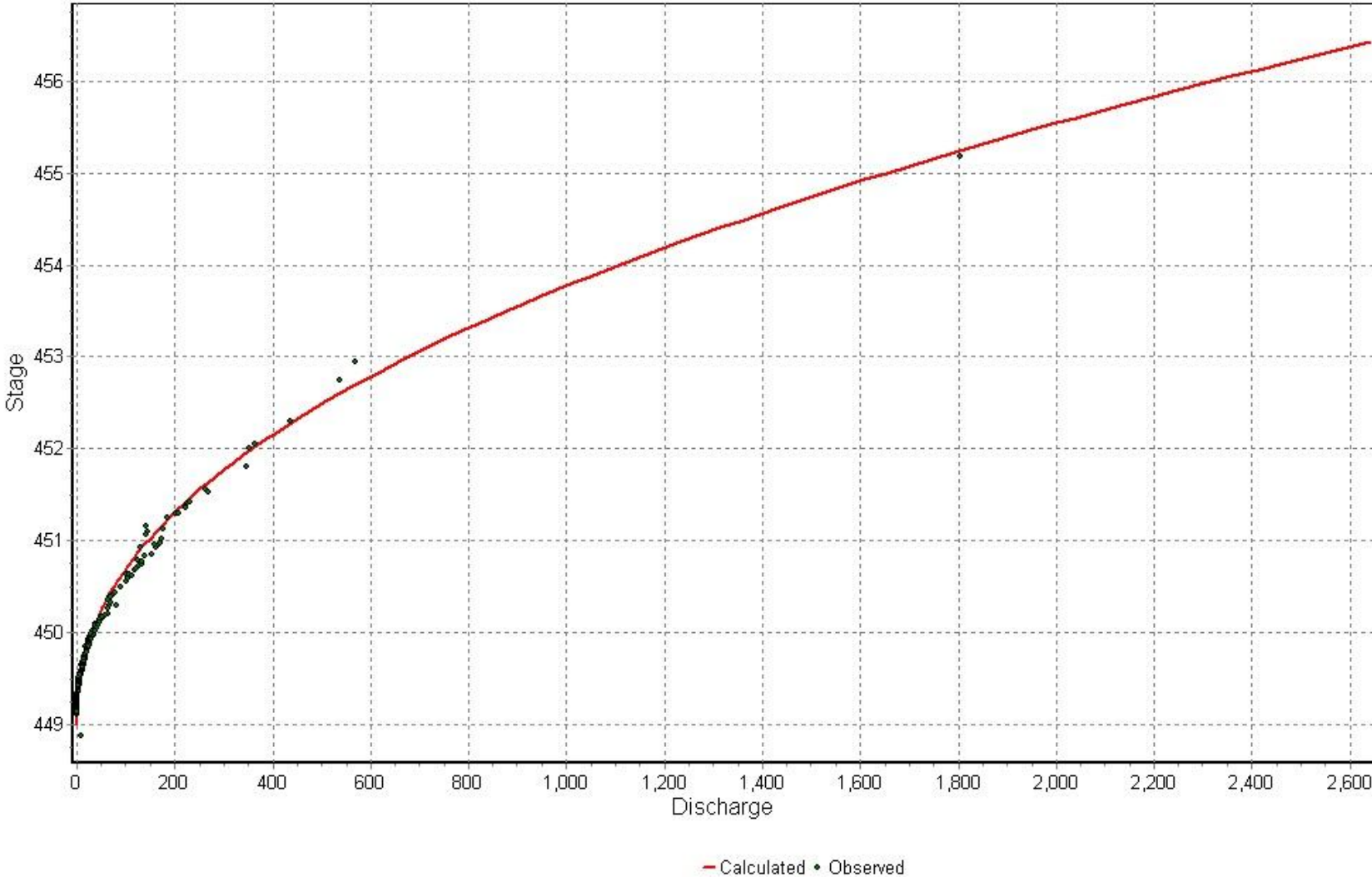
Division : Narmada Division, Bhopal

Local River : Burhner

Sub-Division : UNSD, CWC Jabalpur



STAGE DISCHARGE CURVE OF SITE MOHGAON 15-16



4.17 Narmada at Manot

History Sheet

Site	: Narmada at Manot	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215002
Basin	: Narmada	District	: Mandla
Tributary	:	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada Division Bhopal	Local River	: Narmada
Drainage Area	: 4667 Sq. Km.	Sub-Division	: UNSD CWC Jabalpur
Latitude	: 22°44'08"	Bank	: Right
Zero of Gauge (m)	: 442 (M.S.L)	Longitude	: 80°30'44"
	Opening Date	16/12/1976	Closing Date
Gauge	: 16/12/1976		
Discharge	: 16/12/1976		
Sediment	: 09/11/1979		
Water Quality	: 01/01/1980		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1977-1978	2125	452.500	07/08/1977	0.200	442.795	03/06/1977
1978-1979	960.0	446.025	06/08/1978	0.400	442.680	09/05/1979
1979-1980	2380	450.690	09/08/1979	0.000	442.715	16/05/1980
1980-1981	3277	452.115	09/09/1980	0.000	442.730	02/06/1980
1981-1982	1688	447.610	28/07/1981	0.100	442.730	16/06/1981
1982-1983	1242	448.675	16/08/1982	0.100	442.760	31/05/1983
1983-1984	2423	452.700	08/09/1983	0.100	442.755	16/06/1983
1984-1985	5660	459.650	18/08/1984	0.200	442.765	29/05/1985
1985-1986	4850	455.400	08/08/1985	0.200	442.860	31/05/1986
1986-1987	5762	458.000	08/07/1986	0.200	442.860	10/06/1986
1987-1988	6180	457.475	15/09/1987	0.247	442.755	31/05/1988
1988-1989	4130	454.100	04/08/1988	0.187	442.760	17/06/1988
1989-1990	950.0	446.300	14/08/1989	0.150	442.670	11/06/1989
1990-1991	2300	451.880	25/06/1990	0.600	442.900	31/05/1991
1991-1992	6520	459.300	23/08/1991	0.260	442.995	07/06/1991
1992-1993	3340	453.200	11/09/1992	0.038	442.975	29/05/1993
1993-1994	2980	452.200	17/08/1993	0.018	442.950	12/06/1993
1994-1995	4410	455.550	21/07/1994	0.200	443.200	14/06/1994
1995-1996	3300	453.150	09/08/1995	0.395	443.015	16/06/1995
1996-1997	1650	448.940	27/07/1996	0.343	442.975	04/06/1996
1997-1998	3160	451.600	01/08/1997	0.425	442.975	15/06/1997
1998-1999	2010	449.920	06/07/1998	0.880	443.045	22/05/1999
1999-2000	4390	452.500	18/09/1999	0.842	443.080	08/05/2000
2000-2001	3000	451.620	20/07/2000	0.600	443.020	23/05/2001
2001-2002	3600	452.250	13/07/2001	0.300	442.930	21/05/2002
2002-2003	1940	449.400	09/09/2002	0.100	442.740	31/05/2003
2003-2004	4980	455.900	29/08/2003	0.020	442.490	15/06/2003
2004-2005	5760	458.800	08/08/2004	0.600	442.870	29/05/2005
2005-2006	4486	454.775	06/08/2005	0.010	442.850	08/06/2005
2006-2007	6806	453.310	31/07/2006	0.092	442.840	31/05/2007
2007-2008	970.7	446.805	06/09/2007	0.013	442.830	02/06/2007

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
2008-2009	1393	447.600	11/08/2008	0.047	442.800	06/06/2008
2009-2010	1069	446.850	09/09/2009	0.000	442.560	25/05/2010
2010-2011	2435	449.400	26/07/2010	0.000	442.525	15/06/2010
2011-2012	2439	451.830	07/09/2011	0.000	443.035	29/04/2012
2012-2013	1312	448.500	11/08/2012	0.293	442.870	14/06/2012
2013-2014	1573	449.200	09/08/2013	0.520	442.855	25/05/2014
2014-2015	3475	453.190	06/08/2014	0.272	442.780	15/06/2014

Stage Discharge Sheet for Narmada at Manot for the period 2015-16

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	442.880	1.793	443.860	50.31	443.750	40.66	444.520	156.5	443.830	48.25	443.550	28.21 *
2	442.870	1.705	443.980	90.05	443.720	41.65 *	444.480	144.1	443.810	49.71 *	443.550	20.34
3	442.850	1.490	444.010	94.37	443.810	45.25	444.570	156.3	443.800	46.03	443.500	17.86
4	442.840	1.401	444.790	172.6	448.990	1178	444.270	130.6	443.820	50.64 *	443.500	17.38
5	442.750	1.256	444.240	96.79 *	446.070	328.5	444.140	104.8	443.800	45.93	443.490	16.59
6	442.820	1.153	443.880	53.28	444.800	173.6	444.230	95.54 *	443.780	44.32	443.490	16.35
7	442.810	1.200 *	443.800	46.41	444.550	155.5	444.030	94.80	443.760	40.83	443.480	15.76
8	442.800	0.963	443.760	39.87	444.370	140.9	444.060	97.32	443.750	39.55	443.470	22.70 *
9	442.790	0.890	443.580	65.59 #	444.310	105.8 *	444.140	104.6	443.730	37.45	443.460	22.05 *
10	442.780	0.818	445.460	285.0	444.200	114.3	443.980	79.77	443.710	36.07	443.450	21.41 *
11	442.830	1.217	445.390	280.2	445.150	290.8	443.920	56.25	443.700	39.95 *	443.440	20.78 *
12	442.850	1.474	444.900	195.2 *	445.290	270.8	443.880	50.52	443.680	31.66	443.430	20.15 *
13	442.880	1.806	444.410	142.4	444.890	230.0	443.860	54.46 *	443.660	29.88	443.420	19.54 *
14	442.910	0.419 *	444.150	105.6	445.010	239.8	443.830	48.55	443.630	29.16	443.420	19.54 *
15	443.610	27.59	444.020	93.56	444.710	163.7 *	443.810	46.00	443.600	26.76	443.410	18.93 *
16	443.620	27.76	443.920	56.79	444.710	163.7 *	443.890	51.25	443.580	23.97	443.410	18.93 *
17	443.580	25.08	443.820	46.99	444.520	151.7	443.880	56.41 *	443.550	20.14	443.400	18.33 *
18	443.460	18.62	443.770	46.05 *	444.530	153.9	443.850	49.31	443.530	26.78 *	443.390	17.74 *
19	443.400	16.25	444.170	88.18 *	444.720	160.9	444.140	104.1	443.500	18.29	443.390	17.74 *
20	443.380	15.38	444.360	140.9	444.570	157.9	444.090	78.78 *	443.480	17.59	443.380	17.16 *
21	443.580	30.41 *	444.160	106.8	444.360	140.9	444.070	98.37	443.470	16.76	443.380	17.16 *
22	443.520	20.23	444.040	94.25	444.160	107.0	445.420	278.9	443.470	22.70 *	443.370	16.59 *
23	447.500	860.3	444.060	97.02	444.070	76.51 *	444.600	160.2	443.460	15.78	443.370	11.76
24	445.270	268.3	445.190	296.3	444.020	93.84	444.210	115.2	443.450	21.41 *	443.370	11.67
25	444.160	103.0	444.900	230.7	443.990	82.47	444.100	79.93 *	443.440	20.78 *	443.360	16.02 *
26	443.940	76.53	444.430	121.9 *	443.950	78.77	444.030	95.09	443.420	14.54	443.360	16.02 *
27	443.810	46.51	444.260	121.7	444.010	92.41	443.960	64.54 *	443.400	13.89	443.360	16.02 *
28	443.780	46.95 *	444.120	102.4	444.300	134.1	443.920	55.69	443.400	18.33 *	443.355	15.74 *
29	443.800	46.09	443.950	78.26	444.380	142.5	443.890	51.09	443.390	17.74 *	443.355	15.74 *
30	443.920	58.24	443.840	51.60	447.000	699.3 *	443.860	50.06	443.480	23.36 *	443.350	15.47 *
31			443.780	41.72	445.500	293.3			443.470	17.05		
Ten-Daily Mean												
I Ten-Daily	442.819	1.267	444.136	99.42	444.857	232.4	444.242	116.4	443.779	43.88	443.494	19.87
II Ten-Daily	443.252	13.56	444.291	119.6	444.810	198.3	443.915	59.56	443.591	26.42	443.409	18.88
III Ten-Daily	444.328	155.7	444.248	122.1	444.522	176.5	444.206	104.9	443.441	18.40	443.363	15.22
Monthly												
Min.	442.750	0.419	443.580	39.87	443.720	40.66	443.810	46.00	443.390	13.89	443.350	11.67
Max.	447.500	860.3	445.460	296.3	448.990	1178	445.420	278.9	443.830	50.64	443.550	28.21
Mean	443.466	56.83	444.226	114	444.723	201.6	444.121	93.63	443.598	29.2	443.422	17.99

Annual Runoff in MCM = 1438 Annual Runoff in mm = 308

Peak Observed Discharge = 1178 cumecs on 04/08/2015 Corres. Water Level :448.99 m

Lowest Observed Discharge = 0.010 cumecs on 27/05/2016 Corres. Water Level :442.61 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 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	443.350	15.47 *	443.200	7.764	443.190	7.465	443.070	4.018	443.050	3.511	442.880	0.780 *
2	443.350	15.47 *	443.200	7.675	443.180	7.183	443.070	3.937	443.050	3.430	442.870	0.650 *
3	443.340	10.96	443.200	8.217 *	443.180	7.115	443.050	3.721	443.050	3.086 *	442.860	0.845
4	443.340	10.88	443.190	7.516	443.180	7.032	443.060	3.638	443.040	3.170	442.840	0.614
5	443.330	10.66	443.190	7.435	443.170	6.911	443.060	3.563	443.040	3.101	442.835	0.547
6	443.320	13.85 *	443.190	7.310	443.170	6.828	443.060	3.359 *	443.030	2.934	442.820	0.512
7	443.310	10.30	443.180	7.162	443.160	6.634 *	443.050	3.371	443.030	2.875	442.810	0.452
8	443.310	10.18	443.180	7.074	443.160	6.697	443.050	3.311	443.030	2.864	442.800	0.450 *
9	443.300	9.899	443.170	6.903	443.160	6.604	443.050	3.220	443.020	2.621	442.790	0.389
10	443.300	9.850	443.170	7.016 *	443.150	6.376	443.050	3.145	443.020	2.332 *	442.780	0.334
11	443.290	9.827	443.160	6.738	443.150	6.332	443.080	4.224	443.010	2.940	442.774	0.296
12	443.280	9.696	443.160	6.652	443.140	6.085	443.100	4.811	443.010	2.375	442.770	0.293
13	443.280	11.83 *	443.160	6.583	443.140	5.992	443.100	4.550 *	443.000	2.189	442.760	0.283
14	443.270	9.590	443.150	6.391	443.140	5.900 *	443.120	5.138	443.000	1.883 *	442.750	0.239
15	443.260	9.451	443.150	6.321	443.130	5.759	443.150	6.242	443.000	1.883 *	442.740	0.230 *
16	443.250	9.297	443.150	6.212	443.130	5.660	443.170	6.871	442.990	2.004	442.730	0.184
17	443.250	9.198	443.140	5.900 *	443.120	5.421	443.170	6.779	442.990	1.675 *	442.720	0.124
18	443.240	9.021	443.140	6.075	443.120	5.338	443.130	5.528	442.980	1.875	442.700	0.082
19	443.240	8.938	443.140	5.993	443.110	5.152	443.120	5.074	442.980	1.713	442.690	0.058
20	443.240	9.948 *	443.180	7.162	443.100	4.839	443.110	4.872 *	442.980	1.478 *	442.680	0.051
21	443.240	8.852	443.230	8.599	443.080	3.933 *	443.100	4.830	442.970	1.691	442.670	0.045 *
22	443.240	8.756	443.240	9.224	443.070	4.063	443.100	4.764	442.970	1.671	442.660	0.040 *
23	443.230	8.578	443.220	8.526	443.060	3.979	443.090	4.543	442.960	1.284	442.650	0.028
24	443.230	9.502 *	443.220	9.064 *	443.090	4.609	443.090	4.237 *	442.950	0.954 *	442.640	0.034
25	443.220	9.064 *	443.210	8.174	443.090	4.514	443.090	4.237 *	442.940	1.379	442.630	0.071
26	443.220	8.413	443.210	8.635 *	443.080	4.293	443.080	4.318	442.930	0.662 *	442.620	0.012
27	443.220	9.064 *	443.200	7.863	443.080	4.231	443.080	3.933 *	442.920	0.535 *	442.610	0.010
28	443.220	8.354	443.200	7.787	443.080	3.933 *	443.070	4.084	442.910	0.419 *	442.600	0.010 *
29	443.210	8.048	443.200	7.708	443.070	4.117	443.070	4.003	442.900	0.317 *	442.600	0.010 *
30	443.210	7.997	443.190	7.535			443.060	3.756	442.900	0.110 *	442.620	0.010 *
31	443.200	7.836	443.190	7.806 *			443.060	3.680			442.590	0.010 *
Ten-Daily Mean												
I Ten-Daily	443.325	11.75	443.187	7.407	443.170	6.885	443.057	3.528	443.036	2.992	442.829	0.557
II Ten-Daily	443.260	9.679	443.153	6.403	443.128	5.648	443.125	5.409	442.994	2.001	442.731	0.184
III Ten-Daily	443.222	8.588	443.210	8.266	443.078	4.186	443.081	4.217	442.935	0.902	442.626	0.025
Monthly												
Min.	443.200	7.836	443.140	5.900	443.060	3.933	443.050	3.145	442.900	0.110	442.590	0.010
Max.	443.350	15.47	443.240	9.224	443.190	7.465	443.170	6.871	443.050	3.511	442.880	0.845
Mean	443.267	9.96	443.184	7.388	443.127	5.621	443.087	4.379	442.988	1.965	442.725	0.248

Peak Computed Discharge = 699.3 cumecs on 30/08/2015 Corres. Water Level :447 m
 Lowest Computed Discharge = 0.010 cumecs on 28/05/2016 Corres. Water Level :442.6 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

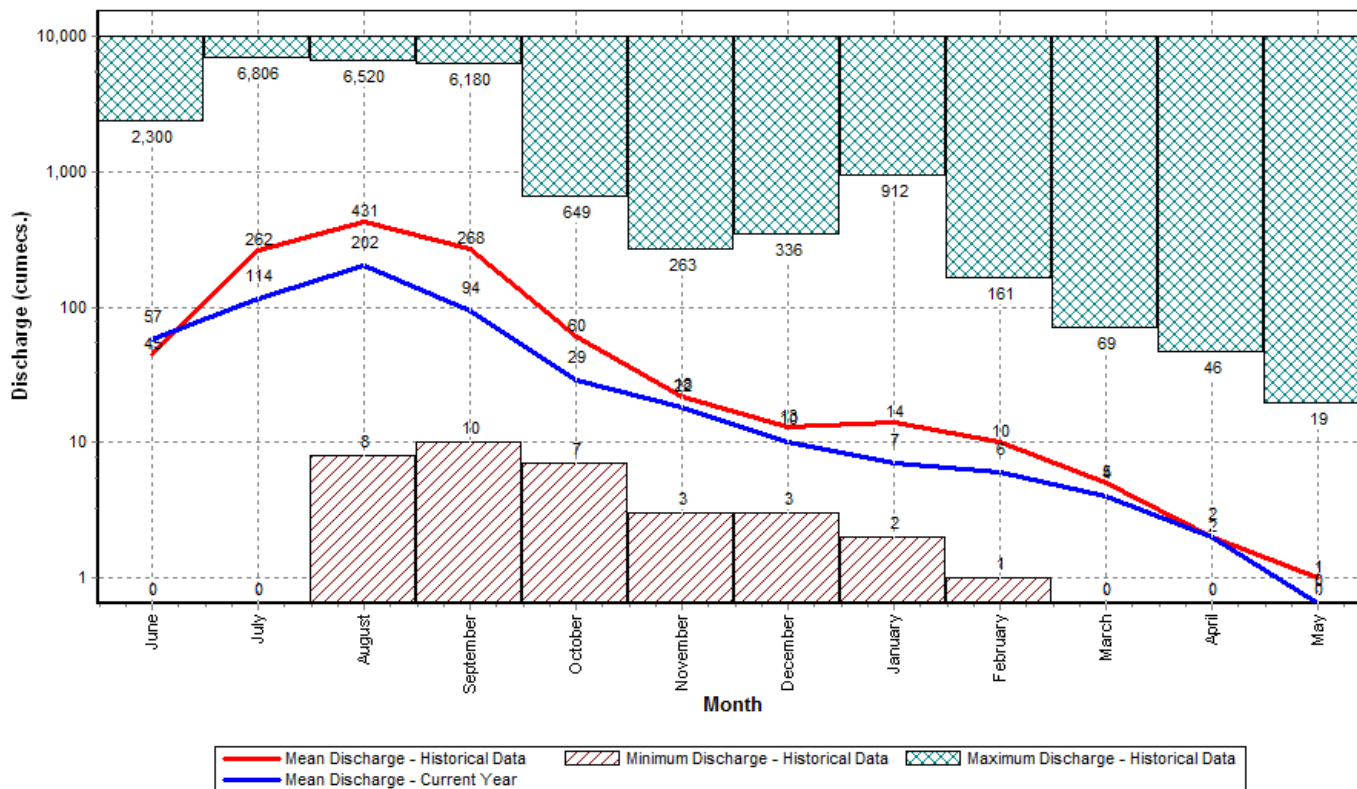
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1977-2016)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



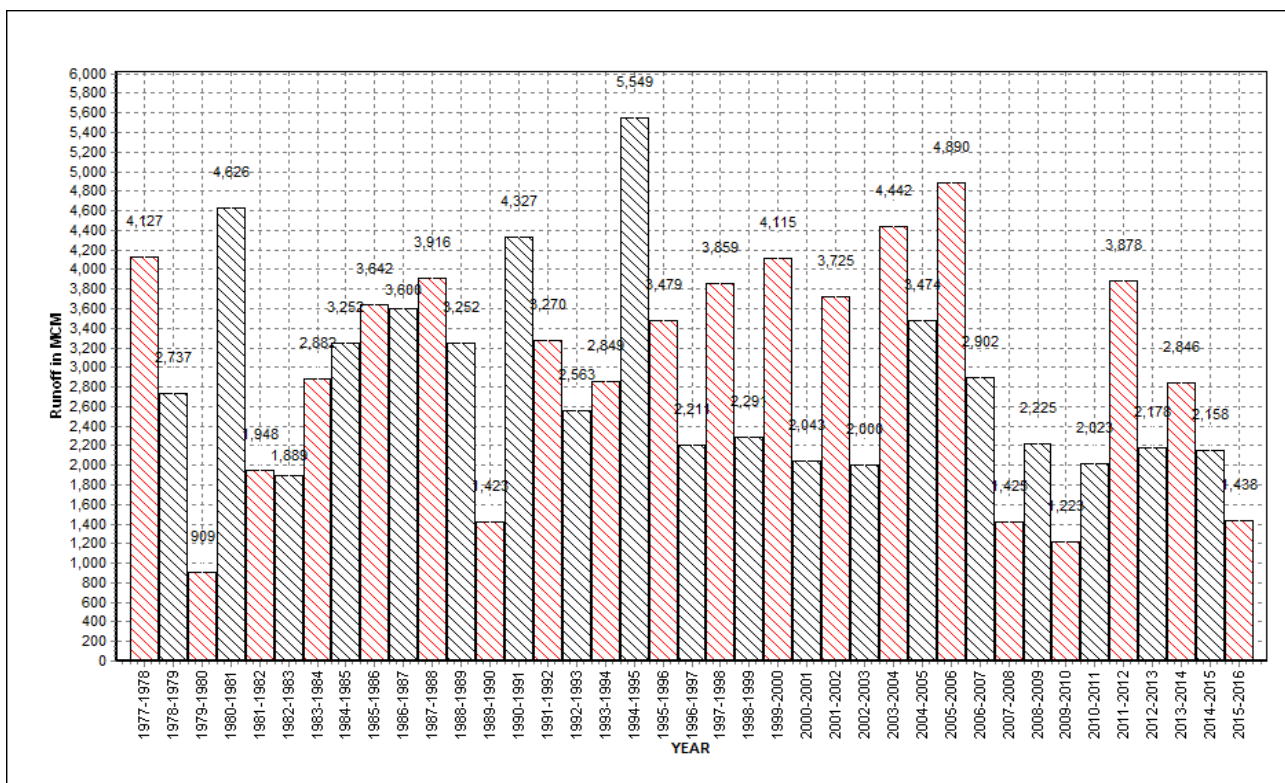
Annual Runoff Values for the period (1977– 2016)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



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

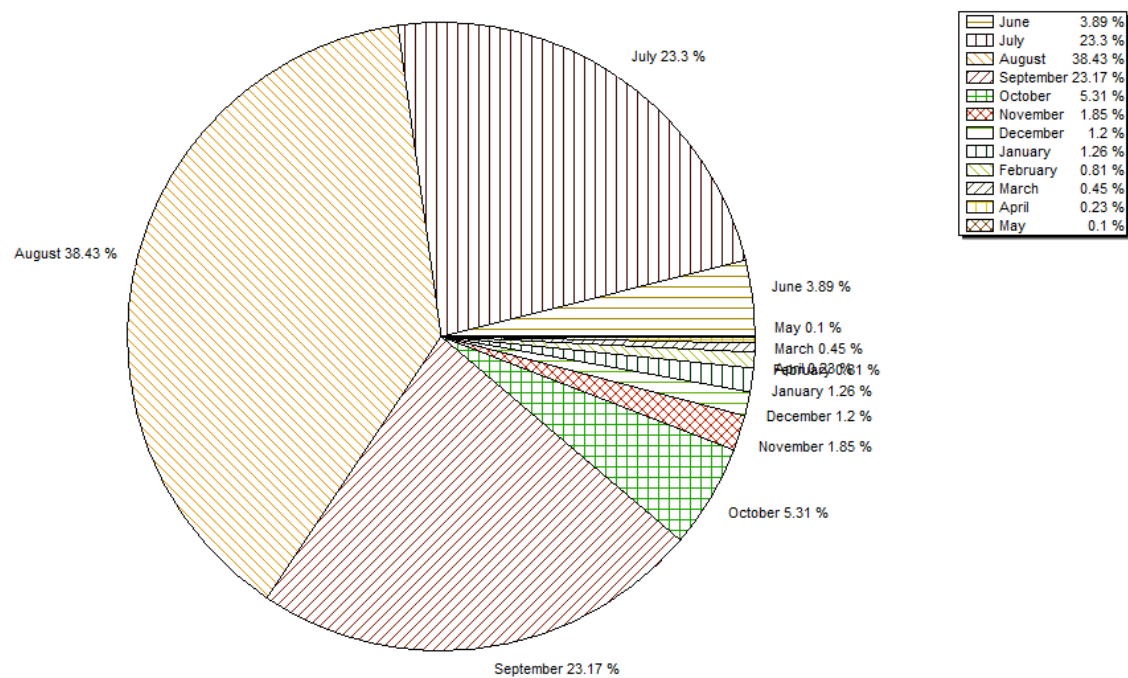
Monthly Average Runoff based on period (1977-2013)

Station Name : Narmada at Manot (010215002)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



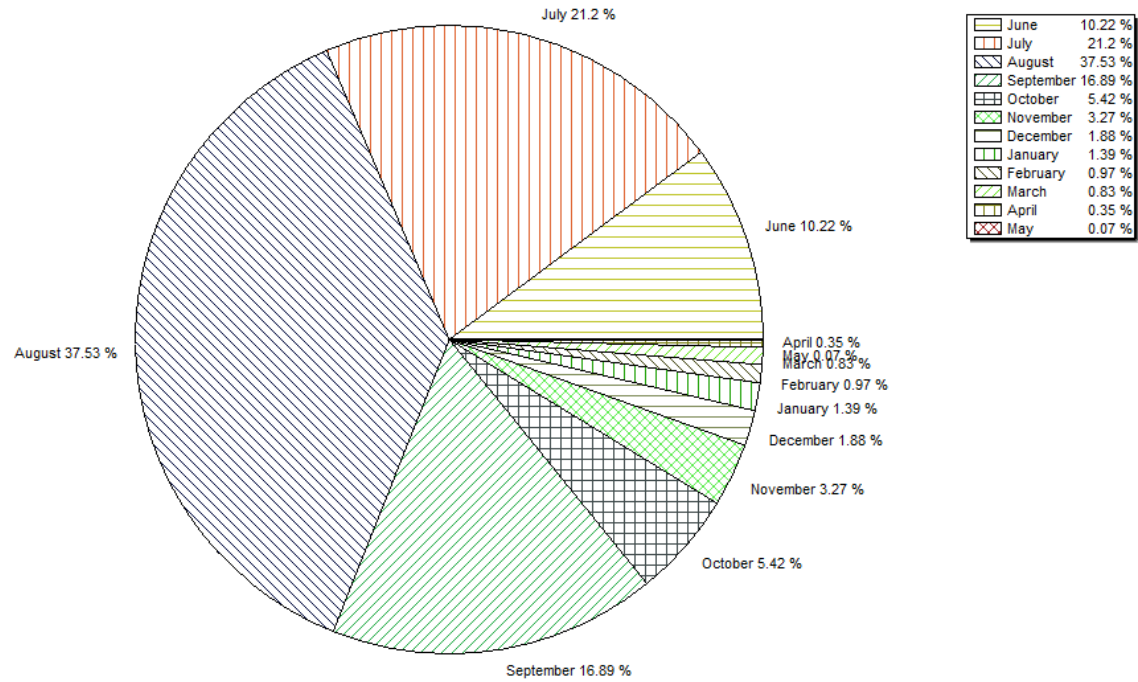
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Manot (010215002)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



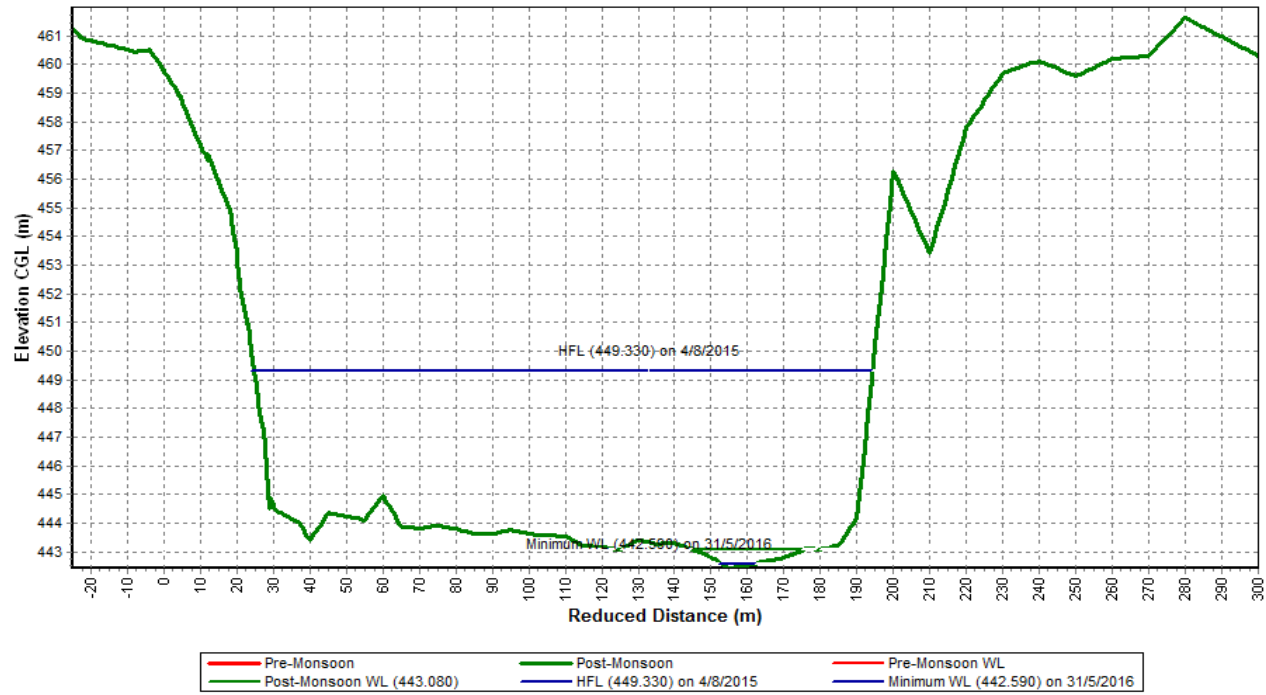
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



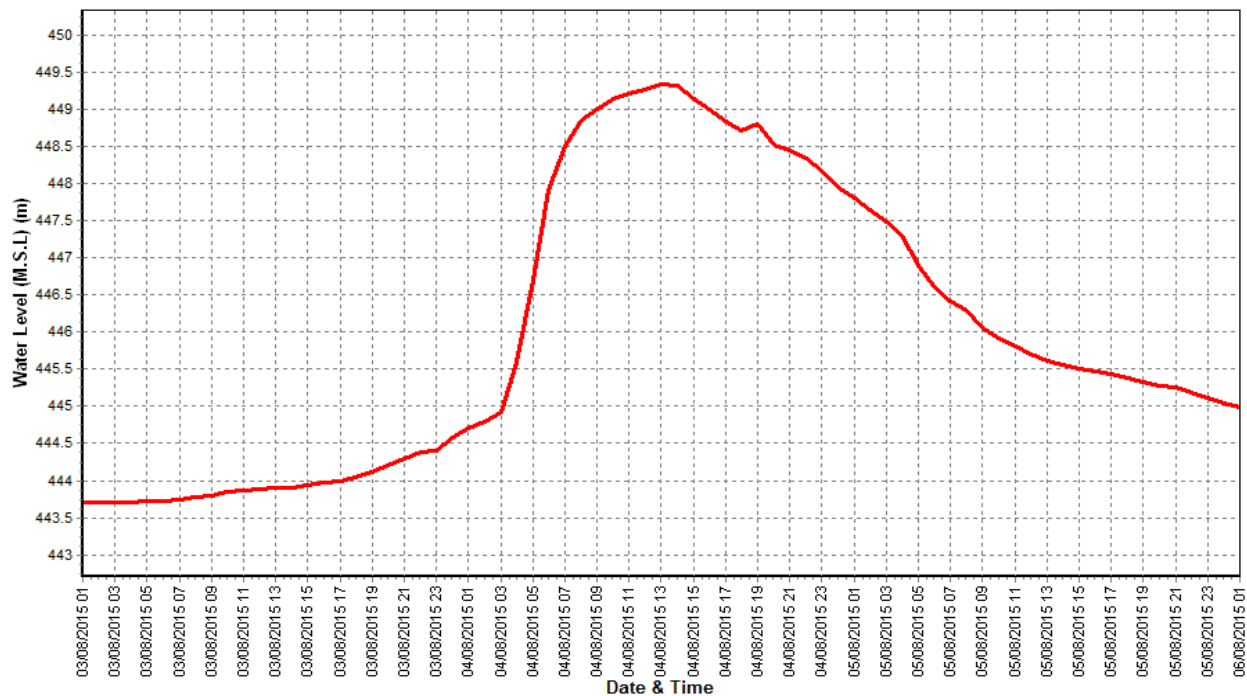
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



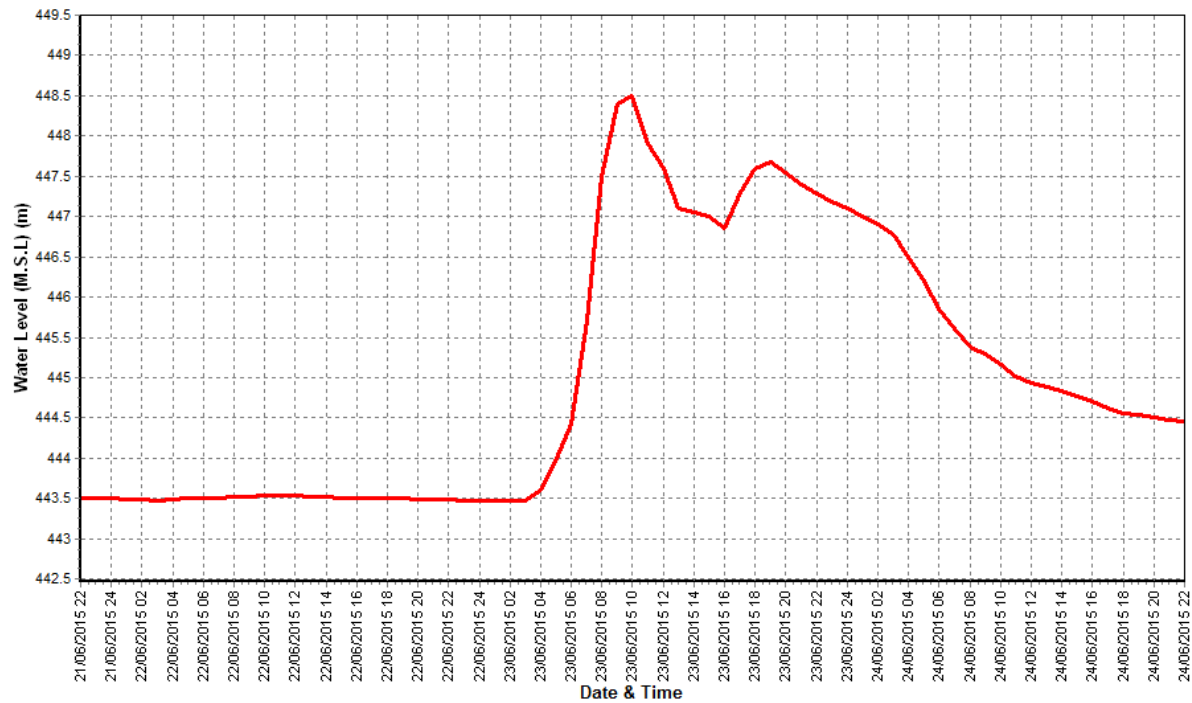
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Manot (010215002)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



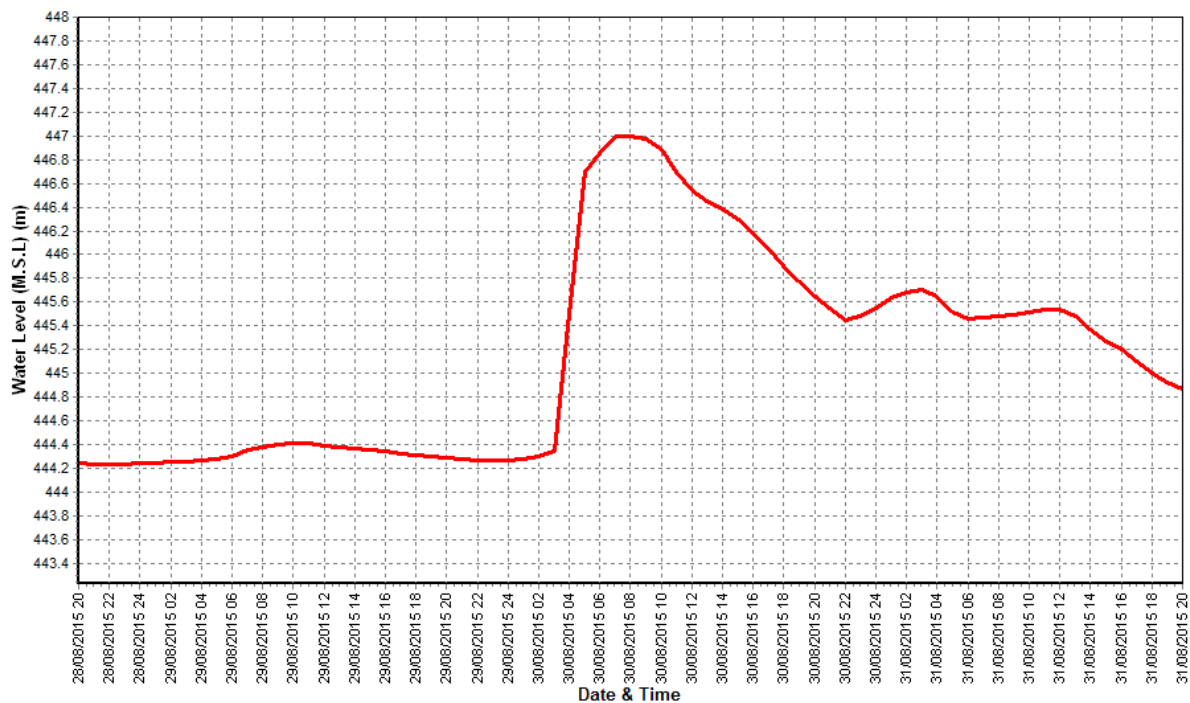
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Manot (010215002)

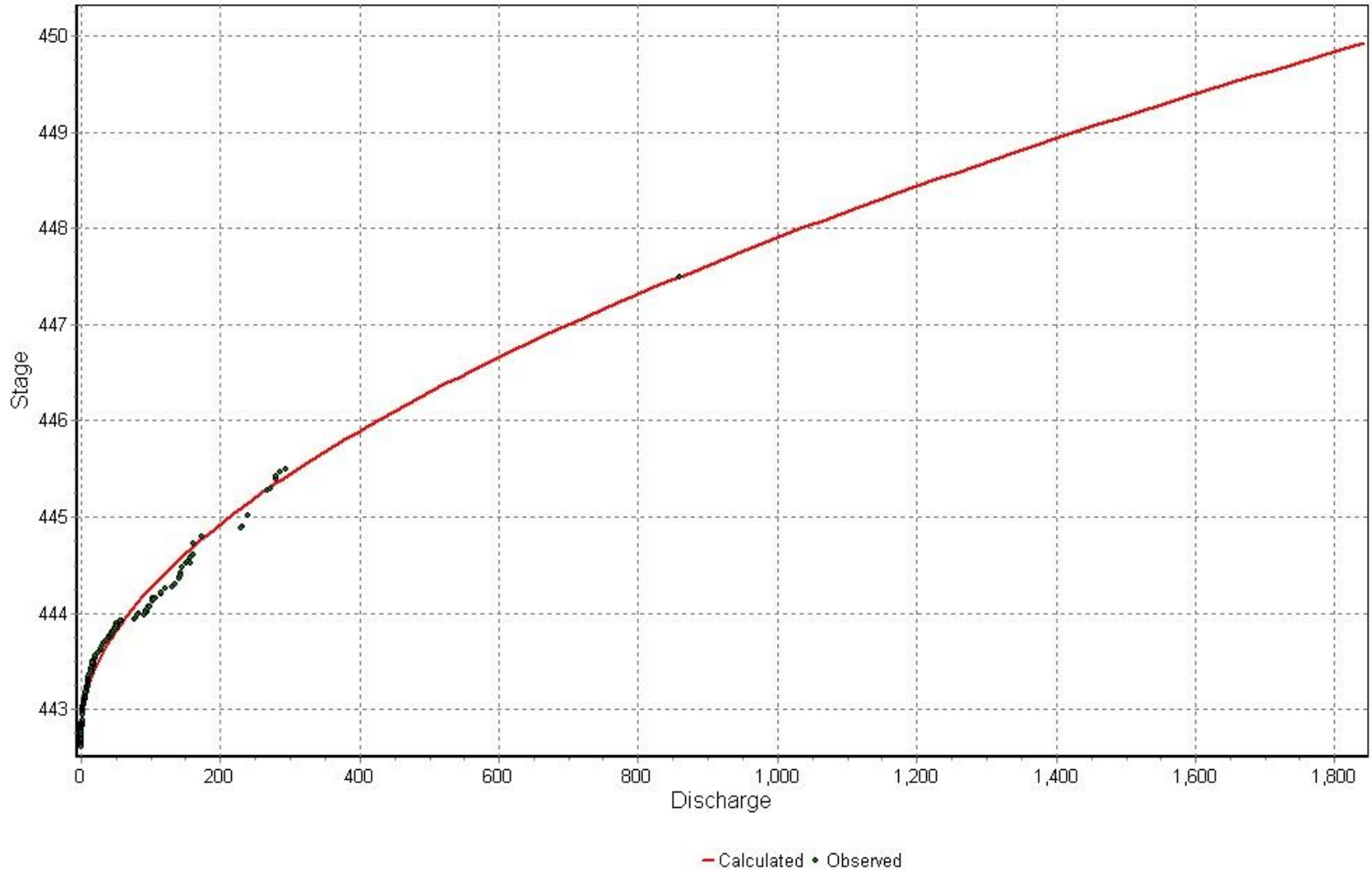
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



STAGE DISCHARGE CURVE OF SITE MANOT 15-16



4.18 Narmada at Dindori

History Sheet

Site	: Narmada at Dindori	Water Year	: 2015-16
State	: Madhya Pradesh	Code	: 010215001
Basin	: Narmada	District	: Dindori
Tributary	:	Independent River	: Narmada
Sub-Sub Tributary	:	Sub Tributary	:
Division	: Narmada Division Bhopal	Local River	: Narmada
Drainage Area	: 2292 Sq. Km.	Sub-Division	: UNSD CWC Jabalpur
Latitude	: 22°56'53"	Bank	: Left
Zero of Gauge (m)	: 660 (M.S.L)	Longitude	: 81°04'34"
	Opening Date	26/06/1988	Closing Date
Gauge	: 26/06/1988		
Discharge	: 01/08/1988		
Sediment	:		
Water Quality	: 15/03/1990		

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

Year	Maximum			Minimum		
	Q (cumecs)	WL (m)	Date	Q (cumecs)	WL (m)	Date
1988-1989	2649	669.000	02/08/1988	0.000		16/07/1988
1989-1990	875.0	665.550	13/08/1989	0.844	662.555	01/06/1989
1990-1991	2250	667.500	05/09/1990	1.000	662.560	19/05/1991
1991-1992	4710	669.640	23/08/1991	1.150	662.585	20/05/1992
1992-1993	3080	668.500	11/09/1992	0.500	662.570	10/05/1993
1993-1994	2560	667.900	27/09/1993	0.300	662.595	05/06/1993
1994-1995	4350	669.450	20/07/1994	0.900	662.550	22/05/1995
1995-1996	1865	667.170	08/08/1995	0.878	662.545	12/06/1995
1996-1997	1515	666.700	01/08/1996	1.026	662.555	06/06/1996
1997-1998	1085	666.110	29/07/1997	1.278	662.595	07/06/1997
1998-1999	1300	666.420	05/07/1998	1.277	662.575	12/05/1999
1999-2000	3907	669.300	31/08/1999	1.091	662.570	31/05/2000
2000-2001	980.0	666.250	19/07/2000	0.480	662.540	20/05/2001
2001-2002	2290	667.020	30/06/2001	0.807	662.540	24/05/2002
2002-2003	1130	666.120	24/06/2002	0.500	662.520	25/05/2003
2003-2004	2400	668.000	29/08/2003	0.497	662.520	11/06/2003
2004-2005	1600	667.000	08/08/2004	0.900	662.530	29/05/2005
2005-2006	1306	666.550	22/08/2005	0.296	662.505	21/05/2006
2006-2007	1882	667.700	31/07/2006	0.296	662.550	14/05/2007
2007-2008	347.6	664.230	21/08/2007	0.413	662.510	20/05/2008
2008-2009	1254	667.000	19/09/2008	0.709	662.480	30/04/2009
2009-2010	772.4	665.750	15/08/2009	5.011	663.520	25/08/2009
2010-2011	490.1	665.400	03/08/2010	5.342	662.640	06/02/2011
2011-2012	1044	666.440	12/08/2011	0.000	662.830	06/11/2011
2012-2013	570.5	665.500	11/08/2012	0.468	663.000	03/07/2012
2013-2014	844.6	665.750	09/08/2013	0.797	662.850	04/06/2013

Stage Discharge Sheet for Narmada at Dindori for the period 2015-16

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	662.520	0.752	663.050	9.052	663.330	11.83	663.890	40.13	663.200	13.56	663.300	15.72 *
2	662.520	0.760	663.090	11.36	663.130	10.95 *	664.160	94.52	663.160	11.69 *	663.050	9.177
3	662.530	1.025	664.140	93.81	663.830	37.94	663.900	42.16	663.190	14.06	662.990	10.44
4	662.600	2.631	663.850	39.76	665.810	664.5	663.920	44.82	663.140	11.19 *	662.950	9.265
5	662.690	4.178	663.530	24.84 *	664.200	99.08	663.820	22.25	663.130	12.49	662.920	8.953
6	662.620	2.589	663.180	16.64	664.020	65.51	663.780	39.36 *	663.040	9.708	662.900	9.113
7	662.620	3.169 *	663.180	17.33	663.980	60.53	663.600	21.49	663.010	10.68	662.890	8.920
8	662.610	2.498	663.210	16.05	663.900	42.61	663.650	25.77	662.980	10.22	662.880	6.157 *
9	662.640	4.054	663.200	11.31	663.840	43.73 *	663.520	19.16	662.960	9.969	662.870	6.697
10	662.710	4.711	664.410	135.7	664.090	85.16	663.300	15.86	662.960	10.03	662.850	8.145
11	662.630	4.107	664.710	231.5	664.770	254.9	663.180	13.70	662.960	7.448 *	662.840	5.585 *
12	662.590	3.116	664.130	70.99 *	664.260	109.7	663.140	12.33	662.950	9.768	662.830	7.985
13	663.720	13.80	663.890	40.27	664.450	144.5	663.280	15.09 *	662.940	4.234	662.800	7.775
14	663.630	29.99 *	663.850	40.07	664.220	104.2	663.290	15.23	662.930	9.274	662.790	7.581
15	663.070	11.31	663.650	25.72	664.250	85.81 *	663.380	16.73	662.910	8.870	662.780	4.811 *
16	662.920	10.02	663.560	20.49	664.070	64.42 *	663.200	14.70	662.890	8.741	662.760	7.445
17	662.795	9.005	663.380	12.92	664.060	72.30	663.880	46.86 *	662.890	8.871	662.750	7.188
18	663.380	14.56	664.200	79.35 *	664.180	96.14	663.910	42.76	662.880	6.157 *	662.730	7.134
19	663.310	13.28	664.220	81.88 *	664.120	88.94	663.740	31.21	662.870	8.686	662.720	6.923
20	662.845	9.362	663.880	38.05	663.960	56.32	663.590	27.83 *	662.860	8.207	662.720	6.759
21	662.830	5.449 *	663.770	30.71	663.880	39.94	664.250	111.2	662.850	8.010	662.710	6.630
22	662.810	8.415	663.630	23.85	663.800	30.32	664.360	126.8	662.840	5.585 *	662.700	3.919 *
23	666.130	908.9	664.250	105.9	663.760	37.98 *	663.930	44.82	662.840	7.843	662.690	5.251
24	663.980	48.79	664.640	209.5	663.655	23.40	663.890	41.65	662.840	5.585 *	662.690	5.244
25	663.500	20.39	664.015	93.55	663.440	20.14	663.770	38.66 *	662.840	5.585 *	662.680	3.719 *
26	663.190	16.85	663.880	46.86 *	663.850	32.31	663.630	22.22	662.830	7.666	662.680	5.172
27	663.070	11.13	663.800	30.03	663.640	24.39	663.470	22.12 *	662.810	7.395	662.670	4.765
28	663.040	8.955 *	663.680	26.28	663.810	31.56	663.375	17.93	662.900	6.563	662.670	4.835
29	662.980	7.434	663.530	18.60	663.650	25.15	663.310	16.54	662.930	9.319	662.660	3.527 *
30	663.230	16.84	663.430	15.46	663.650	31.12 *	663.250	15.39	663.450	18.82	662.660	4.538
31			663.370	12.72	663.990	53.16			663.280	15.99		
Ten-Daily Mean												
I Ten-Daily	662.606	2.637	663.484	37.59	664.013	112.2	663.754	36.55	663.077	11.36	662.960	9.259
II Ten-Daily	663.089	11.85	663.947	64.13	664.234	107.7	663.459	23.64	662.908	8.026	662.772	6.919
III Ten-Daily	663.476	105.3	663.818	55.77	663.739	31.77	663.724	45.73	662.946	8.942	662.681	4.760
Monthly												
Min.	662.520	0.752	663.050	9.052	663.130	10.95	663.140	12.33	662.810	4.234	662.660	3.527
Max.	666.130	908.9	664.710	231.5	665.810	664.5	664.360	126.8	663.450	18.82	663.300	15.72
Mean	663.057	39.94	663.752	52.6	663.987	82.21	663.646	35.31	662.976	9.426	662.804	6.979

Annual Runoff in MCM = 128 Annual Runoff in mm = 56

Peak Observed Discharge = 908.9 cumecs on 23/06/2015 Corres. Water Level :666.13 m

Lowest Observed Discharge = 0.611 cumecs on 10/05/2016 Corres. Water Level :662.56 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

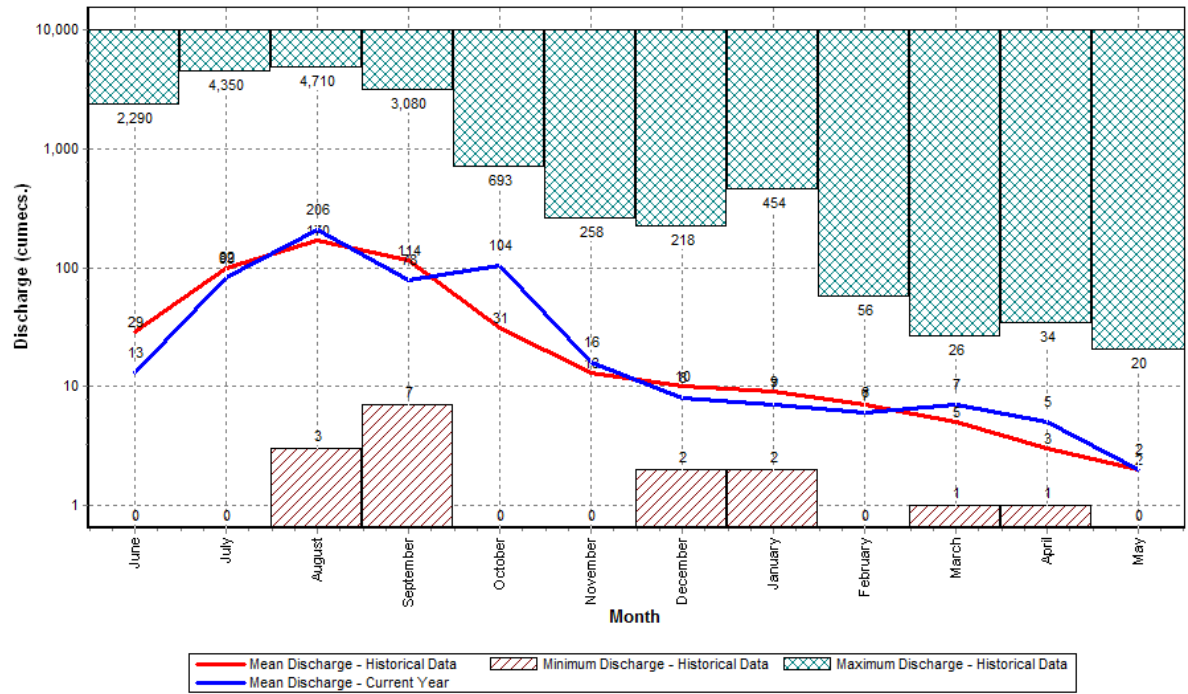
Stage Discharge Sheet for Narmada at Dindori for the period 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	662.650	4.200	662.630	3.734	662.700	5.453	662.600	2.711	662.680	2.136	662.580	-999.990 *
2	662.650	4.166	662.630	3.711	662.690	5.466	662.600	2.697	662.660	1.931	662.580	0.745
3	662.640	4.124	662.640	3.169 *	662.690	5.203	662.600	2.654	662.650	3.435 *	662.570	0.732
4	662.630	3.864	662.620	3.535	662.680	5.076	662.580	2.501	662.640	1.769	662.570	0.714
5	662.630	3.872	662.620	3.340	662.680	3.227	662.580	2.497	662.640	1.735	662.580	0.737
6	662.630	3.256 *	662.620	3.495	662.660	3.599	662.580	-999.990 *	662.640	1.698	662.560	0.706
7	662.630	3.783	662.630	3.562	662.660	3.527 *	662.680	2.956	662.580	1.570	662.560	0.658
8	662.630	3.780	662.620	3.380	662.660	3.696	662.700	3.411	662.640	1.764	662.560	-999.990 *
9	662.630	3.675	662.620	3.372	662.650	2.468	662.720	3.874	662.640	1.718	662.560	0.663
10	662.630	3.670	662.630	3.084 *	662.650	2.745	662.610	2.976	662.640	3.344 *	662.560	0.611
11	662.630	3.818	662.610	3.338	662.640	2.410	662.600	2.995	662.650	1.763	662.560	0.629
12	662.630	3.586	662.610	3.382	662.640	2.105	662.600	3.150	662.630	1.436	662.560	0.684
13	662.630	3.256 *	662.610	3.273	662.640	2.337	662.600	3.001 *	662.630	1.563	662.560	0.618
14	662.630	3.681	662.610	3.261	662.980	7.803 *	662.600	3.091	662.620	3.169 *	662.570	0.629
15	662.630	3.718	662.610	3.295	662.980	10.67	662.700	3.438	662.610	3.084 *	662.570	-999.990 *
16	662.630	3.611	662.610	3.440	662.980	6.311	662.740	3.817	662.600	1.458	662.570	0.693
17	662.630	3.478	662.630	3.256 *	662.980	4.244	662.760	4.121	662.590	-999.990 *	662.570	0.653
18	662.630	3.404	662.650	4.043	662.980	3.958	662.710	3.265	662.590	1.337	662.570	0.688
19	662.630	3.384	662.710	6.716	663.000	3.324	662.710	3.251	662.590	1.252	662.570	0.666
20	662.630	3.256 *	662.800	8.337	663.000	3.078	662.690	3.818 *	662.580	-999.990 *	662.570	0.620
21	662.630	3.399	662.800	7.879	662.980	7.803 *	662.680	2.941	662.580	1.223	662.570	0.580 *
22	662.630	3.559	662.800	7.815	662.970	3.112	662.660	2.302	662.580	0.966	662.570	0.580 *
23	662.630	3.807	662.750	7.290	662.960	3.158	662.660	2.347	662.580	0.903	662.570	0.657
24	662.630	3.256 *	662.630	4.235 *	662.960	2.996	662.650	3.435 *	662.570	0.668	662.570	0.668
25	662.630	3.256 *	662.730	7.197	662.620	2.345	662.640	3.344 *	662.570	0.816	662.850	4.468
26	662.630	3.643	662.630	4.235 *	662.620	2.697	662.620	2.295	662.570	0.786	662.640	2.353
27	662.630	3.256 *	662.720	6.832	662.650	2.895	662.620	3.169 *	662.570	0.768	662.600	2.208
28	662.630	3.710	662.710	6.528	662.620	3.169 *	662.660	2.196	662.580	0.868	662.600	2.286
29	662.630	3.798	662.710	6.735	662.600	2.654	662.660	2.200	662.580	0.823	662.600	3.001 *
30	662.630	3.457	662.710	6.370			662.690	2.179	662.580	0.761	662.600	2.301
31	662.630	3.376	662.630	3.919 *			662.690	2.179			662.600	2.381
Ten-Daily Mean												
I Ten-Daily	662.635	3.839	662.626	3.438	662.672	4.046	662.625	-97.371	662.641	2.110	662.568	-199.442
II Ten-Daily	662.630	3.519	662.645	4.234	662.882	4.624	662.671	3.395	662.609	-198.492	662.567	-99.411
III Ten-Daily	662.630	3.502	662.711	6.276	662.776	3.425	662.657	2.599	662.576	0.858	662.615	1.953
Monthly												
Min.	662.630	3.256	662.610	3.084	662.600	2.105	662.580	-999.990	662.570	-999.990	662.560	-999.990
Max.	662.650	4.200	662.800	8.337	663.000	10.67	662.760	4.121	662.680	3.435	662.850	4.468
Mean	662.632	3.616	662.662	4.702	662.777	4.053	662.651	-29.393	662.609	-65.174	662.585	-95.711

Peak Computed Discharge = 85.81 cumecs on 15/08/2015 Corres. Water Level :664.25 m
 Lowest Computed Discharge = -999.990 cumecs on 06/03/2016 Corres. Water Level :662.58 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**

Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 1988-2016)



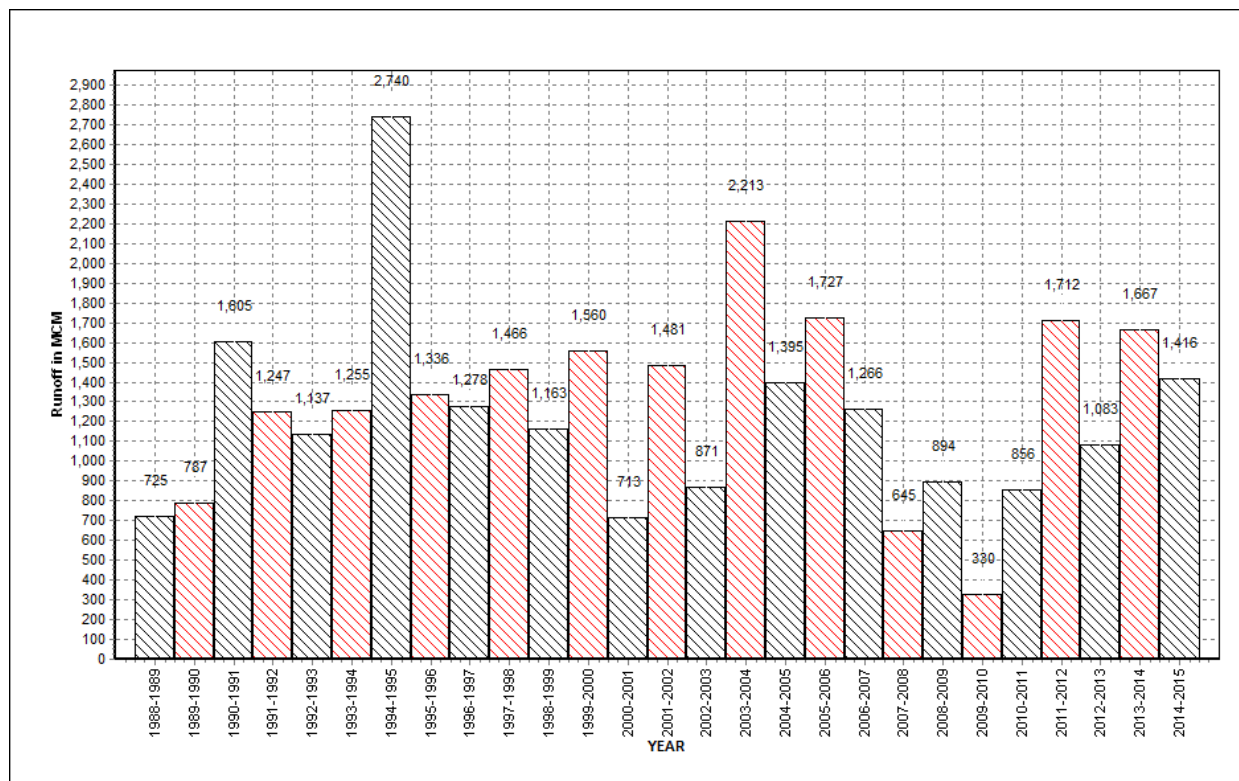
Annual Runoff Values for the period (1988– 2016)

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

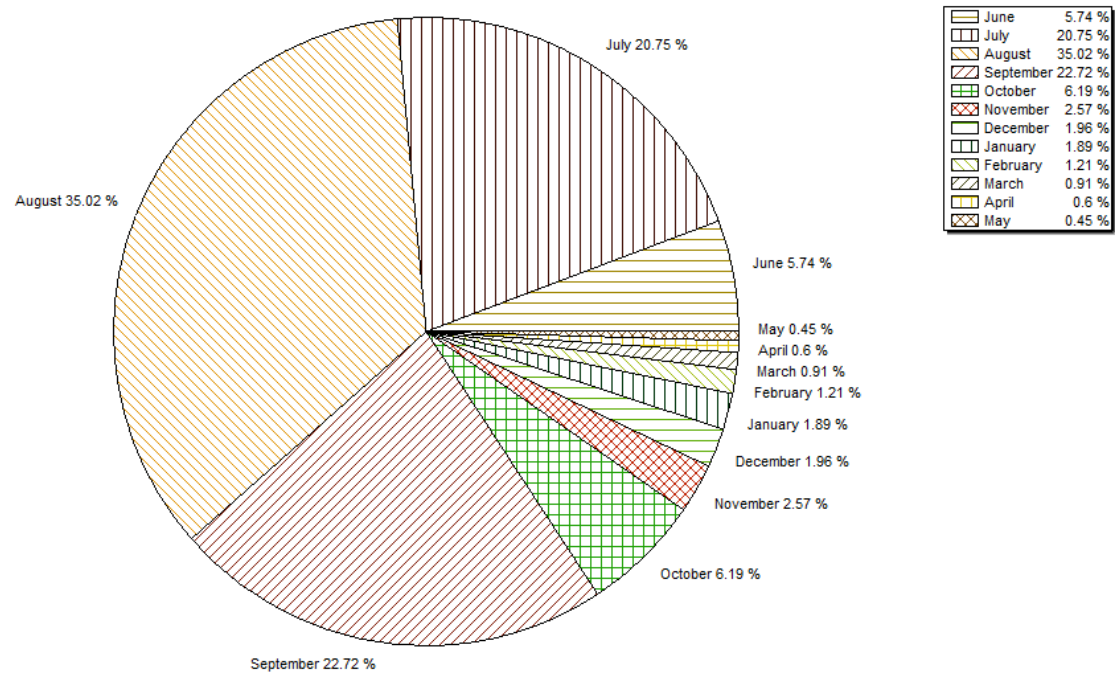
Monthly Average Runoff based on period (1988-2014)

Station Name : Narmada at Dindori (010215001)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



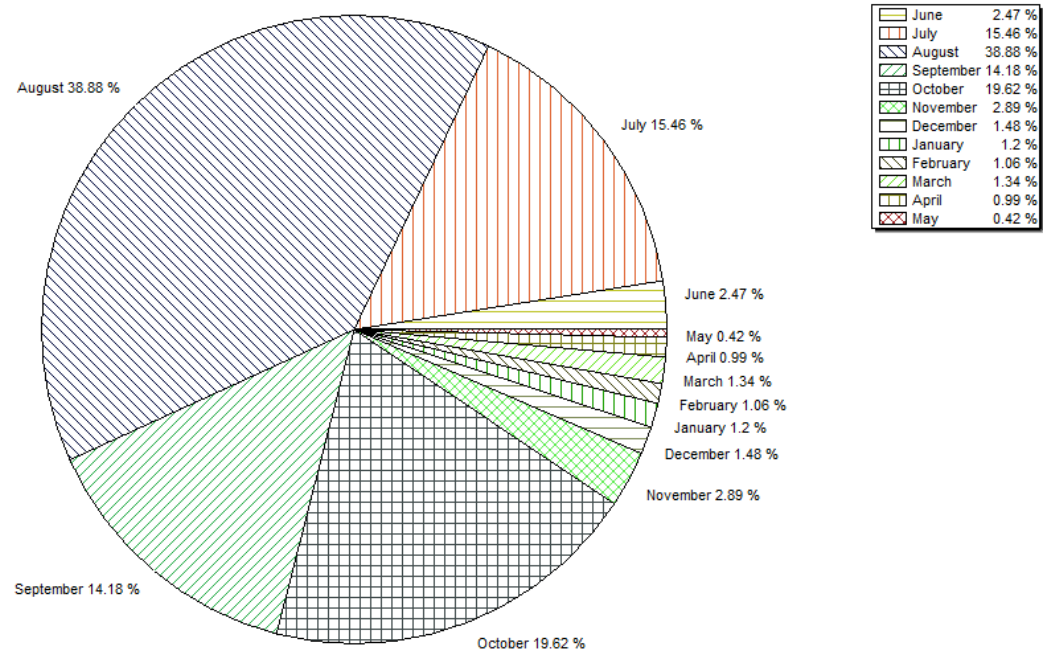
Monthly Runoff for the Year (2015-16)

Station Name : Narmada at Dindori (010215001)

Local River : Narmada

Division : Narmada Division, Bhopal

Sub-Division : UNSD, CWC Jabalpur



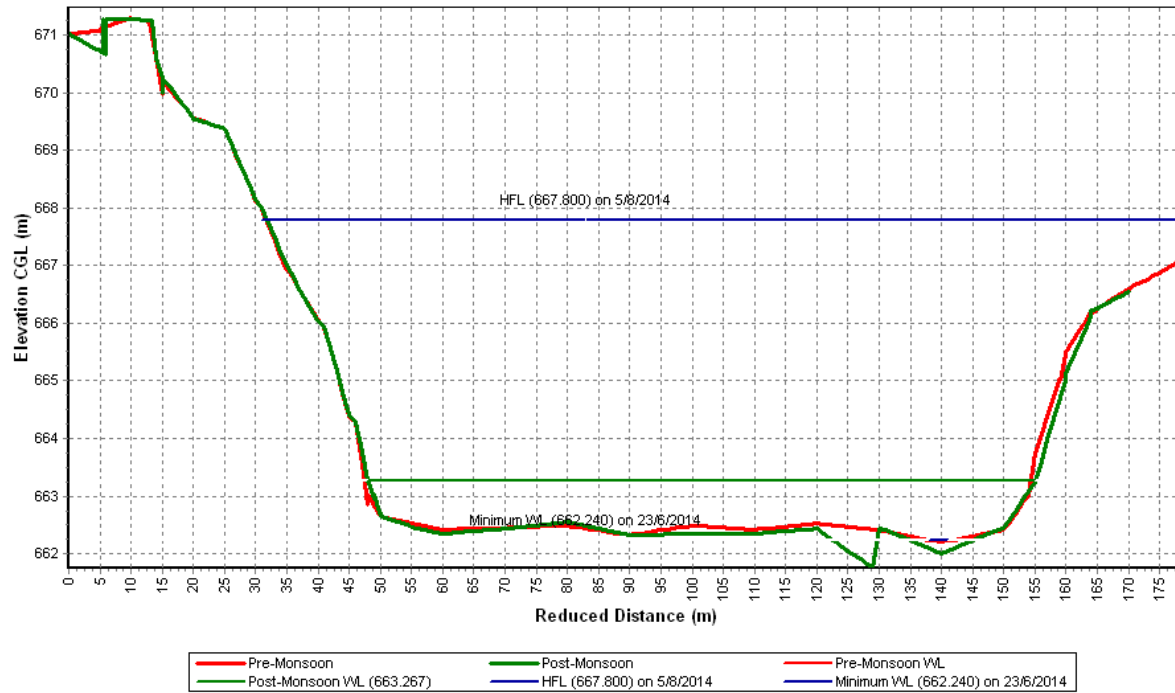
Pre-Monsoon & Post-Monsoon X-Section for Water Year (2015-16)

Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



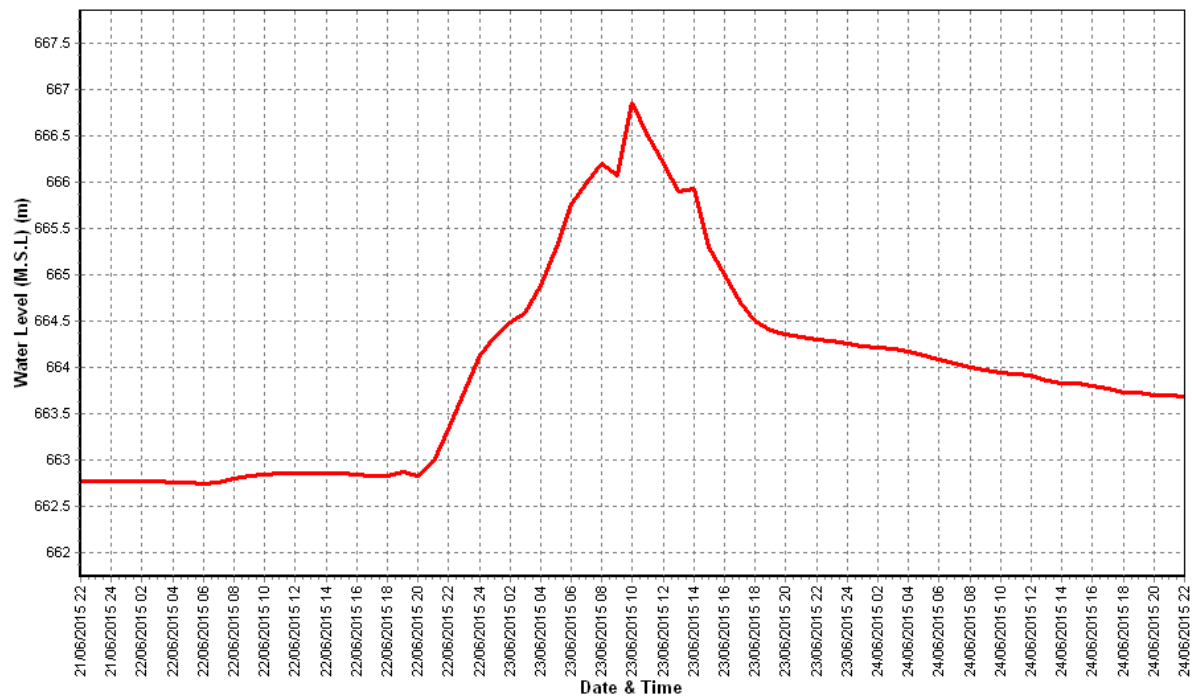
Water Level vs. Time - Graph of Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



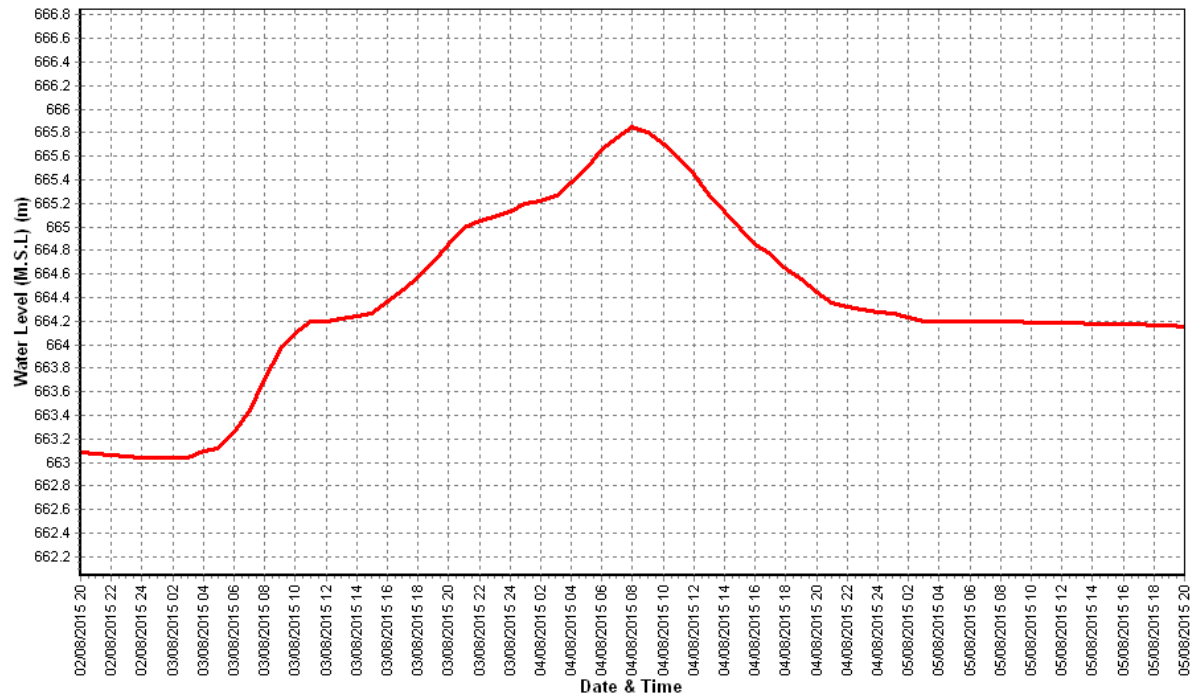
Water Level vs. Time - Graph of 2nd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Dindori (010215001)

Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



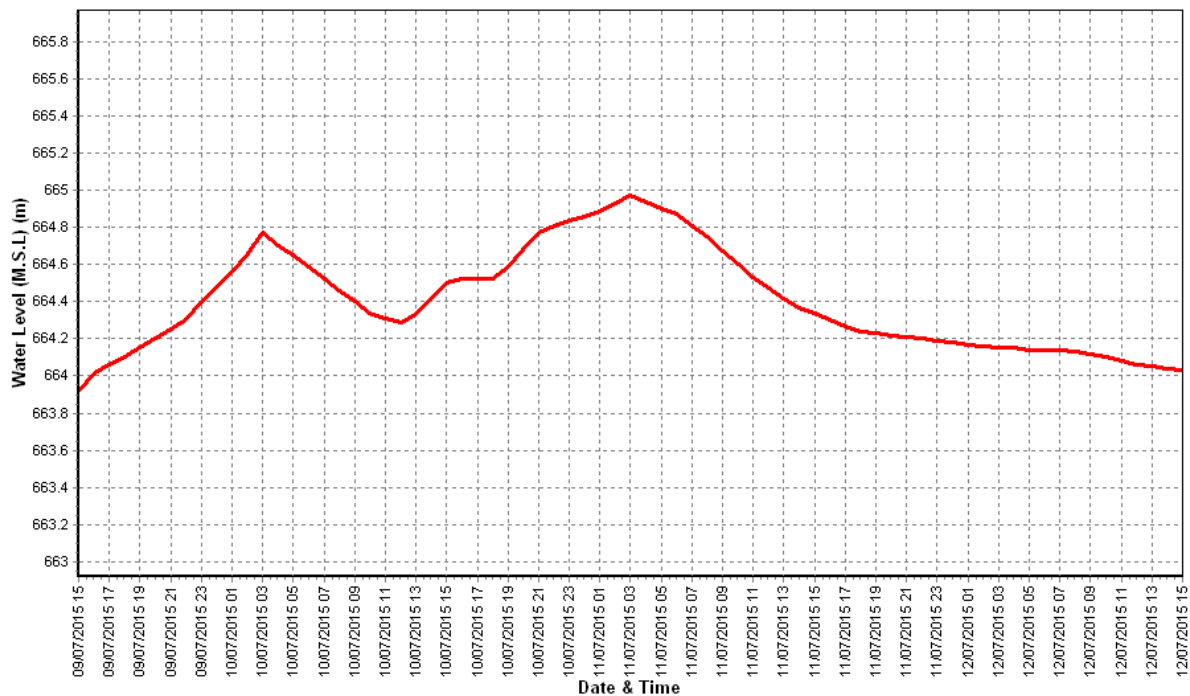
Water Level vs. Time - Graph of 3rd Highest Flood Peak during the Year (2015-16)

Station Name : Narmada at Dindori (010215001)

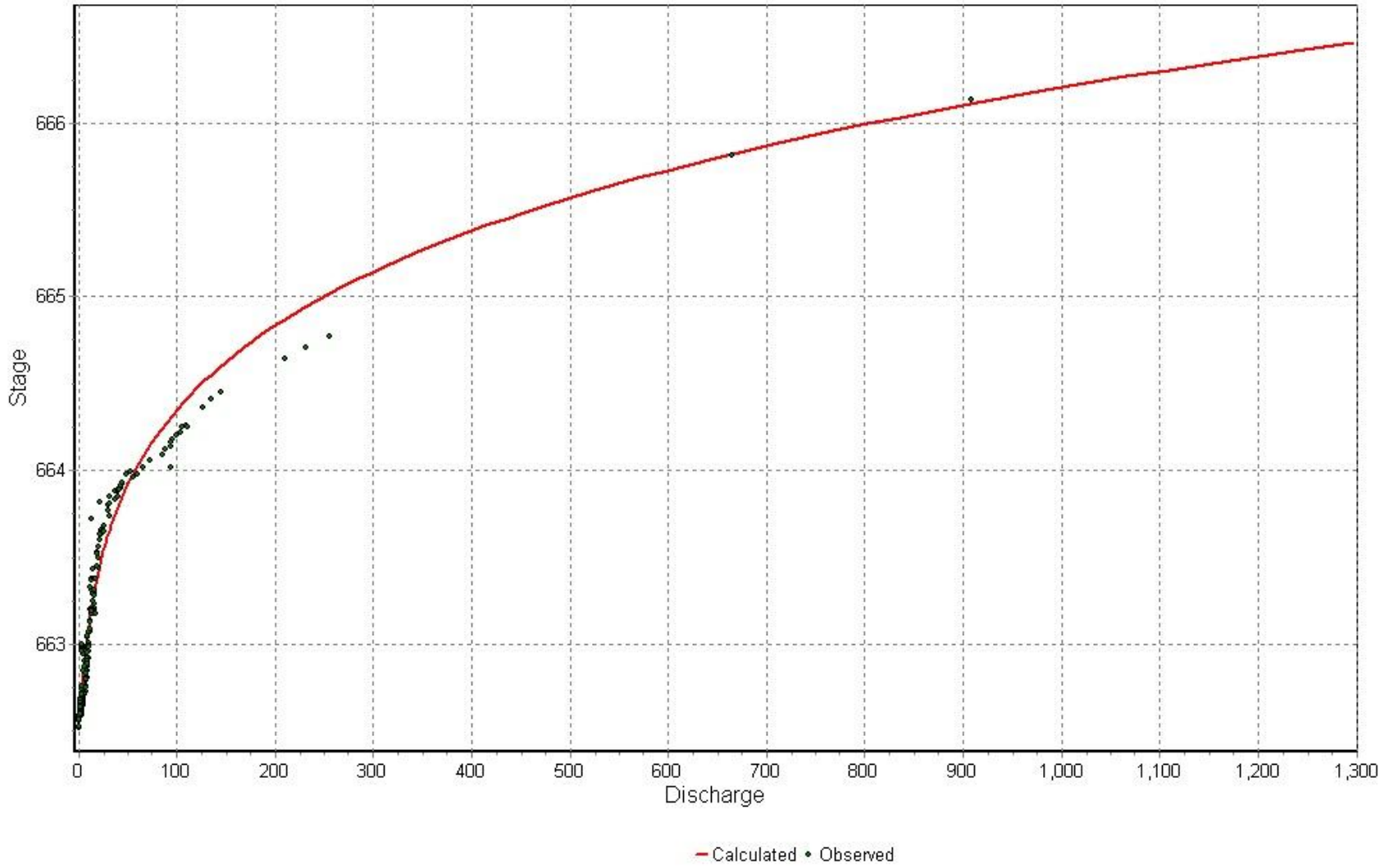
Division : Narmada Division, Bhopal

Local River : Narmada

Sub-Division : UNSD, CWC Jabalpur



STAGE DISCHARGE CURVE OF SITE DINDORI 15-16



4.19 Narmada at Bijora

History sheet

Site	: Narmada at Bijora	Water Year	: 2015-16
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	Closing Date
Gauge	: 01/06/1950		
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

Stage Discharge Sheet for Narmada at Bijora for the period 2015-16

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	10.42	368.000	92.99	369.700	202.0	368.000	210.0	369.700	173.0	369.300	194.0 *
2	368.000	10.42	368.000	95.99	368.000	184.0	368.000	173.0	368.000	184.0	369.300	191.0 *
3	368.000	10.42	369.300	95.00	368.000	203.0	368.000	190.0	369.300	194.0	368.000	191.0 *
4	369.700	10.47	368.000	101.0	368.000	206.0	368.000	184.0	368.000	174.0	368.000	187.0
5	369.300	10.46	368.000	95.00	368.000	196.0	368.000	184.0	369.700	192.0	368.000	196.0
6	369.700	10.47	368.000	91.01	368.000	200.0	368.000	188.0	369.700	186.0	368.000	192.0
7	368.000	10.42	369.300	180.0	369.700	188.0	368.000	180.0	369.300	196.0	368.000	197.0
8	369.300	10.46	368.000	188.0	369.700	209.0	368.000	155.0	368.000	194.0	368.000	150.0
9	368.000	10.42	368.000	198.0	368.000	192.0	368.000	191.0	369.700	190.0	368.000	181.0
10	368.000	10.42	368.000	185.0	368.000	197.0	368.000	193.0	369.700	189.0	368.000	185.0
11	368.000	10.42	369.300	198.0	368.000	209.0	368.000	191.0	369.300	182.0	368.000	190.0
12	368.000	10.42	368.000	178.0	368.000	210.0	368.000	192.0	369.300	181.0	368.000	180.0
13	368.000	10.42	368.000	197.0	368.000	195.3	368.000	193.0	369.700	183.0	368.000	190.0
14	368.000	10.42	368.000	187.0	369.300	210.0	368.000	194.0	369.700	192.0	369.700	143.0
15	369.700	10.47	368.000	192.0	368.000	212.0	368.000	193.0	369.700	188.3	369.700	196.0
16	368.000	10.42	369.300	197.0	368.000	186.0	369.300	188.0	368.000	199.0	368.000	200.0
17	369.300	10.46	368.000	192.0	369.700	206.0	368.000	199.0	368.000	185.0	369.300	188.0
18	369.300	10.46	368.000	190.0	368.000	202.0	368.000	188.0	368.000	190.0	369.700	187.0
19	368.000	10.42	368.000	194.0	369.700	207.0	368.000	94.01	368.000	198.0	369.700	188.0
20	369.300	10.46	368.000	190.0	368.000	183.0	368.000	183.0	368.000	152.0	369.700	196.0
21	368.000	10.42	368.000	194.0	369.700	194.0	368.000	200.0	368.000	196.0	369.700	175.0
22	368.000	10.42	368.000	186.0	369.700	187.0	368.000	184.0	368.000	174.0	369.700	194.0
23	369.300	10.46	368.000	191.0	369.700	200.0	368.000	178.0	369.700	137.0	369.700	182.0
24	368.000	10.42	368.000	195.0	368.000	213.0	368.000	180.0	368.000	194.0	369.700	173.0
25	368.000	10.42	368.000	201.0	368.000	172.0	369.700	184.0	369.700	194.0	369.700	188.0
26	368.000	10.42	368.000	186.0	368.000	216.0	369.300	168.0	369.000	199.0	369.700	198.0
27	368.000	10.42	369.300	201.0	368.000	190.0	368.000	174.0	368.000	94.01	369.300	195.0
28	368.000	10.42	368.000	197.0	368.000	190.0	369.700	190.0	368.000	167.0	369.300	181.0
29	369.300	10.46	368.000	194.0	368.000	148.0	368.000	198.0	368.000	194.0	369.300	178.0
30	368.000	10.42	368.000	185.0	368.000	206.0	368.000	173.0	369.300	179.0	369.300	194.0
31			368.000	207.0	368.000	191.0			369.300	197.0		
Ten-Daily Mean												
I Ten-Daily	368.600	10.44	368.260	132.2	368.510	197.7	368.000	184.8	369.110	187.2	368.260	186.4
II Ten-Daily	368.560	10.44	368.260	191.5	368.470	202.0	368.130	181.5	368.770	185.0	368.980	185.8
III Ten-Daily	368.260	10.43	368.118	194.3	368.464	191.5	368.470	182.9	368.636	175.0	369.540	185.8
Monthly												
Min.	368.000	10.42	368.000	91.01	368.000	148.0	368.000	94.01	368.000	94.01	368.000	143.0
Max.	369.700	10.47	369.300	207.0	369.700	216.0	369.700	210.0	369.700	199.0	369.700	200.0
Mean	368.473	10.43	368.210	173.4	368.481	196.9	368.200	183.1	368.832	182.2	368.927	186

Annual Runoff in MCM = 4714 Annual Runoff in mm = 324

Peak Observed Discharge = 216.0 cumecs on 26/08/2015 Corres. Water Level :368 m

Lowest Observed Discharge = 10.42 cumecs on 01/06/2015 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

Stage Discharge Sheet for Narmada at Bijora for the period 2015-16

Day	Dec		Jan		Feb		Mar		Apr		May	
	W.L	Q	WL	Q	WL	Q	WL	Q	WL	Q	WL	Q
1	369.700	194.0	369.700	187.0	369.300	83.00	369.300	209.0	369.300	200.0	369.300	102.0
2	369.300	188.0	369.700	188.0	369.300	83.99	369.300	210.0	369.300	201.0	369.300	209.0
3	368.000	166.0	369.700	198.0	369.300	83.99	369.300	212.0	369.300	103.0	369.300	104.0
4	369.700	185.0	369.700	187.0	369.300	86.00	369.300	205.0	369.300	106.0	369.300	104.0
5	369.300	176.0	369.700	199.0	369.300	85.01	369.300	106.0	369.700	106.0	369.300	104.0
6	369.300	186.0	369.700	192.0	369.300	83.99	369.300	200.0	369.300	101.0	369.300	105.0
7	369.700	198.0	369.700	187.0	369.300	83.00	369.300	106.0	369.300	106.0	369.300	104.0
8	369.700	200.0	369.700	192.0	369.300	86.00	369.300	183.0	369.300	106.0	369.300	102.0
9	369.700	198.0	369.700	187.0	369.300	86.00	369.300	105.0	368.000	97.01	369.300	101.0
10	369.300	194.0	369.300	192.0	369.300	83.99	369.300	105.0	369.300	106.0	369.300	102.0
11	369.700	191.0	369.700	194.0	369.300	83.99	369.700	214.0	368.000	106.0	369.300	102.0
12	369.300	198.0	369.300	204.0	369.300	83.99	369.300	209.0	369.300	106.0	369.300	102.0
13	369.300	200.0	369.700	204.0	369.300	83.99	369.700	200.0	369.300	98.99	369.300	103.0
14	369.300	197.0	369.700	206.0	369.300	83.99	369.700	199.9	369.300	106.0	369.300	106.0
15	368.000	188.0	369.300	103.0	369.300	83.00	368.000	182.0	369.300	106.0	369.300	103.0
16	369.700	196.0	369.300	102.0	369.300	86.00	368.000	196.0	369.300	106.0	369.300	103.0
17	369.700	187.0	369.300	100.0	369.300	84.98	369.300	205.0	369.300	108.0	369.300	102.0
18	369.700	190.0	369.300	83.00	369.300	84.98	369.700	188.0	369.300	106.0	369.300	103.0
19	369.700	197.0	369.300	83.00	369.300	172.0	369.700	203.0	369.300	108.0	369.300	103.0
20	369.700	186.0	369.300	83.00	369.300	83.99	368.000	189.0	369.300	106.0	369.300	103.0
21	369.700	175.0	369.300	83.00	369.300	177.0	369.700	211.0	369.300	106.0	369.300	102.0
22	369.700	194.0	369.300	83.00	369.300	170.0	369.300	199.0	369.300	108.0	369.300	99.99
23	369.700	197.0	369.300	83.00	369.300	179.0	369.300	195.0	369.300	107.0	369.300	101.0
24	368.000	178.0	369.300	83.00	369.300	94.01	369.300	214.0	369.300	207.0	369.300	99.99
25	368.000	183.0	369.300	83.00	369.300	212.0	368.000	202.0	369.300	104.0	369.300	98.99
26	369.700	202.0	369.300	83.00	369.300	106.0	369.300	198.0	369.300	200.0	369.300	99.99
27	369.700	189.0	369.300	83.00	369.300	106.0	369.300	193.0	369.700	104.0	369.300	101.1
28	369.700	195.0	369.300	83.00	368.000	201.0	368.000	201.0	369.300	214.0	369.300	99.99
29	369.700	186.0	369.300	85.01	369.300	213.0	369.300	198.0	369.300	105.0	368.000	102.8
30	369.700	190.0	369.300	83.99			369.700	205.0	369.300	206.0	369.300	45.00
31	369.700	181.0	369.300	74.50			369.700	211.0			368.000	32.82
Ten-Daily Mean												
I Ten-Daily	369.370	188.5	369.660	190.9	369.300	84.49	369.300	164.1	369.210	123.2	369.300	113.7
II Ten-Daily	369.410	193.0	369.420	136.2	369.300	93.09	369.110	198.6	369.170	105.7	369.300	103.0
III Ten-Daily	369.391	188.2	369.300	82.50	369.156	162.0	369.173	202.4	369.340	146.1	369.064	89.42
Monthly												
Min.	368.000	166.0	369.300	74.50	368.000	83.00	368.000	105.0	368.000	97.01	368.000	32.82
Max.	369.700	202.0	369.700	206.0	369.300	213.0	369.700	214.0	369.700	214.0	369.300	209.0
Mean	369.390	189.8	369.455	134.8	369.255	111.5	369.194	188.8	369.240	125	369.216	101.6

Peak Computed Discharge = 194.0 cumecs on 01/11/2015 Corres. Water Level :369.3 m

Lowest Computed Discharge = 191.0 cumecs on 02/11/2015 Corres. Water Level :369.3 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

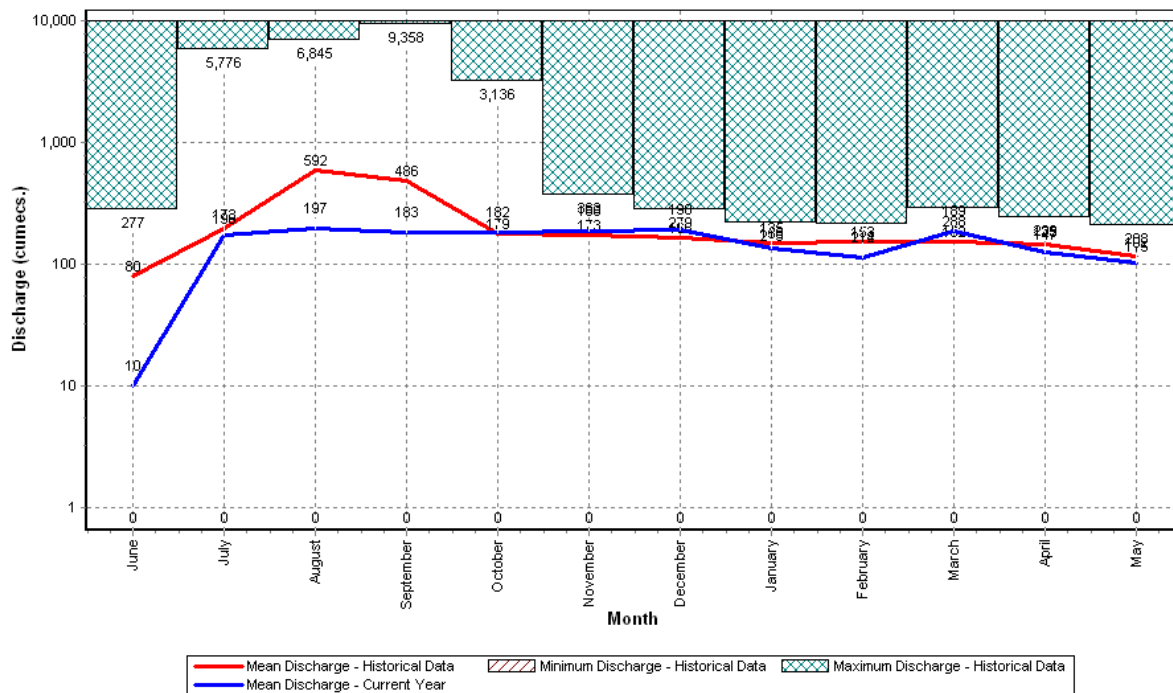
Histogram- Hydrograph for Water Year : 2015-16 (Data considered : 2000-2016)

Station Name : Narmada at Bijora (NA)

Division : DDPC, Bhopal

Local River : Narmada

Sub-Division : SDDPC, Bhopal



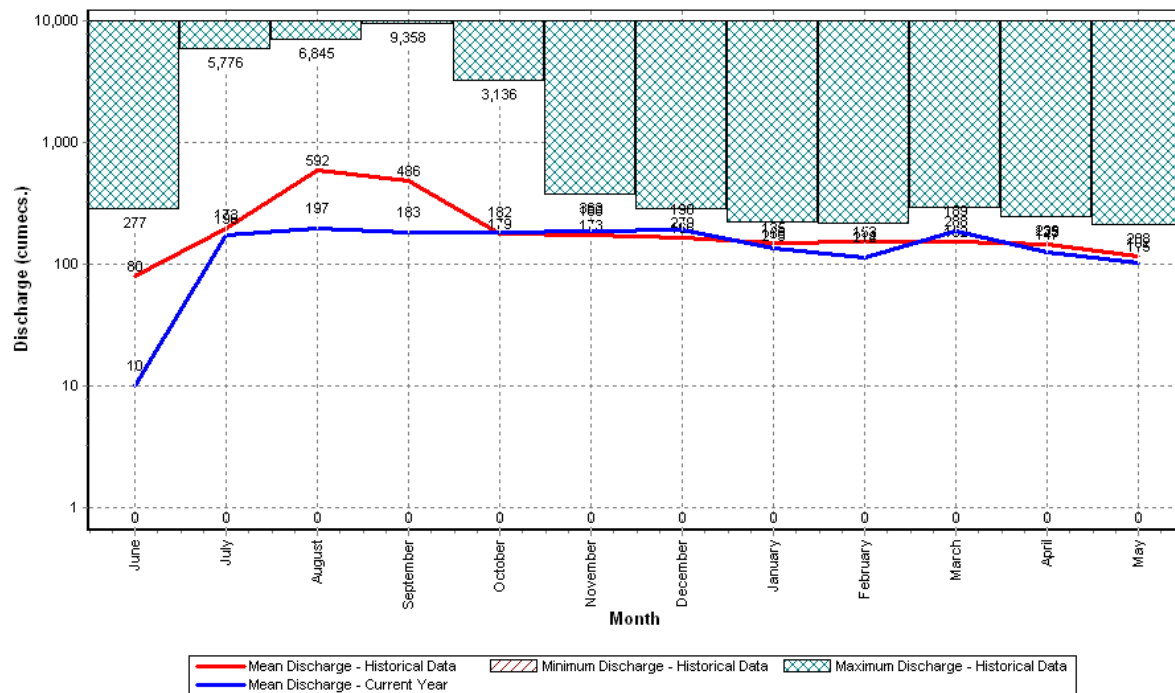
Annual Runoff Values for the period: (2000– 2016)

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

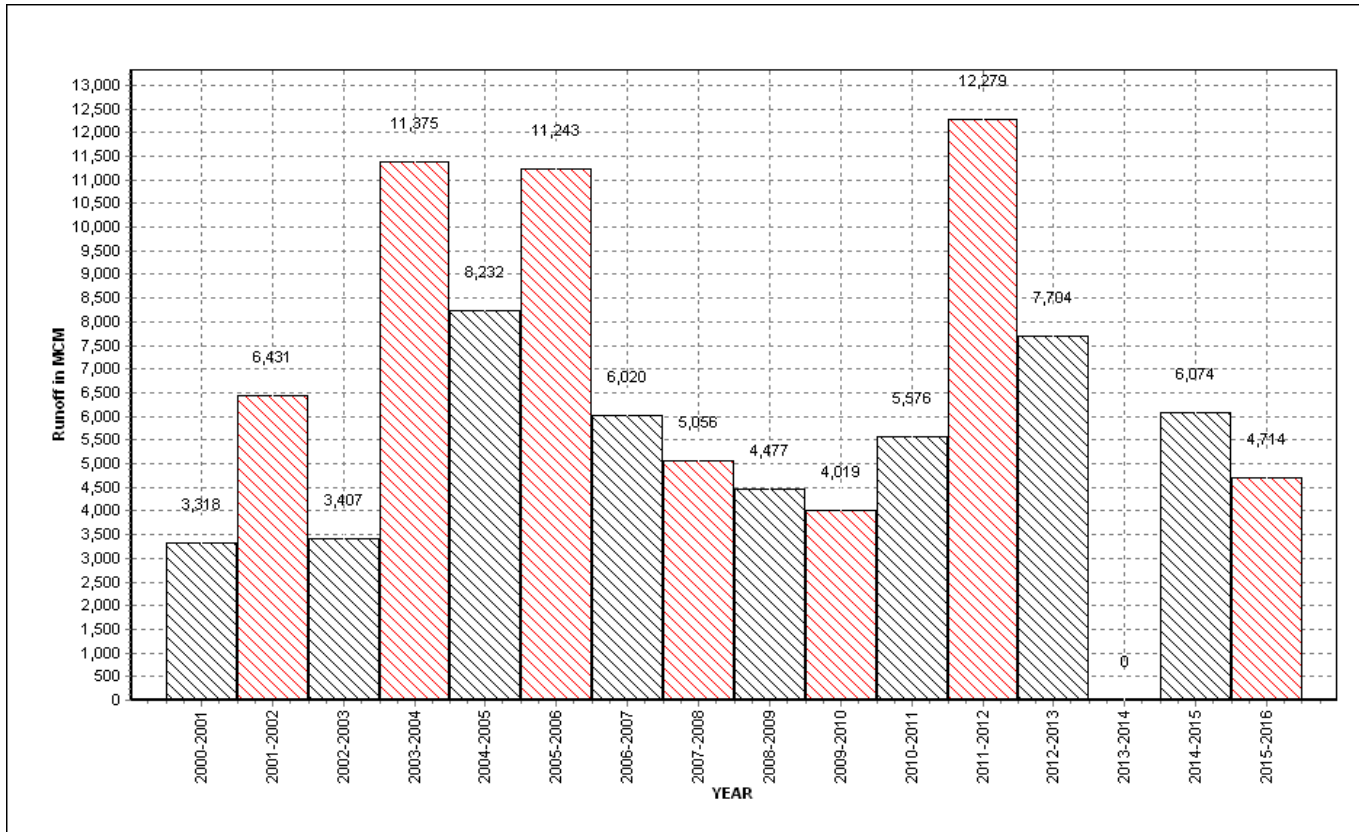
Monthly Average Runoff based on period (2000-2013)

Station Name : Narmada at Bijora (NA)

Division : DDPC, Bhopal

Local River : Narmada

Sub-Division : SDDPC, Bhopal



Monthly Average Runoff for the year (2015-16)

Station Name : Narmada at Bijora (NA)

Local River : Narmada

Division : DDPC, Bhopal

Sub-Division : SDDPC, Bhopal

