GOVERNMENT OF INDIA
CENTRAL WATER COMMISSION
FLOOD FORECAST MONITORING DIRECTORATE

People being rescued by the army personnels and local people after the floods at Tangpura in Srinagar.

FLOOD FORECASTING AND WARNING NETWORK PERFORMANCE APPRAISAL REPORT 2014

NEW DELHI – 110066 **March 2016**

Member (RM)
Central Water Commission
Sewa Bhawan, R. K. Puram
New Delhi-110066

PREFACE

Central Water Commission had started Flood Forecasting & Warning service in India in November 1958 by setting one forecasting station at Old Delhi Bridge, for the national capital, on the river Yamuna. Today, its network of Flood Forecasting and Warning Stations gradually extended covering almost all the major inter-state flood prone river basins throughout the country. It comprises of 175 Flood Forecasting Stations including 28 inflow forecast in 9 major river basins and 71 sub basins of the country. It covers 16 states besides NCT Delhi and UT of Dadra & Nagar Haveli. The flood forecasting activities of the Commission are being performed every year from May to October through its 20 field divisions which issue flood forecasts and warnings to the civil authorities of the states as well as to other organizations of the central & state governments, as and when the river water level touches or is expected to cross the warning level at the flood forecasting stations. Inflow Forecasts are issued for 28 reservoir/dam/barrages. The forecasts are formulated whenever the inflow into the dam exceeds the threshold value fixed by the respective project authorities for reservoir regulation as well as flood moderation.

The flood season 2014 witnessed unprecedented flood events at 2 stations in the rivers Ghaghra and Rapti in the country. High Flood Situation was witnessed at 9 stations in River Brahmaputra, Buridehing and Beki in Assam; River Ghaghra in Uttar Pradesh and Bihar, River Bagmati in Bihar and River Baitarni in Odisha. The year witnessed moderate to low intensity floods in many other parts of India. The highlight was the floods in Jammu and Kashmir during September 2014.

During the year 2014, 4772 forecasts were issued out of which 4667 forecasts (97.8%) were found to be within the limits of accuracy. The number of level forecasts issued during the year 2014 were 3884 out of which 3804 (97.94%) was within the limit of accuracy of ± 0.15 m. The number of inflow forecasts issued was 888 out of which 863 (97.18%) were within limits of accuracy of ±20%.

The Telemetry data have been received in all Divisions. Chambal Division (Jaipur), ERD (Bhubaneshwar), Mahanadi Division (Burla), LKD (Hyderabad) etc. are successfully using Telemetry data for flood forecasting through Mathematical Model. Other Divisions are also making attempt to use the Telemetry data by developing MIKE 11 model for Flood Forecasting in their jurisdictions.

The level of performance achieved, has been possible as a result of the dedicated team work of the officers and staff manning the various activities of

hydrometeorological observations & flood forecasting and monitoring the flood forecasting activities of the field offices.

India Meteorological Department (IMD) through its Flood Meteorological Offices (FMO) also helped in this endeavour by providing all the Meteorological inputs for formulation of Flood Forecasts. CWC wishes to place its acknowledgements for the services provided by IMD through its various FMOs.

Flood Forecast Monitoring (FFM) Directorate plays an important role in compiling the information received from various field offices at Headquarters and issues daily bulletins which are sent to various offices of the MOWR, MHA, Railway Board, Transport Ministry and Ministry of Agriculture. I wish to place on record my deep appreciations of the efforts put in by the officers and staff of FFM Directorate in carrying out the work with utmost devotion & dedication in bringing out this report. The staff of this Directorate, along with other supporting staff from other Directorates during flood duties in the flood season of 2014 also deserves all appreciation in keeping the control room fully functional on all the week days, including holidays, Saturdays & Sundays. The control room was kept operational round the clock throughout the flood season.

It is hoped that the momentum gained in improving performance, innovations in evaluation, modernization as well as computerization, year after year, will be further accelerated to achieve greater accuracy of each and every forecast especially in high and unprecedented flood situations with the help of mathematical modelling supported by real-time data from telemetry.

Suggestions/comments of the Users of this report with a view to further enhance its usefulness are welcomed and will be incorporated in the next edition.

New Delhi **(Narendra Kumar)**
March, 2016 **Member (RM)**

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EXECUTIVE SUMMARY

0.1 Meteorological Situation

During 2014, the south west monsoon performance was as given below:

For the country as a whole, the rainfall for the season (June-September) was 88% of its long period average (LPA). Seasonal rainfall was 79% of its LPA over Northwest India, 90% of its LPA over Central India, 93% of its LPA over south Peninsula and 88% of its LPA over Northeast (NE) India. Out of the total 36 meteorological subdivisions, 23 subdivisions constituting 67% of the total area of the country received normal season rainfall and 12 subdivisions (30% of the total area of the country) received deficient season rainfall. One subdivision (South Interior Karnataka) constituting 3% of the total area of the country received excess rainfall. Monthly rainfall over the country as a whole was 57% of LPA in June, 90% of LPA each in July and August, and 108% of LPA in September. Monsoon current advanced over the Andaman Sea 2 days earlier than its normal date of 20th May. However, it set in over Kerala on 6th June, 5 days later than its normal date of 1st June and covered the entire country by 17th July, 2 days later than its normal date of 15th July. Withdrawal of monsoon from west Rajasthan commenced on 17th September against its normal date of 1st September. During the season, 1 Very Severe Cyclonic Storm (**HUDHUD**), 1 Cyclonic Storm (**Nanauk**), 2 monsoon depressions and 10 monsoon low pressure areas were formed as against the normal of 6 monsoon depressions and 6 monsoon low pressure areas per season.

0.2 Flood Situation

During the year 2014, two stations namely Balrampur on river Rapti and Elgin Bridge on river Ghaghra flowed in Unprecedented Flood Situation. Eleven Stations namely., River Baitarni at Anandpur in Keonjhar district of Odisha, River Brahmaputra at Dibrugarh in Dibrugarh district, Neamatighat in Jorhat District, River Buridehing at Chenimari (Khowang) and River Beki at Road Bridge in Barpeta District of Assam, River Ghaghra at Ayodhya in Faizabad District of Uttar Pradesh, Darauli and Gangpur Siswan in Siwan district of Bihar, River Bagmati at Benibad in Muzzafarpur District of Bihar flowed in High Flood Situation. 63 stations flowed in Moderate Flood Situation and 98 stations flowed in Low Flood Situation.

0.3 Flood Forecasting Performance

During the year 2014, 4772 forecasts were issued out of which 4667 forecasts (97.8%) were found to be within the limits of accuracy. The number of level forecasts issued during the year 2014 were 3884 out of which 3804 (97.94%) was within the limit of accuracy of ± 0.15 m. The number of inflow forecasts issued was 888 out of which 863 (97.18%) were within limits of accuracy of ±20%.

Salient Features of Flood Forecasting System

The "Salient Features" of Flood Forecasting and Warning Network of the Central Water Commission are given in the table shown below.

1.	Establishment of 'First Scientific Flood Forecasting Unit" (F.F.U.) at Delhi in India	November, 1958
2.	Date of issue of first scientific flood forecast	25th July, 1959
3.	Name of first forecasting site and river	Delhi Railway Bridge (old) on the River Yamuna
4.	Year of commencement of flood forecasting system on the inter-state rivers i.e. first national level expansion	1969
5.	No. of Chief Engineer's offices including one CE (Flood Management) at CWC' headquarters, Monitoring – Central, Nagpur and Cauvery and Southern Rivers Oragnisation, Coimbatore being organisations supporting the Flood Forecasting Activities	11
6.	No. of Superintending Engineer's offices including one Flood Forecast Monitoring Directorate at CWC headquarter	14
7.	No. of present Flood Forecasting Divisions No. of Divisions supporting FF Activities	20 05
8.	No. of Control Room/Sub-Divisions engaged in flood forecasting work	64
9.	No. of inter-state rivers (main/tributaries) covered by flood forecasting programme	71
10.	No. of states including union -territories covered under F.F. Programme	18
11.	No. of forecasting sites	175
12.	No. of gauge and gauge & discharge sites	878
13.	No. of wireless stations including Control Rooms)	544
14.	No. of Telemetry Stations installed/under installation during IX,X and XI Plans	445
15.	Maximum no. of forecasts issued in any one year Second Highest no. of forecasts issued	8566 (in 1990) 8223 (in 2007)
16.	No. of forecasts issued in flood season 2010	7519
17.	No. of forecasts issued in flood season 2011	5991
18.	No. of forecasts issued in flood season 2012	5031
19.	No. of forecasts issued in flood season 2013	7060

CHAPTER-1

NATIONAL FLOOD FORECASTING NETWORK

1.1 FLOOD FORECASTING SERVICES

Flood causes considerable damage to human lives and property almost every year. About one third of total flood prone area (40 mha assessed by the Rashtriya Barh Ayog) of the country has been provided with reasonable protection against flood of a low magnitude due to technological and economical constraints but there is no protection from floods of higher magnitude. Since adoption of National Flood Policy by Government of India in 1954, it was realized that a total protection against flood by structural means alone is not possible and that optimum solution would consist of a mixture of structural and non-structural measures. Therefore, stress has been laid on non-structural measures like flood forecasting and warning, which is most important among such means to minimize the damage potential from floods. Accurate and timely flood forecasts and advance warning have, therefore, to be aimed for providing valuable time to the people and to civil authorities in taking preventive measures like evacuation, relief and rehabilitation measures, preparedness for flood fighting by engineering authorities etc. and thus mitigating such loses from floods.

1.2 FLOOD FORECASTING NETWORK IN THE COUNTRY

Flood Forecasting has been recognized as the most important, reliable and cost effective non-structural measures for flood mitigation. Recognizing the great importance of this measure, flood forecasting of river Yamuna at Delhi was suggested by Reddy Committee set up by Prime Minister, Govt. of India to manage flooding of Delhi. Accordingly in the year 1958, CWC commenced the flood forecasting service in a small way by establishing flood forecasting unit for issuing water level forecasts of the Yamuna for the National Capital, Delhi. On the recommendation of various committees/panels, a "Flood Forecast & Warning Organisation" was set up in CWC in 1969 to establish forecasting sites on inter-state rivers at various flood prone places in the country. 41 forecasting sites were added in 1969, making total number of forecasting sites to 43. Extension of the service followed from time to time and now the river forecasting has been expanded over the years to cover nine major inter-state flood prone river basins, which comprises of 71 sub-river basins traversing the country. The year-wise positions of the number of flood forecasting sites till the flood season 2014 in the network of Central Water Commission are shown in the **Table 1.1**:

Table-1.1: Yearwise positions of number of forecasting sites in CWC

Year	No. of Flood Forecasting Sites	Year	No. of Flood Forecasting Sites
1958	01	2001	159
1965	02	2002	161
1969	43	2003	166
1977	77	2004	172
1980	84	2005	173
1985	145	2006	175
1987	147	2007	175
1990	157	2011	175
		2014	175

The "National Flood Forecasting and Warning Network" of Central Water Commission, which comprised of 175 flood forecasting sites including 28 inflow forecasting sites in flood season 2014 is shown in **Map-1.** The number of flood forecasting sites on each of the nine major inter-state river systems, which constitutes 71 river sub-basins in the country, are given in the **Table 1.2**.

Table 1.2: Number of flood forecasting sites in major inter-state river systems

S. No.	Major Interstate River Systems	Type of Forecasting Sites		Total
		Level Forecasting	Inflow Forecasting	
1	Ganga & its tributaries	77	10	87
2	Brahmaputra & its tributaries	27	00	27
3	Barak System	05	00	05
4	Eastern Rivers	08	01	09
5	Mahanadi	03	01	04
6	Godavari	14	04	18
7	Krishna	03	06	09
8	West Flowing Rivers	09	06	15
9	Southern River System (Pennar)	01	00	01
Total		147	28	175

The above flood forecasting network covers the following 16 states, one Union Territory and NCT of Delhi as shown in the **Table 1.3**

Table 1.3 Statewise Flood Forecasting Network in CWC

Sl. No.	State	Type of Forecasting sites		Total Forecasting sites
		Stage forecasting	Inflow forecasting	
1	Andhra Pradesh	5	3	8
2	Assam	24	0	24
3	Bihar	32	0	32
4	Chhattisgarh	1	0	1
5	Gujarat	6	5	11
6	Haryana	0	1	1
7	Jharkhand	1	4	5
8	Karnataka	1	3	4
9	Madhya Pradesh	2	1	3
10	Maharashtra	7	2	9
11	Orissa	11	1	12
12	Telangana	4	4	8
13	Tripura	2	0	2
14	Uttarakhand	3	0	3
15	Uttar Pradesh	34	1	35
16	West Bengal	11	3	14
17	Dadra & Nagar Haveli	1	0	1
18	NCT of Delhi	2	0	2
Total		147	28	175

Central Water Commission through its twenty flood forecasting divisions issued forecasts to the various user agencies, which includes various civil / engineering agencies of the States/ Central Governments such as Irrigation/ Revenue/ Railways/ public undertakings and Dam/ Barrage Authorities/ District Magistrates/ Sub Divisional Officers besides the Defence Authorities involved in the flood loss mitigation work. During the flood season, the Hon'ble Minister of Water Resources, Government of India, the Chairman and the Member (River Management) of Central Water commission were also being apprised of the latest flood situations in the above river basins in the country.

1.3 CLASSIFICATIONS OF VARIOUS FLOOD SITUATIONS

The Central Water Commission has categorized various flood situations, for monitoring the floods in the country though its flood forecasting network, into the following four different categories, depending upon the severity of floods i.e. based on floods magnitudes.

1.3a Level Forecast

(i) LOW FLOOD

The river is said to be in **"LOW FLOOD"** situation at any flood forecasting sites when the water level of the river touches or crosses the warning level, but remains below the danger level of the forecasting site.

(ii) MODERATE FLOOD

If the water level of the river touches or crosses its danger level, but remains 0.50 m below the Highest Flood Level of the site (commonly known as "HFL") then the flood situation is called the **"MODERATE FLOOD"** situation.

(iii) HIGH FLOOD

If the water level of the river at the forecasting site is below the Highest Flood Level of the forecasting site but still within 0.50m of the HFL then the flood situation is called **"HIGH FLOOD"** situation. In **"High Flood Situations"** a special **"Orange Bulletin"** is being issued by the Central Water Commission to the users agencies which contains the "special flood message" related to the high flood.

(iv) UNPRECEDENTED FLOOD

The flood situation is said to be **"UNPRECEDENTED"** when the water level of the river touches or crosses the "**HIGHEST FLOOD LEVEL**" recorded at any forecasting site so far. In **"Unprecedented Flood Situations"** a special **"Red Bulletin"** is being issued by the Central Water Commission to the users agencies which contains the "special flood message" related to the unprecedented flood.

1.4 Standard Operating Procedure (SOP) for Flood Forecasting & Warning

The basic activity of data collection, its transmission and dissemination of flood forecasts to the local administration is carried out by the field divisions of CWC. The modelling centres and Divisional Flood Control Rooms (DFCR) are located in the premises of the field divisions. The field divisions perform these activities as per existing Manual on Flood Forecasting which contains the following critical activities as the general SOPs

1. Nomination of Nodal Officers of CWC for interaction with the Nodal Officers of concerned State Governments before monsoon every year.
2. Gearing up of flood forecasting network before monsoon every year.
3. Operation of Divisional Flood Control Room during monsoon every year
4. Operation of Central Flood Control Room (CFCR) during monsoon every year.

5. Issue of flood forecasts to designated officers of concerned State and transmission thereof through FAX/Telephone/E-mail/ through Special Messengers during monsoon every year.
6. Sending flood alerts through SMS on Mobile Phones to the concerned officers of State/ Central Government during high (12 hourly updates) and unprecedented (3 hourly updates) flood situations and uploading of Flood Forecasts and hourly water level data in CWC's Flood Forecasting Website as per Standard Operating procedure (SOP) for issuing alerts and electronic messaging in the event of disaster situations issued by National Disaster Management Division, Ministry of Home Affairs, vide letter No: 31-32/2003-NDM-III / II dated 10th April 2006, made effective from 24th April 2006.

For the purpose of dissemination of alerts to PMO/ Cabinet Secretariat, a uniform system has been devised by categorizing each type of alert in stages- Yellow, Orange and Red.

Categories of alerts for flood in respect of level forecasts is as indicated below.

Category	Description	Stage
IV	Low Flood (Water level between Warning level and Danger level)	Yellow
III	Moderate Flood (Water level below 0.50m less than HFL and above Danger Level)	Yellow
II	High Flood (Water Level less than Highest Flood Level but still within 0.50 m of the HFL)	Orange
I	Unprecedented Flood (Water Level equal and above Highest Flood Level-HFL)	Red

1.5 Inflow Forecasts

Inflow Forecasts are issued for 28 dams/reservoirs/barrages in various river basins in the country. The project authorities have identified the threshold inflow limits for issue of forecast considering various factors such as safety of the dam, status of reservoir, downstream channel/ canal requirements. As discussed in the previous section, the criteria for issue of High and Unprecedented floods are applicable only to level forecast. However, they are not applicable for inflow forecasts. In view of the unprecedented floods in Krishna in 2009, it is high time that similar criteria are fixed for inflow forecasts too. Locally some of the reservoirs in Krishna and Godavari Basins have categorized certain inflow figures for warning downstream areas for Low, Moderate, High and Unprecedented situations, it has still not been recommended for all the reservoirs in the country as a whole. The categorization of inflow shall be done taking into account the total live storage of the reservoir and the largest design flood discharging capacity and the likely effect of this discharge on the downstream areas, for each inflow

forecast stations. The inflow in volume during the given duration indirectly indicates the possibility of accommodating the given volume or otherwise in the reservoir. The outflow pattern is decided keeping in view of the safety measures at the reservoir and the likely impact of the outflow from the reservoir to cause damages/ difficulties in the downstream areas giving due attention to the Emergency Action Plan (EAP) of the project. Thus, the criteria should cover all the aspects of the flood pattern at the reservoir as well as the downstream.

1.6 EXPANSION OF THE NETWORK OF FLOOD FORECASTING SITES

The operation and maintenance of existing flood forecasting network is carried out as per budget allotment each year under 'Non-Plan' head and is thus subject to such restrictions and cuts applied to items under `Non-Plan'. The allocation during the year 2014-15 was Rs. 2.94 Crore only including that for payment to Government of Bhutan for maintaining hydrometeorological stations in river common to India and Bhutan and strengthening & Modernization of FF and Hyd. Obs. Network in Brahmaputra and Barak Basin. The expansion of the network with a view to cover additional flood prone areas is proposed to be covered under 'Plan' head. Work on such Plan schemes is subject to approval of specific schemes by the Government and the budget allocation of funds.

The salient features of all Flood Forecasting Sites, the details of all the sites basin-wise as well as Statewise during the flood season 2014, is shown at **Annex-I, Annex-II** and **Annex-III** respectively.

1.7 Data Communication System

Central Water Commission maintains 544 Wireless Stations for near real –time data communication. In addition, satellite based Telemetry System has been installed at 445 stations for sensor based automatic data collection and satellite based communication. As the wireless works on pre-fixed schedules and the Telemetry transmit the data at pre-fixed time intervals only, telephone/mobile phone, fax and internet in particular was also used for receiving the vital hydro-meteorological data immediately after its observation and dissemination of flood forecasts to user agencies.

1.7.a Wireless Communication

Wireless network in CWC consists of HF (3 to 30 MHz) and VHF (30 to 300MHz) sets. The HF sets are used for long distance communication between Site and Division (15 to 20Watts), Division to Division (20 to 100 Watts). VHF sets are used for short distance communication (i.e. from river to Site office).

1.7b Telemetry

Sensor based data collection and satellite based communication was installed at 445 sites upto XI plan for real time hourly water levels, hourly rainfall and other important meteorological parameters, established in Krishna, Godavari, Mahanadi, Chambal, Damodar, Ganga, Yamuna, Brahmaputra, Tapi, Mahi and Sutlej Basins. Three earth stations (DDRGS) located at Jaipur and Burla (in PRBS mode) and New Delhi (TDMA mode) are receiving through INSAT/Kalpana satellite. The data from remote stations received in DDRGS are further transmitted to the respective modelling centre through VSAT. The data received was used mainly by the divisions issuing forecast by MIKE-11. Data from 52 sites was not received because of theft, vandalism and damage due to floods.

1.8 DAMAGE DUE TO FLOODS/ HEAVY RAINS BETWEEN 1953 TO 2014

The damage due to floods for the entire country was estimated to be Rs.6771.324 Crore during the flood season 2014. The average annual damages to crops, houses and public utilities from the year 1953 to 2014 as reported by the States/UT's are of the order of Rs. 3864.262 Crore, the maximum annual damage being Rs.32551.758 Crore during 2009.

A comparative details showing the details of damages occurred during the flood season 2012 to 2014 on different accounts, based on the reports (tentative), received from the revenue authorities of the state governments is given in the **Table 1.4**.

Table 1.4: Damages occurred during flood season, 2011 to 2014

Sl. No.	Items	Flood damages during Year the Year				Flood Damages during 1953-2014	
		2012	2013 (tentative)	2014 (tentative)	Average 1953-2014 (tentative)	Maximum	
						Year	Damage
1	Area affected (in mha)	2.141	3.640	13.783	7.191	1978	17.5
2	Population affected (in millions)	14.689	21.147	11.536	31.625	1978	70.45
3	Damaged to Crops(area in mha)	1.95	3.635	4.694	3.772	2005	12.299
4	Damaged to crops(value in Rs. Crore)	1534.108	3214.987	1576.991	1166.705	2003	7307.23
5	Damaged to houses (in numbers)	174526	662495	168914	1210455	1978	3507542
6	Damaged to houses (value in Rs. Crore)	240.573	526.125	458.496	558.041	2009	10809.795
7	Cattle lost (in number)	31558	156855	16558	95225	1979	618248
8	Human lives lost (in numbers)	933	2137	1357	1645	1977	11316
9	Damaged to public Utilities (in Rs. Crores)	9169.968	3938.119	4736.271	2065.285	2009	17509.353
10	Total damages to crops, houses & public utilities (in Rs. Crores)	10944.649	11095.14	6771.324	3864.262	2009	32551.758

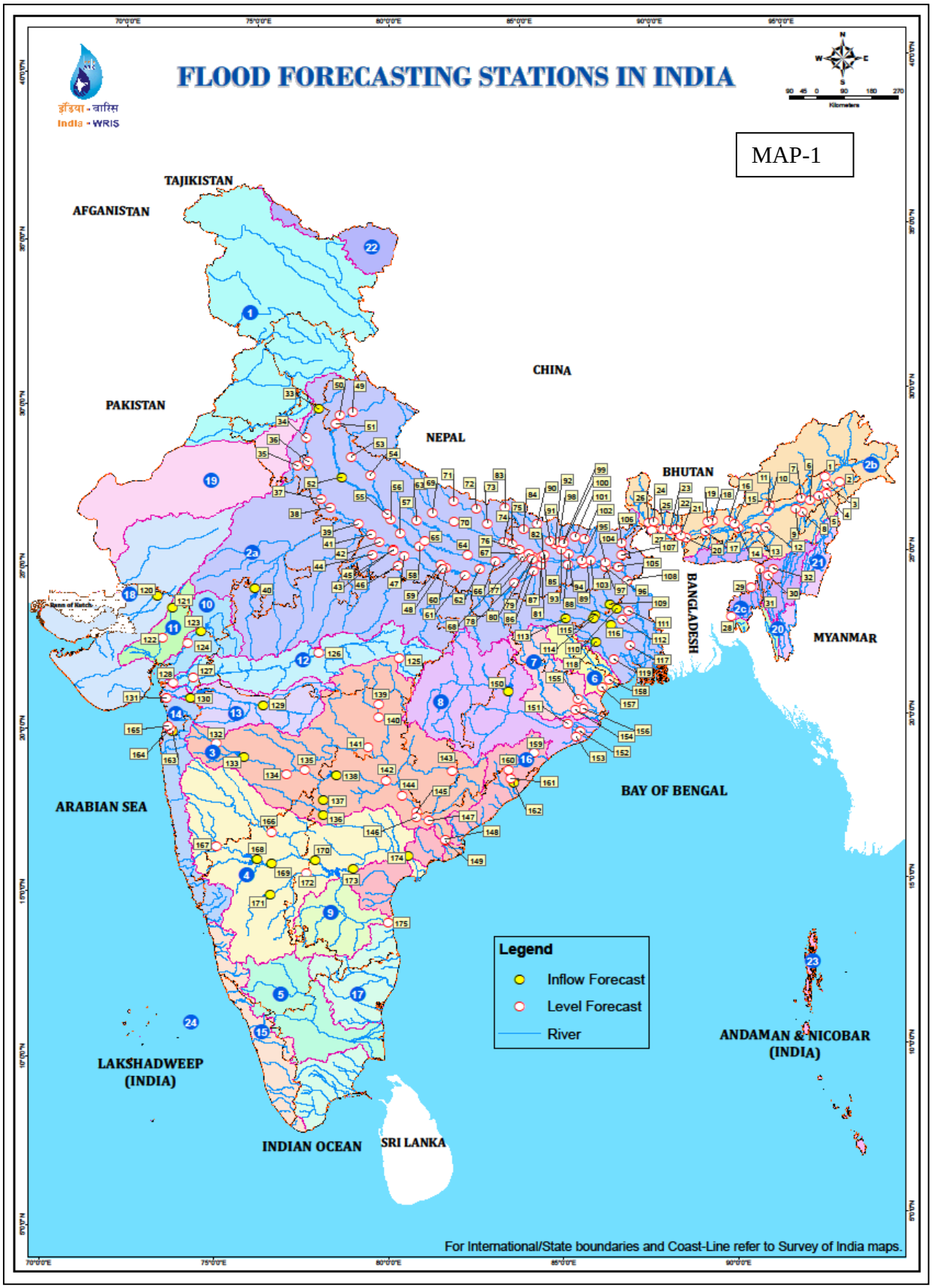
1.9 ANALYSIS OF PERFORMANCE OF FLOOD FORECASTING NETWORK

CWC carries out analysis and appraisal of the forecasting work, at the end of monsoon season. Based on this, measures for improvements, if necessary, are identified. A summary of the performance of the work carried out by the field divisions during the flood season 2014 presented in chapter-3. While the performance of the flood forecasting system is satisfactory, yet there is constant endeavor for improving the performance especially for additional warning time as new technology and more data are becoming available.

1.10 ORGANISATIONAL SET-UP OF FLOOD FORECASTING NETWORK

The present organizational set up of Flood-forecasting & Warning Establishment of Central Water Commission under the Member (River-Management) is spread over regional offices of CWC each headed by a Chief Engineer. Fourteen Circle Offices and twenty five Divisions in its field formations carry out flood forecasting activities. Chief Engineer (Flood Management) and Flood Forecast Monitoring Directorate monitor the Flood Forecasting activities in the headquarters. It also issues flood bulletins at national level.

The organizational chart of Flood Forecasting and Warning set up of the Central Water Commission is given at **Figure-1.1**

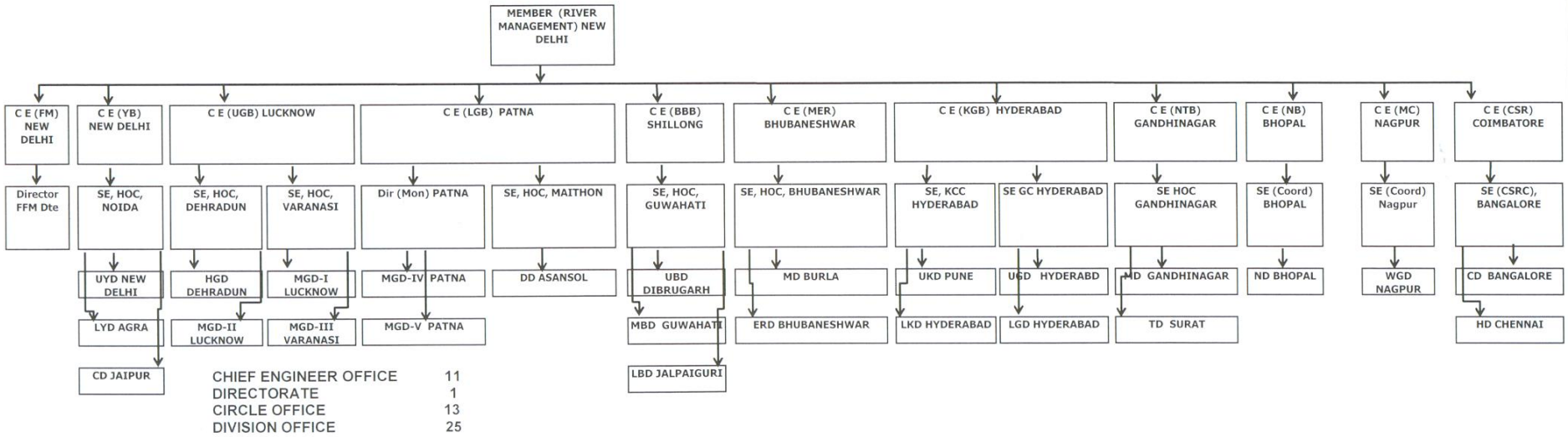

FLOOD FORECASTING STATIONS IN INDIA
इंडिया - वारिस
India - WRIS
MAP-1
TAJIKISTAN
AFGANISTAN
PAKISTAN
CHINA
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL
INDIAN OCEAN
SRI LANKA
LAKSHADWEEP (INDIA)
ANDAMAN & NICOBAR (INDIA)
Legend
Inflow Forecast
Level Forecast
River
For International/State boundaries and Coast-Line refer to Survey of India maps.

List of River Basins	
Basin Code	**Basin Name**
1	Indus (Up to border)
2a	Ganga
2b	Brahmaputra
2c	Barak and others
3	Godavari
4	Krishna
5	Cauvery
6	Subarnarekha
7	Brahmani and Baitarni
8	Mahanadi
9	Pennar
10	Mahi
11	Sabarmati
12	Narmada
13	Tapi
14	West flowing rivers from Tapi to Tadri
15	West flowing rivers from Tadri to Kanyakumari
16	East flowing rivers between Mahanadi and Pennar
17	East flowing rivers between Pennar and Kanyakumari
18	West flowing rivers of Kutch and Saurashtra including Luni
19	Area of inland drainage in Rajasthan
20	Minor rivers draining into Bangladesh
21	Minor rivers draining into Myanmar
22	Area of North Ladakh not draining into Indus
23	Drainage Area of Andaman and Nicobar Islands
24	Drainage Area of Lakshadweep Islands

List of Flood Forecasting Stations											
Sl. No.	**Name of Forecast Station**	**Sl. No.**	**Name of Forecast Station**	**Sl. No.**	**Name of Forecast Station**	**Sl. No.**	**Name of Forecast Station**	**Sl. No.**	**Name of Forecast Station**	**Sl. No.**	**Name of Forecast Station**
1	Dibrugarh	34	Mawi	67	Ballia	100	Hayaghat	133	Jaikwadi Dam	166	Deongaon Bridge
2	Naharkatia	35	Dhansa Regulator	68	Buxar	101	Jhanjarpur	134	Gangakhed	167	Arjunwad
3	Chenimari (Khowang)	36	Delhi Railway Bridge	69	Elgin Bridge	102	Basua	135	Nanded	168	Almatti Dam
4	Nanglamoraghat	37	Mathura	70	Ayodhya	103	Balthara	136	Singur Dam	169	Narayanpur Dam
5	Sibsagar	38	Agra	71	Balrampur	104	Kursela	137	Nizamsagar Dam	170	PD Jurala Project
6	Neamatighat	39	Etawah	72	Bansi	105	Sahibganj	138	Sriramsagar	171	Tungabhadra Dam
7	Badatighat	40	Gandhisagar Dam	73	Gorakhpur (Birdghat)	106	Dengraghat	139	Bhandara	172	Mantralayam
8	Golaghat	41	Auraiya	74	Turtipar	107	Jhawa	140	Pauni	173	Srisailam Dam
9	Numaligarh	42	Kalpi	75	Darauli	108	Farakka Barrage	141	Balharsha	174	Prakasam Barrage
10	N T Road Crossing (Jiabharali)	43	Hamirpur	76	Gangpur Siswan	109	Massanjore Dam	142	Kaleswaram	175	Nellore Anicut
11	Tezpur	44	Mohana	77	Chhapra	110	Tilpara Barrage	143	Jagdalpur		
12	Kampur	45	Sahjina	78	Inderpuri	111	Narayanpur	144	Eturunagaram		
13	Dharamtul	46	Banda	79	Koelwar	112	Gheropara	145	Dummagudem		
14	Guwahati (D C Court)	47	Chillaghat	80	Maner	113	Tenughat Dam	146	Bhadrachalam		
15	NH Crossing (Puthimari)	48	Naini	81	Patna (Dighaghat)	114	Panchet Dam	147	Kunavaram		
16	NT Road Crossing (Pagladiya)	49	Srinagar	82	Patna (Gandhighat)	115	Maithon Dam	148	Rajahmundry GNV Railway Bridge		
17	Goalpara	50	Rishikesh	83	Khadda	116	Durgapur Barrage	149	Dowlaiswaram Barrage		
18	Beki Road Bridge	51	Hardwar	84	Chatia	117	Harinkhola	150	Hirakud Dam		
19	NH Crossing (Manas)	52	Narora Barrage	85	Hazipur	118	Kangsabati Dam	151	Naraj		
20	Dhubri	53	Moradabad	86	Kamtaul	119	Mohanpur	152	Alipingal		
21	Golokganj	54	Bareilly	87	Sripalpur	120	Dantiwada Dam	153	Nimapara		
22	Tufangunj	55	Kannauj (Gurnatia)	88	Hathidah	121	Dharoi Dam	154	Jenapur Expressway		
23	Ghugumari	56	Ankinghat	89	Munger	122	Subash Bridge (Ahmedabad)	155	Anandpur		
24	NH 31	57	Kanpur	90	Lalbeghiaghat	123	Kadana Dam	156	Akhuapada		
25	Mathabhanga	58	Dalmau	91	Muzzafarpur (Sikandarpur)	124	Wanakbori Weir	157	NH 5 Road Bridge		
26	Domohani Road Bridge	59	Phaphamau	92	Rewaghat	125	Mandla	158	Rajghat		
27	Mekhliganj	60	Allahabad (Chhatnag)	93	Samastipur	126	Hoshangabad	159	Purushottampur		
28	Sonamura	61	Mirzapur	94	Rosera	127	Garudeshwar	160	Gunupur		
29	Kailashahar	62	Varanasi	95	Khagaria	128	Bharuch	161	Kashinagar		
30	Matizuri	63	Hanuman Setu(Lucknow)	96	Bhagalpur	129	Hathnur Dam	162	Gotta Barrage		
31	Karimgunj	64	Jaunpur	97	Colgong/Kahalgaon	130	Ukai Dam	163	Madhuban Dam		
32	Annapurnaghat (Silchar)	65	Rae-Bareilly	98	Benibad	131	Surat	164	Daman		
33	Tajewala Barrage (Hathnikund Barrage)	66	Ghazipur	99	Ekmighat	132	Kopergaon	165	Vapi Town		

Fig -1.1

ORGANISATION CHART OF FLOOD FORECASTING AND WARNING SETUP OF CENTRAL WATER COMMISSION



Note:

i) UGD, Hyderabad and WGD, Nagpur support LGD, Hyderabad by supplying data of sitesu nder their jurisdiction on real -time basis.

ii) UKD Pune, HD Chennai and CD, Bangalore support LKD, Hyderabad by supplyiog data of sites under their jurisdiction on real -time basis.

CHAPTER – 2

ROLE OF IMD IN FF ACTIVITIES AND SOUTHWEST MONSOON ACTIVITIES

2.1 Role of IMD & SOUTHWEST MONSOON

2.1a Role of IMD

India Meteorological Department (IMD) provides various Meteorological inputs for formulation of Flood Forecast in Divisional Flood Control Rooms (DFCR) of CWC. The inputs include rainfall in stations other than those operated by CWC on different sub-catchments of river basins, providing Quantitative Precipitation Forecast (QPF) for 24 hours, Weather Situation and Heavy Rainfall Warnings over various basins and outlook for further 48 hours. The QPFs are issued by 0930 hours daily and are modified if necessary around 1230 hours. For this purpose, IMD is operating Flood Meteorological Offices (FMO) in different river basins. These are located at Agra, Ahmedabad, Asansol, Bhubaneshwar, Delhi, Guwahati, Hyderabad, Jalpaiguri, Lucknow and Patna. These FMOs provide all the weather related inputs to the concerned DFCR by fastest available modes of communication. The FMOs are also provided the rainfall figures observed by the stations operated by CWC as well as the water level in the flood forecast stations in the basin by the concerned DFCR.

During the year 2014, the Hydrology division of IMD provided online QPF by using two Numerical Weather Prediction (NWP) models namely WRF ARW (9km x 9km) and Multi Model Ensemble (MME) for various sub-basins of different river basins.

The FMO at Hyderabad uploaded the daily weather summaries, QPF and rainfall figures issued in the web site of Meteorological Centre Hyderabad during the flood season from 15th June to 15th October. During the expansion of flood forecasting network under the XII Plan, it was also agreed that the concerned Regional/ Meteorological Centre falling within a basin will issue the QPF and provide Meteorological inputs for the additional basins where expansion is contemplated.

The INSAT-DRT secretariat of IMD looks after the works of allocation of Station Index number, Time slot allotment and frequency allocation for the various Automatic Weather Stations setup by different organisations. CWC is one of the members of INSAT-DRT User and officers of CWC attend the INSAT-DRT User meetings convened by the INSAT DRT Secretariat of IMD. CWC has so far installed 445 Satellite based Automatic Data Collection Units for collection of Hourly Water Level and Rainfalls from remote stations. IMD has allocated the Station Index Numbers and other parameters for all these stations. During the first year of the 12th Plan there is a proposal to install 125

automatic data collection units in various river basins and IMD has provided the Station Index numbers/ Time slot/ Frequency for these 125 stations. Another 81 stations have been identified for upgradation during the year 2014-14 for which, IMD has been approached for providing Station IDs etc.

2.1b Southwest Monsoon

India gets about 80% of its Annual rainfall during the south-west monsoon from June to September except some portions of south-eastern parts of peninsular India where the main rains occur during the period of north-east monsoon from October to December, which overlap with the receding stage of the south-west monsoon in October. Occasionally, cyclonic storm develop in the south-west bay and move into the Peninsula and produces heavy rain during north-east monsoon season.

Southwest monsoon advances from Kerala in the beginning of June. It produces spell of heavy rainfall along the western coast of the peninsula and on the southern slopes of Khasi and Jaintia hills in north- eastern region.

In association with the depression which occasionally form in the North Bay of Bengal and move north-westwards, heavy rains are produced in the central parts of the country, Orissa, Gangetic West Bengal, southern districts of Bihar, Gujarat region, and East Rajasthan and in the later monsoon months in and around North Deccan.

A very important characteristic of southwest monsoon is the occurrence of "break". The break situations arise when the monsoon trough shifts to the Himalayas and are very important as these cause floods in the rivers rising from the Eastern Himalayas. Sometimes, the phenomenon of break sets in immediately after a monsoon depression has occurred. These two causes occurring in succession serve to intensify the floods.

The whole India has been divided into 36 meteorological sub-divisions by India Meteorological Department (IMD) for the purpose of studies of rainfall/monsoon activities.

The progress of monsoon rainfall over the country is monitored by evaluating the departures of total rainfall from the normal rainfall in respect of meteorological sub-divisions and districts. The IMD has classified the rainfall as excess, normal, deficient and scanty, according to the following criteria.

Excess	:	+ 20% or more than normal
Normal	:	+ 19% to - 19% of the normal
Deficient	:	- 20% to - 59% of the normal
Scanty	:	- 60% to - 99% of the normal
No Rain (N.R.)	:	- 100% of the normal

Normal is defined as the Long Period Average say for 50 years for the period from 1st June to 30th September. Presently Long Period average for the years 1951 to 2000 is being used to define normal. For the country as a whole the normal rainfall during the period 1st June to 30th September is 89 cm.

2.2 HIGHLIGHTS OF SOUTH-WEST MONSOON 2014

- For the country as a whole, the rainfall for the season (June-September) was 88% of its long period average (LPA).

- Seasonal rainfall was 79% of its LPA over Northwest India, 90% of its LPA over Central India, 93% of its LPA over south Peninsula and 88% of its LPA over Northeast (NE) India.

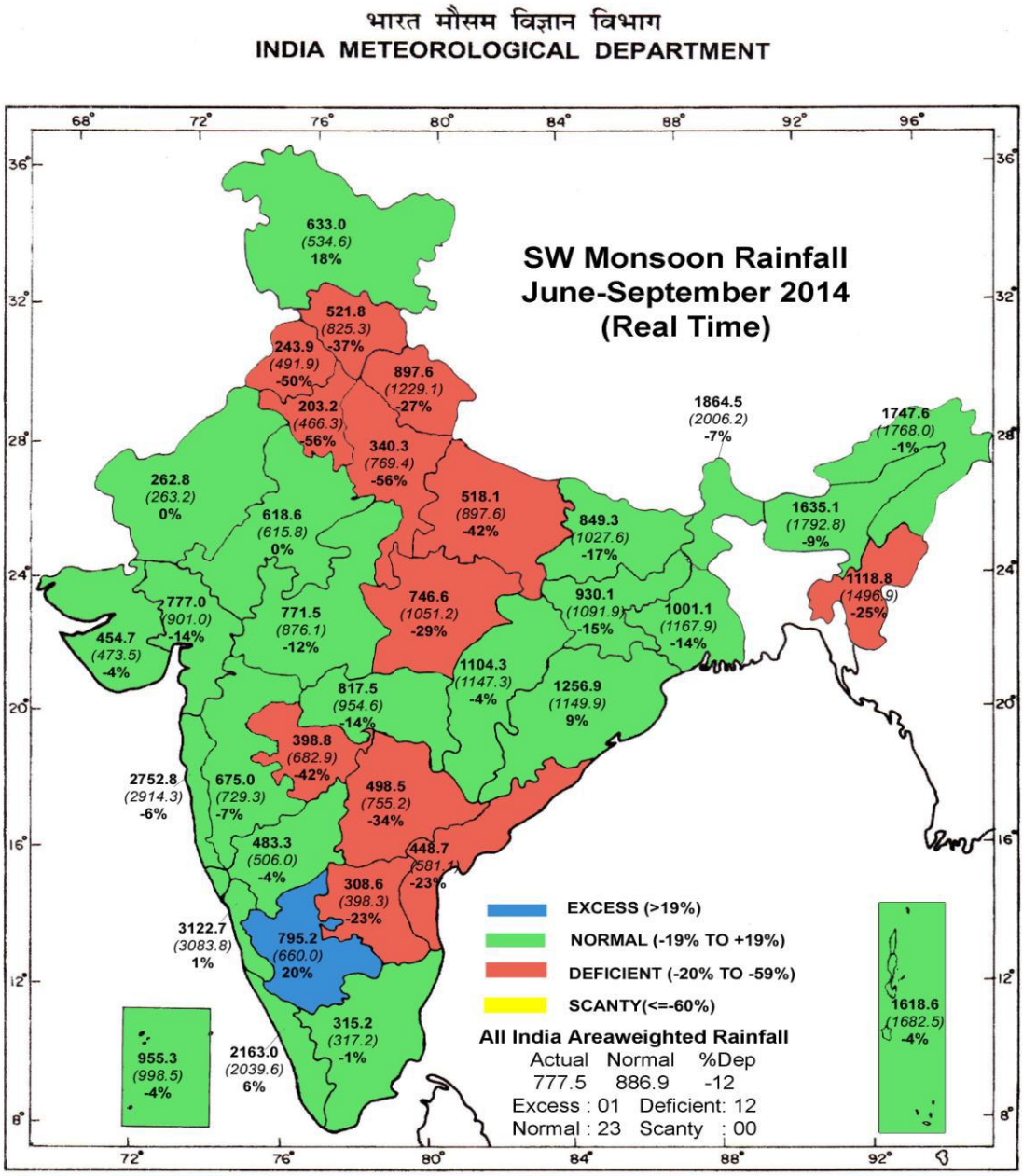
- Out of the total 36 meteorological subdivisions, 23 subdivisions constituting 67% of the total area of the country received normal season rainfall and 12 subdivisions (30% of the total area of the country) received deficient season rainfall. One subdivision (South Interior Karnataka) constituting 3% of the total area of the country received excess rainfall.

- Monthly rainfall over the country as a whole was 57% of LPA in June, 90% of LPA each in July and August, and 108% of LPA in September.

- Monsoon current advanced over the Andaman Sea 2 days earlier than its normal date of 20th May. However, it set in over Kerala on 6th June, 5 days later than its normal date of 1st June and covered the entire country by 17th July, 2 days later than its normal date of 15th July. Withdrawal of monsoon from west Rajasthan commenced on 17th September against its normal date of 1st September.

- During the season, 1 Cyclonic Storm (**Nanauk**), 2 monsoon depressions and 10 monsoon low pressure areas were formed as against the normal of 6 monsoon depressions and 6 monsoon low pressure areas per season.

- The sub-divisionwise South West Monsoon rainfall during June to September 2014 is shown in the Following **Map-2.**



Map-2 Sub-divisionwise South West Monsoon rainfall during 2014

2.3 ONSET OF SOUTH-WEST MONSOON SEASON 2014

During 17th- 18th May, an easterly wave trough embedded in the northern hemispheric equatorial convergence zone developed into a cyclonic circulation over south Andaman Sea and neighbourhood. Associated with this, low level cross equatorial monsoon flow strengthened over the region resulting in the advance of southwest monsoon over most parts of Andaman Sea and some parts of southeast Bay of Bengal on 18th May and remaining parts of Andaman Sea, some more parts of southeast Bay of Bengal and some parts of southwest and east central Bay of Bengal on 19th. Thus the southwest

monsoon current reached over south Andaman Sea 2 days before normal date of 20th May.

However, the southwest monsoon set in over Kerala on 6th June, 5 days later than its normal date of 1st June. Same day, monsoon also advanced into most parts of south Arabian Sea, some parts of Tamil Nadu, most parts of southwest Bay of Bengal and some parts of west central Bay of Bengal. Thereafter, though not rapid, it consistently advanced and by 18th June, it covered central Arabian Sea, some parts of north Arabian Sea, south Gujarat, entire Konkan & Goa, some parts of south peninsula, Odisha, Jharkhand and Bihar, entire northeastern states and most parts of Gangetic West Bengal. The Arabian Sea branch of the monsoon current was aided by the formation of a Cyclonic Storm (**Nanauk**) over the Arabian Sea. The eastward propagation of Madden Julian Oscillation (MJO) over maritime continent led to the development of convection over north Bay of Bengal and the subsequent formation of season's first low pressure area over coastal areas of Bangladesh and neighborhood on 19th June. This aided the advance of Bay of Bengal branch of the southwest monsoon over northeastern states. Subsequently it further advanced into most parts of south peninsula, east and adjoining parts of central India by 20th June.

During the last week of June, the weakening of monsoon activity caused the re-appearance of the heat wave conditions over eastern parts of peninsular India. After a hiatus of 10 days, monsoon started reviving. Subsequently, a favourable interaction of the southwest monsoon current with the mid-latitude westerlies aided the advance of southwest monsoon into the western Himalayan region and adjoining plains of northwest India. It advanced into entire Uttarakhand, Himachal Pradesh and Jammu & Kashmir, some more parts of Uttar Pradesh and some parts of Haryana (including Chandigarh) and Punjab on 1st July.

During the first week of July, the presence of anticyclone over the peninsular region resulted in subdued rainfall activity over parts of north, central and peninsular region. But the formation of a low pressure area over north Bay of Bengal and adjoining coastal areas of Bangladesh and Gangetic West Bengal (during 1st – 7th July) and a cyclonic circulation over west Uttar Pradesh and neighbourhood (during 3rd - 6th July) caused further advance of the monsoon into some more parts of Uttar Pradesh, remaining parts of Haryana (including Delhi) and Punjab and some parts of north Rajasthan on 3rd July and subsequently into most parts of Vidarbha, remaining parts of east Madhya Pradesh and Uttar Pradesh, some parts of west Madhya Pradesh and some more parts of northeast Rajasthan on 7th. Subsequent to the formation and west northwestwards movement of a low pressure area (during 11th- 16th July), an off shore trough at mean sea level extending from Gujarat coast to Kerala coast (10th-16th July) and the cyclonic circulation extending between 3.1 & 5.8 kms a.s.l. over northeast Arabian Sea during (14th-16th July) during the second week, the monsoon activity revived gradually over central India and west coast thereby causing further advance of southwest monsoon over

remaining parts of central India and most parts of northwest India on 16th and remaining parts of north Arabian Sea, Saurashtra & Kutch, Gujarat Region and west Rajasthan and thus the entire country on 17th July 2014

Fig.2.1 shows the isochrones of advance of monsoon 2014.

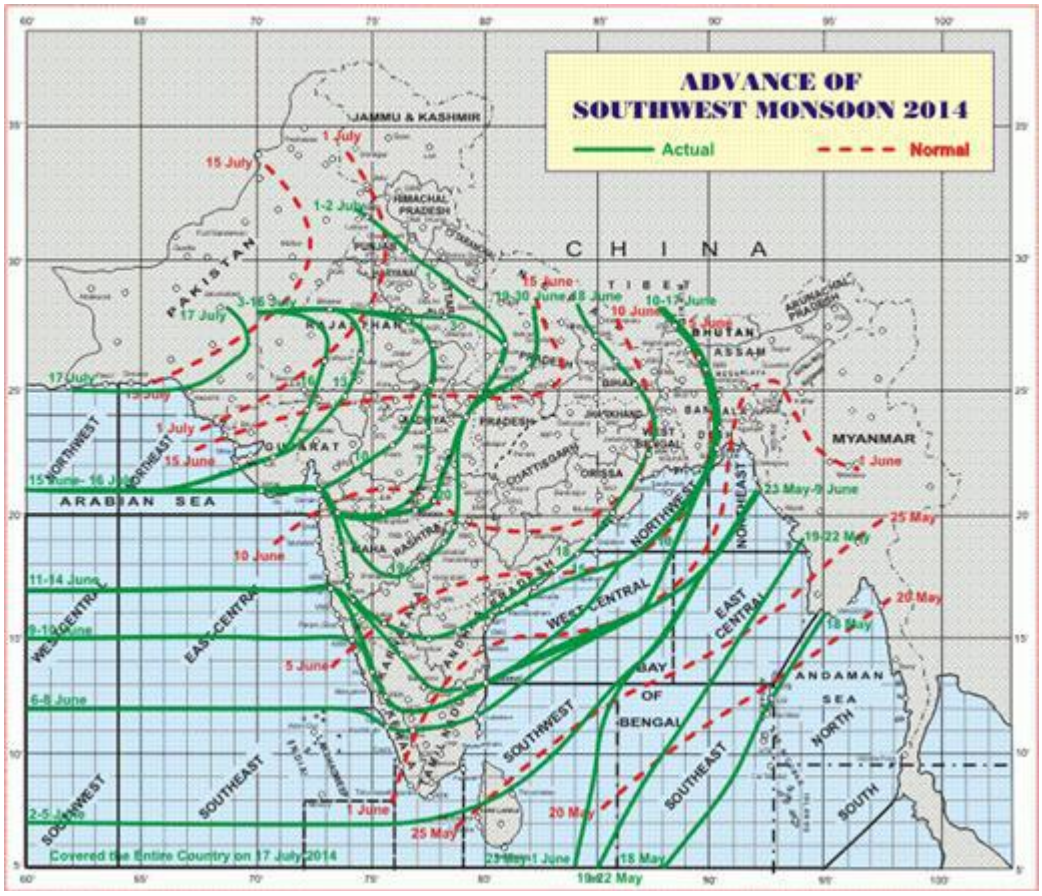


Fig. 2.1 Advance of southwest Monsoon–2014**.**

2.4 CHIEF SYNOPTIC FEATURES

Strong cross equatorial flow prevailed during July and August. The presence of ridge and formation of Cyclonic Storm over Arabian Sea prevented the cross equatorial flow to actually reach the west coast of peninsular India during first half of June. It was weak during later part of the September as well.

The axis of monsoon trough mostly remained normal/south of its normal position during July and first half of September. It extended up to mid tropospheric levels without its characteristic tilt. It mostly remained north of its normal position /close to foot hills of Himalayas during August. The seasonal 'heat low' was less demarcated since second half of August except for first half of September, when it became noticeable. Thereafter, it became less apparent and subsequently, the axis of monsoon trough also weakened

thereby becoming less delineated since 22nd September. With the shifting of monsoon trough to the foot hills of Himalayas during the month of August, the circulation features and rainfall pattern resembled typical break like situation during 15th – 21st August.

During the season, 13 low pressure systems formed. These included 10 low pressure areas, one cyclonic storm (CS), a land depression and a deep depression. Tracks of the depressions and the CS are given in Fig.2.2 Out of the 10 low pressure areas formed during the season (against the season normal of 6), 8 (3 of them well marked) formed over the Bay of Bengal and two (as well marked) over the Arabian Sea. The monthly break up is 1 in June, 3 in July, 3 in August and 3 in September.

During the month of June, one CS and one low pressure area formed. The CS **'Nanauk'** (9th–14th June) which formed over east Arabian Sea at the leading edge of the monsoon current aided the further advance of Arabian branch up to south Gujarat coast. Its remnant vortex drifting northeastwards towards Gujarat resulted in extremely heavy rainfall over Saurashtra & Kutch on 16thJune. The first low pressure area (19th – 22nd June) formed over coastal areas of Bangladesh and neighborhood under the influence of a cyclonic circulation over northwest Bay of Bengal and neighborhood. It increased the rainfall activity over the region and thus led to the further advance of southwest monsoon over sub-divisions in the east.

The formation of second low pressure area (1st -7th July) over north Bay of Bengal and adjoining areas and its more north-northwesterly movement kept the monsoon activity over the eastern parts only. Therefore the rainfall activity all over India during the period remained subdued. With the formation of the land depression (21st – 23rd July) over northeastern parts of Odisha and adjoining areas of Gangetic West Bengal and thereafter its movement as a low pressure area in westward direction along with the other two low pressure areas (11th-18th July & 27th -31st July) over northwest Bay of Bengal, revived the monsoon activity over central and peninsular India during the period.

First week of August witnessed the formation of a deep depression (3rd -6th Aug.) over coastal areas of west Bengal and neighbourhood which spurred the vigorous monsoon conditions over the Indo- Gangetic plains whereas its remnant cyclonic circulation enhanced the rainfall activity over parts of northwest India. The low pressure area (9th -11th Aug.) formed over north Bay of Bengal and its northwestwards movement and dissipation, led the monsoon trough to shift towards the foot hills of the Himalayas on 13th Aug.

With the formation of 2 well marked low pressure areas (23rd -24th Aug.) & (27thAug – 6thSept), one each over the Arabian Sea and Bay of Bengal, the rainfall activity over major parts of peninsular India enhanced during the last week of August. Monsoon activity in general remained weak outside this areas and northeastern parts of the country, which received rainfall associated with the north-south trough in the lower and mid tropospheric westerlies. The formation of the well-marked low pressure area over the Bay of Bengal and its west-northwestwards movement across the central parts of India along with the formation of the low pressure area (2nd -4th Sept.) over Saurashtra & Kutch and adjoining northeast Arabian Sea revived the rainfall activity over central and northwest India.The above well marked low pressure area took a more northward course from 4th Sept and thereafter interacting with the trough in the mid-latitude westerlies in the lower tropospheric levels, caused heavy to very heavy rainfall resulting severe floods in Jammu & Kashmir during first week of September. The formation and movement of the third well marked low pressure area (5th– 9th Sept) over north Bay of Bengal off west Bengal–Bangladesh coasts helped the monsoon trough to shift southwards of its normal position and thus led to vigorous monsoon activity over north, east central and adjoining peninsular India. In the latter half of September, a low pressure area (16th -24th Sept.) formed over northwest Bay of Bengal and adjoining coastal areas of Odisha and west central Bay of Bengal. Its northward movement increased the rainfall activity over eastern parts only.

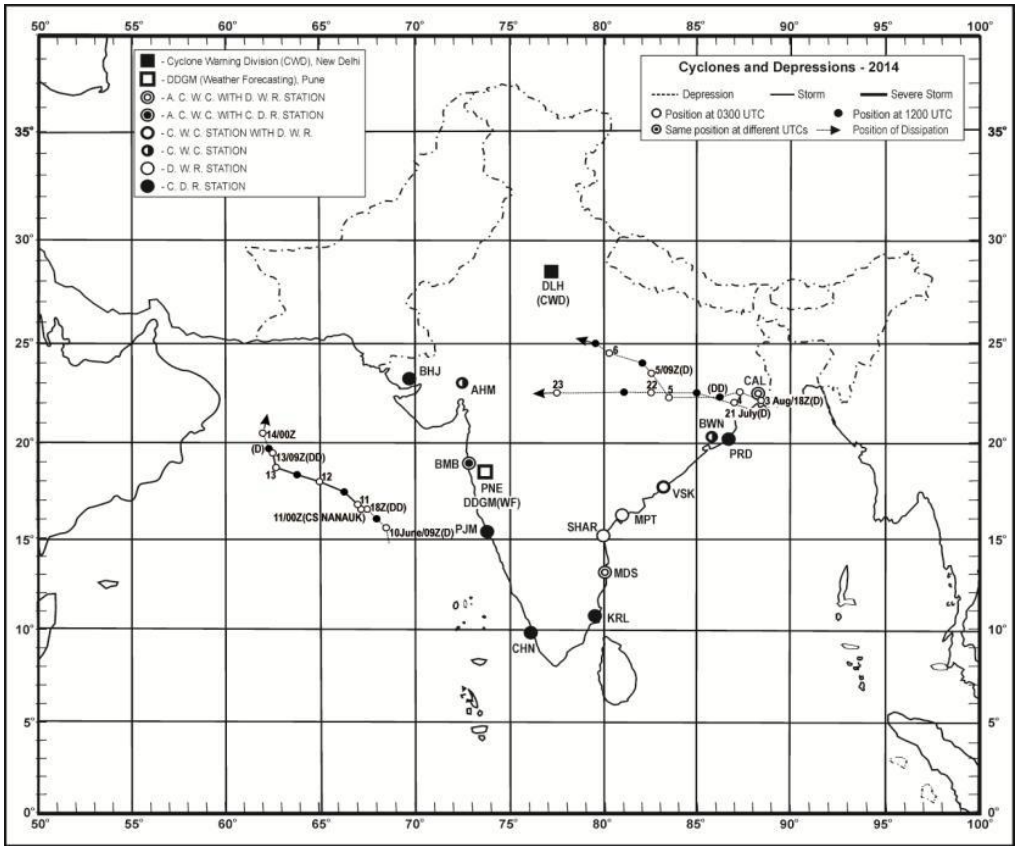


Fig. 2.2 Movement of monsoon depressions during 2014

2.5 Very Severe Cyclonic Storm "HUDHUD"

The Very Severe Cyclonic Storm 'HUDHUD' (07-14 Oct. 2014) developed from a low pressure area which lay over Tenasserim coast and adjoining North Andaman Sea in the morning of 6th Oct. 2014. It concentrated into a *Depression* in the morning of the 7th Oct over the North Andaman Sea. Moving west-northwestwards it intensified into a *Cyclonic Storm (CS)* in the morning of 8th Oct. and crossed Andaman Islands close to Long Island between 0830 and 0930 hrs IST of 8th Oct. It then emerged into Southeast Bay of Bengal and continued to move west-northwestwards. It intensified into a *Severe Cyclonic Storm* (SCS) in the morning of 09th Oct. and further into a *Very Severe Cyclonic Storm* (VSCS) in the afternoon of 10th Oct.. It continued to intensify while moving northwestwards and reached maximum intensity in the early morning of 12th with a maximum sustained wind speed (MSW) of 180 kmph over the West Central Bay of Bengal off Andhra Pradesh coast. It crossed north Andhra Pradesh coast over Visakhapatnam (VSK) between 1200 and 1300 hrs IST of 12th Oct. with the same wind speed. After landfall, it continued to move northwestwards for some time and weakened gradually into *SCS* in the evening and further into a *CS* in the same midnight. It then, weakened further into a *Deep Depression* in the early morning of 13th and weakened into a depression in the evening of 13th. Thereafter, it moved nearly northward and weakened into a well-marked low pressure area over East Uttar Pradesh and neighbourhood in the evening of 14th Oct. 2014.

The salient features of this system are as follows:

i. HUDHUD is the first cyclone that crossed Visakhapatnam coast in the month of Oct., after 1985 and it made landfall on the same day as VSCS Phailin did in 2013.
ii. At the time of landfall on 12th Oct, the estimated maximum sustained surface wind speed in association with the cyclone was about 100 Knots.
iii. The estimated central pressure was 950 hPa with a pressure drop of 54 hPa at the centre compared to surroundings.
iv. It caused very heavy to extremely heavy rainfall over North Andhra Pradesh and South Odisha and strong gale winds leading to large scale structural damage over North Andhra Pradesh and adjoining districts of South Odisha and storm surge over North Andhra Pradesh coast.
v. Maximum 24 hour cumulative rainfall of 38 cm ending at 0830 hrs IST of 13th October was reported from Gantyada (dist Vizianagaram) in Andhra Pradesh. Maximum of storm surge of 1.4 meters above the astronomical tide has been reported by the tide gauge at Visakhapatnam.
vi. The numerical weather prediction (NWP) and dynamical statistical models provided good guidance with respect to its genesis, track and intensity. Though there was divergence in model guidance with respect to landfall point and time in the initial stage, the consensus among the models emerged as the cyclone moved closer to the coast.
viii. India Meteorological Department (IMD) accurately predicted the genesis,

intensity, track and point & time of landfall and also the adverse weather like heavy rainfall, gale wind and storm surge 4-5 days in advance.

The track of VSCS "HUDHUD" is shown in **Fig. 2.3** and the Radar image of Doppler Weather Radar at Visakhapatnam is shown in **Fig. 2.4**

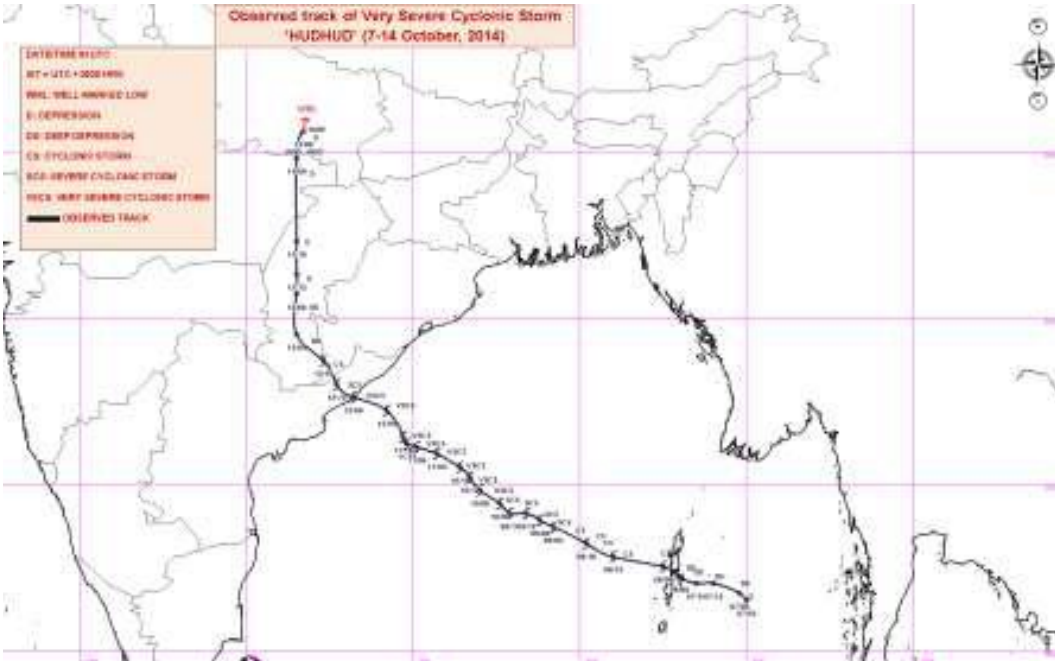


Fig. 2.3 Observed track of VSCS HUDHUD during 7th-14th October 2014.

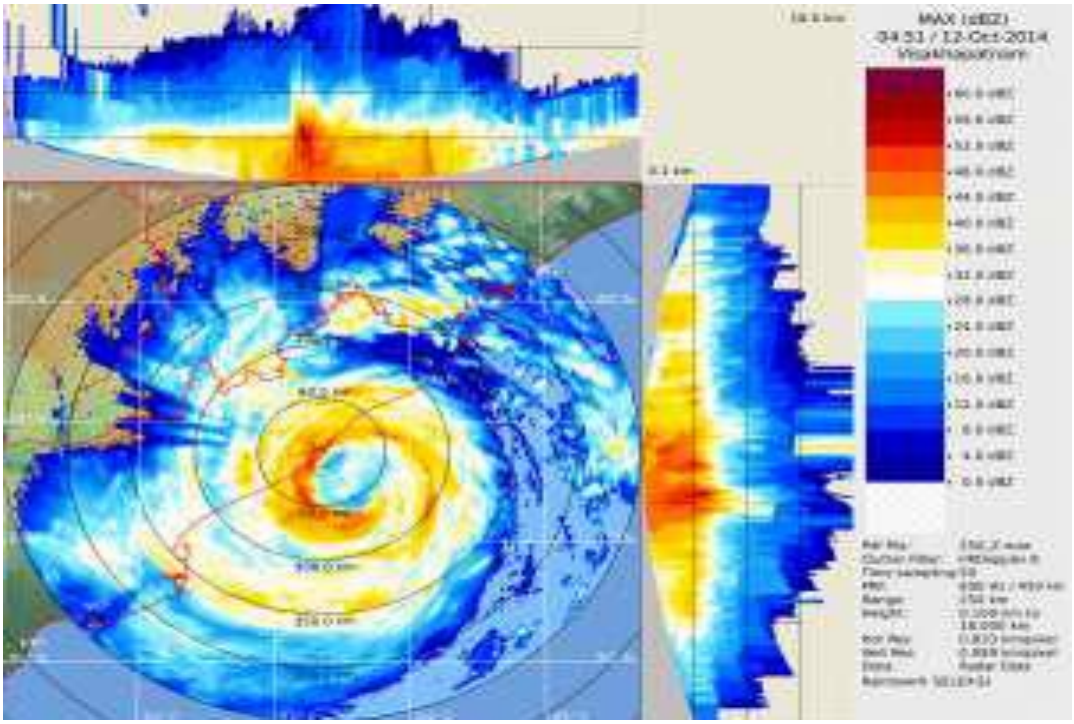


Fig. 2.4: Visakhapatnam RADAR imagery based on 0500 UTC of 12th October 2014

2.6 WITHDRAWAL OF SOUTHWEST MONSOON

The weather over the western parts of Rajasthan remained mainly dry from 17th Sept. A change in the lower tropospheric circulation pattern over the region from cyclonic to anti cyclonic during 16th - 17th Sept also made conditions favorable for the withdrawal of southwest monsoon from the region. Subsequently, withdrawal of monsoon from northwestern most parts of the country commenced on 23rd Sept. It withdrew from some parts of west Rajasthan and Kutch on 23rd Sept. and from some parts of Punjab, Haryana and Gujarat Region, some more parts of Kutch area and remaining parts of west Rajasthan on 26th. On 28th Sept., it further withdrew from remaining parts of Punjab, Haryana, Chandigarh & Delhi and east Rajasthan; some parts of Jammu & Kashmir, Himachal Pradesh, east Uttar Pradesh, Madhya Pradesh and Saurashtra; most parts of west Uttar Pradesh and some more parts of Gujarat Region, Kutch and north Arabian Sea.

The withdrawal was further delayed due to the formation of "HUDHUD" and finally the south west monsoon withdrew from the entire country on 18th October 2014.

Fig.2.5 shows the isochrones of withdrawal of monsoon 2014.

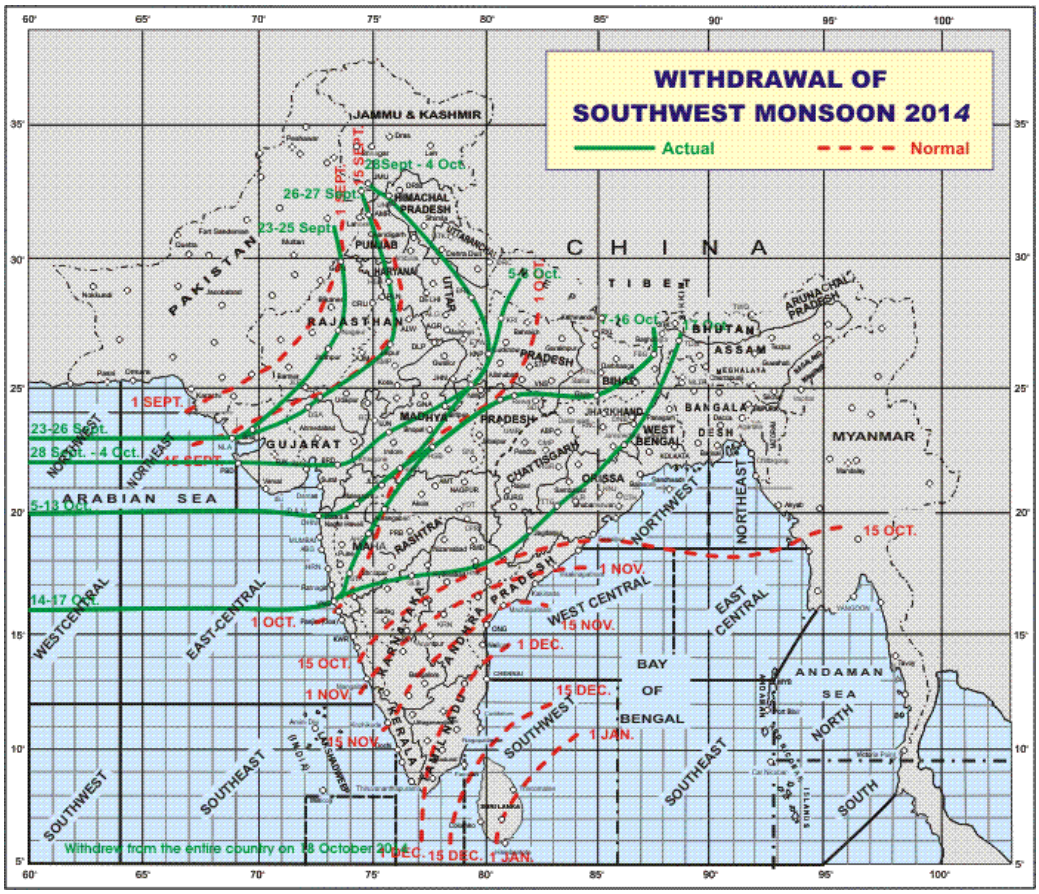


Fig. 2.5 Isochrones of withdrawal of southwest monsoon - 2014

(Source: The extracts for Chapter 2.2 to Chapter 2.6 have been taken from the end of season report published by IMD and the preliminary reports on HUDHUD and the daily weather situation summaries given by IMD).

CHAPTER 3

FLOOD FORECAST PERFORMANCE

3.1 FLOOD FORECASTING EVALUATION - PRESENT CRITERIA AND PROCEDURE

A number of techniques are being utilised for formulation of river stage and inflow forecasts by Central Water Commission. While inflow forecast is being provided for assisting project authorities in reservoir regulation, the stage forecast is done for warning the civil and engineering authorities about the predicted water level well ahead of its occurrence. An accurate forecast is one where the forecast level and corresponding actual observed level exactly synchronize or have such a small difference that it can be taken as reasonably accurate. In an ideal situation, not only the forecast and the corresponding observed value of river stage/ inflow should be the same but also the time of such occurrence should be the same as that predicted.

3.2 EVALUATION CRITERIA FOR STAGE/ INFLOW FORECASTING

As per present practice, all the level and inflow forecasts are being judged by the single criteria of accuracy i.e. the actual level attained is within ± 15cm of forecasted value for stage forecasts and the actual inflow/ volume received in the dam/ barrage is within ± 20% of the forecasted value for inflow forecast. However, the analysis of the forecasts data of individual sites has indicated that the application of uniform criteria to all sites is misleading especially for flashy rivers where rate of change in river level / inflow is sudden / abrupt and large in magnitude. Therefore, there is a need of setting different yardsticks for judging accuracy of flood forecasts for flashy and flat rivers.

The forecast of incoming flood gives the water level or inflow and "time" of occurrences. It is also observed that in many cases the levels attained were found within permissible limit of accuracy but the time of occurrence was not the same. This factor is not presently being taken into account while judging the accuracy of forecasts.

3.3 FLOOD FORECASTING ACTIVITIES

The flood forecasting activities like data collection, forecast formulation and its dissemination during 2014 covered various river basins and States. A total of 5031 forecast were issued during 2014. The performance of flood forecasting Divisionwise, Major Basinwise, Statewise and for the period 2000 to 2014 are given from **Annex-IV to VII.**

3.4 RIVERWISE DETAILS OF FLOOD FORECASTING ACTIVITES & ACCURACY OF FORECAST

3.4.1 Brahmaputra Basin

During the flood season 2014, analysis of the flood forecasts issued reveals that out of 2115 forecasts (32.74% of 4772 forecast) were issued for 25 sites located on the main Brahmaputra and tributaries. Out of these, 2085 forecasts (98.58%) were found within permissible limit of accuracy.

3.4.2 Barak and Meghna Basin

During the flood season 2014, 24 forecasts (0.50% of 4772) were issued for four sites. Out of these, 24 forecasts (100%) were found within permissible limit of accuracy. No forecast was issued for three sites.

3.4.3 Ganga Basin

During the flood season 2014, 1563 forecasts (32.74% of 4772) were issued for 57 sites, out of total 87 sites located on the main Ganga and its tributaries. No forecast was issued for the remaining 30 sites. Out of these, 1532 forecasts (98.02%) were found within permissible limit of accuracy.

3.4.4 Eastern Rivers Basins including Mahanadi

During the flood season 2014, 290 forecasts (6.07% of 4772) were issued for all the nine sites on Eastern Rivers (excluding Mahanadi Basin) and 282 (97.24%) forecasts were found within permissible limit of accuracy. Also 115 forecasts (2.41% of 4772) were issued for all the four sites located on the Mahanadi river basin, of which 114 forecasts (99.13%) were found within permissible limit of accuracy.

3.4.5 Godavari Basin

During the flood season 2014, 83 forecasts (1.74% of 4772) were issued for 7 forecasting sites out of 18 sites, out of which 74 forecasts were found with 89.16% accuracy. No forecasts were issued for the remaining eleven flood forecasting sites.

3.4.6 Krishna Basin

During the flood season 2014, 441 forecasts (9.24% of 4772) were issued for seven forecasting sites out of nine sites and 415 forecasts (94.10 %) were found within permissible limit of accuracy. No forecast was issued for two sites in Krishna basin.

3.4.7 Southern Rivers Basin

Since the North Pennar River did not cross Warning Level, no forecast was issued for one site in Southern River System.

3.4.8 West Flowing Rivers

During the flood season 2014, for the West-flowing Rivers which comprises of the Narmada, the Tapi etc, 141 forecasts (2.94% of 4772) were issued for 7 sites, out of fifteen sites. 141 forecasts (100 %) were found within permissible limit of accuracy. Forecasts were not issued for eight sites.

The Basinwise – Riverwise flood forecasting information in India during flood season 2014 is given in **Annex-II.**

3.5 STATEWISE FLOOD FORECASTING PERFORMANCE

There are 15 states, one Union Territory of the Dadra & Nagar Haveli, and National Capital Territory of Delhi so far covered under the Flood Forecast and Warning Network of the Central Water Commission. The Statewise flood forecasting information in India during the flood season 2014, is given in **Annex –III.** Their salient features are as under:

3.5.1 Andhra Pradesh

In the reorganized state of Andhra Pradesh, there were eight forecasting sites including three inflow sites. Forecasts were issued for seven forecasting sites out of which there were 3 inflow and 4 level sites.

It is revealed that 186 forecasts (43 level and 143 inflow) were issued out of which 175 forecasts (39 level and 136 inflow) were within limits respectively (94.09%). No forecasts were issued for 1 station.

3.5.2 Assam

In the state of Assam, there were 24 forecasting sites and all of them were level forecasting sites. Forecasts were issued for 22 sites. It is seen that during 2014 season, 1869 forecasts were issued out of which 1850 forecasts (98.98%) were found within limit of accuracy.

River Brahmaputra at Dibrugarh, Neamatighat, River Buridehing at Chenimari (Khowang) and River Beki at Road Bridge flowed in High Flood Situation.

3.5.3 Bihar

In the state of Bihar, there were 32 level forecasting sites. Forecasts were issued for 25 sites during the year 2014. Out of 899 forecasts issued

during the flood season 2014, 885 forecasts (98.44%) were found within limit of accuracy. No forecasts were issued for 7 stations.

River Ghaghra at Darauli, Gangpur Siswan and River Bagmati at Benibad flowed in High Flood Situation.

3.5.4 Chhattisgarh

In the state of Chhattisgarh there was only one level flood forecasting site (i.e. Jagdalpur) on the Indravati River (a tributary of the Godavari River). 29 flood forecast were issued for this station during the flood season 2014 out of which 25 (86.21%) were within the limits of accuracy.

3.5.5 Gujarat

There were 11 flood forecasting sites in the state of Gujarat including five inflow forecasting sites. However, forecasts were issued for only five sites. Out of 64 forecasts issued (1 level and 63 inflow), all forecasts (1 level and 63 inflow) (100 %) were found within limits of accuracy during the flood season 2014. No forecasts were issued for 6 stations.

3.5.6 Haryana

Neither any hydrological data was collected nor was any forecast issued for the lone site Tajewala weir on the river Yamuna in the state of Haryana during the flood season 2014 also. Instead data from an upstream site, namely, Hathni Kund Barrage were collected. However, no inflow forecasts were issued due to very little travel time available from base station.

3.5.7 Jharkhand

In the state of Jharkhand, there were four inflow and one level flood forecasting sites. Flood forecasts were issued for all of them. During the flood season 2014, Out of 176 (25 level and 151 inflow) forecasts issued, all the 176 (25 level and 151 inflow) forecasts (100 %) were found within limit of accuracy.

3.5.8 Karnataka

There were four flood forecasting sites in the state of Karnataka which includes three inflow forecasting sites and one level forecasting site. During the flood season 2014, forecasts were issued for 3 inflow forecast sites and the level forecast site did not cross warning level. Out of 235 forecasts (0 level and 235 inflow) issued, 226 (0 level and 226 inflow) forecasts (96.17%) were found within limit of accuracy.

For Base Station
River Tunga at Shivmogga crossed the previous HFL during 2014.

3.5.9 Madhya Pradesh

In the state of Madhya Pradesh, there were two level forecasting sites on the river Narmada and one inflow forecast site at Gandhisagar on river Chambal. During the flood season 2014, forecasts were issued for one level and inflow sites. Out of 14 forecasts issued (13 level and 1 inflow), 14 (13 level and 1 inflow) (100%) forecasts were found within the limit of accuracy. No forecasts were issued for one station.

3.5.10 Maharashtra

There were nine forecasting sites including two inflow forecasting sites, in the state of Maharashtra. During the flood season 2014, forecasts were issued for one inflow forecast station. Total 64 forecasts were issued (64 inflow) during 2014 out of which 64 (64 inflows) were in limit (100%). No forecasts were issued for 8 stations. River Wainganga at Bhandara and Pauni crossed their respective Danger Levels but no forecasts were issued as Bhandara was under the submergence zone of Gosikhurd project and Pauni is just downstream of the project. Letters have been written to Government of Maharashtra for starting of inflow forecast for the Gosikhurd project instead of level forecast at Bhandara and Pauni. Reply is awaited.

3.5.11 Odisha

In the state of Odisha, there were eleven level flood forecasting sites and one inflow forecasting site i.e. Hirakud Dam on the main river Mahanadi. During the flood season 2014, 382 (319 level and 63 inflow) forecasts were issued for all forecast stations out of which 373 (311 level and 62 inflow) (97.64 %) were found within limit of accuracy.

For FF Stations

River Baitarni at Anandpur flowed in High Flood Situation.

3.5.12 Telangana

There are eight forecast stations (4 level and 4 inflow forecast stations) in the reorganised state of Telangana. Forecasts were issued for 3 level and 1 inflow forecast stations during 2014. Out of 97 (29 level and 68 inflow) forecasts issued, 86 (26 level and 60 inflow) (88.66%) were found to be within limit.

3.5.13 Tripura

There were two level forecasting sites in the state of Tripura namely, Kailashahar on river Manu and Sonamura on river Gumti. Forecast was not issued to both these stations as they did not cross warning level during the year 2014..

3.5.14 Uttarakhand

There were three level forecasting sites in the state of Uttarakhand, namely, Srinagar on the Alaknanda, Rishikesh and Haridwar on the main river Ganga. Forecasts were issued for ail stations in 2014. 22 forecasts were issued out of which 17 (77.27%) were within limit of accuracy.

3.5.15 Uttar Pradesh

There were 35 flood forecasting sites in the state of Uttar Pradesh, which includes one inflow forecasting site at Narora barrage (U/S) on the river Ganga and 34 level forecasting stations. During the flood season 2014, forecasts were issued for 18 stations. Out of 328 level forecasts (295 level and 33 inflow), 318 forecasts (285 level and 33inflow) (96.95%) were found within limit of accuracy. No forecasts were issued for 17 stations.

River Rapti at Balrampur and River Ghaghra at Elgin Bridge crossed its previous HFL and flowed in Unprecedented Flood Situation.

River Ghaghra at Ayodhya flowed in High Flood Situation.

3.5.16 West Bengal

In the state of West Bengal, there were 14 flood forecasting sites, which include three inflow forecasting sites. During the flood season 2014, forecasts were issued for 9 sites (6 level and 3 inflow stations). Out of 405 forecasts (338 level and 67 inflow), 393 forecasts (326 level and 67 inflow) (97.04 %) were found within limit of accuracy. No forecasts were issued for five stations.

3.5.17 Dadra & Nagar Haveli

In the Union Territory of Dadra & Nagar Haveli, there was only one flood forecasting site at Daman on river Damanganga. No flood forecast was issued for the site during the flood season 2014.

3.5.18 NCT of Delhi

There are two flood forecasting sites in the National Capital Territory of Delhi (NCT of Delhi), namely, Delhi Railway Bridge on the Yamuna River and

Dhansa Regulator at Delhi and Haryana border on the Sahibi river, a tributary of Yamuna River which is commonly known by name of Najafgarh drain within Delhi town. Both the sites are level forecasting sites. Forecast was issued for Delhi Railway Bridge only. During the flood season 2014, Out of 2 forecasts (only level), 1 forecast (50%) were within limits of accuracy.

The performance of flood forecasting Stations (Divisionwise) in India during flood season 2014 is given in **Annex-IV.**

The Major Basin/Statewise performance of flood forecasting stations in India during flood season is given in **Annex-V to VI**.

3.6 AN OVERVIEW OF FLOOD FORECASTING PERFORMANCE

During the flood season 2014, an average number of flood forecasts issued per forecasting site were 27.27. The number of forecasting sites where the performance accuracy of the issued forecasts was found to be above 97.80 % (National average for flood season 2014) was 79 sites (45.15 %) which include 71 sites (40.57 %) where flood forecasting stations having 100% accurate forecasts. The number of forecasting sites where the performance accuracy was found greater than 97% as fixed in the Results Framework Document (RFD) of Ministry of Water Resources is 80 (45.71%).

The flood forecasting performance of the level forecasting as well as inflow forecasting sites from 2000 to 2014 is given in **Annex-VII** and from 2000 to 2014 as **Fig.3.1.**

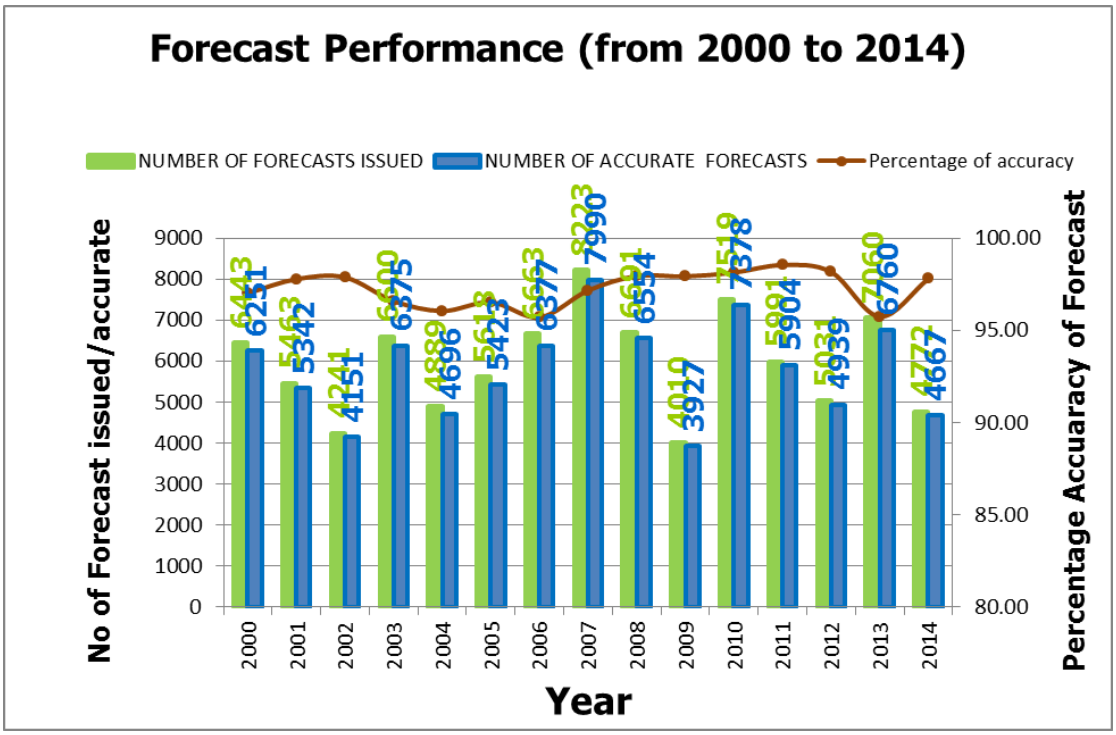


Fig.3.1 Flood Forecast Performance from 2000 to 2014

3.6.1 Overall Performance

Thus, in the nine major river systems in the country where "Flood Forecasting & Warning Network" of the Central Water Commission exists, and floods are being monitored, the accuracy of the forecasting performance during 2014 season varies from a maximum of 100% for Barak and its tributaries, West Flowing rivers to a minimum of 89.16% for the Godavari basin. The overall accuracy performance was of the order of 97.80% for the country as a whole.

Sitewise "Forecast Performance" out of 175 operational sites in flood season 2014 is shown in **Table 3.1**.

Table 3.1 Site wise "Forecast Performance" of flood forecasting sites of CWC in Flood Season, 2014

Sl. No.	Details of sites within different range of permissible limit of accuracy (±15cm,±20%cumec)	Flood Season 2014	
		No. of Sites	% age
1	Sites with performance accuracy between 0.0 % to 25.0%	0	0%
2	Sites with performance accuracy between 25.1 % to 50.0%	3	2.54%
3	Sites with performance accuracy between 50.1 % to 75.0%	4	3.40%
4	Sites with performance accuracy between 75.1 % to 99.99%	40	33.89%
5	Sites with 100% performance accuracy i.e. where all forecasts issued were within permissible limit of accuracy	71	60.17%
6	Total sites where forecasts were issued	118	100

CHAPTER – 4

RIVERWISE APPRAISAL OF FLOOD EVENTS

4.1 GENERAL

All the 175 flood forecasting sites including 28 inflow forecasting sites were operational i.e. where desired hydrological data was observed/ collected, during the flood season 2014. Unprecedented floods, exceeding previous highest flood levels (HFL), were observed in two stations namely Balrampur on river Rapti and Elgin Bridge on river Ghaghra in Uttar Pradesh during the year 2014. The levels were recorded within 0.5 m of their respective H.F.L at 11 sites exclusively.

Details of unprecedented and high flood events in the various river systems covered under the Flood Forecasting & Warning Network are given in **Annex- VIII** and **Annex-IX** respectively for the year 2014**.** Moderate and low flood events were observed as listed at **Annex-X to XII,** for the year 2014. River wise flood events are described in the following paragraphs.

4.2 GANGA BASIN

The Ganga basin comprises of the main stream Ganga and its tributaries / sub- tributaries which were covered under the CWC's Flood Forecasting Network. During the flood season 2014, there were 87 flood forecasting sites in the whole Ganga Basin, which included 77 stage and 10 inflow forecasting sites. The details are given below.

During the flood season 2014, Unprecedented Flood Situation was witnessed at Balrampur on river Rapti and Elgin Bridge on river Ghaghra.

High flood events occurred at Ayodhya on river Ghaghra in Uttar Pradesh, Darauli and Gangpur Siswan, Benibad on river Bagmati in Bihar, Dibrugarh and Neamatighat on river Brahmaputra, Chenimari (Khowang) on river Buridehing and Road Bridge on river Beki in Assam and Anandpur on river Baitarni in Odisha. Refer Annex-IX. The occurrence of Moderate and low flood events is given in Annex-X.

4.3 BRAHMAPUTRA BASIN

The Flood Forecasting and Warning Network of the Central Water Commission carried on the main river Brahmaputra and its 16 tributaries / sub- tributaries during the flood season 2011. The details are shown below.

During the flood season 2014, no stations under Brahmaputra basin witnessed Unprecedented Flood Situation. **However, Dibrugarh,**

Neamatighat, on River Brahmaputra and River Desang at Nanglamoraghat flowed above High Flood Situation (Annex-IX) and many of the other stations flowed in moderate and low flood situation during the season and these are shown in **Annex-XI**.

4.4 BARAK AND MEGHNA SYSTEM

The Barak and Meghna River System under the Flood Forecasting and Warning Network of the Central Water Commission covers five rivers, namely the Barak, the Katakhal, the Kushiyara, the Manu and the Gumti rivers. The river system enters into Bangladesh in the downstream of Silchar in Assam.

There were five level flood forecasting sites in the Barak & Meghna basins system, namely Annapurna Ghat, Matizuri, Karimganj, Kailashahar and Sonamura respectively one each on Barak, Katakhal, Kushiyara, Manu and Gumti rivers. The sites AP Ghat, Matizuri and Karimganj are in Assam and the Kailashahar and Sonamura are in Tripura. The occurrence of Moderate & low floods is given in **Annex-XI**.

4.5 EASTERN RIVERS SYSTEM

The Eastern Rivers under the Flood Forecasting and Warning Network of Central water Commission are the Subarnarekha, the Burhabalang, the Baitarani, the Brahmani, the Rushikulia and the Vamsadhara.

There are nine flood forecasting sites including one inflow forecasting site at Gotta Barrage located in the state of Andhra Pradesh. Remaining all the 8 level forecasting sites are in the state of Odisha. During the flood season 2014, flood forecasts were issued for eight stations.

River Baitarni at Anandpur flowed in High Flood Situation (Annex-IX). The occurrence of Moderate and low floods is given in **Annex-XII**.

4.6 MAHANADI BASIN

In the Mahanadi basin, Central Water Commission has so far covered only the main stream Mahanadi under its Flood Forecasting and Warning Network setup. There were four flood forecasting sites, one being the inflow forecasting site at Hirakud Dam in Odisha. During the flood season 2014, all the sites were operational in Mahanadi River. Forecasts were issued for one inflow and one level forecast stations. Details of moderate and low flood events observed are given in **Annex-XII**.

4.7 GODAVARI BASIN

The Flood Forecasting and Warning Network of Central Water Commission, covers of the main river Godavari and four of its main

tributaries, namely, the Wardha, Wainganga, the Manjira and the Indravathi rivers. There were 18 flood forecasting sites which were operational during the flood seasons 2014. Out of these, 12 sites were on the main Godavari River including two inflow forecasting sites, Jaikwadi dam and Sriramsagar (Pochampad), one in Wardha river, two each on the Manjira and Wainganga rivers, and one in the Indravathi river. Two sites on Manjira, namely, Singur dam & Nizamsagar Dam were also inflow forecasting sites.

The details of low and moderate flood events are shown in **Annex-XII**.

4.8 KRISHNA BASIN

Flood Forecasting and Warning Network of Central Water Commission, covers of the main river Krishna, two of its main tributaries, namely, the Tungabhadra, and the Bhima. There were eight flood forecasting sites on these rivers, which were operational during the flood season, 2014. Out of these sites, five sites (all inflow forecasting sites) are on the main river Krishna, two on the Tungabhadra (one level & other inflow forecasting site) and one on the Bhima. The details of low and moderate flood events are shown in **Annex-XII**.

4.9 SOUTHERN RIVER SYSTEM

There was one forecasting site at Nellore on the Pennar River. During 2014, no forecast was necessary, as the river did not cross warning level.

4.10 WEST FLOWING RIVERS

The important west flowing rivers include the Banas, the Sabarmati, the Mahi, the Narmada, the Tapi and the Damanganga. The Flood forecasting and Warning Network of Central Water Commission covers all the above rivers. There were fifteen flood forecasting sites on the above rivers, including six inflow forecasting sites. One site on the Banas at Dantiwada Dam is an inflow forecasting. One level forecasting and one inflow forecasting sites exist on each of rivers, the Sabarmati and the Mahi. There are four sites (all stage forecasting sites) on the Narmada. Two inflows and one level forecasting site are located on the Tapi and one inflow and two level forecasting sites are on the Damanganga. During 2014, inflow forecasts were issued for five dams. Level forecasts were issued for Wanakbori on river Mahi, Hoshangabad, Garudeshwar, Bharuch on river Narmada and Surat on river Tapi. Details are given in **Annex-XII.**

4.11 AN OVERVIEW OF FORECAST EVENTS

The highlight of this year is as follows:

4.11.1 Unprecedented Flood Situation

4.11.1.1 Balrampur on river Rapti

- Very heavy to exceptionally very heavy rainfall recorded during the period 14th to 18th August 2014 in catchment areas of the river Rapti in Nepal and Uttar Pradesh.
- River Rapti and its tributaries started rising from 15th August 2015 onwards and flowed in Unprecedented Flood Situation during the period 17th to 19th August 2014.

4.11.1.2 Elgin Bridge on river Ghaghra

- Very heavy to exceptionally very heavy rainfall recorded during the period 14th to 18th August 2014 in catchment areas of the river Rapti in Nepal and Uttar Pradesh.
- River Ghaghra and its tributaries started rising from 15th August 2015 onwards and flowed in Unprecedented Flood Situation during the period 18th to 19th August 2014.

4.11.2 High Flood events

High Flood Situation was witnessed in 9 flood forecasting stations in the basins of Ghaghra, Rapti in Uttar Pradesh and Bihar, Brahmaputra, Buridehing and Beki in Assam, Baitarni in Odisha.

4.11.3 Moderate to Low flood events and inflow forecasts

Moderate to low flood events were witnessed in 87 stations and inflow forecasts were issued in 23 IF Stations.

4.11.4 No Forecasts

No flood forecasts were issued at 57 flood forecast stations (51 level and 6 inflow) as they did not cross warning level or flows above criteria in case of inflow forecasts or due to reasons such as reservoir operation and just downstream of reservoir.

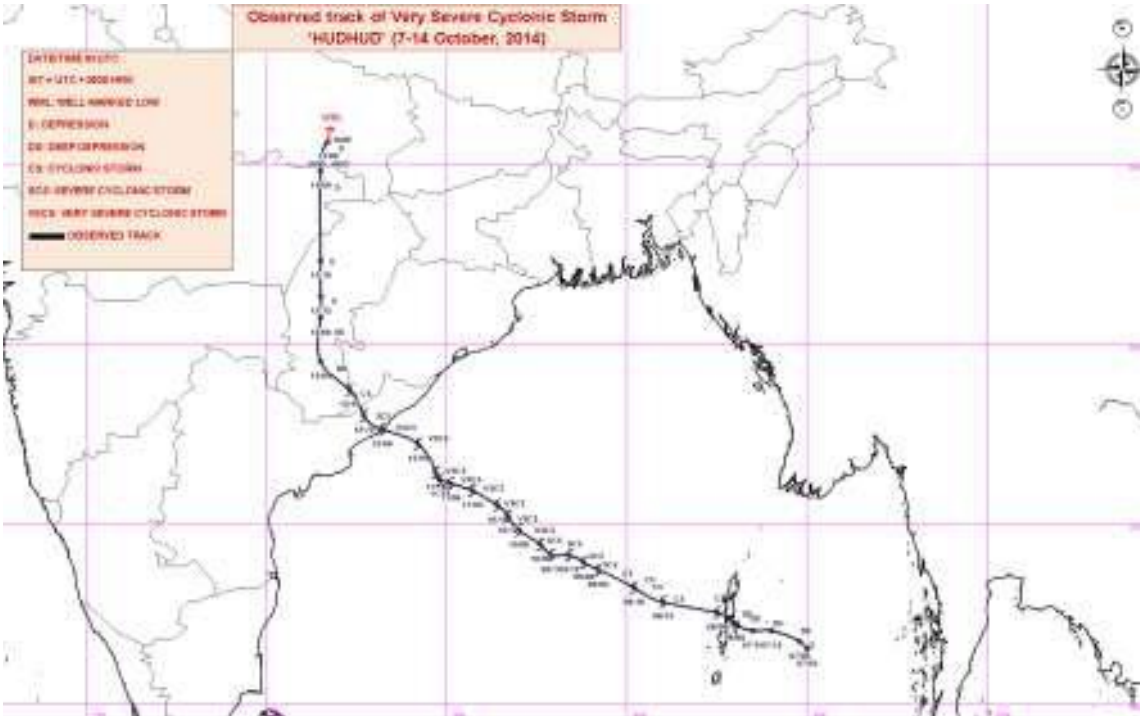
Statement showing number of stations where level/inflow crossed Warning Level

State	Level					Inflow	
	No of Stations where Warning Level exceeded	No. of Station where Danger Level exceeded	No of Stations where within 0.5 m of Highest Flood Level exceeded	No of Stations where Highest Flood Level exceeded	No of station where river level remained below Warning Level	No. of Dams/ Barrages where inflows exceeded threshold limit	No. of Dams/ Barrages where inflows not exceeded threshold limit
Andhra Pradesh	2	2	0	0	1	3	0
Assam	4	14	4	0	2	0	0
Bihar	8	14	3	0	7	0	0
Chhatisgarh	1	0	0	0	0	0	0
Gujarat	1	0	0	0	5	4	1
Haryana	0	0	0	0	0	0	1
Jharkhand	0	1	0	0	0	4	0
Karnataka	0	0	0	0	1	3	0
Madhya Pradesh	0	1	0	0	1	1	0
Maharashtra	0	2	0	0	5	1	1
Odisha	4	6	1	0	0	1	0
Tripura	0	0	0	0	2	0	0
Telangana	1	2	0	0	1	1	3
Uttarakhand	2	1	0	0	0	0	0
Uttar Pradesh	8	6	1	2	17	1	0
West Bengal	3	3	0	0	5	3	0
Dadra Nagar Haveli	0	0	0	0	1	0	0
Delhi	1	0	0	0	1	0	0
Total	35	52	9	2	49	22	6

4.11.5 Flood events in association with "HUDHUD"

4.11.5.1 Flood situation in association with Very Severe Cyclonic Storm "HUDHUD"

A Very Severe Cyclonic Storm originated in Andaman Sea on 7th October had its landfall near Vishakhapatnam in Andhra Pradesh on 12th October 2014 and moved inland in North West and the North direction as shown below:



4.11.5.2 Rainfall: Under the influence of above system, rather heavy to exceptionally heavy rainfall was observed in North coastal districts of AP, almost all districts of Odisha, Chhatisgarh, Jharkhand during 11th October to 15th October 2014 as detailed below:

ANDHRA PRADESH: 12th (50mm to 140mm), 13th (70mm to 380mm), 14th (90mm to 190mm)

ODISHA: 12th (70mm to 120mm), 13th (70mm to 260mm), 14th (80mm to 190mm)October daily rainfall varied from 50mm to 380mm with maximum on 13th.

CHHATTISGARH: 13th (70mm to 170mm), 14th (70mm to 170mm),

JHARKHAND: 13th (80mm to 150mm)

Apart from above East MP, East UP, North Bihar and Sub Himalayan West Bengal also received heavy to exceptionally heavy rainfall on 14th & 15th October 2014.

4.11.5.3 Flood Situation:

4.11.5.3.1 Odisha: No station in Odisha flowed in High/Unprecedented flood situation. Rivers Rishikulya and Vamsadhara flowed in **low to moderate flood situations** at the flood forecasting sites of Purushottampur, Gunupur and Kashinagar.

The reservoir level of Hirakud Dam was lowered by about 1.5 m before the landfall of the storm to have a flood cushion during the actual movement of the storm. In association with the heavy to very heavy rainfall actually occurring, the dam was again filled upto FRL by 15th October 2014.

The reservoir level at Upper Indravathi Project was also lowered by 1.0 m by releasing water to get the desired flood cushion.

4.11.5.3.2 Andhra Pradesh: Gotta barrage on river Vamsadhara received maximum inflow of the order of 2700 cumec(90000 cusec). Other rivers remained **below warning level** at all the Flood Forecasting stations of CWC.

4.11.5.3.3 Chattisgarh: River Indravati remained below warning level at the Flood Forecasting station of CWC.

4.11.5.3.4 Bihar: North Bihar Rivers namely Bagmati, Kamla Balan, Adhwara Group flowed in **low to moderate flood situation**. No flooding observed in other basins.

4.11.5.3.5 UP/WB/Jharkhand: All other rivers in East UP & West Bengal remained below warning level. Before landfall, the reservoir level of Chandil Dam on Subarnarekha in Jharkhand was lowered by about 2.0m by releasing water to avoid flooding in downstream areas in West Bengal & Odisha. The reservoir levels of Damodar valley was below conservation level and inflows were absorbed without flooding in downstream.

4.11.5.4 Role of CWC: Central Water Commission through its field offices at Hyderabad, Bhubaneshwar, Patna, etc monitored the situation for river flooding due to likely heavy to very heavy rainfall in association with HUDHUD. These offices were in close liaison with concerned State Governments. The river water level and forecast depending on situation were disseminated to all concerned regularly. The same was also updated on the CWC website. Total 48 forecasts (level-39/inflow-9) were issued during this period in AP & Odisha. The situation was also monitored by CWC headquarter through Central Flood Control Room (CFCR) on 24x7 basis. Concerned officers of MOWR/CWC attended the NCMC meeting regularly to update the situation.

4.11.6 Flood Situation Reports for other basins

4.11.6.1 Jammu & Kashmir

J&K state experienced heavy to very heavy rainfall during September 3-7, 2014 resulting widespread flooding in different parts of the state. From the detailed analysis of the rainfall, it was found that the rainfall in Jhelum basin during 3rd to 7th September, 2014 was about 320% more than the monthly normal of August and about 600% more than the monthly normal of September. Similarly, in case of Chenab basin, the average rainfall of 3rd to

7th September 2014 was about 300% more than the monthly normal of August and about 500% more than the monthly normal of September. In Tawi basin, the rainfall of 3rd to 7th September 2014 was about 21% more than the monthly normal of August and 200% more than the monthly normal of September. The maximum impact of flooding was around Srinagar city.

Srinagar Valley is a bowl shape valley where the elevation varies from about 1600m to 5300 m on three sides of the valley. However, there is a flat plain of Kashmir valley at EL.1600 m which does not allow rapid drainage of rain waters contributed by higher reaches. During the 4th -6th September, 2014, a lot of runoff was contributed from the higher catchment into the valley. Due to lack of steep slopes the runoff caused severe drainage congestion and inundation in Srinagar and adjoining areas. From the hydrological simulations, it has been estimated that the flood peak in Jhelum river at Sangam located about 50 km upstream of Srinagar was of the order of 2500 cumec (88277 cusec). The flood peak at Srinagar was of the order of 3200 cumec (113000 cusec which sustained for about 6 hours resulting in inundation of large low lying areas and heavy damage in the Jhelum basin especially in Srinagar area due to over topping and subsequent breaching of flood embankments. It has been found from the hydrodynamic study that the banks of river Jhelum in almost entire reach between Sangam and Srinagar were over topped due to occurrence of above flood peaks.

The safe carrying capacity of river Jhelum between Sangam and Srinagar is about 900 cumec (31700 cusec). The flood of September 2014 was about 3 times more of the capacity of the river Jhelum. This resulted in water spread beyond the Jhelum river banks and existing flood spill channel and consequent flooding in the entire adjoining areas.

Earlier, low lying areas along the course of River Jhelum were functioning as natural flood detention basins during floods and were absorbing flood water spilling over the banks of river Jhelum. Subsequently, the same flood water used to get released slowly. However, during the last three to four decades, maximum urbanization has taken place in these low lying areas due to which there is no space for water to get stored during flood season. The situation in Jhelum Basin has got further aggravated due to siltation and encroachments/development of various waterways like river, lakes, marshy land, etc resulting in limited carrying capacity of Jhelum and water bodies.

The flood peak in Chenab basin at Akhnoor was of the order of 23500 cumec (832700 cusec) which is about 76% more than the historical flood of 13300 cumec (469600 cusec) recorded on 10th September, 1992 and caused flooding in adjoining areas.

The flood peak in Tawi river at Sidari (Jammu) during September, 2014 was of the order of 11000 cumec (388400 cusec), which exceeded the highest recorded flood of 9124 cumec (322175 cusec) occurred on 7th July 2005. This flood peak was resulted due to very high intensity of rainfall of the order of

more than 33 mm / hour between 1 AM and 3 AM of 6th September, 2014 caused flooding in adjoining areas.

4.11.6.2 Flood Situation due to formation of lake in Nepal

Due to massive landslide in association with heavy rainfall near Sindhupal Chowk district in Nepal on 2nd August 2014 around 0300 hrs, the river Bhote Kosi, a tributary of river Kosi got blocked endangering downstream area in Nepal and India (North Bihar) due to flood in the event of its sudden failure. A group of officers/experts including two officers from CWC visited Nepal on 2-8-2014 to review the situation and suggest measures. The Government of Nepal carried out controlled blasting to give passage to gradual release of water from the artificial dam created due to landslide. An analysis was carried out in CWC for Dam break situation and it was found that the impact of the sudden breach of the artificial dam may result in flood propagation upto Kosi barrage will take 20 hrs and the maximum rise in river water level near Kosi barrage will be about 50 cm. The situation was continuously monitored from 3rd to 7th August and all concerned beneficiaries were informed about the likely impact of the controlled blasting which was undertaken by the Government of Nepal. The artificial lake breached with displacement of big boulder on 7th September 2014. Following the burst, the water level in the lake reduced by 18 m. The volume and intensity of water release peaked on 7th September itself without much impact.

4.11.7 Flood situation as reported in media with views of CWC thereon

4.11.7.1 Tamilnadu

It was reported on 9th August that River Cauvery received heavy inflows into Mettur Dam of the order of 89,000 cusec due to which the first warning for 12 districts downstream of Mettur Dam was sounded on 10th August 2014.

CWC is not having real-time network in Cauvery Basin in Tamilnadu. However, it was understood that the estimated discharge at Biligundulu CWC site on 8th August was about 72000 cusec (2050 cumec), 9th August was about 88000 cusec (2511 cumec), on 10th August was about 64000 cusec (1825 cumec) and the observed discharge on 11th August was about 2900 cusec (827.70 cumec) and on 12th August it was about 14000 cusec (401.50 cumec).

4.11.7.2 Karnataka

It was reported on 10th August that due to heavy to exceptionally very heavy rainfall in Coastal Karnataka and in Ghat areas of interior Karnataka, most of the rivers in these districts such as Netravathy, Kumaradhara in Dakshina Kannada district, Sauparnika and Varahi rivers in Udupi district flowed over the road bridges in many of the places. In Chickmagalur district, river Tunga, Bhadra and Hemavathy were in spate. Tunga has inundated vast areas of Koppa and Sringeri in Chickmagalur district. In Kodagu district, river Cauvery

and its tributaries were flowing in spate and heavy inflows received in all the four reservoirs in Cauvery basin.

As per CWC network, the river Tungabhadra and its tributaries were in spate right upto the confluence with river Krishna during the period 1st to 9th August 2014. The river started falling from 10th August onwards.

CWC is not maintaining any real-time network in west flowing rivers such as Netravathy etc. However heavy to exceptionally very heavy rainfall occurred during 1st to 10th August all over Coastal and South Interior Karnataka as per Monsoon reports provided by IMD web site.

4.11.7.3 Rajasthan

It was reported that due to very heavy rains in association with a depression which moved from Bay of Bengal to Eastern Rajasthan, heavy to exceptionally very heavy rain occurred in many of the places in East and West Rajasthan. However, the most affected areas included Kota, Sawai Madhopur, Ajmer, Dausa, Jaipur, Jhalawar, Nagaur and Tonk District from 6th to 12th August 2014. The Chambal River was in spate at most of its locations. The river Chambal at Dholpur attained a peak of 136.43m on 8th August which was 6.64m above its Danger Level of 129.79m.

Since there is no flood forecasting station in Rajasthan, no flood forecasts have been issued by CWC. However, some of the Hydrological Observation Stations in Rajasthan serve as base stations to flood forecasting stations on river Yamuna. River Yamuna also rose rapidly downstream of its confluence with Chambal. It did not cross warning level in any of the flood forecasting stations. However due to contribution from Yamuna, river Ganga crossed Danger Level at Ballia in UP and crossed Warning level at Ghazipur in UP.

4.11.7.4 Kerala

Heavy monsoon rains during 4th to 8th August caused damages in the districts of Thrissur, Alappuzha, Kannur, Idukki, Palakkad. Water level in Idukki dam and Mullaperiyar dam build up considerably. There was a second wave of flood between 22nd and 24th August 2014 in Kerala in the same districts due to very heavy rainfall in Kerala.

CWC is not maintaining any real-time network in Kerala. However heavy to very heavy rainfall occurred during 4th to 8th August as well as from 22nd to 23rd August 2014 all over Kerala as per Monsoon reports provided by IMD web site.

CHAPTER 5

RESPONSE FROM USER AGENCIES

5.1 General

Central Water Commission performs the Flood Forecasting and Warning job on flood prone interstate river basins in the country. It issues the forecast to the users such as various civil and engineering departments of the state and central governments including, railway, defense, revenues authorities, public sector undertakings besides National Disaster Management Cell in the Ministry of Home Affairs, who are responsible for taking timely flood fighting measures, rescue operations including shifting of flood affected people to safer places etc.

Though the various state government agencies in-charge of the flood management and relief operations generally do not give their views in writing on usefulness of the flood forecasting activities of CWC, yet some of them do write to the Central Water Commission conveying their views on the usefulness of the flood forecasts received by them.

5.2 Appreciation letters received during flood season 2014

Abstract of some of the messages received by our field unit during the flood season 2014 are given below:

5.2.1 Deputy Relief Commissioner, Ex-Officio Deputy Secretary to Government, Revenue & Disaster Management Department (Special Relief), Government of Odisha, Bhubaneswar-751001. Lr. no: 2661/R&DM (SR) dated 24.11.2014

"Flood Forecast received from Central Water Commission during South West monsoon 2014 was extremely useful for efficient management of flood. These forecasts are promptly circulated among the field functionaries to ensure proper preparedness and undertake required measures. However, it is suggested to consider setting up additional forecasting stations in different river systems. The flood data like river gauges, water discharge, forecast and rainfall data etc could also be transmitted through e-mail at srcodishagov@gmail.com .

5.2.2 Executive Engineer, Balasore Irrigation Division, Balasore, Odisha Lr. No: 5539 dated 16/12/14

CWC sub division office station at Balasore rendered timely forecast about probable flood situation and rain falls which ultimately helped a lot in flood monitoring process and mitigating the flood hazards this year in major rivers like Burhabalang, Subarnarekha and Jalaka pertaining to this Balasore Irrigation Division, Balasore. The

cooperation of CWC especially during devastating and repeated high floods was highly appreciable.

5.2.3 Executive Engineer, PWD, Supaul Division, Government of Bihar. Lr. no: 1648/dated 08.12.2014 (*Translated from Hindi Version*)

The information pertaining to flood forecast, daily water level provided by CWC office was exactly accurate. This helped a lot in informing to general public residing in the area while ensuring the flood alertness. The work done by CWC is satisfactory.

5.2.4 Regional Additional Collector, Bharuch, Gujrat, Letter No. Disaster/Flood/ws/741, dated 26/2/2015.

As per letter, ''**Regional Additional Collector** expressed that I am happy to put on record that Tapi Division of Central Water Commission at Surat has rendered good services during monsoon of the year 2014. Timely and speedy communication has helped a lot to collectorate to take precautionary measures".

5.2.5 Superintending Engineer, Surat-Irrigation Circle, Surat, Gujrat, Letter No. SIC/PB-1/Flood Warning-2014/Utility cert/Monsoon-2015/F-19/WS-34/1126, dated 09/3/2015.

The letter states that the flood forecast, rainfall data for upper Tapi basin and advisory warning received from CWC office well in time helped this office to convey the flood related messages timely to all the concerned Authorities of Surat city and nearby area and release of flood water from Ukai-Karapar was planned according to advisory warning in advance so that least low lying city area was affected with flood water for shorter period in downstream of Ukai dam.

5.2.6 Office of Executive Engineer, Ukai Division No 1, Ukai, District-Tapi (Gujrat), Letter No. UKI-1/PB.IV/F208/783 dated 25/02/2015

The flood forecast issued by CWC in respect of Ukai reservoir during monsoon 2014 along with 1 advisory warning and 1 High Alert warning remained useful in operation of Ukai reservoir during monsoon 2014. The cooperation rendered is highly appreciated.

5.2.7 Office of Superintending Engineer, Government of Gujrat, Damanganga Project Circle, Valsad, Gujrat. Letter No. DMN/PB-1/Flood General/591 dated 19/02/2015

Flood forecasting services rendered for Madhuban Dam during Monsoon -2014 were to satisfaction and are hereby acknowledged. However in this regard if possible, it is requested to convey the inflow

forecast well before 6 Hrs through all electronic communication i.e. E-mail, fax and mobile, so that sufficient time to take prompt action to negotiate the flood may be availed to dam authority. Hoping for rendering such complimentary services in coming years.

ANNEXURES-I to XIII

Salient Features of Flood Forecasting Stations maintained by Central Water Commission

S.No	Name of FF Station/Type	River/Basin	Nearest Town/Vill/District/State	Lat (N)	Long (E)	Base Station (TT in hrs)	Div/Circle/ Orgn	Met Sub Division as per IMD	WL (m)	DL (m)	HFL		Mode of Data Collection	Methodology/ Model used for FF Formulation	Remarks
											(m)	Year			
1	Srinagar	Alaknanda/Ganga	Srinagar/Garhwal/ Uttarakhand	30.22	78.78	1.1 Rudraprayag (06)	HGD/HOCD/UGBO	Uttarakhand	539.00	540.00	536.85	1995	Wireless/ Telemetry	Conventional	Forecast never issued because HFL<WL
2	Rishikesh	Ganga/Ganga	Rishikesh/Dehradun/Uttarakhand	30.11	78.31	2.1 Deoprayag (08) 2.2 Marora (05)	HGD/HOCD/ UGBO	Uttarakhand	339.50	340.50	341.72	1995	Wireless/ Telemetry	Conventional	
3	Hardwar	Ganga/Ganga	Hardwar/Hardwar/ Uttarakhand	29.98	78.19	3.1 Deoprayag (09) 3.2 Marora (06)	HGD/HOCD/ UGBO	Uttarakhand	293.00	294.00	296.30	2010	Wireless/ Telemetry	Conventional	
4	Moradabad	Ramganga/Ganga	Moradabad/Moradabad/Uttar Pradesh	28.83	78.80	4.1 Kalagarh (36)	MGD2/HOCD/ UGBO	West Uttar Prasdesh	189.60	190.60	192.88	2010	Wireless/ Telemetry	Conventional	
5	Bareilly	Ramganga/Ganga	Bareilly/Bareilly/ Uttar pradesh	28.30	79.37	5.1 Moradabad (28)	MGD2/HOCD/ UGBO	West Uttar Prasdesh	162.70	163.70	162.88	1978	Wireless/ Telemetry	Conventional	
6	Kannauj	Ganga/Ganga	Kannauj/Kannauj/ Uttar Pradesh	27.02	79.97	6.1 Narora (D/s) (48)	MGD2/HOCD/ UGBO	West Uttar Prasdesh	124.97	125.97	126.78	2010	Wireless	Conventional	
7	Ankinghat	Ganga/Ganga	Ankinghat/Kanpur/ Uttar Pradesh	26.93	80.03	7.1 Narora (D/s) (48) 7.2 Bareilly (48) 7.3 Fathegarh (12) 7.4 Dabri (12)	MGD2/HOCD/ UGBO	East Uttar Prasdesh	123.00	124.00	124.49	2010	Wireless/ Telemetry	Conventional	
8	Kanpur	Ganga/Ganga	Kanpur/Kanpur/ Uttar Pradesh	26.47	80.38	8.1 Fathegarh (24) 8.2 Dabri (24) 8.3 Ankinghat (12)	MGD2/HOCD/ UGBO	East Uttar Prasdesh	113.00	114.00	114.08	2010	Wireless/ Telemetry	Conventional	
9	Dalmau	Ganga/Ganga	Rae-barerilly/ Rae-barerilly/ Uttar Pradesh	26.06	81.03	9.1 Ankninghat (28) 9.2 Kanpur (16)	MGD2/HOCD/ UGBO	East Uttar Prasdesh	98.36	99.36	99.84	1973	Wireless/ Telemetry	Conventional	
10	Phaphamau	Ganga/Ganga	Allahabad/ Allahabad/ Uttar Pradesh	25.47	83.11	10.1 Kanpur (30) 10.2 Chillaghat (24)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	83.73	84.73	87.98	1978	Wireless/ Telemetry	Conventional	
11	Mawi	Yamuna/Ganga	Panipat/ Muzzafarpur/ Uttar Pradesh	29.38	77.07	11.1 Kalanur (18-30)	UYD/HOCN/ YBO	West Uttar Pradesh	230.00	230.85	232.45	1988	Wireless/ Telemetry	Conventional	
12	Delhi Railway Bridge	Yamuna/Ganga	Delhi/Delhi/ NCT Delhi	28.66	77.25	12.1 Mawi (18-32)	UYD/HOCN/ YBO	Haryana Chandigarh& Delhi	204.00	204.83	207.49	1978	Wireless/ Telemetry	Conventional	
13	Dhansa Regulator	Sahibi/Yamuna/ Ganga	Delhi/Delhi/ NCT Delhi	28.53	76.87	13.1 Dadri (48) 13.2 Masani (48)	UYD/HOCN/ YBO	Haryana Chandigarh& Delhi	211.44	212.44	213.58	1977	Wireless	Conventional	
14	Mathura	Yamuna/Ganga	Mathura/Mathura/ Uttar Pradesh	27.51	77.69	14.1 Mohana (20-33)	UYD/HOCN/ YBO	West Uttar Pradesh	164.20	165.20	169.73	1978	Wireless/ Telemetry	Conventional	

S.No	Name of FF Station/Type	River/Basin	Nearest Town/Vill/District/State	Lat (N)	Long (E)	Base Station (TT in hrs)	Div/Circle/ Orgn	Met Sub Division as per IMD	WL (m)	DL (m)	HFL		Mode of Data Collection	Methodology/ Model used for FF Formulation	Remarks
											(m)	Year			
15	Agra	Yamuna/Ganga	Agra/Agra/ Uttar Pradesh	27.19	78.03	15.1 Mathura (216-4)	LYD/HOCN/ YBO	West Uttar Pradesh	151.40	152.40	154.76	1978	Wireless/ Telemetry	Conventional	
16	Etawah	Yamuna/Ganga	Etawah/Etawah/ Uttar Pradesh	26.75	78.99	16.1 Agra (20-45)	LYD/HOCN/ YBO	West Uttar Pradesh	120.92	121.92	126.13	1978	Wireless/ Telemetry	Conventional	
17	Auraiya	Yamuna/Ganga	Auraiya/Auraiya/ Uttar Pradesh	26.42	79.48	17.1 Etawah (21-24) 17.2 Dhaulpur (15-36)	LYD/HOCN/ YBO	West Uttar Pradesh	112.00	113.00	118.19	1996	Wireless/ Telemetry	Conventional	
18	Kalpi	Yamuna/Ganga	Kalpi/Jalaun/ Uttar Pradesh	26.13	79.76	18.1 Etawah (21-27) 18.2 Dhaulpur (15-42)	LYD/HOCN/ YBO	West Uttar Pradesh	107.00	108.00	112.98	1996	Wireless/ Telemetry	Conventional	
19	Hamirpur	Yamuna/Ganga	Hamirpur/Hamirpur/ Uttar Pradesh	25.96	80.16	19.1 Auraiya (15)	LYD/HOCN/ YBO	East Uttar Prasdesh	102.63	103.63	108.59	1983	Wireless/ Telemetry	Conventional	
20	Chillaghat	Yamuna/Ganga	Banda/Banda/ Uttar Pradesh	25.77	80.53	20.1 Hamirpur (12)	LYD/HOCN/ YBO	East Uttar Prasdesh	99.00	100.00	105.16	1978	Wireless/ Telemetry	Conventional	
21	Mohana	Betwa/Yamuna/ Ganga	Jhansi/Jhansi/ Uttar Pradesh	25.65	78.99	21.1 Garrouli (16-21) 21.2 Nautghat (12-21)	LYD/HOCN/ YBO	East Uttar Prasdesh	121.66	122.66	133.69	1983	Wireless/ Telemetry	Conventional	
22	Sahjiana	Betwa/Yamuna/ Ganga	Hamirpur/Hamirpur/ Uttar Pradesh	25.95	80.15	22.1 Mohana (18-24)	LYD/HOCN/ YBO	East Uttar Prasdesh	103.54	104.54	108.67	1983	Wireless/ Telemetry	Conventional	
23	Banda	Ken/Yamuna/ Ganga	Banda/Banda/ Uttar Pradesh	25.48	80.31	23.1 Madla (12-18) 23.2 Kaimaha (9-15)	LYD/HOCN/ YBO	East Uttar Prasdesh	103.00	104.00	113.29	2005	Wireless/ Telemetry	Conventional	
24	Naini	Yamuna/Ganga	Allahabad/ Allahabad/ Uttar Pradesh	25.42	81.84	24.1 Chillaghat (18-24)	LYD/HOCN/ YBO	East Uttar Prasdesh	83.74	84.74	87.99	1978	Wireless/ Telemetry	Conventional	
25	Allahabad (Chatnag)	Ganga/Ganga	Allahabad/ Allahabad/ Uttar Pradesh	25.41	81.91	25.1 Kanpur (30) 25.2 Chillaghat (24)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	83.73	84.73	88.03	1978	Wireless/ Telemetry	Conventional	
26	Mirzapur	Ganga/Ganga	Mirzapur/Mirzapur/ Uttar Pradesh	25.15	82.53	26.1 Dalmau (28) 26.2 Chillaghat (34)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	76.72	77.72	80.34	1978	Wireless/ Telemetry	Conventional	
27	Varanasi	Ganga/Ganga	Varanasi/Varanasi/ Uttar Pradesh	25.33	83.04	27.1 Kanpur (48) 27.2 Hamirpur(48)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	70.26	71.26	73.90	1978	Wireless/ Telemetry	Conventional	
28	Rae-Bareilly	Sai/Gomti/Ganga	Rae-bareilly/Rae-bareilly/Uttar Pradesh	26.20	81.25	28.1 Bani (48)	MGD2/HOCD/ UGBO	East Uttar Prasdesh	100.00	101.00	104.81	1982	Wireless/ Telemetry	Conventional	

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											(m)	Year			
29	Hanuman Setu	Gomti/Ganga	Lucknow/Lucknow/ Uttar Pradesh	26.86	80.95	29.1 Bhatpurwaghat (48)	MGD2/HOCD/ UGBO	East Uttar Prasdesh	108.50	109.50	110.85	1971	Wireless	Conventional	
30	Jaunpur	Gomti/Ganga	Jaunpur/Jaunpur/ Uttar Pradesh	25.75	82.69	30.1 Sultanpur (24)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	73.07	74.07	77.74	1971	Wireless/ Telemetry	Conventional	
31	Ghazipur	Ganga/Ganga	Ghazipur/ Ghazipur/ Uttar Pradesh	25.58	83.60	31.1 Allahabad (28) 31.2 Sultanpur (30)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	62.11	63.11	65.22	1978	Wireless/ Telemetry	Conventional	
32	Buxar	Ganga/Ganga	Buxar/Buxar/Bihar	25.58	83.97	32.1 Allahabad (30)	MGD5/HOCP/ LGBO	Bihar	59.32	60.32	62.09	1948	Wireless/ Telemetry	Conventional	
33	Elgin Bridge	Ghaghra/Ganga	Barabanki/Barabanki/ Uttar Pradesh	27.09	81.49	33.1 Katernighat (30-36) 33.2 Shardanagar (30-36)	MGD1/HOCV/ UGBO	East Uttar Prasdesh	105.07	106.07	107.56	2009	Wireless/ Telemetry	Conventional	
34	Ayodhya	Ghaghra/Ganga	Ayodhya/Faizbad/ Uttara Pradesh	26.81	82.21	34.1 Elgin Bridge (18-24)	MGD1/HOCV/ UGBO	East Uttar Prasdesh	91.73	92.73	94.01	2009	Wireless/ Telemetry	Conventional	
35	Balrampur	Rapti/Ghaghra/ Ganga	Balrampur/ Balrampur/ Uttar Pradesh	27.44	82.23	35.1 Kakardhari (18-24)	MGD1/HOCV/ UGBO	East Uttar Prasdesh	103.62	104.62	105.25	2000	Wireless/ Telemetry	Conventional	
36	Bansi	Rapti/Ghaghra/ Ganga	Bansi/ Siddarthnagar/ Uttar Pradesh	27.18	82.93	36.1 Balrampur (18-24)	MGD1/HOCV/ UGBO	East Uttar Prasdesh	83.90	84.90	85.82	1998	Wireless/ Telemetry	Conventional	
37	Gorakhpur (Birdghat)	Rapti/Ghaghra/ Ganga	Gorahpur/ Gorakhpur/ Uttar Pradesh	26.73	83.35	37.1 Bansi (18-24)	MGD1/HOCV/ UGBO	East Uttar Prasdesh	73.98	74.98	77.54	1998	Wireless/ Telemetry	Conventional	
38	Turtipar	Ghaghra/Ganga	Balthra/Ballia/ Uttar Pradesh	26.14	83.88	38.1 Ayodhya (30-36) 38.2 Gorakhpur (Birdghat) (30-36)	MGD1/HOCV/ UGBO	East Uttar Prasdesh	63.01	64.01	66.00	1998	Wireless/ Telemetry	Conventional	
39	Darauli	Ghaghra/Ganga	Darauli/Siwan/Bihar	26.07	84.13	39.1 Elgin Bridge (54) 39.2 Gorakhpur (Birdghat) (28)	MGD5/HOCP/ LGBO	Bihar	59.82	60.82	61.74	1998	Wireless	Conventional	
40	Gangpur Siswan	Ghaghra/Ganga	Siwan/Siwan/Bihar	25.91	84.39	40.1 Turtipar (20)	MGD5/HOCP/ LGBO	Bihar	56.04	57.04	58.01	1983	Wireless	Conventional	
41	Chhapra	Ghaghra/Ganga	Chhapra/Saran/Bihar	25.76	84.79	41.1 Gangpur Siswan (16)	MGD5/HOCP/ LGBO	Bihar	52.68	53.68	54.59	1982	Wireless	Conventional	
42	Ballia	Ganga/Ganga	Ballia/ Ballia/ Uttar Pradesh	25.77	84.37	42.1 Varanasi (28) 42.2 Jaunpur (28)	MGD3/HOCV/ UGBO	East Uttar Prasdesh	56.62	57.62	60.25	2003	Wireless/ Telemetry	Conventional	

S.No	Name of FF Station/Type	River/Basin	Nearest Town/Vill/District/State	Lat (N)	Long (E)	Base Station (TT in hrs)	Div/Circle/ Orgn	Met Sub Division as per IMD	WL (m)	DL (m)	HFL		Mode of Data Collection	Methodology/ Model used for FF Formulation	Remarks
											(m)	Year			
43	Inderpuri	Sone/Ganga	Inderpuri/Rohtas/ Bihar	24.84	84.13	43.1 Chopan (12) 43.2 Daltonganj (12)	MGD5/HOCP/ LGBO	Bihar	107.20	108.20	108.85	1975	Wireless	Conventional	
44	Koelwar	Sone/Ganga	Koelwar/Bhojpur/ Bihar	25.57	84.79	44.1 Inderpuri (10-15)	MGD5/HOCP/ LGBO	Bihar	54.52	55.52	58.88	1971	Wireless	Conventional	
45	Maner	Sone/Ganga	Maner/Patna/Bihar	25.70	84.86	45.1 Gandhighat (8)	MGD5/HOCP/ LGBO	Bihar	51.00	52.00	53.79	1976	Wireless	Conventional	
46	Sripalpur	Punpun/Ganga	Sripalpur/Patna/Bihar	25.50	85.11	46.1 Kinjer (24)	MGD5/HOCP/ LGBO	Bihar	49.60	50.60	53.91	1976	Wireless	Conventional	
47	Patna (Dighaghat)	Ganga/Ganga	Patna/ Patna/ Bihar	25.64	85.10	47.1 Allahabad (30) 47.2 Patna (Gandhighat) (04)	MGD5/HOCP/ LGBO	Bihar	49.45	50.45	52.52	1975	Wireless	Conventional	
48	Patna (Gandhighat)	Ganga/Ganga	Patna/ Patna/ Bihar	25.62	85.17	48.1 Buxar (24) 48.2 Darauli (24) 48.3 Japla (24) . 48.4 Rewaghat	MGD5/HOCP/ LGBO	Bihar	47.60	48.60	50.27	1994	Wireless/ Telemetry	Conventional	
49	Hathidah	Ganga/Ganga	Hathidah/Patna/Bihar	25.37	85.99	49.1 Gandhighat (16)	MGD5/HOCP/ LGBO	Bihar	40.76	41.76	43.15	1971	Wireless/ Telemetry	Conventional	
50	Munger	Ganga/Ganga	Munger/Munger/ Bihar	25.38	86.46	50.1 Gandhighat (24)	MGD5/HOCP/ LGBO	Bihar	38.33	39.33	40.99	1976	Wireless/ Telemetry	Conventional	
51	Khadda	Gandak/Ganga	Deoria/Kushinagar/ Uttar Pradesh	27.19	83.95	51.1 Triveni (07)	MGD4/HOCP/ LGBO	Bihar	95.00	96.00	97.50	2002	Wireless	Conventional	
52	Chatia	Gandak/Ganga	Ariraj West Champaran/ Motihari/ Bihar	26.50	84.54	52.1 Triveni (24)	MGD4/HOCP/ LGBO	Bihar	68.15	69.15	70.04	2002	Wireless	Conventional	
53	Rewaghat	Gandak/Ganga	Muzzafarpur/Muzzafarpur/ Bihar	25.99	85.05	53.1 Chatia (20)	MGD5/HOCP/ LGBO	Bihar	53.41	54.41	55.41	1986	Wireless	Conventional	
54	Hazipur	Gandak/Ganga	Hazipur/Vaishali/ Bihar	25.69	85.20	54.1 Rewaghat (16)	MGD5/HOCP/ LGBO	Bihar	49.32	50.32	50.93	1948	Wireless	Conventional	
55	Lalbeghiaghat	Burhi Gandak/ Ganga	Dhaka/Motihari/Bihar	26.65	85.03	55.1 Chainpatia (24)	MGD4/HOCP/ LGBO	Bihar	62.20	63.20	67.09	1975	Wireless	Conventional	
56	Muzzafarpur (Sikandarpur)	Burhi Gandak/ Ganga	Sikandarpur/Muzzafarpur/Bihar	26.14	85.39	56.1 Ahirwala(S) (22)	MGD4/HOCP/ LGBO	Bihar	51.53	52.53	54.29	1987	Wireless	Conventional	

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											(m)	Year			
57	Samastipur	Burhi Gandak/ Ganga	Samastipur/Samastipur/Bihar	25.86	85.79	57.1 Sikandarpur (20)	MGD4/HOCP/ LGBO	Bihar	45.02	46.02	49.38	1987	Wireless	Conventional	
58	Rosera	Burhi Gandak/ Ganga	Rosera/Samastipur/ Bihar	25.74	86.02	58.1 Sikandarpur (28)	MGD4/HOCP/ LGBO	Bihar	41.63	42.63	46.35	1987	Wireless	Conventional	
59	Khagaria	Burhi Gandak/ Ganga	Khagaria/Khagaria/ Bihar	25.50	86.48	59.1 Sikandarpur (24) 59.2 Gandhighat (24)	MGD4/HOCP/ LGBO	Bihar	35.58	36.58	39.22	1976	Wireless	Conventional	
60	Benibad	Bagmati/Ganga	Benibad/Muzzafarpur/ Bihar	26.20	85.67	60.1 Runisaidpur (24)	MGD4/HOCP/ LGBO	Bihar	47.68	48.68	50.01	2004	Wireless/ Telemetry	Conventional	
61	Hayaghat	Bagmati/Ganga	Hayaghat Papermill/Darbhanga/ Bihar	26.08	85.89	61.1 Benibad (24) 61.2 Ekmighat (24)	MGD4/HOCP/ LGBO	Bihar	44.72	45.72	48.96	1987	Wireless/ Telemetry	Conventional	
62	Kamtaul	Adhwara Group/Ganga	Kamtaul Market/Darbhanga/ Bihar	26.33	85.85	62.1 Sonebarsa (24)	MGD4/HOCP/ LGBO	Bihar	49.00	50.00	52.99	1987	Wireless/ Telemetry	Conventional	
63	Ekmighat	Adhwara Group/Ganga	Laheria Seria/Darbhanga/ Bihar	26.12	85.88	63.1 Saulighat (24)	MGD4/HOCP/ LGBO	Bihar	45.94	46.94	49.52	2004	Wireless/ Telemetry	Conventional	
64	Jhanjharpur	Kamlabalan/ Ganga	Jhanjharpur/Madhubani/ Bihar	26.27	86.27	64.1 Jainagar (8)	MGD4/HOCP/ LGBO	Bihar	49.00	50.00	53.01	2004	Wireless	Conventional	
65	Bhagalpur	Ganga/Ganga	Bhagalpur/Bhagalpur/Bihar	25.27	87.02	65.1 Gandhighat (32)	MGD5/HOCP/ LGBO	Bihar	32.68	33.68	34.20	2003	Wireless/ Telemetry	Conventional	
66	Colgong/Kahalgaon	Ganga/Ganga	Colgong/Bhagalpur/ Bihar	25.27	87.23	66.1 Gandhighat (38)	MGD5/HOCP/ LGBO	Bihar	30.09	31.09	32.87	2003	Wireless/ Telemetry	Conventional	
67	Basua	Kosi/Ganga	Supaul/Supaul/Bihar	26.13	86.58	67.1 Birpur (16)	MGD4/HOCP/ LGBO	Bihar	46.75	47.75	49.17	2010	Wireless	Conventional	
68	Balthara	Kosi/Ganga	Choutham/Khagaria/ Bihar	25.54	86.72	68.1 Basua (24) 68.2 Hayaghat (24)	MGD4/HOCP/ LGBO	Bihar	32.85	33.85	36.40	1987	Wireless	Conventional	
69	Kursela	Kosi/Ganga	Kusela/Katihar/Bihar	25.42	87.23	69.1 Basua (24) 69.2 Hathidah (24)	MGD4/HOCP/ LGBO	Bihar	29.00	30.00	32.04	1998	Wireless	Conventional	
70	Sahibganj	Ganga/Ganga	Sahibganj/Sahibganj/Jharkhand	25.25	87.64	70.1 Bhagalpur (22)	MGD5/HOCP/ LGBO	Jharkhand	26.25	27.25	30.91	1998	Wireless	Conventional	

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											(m)	Year			
71	Dengraghat	Mahananda/ Ganga	Bayasi/Purnes/Bihar	25.85	87.81	71.1 Taibpur (24) 71.2 Chargharia (24)	MGD4/HOCP/ LGBO	Bihar	34.65	35.65	38.09	1968	Wireless	Conventional	
72	Jhawa	Mahananda/ Ganga	Jhawa/Katihar/Bihar	25.43	87.76	72.1 Dhengraghat (16) 72.2 Araria (16)	MGD4/HOCP/ LGBO	Bihar	30.40	31.40	33.51	1987	Wireless	Conventional	
73	Farakka Barrage	Ganga/Ganga	Farakka/Murshidabad/ West Bengal	24.80	87.92	73.1 Bhagalpur (36)	MGD4/HOCP/ LGBO	Gangetic West Bengal	21.25	22.25	25.14	1998	Wireless	Conventional	
74	Dibrugarh	Brahmaputra/ Brahmaputra	Dibrugarh/Dibrugarh/Assa m	27.49	94.91	74.1 Passighat (12) 74.2 Tezu (12)	UBD/HOCG/ BBBO	Assam and Meghalaya	104.70	105.70	106.48	1998	Wireless/ Telemetry	Conventional	
75	Naharkatia	Buridehing/ Brahmaputra	Naharkatia/ Dibrugarh/ Assam	27.29	95.33	75.1 Margherita (10)	UBD/HOCG/ BBBO	Assam and Meghalaya	119.40	120.40	122.69	1973	Wireless	Conventional	
76	Chenimari (Khowang)	Buridehing/ Brahmaputra	Khowang/ Dibrugarh/ Assam	27.31	94.88	76.1 Naharkatia (21)	UBD/HOCG/ BBBO	Assam and Meghalaya	101.11	102.11	103.92	1988	Wireless	Conventional	
77	Nanglamoraghat	Desang/ Brahmaputra	Sibsagar/Sibsagar/ Assam	26.99	94.78	77.1 Dillighat (18)	UBD/HOCG/ BBBO	Assam and Meghalaya	93.46	94.46	96.49	1998	Wireless	Conventional	
78	Sibsagar	Dikhow/ Brahmaputra	Sibsagar/Sibsagar/ Assam	26.98	94.58	78.1 Bihubar (09)	UBD/HOCG/ BBBO	Assam and Meghalaya	91.40	92.40	95.62	1974	Wireless	Conventional	
79	Badatighat	Subansiri/ Brahmaputra	Bihuparia/ Lakhimpur/ Assam	26.95	93.96	79.1 Chouldhowaghat (18)	UBD/HOCG/ BBBO	Assam and Meghalaya	81.53	82.53	86.84	1972	Wireless	Conventional	
80	Neamatighat	Brahmaputra/ Brahmaputra	Neamatighat/ Jorhat/ Assam	26.86	94.25	80.1 Dibrugarh (24) 80.2 Chenimari (24)	UBD/HOCG/ BBBO	Assam and Meghalaya	84.04	85.04	87.37	1991	Wireless/ Telemetry	Conventional	
81	Tezpur	Brahmaputra/ Brahmaputra	Tezpur/ Sonitpur/ Assam	26.62	92.80	81.1 Neamatighat (24)	UBD/HOCG/ BBBO	Assam and Meghalaya	64.23	65.23	66.59	1988	Wireless/ Telemetry	Conventional	
82	Golaghat	Dhansisri (S)/ Brahmaputra	Golaghat/ Golaghat Assam	26.50	93.95	82.1 Bokajan (14) 82.2 Gelabil (14)	UBD/HOCG/ BBBO	Assam and Meghalaya	88.50	89.50	91.30	1986	Wireless	Conventional	
83	Numaligarh	Dhansisri (S)/ Brahmaputra	Numaligarh/ Golaghat/ Assam	26.63	93.73	83.1 Golaghat (10)	UBD/HOCG/ BBBO	Assam and Meghalaya	76.42	77.42	79.87	1985	Wireless	Conventional	
84	N T Road Crossing	Jia- Bharali/ Brahmaputra	Balipara/Sonitpur/ Assam	26.81	92.88	84.1 Seppa (9)	UBD/HOCG/ BBBO	Assam and Meghalaya	76.00	77.00	78.50	2007	Wireless	Conventional	

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85	Kampur	Kopili/ Brahmaputra	Kampur/ Nagaon/ Assam	26.15	92.65	85.1 Kheronighat (24)	UBD/HOCG/ BBBO	Assam and Meghalaya	59.50	60.50	61.86	1973	Wireless	Conventional	
86	Dharamtul	Kopili/ Brahmaputra	Dharamtul/Morigaon/Assam	26.17	92.36	86.1 Kampur (15)	UBD/HOCG/ BBBO	Assam and Meghalaya	55.00	56.00	58.09	2004	Wireless	Conventional	
87	Guwahati D C Court	Brahmaputra/ Brahmaputra	Guwahati/Kamrup/ Assam	26.19	91.74	87.1 Tezpur (24)	MBD/HOCG/ BBBO	Assam and Meghalaya	48.68	49.68	51.46	2004	Wireless/ Telemetry	Conventional	
88	N H Crossing	Puthimari/ Brahmaputra	Rangia/ kamrup/ Assam	26.44	91.56	88.1 DRF (13)	MBD/HOCG/ BBBO	Assam and Meghalaya	50.81	51.81	55.08	2008	Wireless/ Telemetry	Conventional	
89	N T Road Crossing	Pagladiya/ Brahmaputra	Nalbari/Nalbari/ Assam	26.45	91.46	89.1 Melabazar (12)	MBD/HOCG/ BBBO	Assam and Meghalaya	51.75	52.75	55.45	2004	Wireless/ Telemetry	Conventional	
90	Road Bridge	Beki/ Brahmaputra	Sorbhog/ Barpeta/ Assam	26.49	90.91	90.1 Kurijampa (12) (Bhutan)	LBD/HOCG/ BBBO	Assam and Meghalaya	44.10	45.10	46.20	2000	Wireless	Conventional	
91	N H Crossing	Manas/ Brahmaputra	Bijni/ Bongaigaon/ Assam	26.46	90.75	91.1 Panbari (6)	LBD/HOCG/ BBBO	Assam and Meghalaya	47.81	48.42	50.08	1984	Wireless	Conventional	
92	Goalpara	Brahmaputra/ Brahmaputra	Goalpara/ Goalpara/ Assam	26.20	90.58	92.1 Guwahati (24)	MBD/HOCG/ BBBO	Assam and Meghalaya	35.27	36.27	37.43	1954	Wireless/ Telemetry	Conventional	
93	Golokganj	Sankosh/ Brahmaputra	Golokganj/Dhubri/ Assam	26.11	89.82	93.1 Sankosh LRP (12) 93.2 Barabisa (12)	LBD/HOCG/ BBBO	Assam and Meghalaya	28.94	29.94	30.95	2007	Wireless/ Telemetry	Conventional	
94	N H 31	Jaldhaka/ Brahmaputra	Dhupguri/ Jalpaiguri/ West Bengal	26.57	88.94	94.1 Nagarakata (6) 94.2 Diana (6) 94.3 Murti (6)	LBD/HOCG/ BBBO	Sub Himalayan West Bengal & Sikkim	80.00	80.90	81.33	1972	Wireless	Conventional	
95	Mathabhanga	Jaldhaka/ Brahmaputra	Mathabhanga/ Coochbehar/ West Bengal	26.32	89.23	95.1 N H 31 (6)	LBD/HOCG/ BBBO	Sub Himalayan West Bengal & Sikkim	47.70	48.20	49.85	2007	Wireless	Conventional	
96	Ghughumari	Torsa	Coochbehar/Coochbehar/ West Bengal	26.29	89.46	96.1 Hasimara (8)	LBD/HOCG/ BBBO	Sub Himalayan West Bengal & Sikkim	39.80	40.41	41.46	2000	Wireless	Conventional	
97	Tufangunj	Raidak -I	Tufangunj/ Coochbehar/ west Bengal	26.31	89.68	97.1 Chepan (12)	LBD/HOCG/ BBBO	Sub Himalayan West Bengal & Sikkim	34.22	35.30	36.36	1993	Wireless	Conventional	
98	Domohani Road Bridge	Tista	Jalpaiguri/ Jalpaiguri/ West Bengal	26.56	88.77	98.1 Tista Bazaar (8) 98.2 Ghista (4-6) 98.3 Chel (4-6) 98.4 Nebra (6)	LBD/HOCG/ BBBO	Sub Himalayan West Bengal & Sikkim	85.65	85.95	89.30	1968	Wireless	Conventional	

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99	Mekhligunj	Tista	Mekhligunj/ Coochbehar/ West Bengal	26.33	88.85	99.1 Domohani Rd Brdige (6)	LBD/HOCG/ BBBO	Sub Himalayan West Bengal & Sikkim	65.45	65.95	66.45	1996	Wireless	Conventional	
100	Dhubri	Brahmaputra/ Brahmaputra	Dhubri/Dhubri/ Assam	26.01	89.99	100.1 Goalpara (15)	LBD/HOCG/ BBBO	Assam and Meghalaya	27.62	28.62	30.36	1988	Wireless/ Telemetry	Conventional	
101	Annapurnaghat (Silchar)	Barak/ Barak	Silchar/Silchar/ Assam	24.83	92.80	101.1 Chottabekra (18)	MBD/HOCG/ BBBO	Assam and Meghalaya	18.83	19.83	21.84	1989	Wireless	Conventional	
102	Matizuri	Katakhal/Barak	Hailakhandi/ Hailakhandi/ Assam	24.85	92.61	102.1 Gharmura (12)	MBD/HOCG/ BBBO	Assam and Meghalaya	19.27	20.27	22.73	2007	Wireless	Conventional	
103	Karimgunj	Kushiyara/Barak	Karimgunj/Karimgunj/Assam	24.87	92.36	103.1 Annapurnaghat (12)	MBD/HOCG/ BBBO	Assam and Meghalaya	13.94	14.94	16.57	2010	Wireless	Conventional	
104	Kailashshar	Manu	Kailashshar/ North Tripura Tripura	24.32	91.99	104.1 Manughat (18-24)	MBD/HOCG/ BBBO	NMMT	24.34	25.34	25.79	1993	Wirless	Conventional	
105	Sonamura	Gumti	Sonamura/ West Tripura/ Tripura	23.47	91.27	105.1 Amarpur (15-21)	MBD/HOCG/ BBBO	NMMT	11.50	12.50	14.42	1993	Wireless	Conventional	
106	Narayanpur	Mayurakshi/ Ganga	Kandi/Murshidabad/ West Bengal	23.88	87.99	106.1 Tilpara Barrage (12-18)	DD/HOCM/ LGBO	Gangetic West Bengal	26.99	27.99	29.69	1995	Wireless	Conventional	
107	Gheropara	Ajoy/Ganga	Khairasol/ Bhirbum/ West Bengal	23.62	87.71	107.1 Jamtara (8-24) 107.2 Sikata Barrage (8-24)	DD/HOCM/ LGBO	Gangetic West Bengal	38.42	39.42	43.94	1978	Wireless	Conventional	
108	Harinkhola	Mundeshwari/ West Benagl	Arambagh/Hooghly/ West Bengal	22.88	87.78	108.1 Durgapur Barrage (20-26)	DD/HOCM/ LGBO	Gangetic West Bengal	11.80	12.80	14.58	1978	Wireless/ Telemetry	Conventional	
109	Mohanpur	Kangsabati/ Ganga	Medhinipur/ Medhinipur/ West Bengal	22.40	87.34	109.1 Kangsabati Dam (24) 109.2 D P Ghat (24)	DD/HOCM/ LGBO	Gangetic West Bengal	24.73	25.73	29.87	1978	Wireless	Conventional	
110	Rajghat	Subarnarekha/ East Flowing Rivers	Jaleswar/Balasore/ Odisha	21.77	87.16	110.1 Jamsaloghat (18-20) 110.2 Fekoghat (6-9)	ERD/HOCB/ MERO	Odisha	9.45	10.36	12.69	2008	Wireless/ Telemetry	Conventional	
111	N H 5 Road Bridge	Burhabalang/ East Flowing Rivers	Govindpur/ Balasore/ Odisha	21.55	86.92	111.1 Baripada (18-20) 111.2 Jayapur (16-18)	ERD/HOCB/ MERO	Odisha	7.21	8.13	9.50	1973	Wireless	Conventional	
112	Anandpur	Baitrani/East Flowing Rivers	Anandpur/ Keonjargarh/ Odisha	21.22	86.11	112.1 Swampatna (6-7)	ERD/HOCB/ MERO	Odisha	37.44	38.36	41.35	2011	Wireless/ Telemetry	Conventional/ Mathematical	

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113	Akhuapada	Baitrani/East Flowing Rivers	Akhuapada/ Bhadrak/ Odisha	20.92	86.28	113.1 Anandpur (18-20)	ERD/HOCB/ MERO	Odisha	17.83	17.83	21.56	1960	Wireless/ Telemetry	Conventional	
114	Jenapur Expressway	Brahmani/East Flowing Rivers	Jenapur/Jajpur/ odisha	20.88	86.01	114.1 Talcher (18-20)	ERD/HOCB/ MERO	Odisha	22.00	23.00	24.78	1975	Wireless/ Telemetry	Conventional	
115	Naraj	Mahanadi/ Mahanadi	Cuttack/ Cuttack/Odisha	20.47	85.77	115.1 Tikarapara (18-20)	ERD/HOCB/ MERO	Odisha	25.41	26.41	27.61	1982	Wireless	Conventional/ Mathematical	
116	Alipingal	Devi/Mahanadi	Alipingal/Jagitsinghpur/ Odisha	20.07	86.17	116.1 Naraj (12)	ERD/HOCB/ MERO	Odisha	10.85	11.76	13.11	2011	Wireless/ Telemetry	Conventional	
117	Nimapara	Kushbhadra/ Mahanadi	Nimapara/Puri/ Odisha	20.06	86.01	117.1 Naraj (12)	ERD/HOCB/ MERO	Odisha	9.85	10.76	11.60	1982	Wireless/ Telemetry	Conventional	
118	Purushottampur	Rishikulya/ East Flowing Rivers	Purushottampur/ Ganjam/ Odisha	19.50	84.87	118.1 Sorada (18-20)	ERD/HOCB/ MERO	Odisha	15.83	16.83	19.65	1990	Wireless/ Telemetry	Conventional	
119	Gunupur	Vamshadara/East Flowing Rivers	Gunupur/Koraput/ Odisha	19.08	83.81	119.1 Kutragada (03-06)	ERD/HOCB/ MERO	Odisha	83.00	84.00	88.75	1980	Wireless/ Telemetry	Conventional	
120	Kashinagar	Vamshadara/East Flowing Rivers	Kashinagar/Ganjam/ Odisha	18.85	83.87	120.1 Kutragada (06-09)	ERD/HOCB/ MERO	Odisha	53.60	54.60	58.93	1980	Wireless/ Telemetry	Conventional/ Mathematical	
121	Mandla	Narmada/ Narmada	Mandla/Mandla/ Madhya Pradesh	23.77	85.56	121.1 Dindori (11) 121.2 Mohgaon (04) 121.3 Mukki (12)	ND/SECB/ NBO	East Madhya Pradesh	437.20	437.80	439.41	1974	Wireless	Conventional	
122	Hoshangabad	Narmada/ Narmada	Hoshangabad/ Hoshangabad/ Madhya Pradesh	22.76	77.69	122.1 Barman(22) 122.2 Tawanagar (08)	ND/SECB/ NBO	West Madhya Pradesh	292.83	293.83	300.90	1973	Wireless	Conventional	
123	Garudeshwar	Narmada/ Narmada	Garudeshwar/ Bharuch/Gujarat	21.89	73.65	123.1 Sardar sarovar dam (12)	TD/HOCG/ NTBO	Gujarat	30.48	31.09	41.65	1970	Wireless/ Telemetry	Conventional	
124	Bharuch	Narmada/ Narmada	Bharuch/Bharuch/ Gujarat	21.70	73.00	124.1 Garudeshwar (12)	TD/HOCG/ NTBO	Gujarat	6.71	7.31	12.65	1970	Wireless/ Telemetry	Conventional	
125	Subash Bridge (Ahmedabad)	Sabarmati/ West Flowing Rivers	Ahmedabad/Ahmedabad/ Gujarat	23.06	72.59	125.1 Derol Bridge (04-06) 125.2 Hatmati Weir (04-06)	MD/HOCG/ NTBO	Gujarat	44.09	45.34	47.45	2006	Wireless/ Telemetry	Conventional	
126	Wanakbori Weir	Mahi/ West Flowing River	Wanakbori/Kheda	22.74	72.69	126.1 Kadana Dam (06) 126.2 Panam Dam (06)	MD/HOCG/ NTBO	Gujarat	71.00	72.54	76.10	2006	Wireless/ Telemetry	Conventional	

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127	Surat	Tapi/ Tapi	Surat/Surat/Gujarat	21.20	72.82	127.1 Hatnur Dam (24)	TD/HOCG/ NTBO	Gujarat	8.50	9.50	12.50	2006	Wireless/ Telemetry	Conventional	
128	Vapi Town	Damanganga/ West Flowing Rivers	Vapi Town/ Valsad/Gujarat	20.37	72.88	128.1 Madhuban Dam (03-06)	TD/HOCG/ NTBO	Gujarat	18.20	19.20	23.76	1976	Wireless/ Telemetry	Conventional	
129	Daman	Damanganga/ West Flowing Rivers	Daman/Daman/Diu	20.41	72.84	129.1 Madhuban Dam (05-09)	TD/HOCG/ NTBO	Gujarat	2.60	3.40	4.00	2004	Wireless/ Telemetry	Conventional	
130	Kopergaon	Godavari/ Godavari	Kopergaon/Ahmednagar/Maharashtra	19.89	74.49	130.1 N M Weir (05-06)	LGD/GC/ KGBO	Marathwada	490.90	493.68	499.17	1969	Wireless/ Telemetry	Conventional	
131	Gangakhed	Godavari/ Godavari	Gangakhed/Parbhani/Maharashtra	18.98	76.75	131.1 Dhalegaon (15-18)	LGD/GC/ KGBO	Marathwada	374.00	375.00	377.57	1947	Wireless/ Telemetry	Conventional	
132	Nanded	Godavari/ Godavari	Nanded/Nanded/ Maharastra	19.15	77.31	132.1 Dhalegaon (24-27) 132.2 Purna (03-06)	LGD/GC/ KGBO	Marathwada	353.00	354.00	357.10	2006	Wireless/ Telemetry	Conventional	
133	Bhandara	Wainganga/ Godavari	Bhandara/Bhandara/Maharashtra	21.15	79.66	133.1 Balaghat (15-18) 133.2 Rajegaon (15-18) 133.3 Sitakesa (15-18)	LGD/GC/ KGBO	Vidharbha	244.00	244.50	250.90	2005	Wireless/ Telemetry	Conventional	
134	Pauni	Wainganga/ Godavari	Pauni/Bhandara/ Maharashtra	20.79	79.65	134.1 Bhandara (06-09) 134.2 K R Bridge (06)	LGD/GC/ KGBO	Vidharbha	226.73	227.73	232.35	1994	Wireless/ Telemetry	Conventional	
135	Balharsha	Wardha/Godavari	Balharsha/Chandrapur/ Maharashtra	19.82	79.37	135.1 Hivra (24-30) 135.2 Nandgaon (24) 135.3 Ghugus (12) 135.4 P G Bridge (12-15)	LGD/GC/ KGBO	Vidharbha	171.50	174.00	176.00	1986	Wireless/ Telemetry	Conventional	
136	Kaleswaram	Godavari/ Godavari	Kaleswaram/Karimnagar/ Andhra Pradesh	18.82	79.91	136.1 Ashti (12) 136.2 Balharsha (12-15) 136.3 Mancherial (12)	LGD/GC/ KGBO	Telangana	103.50	104.75	107.05	1986	Wireless/ Telemetry	Conventional	
137	Jagdalpur	Indravathi/ Godavari	Jagdalpur/ Bastar/ Chhatisgarh	19.09	82.03	137.1 Nowrangpur (06-24) 137.2 Kosagumda (06-24)	LGD/GC/ KGBO	Chhatisgarh	539.50	540.80	544.68	1973	Wireless/ Telemetry	Conventional	
138	Eturunagaram	Godavari/ Godavari	Eturunagaram/ Warangal/ Andhra Pradesh	18.32	80.46	138.1 Kaleswaram (12) 138.2 Pathagudem (09) 138.3 Perur (03)	LGD/GC/ KGBO	Telangana	73.29	75.79	77.66	1990	Wireless/ Telemetry	Conventional	
139	Dummagudem	Godavari/ Godavari	Dummagudem/ Khammam/ Andhra Pradesh	17.85	80.88	139.1 Perur (12-15) 139.2 Taliperu dam (06)	LGD/GC/ KGBO	Telangana	53.00	55.00	60.25	1986	Wireless/ Telemetry	Conventional	
140	Bhadrachalam	Godavari/ Godavari	Bhadrachalam/ Khammam/ Andhra Pradesh	17.67	80.88	140.1 Perur (15-18) 140.2 Taliperu dam (09)	LGD/GC/ KGBO	Telangana	45.72	48.77	55.66	1986	Wireless/ Telemetry	Conventional	

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141	Kunavaram	Godavari/ Godavari	Kunavaram/ Khammam/ Andhra Pradesh	17.57	81.25	141.1 Perur (24-27) 141.2 Taliperu (15-18) 141.3 Konta (06)	LGD/GC/ KGBO	Telangana	37.74	39.24	51.30	1986	Wireless	Conventional	
142	Rajahmundry GNV Railway Bridge	Godavari/ Godavari	Rajahmundry/ East Godavari/ Andhra Pradesh	17.01	81.77	142.1 Koida (12)	LGD/GC/ KGBO	Coastal Andhra Pradesh	17.68	19.51	20.48	1986	Wireless/ Telemetry	Conventional	
143	Dowlaiswaram Barrage	Godavari/ Godavari	Dowlaiswaram/ East Godavari/ Andhra Pradesh	16.94	81.78	143.1 Koida (15)	LGD/GC/ KGBO	Coastal Andhra Pradesh	14.25	16.08	18.36	1986	Wireless/ Telemetry	Conventional	
144	Arjunwad	Krishna/Krishna	Arjunwad/ Kolhapur/ Maharashtra	16.78	74.63	144.1 Karad (24) 144.2 Samdoli (21)	LKD/KCC/ KGBO	Madhya Maharashtra	542.07	543.29	543.69	2005			Not in Operation. State Government is not interested
145	Deongaon Bridge	Bhima/ Krishna	Afzalpur/ Gulbarga/ Karnataka	17.17	76.33	145.1 Takli (18) 145.2 Wadakbal (18)	LKD/KCC/ KGBO	North Interior Karnataka	402.00	404.50	407.34	2006	Wireless/ Telemetry	Conventional	
146	Mantralayam	Tungabhadra	Mantralayam/ Kurnool/ Andhra Pradesh	15.94	77.42	146.1 Ollenur (18) 146.2 T Ramapuram (18)	LKD/KCC/ KGBO	Rayalaseema	310.00	312.00	318.77	2009	Wireless/ Telemetry	Conventional	
147	Nellore Anicut	North Pennar	Nellore/ Nellore/ Andhra Pradesh	14.47	79.99	147.1 Chennur (18) 147.2 Nandipally (18) 147.3 Somasila Project (09)	HD/SR	Coastal Andhra Pradesh	15.91	17.28	18.70	1882	Wireless	Conventional	
148	Narora Barrage	Ganga/Ganga	Narora/ Bulanshahar/ Uttar Pradesh	28.19	78.40	148.1 Haridwar (48)	MGD2/HOCD/ UGBO	West Uttar Pradesh	NA	NA	NA	NA	Wireless	Conventional	
149	Tajewala Barrage (Hathnikund Barrage)	Yamuna/Ganga	Yamunanagar/ Yamunanagar/ Haryana	30.31	77.58	149.1 Paonta (06)	UYD/HOCN/ YBO	Haryana Chandigarh& Delhi					Wireless		Inflow Forecast Not in Operation
150	Gandhisagar Dam	Chambal/Ganga	Gandhisagar Dam/Mandasur/ Madhya Pradesh	24.65	75.61	150.1 Tal (12-21) 150.2 Mahidpur (12-20)	CD/HOCN/ YBO	West Madhya Pradesh	399.90	399.90	399.90	2011	Telemetry	Mathematical	
151	Massanjore Dam	Mayurakshi/Ganga	Massanjore Dam/ Santhal Parganas/ Jharkhand	24.11	87.31	151.1 Maharo (24) 151.2 Kusiyari (24) 151.3 Haripur (24)	DD/HOCM/ LGBO	Jharkhand	121.31		122.87	1999	Wireless/ Telemetry	Conventional	
152	Tilpara Barrage	Mayurakshi/Ganga	Tilpara Dam/Suri/ Birbhum/ West Bengal	23.95	87.53	152.1 Massanjore Dam (24) 152.2 Tantoloi (24)	DD/HOCM/ LGBO	Gangetic West Bengal	62.79		67.05	1978	Wireless/ Telemetry	Conventional	
153	Tenughat Dam	Damodar/Ganga	Tenughat Dam	23.72	85.84	153.1 Hendgir (24) 153.2 Ramgarh (24)	DD/HOCM/ LGBO	Jharkhand	268.83		265.56	1985	Wireless/ Telemetry	Conventional	
154	Panchet Dam	Damodar/Ganga	Panchet Dam/ Dhanbad/ Jharkhand	23.68	86.75	154.1 Pupunki (24) 154.2 Tenughat Dam (24) 154.3 Konar Dam (24)	DD/HOCM/ LGBO	Jharkhand	132.59		132.89	1959	Wireless/ Telemetry	Conventional	

S.No	Name of FF Station/Type	River/Basin	Nearest Town/Vill/District/State	Lat (N)	Long (E)	Base Station (TT in hrs)	Div/Circle/ Orgn	Met Sub Division as per IMD	WL (m)	DL (m)	HFL		Mode of Data Collection	Methodology/ Model used for FF Formulation	Remarks
											(m)	Year			
155	Durgapur Barrage	Damodar/Ganga	Durgapur/ Burdwan/ West Bengal	23.48	87.31	155.1 Panchet Dam (24) 155.2 Maithon Dam (24)	DD/HOCM/ LGBO	Gangetic West Bengal	64.47		64.47	2011	Wireless/ Telemetry	Conventional	
156	Maithon Dam	Barakar/ Damodar	Maithon Dam/ Dhanbad/ Jharkhand	23.78	86.81	156.1 Nandadih (24) 156.2 Tilaiya Dam (24) 156.3 Barkisaraia (24)	DD/HOCM/ LGBO	Jharkhand	150.88		151.79	1959	Wireless/ Telemetry	Conventional	
157	Kangsabati Dam	Kangsabati	Kangsabati Dam/Bankura West Bengal	22.96	86.75	157.1 Simulia (24) 157.2 Purihalsa (24) 157.3 Tusuma (24) 157.4 Kharidwar (24) 157.5 Phulbaria (24)	DD/HOCM/ LGBO	Gangetic West Bengal	134.11		134.71	1978	Wireless	Conventional	
158	Hirakud	Mahanadi/ Mahanadi	Burla/ Sambalpur/ Odisha	21.52	83.85	158.1 Basantpur (24) 158.2 Kurubata (24) 158.3 Sundergarh (24) 158.4 Kelo (6-18) 158.5 Paramapur (4-18)	MahanadiDiv/ HOCB/MERO	Odisha	192.02		192.30	1978	Wireless/ Telemetry	Conventional/ Mathematical	
159	Gotta Barrage	Vamsadhara/ East Flowing Rivers	Gotta Barrage/ Srikakulam/ Andhra Pradesh	18.69	83.96	159.1 Kutragada (12)	ERD/HOCB/ MERO	Coastal Andhra Pradesh	34.84		39.92	1999	Wireless/ Telemetry	Conventional	
160	Dantiwada Dam	Banas/ West Flowing Rivers	Dantiwada dam/Palanpur/ Banaskanta/ Gujarat	24.34	72.34	160.1 Sarotry (2-5) 160.2 Chitrasani (2-5)	MD/HOCG/ NTBO	Gujarat	182.88	185.06	186.04	1973	Wireless/ Telemetry	Conventional	
161	Dharoi Dam	Sabarmati/ West Flowing Rivers	Dharoi Dam/ Mehsana/ Gujarat	24.00	72.86	161.1 Kheroj (2-5) 161.2 Harnav Weir (2-5)	MD/HOCG/ NTBO	Gujarat	187.45	192.25	189.63	1990	Wireless/ Telemetry	Conventional	
162	Kadana Dam	Mahi/ West Flowing Rivers	Kadana Dam/ Panchmahal/ Gujarat	23.31	73.83	162.1 Paderdibadi (2-7) 162.2 Anas PH -II (2-7)	MD/HOCG/ NTBO	Gujarat	126.19	127.71	127.74	1989	Wireless/ Telemetry	Conventional	
163	Hathnur Dam	Tapi/ Tapi	Hathnur Dam/ Jalgaon/ Maharashtra	21.07	75.95	163.1 Burhanpur (12) 163.2 Yerli (12)	TD/HOCG/ NTBO	Marathwada	212.02	214.00	214.00	1989	Wireless/ Telemetry	Conventional	
164	Ukai Dam	Tapi/ Tapi	Ukai Dam/ Surat/ Gujarat	21.25	73.59	164.1 Gidadhe (6) 164.2 Sarangkheda (6)	TD/HOCG/ NTBO	Gujarat	102.41	105.16	105.51	1990	Wireless/ Telemetry	Conventional	
165	Madhuban Dam	Damanganga/ West Flowing River	Madhuban Dam/ Valsad/ Gujarat	20.19	73.06	165.1 Ozarkheda (6) 165.2 Nanipalsan (6)	TD/HOCG/ NTBO	Gujarat	79.86	82.40	80.60	1993	Wireless/ Telemetry	Conventional	
166	Jailwadi Dam	Godavari/Godavari	Paithan/ Aurangabad/ Maharashtra	19.48	75.37	166.1 N M Weir (12)	LGD/GC/ KGBO	Marathwada	463.91	465.58	464.69	1990	Wireless	Conventional	
167	Singur Dam	Manjira/ Godavari	Singur Dam/ Medak/ Andhra Pradesh	17.75	77.93	167.1 Saigaon (24)	LGD/GC/ KGBO	Telangana	523.60	523.60	523.60	1999	Wireless	Conventional	
168	Nizamsagar Dam	Manjira/ Godavari	Nizamsagar dam/ Nizamabad/ Andhra Pradesh	18.22	77.96	168.1 Singur Dam (24)	LGD/GC/ KGBO	Telangana	428.24	428.24	428.24	1999	Wireless	Conventional	

S.No	Name of FF Station/Type	River/Basin	Nearest Town/Vill/District/State	Lat (N)	Long (E)	Base Station (TT in hrs)	Div/Circle/ Orgn	Met Sub Division as per IMD	WL (m)	DL (m)	HFL		Mode of Data Collection	Methodology/ Model used for FF Formulation	Remarks
											(m)	Year			
169	Sriramsagar	Godavari/Godavari	Pochampad/ Nizamabad/ Andhra Pradesh	18.97	78.34	169.1 Nanded (24) 169.2 Nizamsagar (24) 169.3 Degloor (24)	LGD/GC/ KGBO	Telangana	332.54	333.15	332.72	1990	Wireless	Conventional	
170	Almatti Dam	Krishna/ krishna	Almatti Dam/Bijapur/ Karnataka	16.33	75.88	170.1 Kurundwad (48) 170.2 Sadalga (48) 170.3 Gokak (27)	LKD/KCC/ KGBO	North Interior Karnataka	519.60	519.60	519.60	2002	Wireless	Conventional	
171	Narayanpur Dam	Krishna/ krishna	Narayanpur Dam/ Gulbarga/ Karnataka	16.20	76.36	171.1 Kurundwad (54) 171.2 Sadalga (54) 171.3 Gokak (35) 171.4 Almatti Dam (09)	LKD/KCC/ KGBO	North Interior Karnataka	492.25	492.25	492.22	2008	Wireless	Conventional	
172	Priyadharshini Jurala Project	Krishna/ krishna	Gadwal/ Mahbubnagar/ Andhra Pradesh	16.33	77.70	172.1 Huvinhedgi (18) 172.2 Yadgir (18) 172.3 Deosugur (06)	LKD/KCC/ KGBO	Telangana	318.52	318.52	318.50	2012	Wireless	Conventional	
173	Tungabhadra Dam	Tungabhadra/ Krishna	Hospet/ Bellary/ Karnataka	15.26	76.34	173.1 Harlahalli (12) 173.2 Marol (12)	LKD/KCC/ KGBO	South Interior Karnataka	497.74	497.74	497.74	1994	Wireless	Conventional	
174	Srisailam Dam	Krishna/ krishna	Srisailam/ Kurnool/ Andhra Pradesh	16.08	78.90	174.1 Mantralayam (18) 174.2 Krishna Agraharam (18)	LKD/KCC/ KGBO	Rayalaseema	269.75	269.75	273.25	2009	Wireless	Conventional	
175	Prakasam Barrage	Krishna/ krishna	Vijayawada/ Krishna/ Andhra Pradesh	16.50	80.60	175.1 Wadenapalli (16) 175.2 Madhira (12) 175.3 Polampally (12) 175.4 Paleru Bridge (12) 175.5 Keesara (12)	LKD/KCC/ KGBO	Coastal Andhra Pradesh	18.30		21.50	1903	Wireless	Conventional	

Basinwise -Riverwise- Flood Forecasting Information in India during Flood Season 2014												
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						Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)			
1	2	3	4	5	6	7	8	9	10	11	12	13.00
	Ganga Basin											
1	Alaknanda	Srinagar	Uttarakhand	539.00	540.00	536.85	05/09/1995	535.60	08-Aug-14 08	4	4	100.00
2	Ganga	Rishikesh	Uttarakhand	339.50	340.50	341.72	05/09/1995	340.37	16-Aug-14 04	8	6	75.00
3	Ganga	Haridwar	Uttarakhand	293.00	294.00	296.30	19/09/2010	294.85	15-Aug-14 07	10	7	70.00
4	Ganga	Narora Barrage	Uttar Pradesh			180.61	23/09/2010	179.160	20-Jul-14 22	33	33	100.00
5	Ganga	Kannauj	Uttar Pradesh	124.97	125.97	126.78	27/09/2010	125.170	21-Aug-14 04	4	4	100.00
6	Ganga	Ankinghat	Uttar Pradesh	123.00	124.00	124.49	28/09/2010	123.280	21-Aug-14 02	4	4	100.00
7	Ganga	Kanpur	Uttar Pradesh	113.00	114.00	114.08	29/09/2010	112.470	22-Aug-14 04	5	5	100.00
8	Ganga	Dalmau	Uttar Pradesh	98.36	99.36	99.84	03/08/1973	98.690	23-Aug-14 03	3	3	100.00
9	Ganga	Phphamau	Uttar Pradesh	83.73	84.73	87.98	08/09/1978	82.04	11-Aug-14 17	0	0	
10	Ganga	Allahabad Chhatnag	Uttar Pradesh	83.73	84.73	88.03	08/09/1978	81.17	11-Aug-14 14	0	0	
11	Ganga	Mirzapur	Uttar Pradesh	76.72	77.72	80.34	09/09/1978	74.90	11-Aug-14 17	0	0	
12	Ganga	Varanasi	Uttar Pradesh	70.26	71.26	73.90	09/09/1978	69.36	12-Aug-14 04	0	0	
13	Ganga	Ghazipur	Uttar Pradesh	62.11	63.11	65.22	09/09/1978	62.50	12-Aug-14 19	3	3	100.00
14	Ganga	Buxar	Bihar	59.32	60.32	62.09	1948	58.55	12-Aug-14 18	0	0	
15	Ganga	Ballia	Uttar Pradesh	56.62	57.62	60.25	14/09/2003	58.25	13-Aug-14 14	12	12	100.00
16	Ganga	Patna Dighaghat	Bihar	49.45	50.45	52.52	23/08/1975	49.66	19-Aug-14 11	9	8	88.90
17	Ganga	Patna Gandhighat	Bihar	47.60	48.60	50.27	14/08/1994	48.62	19-Aug-14 22	17	16	94.10
18	Ganga	Hathidah	Bihar	40.76	41.76	43.15	07/08/1971	41.46	20-Aug-14 13	14	14	100.00
19	Ganga	Munger	Bihar	38.33	39.33	40.99	19/09/1976	38.15	21-Aug-14 01	0	0	
20	Ganga	Bhagalpur	Bihar	32.68	33.68	34.20	17/09/2003	33.19	21-Aug-14 10	14	14	100.00
21	Ganga	Kahalgaon	Bihar	30.09	31.09	32.87	17/09/2003	31.36	21-Aug-14 09	24	24	100.00
22	Ganga	Sahibgunj	Jharkhand	26.25	27.25	30.91	1998	27.98	22-Aug-14 00	25	25	100.00
23	Ganga	Farakka	West Bengal	21.25	22.25	25.14	07/09/1998	23.17	20-Aug-14 15	68	67	98.50
24	Ramganga	Moradabad	Uttar Pradesh	189.60	190.60	192.88	21/09/2010	191.370	20-Jul-14 20	9	9	100.00
25	Ramganga	Bareilly	Uttar Pradesh	162.70	163.70	162.88	06/8/1978	161.200	22-Jul-14 04	0	0	
26	Yamuna	Tajewala Weir	Haryana			328.27	03/09/1978			0	0	
27	Yamuna	Mawi	Uttar Pradesh	230.00	230.85	232.45	26/09/1988	230.02	29-Jul-14 23	2	1	50.00
28	Yamuna	Delhi Rly Bridge	NCT Delhi	204.00	204.83	207.49	06/09/1978	204.00	30-Jul-14 15	2	1	50.00
29	Yamuna	Mathura	Uttar Pradesh	164.20	165.20	169.73	08/09/1978	164.44	01-Aug-14 12	9	9	100.00
30	Yamuna	Agra	Uttar Pradesh	151.40	152.40	154.76	09/09/1978	149.58	02-Aug-14 11	0	0	
31	Yamuna	Etawa	Uttar Pradesh	120.92	121.92	126.13	11/09/1978	118.05	16-Aug-14 04	0	0	
32	Yamuna	Auraiya	Uttar Pradesh	112.00	113.00	118.19	25/08/1996	111.69	09-Aug-14 09	0	0	

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						Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)			
1	2	3	4	5	6	7	8	9	10	11	12	13.00
33	Yamuna	Kalpi	Uttar Pradesh	107.00	108.00	112.98	25/08/1996	106.71	09-Aug-14 09	0	0	
34	Yamuna	Hamirpur	Uttar Pradesh	102.63	103.63	108.59	12/09/1983	101.71	09-Aug-14 12	0	0	
35	Yamuna	Chilaghat	Uttar Pradesh	99.00	100.00	105.16	06/09/1978	112.47	22-Aug-14 04	0	0	
36	Yamuna	Naini	Uttar Pradesh	83.74	84.74	87.99	08/09/1978	125.17	21-Aug-14 04	0	0	
37	Sahibi	Dhansa	NCT Delhi	211.44	212.44	213.58	06/08/1977	179.16	20-Jul-14 22	0	0	
38	Chambal	Gandhisagar Dam	Madhya Pradesh	399.99				191.37	20-Jul-14 20	1	1	100.00
39	Betwa	Mohana	Uttar Pradesh	121.66	122.66	133.69	11/09/1983	123.28	21-Aug-14 02	0	0	
40	Betwa	Sahjina	Uttar Pradesh	103.54	104.54	108.67	12/09/1983	294.85	15-Aug-14 07	0	0	
41	Ken	Banda	Uttar Pradesh	103.00	104.00	113.29	07/0720/05	23.17	20-Aug-14 15	3	3	100.00
42	Gomati	Lucknow	Uttar Pradesh	108.50	109.50	110.85	10/09/1971	27.98	22-Aug-14 00	0	0	
43	Gomati	Jaunpur	Uttar Pradesh	73.07	74.07	77.74	22/09/1971	31.36	21-Aug-14 09	0	0	
44	SAI	Raibareli	Uttar Pradesh	100.00	101.00	104.81	17/09/1982	33.19	21-Aug-14 10	0	0	
45	Ghaghra	Elgin Bridge	Uttar Pradesh	105.07	106.07	107.56	10/10/2009	38.15	21-Aug-14 01	67	64	95.52
46	Ghaghra	Ayodhya	Uttar Pradesh	91.73	92.73	94.01	11/10/2009	41.46	20-Aug-14 13	54	53	98.15
47	Ghaghra	Turtipar	Uttar Pradesh	63.01	64.01	66.00	28/08/1998	48.620	19-Aug-14 22	51	49	96.08
48	Ghaghra	Darauli	Bihar	59.82	60.82	61.74	29/08/1998	49.660	19-Aug-14 11	39	39	100.00
49	Ghaghra	Gangpur Siswan	Bihar	56.04	57.04	58.01	18/09/1983	58.250	13-Aug-14 14	34	34	100.00
50	Ghaghra	Chhapra	Bihar	52.68	53.68	54.59	03/09/1982	58.550	12-Aug-14 18	0	0	
51	Rapti	Balrampur	Uttar Pradesh	103.62	104.62	105.25	11/09/2000	62.500	12-Aug-14 19	20	18	90.00
52	Rapti	Bansi	Uttar Pradesh	83.90	84.90	85.82	21/08/1998	69.360	12-Aug-14 04	13	13	100.00
53	Rapti	Gorakpur Birdghat	Uttar Pradesh	73.98	74.98	77.54	23/08/1998	74.900	11-Aug-14 17	15	14	93.33
54	Sone	Inderpuri	Bihar	107.20	108.20	108.85	23/08/1975	81.170	11-Aug-14 14	0	0	
55	Sone	Koelwar	Bihar	54.52	55.52	58.88	20/07/1971	82.040	11-Aug-14 17	0	0	
56	Sone	Maner	Bihar	51.00	52.00	53.79	10/09/1976	98.69	23-Aug-14 03	3	2	66.70
57	PunPun	Sripalpur	Bihar	49.60	50.60	53.91	18/09/1976	161.20	22-Jul-14 04	7	7	100.00
58	Gandak	Khadda	Uttar Pradesh	95.00	96.00	97.50	23/07/2002	230.02	29-Jul-14 23	21	21	100.00
59	Gandak	Chatia	Bihar	68.15	69.15	70.04	26/07/2002	340.37	16-Aug-14 04	5	5	100.00
60	Gandak	Rewaghat	Bihar	53.41	54.41	55.41	17/09/1986	535.6	08-Aug-14 08	19	19	100.00
61	Gandak	Hazipur	Bihar	49.32	50.32	50.93	1948			0	0	
62	Burhi Gandak	Lalbeghiaghat	Bihar	62.20	63.20	67.09	30/07/1975	63.59	23-Aug-14 05	19	19	100.00
63	Burhi Gandak	Muzaffarpur	Bihar	51.53	52.53	54.29	15/08/1987	51.38	01-Sep-14 06	0	0	
64	Burhi Gandak	Samastipur	Bihar	45.02	46.02	49.38	15/08/1987	45.43	26-Aug-14 17	15	15	100.00

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						Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2	3	4	5	6	7	8	9	10	11	12	13.00
65	Burhi Gandak	Rosera	Bihar	41.63	42.63	46.35	16/08/1987	42.35	01-Sep-14 19	17	16	94.10
66	Burhi Gandak	Khagaria	Bihar	35.58	36.58	39.22	1976	36.79	22-Aug-14 10	19	18	94.70
67	Bagmati	Benibad	Bihar	47.68	48.68	50.01	12/07/2004	49.53	17-Aug-14 21	87	84	96.60
68	Bagmati	Hayaghat	Bihar	44.72	45.72	48.96	14/08/1987	46.16	21-Aug-14 01	23	23	100.00
69	Adhwara Group	Kamtaul	Bihar	49.00	50.00	52.99	12/08/1987	51.04	31-Aug-14 06	50	50	100.00
70	Adhwara Group	Ekmighat	Bihar	45.94	46.94	49.52	12/07/2004	47.21	31-Aug-14 05	25	24	96.00
71	Kamla Balan	Jhanjharpur	Bihar	49.00	50.00	53.01	10/07/2004	52.19	15-Aug-14 18	86	86	100.00
72	Kosi	Basua	Bihar	46.75	47.75	49.17	25/08/2010	48.51	15-Aug-14 22	216	216	100.00
73	Kosi	Baltara	Bihar	32.85	33.85	36.40	15/08/1987	34.61	18-Aug-14 21	66	66	100.00
74	Kosi	Kursela	Bihar	29.00	30.00	32.04	06/09/1998	30.49	17-Aug-14 06	24	23	95.80
75	Mahananda	Dhengraghat	Bihar	34.65	35.65	38.09	1968	36.23	27-Aug-14 16	32	28	87.50
76	Mahananda	Jhawa	Bihar	30.40	31.40	33.51	14/08/1987	31.49	28-Aug-14 05	35	35	100.00
77	Mayurakshi	Massanjore Dam	Jharkhand	121.31		122.87	25/09/1999	118.16	19-Jul-14 06	8	8	100.00
78	Mayurakshi	Tilpara Barrage	West Bengal	62.79		67.05	27/09/1978	62.78	15-Sep-14 12	5	5	100.00
79	Mayurakshi	Narayanpur	West Bengal	26.99	27.99	29.69	27/09/1995	23.80	19-Aug-14 20	0	0	
80	Ajoy	Gheropara	West Bengal	38.42	39.42	43.94	27/09/1978	38.31	04-Jul-14 06	0	0	
81	Damodar	Tenughat Dam	Jharkhand	268.83		265.56	17/09/1985	261.21	22-Jun-14 05	34	34	100.00
82	Damodar	Panchet Dam	Jharkhand	132.59		132.89	02/10/1959	127.26	16-Aug-14 12	71	71	100.00
83	Damodar	Durgapur Barrage	West Bengal	64.47		64.47	31/10/2002	64.46	16-Aug-14 12	58	58	100.00
84	Barakar	Maithon Dam	Jharkhand	150.88		151.79	02/10/1959	147.26	15-Aug-14 15	38	38	100.00
85	Mundeshwari	Harinkhola	West Bengal	11.80	12.80	14.58	29/09/1978	11.34	17-Aug-14 06	0	0	
86	Kangsabati	Kangsabati Dam	West Bengal	134.11		134.71	02/09/1978	128.87	12-Aug-14 06	4	4	100.00
87	Kangsabati	Mohanpur	West Bengal	24.73	25.73	29.87	02/09/1978	20.68	10-Aug-14 09	0	0	
	Brahmaputra Basin											
88	Brahmaputra	Dibrugrah	Assam	103.24	104.24	106.48	03/09/1998	106.09	24-Aug-14 03	173	172	99.42
89	Brahmaputra	Neamatighat	Assam	84.04	85.04	87.37	11/07/1991	86.92	24-Aug-14 17	119	118	99.16
90	Brahmaputra	Tezpur	Assam	64.23	65.23	66.59	27/08/1988	65.89	26-Aug-14 07	63	63	100.00
91	Brahmaputra	Guwahati	Assam	48.68	49.68	51.46	21/07/2004	50.09	27-Aug-14 17	19	19	100.00
92	Brahmaputra	Goalpara	Assam	35.27	36.27	37.43	31/07/1954	36.89	28-Aug-14 12	50	50	100.00
93	Brahmaputra	Dhubri	Assam	27.62	28.62	30.36	28/08/1988	29.75	28-Aug-14 23	206	206	100.00
94	Burhidihing	Naharkatia	Assam	119.40	120.40	122.69	17/06/1973	119.36	25-Aug-14 13	0	0	
95	Burhidihing	Khowang	Assam	101.11	102.11	103.92	25/08/1988	103.63	26-Aug-14 23	23	23	100.00
96	Desang	Nanglamoraghat	Assam	93.46	94.46	96.49	06/09/1998	95.15	26-Aug-14 16	38	36	94.74

Basinwise -Riverwise- Flood Forecasting Information in India during Flood Season 2014												
Sl.No.	Name of the river	Name of FF site	Name of State	Warning Level (m)	Danger level (m)	Highest Flood Level		Maximum Level -2014				
						Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2	3	4	5	6	7	8	9	10	11	12	13.00
97	Dikhow	Shivsagar	Assam	91.40	92.40	95.62	08/07/1974	93.10	11-Aug-14 00	65	65	100.00
98	Subansiri	Badatighat	Assam	81.53	82.53	86.84	28/06/1972	82.73	25-Aug-14 18	37	36	97.29
99	Dhansiri (S)	Golaghat	Assam	88.50	89.50	91.30	11/10/1986	89.22	25-Sep-14 04	19	18	94.74
100	Dhansiri (S)	Numaligarh	Assam	76.42	77.42	79.87	24/09/1985	78.58	25-Sep-14 09	172	171	99.42
101	Jiabharali	Jiabharali_NTX	Assam	76.00	77.00	78.50	26/07/2007	77.95	15-Aug-14 21	360	356	98.89
102	Kopilli	Kampur	Assam	59.50	60.50	61.86	16/06/1973	61.33	28-Sep-14 09	18	18	100.00
103	Kopilli	Dharmatul	Assam	55.00	56.00	58.09	21/07/2004	56.61	29-Sep-14 01	63	63	100.00
104	Puthimari	Puthimari _NHX	Assam	50.81	51.81	55.08	31/08/2008	53.90	23-Sep-14 06	157	150	95.54
105	Pagladiya	Pagladia_NTX	Assam	51.75	52.75	55.45	08/07/2004	52.75	23-Sep-14 06	11	11	100.00
106	Beki	Beki NHX	Assam	44.10	45.10	46.20	04/08/2000	45.84	22-Sep-14 18	213	213	100.00
107	Manas	Manas NHX	Assam	47.81	48.42	50.08	15/09/1984	48.19	25-Aug-14 23	9	9	100.00
108	Sankosh	Golakganj	Assam	28.94	29.94	30.95	08/09/2007	30.40	16-Aug-14 17	30	29	96.67
109	Raidak-I	Tufanganj	West Bengal	34.22	35.30	36.36	21/07/1993	35.21	27-Aug-14 07	9	8	88.89
110	Torsa	Ghughumari	West Bengal	39.80	40.41	41.46	03/08/2000	40.42	16-Aug-14 02	13	9	69.23
111	Jaldhaka	NH-31	West Bengal	80.00	80.90	81.33	28/08/1972	80.58	26-Aug-14 12	20	17	85.00
112	Jaldhaka	Mathabhanga	West Bengal	47.70	48.20	49.85	07/09/2007	48.00	26-Aug-14 23	2	1	50.00
113	Tista	Domohani	West Bengal	85.65	85.95	89.30	14/10/1968	86.20	15-Aug-14 11	226	224	99.12
114	Tista	Mekhliganj	West Bengal	65.45	65.95	66.45	13/07/1996	65.09	23-Jun-14 23	0	0	
	Barak & Meghna Basins											
115	Barak	APGhat	Assam	18.83	19.83	21.84	01/08/1989	18.54	25-Aug-14 09	0	0	-
116	Katakhal	Matizuri	Assam	19.27	20.27	22.73	10/09/2007	20.35	07-Sep-14 17	15	15	100.00
117	Kushiyara	Karimganj	Assam	13.94	14.94	16.57	10/06/2010	14.30	09-Sep-14 14	9	9	100.00
118	Manu	Kailashar	Tripura	24.34	25.34	25.79	07/06/1993	22.68	20-Sep-14 05	0	0	-
119	Gumti	Sonamura	Tripura	11.50	12.50	14.42	23/07/1993	11.49	23-Jun-14 02	0	0	-
	Eastern Rivers (Excluding Mahanadi)											
120	Subernarekna	Rajghat	Odisha	9.45	10.36	12.69	19/06/2008	10.55	06-Aug-14 20	6	6	100.00
121	Burhabalang	NH_5 _Road Bridge	Odisha	7.21	8.13	9.50	12/10/1973	8.36	05-Aug-14 08	4	4	100.00
122	Baitarni	Anandpur	Odisha	37.44	38.36	41.35	23-09-2011	41.06	05-Aug-14 08	18	14	77.80
123	Baitarni	Akhuapada	Odisha		17.83	21.95	16/08/1960	20.69	05-Aug-14 17	15	15	100.00
124	Brahmani	Jenapur	Odisha	22.00	23.00	24.78	20/08/1975	22.88	06-Aug-14 07	3	3	100.00
125	Rushikuluya	Purushottampur	Odisha	15.83	16.83	19.65	04/11/1990	16.68	13-Oct-14 23	3	3	100.00
126	Vamsadhara	Gunupur	Odisha	83.00	84.00	88.75	17/09/1980	84.21	07-Sep-14 06	25	21	84.00
127	Vamsadhara	Kashinagar	Odisha	53.60	54.60	58.93	18/09/1980	55.78	07-Sep-14 11	193	193	100.00
128	Vamsadhara	Gotta Barrage	Andhra Pradesh	34.84	34.84	39.92	07/10/1999	38.10	16-Jul-14 10	23	23	100.00

Basinwise -Riverwise- Flood Forecasting Information in India during Flood Season 2014												
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						Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2	3	4	5	6	7	8	9	10	11	12	13.00
	Mahanadi Basin											
129	Mahanadi	Hirakud Dam	Odisha	192.02		192.30	30/01/1998	192.02	29-Sep-14 09	63	62	98.41
130	Mahanadi	Naraj	Odisha	25.41	26.41	27.61	31/08/1982	26.36	06-Sep-14 20	34	34	100.00
131	Mahanadi	Alipingal Devi	Odisha	10.85	11.76	13.11	11-09-2011	11.95	07-Aug-14 12	9	9	100.00
132	Mahanadi	Nimapara	Odisha	9.85	10.76	11.60	31/08/1982	10.58	07-Aug-14 18	9	9	100.00
	Godavari Basin											
133	Godavari	Kopergaon	Maharashtra	490.90	493.68	499.17	1969	490.15	06-Sep-14 16	0	0	
134	Godavari	Jaikwadi Dam	Maharashtra	463.91		464.69	12/10/1990	460.51	15-Jul-14 13	0	0	
135	Godavari	Gangakhed	Maharashtra	374.00	375.00	377.57	1947	364.34	06-Sep-14 10	0	0	
136	Godavari	Nanded	Maharashtra	353.00	354.00	357.10	06/08/2006	344.40	07-Sep-14 19	0	0	
148	Manjira	Singur Dam	Telangana	523.60		523.60	15/10/1999	519.74	17-Jun-14 05	0	0	
149	Manjira	Nizamsagar Dam	Telangana	428.24		428.24	15/10/1999	424.85	11-Sep-14 19	0	0	
137	Godavari	Sriram Sagar	Telangana	332.54		332.72	13/10/1990	326.49	21-Sep-14 07	0	0	
146	Wainganga	Bhandara	Maharashtra	244.00	244.50	250.90	16/09/2005	241.50	07-Aug-14 08	0	0	
147	Wainganga	Pauni	Maharashtra	226.73	227.73	232.35	07/09/1994	224.15	06-Aug-14 06	0	0	
145	Wardha	Balharsha	Maharashtra	171.50	174.00	176.00	15/08/1986	162.48	16-Jul-14 19	0	0	
138	Godavari	Kaleswaram	Telangana	103.50	104.75	107.05	15/08/1986	102.33	07-Sep-14 18	0	0	
150	Indravati	Jagdalpur	Chhatisgarh	539.50	540.80	544.68	09/07/1973	540.64	22-Jul-14 15	29	25	86.20
139	Godavari	Eturunagaram	Telangana	73.29	75.79	77.66	24/08/1990	75.33	08-Sep-14 06	10	10	100.00
140	Godavari	Dummagudam	Telangana	53.00	55.00	60.25	16/08/1986	55.51	08-Sep-14 13	7	6	85.70
141	Godavari	Bhadrachalam	Telangana	45.72	48.77	55.66	16/08/1986	49.71	08-Sep-14 06	12	10	83.30
142	Godavari	Kunavaram	Andhra Pradesh	37.74	39.24	51.30	16/08/1986	40.47	09-Sep-14 10	9	8	88.90
143	Godavari	Rajamundry	Andhra Pradesh	17.68	19.51	20.48	16/08/1986	17.68	09-Sep-14 19	4	4	100.00
144	Godavari	Dowalaiswaram	Andhra Pradesh	14.25	16.08	18.36	16/08/1986	15.58	09-Sep-14 13	12	11	91.70
	Krishna Basin								-			
151	Krishna	Arjunwad	Maharashtra	542.07	543.29	543.69	05-08-2005	-	19-Sep-14 08	0	0	
152	Krishna	Alamati Dam	Karnataka	519.60		519.60	18-09-2002	519.60	18-Aug-14 06	41	41	100.00
153	Krishna	Narayanpur Dam	Karnataka	492.25		492.22	26-09-2008	492.25	23-Aug-14 22	53	49	92.00
154	Krishna	Priyadarshini	Telangana	318.52		318.50	09-10-2012	318.51	10-Sep-14 05	68	60	88.00
155	Krishna	Srisailam Dam	Andhra Pradesh	269.75		273.25	03-10-2009	269.75	01-Sep-14 06	90	86	96.00
156	Krishna	Prakasham Barrage	Andhra Pradesh	18.30		21.50	07-10-1903	17.40	07-Sep-14 17	30	27	90.00
157	Bhima	Deongaon	Karnataka	402.00	404.50	407.34	13-08-2006	398.15	08-Sep-14 17	0	0	
158	Tungabhadra	Tungabhadra Dam	Karnataka	497.74		497.74	08-10-1994	497.74	13-Aug-18 18	141	136	96.00
159	Tungabhadra	Mantralayam	Andhra Pradesh	310.00	312.00	318.77	02-10-2009	312.07	05-Aug-14 03	18	16	89.00
	Southern River System:											
160	Pennar	Nellore	Andhra Pradesh	15.91	17.28	18.70	30-11-1882	13.71	24-Oct-14 08	0	0	

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						Level (m)	**Date/ Month/ Year**	**Level (m)**	**Date and Time DD/MM/YY)**	**No.of Forecasts issued**	**No.of Forecasts within limits**	**Percent-age of accuracy**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13.00**
	Western River Systems:											
161	Banas	Dantiwada Dam	Gujarat	182.88	185.06	186.04	01/09/1973	172.88	25-Sep-14 01	0	0	
162	Sabarmati	Dharoi Dam	Gujarat	187.45	192.25	189.63	03/09/1990	187.20	06-Oct-14 08	5	5	100.00
163	Sabarmati	Ahmedabad	Gujarat	44.09	45.34	47.45	19/08/2006	41.98	06-Sep-14 15	0	0	
164	Mahi	Kadana Dam	Gujarat	126.19	127.71	127.74	09/09/1989	127.66	26-Sep-14 03	6	6	100.00
165	Mahi	Wanakbori	Gujarat	71.00	72.54	76.10	12/08/2006	71.32	09-Sep-14 16	0	0	
166	Naramada	Mandla	Madhya Pradesh	437.20	437.80	439.41	18/08/1974	438.55	06-Aug-14 10	13	13	100.00
167	Naramada	Hoshangabad	Madhya Pradesh	292.83	293.83	300.90	30/08/1973	289.05	08-Aug-14 19	0	0	
168	Naramada	Garudeswar	Gujarat	30.48	31.09	41.65	06/09/1970	23.41	09-Sep-14 06	0	0	
169	Naramada	Bharuch	Gujarat	6.71	7.31	12.65	07/09/1970	6.80	09-Sep-14 17	1	1	100.00
170	Tapi	Hatnur Dam	Maharashtra	212.00	214.00	214.00	12/10/1989	214.00	10-Oct-14 16	64	64	100.00
171	Tapi	Ukai Dam	Gujarat	102.41	105.16	105.51	08/10/1990	103.89	22-Sep-14 14	43	43	100.00
172	Tapi	Surat	Gujarat	8.50	9.50	12.50	09/08/2006	6.50	10-Sep-14 05	0	0	
173	Damanganga	Madhuban Dam	Gujarat	79.86	82.40	80.60	27/09/1993	79.70	10-Oct-14 16	9	9	100.00
174	Damanganga	Vapi Town	Gujarat	18.20	19.20	23.76	03/08/2004	17.60	29-Jul-14 12	0	0	
175	Damanganga	Daman	Dadra & Nagar Haveli	2.60	3.40	4.00	03/08/2004	2.10	14-Jun-14 16	0	0	
								Total Forecasts		*4772*	*4667*	97.80
								Level Forecasts		3884	3804	97.94
								Inflow Forecast		888	863	97.18

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					Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2										
	Andhra Pradesh										
1	Vamsadhara	Gotta Barrage	34.48	34.84	39.92	07/10/1999	38.10	16-Jul-14 10	23	23	100.00
2	Godavari	Kunavaram	37.74	39.24	51.30	16/08/1986	40.47	09-Sep-14 10	9	8	88.90
3	Godavari	Rajamundry	17.68	19.51	20.48	16/08/1986	17.68	09-Sep-14 19	4	4	100.00
4	Godavari	Dowalaiswaram	14.25	16.08	18.36	16/08/1986	15.58	09-Sep-14 13	12	11	91.70
5	Krishna	Srisailam Dam	269.75		273.25	03/10/2009	269.75	10-Sep-14 05	90	86	96
6	Krishna	Prakasam Barrage	18.30		21.50	07/10/1903	17.40	07-Sep-14 17	30	27	90
7	Tungbhadra	Mantralayam	310.00	312.00	318.77	02/10/2009	312.07	05-Aug-14 03	18	16	**89**
8	Pennar	Nellore Anicut	15.91	17.28	18.70	30/11/1882	13.71	24-Oct-14 08	0	0	**0**
	Assam										
9	Brahmaputra	Dibrugrah	103.24	104.24	106.48	03/09/1998	106.09	24-Aug-14 03	173	172	99.42
10	Brahmaputra	Neamatighat	84.04	85.04	87.37	11/07/1991	86.92	24-Aug-14 17	119	118	99.16
11	Brahmaputra	Tezpur	64.23	65.23	66.59	27/08/1988	65.89	26-Aug-14 07	63	63	100.00
12	Brahmaputra	Guwahati	48.68	49.68	51.46	21/07/2004	50.09	27-Aug-14 17	19	19	100.00
13	Brahmaputra	Goalpara	35.27	36.27	37.43	31/07/1954	36.89	28-Aug-14 12	50	50	100.00
14	Brahmaputra	Dhubri	27.62	28.62	30.36	28/08/1988	29.75	28-Aug-14 23	206	206	100.00
15	Burhidihing	Naharkatia	119.40	120.40	122.69	17/06/1973	119.36	25-Aug-14 13	0	0	
16	Burhidihing	Khowang	101.11	102.11	103.92	25/08/1988	103.63	26-Aug-14 23	23	23	100.00
17	Desang	Nanglamoraghat	93.46	94.46	96.49	06/09/1998	95.15	26-Aug-14 16	38	36	94.74
18	Dikhow	Shivsagar	91.40	92.40	95.62	08/07/1974	93.10	11-Aug-14 00	65	65	100.00
19	Subansiri	Badatighat	81.53	82.53	86.84	28/06/1972	82.73	25-Aug-14 18	37	36	97.29
20	Dhansiri (S)	Golaghat	88.50	89.50	91.30	11/10/1986	89.22	25-Sep-14 04	19	18	94.74
21	Dhansiri (S)	Numaligarh	76.42	77.42	79.87	24/09/1985	78.58	25-Sep-14 09	172	171	99.42
22	Jiabharali	Jiabharali_NTX	76.00	77.00	78.50	26/07/2007	77.95	15-Aug-14 21	360	356	98.89
23	Kopilli	Kampur	59.50	60.50	61.86	16/06/1973	61.33	28-Sep-14 09	18	18	100.00
24	Kopilli	Dharmatul	55.00	56.00	58.09	21/07/2004	56.61	29-Sep-14 01	63	63	100.00
25	Puthimari	Puthimari _NHX	50.81	51.81	55.08	31/08/2008	53.90	23-Sep-14 06	157	150	95.54
26	Pagladiya	Pagladia_NTX	51.75	52.75	55.45	08/07/2004	52.75	23-Sep-14 06	11	11	100.00
27	Beki	Beki NHX	44.10	45.10	46.20	04/08/2000	45.84	22-Sep-14 18	213	213	100.00
28	Manas	Manas NHX	47.81	48.42	50.08	15/09/1984	48.19	25-Aug-14 23	9	9	100.00
29	Sankosh	Golakganj	28.94	29.94	30.95	08/09/2007	30.40	16-Aug-14 17	30	29	96.67
30	Barak	APGhat	18.83	19.83	21.84	01/08/1989	18.54	25-Aug-14 09	0	0	-
31	Katakhal	Matizuri	19.27	20.27	22.73	10/09/2007	20.35	07-Sep-14 17	15	15	100.00
32	Kushiyara	Karimganj	13.94	14.94	16.57	10/06/2010	14.30	09-Sep-14 14	9	9	100.00

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1	2										
	Bihar										
33	Ganga	Buxar	59.32	60.32	62.09	1948	58.55	12-Aug-14 18	0	0	
34	Ganga	Patna Gandhighat	49.45	50.45	52.52	23/08/1975	49.66	19-Aug-14 11	9	8	88.90
35	Ganga	Patna Dighaghat	47.60	48.60	50.27	14/08/1994	48.62	19-Aug-14 22	17	16	94.10
36	Ganga	Hathidah	40.76	41.76	43.15	07/08/1971	41.46	20-Aug-14 13	14	14	100.00
37	Ganga	Munger	38.33	39.33	40.99	19/09/1976	38.15	21-Aug-14 01	0	0	
38	Ganga	Bhagalpur	32.68	33.68	34.20	17/09/2003	33.19	21-Aug-14 10	14	14	100.00
39	Ganga	Kahalgaon	30.09	31.09	32.87	17/09/2003	31.36	21-Aug-14 09	24	24	100.00
40	Ghaghra	Darauli	59.82	60.82	61.74	29/08/1998	61.430	22-Aug-14 13	39	39	100.00
41	Ghaghra	Gangpur Siswan	56.04	57.04	58.01	18/09/1983	57.870	22-Aug-14 14	34	34	100.00
42	Ghaghra	Chhapra	52.68	53.68	54.59	03/09/1982	51.310	21-Aug-14 11	0	0	
43	Sone	Inderpuri	107.20	108.20	108.85	23/08/1975	105.20	12-Aug-14 08	0	0	
44	Sone	Koelwar	54.52	55.52	58.88	20/07/1971	52.94	14-Aug-14 10	0	0	
45	Sone	Maner	51.00	52.00	53.79	10/09/1976	51.28	14-Aug-14 08	3	2	66.70
46	PunPun	Sripalpur	49.60	50.60	53.91	18/09/1976	50.54	17-Aug-14 21	7	7	100.00
47	Gandak	Chatia	68.15	69.15	70.04	26/07/2002	69.06	18-Aug-14 10	5	5	100.00
48	Gandak	Rewaghat	53.41	54.41	55.41	17/09/1986	54.60	19-Aug-14 09	19	19	100.00
49	Gandak	Hazipur	49.32	50.32	50.93	1948	48.92	19-Aug-14 07	0	0	
50	Burhi Gandak	Lalbeghiaghat	62.20	63.20	67.09	30/07/1975	63.59	23-Aug-14 05	19	19	100.00
51	Burhi Gandak	Muzaffarpur	51.53	52.53	54.29	15/08/1987	51.38	01-Sep-14 06	0	0	
52	Burhi Gandak	Samastipur	45.02	46.02	49.38	15/08/1987	45.43	26-Aug-14 17	15	15	100.00
53	Burhi Gandak	Rosera	41.63	42.63	46.35	16/08/1987	42.35	01-Sep-14 19	17	16	94.10
54	Burhi Gandak	Khagaria	35.58	36.58	39.22	1976	36.79	22-Aug-14 10	19	18	94.70
55	Bagmati	Benibad	47.68	48.68	50.01	12/07/2004	48.42	17-Aug-14 21	87	84	96.60
56	Bagmati	Hayaghat	44.72	45.72	48.96	14/08/1987	46.16	21-Aug-14 01	23	23	100.00
57	Adhwara Group	Kamtaul	49.00	50.00	52.99	12/08/1987	51.04	31-Aug-14 06	50	50	100.00
58	Adhwara Group	Ekmighat	45.94	46.94	49.52	12/07/2004	47.21	31-Aug-14 05	25	24	96.00
59	Kamla Balan	Jhanjharpur	49.00	50.00	53.01	10/07/2004	52.19	15-Aug-14 18	86	86	100.00
60	Kosi	Basua	46.75	47.75	49.17	25/08/2010	48.51	15-Aug-14 22	216	216	100.00
61	Kosi	Baltara	32.85	33.85	36.40	15/08/1987	34.61	18-Aug-14 21	66	66	100.00
62	Kosi	Kursela	29.00	30.00	32.04	06/09/1998	30.49	17-Aug-14 06	24	23	95.80
63	Mahananda	Dhengraghat	34.65	35.65	38.09	1968	36.23	27-Aug-14 16	32	28	87.50
64	Mahananda	Jhawa	30.40	31.40	33.51	14/08/1987	31.49	28-Aug-14 05	35	35	100.00

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					Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2										
	Chhatisgarh										
65	Indravati	Jagdalpur	539.50	540.80	544.68	09/07/1973	540.64	22-Jul-14 15	29	25	86.20
	Dadra & Nagar Haveli										
66	Damanganga	Daman	2.60	3.40	4.00	03/08/2004	2.10	14-Jun-14 16	0	0	
	Gujarat										
67	Banas	Dantiwada Dam	182.88	185.06	186.04	01/09/1973	172.88	25-Sep-14 01	0	0	
68	Sabarmati	Dharoi Dam	187.45	192.25	189.63	03/09/1990	187.20	06-Oct-14 08	5	5	100.00
69	Sabarmati	Ahmedabad	44.09	45.34	47.45	19/08/2006	41.98	06-Sep-14 15	0	0	
70	Mahi	Kadana Dam	126.19	127.71	127.74	09/09/1989	127.66	26-Sep-14 03	6	6	100.00
71	Mahi	Wanakbori	71.00	72.54	76.10	12/08/2006	71.32	09-Sep-14 16	0	0	
72	Naramada	Garudeswar	30.48	31.09	41.65	06/09/1970	23.41	09-Sep-14 06	0	0	
73	Naramada	Bharuch	6.71	7.31	12.65	07/09/1970	6.80	09-Sep-14 17	1	1	100.00
74	Tapi	Ukai Dam	102.41	105.16	105.51	08/10/1990	103.89	22-Sep-14 14	43	43	100.00
75	Tapi	Surat	8.50	9.50	12.50	09/08/2006	6.50	10-Sep-14 05	0	0	
76	Damanganga	Madhuban Dam	79.86	82.40	80.60	27/09/1993	79.70	10-Oct-14 16	9	9	100.00
77	Damanganga	Vapi Town	18.20	19.20	23.76	03/08/2004	17.60	29-Jul-14 12	0	0	
	Haryana										
78	Yamuna	Tajewala Weir	PL=334		338.30	16-06-2013	335.00	16-Jul-14 15	0	0	
	Jharkhand										
79	Ganga	Sahibgunj	26.25	27.25	30.91	1998	27.98	22-Aug-14 00	25	25	100.00
80	Mayurakshi	Massanjore Dam	FRL = 121.31		122.87	25/09/1999	118.16	19-Jul-14 06	8	8	100.00
81	Damodar	Tenughat Dam	FRL = 268.83		265.56	17/09/1985	261.21	22-Jun-14 05	34	34	100.00
82	Damodar	Panchet Dam	FRL = 132.59		132.89	02/10/1959	127.26	16-Aug-14 12	71	71	100.00
83	Barakar	Maithon Dam	FRL= 150.88		151.79	02/10/1959	147.26	15-Aug-14 15	38	38	100.00
	Karnataka										
84	Krishna	Alamati Dam	FRL=519.60		519.60	18-09-2002	519.60	19-Sep-14 08	41	41	100
85	Krishna	Narayanpur Dam	FRL=492.25		492.22	26-09-2008	492.25	24-Aug-14 03	53	49	92
86	Bhima	Deongaon	402.00	404.50	407.34	13-08-2006	398.15	08-Sep-14 20	0	0	0
87	Tungbhadra	Tungabhadra Dam	FRL=497.74		497.74	08-10-1994	497.74	13-Oct-14 22	141	136	96
	Madhya Pradesh										
88	Chambal	Gandhisagar Dam	FRL+399.99				397.21	22-Sep-14 08	1	1	100.00
89	Naramada	Mandla	437.20	437.80	439.41	18/08/1974	438.55	06-Aug-14 10	13	13	100.00
90	Naramada	Hoshangabad	292.83	293.83	300.90	30/08/1973	289.05	08-Aug-14 19	0	0	
	Maharashtra										
91	Godavari	Kopergaon	490.90	493.68	499.17	1969	490.15	06-Sep-14 16	0	0	
92	Godavari	Jaikwadi Dam	FRL=463.91		464.69	12/10/1990	460.51	15-Jul-14 13	0	0	
93	Godavari	Gangakhed	374.00	375.00	377.57	1947	364.34	06-Sep-14 10	0	0	
94	Godavari	Nanded	353.00	354.00	357.10	06/08/2006	344.40	07-Sep-14 19	0	0	
95	Wardha	Balharsha	171.50	174.00	176.00	15/08/1986	162.48	16-Jul-14 19	0	0	
96	Wainganga	Bhandara	244.00	244.50	250.90	16/09/2005	241.50	07-Aug-14 08	0	0	

Statewise Flood Forecasting Information In India during Flood Season 2014

Sl. No.	Name of the river	Name of FF site	Warning Level (m)	Danger level (m)	Highest Flood Level		Maximum Level -2014				
					Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2										
97	Wainganga	Pauni	226.73	227.73	232.35	07/09/1994	224.15	06-Aug-14 06	0	0	
98	Krishna	Arjunwad	542.07	543.29	543.69	05/08/2005	-	19-Sep-14 08	0	0	
99	Tapi	Hatnur Dam	212.02	214.00	214.00	12/10/1989	214.00	10-Oct-14 16	64	64	100.00
	NCT Delhi										
100	Yamuna	Delhi Rly Bridge	204.00	204.83	207.49	06/09/1978	204.00	30-Jul-14 15	2	1	50.00
101	Sahibi	Dhansa	211.44	212.44	213.58	06/08/1977			0	0	
	Odisha										
102	Subernarekna	Rajghat	9.45	10.36	12.69	19/06/2008	10.55	06-Aug-14 20	6	6	100.00
103	Burhabalang	NH_5 _Road Bridge	7.21	8.13	9.50	12/10/1973	8.36	05-Aug-14 08	4	4	100.00
104	Baitarni	Anandpur	37.44	38.36	41.35	23-09-2011	41.06	05-Aug-14 08	18	14	77.80
105	Baitarni	Akhuapada	17.83	17.83	21.95	16/08/1960	20.69	05-Aug-14 17	15	15	100.00
106	Brahmani	Jenapur	22.00	23.00	24.78	20/08/1975	22.88	06-Aug-14 07	3	3	100.00
107	Rushikuluya	Purushottampur	15.83	16.83	19.65	04/11/1990	16.68	13-Oct-14 23	3	3	100.00
108	Vamsadhara	Gunupur	83.00	84.00	88.75	17/09/1980	84.21	07-Sep-14 06	25	21	84.00
109	Vamsadhara	Kashinagar	53.60	54.60	58.93	18/09/1980	55.78	07-Sep-14 11	193	193	100.00
110	Mahanadi	Hirakud Dam	FRL=192.02		192.30	30/01/1998	192.02	29-Sep-14 09	63	62	98.41
111	Mahanadi	Naraj	25.41	26.41	27.61	31/08/1982	26.36	06-Sep-14 20	34	34	100.00
112	Mahanadi	Alipingal Devi	10.85	11.76	13.11	11-09-2011	11.95	07-Aug-14 12	9	9	100.00
113	Mahanadi	Nimapara	9.85	10.76	11.60	31/08/1982	10.58	07-Aug-14 18	9	9	100.00
	Telagana										
114	Manjira	Singur Dam	523.60		523.60	15/10/1999	519.74	17-Jun-14 05	0	0	
115	Manjira	Nizamsagar Dam	428.24		428.24	15/10/1999	424.85	11-Sep-14 19	0	0	
116	Godavari	Sriram Sagar	332.54		332.72	13/10/1990	326.49	21-Sep-14 07	0	0	
117	Godavari	Kaleswaram	103.50	104.75	107.05	15/08/1986	102.33	07-Sep-14 18	0	0	
118	Godavari	Eturunagaram	73.29	75.79	77.66	24/08/1990	75.33	08-Sep-14 06	10	10	100.00
119	Godavari	Dummagudam	53.00	55.00	60.25	16/08/1986	55.51	08-Sep-14 13	7	6	85.70
120	Godavari	Bhadrachalam	45.72	48.77	55.66	16/08/1986	49.71	08-Sep-14 06	12	10	83.30
121	Krishna	Priyadarshini	318.52		318.50	09-10-2012	318.51	25-Aug-14 15	68	60	88.00
	Tripura										
122	Manu	Kailashar	24.34	25.34	25.79	07/06/1993	22.68	20-Sep-14 05	0	0	
123	Gumti	Sonamura	11.50	12.50	14.42	23/07/1993	11.49	23-Jun-14 02	0	0	
	Uttar Pradesh										
124	Ganga	Narora Barrage	PL= 180.79 at D/S		180.61	23/09/2010	179.160	20-Jul-14 22	33	33	100.00
125	Ganga	Kannauj	124.97	125.97	126.78	27/09/2010	125.170	21-Aug-14 04	4	4	100.00
126	Ganga	Ankinghat	123.00	124.00	124.49	28/09/2010	123.280	21-Aug-14 02	4	4	100.00
127	Ganga	Kanpur	113.00	114.00	114.08	29/09/2010	112.470	22-Aug-14 04	5	5	100.00
128	Ganga	Dalmau	98.36	99.36	99.84	03/08/1973	98.690	23-Aug-14 03	3	3	100.00

Statewise Flood Forecasting Information In India during Flood Season 2014

Sl. No.	Name of the river	Name of FF site	Warning Level (m)	Danger level (m)	Highest Flood Level		Maximum Level -2014				
					Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2										
129	Ganga	Phphamau	83.73	84.73	87.98	08/09/1978	82.04	11-Aug-14 17	0	0	
130	Ganga	Allahabad	83.73	84.73	88.03	08/09/1978	81.17	11-Aug-14 14	0	0	
131	Ganga	Mirzapur	76.72	77.72	80.34	09/09/1978	74.90	11-Aug-14 17	0	0	
132	Ganga	Varanasi	70.26	71.26	73.90	09/09/1978	69.36	12-Aug-14 04	0	0	
133	Ganga	Ghazipur	62.11	63.11	65.22	09/09/1978	62.50	12-Aug-14 19	3	3	100.00
134	Ganga	Ballia	56.62	57.62	60.25	14/09/2003	58.25	13-Aug-14 14	12	12	100.00
135	Ramganga	Moradabad	189.60	190.60	192.88	21/09/2010	191.370	20-Jul-14 20	9	9	100.00
136	Ramganga	Bareilly	162.70	163.70	162.88	06/8/1978	161.200	22-Jul-14 04	0	0	
137	Yamuna	Mawi	230.00	230.85	232.45	26/09/1988	230.02	29-Jul-14 23	2	1	50.00
138	Yamuna	Mathura	164.20	165.20	169.73	08/09/1978	164.44	01-Aug-14 12	9	9	100.00
139	Yamuna	Agra	151.40	152.40	154.76	09/09/1978	149.58	02-Aug-14 11	0	0	
140	Yamuna	Etawa	120.92	121.92	126.13	11/09/1978	118.05	16-Aug-14 04	0	0	
141	Yamuna	Auraiya	112.00	113.00	118.19	25/08/1996	111.69	09-Aug-14 09	0	0	
142	Yamuna	Kalpi	107.00	108.00	112.98	25/08/1996	106.71	09-Aug-14 09	0	0	
143	Yamuna	Hamirpur	102.63	103.63	108.59	12/09/1983	101.71	09-Aug-14 12	0	0	
144	Yamuna	Chilaghat	99.00	100.00	105.16	06/09/1978	97.26	09-Aug-14 23	0	0	
145	Yamuna	Naini	83.74	84.74	87.99	08/09/1978	81.76	11-Aug-14 10	0	0	
146	Betwa	Mohana	121.66	122.66	133.69	11/09/1983	119.81	08-Aug-14 07	0	0	
147	Betwa	Sahjina	103.54	104.54	108.67	12/09/1983	101.34	09-Aug-14 15	0	0	
148	Ken	Banda	103.00	104.00	113.29	07/0720/05	104.64	07-Aug-14 18	3	3	100.00
149	Gomati	Lucknow	108.50	109.50	110.85	10/09/1971	105.865	10-Jul-14 16	0	0	
150	Gomati	Jaunpur	73.07	74.07	77.74	22/09/1971	70.00	10-Jul-14 03	0	0	
151	SAI	Raibareli	100.00	101.00	104.81	17/09/1982	99.314	22-Jul-14 15	0	0	
152	Ghaghra	Elgin Bridge	105.07	106.07	107.56	10/10/2009	107.616	18-Aug-14 16	67	64	95.52
153	Ghaghra	Ayodhya	91.73	92.73	94.01	11/10/2009	93.600	19-Aug-14 17	54	53	98.15
154	Ghaghra	Turtipar	63.01	64.01	66.00	28/08/1998	64.865	22-Aug-14 06	51	49	96.08
155	Rapti	Balrampur	103.62	104.62	105.25	11/09/2000	105.510	18-Aug-14 01	20	18	90.00
156	Rapti	Bansi	83.90	84.90	85.82	21/08/1998	84.930	23-Aug-14 17	13	13	100.00
157	Rapti	Gorakpur Birdghat	73.98	74.98	77.54	23/08/1998	75.330	24-Aug-14 15	15	14	93.33
158	Gandak	Khadda	95.00	96.00	97.50	23/07/2002	96.16	15-Aug-14 21	21	21	100.00
	Uttarakhand										
159	Alaknanda	Srinagar	539.00	540.00	536.85	05/09/1995	535.60	08-Aug-14 08	4	4	100.00
160	Ganga	Rishikesh	339.50	340.50	341.72	05/09/1995	340.37	16-Aug-14 04	8	6	75.00
161	Ganga	Haridwar	293.00	294.00	296.30	19/09/2010	294.85	15-Aug-14 07	10	7	70.00

Statewise Flood Forecasting Information In India during Flood Season 2014

Sl. No.	Name of the river	Name of FF site	Warning Level (m)	Danger level (m)	Highest Flood Level		Maximum Level -2014				
					Level (m)	Date/ Month/ Year	Level (m)	Date and Time DD/MM/YY)	No.of Forecasts issued	No.of Forecasts within limits	Percent-age of accuracy
1	2										
	West Bengal										
162	Ganga	Farakka	21.25	22.25	25.14	07/09/1998	23.17	20-Aug-14 15	68	67	98.50
163	Mayurakshi	Tilpara Barrage	PL= 62.79		67.05	27/09/1978	62.78	15-Sep-14 12	5	5	100.00
164	Mayurakshi	Narayanpur	26.99	27.99	29.69	27/09/1995	23.80	19-Aug-14 20	0	0	
165	Ajoy	Gheropara	38.42	39.42	43.94	27/09/1978	38.31	04-Jul-14 06	0	0	
166	Damodar	Durgapur Barrage	PL = 64.47		64.47	31/10/2002	64.46	16-Aug-14 12	58	58	100.00
167	Mundeshwari	Harinkhola	11.80	12.80	14.58	29/09/1978	11.34	17-Aug-14 06	0	0	
168	Kangsabati	Kangsabati Dam	FRL=134.11		134.71	02/09/1978	128.87	12-Aug-14 06	4	4	100.00
169	Kangsabati	Mohanpur	24.73	25.73	29.87	02/09/1978	20.68	10-Aug-14 09	0	0	
170	Raidak-I	Tufanganj	34.22	35.30	36.36	21/07/1993	35.21	27-Aug-14 07	9	8	88.89
171	Torsa	Ghughumari	39.80	40.41	41.46	03/08/2000	40.42	16-Aug-14 02	13	9	69.23
172	Jaldhaka	NH-31	80.00	80.90	81.33	28/08/1972	80.58	26-Aug-14 12	20	17	85.00
173	Jaldhaka	Mathabhanga	47.70	48.20	49.85	07/09/2007	48.00	26-Aug-14 23	2	1	50.00
174	Tista	Domohani	85.65	85.95	89.30	14/10/1968	86.20	15-Aug-14 11	226	224	99.12
175	Tista	Mekhliganj	65.45	65.95	66.45	13/07/1996	65.09	23-Jun-14 23	0	0	
							Total Forecasts		***4772***	***4667***	**97.80**
							Level Forecasts		**3884**	**3804**	**97.94**
							Inflow Forecast		**888**	**863**	**97.18**

Performance of Flood Forecasting Stations (Divisionwise) in India during Flood Season 2014

Sl. No	Division	Level Forecasts only					Inflow Forecasts only					Total Forecast Stations				
		Stns.	F/c issued for	Total	Within Limit	Accuracy	Stns.	F/c issued for	Total	Within Limit	Accuracy	Stns.	F/c issued for	Total	Within Limit	Accuracy
1	Himalayan Ganga Divn, Dehradun	3	3	22	17	77.27	0	0	0	0		3	3	22	17	77.27
2	Middle Ganga Division 1, Lucknow	6	6	220	211	95.91	0	0	0	0		6	6	220	211	95.91
3	Middle Ganga Division 2, Lucknow	8	5	25	25	100.00	1	1	33	33	100.00	9	6	58	58	100.00
4	Middle Ganga Division 3, Varanasi	7	2	15	15	100.00	0	0	0	0		7	2	15	15	100.00
5	Middle Ganga Division 4, Patna	17	16	740	729	98.51	0	0	0	0		17	16	740	729	98.51
6	Middle Ganga Division 5, Patna	18	12	273	269	98.53	0	0	0	0		18	12	273	269	98.53
7	Upper Yamuna Divn, Delhi	4	3	13	11	84.62	1	0	0	0		5	3	13	11	84.62
8	Chambal Division, Jaipur	0	0	0	0		1	1	1	1	100.00	1	1	1	1	100.00
9	Lower Yamuna Divn, Agra	10	1	3	3	100.00	0	0	0	0		10	1	3	3	100.00
10	Damodar Divn, Asansol	4	0	0	0		7	7	218	218	100.00	11	7	218	218	100.00
11	Upper Brahmaputra Divn, Dibrugarh	13	12	1150	1139	99.04	0	0	0	0		13	12	1150	1139	99.04
12	Middle Brahmaputra Divn, Guwahati	9	6	261	254	97.32	0	0	0	0		9	6	261	254	97.32
13	Lower Brahmaputra Divn, Jalpaiguri	10	9	728	716	98.35	0	0	0	0		10	9	728	716	98.35
14	Eastern Rivers Divn, Bhubaneswar	8	8	267	259	97.00	1	1	23	23	100.00	9	9	290	282	97.24
15	Mahanadi Divn, Burla	3	3	52	52	100.00	1	1	63	62	98.41	4	4	115	114	99.13
16	Lower Godavari Divn, Hyderabad	14	7	83	74	89.16	4	0	0	0		18	7	83	74	89.16
17	Lower Krishna Divn, Hyderabad	4	1	18	16	88.89	6	6	423	399	94.33	10	7	441	415	94.10
18	Mahi Divn, Ahmedabad	2	0	0	0		3	2	11	11	100.00	5	2	11	11	100.00
19	Tapi Divn,Surat	5	1	1	1	100.00	3	3	116	116	100.00	8	4	117	117	100.00
20	Narmada Divn, Bhopal	2	1	13	13	100.00	0	0	0	0		2	1	13	13	100.00
Total		**147**	**96**	**3884**	**3804**	**97.94**	**28**	**22**	**888**	**863**	**97.18**	**175**	**118**	**4772**	**4667**	**97.80**

Annex V

Performance of Flood Forecasting Stations (Major Basinwise) in India during Flood Season 2014

Sl. No	Name of the Major River basin	Total no.of FF sites			No.of FF sites where no forecast was issued			Level Forecasts			Inflow Forecasts			Overall Forecasts		
		Total no	Level FF sites	Inflow FF sites	Total no	Level FF sites	Inflow FF sites	Total No.	Within limits	% of Accu-racy	Total No.	Within limits	% of Accu-racy	Total No.	Within limits	% of Accu-racy
1	Ganga and its tributaries	87	77	10	30	29	1	1311	1280	97.64	252	252	100.00	1563	1532	98.02
2	Brahamputra and its tributaries	27	27	0	2	2	0	2115	2085	98.58	0	0		2115	2085	98.58
3	Barak and its tributaries	5	5	0	3	3	0	24	24	100.00	0	0		24	24	100.00
4	Eastern Rivers	9	8	1	0	0	0	267	259	97.00	23	23	100.00	290	282	97.24
5	Mahanadi and its tributaries	4	3	1	0	0	0	52	52	100.00	63	62	98.41	115	114	99.13
6	Godavari and its tributaries	18	14	4	11	7	4	83	74	89.16	0	0		83	74	89.16
7	Krishna and its tributaries	9	3	6	2	2	0	18	16	88.89	423	399	94.33	441	415	94.10
8	West Flowing rivers	15	9	6	8	7	1	14	14	100.00	127	127	100.00	141	141	100.00
9	Southern rivers	1	1	0	1	1	0	0	0		0	0		0	0	
Total		**175**	**147**	**28**	**57**	**51**	**6**	**3884**	**3804**	97.94	**888**	**863**	97.18	4772	4667	97.80

Performance of Flood Forecasting Stations (Statewise) in India during Flood Season 2014

Annex VI

Sl. No	Name of the Major River basin	Total no.of FF sites			No.of FF sites where no forecast was issued			Level Forecasts			Inflow Forecasts			Overall Forecasts		
		Total no	Level FF sites	Inflow FF sites	Total no	Level FF sites	Inflow FF sites	Total No.	Within limits	Accuracy (%)	Total No.	Within limits	Accuracy (%)	Total No.	Within limits	Accuracy (%)
1	Andhra Pradesh	8	5	3	1	1	0	43	39	90.70	143	136	95.10	186	175	94.09
2	Assam	24	24	0	2	2	0	1869	1850	98.98	0	0	#DIV/0!	1869	1850	98.98
3	Bihar	32	32	0	7	7	0	899	885	98.44	0	0	#DIV/0!	899	885	98.44
4	Chattisgarh	1	1	0	0	0	0	29	25	86.21	0	0	#DIV/0!	29	25	86.21
5	D,NH	1	1	0	1	1	0	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!
6	Gujarat	11	6	5	6	5	1	1	1	100.00	63	63	100.00	64	64	100.00
7	Haryana	1	0	1	1	0	1			#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!
8	Jharkhand	5	1	4	0	0	0	25	25	100.00	151	151	100.00	176	176	100.00
9	Karnataka	4	1	3	1	1	0	0	0	#DIV/0!	235	226	96.17	235	226	96.17
10	Madhya Pradesh	3	2	1	1	1	0	13	13	100.00	1	1	100.00	14	14	100.00
11	Maharashtra	9	7	2	8	7	1	0	0	#DIV/0!	64	64	100.00	64	64	100.00
12	NCT, DELHI	2	2	0	1	1	0	2	1	50.00	0	0	#DIV/0!	2	1	50.00
13	Odisha	12	11	1	0	0	0	319	311	97.49	63	62	98.41	382	373	97.64
14	Telangana	8	4	4	4	1	3	29	26	89.66	68	60	88.24	97	86	88.66
15	Tripura	2	2	0	2	2	0	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!
16	Uttar Pradesh	35	34	1	17	17	0	295	285	96.61	33	33	100.00	328	318	96.95
17	Uttarakhand	3	3	0	0	0	0	22	17	77.27	0	0	#DIV/0!	22	17	77.27
18	West Bengal	14	11	3	5	5	0	338	326	96.45	67	67	100.00	405	393	97.04
Total		**175**	**147**	28	**57**	**51**	6	**3884**	**3804**	97.94	**888**	**863**	97.18	**4772**	**4667**	97.80

FLOOD FORECASTING PERFORMANCE FROM 2000 TO 2014

Year	No.of Level Forecasts issued			No.of Inflow Forecasts issued			Total No.of Forecasts issued		
	Total	Within +/-15 cm of deviation from actual	Accuracy (%)	Total	Within +/- 20% cumec of deviation from actual	Accuracy (%)	Total	Within +/- 15 cm or +/- 20% cumec of deviation from actual	Accuracy (%)
2000	5622	5504	97.90	821	747	90.99	6443	6251	97.02
2001	4606	4533	98.42	857	809	94.40	5463	5342	97.79
2002	3618	3549	98.09	623	602	96.63	4241	4151	97.88
2003	5989	5789	96.66	611	586	95.91	6600	6375	96.59
2004	4184	4042	96.61	705	654	92.77	4889	4696	96.05
2005	4323	4162	96.28	1295	1261	97.37	5618	5423	96.53
2006	5070	4827	95.21	1593	1550	97.30	6663	6377	95.71
2007	6516	6339	97.28	1707	1651	96.72	8223	7990	97.17
2008	5670	5551	97.90	1021	1003	98.24	6691	6554	97.95
2009	3343	3298	98.65	667	629	94.30	4010	3927	97.93
2010	6491	6390	98.44	1028	988	96.11	7519	7378	98.12
2011	4848	4795	98.91	1143	1109	97.03	5991	5904	98.55
2012	4200	4136	98.47	831	803	96.63	5031	4939	98.17
2013	5741	5471	95.30	1319	1289	97.73	7060	6760	95.75
2014	3884	3804	97.94	888	863	97.18	4772	4667	97.80
Average	4940	4813	97.43	1007	970	96.33	5948	5782	97.21

Unprecedented flood events in India under CWC FF & W Network - 2014 flood season										
Sl .No	River	Station	State	Danger level in metres	Existing Highest Flood Level (HFL)		New HFL		Duration	
					Level in metres	Date of occurrence	Level	Date and Time of Occurrence	From	To
1	Rapti	Balrampur	Uttar Pradesh	104.62	105.25	11.09.2000	105.51	18-08-14: 01	17-08-14: 07	19-08-14: 22
2	Ghaghra	Elgin Bridge	Uttar Pradesh	106.07	107.56	10.10.2009	107.62	18-08-14: 16	18-08-14: 11	19-08-14: 02

High Flood Events during Flood Season - 2014

Annex IX

Sl.No	River	Station	State	District	Danger level in metres	Existing HFL		Peak Level attained in 2014		Duration of High Flood	
						Level in metres	Date of occurrence	Level	Date/Time	From	To
1	Baitarni	Ananadpur	Odisha	Keonjhar	38.36	41.35	23-09-2011	41.06	05-08-14: 07	05-08-14: 02	05-08-14: 10
2	Beki	Beki Road Bridge	Assam	Barpeta	45.10	46.20	04-08-2000	45.71	15-08-14: 17	15-08-14: 16	15-08-14: 19
3	Rapti	Balrampur	Uttar Pradesh	Balrampur	104.62	105.25	11-09-2000	105.51	18-08-14: 01	16-08-14: 07	22-08-14: 21
4	Ghaghra	Elgin Bridge	Uttar Pradesh	Barabanki	106.07	107.56	10-10-2009	107.62	18-08-14: 16	16-08-14: 20	20-08-14: 00
5	Bagmati	Benibad	Bihar	Muzzafarpur	48.68	50.01	12-07-2004	49.53	17-08-14: 23	17-08-14: 19	18-08-14: 17
6	Ghaghra	Ayodhya	Uttar Pradesh	Faizabad	92.73	94.01	11-10-2009	93.6	19-08-14: 16	18-08-14: 23	20-08-14: 12
7	Ghaghra	Darauli	Bihar	Siwan	60.82	61.74	29-08-1998	61.43	22-08-14: 13	19-08-14: 06	23-08-14: 19
8	Ghaghra	Gangpur Ssiswan	Bihar	Siwan	57.04	58.01	18-09-1983	57.87	22-08-14: 23	19-08-14: 18	24-08-14: 06
9	Brahmaputra	Dibrugarh	Assam	Dibrugarh	105.70	106.48	03-09-1998	106.09	24-08-14: 03	23-08-14: 14	24-08-14: 14
10	Brahmaputra	Neamatighat	Assam	Jorhat	85.04	87.37	11-07-1991	86.92	24-08-14: 17	24-08-14: 14	25-08-14: 06
11	Buridehing	Chenimari (Khowang)	Assam	Dibrugarh	102.11	103.92	25-08-1988	103.63	26-08-14: 23	26-08-14: 08	27-08-14: 15

High Flood Level= HFL-0.50 M

Low and Moderate flood events on main Ganga and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	Date/Time	From	To	No.of days	From	To	No.of days
1	Alaknanda	Srinagar	Uttrakhand	539.00	540.00	535.6	08-08-2014 08:00	16-07-2014 08:00	16-07-2014 13:00	1	_	_	
								19-07-2014 00:00	19-07-2014 05:00	1	_	_	
								01-08-2014 10:00	01-08-2014 10:00	1	_	_	
								01-08-2014 14:00	01-08-2014 15:00	1	_	_	
								08-08-2014 05:00	08-08-2014 11:00	1	_	_	
2	Ganga	Rishikesh	Uttarakhand	339.50	340.50	340.37	16-08-2014 04:00	01-08-2014 18:00	01-08-2014 18:00	1	_	_	_
								04-08-2014 20:00	04-08-2014 20:00	1	_	_	_
								08-08-2014 10:00	08-08-2014 20:00	1	_	_	_
								15-08-2014 10:00	17-08-2014 01:00	3	_	_	_
3	Ganga	Haridwar	Uttarakhand	293.00	294.00	294.85	15-08-2014 07:00	19-07-2014 03:00	19-07-2014 12:00	1	_	_	_
								31-07-2014 16:00	31-07-2014 19:00	1	_	_	_
								01-08-2014 18:00	01-08-2014 21:00	1	_	_	_
								05-08-2014 10:00	05-08-2014 21:00	1	_	_	_
								08-08-2014 11:00	08-08-2014 22:00	1	_	_	_
								15-08-2014 04:00	15-08-2014 05:00	1	15-08-2014 06:00	16-08-2014 11:00	2
								15-08-2014 09:00	15-08-2014 10:00	1	_	_	_
								16-08-2014 12:00	17-08-2014 07:00	2	_	_	_
4	Ganga	Kannauj	Uttar Pradesh	124.97	125.97	125.170	21-Aug-14 04	19-08-2014 17:00	22-08-2014 15:00	3	_	_	
5	Ganga	Ankinghat	Uttar Pradesh	123.00	124.00	123.280	21-Aug-14 02	19-08-2014 11:00	23-08-2014 04:00	4	-	-	-
6	Ganga	Kanpur	Uttar Pradesh	113.00	114.00	112.470	22-Aug-14 04	20-08-2014 00:00	23-08-2014 19:00	4	-	-	-
7	Ganga	Dalmau	Uttar Pradesh	98.36	99.36	98.690	23-Aug-14 03	21-08-2014 12:00	24-08-2014 08:00	3	-	-	-
8	Ganga	Phaphamau	Uttar Pradesh	83.73	84.73	82.04	11-Aug-14 17	-	-	-	-	-	-
9	Ganga	Allahabad (Chhatnag	Uttar Pradesh	83.73	84.73	81.17	11-Aug-14 14	-	-	-	-	-	-
10	Ganga	Mirzapur	Uttar Pradesh	76.72	77.72	74.90	11-Aug-14 17	-	-	-	-	-	-
11	Ganga	Varanasi	Uttar Pradesh	70.26	71.26	69.36	12-Aug-14 04	-	-	-	-	-	-
12	Ganga	Ghazipur	Uttar Pradesh	62.11	63.11	62.50	12-Aug-14 19	11-08-2014 14:00	13-08-2014 20:00	3	-	-	-
13	Ganga	Buxar	Bihar	59.32	60.32	58.55	12-Aug-14 18	-	-	-	-	-	-
14	Ganga	Ballia	Uttar Pradesh	56.62	57.62	58.25	13-Aug-14 14	10-08-2014 23:00	21-08-2014 11:00	12	11-08-2014 13:00	15-08-2014 06:00	5
15	Ganga	Patna (Dighaghat)	Bihar	49.45	50.45	48.62	19-Aug-14 22	12-08-2014 13:00	15-08-2014 14:00	4			
								18-08-2014 02:00	23-08-2014 05:00	6			
16	Ganga	Patna (Gandhighat)	Bihar	47.60	48.60	49.66	19-Aug-14 11	10-08-2014 23:00	27-08-2014 23:00	18	14-08-2014 00:00	14-08-2014 15:00	2
											18-08-2014 23:00	21-08-2014 03:00	4
17	Ganga	Hathidah	Bihar	40.76	41.76	41.46	20-Aug-14 13	12-08-2014 04:00	26-08-2014 07:00	15	-	-	-
18	Ganga	Munger	Bihar	38.33	39.33	38.15	21-Aug-14 01	-	-		-	-	-
19	Ganga	Bhagalpur	Bihar	32.68	33.68	33.19	21-Aug-14 10	14-08-2014 01:00	26-08-2014 09:00	13	-	-	-
20	Ganga	Colgong/ Kahalgaon	Bihar	30.09	31.09	31.36	21-Aug-14 09	09-08-2014 14:00	01-09-2014 18:00	24	11-08-2014 11:00	26-08-2014 06:00	13
21	Ganga	Sahibganj	Jharkhand	26.25	27.25	27.98	22-Aug-14 00	09-08-2014 11:00	02-09-2014 23:00	25	14-08-2014 07:00	28-08-2014 06:00	15
22	Ganga	Farakka	West Bengal	21.25	22.25	23.17	20-Aug-14 15	07-08-2014 08:00	06-09-2014 04:00	31	12-08-2014 21:00	31-08-2014 04:00	20
								22-09-2014 10:00	26-09-2014 04:00	35	-	-	-
23	Ramganga	Moradabad	Uttar Pradesh	189.60	190.60	191.370	20-Jul-14 20	19-07-2014 16:00	23-07-2014 14:00	3	20-07-2014 09:00	22-07-2014 06:00	2
								16-08-2014 08:00	19-08-2014 05:00	3	-	-	-
24	Ramganga	Bareilly	Uttar Pradesh	162.70	163.70	161.200	22-Jul-14 04	-	-	-	-	-	-

Low and Moderate flood events on main Ganga and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	Date/Time	From	To	No.of days	From	To	No.of days
25	Yamuna	Mawi	Uttar Pradesh	230.00	230.85	230.02	29-Jul-14 23	29-07-2014 13:00	29-07-2014 16:00	1	-	-	-
								17-08-2014 04:00	17-08-2014 09:00	1	-	-	-
26	Yamuna	Delhi Rly Bridge	NCT Delhi	204.00	204.83	204.00	30-Jul-14 15	30-07-2014 06:00	30-07-2014 07:00	1	-	-	-
27	Yamuna	Mathura	Uttar Pradesh	164.20	165.20	164.44	01-Aug-14 12	23-07-2014 10:00	24-07-2014 04:00	2	-	-	-
								01-08-2014 00:00	02-08-2014 17:00	2	-	-	-
								10-08-2014 03:00	10-08-2014 16:00	1	-	-	-
								10-08-2014 22:00	14-08-2014 00:00	4	-	-	-
								19-08-2014 19:00	20-08-2014 05:00	2	-	-	-
28	Yamuna	Agra	Uttar Pradesh	151.40	152.40	149.58	02-Aug-14 11	-	-	-	-	-	-
29	Yamuna	Etawah	Uttar Pradesh	120.92	121.92	118.05	16-Aug-14 04	-	-	-	-	-	-
30	Yamuna	Auraiya	Uttar Pradesh	112.00	113.00	111.69	09-Aug-14 09	-	-	-	-	-	-
31	Yamuna	Kalpi	Uttar Pradesh	107.00	108.00	106.71	09-Aug-14 09	-	-	-	-	-	-
32	Yamuna	Hamirpur	Uttar Pradesh	102.63	103.63	101.71	09-Aug-14 12	-	-	-	-	-	-
33	Yamuna	Chillaghat	Uttar Pradesh	99.00	100.00	97.26	09-Aug-14 23	-	-	-	-	-	-
34	Yamuna	Naini	Uttar Pradesh	83.74	84.74	81.76	11-Aug-14 10	-	-	-	-	-	-
35	Sahibi	Dhansa Regulator	NCT Delhi	211.44	212.44	210.300	09-09-14: 00	-	-	-	-	-	-
36	Betwa	Mohana	Uttar Pradesh	121.66	122.66	119.81	08-Aug-14 07	-	-	-	-	-	-
37	Betwa	Sahjina	Uttar Pradesh	103.54	104.54	101.34	09-Aug-14 15	-	-	-	-	-	-
38	Ken	Banda	Uttar Pradesh	103.00	104.00	104.64	07-Aug-14 18	07-08-2014 04:00	07-08-2014 09:00	1	07-08-2014 10:00	08-08-2014 01:00	2
								08-08-2014 02:00	08-08-2014 05:00	1	-	-	-
39	Gomati	Lucknow (Hanuman	Uttar Pradesh	108.50	109.50	105.865	10-Jul-14 16	-	-	-	-	-	-
40	Gomati	Jaunpur	Uttar Pradesh	73.07	74.07	70.00	10-Jul-14 03	-	-	-	-	-	-
41	Sai	Rae- Bareilly	Uttar Pradesh	100.00	101.00	99.314	22-Jul-14 15	-	-	-	-	-	-
42	Ghaghra	Elgin Bridge	Uttar Pradesh	105.07	106.07	107.616	18-Aug-14 16	08-07-2014 16:00	10-07-2014 10:00	3	19-07-2014 20:00	03-08-2014 02:00	16
								15-07-2014 21:00	09-09-2014 03:00	57	03-08-2014 10:00	09-08-2014 00:00	6
								11-09-2014 01:00	20-09-2014 02:00	9	15-08-2014 17:00	22-08-2014 03:00	8
								-	-	-	30-09-2014 15:00	14-09-2014 05:00	2
43	Ghaghra	Ayodhya	Uttar Pradesh	91.73	92.73	93.600	19-Aug-14 17	19-07-2014 05:00	31-08-2014 10:00	44	22-07-2014 05:00	25-07-2014 07:00	4
								07-09-2014 17:00	08-09-2014 12:00	2	26-07-2014 05:00	26-07-2014 14:00	1
								13-09-2014 00:00	19-09-2014 11:00	8	31-07-2014 03:00	02-08-2014 00:00	3
								-	-	-	04-08-2014 14:00	09-08-2014 01:00	6
								-	-	-	16-08-2014 00:00	22-08-2014 13:00	8
44	Ghaghra	Turtipar	Uttar Pradesh	63.01	64.01	64.865	22-Aug-14 06	21-07-2014 02:00	02-09-2014 17:00	44	17-08-2014 10:00	24-08-2004 04:00	8
								14-09-2014 17:00	20-09-2014 18:00	7	-	-	-
45	Ghaghra	Darauli	Bihar	59.82	60.82	61.430	22-Aug-14 13	19-07-2014 18:00	30-07-2014 04:00	10	18-08-2014 09:00	24-08-2014 16:00	7
								31-07-2014 22:00	04-08-2014 19:00	5	-	-	-
								05/08/14 21:	11-08-2014 03:00	7	-	-	-
								16-08-2014 01:00	02-09-2014 12:00	18	-	-	-
								15-09-2014 13:00	17-09-2014 13:00	3	-	-	-
46	Ghaghra	Gangpur Siswan	Bihar	56.04	57.04	57.870	22-Aug-14 14	23-07-2014 15:00	28-07-2014 04:00	6	18-08-2014 02:00	25-08-2014 02:00	8
								06-08-2014 05:00	31-08-2014 23:00	26	-	-	-
								16-09-2014 04:00	17-09-2014 13:00	2	-	-	-

Low and Moderate flood events on main Ganga and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	Date/Time	From	To	No.of days	From	To	No.of days
47	Ghaghra	Chhapra	Bihar	52.68	53.68	51.310	21-Aug-14 11	-	-	-	-	-	-
48	Rapti	Balrampur	Uttar Pradesh	103.62	104.62	105.510	18-Aug-14 01	08-07-2014 04:00	10-07-2014 10:00	3	16-08-2014 02:00	23-08-2014 05:00	8
								05-08-2014 05:00	07-08-2014 16:00	3	-	-	-
								14-08-2014 19:00	26-08-2014 22:00	13	-	-	-
								13-09-2014 02:00	13-09-2014 17:00	1	-	-	-
49	Rapti	Bansi	Uttar Pradesh	83.90	84.90	84.930	23-Aug-14 17	16-08-2014 14:00	28-08-2014 11:00	13	23-08-2014 14:00	24-08-2014 23:00	2
50	Rapti	Gorakhpur (Birdghat	Uttar Pradesh	73.98	74.98	75.330	24-Aug-14 15	17-08-2014 12:00	31-08-2014 23:00	15	18-08-2014 05:00	19-08-2014 03:00	2
								-	-	-	20-08-2014 11:00	29-08-2014 09:00	10
51	Sone	Inderpuri	Bihar	107.20	108.20	105.20	12-Aug-14 08	-	-	-	-	-	-
52	Sone	Koelwar	Bihar	54.52	55.52	52.94	14-Aug-14 10	-	-	-	-	-	-
53	Sone	Maner	Bihar	51.00	52.00	51.28	14-Aug-14 08	14-08-2014 22:00	23-08-2014 00:00	9	-	-	-
54	PunPun	Sripalpur	Bihar	49.60	50.60	50.54	17-Aug-14 21	14-08-2014 20:00	22-08-2014 03:00	9	-	-	-
55	Gandak	Khadda	Uttar Pradesh	95.00	96.00	96.16	15-Aug-14 21	19-07-2014 03:00	20-07-2014 20:00	2	-	-	-
								05-08-2014 01:00	06-08-2014 00:00	1	-	-	-
								13-08-2014 23:00	17-08-2014 23:00	5	15-08-2014 14:00	16-08-2014 09:00	2
								28-08-2014 02:00	29-08-2014 14:00	2	-	-	-
56	Gandak	Chatia	Bihar	68.15	69.15	69.06	18-Aug-14 10	16-08-2014 03:00	21-08-2014 01:00	6	-	-	-
57	Gandak	Rewaghat	Bihar	53.41	54.41	54.60	19-Aug-14 09	21-07-2014 18:00	24-07-2014 05:00	4	18-08-2014 12:00	20-08-2014 15:00	3
								06-08-2014 12:00	08-08-2014 00:00	2	-	-	-
								15-08-2014 08:00	24-08-2014 03:00	10	-	-	-
								27-08-2014 19:00	31-08-2014 18:00	5	-	-	-
58	Gandak	Hazipur	Bihar	49.32	50.32	48.92	19-Aug-14 07	-	-	-	-	-	-
59	Burhi Gandak	Lalbeghiaghat	Bihar	62.20	63.20	63.59	23-Aug-14 05	15-08-2014 09:00	03-09-2014 05:00	20	18-08-2014 21:00	26-08-2014 09:00	9
								-	-	-	28-08-2014 14:00	29-08-2014 19:00	2
60	Burhi Gandak	Muzaffarpur (Sikand	Bihar	51.53	52.53	51.38	01-Sep-14 06	-	-	-	-	-	-
61	Burhi Gandak	Samastipur	Bihar	45.02	46.02	45.43	26-Aug-14 17	21-08-2014 20:00	05-09-2014 19:00	16	-	-	-
62	Burhi Gandak	Rosera	Bihar	41.63	42.63	42.35	01-Sep-14 19	21-08-2014 12:00	07-09-2014 00:00	17	-	-	-
63	Burhi Gandak	Khagaria	Bihar	35.58	36.58	36.79	22-Aug-14 10	12-08-2014 16:00	31-08-2014 04:00	20	19-08-2014 15:00	24-08-2014 23:00	6
64	Bagmati	Benibad	Bihar	47.68	48.68	48.42	17-Aug-14 21	26-06-2014 17:00	25-06-2014 04:00	4	-	-	-
								25-06-2014 13:00	25-06-2014 20:00	1	-	-	-
								29-06-2014 16:00	01-07-2014 22:00	3	-	-	-
								02-07-2014 14:00	04-07-2014 10:00	3	-	-	-
								05-07-2014 22:00	06-07-2014 22:00	2	-	-	-
								11-07-2014 06:00	17-07-2014 02:00	7	12-07-2014 15:00	15-07-2014 09:00	4
								23-07-2014 04:00	24-07-2014 13:00	2	-	-	-
								26-07-2014 05:00	28-07-2014 07:00	3	-	-	-
								31-07-2014 06:00	02-08-2014 06:00	3	-	-	-
								04-08-2014 04:00	07-08-2014 13:00	4	04-08-2014 20:00	06-08-2014 06:00	3
								09-08-2014 06:00	13-08-2014 05:00	5	-	-	-
								13-08-2014 22:00	03-10-2014 15:00	52	14-08-2014 07:00	03-09-2014 18:00	21
								16-10-2014 10:00	19-10-2014 15:00	4	14-09-2014 22:00	15-09-2014 07:00	2
								-	-	-	22-09-2014 22:00	27-09-2014 00:00	5
								-	-	-	27-09-2014 10:00	28-09-2014 11:00	2
								-	-	-	16-10-2014 20:00	17-10-2014 06:00	2

Low and Moderate flood events on main Ganga and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	Date/Time	From	To	No.of days	From	To	No.of days
65	Bagmati	Hayaghat	Bihar	44.72	45.72	46.16	21-Aug-14 01	17-08-2014 21:00	09-09-2014 00:00	22	19-08-2014 00:00	04-09-2014 17:00	17
66	Adhwara Group	Kamtaul	Bihar	49.00	50.00	51.04	31-Aug-14 06	15-08-2014 23:00	09-09-2014 06:00	26	17-08-2014 09:00	05-09-2014 14:00	20
								14-09-2014 18:00	23-09-2014 06:00	10	18-09-2014 05:00	18-09-2014 16:00	1
								27-09-2014 09:00	04-10-2014 06:00	8	-	-	-
								16-10-2014 14:00	26-10-2014 01:00	11	17-10-2014 18:00	23-10-2014 16:00	7
67	Adhwara Group	Ekmighat	Bihar	45.94	46.94	47.21	31-Aug-14 05	17-08-2014 11:00	11-09-2014 06:00	26	19-08-2014 19:00	05-09-2014 03:00	18
68	Kamla Balan	Jhanjharpur	Bihar	49.00	50.00	52.19	15-Aug-14 18	17-06-2014 15:00	18-06-2014 14:00	2	-	-	-
								20-06-2014 18:00	21-06-2014 03:00	2	-	-	-
								30-06-2014 13:00	01-07-2014 06:00	2	-	-	-
								02-07-2014 11:00	03-07-2014 01:00	2	-	-	-
								04-07-2014 10:00	07-07-2014 06:00	4	04-07-2014 16:00	05-07-2014 02:00	2
								08-07-2014 22:00	10-07-2014 00:00	2	-	-	-
								12-07-2014 14:00	12-07-2014 23:00	1	-	-	-
								13-07-2014 13:00	14-07-2014 23:00	2	-	-	-
								13-08-2014 23:00	02-09-2014 00:00	20	14-08-2014 03:00	18-08-2014 15:00	5
								06-09-2014 11:00	08-09-2014 07:00	3	19-08-2014 14:00	20-08-2014 01:00	2
								13-09-2014 15:00	14-09-2014 22:00	2	24-08-2014 09:00	24-08-2014 23:00	1
								17-09-2014 22:00	18-09-2014 06:00	2	25-08-2014 07:00	25-08-2014 14:00	1
								20-09-2014 13:00	21-09-2014 07:00	2	25-08-2014 20:00	28-08-2014 17:00	4
								21-09-2014 20:00	23-09-2014 07:00	3	30-08-2014 12:00	30-08-2014 23:00	1
								25-09-2014 10:00	26-09-2014 07:00	2	31-08-2014 19:00	01-09-2014 07:00	2
								25-09-2014 09:00	28-09-2014 22:00	1	06-09-2014 16:00	07-09-2014 13:00	2
								15-10-2014 14:00	16-10-2014 13:00	2	13-09-2014 19:00	14-09-2014 07:00	2
69	Kosi	Basua	Bihar	46.75	47.75	48.51	15-Aug-14 22	23-06-2014 06:00	09-10-2014 00:00	108	14-07-2014 18:00	17-07-2014 17:00	4
								-	-	-	19-07-2014 06:00	28-08-2014 04:00	10
								-	-	-	14-09-2014 17:00	18-09-2014 02:00	5
								-	-	-	22-09-2014 03:00	23-09-2014 22:00	2
70	Kosi	Baltara	Bihar	32.85	33.85	34.61	18-Aug-14 21	27-07-2014 12:00	02-08-2014 04:00	7	-	-	-
								04-08-2014 02:00	09-08-2014 14:00	6	-	-	-
								10-08-2014 04:00	01-10-2014 01:00	52	16-08-2014 08:00	04-09-2014 13:00	20
71	Kosi	Kursela	Bihar	29.00	30.00	30.49	17-Aug-14 06	10-08-2014 01:00	02-09-2014 22:00	24	14-08-2014 22:00	26-08-2014 22:00	13
72	Mahananda	Dhengraghat	Bihar	34.65	35.65	36.23	27-Aug-14 16	08-06-2014 20:00	10-06-2014 01:00	3	-	-	-
								30-06-2014 11:00	01-07-2014 22:00	2	-	-	-
								10-07-2014 05:00	15-07-2014 09:00	6	-	-	-
								16-07-2014 13:00	18-07-2014 00:00	2	-	-	-
								15-08-2014 00:00	31-08-2014 02:00	18	15-08-2014 14:00	18-08-2014 21:00	4
								22-09-2014 17:00	24-09-2014 17:00	3	23-08-2014 19:00	24-08-2014 06:00	2
								28-09-2014 11:00	30-09-2014 04:00	3	26-08-2014 01:00	29-08-2014 02:00	4
73	Mahananda	Jhawa	Bihar	30.40	31.40	31.49	28-Aug-14 05	15-08-2014 17:00	31-08-2014 22:00	17	27-08-2014 20:00	28-08-2014 17:00	2
								23-09-2014 12:00	24-09-2014 12:00	2	-	-	-
74	Mayurakshi	Narayanpur	West Bengal	26.99	27.99	23.80	19-Aug-14 20	-	-	-	-	-	-
74	Ajoy	Gheropara	West Bengal	38.42	39.42	38.31	04-Jul-14 06	-	-	-	-	-	-
76	Mundeshwari	Harinkhola	West Bengal	11.80	12.80	11.34	17-Aug-14 06	-	-	-	-	-	-
77	Kangsabati	Mohanpur	West Bengal	24.73	25.73	20.68	10-Aug-14 09	-	-	-	-	-	-

Low and Moderate flood events on main Brahamaputra and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	From	From	To	No.of days	From	To	No.of days
1	Brahmaputra	Dibrugarh	Assam	104.70	105.70	106.09	24-Aug-14 03	10-May-14 07	13-May-14 14	04	13-Aug-14 06	13-Aug-14 21	01
								15-May-14 03	17-May-14 01	03	14-Aug-14 20	14-Aug-14 23	01
								21-Jun-14 21	07-Jul-14 05	17	16-Aug-14 08	17-Aug-14 14	02
								07-Jul-14 17	11-Jul-14 08	05	23-Aug-14 00	25-Aug-14 14	03
								14-Jul-14 23	06-Sep-14 02	55	-	-	
								11-Sep-14 05	13-Sep-14 05	03	-	-	
								22-Sep-14 11	25-Sep-14 12	04	-	-	
								26-Sep-14 04	26-Sep-14 12	01	-	-	
								27-Sep-14 22	29-Sep-14 16	03	-	-	
2	Brahmaputra	Neamatighat	Assam	84.04	85.04	86.92	24-Aug-14 17	11-May-14 02	19-May-14 08	09	23-Jun-14 12	28-Jun-14 06	06
								11-Jun-14 01	16-Jun-14 12	06	29-Jun-14 19	12-Jul-14 12	14
								22-Jun-14 06	04-Oct-14 02	105	15-Jul-14 23	03-Sep-14 03	51
								-	-	-	23-Sep-14 12	26-Sep-14 14	04
								-	-	-	28-Sep-14 13	30-Sep-14 10	02
								-	-	-	-	-	-
3	Brahmaputra	Tezpur	Assam	64.23	65.23	65.89	26-Aug-14 07	24-Jun-14 11	28-Jun-14 21	05	15-Aug-14 05	20-Aug-14 11	06
								30-Jun-14 18	08-Jul-14 03	09	24-Aug-14 08	29-Aug-14 12	06
								08-Jul-14 17	12-Jul-14 21	05	-	-	-
								17-Jul-14 14	29-Jul-14 07	13	-	-	-
								07-Aug-14 11	10-Aug-14 03	04	-	-	-
								11-Aug-14 05	02-Sep-14 15	23	-	-	-
								25-Sep-14 01	27-Sep-14 18	03	-	-	-
								28-Sep-14 13	29-Sep-14 00	02	-	-	-

Low and Moderate flood events on main Brahamaputra and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	From	From	To	No.of days	From	To	No.of days
4	Brahmaputra	Guwahati	Assam	48.68	49.68	50.09	27-Aug-14 17	15/08/14 08: 26/09/14 11:	01/09/14 05: 27/09/14 12:	18 2	17/08/14(13) 26/08/14(01)	19/08/14(01) 29/08/14(12)	3 4
5	Brahmaputra	Goalpara	Assam	35.27	36.27	36.89	28-Aug-14 12	27/06/14(10) 04/07/14(05) 12/07/14(15) 19/07/14(12) 14/08/14(17) 22/09/14(18)	27/06/14(17) 07/07/14(04) 13/07/14(18) 29/07/14(18) 06/09/14(04) 02/10/14(04)	1 4 2 11 24 11	17/08/14(04) 24/08/14(09)	22/08/14(22) 01/09/14(02)	6 9
6	Brahma- putra	Dhubri	Assam	27.62	28.62	**29.75**	28.08.14 2300	25.06.14 - - -	06.10.14 - - -	104 - - -	22.07.14 16.08.14 23.09.14 27.09.14	26.07.14 04.09.14 25.09.14 29.09.14	5 20 3 3
7	Buridehing	Naharkatia	Assam	119.40	120.40	119.36	25-Aug-14 13	-	-		-		-
								-	-	-	-	-	-
8	Buridehing	Chenimari	Assam	101.11	102.11	103.63	26-Aug-14 23	14-Aug-14 21	23-Aug-14 04	10	25-Aug-14 03	29-Aug-14 05	05
								24-Aug-14 10	30-Aug-14 08	7	-	-	-
								22-Sep-14 19	30-Sep-14 07	09	-	-	-
9	Subansiri	Badatighat	Assam	81.53	82.53	82.73	25-Aug-14 18	19-Jul-14 07	21-Jul-14 12	03	25-Aug-14 02	27-Aug-14 03	03
10	Dikhow	Sivasagar	Assam	91.4	92.4	93.10	11-Aug-14 01	14-Aug-14 22	30-Aug-14 16	17	-	-	
								18-Jul-14 19	21-Jul-14 05	04	19-Jul-14 09	20-Jul-14 00	02
								31-Jul-14 14	31-Jul-14 23	01	03-Aug-14 05	04-Aug-14 07	02
								02-Aug-14 15	05-Aug-14 14	04	10-Aug-14 16	11-Aug-14 15	02
								09-Aug-14 08	12-Aug-14 08	04	-	-	-
								14-Aug-14 16	14-Aug-14 17	01	-	-	-
								15-Aug-14 07	19-Aug-14 22	05	-	-	-
								22-Aug-14 16	27-Aug-14 04	06	-	-	-
								23-Sep-14 20	26-Sep-14 09	04	-	-	-
11	Desang	Nanglamoraghat	Assam	93.46	94.46	95.15	26-Aug-14 16	19-Jul-14 07	21-Jul-14 09	03	15-Aug-14 10	17-Aug-14 20	03
								10-Aug-14 09	11-Aug-14 01	02	24-Aug-14 23	28-Aug-14 03	05
								14-Aug-14 14	22-Aug-14 05	09	-	-	-
								24-Aug-14 07	29-Aug-14 00	06	-	-	-
								22-Sep-14 17	25-Sep-14 16	04	-	-	-
12	Dhansiri(S)	Golaghat	Assam	88.50	89.50	89.22	25-Sep-14 04	-	-	-	-	-	-
								31-Jul-14 02	01-Aug-14 04	02	-	-	-
								02-Aug-14 04	04-Aug-14 21	03	-	-	-
								05-Aug-14 23	06-Aug-14 16	02	-	-	-
								09-Sep-14 04	09-Sep-14 13	01	-	-	-
								24-Sep-14 05	28-Sep-14 07	05	-	-	-

Low and Moderate flood events on main Brahamaputra and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	From	From	To	No.of days	From	To	No.of days
13	Dhansiri(S)	Numaligarh	Assam	76.42	77.42	78.58	25-Sep-14 09	05-Jul-14 08	07-Jul-14 20	03	26-Jul-14 13	27-Jul-14 11	02
								14-Jul-14 23	05-Oct-14 17	84	28-Jul-14 07	07-Aug-14 05	11
								-	-	-	09-Aug-14 06	12-Aug-14 19	04
								-	-	-	15-Aug-14 07	20-Aug-14 10	06
								-	-	-	22-Aug-14 03	28-Aug-14 21	07
								-	-	-	08-Sep-14 07	10-Sep-14 21	03
								-	-	-	11-Sep-14 08	13-Sep-14 06	03
								-	-	-	21-Sep-14 23	22-Sep-14 15	02
								-	-	-	23-Sep-14 09	30-Sep-14 03	08
14	Kopili	Kampur	Assam	59.50	60.50	61.33	28/09/14:09-12	15-Aug-14 22	22-Aug-14 07	8	16-Aug-14 18	20-Aug-14 10	5
								25-Aug-14 05	28-Aug-14 21	4	24-Sep-14 12	30-Sep-14 02	7
								24-Sep-14 07	01-Oct-14 08	8	-	-	-
15	Kopili	Dharamtul	Assam	55.00	56.00	56.61	29/09/14:01-15	16-Aug-14 06	03-Sep-14 12	19	18-Aug-14 17	30-Aug-14 20	13
								23-Sep-14 19	06-Oct-14 17	14	24-Sep-14 17	03-Oct-14 19	10
								09-May-14 13	09-May-14 18	01	10-Jun-14 09	10-Jun-14 16	01
								12-May-14 14	12-May-14 22	01	21-Jun-14 10	25-Jun-14 21	05
								14-May-14 16	15-May-14 03	02	30-Jun-14 05	30-Jun-14 23	01
								15-May-14 11	15-May-14 23	01	08-Jul-14 06	10-Jul-14 01	03
								17-May-14 08	18-May-14 04	02	16-Jul-14 07	16-Jul-14 21	01
								22-May-14 15	23-May-14 00	02	17-Jul-14 05	17-Jul-14 16	01
								23-May-14 08	24-May-14 02	01	18-Jul-14 01	19-Jul-14 19	02
								30-May-14 03	31-May-14 00	02	20-Jul-14 16	21-Jul-14 02	02
								05-Jun-14 18	06-Jun-14 00	02	23-Jul-14 13	23-Jul-14 20	01
								06-Jun-14 12	07-Jun-14 05	02	13-Aug-14 12	13-Aug-14 22	01

Low and Moderate flood events on main Brahamaputra and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	From	From	To	No.of days	From	To	No.of days
16	Jiabharali	NT.Rd.X-ing	Assam	76.00	77.00	77.95	15/08/14:21-22	07-Jun-14 08	09-Jun-14 03	03	14-Aug-14 03	18-Aug-14 17	05
								09-Jun-14 10	15-Jun-14 09	06	19-Aug-14 05	27-Aug-14 16	09
								19-Jun-14 14	20-Jun-14 00	02	10-Sep-14 09	10-Sep-14 10	01
								20-Jun-14 17	06-Sep-14 04	79	11-Sep-14 07	11-Sep-14 11	01
								07-Sep-14 13	08-Sep-14 09	02	13-Sep-14 04	13-Sep-14 23	01
								10-Sep-14 02	07-Oct-14 20	28	14-Sep-14 05	14-Sep-14 21	01
								-	-	-	21-Sep-14 10	21-Sep-14 19	01
								-	-	-	21-Sep-14 22	21-Sep-14 22	
								-	-	-	22-Sep-14 03	24-Sep-14 00	03
								-	-	-	26-Sep-14 12	27-Sep-14 23	02
								-	-	-	28-Sep-14 02	28-Sep-14 21	01
17	Puthimari	Puthimari _NHX	Assam	50.81	51.81	53.90	23-Sep-14 06	09/05/14(06)	11/05/14(01)				
								22/05/14(08)	23/05/14(11)	3			
								22/06/14(03)	30/06/14(04)	2 9	22/06/14(11)	23/06/14(19)	2
								30/06/14(16)	01/07/14(17)	1	24/06/14(12)	24/06/14(22)	1
								04/07/14(10)	06/07/14(05)	3	14/08/14(12)	17/08/14(02)	4
								08/07/14(14)	12/07/14(10)	5	17/08/14(05)	19/08/14(05)	2
								14/07/14(13)	20/07/14(17)	7	25/08/14(17)	26/08/14(02)	2
								21/07/14(20)	22/07/14(17)	2	26/08/14(06)	27/08/14(05)	1
								23/07/14(10)	27/07/14(17)	5	22/09/14(02)	25/09/14(01)	3
								02/08/14(11)	02/08/14(17)	1	25/09/14(06)	25/09/14(10)	1
								10/08/14(15)	08/09/14(11)	30			
								20/09/14(18)	07/10/14(15)	18			
18	Pagladia	Pagladia_NTX	Assam	51.75	52.75	52.75	23-Sep-14 06	14/08/14(13)	15/08/14(05)				
								15/08/14(10)	16/08/14(02)				
								17/08/14(07)	17/08/14(24)	2 1	23/09/14(06)	23/09/14(07)	1
								22/09/14(08)	24/09/14(09)	1 3			
19	Barak	APGhat	Assam	18.83	19.83	18.54	25-Aug-14 09	-	-		-	-	
20	Katakhal	Matizuri	Assam	19.27	20.27	20.35	07-Sep-14 17	30/07/14(18)	31/07/14(23)	2 5			
								06/09/14(07)	10/09/14(10)	2	07/09/14(07)	07/09/14(20)	1
								20/09/14(06)	21/09/14(16)				
21	Kushiyara	Karimganj	Assam	13.94	14.94	14.30	09-Sep-14 14	25/08/14(10)	26/08/14(17)	2	-	-	-
								08/09/14(15)	10/09/14(21)	3			
22	Manu	Kailashar	Tripura	24.34	25.34	22.68	20-Sep-14 05	-	-		-	-	
23	Gumti	Sonamura	Tripura	11.50	12.50	11.49	23-Jun-14 02	-	-		-	-	-
24	Manas	Manas NH- Crossing	Assam	47.81	48.42	**48.19**	25-Aug-14 23	25-Aug-14 13	27-Aug-14 00	2	-	-	-
								22-Sep-14 13	23-Sep-14 05	2	-	-	-

Low and Moderate flood events on main Brahamaputra and its tributaries- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	From	From	To	No.of days	From	To	No.of days
25	Beki	Beki Rd. Bridge	Assam	44.10	45.10	**45.84**	22-Sep-14	29-May-14 11	30-May-14 18	2	22-Jun-14 14	25-Jun-14 10	4
								07-Jun-14 19	11-Jun-14 06	5	30-Jun-14 16	30-Jun-14 18	1
								21-Jun-14 09	17-Sep-14 15	89	09-Jul-14 02	09-Jul-14 11	1
								20-Sep-14 06	03-Oct-14 02	14	15-Jul-14 15	28-Jul-14 00	13
								-	-	-	31-Jul-14 15	31-Jul-14 22	1
								-	-	-	03-Jul-08 03	31-Jul-14 23	1
								-	-	-	04-Aug-14 14	04-Aug-14 18	2
								-	-	-	14-Aug-14 17	27-Aug-14 19	14
								-	-	-	21-Sep-14 17	24-Sep-14 21	4
26	Sankosh	Golokganj	Assam	28.94	29.94	**30.40**	16-Aug-14 17	15-Aug-14 17	30-Aug-14 07	16	16-Aug-14 12	17-Aug-14 14	2
								-	-	-	27-Aug-14 01	28-Aug-14 10	2
27	Teesta	Domohani	West Begal	85.65	85.95	**86.20**	15-Aug-14 11	13-Jun-14 19	13-Jun-14 21	1	29-Jun-14 13	29-Jun-14 14	1
								22-Jun-14 12	26-Jun-14 04	5	01-Jul-14 14	01-Jul-14 19	1
								28-Jun-14 11	12-Jul-14 00	14	06-Jul-14 12	06-Jul-14 17	1
								13-Jul-14 11	02-Sep-14 18	52	08-Jul-14 15	09-Jul-14 02	2
								09-Sep-14 13	10-Sep-14 04	2	13-Jul-14 15	13-Jul-14 21	1
								13-Sep-14 11	18-Sep-14 11	6	15-Jul-14 14	15-Jul-14 23	1
								20-Sep-14 01	30-Sep-14 00	10	17-Jul-14 15	17-Jul-14 20	1
								-	-	-	22-Jul-14 10	22-Jul-14 14	1
								-	-	-	05-Aug-14 12	05-Aug-14 20	1
								-	-	-	14-Aug-14 14	23-Aug-14 14	10
								-	-	-	25-Aug-14 11	27-Aug-14 22	3
28	Teesta	Mekhliganj	West Bengal	65.45	65.95	**65.09**	23-Jun-14 23	BWL	-	-	-	-	-
29	Jaldhaka	N H 31	West bengal	80.00	80.90	**80.58**	26-Aug-14 12	25-Jun-14 07	25-Jun-14 16	1	-	-	-
								28-Jun-14 14	28-Jun-14 22	1	-	-	-
								15-Aug-14 08	16-Aug-14 19	2	-	-	-
								18-Aug-14 08	18-Aug-14 21	1	-	-	-
								22-Aug-14 10	26-Aug-14 22	5	-	-	-
30	Jaldhaka	Mathabhanga	West bengal	47.70	48.20	**48.00**	26-Aug-14 23	26-Aug-14 18	27-Aug-14 18	2	-	-	-
31	Torsa	Ghughumari	West Bengal	39.80	40.41	**40.42**	16-Aug-14 02	25-Jun-14 21	26-Jun-14 00	1	16-Aug-14 02	16-Aug-14 04	**1**
								15-Aug-14 12	17-Aug-14 11	3	-	-	-
								24-Aug-14 14	27-Aug-14 05	4	-	-	-
32	Radak-I	Tufanganj	West Bengal	34.22	35.30	**35.21**	27-Aug-14 07	26-Aug-14 14	28-Aug-14 10	3	-	-	-
								22-Sep-14 03	23-Sep-14 15	2	-	-	-

Annex XII

Low and Moderate flood events on various river systems (excluding Ganga and Brahmaputra basins)- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	Time	From	To	No. of days	From	To	No. of days
1	Subernarekna	Rajghat	Odisha	9.45	10.36	10.55	06-Aug-14 20	06-Aug-14 04	07-Aug-14 09	**2**	06-Aug-14 12	07-Aug-14 01	2
								11-Aug-14 08	12-Aug-14 21	**2**	11-Aug-14 19	12-Aug-14 12	2
2	Burhabalang	NH 5 Road Bridge	Odisha	7.21	8.13	8.36	05-Aug-14 08	04-Aug-14 11	06-Aug-14 07	**3**	04-Aug-14 22	05-Aug-14 21	2
3	Baitarni	Anandpur	Odisha	37.44	38.36	41.06	05-Aug-14 08	20-Jul-14 17	21-Jul-14 02	**2**	-	-	-
								21-Jul-14 07	22-Jul-14 23	**2**	21-Jul-14 09	22-Jul-14 19	2
								04-Aug-14 12	06-Aug-14 23	**3**	04-Aug-14 14	06-Aug-14 17	3
								10-Aug-14 04	10-Aug-14 18	**1**	-	-	-
4	Baitarni	Akhuapada	Odisha		17.83	20.69	05-Aug-14 17	-	-	**-**	22-Jul-04 00	23-Jul-14 18	3
								-	-	**-**	04-Aug-14 16	07-Aug-14 17	4
								-	-	**-**	10-Aug-14 09	11-Aug-14 07	2
5	Brahmani	Jenapur	Odisha	22.00	23.00	22.88	06-Aug-14 07	05-Aug-14 14	06-Aug-14 20	**2**	-	-	-
6	Rushikuluya	Purushottampur	Odisha	15.83	16.83	16.68	13-Oct-14 23	13-Oct-14 12	14-Oct-14 17	**2**	-	-	-
7	Vamsadhara	Gunupur	Odisha	83.00	84.00	84.21	07-Sep-14 06	04-Aug-14 13	05-Aug-14 03	**2**	-	-	-
								05-Sep-14 19	06-Sep-14 07	**2**	05-Sep-14 21	06-Sep-14 01	2
								06-Sep-14 12	08-Sep-14 05	**3**	07-Sep-14 05	07-Sep-14 13	1
8	Vamsadhara	Kashinagar	Odisha	53.60	54.60	55.78	07-Sep-14 11	20-Jul-14 00	21-Jul-14 03	**3**	19-Jul-14 04	19-Jul-14 14	1
								21-Jul-14 07	25-Jul-14 00	**4**	-	-	-
								28-Jul-14 16	30-Jul-14 10	**3**	-	-	-
								30-Jul-14 14	31-Jul-14 15	**2**	-	-	-
								31-Jul-14 16	02-Aug-14 13	**3**	-	-	-
								04-Aug-14 00	03-Aug-14 12	**1**	-	-	-
								03-Aug-14 16	09-Aug-14 20	**7**	04-Aug-14 16	05-Aug-14 06	2
								13-Aug-14 06	13-Aug-14 13	**1**	-	-	-
								16-Aug-14 12	16-Aug-14 17	**1**	-	-	-
								17-Aug-14 06	18-Aug-14 14	**2**	-	-	-
								27-Aug-14 05	28-Aug-14 12	**2**	-	-	-
								28-Aug-14 15	22-Sep-14 14	**26**	04-Sep-14 19	04-Sep-14 21	1
								-	-	**-**	05-Sep-14 22	06-Sep-14 10	2
								-	-	**-**	06-Sep-14 15	08-Sep-14 19	3
								-	-	**-**	13-Sep-14 08	13-Sep-14 13	1
								11-Oct-14 10	12-Oct-14 03	**2**	-	-	-
								12-Oct-14 05	16-Oct-14 23	**5**	13-Oct-14 02	14-Oct-14 02	2
								17-Oct-14 18	18-Oct-14 12	**2**	-	-	-
								19-Oct-14 21	20-Oct-14 04	**2**	-	-	-
								22-Oct-14 20	23-Oct-14 02	**2**	-	-	-
9	Mahanadi	Naraj	Odisha	25.41	26.41	26.36	06-Sep-14 20	23-Jul-14 20	24-Jul-14 16	**2**	-	-	-
								27-Jul-14 12	29-Jul-14 03	**3**	-	-	-
								01-Aug-14 06	02-Aug-14 13	**2**	-	-	-
								02-Aug-14 17	02-Aug-14 23	**1**	-	-	-
								03-Aug-14 10	04-Aug-14 08	**2**	04-Aug-14 09	05-Aug-14 17	2
								05-Aug-14 18	06-Aug-14 11	**2**	06-Aug-14 12	09-Aug-14 23	4
								10-Aug-14 00	14-Aug-14 01	**5**	-	-	-
								06-Sep-14 06	10-Sep-14 07	**5**	-	-	-
10	Mahanadi	Alipingal Devi	Odisha	10.85	11.76	11.95	07-Aug-14 12	05-Aug-14 23	07-Aug-14 03	**3**	07-Aug-14 04	08-Aug-14 02	2
								08-Aug-14 03	10-Aug-14 23	**3**	-	-	-
11	Mahanadi	Nimapara	Odisha	9.85	10.76	10.58	07-Aug-14 18	06-Aug-14 06	10-Aug-14 18	**5**	-	-	-
12	Godavari	Kopergaon	Maharashtra	490.90	493.68	490.15	06-Sep-14 16	-	-	**-**	-	-	-
13	Godavari	Gangakhed	Maharashtra	374.00	375.00	364.34	06-Sep-14 10	-	-	**-**	-	-	-
14	Godavari	Nanded	Maharashtra	353.00	354.00	344.40	07-Sep-14 19	-	-	**-**	-	-	-
15	Godavari	Kaleswaram	Telangana	103.50	104.75	102.33	07-Sep-14 18	-	-	**-**	-	-	-

Annex XII

Low and Moderate flood events on various river systems (excluding Ganga and Brahmaputra basins)- 2014 flood season

Sl. No.	River	Station	State	Warning level in metres	Danger level in metres	Peak level in 2014		Flood period above warning level			Flood period above danger level		
						Level in metres	Time	From	To	No. of days	From	To	No. of days
16	Godavari	Eturunagaram	Telangana	73.29	75.79	75.33	08-Sep-14 06	07-Sep-14 06	11-Sep-14 00	**4**	-	-	-
17	Godavari	Dummagudam	Telangana	53.00	55.00	55.51	08-Sep-14 13	07-Sep-14 18	09-Sep-14 22	**2**	08-Sep-14 06	09-Sep-14 01	2
18	Godavari	Bhadrachalam	Telangana	45.72	48.77	49.71	08-Sep-14 06	07-Sep-14 15	10-Sep-14 15	**4**	08-Sep-14 07	09-Sep-14 11	2
19	Godavari	Kunavaram	Andhra Pradesh	37.74	39.24	40.47	09-Sep-14 10	08-Sep-14 08	11-Sep-14 09	**4**	08-Sep-14 17	10-Sep-14 06	3
20	Godavari	Rajamundry	Andhra Pradesh	17.68	19.51	17.68	09-Sep-14 19	09-Sep-14 08	10-Sep-14 01	**2**	-	-	-
21	Godavari	Dowalaiswaram	Andhra Pradesh	14.25	16.08	15.58	09-Sep-14 13	08-Sep-14 09	10-Sep-14 16	**3**	-	-	-
22	Wainganga	Bhandara	Maharashtra	244.00	244.50	241.50	07-Aug-14 08	-	-	**-**	-	-	-
23	Wainganga	Pauni	Maharashtra	226.73	227.73	224.15	06-Aug-14 06	-	-	**-**	-	-	-
24	Wardha	Balharsha	Maharashtra	171.50	174.00	162.48	16-Jul-14 19	-	-	**-**	-	-	-
25	Indravati	Jagdalpur	Chhatisgarh	539.50	540.80	540.64	22-Jul-14 15	21-Jul-14 14	23-Jul-14 08	**3**	-	-	-
								29-Jul-14 08	30-Jul-14 12	**2**	-	-	-
								04-Aug-14 04	06-Aug-14 01	**3**	-	-	-
								07-Sep-14 12	08-Sep-14 18	**2**	-	-	-
								21-Sep-14 05	21-Sep-14 21	**1**	-	-	-
26	Krishna	Arjunwad	Maharashtra	542.07	543.29	-	19-Sep-14 08	-	-	**-**	-	-	-
27	Bhima	Deongaon	Karnataka	402.00	404.50	398.15	08-Sep-14 17	-	-	**-**	-	-	-
28	Tungabhadra	Mantralayam	Andhra Pradesh	310.00	312.00	312.07	05-Aug-14 03	03-Aug-14 14	10-Aug-14 12	**8**	04-Aug-14 16	05-Aug-14 15	2
29	Pennar	Nellore	Andhra Pradesh	15.91	17.28	13.71	24-Oct-14 08	-	-	**-**	-	-	-
30	Sabarmati	Ahmedabad Shubhash Bridge	Gujarat	44.09	45.34	41.98	06-Sep-14 15	-	-	**-**	-	-	-
31	Mahi	Wanakbori	Gujarat	71.00	72.54	71.32	09-Sep-14 16	-	-	**-**	-	-	-
32	Naramada	Mandla	Madhya Pradesh	437.20	437.80	438.55	06-Aug-14 10	22-Jul-14 19	23-Jul-14 03	**2**	06-Aug-14 02	06-Aug-14 16	1
								06-Aug-14 00	06-Aug-14 21	**1**	-	-	-
33	Naramada	Hoshangabad	Madhya Pradesh	292.83	293.83	289.05	08-Aug-14 19	-	-	**-**	-	-	-
34	Naramada	Garudeswar	Gujarat	30.48	31.09	23.41	09-Sep-14 06	-	-	**-**	-	-	-
35	Naramada	Bharuch	Gujarat	6.71	7.31	6.80	09-Sep-14 17	09-09-2014 17:00	09-09-2014 20:00	**1**	-	-	-
36	Tapi	Surat	Gujarat	8.50	9.50	6.50	10-Sep-14 05	-	-	**-**	-	-	-
37	Damanganga	Vapi Town	Gujarat	18.20	19.20	17.60	29-Jul-14 12	-	-	**-**	-	-	-
38	Damanganga	Daman	Dadra & Nagar Have	2.60	3.40	2.10	14-Jun-14 16	-	-	**-**	-	-	-