Water Quality Status of Maharashtra 2012-13

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

The Energy & Resources Institute

Water Quality Status of Maharashtra 2012-13

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The Energy and Resources Institute

...towards global sustainable development

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MAHARASHTRA POLLUTION CONTROL BOARD

Preface

Water Quality Monitoring is one of important function of State Pollution Control Board. It helps in evaluating the nature & extent of water contamination, assess the water quality trends, evaluate the success of pollution control measures taken & prioritization of efforts to be initiated. Maharashtra Pollution Control Board is monitoring water quality under National Water Monitoring Programme (NWMP) and State Water Monitoring Programme (SWMP) at various locations as per the Uniform Monitoring Protocol of Central Pollution Control Board / MoEF, New Delhi.

This document contains compilation & statistical analysis of Water Quality Monitoring data observed at 250 monitoring stations during the period 2012 to 2013. Also National Sanitation Foundation, USA's formula has been used to calculate Water Quality Index (WQI) to depict the water quality in a easy to understand the general public at large. The WQI is also used to compare with the water quality of last 3 years.

Also presents a comparison for the trend in water quality index for the inter-basin analysis for the past two years along with the trend for intra-basin analysis for the past six years. The Godavari Middle and Tapi Middle basin have shown slight improvement in terms of water quality, however the water bodies at Bhima upper sub basin and water bodies near the coast line along Mumbai and Tarapur stretch (Thane district) need immediate action. Spatial maps have been generated in GIS platform to present the status of water quality at a glance. I trust findings of this report will help all concerned departments to prepare suitable action plans for improvement of water quality.

This report is prepared by The Energy and Resourses Institute (TERI), Western Regional Centre and I appreciate the efforts of *Dr. Anjali Parasnis, Associate Director and Mr. Prathmesh Chourey, Associate fellow-* TERI in preparing the report. Contribution of *Shri. Bharat Nimbarte then Joint Director-WPC, Dr.Y.B.Sontakke, Joint Director-WPC and Ms.Yamini Chachad, Junior Scientific Officer* are appreciated for their inputs in the report.

Date:- June 2014

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Abbreviations

BIS	Bureau of Indian Standards
BOD	Biochemical Oxygen Demand
CGWB	Central Ground Water Board
CPCB	Central Pollution Control Board
CWC	Central Water Commission
DO	Dissolved Oxygen
FC	Fecal Coliform
GEMS	Global Environment Monitoring System
GIS	Geographical Information System
GSDA	Groundwater Surveys & Development Agency
MINARS	Monitoring of Indian National Aquatic Resources System
MMR	Mumbai Metropolitan Region
MoEF	Ministry of Environment and Forests
MPCB	Maharashtra Pollution Control Board
NSFWQI	National Sanitation Foundation Water Quality Index
NWMP	National Water Monitoring Program
pH	Power of Hydrogen
RO	Regional Office
SD	Standards Deviation
Shp	Shape files
SPCBs	State Pollution Control Boards
SW	Surface Water
WHO	World Health Organisation
WQMS	Water Quality Monitoring Stations
YAP	Yamuna Action Plan

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Executive Summary

In India, water pollution is one of the major and most critical issues, as almost 70% of the surface water resources and various groundwater reserves are contaminated by biological, toxic, organic and inorganic pollutants[1]. As per CPCB (Central Pollution Control Board), the largest source of water pollution in India is the release of untreated sewage from urban centres, industrial effluents and organic runoffs from agricultural fields. The effects of water pollution are not only devastating to humans but also to the fragile aquatic and riparian ecosystems constituting the biosphere of plants, animals, fish, and birds.

In Maharashtra, of the 5 river basin systems, 55% of the required water is sourced from the four river basins namely, Krishna, Godavari, Tapi and Narmada, which lie to the east of the Western Ghats. While, 45% of state's water resources, emanate from Western Ghats and the rivers such as Vaitarna, Kalu, Mithi in this basin are famously known as west flowing rivers.

MPCB, being the state nodal agency under CPCB, monitors and documents data for water quality under two programs of NWMP (National Water Quality Monitoring Program) titled GEMS (Global Environment Monitoring System) and MINARS (Monitoring of Indian National Aquatic Resources). Under these schemes there are a total of 250 WQMS (Water Quality Monitoring Stations), the highest among all states and Union Territories in India. Out of these stations, 156 are on rivers, 34 on sea/creeks, 10 on artificial drains and 50 for ground water. These monitoring programs analyse the water samples for 9 core quality parameters including pH, BOD (Bio-chemical Oxygen Demand), Nitrate, Fecal Coliform, Total Coliform and 19 general parameters like turbidity, COD (Chemical Oxygen Demand), Magnesium, Sulpahte, Sodium and so on.

The status of water quality using this complex set of data recorded by MPCB, gets represented by calculating the WQI (Water Quality Index) using the formula developed by NSF (National Sanitation Foundation) and modified by CPCB. The monthly observations for surface water quality and half yearly observations for groundwater have been used to calculate the WQI with the following categories.

WQI	Quality classification	Remarks	Colour code
Surface Water Quality			
63 - 100	Good to Excellent	Non Polluted	
50 - 63	Medium to Good	Non Polluted	
38 - 50	Bad	Polluted	
38 and less	Bad to Very Bad	Heavily Polluted	
Ground Water Quality			
<50	Excellent	Non Polluted	
50-100	Good water	Non Polluted	
100-200	Poor Water	Polluted	
200-300	Very Very Poor	Polluted	
>300	Water Unsuitable for drinking	Heavily Polluted	

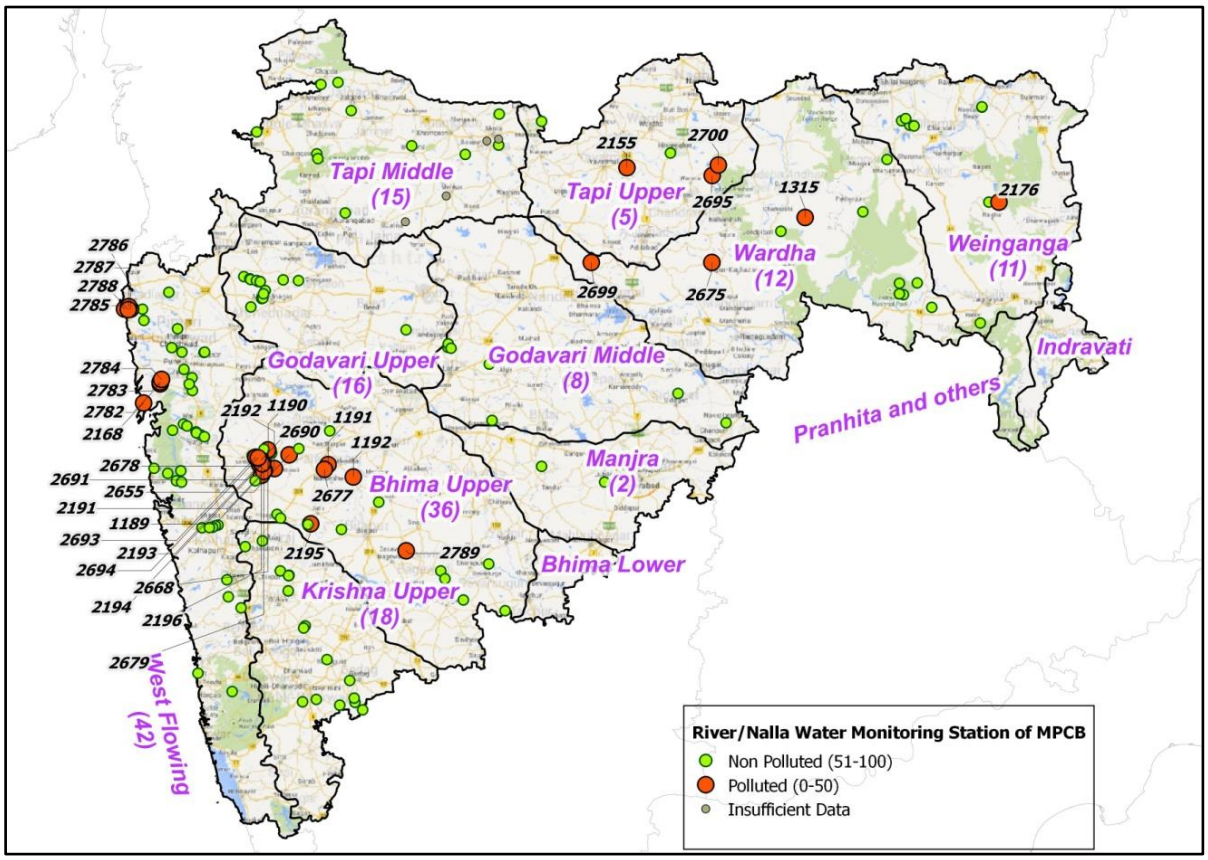
[1] M.N. Murty and Surender Kumar, *Water Pollution in India An Economic Appraisal*, India Infrastructure Report 2011, pps- 285-298. IDFC

Surface Water Quality

The impact of urbanization and industrialization is clearly visible on water resources in Maharashtra. Majority of the WQMS which recorded WQI (Water Quality Index) below 50 (polluted) in the summer month of April, lie in the western region of Maharashtra, which has major urbanised and industralized cities like Mumbai, Thane, Navi Mumbai and Pune. Out of the 190 WQMS representing surface (rivers, nallahs, sea and creek) water quality, around 35 WQMS (Table No. 1) located in the Bhima Upper- Sub Basin of Krishna Basin and the Coastal basin (West flowing rivers) (Map No. 1), recorded a high level of pollution in the peak summer and winter months. However, a trend across each basin and a station wise trend for the water quality recorded during 2012-13 have been presented in the report to pin point the most affected and polluted patches of rivers in the state.

The WQMS representing surface water quality for Bhima, Mula, Mutha, Nira and Pawna rivers in the Bhima Upper-sub basin also recorded heavy pollution loads throughout the year. The Pawna river was recorded to be heavily polluted in the villages of Pimprigaon, Kasarwadi and Sagavigaon of Haveli taluka, Pune district. The average Fecal coliform recorded in these water bodies were more than 100 MPN (Most Probable Number), which was the primary reason for high pollution levels. These areas need further investigation especially for sewage release and an appropriate action plan to substantially control the water pollution at these locations.

The Purna river in the Tapi basin and Wardha, Weinganga, Kanhan, Godavari and Darna rivers in the Godavari basin recorded good water quality almost throughout the year and were recorded to be non- polluted.



Map No. 1: Spatial representation surface WQMS which recorded WQI as polluted for most of the year 2012-13

Table No. 1: Details of WQMS which recorded WQI as most polluted in 2012-13

Station Code	Station Name	Village	Taluka	District
1189	Bhima river at Pune (Mutha river) at U/s of Vithalwadi near Sankar Mandir.	Vithalwadi	Haweli	Pune
1190	Bhima river at D/s of Bundgarden; Pune.	Yerwada	Haweli	Pune
1191	Bhima river after confluence with Mula-Mutha at Pargaon near Vasant Bandara.	Pargaon	Daund	Pune
1192	Bhima river at Daund near Mahadev temple.	Daund	Daund	Pune
1315	Wardha River at Pulgaon Railway Bridge	Pulgaon	wardha	Wardha
2155	Purna River at D/s of confluence of Morna Purna at Andhura village	Andura	Balapur	Akola
2168	Mithi River at near bridge	Mahim	Bandra	Mumbai
2176	Wainganga River at D/s of Gaurav Paper Mills Near Jackwell	Bramhpuri	Chandrapur	Chandrapur
2191	Mutha River at Sangam Bridge Near Ganpathi Ghat	Shivaji Nagar	Pune	Pune
2192	Mula-Mutha River at Mundhwa Bridge	Mundhawa	Haweli	Pune
2193	Mula River at Aundh Bridge -Aundgaon	Aundhgaon	Haweli	Pune
2194	Mula River at Harrison Bridge near Mula - Pawana Sangam	Bopodi	Haweli	Pune
2195	Nira River at D/s of Jubilant Organosis Pune	Nimbut	Baramati	Pune
2196	Pawana River at Sangavigaon; Pune	Sangavigaon	Haweli	Pune
2655	Bhima River at Koregaon near Koregaon Bridge; Pune	Koregaon	Shirur	Pune
2668	Indrayani River at D/s of Moshi village	Moshi	Haveli	Pune
2675	Morna River at D/s. of Railway Bridge	Akola	Akola	Akola
2677	Mula-Mutha River at D/s of Theur; Pune	Theur	Haweli	Pune
2678	Mutha River near Veer Savarkar Bhavan	Pune M.C	Pune	Pune
2679	Mutha River at Deccan Bridge; Pune	Deccan	Pune	Pune
2690	Pawana River at Kasarwadi Pune	Kasarwadi	Haweli	Pune
2691	Pawana River at Dapodi Bridge at Pawana-Mulla Sangan Pune	Dapodi	Haweli	Pune
2693	Pawana River at Chinchwadgaon; Pune	Chinchwadgaon	Haweli	Pune
2694	Pawana River at Pimprigaon; Pune	Pimprigaon	Haweli	Pune
2695	Pedhi River near Road Bridge at Dadhi-Pedhi village	Asegaon	Chandur Bazar	Amravati
2699	Penganga River at Mehkar-Buldana Road Bridge	Mehkar	Mehkar	Buldana
2700	Purna River near Achalpur-Amravati Road Bridge; Asegaon	Asegaon	Chandur bazaar	Amravati
2782	Rabodi Nalla	Rabodi	Thane	Thane
2783	Colour Chem Nalla	Majiwada	Thane	Thane
2784	Sandoz Nalla	Sandozbaug	Thane	Thane
2785	BPT Navapur	Navapur	Palghar	Thane
2786	Tarapur MIDC Nalla; near sump No.1	MIDC Tarapur	Palghar	Thane
2787	Tarapur MIDC Nalla	MIDC Tarapur	Palghar	Thane
2788	Tarapur MIDC Nalla near sump-III	MIDC Tarapur	Palghar	Thane
2789	Nalla at D/s of Alkai Mandir; Solapur	Aklai	Malshiras	Solapur

Interbasin Analysis

Upon analysing the inter-basin performance (Figure No. 1) for the quality of surface water in Maharashtra, one may note that the Bhima-upper sub-basin has the most severely polluted river basin in the whole state. Almost half of the observations across all the monitoring stations recorded the quality of water as 'Bad' or 'Bad to Very Bad'. In this sub-basin mere 10 to 15% of the observations recorded the quality of water in the category of 'Good to Excellent'. The Basin comprises of Indryani, Mutha, Bhima and Pawna rivers which are severely affected with domestic sewage discharge since high annual average FC (Fecal Coliform) levels recorded in the rivers of this basin were in the range of 200-350 MPN. As compared to Bhima upper sub basin, the Krishna upper basin was relatively less polluted, and recorded about 50% of the observations in the 'Good to Excellent' category. The water quality along the rivers Venna, Umodi, Krishna and Koyna was recorded to be majorly in the category of 'Medium to Good'.

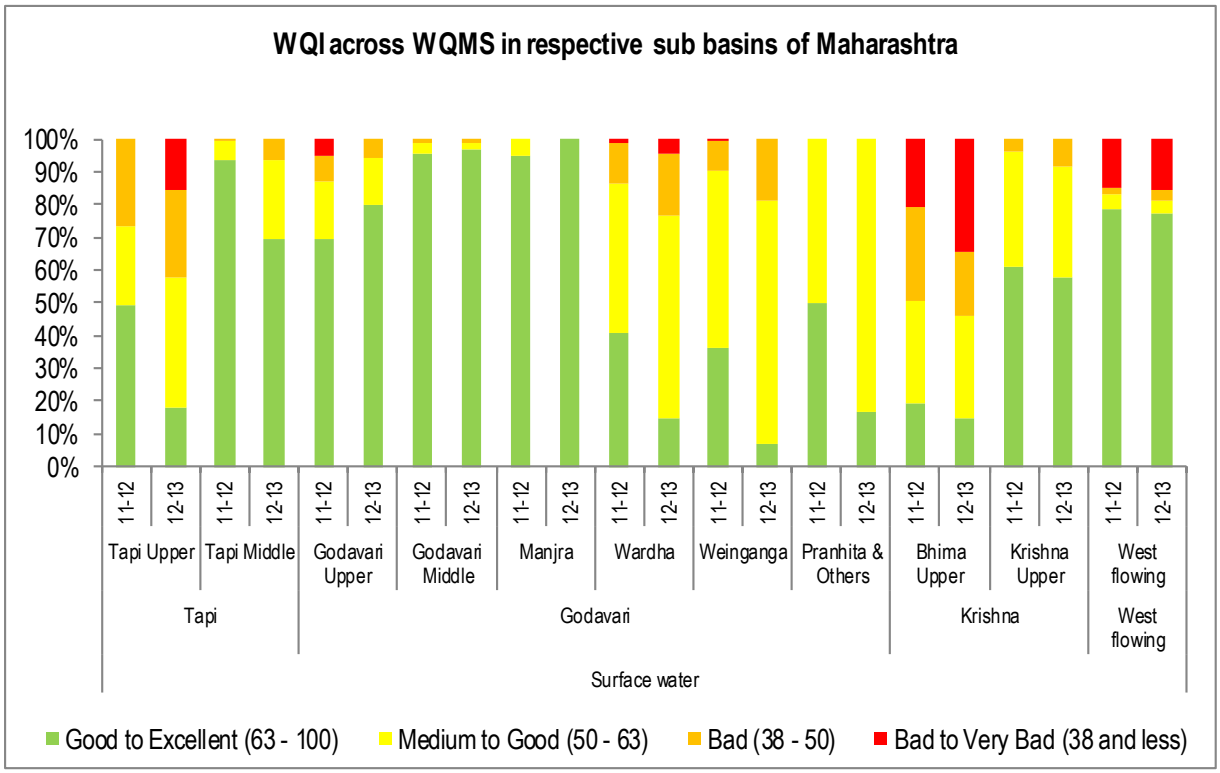


Figure No. 1: WQI across WQMS in respective sub basins of Maharashtra

Note: The above comparison is based on the WQI recorded at a monitoring station and the average number of times the WQI was of a certain category at all the WQMS in that basin.

** West Flowing river basins also include the water monitoring done at Nallas of Rabodi, Colourchem, Sandoz and MIDC Tarapur*

The water quality monitoring stations along the West flowing rivers monitor the water quality for rivers like Patalganga, Kundalika, Bhatsa, Ulhas, Kalu, Vashishti, Amba, Surya, Savitri and so on. With the presence of MMR (Mumbai Metropolitan Region) this is one of the most urbanised region with cities like Mumbai, Navi Mumbai, Thane, Kalyan-Dombivali and so on, while on the other hand it has industrial areas like TTC (Trans Thane Creek), Taloja, Tarapur, Dombivali, Ambernath and so on. Release of untreated sewage is also high from these cities in this basin and the FC levels recorded by the WQMS representing these areas exceeded the annual average of 200 MPN. While many of the monitoring stations in this basin had observations in the category of 'Good to Excellent' the rivers like Ulhas and Mithi which lie near the cities recorded high levels of pollution. The Nallas in Thane city as well as Tarapur industrial area were among the most polluted in water bodies in this basin. The nallah represented by WQMS (2786) near Tarapur MIDC was recorded to be heavily polluted throughout the year. Similarly the, nallahs at Thane (Rabodi, Colour Chem, Sandoz), were also recorded to be highly polluted, with WQI in between through-out the year. These nallahs lie close to the coastline and could severely affect the water quality and the aquatic life associated with the same. It is highly desired to adopt appropriate treatment facilities for industrial and domestic waste water in these two areas.

The Tapi upper sub basin which comprises of Purna Pedhi and Tapi rivers was also found to be polluted along certain stretches. Less than 20% of the all the observations recorded indicated water quality in the category of 'Good to Excellent', while around 15% of the observations across all the locations in this basin recorded water quality to be in the category of 'Bad to Very Bad'. The Tapi Middle sub basin was found to be less polluted relatively, and more than 90 percent of the observations across all the monitoring stations in this basin recorded water quality to be 'Good to Excellent'.

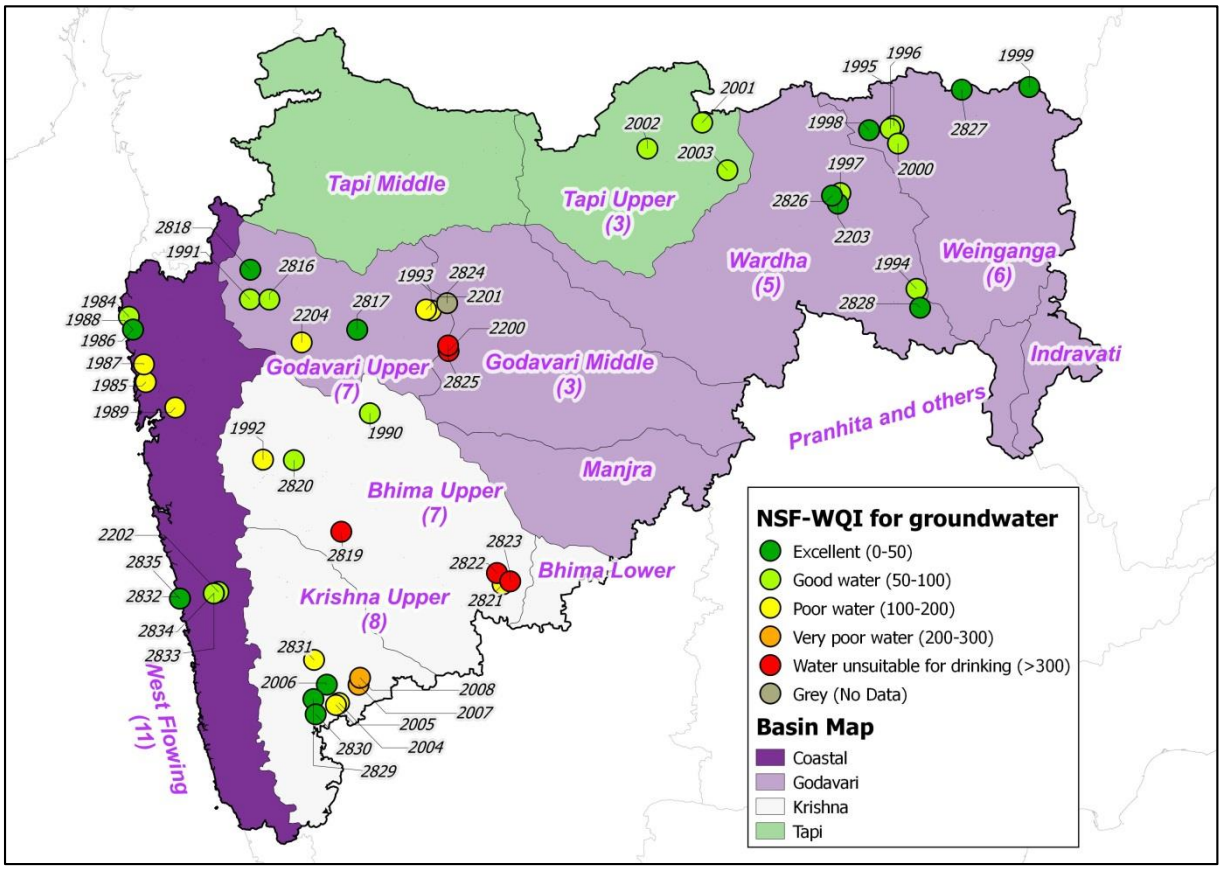
In the Godavari Basin, the Wardha, Weinganga and Pranhita sub basins recorded quality of water in the category of 'Medium' and 'Bad' for almost 85% of the observations. The rivers in these basins include Kanhan, Weinganga, Penganga and Wardha. In this basin too, the reason for pollution could be attributed to release of domestic sewage, since the average FC levels recorded were too high (60 to 100 MPN) across the all the monitoring stations. While the Godavari Upper, Middle and Manjra sub basins were recorded to be less polluted.

Saline (Sea and Creek) Water Quality

In the year 2012-13 saline water quality was monitored at around 34 locations across the 720km long coastline of the state. These WQMS are located in the districts of Mumbai (10), Thane (18), Raigad (2) and Ratnagiri (4). The saline water along the coast of Mumbai was monitored and recorded to be polluted. Sea water at Worli sea face and the beaches of Versova, Juhu, Charni road (Girgaum) was consistently recorded to be polluted throughout the year and the WQI at these locations was in the range of Bad to Medium. The same scenario was also observed for the saline water monitoring in Thane where the water quality was in the range of bad to medium. This could be attributed to release of semi-treated sewage directly into the sea and creek water in Mumbai and Thane. Appropriate infrastructure needs to be set up to treat sewage water at the earliest. This shall directly help in reducing the pollution levels along the coastal water in these districts. Saline water monitoring at the places like Ganpatipule, Madvigaon and Mirkarwada in the Ratnagiri taluka (Ratnagiri district), recorded good water quality throughout the year, indicating that the water at these locations was non-polluted.

Groundwater Quality

MPCB, monitors the ground water quality at around 50 ground water monitoring stations with a frequency of twice a year for parameters like pH, Nitrate, TDS (Total Dissolved Solids), Hardness, Fluoride, microbial content, Sulphates and so on. On an average the pH levels of the groundwater samples were recorded in the range of 7.5 to 8.5. Groundwater in Aurangabad region was recorded as the most alkaline with pH values exceeding 8.5 at Wahegaon and Katpur villages of Paithan taluka. Nitrite and Fluoride levels were also at higher levels in the regions of Aurangabad, Pune Solapur and Kolhapur. More numbers of WQM stations are desired especially in the Marathwada region.



Map No. 2: Spatial representation for average ground WQI recorded in 2012-14

Introduction

Water Pollution

Contamination of water or alteration of the physical, chemical or biological properties of water through the discharge of various kinds of wastes into water, directly or indirectly, rendering the water harmful for public health, health of animals, plants, aquatic organisms and so on has been termed as Water Pollution. It is one of the major and most critical issues in India, as almost 70 per cent of its surface water resources and many of its groundwater reserves are contaminated by biological, toxic, organic and inorganic pollutants.[2]

Water pollution can come from a number of different sources. If the pollution comes from a single source, such as an oil spill, it is called point-source pollution. If the pollution comes from many sources, it is called nonpoint-source pollution. As per CPCB[3] (Central Pollution Control Board), the largest source of water pollution in India is release of untreated sewage from urban centres, the release of industrial effluents and organic runoffs from agricultural fields. The major water pollutants are chemical, biological, or physical materials that degrade water quality. Based on the set of hazards they present pollutants can be classed into eight categories: Petroleum Products, Pesticides and Herbicides, Heavy Metals, Hazardous Wastes, Excess Organic Matter, Sediment, Infectious organisms, Thermal Pollution.

When toxic substances enter lakes, streams, rivers, oceans, and other water bodies, they get dissolved or lie suspended in water or get deposited on the bed. This results in the pollution of water whereby the quality of the water deteriorates, affecting aquatic ecosystems. Further the pollutants can also seep down and affect the groundwater deposits and aquifers. Varying on the concentration of pollutants, chemical and biochemical parameters the water may not be suitable for a desired application like drinking, recreation, agriculture, industrial applications, irrigation and so on.

The effects of water pollution are not only devastating to humans but also to animals, fish, and birds. The consumption of polluted water may lead to not only poisoning of humans, animals, birds food animals, but also disturbs the fragile aquatic and riparian ecosystem. Also dumping solid waste and release of sewage leaves a strong stench in the vicinity and diminishes the aesthetic quality of rivers, lakes, creeks, sea, beaches and so on.

Water Pollution Act

Given the impacts of water pollution, which is majorly attributed to various anthropogenic activities, regulating water pollution and monitoring the water quality levels becomes very essential. Realising the gravity of the issue, Ministry of Environment and Forests (MoEF), Government of India, under a policy decision enacted The Water (Prevention and Control of Pollution) Act in 1974. to provide prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. Under the Act, MoEF established and delegated the powers and functions under the act to Central Pollution Control Board (CPCB). Further, The Water (Prevention and Control of Pollution) Cess Act

[2] M.N. Murty and Surender Kumar, *Water Pollution in India An Economic Appraisal*, India Infrastructure Report 2011, pps- 285-298. IDFC

[3] Central Pollution Control Board, *Status Of Sewage Treatment Plants In Ganga Basin*

was enacted in 1977, to provide for the levy and collection of a cess/tax on water consumed by persons operating and carrying out certain types of industrial activities.

National Water Quality Monitoring Program

CPCB, Along with its nodal agencies, the SPCBs (State Pollution Control Boards), is responsible for implementation of legislations relating to prevention and control of environmental pollution pertaining to air and water. Presently the inland water quality-monitoring network is operated under a three-tier programme i.e. Global Environmental Monitoring System (GEMS), Monitoring of Indian National Aquatic Resources System (MINARS) and Yamuna Action Plan (YAP).

GEMS

CPCB has been identified as the Government of India's agency to serve as a focal point for carrying out water quality monitoring under the United Nation's, Global Environment Monitoring System (GEMS) Water Programme under of World Health Organisation (WHO). The GEMS programme is dedicated to provide water quality data and information of the highest integrity, accessibility and interoperability.

MINARS

A national programme titled Monitoring of Indian National Aquatic Resources (MINARS) was started in 1984, with a total of 113 stations spread over 10 river basins. The present network comprises of 870 stations on rivers, lentic water bodies and subsurface water. Water samples are being analysed for 28 parameters consisting of physico-chemical and bacteriological parameters for ambient water samples apart from field observations[4].

Monitoring Network

CPCB has established a network of monitoring stations across the country. The present network comprises of 2500 stations in 28 States and 6 Union Territories spread over the country[5]. The monitoring network covers 445 Rivers, 154 Lakes, 12 Tanks, 78 Ponds, 41 Creeks/Seawater, 25 Canals, 45 Drains, 10 Water Treatment Plant (Raw Water) and 807 Wells. Among the 2500 stations, 1275 are on rivers, 190 on lakes, 45 on drains, 41 on canals, 12 on tanks, 41 on creeks/seawater, 79 on ponds, 10 Water Treatment Plant (Raw Water) and 807 are groundwater stations.

[4] Bharadwaj RM, *Water Quality Monitoring In India- Achievements And Constraints*, IWG-Env, International Work Session on Water Statistics, Vienna, June 20-22 2005

[5] Central Pollution Control Board 2011-12, *National Water Monitoring Programme*

Water Quality Monitoring in Maharashtra

Water resources of a state consist of surface and under surface water as well as any other aquifers or drainage running through the state. The geographical area of Maharashtra state is 3.07lakh sq.km with the annual precipitation ranging from 400-6000 mm during the period of monsoon months. The estimated average-annual availability of water resources is estimated to be around 164 km^3 of surface water and 20.5 km^3 of subsurface water.

In Maharashtra, of the 5 river basin systems, 55% of the dependable water yield is available in the four river basins namely, Krishna, Godavari, Tapi and Narmada, which lie on the east of the Western Ghats and 45% of state's water resources emanate from Western Ghats, famously known as west flowing rivers. These are majorly seasonal rivers and drain into the Arabian Sea. Maharashtra state has a rich source of water however as a result of increase in the population and pollution in the state's river basins and sub basins, competition for water supply & conflict among different usage of water has emerged and is growing. Given the pressures from urbanization and industrialization there is a dire need to monitor and regulate water pollution in Maharashtra.

Maharashtra tops the list of Indian states and union territories in terms of infrastructure available for monitoring water quality (Figure No. 2). The state had 557 stationary drinking water quality testing laboratories as on January 31, 2014, about one-fourth of the total such stationary testing laboratories available in the entire country, data from the Ministry of Drinking Water and Sanitation showed.[6] In Maharashtra, water quality is monitored by various agencies namely Hydrology Project (SW), Groundwater Surveys & Development Agency (GSDA), Central Pollution Control Board (CPCB), Maharashtra Pollution Control Board (MPCB), Central Water Commission (CWC), Central Ground Water Board (CGWB) as per provisions made by "Water Quality Assessment Authority" constituted under sub sections (1) and (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986).

Monitoring network in Maharashtra – GEMS and MINARS

MPCB, being the state nodal agency under CPCB, monitors and documents data for water quality under two programs of NWMP titled GEMS and MINARS under which there are a total of 250 monitoring stations out of which, 156 are on rivers, 34 on sea/creeks, 10 on drains and 50 for ground water (Figure No. 2). Depending on the water resources in a region and the necessity identified for pollution monitoring, various stations have been commissioned under each RO (Regional Office) of MPCB. A summary of the stations under each RO is presented in Annex - I. These monitoring programs analyse the water samples for 9 core parameters and 19 general parameters (Table No. 2). The monitoring agencies have also analysed the trace metals at few locations. In Maharashtra the monitoring is done approx. 200 times on monthly basis in surface waters comprising of Rivers, lakes, tanks, ponds, creeks/sea water, canals & drains and 50 times on a half yearly basis in case of ground water[7].Also the breakup of the WQMS representing different the type of water bodies in 2011-12 is presented in Figure No. 3.

[6] Central Pollution Control Board 2011-12, *National Water Monitoring Programme*

[7] CPCB 2010, *Status of Water Quality in India*,

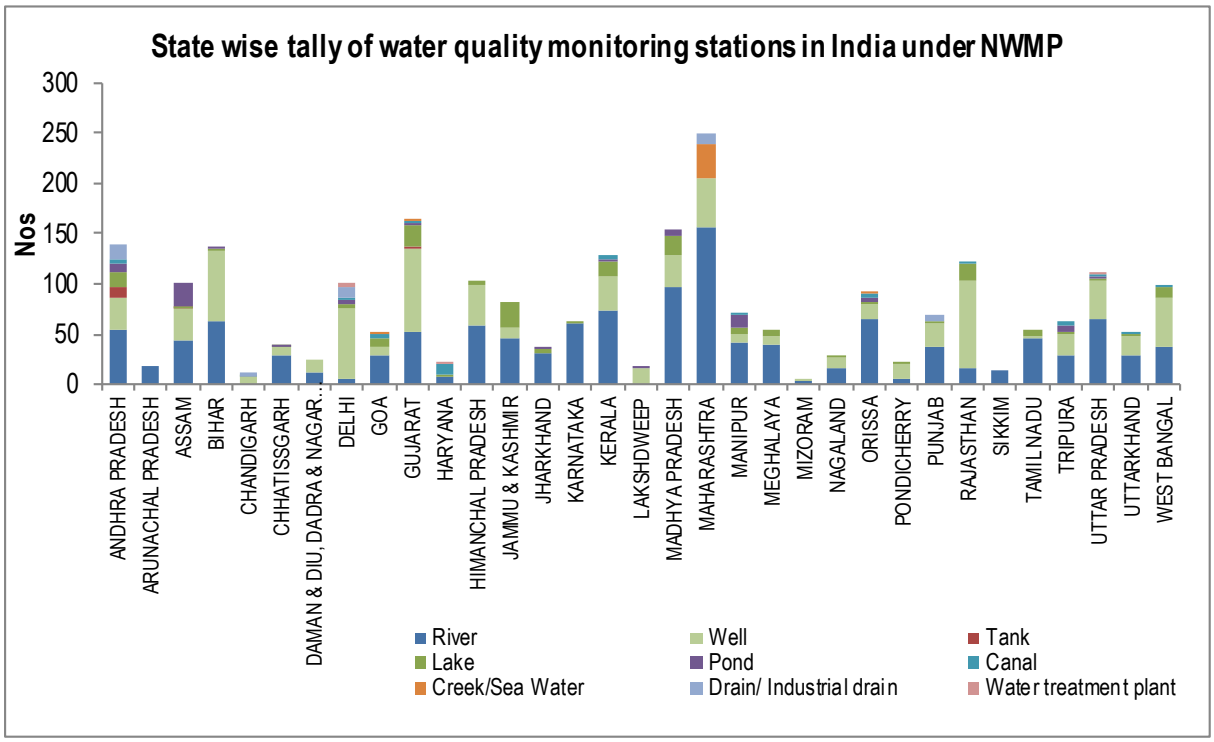


Figure No. 2: State wise tally of water quality monitoring stations in India under NWMP (2011-12)

Data Source: CPCB, 2012[8]

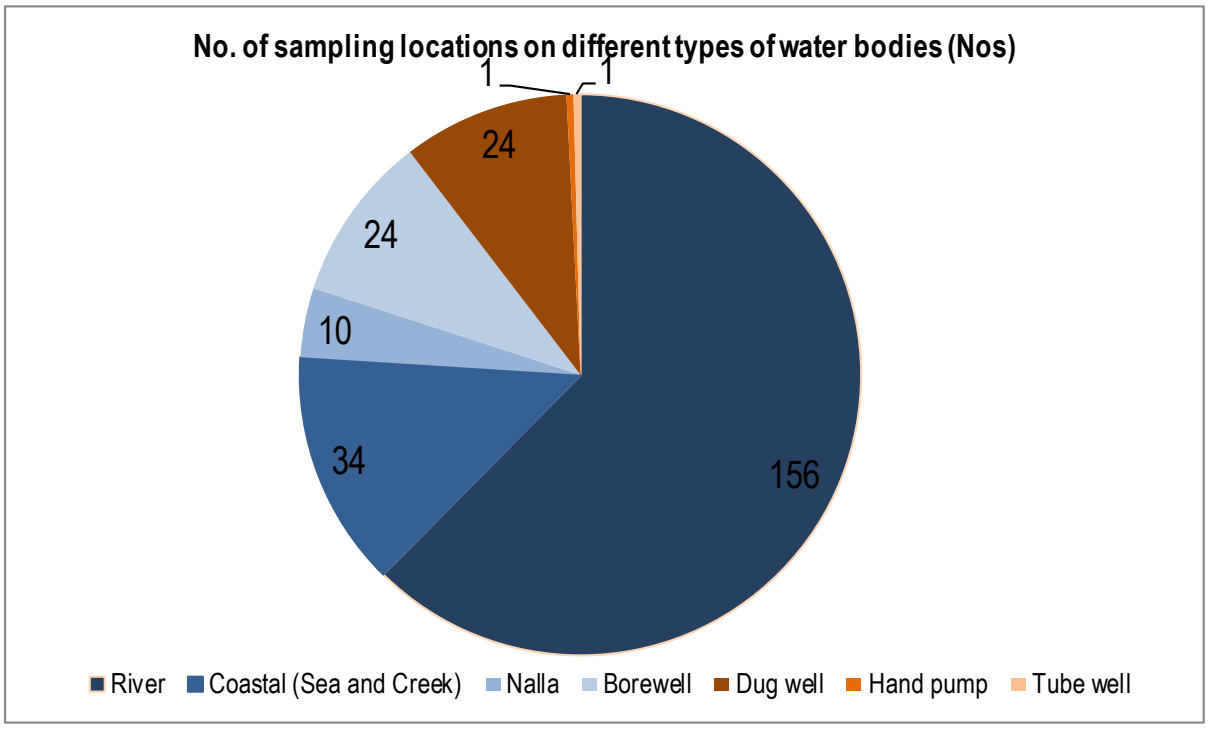


Figure No. 3: Number of sampling locations of MPCB on different types of water bodies

[8] Central Pollution Control Board 2011-12, *National Water Monitoring Programme*

Table No. 2: List of parameters tested and analyzed by MPCB

Sr No	Field Observations	Core Parameters	General Parameters	Trace Metals
1.	Weather	Temperature	Turbidity	Cadmium
2.	Depth of Water Body	Dissolved Oxygen	Phenophthalein alkalinity	Copper
3.	Human activities	pH	Total Alkalinity	Lead
4.	Floating Matter (Visible Effluent discharge)	Conductivity	Chlorides	Chromium total
5.	Color	BOD	COD	Nickel
6.	Odour	Nitrate	Total Kjeldahl-N	Zinc
7.		Nitrite	Ammonia-N	Iron
8.		Fecal Coliform	Hardness as $CaCO_3$	
9.		Total coliform	Calcium $CaCO_3$	
10.			Magnesium $CaCO_3$	
11.			Sulphate	
12.			Sodium	
13.			Total dissolved solids	
14.			Total fixed solids	
15.			Total suspended solids	
16.			Phosphate	
17.			Boron	
18.			Potassium	
19.			Fluoride	

Methodology

In order to interpret the data sets recorded by the WQMS across the state in the most comprehensive and illustrative manner, basin wise analysis was developed for evaluating the surface water quality. Saline (Sea and Creek) water and ground water quality has been analysed separately. Further to present the multiple variables (pH, BOD, FC, DO) into one single value Water quality Index was calculated for surface (fresh and saline) and ground water. To present the data in a spatial format GIS (Geographical Information System) maps were generated.

Spatial Maps

Sub - basin level maps

Of the 5 major river basin systems Krishna, Godavari, Tapi and Narmada, West Flowing rivers, Narmada basin comprises of just 0.5%[9] of the total area. Hence, it was included in the Tapi basin for ease and convenience, while the remaining WQMS were divided into the remaining four basins. Since the basins are huge and have many WQMS within them, the sub basin level map was generated as per data and demarcation published by CGWB[10] (Central Ground Water Board), Ministry of Water Resources Government of India. The imageries, for the basins of Tapi, Krishna and Godavari, were downloaded, geo-referenced and digitized on GIS platform to generate shape (.shp) files.

MPCB Regional Office (RO) maps

Maps depicting the jurisdiction of the regional offices of MPCB, superimposed with district boundaries have been generated as part of this report. The peak season water quality index for the stations in each RO have been compiled for the necessary action by the respective RO's of MPCB.

Organizing and presentation of the data sets

The data sets for water quality parameters in soft copy were shared by MPCB for the years 2008 to 2012 for the parameters like temperature, dissolved oxygen, pH, conductivity, BOD, COD, Fecal Coliform and so on. The data sets were organised in spread sheets for further analysis and illustrative presentation. Stock graphs have been generated to depict the minimum, maximum, 25th and 75th percentile values along with the mean values observed for parameters namely pH, BOD, DO and FC. The standard deviation (SD) values were calculated and have been presented along with the data sets.

[9] Maharashtra Water Resources Regulatory Authority, http://www.mwrra.org/introduction.php?link=wr
[10] Central Ground Water Board, http://cgwb.gov.in/watershed/list-ws.html

Water Quality Index

A water quality index provides a single number (like a grade) that expresses overall water quality of a certain water sample (location and time specific) on several water quality parameters.

The objective of developing an index is to simplify the complex water quality parametric data into comprehensive information for easy understanding. A water index based on some very important parameters provides a simple indicator of water quality and a general idea on the possible problems with the water in the region.

In 1970, the National Sanitation Foundation developed the Water Quality Index (NSFWQI), a standardized method for comparing the water quality of various water bodies. NSFWQI is one of the most respected and utilized water quality index in the United States. Nine water quality parameters selected for calculating the index included

- Dissolved Oxygen (DO)
- Faecal Coliform (FC)
- pH
- Biochemical Oxygen Demand (BOD) (5-day)
- Temperature change (from 1 mile upstream)
- Total phosphate
- Nitrate
- Turbidity
- Total Solids

The expression for calculation the NSFWQI is expressed as;

$$\text{NSFWQI} = \sum_{i=1}^{p} \text{WiIi}$$

Where;

Ii= sub index for i^{th} water quality parameter

Wi= weight (in terms of importance) associated with water quality parameter

P= number of water quality parameters

WQI for surface water

Given the parameters monitored in India under the NWMP and to maintain the uniformity while comparing the WQI across the nation, the NSF WQI has been modified and relative weights been assigned by CPCB. The modified weights and the equation for the sub-indices as per CPCB are given in Table No. 3 and the equations used to determine the sub index values are given in Table No. 4.

Table No. 3: Original and modified weights for computation of WQI based on DO, FC, pH and BOD

Parameters	Original Weights from NSF WQI	Modified Weights by CPCB
Dissolved Oxygen (DO)	0.17	0.31
Fecal Coliform (FC)	0.15	0.28
pH	0.12	0.22
BOD	0.1	0.19
Total	0.54	1

Table No. 4: Sub index equation used to calculate NSF WQI for DO, FC, pH and BOD

Water Quality Parameters (units)	Range Applicable	Equation
Dissolved Oxygen (DO) (% Saturation)	0-40	0.18 + 0.66 X % Saturation DO
	40-100	(-13.55) + 1.17 X % Saturation DO
	100-140	163.34 - 0.62 X % Saturation DO
Fecal Coliform (FC) (counts/100 ml)	1 - 10^3	97.2 - 26.6 X log FC
	10^3 - 10^5	42.33 - 7.75 X log FC
	>10^5	2
pH	02 - 05	16.1 + 7.35 X (pH)
	05 - 7.3	(-142.67) + 33.5 X (pH)
	7.3 - 10	316.96 - 29.85 X (pH)
	10 – 12	96.17 - 8.0 X (pH)
	<2, >12	0
BOD (mg/l)	0 – 10	96.67 - 7 X (BOD)
	10 – 30	38.9 - 1.23 X (BOD
	>30	2

Upon determining the Water Quality Index, the water quality is described for easy understanding and interpretation. The description used in the report for classifying and the describing the water quality is presented in Table No. 5.

Table No. 5: Water Quality Classification and Best Designated use

WQI	Quality classification	Class by CPCB	Class by MPCB	Remarks	Colour code used in the report
63 - 100	Good to Excellent	A	A-I	Non Polluted	
50 - 63	Medium to Good	B	Not Prescribed	Non Polluted	
38 - 50	Bad	C	A-II	Polluted	
38 and less	Bad to Very Bad	D, E	A-III, A-IV	Heavily Polluted	

WQI for groundwater

MPCB monitors ground water quality for parameters like pH, total hardness, Calcium, Magnesium, Chloride, total dissolved solids, Fluoride, Manganese, Nitrate, Sulphates and so on once in six months. Based on the stringency of the parameters and its relative importance in the overall quality of water for drinking purposes each parameter has been assigned specific weightage[11]. The relative weights of the same have been determined (Table No. 6) for the parameters monitored and recorded by MPCB for the water samples monitored in the year 2011-12.

Table No. 6: Relative Weight of chemical parameters used for calculating WQI for Ground water

Chemical Parameters	Indian Standards for Drinking Water Quality[12]		Weight (Wi)			
	Acceptable Limit	Permissible Limits	Weight	Relative Weight	Weight w/o Iron, Manganese and Bicarbonate	Relative Weight w/o Iron, Manganese and Bicarbonate
pH	6.5-8.5	No relaxation	4	0.09756	4	0.13333
Total Hardness (TH)	300	600	2	0.04878	2	0.06667
Calcium	75	200	2	0.04878	2	0.06667
Magnesium	30	No relaxation	2	0.04878	2	0.06667
Bicarbonate	244	732	3	0.07317	-	-
Chloride	250	1000	3	0.07317	3	0.10000
Total Dissolved Solids (TDS)	500	2000	4	0.09756	4	0.13333
Fluoride	1	1.5	4	0.09756	4	0.13333
Manganese	0.1	0.3	4	0.09756	-	-
Nitrate	45	No relaxation	5	0.12195	5	0.16667
Iron	0.3	No relaxation	4	0.09756	-	-
Sulphate	200	400	4	0.09756	4	0.13333
			41	**1**	**30**	**1**

Source: BIS 10500 and CPCB 2001

The relative weight is then computed from the following equation

[11] C. R. Ramakrishnaiah, *Assessment of Water Quality Index for the Groundwater* , E-Journal of Chemistry, 2009, 6(2), 523-530; ISSN: 0973-4945

[12] Bureau of Indian Standards, *Draft Indian Standard Drinking Water – Specification*; Second Revision of IS 10500, ICS No. 13.060.20

$$Wi = \frac{wi}{\sum_{i=1}^{n} wi}$$

Where;

Wi= the relative weight

wi= the weight of each parameter

n= number of parameters

In the next step a quality rating scale (qi) for each parameter is assigned by dividing its concentration in each water sample by its respective standard according to the guidelines published by BIS (Bureau of Indian Standards) and the result thus obtained is multiplied by 100

$$qi = (Ci/Si) \times 100$$

where

qi = quality rating

Ci = the concentration of each chemical parameter in each water sample in mg/L

Si = the Indian drinking water standard for each chemical parameter in mg/L according to the guidelines of the BIS 10500, (2004-2005).

Based on the absolute value of the index determined from the calculations, water quality is classified as presented below in Table No. 7.

Table No. 7: Groundwater classification based on the Water Quality Index

WQI Value	Water Quality	Colour code used in this report
<50	Excellent	
50-100	Good water	
100-200	Poor Water	
200-300	Very Very Poor water	
>300	Water Unsuitable for drinking	

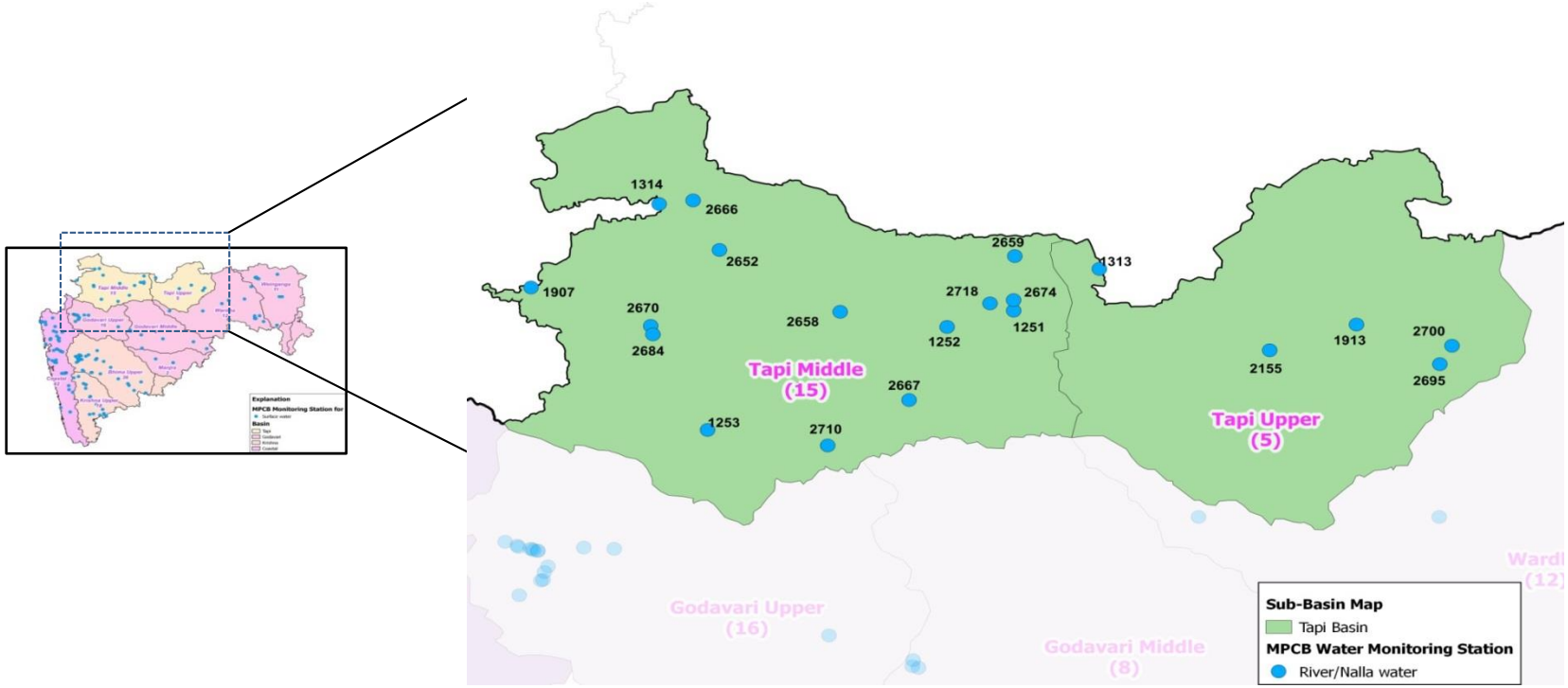
Surface Water Quality

Surface water comprises of rivers, lakes, reservoirs, seas, wetlands and so on. Maharashtra state receives good rainfall in monsoon which replenishes the surface water resources. The surface water sources form the major source of water supply in the state. However given the pressure from urbanization and industrialization these resources are under tremendous stress owing to a dual cause, demand for water supply and release of pollutants in the water. Moreover the ever increasing population creates more demand for water supply while at the same time it also generates sewage which is often released in the water bodies, untreated causing severe contamination and pollution.

Owing to this dual pressure, regular vigilance is required to regulate water pollution. Towards this MPCB has installed 200 surface water quality monitoring stations on rivers (59), sea (16), creeks (19), and nallas (10). Water quality is monitored per month across all the stations. The spatial presence of the stations is presented in the respective section for each basin.

The following section presents the illustrations of the parameters pH, DO, BOD and FC recorded across the 200 stations of MPCB in a lucid format. Further, basin wise water quality index is presented in this section for the basins of Krishna, Godvari, Tapi and West flowing rivers.

Tapi Basin



Map No. 3: Network of surface water quality monitoring stations in Tapi Basin

In Maharashtra the Tapi Basin could be divided into two sub-basins Tapi Upper and Tapi Middle. There are a total of 20 surface water monitoring stations (5 on upper and 15 on middle) in Tapi river basin in Maharashtra. A list of the station and the codes has been provided below in Table No. 8

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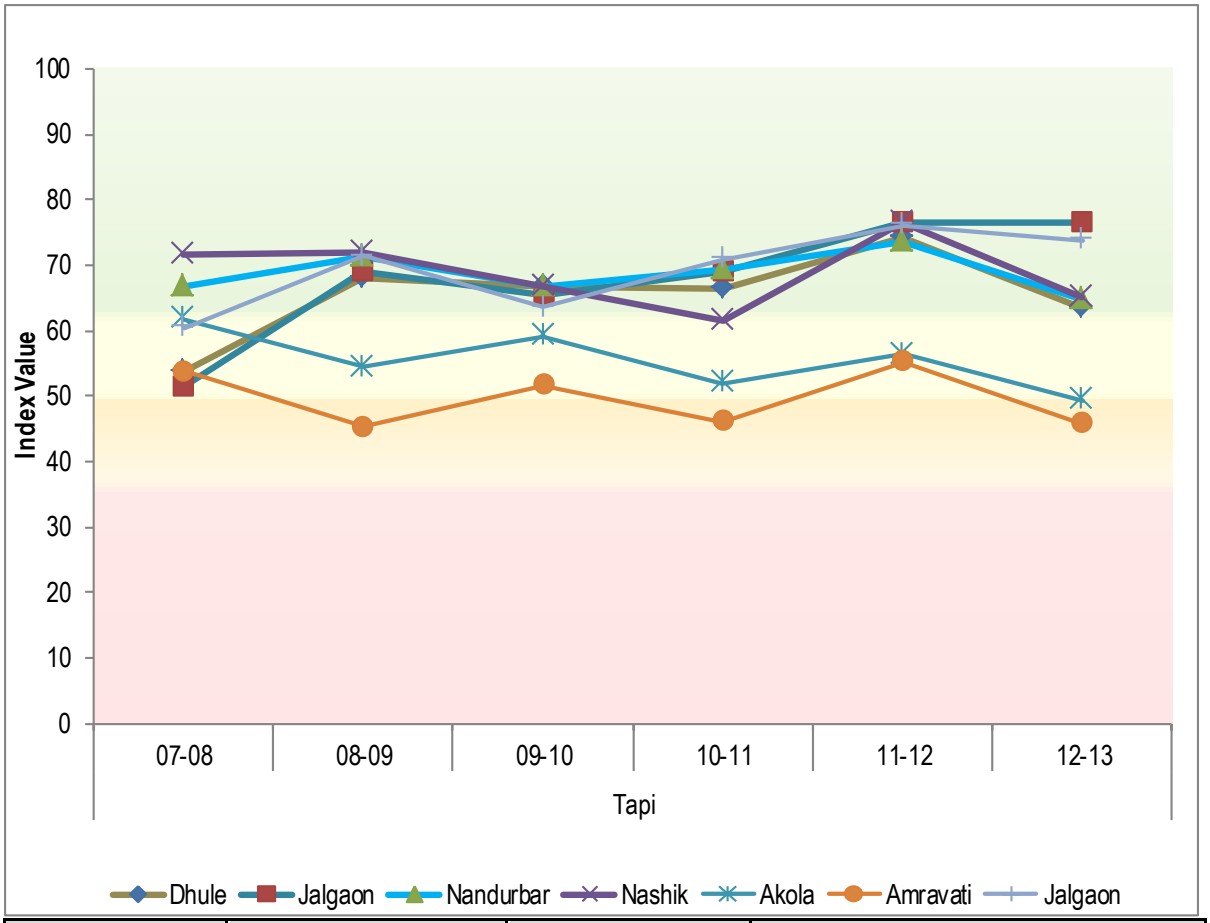
Tapi Basin (Intra Basin analysis)



WQI	Category	Class by CPCB	Remarks
63-100	Good to Excellent	A	Non polluted
50-63	Medium to Good	B	Non polluted
38-50	Bad	C	Polluted
38 & less	Bad to Very Bad	D, E	Heavily polluted

Figure No. 4: Trend of annual average WQI across districts of Tapi basin

Note:

This graph considers the average WQI for all the monitoring stations in that particular district and hence may include some bias. This graph is only for an overview and monitoring station wise data maybe analyzed to pin point the most affected and polluted patches of rivers in that district.

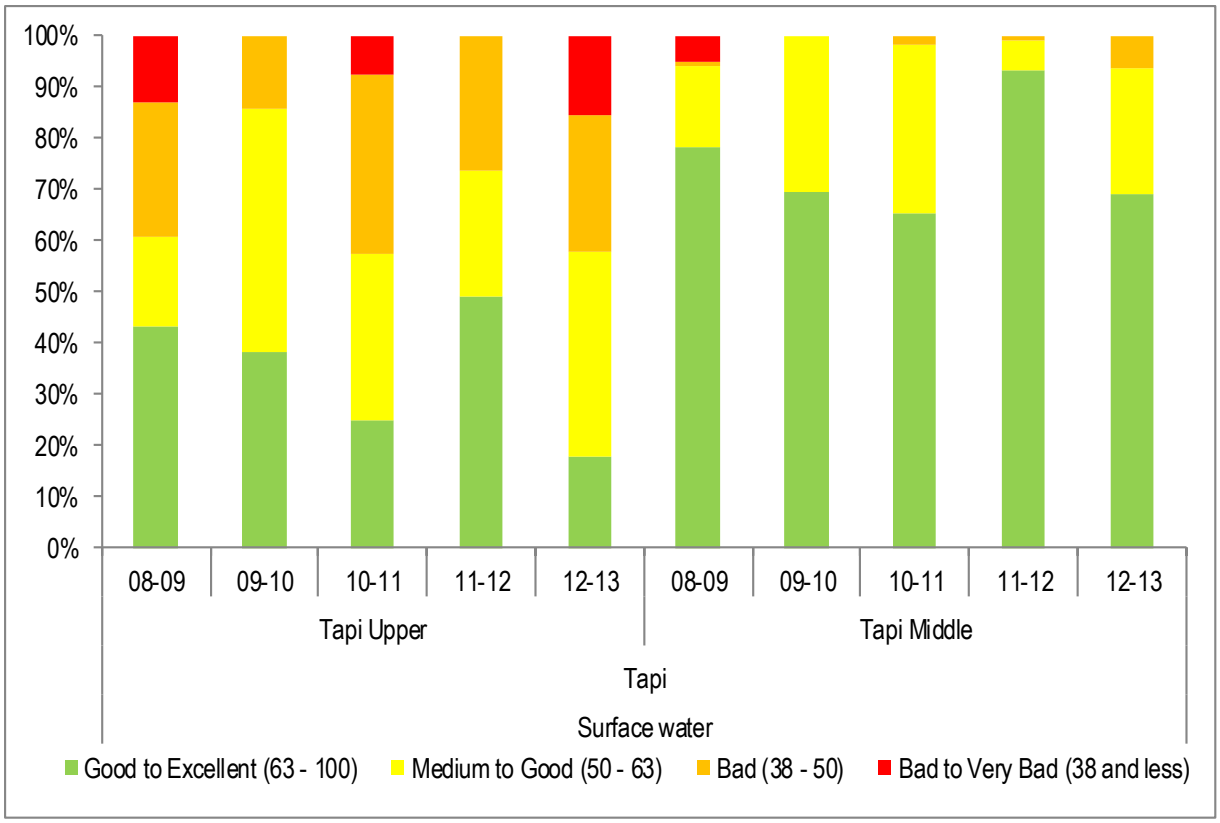
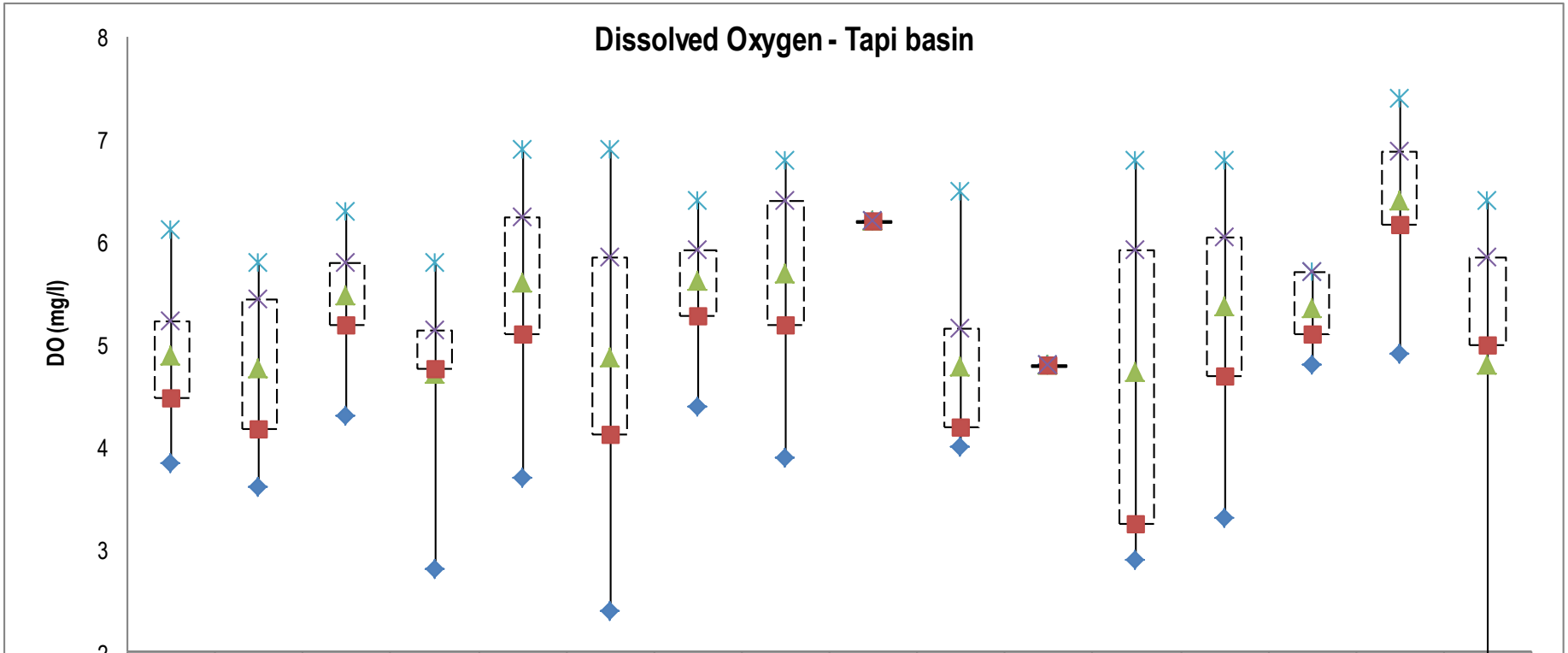


Figure No. 5: Trend of average occurrence for different category of WQI in Tapi basin

The Intra basin performance of Tapi Basin across six districts of the state are depicted in Figure No. 4 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in Figure No. 5.

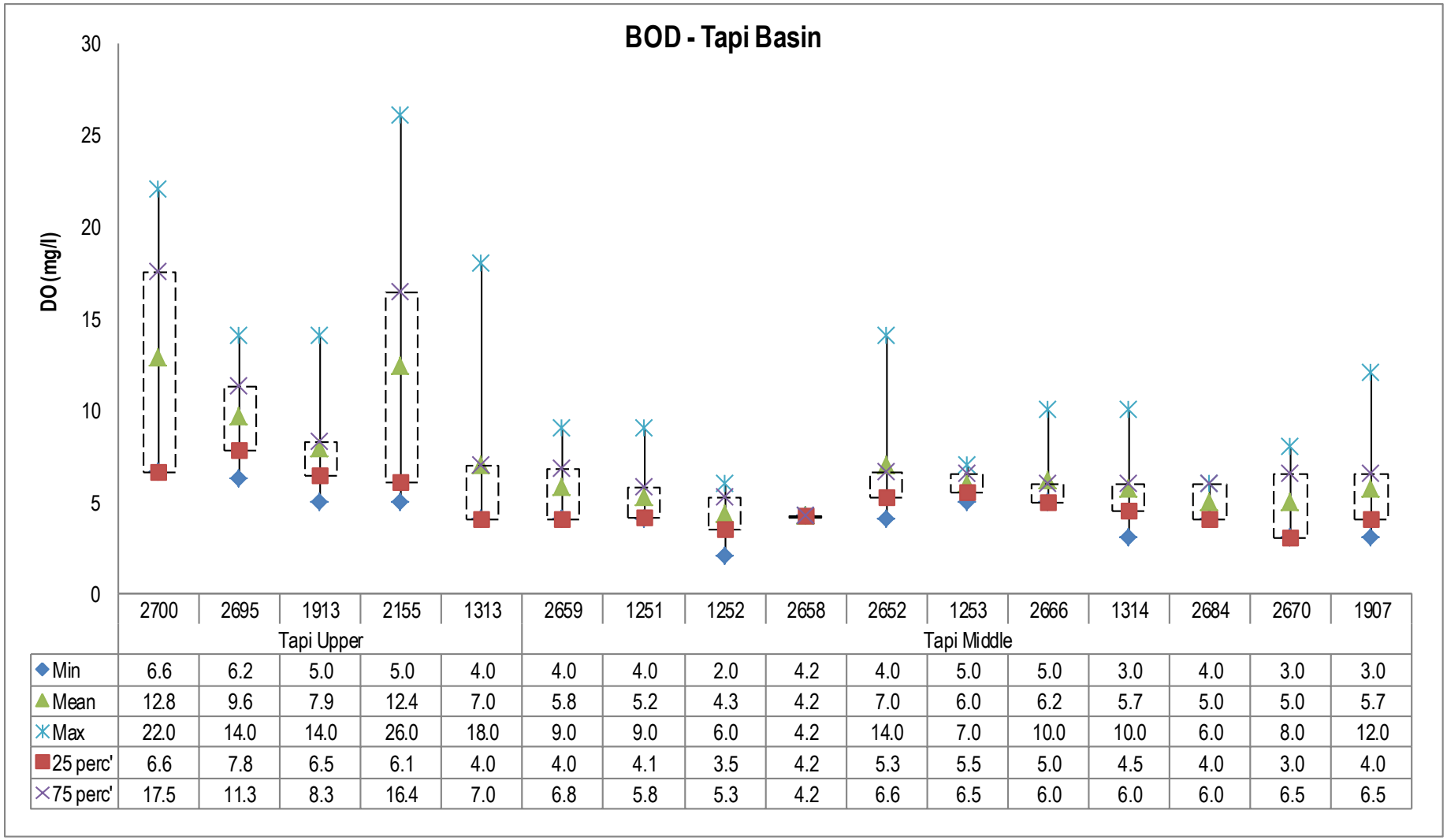
As per the data sets among six districts, namely Akola, Amravati, Dhule, Jalgaon, Nandurbar and Nashik, the annual average WQI of 2 of Amravati and 2 of Akola were consistently in Bad to Medium category (i.e. WQI in range of 38-63) from 08-09 till 12-13. Whereas, Dhule (5 WQMS), Jalgaon (8 WQMS), Nandurbar (2 WQMS) and Nashik (1 WQMS) were Good to Excellent (i.e. WQI in range of 63-100). The results showed that average WQI across Akola districts showed more or less downward trend and in rest of the districts were consistent for the over all water quality within that district.

Figure No. 5 shows average annual occurrence of WQI across 5 WQM stations of Tapi Upper and 15 WQMS of Tapi Middle for 7 years starting from 2007. Intra Sub basins results for Tapi Basin showed that the occurrence of Good to Excellent category of WQI in Tapi Middle sub basins is twice times that of the Bhima Upper, indicating that more likely occurrence of Good to Excellent category. Hence the overall preview of Tapi Middle sub basin is better when compared to Tapi Upper.



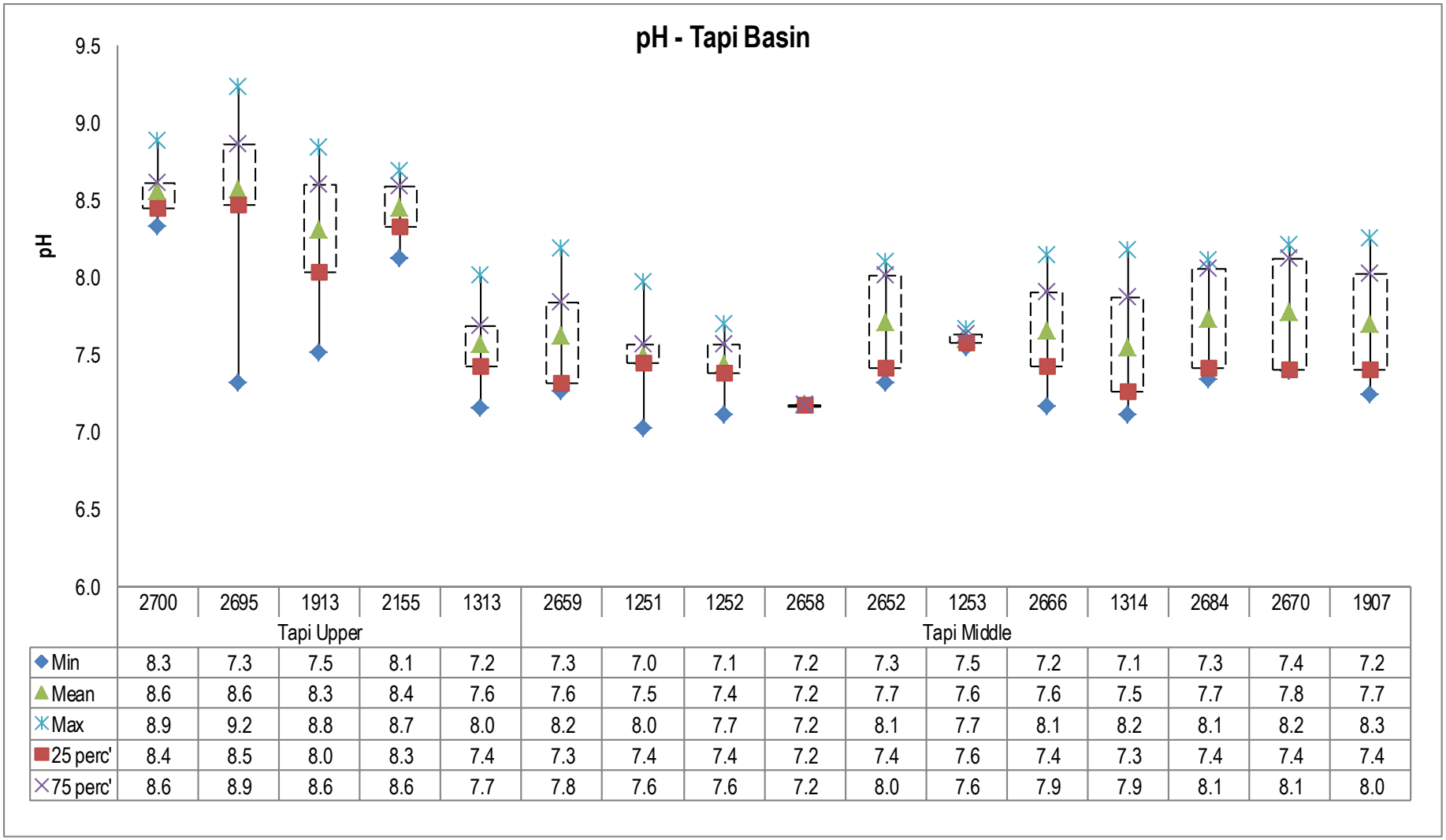
	2700	2695	1913	2155	1313	2659	1251	1252	2658	2652	1253	2666	1314	2684	2670	1907
	Tapi Upper					Tapi Middle										
Min	3.8	3.6	4.3	2.8	3.7	2.4	4.4	3.9	6.2	4.0	4.8	2.9	3.3	4.8	4.9	0.0
Mean	4.9	4.8	5.5	4.7	5.6	4.9	5.6	5.7	6.2	4.8	4.8	4.7	5.4	5.4	6.4	4.8
Max	6.1	5.8	6.3	5.8	6.9	6.9	6.4	6.8	6.2	6.5	4.8	6.8	6.8	5.7	7.4	6.4
25 perc'	4.5	4.2	5.2	4.8	5.1	4.1	5.3	5.2	6.2	4.2	4.8	3.3	4.7	5.1	6.2	5.0
75 perc'	5.2	5.5	5.8	5.1	6.3	5.9	5.9	6.4	6.2	5.2	4.8	5.9	6.1	5.7	6.9	5.9

Figure No. 6: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Tapi basin



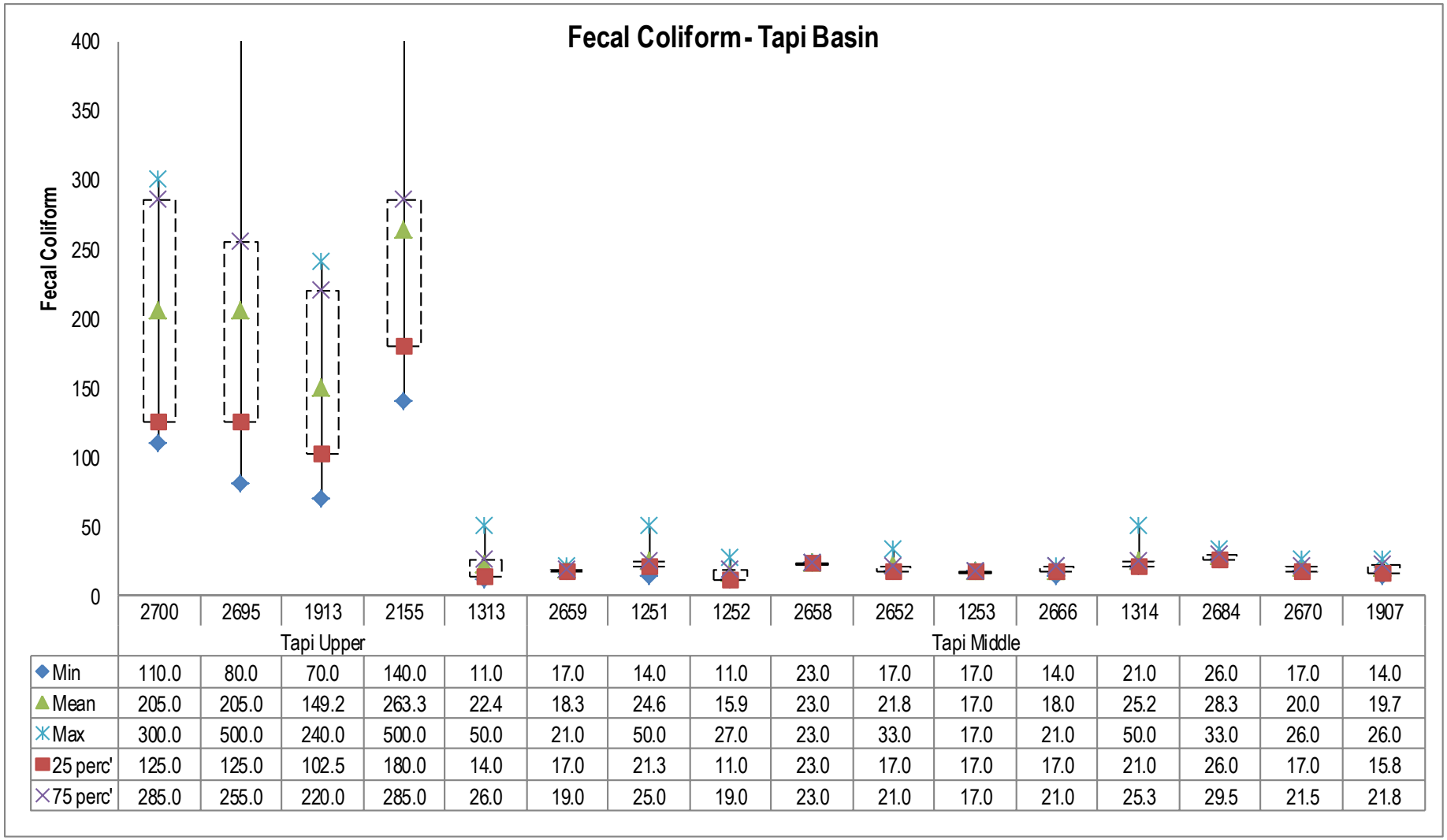
	2700	2695	1913	2155	1313	2659	1251	1252	2658	2652	1253	2666	1314	2684	2670	1907
	Tapi Upper					Tapi Middle										
Min	6.6	6.2	5.0	5.0	4.0	4.0	4.0	2.0	4.2	4.0	5.0	5.0	3.0	4.0	3.0	3.0
Mean	12.8	9.6	7.9	12.4	7.0	5.8	5.2	4.3	4.2	7.0	6.0	6.2	5.7	5.0	5.0	5.7
Max	22.0	14.0	14.0	26.0	18.0	9.0	9.0	6.0	4.2	14.0	7.0	10.0	10.0	6.0	8.0	12.0
25 perc'	6.6	7.8	6.5	6.1	4.0	4.0	4.1	3.5	4.2	5.3	5.5	5.0	4.5	4.0	3.0	4.0
75 perc'	17.5	11.3	8.3	16.4	7.0	6.8	5.8	5.3	4.2	6.6	6.5	6.0	6.0	6.0	6.5	6.5

Figure No. 7: Trend of BOD levels recorded at WQMS at Tapi basin



	2700	2695	1913	2155	1313	2659	1251	1252	2658	2652	1253	2666	1314	2684	2670	1907
	Tapi Upper					Tapi Middle										
Min	8.3	7.3	7.5	8.1	7.2	7.3	7.0	7.1	7.2	7.3	7.5	7.2	7.1	7.3	7.4	7.2
Mean	8.6	8.6	8.3	8.4	7.6	7.6	7.5	7.4	7.2	7.7	7.6	7.6	7.5	7.7	7.8	7.7
Max	8.9	9.2	8.8	8.7	8.0	8.2	8.0	7.7	7.2	8.1	7.7	8.1	8.2	8.1	8.2	8.3
25 perc'	8.4	8.5	8.0	8.3	7.4	7.3	7.4	7.4	7.2	7.4	7.6	7.4	7.3	7.4	7.4	7.4
75 perc'	8.6	8.9	8.6	8.6	7.7	7.8	7.6	7.6	7.2	8.0	7.6	7.9	7.9	8.1	8.1	8.0

Figure No. 8: Trend of pH levels recorded at WQMS at Tapi basin



	2700	2695	1913	2155	1313	2659	1251	1252	2658	2652	1253	2666	1314	2684	2670	1907
	Tapi Upper					Tapi Middle										
Min	110.0	80.0	70.0	140.0	11.0	17.0	14.0	11.0	23.0	17.0	17.0	14.0	21.0	26.0	17.0	14.0
Mean	205.0	205.0	149.2	263.3	22.4	18.3	24.6	15.9	23.0	21.8	17.0	18.0	25.2	28.3	20.0	19.7
Max	300.0	500.0	240.0	500.0	50.0	21.0	50.0	27.0	23.0	33.0	17.0	21.0	50.0	33.0	26.0	26.0
25 perc'	125.0	125.0	102.5	180.0	14.0	17.0	21.3	11.0	23.0	17.0	17.0	17.0	21.0	26.0	17.0	15.8
75 perc'	285.0	255.0	220.0	285.0	26.0	19.0	25.0	19.0	23.0	21.0	17.0	21.0	25.3	29.5	21.5	21.8

Figure No. 9: Trend of Fecal Coliform levels recorded at WQMS at Tapi basin

Water Quality Index for WQMS in Tapi Basin

Mar	NA	NA	NA	39	44	51	49	42	65	50	50	NA	80	71	61	75	NA	NA	72	71	76	81	71	NA	79	73	NA	76	70	NA	82	76	NA	76	72	NA	75	70	NA	69	66	NA	79	70	NA	NA	NA	NA	78	NA	NA	80	66	77	78	68	NA	79	68	NA
Feb	NA	NA	NA	32	46	38	61	53	51	61	42	NA	81	83	62	74	78	NA	74	84	65	82	85	NA	82	82	NA	76	86	NA	78	82	NA	82	84	NA	83	83	NA	82	74	NA	77	78	NA	65	NA	NA	80	49	NA	82	76	57	78	78	NA	75	77	NA
Jan	57	NA	NA	64	41	34	NA	51	44	NA	66	NA	65	81	91	69	76	NA	62	76	81	65	77	NA	57	78	NA	57	70	NA	64	71	NA	65	77	NA	58	77	NA	60	76	NA	58	71	NA	64	NA	NA	61	79	NA	59	76	62	60	75	NA	62	71	NA
Dec	51	NA	NA	30	68	43	NA	67	52	42	59	57	65	77	62	71	78	NA	64	73	69	67	75	NA	66	78	NA	NA	75	NA	67	68	NA	61	77	NA	63	76	NA	63	72	64	64	79	62	NA	71	NA	60	76	64	58	76	59	59	61	72	NA	56	64
Nov	47	64	32	32	55	37	NA	57	48	59	67	34	64	76	77	70	71	62	67	80	74	58	79	NA	64	65	NA	NA	72	76	62	79	NA	62	77	NA	65	78	NA	53	76	61	62	76	54	NA	NA	NA	57	67	66	59	51	NA	56	74	55	NA	78	68
Oct	49	66	49	39	69	52	63	68	61	59	72	47	60	69	NA	68	78	NA	58	60	69	62	87	NA	71	83	NA	NA	72	64	58	79	NA	51	76	NA	62	NA	NA	70	75	66	59	70	62	NA	NA	68	56	77	78	58	85	75	53	74	74	NA	78	75
Sep	52	57	42	52	48	47	NA	66	55	45	63	42	87	76	78	67	62	67	71	68	75	81	67	NA	81	76	NA	NA	78	71	50	85	NA	84	84	NA	82	82	NA	59	77	67	83	60	61	NA	77	63	79	63	61	76	79	67	72	70	76	NA	75	69
Aug	50	62	57	46	55	54	NA	46	33	49	60	55	62	85	84	63	82	76	68	85	81	56	86	NA	68	82	NA	62	86	81	65	86	NA	65	85	NA	72	85	NA	67	85	NA	59	85	75	NA	82	NA	62	89	55	71	81	57	74	86	NA	70	86	44
Jul	NA	NA	NA	NA	50	63	49	53	37	38	49	36	60	81	54	NA	NA	47	64	88	65	NA	NA	NA	71	NA	NA	NA	79	87	NA	NA	NA	65	NA	NA	71	NA	NA	58	82	NA	NA	82	51	55	NA	NA	41	78	47	60	81	49	73	NA	NA	NA	NA	53
Jun	NA	NA	NA	NA	NA	44	NA	46	58	NA	NA	NA	NA	68	80	NA	NA	NA	65	NA	83	NA	NA	NA	75	55	NA	NA	64	81	NA	NA	NA	63	NA	NA	67	NA	NA	NA	69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	60	66	75	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	47	NA	45	NA	54	55	NA	42	NA	82	73	80	NA	NA	NA	79	70	78	NA	NA	NA	NA	NA	NA	NA	68	82	NA	NA	NA	NA	NA	NA	81	NA	NA	NA	73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	80	75	72	NA	NA	NA	81	71	NA
Apr	NA	NA	NA	49	49	44	50	64	58	NA	60	NA	71	72	83	NA	72	NA	78	68	83	NA	NA	NA	NA	NA	NA	NA	74	83	NA	NA	NA	NA	NA	83	84	NA	NA	NA	76	NA	NA	NA	NA	NA	NA	NA	71	76	NA	NA	75	72	NA	NA	NA	NA	71	75
	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2700			2695			1913			2155			1313			2659			1251			2674			2718			1252			2667			2658			2710			2684			2652			1253			2666			1314			2670			1907		
	Tapi Upper															Tapi Middle																																												
	Tapi																																																											

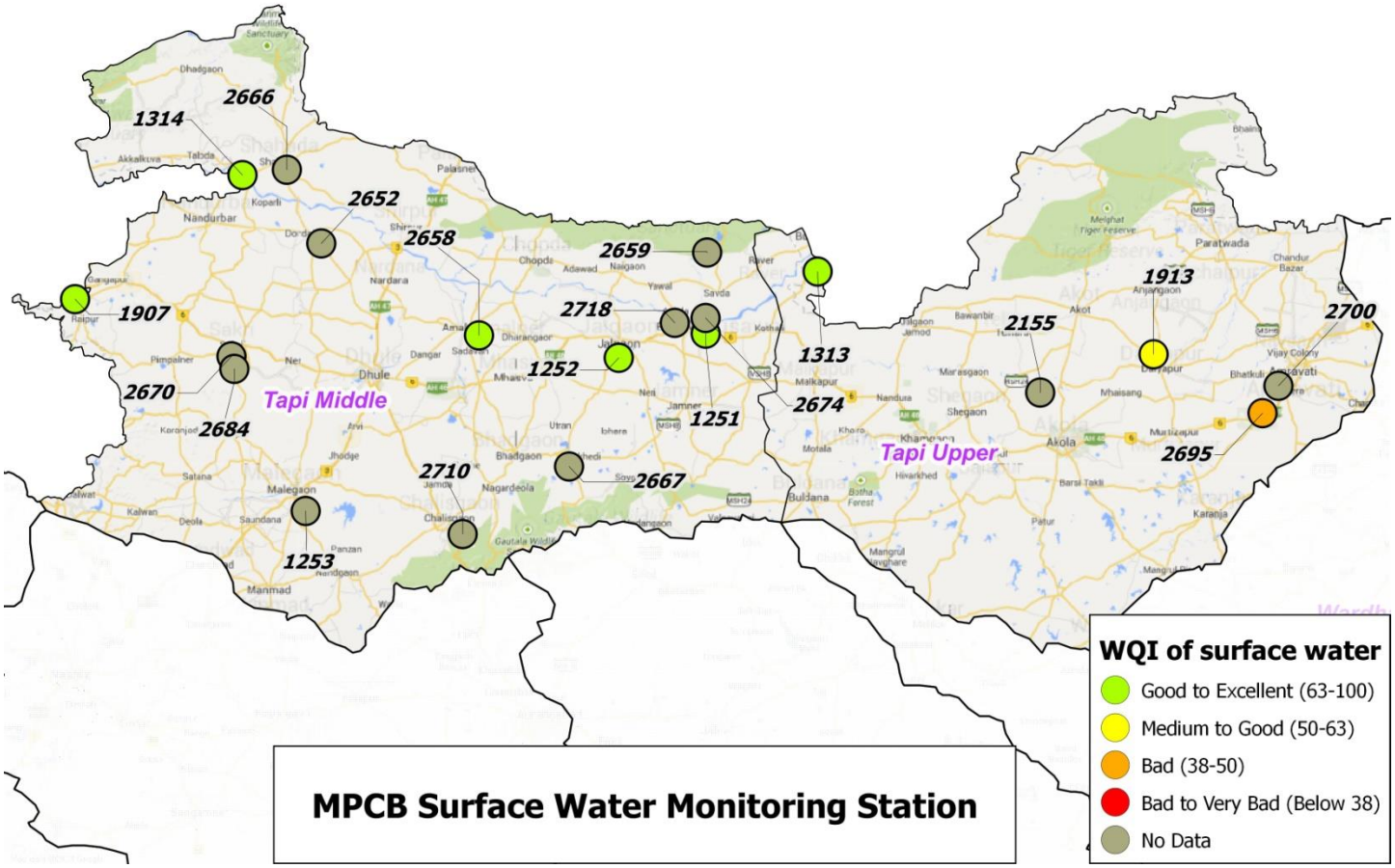
Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

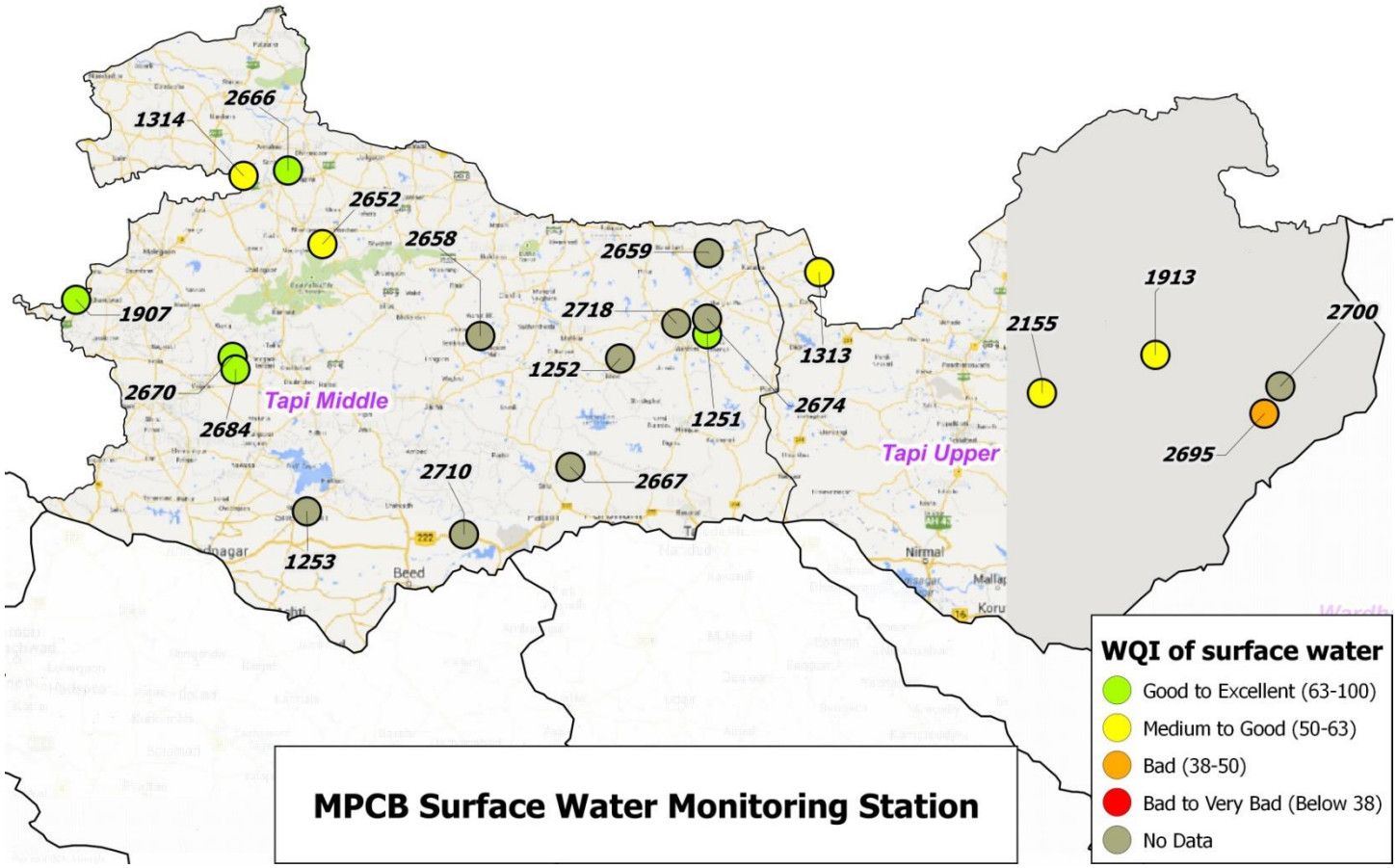
Table No. 8: Surface water quality monitoring stations in Tapi river basin

Station Code	River	Name of the Station	Village	Taluka	District
2700	Purna	Purna River near Achalpur-Amravati Road Bridge, Asegaon	Asegaon	Chandur bazaar	Amravati
2695	Pedhi	Pedhi river near road bridge at Dadhi-Pedhi village.	Asegaon	Chandur Bazar	Amravati
1913	Purna	Purna river at Dhupeshwar at U/s of Malkapur water works.	Malkapur	Akola	Akola
2155	Purna	Purna river at D/s of confluence of Morna and Purna, at Andura village.	Andura	Balapur	Akola
1313	Tapi	Tapi river at Ajnad Village	Ajnad	Raver	Jalgaon
2659	Burai	Burai river before confluece to Tapi river at Mukudas village	Mukudas	Dhule	Dhule
1251	Tapi	Tapi river at U/s of Bhusawal	Bhusawal Railway Colony	Bhusawal	Jalgaon
2674	Mor	Mor river at Padalashe village.	Padalashe	Jalgaon	Jalgaon
2718	Waghur	Waghur river at Sakegaon before confluence with Tapi river.	Sakegaon	Jalgaon	Jalgaon
1252	Girna	Girna river at Jalgaon at intake of Girna pump huose.	Girna pump house area	Jalgaon	Jalgaon
2667	Hiwara	Hiwara river at D/s of Pachora	Pachora	Jalgaon	Jalgaon
2658	Bori	Bori river at D/s of Amalner	Amalner	Jalgaon	Jalgaon
2710	Titur	Titur river at D/s of Chalisgaon	Chalisgaon	Jalgaon	Jalgaon
2684	Panzara	Panzare river near Panzarakan SSK Ltd.	Panzare	Dhule	Dhule
2652	Amravati	Amaravati river at D/s of Dondaicha	Dondaicha	Dhule	Dhule
1253	Girna	Girna river at Malegaon at Malegaon road bridge.	Malegaon	Malegaon	Nashik
2666	Gomai	Gomai river at D/s of Shahada	Shahada	Dhule	Dhule
1314	Tapi	Tapi river at Ubad Village near Gujrat border.	Ubad	Shahada	Nandurbar
2670	Kan	Kan river at Sakri water works	Sakri	Dhule	Dhule
1907	Rangavali	Rangavali river at D/s of Navapur near Rangavali bridge.	Navapur	Navapur	Nandurbar

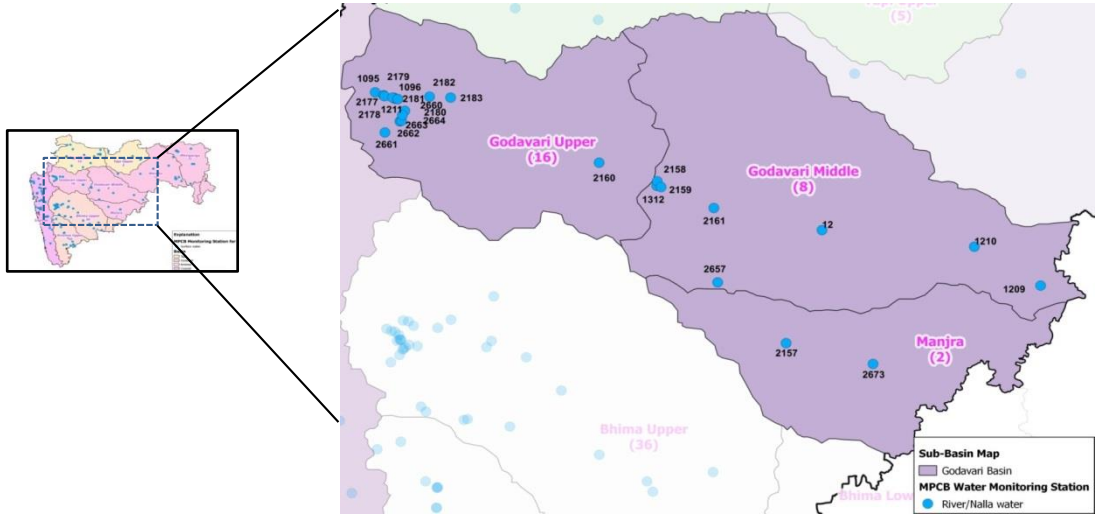
Spatial map of Surface WQI at Tapi Basin (April-2012)



Spatial map of Surface WQI at Tapi Basin (December-2012)



Godavari Basin 1 of 2: Godavari upper, Godavari Middle and Manjra Sub basin

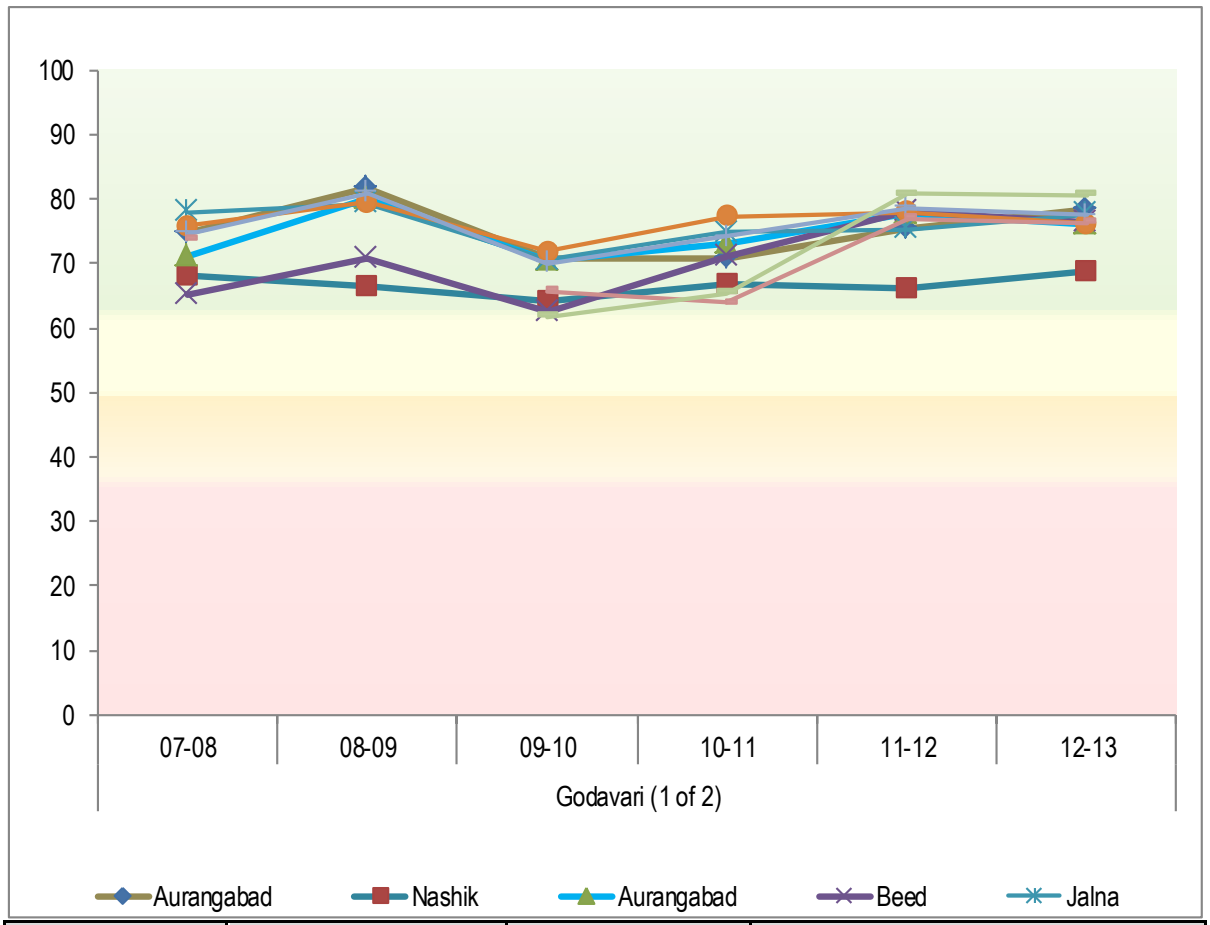


Map No. 4: Network of surface water quality monitoring stations in Godavari basin 1 of 2 Godavari upper, Godavari Middle and Manjra Sub basin

The Godavari river basin passes through six states (third largest basin in India) and drains about 10% of the total geographical area of the country[13]. Approximately 50 percent of the catchment area comes under Maharashtra. In Maharashtra the Godavari Basin could be divided into six sub-basins Godavari Upper, Godavari Middle, Manjra, Wardha, Weinganga, Indravati and Pranhita. In this report for the ease of analysis the sub-basins have been categorized into two, Godavari 1 Basin covering Upper, middle and Manjra sub-basin and Godavari 2 basin covering Wardha, Weinganga, Indravati and Pranhita. In basin 1 there are a total of 26 surface water monitoring stations (16 on upper, 8 on middle and 2 on Manjra). A list of the station and the codes has been provided below in Table No. 9. In basin 2 there are a total of 26 surface water monitoring stations (12 on Wardha, 8 on middle and 2 on Manjra). A list of stations and codes has been provided below in Table No. 10.

[13] http://www.kgbo-cwc.ap.nic.in/About%20Basins/About%20Godavari%20Basin.pdf

Godavari Basin (1 of 2) (Intra Basin analysis)



WQI	Category	Class by CPCB	Remarks
63-100	Good to Excellent	A	Non polluted
50-63	Medium to Good	B	Non polluted
38-50	Bad	C	Polluted
38 & less	Bad to Very Bad	D, E	Heavily polluted

Figure No. 10: Trend of annual average WQI across districts of Godavari basin (1 of 2)

Note:

This graph considers the average WQI for all the monitoring stations in that particular district and hence may include some bias. This graph is only for an overview and monitoring station wise data maybe analyzed to pin point the most affected and polluted patches of rivers in that district.

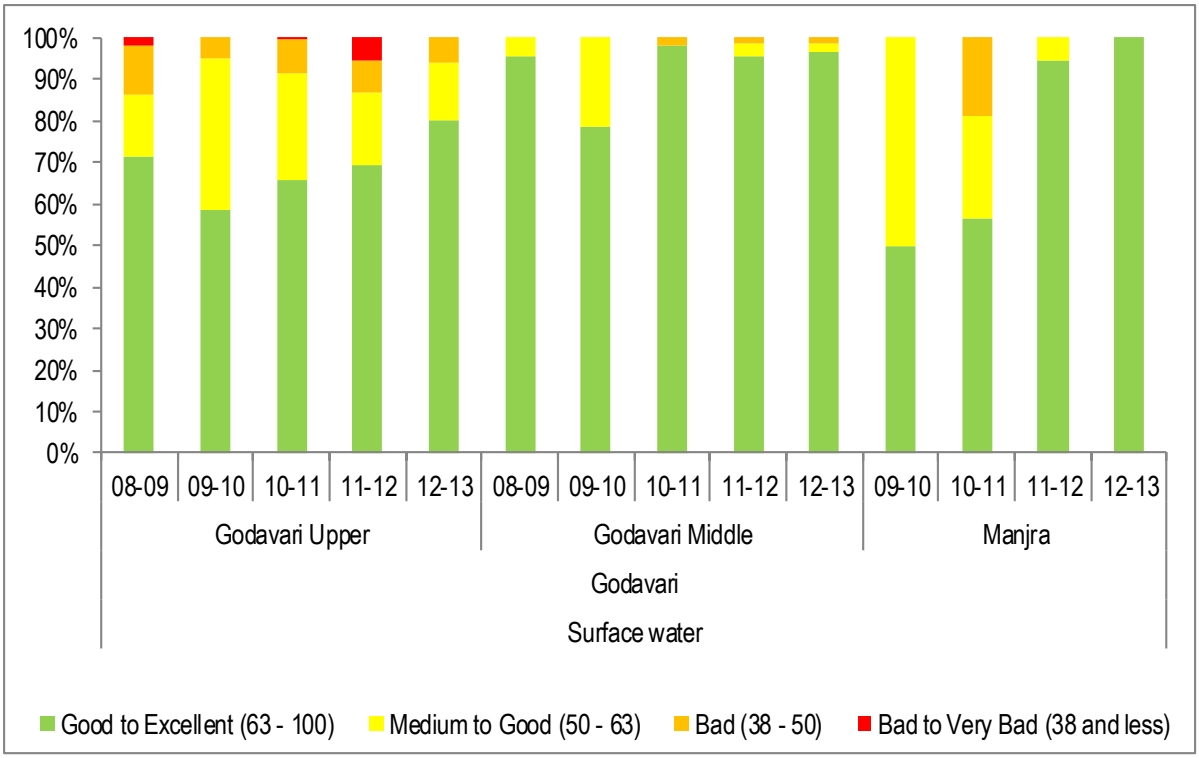
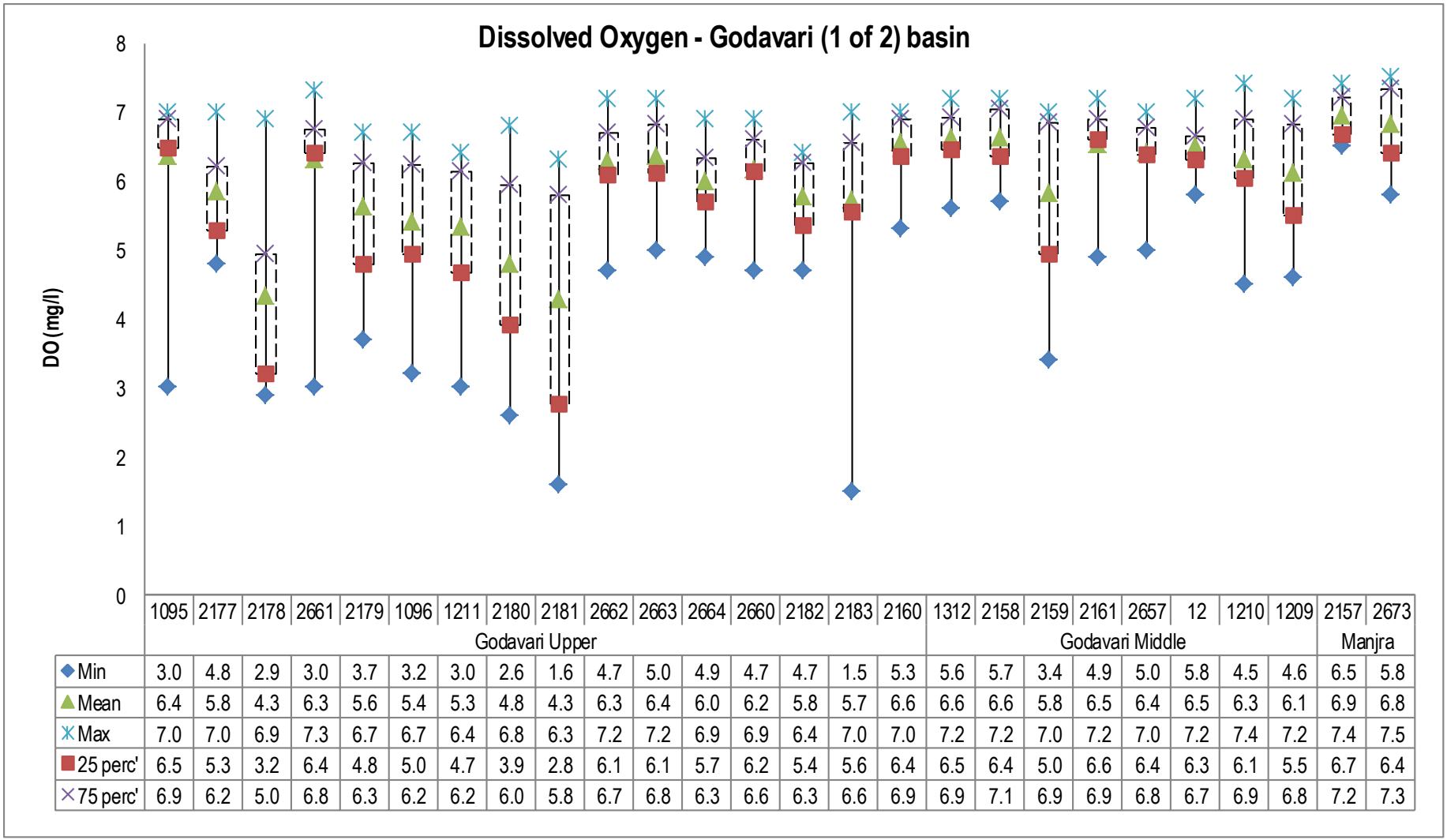


Figure No. 11: Trend of average occurrence for different category of WQI in Godavari basin (1 of 2)

The Intra basin performance of Godavari (1 of 2) across eight districts of the state is depicted in Figure No. 10 and the average occurrence of different category of WQI across all WQMS is depicted in Figure No. 11.

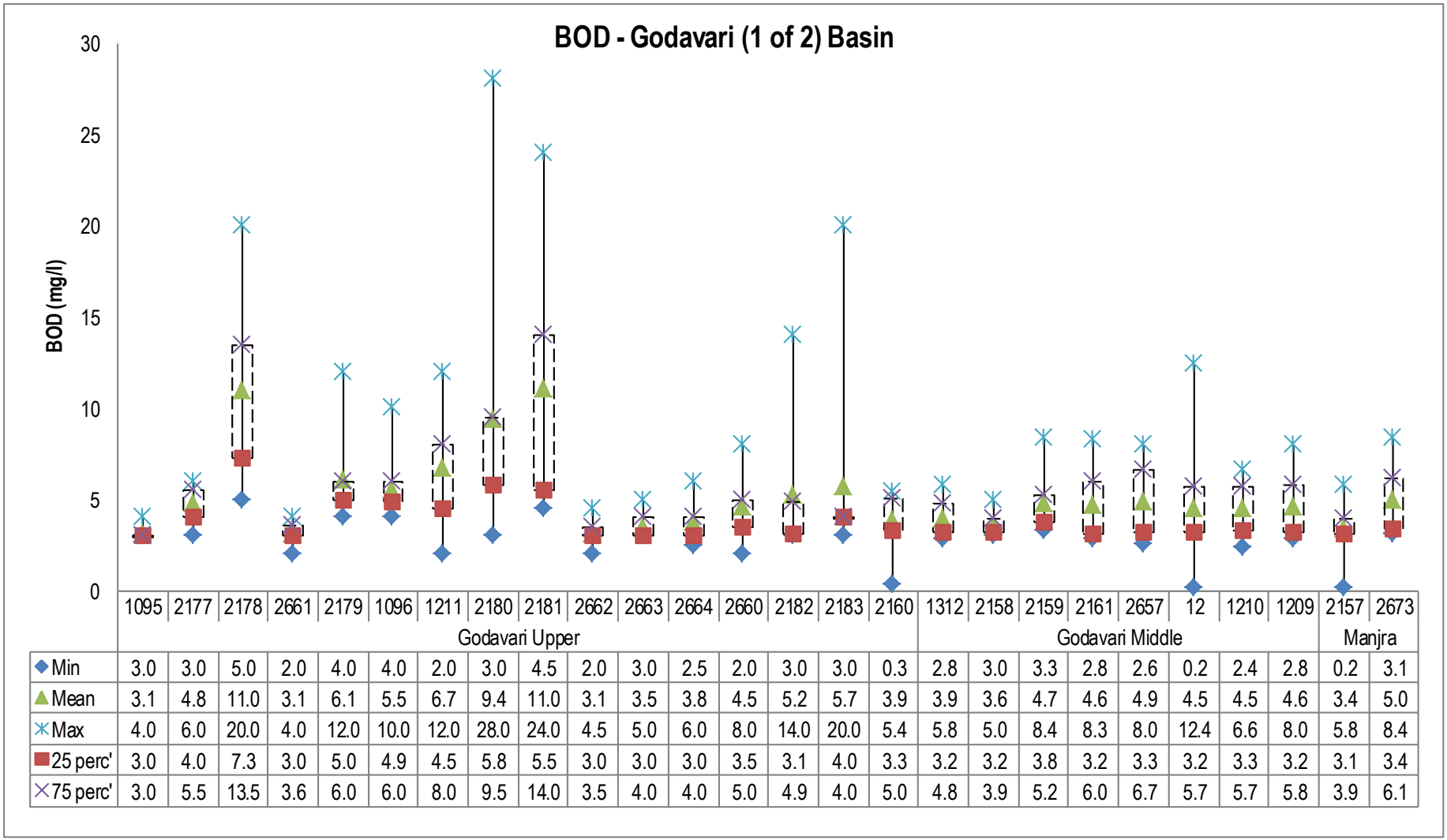
The results showed that among eight districts, namely Aurangabad, Beed, Jalna, Latur, Nanded, Nashik, Osmanabad and Parbhani, the annual average WQI of all the districts were in Good to medium category (i.e. WQI in range of 63-100) from 08-09 till 12-13. The results showed that average WQI across eight districts showed consistent values with consistent trends.

Figure No. 11 shows average annual occurrence of WQI across 8 WQM stations of Godavari Upper, 16 WQMS of Godavari Middle and 2 WQMS of Manjra sub basins for 7 years starting from 2007. Intra Sub basins results for Godavari (1 of 2) Basin showed that the occurrence of Good to Excellent category of WQI in Godavari Middle sub basins were higher than that of the Godavari Upper and Manjra, indicating that more likely occurrence of Good to Excellent category. Hence, the overall preview of Godavari Middle sub basin is better when compared to other two sub basins.



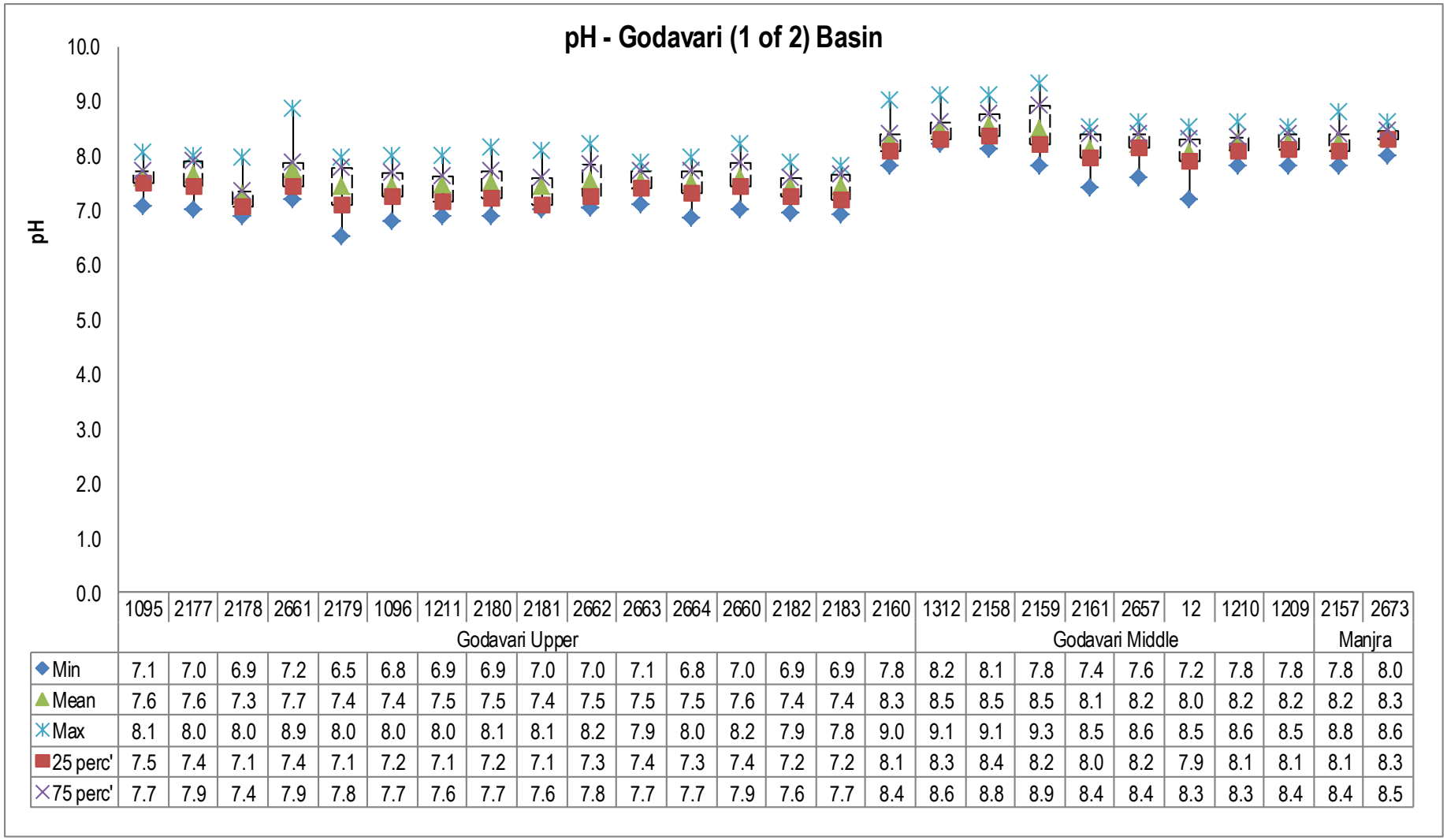
	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	2660	2182	2183	2160	1312	2158	2159	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																Godavari Middle								Manjra	
Min	3.0	4.8	2.9	3.0	3.7	3.2	3.0	2.6	1.6	4.7	5.0	4.9	4.7	4.7	1.5	5.3	5.6	5.7	3.4	4.9	5.0	5.8	4.5	4.6	6.5	5.8
Mean	6.4	5.8	4.3	6.3	5.6	5.4	5.3	4.8	4.3	6.3	6.4	6.0	6.2	5.8	5.7	6.6	6.6	6.6	5.8	6.5	6.4	6.5	6.3	6.1	6.9	6.8
Max	7.0	7.0	6.9	7.3	6.7	6.7	6.4	6.8	6.3	7.2	7.2	6.9	6.9	6.4	7.0	7.0	7.2	7.2	7.0	7.2	7.0	7.2	7.4	7.2	7.4	7.5
25 perc'	6.5	5.3	3.2	6.4	4.8	5.0	4.7	3.9	2.8	6.1	6.1	5.7	6.2	5.4	5.6	6.4	6.5	6.4	5.0	6.6	6.4	6.3	6.1	5.5	6.7	6.4
75 perc'	6.9	6.2	5.0	6.8	6.3	6.2	6.2	6.0	5.8	6.7	6.8	6.3	6.6	6.3	6.6	6.9	6.9	7.1	6.9	6.9	6.8	6.7	6.9	6.8	7.2	7.3

Figure No. 12: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Godavari-1 basin



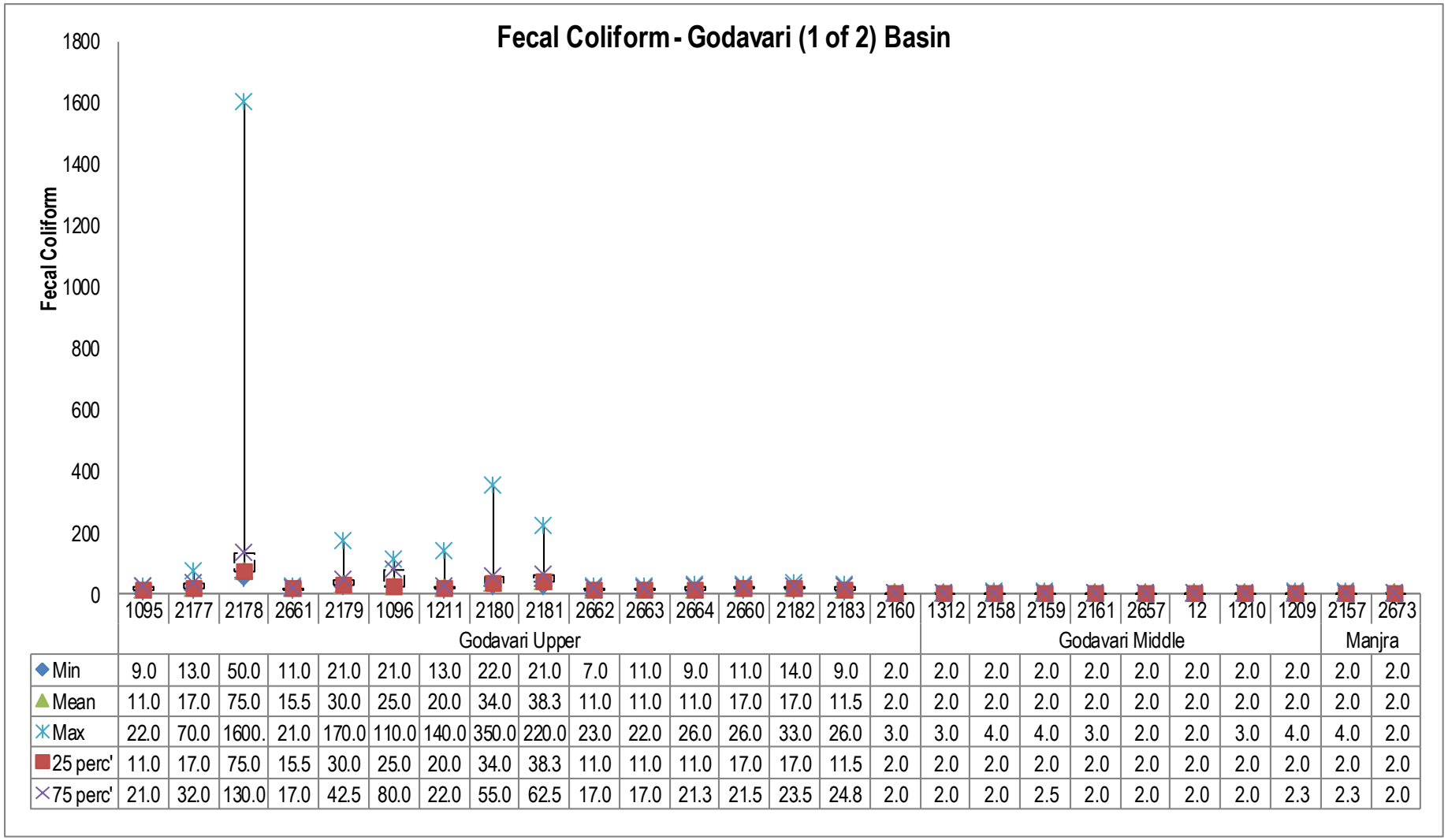
	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	2660	2182	2183	2160	1312	2158	2159	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																Godavari Middle								Manjra	
Min	3.0	3.0	5.0	2.0	4.0	4.0	2.0	3.0	4.5	2.0	3.0	2.5	2.0	3.0	3.0	0.3	2.8	3.0	3.3	2.8	2.6	0.2	2.4	2.8	0.2	3.1
Mean	3.1	4.8	11.0	3.1	6.1	5.5	6.7	9.4	11.0	3.1	3.5	3.8	4.5	5.2	5.7	3.9	3.9	3.6	4.7	4.6	4.9	4.5	4.5	4.6	3.4	5.0
Max	4.0	6.0	20.0	4.0	12.0	10.0	12.0	28.0	24.0	4.5	5.0	6.0	8.0	14.0	20.0	5.4	5.8	5.0	8.4	8.3	8.0	12.4	6.6	8.0	5.8	8.4
25 perc'	3.0	4.0	7.3	3.0	5.0	4.9	4.5	5.8	5.5	3.0	3.0	3.0	3.5	3.1	4.0	3.3	3.2	3.2	3.8	3.2	3.3	3.2	3.3	3.2	3.1	3.4
75 perc'	3.0	5.5	13.5	3.6	6.0	6.0	8.0	9.5	14.0	3.5	4.0	4.0	5.0	4.9	4.0	5.0	4.8	3.9	5.2	6.0	6.7	5.7	5.7	5.8	3.9	6.1

Figure No. 13: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Godavari-1 basin



	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	2660	2182	2183	2160	1312	2158	2159	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																Godavari Middle								Manjra	
Min	7.1	7.0	6.9	7.2	6.5	6.8	6.9	6.9	7.0	7.0	7.1	6.8	7.0	6.9	6.9	7.8	8.2	8.1	7.8	7.4	7.6	7.2	7.8	7.8	7.8	8.0
Mean	7.6	7.6	7.3	7.7	7.4	7.4	7.5	7.5	7.4	7.5	7.5	7.5	7.6	7.4	7.4	8.3	8.5	8.5	8.5	8.1	8.2	8.0	8.2	8.2	8.2	8.3
Max	8.1	8.0	8.0	8.9	8.0	8.0	8.0	8.1	8.1	8.2	7.9	8.0	8.2	7.9	7.8	9.0	9.1	9.1	9.3	8.5	8.6	8.5	8.6	8.5	8.8	8.6
25 perc'	7.5	7.4	7.1	7.4	7.1	7.2	7.1	7.2	7.1	7.3	7.4	7.3	7.4	7.2	7.2	8.1	8.3	8.4	8.2	8.0	8.2	7.9	8.1	8.1	8.1	8.3
75 perc'	7.7	7.9	7.4	7.9	7.8	7.7	7.6	7.7	7.6	7.8	7.7	7.7	7.9	7.6	7.7	8.4	8.6	8.8	8.9	8.4	8.4	8.3	8.3	8.4	8.4	8.5

Figure No. 14: Trend of pH levels recorded at WQMS at Godavari-1 basin



	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	2660	2182	2183	2160	1312	2158	2159	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																Godavari Middle								Manjra	
Min	9.0	13.0	50.0	11.0	21.0	21.0	13.0	22.0	21.0	7.0	11.0	9.0	11.0	14.0	9.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Mean	11.0	17.0	75.0	15.5	30.0	25.0	20.0	34.0	38.3	11.0	11.0	11.0	17.0	17.0	11.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max	22.0	70.0	1600.	21.0	170.0	110.0	140.0	350.0	220.0	23.0	22.0	26.0	26.0	33.0	26.0	3.0	3.0	4.0	4.0	3.0	2.0	2.0	3.0	4.0	4.0	2.0
25 perc'	11.0	17.0	75.0	15.5	30.0	25.0	20.0	34.0	38.3	11.0	11.0	11.0	17.0	17.0	11.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
75 perc'	21.0	32.0	130.0	17.0	42.5	80.0	22.0	55.0	62.5	17.0	17.0	21.3	21.5	23.5	24.8	2.0	2.0	2.0	2.5	2.0	2.0	2.0	2.0	2.3	2.3	2.0

Figure No. 15: Trend of Fecal Coliform levels recorded at WQMS at Godavari-1 basin

Water Quality Index for WQMS in Godavari Basin (1 of 2):Sub-basin-Godavari Upper

	1095			2177			2178			2661			2179			1096			2180			2181			2662			2663			2664			2660			2182			2183			2160			1211		
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
Mar	76	75	79	72	63	66	52	32	51	75	80	79	66	74	68	65	66	74	61	74	55	73	74	54	75	76	82	74	79	72	72	76	77	76	80	65	78	81	75	78	79	78	80	77	78	67	74	70
Feb	76	80	77	78	68	71	29	60	69	51	71	NA	60	66	69	62	61	60	65	71	75	47	75	72	72	75	78	74	75	78	45	77	65	75	76	79	61	77	NA	77	79	NA	79	76	77	62	70	58
Jan	78	79	77	70	63	64	41	32	59	64	71	63	75	41	71	51	51	68	73	42	69	77	33	67	58	72	69	67	75	70	55	76	69	71	73	76	66	51	70	73	68	73	69	74	77	56	54	67
Dec	80	72	78	69	61	66	50	53	53	71	77	75	75	50	64	54	59	65	75	48	55	71	48	42	64	73	78	46	75	77	58	70	72	64	77	71	73	59	58	75	74	73	71	77	77	63	54	52
Nov	84	80	59	78	75	69	51	65	54	78	65	55	75	42	58	59	75	60	58	55	40	76	43	41	70	72	72	69	79	70	58	77	69	71	77	NA	69	49	70	77	73	71	NA	NA	81	61	65	45
Oct	68	80	81	66	72	73	39	35	54	81	68	84	50	65	69	46	73	67	46	48	71	61	37	53	61	74	83	66	76	83	62	75	77	69	69	70	60	56	67	68	69	NA	44	76	70	45	45	70
Sep	84	83	81	75	83	67	57	70	52	70	85	77	50	65	62	70	80	70	52	72	58	55	70	54	69	85	81	76	82	77	66	85	72	72	84	73	70	80	65	70	80	72	75	NA	77	70	82	59
Aug	77	79	80	66	58	76	48	64	51	72	82	77	58	52	60	56	58	67	58	47	53	73	53	41	77	73	78	73	77	78	67	82	78	72	70	76	69	66	76	71	78	74	75	88	78	60	53	64
Jul	75	80	78	61	54	81	54	42	42	72	74	85	57	70	75	49	52	50	55	37	41	70	35	40	77	71	78	75	74	80	72	72	77	NA	66	59	68	73	69	75	75	43	75	76	86	54	60	76
Jun	76	NA	78	59	67	73	61	46	NA	78	77	78	53	67	65	50	52	74	49	56	68	67	59	69	84	74	74	80	74	76	77	74	77	73	68	74	77	63	72	84	78	72	NA	72	74	58	58	73
May	78	72	81	66	66	68	49	45	43	82	75	80	64	58	68	70	59	68	61	53	65	70	57	71	80	79	76	79	79	79	83	83	76	72	70	76	75	66	74	86	77	81	NA	79	78	61	59	74
Apr	82	65	78	81	64	70	56	33	64	79	80	75	57	59	70	60	59	69	55	37	66	54	45	68	82	80	76	80	53	74	84	81	77	83	69	79	77	77	77	75	80	76	NA	58	86	40	38	70
	Godavari Upper																																															

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 9: Surface water quality monitoring stations in Godavari Basin (1 of 2)

Station Code	River	Name of the Station	Village	Taluka	District
1095	Godavari	Godavari river at U/s of Gangapur Dam	Gangapur	Nashik	Nashik
2177	Godavari	Godavari river near Someshwar Temple	Someshwar	Nashik	Nashik
2178	Chikhali nalla	Chikhali nalla meets Godavari river.	Chikhali	Nashik	Nashik
2661	Darna	Darna river at Aswali (Darna Dam)	Aswali	Igatpuri	Nashik
2179	Godavari	Godavari river at Hanuman Ghat	Nashik city	Nashik	Nashik
1096	Godavari	Godavari river at Ramkund	Panchavati	Nashik	Nashik
2180	Godavari	Godavari river at Tapovan	Tapovan	Nashik	Nashik
2181	Godavari	Godavari river at Kapila-Godavari confluence point	Tapovan	Nashik	Nashik
2662	Darna	Darna river at M.E.S. site Pumping station.	Bhagur	Nashik	Nashik
2663	Darna	Darna river at Bhagur pumping station near Pandhurli bridge	Bhagur	Nashik	Nashik
2664	Darna	Darna river at Sansari.	Sansari	Nashik	Nashik
2660	Darna	Darna river at Chehedi water works(pumping station)	Chehedi	Nashik	Nashik
2182	Godavari	Godavari river at Saikheda village	Saikheda	Niphad	Nashik
2183	Godavari	Godavari river at Nandur-Madhameshwar Dam.	Nandur	Niphad	Nashik
2160	Godavari	Godavari river at U/s of Aurangabad Reservoir, Kaigaon Tokka	Kaigaon	Gangapur	Aurangabad
1211	Godavari	Godavari river at Nashik D/s near Amardham	Gadgebaba Maharaj Nagar	Nashik	Nashik

Water Quality Index for WQMS in Godavari Basin (1 of 2):Sub-basin-Godavari Middle and Manjra

Mar	85	77	80	80	80	79	82	NA	79	79	82	72	75	81	NA	83	84	78	75	81	78	78	80	86	79	80	87	62	NA	NA
Feb	66	79	81	68	78	81	64	70	75	70	83	82	80	81	NA	82	83	78	76	86	80	68	82	82	75	83	80	77	NA	NA
Jan	78	81	84	71	79	84	77	76	71	76	84	77	76	84	NA	79	84	81	80	85	77	74	NA	68	74	79	77	73	79	74
Dec	73	81	76	68	79	80	73	61	76	70	83	80	NA	86	NA	72	80	77	76	80	81	73	76	77	73	83	80	70	78	71
Nov	73	78	80	NA	78	80	NA	79	78	79	41	78	74	80	78	76	83	62	73	77	68	78	82	76	73	79	81	NA	62	82
Oct	NA	76	70	NA	79	71	NA	76	72	NA	80	63	45	83	64	NA	80	71	NA	79	66	NA	77	74	49	84	79	50	75	72
Sep	69	82	77	70	80	NA	71	80	NA	NA	82	66	68	75	74	NA	88	68	77	89	65	71	NA	78	52	80	80	52	80	82
Aug	78	86	71	74	NA	71	NA	NA	61	77	76	NA	77	79	NA	NA	83	80	80	79	78	78	83	82	79	87	79	NA	86	77
Jul	72	79	72	NA	80	72	NA	71	43	73	NA	88	70	NA	NA	NA	76	82	76	79	78	74	NA	80	NA	80	82	NA	NA	NA
Jun	NA	78	71	NA	77	74	NA	69	73	NA	77	75	NA	72	72	NA	70	74	NA	60	67	NA	NA	65	50	73	83	NA	NA	NA
May	NA	84	85	NA	82	85	NA	75	84	NA	70	86	77	64	87	NA	72	87	76	69	86	NA	NA	85	49	83	80	NA	NA	NA
Apr	NA	77	85	NA	82	82	NA	75	86	NA	72	86	NA	76	84	NA	66	84	NA	58	84	NA	70	NA	NA	80	79	NA	80	NA
FY	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**	**10-11**	**11-12**	**12-13**
	1312			**2158**			**2159**			**2161**			**2657**			**1210**			**1209**			**12**			**2157**			**2673**		
	Godavari Middle																								**Manjra**					

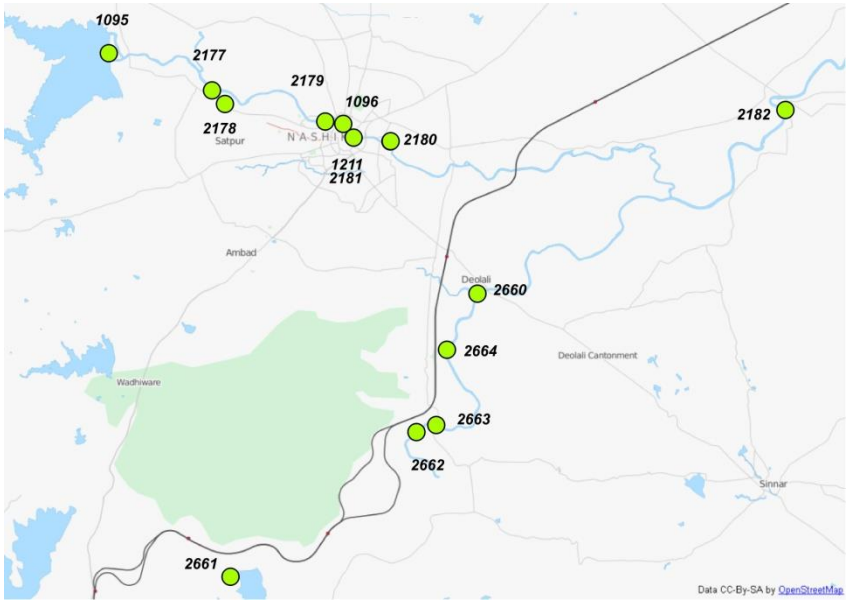
Legend

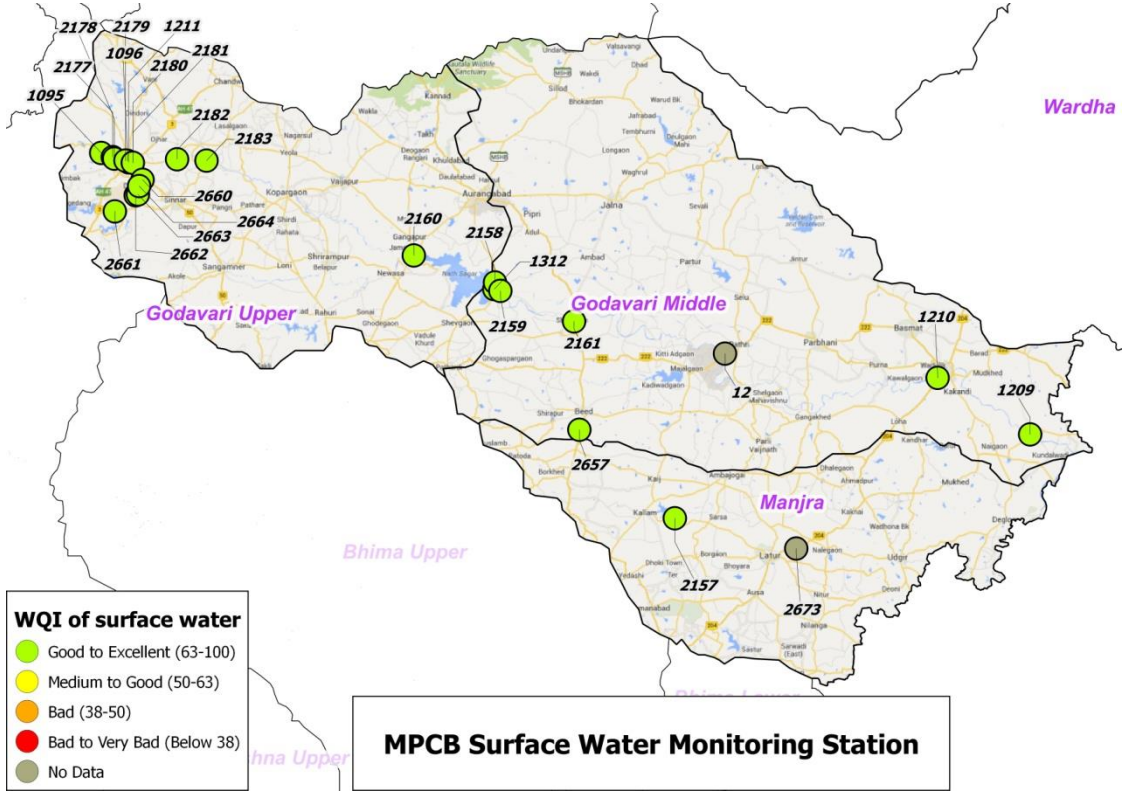
Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Surface water quality monitoring stations in Godavari Basin (1 of 2)

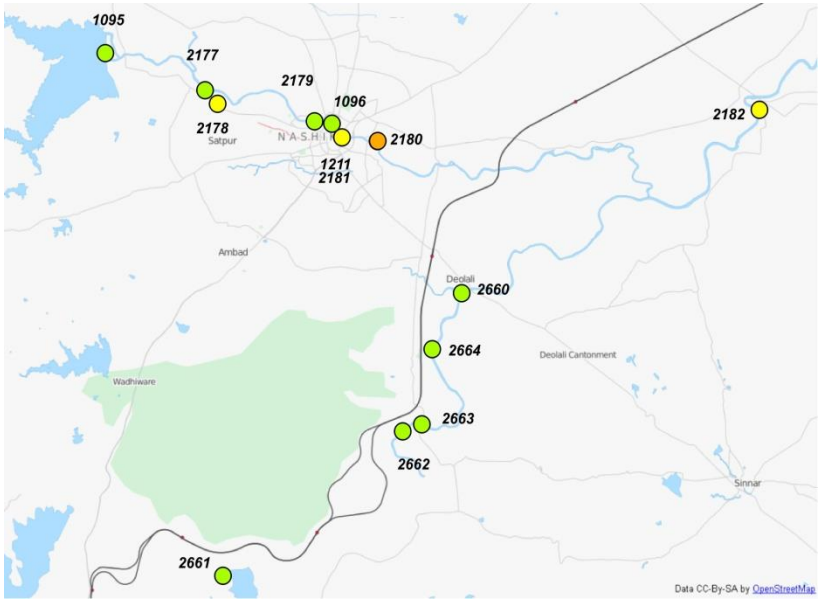
Station Code	River	Name of the Station	Village	Taluka	District
1312	Godavari	Godavari river at Jaikwadi Dam, Paithan.	Paithan	Paithan	Aurangabad
2158	Godavari	Godavari river at U/s of Paithan at Paithan intake pump house..	Jayakwadi	Paithan	Aurangabad
2159	Godavari	Godavari river at D/s of Paithan at Pathegaon bridge.	Pathegaon	Paithan	Aurangabad
2161	Godavari	Godavari river at Jalna Intake water pump house, Shahabad.	Shahabad	Ambad	Jalna
2657	Bindusara	Bindusara river at Beed, near intake water pump house at Dam.	Paligaon	Beed	Beed
1210	Godavari	Godavari river at Nanded near Intake water pump house.	Vishnupuri	Nanded	Nanded
1209	Godavari	Godavari river at Raher	Raher	Nayagaon	Nanded
12	Godavari	Godavari river at Dhalegaon	Dhalegaon	Pathari	Parbhani
2673	Manjra	Manjra river at D/s of Latur, near Latur-Nanded bridge.	Bhatkheda	Latur	Latur
2157	Godavari	Godavari river at Latur water intake near Pump house.	Dhamegaon	Kalumb	Osmanabad

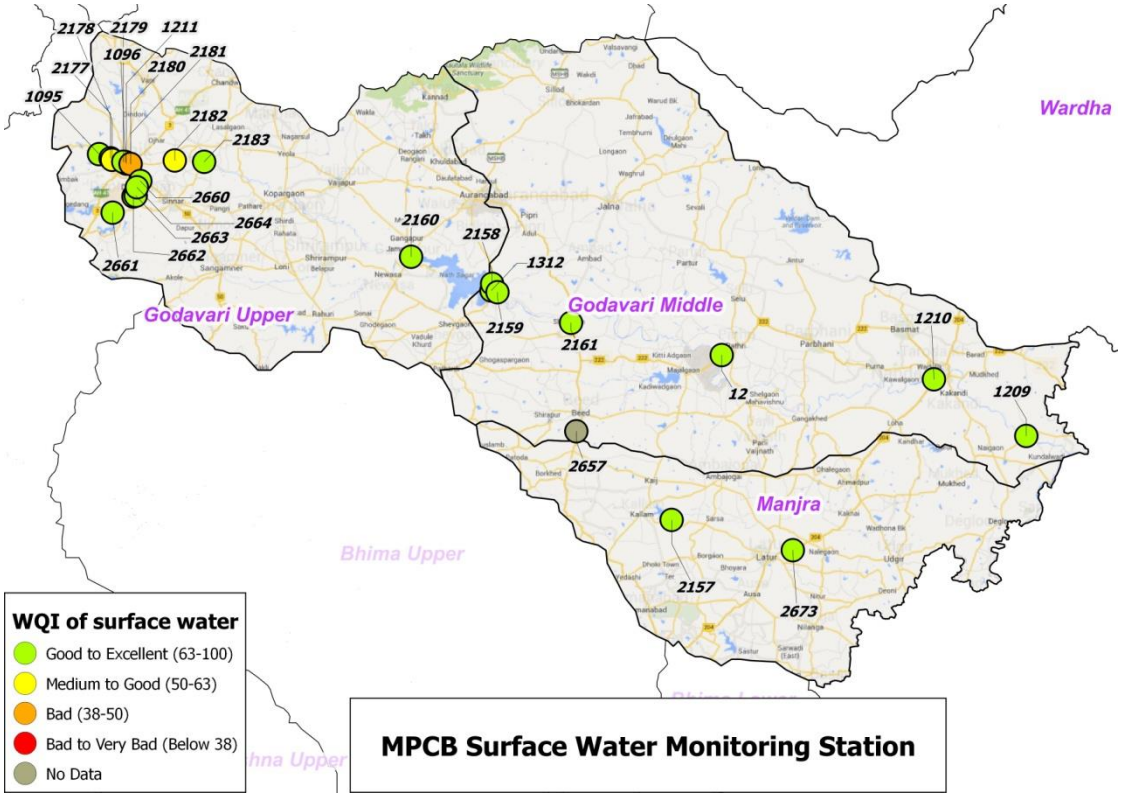
Spatial map of Surface WQI at Godavari Basin (1 of 2) (April 2012)



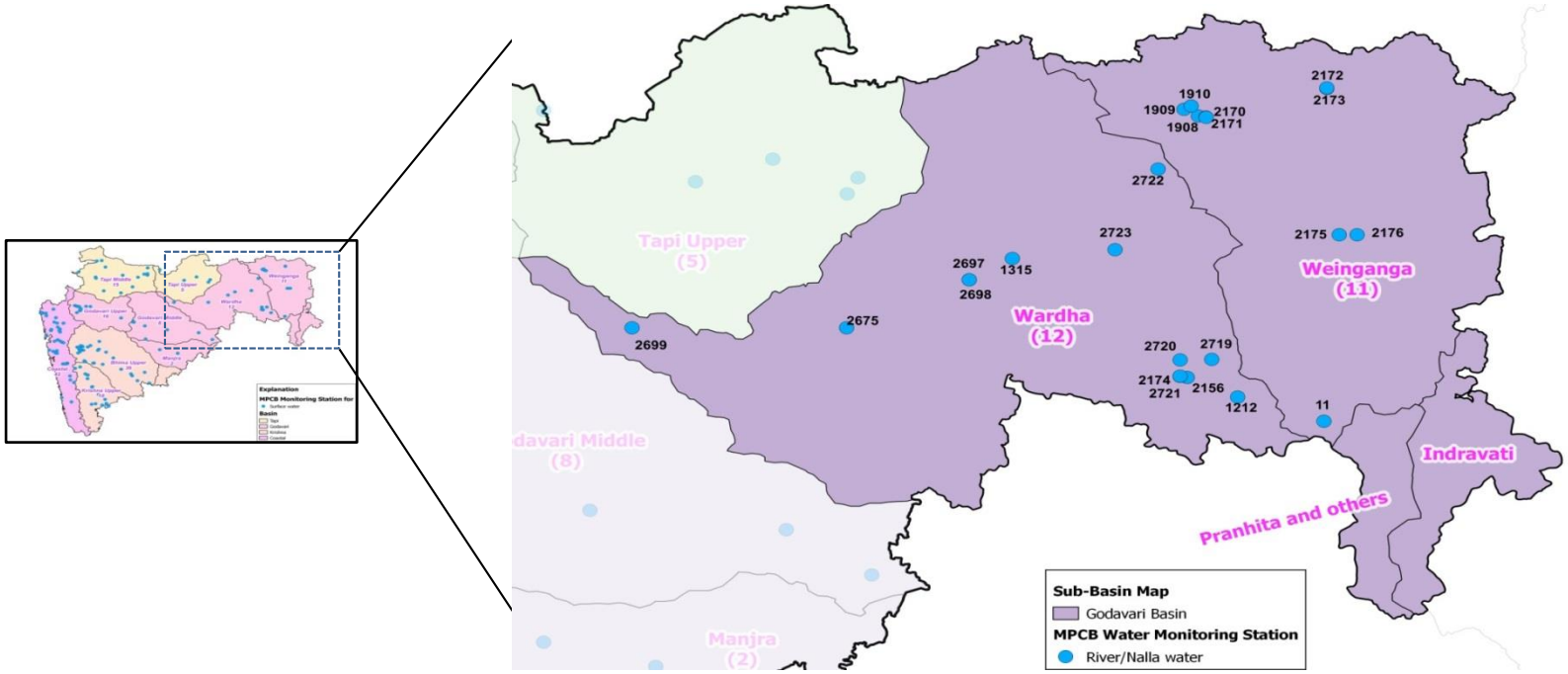


Spatial map of Surface WQI at Godavari Basin (1 of 2) (December 2012)



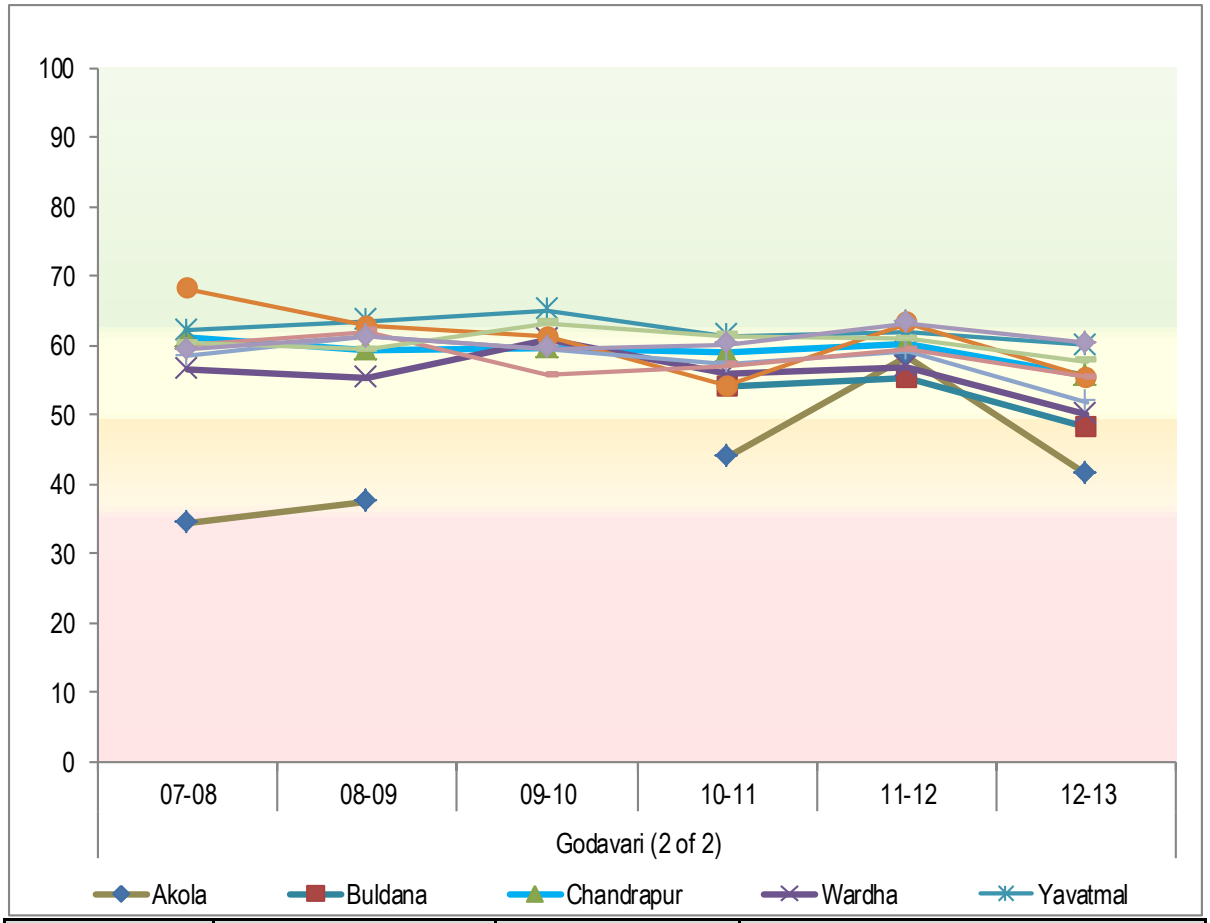


Godavari Basin 2 of 2: Wardha, Weinganga and Pranhita Sub basin



Map No. 5: Network of surface water quality monitoring stations in Godavari basin 2 of 2: Wardh, Weinganga and Pranhita Sub basin

Godavari Basin (2 of 2) (Intra Basin analysis)



WQI	Category	Class by CPCB	Remarks
63-100	Good to Excellent	A	Non polluted
50-63	Medium to Good	B	Non polluted
38-50	Bad	C	Polluted
38 & less	Bad to Very Bad	D, E	Heavily polluted

Figure No. 16: Trend of annual average WQI across districts of Godavari basin (2 of 2)

Note:

This graph considers the average WQI for all the monitoring stations in that particular district and hence may include some bias. This graph is only for an overview and monitoring station wise data maybe analyzed to pin point the most affected and polluted patches of rivers in that district.

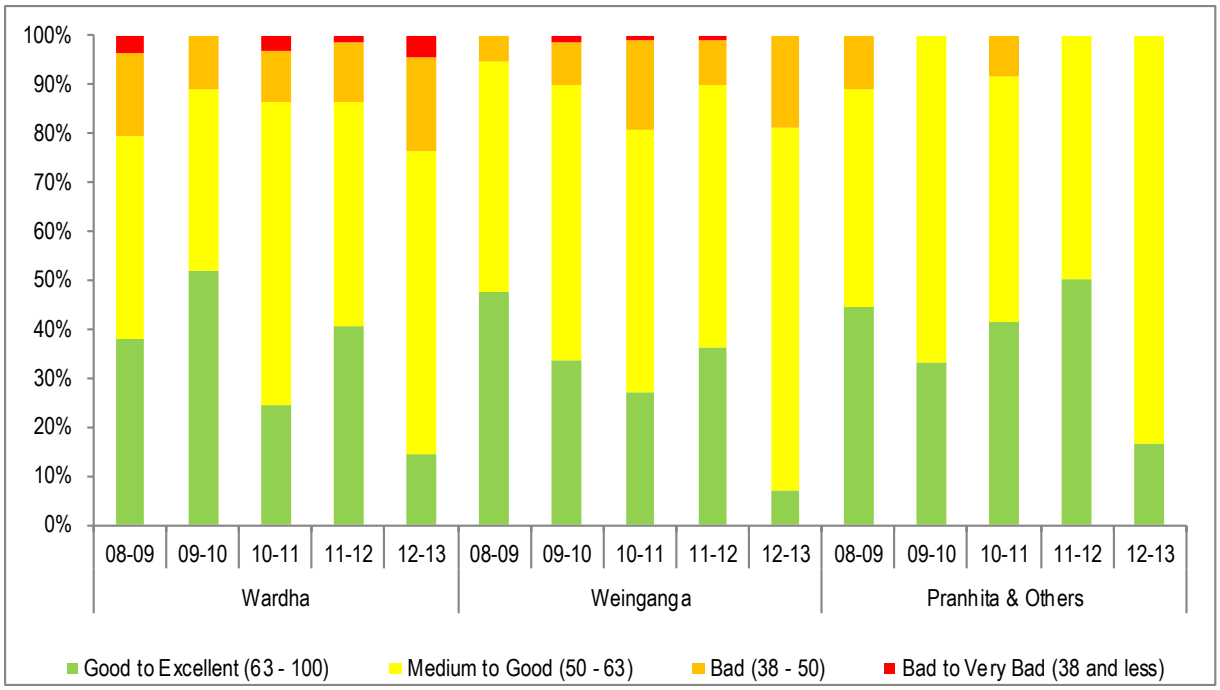
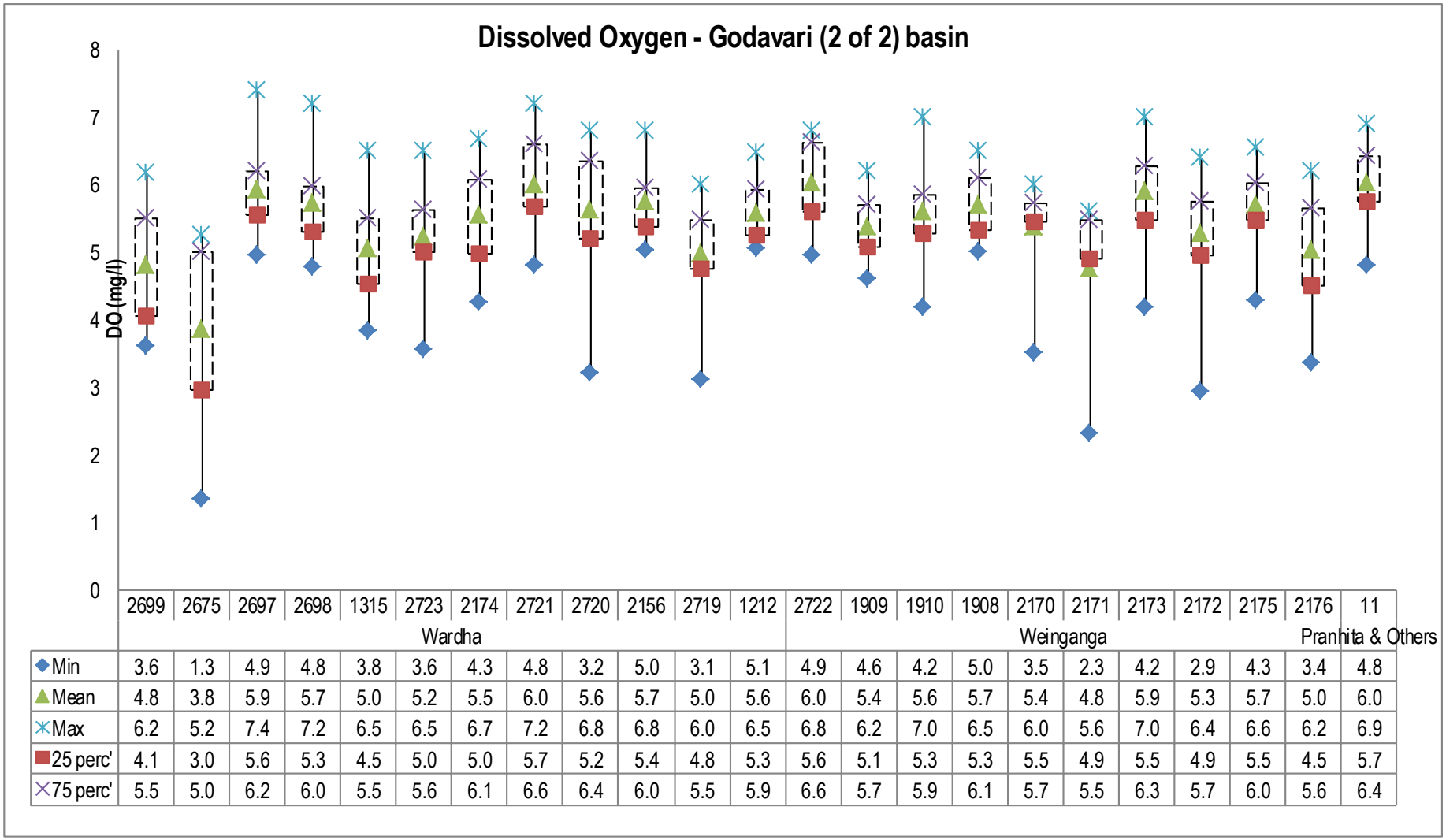


Figure No. 17: Trend of average occurrence for different category of WQI in Godavari basin (2 of 2)

The Intra basin performance of Godavari (2 of 2) basin across seven districts of the state are depicted in Figure No. 16 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in Figure No. 17.

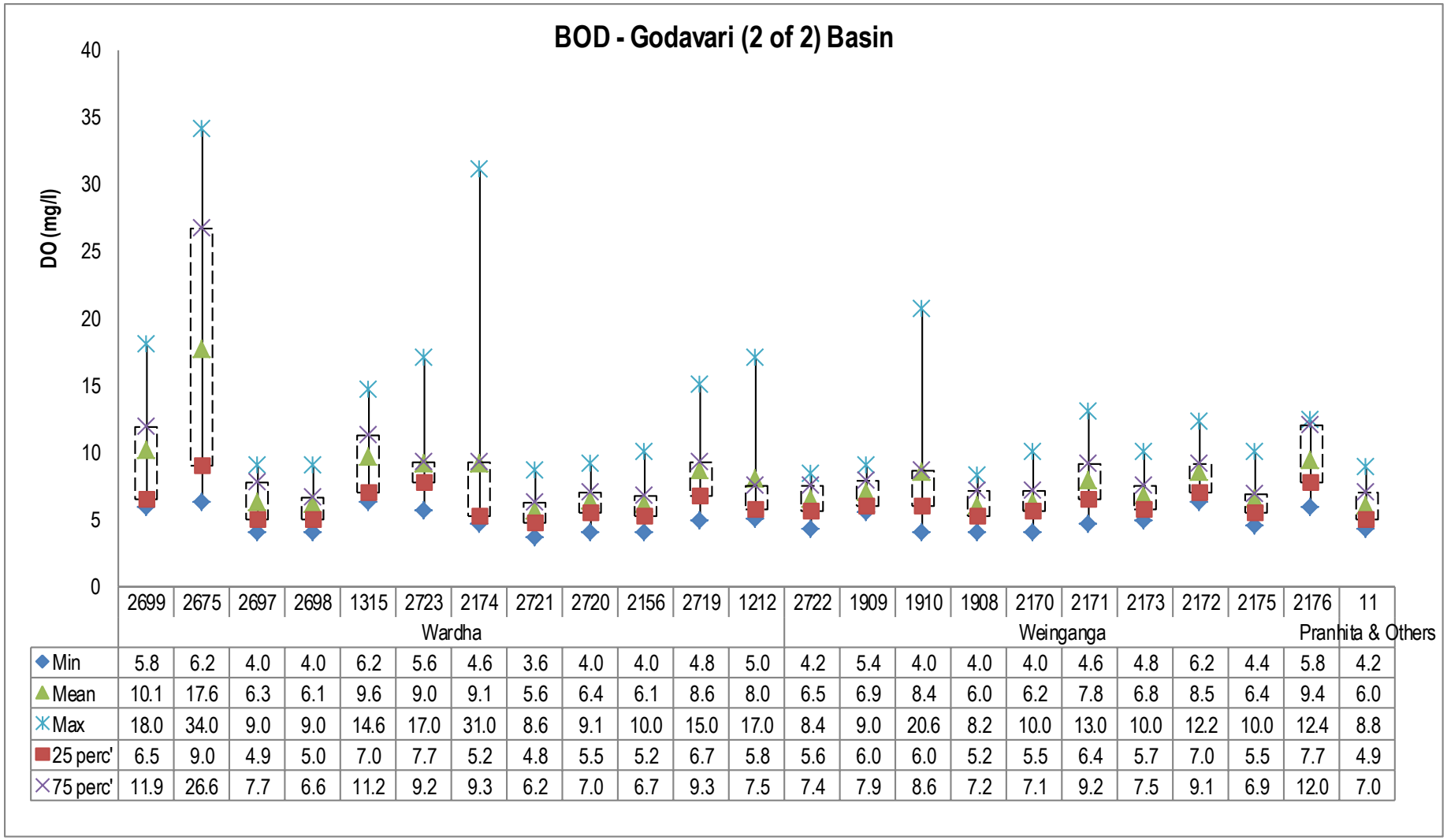
The results showed that among seven districts, namely Akola, Bandara, Buldhana, Chandrapur, Nagpur, Wardha and Yavatmal, the annual average WQI of all the districts except Akola were Medium to Good (i.e. WQI in range of 50-63). The results showed that average WQI across districts showed slight downward trend towards the recent years.

Figure No. 17 shows average annual occurrence of WQI across 12 WQM stations of Wardha, 10 WQMS of Weinganga and 1 WQMS of Pranhita sub basins for 7 years starting from 2008. Intra Sub basins results for Godavari (2 of 2) basin showed that the occurrence of 'Good to Excellent' and 'Medium to Good' categories of WQI were almost similar but the 'Bad' and 'Bad to Very Bad' categories were seen more in Wardha sub basins, indicating that more likely occurrence of 'Bad' and 'Bad to Very Bad' category. Hence the overall preview of Weinganga and Pranhita sub basin is better when compared to Wardha sub basin.



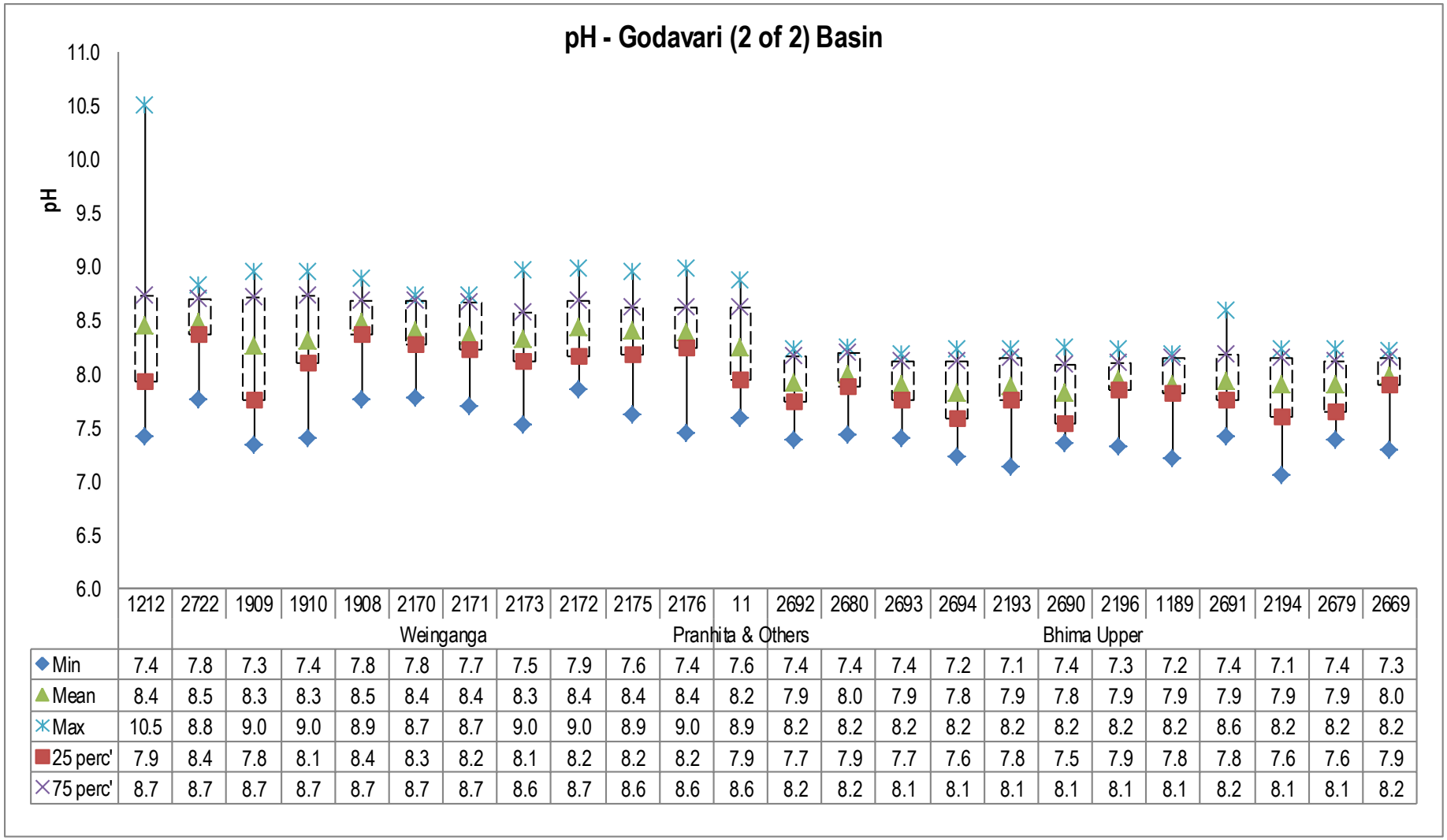
	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	1909	1910	1908	2170	2171	2173	2172	2175	2176	11
	Wardha												Weinganga										Pranhita & Others
Min	3.6	1.3	4.9	4.8	3.8	3.6	4.3	4.8	3.2	5.0	3.1	5.1	4.9	4.6	4.2	5.0	3.5	2.3	4.2	2.9	4.3	3.4	4.8
Mean	4.8	3.8	5.9	5.7	5.0	5.2	5.5	6.0	5.6	5.7	5.0	5.6	6.0	5.4	5.6	5.7	5.4	4.8	5.9	5.3	5.7	5.0	6.0
Max	6.2	5.2	7.4	7.2	6.5	6.5	6.7	7.2	6.8	6.8	6.0	6.5	6.8	6.2	7.0	6.5	6.0	5.6	7.0	6.4	6.6	6.2	6.9
25 perc'	4.1	3.0	5.6	5.3	4.5	5.0	5.0	5.7	5.2	5.4	4.8	5.3	5.6	5.1	5.3	5.3	5.5	4.9	5.5	4.9	5.5	4.5	5.7
75 perc'	5.5	5.0	6.2	6.0	5.5	5.6	6.1	6.6	6.4	6.0	5.5	5.9	6.6	5.7	5.9	6.1	5.7	5.5	6.3	5.7	6.0	5.6	6.4

Figure No. 18: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Godavari-2 of 2 basin



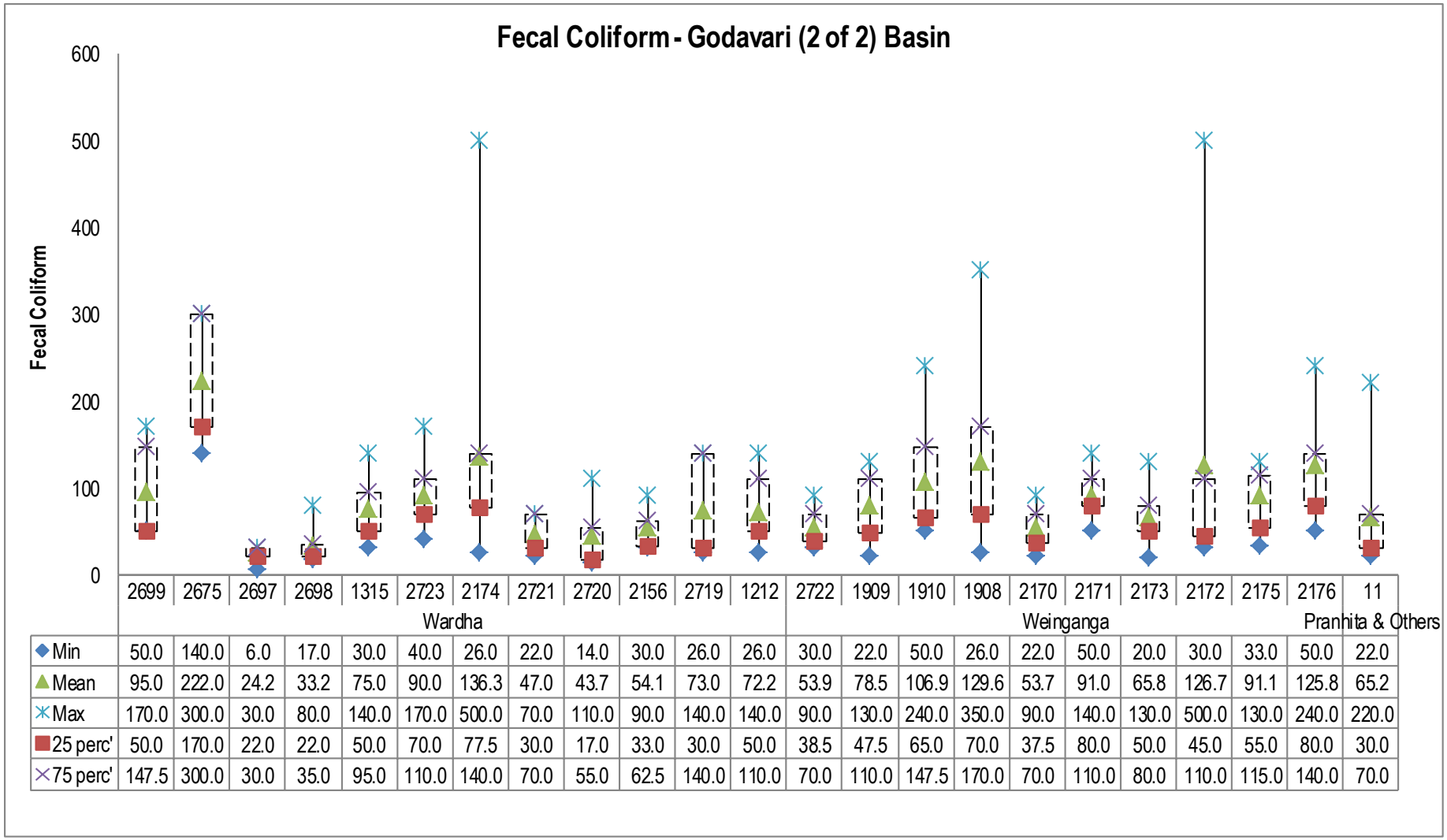
	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	1909	1910	1908	2170	2171	2173	2172	2175	2176	11
	Wardha												Weinganga									Pranhita & Others	
Min	5.8	6.2	4.0	4.0	6.2	5.6	4.6	3.6	4.0	4.0	4.8	5.0	4.2	5.4	4.0	4.0	4.0	4.6	4.8	6.2	4.4	5.8	4.2
Mean	10.1	17.6	6.3	6.1	9.6	9.0	9.1	5.6	6.4	6.1	8.6	8.0	6.5	6.9	8.4	6.0	6.2	7.8	6.8	8.5	6.4	9.4	6.0
Max	18.0	34.0	9.0	9.0	14.6	17.0	31.0	8.6	9.1	10.0	15.0	17.0	8.4	9.0	20.6	8.2	10.0	13.0	10.0	12.2	10.0	12.4	8.8
25 perc'	6.5	9.0	4.9	5.0	7.0	7.7	5.2	4.8	5.5	5.2	6.7	5.8	5.6	6.0	6.0	5.2	5.5	6.4	5.7	7.0	5.5	7.7	4.9
75 perc'	11.9	26.6	7.7	6.6	11.2	9.2	9.3	6.2	7.0	6.7	9.3	7.5	7.4	7.9	8.6	7.2	7.1	9.2	7.5	9.1	6.9	12.0	7.0

Figure No. 19: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Godavari-2 of 2 basin



	1212	2722	1909	1910	1908	2170	2171	2173	2172	2175	2176	11	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669
		Weinganga										Pranhita & Others						Bhima Upper						
Min	7.4	7.8	7.3	7.4	7.8	7.8	7.7	7.5	7.9	7.6	7.4	7.6	7.4	7.4	7.4	7.2	7.1	7.4	7.3	7.2	7.4	7.1	7.4	7.3
Mean	8.4	8.5	8.3	8.3	8.5	8.4	8.4	8.3	8.4	8.4	8.4	8.2	7.9	8.0	7.9	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	8.0
Max	10.5	8.8	9.0	9.0	8.9	8.7	8.7	9.0	9.0	8.9	9.0	8.9	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.6	8.2	8.2	8.2
25 perc'	7.9	8.4	7.8	8.1	8.4	8.3	8.2	8.1	8.2	8.2	8.2	7.9	7.7	7.9	7.7	7.6	7.8	7.5	7.9	7.8	7.8	7.6	7.6	7.9
75 perc'	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.6	8.7	8.6	8.6	8.6	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.1	8.1	8.2

Figure No. 20: Trend of pH levels recorded at WQMS at Godavari-2 of 2 basin



	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	1909	1910	1908	2170	2171	2173	2172	2175	2176	11
	Wardha												Weinganga										Pranhita & Others
Min	50.0	140.0	6.0	17.0	30.0	40.0	26.0	22.0	14.0	30.0	26.0	26.0	30.0	22.0	50.0	26.0	22.0	50.0	20.0	30.0	33.0	50.0	22.0
Mean	95.0	222.0	24.2	33.2	75.0	90.0	136.3	47.0	43.7	54.1	73.0	72.2	53.9	78.5	106.9	129.6	53.7	91.0	65.8	126.7	91.1	125.8	65.2
Max	170.0	300.0	30.0	80.0	140.0	170.0	500.0	70.0	110.0	90.0	140.0	140.0	90.0	130.0	240.0	350.0	90.0	140.0	130.0	500.0	130.0	240.0	220.0
25 perc'	50.0	170.0	22.0	22.0	50.0	70.0	77.5	30.0	17.0	33.0	30.0	50.0	38.5	47.5	65.0	70.0	37.5	80.0	50.0	45.0	55.0	80.0	30.0
75 perc'	147.5	300.0	30.0	35.0	95.0	110.0	140.0	70.0	55.0	62.5	140.0	110.0	70.0	110.0	147.5	170.0	70.0	110.0	80.0	110.0	115.0	140.0	70.0

Figure No. 21: Trend of Fecal Coliform levels recorded at WQMS at Godavari-2 basin

Water Quality Index for WQMS at Godavari Basin (2 of 2): Sub basin Wardha

Mar	38	38	NA	NA	NA	NA	61	63	57	63	65	59	55	42	54	45	38	47	61	60	60	60	55	53	63	63	69	55	61	62	54	51	55	NA	64	35
Feb	53	42	NA	NA	NA	NA	70	58	62	70	60	63	65	49	46	64	42	54	64	61	63	63	41	53	62	50	64	68	52	60	61	52	44	NA	58	53
Jan	NA	44	33	NA	NA	NA	65	60	59	51	58	51	70	63	51	48	62	50	60	63	56	52	55	53	68	48	59	60	53	43	57	40	46	57	57	55
Dec	57	64	43	30	58	32	57	64	55	54	70	63	52	64	51	49	59	51	64	68	65	54	64	57	60	73	58	61	62	64	41	67	54	NA	68	61
Nov	61	66	43	35	48	27	61	65	65	61	71	58	66	62	58	50	58	42	53	67	57	45	62	46	58	68	41	59	60	59	53	64	35	NA	58	54
Oct	56	66	58	59	70	57	NA	74	59	NA	75	63	53	66	55	53	68	57	67	65	64	NA	65	57	64	74	55	NA	71	59	65	69	49	62	77	52
Sep	59	64	56	43	61	45	67	71	68	60	71	64	61	60	48	63	57	54	63	72	50	57	66	52	66	69	63	66	66	57	63	66	61	NA	65	59
Aug	56	57	58	50	56	47	NA	60	57	57	59	66	53	66	47	54	49	45	61	57	66	NA	50	61	61	61	63	66	55	61	60	61	59	NA	59	55
Jul	NA	54	NA	47	NA	NA	NA	57	62	NA	56	71	54	56	43	60	59	53	NA	62	70	NA	57	63	NA	53	71	NA	51	67	NA	53	65	45	48	62
Jun	NA	NA	NA	NA	NA	NA	NA	63	60	NA	50	54	58	NA	55	54	NA	58	NA	54	55	NA	50	39	NA	40	57	NA	46	61	NA	25	52	NA	59	45
May	NA	NA	NA	NA	NA	NA	NA	72	50	NA	69	50	58	NA	37	52	NA	54	NA	72	57	NA	63	53	NA	62	50	NA	55	56	NA	54	53	NA	70	53
Apr	NA	56	NA	NA	NA	NA	61	49	75	65	71	62	58	62	50	48	54	45	NA	69	61	NA	66	58	NA	70	57	54	67	59	NA	66	49	65	63	67
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2699			2675			2697			2698			1315			2723			2721			2174			2720			2156			2719			1212		
	Wardha																																			

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 10: Surface water quality monitoring stations in Godavari Basin (2 of 2)

Station Code	River	Name of the Station	Village	Taluka	District
2699	Penganga	Penganga river at Mehkar- Buldana road bridge.	Mehkar	Mehkar	Buldana
2675	Morna	Morna river at D/s of Railway bridge.	Akola	Akola	Akola
2697	Penganga	Penganga river near water supply scheme of Umarkhed M.C.	Belkhed	Umarkhed	Yavatmal
2698	Penganga	Penganga river D/s of Isapur Dam	Isapur	Pusad	Yavatmal
1315	Wardha	Wardha river at PulgaonRailway Bridge	Pulgaon	wardha	Wardha
2723	Wena	Wena river at D/s of Mohata Mills, near bridge on Hinganghat-Wadner road	Hinganghat	Hinganghat	Wardha
2721	Wardha	Wardha river at U/s of ACC Ltd, Ghuggus near WCL pump house	Ghuggus	Chandrapur	Chandrapur
2174	Wardha	Wardha river at D/s of ACC Ltd, Ghugus near WCL pump house	Ghuggus	Chandrapur	Chandrapur
2720	Wardha	Wardha river at U/s of Erai river at Hadasti near Arun Engg. works	Hadasti	Chandrapur	Chandrapur
2156	Wardha	Wardha river at confluence point of Penganga & Wardha.	Jugad	Wani	Yavatmal
2719	Wardha	Wardha river at D/s of Erai river at Hadasti near Arun Engg. Works	Hadasti	Chandrapur	Chandrapur
1212	Wardha	Wardha river at Rajura bridge	Rajura	Chandrapur	Chandrapur

Water Quality Index for WQMS at Godavari Basin (2 of 2): Sub basinWeinganga and Pranhita

Mar	55	50	53	56	49	59	65	50	53	58	57	59	51	43	43	50	35	39	56	58	67	52	53	56	58	62	60	51	57	48	59	69	61
Feb	NA	56	54	70	48	56	NA	45	61	NA	56	61	64	56	55	50	51	51	63	50	54	63	42	47	72	57	56	64	47	48	65	59	55
Jan	71	60	58	62	60	57	67	66	54	66	47	49	63	64	59	49	57	47	62	63	59	46	61	51	69	59	44	51	56	41	66	55	56
Dec	NA	66	52	62	61	59	NA	75	51	NA	60	56	62	61	59	50	59	54	64	73	59	55	67	52	56	69	62	39	NA	50	62	66	61
Nov	NA	51	52	63	65	53	NA	62	42	NA	61	56	65	64	61	56	60	56	55	65	61	46	65	57	64	63	57	49	60	39	59	62	57
Oct	57	74	58	63	71	58	59	72	49	56	63	52	63	66	65	44	67	61	58	67	69	53	66	63	NA	68	57	NA	68	52	67	76	59
Sep	NA	60	63	71	65	50	NA	61	67	NA	57	53	64	63	56	56	59	NA	64	62	53	54	59	48	64	70	49	62	66	42	65	65	58
Aug	NA	70	53	58	63	60	NA	63	52	NA	63	58	65	57	57	58	55	52	53	57	54	46	69	47	57	49	60	49	47	56	67	55	50
Jul	59	56	61	65	59	70	60	61	62	49	66	64	53	55	63	50	55	59	45	74	63	33	63	39	NA	57	67	NA	51	57	43	61	69
Jun	NA	NA	59	56	NA	55	NA	NA	57	NA	64	58	67	62	59	56	57	59	58	NA	61	54	NA	51	NA	64	58	NA	55	55	57	56	62
May	NA	NA	46	55	NA	58	NA	NA	46	NA	57	NA	66	62	60	56	55	NA	60	71	57	55	NA	52	NA	58	52	NA	52	45	55	67	60
Apr	53	53	60	56	70	57	49	63	56	42	65	58	57	72	56	48	62	40	52	74	53	52	68	58	NA	65	51	NA	62	43	56	68	74
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	1909			2722			1910			1908			2170			2171			2173			2172			2175			2176			11		
	Weinganga																														Pranhita & Others		

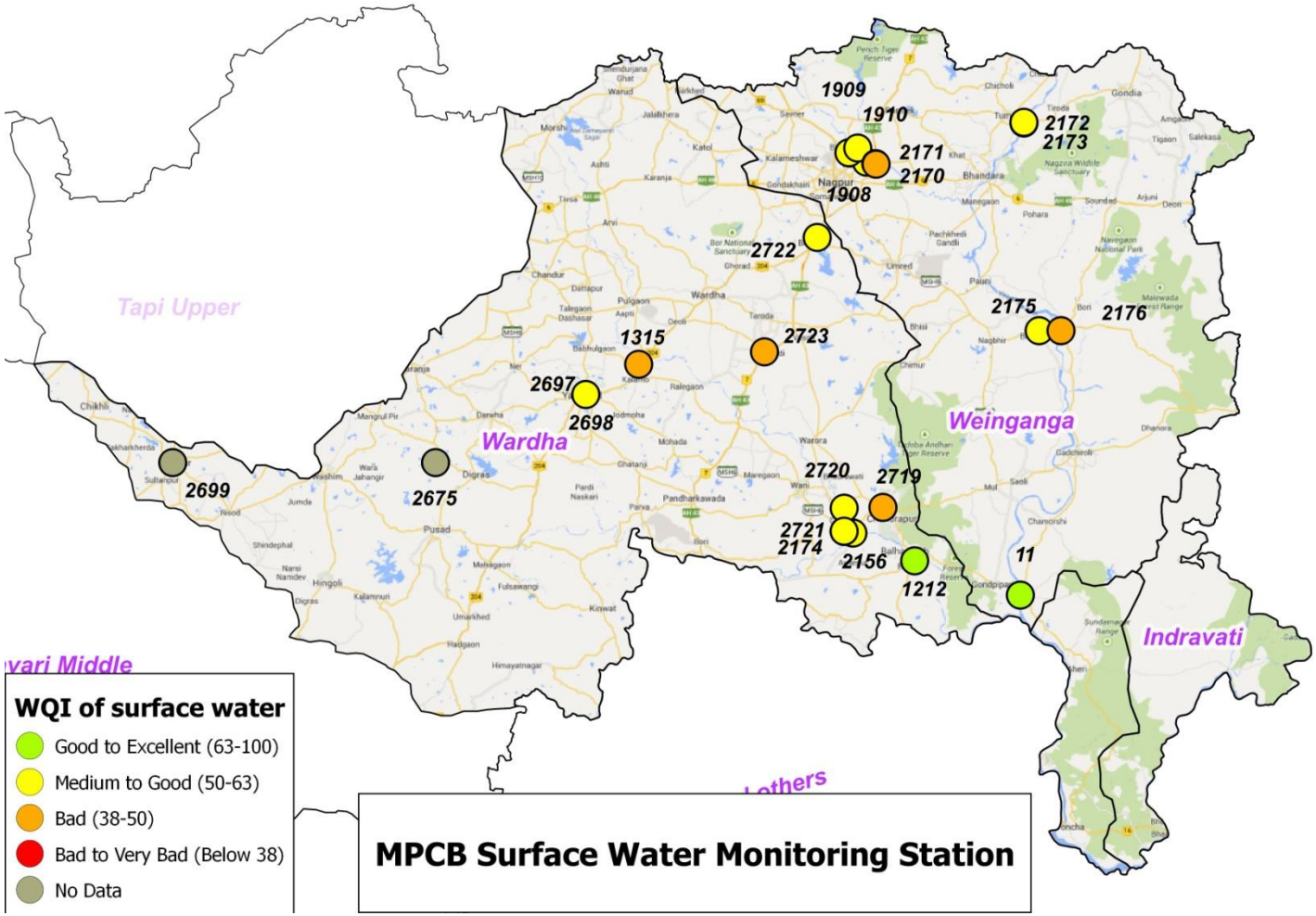
Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

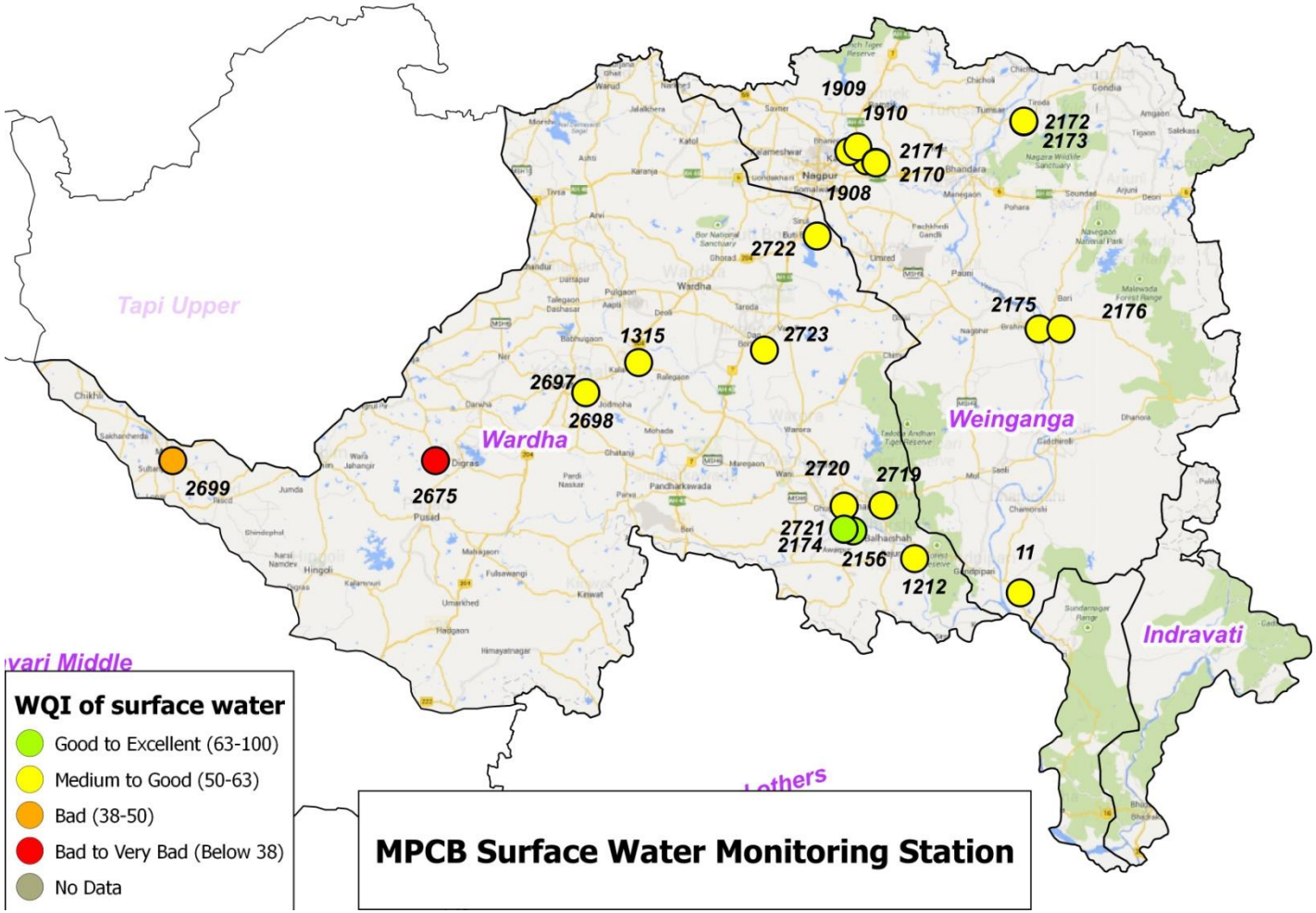
Surface water quality monitoring stations in Godavari Basin (2 of 2)

Station Code	River	Name of the Station	Village	Taluka	District
1909	Kanhan	Village- Agargaon, Taluka- Kuhi, District- Nagpur	Agargaon	Kuhi	Nagpur
2722	Wena	Wena river at U/s of Mohata Mills,	Hinganghat	Hinganghat	Wardha
1910	Wainganga	Wainganga river after confluence with Kanhan river	Ambhora	Kuhi	Nagpur
1908	Kolar	Kolar river before confluence with Kanhan river at Waregaon Bridge.	Waregaon	Kamptee	Nagpur
2170	Kanhan	Kanhan river at U/s of M/s Vidarbha Paper Mills	Sinora	Parseoni	Nagpur
2171	Kanhan	Kanhan river at D/s of M/s Vidarbha Paper Mills	Sinora	Parseoni	Nagpur
2173	Wainganga	Wainganga at U/s of Ellora Paper Mills	Tumsar	Tumsar	Bandara
2172	Wainganga	Wainganga at D/s of Ellora Paper Mills	Tumsar	Tumsar	Bandara
2175	Wainganga	Wainganga at U/s of Gaurav Paper Mills, near jackwell.	Bramhpuri	Chandrapur	Chandrapur
2176	Wainganga	Wainganga at D/s of Gaurav Paper Mills, near jack well.	Bramhpuri	Chandrapur	Chandrapur
11	Wainganga	Wainganga river at Ashti	Ashti	Gondpipri	Chandrapur

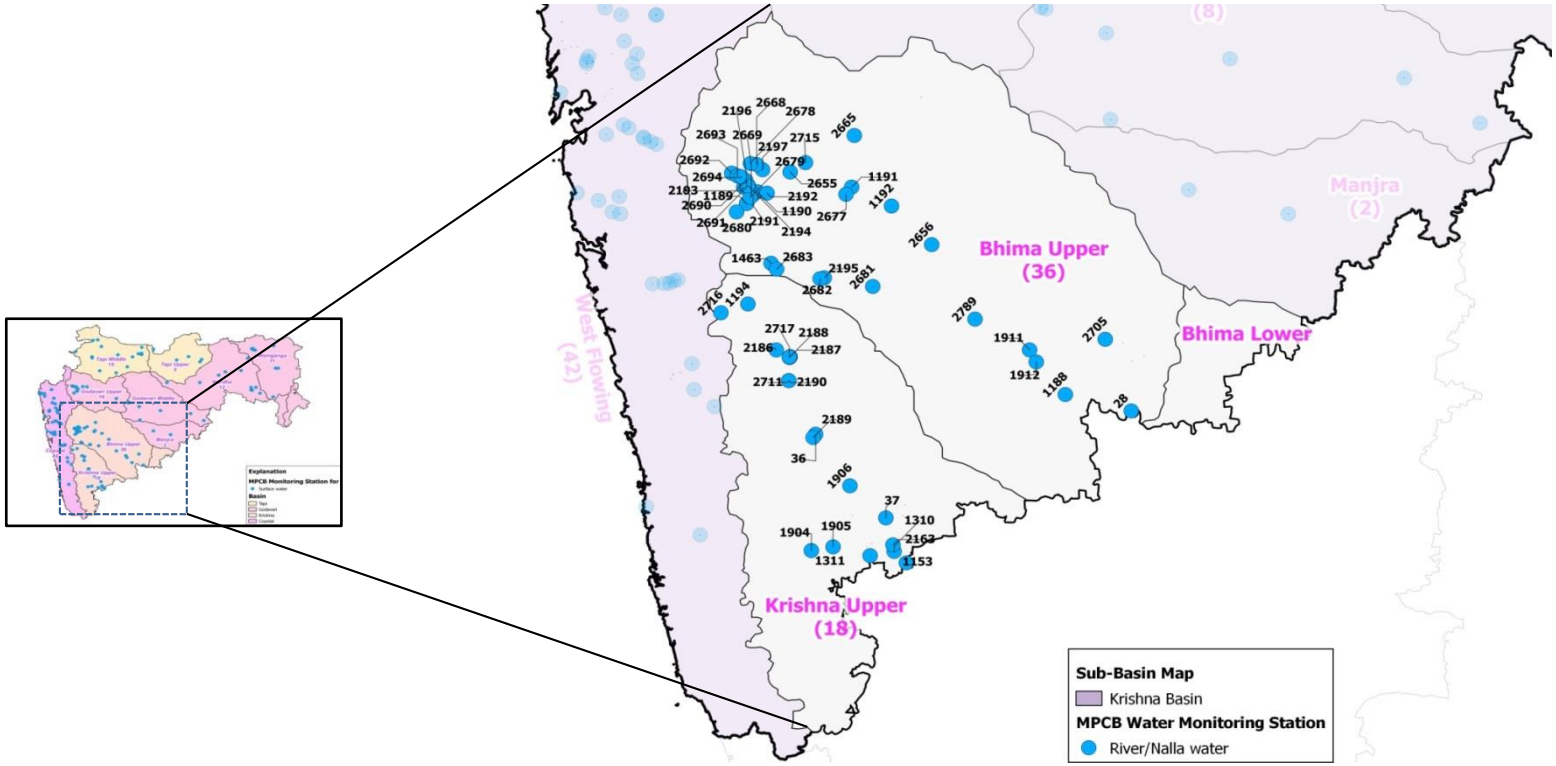
Spatial map of Surface WQI in Godavari Basin (2 of 2) (April 2012)



Spatial map of Surface WQI in Godavari Basin (2 of 2) (December 2012)



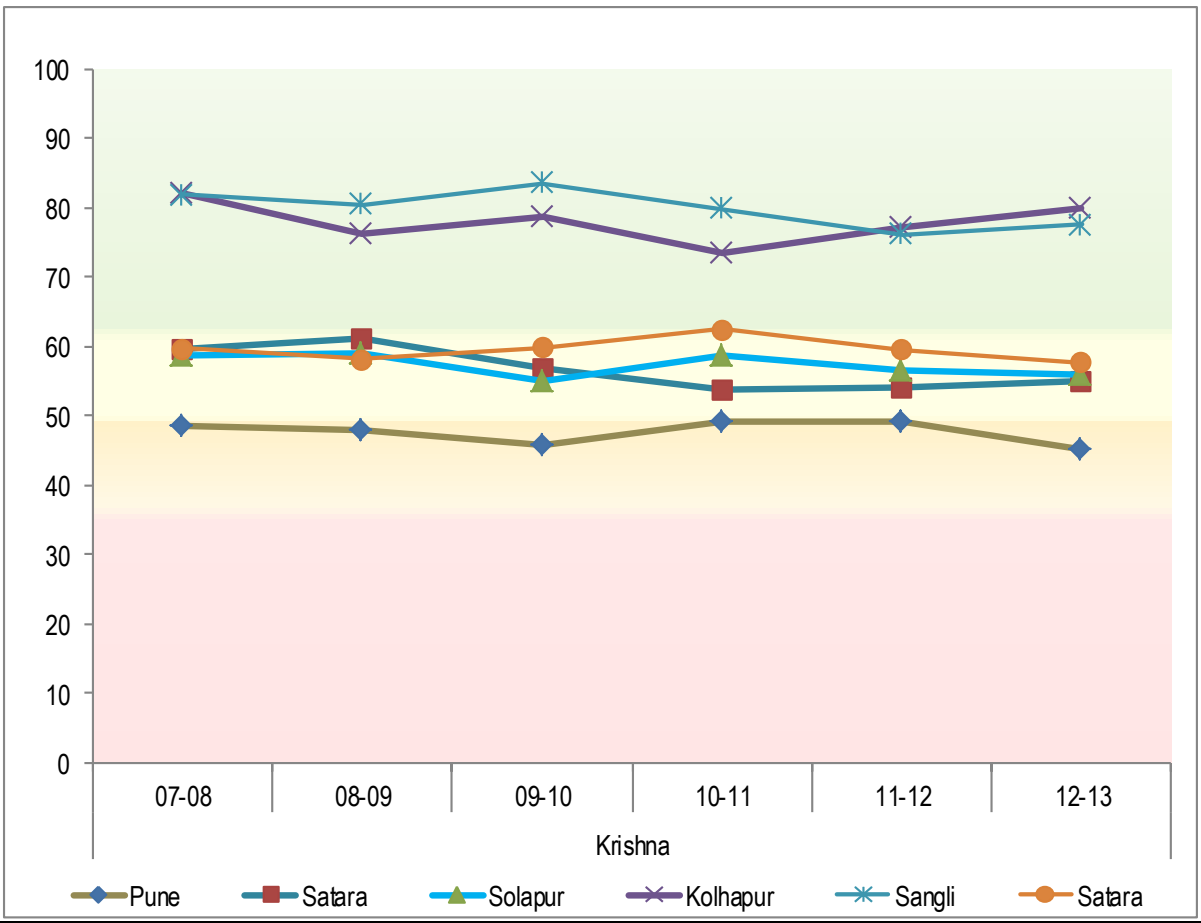
Krishna Basin



Map No. 6: Network of surface water quality monitoring stations in Bhima upper sub basin; Krishna Basin 1of 2

In Maharashtra the Krishna Basin could be divided into three sub-basins Bhima Upper and Lower basin and Krishna Upper. There are a total of 54 (36 on Bhima upper and 18 on Krishna upper) surface water monitoring stations in the Krishna river basin in Maharashtra. There is no monitoring station on Bhima lower sub-basin. A list of the station and the codes has been provided below in Table No. 11, Table No. 14 and Table No.13.

Krishna Basin (Intra Basin analysis)



WQI	Category	Class by CPCB	Remarks
63-100	Good to Excellent	A	Non polluted
50-63	Medium to Good	B	Non polluted
38-50	Bad	C	Polluted
38 & less	Bad to Very Bad	D, E	Heavily polluted

Figure No. 22: Trend of annual average WQI across districts of Krishna basin

Note:

This graph considers the average WQI for all the monitoring stations in that particular district and hence may include some bias. This graph is only for an overview and monitoring station wise data maybe analyzed to pin point the most affected and polluted patches of rivers in that district.

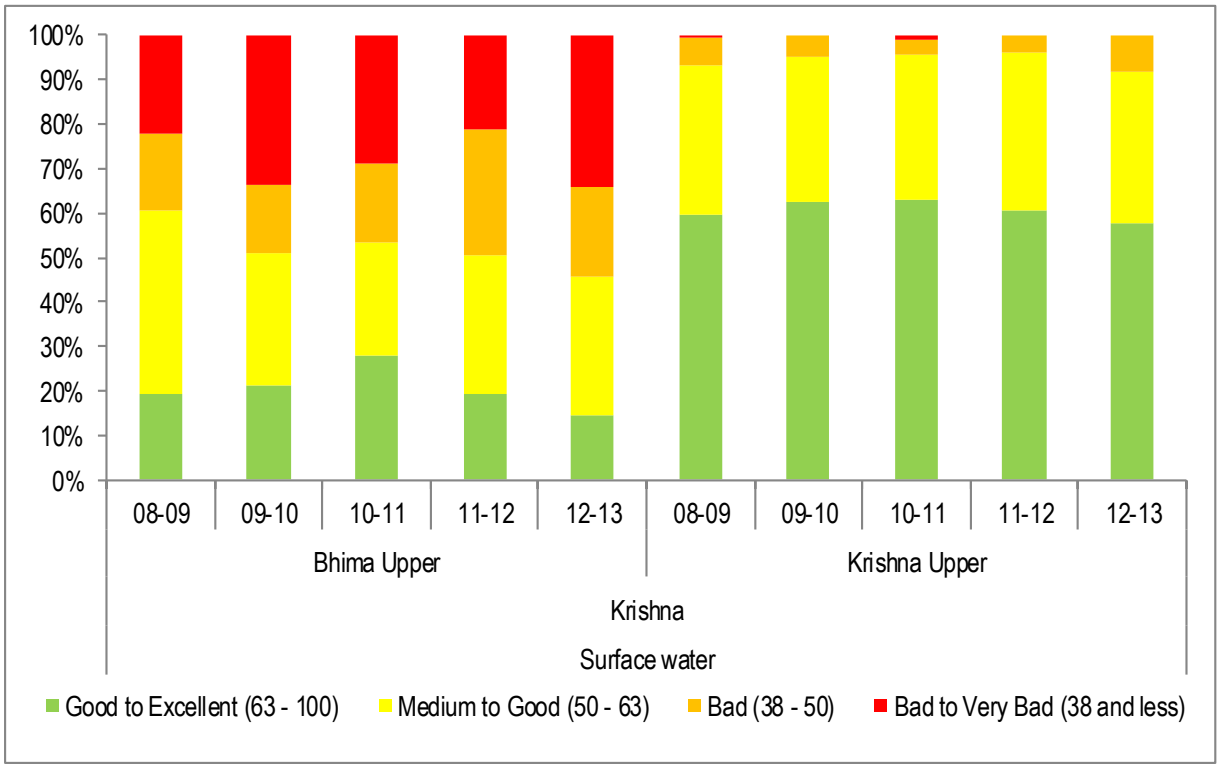
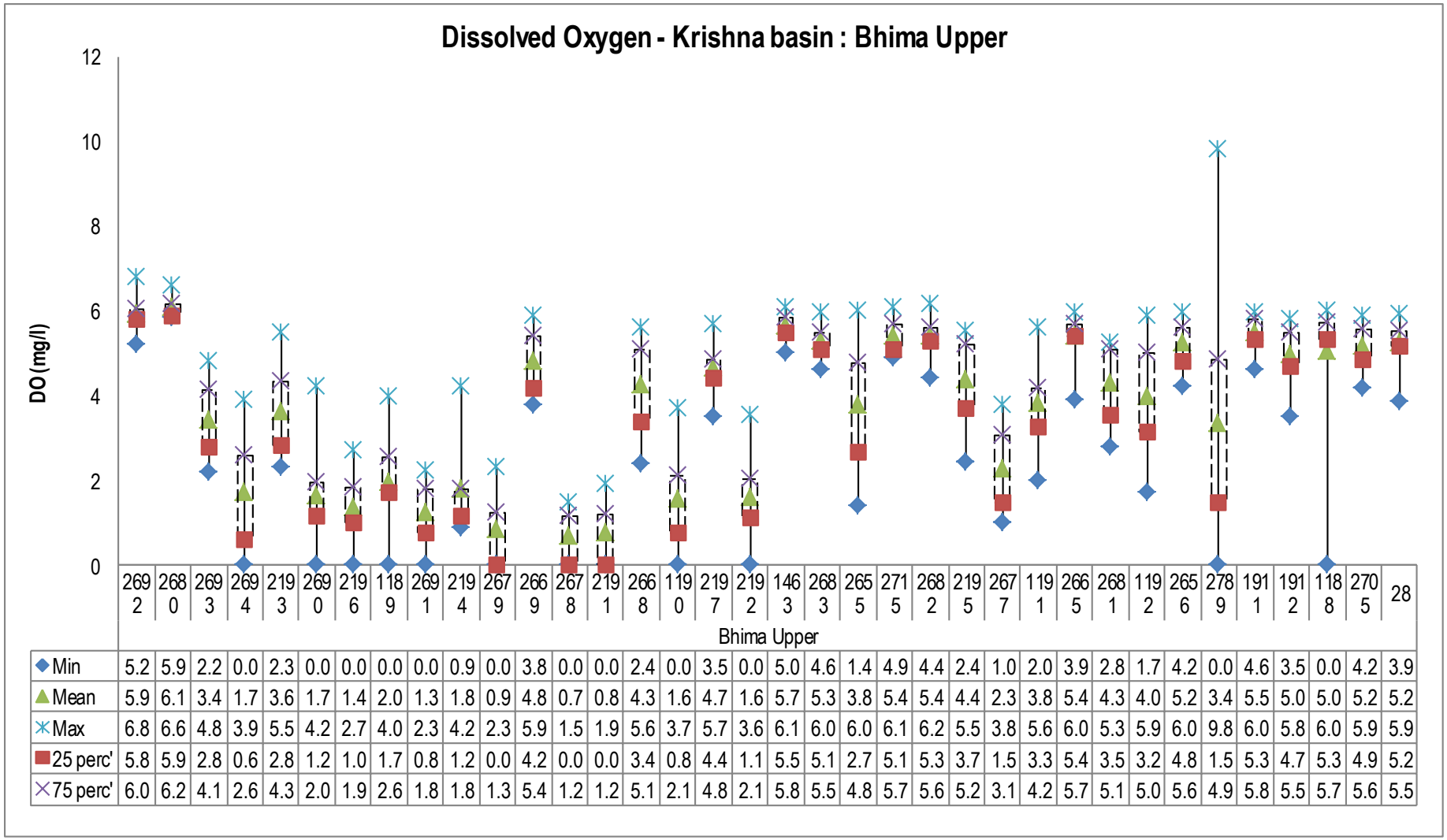


Figure No. 23: Trend of average occurrence for different category of WQI in Krishna basin

The Intra basin performance of Krishna basin across five districts of the state are depicted in Figure No. 22 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in Figure No. 23.

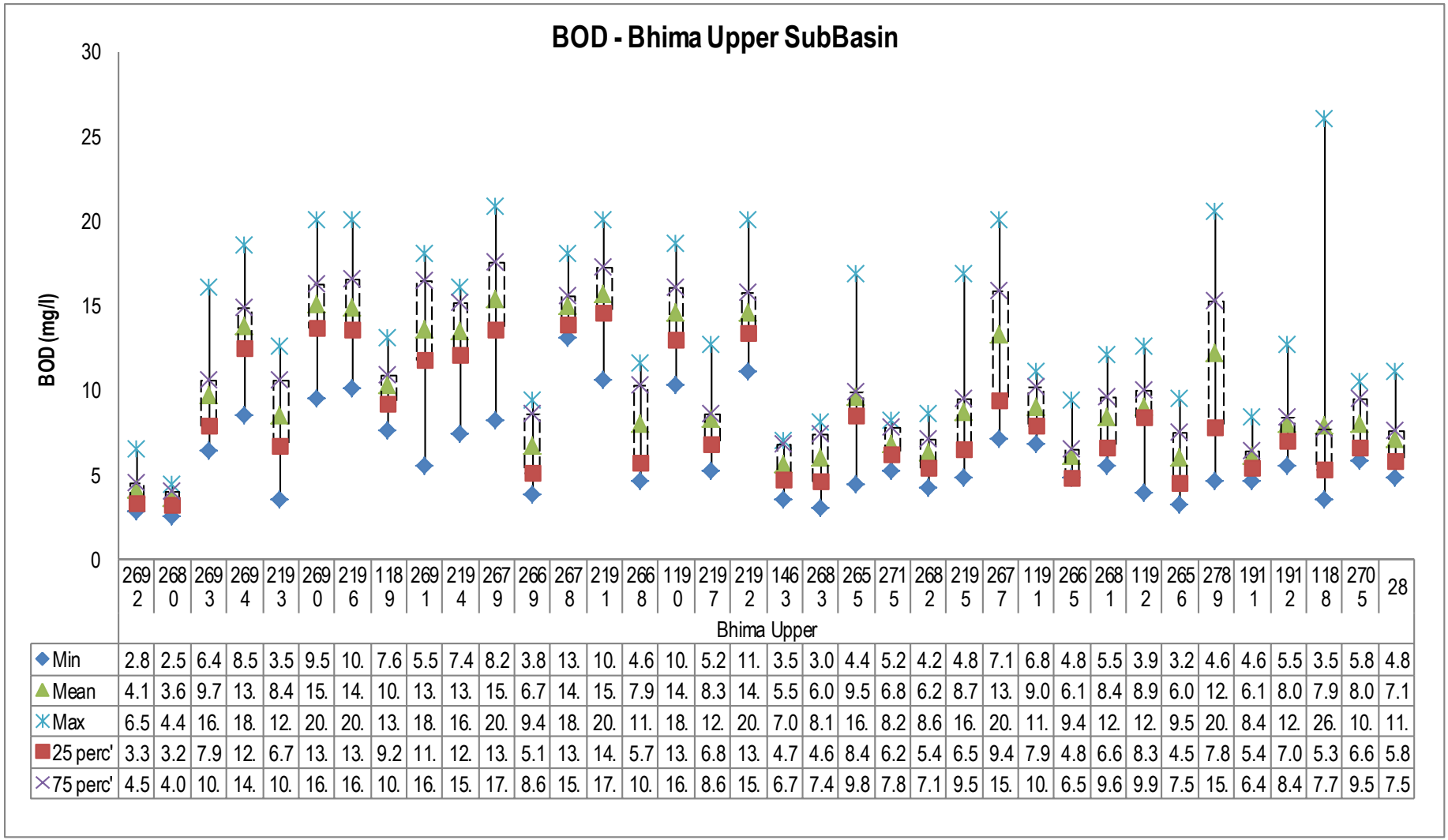
The results showed that among five districts, namely Kolhapur, Pune, Sangli, Satara and Solapur, the annual average WQI of 28 WQMS of Pune were consistently in Bad category (i.e. WQI in range of 38-50) from 07-08 till 12-13. Whereas, Satara (12 WQMS) and Solapur (6 WQMS) were Medium to Good (i.e. WQI in range of 50-63) and Kolhapur (6 WQMS) and Sangli (2 WQMS) were Good to Excellent category (i.e. WQI in range of 63-100). The average WQI across various districts showed more or less consistent values.

Figure No. 23 shows average annual occurrence of WQI across 36 WQM stations of Bhima Upper and 18 WQMS of Krishna Upper for 7 years starting from 2008. Intra Sub basins results for Krishna Basin showed that the occurrence of Good to Excellent category of WQI in Krishna Upper sub basins is three times that of the Bhima Upper, indicating that more likely occurrence of Good to Excellent category. Hence the overall preview of Krishna Upper is better when compared to Bhima Upper.



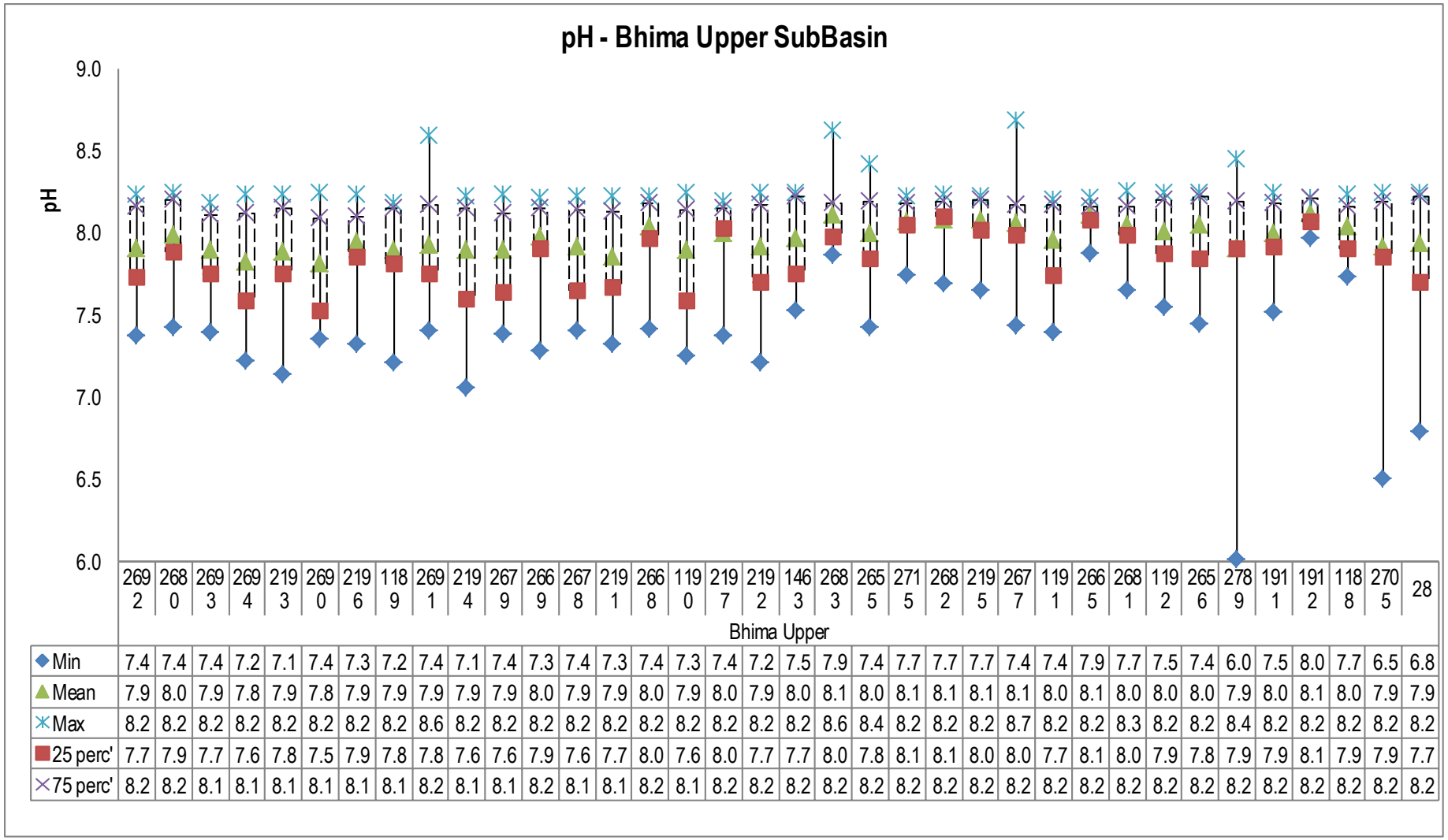
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	2789	1911	1912	1188	2705	28
Min	5.2	5.9	2.2	0.0	2.3	0.0	0.0	0.0	0.0	0.9	0.0	3.8	0.0	0.0	2.4	0.0	3.5	0.0	5.0	4.6	1.4	4.9	4.4	2.4	1.0	2.0	3.9	2.8	1.7	4.2	0.0	4.6	3.5	0.0	4.2	3.9
Mean	5.9	6.1	3.4	1.7	3.6	1.7	1.4	2.0	1.3	1.8	0.9	4.8	0.7	0.8	4.3	1.6	4.7	1.6	5.7	5.3	3.8	5.4	5.4	4.4	2.3	3.8	5.4	4.3	4.0	5.2	3.4	5.5	5.0	5.0	5.2	5.2
Max	6.8	6.6	4.8	3.9	5.5	4.2	2.7	4.0	2.3	4.2	2.3	5.9	1.5	1.9	5.6	3.7	5.7	3.6	6.1	6.0	6.0	6.1	6.2	5.5	3.8	5.6	6.0	5.3	5.9	6.0	9.8	6.0	5.8	6.0	5.9	5.9
25 perc'	5.8	5.9	2.8	0.6	2.8	1.2	1.0	1.7	0.8	1.2	0.0	4.2	0.0	0.0	3.4	0.8	4.4	1.1	5.5	5.1	2.7	5.1	5.3	3.7	1.5	3.3	5.4	3.5	3.2	4.8	1.5	5.3	4.7	5.3	4.9	5.2
75 perc'	6.0	6.2	4.1	2.6	4.3	2.0	1.9	2.6	1.8	1.8	1.3	5.4	1.2	1.2	5.1	2.1	4.8	2.1	5.8	5.5	4.8	5.7	5.6	5.2	3.1	4.2	5.7	5.1	5.0	5.6	4.9	5.8	5.5	5.7	5.6	5.5

Figure No. 24: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Bhima upper sub basin - Krishna basin 1 of 2



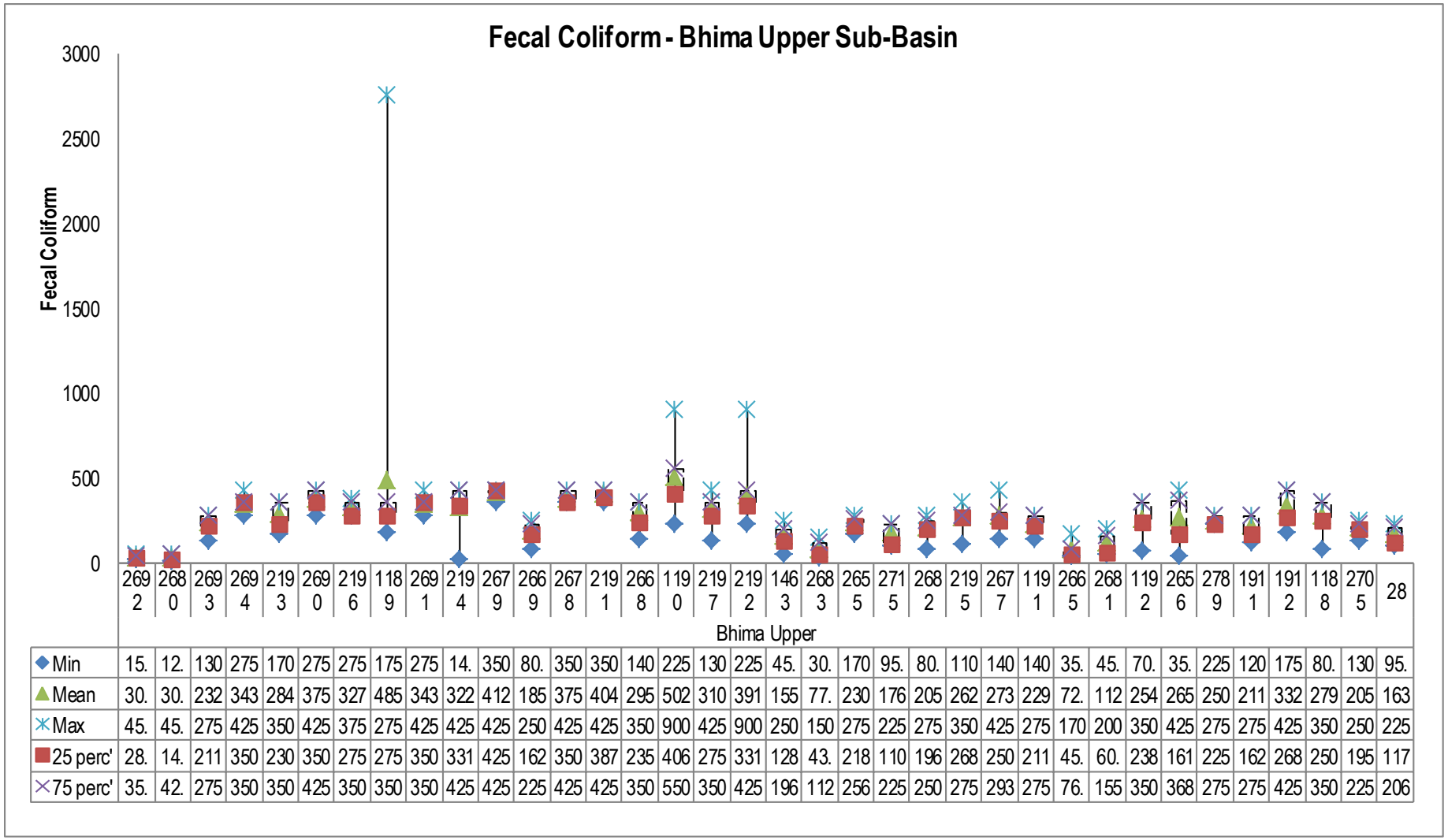
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	2789	1911	1912	1188	2705	28
Min	2.8	2.5	6.4	8.5	3.5	9.5	10.	7.6	5.5	7.4	8.2	3.8	13.	10.	4.6	10.	5.2	11.	3.5	3.0	4.4	5.2	4.2	4.8	7.1	6.8	4.8	5.5	3.9	3.2	4.6	4.6	5.5	3.5	5.8	4.8
Mean	4.1	3.6	9.7	13.	8.4	15.	14.	10.	13.	13.	15.	6.7	14.	15.	7.9	14.	8.3	14.	5.5	6.0	9.5	6.8	6.2	8.7	13.	9.0	6.1	8.4	8.9	6.0	12.	6.1	8.0	7.9	8.0	7.1
Max	6.5	4.4	16.	18.	12.	20.	20.	13.	18.	16.	20.	9.4	18.	20.	11.	18.	12.	20.	7.0	8.1	16.	8.2	8.6	16.	20.	11.	9.4	12.	12.	9.5	20.	8.4	12.	26.	10.	11.
25 perc'	3.3	3.2	7.9	12.	6.7	13.	13.	9.2	11.	12.	13.	5.1	13.	14.	5.7	13.	6.8	13.	4.7	4.6	8.4	6.2	5.4	6.5	9.4	7.9	4.8	6.6	8.3	4.5	7.8	5.4	7.0	5.3	6.6	5.8
75 perc'	4.5	4.0	10.	14.	10.	16.	16.	10.	16.	15.	17.	8.6	15.	17.	10.	16.	8.6	15.	6.7	7.4	9.8	7.8	7.1	9.5	15.	10.	6.5	9.6	9.9	7.5	15.	6.4	8.4	7.7	9.5	7.5

Figure No. 25: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Bhima upper sub basin - Krishna basin 1 of 2



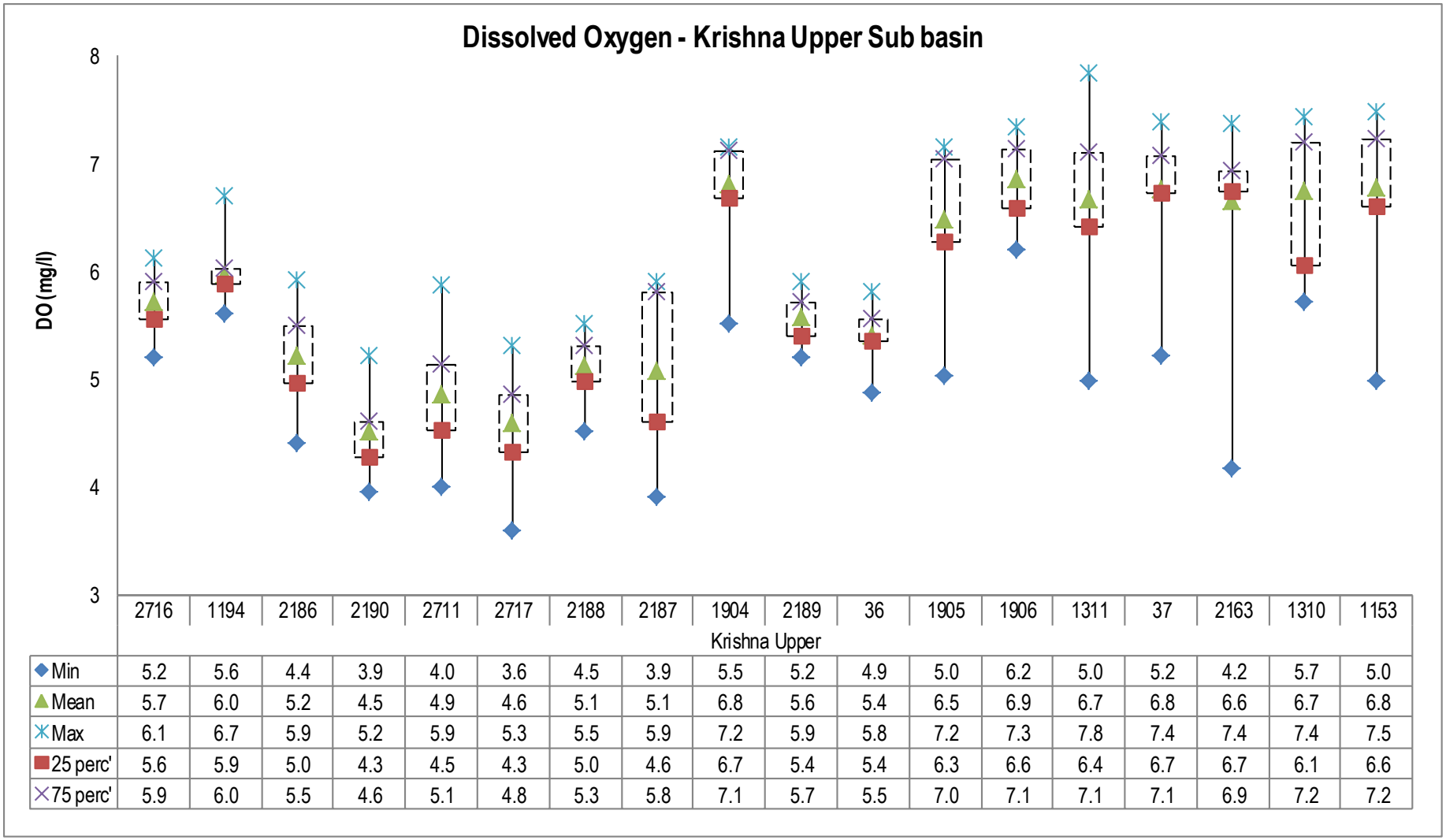
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	2789	1911	1912	1188	2705	28
Min	7.4	7.4	7.4	7.2	7.1	7.4	7.3	7.2	7.4	7.1	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.2	7.5	7.9	7.4	7.7	7.7	7.7	7.4	7.4	7.9	7.7	7.5	7.4	6.0	7.5	8.0	7.7	6.5	6.8
Mean	7.9	8.0	7.9	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	8.0	7.9	8.0	7.9	8.0	8.1	8.0	8.1	8.1	8.1	8.1	8.0	8.1	8.0	8.0	8.0	7.9	8.0	8.1	8.0	7.9	7.9
Max	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.6	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.6	8.4	8.2	8.2	8.2	8.7	8.2	8.2	8.3	8.2	8.2	8.4	8.2	8.2	8.2	8.2	8.2
25 perc'	7.7	7.9	7.7	7.6	7.8	7.5	7.9	7.8	7.8	7.6	7.6	7.9	7.6	7.7	8.0	7.6	8.0	7.7	7.7	8.0	7.8	8.1	8.1	8.0	8.0	7.7	8.1	8.0	7.9	7.8	7.9	7.9	8.1	7.9	7.9	7.7
75 perc'	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.1	8.1	8.2	8.1	8.1	8.2	8.1	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2

Figure No. 26: Trend of pH levels recorded at WQMS at Bhima upper sub basin - Krishna basin 1 of 2



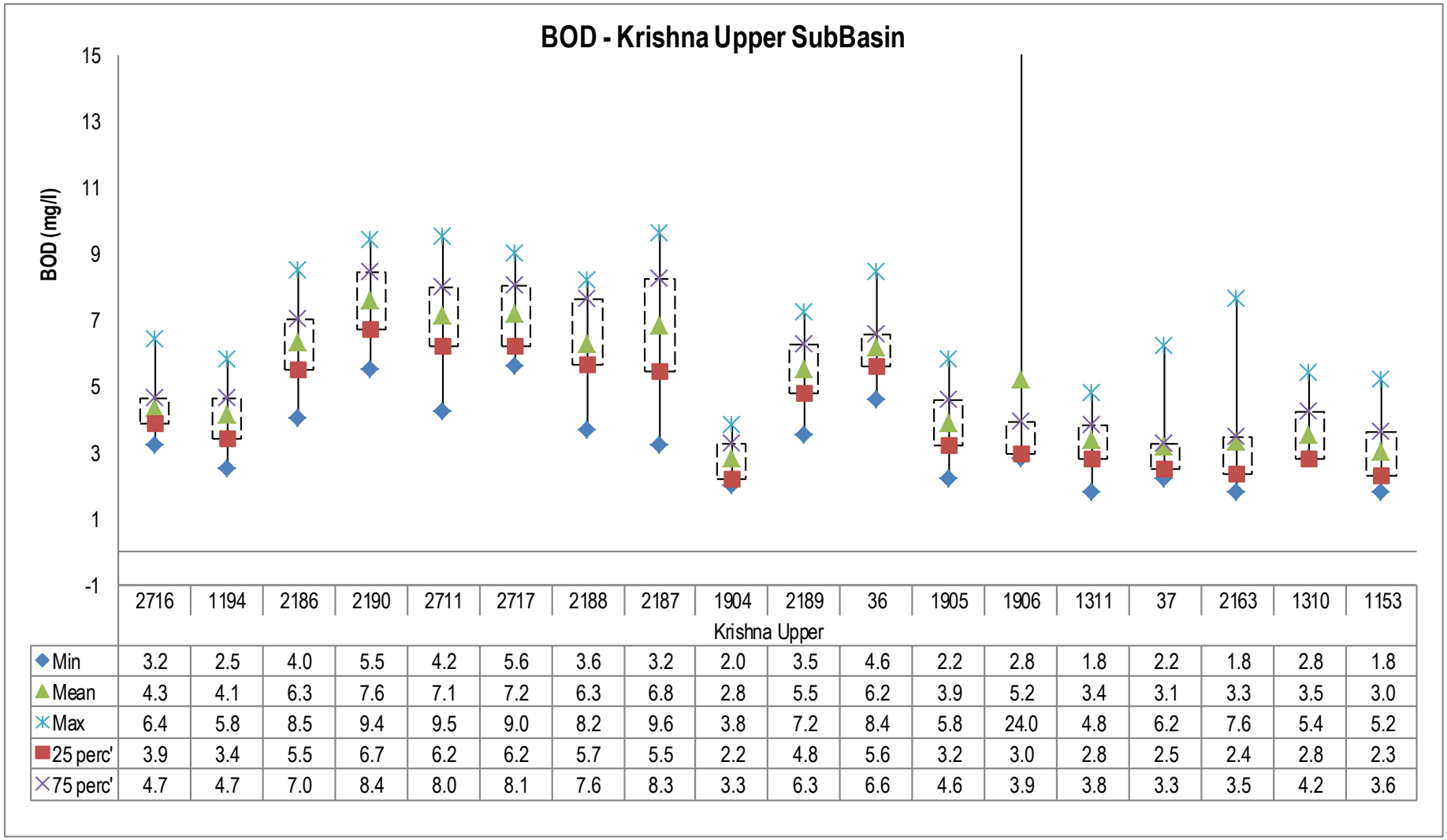
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	2789	1911	1912	1188	2705	28
Min	15.	12.	130	275	170	275	275	175	275	14.	350	80.	350	350	140	225	130	225	45.	30.	170	95.	80.	110	140	140	35.	45.	70.	35.	225	120	175	80.	130	95.
Mean	30.	30.	232	343	284	375	327	485	343	322	412	185	375	404	295	502	310	391	155	77.	230	176	205	262	273	229	72.	112	254	265	250	211	332	279	205	163
Max	45.	45.	275	425	350	425	375	275	425	425	425	250	425	425	350	900	425	900	250	150	275	225	275	350	425	275	170	200	350	425	275	275	425	350	250	225
25 perc'	28.	14.	211	350	230	350	275	275	350	331	425	162	350	387	235	406	275	331	128	43.	218	110	196	268	250	211	45.	60.	238	161	225	162	268	250	195	117
75 perc'	35.	42.	275	350	350	425	350	350	350	425	425	225	425	425	350	550	350	425	196	112	256	225	250	275	293	275	76.	155	350	368	275	275	425	350	225	206

Figure No. 27: Trend of Fecal Coliform levels recorded at WQMS at Bhima upper sub basin - Krishna basin 1 of 2



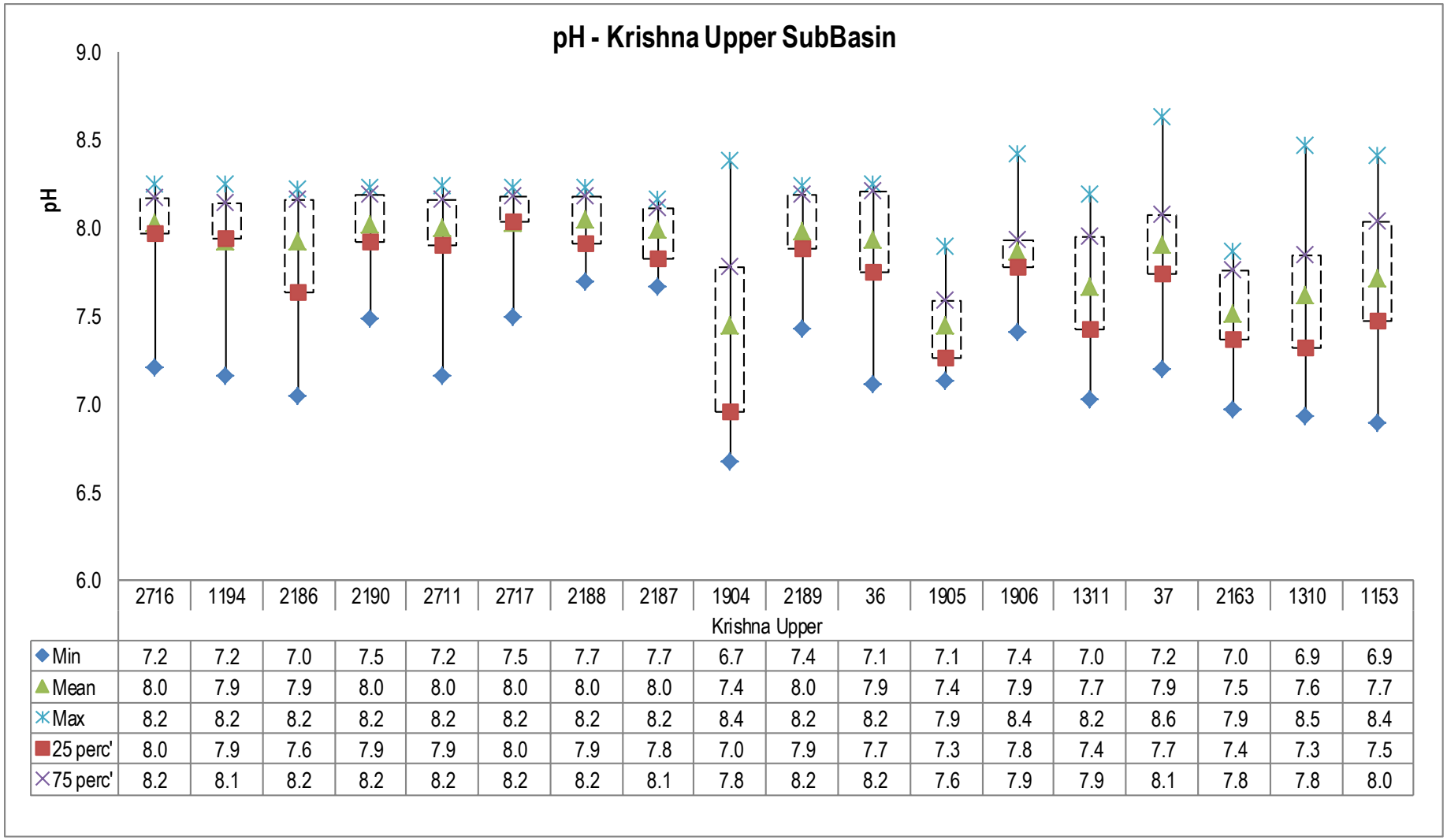
	2716	1194	2186	2190	2711	2717	2188	2187	1904	2189	36	1905	1906	1311	37	2163	1310	1153
	Krishna Upper																	
Min	5.2	5.6	4.4	3.9	4.0	3.6	4.5	3.9	5.5	5.2	4.9	5.0	6.2	5.0	5.2	4.2	5.7	5.0
Mean	5.7	6.0	5.2	4.5	4.9	4.6	5.1	5.1	6.8	5.6	5.4	6.5	6.9	6.7	6.8	6.6	6.7	6.8
Max	6.1	6.7	5.9	5.2	5.9	5.3	5.5	5.9	7.2	5.9	5.8	7.2	7.3	7.8	7.4	7.4	7.4	7.5
25 perc'	5.6	5.9	5.0	4.3	4.5	4.3	5.0	4.6	6.7	5.4	5.4	6.3	6.6	6.4	6.7	6.7	6.1	6.6
75 perc'	5.9	6.0	5.5	4.6	5.1	4.8	5.3	5.8	7.1	5.7	5.5	7.0	7.1	7.1	7.1	6.9	7.2	7.2

Figure No. 28: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Krishna upper sub basin - Krishna basin 2 of 2



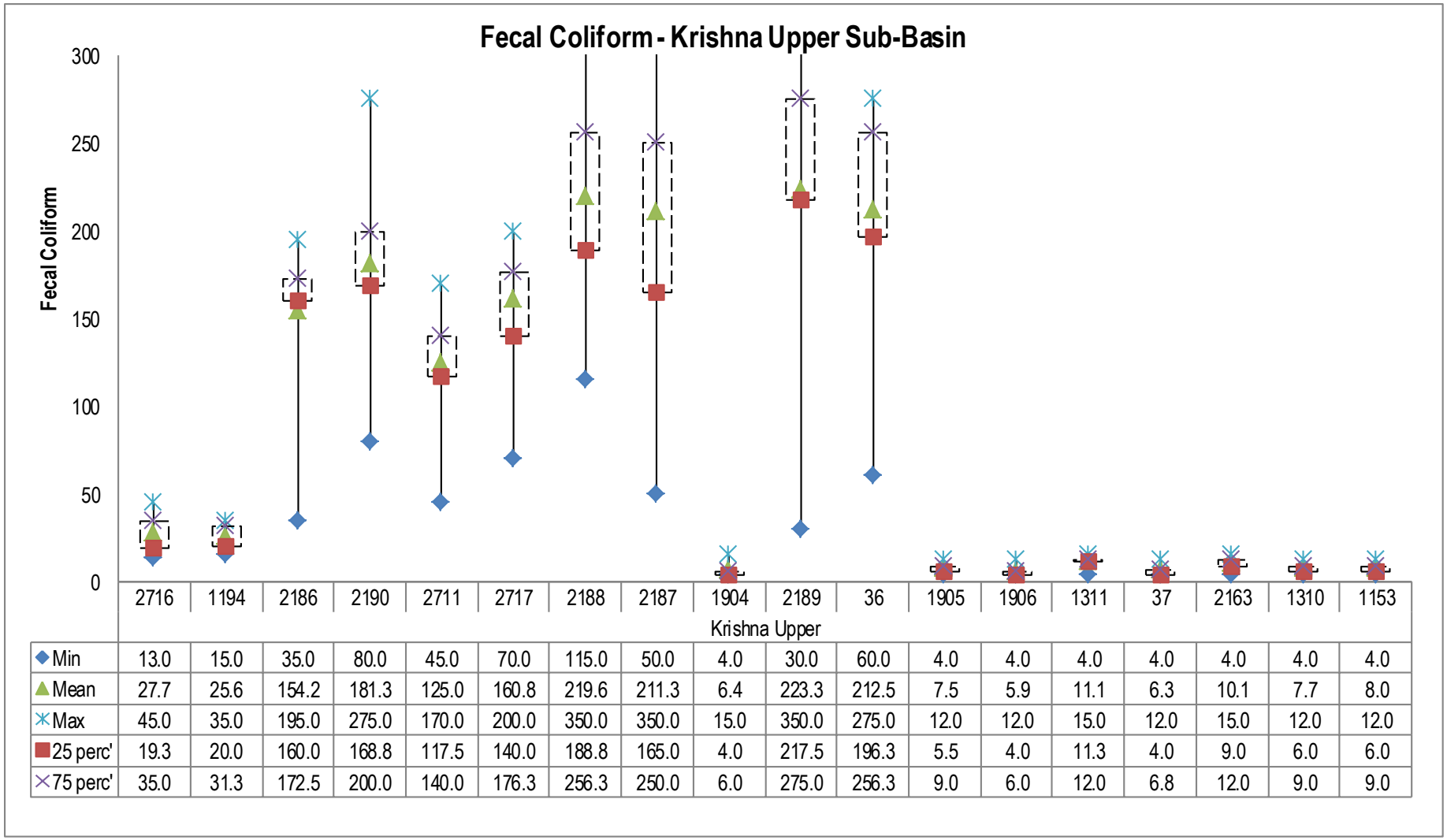
	2716	1194	2186	2190	2711	2717	2188	2187	1904	2189	36	1905	1906	1311	37	2163	1310	1153
	Krishna Upper																	
Min	3.2	2.5	4.0	5.5	4.2	5.6	3.6	3.2	2.0	3.5	4.6	2.2	2.8	1.8	2.2	1.8	2.8	1.8
Mean	4.3	4.1	6.3	7.6	7.1	7.2	6.3	6.8	2.8	5.5	6.2	3.9	5.2	3.4	3.1	3.3	3.5	3.0
Max	6.4	5.8	8.5	9.4	9.5	9.0	8.2	9.6	3.8	7.2	8.4	5.8	24.0	4.8	6.2	7.6	5.4	5.2
25 perc'	3.9	3.4	5.5	6.7	6.2	6.2	5.7	5.5	2.2	4.8	5.6	3.2	3.0	2.8	2.5	2.4	2.8	2.3
75 perc'	4.7	4.7	7.0	8.4	8.0	8.1	7.6	8.3	3.3	6.3	6.6	4.6	3.9	3.8	3.3	3.5	4.2	3.6

Figure No. 29: Trend of Biological Oxygen Demand (B) levels recorded at WQMS at Krishna upper sub basin - Krishna basin 2 of 2



	2716	1194	2186	2190	2711	2717	2188	2187	1904	2189	36	1905	1906	1311	37	2163	1310	1153
	Krishna Upper																	
Min	7.2	7.2	7.0	7.5	7.2	7.5	7.7	7.7	6.7	7.4	7.1	7.1	7.4	7.0	7.2	7.0	6.9	6.9
Mean	8.0	7.9	7.9	8.0	8.0	8.0	8.0	8.0	7.4	8.0	7.9	7.4	7.9	7.7	7.9	7.5	7.6	7.7
Max	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.4	8.2	8.2	7.9	8.4	8.2	8.6	7.9	8.5	8.4
25 perc'	8.0	7.9	7.6	7.9	7.9	8.0	7.9	7.8	7.0	7.9	7.7	7.3	7.8	7.4	7.7	7.4	7.3	7.5
75 perc'	8.2	8.1	8.2	8.2	8.2	8.2	8.2	8.1	7.8	8.2	8.2	7.6	7.9	7.9	8.1	7.8	7.8	8.0

Figure No. 30: Trend of pH levels recorded at WQMS at Krishna upper sub basin - Krishna basin 2 of 2



	2716	1194	2186	2190	2711	2717	2188	2187	1904	2189	36	1905	1906	1311	37	2163	1310	1153
	Krishna Upper																	
Min	13.0	15.0	35.0	80.0	45.0	70.0	115.0	50.0	4.0	30.0	60.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Mean	27.7	25.6	154.2	181.3	125.0	160.8	219.6	211.3	6.4	223.3	212.5	7.5	5.9	11.1	6.3	10.1	7.7	8.0
Max	45.0	35.0	195.0	275.0	170.0	200.0	350.0	350.0	15.0	350.0	275.0	12.0	12.0	15.0	12.0	15.0	12.0	12.0
25 perc'	19.3	20.0	160.0	168.8	117.5	140.0	188.8	165.0	4.0	217.5	196.3	5.5	4.0	11.3	4.0	9.0	6.0	6.0
75 perc'	35.0	31.3	172.5	200.0	140.0	176.3	256.3	250.0	6.0	275.0	256.3	9.0	6.0	12.0	6.8	12.0	9.0	9.0

Figure No. 31: Trend of Fecal Coliform levels recorded at WQMS at Krishna upper sub basin - Krishna basin 2 of 2

Water Quality Index for WQMS at Krishna Basin (1 of 2): Sub basin Bhima upper (1 of 3)

Mar	62	56	NA	73	71	73	78	73	76	49	40	37	39	33	32	37	51	43	35	32	31	36	51	30	NA	37	35	34	53	30	32	37	30	NA	33	29
Feb	51	41	63	66	74	67	79	74	74	39	34	35	35	31	40	40	35	58	33	30	30	36	31	30	NA	54	51	31	35	34	36	34	40	NA	NA	43
Jan	NA	43	NA	73	78	74	78	70	71	35	42	48	22	32	41	33	46	57	29	32	38	22	35	34	37	40	36	29	33	29	29	48	56	NA	NA	31
Dec	NA	50	55	74	75	71	NA	74	70	53	40	48	45	36	30	42	42	43	65	38	34	62	38	33	NA	43	36	40	35	30	36	36	32	NA	NA	28
Nov	66	49	NA	79	71	67	77	70	66	62	41	53	44	34	31	52	46	49	37	34	31	40	36	28	NA	38	31	35	37	27	NA	32	31	NA	NA	25
Oct	69	47	60	76	73	72	54	72	75	51	48	53	39	38	38	36	40	45	34	36	37	38	33	38	48	41	36	36	38	37	38	35	31	NA	NA	31
Sep	57	NA	NA	77	71	70	NA	72	69	61	60	40	41	38	32	52	58	57	41	44	35	39	47	31	NA	56	33	41	44	34	41	48	31	NA	NA	30
Aug	59	NA	NA	75	75	74	38	77	71	59	58	53	41	35	47	51	NA	51	34	39	45	39	38	31	NA	55	39	38	39	39	37	46	44	NA	NA	32
Jul	69	NA	NA	82	73	74	79	76	70	48	36	48	35	30	39	46	48	37	39	36	38	36	40	38	40	53	41	33	33	37	31	37	32	NA	NA	33
Jun	71	57	58	74	75	68	74	81	69	46	52	40	33	37	31	29	45	38	32	41	32	26	37	36	NA	53	35	27	41	45	29	40	35	27	NA	33
May	62	67	52	76	69	76	67	77	NA	51	48	44	48	39	33	50	54	36	56	42	31	27	42	35	NA	49	34	26	39	32	26	39	31	37	NA	31
Apr	NA	59	NA	68	75	65	72	77	69	62	53	40	48	35	32	34	NA	46	35	41	31	46	39	29	36	33	40	35	44	32	42	NA	37	28	NA	31
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2715			2692			2680			2693			2694			2193			2690			2196			1189			2691			2194			2679		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 11: Surface water quality monitoring stations in Bhima upper Sub basin (1 of 2): Krishna Basin (1 of 3)

Station Code	River	Name of the Station	Village	Taluka	District
2715	Vel river	Vel river at Shikrapur, Pune	Shikrapur	Shirur	Pune
2692	Pawana river	Pawana river at Ravet Weir, Pune..	Ravet	Haweli	Pune
2680	Mutha river	Mutha river at Khadakvasla Dam, Pune.	Kadakvasla	Haweli	Pune
2693	Pawana river	Pawana river at Chinchwadgaon, Pune.	Chinchwadgaon	Haweli	Pune
2694	Pawana river	Pawana river at Pimpri gaon, Pune.	Pimprigaon	Haweli	Pune
2193	Mula river	Mula river at Aundh bridge, Aundgaon.	Aundhgaon	Haweli	Pune
2690	Pawana river	Pawana river at Kasarwadi, Pune.	Kasarwadi	Haweli	Pune
2196	Pawana river	Pawana river at Sangavi gaon, Pune.	Sangavigaon	Haweli	Pune
1189	Bhima river	Bhima river at Pune (Mutha river) at U/s of Vithalwadi near Sankar Mandir.	Vithalwadi	Haweli	Pune
2691	Pawana river	Pawana river at Dapodi bridge, at Pawana- Mulla Sangam,Pune.	Dapodi	Haweli	Pune
2194	Mula river	Mula river at Harrison bridge near Mula- Pawana sangam.	Bopodi	Haweli	Pune
2679	Mutha river	Mutha river at Deccan bridge, Pune.	Deccan	Pune	Pune

Water Quality Index for WQMS at Krishna Basin (1 of 2): Sub basin Bhima upper (2 of 3)

Mar	60	49	62	27	33	28	27	32	29	55	45	58	NA	32	28	57	50	52	28	37	28	64	65	68	55	71	68	56	51	37	60	62	63	48	51	43
Feb	53	35	45	26	29	36	29	32	32	33	39	38	NA	34	39	46	35	46	31	34	35	67	53	64	54	59	66	55	36	49	69	51	59	58	43	42
Jan	37	42	62	28	32	30	26	32	33	NA	38	56	34	35	36	51	39	41	33	35	34	58	51	62	47	64	62	36	55	32	65	60	64	52	50	37
Dec	65	54	46	34	31	28	31	33	27	60	40	41	NA	37	25	62	49	49	38	37	25	61	64	56	68	57	60	NA	51	45	56	61	47	44	49	46
Nov	NA	57	55	NA	37	28	NA	29	31	NA	42	52	NA	34	32	44	51	50	NA	32	30	69	63	62	68	59	63	70	45	62	67	59	60	57	55	54
Oct	64	57	62	37	33	32	31	35	30	55	47	57	36	33	32	59	55	49	34	33	35	48	56	59	70	59	55	64	59	51	49	64	61	41	53	58
Sep	66	63	67	36	44	31	33	43	32	61	59	61	NA	49	33	58	61	64	37	53	35	66	64	65	NA	58	60	67	68	54	63	60	58	57	56	51
Aug	NA	61	58	37	64	35	33	35	37	59	59	52	NA	43	44	32	65	53	36	44	44	63	69	66	60	60	58	67	64	35	59	65	59	53	61	59
Jul	67	NA	49	31	32	30	28	34	29	NA	59	44	35	51	31	38	60	50	29	50	32	67	74	64	42	62	56	73	57	53	70	65	62	NA	62	58
Jun	35	69	52	25	41	33	28	37	30	32	63	37	NA	38	29	37	66	NA	26	40	32	70	74	57	47	59	57	67	67	46	71	71	57	68	55	48
May	63	42	NA	33	38	26	24	35	NA	28	38	NA	NA	41	30	55	53	NA	32	69	33	64	48	67	63	63	56	60	70	48	55	57	64	54	36	49
Apr	55	55	51	27	37	32	28	NA	30	49	54	45	27	39	36	51	53	54	28	NA	38	69	NA	62	64	61	56	52	60	41	69	56	58	51	28	54
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2669			2678			2191			2668			1190			2197			2192			1463			2683			2655			2682			2195		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 12: Surface water quality monitoring stations in Krishna Basin (1 of 2): Sub basin Bhima upper (2 of 3)

Station Code	River	Name of the Station	Village	Taluka	District
2669	Indrayani river	Indrayani river at U/s of Moshigaon, Pune	Moshigaon	Haweli	Pune
2678	Mutha river	Mutha river near Veer Savarkar Bhavan, Pune	Pune M.C	Pune	Pune
2191	Mutha river	Mutha river at Sangam bridge near Ganapathy ghat	Shivaji Nagar	Pune	Pune
2668	Indrayani river	Indrayani river at D/s of Moshi village.	Moshi	Haveli	Pune
1190	Bhima river	Bhima river at D/s of Bundgarden, Pune.	Yerwada	Haweli	Pune
2197	Indrayani river	Indrayani river at D/s of Alandigaon, Pune	Alandigaon	Haweli	Pune
2192	Mula-Mutha river	Mula - Mutha river at Mundhawa bridge.	Mundhawa	Haweli	Pune
1463	Nira river	Nira river at Sarola bridge	Sarola	Bhor	Pune
2683	Nira river	Nira river at Shirwal, Satara.	Shindewadi, Shirwal	Khandala	Satara
2655	Bhima river	Bhima river at Koregaon near Koregaon bridge, Pune	Koregaon	Shirur	Pune
2682	Nira river	Nira river at U/s of Jubilant Organosis, Pune.	Nira(Datta ghat)	Baramati	Pune
2195	Nira river	Nira river at D/s of Jubilant Organosis, Pune.	Nimbut	Baramati	Pune

Water Quality Index for WQMS at Krishna Basin (1 of 2): Sub basin Bhima upper (3 of 3)

Mar	36	40	31	NA	42	36	58	46	47	42	50	44	NA	48	35	70	55	66	48	32	45	NA	70	64	NA	58	57	62	65	60	46	69	56	44	57	48
Feb	37	31	36	NA	48	47	60	49	63	35	40	55	NA	55	43	70	56	66	38	27	63	NA	66	64	NA	64	60	69	64	65	50	59	63	50	57	63
Jan	NA	47	32	35	41	57	57	57	60	43	38	53	41	54	51	69	52	66	42	37	56	56	61	64	48	54	42	65	49	25	60	57	NA	60	58	58
Dec	NA	38	36	NA	47	43	NA	56	58	55	44	51	NA	49	48	67	55	56	NA	45	32	NA	65	61	NA	55	56	57	48	65	53	55	56	61	59	57
Nov	39	44	32	NA	48	47	60	53	NA	71	58	57	NA	49	45	68	62	54	NA	53	56	NA	57	64	NA	51	60	57	50	62	62	55	60	59	53	56
Oct	72	48	44	67	58	47	69	49	67	58	50	59	62	50	55	76	72	63	NA	56	44	76	68	61	68	57	55	69	63	50	57	52	50	78	50	51
Sep	37	NA	40	NA	58	57	54	61	63	NA	55	63	NA	60	62	60	72	65	NA	49	34	NA	62	64	NA	59	60	60	NA	60	NA	57	62	66	51	64
Aug	67	46	47	NA	66	52	51	64	NA	61	50	53	NA	64	59	61	74	62	50	38	60	NA	71	67	NA	65	59	62	70	61	68	63	46	71	57	59
Jul	75	47	35	64	67	46	67	61	NA	41	38	52	73	NA	48	76	74	56	38	31	35	68	NA	63	65	68	57	68	71	65	71	NA	57	73	66	61
Jun	36	43	36	NA	38	42	73	42	NA	35	53	37	NA	47	38	72	69	50	46	37	37	NA	69	61	NA	61	51	70	60	67	66	65	59	79	55	58
May	41	39	31	NA	40	40	NA	57	64	60	52	45	NA	50	35	70	67	46	44	39	32	NA	69	56	NA	66	48	53	69	68	59	60	52	26	59	58
Apr	54	35	36	46	48	47	63	43	66	50	37	38	46	45	49	69	65	56	29	42	23	64	55	72	66	55	64	NA	70	61	66	61	59	67	38	58
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2677			1191			2665			2681			1192			2656			2789			1911			1912			1188			2705			28		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 13: Surface water quality monitoring stations in Krishna Basin (1 of 2): Sub basin Bhima upper (3 of 3)

Station Code	River	Name of the Station	Village	Taluka	District
2677	Mula-Mutha river	Mula-Mutha river at D/s of Theur, Pune	Theur	Haweli	Pune
1191	Bhima river	Bhima river after confluence with Mula-Mutha at Pargaon near Vasant Bandara.	Pargaon	Daund	Pune
2665	Ghod river	Ghod river at Shirur, Pune.	Shirur	Shirur	Pune
2681	Nira river	Nira river at Sangavi	Sangavi	Phaltan	Satara
1192	Bhima river	Bhima river at Daund near Mahadev temple.	Daund	Daund	Pune
2656	Bhima river	Bhima river- Backwater of Ujani Dam near raw water pump house.	Kumbargaon	Indapur	Pune
2789	Nalla	Nalla at D/s of Aklai Mandir, Solapur	Aklai	Malshiras	Solapur
1911	Chandrabhaga river	Chandrabhaga river at U/s of Pandharpur town.	Gursale	Pandarpur	Solapur
1912	Chandrabhaga river	Chandrabhaga river at D/s of Pandharpur town near Vishnupant Mandir.	Gopalpur	Pandarpur	Solapur
1188	Bhima river	Bhima river at Narsingpur near Sangam bridge after confluence with Nira rive	Narsingpur	Malshiros	Solapur
2705	Sina river	Sina river near Laboti toll naka, Solapur	Laboti	Mohal	Solapur
28	Bhima river	Bhima river at Takali near Karnataka border.	Takali	South Solapur	Solapur

Water Quality Index for WQMS at Krishna Basin (2 of 2): Sub basin Krishna upper (1 of 2)

Mar	NA	61	69	71	67	70	57	54	64	54	51	50	58	56	47	58	55	45	60	51	58	57	56	66	70	81	86
Feb	66	54	69	70	68	69	60	48	63	55	53	56	55	49	61	52	50	55	56	48	55	63	53	60	75	79	85
Jan	NA	65	66	NA	70	69	62	54	58	NA	57	52	52	52	59	43	52	55	63	53	56	63	61	57	NA	69	77
Dec	69	65	68	77	74	68	57	57	58	63	55	51	65	59	52	58	54	55	58	50	55	60	58	50	80	75	79
Nov	72	63	66	74	70	71	71	51	60	69	55	54	69	55	54	66	55	53	69	50	59	69	56	56	NA	82	81
Oct	65	71	63	75	66	67	72	58	56	63	57	54	71	64	49	64	39	48	59	60	59	73	55	61	80	84	85
Sep	71	66	64	69	68	70	NA	60	59	58	58	51	58	62	54	61	59	52	53	58	60	67	54	48	82	86	84
Aug	62	72	73	64	75	76	59	61	54	57	67	53	NA	61	64	NA	64	54	56	61	56	NA	63	54	84	80	84
Jul	75	67	64	76	74	65	49	66	52	71	69	48	59	72	53	67	NA	50	70	64	50	62	64	53	80	64	83
Jun	74	72	66	71	64	71	67	62	58	65	55	47	53	67	60	70	68	55	52	62	54	63	65	50	NA	80	81
May	68	68	62	63	69	66	58	60	48	65	64	46	66	61	51	66	60	46	62	56	48	64	57	51	79	NA	79
Apr	69	54	61	68	69	65	55	50	52	58	66	53	63	59	49	46	61	54	64	50	51	60	47	48	74	80	77
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2716			1194			2186			2190			2711			2717			2188			2187			1904		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Surface water quality monitoring stations in Krishna Basin (2of 2): Sub Basin Krishna upper (1 of 2)

Station Code	River	Name of the Station	Village	Taluka	District
2716	Venna river	Venna river at Mahabaleshwar..	Mahabaleshwar	Mahabaleshwar	Satara
1194	Krishna river	Krishna river at Dhom Dam	Wai	Mahabaleshwar	Satara
2186	Venna river	Venna river at Varye, Satara	Varye	Satara	Satara
2190	Krishna river	Krishna river at Wai, Satara..	Wai	Wai	Satara
2711	Urmodi river	Urmodi river at Nagthane, Satara.	Nagthane	Satara	Satara
2717	Venna river	Venna river at Mahuli, Satara	Mahuli	Satara	Satara
2188	Krishna river	Krishna river at Krishna- Venna sangam, Mahuli.	Mahuli	Mahuli	Satara
2187	Krishna river	Krishna river at Kshetra Mahuli, Satara.	Kshetra Mahuli	Mahuli	Satara
1904	Panchganga river	Panchaganga river at U/s of Kolhapur town near Balinga Pumping station.	Balinga	Karvir	Kolhapur

Water Quality Index for WQMS at Krishna Basin (2 of 2): Sub basin Krishna upper (2 of 2)

Mar	59	57	63	57	56	63	35	83	78	75	78	79	NA	82	78	67	76	83	54	86	85	54	81	83	38	84	82
Feb	56	61	63	61	53	60	73	78	82	NA	76	78	NA	64	79	NA	76	79	77	82	85	73	85	90	73	83	82
Jan	57	54	64	47	53	61	NA	64	77	78	69	76	NA	62	73	79	63	65	81	57	75	NA	72	74	77	65	66
Dec	58	62	60	59	51	59	74	75	83	79	83	75	NA	77	75	80	78	76	84	79	82	81	74	82	77	76	85
Nov	68	49	59	69	47	49	NA	82	75	79	66	77	NA	81	80	84	69	79	78	81	80	NA	64	73	NA	67	76
Oct	57	56	59	62	68	54	76	62	85	77	87	79	NA	83	82	85	90	79	75	77	83	77	72	83	78	NA	75
Sep	54	56	64	55	56	58	82	84	85	81	86	64	NA	84	83	86	84	84	77	85	85	84	87	82	85	88	87
Aug	52	61	61	53	64	61	84	76	85	88	81	80	NA	82	80	85	84	84	79	80	85	82	84	79	81	83	82
Jul	69	67	56	63	70	58	80	64	72	79	NA	76	81	74	50	82	NA	78	79	64	77	79	78	86	80	67	87
Jun	71	58	56	58	60	62	NA	77	87	84	69	81	NA	73	88	87	66	80	NA	79	83	NA	75	78	NA	81	82
May	69	58	56	65	65	56	75	87	73	82	71	81	NA	86	77	83	69	81	74	87	86	76	84	80	49	86	84
Apr	63	64	60	60	59	56	56	84	74	60	77	77	54	83	76	77	78	71	71	77	61	48	76	76	82	54	90
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2189			36			1905			1906			1311			37			2163			1310			1153		

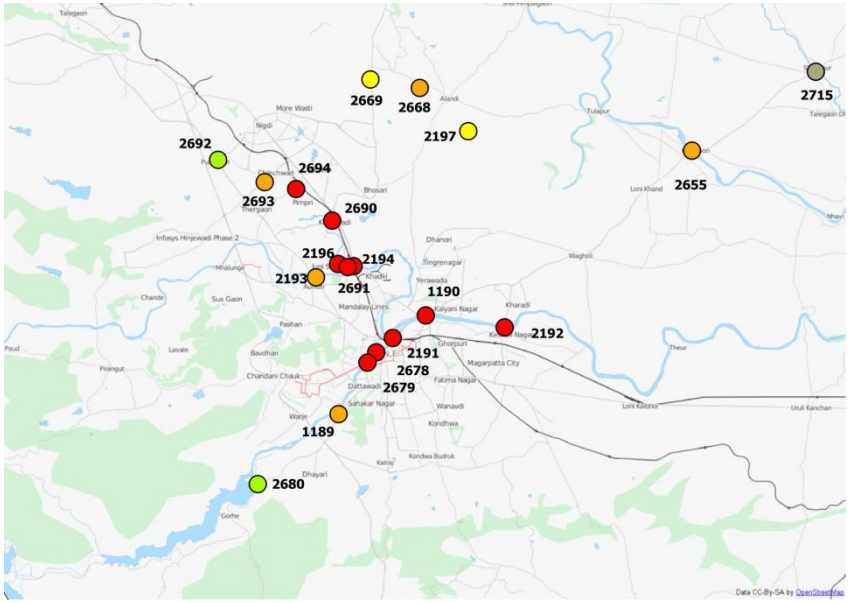
Legend

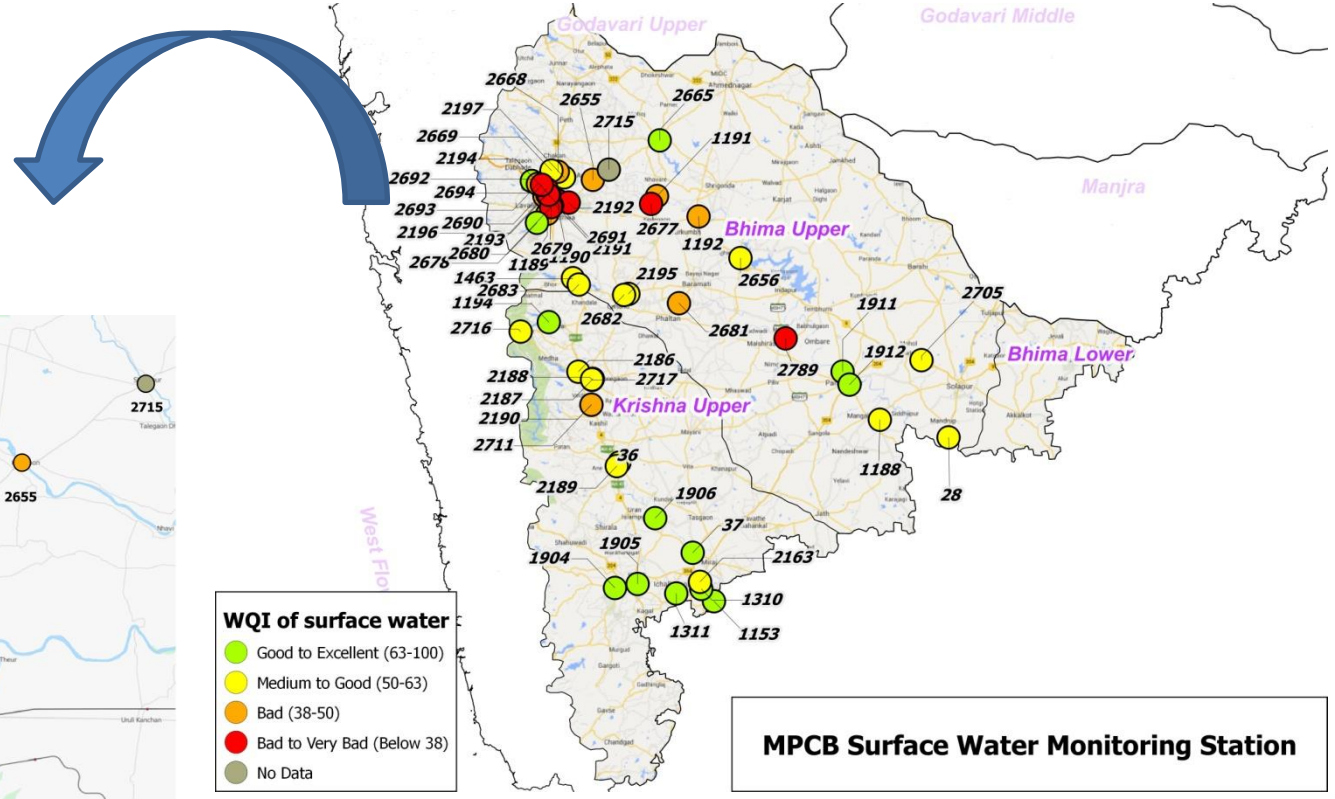
Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 14: Surface water quality monitoring stations in Bhima upper Sub basin (2 of 2): Krishna Basin (2of 2)

Station Code	River	Name of the Station	Village	Taluka	District
2189	Koyna river	Koyna river at Karad.	Karad	Karad	Satara
36	Krishna river	Krishna river at Krishna bridge, Karad(Krishna river at NH-4 bridge, Karad.)	Karad	Karad	Satara
1905	Panchaganga river	Panchaganga river at D/s of Kolhapur town at Gandhi nagar near NH-4 bridge and MIDC intake well.	Uchegaon	Kolhapur	Kolhapur
1906	Krishna river	Krishna river at Walwa, D/s of Islampur near Vithal Temple.	Walwa	Walwa	Sangli
1311	Panchganga river	Panchaganga river at Ichalkaranji near MIDC intake well.	Shiradhwad (Ichalkaranji ghat)	Hatkanangale	Kolhapur
37	Krishna river	Krishna river at Maighat, Sangli	Gawali gally	Miraj	Sangli
2163	Panchganga river	Panchganga River at Shirol near Shirol intake well	Shirol	Shirol	Kolhapur
1310	Krishna river	Krishna river at Kurundwad near Santaji Ghorpade Ghat.	Narshingwadi, Kurundwad	Shirol	Kolhapur
1153	Krishna river	Krishna river at Rajapur Weir	Rajapur	Shirol	Kolhapur

Spatial map of Surface WQI at Krishna Basin (April 2012)





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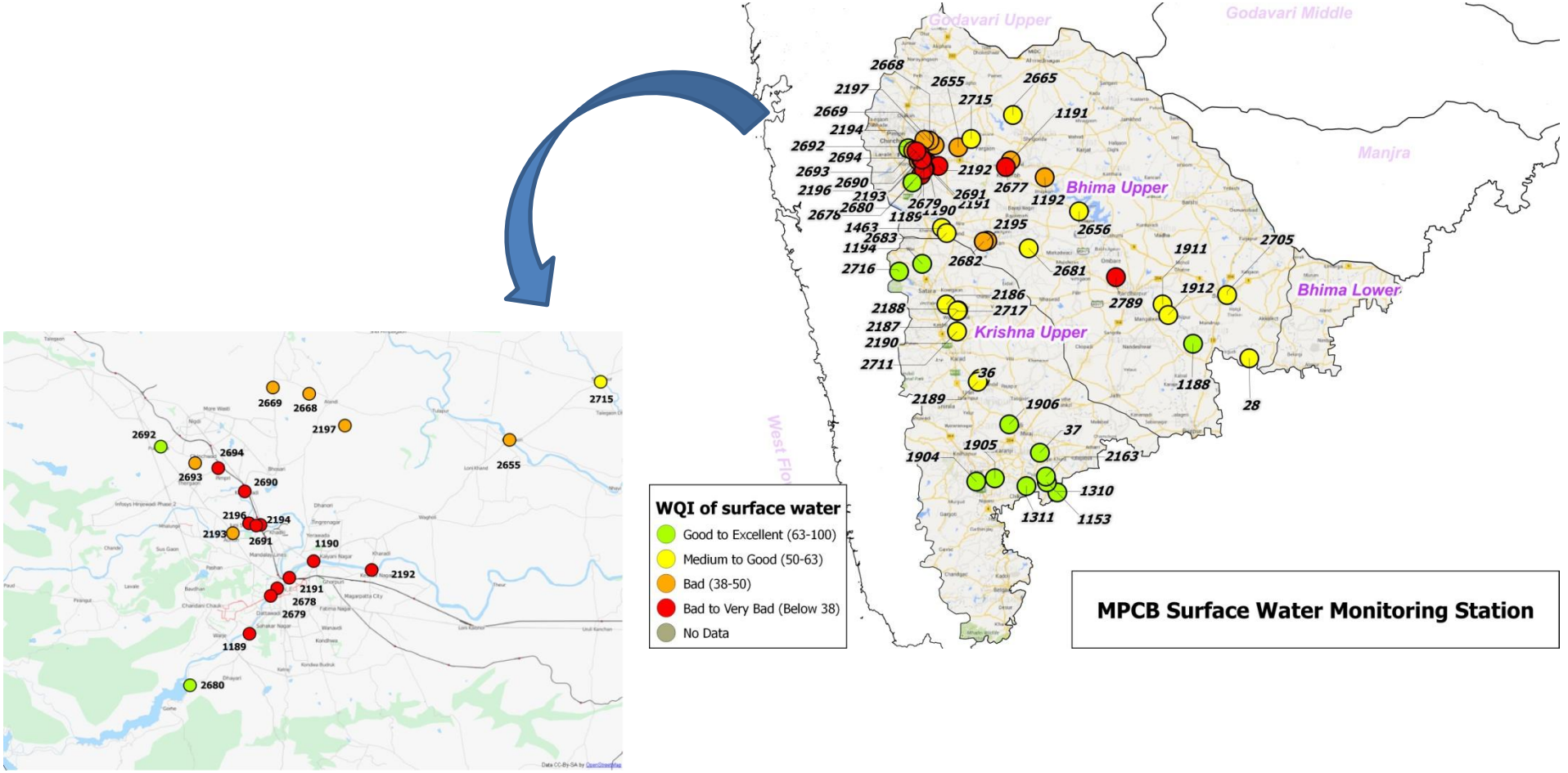
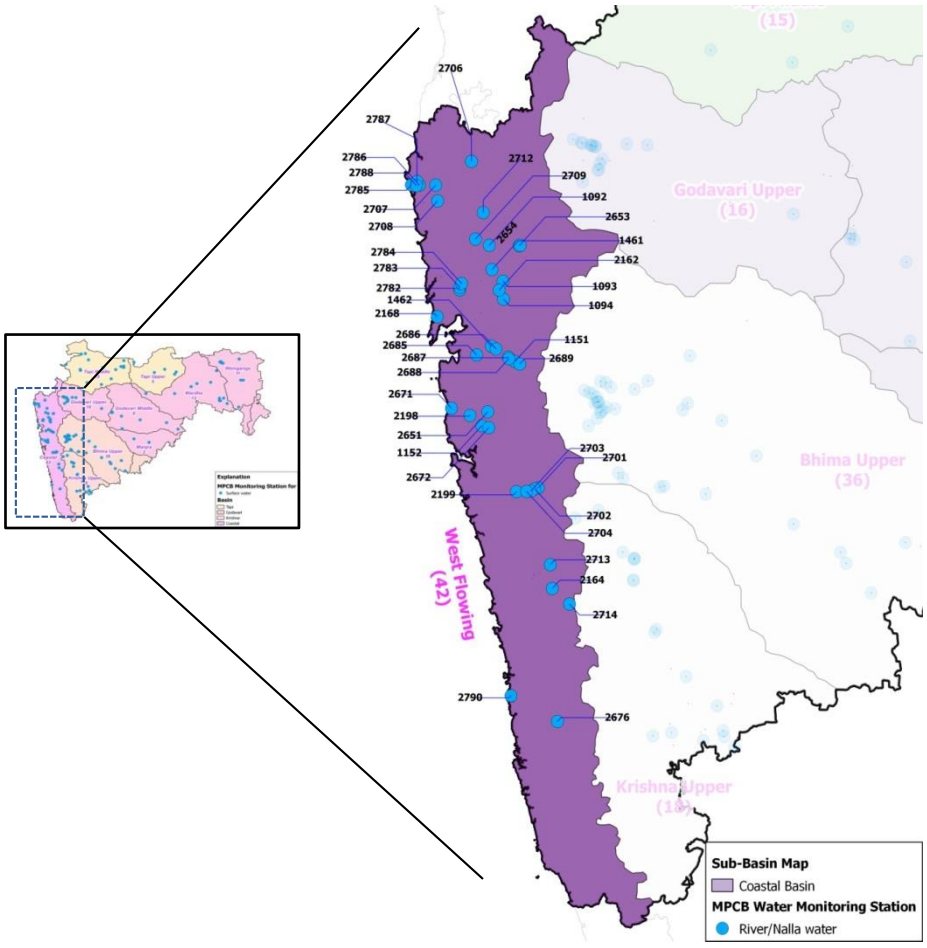
Spatial map of Surface WQI at Krishna Basin (December 2012)



West Flowing Rivers

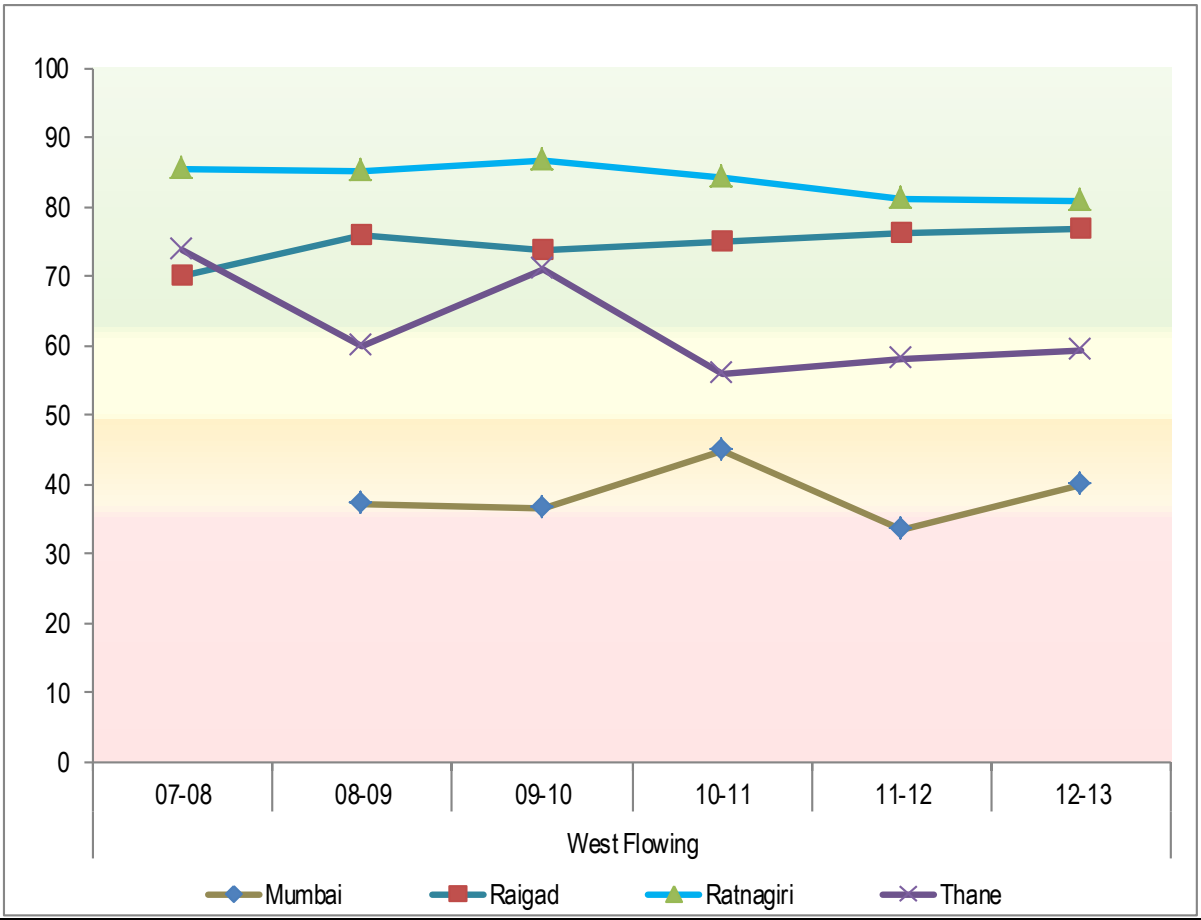
Maharashtra has many westwards flowing rivers originating from the Western Ghats like Damanganga, Surya, Vaitarna, Ulhas, Savitri, Kundalika, Patalganga, Vashisti, Shastri, Karli, Terekhol and so on[14]. These rivers are an important source of drinking water, agricultural applications and industrial purposes and are known to contribute about 44.54% of the yield at 75% dependability of Maharashtra. Rivers like Vaitarna, Patalganga, Ulhas, Balganga and so on with tributaries such as Tansa, Bhasta and Barvi are used as sources of drinking water. While rivers like Ulhas, Patalganga, Panvel, Bhogeshwari and Amba & few other tributaries like Vashishthi and Kundalika lie very close to industrial areas and are thus prone to water pollution due to release of industrial effluents. The monitoring network set up on the west flowing rivers is presented in Map No. 7.



Map No. 7: Network of surface water quality monitoring stations for west flowing river

[14] http://sandrp.in/rivers/Rivers_of_Maharashtra_Dec_2011.PDF

West Flowing River Basin (Intra Basin analysis)



WQI	Category	Class by CPCB	Remarks
63-100	Good to Excellent	A	Non polluted
50-63	Medium to Good	B	Non polluted
38-50	Bad	C	Polluted
38 & less	Bad to Very Bad	D, E	Heavily polluted

Figure No. 32: Trend of annual average WQI across districts of West Flowing river basin

Note:

This graph considers the average WQI for all the monitoring stations in that particular district and hence may include some bias. This graph is only for an overview and monitoring station wise data maybe analyzed to pin point the most affected and polluted patches of rivers in that district.

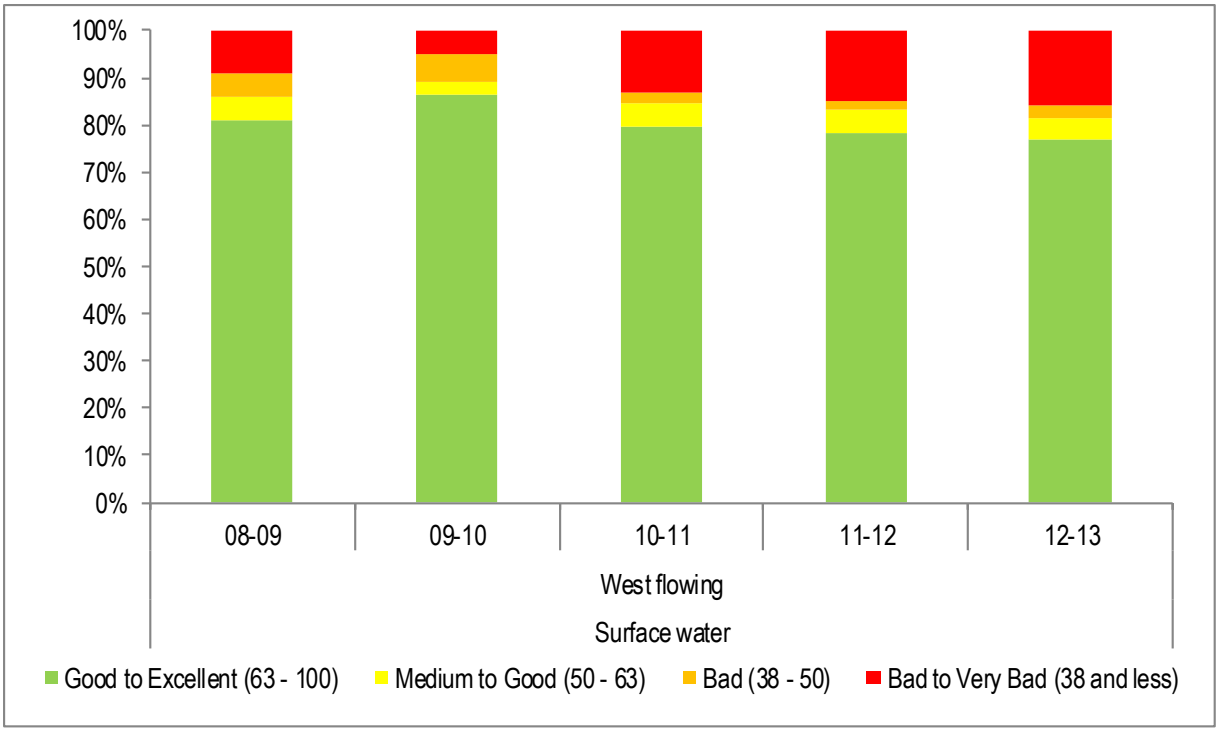
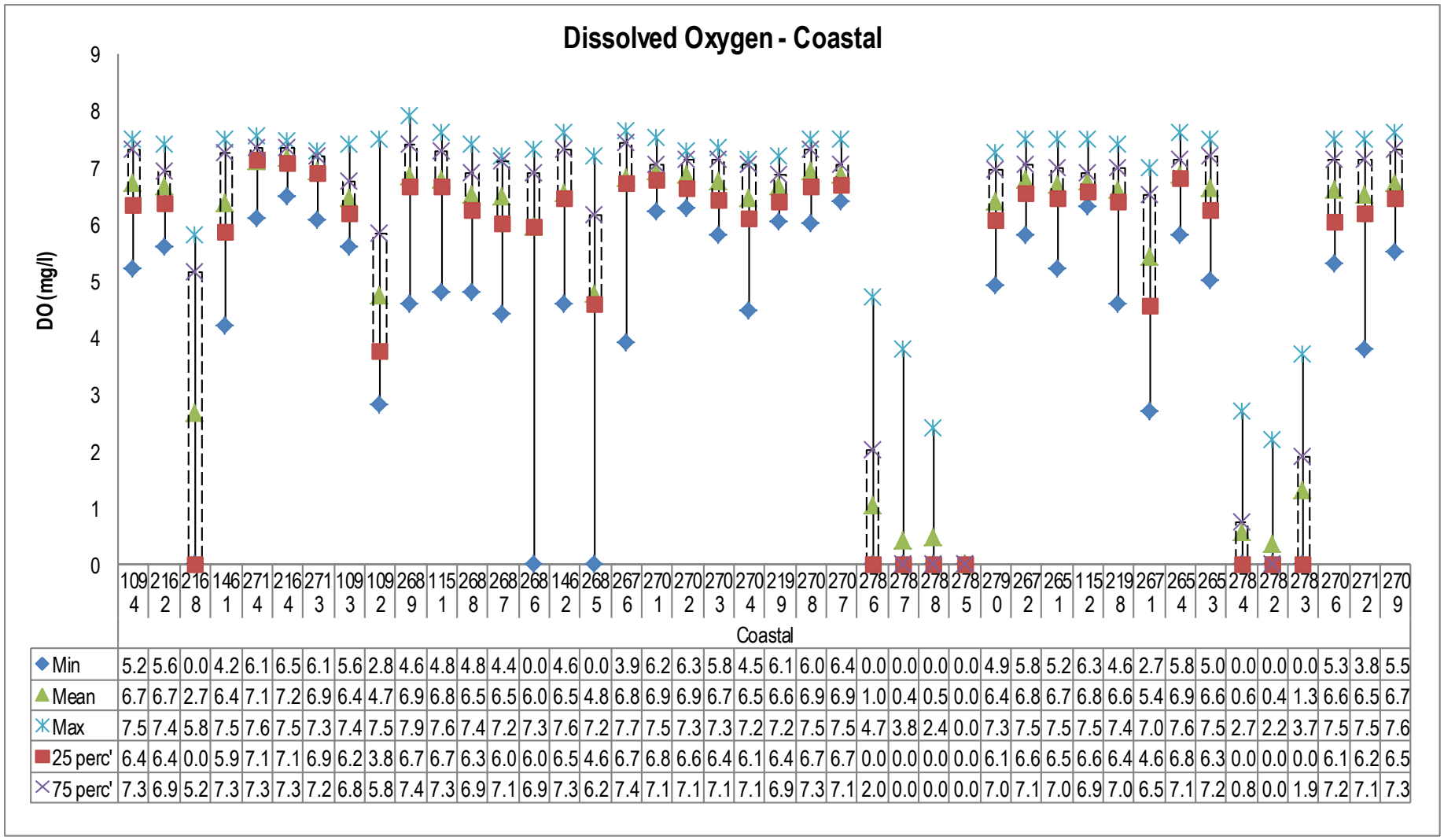


Figure No. 33: Trend of average occurrence for different category of WQI in West Flowing River basin

The Intra basin performance of Coastal Basin for west flowing river and nalla across four districts of the state are depicted in Figure No. 32 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in Figure No. 33.

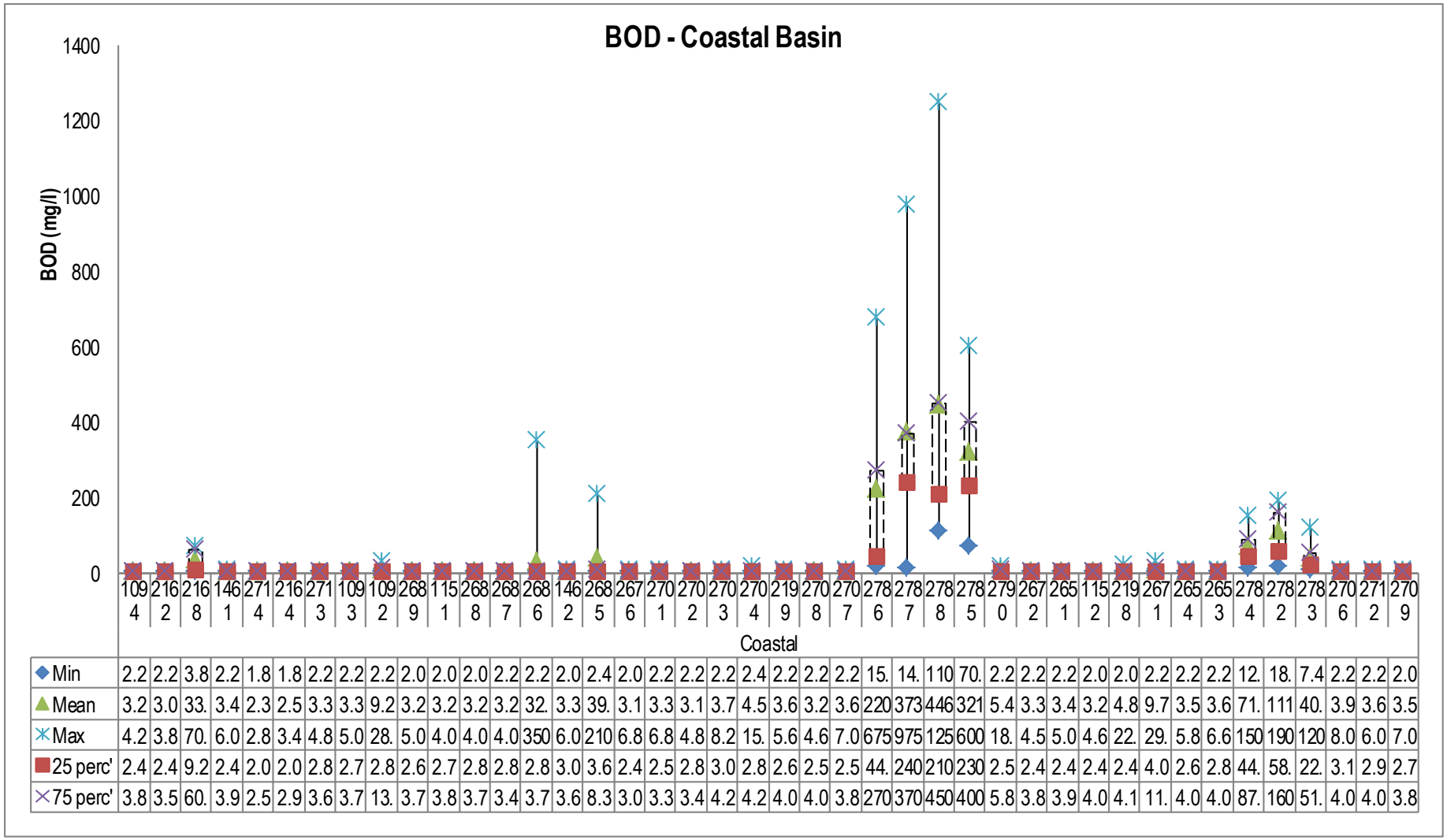
The results showed that among four districts, namely Thane, Mumbai, Raigad and Ratnagiri, the annual average WQI of Mumbai (1 WQMS) were consistently in Bad to Medium category (i.e. WQI in range of 38-63) from 07-08 till 13-14. Whereas, Raigad (17 WQMS), and Ratnagiri (5 WQMS) were in Good to Excellent (i.e. WQI in range of 63-100). Thane with 19 WQMS were in Medium to good category in most of the years. The results showed that average WQI across Thane districts showed upward trend in recent years and in rest of the districts no trend was seen.

Figure No. 33shows average annual occurrence of WQI across 42 WQM stations of coastal basin for west flowing rivers and nallas for 6 years starting from 2008. The results for West flowing showed that the occurrence of Good to Excellent category of WQI has increased over the years across all the WQMS. Hence the overall preview of the basin is satisfactory.



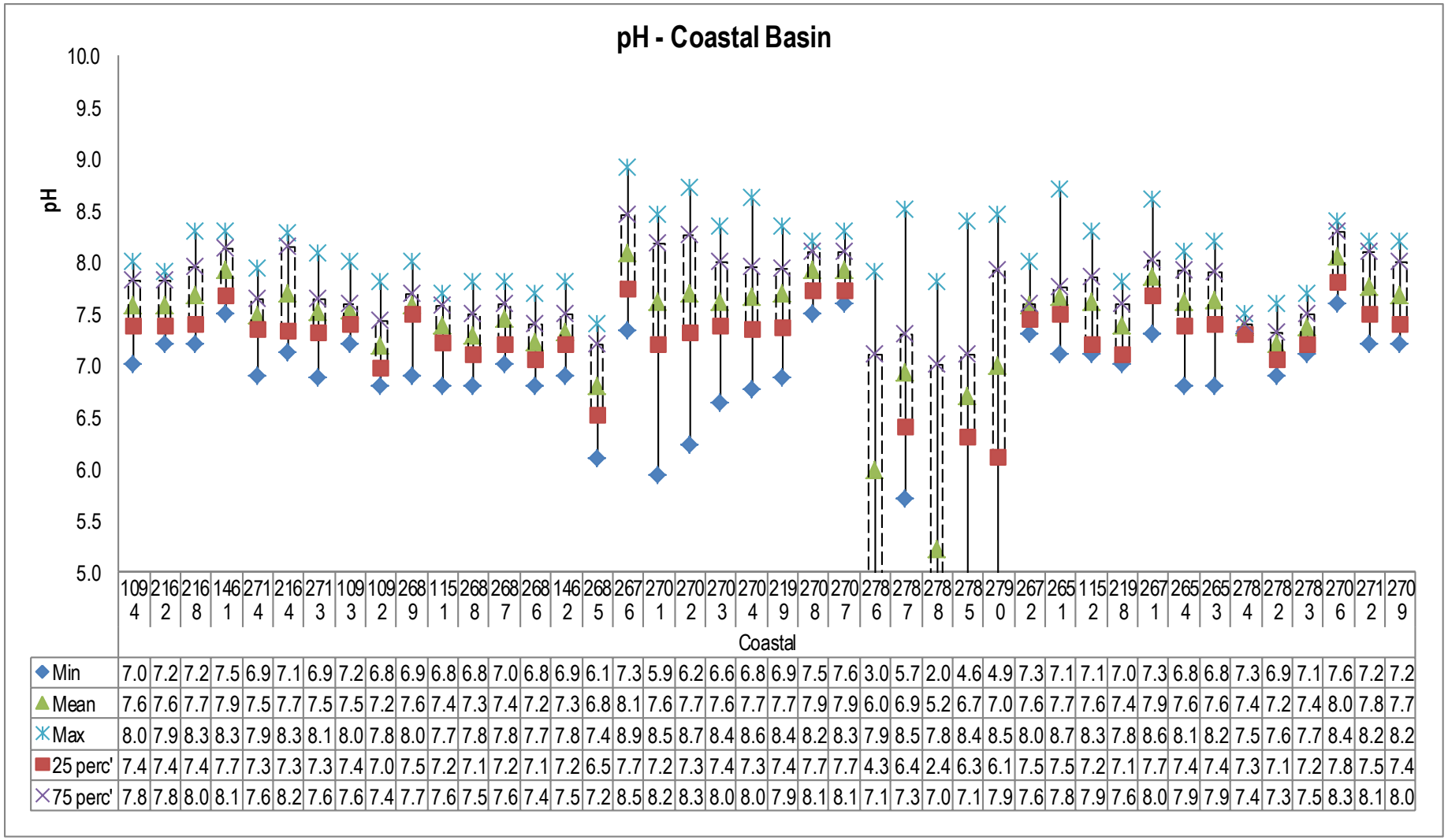
	1094	2162	2168	1461	2714	2164	2713	1093	1092	2689	1151	2688	2687	2686	1462	2685	2676	2701	2702	2703	2704	2199	2708	2707	2786	2787	2788	2785	2790	2672	2651	1152	2198	2671	2654	2653	2784	2782	2783	2706	2712	2709
Min	5.2	5.6	0.0	4.2	6.1	6.5	6.1	5.6	2.8	4.6	4.8	4.8	4.4	0.0	4.6	0.0	3.9	6.2	6.3	5.8	4.5	6.1	6.0	6.4	0.0	0.0	0.0	0.0	4.9	5.8	5.2	6.3	4.6	2.7	5.8	5.0	0.0	0.0	0.0	5.3	3.8	5.5
Mean	6.7	6.7	2.7	6.4	7.1	7.2	6.9	6.4	4.7	6.9	6.8	6.5	6.5	6.0	6.5	4.8	6.8	6.9	6.9	6.7	6.5	6.6	6.9	6.9	1.0	0.4	0.5	0.0	6.4	6.8	6.7	6.8	6.6	5.4	6.9	6.6	0.6	0.4	1.3	6.6	6.5	6.7
Max	7.5	7.4	5.8	7.5	7.6	7.5	7.3	7.4	7.5	7.9	7.6	7.4	7.2	7.3	7.6	7.2	7.7	7.5	7.3	7.3	7.2	7.2	7.5	7.5	4.7	3.8	2.4	0.0	7.3	7.5	7.5	7.5	7.4	7.0	7.6	7.5	2.7	2.2	3.7	7.5	7.5	7.6
25 perc'	6.4	6.4	0.0	5.9	7.1	7.1	6.9	6.2	3.8	6.7	6.7	6.3	6.0	6.0	6.5	4.6	6.7	6.8	6.6	6.4	6.1	6.4	6.7	6.7	0.0	0.0	0.0	0.0	6.1	6.6	6.5	6.6	6.4	4.6	6.8	6.3	0.0	0.0	0.0	6.1	6.2	6.5
75 perc'	7.3	6.9	5.2	7.3	7.3	7.3	7.2	6.8	5.8	7.4	7.3	6.9	7.1	6.9	7.3	6.2	7.4	7.1	7.1	7.1	7.1	6.9	7.3	7.1	2.0	0.0	0.0	0.0	7.0	7.1	7.0	6.9	7.0	6.5	7.1	7.2	0.8	0.0	1.9	7.2	7.1	7.3

Figure No. 34: Trend of Dissolved Oxygen (DO) levels recorded monitoring west flowing rivers



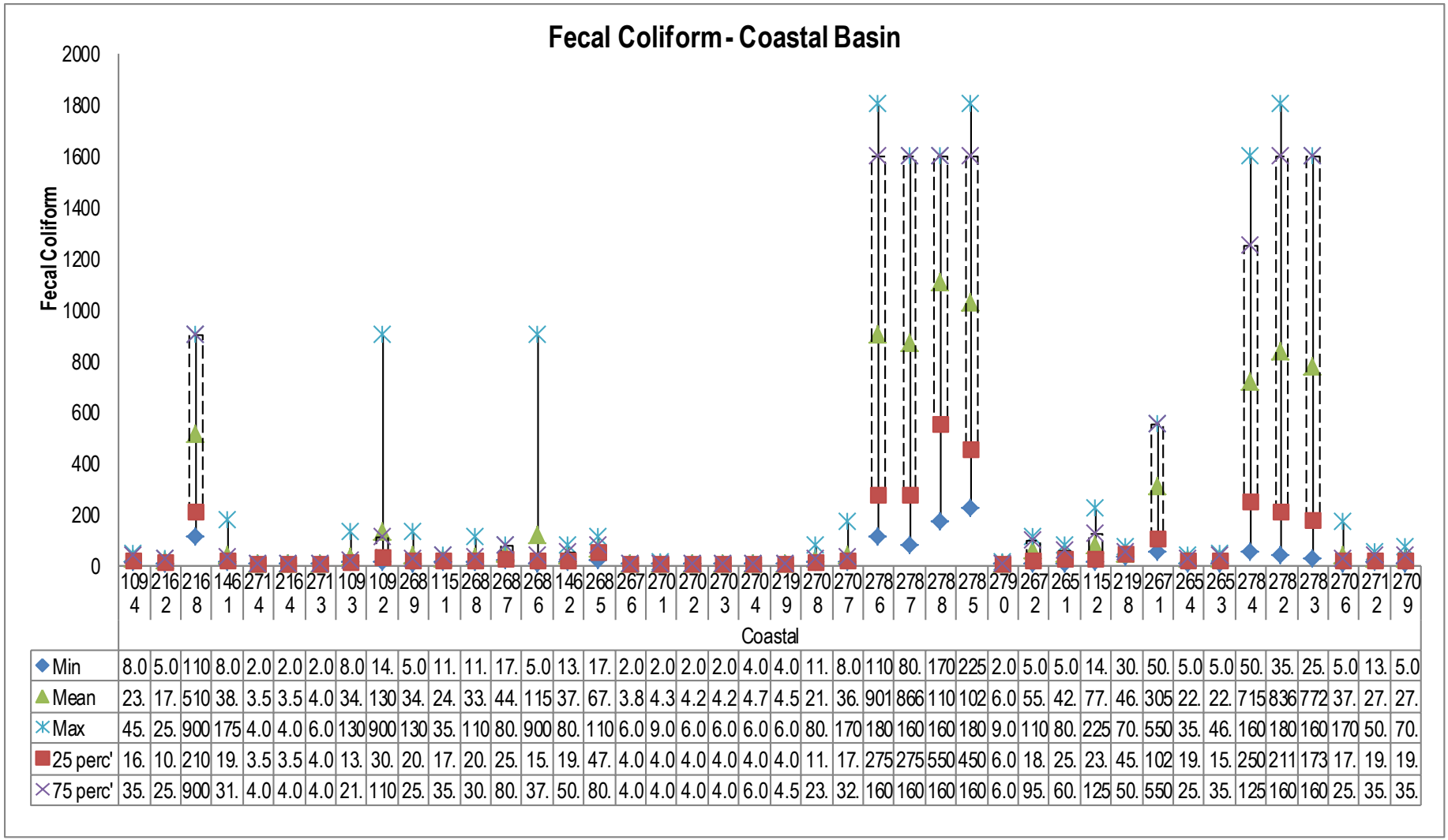
	1094	2162	2168	1461	2714	2164	2713	1093	1092	2689	1151	2688	2687	2686	1462	2685	2676	2701	2702	2703	2704	2199	2708	2707	2786	2787	2788	2785	2790	2672	2651	1152	2198	2671	2654	2653	2784	2782	2783	2706	2712	2709
Min	2.2	2.2	3.8	2.2	1.8	1.8	2.2	2.2	2.2	2.0	2.0	2.0	2.2	2.2	2.0	2.4	2.0	2.2	2.2	2.2	2.4	2.2	2.2	2.2	15.	14.	110	70.	2.2	2.2	2.2	2.0	2.0	2.2	2.2	2.2	12.	18.	7.4	2.2	2.2	2.0
Mean	3.2	3.0	33.	3.4	2.3	2.5	3.3	3.3	9.2	3.2	3.2	3.2	3.2	32.	3.3	39.	3.1	3.3	3.1	3.7	4.5	3.6	3.2	3.6	220	373	446	321	5.4	3.3	3.4	3.2	4.8	9.7	3.5	3.6	71.	111	40.	3.9	3.6	3.5
Max	4.2	3.8	70.	6.0	2.8	3.4	4.8	5.0	28.	5.0	4.0	4.0	4.0	350	6.0	210	6.8	6.8	4.8	8.2	15.	5.6	4.6	7.0	675	975	125	600	18.	4.5	5.0	4.6	22.	29.	5.8	6.6	150	190	120	8.0	6.0	7.0
25 perc'	2.4	2.4	9.2	2.4	2.0	2.0	2.8	2.7	2.8	2.6	2.7	2.8	2.8	2.8	3.0	3.6	2.4	2.5	2.8	3.0	2.8	2.6	2.5	2.5	44.	240	210	230	2.5	2.4	2.4	2.4	2.4	4.0	2.6	2.8	44.	58.	22.	3.1	2.9	2.7
75 perc'	3.8	3.5	60.	3.9	2.5	2.9	3.6	3.7	13.	3.7	3.8	3.7	3.4	3.7	3.6	8.3	3.0	3.3	3.4	4.2	4.2	4.0	4.0	3.8	270	370	450	400	5.8	3.8	3.9	4.0	4.1	11.	4.0	4.0	87.	160	51.	4.0	4.0	3.8

Figure No. 35: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at west flowing rivers (coastal basin)



	1094	2162	2168	1461	2714	2164	2713	1093	1092	2689	1151	2688	2687	2686	1462	2685	2676	2701	2702	2703	2704	2199	2708	2707	2786	2787	2788	2785	2790	2672	2651	1152	2198	2671	2654	2653	2784	2782	2783	2706	2712	2709
Min	7.0	7.2	7.2	7.5	6.9	7.1	6.9	7.2	6.8	6.9	6.8	6.8	7.0	6.8	6.9	6.1	7.3	5.9	6.2	6.6	6.8	6.9	7.5	7.6	3.0	5.7	2.0	4.6	4.9	7.3	7.1	7.1	7.0	7.3	6.8	6.8	7.3	6.9	7.1	7.6	7.2	7.2
Mean	7.6	7.6	7.7	7.9	7.5	7.7	7.5	7.5	7.2	7.6	7.4	7.3	7.4	7.2	7.3	6.8	8.1	7.6	7.7	7.6	7.7	7.7	7.9	7.9	6.0	6.9	5.2	6.7	7.0	7.6	7.7	7.6	7.4	7.9	7.6	7.6	7.4	7.2	7.4	8.0	7.8	7.7
Max	8.0	7.9	8.3	8.3	7.9	8.3	8.1	8.0	7.8	8.0	7.7	7.8	7.8	7.7	7.8	7.4	8.9	8.5	8.7	8.4	8.6	8.4	8.2	8.3	7.9	8.5	7.8	8.4	8.5	8.0	8.7	8.3	7.8	8.6	8.1	8.2	7.5	7.6	7.7	8.4	8.2	8.2
25 perc'	7.4	7.4	7.4	7.7	7.3	7.3	7.3	7.4	7.0	7.5	7.2	7.1	7.2	7.1	7.2	6.5	7.7	7.2	7.3	7.4	7.3	7.4	7.7	7.7	4.3	6.4	2.4	6.3	6.1	7.5	7.5	7.2	7.1	7.7	7.4	7.4	7.3	7.1	7.2	7.8	7.5	7.4
75 perc'	7.8	7.8	8.0	8.1	7.6	8.2	7.6	7.6	7.4	7.7	7.6	7.5	7.6	7.4	7.5	7.2	8.5	8.2	8.3	8.0	8.0	7.9	8.1	8.1	7.1	7.3	7.0	7.1	7.9	7.6	7.8	7.9	7.6	8.0	7.9	7.9	7.4	7.3	7.5	8.3	8.1	8.0

Figure No. 36: Trend of pH levels recorded at WQMS at west flowing rivers (coastal basin)



	1094	2162	2168	1461	2714	2164	2713	1093	1092	2689	1151	2688	2687	2686	1462	2685	2676	2701	2702	2703	2704	2199	2708	2707	2786	2787	2788	2785	2790	2672	2651	1152	2198	2671	2654	2653	2784	2782	2783	2706	2712	2709
Min	8.0	5.0	110	8.0	2.0	2.0	2.0	8.0	14.	5.0	11.	11.	17.	5.0	13.	17.	2.0	2.0	2.0	2.0	4.0	4.0	11.	8.0	110	80.	170	225	2.0	5.0	5.0	14.	30.	50.	5.0	5.0	50.	35.	25.	5.0	13.	5.0
Mean	23.	17.	510	38.	3.5	3.5	4.0	34.	130	34.	24.	33.	44.	115	37.	67.	3.8	4.3	4.2	4.2	4.7	4.5	21.	36.	901	866	110	102	6.0	55.	42.	77.	46.	305	22.	22.	715	836	772	37.	27.	27.
Max	45.	25.	900	175	4.0	4.0	6.0	130	900	130	35.	110	80.	900	80.	110	6.0	9.0	6.0	6.0	6.0	6.0	80.	170	180	160	160	180	9.0	110	80.	225	70.	550	35.	46.	160	180	160	170	50.	70.
25 perc'	16.	10.	210	19.	3.5	3.5	4.0	13.	30.	20.	17.	20.	25.	15.	19.	47.	4.0	4.0	4.0	4.0	4.0	4.0	11.	17.	275	275	550	450	6.0	18.	25.	23.	45.	102	19.	15.	250	211	173	17.	19.	19.
75 perc'	35.	25.	900	31.	4.0	4.0	4.0	21.	110	25.	35.	30.	80.	37.	50.	80.	4.0	4.0	4.0	4.0	6.0	4.5	23.	32.	160	160	160	160	6.0	95.	60.	125	50.	550	25.	35.	125	160	160	25.	35.	35.

Figure No. 37: Trend of Fecal Coliform levels recorded at WQMS in west flowing rivers (coastal basin)

Water Quality Index of WQMS on West Flowing Rivers (1 of 3)

Mar	80	78	80	80	75	81	62	NA	79	68	73	78	70	82	82	49	56	54	NA	NA	80
Feb	77	78	83	80	78	82	63	74	81	78	79	79	77	77	79	NA	44	42	NA	NA	80
Jan	NA	76	75	NA	77	76	63	73	79	76	75	79	70	77	77	36	53	48	NA	NA	67
Dec	NA	77	74	NA	76	80	65	79	84	NA	77	81	73	81	83	NA	73	65	NA	NA	79
Nov	NA	71	83	NA	75	84	69	79	77	73	76	79	77	76	86	NA	77	74	NA	NA	71
Oct	NA	78	80	NA	73	79	NA	73	80	79	78	83	76	77	81	NA	NA	82	NA	NA	80
Sep	NA	NA	81	NA	81	82	69	75	NA	71	79	76	76	79	76	NA	77	87	NA	NA	79
Aug	NA	78	74	NA	68	76	NA	75	73	71	78	76	70	NA	78	NA	68	77	NA	NA	74
Jul	NA	78	83	NA	79	77	NA	72	83	NA	75	79	NA	74	83	NA	74	66	NA	NA	76
Jun	NA	77	78	NA	78	76	74	NA	75	80	NA	73	NA	NA	73	NA	NA	48	NA	NA	77
May	NA	NA	72	NA	NA	63	77	NA	79	79	NA	81	76	NA	78	NA	58	40	NA	NA	69
Apr	NA	76	73	NA	77	66	81	73	69	81	77	77	79	78	77	NA	80	42	NA	58	75
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2654			**2653**			**1093**			**1094**			**2162**			**1092**			**1461**		

Mar	74	83	83	77	84	82	24	26	28	26	26	29	24	27	29	75	NA	79	72	73	NA
Feb	67	82	84	68	77	83	25	26	27	25	26	27	24	25	36	NA	78	76	NA	78	76
Jan	NA	75	74	NA	73	75	26	26	29	26	26	29	26	27	29	75	75	79	75	67	79
Dec	NA	75	77	NA	73	81	NA	27	28	26	29	27	39	34	29	79	73	79	76	73	75
Nov	NA	76	77	NA	79	79	26	25	30	23	26	25	25	28	32	NA	NA	84	NA	72	82
Oct	NA	84	77	NA	75	82	NA	26	29	NA	26	33	NA	26	35	76	NA	77	72	76	NA
Sep	NA	79	83	NA	81	71	NA	60	44	NA	50	42	NA	52	58	81	74	79	79	75	81
Aug	NA	76	56	NA	69	82	NA	34	27	NA	25	23	NA	35	28	78	77	75	80	74	77
Jul	NA	71	74	NA	74	80	NA	27	37	NA	33	30	NA	31	37	NA	NA	NA	NA	NA	65
Jun	NA	64	71	NA	68	69	NA	NA	25	NA	NA	26	NA	NA	37	NA	NA	76	NA	NA	78
May	NA	NA	76	NA	NA	73	NA	NA	26	NA	NA	25	NA	NA	27	78	73	80	77	72	77
Apr	NA	60	76	NA	57	76	27	25	NA	17	29	24	27	36	23	79	72	NA	81	74	77
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2712			**2709**			**2784**			**2782**			**2783**			**2708**			**2707**		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 15: Surface water quality monitoring stations on West flowing rivers (1 of 3)

Station Code	River	Name of the Station	Village	Taluka	District
2654	Bhatsa river	Bhatsa river at U/s of Liberty Oil Mills	Satne	Shahapur	Thane
2653	Bhatsa river	Bhatsa river at D/s of Liberty Oil Mills	Satne	Shahapur	Thane
1093	Ulhas river	Ulhas river at U/s of NRC Bund,	Mohane	Kalyan	Thane
1094	Ulhas river	Ulhas river at U/s of Badlapur water works	Kulgaon	Ambernath	Thane
2162	Ulhas river	Ulhas River at Jambhul water works	Jambhul	Ambernath	Thane
1092	Kalu river	Kalu river at Atale village	Atale	Kalyan	Thane
1461	Bhatsa river	Bhatsa river at D/s of Pise Dam	Pise	Bhiwandi	Thane
2712	Vaitarna river	Vaitarna river near Road bridge	Gandhare	Wada	Thane
2709	Tansa river	Tansa River near Road bridge	Dakewali	Wada	Thane
2784	Sandoz nalla	Sandoz Nalla	Sandozbaug	Thane	Thane
2782	Rabodi nalla	Rabodi Nalla	Rabodi	Thane	Thane
2783	Colour Chemnalla	Colour Chem Nalla	Majiwada	Thane	Thane
2708	Surya river	Surya river at intake of Vasai- Virar water scheme	Masvan	Palghar	Thane
2707	Surya river	Surya river at MIDC Pumping station on Boisar-	Garvashet	Palghar	Thane

Water Quality Index of WQMS on West Flowing Rivers (2 of 3)

Mar	14	24	NA	13	NA	NA	14	NA	NA	25	23	24	71	62	77	34	24	29	73	86	80	77	85	87	72	86	82	48	81	80	69	NA	77	45	89	80	79	NA	78	60	NA	76
Feb	22	27	40	25	NA	19	NA	NA	NA	22	24	26	73	72	73	24	26	28	87	83	64	87	74	74	NA	72	81	NA	75	78	73	76	81	NA	NA	78	77	78	81	67	83	85
Jan	23	20	24	26	71	39	19	NA	NA	26	22	18	73	79	80	53	27	25	83	81	82	83	53	84	86	76	67	86	68	68	75	72	82	76	68	71	75	67	79	71	71	81
Dec	14	26	26	15	61	22	13	NA	NA	NA	23	21	77	74	80	NA	28	24	87	83	78	79	70	78	84	74	74	84	83	67	76	76	82	82	81	75	81	83	82	73	84	85
Nov	NA	25	18	26	61	20	15	NA	11	23	29	22	NA	75	NA	NA	48	27	83	79	NA	84	89	NA	77	84	83	84	80	86	NA	80	71	82	67	78	NA	78	74	NA	79	72
Oct	NA	26	18	NA	49	15	NA	16	11	NA	17	16	NA	81	73	60	25	60	NA	88	83	NA	88	80	NA	87	82	NA	83	86	81	77	88	80	88	82	NA	76	NA	79	73	83
Sep	NA	22	42	NA	25	29	NA	24	24	NA	29	29	83	73	79	NA	53	55	NA	86	78	NA	89	84	NA	88	80	NA	86	83	79	77	83	86	85	86	71	82	83	72	76	76
Aug	NA	20	NA	NA	25	25	NA	23	33	NA	22	23	78	74	75	53	37	59	NA	82	87	NA	76	88	NA	83	86	NA	88	89	73	77	84	NA	87	86	67	78	87	72	78	81
Jul	NA	23	26	NA	30	26	NA	12	24	NA	25	18	NA	75	57	NA	33	54	NA	87	88	NA	84	88	NA	81	90	NA	86	87	NA	74	80	75	86	88	74	78	85	NA	79	80
Jun	NA	NA	NA	NA	NA	23	NA	NA	NA	NA	NA	24	NA	NA	69	NA	NA	33	NA	86	83	NA	NA	80	NA	NA	86	NA	NA	83	80	NA	79	79	32	83	NA	68	80	76	65	78
May	NA	NA	14	NA	NA	NA	NA	NA	NA	NA	NA	21	78	75	76	49	NA	47	NA	84	82	NA	79	80	NA	75	83	NA	77	79	75	70	74	77	75	83	80	70	83	86	77	78
Apr	NA	17	23	NA	26	NA	NA	NA	NA	NA	NA	NA	83	80	77	42	NA	NA	NA	65	84	NA	73	80	NA	75	82	NA	72	62	78	NA	NA	57	NA	87	74	NA	NA	79	NA	NA
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2786			2787			2788			2785			2706			2168			2701			2702			2703			2704			2689			2199			1151			2688		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 16: Surface water quality monitoring stations at west flowing rivers (2 of 3)

Station Code	River	Name of the Station	Village	Taluka	District
2786	Tarapur MIDC nalla	Tarapur MIDC Nalla, near sump No.I	MIDC Tarapur	Palghar	Thane
2787	Tarapur MIDC nalla	Tarapur MIDC Nalla, near sump No.II	MIDC Tarapur	Palghar	Thane
2788	Tarapur MIDC nalla	Tarapur MIDC Nalla, near sump No.III	MIDC Tarapur	Palghar	Thane
2785	BPT Navapur	BPT, Navapur	Navapur	Palghar	Thane
2706	Surya river	Surya river at U/s of Surya Dam	Dhamni	Vikramgad	Thane
2168	Mithi river	Mithi River near Road bridge	Mahim	Bandra	Mumbai
2701	Savitri	Savitri river jackwell at Upsa Kendre	Nangalwadi	Mahad	Raigad
2702	Savitri	Savitri river at Shedav Dov	Shedav Dov	Mahad	Raigad
2703	Savitri	Savitri river at Dadli road bridge	Dadli	Mahad	Raigad
2704	Savitri	Savitri river at Muthavali Village	Muthavali	Mahad	Raigad
2689	Patalganga	Patalganga river at Gagangiri Maharaj Temple	Khopoli	Khalapur	Raigad
2199	Savitri	Savitri river at Ovale Village	Ovale	Mahad	Raigad
1151	Patalganga	Patalganga river at Shilphata bridge	Khopoli	Khalapur	Raigad
2688	Patalganga	Patalganga river at Savroli bridge	Savroli	Khalapur	Raigad

Water Quality Index of WQMS on West Flowing Rivers (3of 3)

Mar	78	NA	NA	72	NA	79	NA	NA	80	75	NA	77	75	75	72	NA	79	75	63	NA	29	53	80	72	74	60	38	83	83	91	83	84	86	84	85	90	84	81	88	77	67	54
Feb	71	82	81	77	79	85	NA	79	85	75	75	84	80	77	81	NA	78	78	63	79	27	74	81	80	70	54	76	88	83	88	83	88	61	83	83	86	88	81	85	74	81	76
Jan	73	65	81	69	67	81	70	76	65	77	81	82	81	78	77	75	73	76	57	58	82	63	79	79	74	66	39	85	73	80	84	79	73	87	74	83	87	74	76	76	80	70
Dec	75	84	75	72	80	78	74	83	82	76	82	83	75	83	75	NA	78	75	74	72	NA	63	72	76	NA	52	55	90	81	82	83	76	86	88	80	80	85	80	71	89	70	73
Nov	NA	84	70	NA	80	78	NA	84	72	75	78	81	72	78	82	NA	78	84	NA	82	62	71	77	83	NA	49	75	NA	82	86	89	78	79	NA	86	83	NA	82	84	76	NA	61
Oct	NA	78	83	79	79	82	79	77	NA	NA	75	87	80	75	84	NA	74	85	NA	78	69	NA	73	83	NA	53	71	84	NA	86	NA	89	86	87	NA	86	80	NA	85	NA	NA	NA
Sep	74	78	82	68	80	81	75	82	77	74	81	81	74	74	81	NA	77	84	74	78	71	73	77	80	NA	67	69	87	87	82	NA	91	80	87	85	76	86	82	78	NA	86	NA
Aug	67	79	NA	76	81	23	NA	81	83	74	72	NA	73	NA	NA	NA	72	84	69	80	NA	75	64	82	NA	72	60	89	86	82	NA	86	79	85	80	76	83	77	78	90	88	NA
Jul	NA	77	83	NA	79	82	NA	75	81	58	73	75	70	73	70	72	70	74	NA	74	82	66	59	76	NA	62	71	79	82	84	NA	NA	87	82	68	84	80	76	82	81	80	79
Jun	NA	84	73	NA	84	83	NA	74	84	NA	76	71	NA	76	78	NA	76	73	NA	71	60	NA	73	78	NA	69	43	91	NA	87	NA	83	81	91	NA	85	89	NA	84	83	89	88
May	84	77	78	87	80	81	80	70	82	NA	NA	75	NA	NA	79	NA	NA	74	89	NA	67	74	NA	77	NA	58	53	85	88	80	NA	NA	81	89	84	80	84	82	79	79	73	77
Apr	80	78	NA	82	77	71	71	73	NA	83	72	75	83	77	73	NA	80	70	74	64	55	90	71	52	NA	49	52	82	NA	87	NA	84	86	90	83	90	84	81	87	78	79	81
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2687			2686			1462			2672			2651			1152			2685			2198			2671			2714			2676			2164			2713			2790		

Legend

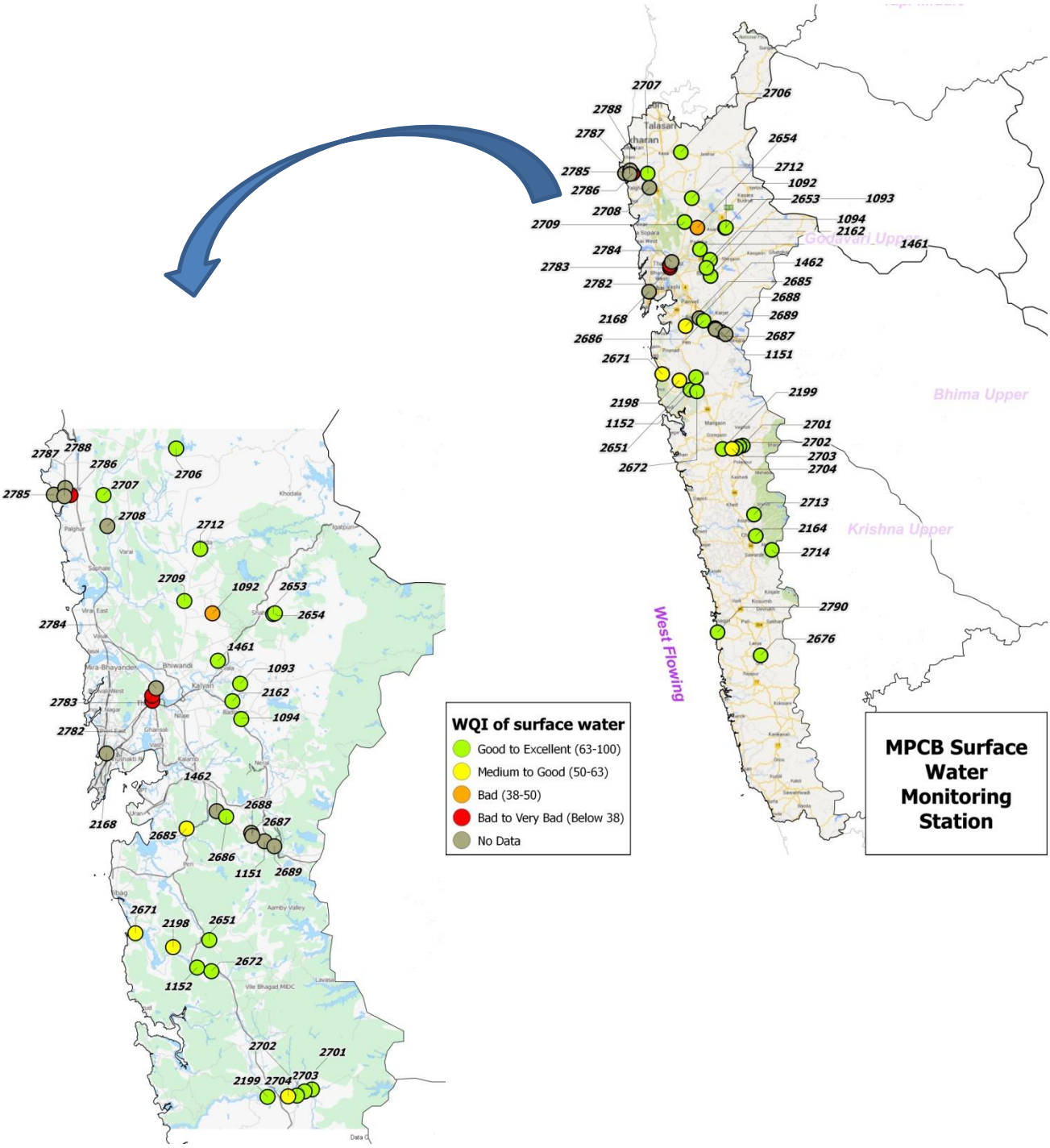
Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Surface water quality monitoring stations on West flowing rivers (3 of 3)

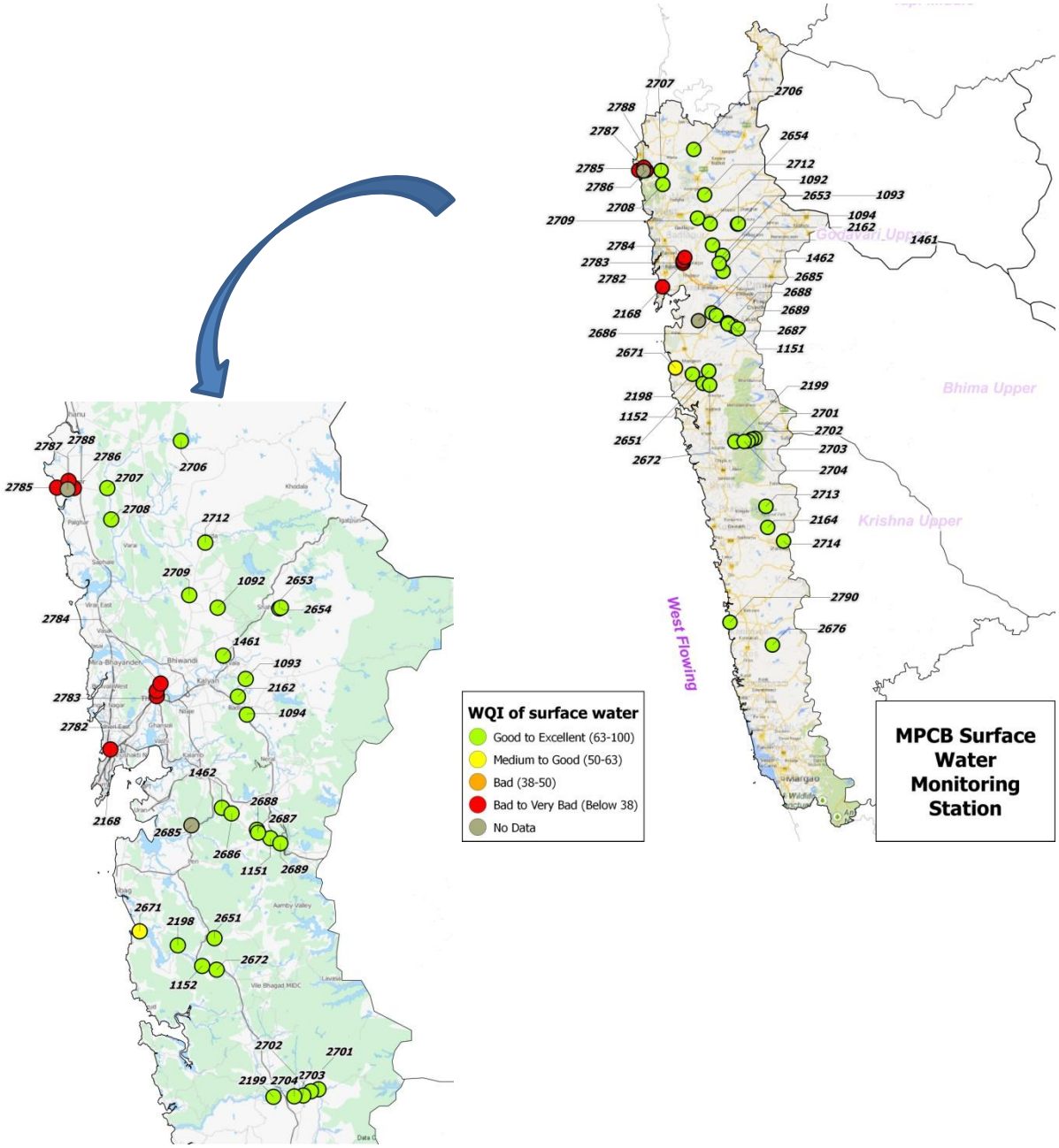
Station Code	River	Name of the Station	Village	Taluka	District
2687	Patalganga	Patalganga river at Khalapur Pumping Station	Khalapur	Khalapur	Raigad
2686	Patalganga	Patalganga river at Vyal Pump House	Vyal	Khalapur	Raigad
1462	Patalganga	Patalganga near intake of MIDC water works(Turade w/w)	Turade	Khalapur	Raigad
2672	Kundalika	Kundalika river at Dhatav Jackwell	Dhatav	Roha	Raigad
2651	Amba	Amba river at D/s of Waken bridge	Waken Phata	Roha	Raigad
1152	Kundalika	Kundalika river at Roha bridge	Roha	Roha	Raigad
2685	Patalganga	Patalganga river at D/s of Kharpada bridge.	Kharpada	Khalapur	Raigad
2198	Kundalika	Kundalika river at Are Khurd (saline zone)	Are Khurd	Roha	Raigad
2671	Kundalik	Kundalika river near Salav bridge (saline zone)	Salav	Roha	Raigad
2714	Vashishti	Vashisti river at U/s of Pophali near Konphansawane bridge.	Pophali	Chiplun	Ratnagiri
2676	Muchkundi	Muchkundi river at Waked, Ratnagiri, near M/s Asahi Maharashtra Glass Ltd	Waked	Lanja	Ratnagiri
2164	Vashishti	Vashisti river at U/s of Three M Paper Mills near M/s Multifilms Plastic Pvt. Ltd.	Kherdi	Chiplun	Ratnagiri
2713	Vashishti	Vashisti river at D/s of Three M Paper Mills near Chiplun water	Kherdi	Chiplun	Ratnagiri

Station Code	River	Name of the Station	Village	Taluka	District
		intake jackwell.			
2790	Pimpal-Paneri nalla	Pimpal-Paneri nalla at Ratnagiri near Finolex Industries.	Yahganigaon	Ratnagiri	Ratnagiri

Spatial map of Surface WQI of West Flowing Rivers (April 2012)



Spatial map of Surface WQI of West Flowing Rivers (December 2012)



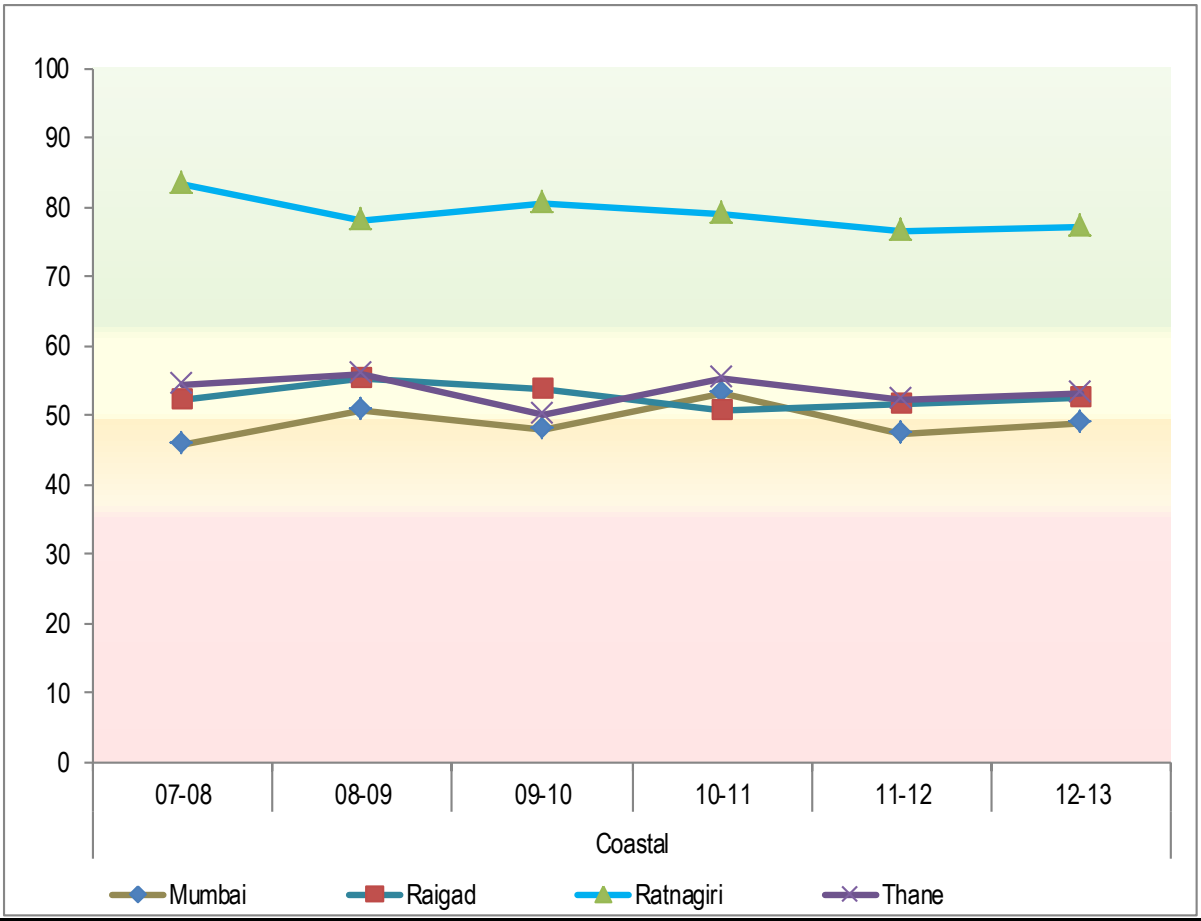
Saline (Sea and Creek) Water Quality

Being a coastal state Maharashtra is bestowed with a huge coast line of about 720 kms. Thane, Mumbai, Raigad, Ratnagiri and Sindhudurg districts are all located along the coastal front in Maharashtra. These districts are blessed with beaches, mangroves, migratory birds, corals and a lot of unique marine biodiversity. These areas are not only stress busters for general public but also cater to the sector of tourism in the state. These patches are also significant for various livelihood opportunities since they support occupations like fishing and salt production in the state.

Given the fact that water pollution on the coastal front shall directly impact the marine ecosystem and through consumption of fish and salt it poses a potential threat to humans, it is of significant importance to monitor sea water quality.

MPCB has 34 monitoring stations along the sensitive and pollution prone areas of coastline of the state. Regular monitoring is conducted at these monitoring stations. The following section presents the DO, FC, pH and BOD data recorded at the sea and creek WQMS in illustrative manner

Coastal Basin (Sea / Creek Water Sample)



WQI	Category	Class by CPCB	Remarks
63-100	Good to Excellent	A	Non polluted
50-63	Medium to Good	B	Non polluted
38-50	Bad	C	Polluted
38 & less	Bad to Very Bad	D, E	Heavily polluted

Figure No. 38: Trend of annual average WQI across districts for sea and creek water

Note:

This graph considers the average WQI for all the monitoring stations in that particular district and hence may include some bias. This graph is only for an overview and monitoring station wise data maybe analyzed to pin point the most affected and polluted patches of rivers in that district.

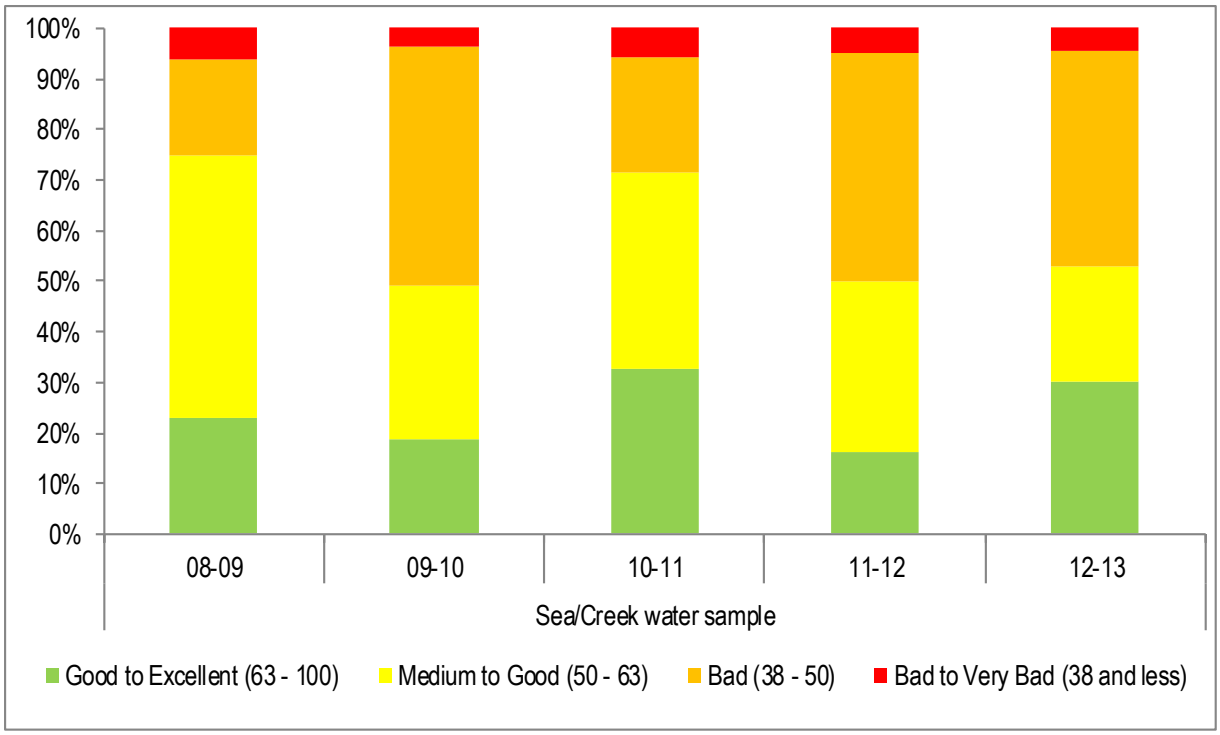
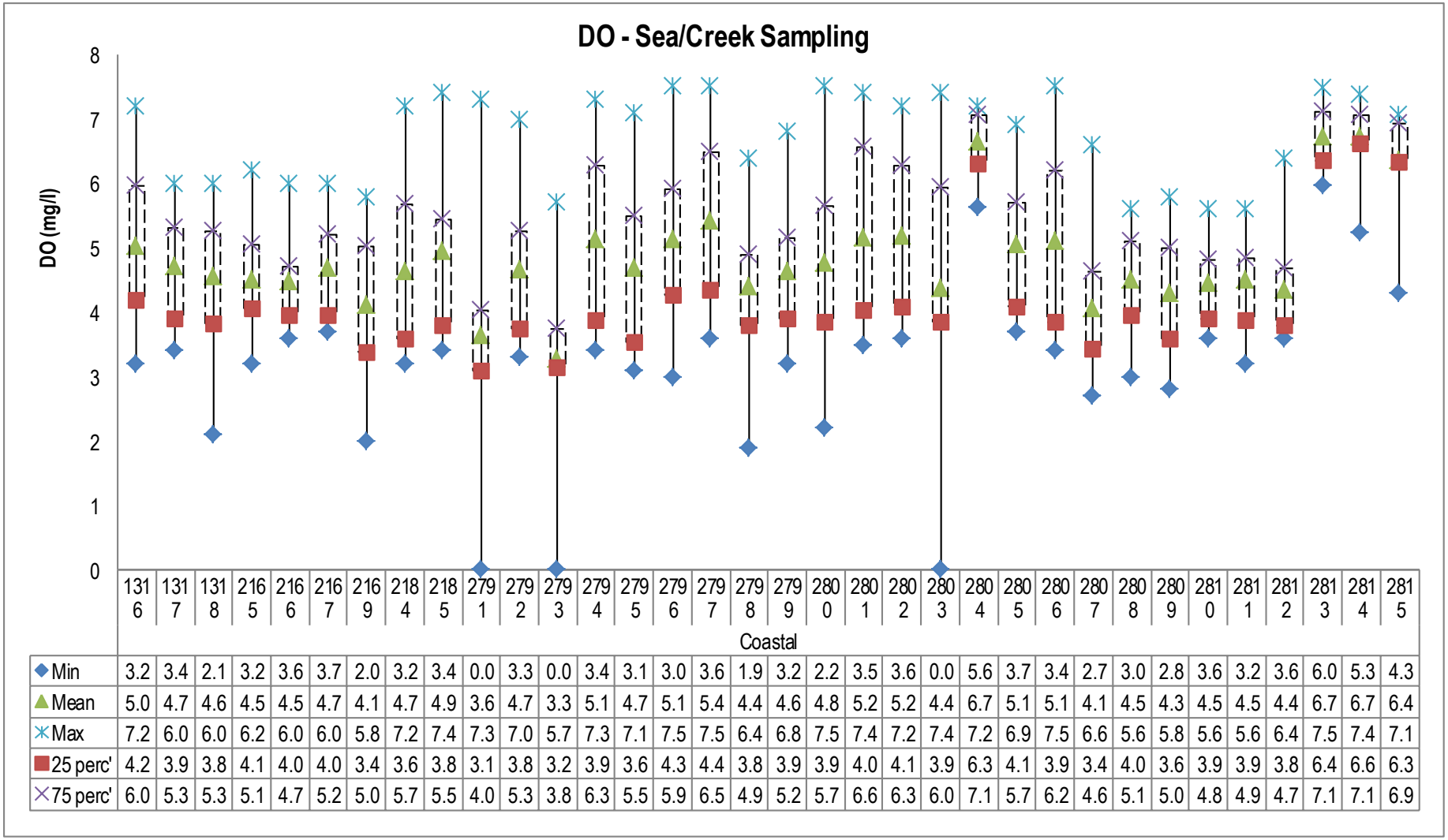


Figure No. 39: Trend of average occurrence of different category of WQI in sea and creek water

The Intra basin performance of Coastal Basin for sea and creeks across four districts of the state are depicted in Figure No. 38 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in Figure No. 39.

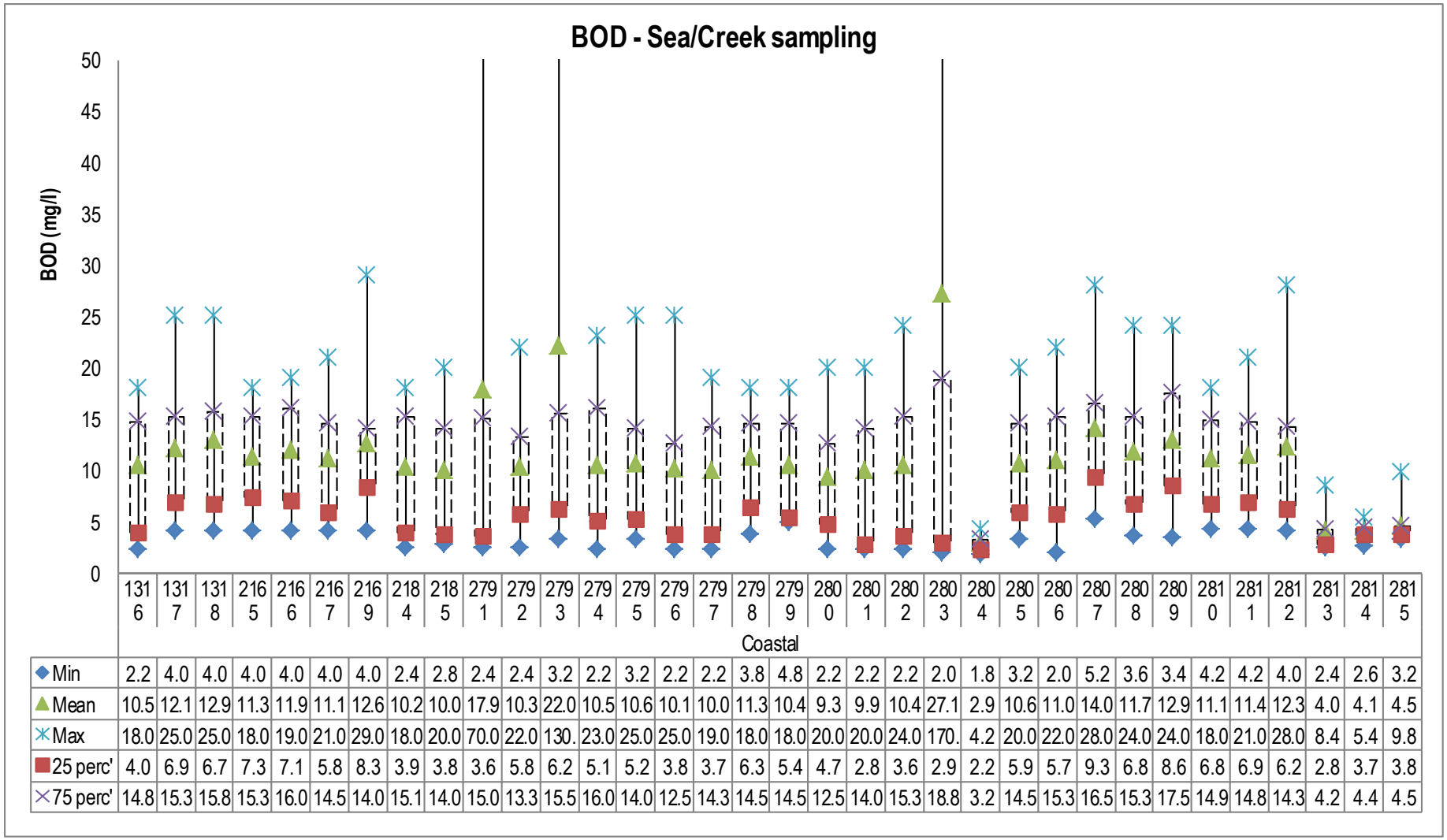
The results showed that among four districts, namely Thane, Mumbai, Raigad and Ratnagiri, the annual average WQI of Ratnagiri (4 WQMS) were consistently in Good to Excellent (i.e. WQI in range of 63-100) from 07-08 till 13-14. Whereas, Raigad (2 WQMS), Thane (18 WQMS) and Ratnagiri (4 WQMS) were in Bad to Medium category (i.e. WQI in range of 38-63). The average WQI across Thane, Mumbai and Raigad districts showed upward trend in recent years and in Ratnagiri districts showed downward trend.

Figure No. 39 shows average annual occurrence of WQI across 34 WQM stations of coastal basin of sea and creek water sample for 7 years starting from 2007. The results showed that the occurrence of Good to Excellent category of WQI has increased over the years across all the WQMS but is less than the occurrence of 'Bad' and 'Bad to Very Bad' category of WQI.



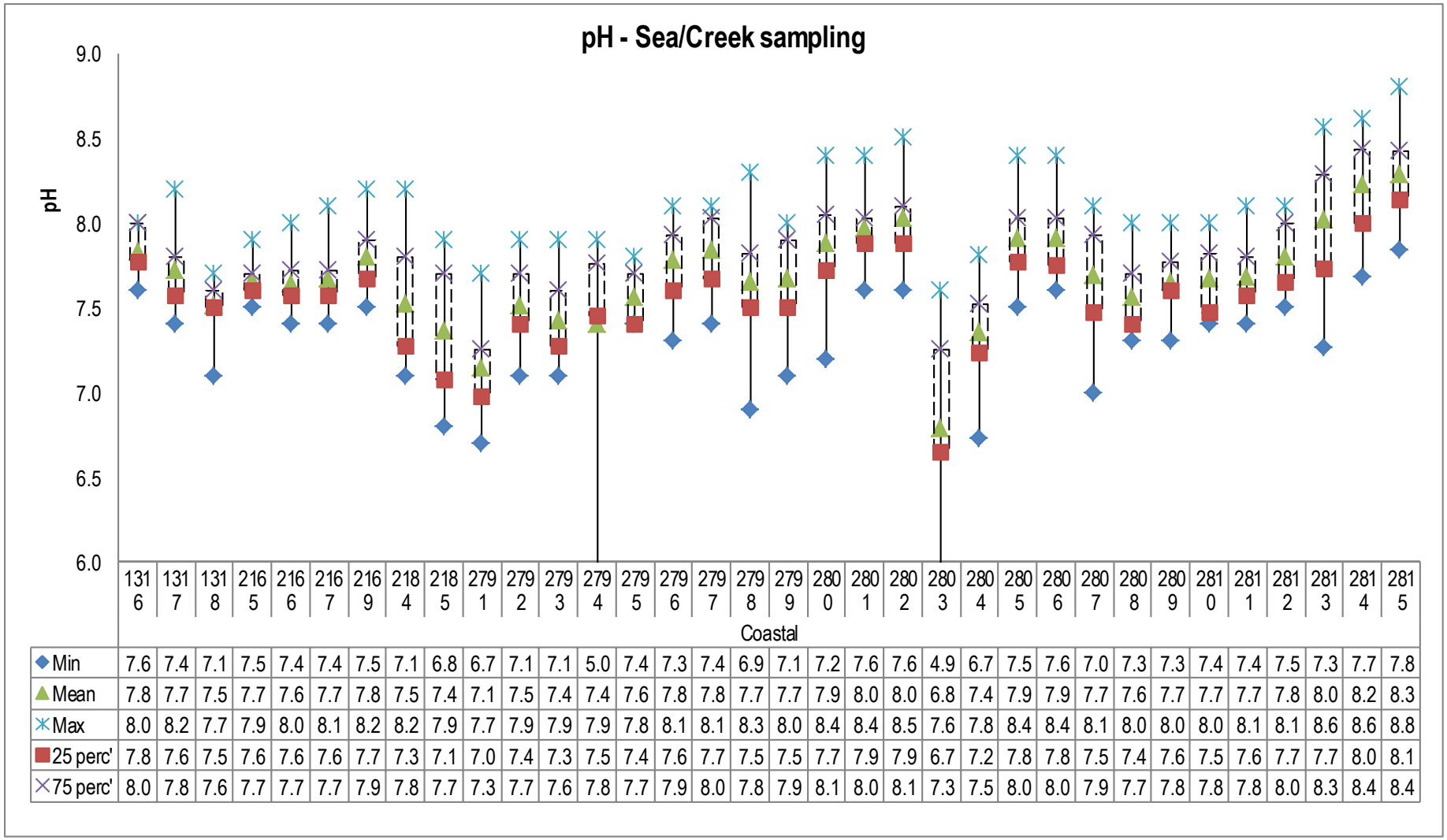
	1316	1317	1318	2165	2166	2167	2169	2184	2185	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815
Min	3.2	3.4	2.1	3.2	3.6	3.7	2.0	3.2	3.4	0.0	3.3	0.0	3.4	3.1	3.0	3.6	1.9	3.2	2.2	3.5	3.6	0.0	5.6	3.7	3.4	2.7	3.0	2.8	3.6	3.2	3.6	6.0	5.3	4.3
Mean	5.0	4.7	4.6	4.5	4.5	4.7	4.1	4.7	4.9	3.6	4.7	3.3	5.1	4.7	5.1	5.4	4.4	4.6	4.8	5.2	5.2	4.4	6.7	5.1	5.1	4.1	4.5	4.3	4.5	4.5	4.4	6.7	6.7	6.4
Max	7.2	6.0	6.0	6.2	6.0	6.0	5.8	7.2	7.4	7.3	7.0	5.7	7.3	7.1	7.5	7.5	6.4	6.8	7.5	7.4	7.2	7.4	7.2	6.9	7.5	6.6	5.6	5.8	5.6	5.6	6.4	7.5	7.4	7.1
25 perc'	4.2	3.9	3.8	4.1	4.0	4.0	3.4	3.6	3.8	3.1	3.8	3.2	3.9	3.6	4.3	4.4	3.8	3.9	3.9	4.0	4.1	3.9	6.3	4.1	3.9	3.4	4.0	3.6	3.9	3.9	3.8	6.4	6.6	6.3
75 perc'	6.0	5.3	5.3	5.1	4.7	5.2	5.0	5.7	5.5	4.0	5.3	3.8	6.3	5.5	5.9	6.5	4.9	5.2	5.7	6.6	6.3	6.0	7.1	5.7	6.2	4.6	5.1	5.0	4.8	4.9	4.7	7.1	7.1	6.9

Figure No. 40: Trend of Dissolved Oxygen (DO) levels recorded at WQMS monitoring sea and creek water



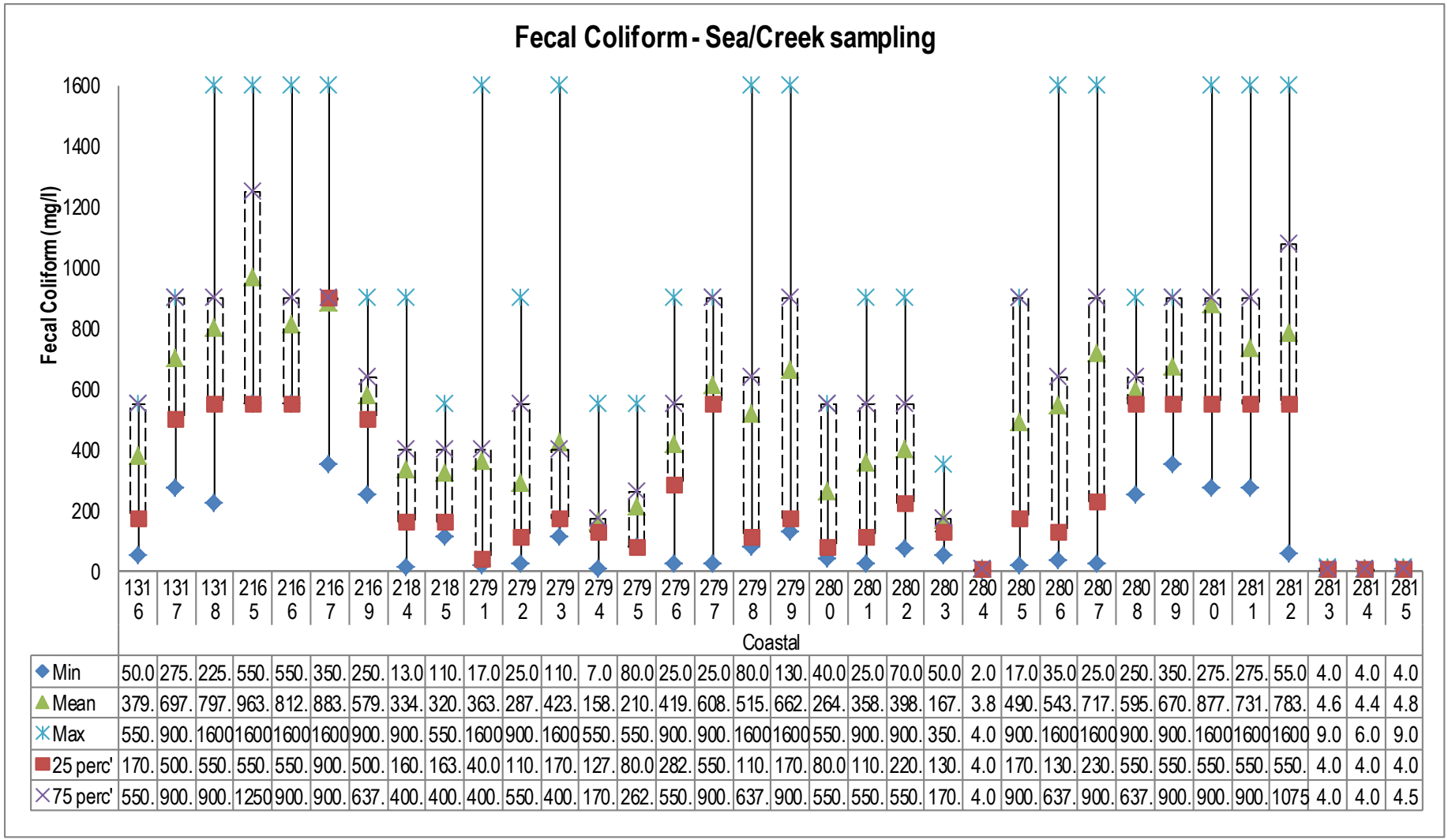
	1316	1317	1318	2165	2166	2167	2169	2184	2185	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815
Min	2.2	4.0	4.0	4.0	4.0	4.0	4.0	2.4	2.8	2.4	2.4	3.2	2.2	3.2	2.2	2.2	3.8	4.8	2.2	2.2	2.2	2.0	1.8	3.2	2.0	5.2	3.6	3.4	4.2	4.2	4.0	2.4	2.6	3.2
Mean	10.5	12.1	12.9	11.3	11.9	11.1	12.6	10.2	10.0	17.9	10.3	22.0	10.5	10.6	10.1	10.0	11.3	10.4	9.3	9.9	10.4	27.1	2.9	10.6	11.0	14.0	11.7	12.9	11.1	11.4	12.3	4.0	4.1	4.5
Max	18.0	25.0	25.0	18.0	19.0	21.0	29.0	18.0	20.0	70.0	22.0	130.	23.0	25.0	25.0	19.0	18.0	18.0	20.0	20.0	24.0	170.	4.2	20.0	22.0	28.0	24.0	24.0	18.0	21.0	28.0	8.4	5.4	9.8
25 perc'	4.0	6.9	6.7	7.3	7.1	5.8	8.3	3.9	3.8	3.6	5.8	6.2	5.1	5.2	3.8	3.7	6.3	5.4	4.7	2.8	3.6	2.9	2.2	5.9	5.7	9.3	6.8	8.6	6.8	6.9	6.2	2.8	3.7	3.8
75 perc'	14.8	15.3	15.8	15.3	16.0	14.5	14.0	15.1	14.0	15.0	13.3	15.5	16.0	14.0	12.5	14.3	14.5	14.5	12.5	14.0	15.3	18.8	3.2	14.5	15.3	16.5	15.3	17.5	14.9	14.8	14.3	4.2	4.4	4.5

Figure No. 41: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS monitoring sea and creek water



	1316	1317	1318	2165	2166	2167	2169	2184	2185	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815
Min	7.6	7.4	7.1	7.5	7.4	7.4	7.5	7.1	6.8	6.7	7.1	7.1	5.0	7.4	7.3	7.4	6.9	7.1	7.2	7.6	7.6	4.9	6.7	7.5	7.6	7.0	7.3	7.3	7.4	7.4	7.5	7.3	7.7	7.8
Mean	7.8	7.7	7.5	7.7	7.6	7.7	7.8	7.5	7.4	7.1	7.5	7.4	7.4	7.6	7.8	7.8	7.7	7.7	7.9	8.0	8.0	6.8	7.4	7.9	7.9	7.7	7.6	7.7	7.7	7.7	7.8	8.0	8.2	8.3
Max	8.0	8.2	7.7	7.9	8.0	8.1	8.2	8.2	7.9	7.7	7.9	7.9	7.9	7.8	8.1	8.1	8.3	8.0	8.4	8.4	8.5	7.6	7.8	8.4	8.4	8.1	8.0	8.0	8.0	8.1	8.1	8.6	8.6	8.8
25 perc'	7.8	7.6	7.5	7.6	7.6	7.6	7.7	7.3	7.1	7.0	7.4	7.3	7.5	7.4	7.6	7.7	7.5	7.5	7.7	7.9	7.9	6.7	7.2	7.8	7.8	7.5	7.4	7.6	7.5	7.6	7.7	7.7	8.0	8.1
75 perc'	8.0	7.8	7.6	7.7	7.7	7.7	7.9	7.8	7.7	7.3	7.7	7.6	7.8	7.7	7.9	8.0	7.8	7.9	8.1	8.0	8.1	7.3	7.5	8.0	8.0	7.9	7.7	7.8	7.8	7.8	8.0	8.3	8.4	8.4

Figure No. 42: Trend of pH levels recorded at WQMS monitoring sea and creek water



	1316	1317	1318	2165	2166	2167	2169	2184	2185	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815
Min	50.0	275.	225.	550.	550.	350.	250.	13.0	110.	17.0	25.0	110.	7.0	80.0	25.0	25.0	80.0	130.	40.0	25.0	70.0	50.0	2.0	17.0	35.0	25.0	250.	350.	275.	275.	55.0	4.0	4.0	4.0
Mean	379.	697.	797.	963.	812.	883.	579.	334.	320.	363.	287.	423.	158.	210.	419.	608.	515.	662.	264.	358.	398.	167.	3.8	490.	543.	717.	595.	670.	877.	731.	783.	4.6	4.4	4.8
Max	550.	900.	1600	1600	1600	1600	900.	900.	550.	1600	900.	1600	550.	550.	900.	900.	1600	1600	550.	900.	900.	350.	4.0	900.	1600	1600	900.	900.	1600	1600	1600	9.0	6.0	9.0
25 perc'	170.	500.	550.	550.	550.	900.	500.	160.	163.	40.0	110.	170.	127.	80.0	282.	550.	110.	170.	80.0	110.	220.	130.	4.0	170.	130.	230.	550.	550.	550.	550.	550.	4.0	4.0	4.0
75 perc'	550.	900.	900.	1250	900.	900.	637.	400.	400.	400.	550.	400.	170.	262.	550.	900.	637.	900.	550.	550.	550.	170.	4.0	900.	637.	900.	637.	900.	900.	900.	1075	4.0	4.0	4.5

Figure No. 43: Trend of Fecal Coliforms levels recorded at WQMS monitoring sea and creek water

Water quality Index for WQMS monitoring Sea and Creek water (1 of 3)

Mar	NA	56	45	NA	66	41	68	44	43	NA	52	39	NA	65	39	NA	35	39	62	51	46	62	53	45	65	61	43	56	57	48	63	59	38
Feb	NA	57	42	NA	42	44	66	42	43	64	52	44	57	37	53	64	38	43	67	41	45	62	55	42	65	61	41	56	56	45	62	49	44
Jan	66	53	41	67	56	41	67	51	63	66	33	33	49	56	63	56	46	41	65	56	42	NA	50	42	66	50	34	47	48	45	NA	47	46
Dec	66	49	47	63	54	45	65	61	47	65	49	49	36	47	48	60	54	52	61	46	46	66	46	46	NA	52	44	46	53	53	57	55	45
Nov	66	48	69	67	39	73	68	48	52	61	47	55	64	49	60	69	53	56	61	44	60	54	53	66	NA	57	69	64	60	69	62	58	68
Oct	NA	52	73	NA	51	76	NA	53	55	NA	52	55	NA	56	50	NA	57	58	NA	50	58	NA	49	69	NA	53	68	NA	60	62	NA	47	65
Sep	NA	45	66	NA	49	69	NA	48	64	NA	47	63	NA	61	77	NA	47	47	NA	43	72	NA	30	79	NA	52	67	NA	57	75	NA	62	79
Aug	NA	66	59	NA	67	55	NA	64	60	NA	NA	40	NA	74	64	NA	61	70	NA	64	64	NA	32	67	NA	66	69	NA	72	72	NA	68	67
Jul	NA	56	76	NA	58	75	NA	44	53	NA	45	44	NA	48	65	NA	45	58	NA	49	51	NA	51	53	NA	60	58	NA	56	51	NA	49	58
Jun	NA	NA	52	NA	NA	57	NA	NA	44	NA	NA	44	NA	NA	40	NA	NA	47	NA	NA	40	NA	NA	51	NA	43	46	NA	NA	NA	NA	46	48
May	NA	NA	48	NA	NA	44	NA	NA	47	NA	NA	50	NA	NA	43	NA	NA	48	NA	NA	42	NA	NA	41	NA	NA	49	NA	NA	44	NA	NA	48
Apr	44	NA	37	38	NA	49	46	NA	NA	35	NA	38	33	NA	51	36	57	50	42	55	56	47	NA	52	47	NA	46	42	49	41	41	48	49
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2802			2801			2799			2807			2800			2798			2805			2797			1316			2795			2796		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 17: Surface water quality monitoring stations monitoring Sea and Creek water (1 of 3)

Station Code	Sea/Creek	Name of the Station	Village	Taluka	District
2802	Dahanu creek	Dahanu creek at Dahanu Fort	Danugaon	Dahanu	Thane
2801	Savta creek	Savta creek	Savta	Dahanu	Thane
2799	Dandi creek	Dandi creek	Dandi	Palghar	Thane
2807	Navapur sea	Navapur sea	Navapur	Palghar	Thane
2800	Sarwali creek	Sarwali creek	Sarwali	Palghar	Thane
2798	Kharekuran Murbe creek	Kharekuran Murbhe creek	Kharekuran	Palghar	Thane
2805	Arnala sea	Arnala Sea	Arnala	Vasai	Thane
2797	Bhayander creek	Bhayander Creek at D/s of Railway bridge at Jasal park choupathy.	Navghar	Bhayander	Thane
1316	Bassein creek	Bassein creek at Vasai Fort, Thane	Bassein	Vasai	Thane
2795	Ulhas creek	Ulhas Creek at Gaimukh at Nagla Bunder on Ghod Buder road.	Nagla	Thane	Thane
2796	Ulhas creek	Ulhas Creek at Versova bridge	Versova	Vasai	Thane

Water quality Index for WQMS monitoring Sea and Creek water (2 of 3)

Mar	NA	63	44	24	43	52	57	65	45	58	32	46	54	56	47	58	52	42	60	64	42	58	47	43	60	50	42	50	NA	43	60	46	42
Feb	64	45	43	42	NA	40	48	53	45	49	46	43	70	49	46	40	NA	46	NA	48	47	40	53	42	49	55	42	24	59	43	63	60	44
Jan	23	53	39	55	47	43	59	50	47	40	55	50	63	35	46	45	56	47	51	56	51	57	55	48	60	52	42	58	38	NA	NA	57	37
Dec	64	47	40	NA	44	30	44	56	52	NA	46	49	NA	52	50	67	49	47	NA	48	51	52	43	41	56	40	42	NA	49	49	60	43	48
Nov	59	48	66	NA	75	67	66	56	83	62	59	69	60	61	52	NA	52	58	62	48	70	NA	44	58	NA	42	58	NA	53	66	54	49	63
Oct	NA	45	55	NA	76	80	NA	50	66	NA	63	66	NA	60	54	NA	48	72	NA	51	61	54	45	57	NA	40	61	NA	47	57	NA	48	55
Sep	NA	44	78	NA	81	82	NA	62	81	NA	60	81	NA	56	69	67	62	69	58	48	71	56	40	37	NA	40	50	NA	50	60	NA	45	60
Aug	NA	49	74	NA	72	65	NA	70	67	NA	62	52	NA	58	52	66	42	65	NA	61	65	NA	44	55	NA	44	54	51	50	60	NA	48	60
Jul	NA	44	56	NA	64	65	NA	53	55	NA	43	62	NA	30	47	NA	52	70	39	44	75	60	43	53	NA	43	52	NA	43	NA	NA	48	51
Jun	NA	NA	48	NA	NA	39	NA	NA	56	NA	NA	47	NA	NA	43	NA	NA	46	NA	NA	55	NA	35	28	NA	NA	38	NA	NA	46	NA	NA	46
May	NA	NA	39	NA	NA	24	NA	NA	46	NA	NA	47	NA	NA	32	56	25	49	36	NA	43	50	NA	49	NA	NA	46	NA	36	45	NA	NA	44
Apr	44	61	45	NA	NA	43	43	51	51	46	48	51	41	46	26	42	48	49	46	50	46	48	43	41	39	42	47	36	NA	36	44	NA	49
FY	10-Nov	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2806			2791			2794			2792			2793			2184			2185			2169			2812			1318			2811		

Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

Table No. 18: Surface water quality monitoring stations monitoring Sea and Creek water (2 of 3)

Station Code	Sea/Creek	Name of the Station	Village	Taluka	District
2806	Uttan sea	Uttan Sea at Bhayander.	Uttan	Bhayander	Thane
2791	Ulhas creek	Ulhas Creek at Reti Bunder at D/s of Kalyan- Bhiwandi bridge	Kalyan	Kalyan	Thane
2794	Ulhas creek	Ulhas Creek at Kolshet Reti Bunder	Kolshet	Thane	Thane
2792	Ulhas creek	Ulhas Creek at Mumbra Reti Bunder	Mumbra	Thane	Thane
2793	Thane creek	Thane Creek at Kalwa Road bridge	Kalwa	Thane	Thane
2184	Vashi creek	Vashi Creek at Airoli bridge	Airoli	Thane	Thane
2185	Vashi creek	Vashi Creek at Vashi bridge	Vashi	Thane	Thane
2169	Sea	Sea Water at Versova beach	Versova	Andheri	Mumbai Suburban
2812	Sea	Sea Water at Juhu beach	Juhugaon	Santacruz	Mumbai Suburban
1318	Mahim creek	Mahim creek at Mahim Bay	Mahim	Bandra	Mumbai City
2811	Sea	Sea water at Shivaji Park(Dadar Choupathy)	Dadar	Dadar	Mumbai City

Water quality Index for WQMS monitoring Sea and Creek water (3 of 3)

Mar	59	47	42	NA	49	43	NA	57	44	61	50	45	61	53	42	61	45	45	60	NA	26	60	53	40	NA	90	89	78	84	79	76	82	78	83	85	77
Feb	60	47	42	NA	49	43	61	53	44	60	NA	44	61	46	49	60	53	44	29	47	26	60	58	45	NA	81	81	86	67	81	84	63	74	86	70	76
Jan	64	55	38	NA	58	40	NA	48	39	60	47	38	57	54	37	65	41	39	NA	39	62	55	59	41	NA	75	76	78	71	75	78	63	73	79	69	73
Dec	62	48	58	NA	NA	48	42	47	NA	62	45	45	NA	47	51	57	43	47	NA	69	42	NA	46	49	NA	NA	82	83	85	76	83	74	75	84	83	77
Nov	56	45	66	NA	NA	64	NA	42	52	60	47	65	NA	45	51	56	48	67	NA	52	64	NA	49	65	NA	NA	84	77	66	72	74	66	73	74	66	74
Oct	63	47	54	NA	48	56	NA	47	64	NA	49	54	NA	50	63	62	50	NA	NA	62	78	NA	47	53	NA	NA	84	NA	NA	76	NA	NA	NA	NA	NA	75
Sep	59	45	66	NA	NA	59	NA	46	NA	NA	42	55	NA	42	67	NA	41	56	NA	61	70	NA	39	64	NA	NA	82	NA	90	76	NA	87	76	NA	89	62
Aug	32	57	56	NA	NA	60	NA	55	63	NA	57	48	NA	53	62	53	51	59	NA	60	82	48	53	56	NA	NA	75	79	85	83	80	90	80	81	88	74
Jul	NA	47	52	NA	NA	40	NA	49	39	57	50	54	NA	49	51	51	49	53	NA	54	83	NA	50	51	NA	NA	84	83	60	68	77	58	81	76	67	79
Jun	51	NA	44	NA	NA	47	NA	NA	48	47	NA	44	NA	NA	49	51	NA	38	NA	NA	42	NA	NA	49	NA	NA	82	78	71	79	74	83	75	76	89	74
May	48	38	40	NA	NA	41	NA	NA	37	47	37	44	NA	NA	38	47	39	47	NA	NA	41	NA	38	36	NA	NA	83	82	75	78	79	NA	72	78	77	67
Apr	44	46	48	NA	NA	45	44	63	51	40	36	48	41	NA	50	47	45	45	NA	47	47	44	48	46	NA	NA	78	72	76	82	73	76	83	79	75	70
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2167			2810			2809			2166			2808			2165			2803			1317			2804			2813			2814			2815		

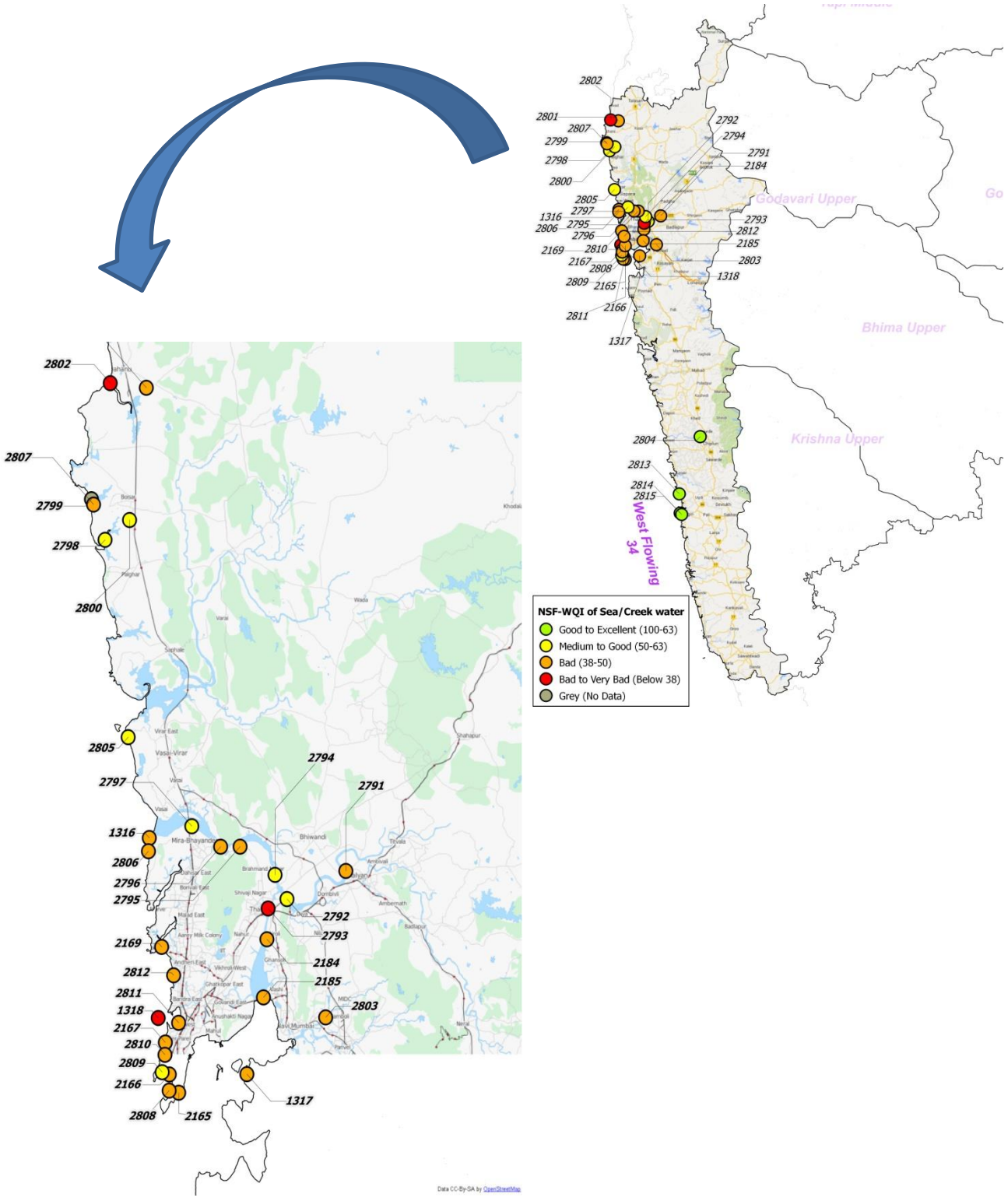
Legend

Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data

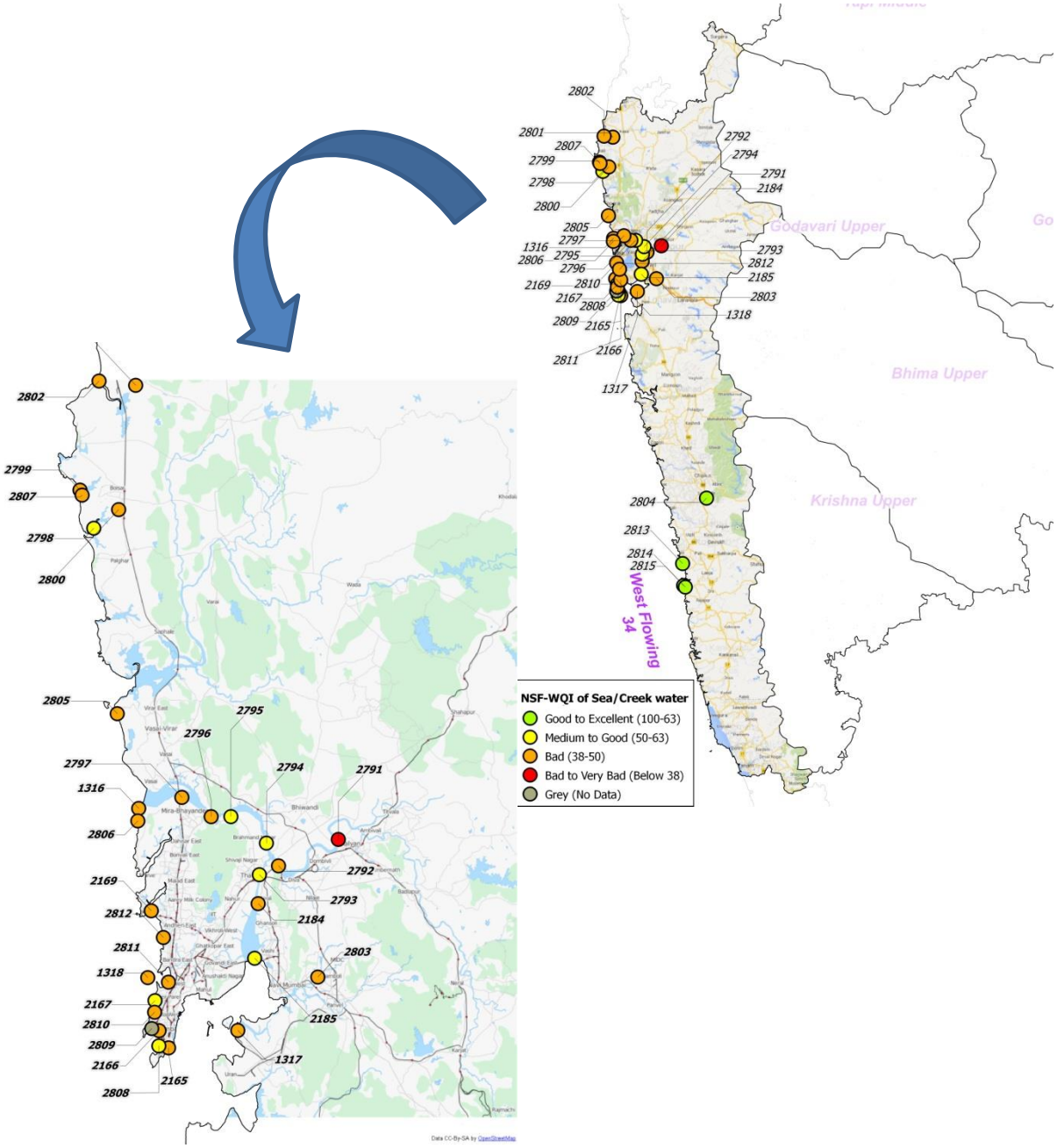
Table No. 19: Surface water quality monitoring stations monitoring Sea and Creek water (3of 3)

Station Code	Sea/Creek	Name of the Station	Village	Taluka	District
2167	Sea	Sea water at Worli Seaface	Worli	Worli	Mumbai City
2810	Sea	Sea water at Haji Ali	Worli	Worli	Mumbai City
2809	Sea	Sea water at Malabar Hill	Walkeshwar	Mumbai	Mumbai City
2166	Sea	Sea water at Charni Road Choupathy	Girgaon	Mumbai	Mumbai City
2808	Sea	Sea water at Nariman Point	Colaba	Colaba	Mumbai City
2165	Sea	Sea water at Gateway of Maharashtra	Colaba	Colaba	Mumbai City
2803	Panvel creek	Panvel Creek at Kopra bridge	Kopra	Panvel	Raigad
1317	Thane creek	Thane creek at Elephanta Island	Gharapuri, Elephanta Island	Uran	Raigad
2804	Karambavane creek	Karambavane creek at Chiplun.	Karambavane	Chiplun	Ratnagiri
2813	Sea	Sea Water at Ganapathipule.	Ganapatipule	Ratnagiri	Ratnagiri
2814	Sea	Sea water at Bhagwati Bunder, Ratnagiri near Ultra Tech Cement Jetty.	Mirkarwada	Ratnagiri	Ratnagiri
2815	Madvi sea	Madvi sea water at Ratnagiri near Jodhale Maruti Temple.	Madvigaon	Ratnagiri	Ratnagiri

Spatial map of WQI for Sea and Creek Water (April 2012)



Spatial map of WQI for Sea and Creek Water (December 2012)



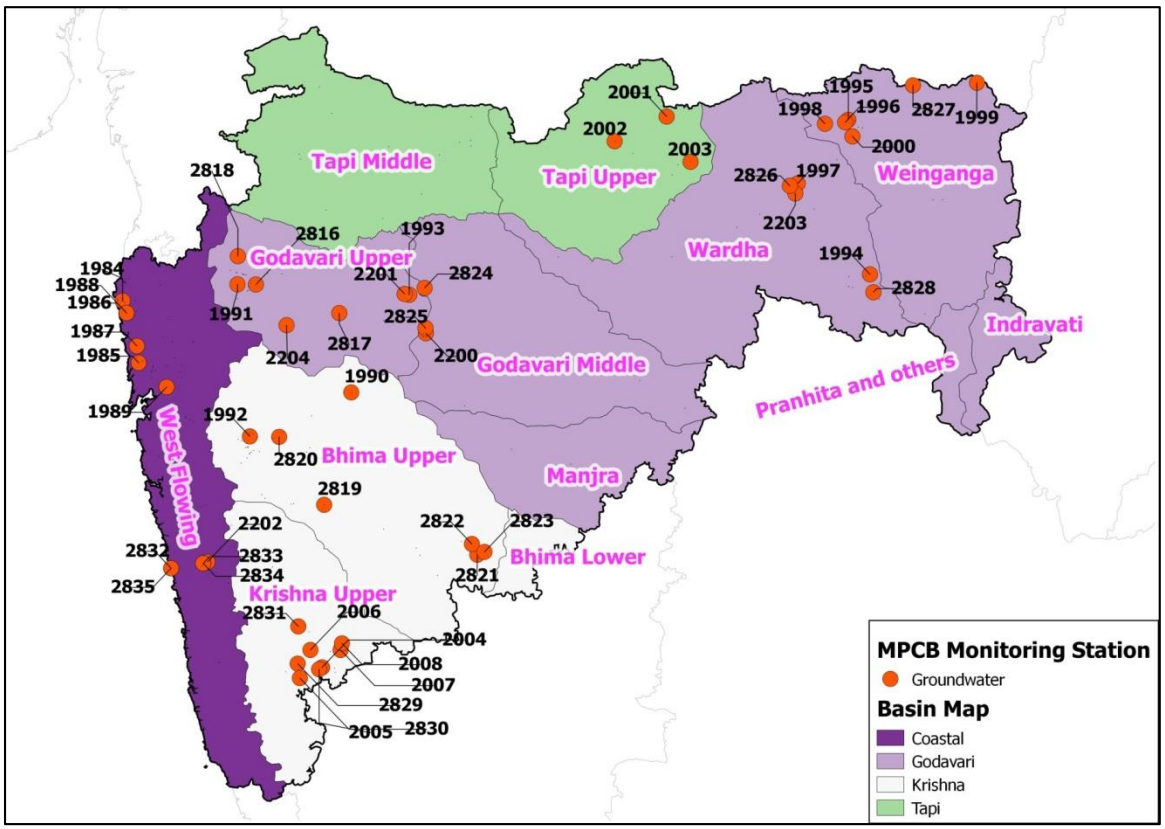
Groundwater Quality

Groundwater comprises of water located beneath the earth's surface in soil pore spaces and aquifers which form due to formation of cracks in the rocks. Groundwater is recharged from rain and surface water and is a unique and at times the only source for water supply in regions where centralized water supply is not available.

The geographical area of Maharashtra state is 308 lakh ha and its cultivable area is 225 lakh ha. Out of this, 40% of the area is drought prone[15]. Given such a large area of the state being drought prone dependence on groundwater is very high for agricultural and domestic use. Hence monitoring of groundwater is very essential.

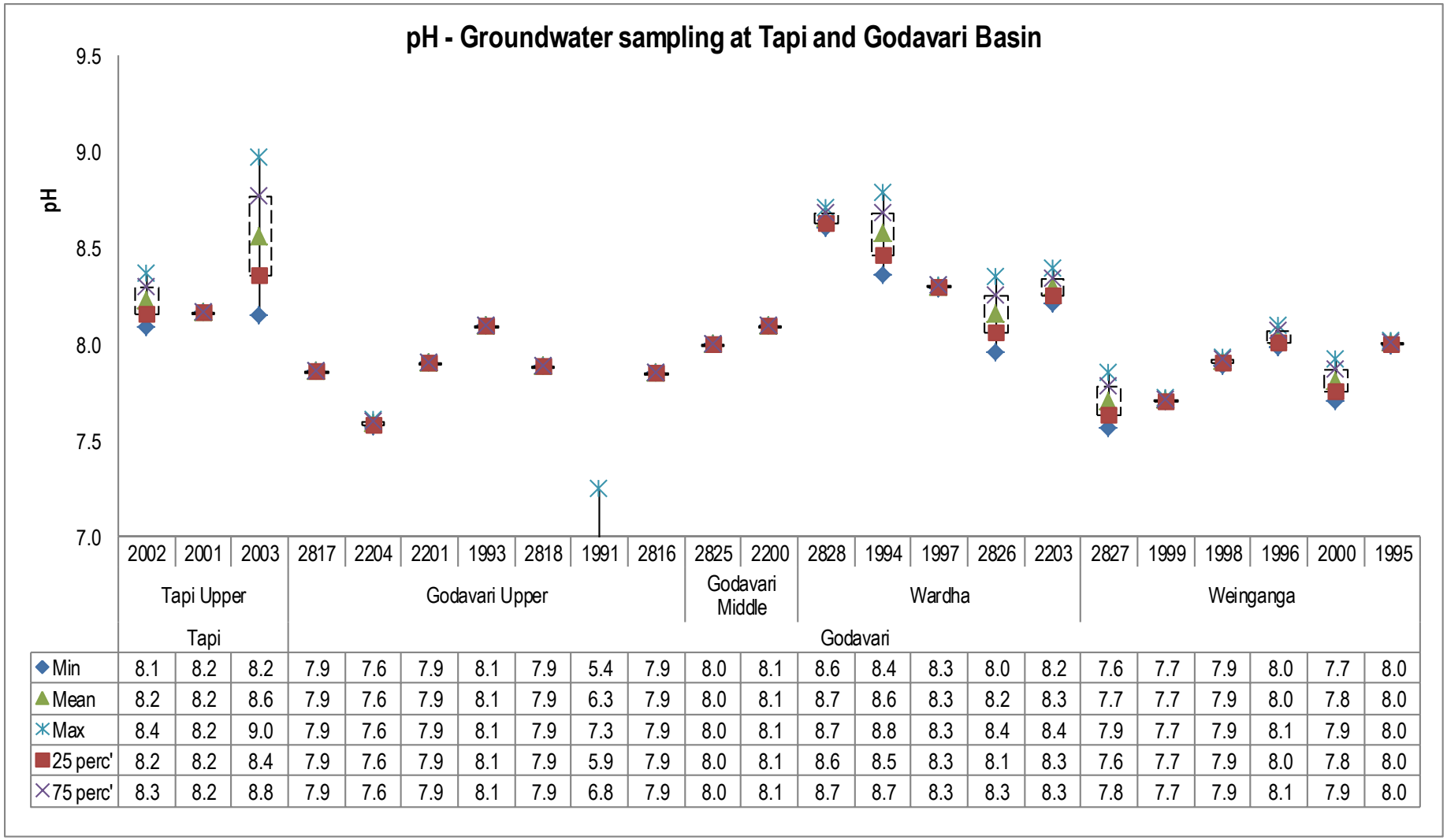
In Maharashtra CGWB (Central Ground Water Board), GSDA (Groundwater Survey and Development Agency) and MPCB, monitor the ground water quality across various districts of the state. MPCB has 50 ground water monitoring stations which monitor water quality twice a year for parameters like pH, Nitrate, TDS, Hardness, Fluoride, microbial content, Sulphates and so on.

The network of the monitoring stations is spatially presented in Map No. 8 and the parametric values for the pH, Nitrate, Flouride and hardness in terms of $CaCO_3$ is presented in the following section. The illustrations have been clubbed basin wise for convenience in presentation.



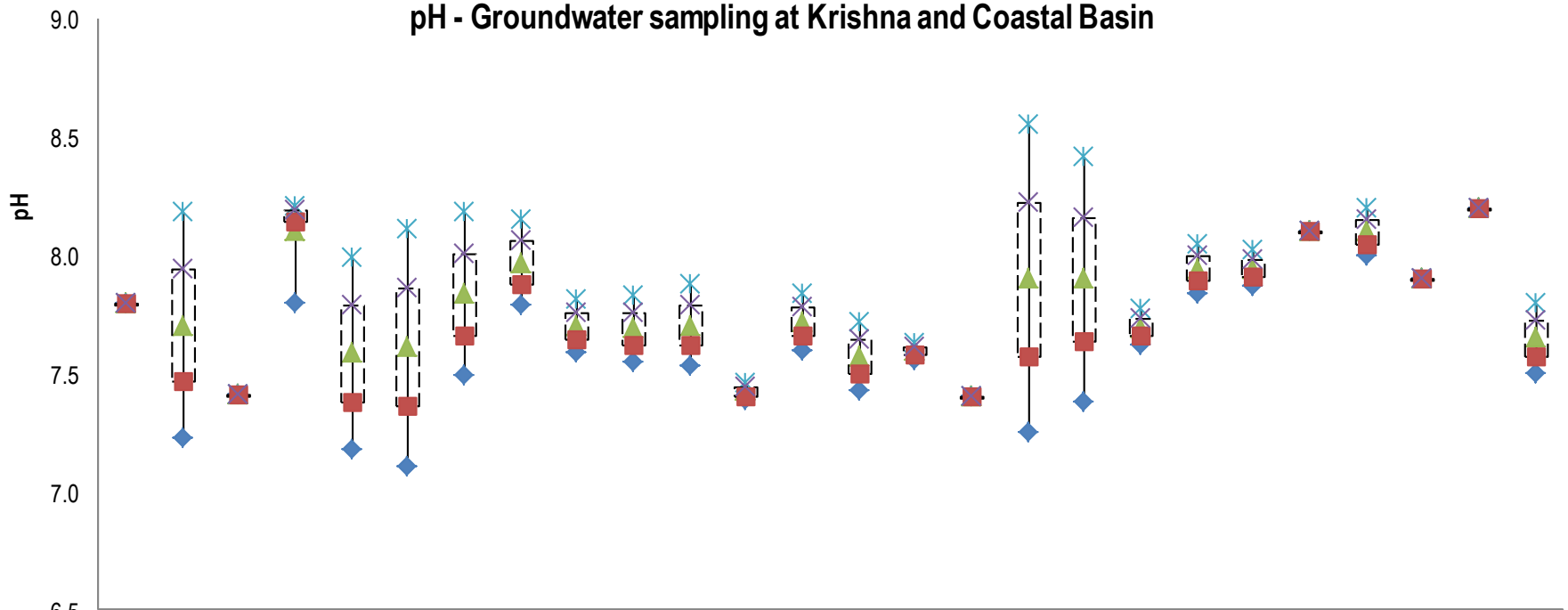
Map No. 8: Network of Groundwater quality monitoring stations monitored by MPCB in Maharashtra

[15] Maharashtra Water Resources Regulatory Authority, http://www.mwrra.org/introduction.php?link=wr



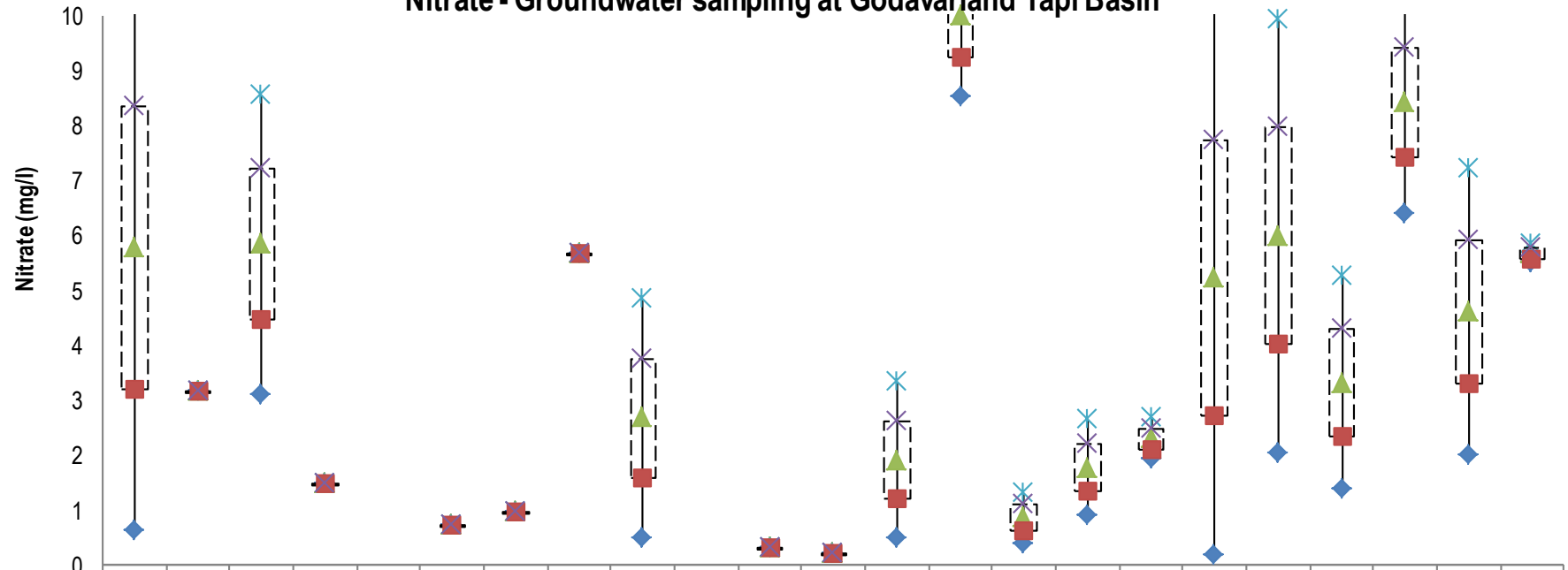
	2002	2001	2003	2817	2204	2201	1993	2818	1991	2816	2825	2200	2828	1994	1997	2826	2203	2827	1999	1998	1996	2000	1995
	Tapi Upper			Godavari Upper							Godavari Middle		Wardha					Weinganga					
	Tapi			Godavari																			
Min	8.1	8.2	8.2	7.9	7.6	7.9	8.1	7.9	5.4	7.9	8.0	8.1	8.6	8.4	8.3	8.0	8.2	7.6	7.7	7.9	8.0	7.7	8.0
Mean	8.2	8.2	8.6	7.9	7.6	7.9	8.1	7.9	6.3	7.9	8.0	8.1	8.7	8.6	8.3	8.2	8.3	7.7	7.7	7.9	8.0	7.8	8.0
Max	8.4	8.2	9.0	7.9	7.6	7.9	8.1	7.9	7.3	7.9	8.0	8.1	8.7	8.8	8.3	8.4	8.4	7.9	7.7	7.9	8.1	7.9	8.0
25 perc'	8.2	8.2	8.4	7.9	7.6	7.9	8.1	7.9	5.9	7.9	8.0	8.1	8.6	8.5	8.3	8.1	8.3	7.6	7.7	7.9	8.0	7.8	8.0
75 perc'	8.3	8.2	8.8	7.9	7.6	7.9	8.1	7.9	6.8	7.9	8.0	8.1	8.7	8.7	8.3	8.3	8.3	7.8	7.7	7.9	8.1	7.9	8.0

Figure No. 44: Parametric values of pH recorded at WQMS monitoring groundwater in Godavari and Tapi basin



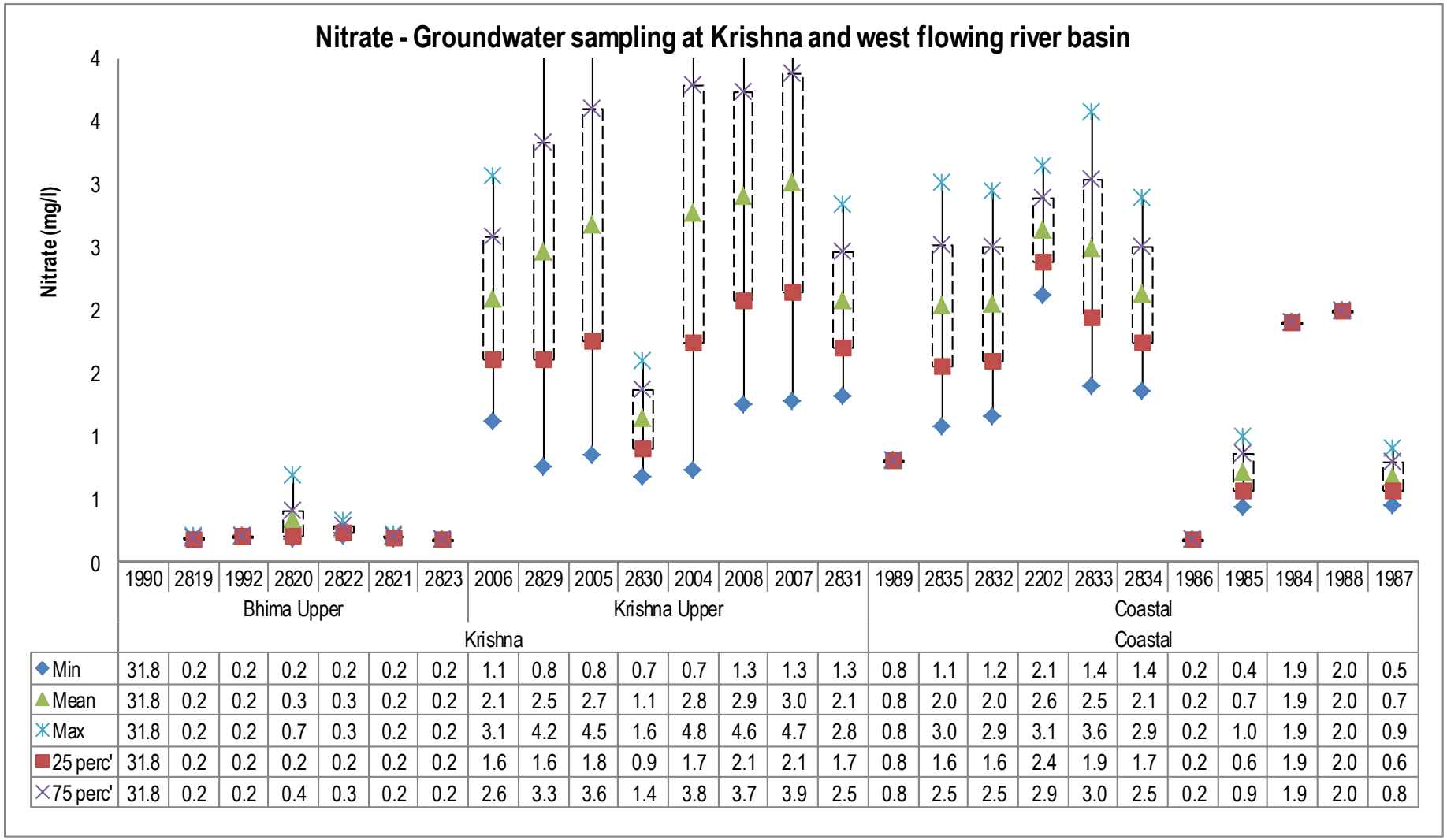
	1990	2819	1992	2820	2822	2821	2823	2006	2829	2005	2830	2004	2008	2007	2831	1989	2835	2832	2202	2833	2834	1986	1985	1984	1988	1987
	Bhima Upper							Krishna Upper								Coastal										
	Krishna															Coastal										
Min	7.8	7.2	7.4	7.8	7.2	7.1	7.5	7.8	7.6	7.6	7.5	7.4	7.6	7.4	7.6	7.4	7.3	7.4	7.6	7.8	7.9	8.1	8.0	7.9	8.2	7.5
Mean	7.8	7.7	7.4	8.1	7.6	7.6	7.8	8.0	7.7	7.7	7.7	7.4	7.7	7.6	7.6	7.4	7.9	7.9	7.7	7.9	7.9	8.1	8.1	7.9	8.2	7.7
Max	7.8	8.2	7.4	8.2	8.0	8.1	8.2	8.2	7.8	7.8	7.9	7.5	7.8	7.7	7.6	7.4	8.6	8.4	7.8	8.1	8.0	8.1	8.2	7.9	8.2	7.8
25 perc'	7.8	7.5	7.4	8.1	7.4	7.4	7.7	7.9	7.6	7.6	7.6	7.4	7.7	7.5	7.6	7.4	7.6	7.6	7.7	7.9	7.9	8.1	8.1	7.9	8.2	7.6
75 perc'	7.8	7.9	7.4	8.2	7.8	7.9	8.0	8.1	7.8	7.8	7.8	7.4	7.8	7.6	7.6	7.4	8.2	8.2	7.7	8.0	8.0	8.1	8.2	7.9	8.2	7.7

Figure No. 45: Parametric values of pH recorded at WQMS monitoring groundwater in Krishna and west flowing river basin



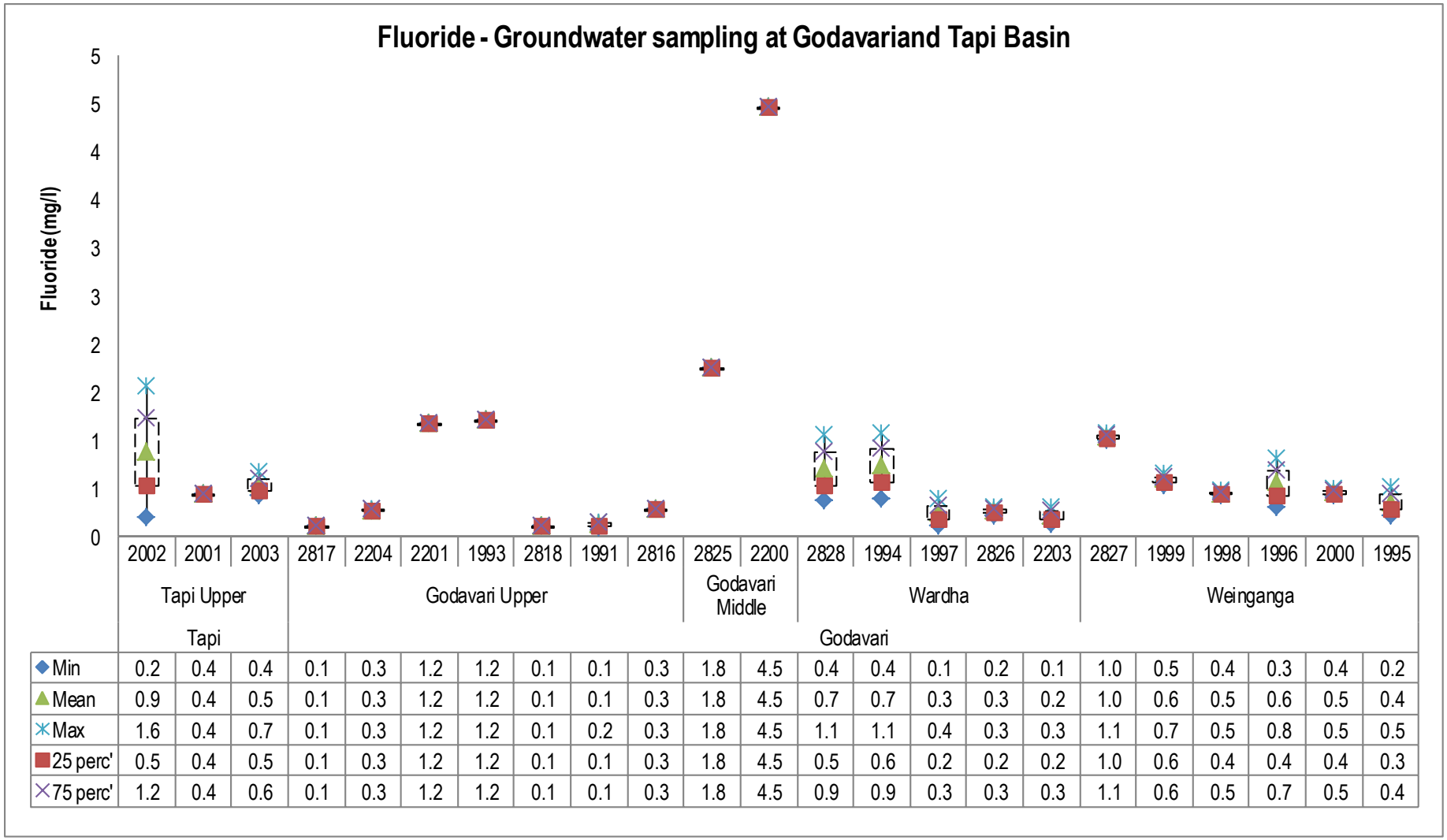
	2002	2001	2003	2817	2204	2201	1993	2818	1991	2816	2825	2200	2828	1994	1997	2826	2203	2827	1999	1998	1996	2000	1995
	Tapi Upper			Godavari Upper							Godavari Middle		Wardha					Weinganga					
	Tapi			Godavari																			
Min	0.6	3.2	3.1	1.5	20.1	0.7	0.9	5.7	0.5	90.3	0.3	0.2	0.5	8.5	0.4	0.9	1.9	0.2	2.0	1.4	6.4	2.0	5.5
Mean	5.8	3.2	5.8	1.5	25.2	0.7	0.9	5.7	2.7	90.3	0.3	0.2	1.9	10.0	0.9	1.8	2.3	5.2	6.0	3.3	8.4	4.6	5.7
Max	10.9	3.2	8.6	1.5	30.3	0.7	0.9	5.7	4.8	90.3	0.3	0.2	3.3	11.5	1.3	2.6	2.7	10.3	9.9	5.3	10.4	7.2	5.9
25 perc'	3.2	3.2	4.5	1.5	22.7	0.7	0.9	5.7	1.6	90.3	0.3	0.2	1.2	9.3	0.6	1.3	2.1	2.7	4.0	2.3	7.4	3.3	5.6
75 perc'	8.3	3.2	7.2	1.5	27.7	0.7	0.9	5.7	3.8	90.3	0.3	0.2	2.6	10.8	1.1	2.2	2.5	7.7	8.0	4.3	9.4	5.9	5.8

Figure No. 46: Parametric values of Nitrate recorded at WQMS monitoring groundwater in Godavari and Tapi basin



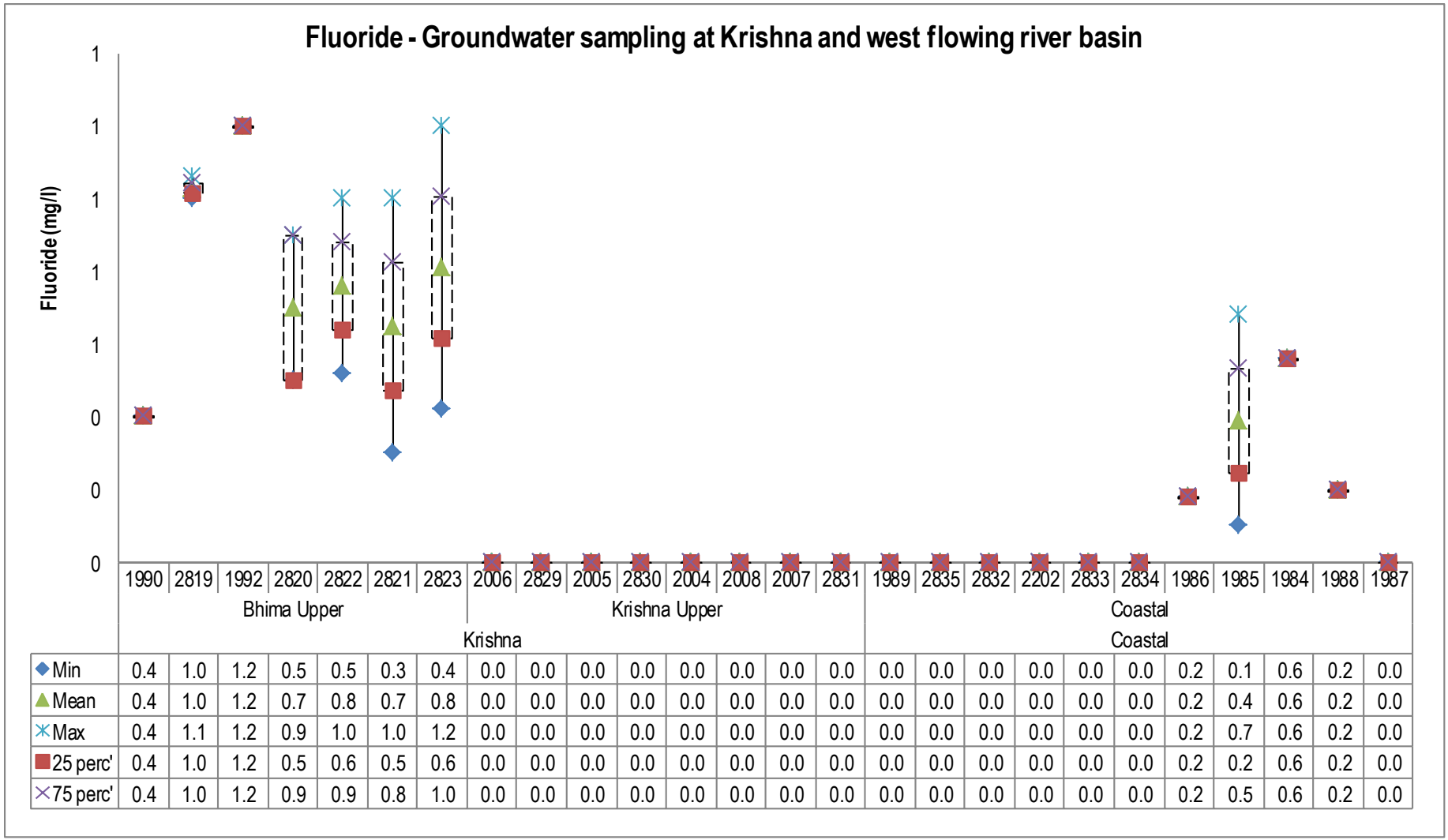
	1990	2819	1992	2820	2822	2821	2823	2006	2829	2005	2830	2004	2008	2007	2831	1989	2835	2832	2202	2833	2834	1986	1985	1984	1988	1987
	Bhima Upper							Krishna Upper								Coastal										
	Krishna															Coastal										
Min	31.8	0.2	0.2	0.2	0.2	0.2	0.2	1.1	0.8	0.8	0.7	0.7	1.3	1.3	1.3	0.8	1.1	1.2	2.1	1.4	1.4	0.2	0.4	1.9	2.0	0.5
Mean	31.8	0.2	0.2	0.3	0.3	0.2	0.2	2.1	2.5	2.7	1.1	2.8	2.9	3.0	2.1	0.8	2.0	2.0	2.6	2.5	2.1	0.2	0.7	1.9	2.0	0.7
Max	31.8	0.2	0.2	0.7	0.3	0.2	0.2	3.1	4.2	4.5	1.6	4.8	4.6	4.7	2.8	0.8	3.0	2.9	3.1	3.6	2.9	0.2	1.0	1.9	2.0	0.9
25 perc'	31.8	0.2	0.2	0.2	0.2	0.2	0.2	1.6	1.6	1.8	0.9	1.7	2.1	2.1	1.7	0.8	1.6	1.6	2.4	1.9	1.7	0.2	0.6	1.9	2.0	0.6
75 perc'	31.8	0.2	0.2	0.4	0.3	0.2	0.2	2.6	3.3	3.6	1.4	3.8	3.7	3.9	2.5	0.8	2.5	2.5	2.9	3.0	2.5	0.2	0.9	1.9	2.0	0.8

Figure No. 47: Parametric values of Nitrate recorded at WQMS monitoring groundwater in Krishna and west flowing river basin



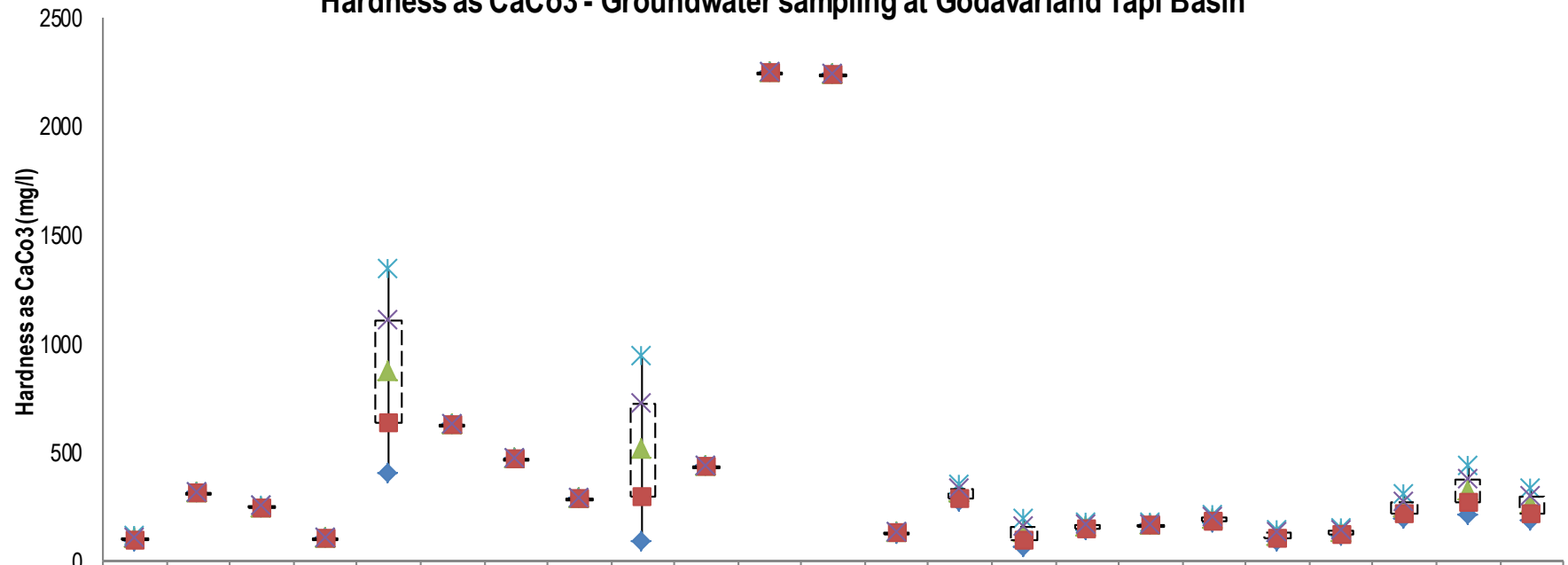
	2002	2001	2003	2817	2204	2201	1993	2818	1991	2816	2825	2200	2828	1994	1997	2826	2203	2827	1999	1998	1996	2000	1995
	Tapi Upper			Godavari Upper							Godavari Middle		Wardha					Weinganga					
	Tapi			Godavari																			
Min	0.2	0.4	0.4	0.1	0.3	1.2	1.2	0.1	0.1	0.3	1.8	4.5	0.4	0.4	0.1	0.2	0.1	1.0	0.5	0.4	0.3	0.4	0.2
Mean	0.9	0.4	0.5	0.1	0.3	1.2	1.2	0.1	0.1	0.3	1.8	4.5	0.7	0.7	0.3	0.3	0.2	1.0	0.6	0.5	0.6	0.5	0.4
Max	1.6	0.4	0.7	0.1	0.3	1.2	1.2	0.1	0.2	0.3	1.8	4.5	1.1	1.1	0.4	0.3	0.3	1.1	0.7	0.5	0.8	0.5	0.5
25 perc'	0.5	0.4	0.5	0.1	0.3	1.2	1.2	0.1	0.1	0.3	1.8	4.5	0.5	0.6	0.2	0.2	0.2	1.0	0.6	0.4	0.4	0.4	0.3
75 perc'	1.2	0.4	0.6	0.1	0.3	1.2	1.2	0.1	0.1	0.3	1.8	4.5	0.9	0.9	0.3	0.3	0.3	1.1	0.6	0.5	0.7	0.5	0.4

Figure No. 48: Parametric values of Fluoride recorded at WQMS monitoring groundwater in Godavari and Tapi basin



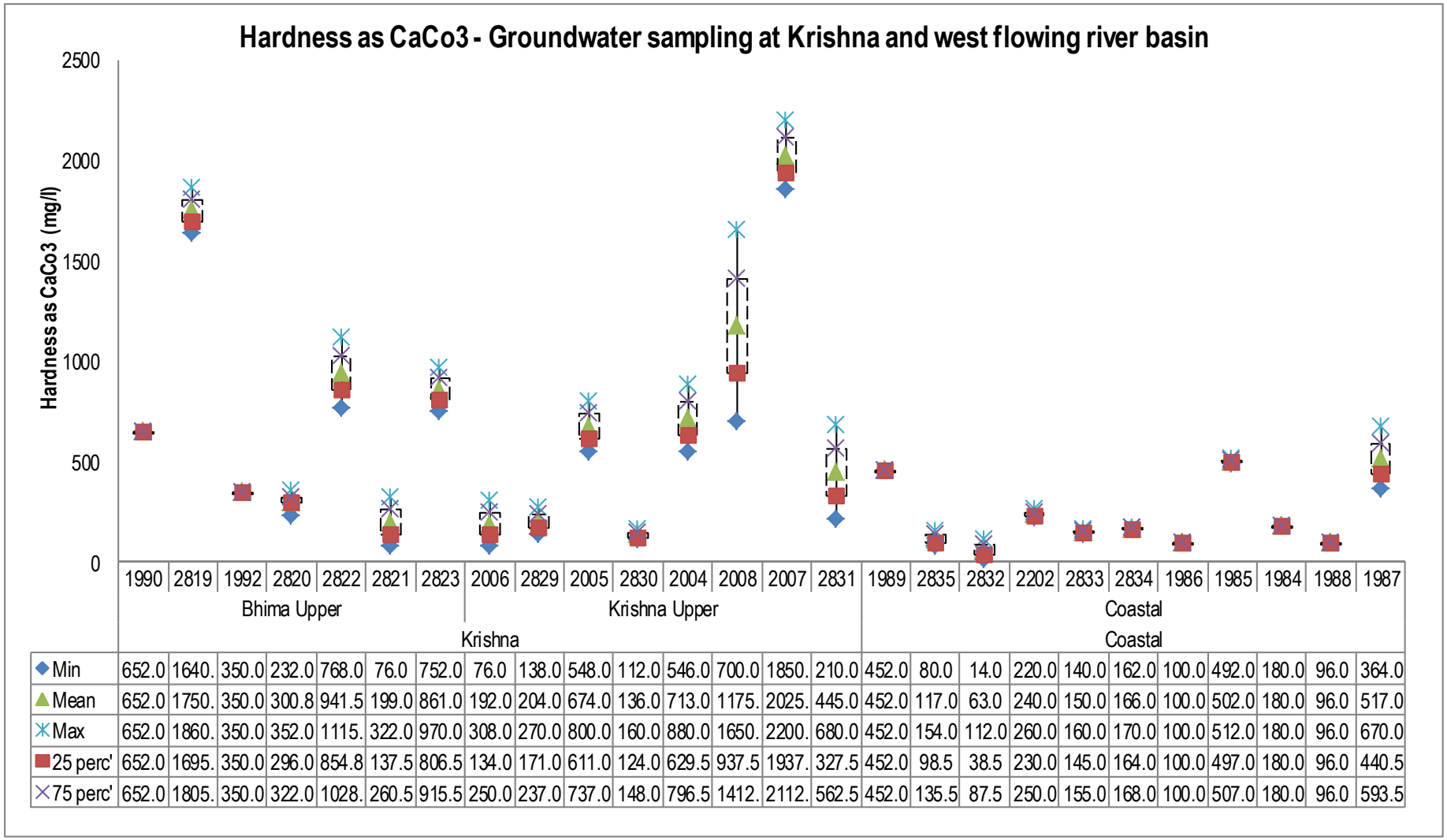
	1990	2819	1992	2820	2822	2821	2823	2006	2829	2005	2830	2004	2008	2007	2831	1989	2835	2832	2202	2833	2834	1986	1985	1984	1988	1987
	Bhima Upper							Krishna Upper								Coastal										
	Krishna															Coastal										
Min	0.4	1.0	1.2	0.5	0.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.6	0.2	0.0
Mean	0.4	1.0	1.2	0.7	0.8	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.2	0.0
Max	0.4	1.1	1.2	0.9	1.0	1.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.6	0.2	0.0
25 perc'	0.4	1.0	1.2	0.5	0.6	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.6	0.2	0.0
75 perc'	0.4	1.0	1.2	0.9	0.9	0.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.6	0.2	0.0

Figure No. 49: Parametric values of Fluoride recorded at WQMS monitoring groundwater in Krishna and west flowing basin



	2002	2001	2003	2817	2204	2201	1993	2818	1991	2816	2825	2200	2828	1994	1997	2826	2203	2827	1999	1998	1996	2000	1995
	Tapi Upper			Godavari Upper							Godavari Middle		Wardha					Weinganga					
	Tapi			Godavari																			
Min	90.0	310.0	240.0	100.3	400.0	624.0	468.0	284.0	81.8	432.0	2250.0	2240.0	124.0	270.0	64.0	140.0	164.0	170.0	90.0	110.0	190.0	210.0	184.0
Mean	100.0	310.0	245.0	100.3	871.5	624.0	468.0	284.0	510.9	432.0	2250.0	2240.0	127.0	310.0	127.0	155.0	167.0	190.0	115.0	130.0	245.0	320.0	257.0
Max	110.0	310.0	250.0	100.3	1343.0	624.0	468.0	284.0	940.0	432.0	2250.0	2240.0	130.0	350.0	190.0	170.0	170.0	210.0	140.0	150.0	300.0	430.0	330.0
25 perc'	95.0	310.0	242.5	100.3	635.8	624.0	468.0	284.0	296.3	432.0	2250.0	2240.0	125.5	290.0	95.5	147.5	165.5	180.0	102.5	120.0	217.5	265.0	220.5
75 perc'	105.0	310.0	247.5	100.3	1107.3	624.0	468.0	284.0	725.4	432.0	2250.0	2240.0	128.5	330.0	158.5	162.5	168.5	200.0	127.5	140.0	272.5	375.0	293.5

Figure No. 50: Parametric values of Hardness at $CaCO_3$ recorded at WQMS monitoring groundwater in Godavari and Tapi basin



	1990	2819	1992	2820	2822	2821	2823	2006	2829	2005	2830	2004	2008	2007	2831	1989	2835	2832	2202	2833	2834	1986	1985	1984	1988	1987
	Bhima Upper							Krishna Upper								Coastal										
	Krishna															Coastal										
Min	652.0	1640.	350.0	232.0	768.0	76.0	752.0	76.0	138.0	548.0	112.0	546.0	700.0	1850.	210.0	452.0	80.0	14.0	220.0	140.0	162.0	100.0	492.0	180.0	96.0	364.0
Mean	652.0	1750.	350.0	300.8	941.5	199.0	861.0	192.0	204.0	674.0	136.0	713.0	1175.	2025.	445.0	452.0	117.0	63.0	240.0	150.0	166.0	100.0	502.0	180.0	96.0	517.0
Max	652.0	1860.	350.0	352.0	1115.	322.0	970.0	308.0	270.0	800.0	160.0	880.0	1650.	2200.	680.0	452.0	154.0	112.0	260.0	160.0	170.0	100.0	512.0	180.0	96.0	670.0
25 perc'	652.0	1695.	350.0	296.0	854.8	137.5	806.5	134.0	171.0	611.0	124.0	629.5	937.5	1937.	327.5	452.0	98.5	38.5	230.0	145.0	164.0	100.0	497.0	180.0	96.0	440.5
75 perc'	652.0	1805.	350.0	322.0	1028.	260.5	915.5	250.0	237.0	737.0	148.0	796.5	1412.	2112.	562.5	452.0	135.5	87.5	250.0	155.0	168.0	100.0	507.0	180.0	96.0	593.5

Figure No. 51: Parametric values of Hardness at $CaCO_3$ recorded at WQMS monitoring groundwater in Krishna and west flowing river basin

Water Quality Index for ground water in Tapi and Godavari basin (1 of 3)

Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	NA	65	89	NA	30	NA	NA	66	40	NA	62	NA	NA	78	80	NA	430	NA	123	232	NA	NA	71	NA	NA	59	15	NA	79	NA
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NA	73	32	37	82	75	43	38	64	NA	66	15	NA	NA	222	45	257	181	NA	187	140	NA	63	37	NA	50	102	NA	56	96
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2002			2001			2003			2817			2204			2201			1993			2818			1991			2816		
	Tapi Upper									Godavari Upper																				

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

Table No. 20: Ground water quality monitoring stations in Tapi and Godavari basin (1of 3)

Station ID	Location of the Station	Village	Taluka	District
2002	Bore well Opp. Gajanan Maharaj Temple at Anjangaon road.	Anjangaon	Akot	Akola
2001	Tube well at water treatment plant of.Achalpur M.C, near Post Office.	Paratwada	Achalpur	Amravati
2003	Dug well at Plot No-4, Street No. 49-C, at Nehru Bal Udyan Azad Maidan,	Yavatmal	Yavatmal	Yavatmal
2824	Dug well at Naregaon.	Naregaon	Aurangabad	Aurangabad
2817	Bore well at Chitali near Wagh vasthi.	Chitali	Rahata	Ahmadnagar
2204	Dug well at Gunjalwadi, Sangamner near Primary Health Care Center.	Gunjalwadi	Sangamner	Ahmadnagar
2201	Dug well at Ranjangaon.	Ranjangaon	Gangapur	Aurangabad
1993	Dug well at Pandarpur	Pandharpur	Gangapur	Aurangabad
2818	Bore well at M/s Spectron Ethers, Rasegaon near Siddeshwar Mahadev Mandir.	Rasegaon	Dindori	Nashik
1991	Bore well at MSW Site, Pathardi	Pathardi	Nashik	Nashik
2816	Dug well of Mr. Sampat Walunj, near M/s Mahajeet Clayton.	Shinde village	Nashik	Nashik

Water Quality Index for ground water in Tapi and Godavari basin (2 of 3)

Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	256	NA	NA	220	562	NA	320	599	NA	NA	NA	36	NA	89	69	NA	62	111	NA	47	30	NA	47	31
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NA	112	NA	NA	231	578	NA	727	781	NA	55	37	NA	55	105	44	85	32	NA	51	35	42	61	44
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2824			2825			2200			2828			1994			1997			2826			2203		
	Godavari Middle									Wardha														

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

Ground water quality monitoring stations in Tapi basin and Godavari basin (2 of 3)

Station ID	Location of the Station	Village	Taluka	District
2824	Dug well at Naregaon.	Naregaon	Aurangabad	Aurangabad
2825	Bore well at Wahegaon, near Zilla Parishet School.	Wahegaon	Paithan	Aurangabad
2200	Bore well at Katpur, near Z.P School.	Katpur	Paithan	Aurangabad
2828	Dug well near Jilla Parishet Primary school, Visapur.	Visapur	Ballarpur	Chandrapur
1994	Dug well at TPS-Durgapur	Durgapur	Chandrapur	Chandrapur
1997	Bore well near Primary Health Centre.	Raipur	Hingna	Nagpur
2826	Dug well near Railway station, Cotton Market.	Wardha	Wardha	Wardha
2203	Hand Pump in the premises of Zilla Parishad Primary School.	Bhugaon	Wardha	Wardha

Water Quality Index for ground water in Tapi and Godavari basin (3 of 3)

Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	NA	28	54	NA	NA	42	NA	58	41	NA	124	69	NA	69	72	NA	66	48
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NA	56	44	36	46	38	55	128	43	NA	115	57	51	96	57	54	93	63
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2827			1999			1998			1996			2000			1995		
	Weinganga																	

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

T

Ground water quality monitoring stations in Tapi basin and Godavari basin (3 of 3)

Station ID	Location of the Station	Village	Taluka	District
2827	Bore well Near Railway crossing at Dongri Buzurg.	Dongri-Buzurg	Tumsar	Bandara
1999	Bore well Near Gram Panchayat office.	Changera	Gondia	Gondia
1998	Gram Panchayat Dug well near Gram Panchayat Office.	Brahmni	Kalmeshwar	Nagpur
1996	Gram Panchayath Dug well, Near Jagadamba G M S Mandir Sahakari Sanstha	Koradi	Kamptee	Nagpur
2000	Dug well near Sarode Kirana Store.	Bhandewadi	Nagpur	Nagpur
1995	Gram Panchayath Dug well , Near Balaji Gajbhiye House,	Khaperkheda	Saoner	Nagpur

Water Quality Index for ground water in Krishna Basin (1 of 2)

Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	139	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	NA	72	NA	NA	850	543	55	104	NA	NA	162	71	NA	222	169	NA	151	31	NA	279	158
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	109	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	72	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	101	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	67	103	NA	NA	NA	NA	172	NA	NA	242	NA
Apr	NA	NA	92	53	244	413	49	68	164	NA	45	NA	NA	NA	448	NA	NA	220	NA	NA	490
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	1990			2819			1992			2820			2822			2821			2823		
	Bhima Upper																				

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

Ground water quality monitoring stations in Krishna Basin (1 of 2)

Station ID	Location of the Station	Village	Taluka	District
1990	Bore well at BMW Site , Burudgaon	Burudgaon	Ahmednagar	Ahmadnagar
2819	Dug well owned by Shri Deshmukh.	Malegaon	Baramati	Pune
1992	Dug well at MSW Site, Pimpri-Chinchwad.	Moshi	Haveli	Pune
2820	Dug well owned by Shri Shivaji Baban Darekar	Sanaswadi	Shirur	Pune
2822	Bore well near Chincholi.	Chincholi	Mohol	Solapur
2821	Bore well at Bale railway station premises	Dahegaon	North Solapur	Solapur
2823	Bore well at Shete Vasti, near old Tuljapur road.	Shete vasthi, Tuljapur Naka	Solapur	Solapur

Water Quality Index for ground water in Krishna Basin (2 of 2)

Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	NA	127	69	NA	71	53	NA	89	102	NA	97	33	NA	97	134	213	149	222	263	124	315	122	114	42
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	45	124	24	NA	58	30	74	76	144	NA	100	27	130	91	148	234	256	201	276	333	257	NA	227	333
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	2006			2829			2005			2830			2004			2008			2007			2831		
	Krishna Upper																							

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

Ground water quality monitoring stations in Krishna Basin (2 of 2)

Station ID	Location of the Station	Village	Taluka	District
2006	Bore well at MIDC, Shiroli.	Shinoli	Chandgad	Kolhapur
2829	Bore well at MIDC Shiroli nearM/s Pratibha Enterprises.	Shiroli	Hatkanangale	Kolhapur
2005	Bore well at Khanjirenagar.	Khanjirenagar	Hatkanangale	Kolhapur
2830	Bore well at MIDC Gokul-Shirgaon.	Gokul-Shirgaon	Karvir	Kolhapur
2004	Bore well at Parvati Industrial Estate.	Yadrav	Shirol	Kolhapur
2007	Bore well at Savali, near Gram Panchayat office.	Savali	Miraj	Sangli
2831	Dug well at Sakharali, near MIDC Islampur near Krishna Milk Industry.	Sakharali	Walwa	Sangli

Water Quality Index for ground water in the west flowing river Basin

Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	NA	72	NA	NA	79	140	NA	161	NA	NA	73	NA	NA	91	94	NA	67	139	NA	25	14	NA	25	18	NA	22	31	NA	30	23	NA	32	23
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	409	NA	26	NA	218	213	99	NA	53	378	79	25	81	107	170	NA	NA	NA	NA	15	29	NA	16	28	NA	NA	94	NA	124	28	NA	47	78
FY	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13	10-11	11-12	12-13
	1986			1985			1984			1988			1987			1989			2835			2832			2202			2833			2834		
	Coastal																																

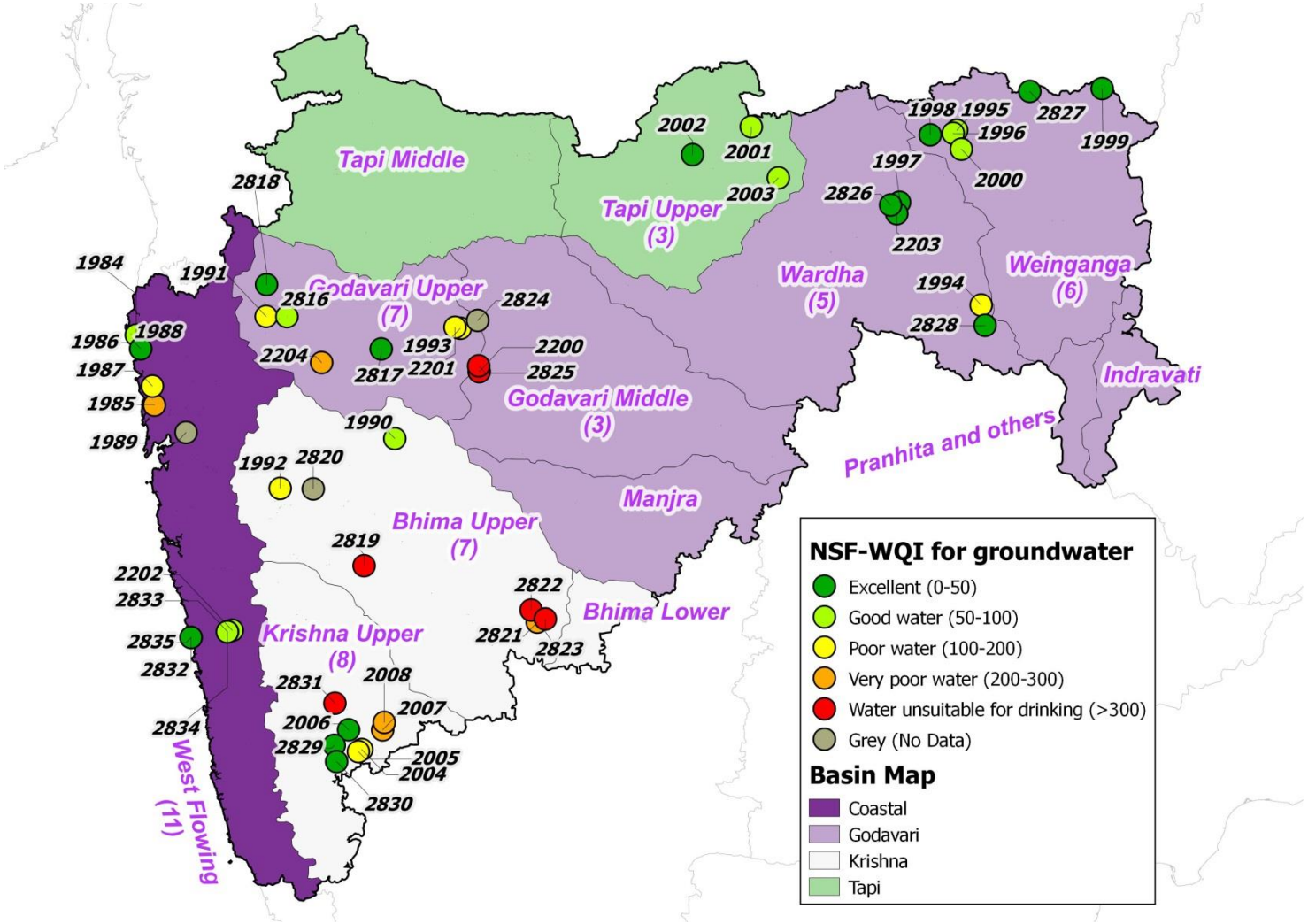
Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

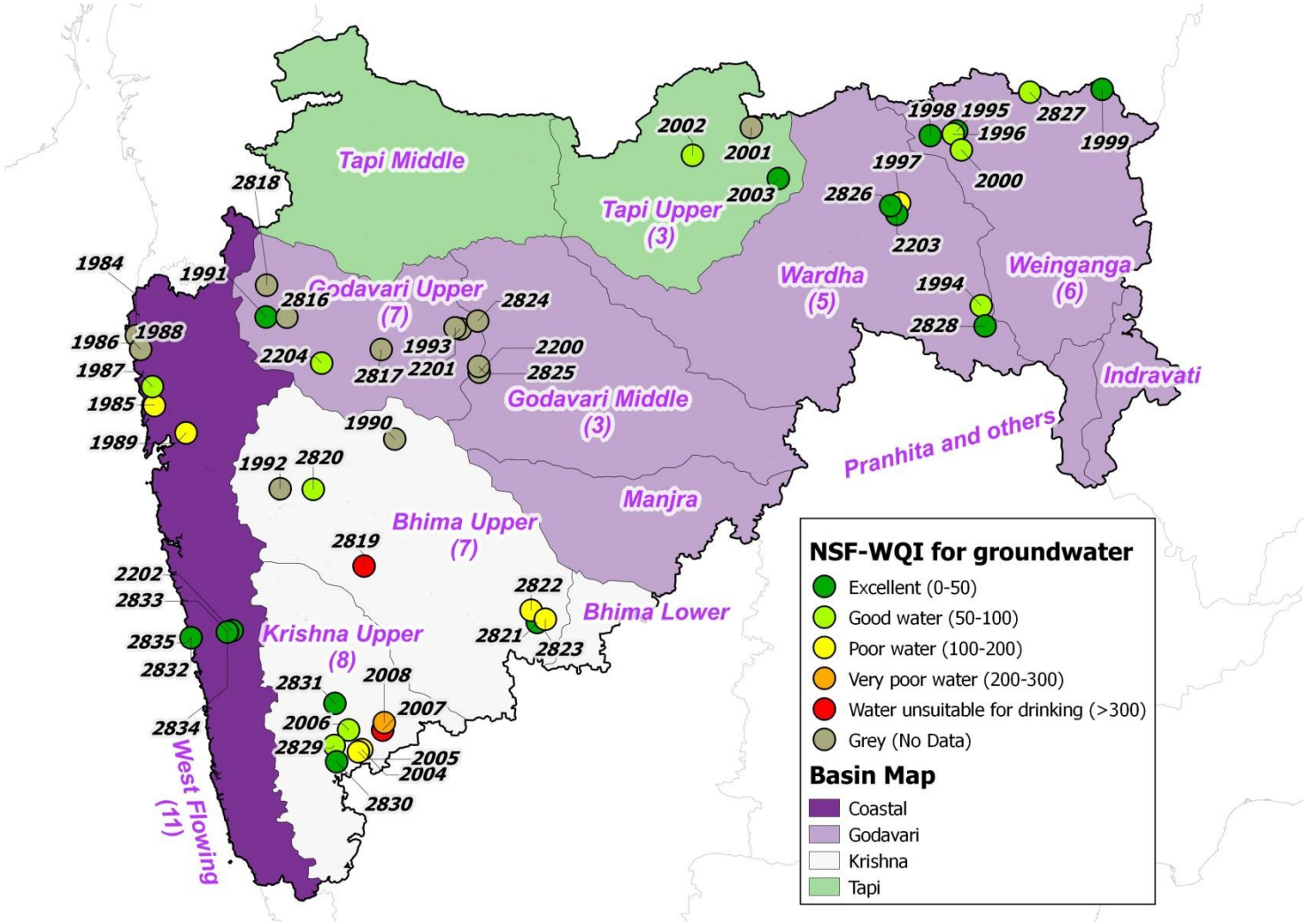
Ground water quality monitoring stations in West Flowing river basin

Station ID	Location of the Station	Village	Taluka	District
1986	Bore well at Motapada	Motapada	Dahanu	Thane
1985	Dug well at 5 -Star Industrial estate	Kashimira	Mira-Bhayander	Thane
1984	Bore well at M/s Tata Iron &Steel Co.Ltd, S-76, (Indl.Estate,Tarapur)	MIDC Tarapur,	Palghar	Thane
1988	Bore well at Gharatwadi	Aliyali	Palghar	Thane
1987	Bore well at Vasai	Gokhiware	Vasai	Thane
1989	Bore well at MWML Site at Taloja	Karawla- Taloja	Panvel	Raigad
2835	Dug well No. 2, Gram Panchayat, Brahmanwadi- Anjanwel.	Anjanwel	Guhagar	Ratnagiri
2832	Dug well No.1 at Brahmanwadi-Anjanwel,owned by Shri. Vaidya.	Anjanwel	Guhagar	Ratnagiri
2202	Dug well at Ghane Kunt, near Awashi, owned by Shri.Rajendra Amre.	Ghane Kunt	Khed	Ratnagiri
2833	Dug well No.-1 at Group Gram Panchayat at Arketwadi, near Masjid	Arketwadi	Khed	Ratnagiri
2834	Dug well No.2 at Arketwadi.	Arketwadi	Khed	Ratnagiri

Spatial map for Ground WQI in Maharashtra (April 2012)



Spatial map for Ground WQI in Maharashtra (October 2012)



Conclusion

Industrialization and urbanization are the two major factors influencing the quality of water resources in Maharashtra. The surface water in vicinity of the urban areas was found to be most polluted.

Bhima upper sub-basin of Krishna Basin was recorded to be the most polluted among the four basins in Maharashtra in terms of surface water quality. Bhima, Mula, Mutha, Nira and Pawna rivers in the Bhima Upper-sub basin also recorded heavy pollution loads throughout the year. The Pawna river was recorded to be heavily polluted near the villages of Pimprigaon, Kasarwadi and Sagavigaon of Haveli taluka of Pune district. Similarly, the, nallahs at Thane (Rabodi, Colour Chem, Sandoz), were also recorded to be highly polluted through-out the year. These nallahs lie close to the coastline and could severely affect the water quality and the associated aquatic ecosystem.

Many of the major and rapidly growing cities like Vasai-Virar, Kalyan Dombivali, Mira-Bhayander lie in the MMR (Mumbai Metropolitan Region), along the Ulhas river, Vasai and Thane creek. The release of semi-treated domestic waste water is one of the major reasons for polluted rivers. To tackle this issue it is highly desired to have appropriate waste water treatment facilities to treat domestic and industrial waste water. Scientific and state of art sewage treatment facilities should be installed by major A class cities like Mumbai, Pune, Thane, and so on in the state.

In Maharashtra MPCB monitors groundwater quality at 50 WQMS, however given the fact that 40% of the state is drought prone it is evident that ground water reserves being banked upon to meet the demand. Hence more stations for groundwater quality should be installed especially in the Marathwada and Vidharba region.

Annex I – RO wise summary of WQI in 2012-13

The Maharashtra State government in 1981 adopted the Water (Prevention and Control of Pollution) Act 1974 and under this MPCB (Maharashtra Pollution Control Board) was established in the year 1981.

The main functions of MPCB are:

- To plan a comprehensive program for the prevention, control or abatement of pollution and secure executions thereof,
- To collect and disseminate information relating to pollution and the prevention, control or abatement thereof,
- To inspect sewage or trade effluent treatment and disposal facilities, and air pollution control systems and to review plans, specification or any other data relating to the treatment plants, disposal systems and air pollution control systems in connection with the consent granted,
- Supporting and encouraging the developments in the fields of pollution control, waste recycle reuse, eco-friendly practices etc.
- To educate and guide the entrepreneurs in improving environment by suggesting appropriate pollution control technologies and techniques
- To create public awareness about clean and healthy environment and attending the public complaints regarding pollution.

Being a highly industrialized, populated and urbanized state, Maharashtra has numerous sources which lead to water pollution, which have deteriorated the water quality of many river, seas, creeks, drains ground water and so on. Release of sewage, industrial waste water, and dumping of solid waste are the three major causes of water pollution.

Hence, to keep a constant vigilance MPCB has established 12 RO (Regional Offices) across the state to check and regulate the pollution levels with necessary control measures. MPCB implements a range of environmental legislation in the state and functions under the administrative control of Environment Department, Government of Maharashtra.

The following section presents the RO wise highlights on the status of the water quality monitoring network for the year 2011-12 and presents the gist of the water quality index for the respective stations for months of May and December.

RO – Amravati

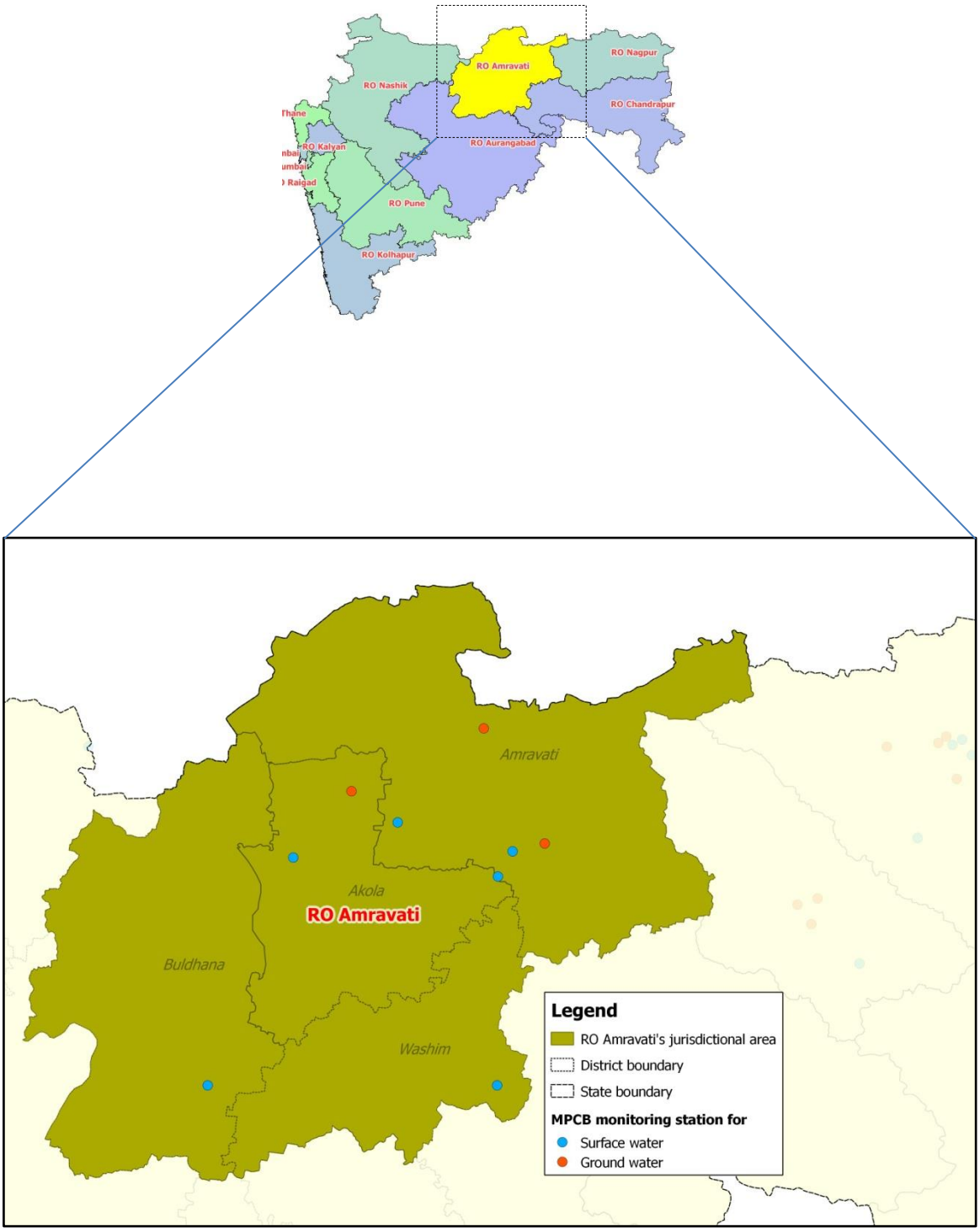
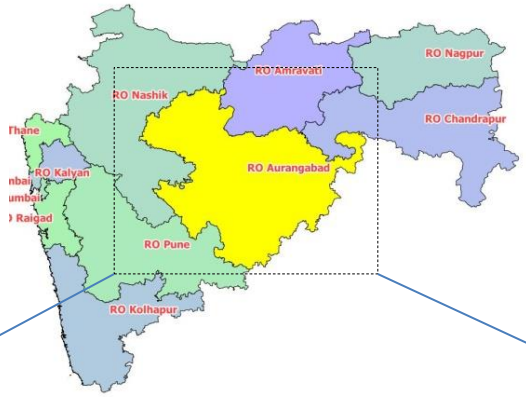

RO Amravati
RO Nagpur
RO Nashik
RO Chandrapur
RO Aurangabad
RO Kalyan
RO Pune
RO Kolhapur
Amravati
Akola
RO Amravati
Buldhana
Washim
Legend
RO Amravati's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Ground water

Table No. 1: Water quality Index for surface and ground water monitoring at Amravati-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	1913	Purna river at Dhupeshwar at U/s of Malkapur water works.	Malkapur	Akola	Akola	58	52
	2155	Purna river at D/s of confluence of Morna and Purna, at Andura village.	Andura	Balapur	Akola		57
	2675	Morna river at D/s of Railway bridge.	Akola	Akola	Akola		32
	2695	Pedhi river near road bridge at Dadhi- Pedhi village.	Asegaon	Chandur Bazar	Amravati	44	43
	2699	Penganga river at Mehkar- Buldana road bridge.	Mehkar	Mehkar	Buldana		43
	2700	Purna River near Achalpur-Amravati Road Bridge, Asegaon	Asegaon	Chandur bazaar	Amravati		
Ground water	2001	Tube well at water treatment plant of M.C.Achalpur near Post Office.	Paratwada	Achalpur	Amravati	75	
	2002	Bore well Opp. Gajanan Maharaj Temple at Anjangaon road.	Anjangaon	Akot	Akola	32	89
	2003	Dug well at Plot No- 4, Street No. 49-C, at Nehru Bal Udyan Azad Maidan, owned by Yavatmal M.C.	Nehru Bal Udyan Azad Maidan	Yavatmal	Yavatmal	64	40

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Aurangabad



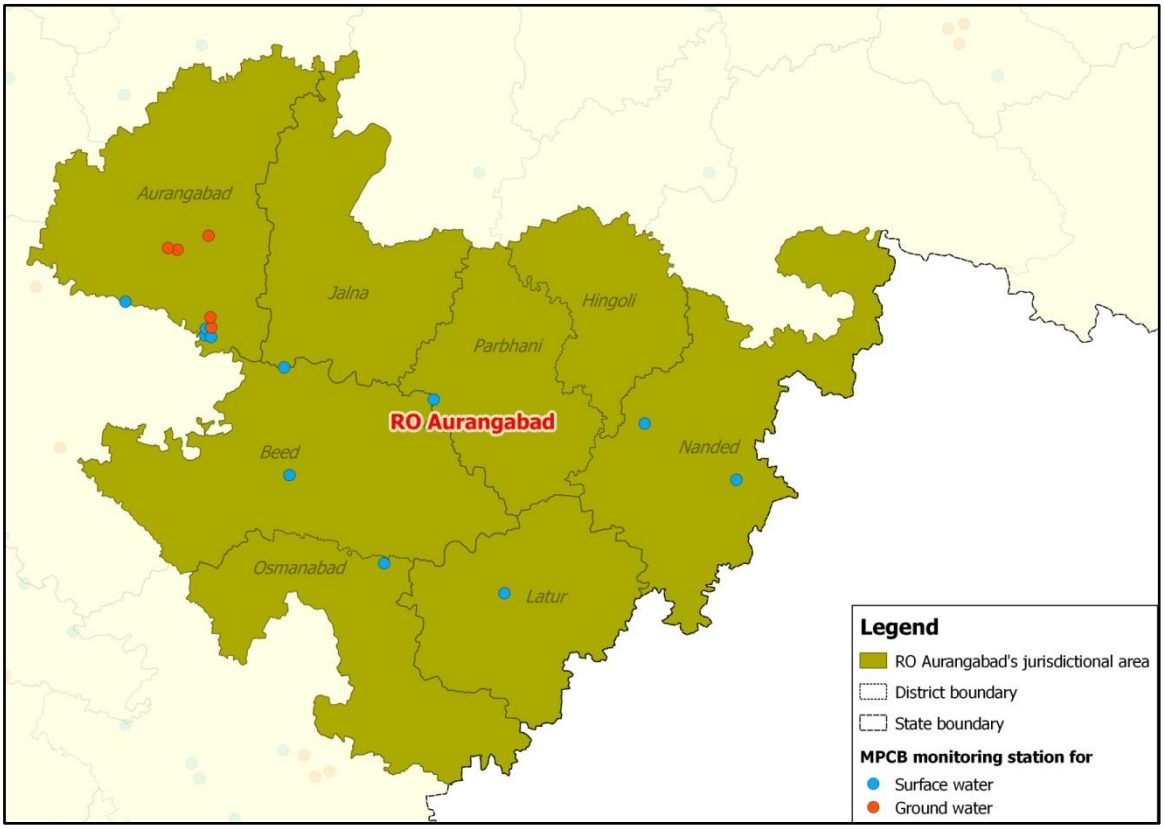


Table No. 2: Water quality Index for surface and ground water monitoring at Aurangabad-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	12	Godavari river at Dhalegaon	Dhalegaon	Pathari	Parbhani		77
	1209	Godavari river at Raher	Raher	Nayagaon	Nanded	84	81
	1210	Godavari river at Nanded near Intake water pump house.	Vishnupuri	Nanded	Nanded	84	77
	1312	Godavari river at Jaikwadi Dam, Paithan.	Paithan	Paithan	Aurangabad	85	76
	2157	Godavari river at Latur water intake near Pump house.	Dhamegaon	Kalumb	Osmanabad	79	80
	2158	Godavari river at U/s of Paithan at Paithan intake pump house..	Jayakwadi	Paithan	Aurangabad	82	80
	2159	Godavari river at D/s of Paithan at Pathegaon bridge.	Pathegaon	Paithan	Aurangabad	86	76
	2160	Godavari river at U/s of Aurangabad Reservoir, Kaigaon Tokka near Kaigaon bridge.	Kaigaon	Gangapur	Aurangabad	86	77
	2161	Godavari river at Jalna Intake water pump house, Shahabad.	Shahabad	Ambad	Jalna	86	80
	2657	Bindusara river at Beed, near intake water pump house at Dam.	Paligaon	Beed	Beed	84	
	2673	Manjra river at D/s of Latur, near Latur- Nanded bridge..	Bhatkheda	Latur	Latur		71
Ground water	1993	Dug well at Pandarpur, Gangapur, Aurangabad	Pandharpur	Gangapur	Aurangabad	140	
	2200	Bore well at Katpur, near Z.PSchool.	Katpur	Paithan	Aurangabad	781	
	2201	Dug well at Ranjangaon	Ranjangaon	Gangapur	Aurangabad	181	
	2825	Bore well at Wahegaon, near Zilla Parishet School	Wahegaon	Paithan	Aurangabad	578	

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Chandrapur

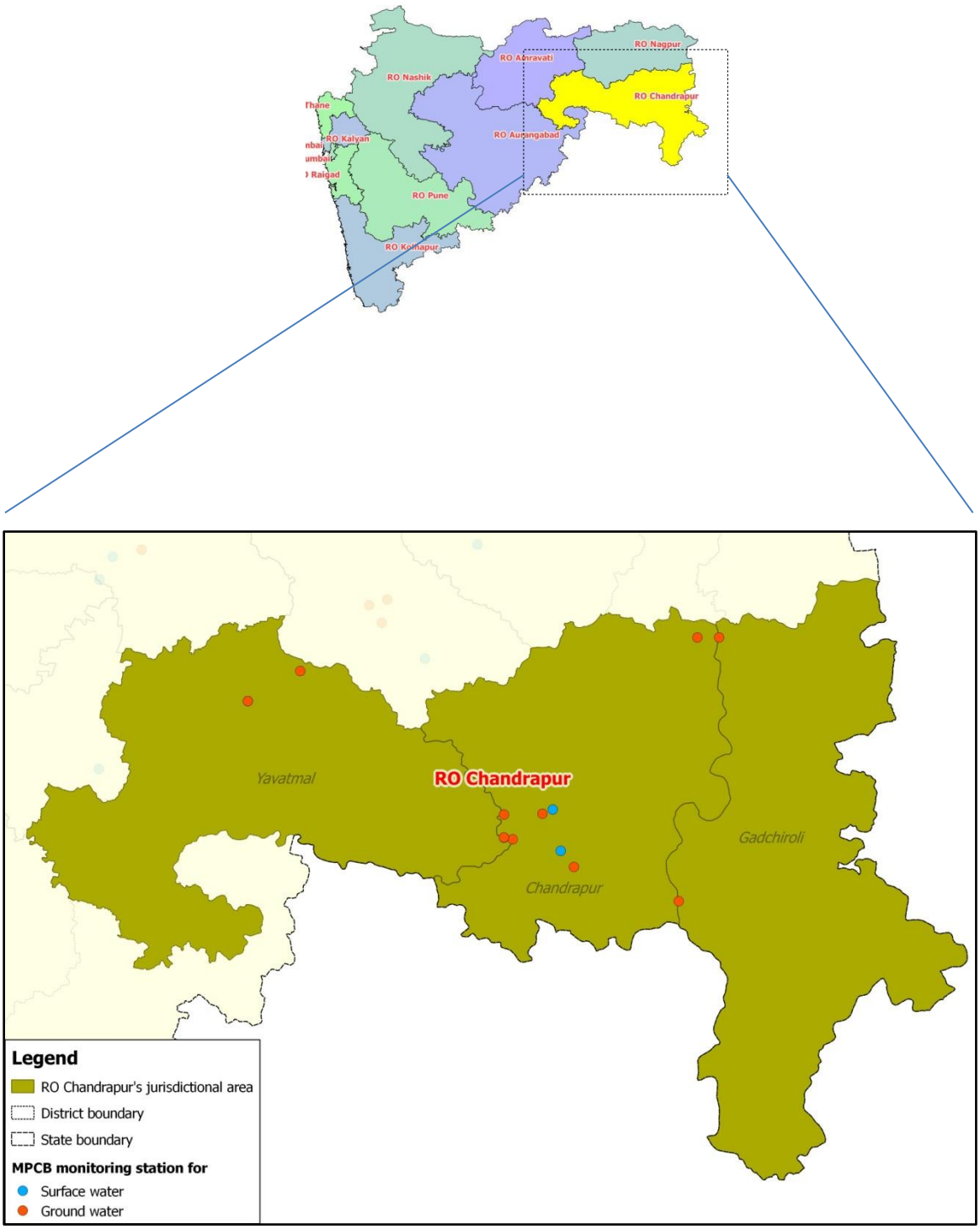


Table No. 3: Water quality Index for surface and ground water monitoring at Chandrapur-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	11	Wainganga river at Ashti	Ashti	Gondpipri	Chandrapur	74	61
	1212	Wardha river at Rajura bridge	Rajura	Chandrapur	Chandrapur	67	61
	1315	Wardha river at PulgaonRailway Bridge	Pulgaon	wardha	Wardha	50	51
	2156	Wardha river at confluence point of Penganga & Wardha.	Jugad	Wani	Yavatmal	59	64
	2174	Wardha river at D/s of ACC Ltd, Ghugus near WCL pump house	Ghuggus	Chandrapur	Chandrapur	58	57
	2175	Wainganga at U/s of Gaurav Paper Mills, near jackwell.	Bramhpuri	Chandrapur	Chandrapur	51	62
	2176	Wainganga at D/s of Gaurav Paper Mills, near jack well.	Bramhpuri	Chandrapur	Chandrapur	43	50
	2697	Penganga river near water supply scheme of Umarkhed M.C.	Belkhed	Umarkhed	Yavatmal	75	55
	2698	Penganga river D/s of Isapur Dam	Isapur	Pusad	Yavatmal	62	63
	2719	Wardha river at D/s of Erai river at Hadasti near Arun Engg. Works	Hadasti	Chandrapur	Chandrapur	49	54
	2720	Wardha river at U/s of Erai river at Hadasti near Arun Engg. works	Hadasti	Chandrapur	Chandrapur	57	58
	2721	Wardha river at U/s of ACC Ltd, Ghuggus near WCL pump house	Ghuggus	Chandrapur	Chandrapur	61	65
Ground water	1994	Dug well At TPS Durgapur near Naseeb Kirana & general Store.	Durgapur	Chandrapur	Chandrapur	105	69
	2828	Dug well near Zilla Parishet Primary school, At Visapur	Visapur	Ballarpur	Chandrapur	37	36

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Kalyan

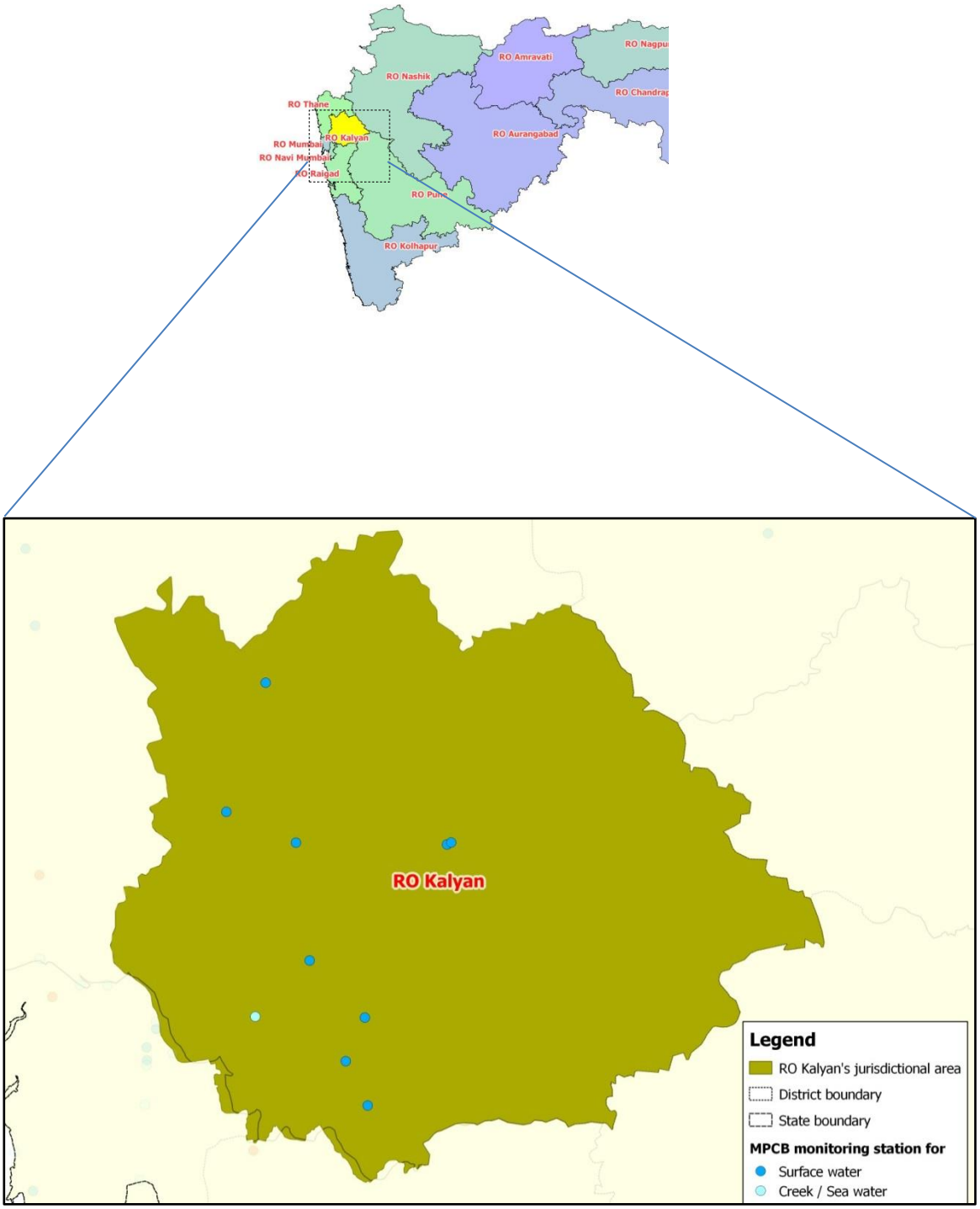
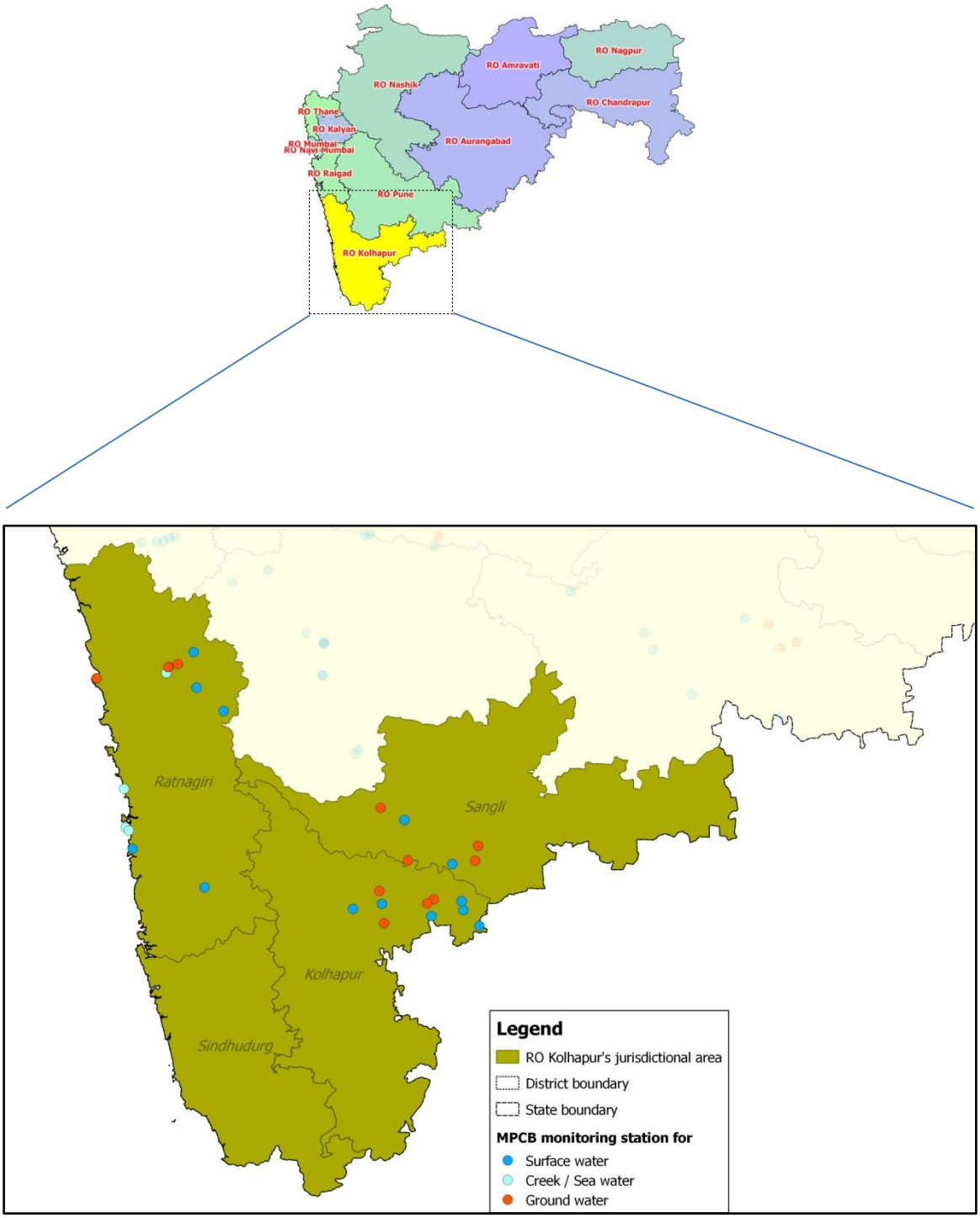

RO Nashik
RO Amravati
RO Thane
RO Kalyan
RO Aurangabad
RO Mumbai
RO Navi Mumbai
RO Raigad
RO Pune
RO Kolhapur
RO Kalyan
Legend
RO Kalyan's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Creek / Sea water

Table No. 4: Water quality Index for surface and ground water monitoring at Kalyan-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	1092	Kalu river at Atale village	Atale	Kalyan	Thane	42	65
	1093	Ulhas river at U/s of NRC Bund,	Mohane	Kalyan	Thane	69	84
	1094	Ulhas river at U/s of Badlapur water works,	Kulgaon	Ambernath	Thane	77	81
	1461	Bhatsa river at D/s of Pise Dam	Pise	Bhiwandi	Thane	75	79
	2162	Ulhas River at Jambhul water works	Jambhul	Ambernath	Thane	77	83
	2653	Bhatsa river at D/s of Liberty Oil Mills	Satne	Shahapur	Thane	66	80
	2654	Bhatsa river at U/s of Liberty Oil Mills	Satne	Shahapur	Thane	73	74
	2709	Tansa River near Road bridge	Dakewali	Wada	Thane	76	81
	2712	Vaitarna river near Road bridge	Gandhare	Wada	Thane	76	77
Saline	2791	Ulhas Creek at Reti Bunder at D/s of Kalyan-Bhiwandi bridge	Kalyan	Kalyan	Thane	43	80

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Kolhapur


RO Nagpur
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RO Kalyan
RO Mumbai
RO Navi Mumbai
RO Aurangabad
RO Raigad
RO Pune
RO Kolhapur
Ratnagiri
Sangli
Kolhapur
Sindhudurg
Legend
RO Kolhapur's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Creek / Sea water
Ground water

Table No. 5: Water quality Index for surface and ground water monitoring at Kolhapur-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	37	Krishna river at Maighat, Sangli	Gawali gally	Miraj	Sangli	71	76
	1153	Krishna river at Rajapur Weir	Rajapur	Shirol	Kolhapur	90	85
	1310	Krishna river at Kurundwad near Santaji Ghorpade Ghat.	Narshingwadi, Kurundwad	Shirol	Kolhapur	76	82
	1311	Panchaganga river at Ichalkaranji near MIDC intake well.	Shiradhwad	Hatkanangale	Kolhapur	76	75
	1904	Panchaganga river at U/s of Kolhapur town near Balinga Pumping station.	Balinga	Karvir	Kolhapur	77	79
	1905	Panchaganga river at D/s of Kolhapur town at Gandhi nagar near NH-4 bridge and MIDC intake well.	Uchegaon	Kolhapur	Kolhapur	74	83
	1906	Krishna river at Walwa, D/s of Islampur near Vithal Temple.	Walwa	Walwa	Sangli	77	75
	2163	Panchganga River at Shirol near Shirol intake well	Shirol	Shirol	Kolhapur	61	82
	2164	Vashisti river at U/s of Three M Paper Mills near M/s Multifilms Plastic Pvt. Ltd..	Kherdi	Chiplun	Ratnagiri	90	80
	2676	Muchkundi river at Waked, Ratnagiri, near M/s Asahi Maharashtra Glass Ltd	Waked	Lanja	Ratnagiri	86	86
	2713	Vashisti river at D/s of Three M Paper Mills near Chiplun water intake jackwell.	Kherdi	Chiplun	Ratnagiri	87	71
	2714	Vashisti river at U/s of Pophali near Konphansawane bridge.	Pophali	Chiplun	Ratnagiri	87	82
	2790	Pimpal-Paneri nalla at Ratnagiri near Finolex Industries.	Yahganigaon	Ratnagiri	Ratnagiri	81	73
Saline	2804	Karambavane creek at Chiplun.	Karambavane	Chiplun	Ratnagiri	78	82
	2813	Sea Water at Ganapathipule.	Ganapatipule	Ratnagiri	Ratnagiri	82	76
	2814	Sea water at Bhagwati Bunder, Ratnagiri near Ultra Tech Cement Jetty.	Mirkarwada	Ratnagiri	Ratnagiri	83	75
	2815	Madvi sea water at Ratnagiri near Jodhale Maruti Temple.	Madvigaon	Ratnagiri	Ratnagiri	70	77
Ground water	2004	Bore well at Parvati Industrial Estate, Yadrav, Kolhapur	Yadrav	Shirol	Kolhapur	148	134
	2005	Bore well at Khanjirenagar, Kolhapur	Khanjirenagar	Hatkanangale	Kolhapur	144	102

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
	2006	Bore well at Shinoli near M/s Aqua Alloy Steel.	Shinoli	Chandgad	Kolhapur	24	69
	2007	Bore well at Savali, near Gram Panchayat office.	Savali	Miraj	Sangli	257	315
	2008	Dug well at Sambarwadi, owned by Shri. Kishan Hali Rajput.	Sambarwadi	Miraj	Sangli	201	222
	2202	Dug well at Ghane Kunt, near Awashi, owned by Shri.Rajendra Amre.	Ghane Kunt	Khed	Ratnagiri	94	31
	2829	Bore well at MIDC Shiroli near M/s Pratibha Enterprises.	Shiroli	Hatkanangale	Kolhapur	30	53
	2830	Bore well at MIDC Gokul-Shirgaon.	Gokul-Shirgaon	Karvir	Kolhapur	27	33
	2831	Dug well at Sakharali, near MIDC Islampur near Krishna Milk Industry.	Sakharali	Walwa	Sangli	333	42
	2832	Dug well No. 1 at Brahmanwadi-Anjanwel, owned by Shri. Vaidya.	Anjanwel	Guhagar	Ratnagiri	28	18
	2833	Dug well-No.-1 owned by Group Gram Panchayat Arketwadi, near Masjid .	Arketwadi	Khed	Ratnagiri	28	23
	2834	Dug well No.2 at Arketwadi	Arketwadi	Khed	Ratnagiri	78	23
	2835	Dug well No. 2, owned by Group Gram Panchayat, Brahmanwadi- Anjanwel	Anjanwel	Guhagar	Ratnagiri	29	14

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Mumbai

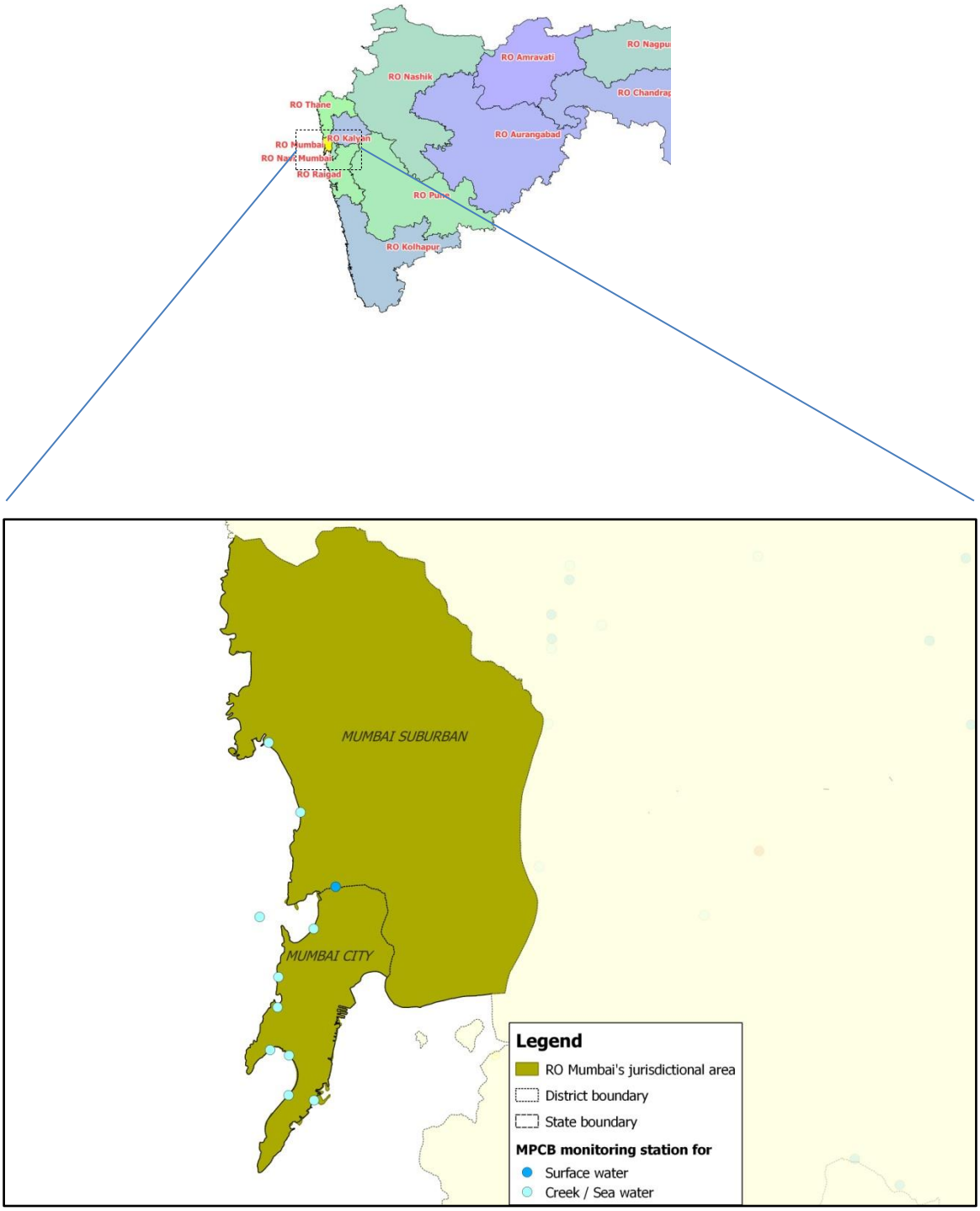
RO Nagpur
RO Amravati
RO Nashik
RO Chandrapur
RO Thane
RO Kalyan
RO Aurangabad
RO Mumbai
RO Navi Mumbai
RO Raigad
RO Pune
RO Kolhapur
MUMBAI SUBURBAN
MUMBAI CITY
Legend
RO Mumbai's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Creek / Sea water

Table No. 6: Water quality Index for surface and ground water monitoring at Mumbai-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	**2168**	Mithi River near Road bridge	Mahim	Bandra	Mumbai		24
Saline	**1318**	Mahim creek at Mahim Bay	Mahim	Bandra	Mumbai	36	49
	2165	Sea water at Gateway of Maharashtra	Colaba	Colaba	Mumbai	45	47
	2166	Sea water at Charni Road Choupathy	Girgaon	Mumbai	Mumbai	48	45
	2167	Sea water at Worli Seaface	Worli	Worli	Mumbai	48	58
	2169	Sea Water at Versova beach	Versova	Andheri	Mumbai	41	41
	2808	Sea water at Nariman Point	Colaba	Colaba	Mumbai	50	51
	2809	Sea water at Malabar Hill	Walkeshwar	Mumbai	Mumbai	51	
	2810	Sea water at Haji Ali	Worli	Worli	Mumbai	45	48
	2811	Sea water at Shivaji Park(Dadar Choupathy)	Dadar	Dadar	Mumbai	49	48
	2812	Sea Water at Juhu beach	Juhugaon	Santacruz	Mumbai	47	42

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Nagpur

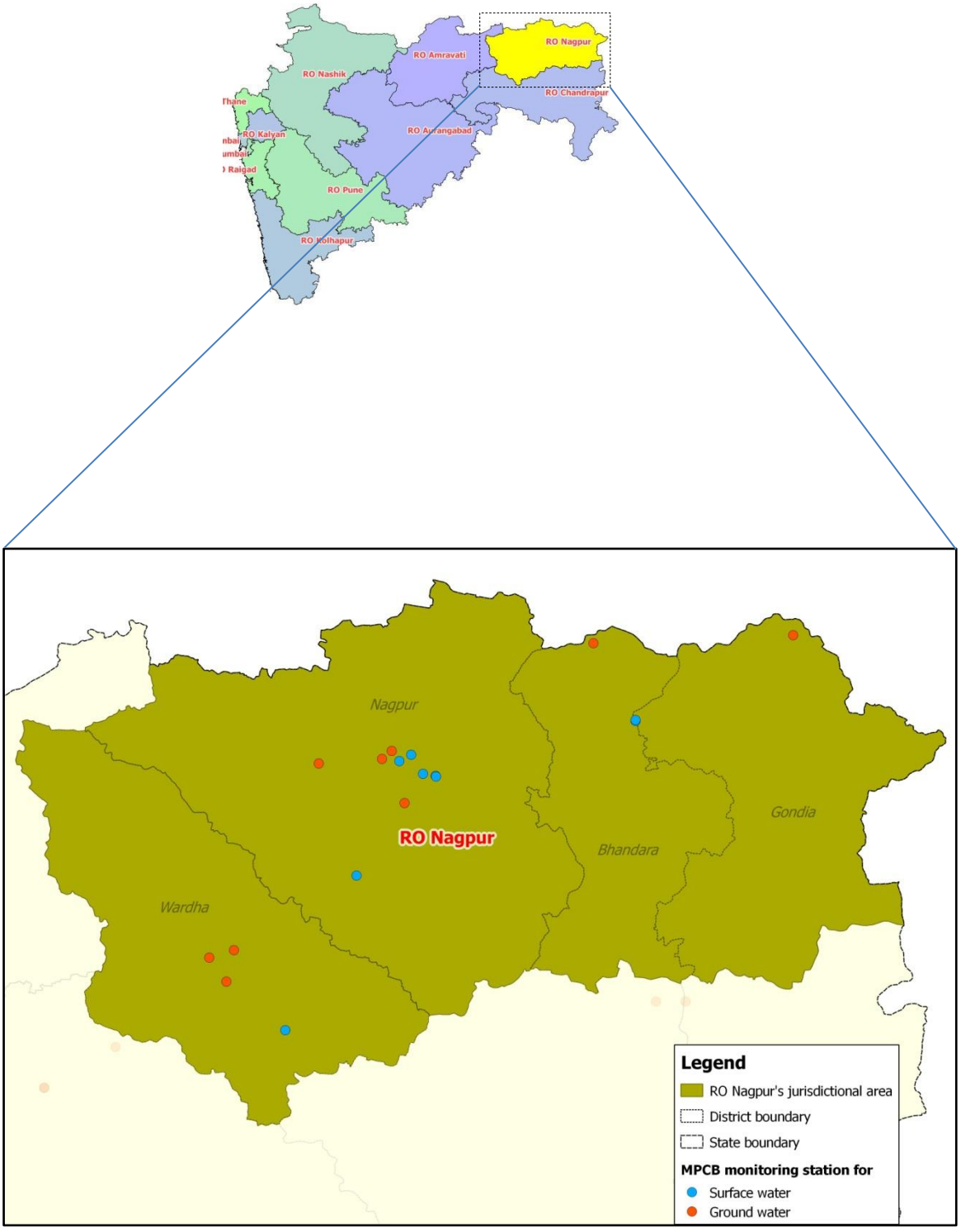
RO Nagpur
RO Amravati
RO Nashik
RO Chandrapur
RO Kalyan
RO Aurangabad
RO Pune
RO Kolhapur
Nagpur
RO Nagpur
Bhandara
Gondia
Wardha
Legend
RO Nagpur's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Ground water

Table No. 7: Water quality Index for surface and ground water monitoring at Nagpur-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/ Dec
Surface water	1908	Kolar river before confluence with Kanhan river at Waregaon Bridge.	Waregaon	Kamptee	Nagpur	58	56
	1909	Village- Agargaon, Taluka- Kuhi, District- Nagpur	Agargaon	Kuhi	Nagpur	60	52
	1910	Wainganga river after confluence with Kanhan river	Ambhora	Kuhi	Nagpur	56	51
	2170	Kanhan river at U/s of M/s Vidarbha Paper Mills	Sinora	Parseoni	Nagpur	56	59
	2171	Kanhan river at D/s of M/s Vidarbha Paper Mills	Sinora	Parseoni	Nagpur	40	54
	2172	Wainganga at D/s of Ellora Paper Mills	Tumsar	Tumsar	Bandara	58	52
	2173	Wainganga at U/s of Ellora Paper Mills	Tumsar	Tumsar	Bandara	53	59
	2722	Wena river at U/s of Mohata Mills, near Railway bridge on Wadha-Chandrapur railway line.	Hinganghat	Hinganghat	Wardha	57	59
	2723	Wena river at D/s of Mohata Mills, near bridge on Hinganghat-Wadner road	Hinganghat	Hinganghat	Wardha	45	51
Ground water	1995	Gram Panchayath Dug well , Near Balaji Gajbhiye House, Khaperkheda	Khaperkheda (Ward No.4)	Saoner	Nagpur	63	48
	1996	Gram Panchayath Dug well , Near Jagadamba G M S Mandir Sahakari Sanstha	Koradi	Kamptee	Nagpur	57	69
	1997	Bore well near Primary Health Centre, Raipur(Hingna)	Raipur	Hingna	Nagpur	32	111
	1998	Gram Panchayat Dug well near Gram Panchayat Office, Brahmni	Brahmni	Kalmeshwar	Nagpur	43	41

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/ Dec
	1999	Bore well Near Gram Panchayat,Changera.	Changera	Gondia	Gondia	38	42
	2000	Dug well near Sarode Kirana Store, Bhandewadi, Nagpur	Bhandewadi	Nagpur	Nagpur	57	72
	2203	Hand pump in the premises of Zilla Parishad Primary School	Bhugaon	wardha	Wardha	44	31
	2826	Dug well near Railway station & Cotton market	Wardha	wardha	Wardha	35	30
	2827	Bore well Near Railway crossing at Dongri Buzurg.	Dongri-Buzurg	Tumsar	Bandara	44	54

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Nashik

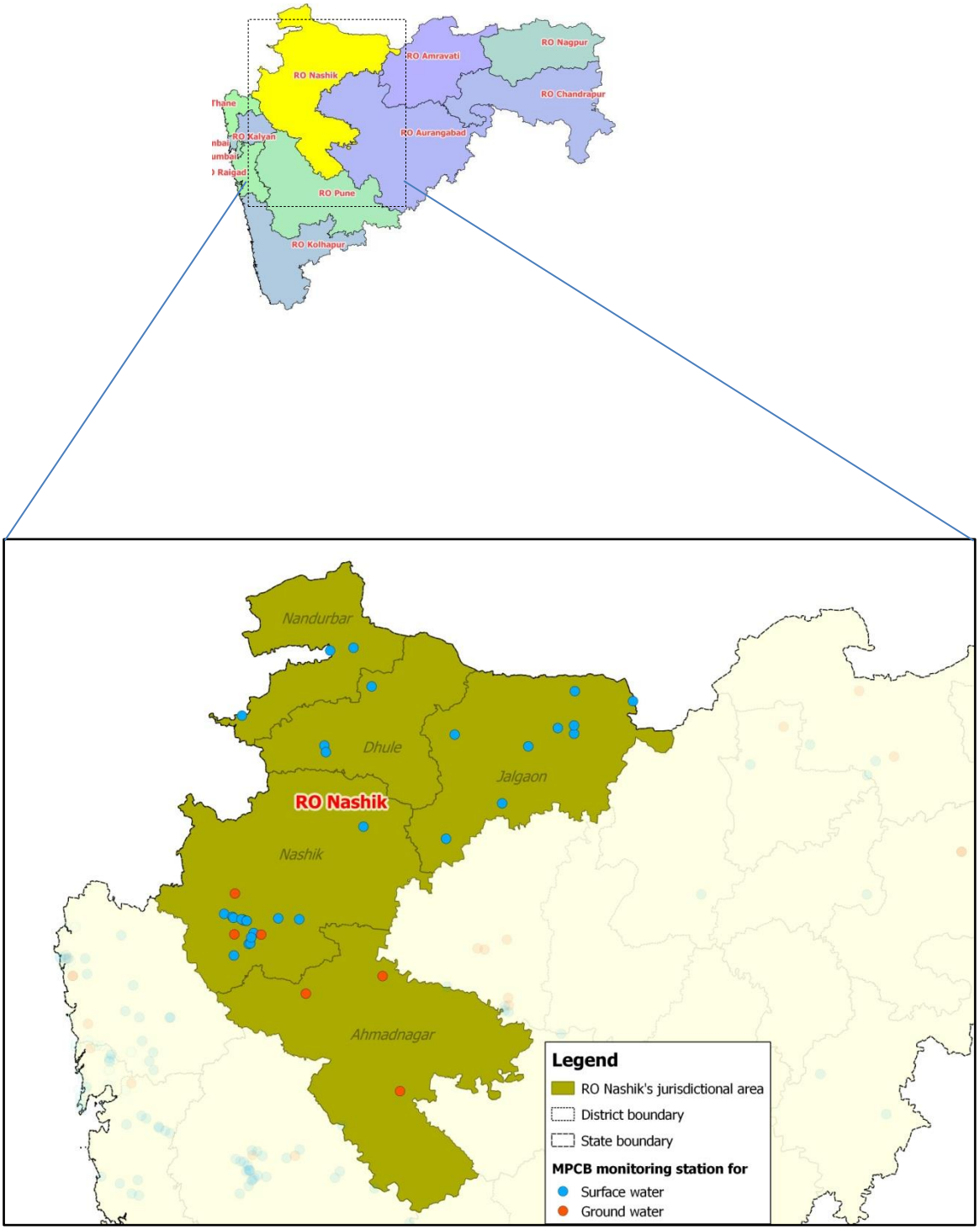
RO Nagpur
RO Amravati
RO Nashik
RO Chandrapur
RO Aurangabad
RO Kalyan
RO Pune
RO Kolhapur
Nandurbar
Dhule
Jalgaon
RO Nashik
Nashik
Ahmadnagar
Legend
RO Nashik's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Ground water

Table No. 8: Water quality Index for surface and ground water monitoring at Nashik-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	1095	Godavari river at U/s of Gangapur Dam	Gangapur	Nashik	Nashik	78	78
	1096	Godavari river at Ramkund	Panchavati	Nashik	Nashik	69	65
	1211	Godavari river at Nashik D/s near Amardham	Gadgebaba Maharaj Nagar	Nashik	Nashik	70	52
	1251	Tapi river at U/s of Bhusawal	Bhusawal Railway Colony	Bhusawal	Jalgaon	83	69
	1252	Girna river at Jalgaon at intake of Girna pump huose.	Girna pump house area	Jalgaon	Jalgaon	83	
	1253	Girna river at Malegaon at Malegaon road bridge.	Malegaon	Malegaon	Nashik		
	1313	Tapi river at Ajnad Village	Ajnad	Raver	Jalgaon	83	62
	1314	Tapi river at Ubad Village near Gujrat border.	Ubad	Shahada	Nandurbar	72	59
	1907	Rangavali river at D/s of Navapur near Rangavali bridge.	Navapur	Navapur	Nandurbar	75	64
	2177	Godavari river near Someshwar Temple	Someshwar	Nashik	Nashik	70	66
	2178	Chikhali nalla meets Godavari river.	Chikhali	Nashik	Nashik	64	53
	2179	Godavari river at Hanuman Ghat	Nashik city	Nashik	Nashik	70	64
	2180	Godavari river at Tapovan	Tapovan	Nashik	Nashik	66	55
	2181	Godavari river at Kapila-Godavari confluence point	Tapovan	Nashik	Nashik	68	42
	2182	Godavari river at Saikheda village	Saikheda	Niphad	Nashik	77	58
	2183	Godavari river at Nandur- Madhameshwar Dam.	Nandur	Niphad	Nashik	76	73
	2652	Amaravati river at D/s of Dondaicha	Dondaicha	Dhule	Dhule		62
	2658	Bori river at D/s of Amalner	Amalner	Jalgaon	Jalgaon	83	
	2659	Burai river before confluece to Tapi river at Mukudas village	Mukudas	Dhule	Dhule		
	2660	Darna river at Chehedi water works(pumping station)	Chehedi	Nashik	Nashik	79	71

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
	2661	Darna river at Aswali (Darna Dam)	Aswali	Igatpuri	Nashik	75	75
	2662	Darna river at M.E.S. site Pumping station.	Bhagur	Nashik	Nashik	76	78
	2663	Darna river at Bhagur pumping station near Pandhurli bridge	Bhagur	Nashik	Nashik	74	77
	2664	Darna river at Sansari.	Sansari	Nashik	Nashik	77	72
	2666	Gomai river at D/s of Shahada	Shahada	Dhule	Dhule		64
	2670	Kan river at Sakri water works	Sakri	Dhule	Dhule		72
	2684	Panzare river near Panzarakan SSK Ltd.	Panzare	Dhule	Dhule		64
Ground water	1990	Bore well at BMW Site , Burudgaon	Burudgaon	Ahmednagar	Ahmadnagar	92	
	1991	Bore well at MSW Site, Pathardi, Nashik	Pathardi	Nashik	Nashik	102	15
	2204	Dug well at Gunjalwadi, Sangamner near Primary Health Care Center.	Gunjalwadi	Sangamner	Ahmadnagar	222	80
	2816	Dug well of Mr. Sampat Walunj, near M/s Mahajeet Clayton.	Shinde village	Nashik	Nashik	96	
	2817	Bore well at Chitali near Wagh vasthi	Chitali	Rahata	Ahmadnagar	15	
	2818	Bore well at Spectron Ethers, Rasegaon near Siddeshwar Mahadev Mandir.	Rasegaon	Dindori	Nashik	37	

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Navi Mumbai

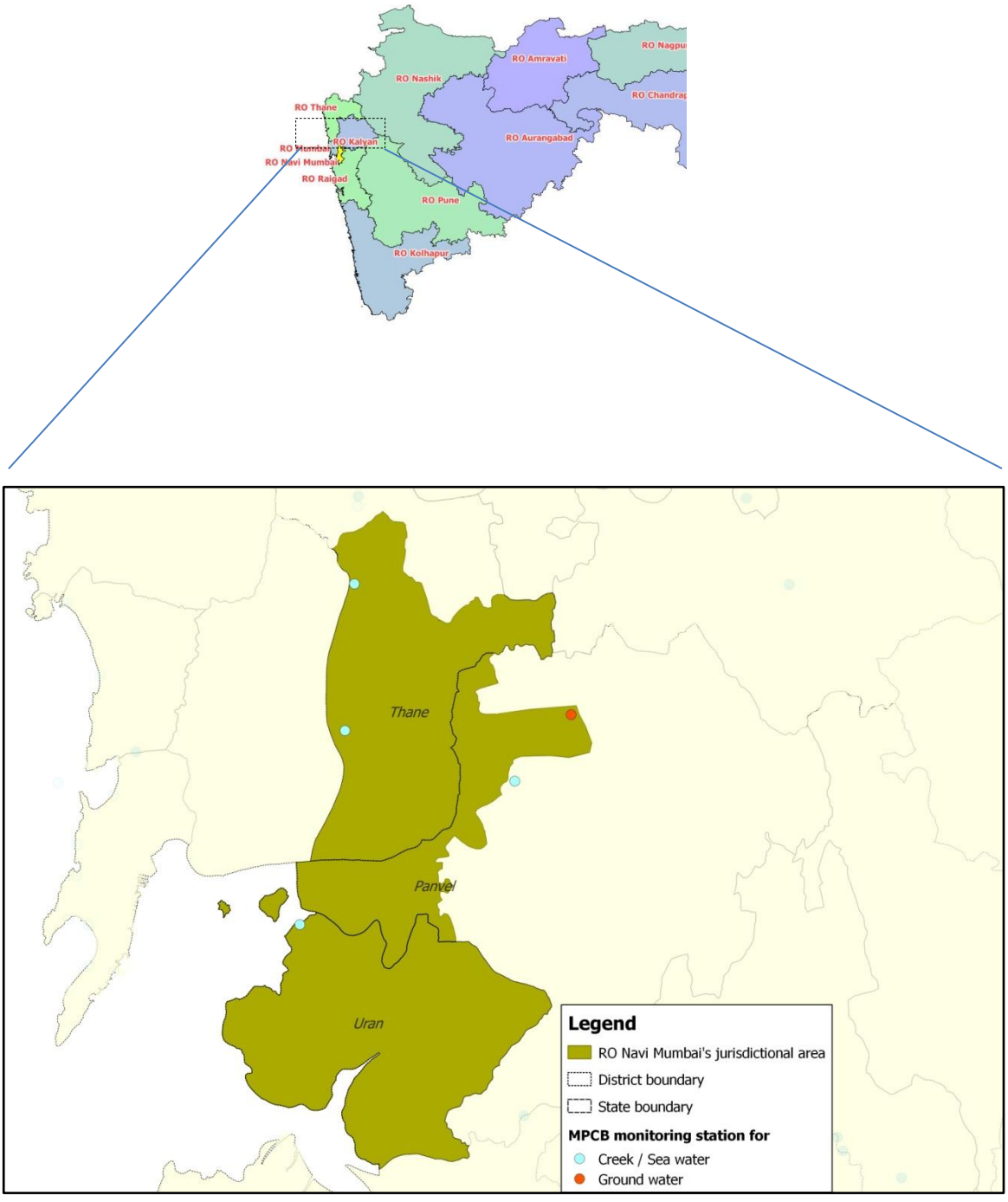

Table No. 9: Water quality Index for surface and ground water monitoring at Navi Mumbai-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Saline	1317	Thane creek at Elephanta Island	Gharapuri, Elephanta Island	Uran	Raigad	46	49
	2184	Vashi Creek at Airoli bridge	Airoli	Thane	Thane	49	47
	2185	Vashi Creek at Vashi bridge	Vashi	Thane	Thane	46	51

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Pune

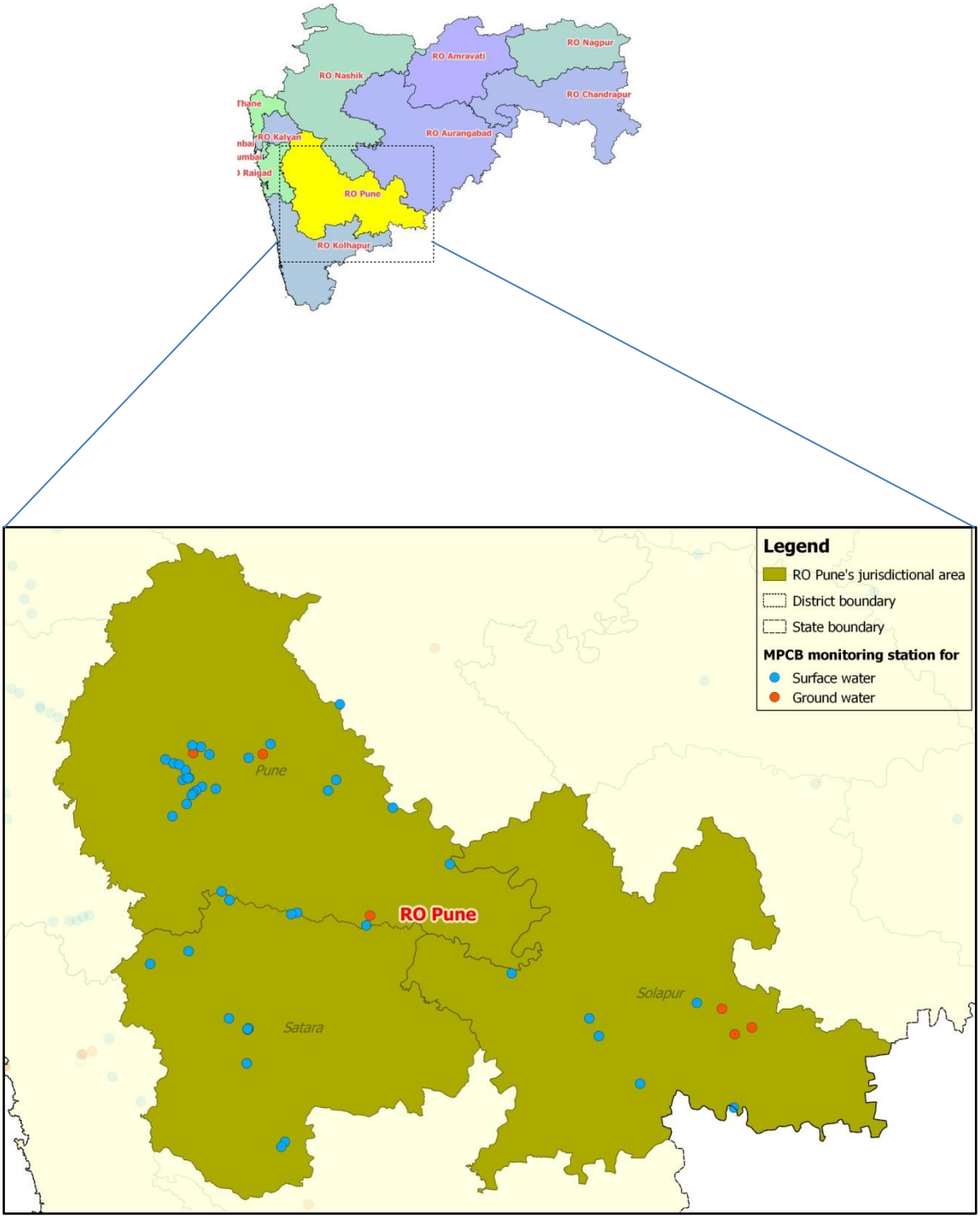
RO Amravati
RO Nagpur
RO Nashik
RO Chandrapur
RO Aurangabad
RO Kalyan
RO Pune
RO Kolhapur
Legend
RO Pune's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Ground water
Pune
RO Pune
Satara
Solapur

Table No. 10: Water quality Index for surface and ground water monitoring at Pune-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	28	Bhima river at Takali near Karnataka border.	Takali	South Solapur	Solapur	58	57
	36	Krishna river at Krishna bridge, Karad(Krishna river at NH-4 bridge, Karad.)	Karad	Karad	Satara	56	59
	1188	Bhima river at Narsingpur near Sangam bridge after confluence with Nira rive	Narsingpur	Malshiros	Solapur	61	65
	1189	Bhima river at Pune (Mutha river) at U/s of Vithalwadi near Sankar Mandir.	Vithalwadi	Haweli	Pune	40	36
	1190	Bhima river at D/s of Bundgarden, Pune.	Yerwada	Haweli	Pune	36	25
	1191	Bhima river after confluence with Mula-Mutha at Pargaon near Vasant Bandara.	Pargaon	Daund	Pune	47	43
	1192	Bhima river at Daund near Mahadev temple.	Daund	Daund	Pune	49	48
	1194	Krishna river at Dhom Dam	Wai	Mahabaleshwar	Satara	65	68
	1463	Nira river at Sarola bridge	Sarola	Bhor	Pune	62	56
	1911	Chandrabhaga river at U/s of Pandharpur town.	Gursale	Pandarpur	Solapur	72	61
	1912	Chandrabhaga river at D/s of Pandharpur town near Vishnupant Mandir.	Gopalpur	Pandarpur	Solapur	64	56
	2186	Venna river at Varye, Satara	Varye	Satara	Satara	52	58
	2187	Krishna river at Kshetra Mahuli, Satara.	Kshetra Mahuli	Mahuli	Satara	48	50

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
	2188	Krishna river at Krishna- Venna sangam, Mahuli.	Mahuli	Mahuli	Satara	51	55
	2189	Koyna river at Karad.	Karad	Karad	Satara	60	60
	2190	Krishna river at Wai, Satara..	Wai	Wai	Satara	53	51
	2191	Mutha river at Sangam bridge near Ganapathy ghat..	Shivaji Nagar	Pune	Pune	30	27
	2192	Mula - Mutha river at Mundhawa bridge.	Mundhawa	Haweli	Pune	38	25
	2193	Mula river at Aundh bridge ,Aundgaon.	Aundhgaon	Haweli	Pune	46	43
	2194	Mula river at Harrison bridge near Mula-Pawana sangam.	Bopodi	Haweli	Pune	37	32
	2195	Nira river at D/s of Jubilant Organosis, Pune.	Nimbut	Baramati	Pune	54	46
	2196	Pawana river at Sangavi gaon, Pune.	Sangavigaon	Haweli	Pune	29	33
	2197	Indrayani river at D/s of Alandigaon, Pune	Alandigaon	Haweli	Pune	54	49
	2655	Bhima river at Koregaon near Koregaon bridge, Pune	Koregaon	Shirur	Pune	41	45
	2656	Bhima river- Backwater of Ujani Dam near raw water pump house..	Kumbargaon	Indapur	Pune	56	56
	2665	Ghod river at Shirur, Pune.	Shirur	Shirur	Pune	66	58
	2668	Indrayani river at D/s of Moshi village.	Moshi	Haveli	Pune	45	41
	2669	Indrayani river at U/s of Moshigaon, Pune	Moshigaon	Haweli	Pune	51	46

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
	2677	Mula-Mutha river at D/s of Theur, Pune	Theur	Haweli	Pune	36	36
	2678	Mutha river near Veer Savarkar Bhavan, Pune..	Pune M.C	Pune	Pune	32	28
	2679	Mutha river at Deccan bridge, Pune.	Deccan	Pune	Pune	31	28
	2680	Mutha river at Khadakvasla Dam, Pune.	Kadakvasla	Haweli	Pune	69	70
	2681	Nira river at Sangavi	Sangavi	Phaltan	Satara	38	51
	2682	Nira river at U/s of Jubilant Organosis, Pune.	Nira(Datta ghat)	Baramati	Pune	58	47
	2683	Nira river at Shirwal, Satara.	Shindewadi, Shirwal	Khandala	Satara	56	60
	2690	Pawana river at Kasarwadi, Pune.	Kasarwadi	Haweli	Pune	31	34
	2691	Pawana river at Dapodi bridge, at Pawana- Mulla Sangam,Pune.	Dapodi	Haweli	Pune	32	30
	2692	Pawana river at Ravet Weir, Pune..	Ravet	Haweli	Pune	65	71
	2693	Pawana river at Chinchwadgaon, Pune.	Chinchwadgaon	Haweli	Pune	40	48
	2694	Pawana river at Pimpri gaon, Pune.	Pimprigaon	Haweli	Pune	32	30
	2705	Sina river near Laboti toll naka, Solapur	Laboti	Mohal	Solapur	59	56
	2711	Urmodi river at Nagthane, Satara.	Nagthane	Satara	Satara	49	52
	2715	Vel river at Shikrapur, Pune	Shikrapur	Shirur	Pune		55

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
	2716	Venna river at Mahabaleshwar..	Mahabaleshwar	Mahabaleshwar	Satara	61	68
	2717	Venna river at Mahuli, Satara	Mahuli	Satara	Satara	54	55
	2789	Nalla at D/s of Aklai Mandir, Solapur	Aklai	Malshiras	Solapur	23	32
Ground water	**1992**	Dug well at MSW Site,owned by Shri.Dattu Kondiba Borate at Borate Vasthi.	Moshi	Haveli	Pune	164	
	2819	Dug well owned by Shri Deshmukh	Malegaon	Baramati	Pune	413	543
	2820	Dug well owned by Shri Shivaji Baban Darekar	Sanaswadi	Shirur	Pune		71
	2821	Bore well at Bale railway station premises owned by Shri. Digambar Joshi.	Dahegaon	North Solapur	Solapur	220	31
	2822	Bore well near Chincholi MIDC	Chincholi	Mohol	Solapur	448	169
	2823	Bore well at Shete Vasti, near old Tuljapur road	Shete vasthi, Tuljapur Naka	Solapur	Solapur	490	158

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Raigad

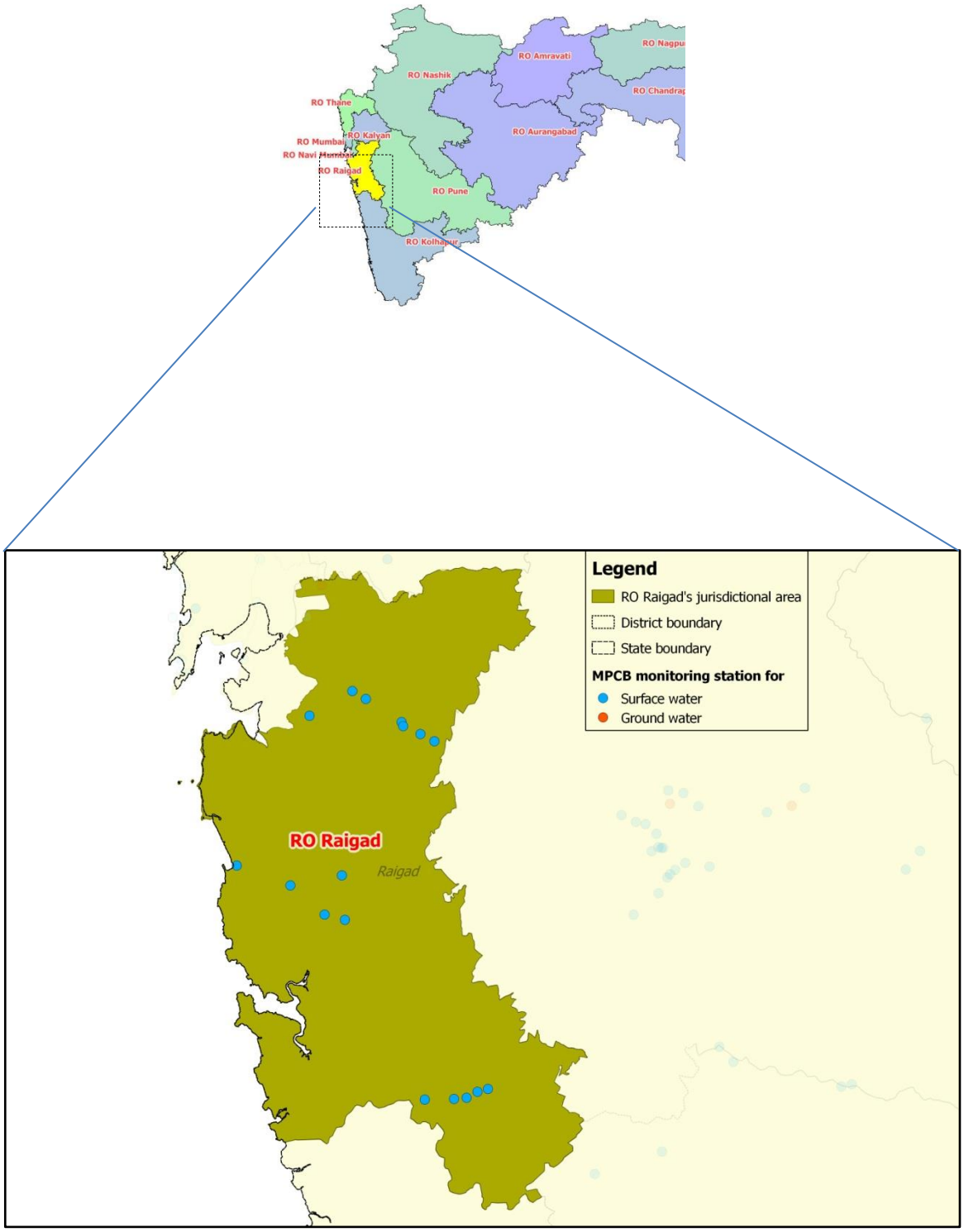
RO Amravati
RO Nashik
RO Thane
RO Kalyan
RO Mumbai
RO Navi Mumbai
RO Raigad
RO Aurangabad
RO Pune
RO Kolhapur
Legend
RO Raigad's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Ground water
RO Raigad
Raigad

Table No. 11: Water quality Index for surface and ground water monitoring at Raigad-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	1151	Patalganga river at Shilphata bridge	Khopoli	Khalapur	Raigad		82
	1152	Kundalika river at Roha bridge	Roha	Roha	Raigad	70	75
	1462	Patalganga near intake of MIDC water works (Turade w/w)	Turade	Khalapur	Raigad		82
	2198	Kundalika river at Are Khurd (saline zone)	Are Khurd	Roha	Raigad	52	76
	2199	Savitri river at Ovale Village	Ovale	Mahad	Raigad	87	75
	2651	Amba river at D/s of Waken bridge	Waken Phata	Roha	Raigad	73	75
	2671	Kundalika river near Salav bridge (saline zone)	Salav	Roha	Raigad	52	55
	2672	Kundalika river at Dhatav Jackwell	Dhatav	Roha	Raigad	75	83
	2685	Patalganga river at D/s of Kharpada bridge.	Kharpada	Khalapur	Raigad	55	
	2686	Patalganga river at Vyal Pump House	Vyal	Khalapur	Raigad	71	78
	2687	Patalganga river at Khalapur Pumping Station	Khalapur	Khalapur	Raigad		75
	2688	Patalganga river at Savroli bridge	Savroli	Khalapur	Raigad		85
	2689	Patalganga river at Gagangiri Maharaj Temple	Khopoli	Khalapur	Raigad		82
	2701	Savitri river jackwell at Upsa Kendre	Nangalwadi	Mahad	Raigad	84	78
	2702	Savitri river at Shedav Dov	Shedav Dov	Mahad	Raigad	80	78
	2703	Savitri river at Dadli road bridge	Dadli	Mahad	Raigad	82	74
	2704	Savitri river at Muthavali Village	Muthavali	Mahad	Raigad	62	67

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Saline	**2803**	Panvel Creek at Kopra bridge	Kopra	Panvel	Raigad	47	42
Ground water	**1989**	Bore well at MWML Site at Taloja	Karawla-Taloja	Panvel	Raigad		139

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

RO – Thane

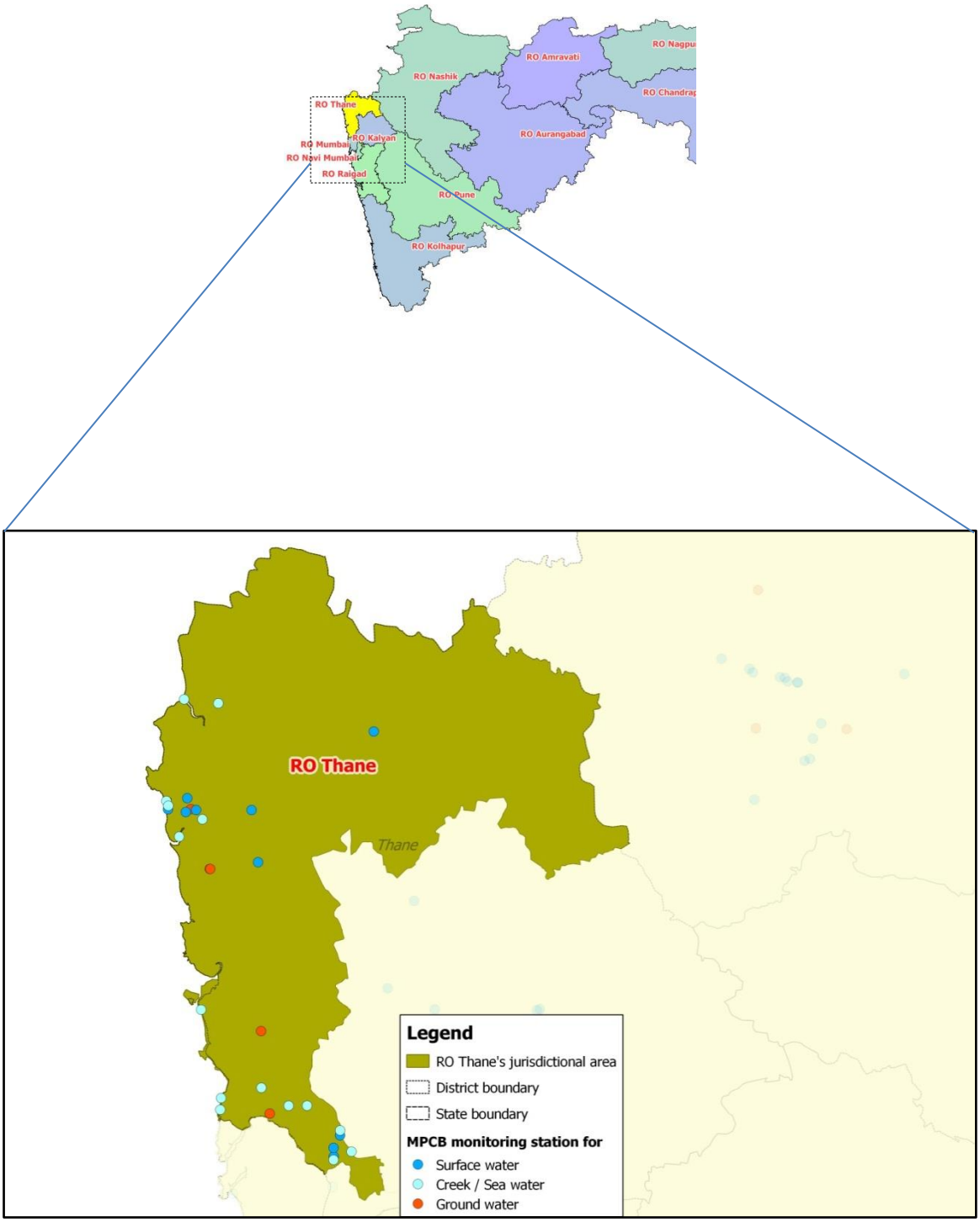
RO Amravati
RO Nashik
RO Thane
RO Kalyan
RO Mumbai
RO Navi Mumbai
RO Raigad
RO Aurangabad
RO Pune
RO Kolhapur
RO Thane
Thane
Legend
RO Thane's jurisdictional area
District boundary
State boundary
MPCB monitoring station for
Surface water
Creek / Sea water
Ground water

Table No. 12: Water quality Index for surface and ground water monitoring at Thane-RO – 2012-13

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
Surface water	2706	Surya river at U/s of Surya Dam	Dhamni	Vikramgad	Thane	77	80
	2707	Surya river at MIDC Pumping station on Boisar-Chillarphata road)	Garvashet	Palghar	Thane	77	75
	2708	Surya river at intake of Vasai- Virar water scheme	Masvan	Palghar	Thane		79
	2782	Rabodi Nalla	Rabodi	Thane	Thane	24	27
	2783	Colour Chem Nalla	Majiwada	Thane	Thane	23	29
	2784	Sandoz Nalla	Sandozbaug	Thane	Thane		28
	2785	BPT, Navapur	Navapur	Palghar	Thane		21
	2786	Tarapur MIDC Nalla, near sump No.I	MIDC Tarapur	Palghar	Thane	23	26
	2787	Tarapur MIDC Nalla, near sump No.II	MIDC Tarapur	Palghar	Thane		22
	2788	Tarapur MIDC Nalla, near sump No.III	MIDC Tarapur	Palghar	Thane		
Saline	1316	Bassein creek at Vasai Fort, Thane	Bassein	Vasai	Thane	46	44
	2792	Ulhas Creek at Mumbra Reti Bunder	Mumbra	Thane	Thane	51	49
	2793	Thane Creek at Kalwa Road bridge	Kalwa	Thane	Thane	26	50
	2794	Ulhas Creek at Kolshet Reti Bunder	Kolshet	Thane	Thane	51	52
	2795	Ulhas Creek at Gaimukh at Nagla Bunder on Ghod Buder road.	Nagla	Thane	Thane	41	53
	2796	Ulhas Creek at Versova bridge	Versova	Vasai	Thane	49	45
	2797	Bhayander Creek at D/s of Railway bridge at Jasal park choupathy.	Navghar	Bhayander	Thane	52	46
	2798	Kharekuran Murbhe creek	Kharekuran	Palghar	Thane	50	52

Type of water	Station ID	Station name	Village	Taluka	District	Apr	Oct/Dec
	2799	Dandi creek	Dandi	Palghar	Thane		47
	2800	Sarwali creek	Sarwali	Palghar	Thane	51	48
	2801	Savta creek	Savta	Dahanu	Thane	49	45
	2802	Dahanu creek at Dahanu Fort	Danugaon	Dahanu	Thane	37	47
	2805	Arnala Sea	Arnala	Vasai	Thane	56	46
	2806	Uttan Sea at Bhayander.	Uttan	Bhayander	Thane	45	40
	2807	Navapur sea	Navapur	Palghar	Thane	38	49
Ground water	1984	Bore well at M/s Tata Iron & Steel Co. Ltd, S-76	MIDCTarapur, Industrial Estate	Palghar	Thane	53	
	1985	Dug well at 5 Star Industrial Estate	Kashimira	Mira-Bhayander	Thane	213	140
	1986	Bore well at Motapada	Motapada	Dahanu	Thane	26	
	1987	Bore well at Vasai	Gokhiware	Vasai	Thane	170	94
	1988	Bore well at Gharatwadi, Palghar	Aliyali	Palghar	Thane	25	

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	No Data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	No Data

Annex II – Data Sets of Water Quality Monitored in 12-13

Soft Copy of the Data sets on a CD

Annex III – Details of River Action Plan

Sr. No.	Name of the River	Date of Submission to Env. Department, GoM.
1	Bhima, Mula and Mutha, Pune	16.09.2010
2	Panchaganga River, Kolhapur	11.08.2011
3	Upper Godavari River, Nashik	20.05.2012
4	Tapi Purna River, Amravati	16.05.2012
5	Nag River, Nagpur	---
6	Irai –Zarpat- Nag	03.08.2012
7	Krishna River,	03.01.2013

Annex IV – Polluted River stretches in Maharashtra as per CPCB, 2010

Maharashtra Pollution Control Board is monitoring river water quality in Maharashtra under National Water Quality Programme (NWMP). The water quality data generated through NWMP is analysed for Biochemical Oxygen Demand parameter & the locations exceeding the water quality criteria are identified as polluted locations by CPCB. Ref: CPCB letter no.A-14011/1/2010- MON 83 dated 04.10.2010.

Polluted River Stretches in Maharashtra Priority I: (BOD>30mg/I and BOD exceeding 6mg/l on all occasion)			
River	Polluted Stretch	Source/Town	Monitoring Locations
Bhima	Vithalwadi to Takli	Pune Sewage	Pune D/S of Bundgarder
		Daunt Sewage	Pune U/S Vithalwadi
			Pargaon (after Confluence with Mule Martha)
Godavari	Nashik D/s to Paithan	Nashik Sewage	Nashik D/S
			Jayakwadi Dam, Raher
			U/S of Gangapur Dam Nashik
			U/s of Paithan Jayakwadi
			D/s of Paithan Pathegaon
			Near Someshwar Temple
			Hanuman Ghat, Nashik
			Nashik D/S
			Panchavati at Ramkund
			Kapila Godavari, Cont Point Tapovan
			Saikheda
			Tapovan
Mula & Mutha	D/s Pune City	City Sewage of Pune	Mula-Mutha River at Mundhawa Bridge
			Mula at Aunth Bridge
			Mula Harrison Bridge
			Mutha at Sangam Bridge
Pawana	Pune Sangavi Gaon	Pune Sewage	Pune Sangavi Gaon
Indrayani	Alandi to Confluence with Bhima	Pune Sewage	Alandi Gaon
Koyna	Karad D/s	Karad Sewage	Karad
Mithi	Mumbai Stretch	Mumbai	Mithi River
Kundalika	Are Khurd	Roha Sewage	Are Khurd
			Kundalika at Roha City

Polluted River Stretches in Maharashtra Priority II: (BOD between 20 & 30 mg/l)			
River	Polluted Stretch	Source/Town	Monitoring Locations
Tapi	M P Border to Bhusaval	Bhisaval Sewage	Ajnand Village
			Uphad Village
			Bhusaval U/s
Girna	Malegaon to Jalgaon	Malegaon Sewage	Malegaon (Manmad)
		Jalgaon Sewage	Jalgaon
Nira	D/s of Jubilant Organosis, Pune	Industrial Wastewater	D/s of Jubilant Organosis, Pune

Polluted River Stretches in Maharashtra Priority III: (BOD between 10 & 20 mg/l)			
River	Polluted Stretch	Source/Town	Monitoring Locations
Weinganga	D/s Ashti	Municipal Sewage of Ashti Gaon	at Ashti
			After confluence of Kanhan
			D/s of Ellora Paper Mill
			U/s of Ellora Paper Mill
			U/s of Gaurav Paper Mills, Jackwell
			D/s of Gaurav Paper Mills, Jackwell
Wardha	Along Rajura Village	Paper Mills Waste	Rajura Bridge
			D/s of ACC Ghugus
			At Confluence point of Panganga and Wardha at Jaud
Bhima	Narsinghpur D/s	Nira Discharge	Narsinghpue (D/s after confl with R Nira)
Krishna	Dhomdam to Kolhapur	Sewage and Industrial Waste from Karad and Sangli	Krishna Bridge, Karad
			At Kshetra Mahuli
			Krishna Vennasangam at Mahuli
			At Wai
			Mohabaleshwar Dhom Dam Near Koyna Dam
Purna	Andura Village		D/s of Confl of Morna & Purna Andura Village
			Purna At Dhupeshwar
Nira	Along Pulgaon	Pulgaon Cotton Mill	Pulgaon Cotton Mill Wardha
			Sarole Bldg on Pune Bangalore Highway
Chandrabhaga	Along Pandharpur Town	Sewage of Pandharpur Town	D/s of Pandharpur Town
			U/s of Pandharpur Town
Venna River	Varye Satara		Satara D/s

Polluted River Stretches in Maharashtra Priority IV: (BOD between 6-10 mg/l)			
River	Polluted Stretch	Source/Town	Monitoring Locations
Kalu	Atale village to confl. with Ulhas	Municipal & Industrial waste water	Atale Village
Kanhan	D/s Nagpur	Industrial and Domestic Waste of Nagpur	D/s of Nagpur
			U/s of M/s Vidharbha Paper Mills, Sinora
			U/s of M/s Vidharbha Paper Mills, Sinora
Kolar	Along Kamptee	Municipal Waste Water	Before Confluence to Kanhan at Kamptee
Ulhas	Mohane	Industrial and Domestic runoff Ulhasnagar	U/s of Nrc bund at Mohane
			Jhambul Water Works
Panchganga	Kolhapur	Industrial and Municipal Sewage of Kolhapur	D/s of Kolhapur Town
Patalganga	Khopoli to Esturaine Region	Industrial and Municipal Sewage of Khopoli, rasayani and Paundh	Shilphata
			Near Intake of Mide W/W
Rangavali	Along Navapur	Sewage of Navapur	D/s of Navapur

Polluted River Stretches in Maharashtra Priority V: (BOD between 3 & 6 mg/l)		
River	Polluted Stretch	Monitoring Location
Ulhas	Along Badlapur	U/s of Badlapur
Bhatsa	Along Pise Village	D/s of Pise Dam Nr Pise Village (Ulhas)

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