Water Quality Status of Maharashtra 2015-16

Maharashtra Pollution Control Board

महाराष्ट्र प्रदूषण नियंत्रण मंडळ

The Energy & Resources Institute

Water Quality Status of Maharashtra 2015-16

(Compilation of Water Quality Data Recorded by MPCB)

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The Energy and Resources Institute

...towards global sustainable development

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MAHARASHTRA POLLUTION CONTROL BOARD

Preface

Maharashtra Pollution Control Board is monitoring water quality in Maharashtra to comply with the mandate of Water (Prevention & Control of Pollution) Act, 1974 and to disseminate status of water quality in the State of Maharashtra. 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 294 monitoring stations during the period April 2015 to March 2016. 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 few years.

Also presents a comparison for the trend in water quality index for intra-basin analysis for the past ten years and specifically for last three years. Graphical presentation of water quality trend for last 10 years of 294 stations and also riverwise is added in this report. Spatial presentation of water quality indices for the peak summer and post monsoon months is shown for the year 2015-16. In 2015-16 the sub-basins of Krishna has recorded the highest percentage of observations in Good to Excellent category. The water quality in Weinganaga has deteriorated, also reduced in Tapi Upper, Godavari Upper, Godavari Middle and Wardha sub basin. Spatial maps have been generated in GIS platform to present the status of water quality at a glance. Also maps showing status of surface and ground water quality are attached. I trust findings of this report will help all concerned departments to prepare suitable action plans for improvement of water quality.

I place a record of gratitude to *Hon'ble Minister for Environment, Shri Ramdasbhai Kadam, Hon'ble Minister of State for Environment, Shri Pravin Pote Patil and Hon'ble Additional Chief Secretary (Environment) Govt. of Maharashtra and Chairman of the Board, Shri Satish Gavai, IAS* for having guided through the process.

This report is prepared by The Energy and Resources 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 *Dr.Y.B.Sontakke, Joint Director-WPC and Ms.Yamini Chachad, Junior Scientific Officer* are appreciated for their inputs in the report.

22/12/16

Date: December 2016

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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
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

MPCB (Maharashtra Pollution Control Board), being the state nodal agency under CPCB (Central Pollution Control Board), regularly monitors the water quality across 294 WQMS (Water Quality Monitoring Stations) for both surface (176 on rivers, 36 on sea/creeks, 12 on drains, 4 dams) and ground water (29 Borewells, 35 Dugwell, 1 Handpump, 1 Tubewell) under two programs of NWMP (National Water Quality Monitoring Program) and SWMP (State Water Quality Monitoring Program). Surface water samples are monitored once every month whereas the ground water samples are monitored bi-anually.

This report presents the statistical analysis of the data representing water quality monitored in the year 2015-16, along with illustrations and spatial representations to have an overview on the performance for quality of surface and ground water in the state. The report further discusses the highlights on the annual and seasonal performance of the Water quality Index (WQI) for major basins (Tapi, Godavari, Krishna, and West Flowing) as well as for the water samples representing saline (sea/creek) and groundwater for general classification (Table No. 1). The WQI has been determined based on the formula developed by NSF (National Sanitation Foundation) and modified by CPCB (Central Pollution Control Board)[1] (Table No. 1) which depicts the water quality in simple and easy way for general public at large.

Table No. 1: Formula and classification of Water quality indices for surface and groundwater

Surface Water Quality	**Ground Water Quality**
$$\mathrm{WQI} = \sum_{i=1}^{p} \mathrm{WiIi}$$	$$\mathrm{WQI} = \sum_{i=1}^{n=9} qi.wi$$
Where; Ii = sub index for water quality parameter Wi = weight (in terms of importance) associated with water quality parameter P = number of water quality parameters	Where; qi = quality rating wi = relative of each weight

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] Maharashtra Pollution Control Board, Methodology for Data Interpretation

Surface Water Quality

In the year 2015-16, surface (rivers, sea, creek and nallahs) water quality was monitored at about 229 locations (WQMS). The four major basins namely Tapi, Godavari, Krishna and West flowing rivers were considered to categorize the rivers in respective basins and sub basins (Table No. 2). Based on the annual average WQI for the 229 WQMS, it was recorded that 115 WQMS were recorded to be in the 'Good to Excellent' category while 75 WQMS were in 'Medium to Good' category. As for the polluted categories only 29 and 8 WQMS were recorded in 'Bad' and 'Bad to Very Bad' categories respectively. About 2 stations were recorded dry throughout the year.

Table No. 2: Annual Average WQI for surface WQMS in various basins and sub basins

Basin	Sub basins	Name of Rivers	Category wise No of WQMS					
			G2E	M2G	B	B2V	Dry	Total
Tapi	Tapi Upper	Tapi, Purna, Pedhi	1	3	1	-	-	**5**
	Tapi Middle	Tapi, Girna, Rangavali, Amravati, Bori, Burai, Gomai, Hiwara, Kan, Mor, Panzara, Titur, Waghur,	6	10	1	-	-	**17**
Godavari 1	Godavari Upper	Godavari, Chikhali nalla, Darna	17	4	-	-		**21**
	Godavari Middle	Godavari, Bindusara	9	1	-	-	1	**11**
	Manjra	Godavari, Manjra	1	-	-	-	1	**2**
Godavari 2	Wardha	Wardha, Penganga	1	11	-	-	-	**12**
	Weinganga	Kolar, Kanhan, Weinganga	-	12	2	2	-	**16**
	Pranhita and others	Wainganga	-	1	-	-	-	**1**
Krishna	Bhima Upper	Bhima, Nira, Chandrabhaga, Mutha, Ghod, Indrayani, Pawana, Sina, Vel, Nalla, Mula-Mutha	14	16	7	-	-	**37**
	Krishna Upper	Krishna, Panchganga, Koyna, Urmodi, Venna	21	-	-	-	-	**21**
West Flowing s		Kalu, Ulhas, Patalganga, Bhatsa, Vashishti, Mithi, Kundalika, Savitri, Amba, Kundalik, Muchkundi, Surya, Tansa, Vaitarna,	39	1	1	-	-	**41**
Nallah		Rabodi nalla, Colour Chem nalla, Sandoz nalla, BPT Navapur, Tarapur MIDC nalla, Pimpal-Paneri nalla	2	-	1	6	-	**9**
Saline			4	16	16	-	-	**36**
Total			115	75	29	8	2	**229**

Legend

G2E: Good to Excellent	M2G: Medium to Good	B: Bad	B2V: Bad to Very bad

The quality of water is affected by various factors like rate of precipitation, flow rate of water, high evaporation rate during the summers, sporadic pollution loads from various anthropogenic activities and so on. Hence, there could be varied fluctuations in the quality of water at the same monitoring location leading to seasonal and monthly variations. Thus to eliminate this shortcoming an interbasin analysis for the occurrence and share of water quality index across the basins has been developed without averaging any values.

As seen in Figure No. 1, it is interesting to note that the sub-basins of Krishna have recorded the highest share of observations in 'Good to Excellent' category while Weinganga basin has recorded the least number of observations in the same category. It could also be observed that the percentage in the 'Good to Excellent' category has been reduced for majority of the stations in this basin as compared to last year. Similarly, the performance of water quality in Weinganga has deteriorated as the share of 'Bad to Very Bad' category of WQI has increased compared to the previous year (2014-15) while it has been drastically reduced in the Tapi Upper, Godavai Upper, Godavari Middle and Wardha sub basin. Manjra sub station has recorded no readings in 'Bad to Very Bad', 'Bad' and 'Medium to Bad' for the last two years.

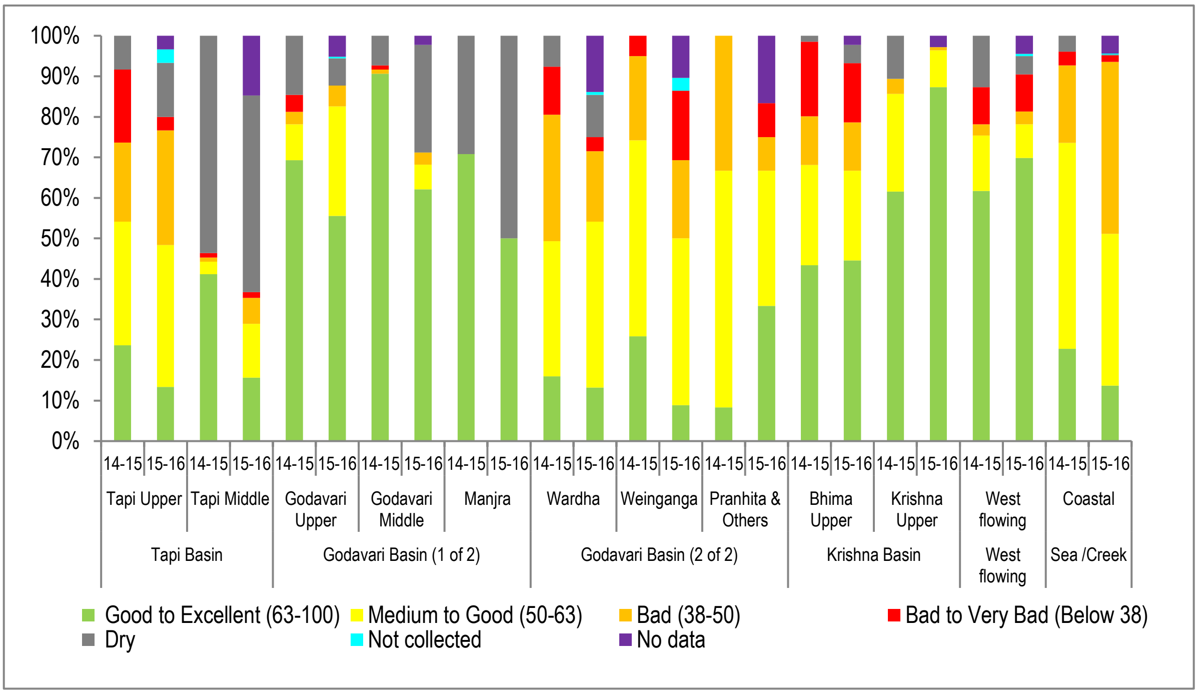


Figure No. 1: Average occurrence of different category of WQI across WQMS in respective sub basins of Maharashtra

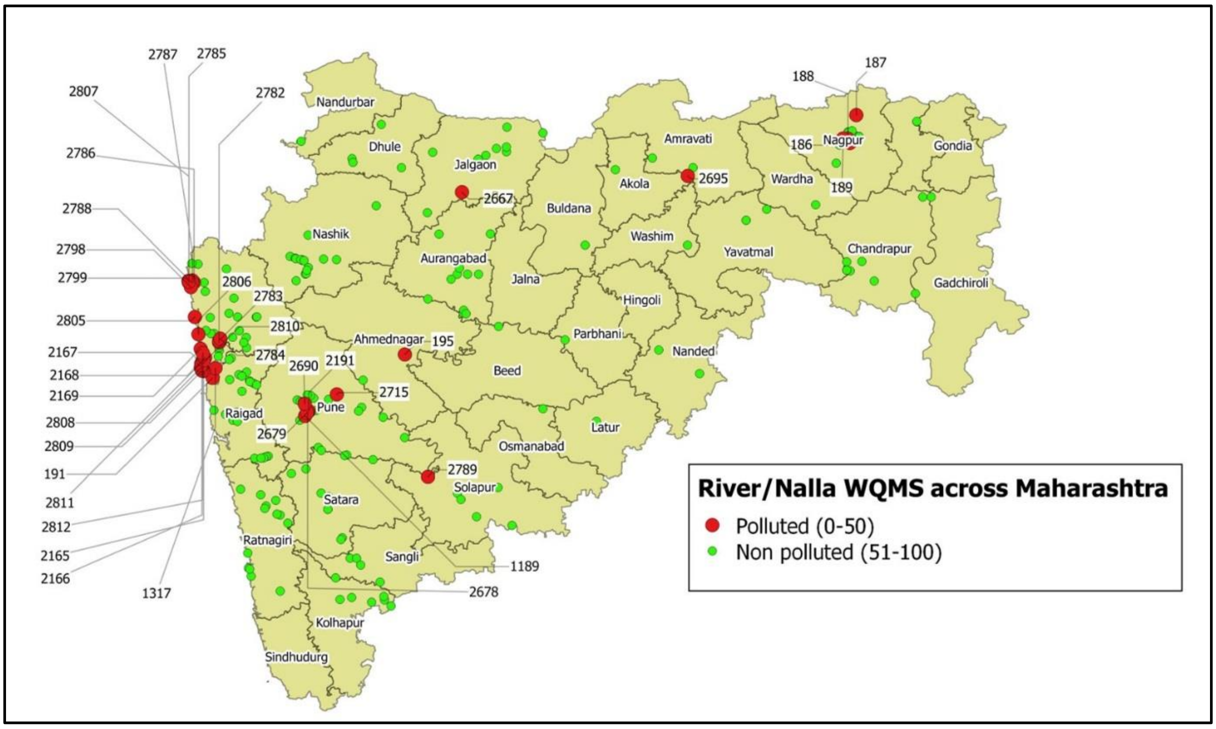
Note: *The above comparison is based on the WQI recorded at a monitoring station and the average number of times the WQI was of a certain category at all the WQMS in that basin.*

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

A spatial representation of the polluted locations, WQI<50 for more than 50% of the observations, has been presented in Map No. 1 and the corresponding details of the WQMS have been enlisted in Table No. 3. The disctricts of Mumbai, Thane, Raigad, Pune and Nagpur followed by Jalgaon, Ahmadnagar, Solapur, Akola, Washim and Dhule have been detected to have polluted rivers.

In the year 2015-16, saline water quality was monitored at around 34 locations across the 720km long coastline of the state. In terms of the monitoring done for sea and creek water along the coastline of the state, a majority of the WQMS are located in Mumbai (8), Mumbai Suburban (2) and Thane (18) districts. The Raigad and Ratnagiri districts have 2 and 4 WQMS respectively while there is no WQMS in the Sindhudurg district.

Sea water samples from Mumbai and Thane were recorded to be polluted throughout the year and the WQI at these locations was in the category 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.



Map No. 1: Spatial representation surface WQMS which recorded WQI as polluted for more than 50% of the observations

Table No. 3: WQMS which recorded WQI as polluted for more than 50% observations in 2015-16

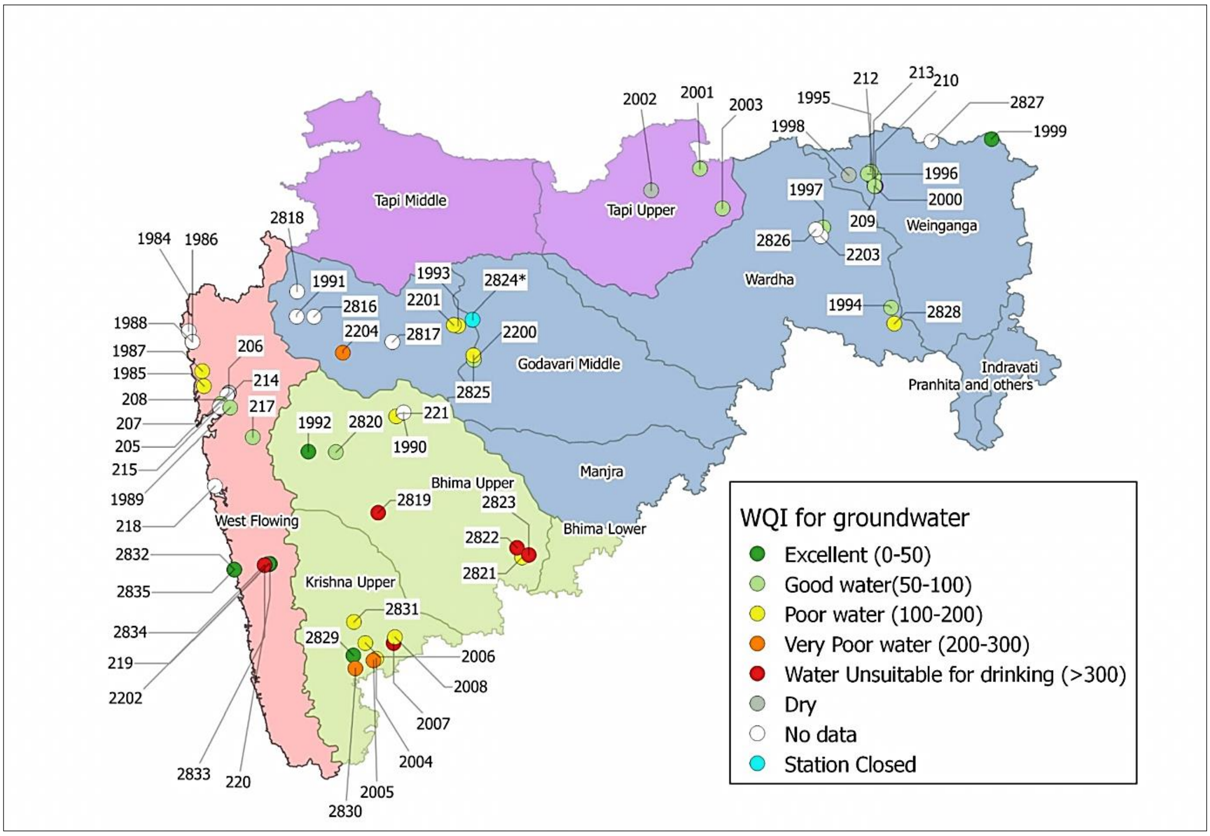
Sr No	Station code	Water Body	Station Name	Village	Taluka	District
1	186	Nag	Nag Near, Bhandewadi Bridge, Nagpur	Nagpur	Nagpur	Nagpur
2	187	Nag	Nag Near, Asoli Bridge, Bhandara Road, Nagpur	Nagpur	Nagpur	Nagpur
3	188	Pill	Pill Near, Wanjra Layout Kamptee Road, Nagpur	Nagpur	Nagpur	Nagpur
4	189	Pill	Pill Near, Mankapur on Koradi Road, Nagpur	Nagpur	Nagpur	Nagpur
5	191	Sea Water	Arabian Sea behind ONGC Uran	Uran	Uran	Raigad
6	195	Sina	Sina Bridge At Burudgaon Road, A/P Ahmednagar, Taluka & District Ahmednagar	Burudgaon	Ahmednagar	Ahmednagar
7	1189	Bhima	Bhima at Pune(Mutha) at U/s of Vithalwadi near Sankar Mandir	Vithalwadi	Haweli	Pune
8	1317	Thane creek	Thane creek at Elephanta Island	Gharapuri, Elephanta Island	Uran	Raigad
9	2165	Sea	Sea Water at Gateway of India	Colaba	Colaba	Mumbai
10	2166	Sea	Sea Water at Charni Road Choupathy	Girgaon	Mumbai	Mumbai
11	2167	Sea	Sea Water at Worli Seaface	Worli	Worli	Mumbai
12	2168	Mithi	Mithi at near bridge	Mahim	Bandra	Mumbai
13	2169	Sea	Sea Water at Varsova Beach	Versova	Andheri	Mumbai
14	2191	Mutha	Mutha at Sangam Bridge Near Ganpathi Ghat	Shivaji Nagar	Pune	Pune
15	2667	Hiwara	Hiwara D/s of Pachora	Pachora	Jalgaon	Jalgaon
16	2678	Mutha	Mutha near Veer Savarkar Bhavan	Pune M.C	Pune	Pune
17	2679	Mutha	Mutha at Deccan Bridge, Pune	Deccan	Pune	Pune
18	2690	Pawana	Pawana at Kasarwadi Pune	Kasarwadi	Haweli	Pune
19	2695	Pedhi	Pedhi near Road Bridge at Dadhi-Pedhi village	Asegaon	Chandur Bazar	Amravati
20	2782	Rabodi	Rabodi Nalla	Rabodi	Thane	Thane

Sr No	Station code	Water Body	Station Name	Village	Taluka	District
		nalla				
21	2783	Colour Chem nalla	Colour Chem Nalla	Majiwada	Thane	Thane
22	2784	Sandoz nalla	Sandoz Nalla	Sandozbaug	Thane	Thane
23	2785	BPT Navapur	BPT Navapur	Navapur	Palghar	Palghar
24	2786	Tarapur MIDC nalla	Tarapur MIDC Nalla, near sump No1	MIDC Tarapur	Palghar	Palghar
25	2787	Tarapur MIDC nalla	Tarapur MIDC Nalla	MIDC Tarapur	Palghar	Palghar
26	2788	Tarapur MIDC nalla	Tarapur MIDC Nalla near sump-III	MIDC Tarapur	Palghar	Palghar
27	2789	Nalla	Nalla at D/s of Alkai Mandir, Solapur	Aklai	Malshiras	Solapur
28	2798	Kharekuran Murbe creek	Kharekuran Murbe Creek	Kharekuran	Palghar	Thane
29	2799	Dandi creek	Dandi Creek	Dandi	Palghar	Thane
30	2805	Arnala sea	Arnala Sea	Arnala	Vasai	Thane
31	2806	Uttan sea	Uttan Sea at Bhayander	Uttan	Bhayander	Thane
32	2807	Navapur sea	Navapur Sea	Navapur	Palghar	Thane
33	2808	Sea	Sea Water at Nariman Point	Colaba	Colaba	Mumbai
34	2809	Sea	Sea Water at Malabar Hill	Walkeshwar	Mumbai	Mumbai
35	2810	Sea	Sea Water at Haj Ali	Worli	Worli	Mumbai
36	2811	Sea	Sea Water at Shivaji Park (Dadar Choupathy)	Dadar	Dadar	Mumbai
37	2812	Sea	Sea Water at Juhu Beach	Juhugaon	Santacruz	Mumbai

Ground water Quality

MPCB, monitors the ground water quality of around 65 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. The ground water quality analysis for the year 2015-16 has been done for 65 monitoring stations. The water quality of Solapur district was recorded to be polluted throughout the year and the WQI indicated that the ground water in that location was ‘Unsuitable for drinking’. Solapur district was followed by Kolhapur district which recorded WQI in the ‘Very poor’ category for the year 2015-16. A slight improvement was observed in the ground water quality of Kolhapur as compared to last year when the water was catergorised as “Water Unsuitable for Drinking”.

The pH levels for all ground WQMS were observed in the range of 6.5-9 except for the WQMS representing a common well at Patwardhan village in Lote Taluka of Ratnagiri district (Station No. 219). This station recorded the average pH value of 5.4 indicating that the water is acidic. Similarly a bore well at Chincholi in Solapur district (WQMS 2822) recorded the highest Nitrate value of 33.4 mg/l and highest concentration of hardness (1124 mg/l) which is almost 4 times the permissible level of 300 mg/l. However the levels of Fluoride were found to be well within the limits at this station.



Map No. 2: Spatial representation for average groundwater WQI

**Station No. 2824 was non functional in reporting year.*

Introduction

Water Pollution

Any change in the physical, chemical and biological properties of water that has a harmful effect on living things is termed as 'water pollution' (WHO 1997)[2]. In India, almost 70 per cent of its surface water resources and most of its groundwater reserves are contaminated by biological, toxic, organic and inorganic pollutants[3].

Water pollution results from various point sources such as industrial effluents and domestic waste, and non-point sources such as fertilizer and pesticide run-offs in rural areas from the agricultural fields. It is estimated that amount of wastewater produced annually is about 1,500 km^3 which is six times more water that exists in all the s of the world.[4] As per Central Pollution Control Board (CPCB), 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[5]. Along with human activities, various micro-biological agents like bacteria, viruses and protozoa also cause water pollution which may cause various water-borne diseases. Based on the set of hazards the present pollutants are can be classed into eight categories: petroleum products, pesticides and herbicides, heavy metals, hazardous wastes, excess organic matter, sediment, infectious organisms, thermal pollution. [6]

When toxic substances enter lakes, streams, s, 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. The annual replenishable ground water resource of country has been estimated as 433 billion cubic meter (bcm) out of which 33 bcm is available in Maharashtra state.[7] Growing demand for water in agriculture, industrial and domestic sectors has brought problems of over-exploitation of the groundwater resource resulting in continuous decline in groundwater levels. In Maharashtra, out of 353 assests of groundwater, 19 are semi critical, 1 is critical and 9 are over exploited.[8]

The effects of water pollution are not only devastating to humans but also to flora and fuanaWater pollution can also significantly increase the rate of algal blooms which can cause depletion of oxygen in the water affecting the aquatic life. In India, about one third of deaths of children (0-5 years) are due to diarrhoea and pneumonia[9].Water contaminated with nitrate can lead to methemoglobinemia, a condition where nitrates are converted into nitrites in the digestive system, impairing the ability of blood to carry oxygen. The consumption of water contaminated with pesticides can result in cellular and Deoxyribonucleic Acid (DNA) damage, suppression on immune system, cancers, tumours and lesions on fish and animals. Physical deformaties such as hooked beaks in birds and

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[2] R.Gambhir, *Water Pollution: Impact of Pollutants and New Promising Techniques in Purification Process*

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

[4] Pacific Institute, *World water quality facts and statistics*.

[5] Central Pollution Control Board, *Status of Sewage treatment plant in Ganga basin*

[6] http://www.oocities.org/pollution_nirantar/water_pollution.htm

[7] India, WRIS *State-Wise Ground Water Resources Availability, Utilization and Stage of Development, India*

[8] Ministry of water resources, *Groundwater year book 2013-14*

[9] Unicef, *Water in India:Situation and Prospects*

thinning of egg shell can occur in avifauna.[10] The consumption of polluted water may lead to not only poisoning of humans, animals, birds, but also disturbs the fragile aquatic and riparian ecosystem.

Dumping of solid wastes is also an important factor resulting in deterioration of the groundwater quality. It is noted that more than 90% of the Municipal Solid Waste (MSW) generated in India is directly dumped on land in an unsatisfactory manner[11]. Solid waste includes all the discarded solid materials from commercial, municipal, industrial, and agricultural activities. Surface water percolating through the waste can dissolve out or leach harmful chemicals that are then carried away from the dumpsites in surface or subsurface runoff which percolates through the soil and reaches the groundwater thus resulting in groundwater pollution. Direct dumping of sewage in s, seas, and lakes results in the accumulation of toxic substances which affects the food chain of birds and animals[12].

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 becomes very essential. Realising the gravity of the issue, Ministry of Environment and Forests (MoEF), Government of India, under a policy decision enacted at The Water (Prevention and Control of Pollution) Act in 1974, to provide prevention and control of water pollution, and for maintaining or restoring of wholesomeness of water in the country. Under the Act, MoEF has established and delegated the powers and functions to CPCB. Further, The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977, to provide the levy and collection of a cess/tax on water consumed by stakeholders operating and carrying out certain types of industrial activities.

National Water Quality Monitoring Program

The Central Pollution Control Board (CPCB) in collaboration with State Pollution Control Board (SPCB) has established a network of monitoring stations on s across the country. Presently, 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 carry out water quality monitoring under the United Nation's, Global Environment Monitoring System (GEMS) Water Programme under 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 basins. Water samples are

[10] A.Agrawal & R.Pandey, *Water Pollution with Special Reference to Pesticide Contamination in India*, 2010
[11] R.Chatterjee, *Municipal Solid waste management in Kohima city*, India, 2010
[12] N.Raman & D.Narayan, *Impact of solid waste effect on groundwater and soil qualitynearer to Pallavaram solid waste landfill site in Chennai*, 2008

being analysed for 28 parameters consisting of physico-chemical and bacteriological parameters for ambient water samples apart from field observations[13].

Monitoring Network

CPCB has established National water quality monitoring programme for monitoring stations across the country. The present network comprises of 2500 stations in 28 states and 6 Union Territories spread over the country.[14]The various water bodies and the corresponding number of monitoring stations under the network of National water quality monitoring programme is represented in Figure No. 2.

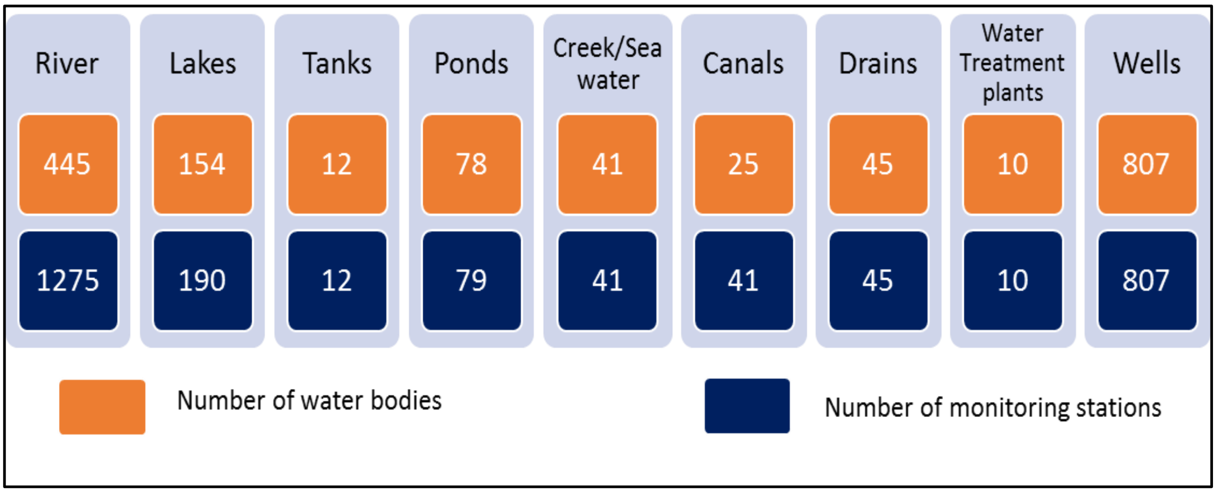


Figure No. 2: National Water Quality Monitoring Programme (NWMP) Network

Source: CPCB Envis

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

[14] CPCB Envis

Water Quality Monitoring in Maharashtra

Located on the west coast of India, Maharashtra is the second state in India in terms of population (11.24 crores)[15] and the third largest in terms of area (30.7Mha).[16]. The total geographical area of the state is divided into 5 basins, namely Godavari, Tapi, Narmada, Krishna and West flowing s of the Konkan region.

In Maharashtra, 55% of the dependable yield is received from four basins (Krishna, Godavari, Tapi and Narmada) whereas remaining 45% of state's water resources is from West Flowing s[17]. The 75% dependable yield from basin in Maharashtra is represented in Figure No. 3. Maharashtra tops the list of Indian states and union territories in terms of infrastructure available for monitoring water quality (Figure No. 4). As per Ministry of Drinking Water and Sanitation, 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.[18]

In Maharashtra, water quality is monitored by various agencies namely Hydrology Project (SW), Groundwater Surveys & Development Agency (GSDA), 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 (Act No.29 of 1986).

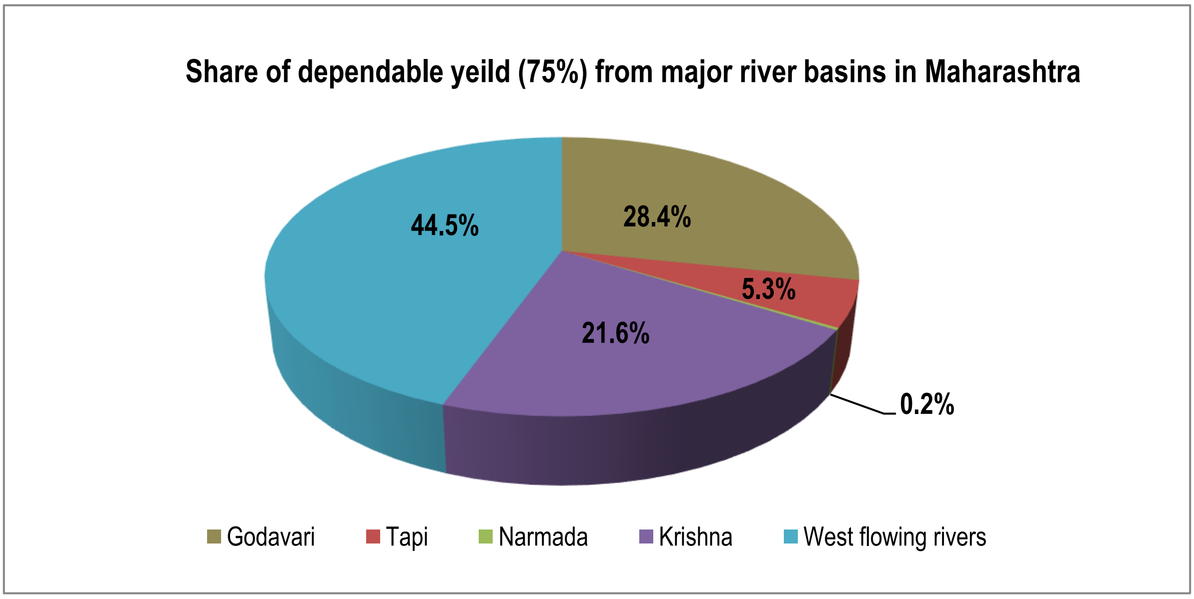


Figure No. 3: Share of dependable yeild (75%) from major basins in Maharashtra

Source: www.mwrra.org

[15] Census 2011
[16] Centre for Technology Alternatives for Rural Areas, Water resources of Maharashtra State
[17] Maharashtra Water Resources Regulatory Authority
[18] Central Pollution Control Board 2011-12, *National Water Monitoring Programme*

Monitoring network in Maharashtra – GEMS and MINARS

The water quality testing under the GEMS and MINARS program under NWMP in Maharashtra is monitored by MPCB (state nodal agency). Monitoring is carried out at 250 station, Table No. 4, (156 are on s, 34 on sea/creek, 10 on nallahs and 50 groundwater), the highest across all states of Maharashtra (Figure No. 4). MPCB has infrastructure to monitor 44 parameters including field observations, general parameters, core parameters and trace metals (Table No. 5). The water samples are monitored with a monthly and six monthly frequency for surface and groundwater stations respectively.

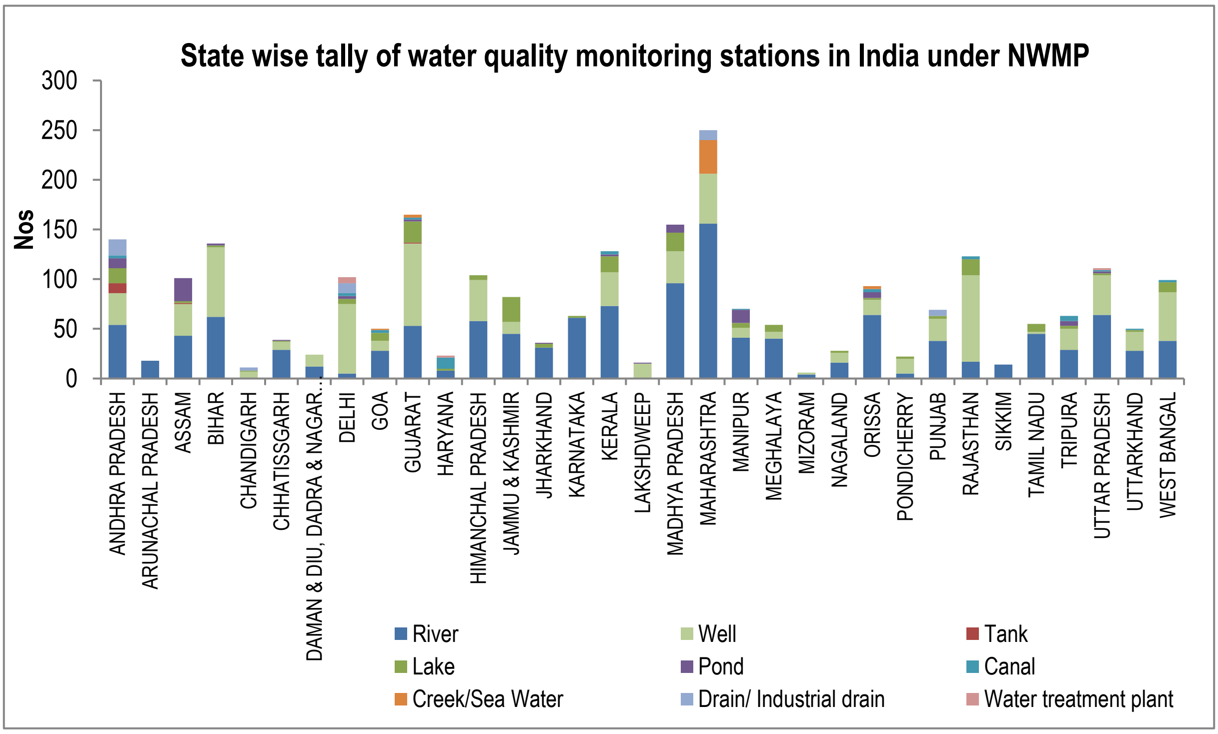


Figure No. 4: State wise tally of water quality monitoring stations in India under NWMP (2011-12)

Data Source: CPCB, 2012

Table No. 4: Basin and water body typewise tally of WQMS in Maharashtra

Water body			**Basin**		
	Tapi	Godavari	Krishna	West Flowing Rivers	**Grand Total**
Rivers	20	59	57	40	**176**
Creek				20	**20**
Sea				16	**16**
Nalla	2	1	1	8	**12**
Dam		2		2	**4**
Bore well	1	10	10	7	**29**
Dug well	1	15	5	11	**32**
Hand pump		1			**1**
Tube well	1				**1**
Well			1	2	**3**
Grand Total	**25**	**88**	**74**	**106**	**294**

Table No. 5: 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		Ammonia-N	Hardness as CaCO3	Iron
8		Fecal Coliform	Calcium CaCO3	Arsenic
9		Total coliform	Magnesium CaCO3	Mercury
10			Sulphate	Cyanide
11			Sodium	
12			Total dissolved solids	
13			Total fixed solids	
14			Total suspended solids	
15			Phosphate	
16			Boron	
17			Potassium	
18			Fluoride	

Methodology

The comprehensive data sets recorded by WQMS across the state were organised basin wise for evaluation for both surface and groundwater quality. The water monitoring stations were further arranged from upstream to downstream in order to study basin wise trend of water quality. The classification of the various rivers, their basins and subbasins considered in this report is presented in Table No. 6. The Water quality index is determined by calculating the basic parameters like pH, BOD (mg/l), DO (mg/l to %) and FC (MPN/100ml). The WQI has been calculated separately for surface water and groundwater water samples using the formula provided by National Sanitation Foundation (NSF) and the relative weights modified by CPCB. To present the data in a spatial format GIS (Geographical Information System) maps were generated.

Table No. 6: Classification of the rivers considered under basins and sub basins in the report

Basin	Sub basins	Name of rivers	Number of WQM stations
Tapi	Tapi Upper	Tapi, Purna, Pedhi	8
	Tapi Middle	Tapi, Girna, Rangavali, Amravati, Bori, Burai, Gomai, Hiwara, Kan, Mor, Panzara, Titur, Waghur, Waghur	17
Godavari 1	Godavari Upper	Godavari, Chikhali nalla, Darna	28
	Godavari Middle	Godavari, Bindusara	14
	Manjra	Godavari, Manjra	2
Godavari 2	Wardha	Wardha, Penganga	17
	Weinganga	Kolar, Kanhan, Wainganga	26
	Pranhita and others	Wainganga	1
Krishna	Bhima Upper	Bhima, Nira, Chandrabhaga, Mutha, Ghod, Indrayani, Pawana, Sina, Vel, Nalla, Mula-Mutha	45
	Krishna Upper	Krishna, Panchganga, Koyna, Urmodi, Venna	29
West Flowing s		Kalu, Ulhas, Patalganga, Bhatsa, Vashishti, Mithi, Kundalika, Savitri, Amba, Kundalik, Muchkundi, Surya, Tansa, Vaitarna, Rabodi nalla, Colour Chem nalla, Sandoz nalla, BPT Navapur, Tarapur MIDC nalla, Pimpal-Paneri nalla	71
Saline			36
Total			**294**

Spatial Maps

Sub -basin level maps

Of the 5 major basin, Narmada basin comprises of just 0.5%[19] 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[20] (Central Ground Water Board), Ministry of Water Resources Government of India. The imageries, for the basins of Tapi, Krishna and Godavari, were downloaded and upon geo-referencing those, the maps were 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 like temperature, dissolved oxygen, pH, conductivity, BOD, COD, and Fecal Coliform and so on were shared by MPCB in soft copy for the years 2008 to 2012. 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 in the spread sheets.

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) for 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 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, USA 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

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

- 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;

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

Where;

Ii= sub index for ith 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 as per CPCB are given in Table No. 7 and the equations used to determine the sub index values are given Table No. 8. 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. 9.

Table No. 7: 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. 8: 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

Table No. 9: Water Quality Classification and Best Designated use

WQI	Quality classification	Class by CPCB	Class by MPCB	Remarks	Colour code
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	

Sample calculation for determining Surface WQI

Parameters considered in the year 2014-15- Biological Oxygen Demand (BOD), Dissolved Oxygen (DO), pH, Fecal Coliform (FC)

Station Name	:	Wainganga at Ashti	Station Code	:	11
Sub basin	:	Pranhita	Basin	:	Godavari
BOD	:	6.9 mg/l	DO	:	5mg/l
FC	:	70 MPN/100 ml	pH	:	8.66

Formula

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

Where;

Ii= sub index for water quality parameter

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

P= number of water quality parameters

Sub index for BOD

BOD value = 6.9 mg/l

Since 6.9 lies in range (0-10), the corresponding formula is used from Table No. 8

Sub Index (BOD) = 96.67 – 7 X (BOD value)

= 96.67 – 7 X 6.9

= 48.37 X Modified Weights by CPCB for BOD (Table No. 7)

= 48.37 X 0.19

= 9.1903

Sub index for Dissolved Oxygen (DO)

DO value = 5 mg/l

DO (saturation %) = 5 /6.5 X 100 [6.5 has been taken as constant as per DO vs temp]

= 76.92308

Since 76.92 lies in range (40-100), the corresponding formula is used from Table No. 8

Sub Index (DO) = (-13.55) + 1.17 X % Saturation DO value

= (-13.55) + 1.17 X 76.92

= 76.4464 X Modified Weights by CPCB for DO (Table No. 7)

= 76.4464* 0.31

= 23.69839

Sub index for Fecal Coliform (FC)

Fecal Coliform value = 70 MPN/100ml

Since 70 lies in range (0-10^3), the corresponding formula is used from Table No. 8

Sub Index (FC) = 97.2 - 26.6 X log FC

= 97.2-26.6 X log 70

= 48.12039 X Modified Weights by CPCB for FC (Table No. 7)

= 48.12039 X 0.28

= 13.47371

Sub Index for pH

pH value = 8.66

Since 8.6 lies in range (7.3-10), the corresponding formula is used from Table No. 8

Sub Index (pH) = 316.96 - 29.85 X (pH)

= 316.96-29.85 X 8.66

= 58.459 X Modified Weights by CPCB for pH (Table No. 7)

= 58.459 X 0.22

= 12.86098

WQI of Wainganga at Ashti

WQI = ∑ (sub –index of all parameters)

= ∑ (9.1903+23.69839+13.47371+12.86098)

= 59

Quality Classification: Medium to Good

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[21]. The relative weights of the same have been determined (

Table No. 10) for the parameters monitored and recorded by MPCB for the water samples monitored in the year 2014-15.These weights indicate the relative harmfulness when present in water. The maximum weight assigned is 5 and minimum is 1.

Table No. 10: Relative Weight of chemical parameters used for calculating WQI for Ground water

Chemical Parameters	**Indian Standards for Drinking Water Quality[22]**		**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

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

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

The maximum weight of 5 has been assigned to the parameter nitrate due to its major importance in water quality while, magnesium is given the minimum weight of 1 as may notbe harmful.

The relative weight is then computed from the following equation

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

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. 11.

Table No. 11: 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	

Sample Calculation for determining Ground WQI

Station name : Bore well at Parvati Industrial Estate, Yadrav, Kolhapur

Station code	: 2004	Sub basin	: Krishna Upper	Basin	: Krishna
Calcium	: 235 mg/l	Chlorides	: 473 mg/l	Fluoride: BDL	
Magnesium	: 925 mg/l	Nitrate	: 0.62 mg/l	Sulphate: 278.5 mg/l	
pH	: 6.9	TDS	: 2166 mg/l	TH	: 1160 mg/l

Formula

$$\text{WQI} = \sum_{i=1}^{n=9} qi.wi$$

Where;

Wi = relative weight

qi = quality rating

wi = relative of each weight

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

Where;

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)

Parameters considered for groundwater monitoring: pH, Total hardness, Calcium, Magnesium, Chloride, Total Dissolved Solids, Fluoride and Sulphate.

*The relative weight (wi) without iron, manganese and Bicarbonate has been considered in calculation.

Sub Index for pH

pH = 6.9

Sub index (pH) = Concentration /Standard X 100

= 6.9/7.5 X 100

= 92 X relative weight (Table No. 10)

= 92 X 0.13333

= 12.26636

Sub index for Total hardness

Total hardness = 1160

Sub index (TH) = Concentration /Standard X 100

= 1160/ 300*100

= 386.6667 X relative weight (Table No. 10)

= 386.667 X 0.06667

= 25.77907

Sub index Calcium

Calcium = 235

Sub index (Calcium) = Concentration /Standard *100

= 235/ 75 X 100

= 313.3333 X relative weight (Table No. 10)

= 313.3333 X 0.0666

= 20.88993

Sub index for Chloride

Chloride = 473

Sub index (Chloride) = Concentration /Standard X 100

= 473/ 250 X 100

= 189.2 X relative weight (Table No. 10)

= 189.2 X 0.1

= 18.92

Sub index for Fluoride

Fluoride = 0

Sub index (Fluoride) = Concentration /Standard X 100

= 0/ 1 X 100

= 0 X relative weight (Table No. 10)

= 0 X 0.1333

= 0

Sub index for Magnesium

Magnesium = 925

Sub index (Mg) = Concentration/ Standard X 100

= 925/ 30*100

= 3083.333 X relative weight (Table No. 10)

= 3083.333 X 0.06667

= 205.5658

Sub index for Nitrate

Nitrate = 0.62

Sub index (Nitrate) = Concentration/ Standard X 100

= 0.62/45 *100

= 1.377778 X relative weight (Table No. 10)

= 1.377778 X 0.16667

= 0.229634

Sub index for Sulphate

Sulphate = 278.5

Sub index (Sulphate) = Concentration/ Standard X 100

= 278.5/ 200 X 100

= 139.25 X relative weight (Table No. 10)

= 139.25 X 0.13333

= 18.5662

Total Dissolved Solids

Total Dissolved Solids= 2166

Sub index (TDS) = Concentration/ Standard X 100

= 2166/ 500 X 100

= 433.2 X relative weight (Table No. 10)

= 433.2 X 0.13333

= 57.75856

WQI of Bore well at Parvati Industrial Estate, Yadrav, Kolhapur

WQI = ∑ (sub –index of all parameters)

= ∑ (12.26636 + 25.77907 + 20.88993+ 18.92 + 0+ 205.5658 + 0.229634+ 18.5662 + 57.75856)

= 360

Quality Classification: Water Unsuitable for drinking

Surface Water Quality

Surface water is available in the form of s, lakes, ponds, canals and so on. However, s comprise the most important source of surface water. The surface water resources potential of India, is about 1869 Billion Cubic Meters (BCM). Due to various topographical constraints and uneven distribution over space and time, only about 690 BCM of surface water and 431 BCM of ground water can be used.[23] It has been estimated that due to increase in population between 2001 and 2011 in India, the per capita availability of water resources has reduced from 1,816 cubic meter to 1,544 cubic meter.[24] The stress on water resources is increasing rapidly due to the pressure from urbanization and industrialization. The pollution of water resources caused by discharge of sewage and industrial effluents in water bodies further deteriorate quality of water.

In order to have contionous vigilance check on water quality across the state, MPCB has installed WQMS (Water Quality Monitoring Stations) across the state. The total WQMS for year 2015-16 are represented in the Table No. 12. Water quality is monitored per month across all the stations. The spatial presence of the stations is presented basin wise in the respective sections.

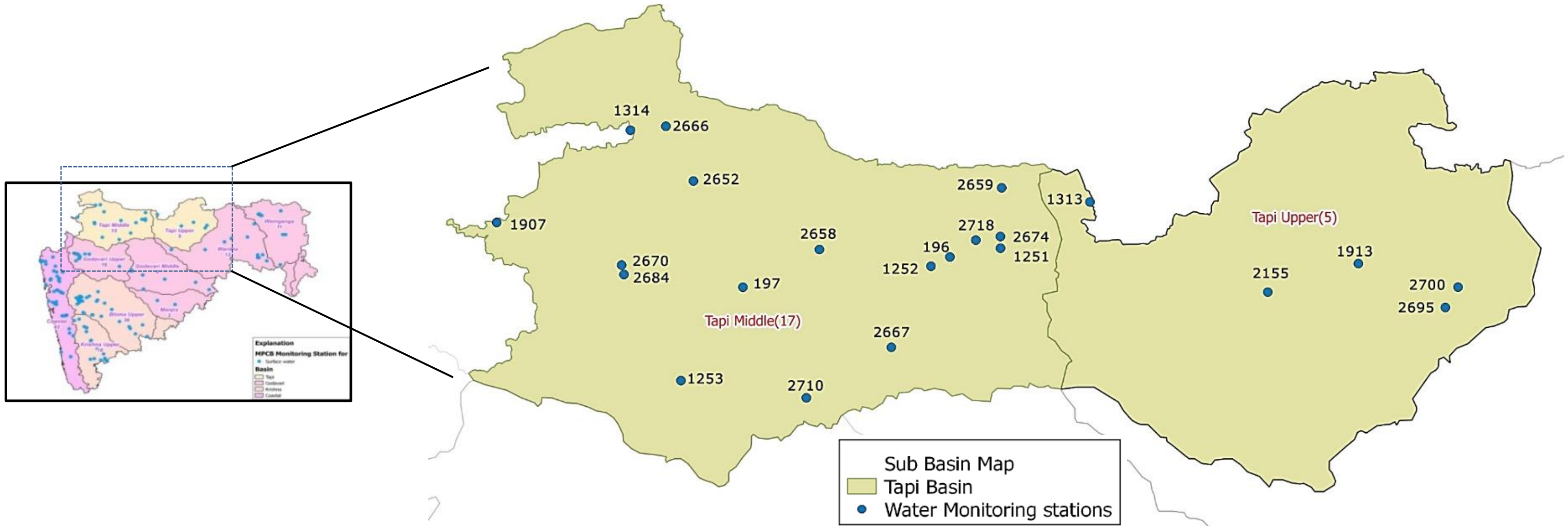
Table No. 12: List of monitoring stations across different type of water bodies under MPCB

Water Quality monitoring stations	
Water Bodies	**2015-16**
Rivers	176
Sea and Creek	36
Nalla	12
Dams	4
Borewell	29
Dug well	32
Hand pump	1
Tube well	1
Well	3
Total	**294**

The following section presents the illustrations of the parameters pH, DO, BOD and FC recorded across the 229 surface water quality monitoring 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.

[23] Central Water Comission,*Annual Report 2013-14*
24 Central Water Comission,*Water and related statistics*

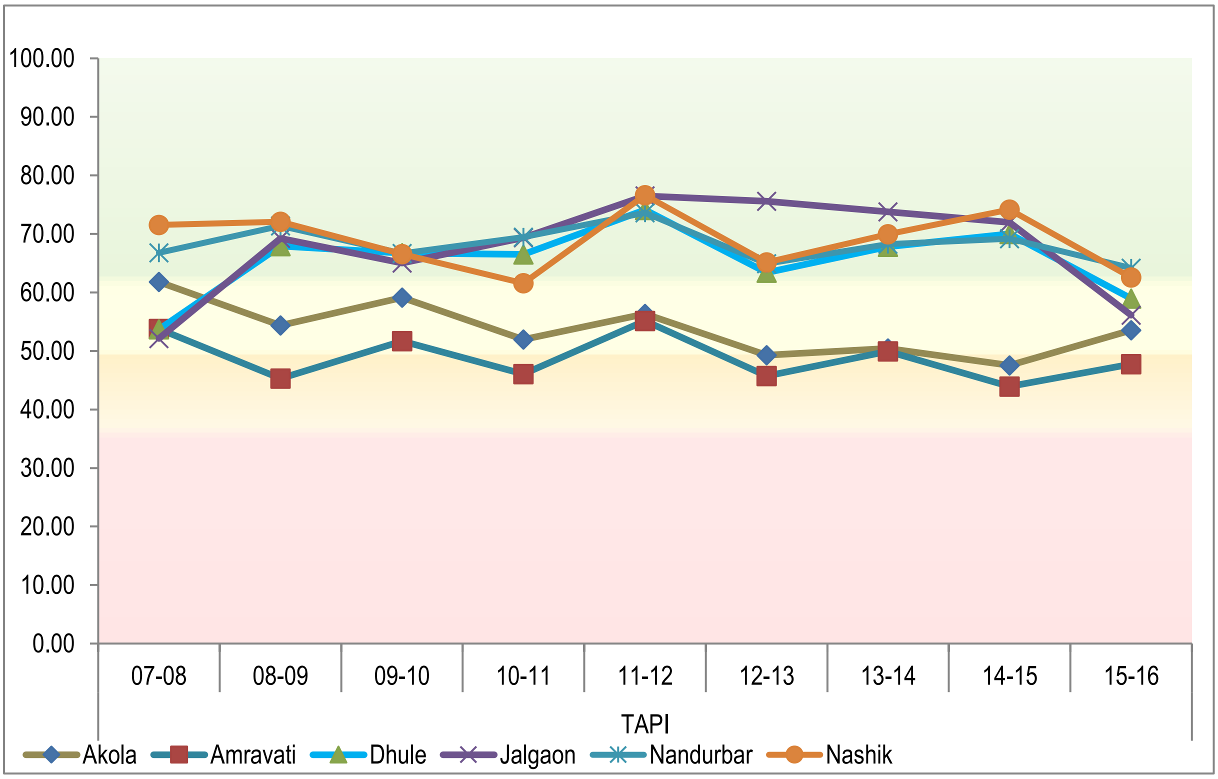
Tapi Basin



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 22 surface water monitoring stations (5 on upper and 17 on middle) in Tapi basin in Maharashtra. A list of the station and the codes has been provided below in Table No. 13.

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. 5: 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 s in that district.

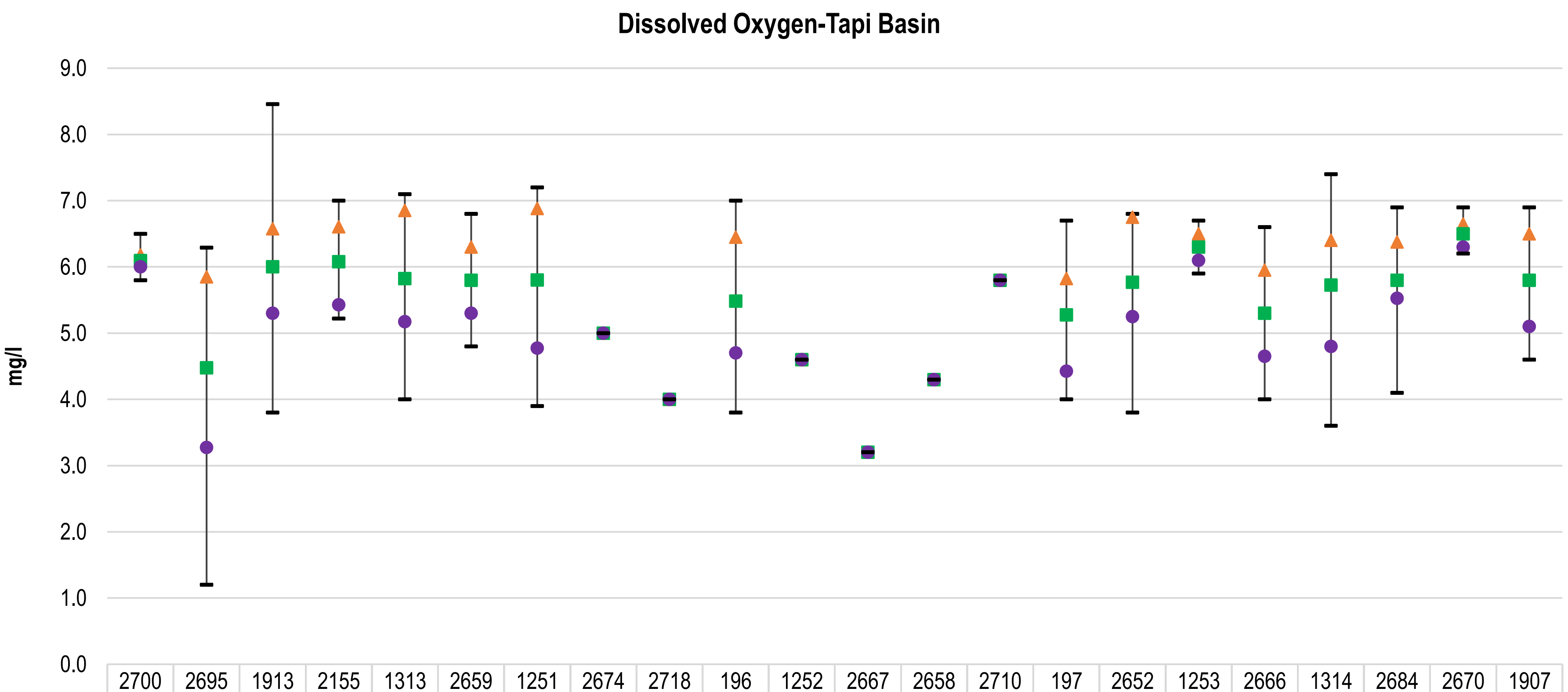
Figure No. 6: Trend of average occurrence for different category of WQI in Tapi basin

The Intra basin performance of Tapi Basin across six districts of the state is depicted in Figure No. 5 and the average annual occurrence of different category of Water Quality Index across all WQMS in Tapi basin is depicted in the Figure No. 6.

It is observed that among six districts, namely Akola, Amravati, Dhule, Jalgaon, Nandurbar and Nashik, the annual average WQI of Amravati and Akola were consistently in Bad to Medium category (i.e. WQI in range of 38-63) from 07-08 till 14-15. This year in 2015–16 both the districts have registered improvement in the over all water quality.

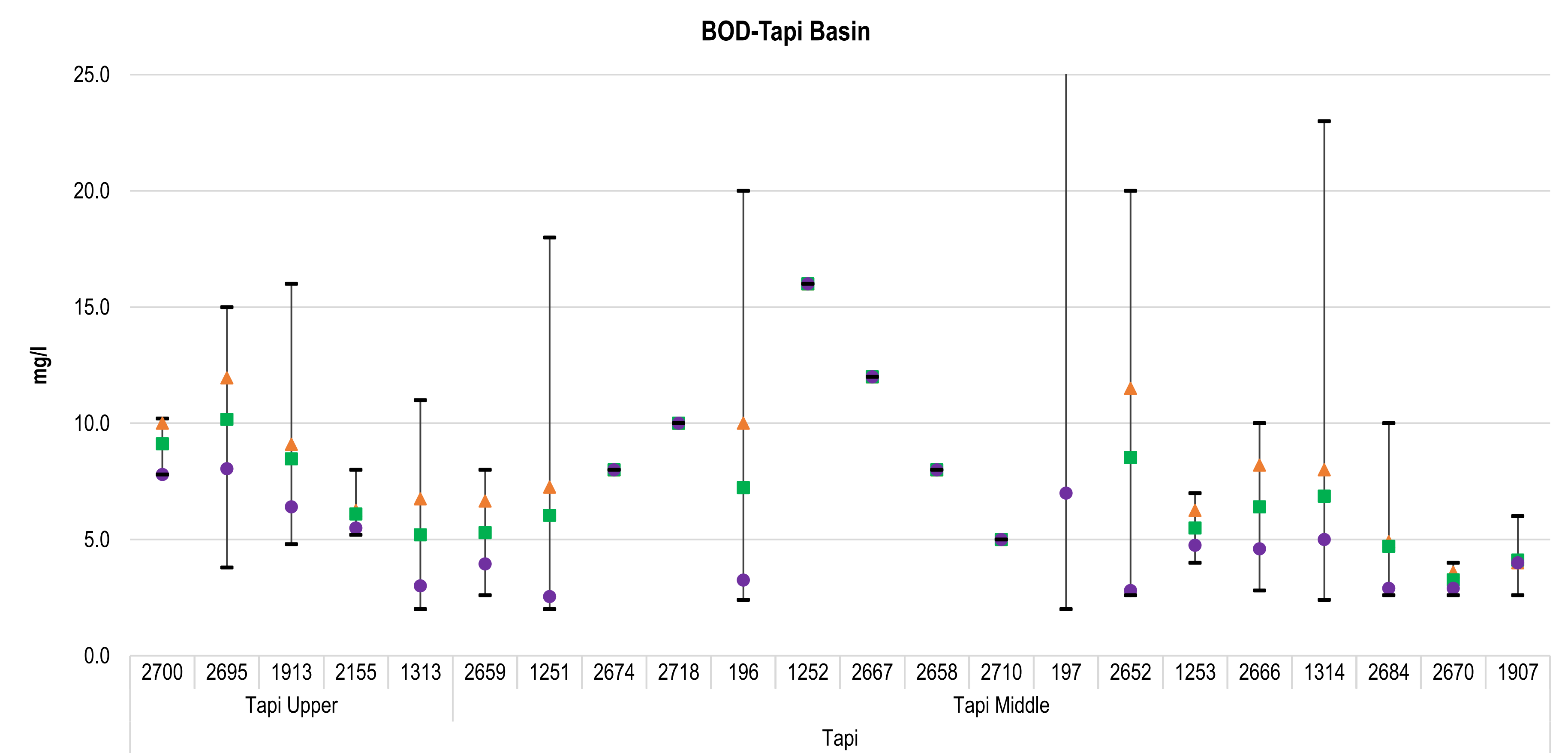
Dhule, Jalgaon, Nandurbar and Nashik belong in the Medium to Good category (i.e. WQI in range of 50-63). But a decrease could be recorded in all these 4 stations this year which indicates deterioration in the water quality at these stations.

The Tapi basin has 8 WQMS in Tapi Upper and 15 WQMS in Tapi Middle. From Figure No. 6, it can be noted that more 50% of the observations in Tapi Middle were recorded to be in the dry and no data category while only 20% of the observations in Tapi Upper were recorded as Dry, Not collected and No Data categories. This could be attributed to lack of rainfall this year which has lead to the drying of rivers. The occurrence of "Medium to Good" and "Bad" categories of WQI are more than double in the Tapi Upper compared to Tapi Middle. This indicates that the water quality in Tapi Upper is better compared to Tapi Middle.



	Tapi																					
	Tapi Upper					Tapi Middle																
	2700	2695	1913	2155	1313	2659	1251	2674	2718	196	1252	2667	2658	2710	197	2652	1253	2666	1314	2684	2670	1907
Max	6.5	6.3	8.5	7.0	7.1	6.8	7.2	5.0	4.0	7.0	4.6	3.2	4.3	5.8	6.7	6.8	6.7	6.6	7.4	6.9	6.9	6.9
75 Perc	6.2	5.9	6.6	6.6	6.9	6.3	6.9	5.0	4.0	6.5	4.6	3.2	4.3	5.8	5.8	6.8	6.5	6.0	6.4	6.4	6.7	6.5
Avg	6.1	4.5	6.0	6.1	5.8	5.8	5.8	5.0	4.0	5.5	4.6	3.2	4.3	5.8	5.3	5.8	6.3	5.3	5.7	5.8	6.5	5.8
25 Perc	6.0	3.3	5.3	5.4	5.2	5.3	4.8	5.0	4.0	4.7	4.6	3.2	4.3	5.8	4.4	5.3	6.1	4.7	4.8	5.5	6.3	5.1
Min	5.8	1.2	3.8	5.2	4.0	4.8	3.9	5.0	4.0	3.8	4.6	3.2	4.3	5.8	4.0	3.8	5.9	4.0	3.6	4.1	6.2	4.6

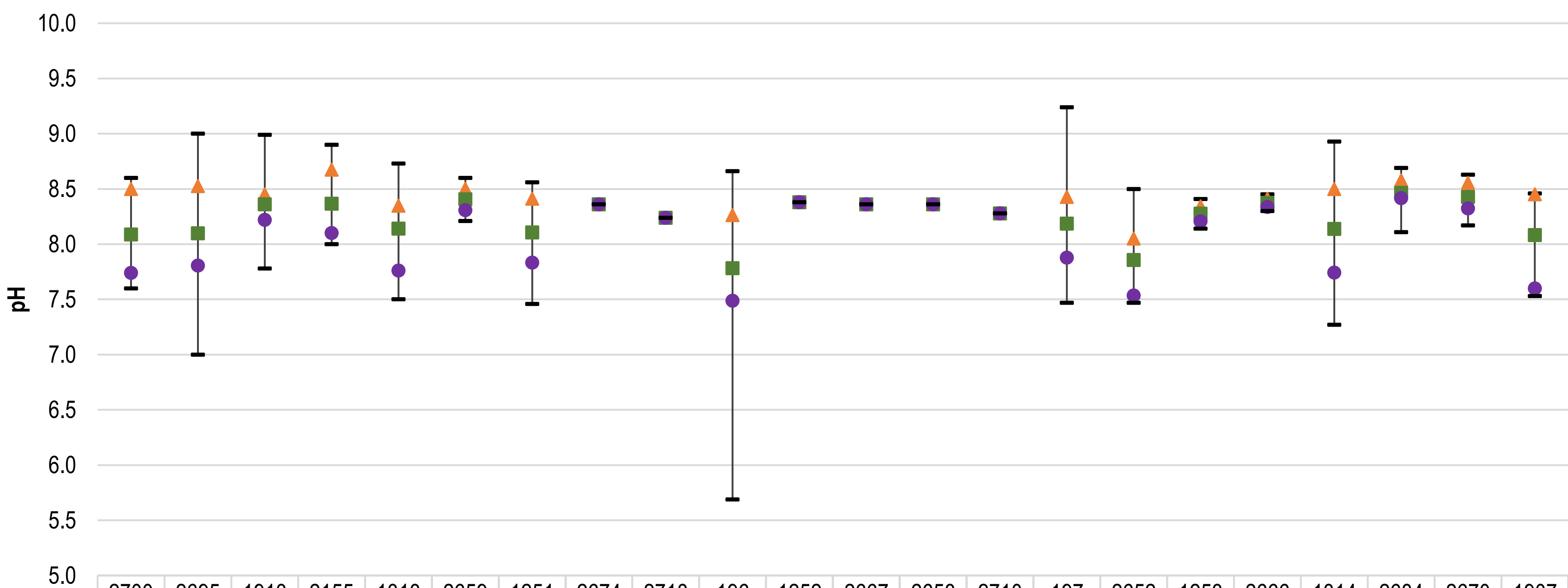
Figure No. 7: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Tapi basin



Tapi	Tapi Upper					Tapi Middle																
	2700	2695	1913	2155	1313	2659	1251	2674	2718	196	1252	2667	2658	2710	197	2652	1253	2666	1314	2684	2670	1907
Max	10.2	15.0	16.0	8.0	11.0	8.0	18.0	8.0	10.0	20.0	16.0	12.0	8.0	5.0	90.0	20.0	7.0	10.0	23.0	10.0	4.0	6.0
75 Perc	10.0	12.0	9.1	6.3	6.8	6.7	7.3	8.0	10.0	10.0	16.0	12.0	8.0	5.0	42.5	11.5	6.3	8.2	8.0	4.9	3.6	4.0
Avg	9.1	10.2	8.5	6.1	5.2	5.3	6.0	8.0	10.0	7.2	16.0	12.0	8.0	5.0	27.5	8.5	5.5	6.4	6.9	4.7	3.3	4.1
25 Perc	7.8	8.1	6.4	5.5	3.0	4.0	2.6	8.0	10.0	3.3	16.0	12.0	8.0	5.0	7.0	2.8	4.8	4.6	5.0	2.9	2.9	4.0
Min	7.8	3.8	4.8	5.2	2.0	2.6	2.0	8.0	10.0	2.4	16.0	12.0	8.0	5.0	2.0	2.6	4.0	2.8	2.4	2.6	2.6	2.6

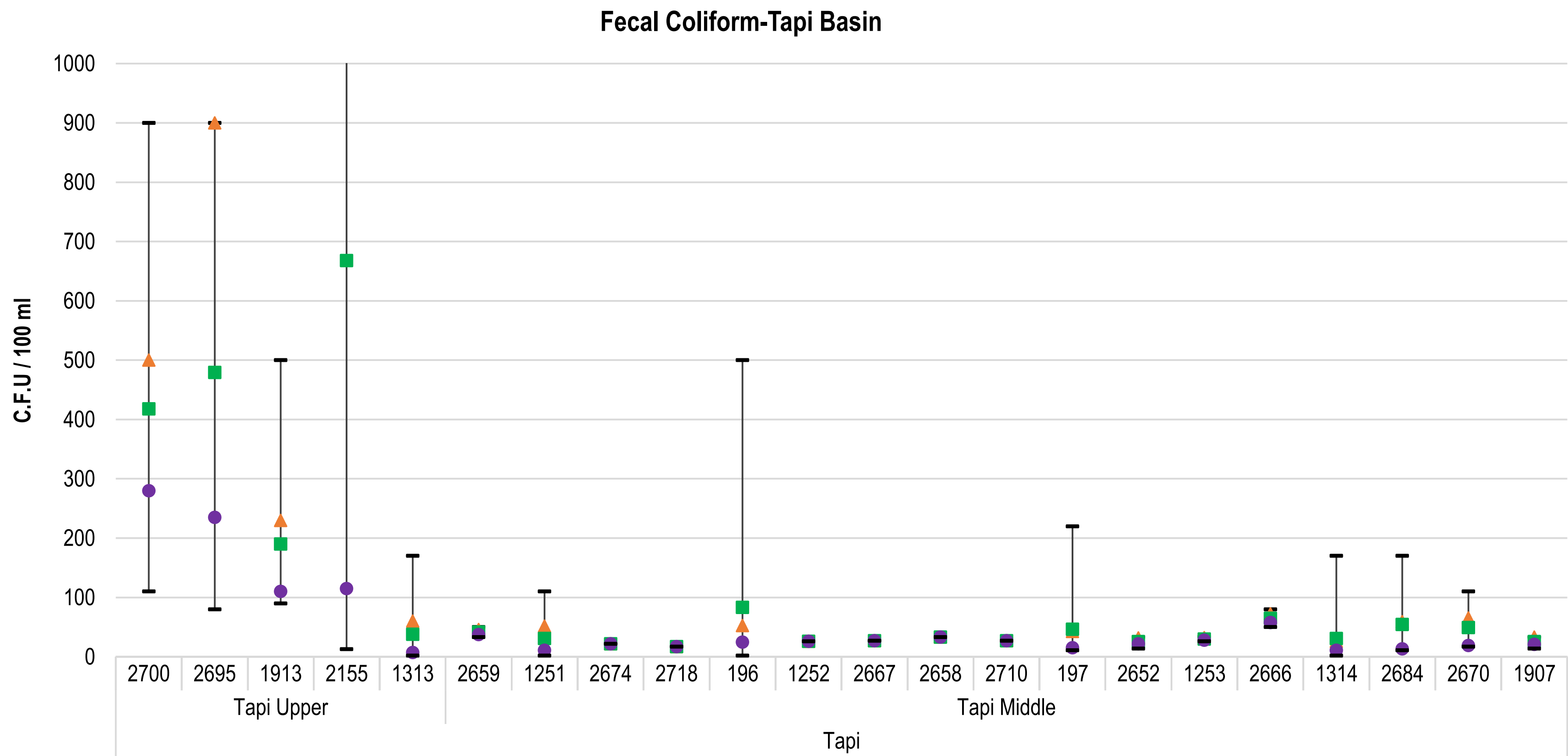
Figure No. 8: Trend of BOD levels recorded at WQMS at Tapi basin

pH-Tapi Basin



	Tapi Upper					Tapi Middle																
	2700	2695	1913	2155	1313	2659	1251	2674	2718	196	1252	2667	2658	2710	197	2652	1253	2666	1314	2684	2670	1907
	Tapi																					
Max	8.6	9.0	9.0	8.9	8.7	8.6	8.6	8.4	8.2	8.7	8.4	8.4	8.4	8.3	9.2	8.5	8.4	8.5	8.9	8.7	8.6	8.5
75 Perc	8.5	8.5	8.5	8.7	8.3	8.5	8.4	8.4	8.2	8.3	8.4	8.4	8.4	8.3	8.4	8.1	8.3	8.4	8.5	8.6	8.6	8.5
Avg	8.1	8.1	8.4	8.4	8.1	8.4	8.1	8.4	8.2	7.8	8.4	8.4	8.4	8.3	8.2	7.9	8.3	8.4	8.1	8.5	8.4	8.1
25 Perc	7.7	7.8	8.2	8.1	7.8	8.3	7.8	8.4	8.2	7.5	8.4	8.4	8.4	8.3	7.9	7.5	8.2	8.3	7.7	8.4	8.3	7.6
Min	7.6	7.0	7.8	8.0	7.5	8.2	7.5	8.4	8.2	5.7	8.4	8.4	8.4	8.3	7.5	7.5	8.1	8.3	7.3	8.1	8.2	7.5

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



	2700	2695	1913	2155	1313	2659	1251	2674	2718	196	1252	2667	2658	2710	197	2652	1253	2666	1314	2684	2670	1907
Max	900	900	500	1600	170	50	110	22	17	500	26	27	33	27	220	33	34	80	170	170	110	33
75 Perc	500	900	230	1600	60	45.75	51.5	22	17	52.5	26	27	33	27	42.5	31.5	32	72.5	26	59	65.5	33
Avg	418	479.17	190	667.88	37.667	41.5	30.75	22	17	83.417	26	27	33	27	46.5	25.667	30	65	30.917	54.25	49.333	25.4
25 Perc	280.0	235.0	110.0	115.0	7.3	37.3	11.0	22.0	17.0	24.8	26.0	27.0	33.0	27.0	15.0	22.0	28.0	57.5	11.0	13.3	19.0	21.0
Min	110	80	90	13	2	33	2	22	17	2	26	27	33	27	11	14	26	50	2	11	17	14

Figure No. 10: Trend of Fecal Coliform levels recorded at WQMS at Tapi basin

Water Quality Index for WQMS in Tapi Basin

Apr		38	46	49	55		56			39					49		.		60			
May	.	35	44	.	53		59			52					27		.		46			
Jun		45	44		58		62			65					41		.		58			
Jul	50	45	50	55	67	67	68			63					67	72	.	64	69	61	63	68
Aug	52	51	59	56	50	52	48	56	51	50	50	46	52	62	65	66	58	47	53	49	63	62
Sep	46	46	55	56	52	.	52	.	.	49	.	.	.	.	54	54	.	.	67	.	.	62
Oct	55	51	56	52	62	.	65	.	.	62	.	.	.	.	63	.	67	.	71	68	68	71
Nov	49	45	49	67	69		66			57	.				34		.		58	66		61
Dec		48	53	48	79		64			67					47		.		54			
Jan		36	70	48	75		77			67					71		.		75			
Feb		43	61		78		79			55					39		.		73			
Mar		56			80		81			79					36		.		78			
Station code	2700	2695	1913	2155	1313	2659	1251	2674	2718	196	1252	2667	2658	2710	197	2652	1253	2666	1314	2684	2670	1907
Sub -Basin	Tapi Upper					Tapi Middle																

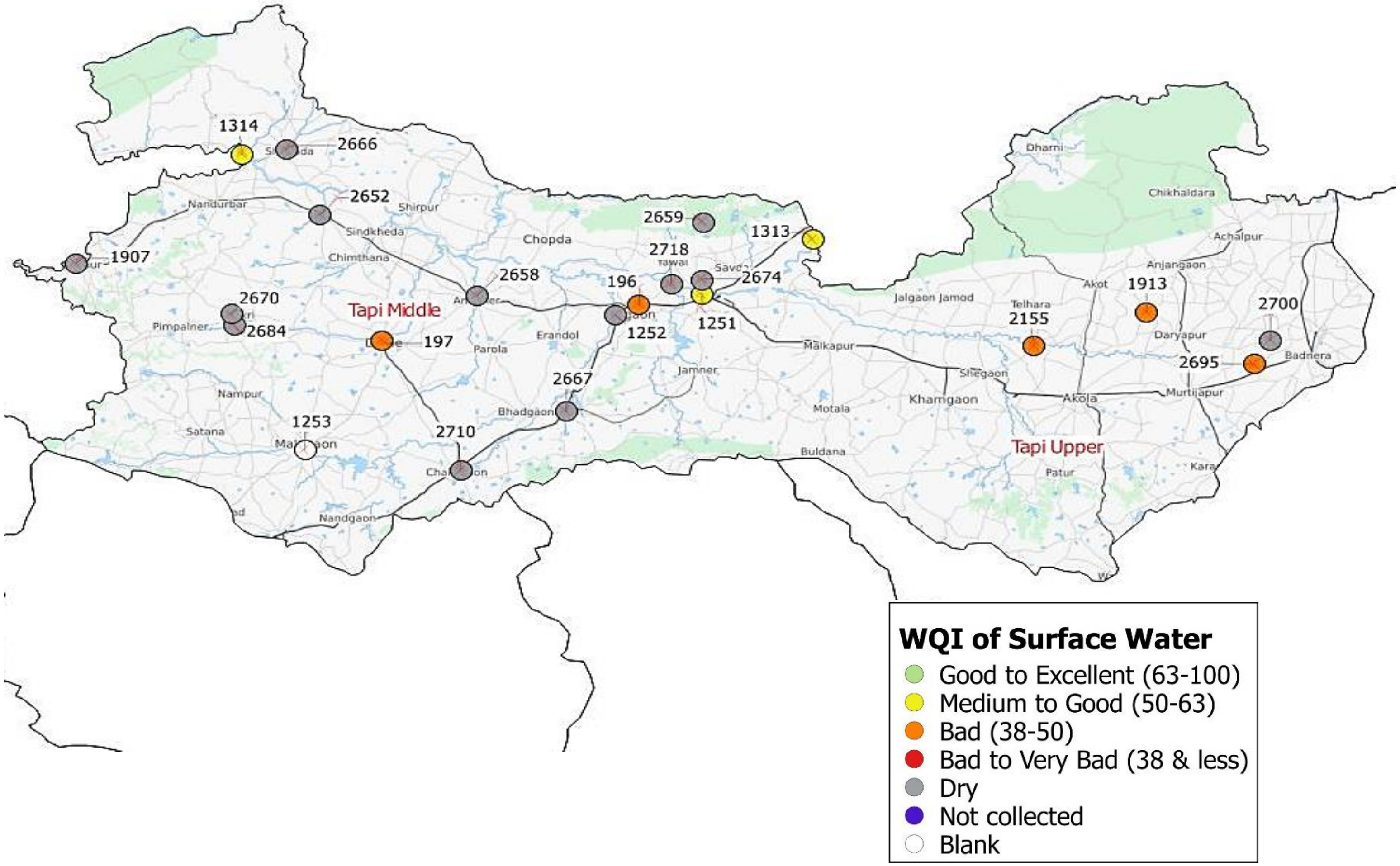
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

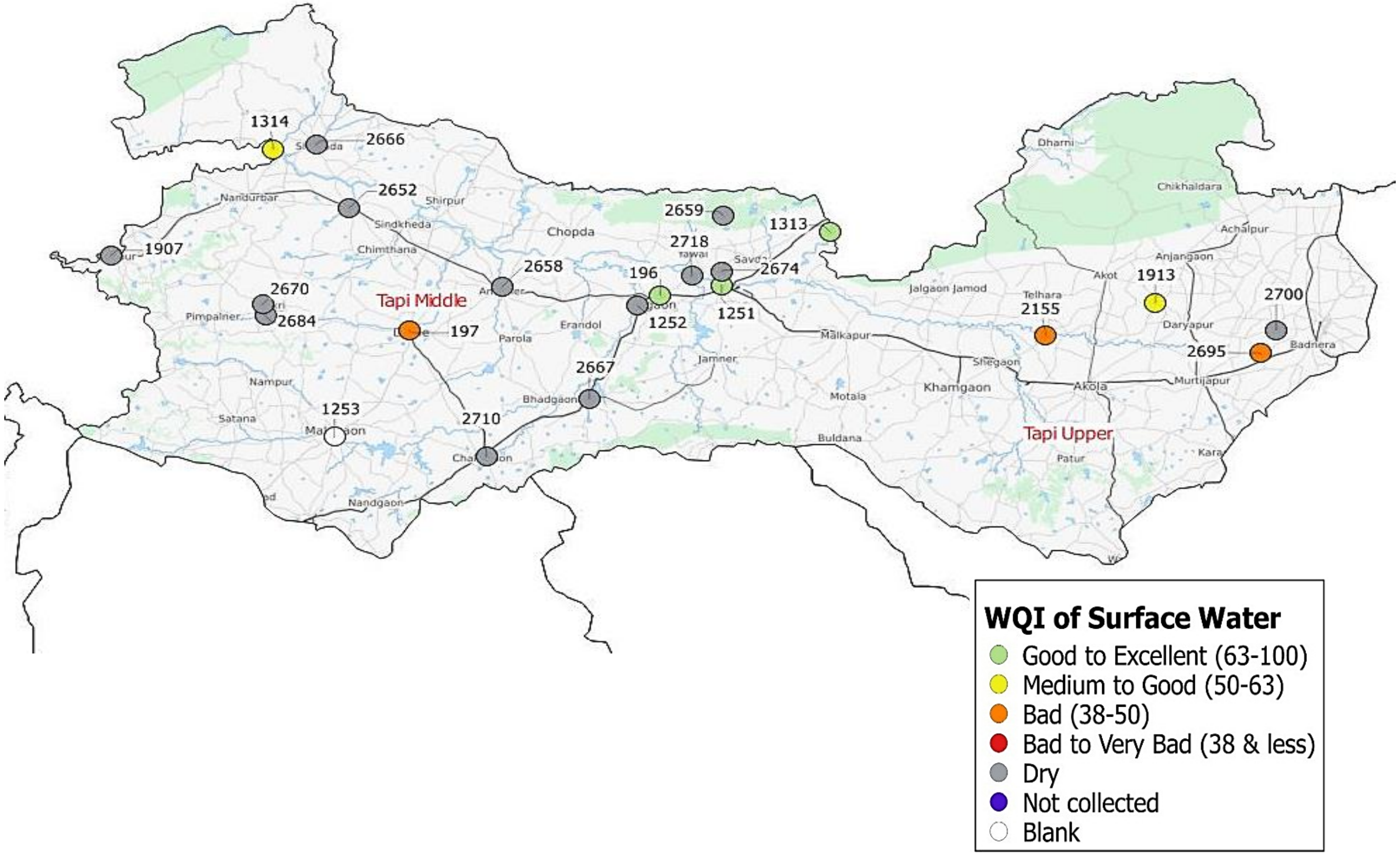
Table No. 13: Surface water quality monitoring stations in Tapi basin

Program	Station ID	River/nalla	Station Name	Village	Taluka	District
NWMP	2700	Purna	Purna near Achalpur-Amravati Road Bridge, Asegaon	Asegaon	Chandur bazaar	Amravati
NWMP	2695	Pedhi	Pedhi near Road Bridge at Dadhi-Pedhi village	Asegaon	Chandur Bazar	Amravati
NWMP	1913	Purna	Purna at Dhupeshwar at U/s of Malkapur Water works	Malkapur	Akola	Akola
NWMP	2155	Purna	Purna at D/s of confluence of Morna & Purna at Andhura village	Andura	Balapur	Akola
NWMP	1313	Tapi	Tapi at Ajnad	Ajnad	Raver	Jalgaon
NWMP	2659	Burai	Burai before confluece to Tapi	Mukudas	Dhule	Dhule
NWMP	1251	Tapi	Tapi at Bhusawal	Bhusawal Railway Colony	Bhusawal	Jalgaon
NWMP	2674	Mor	Mor near Padalshe	Padalashe	Jalgaon	Jalgaon
NWMP	2718	Waghur	Waghur at Sakegaon before Confluence with Tapi	Sakegaon	Jalgaon	Jalgaon
SWMP	196	Nalla	Lowki Nalla At Khedi, Taluka & District - Jalgaon	Khedi	Khedi	Jalgaon
NWMP	1252	Girna	Girna at Jalgaon at intake of Girna pump house	Girna pump house area	Jalgaon	Jalgaon
NWMP	2667	Hiwara	Hiwara D/s of Pachora	Pachora	Jalgaon	Jalgaon
NWMP	2658	Bori	Bori D/s of Amalner	Amalner	Jalgaon	Jalgaon
NWMP	2710	Titur	Titur D/s of Chalisgaon	Chalisgaon	Jalgaon	Jalgaon
SWMP	197	Nalla	Moti Nalla before Confluence with Panjara Dhule, Taluka & District - Dhule	Dhule	Dhule	Dhule
NWMP	2652	Amravati	Amravati D/s of Dondaicha	Dondaicha	Dhule	Dhule
NWMP	1253	Girna	Girna at Malegaon at Malegaon road bridge	Malegaon	Malegaon	Nashik
NWMP	2666	Gomai	Gomai D/s of Shahada	Shahada	Dhule	Dhule
NWMP	1314	Tapi	Tapi at Ubad village near Gujrat border	Ubad	Shahada	Nandurbar
NWMP	2684	Panzara	Panzara near Panzarakan SSK Ltd	Panzare	Dhule	Dhule
NWMP	2670	Kan	Kan near Sakri water works	Sakri	Dhule	Dhule
NWMP	1907	Rangavali	Rangavali at D/s of Navapur near Rangavali bridge	Navapur	Navapur	Nandurbar

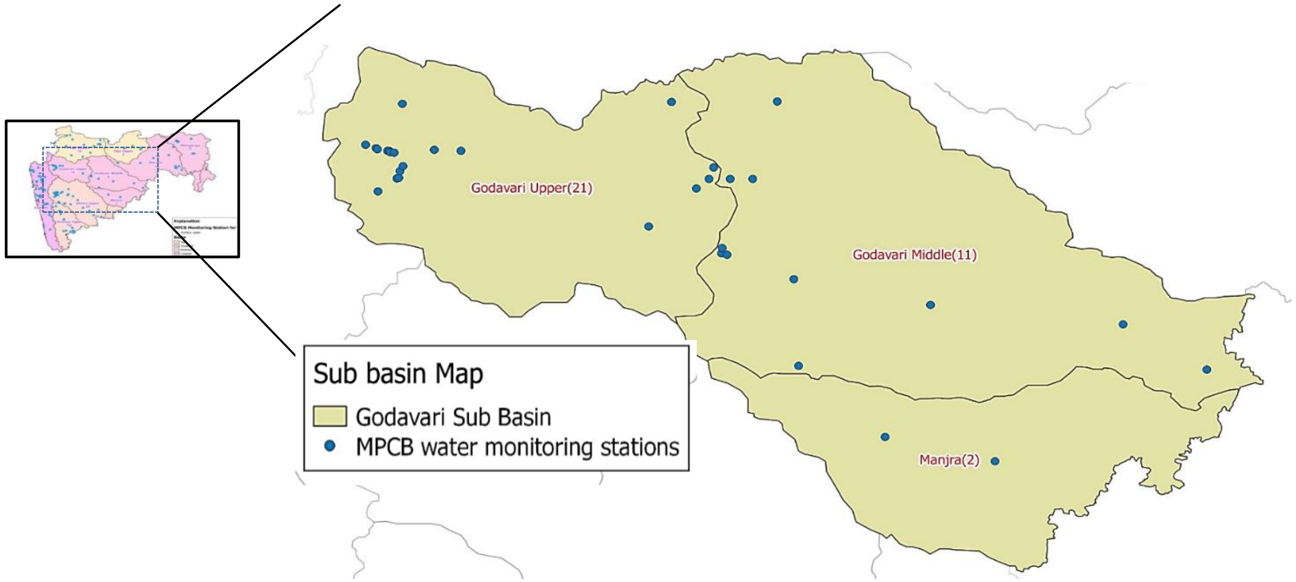
Spatial map of Surface WQI at Tapi Basin (April -2015)



Spatial map of Surface WQI at Tapi Basin (December-2015)



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

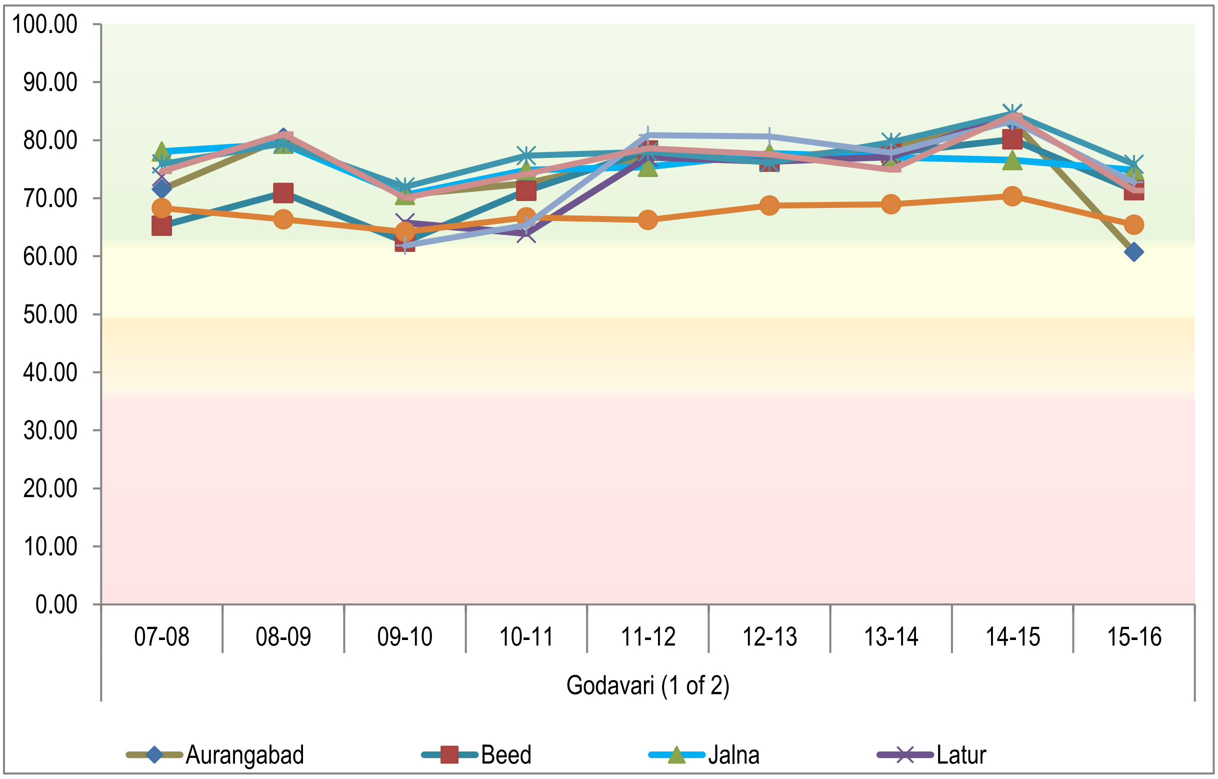


Map No. 4: Network of surface water quality monitoring stations in Godavari basin 1 of 2 –Godavari upper, Godavari middle and Manjra Sub basin

The Godavari basin passes through six states (third largest basin in India) and drains about 10% of the total geographical area of the country[25]. Approximately 50 percent of the catchment area comes under the state of 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 34 surface water monitoring stations (21 on upper, 11 on middle and 2 on Manjra). A list of the station and the codeshas been provided below.In basin 2 there are a total of 29 surface water monitoring stations (12 on Wardha, 16 on Weinganga and 1 on Pranhita). A list of stations and codes has been provided below in Table No. 15.

[25] 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. 11: 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 s in that district

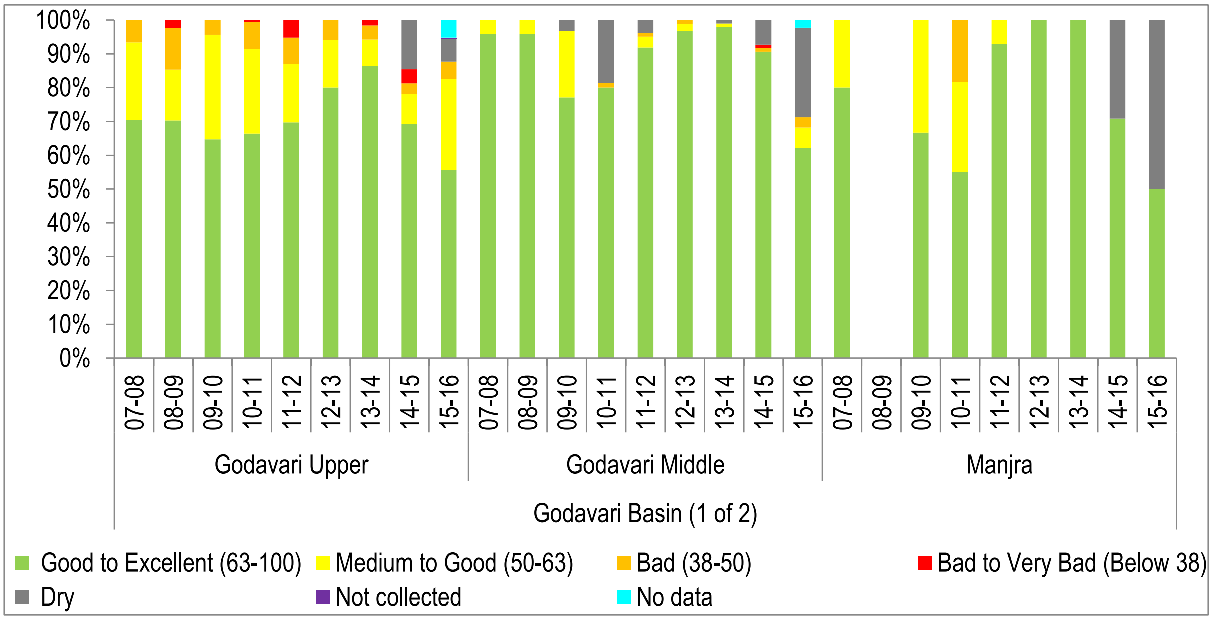
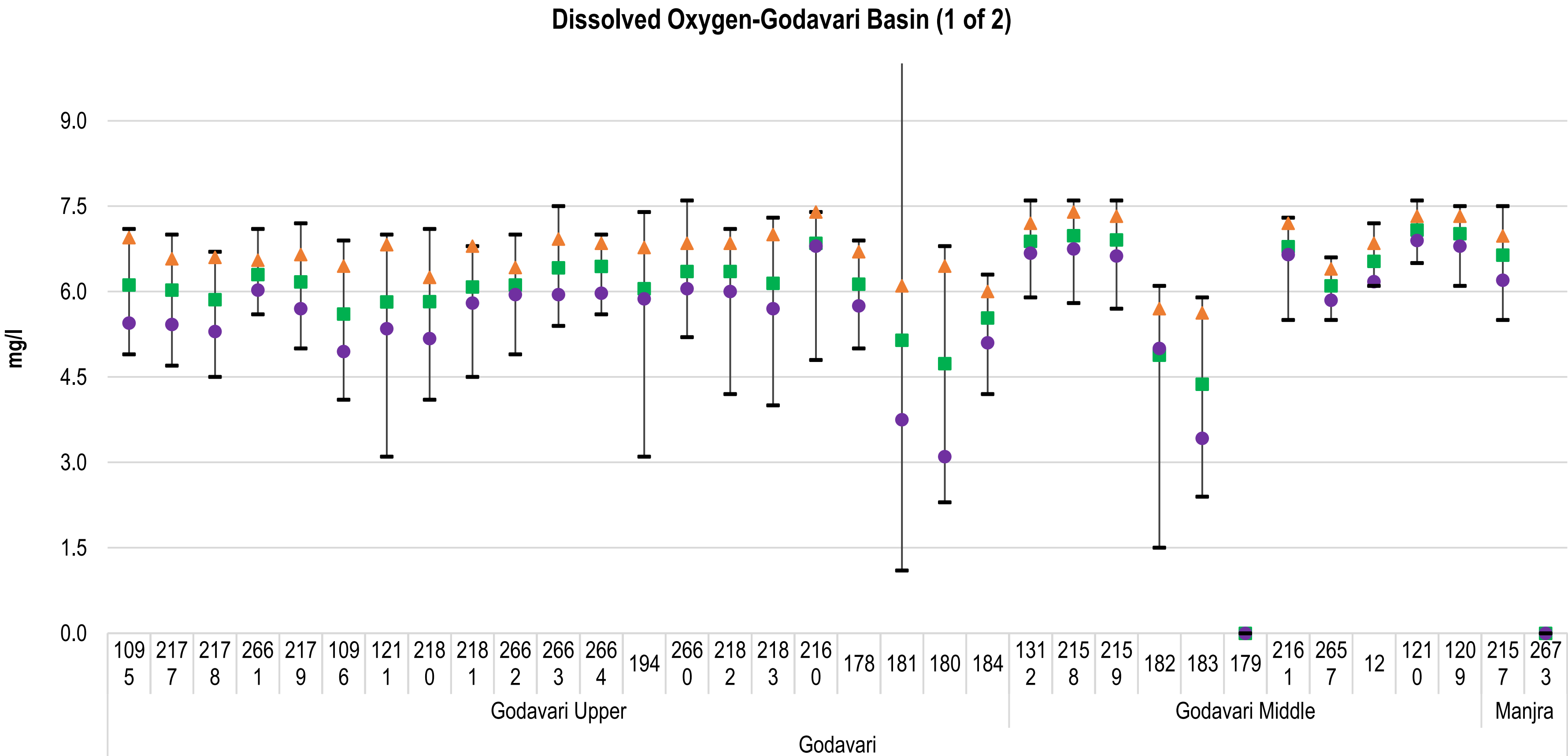


Figure No. 12: Trend of average occurrence for different category of WQI in Godavari basin (1 of 2)

The intra basin performance of Godavari (1 of 2) and the average occurrence of different category of WQI across all WQMS is depicted in Figure No. 11 and Figure No. 12 respectively.

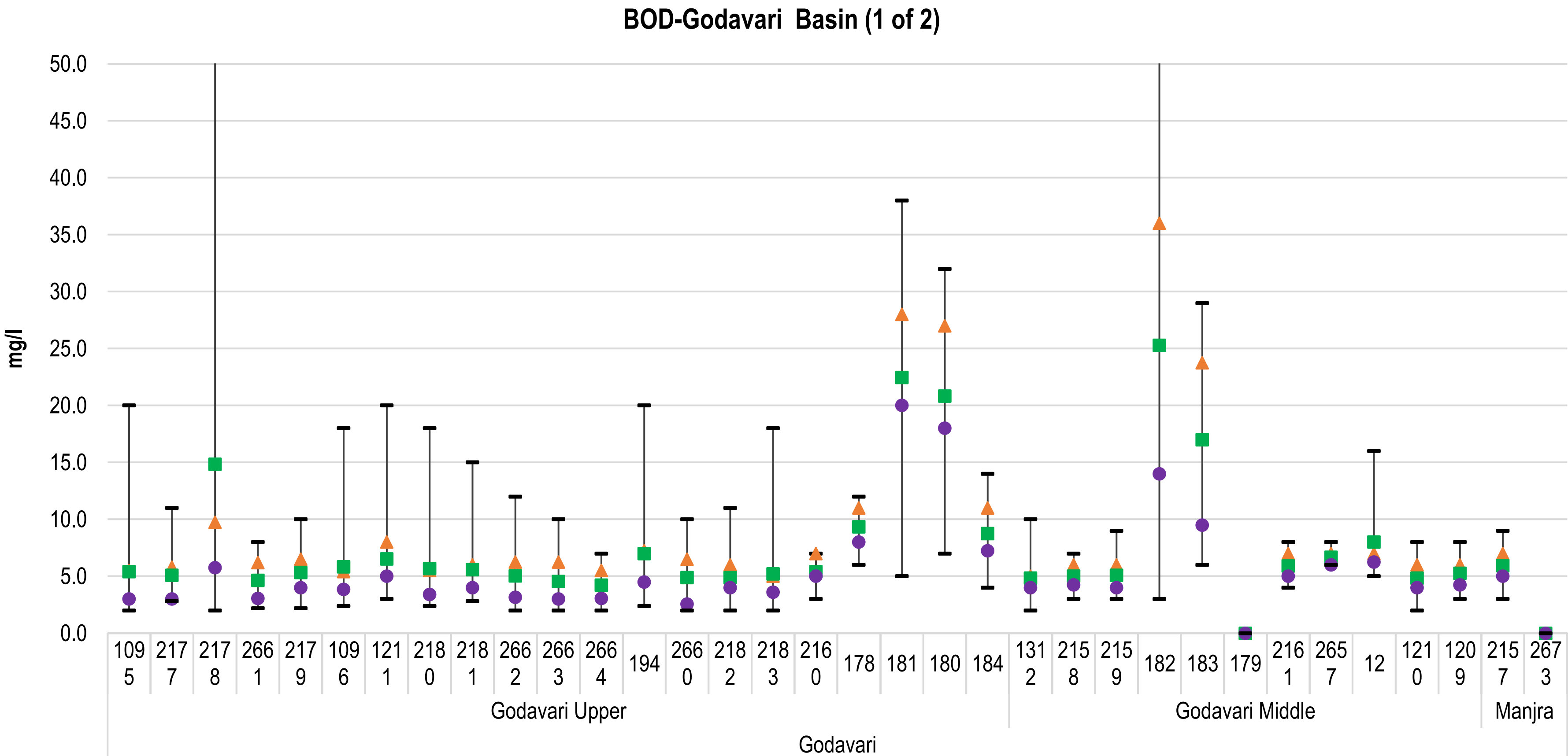
It is observed that the annual average WQI across major districts of Godavari basin (1 of 2) namely - Beed, Jalna, Latur, Nanded, Nashik, Osmanabad and Parbhani are in Good to excellent category (63-100) except for Aurangabad. The WQI of Aurangabad was found to decrease this year from Good to Excellent to Good to Medium category (50-63). Irrespective of the fact that majority of the indices for districts belong in the Good to Excellent category, a slight decrease could be observed this year which indicates a slight deterioration in the water quality.

Figure No. 12 shows average annual occurrence of WQI across 23 WQM stations of Godavari Upper, 11 WQMS of Godavari Middle and 2 WQMS of Manjra sub basins for last 8 years. Intra basin graphs shows that the occurrence of Good to Excellent category of WQI in Godavari Middle is higher as compared to Godavari Upper and Manjra sub basin.



	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
Max	7.1	7.0	6.7	7.1	7.2	6.9	7.0	7.1	6.8	7.0	7.5	7.0	7.4	7.6	7.1	7.3	7.4	6.9	12.0	6.8	6.3	7.6	7.6	7.6	6.1	5.9	0.0	7.3	6.6	7.2	7.6	7.5	7.5	0.0
75 Perc	7.0	6.6	6.6	6.6	6.7	6.5	6.8	6.3	6.8	6.4	6.9	6.9	6.8	6.9	6.9	7.0	7.4	6.7	6.1	6.5	6.0	7.2	7.4	7.3	5.7	5.6	0.0	7.2	6.4	6.9	7.3	7.3	7.0	0.0
Avg	6.1	6.0	5.9	6.3	6.2	5.6	5.8	5.8	6.1	6.1	6.4	6.4	6.1	6.4	6.4	6.1	6.9	6.1	5.1	4.7	5.5	6.9	7.0	6.9	4.9	4.4	0.0	6.8	6.1	6.5	7.1	7.0	6.6	0.0
25 Perc	5.5	5.4	5.3	6.0	5.7	5.0	5.4	5.2	5.8	6.0	6.0	6.0	5.9	6.1	6.0	5.7	6.8	5.8	3.8	3.1	5.1	6.7	6.8	6.6	5.0	3.4	0.0	6.7	5.9	6.2	6.9	6.8	6.2	0.0
Min	4.9	4.7	4.5	5.6	5.0	4.1	3.1	4.1	4.5	4.9	5.4	5.6	3.1	5.2	4.2	4.0	4.8	5.0	1.1	2.3	4.2	5.9	5.8	5.7	1.5	2.4	0.0	5.5	5.5	6.1	6.5	6.1	5.5	0.0

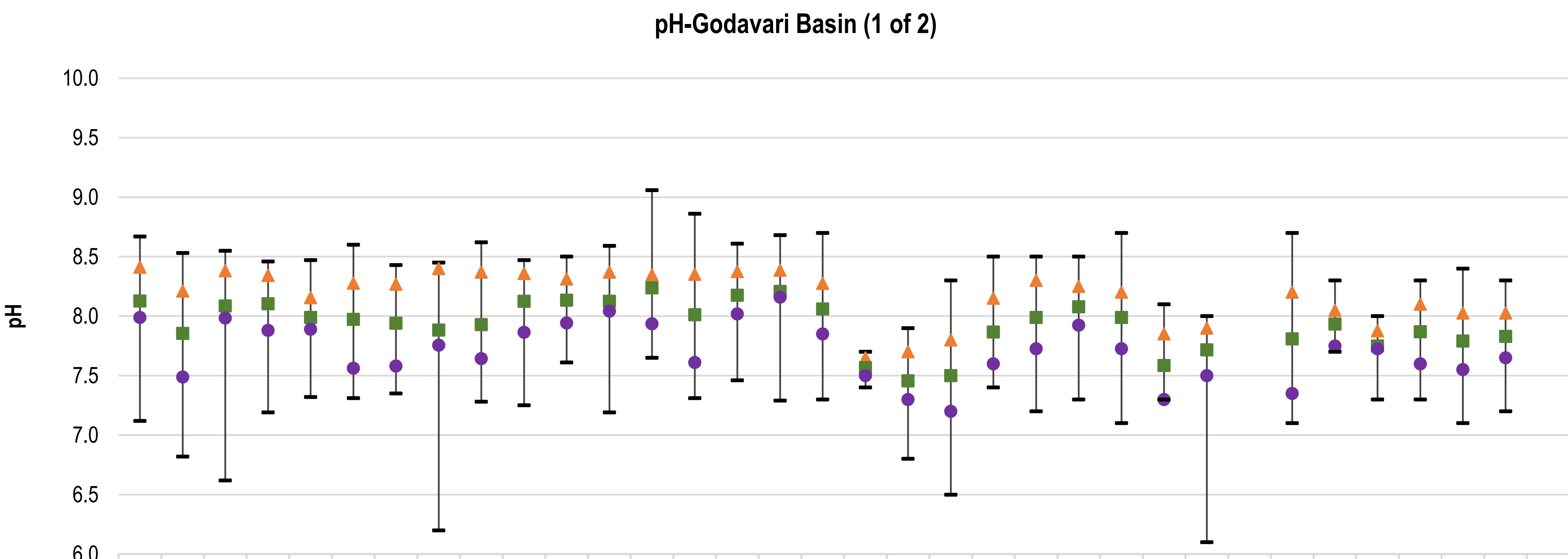
Figure No. 13: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Godavari basin (1of 2)



	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160
Sub-basin	Godavari Upper																
Basin	Godavari																
Max	20.0	11.0	60.0	8.0	10.0	18.0	20.0	18.0	15.0	12.0	10.0	7.0	20.0	10.0	11.0	18.0	7.0
75 Perc	5.5	5.8	9.8	6.2	6.5	5.4	8.0	5.5	6.0	6.3	6.3	5.5	7.3	6.5	6.0	5.0	7.0
Avg	5.4	5.1	14.8	4.7	5.3	5.8	6.5	5.7	5.6	5.0	4.5	4.2	7.0	4.9	4.9	5.2	5.4
25 Perc	3.0	3.0	5.8	3.1	4.0	3.9	5.0	3.4	4.0	3.2	3.0	3.1	4.5	2.6	4.0	3.6	5.0
Min	2.0	2.8	2.0	2.2	2.2	2.4	3.0	2.4	2.8	2.0	2.0	2.0	2.4	2.0	2.0	2.0	3.0

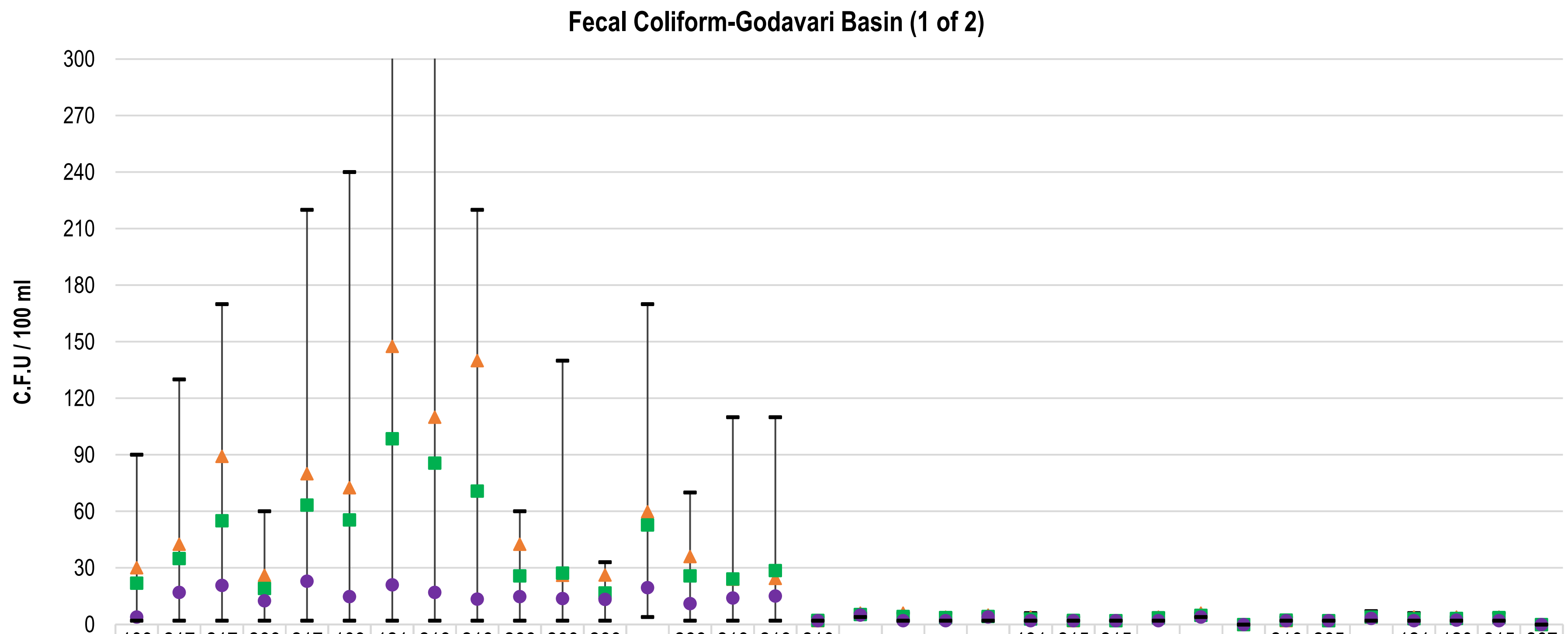
	178	181	180	184	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
Sub-basin	Godavari Upper				Godavari Middle											Manjra	
Basin	Godavari																
Max	12.0	38.0	32.0	14.0	10.0	7.0	9.0	52.0	29.0	0.0	8.0	8.0	16.0	8.0	8.0	9.0	0.0
75 Perc	11.0	28.0	27.0	11.0	5.0	6.0	6.0	36.0	23.8	0.0	7.0	7.0	7.0	6.0	6.0	7.0	0.0
Avg	9.3	22.5	20.8	8.8	4.8	5.0	5.1	25.3	17.0	0.0	5.9	6.7	8.0	4.8	5.3	5.9	0.0
25 Perc	8.0	20.0	18.0	7.3	4.0	4.3	4.0	14.0	9.5	0.0	5.0	6.0	6.3	4.0	4.3	5.0	0.0
Min	6.0	5.0	7.0	4.0	2.0	3.0	3.0	3.0	6.0	0.0	4.0	6.0	5.0	2.0	3.0	3.0	0.0

Figure No. 14: Trend of BOD levels recorded at WQMS at Godavari basin (1 of 2)



Basin	Godavari																																
Sub-basin	Godavari Upper																				Godavari Middle											Manjra	
Station	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
Max	8.7	8.5	8.6	8.5	8.5	8.6	8.4	8.5	8.6	8.5	8.5	8.6	9.1	8.9	8.6	8.7	8.7	7.7	7.9	8.3	8.5	8.5	8.5	8.7	8.1	8.0	0.0	8.7	8.3	8.0	8.3	8.4	8.3	
75 Perc	8.4	8.2	8.4	8.3	8.2	8.3	8.3	8.4	8.4	8.4	8.3	8.4	8.3	8.4	8.4	8.4	8.3	7.7	7.7	7.8	8.2	8.3	8.3	8.2	7.9	7.9	0.0	8.2	8.1	7.9	8.1	8.0	8.0	
Avg	8.1	7.9	8.1	8.1	8.0	8.0	7.9	7.9	7.9	8.1	8.1	8.1	8.2	8.0	8.2	8.2	8.1	7.6	7.5	7.5	7.9	8.0	8.1	8.0	7.6	7.7	0.0	7.8	7.9	7.8	7.9	7.8	7.8	
25 Perc	8.0	7.5	8.0	7.9	7.9	7.6	7.6	7.8	7.6	7.9	7.9	8.0	7.9	7.6	8.0	8.2	7.9	7.5	7.3	7.2	7.6	7.7	7.9	7.7	7.3	7.5	0.0	7.4	7.8	7.7	7.6	7.6	7.7	
Min	7.1	6.8	6.6	7.2	7.3	7.3	7.4	6.2	7.3	7.3	7.6	7.2	7.7	7.3	7.5	7.3	7.3	7.4	6.8	6.5	7.4	7.2	7.3	7.1	7.3	6.1	0.0	7.1	7.7	7.3	7.3	7.1	7.2	

Figure No. 15: Trend of pH levels recorded at WQMS at Godavari basin (1 of 2)



	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																					Godavari Middle												Manjra
	Godavari																																	
Max	90	130	170	60	220	240	500	500	220	60	140	33	170	70	110	110	4	6	6	6	6	6	4	2	6	6	0	4	2	7	6	4	6	0
75 Perc	30	42.5	89.3	26	80	72.5	148	110	140	42.5	26	26.3	59.8	36	24	24.5	2	6	6	4	5	4	2	2	4	6	0	2	2	4	4	4	4	0
Avg	21.8	34.9	55	19.1	63.3	55.4	98.5	85.6	70.8	25.8	27.3	16.8	52.9	25.8	24.2	28.5	2.18	5.33	4.2	3.6	4.29	2.91	2.18	2	3.43	4.86	0	2.36	2	4	3	3.25	3.58	0
25 Perc	4.0	17.0	20.8	12.5	23.0	14.8	21.0	17.0	13.5	14.8	13.8	13.3	19.5	11.0	14.0	15.0	2.0	5.0	2.0	2.0	4.0	2.0	2.0	2.0	2.0	4.0	0.0	2.0	2.0	3.3	2.0	2.3	2.0	0.0
Min	2	2	2	2	2	2	2	2	2	2	2	2	4	2	2	2	2	4	2	2	2	2	2	2	2	4	0	2	2	2	2	2	2	0

Figure No. 16: Trend of Fecal Coliform levels recorded at WQMS at Godavari basin (1 of 2)

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

Apr	57	53	.	60	50	44	47	52	47	60	57	58	55	57	61	55	72		58	54	
May	51	52	.	59	51	48	43	42	49	52	57	61	49	56	61	52	70		82	65	
Jun	70	68	.	71	65	62	60	54	64	63	64	62	57	67	63	61	79		64	68	
Jul	65	64	.	67	69	63	66	67	66	67	66	70	65	63	67	68	74		56	60	
Aug	59	52	57	59	59	57	55	60	58	51	63	67	56	58	64	61	72	67	68	61	67
Sep	63	64	48	60	61	63	60	61	65	59	64	66		68	65	65	77	69	69	66	67
Oct	.	71	.	70	68	69	70	73	71	70	70	72	67	75	.	.	66	67	72	72	69
Nov	68	67	.	67	.	59	60	66	65	67	68	67		69	55	58	77		.	.	.
Dec	71	72	62	71	60	67	60	65	71	71	71	70		71	67	70	78		56	52	66
Jan	77	78	73	74	70	70	70	72	71	79	77	78	77	76	79	83	76		57	57	74
Feb	82	76	67	83	77	76	80	72	81	78	82	76			81	79	55		51	48	56
Mar	83	83	41	80	81	81	78	70	79	81	76	74	73	84	78	82	72		43	55	63
Station code	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184
Sub - Basin	Godavari Upper																				

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

Table No. 14: Surface water quality monitoring stations in Godavari Basin (1 of 2)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	1095	Godavari	Godavari at U/s of Gangapur Dam	Gangapur	Nashik	Nashik
NWMP	2177	Godavari	Godavari near Someshwar Temple	Someshwar	Nashik	Nashik
NWMP	2178	Chikhali nalla	Chikhali Nalla Meets Godavari	Chikhali	Nashik	Nashik
NWMP	2661	Darna	Darna at Aswali (Darna Dam)	Aswali	Igatpuri	Nashik
NWMP	2179	Godavari	Godavari at Hanuman Ghat	Nashik city	Nashik	Nashik
NWMP	1096	Godavari	Godavari at Panchavati at Ramkund	Panchavati	Nashik	Nashik
NWMP	1211	Godavari	Godavari at Nashik D/s of near Amardham	Gadgebaba Maharaj Nagar	Nashik	Nashik
NWMP	2180	Godavari	Godavari at near Tapovan	Tapovan	Nashik	Nashik
NWMP	2181	Godavari	Godavari at Kapila -Godavari confluence point	Tapovan	Nashik	Nashik
NWMP	2662	Darna	Darna at MES site Pumping station	Bhagur	Nashik	Nashik
NWMP	2663	Darna	Darna at Bhagur Pumping station near Pandhurli Bridge	Bhagur	Nashik	Nashik
NWMP	2664	Darna	Darna at Sansari	Sansari	Nashik	Nashik
SWMP	194	Kadwa	Kadwa at Awankhed Village, Taluka - Dindori, District - Nashik	Awankhed Village	Dindori	Nashik
NWMP	2660	Darna	Darna at Chehedi pumping station	Chehedi	Nashik	Nashik
NWMP	2182	Godavari	Godavari at Saikheda	Saikheda	Niphad	Nashik
NWMP	2183	Godavari	Godavari at Nandur-Madhameshwar Dam	Nandur	Niphad	Nashik
NWMP	2160	Godavari	Godavari at U/s of Aurangabad Reservoir Kaigaon Tokka near, Kaigaon Bridge	Kaigaon	Gangapur	Aurangabad
SWMP	178	Shivna	Kannad - D/S of Kannad near Bridge	Kannad	Kannad	Aurangabad
SWMP	181	Kham	Aurangabad - Near Patoda Village	Aurangabad	Aurangabad	Aurangabad
SWMP	180	Kham	Aurangabad - Near Holly cross bridge	Aurangabad	Aurangabad	Aurangabad
SWMP	184	Harsool Dam	Aurangabad - Harsool Dam	Aurangabad	Aurangabad	Aurangabad

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

Apr	70	75	74	49			80	73	67	72	76	75	
May	68	68	63	66			66		73	74	71	73	
Jun	82	82	85	69			77		74	81	78	77	
Jul	76	73	76	64			78		71	80	77	67	
Aug	75	77	80	59	62		75			75	78	72	
Sep	80	77	74	60	64		72		.	76	72	77	
Oct	76	73	74	72	67		69	71	72	74	70	72	
Nov	74	75	73		.		75	70	70	76	78	72	
Dec	78	79	80		62		73			77	76	76	
Jan	73	75	77		49		79	.		82	80	69	
Feb	51	54	55		49					78	75	75	
Mar	71	71	73		49		79			72	72	69	
Station code	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
Sub -Basin	Godavari Middle											Manjra	

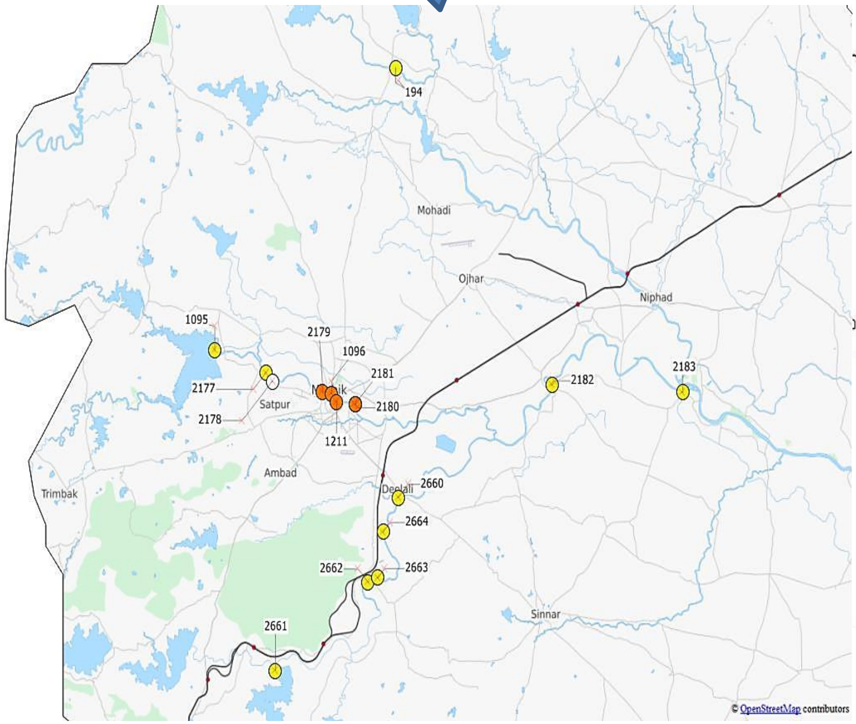
Legend

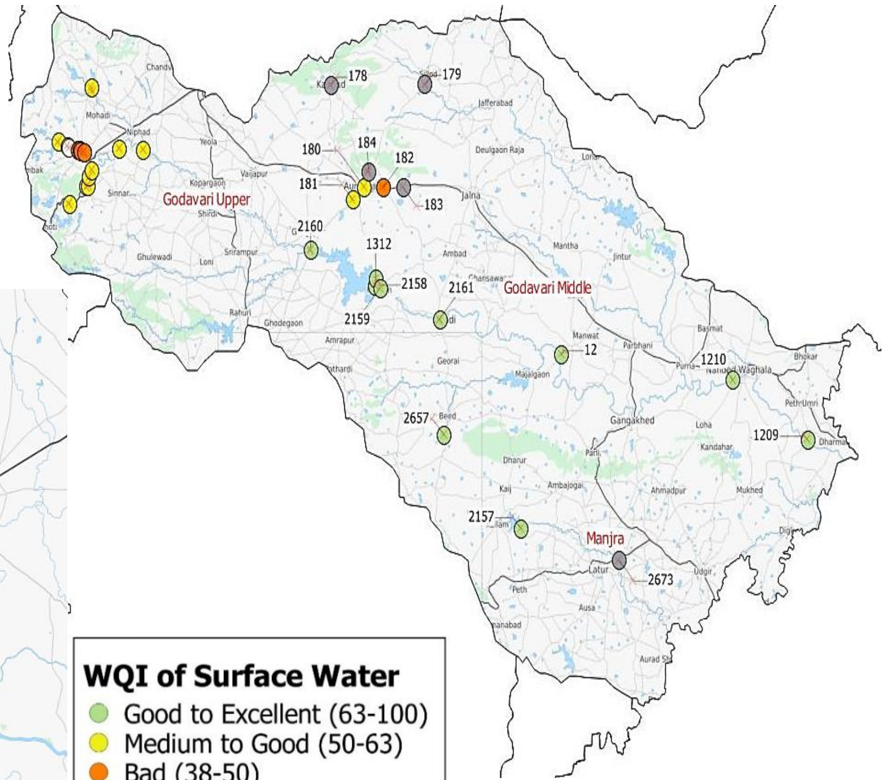
Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected

Table No. 15: Surface water quality monitoring stations in Godavari Basin (1of 2)

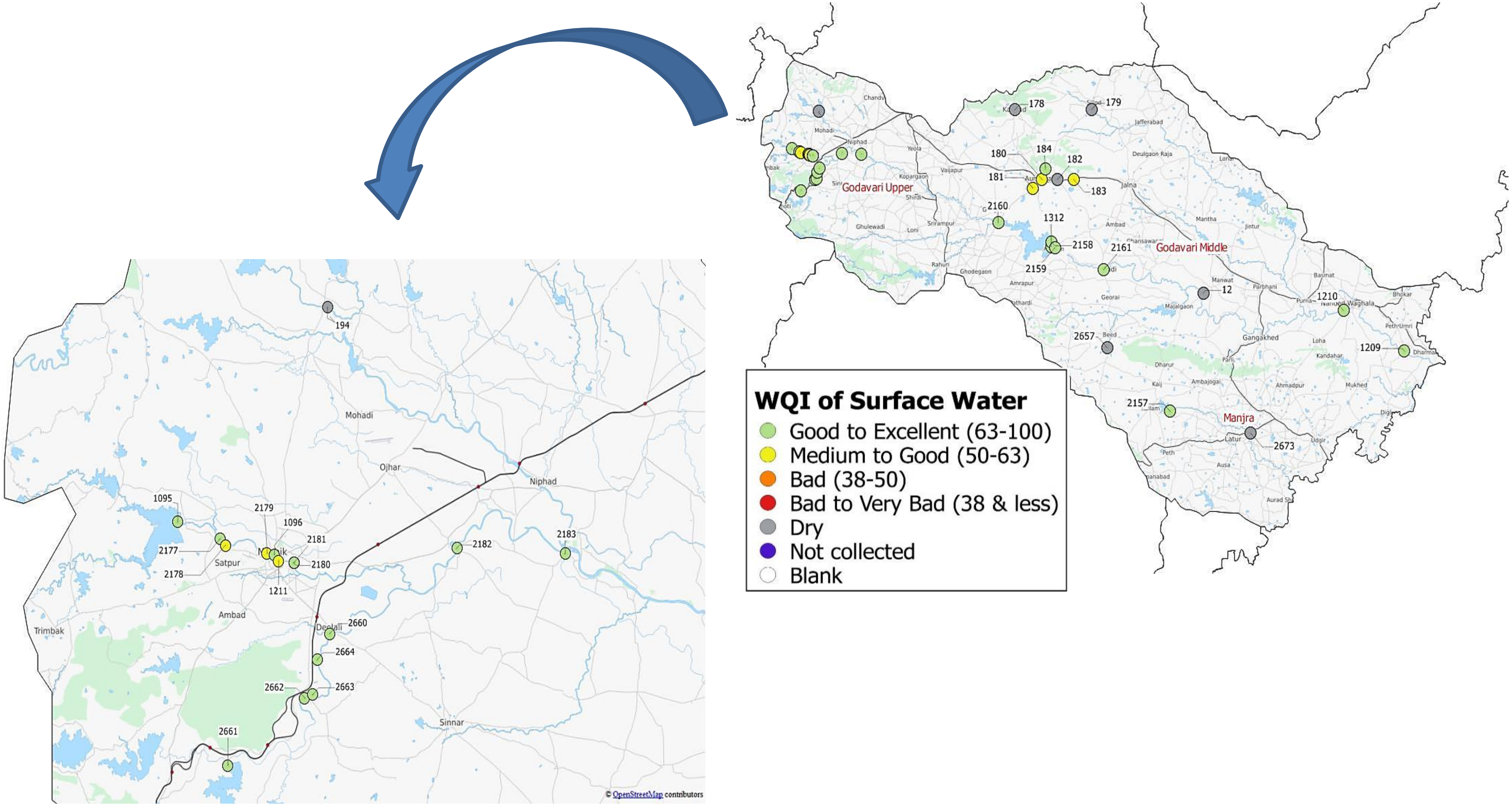
Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	1312	Godavari	Godavari at Jaikwadi Dam, Paithan	Paithan	Paithan	Aurangabad
NWMP	2158	Godavari	Godavari at Paithan U/s of Paithan Intake pump house	Jayakwadi	Paithan	Aurangabad
NWMP	2159	Godavari	Godavari at D/s of Paithan at Pathegaon bridge	Pathegaon	Paithan	Aurangabad
SWMP	182	Sukhna	Aurangabad - Near Chikhalthana Bridge	Aurangabad	Aurangabad	Aurangabad
SWMP	183	Sukhna Dam	Aurangabad - At Sukhna Dam	Aurangabad	Aurangabad	Aurangabad
SWMP	179	Purna	Sillod - D/S of Sillod near bridge at bhavan	Sillod	Sillod	Aurangabad
NWMP	2161	Godavari	Godavari at Jalna Intake water pump house Shahagad	Shahabad	Ambad	Jalna
NWMP	2657	Bindusara	Bindusara at Beed, near Intake water pump house at Dam	Paligaon	Beed	Beed
NWMP	12	Godavari	Godavari at Dhalegaon	Dhalegaon	Pathari	Parbhani
NWMP	1210	Godavari	Godavari at Intake of pump house	Vishnupuri	Nanded	Nanded
NWMP	1209	Godavari	Godavari at Raher	Raher	Nayagaon	Nanded
NWMP	2157	Godavari	Godavari at Latur Water intake near pump house	Dhamegaon	Kalumb	Osmanabad
NWMP	2673	Manjra	Manjra at D/s of Latur, near Latur-Nanded Bridge	Bhatkheda	Latur	Latur

Spatial map of SurfaceWQI at Godavari Basin (1 of 2) (April 2015)

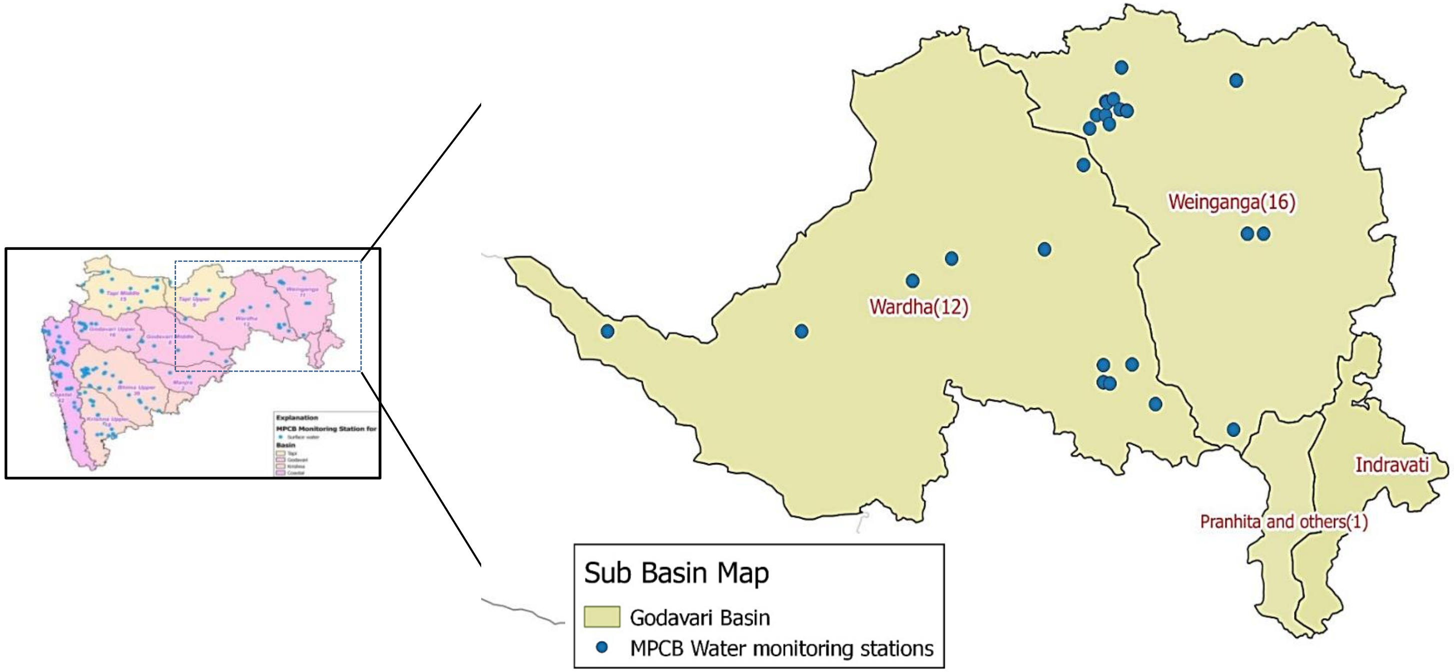




Spatial map of Surface WQI at Godavari Basin (1 of 2) (December 2015)

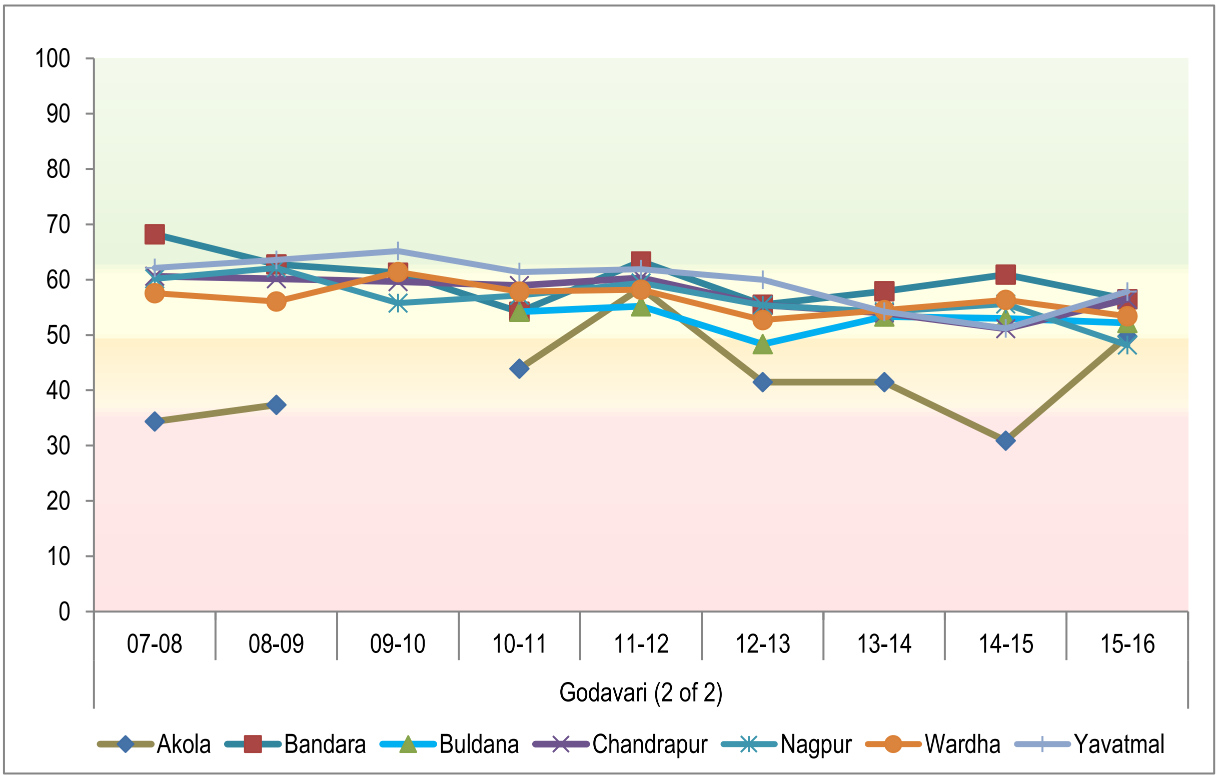


Godavari Basin (2 of 2): Wardha, Weinganga and Pranhita Sub basin



Map No. 5: Network of surface water quality monitoring stations in Godavari basin 2 of 2 –Wardha, 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. 17: 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 s in that district

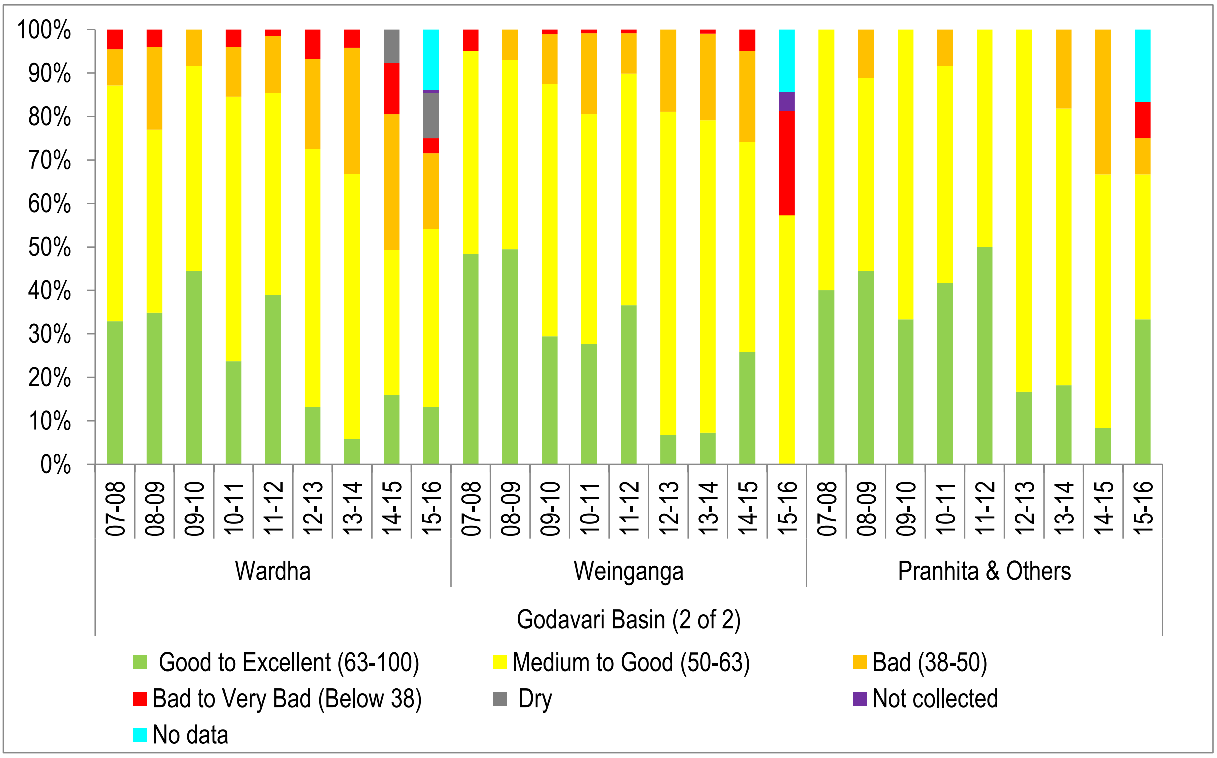
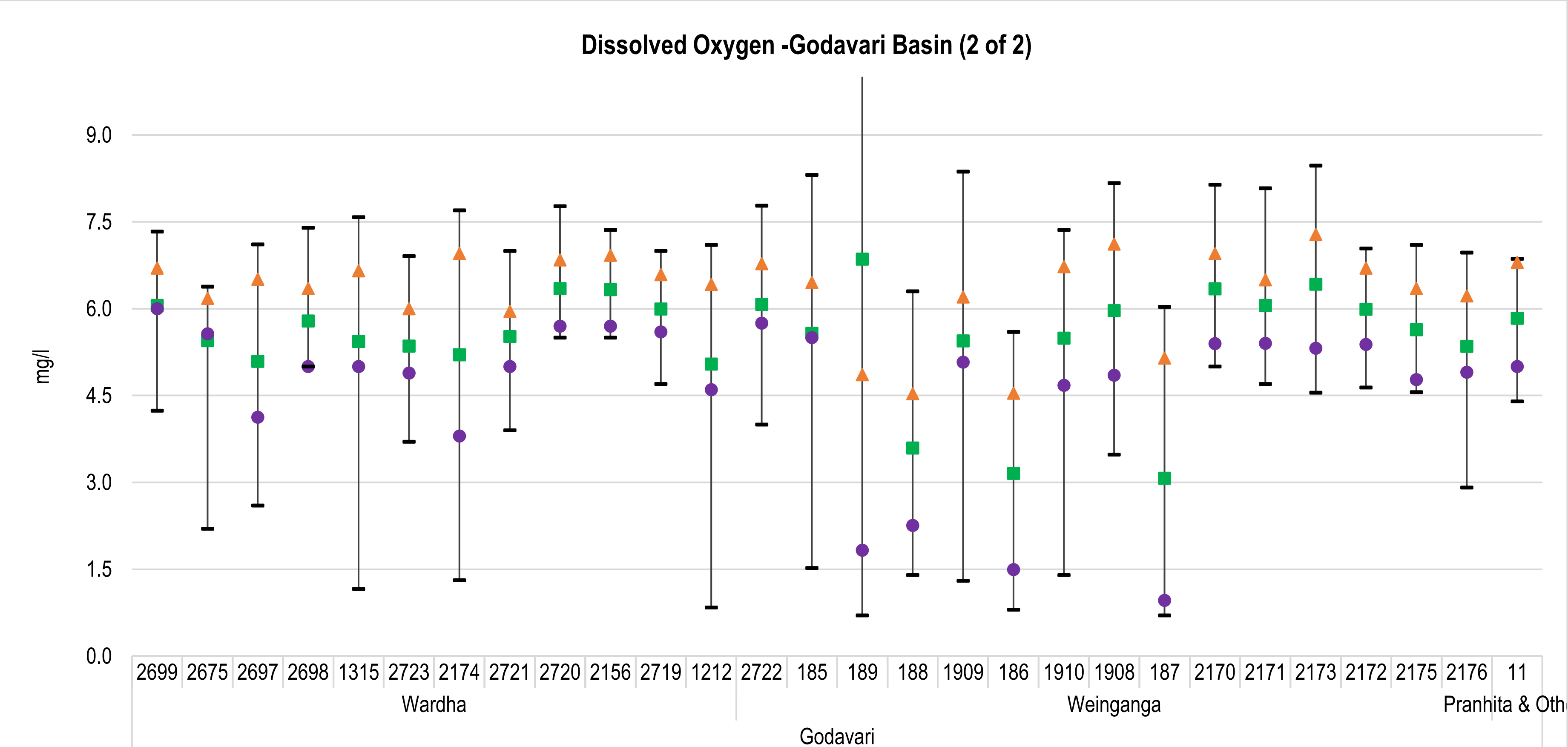


Figure No. 18: Trend of average occurrence for different category of WQI in Godavari basin (2 of 2)

The intra basin performance of Godavari (2 of 2) basin across seven districts of the state are depicted in the Figure No. 17 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in the Figure No. 18.

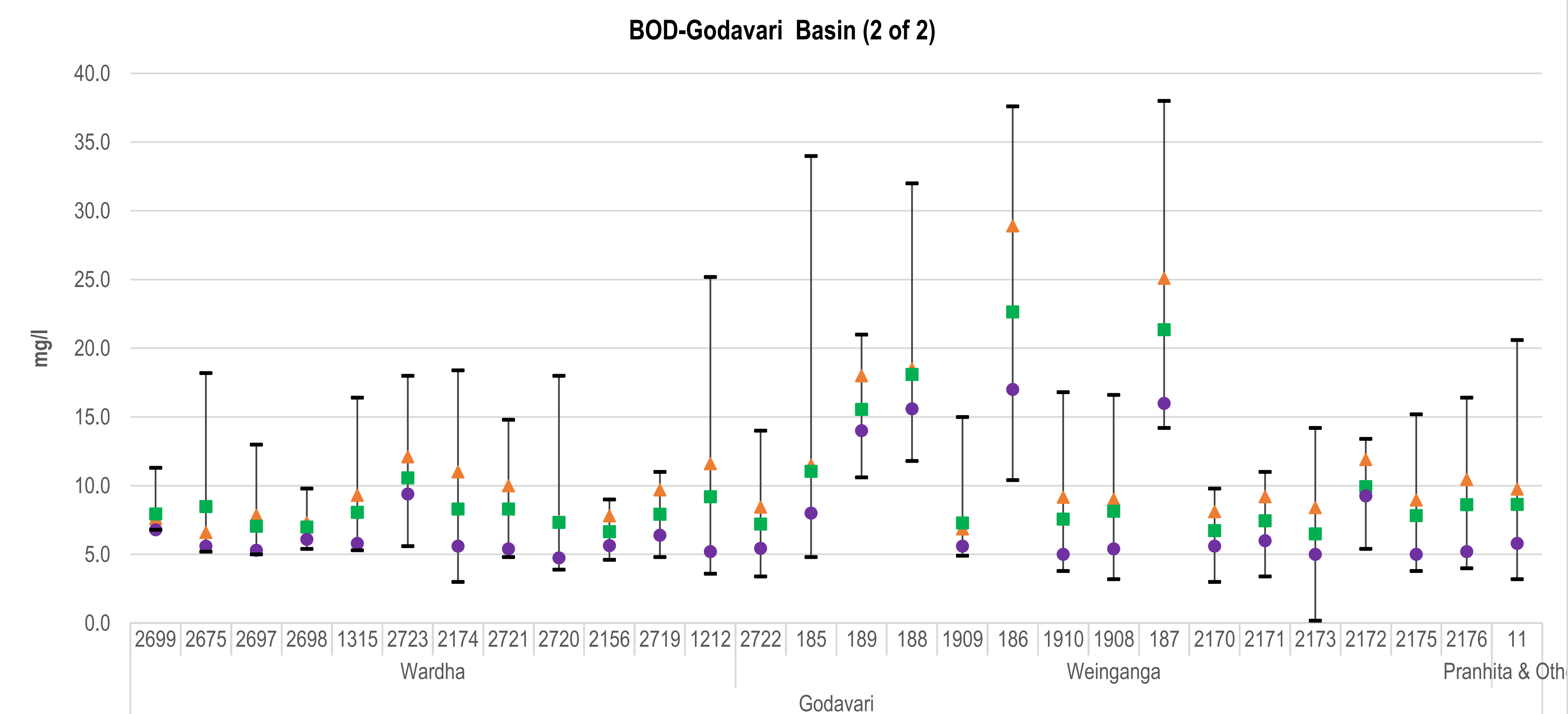
Among the seven districts namely Akola, Bandara, Buldhana, Chandrapur, Nagpur, Wardha and Yavatmal, the annual average WQI of all the districts except Akola were Medium to Good (50-63). But this year in 2015- 16, an improvement in the water quality at Akola has been recorded as the WQI has improved from Very Bad to Bad category.

The trend of intra sub basin wise water quality for Godavari (2 of 2) basin shows that occurrence of Good to Excellent catergory of WQI was highest in Pranhita and others compared to Weinganga and Wardha. The occurrence of Medium to Good category of WQI has almost remained the same for Wardha and Weinganga. The occurrence of Bad to Very bad category could be observed to be lowest at Wardha while the Bad category is found to be lowest at Pranhita and others.



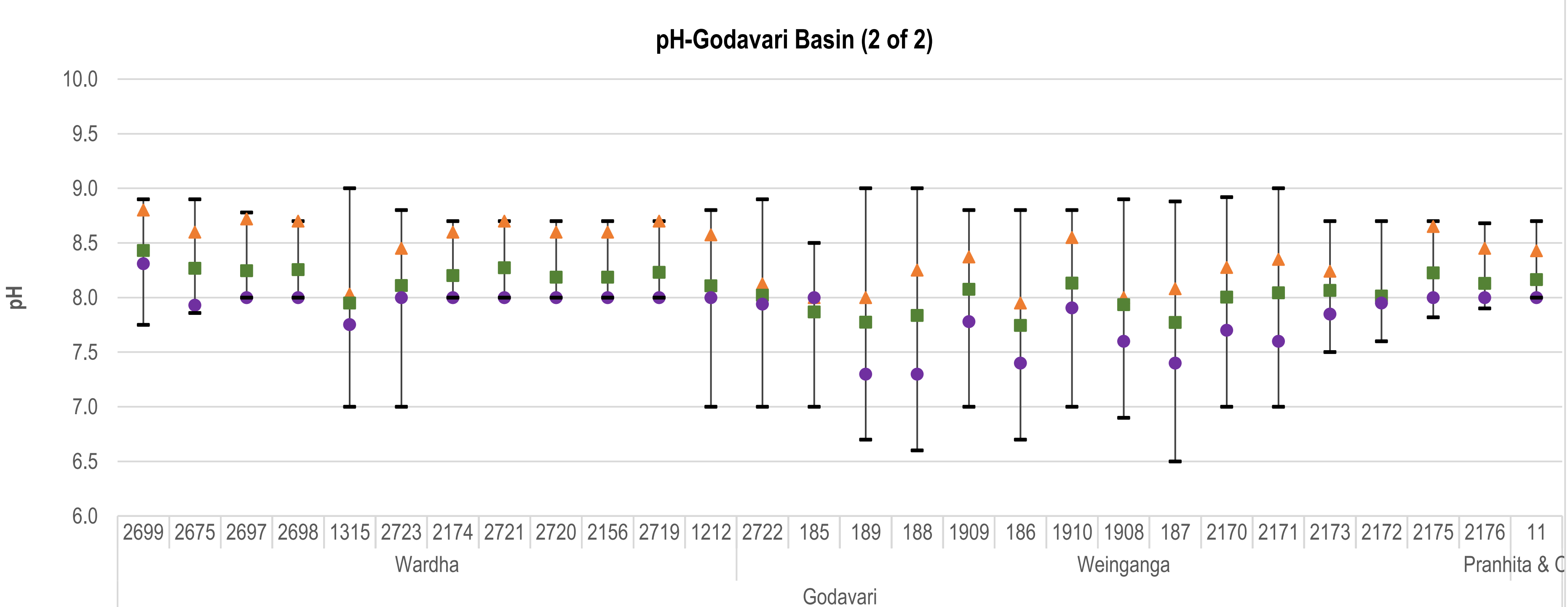
	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
	Wardha												Weinganga															Pranhita & Oth
	Godavari																											
Max	7.3	6.4	7.1	7.4	7.6	6.9	7.7	7.0	7.8	7.4	7.0	7.1	7.8	8.3	40.0	6.3	8.4	5.6	7.4	8.2	6.0	8.1	8.1	8.5	7.0	7.1	7.0	6.9
75 Perc	6.7	6.2	6.5	6.4	6.7	6.0	7.0	6.0	6.8	6.9	6.6	6.4	6.8	6.5	4.9	4.5	6.2	4.5	6.7	7.1	5.1	7.0	6.5	7.3	6.7	6.4	6.2	6.8
Avg	6.1	5.4	5.1	5.8	5.4	5.4	5.2	5.5	6.3	6.3	6.0	5.0	6.1	5.6	6.9	3.6	5.4	3.2	5.5	6.0	3.1	6.3	6.1	6.4	6.0	5.6	5.3	5.8
25 Perc	6.0	5.6	4.1	5.0	5.0	4.9	3.8	5.0	5.7	5.7	5.6	4.6	5.8	5.5	1.8	2.3	5.1	1.5	4.7	4.9	1.0	5.4	5.4	5.3	5.4	4.8	4.9	5.0
Min	4.2	2.2	2.6	5.0	1.2	3.7	1.3	3.9	5.5	5.5	4.7	0.8	4.0	1.5	0.7	1.4	1.3	0.8	1.4	3.5	0.7	5.0	4.7	4.6	4.6	4.6	2.9	4.4

Figure No. 19: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Godavari basin (2 of 2)



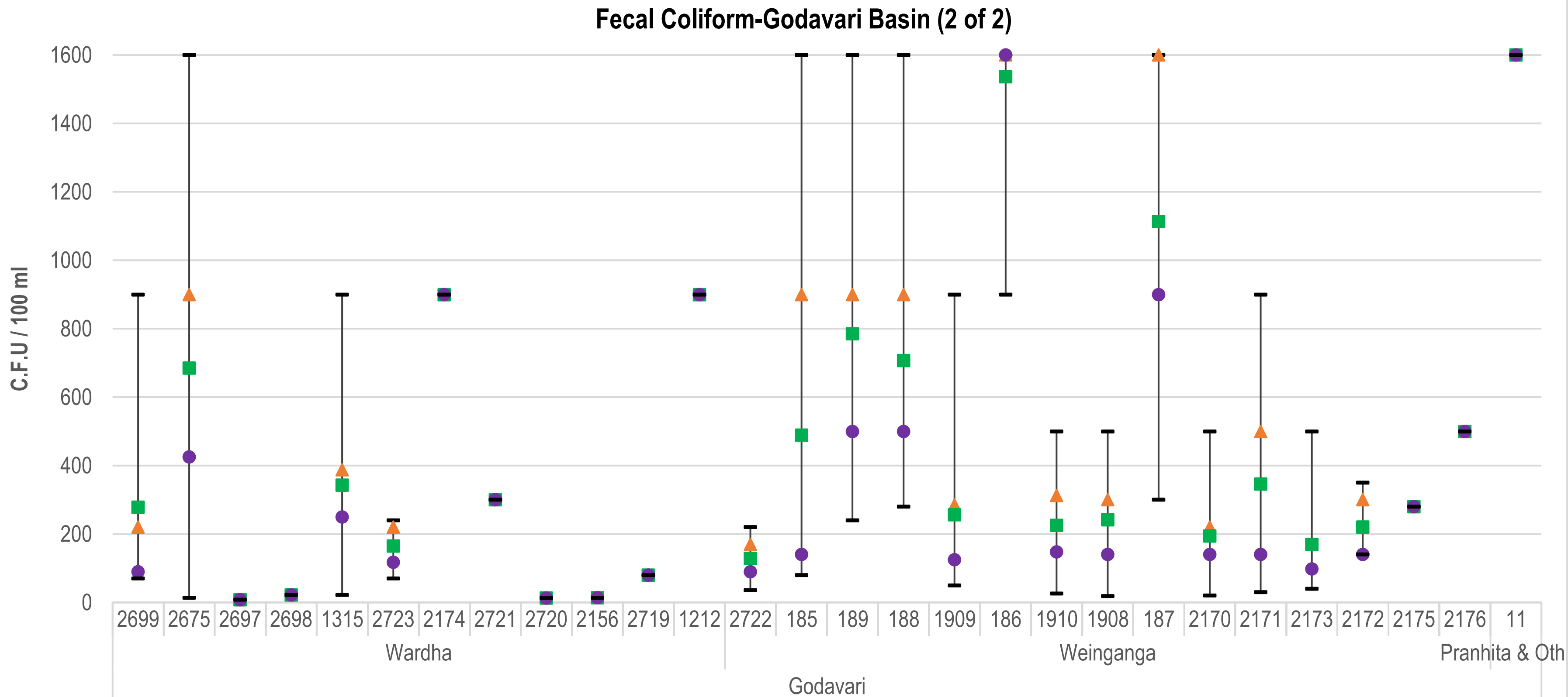
	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Max	11.3	18.2	13.0	9.8	16.4	18.0	18.4	14.8	18.0	9.0	11.0	25.2	14.0	34.0	21.0	32.0	15.0	37.6	16.8	16.6	38.0	9.8	11.0	14.2	13.4	15.2	16.4	20.6
75 Perc	7.6	6.6	7.9	7.3	9.3	12.1	11.0	10.0	7.4	7.8	9.7	11.6	8.5	11.5	18.0	18.5	6.9	28.9	9.2	9.0	25.1	8.1	9.2	8.4	11.9	9.0	10.5	9.8
Avg	7.9	8.5	7.1	7.0	8.1	10.6	8.3	8.3	7.3	6.6	7.9	9.2	7.2	11.1	15.5	18.1	7.3	22.7	7.6	8.1	21.4	6.7	7.5	6.5	9.9	7.8	8.6	8.6
25 Perc	6.8	5.6	5.3	6.1	5.8	9.4	5.6	5.4	4.8	5.7	6.4	5.2	5.5	8.0	14.0	15.6	5.6	17.0	5.0	5.4	16.0	5.6	6.0	5.0	9.3	5.0	5.2	5.8
Min	6.8	5.2	5.0	5.4	5.3	5.6	3.0	4.8	3.9	4.6	4.8	3.6	3.4	4.8	10.6	11.8	4.9	10.4	3.8	3.2	14.2	3.0	3.4	0.2	5.4	3.8	4.0	3.2

Figure No. 20: Trend of BOD levels recorded at WQMS at Godavari basin (2 of 2)



	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Max	8.9	8.9	8.8	8.7	9.0	8.8	8.7	8.7	8.7	8.7	8.7	8.8	8.9	8.5	9.0	9.0	8.8	8.8	8.8	8.9	8.9	8.9	9.0	8.7	8.7	8.7	8.7	8.7
75 Perc	8.8	8.6	8.7	8.7	8.0	8.5	8.6	8.7	8.6	8.6	8.7	8.6	8.1	8.0	8.0	8.3	8.4	8.0	8.6	8.0	8.1	8.3	8.4	8.2	8.0	8.7	8.5	8.4
Avg	8.4	8.3	8.2	8.3	8.0	8.1	8.2	8.3	8.2	8.2	8.2	8.1	8.0	7.9	7.8	7.8	8.1	7.7	8.1	7.9	7.8	8.0	8.0	8.1	8.0	8.2	8.1	8.2
25 Perc	8.3	7.9	8.0	8.0	7.8	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.9	8.0	7.3	7.3	7.8	7.4	7.9	7.6	7.4	7.7	7.6	7.9	8.0	8.0	8.0	8.0
Min	7.8	7.9	8.0	8.0	7.0	7.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	6.7	6.6	7.0	6.7	7.0	6.9	6.5	7.0	7.0	7.5	7.6	7.8	7.9	8.0

Figure No. 21: Trend of Ph levels recorded at WQMS at Godavari basin (2 of 2)



	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Max	900	1600	8	22	900	240	900	300	13	14	80	900	220	1600	1600	1600	900	1600	500	500	1600	500	900	500	350	280	500	1600
75 Perc	220	900	8	22	388	220	900	300	13	14	80	900	170	900	900	900	285	1600	313	300	1600	220	500	170	300	280	500	1600
Avg	278	685	8	22	343	165	900	300	13	14	80	900	129	489	785	707	257	1536	226	242	1114	195	346	170	220	280	500	1600
25 Perc	90.0	425.	8.0	22.0	250.	117.	900.	300.	13.0	14.0	80.0	900.	90.0	140.	500.	500.	125.	1600	147.	140.	900.	140.	140.	97.5	140.	280.	500.	1600
Min	70	14	8	22	22	70	900	300	13	14	80	900	36	80	240	280	50	900	26	19	300	20	30	40	140	280	500	1600

Figure No. 22: Trend of Fecal Coliform levels recorded at WQMS at Godavari basin (2 of 2)

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

Apr			51	60	56	51	46	54	60	62	57	52
May			57	59	32	43	53	62	55	61	58	48
Jun			48	61	51	50	48	50	62	59	59	63
Jul	54	47	55	52	54	53	62	63	61	63	59	53
Aug	53	54	.	.	58	52	.	.	.	.	.	.
Sep	53	54	48	53	60	45	51	57	57	52	46	54
Oct	57	52	.	.	57	48	68	54	.	70	.	59
Nov	45	67	68	62	59	46	30	41	67	70	63	26
Dec		46	65	65	49	48	67	66	69	66	63	64
Jan		46	47	47	58	57	48	47	69	47	45	46
Feb		32	.	.	58	61	.	.	.	.	.	.
Mar		Not collected			37	52	73		71			72
Station code	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212
Sub -Basin	Wardha											

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

Table No. 16: Surface water quality monitoring stations in Godavari Basin (2 of 2)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	2699	Penganga	Penganga at Mehkar-Buldana Road Bridge	Mehkar	Mehkar	Buldana
NWMP	2675	Morna	Morna at D/s of Railway Bridge	Akola	Akola	Akola
NWMP	2697	Penganga	Penganga near water supply scheme of Umarkhed MC	Belkhed	Umarkhed	Yavatmal
NWMP	2698	Penganga	Penganga D/s of Isapur Dam	Isapur	Pusad	Yavatmal
NWMP	1315	Wardha	Wardha at Pulgaon Railway Bridge	Pulgaon	wardha	Wardha
NWMP	2723	Wena	Wena at D/s of Mohata Mills, near Bridge on Hinganghat-Wadner Road	Hinganghat	Hinganghat	Wardha
NWMP	2174	Wardha	Wardha at D/s of ACC Ghuggus	Ghuggus	Chandrapur	Chandrapur
NWMP	2721	Wardha	Wardha at U/s of ACC Ghuggus	Ghuggus	Chandrapur	Chandrapur
NWMP	2720	Wardha	Wardha at U/s of Erai	Hadasti	Chandrapur	Chandrapur
NWMP	2156	Wardha	Wardha at confluence point of Penganga & Wardha	Jugad	Wani	Yavatmal
NWMP	2719	Wardha	Wardha at D/s of Erai	Hadasti	Chandrapur	Chandrapur
NWMP	1212	Wardha	Wardha at Rajura bridge	Rajura	Chandrapur	Chandrapur

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

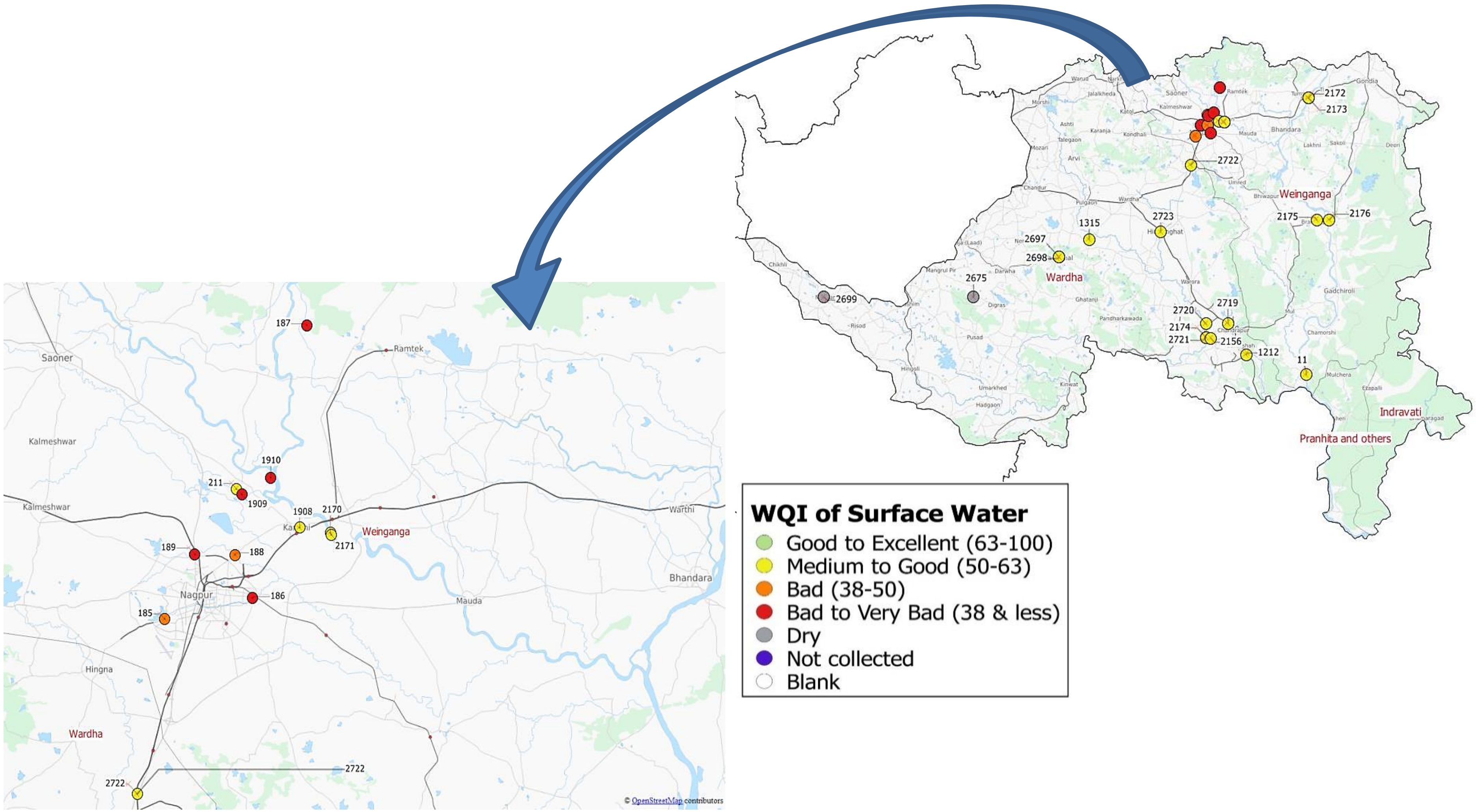
Apr	54	48	28	39	31	29	30	55	29	56	53	51	54	51	52	58
May	45	50	33	42	42	27	51	45	27	50	48	60	62	58	56	57
Jun	56	52	35	32	54	30	49	52	28	62	59	64	58	55	56	59
Jul	54	45	30	33	55	26	52	59	28	48	50	68	53	61	62	53
Aug	62	56	50	48	53	44	54	61	45	58	60	56	52	.	.	.
Sep	52	47	27	25	53	17	46	47	19	49	40	43	.	52	48	49
Oct	61				58		60	.		.	.	64	55	59	62	65
Nov	63	63	37	41	58	25	58	40	26	58	54	56	45	41	37	25
Dec	53	63	32	30	55	34	57	58	34	55	46	.	.	66	63	63
Jan	62	59	58	45	66	41	62	61	47	65	67	67	47	47	45	63
Feb	62	52	48	45	58	44	59	60	48	63	60	65	58	.	.	.
Mar	61	27	38	32	57	34	59	64	30	66	61	58	53	74	72	73
Station code	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Sub -Basin	Weinganga															Pranhita & Others

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

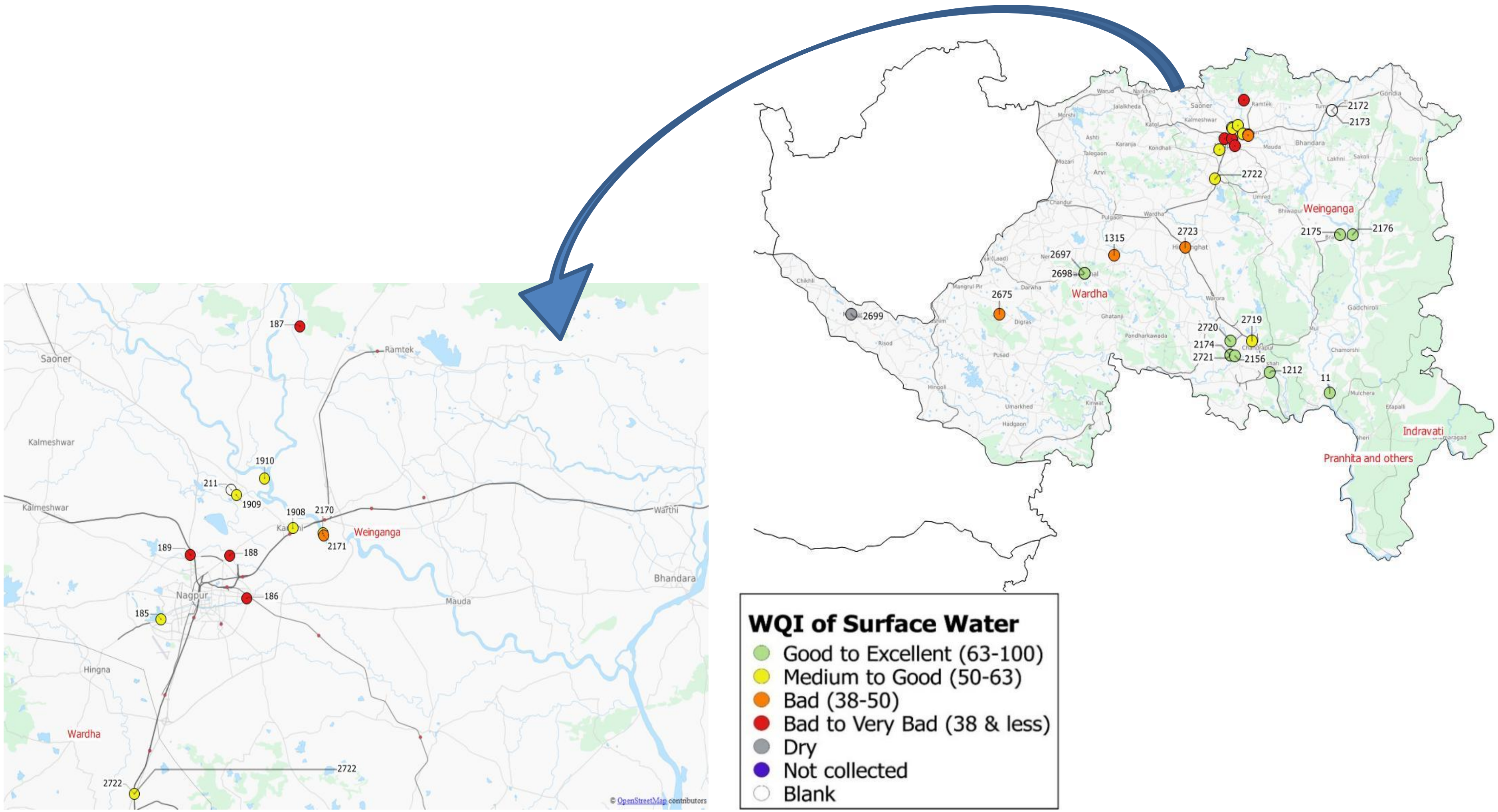
Table No. 17: Surface water quality monitoring stations in Godavari Basin (2 of 2)

Program	Station ID	River/nalla	Station Name	Village	Taluka	District
NWMP	2722	Wena	Wena at U/s of Mohata Mills, nearby Brigde on Hinganghat Wadner Road	Hinganghat	Hinganghat	Wardha
SWMP	185	Nag	Nag Near, Ambazari Lake, Nagpur	Nagpur	Nagpur	Nagpur
SWMP	189	Pill	Pill Near, Mankapur on Koradi Road, Nagpur	Nagpur	Nagpur	Nagpur
SWMP	188	Pill	Pill Near, Wanjra Layout Kamptee Road, Nagpur	Nagpur	Nagpur	Nagpur
NWMP	1909	Kanhan	Kanhan at D/s of Nagpur	Agargaon	Kuhi	Nagpur
SWMP	186	Nag	Nag Near, Bhandewadi Bridge, Nagpur	Nagpur	Nagpur	Nagpur
NWMP	1910	Wainganga	Wainganga after confluence with Kanhan	Ambhora	Kuhi	Nagpur
NWMP	1908	Kolar	Kolar before confluence with Kanhan at Waregaon Bridge	Waregaon	Kamptee	Nagpur
SWMP	187	Nag	Nag Near, Asoli Bridge, Bhandara Road, Nagpur	Nagpur	Nagpur	Nagpur
NWMP	2170	Kanhan	Kanhan (Wainganga basin) at U/s of M/s Vidharba Paper Mill	Sinora	Parseoni	Nagpur
NWMP	2171	Kanhan	Kanhan (Wainganga basin) at D/s of M/s Vidharbha Paper Mills	Sinora	Parseoni	Nagpur
NWMP	2173	Wainganga	Wainganga at U/s of Ellora Paper Mills	Tumsar	Tumsar	Bandara
NWMP	2172	Wainganga	Wainganga at D/s of Ellora Paper Mill	Tumsar	Tumsar	Bandara
NWMP	2175	Wainganga	Wainganga at U/s of Gaurav Paper Mills near Jack Well	Bramhpuri	Chandrapur	Chandrapur
NWMP	2176	Wainganga	Wainganga at D/s of Gaurav Paper Mills Near Jackwell	Bramhpuri	Chandrapur	Chandrapur
NWMP	11	Wainganga	Wainganga at Ashti	Ashti	Gondpipri	Chandrapur

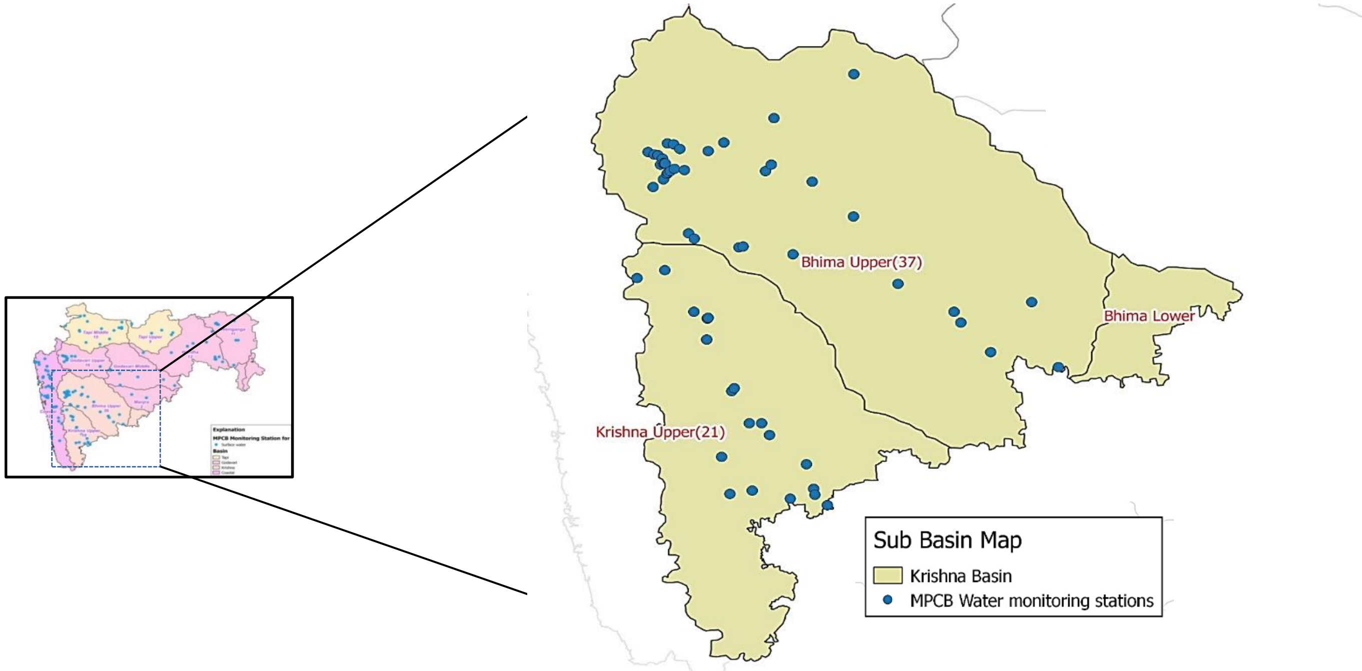
Spatial map of Surface WQI in Godavari Basin (2 of 2) (April 2015)



Spatial map of Surface WQI in Godavari Basin (2 of 2) (December 2015)



Krishna Basin

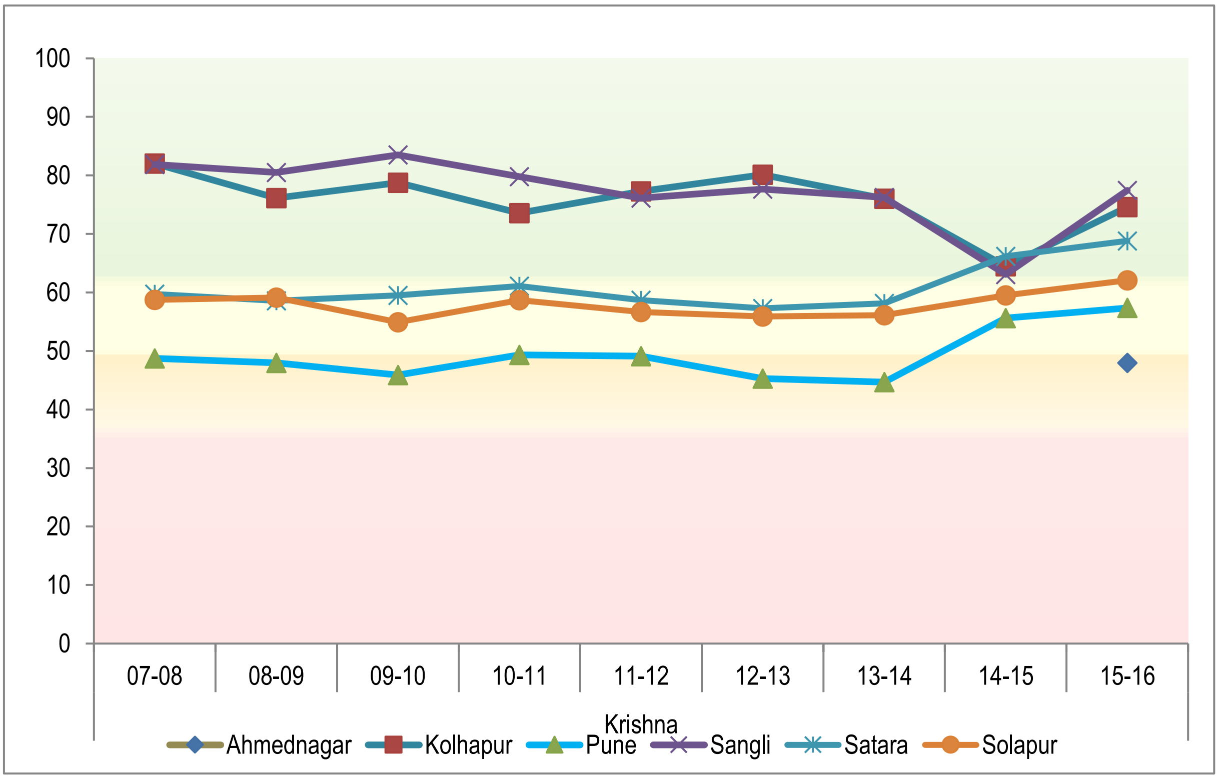


Map No. 6: Network of surface water quality monitoring stations in Krishna basin

The Krishna originates as the Upper Krishna basin in the Western Ghats of Maharashtra and Karnataka, drains the Deccan Plateau, and discharges into the Bay of Bengal. The Krishna basin spreads across the states of Maharashtra(69,425sq km), Karnataka(113,271 sq km) and Andhra Pradesh (76,252 sq km) covering total area of 2,58,948 sq km which is about 8% of total geographical area of country. The principal tributaries joining Krishna are the Ghataprabha, the Malaprabha, the Bhima, the Tungabhadra and the Musi[26].

[26]India,WRIS

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. 23: 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 s in that district

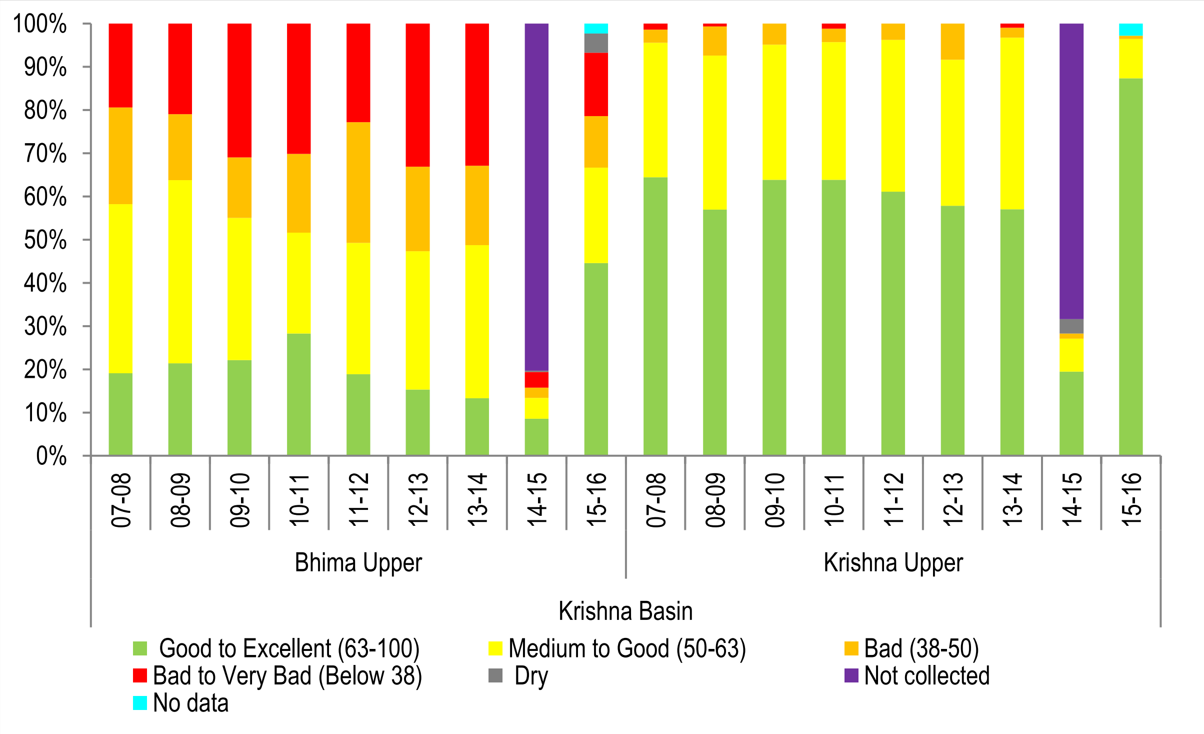
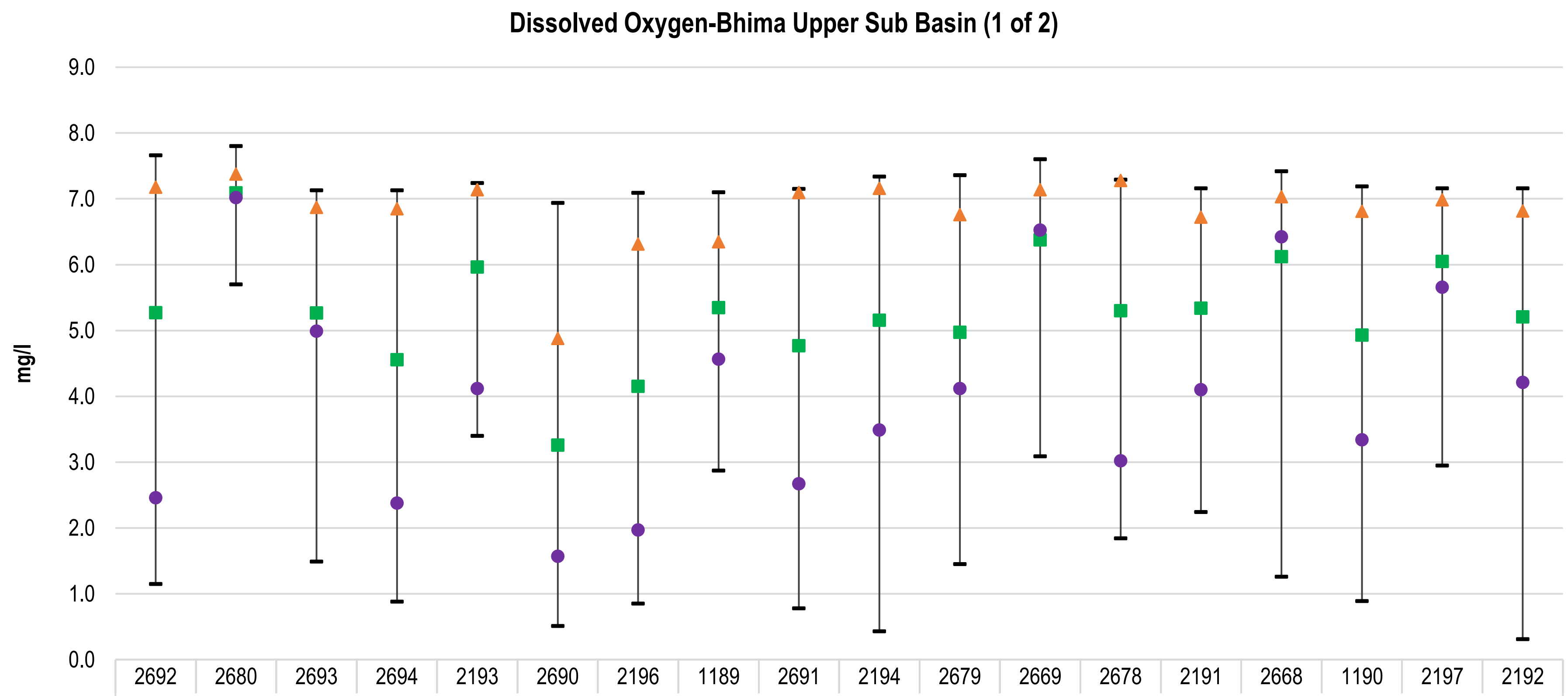


Figure No. 24: Trend of average occurrence for different category of WQI in Krishna basin

The intra basin performance of Krishna Basin across five districts is depicted in the Figure No. 23 and the average annual occurrence of different category of WQI across all WQMS is depicted in the Figure No. 24.

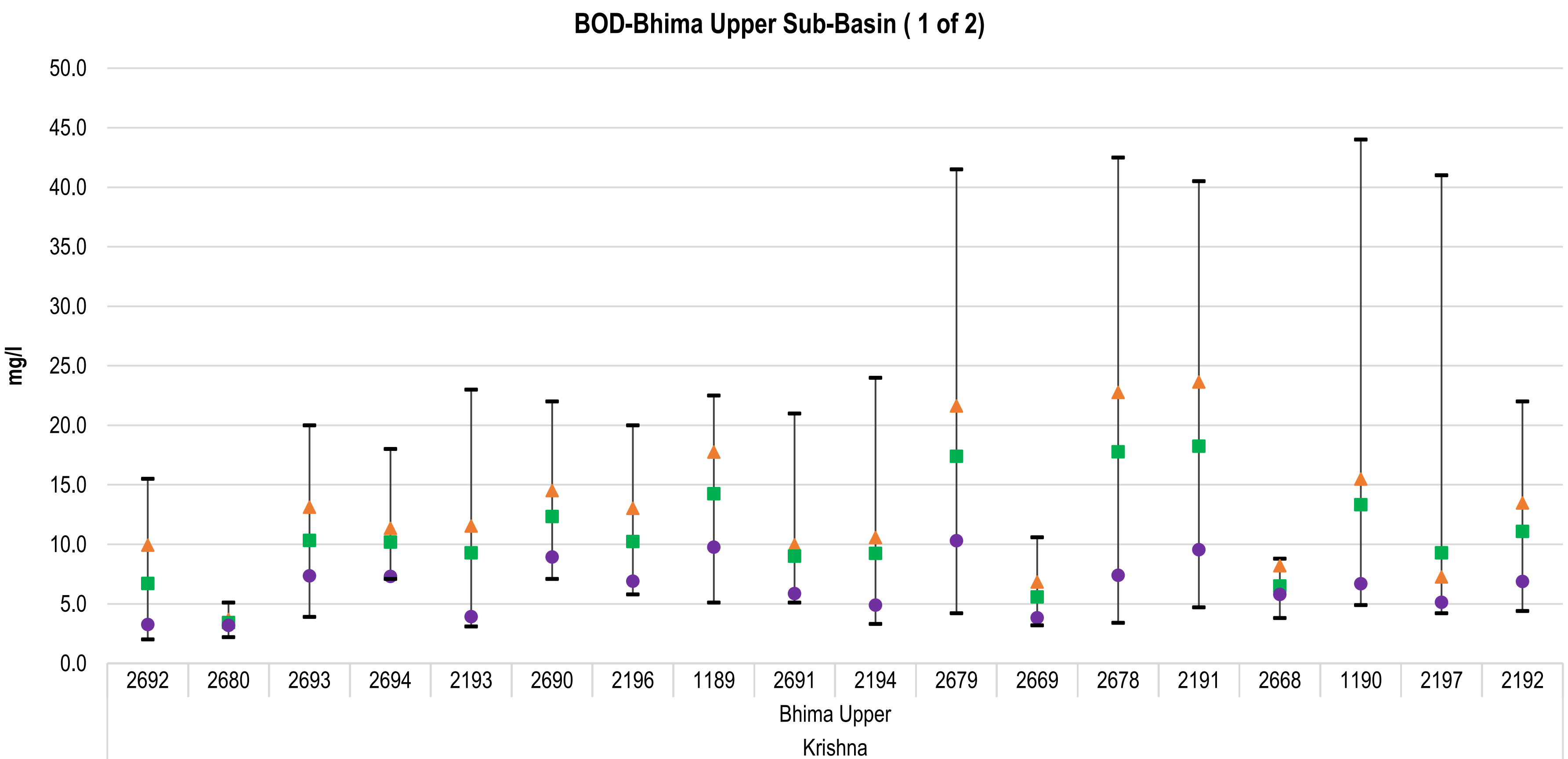
It is observed that among the 5 districts- Kolhapur, Pune, Sangli, Satara and Solapur, the annual average WQI of Sangli and Kolhapur were Good to Excellent category (63-100). Satara and Solapur display an increasing trend in the WQI as Satara has improved from 'Mediun to Good' to Good to Excellent category and Solapur has shown an increasing trend towards the Good to Excellent category. Since the last 2 years, the WQI of Pune has also improved from "Bad" category to "Medium to Good" category. The new station added at Ahednagar has shown the WQI to be in the Bad category in 2015- 16.

Intra sub basins results for Krishna basin showed that occurrence of Bad and bad to very bad category of WQI is present only in Bhima upper. Good to Excellent category is twice in Krishna Upper. Hence the overall preview of WQI in Krishna sub basin is better as compared to Bhima Upper



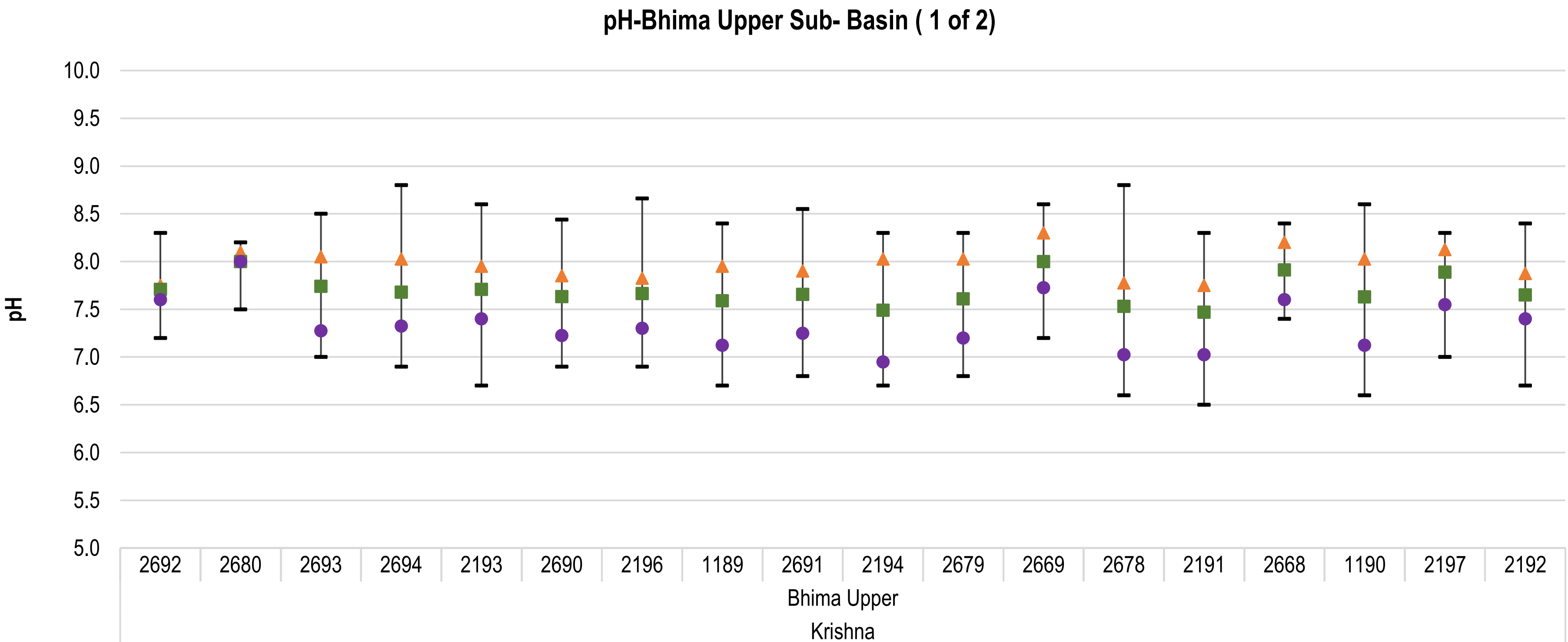
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192
	Bhima Upper Krishna																	
Max	7.7	7.8	7.1	7.1	7.2	6.9	7.1	7.1	7.2	7.3	7.4	7.6	7.3	7.2	7.4	7.2	7.2	7.2
75 Perc	7.2	7.4	6.9	6.9	7.1	4.9	6.3	6.3	7.1	7.2	6.8	7.1	7.3	6.7	7.0	6.8	7.0	6.8
Avg	5.3	7.1	5.3	4.6	6.0	3.3	4.2	5.3	4.8	5.2	5.0	6.4	5.3	5.3	6.1	4.9	6.0	5.2
25 Perc	2.5	7.0	5.0	2.4	4.1	1.6	2.0	4.6	2.7	3.5	4.1	6.5	3.0	4.1	6.4	3.3	5.7	4.2
Min	1.2	5.7	1.5	0.9	3.4	0.5	0.9	2.9	0.8	0.4	1.5	3.1	1.8	2.2	1.3	0.9	3.0	0.3

Figure No. 25: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (1 of 2)



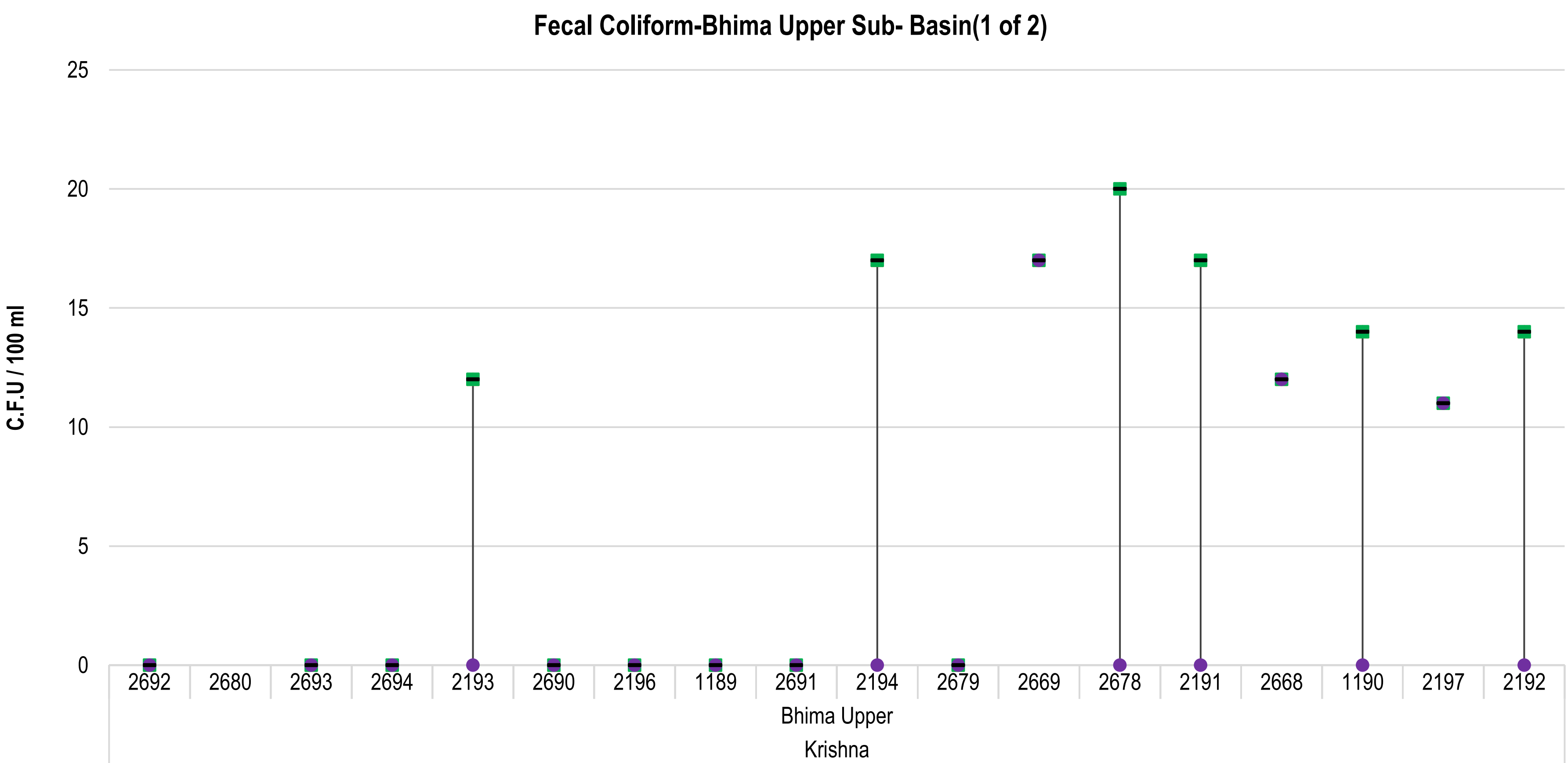
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192
Max	15.5	5.1	20.0	18.0	23.0	22.0	20.0	22.5	21.0	24.0	41.5	10.6	42.5	40.5	8.8	44.0	41.0	22.0
75 Perc	9.9	3.7	13.1	11.4	11.5	14.5	13.0	17.8	10.0	10.6	21.6	6.8	22.8	23.6	8.2	15.5	7.3	13.5
Avg	6.7	3.4	10.3	10.2	9.3	12.3	10.2	14.3	9.0	9.2	17.4	5.6	17.8	18.2	6.5	13.3	9.3	11.1
25 Perc	3.3	3.2	7.4	7.3	3.9	8.9	6.9	9.8	5.9	4.9	10.3	3.8	7.4	9.6	5.8	6.7	5.1	6.9
Min	2.0	2.2	3.9	7.1	3.1	7.1	5.8	5.1	5.1	3.3	4.2	3.2	3.4	4.7	3.8	4.9	4.2	4.4

Figure No. 26: 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
Max	8.3	8.2	8.5	8.8	8.6	8.4	8.7	8.4	8.6	8.3	8.3	8.6	8.8	8.3	8.4	8.6	8.3	8.4
75 Perc	7.8	8.1	8.1	8.0	8.0	7.9	7.8	8.0	7.9	8.0	8.0	8.3	7.8	7.8	8.2	8.0	8.1	7.9
Avg	7.7	8.0	7.7	7.7	7.7	7.6	7.7	7.6	7.7	7.5	7.6	8.0	7.5	7.5	7.9	7.6	7.9	7.7
25 Perc	7.6	8.0	7.3	7.3	7.4	7.2	7.3	7.1	7.3	7.0	7.2	7.7	7.0	7.0	7.6	7.1	7.6	7.4
Min	7.2	7.5	7.0	6.9	6.7	6.9	6.9	6.7	6.8	6.7	6.8	7.2	6.6	6.5	7.4	6.6	7.0	6.7

Figure No. 27: 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
Max	0	35	0	0	12	0	0	0	0	17	0	17	20	17	12	14	11	14
75 Perc	0	35	0	0	12	0	0	0	0	17	0	17	20	17	12	14	11	14
Avg	0	35	0	0	12	0	0	0	0	17	0	17	20	17	12	14	11	14
25 Perc	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	12.0	0.0	11.0	0.0
Min	0	35	0	0	12	0	0	0	0	17	0	17	20	17	12	14	11	14

Figure No. 28: Trend of Fecal Coliform levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (1 of 2)

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

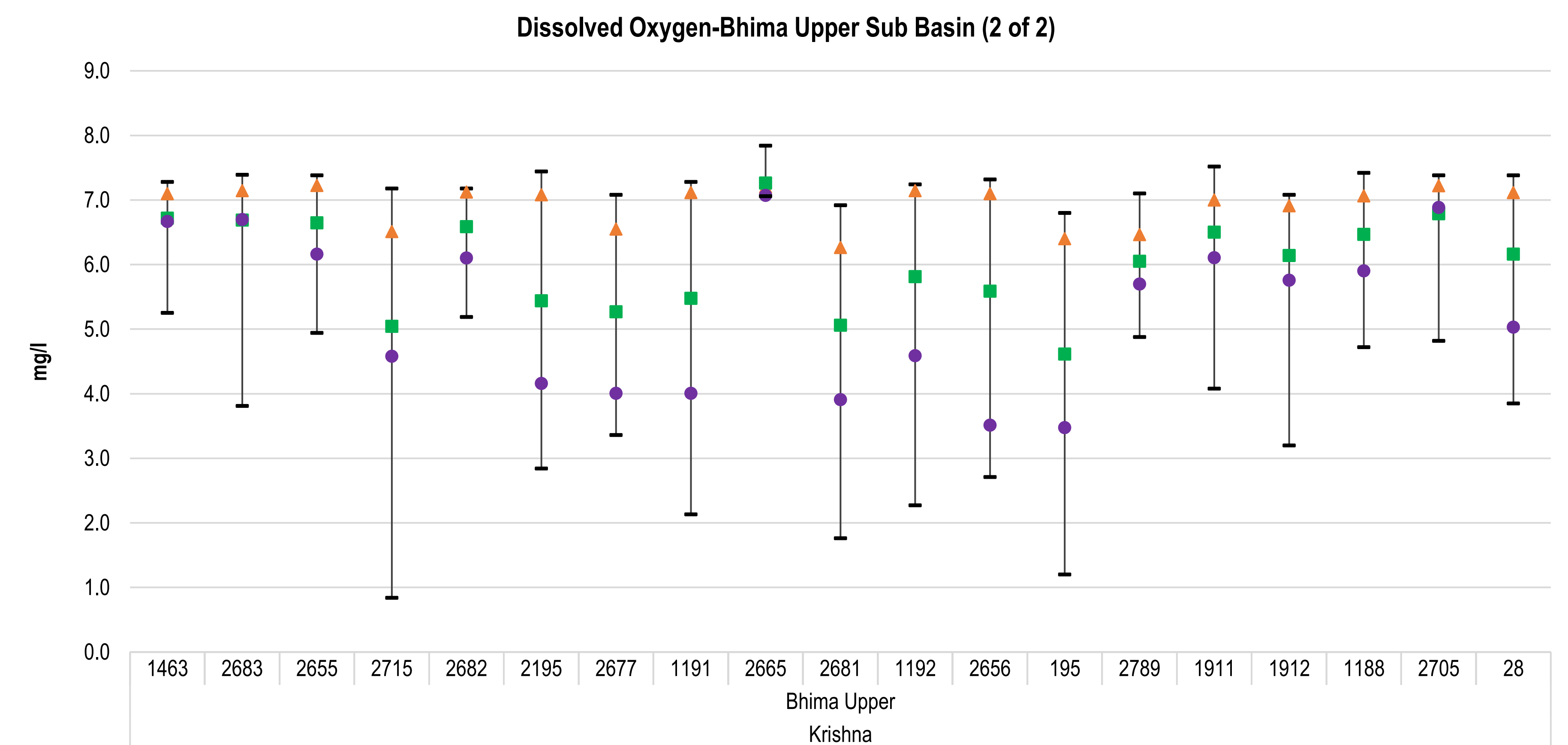
Apr	81	76	68	66	64	68	70	61	70	66	29	73	30	63	69	74	63	64
May	80	.	59	37	66	34	67	77	33	77	77	80	77	25	71	36	70	75
Jun	75	75	59	60	55	61	61	56	59	50	53	49	51	55		43	47	57
Jul	48	77	35	67	80	34	53	34	74	71	33	74	33	30	81	66	76	62
Aug	37	69	24	54	71	24	31		66	64	26	65	21	24	64	58	72	57
Sep	80	75	62	66	79	47	73	61	74	63	66	69	80	78	65	68	72	77
Oct	79	75	74	72	76	70	73	60	73	76	61	77	71	67	76	71	74	70
Nov	72	76	45	44	53	42	58	41	57	50	36	70	35	37	67	56	67	53
Dec	45	78	71	54	46	42	52	28	49	79	27	70	29	31	67	40	68	42
Jan	30	58	32	31	43	31	33	34	31	28	30	72		30	53	40	38	38
Feb	72	69	73	44	41	44	43	31	43	39	31	29	40	40	40	41	65	41
Mar	77	69	31	38	28	32	34	30	32	31	26	56	21	29	54	29	52	31
Station code	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192
Sub -Basin	Bhima Upper (1 of 2)																	

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

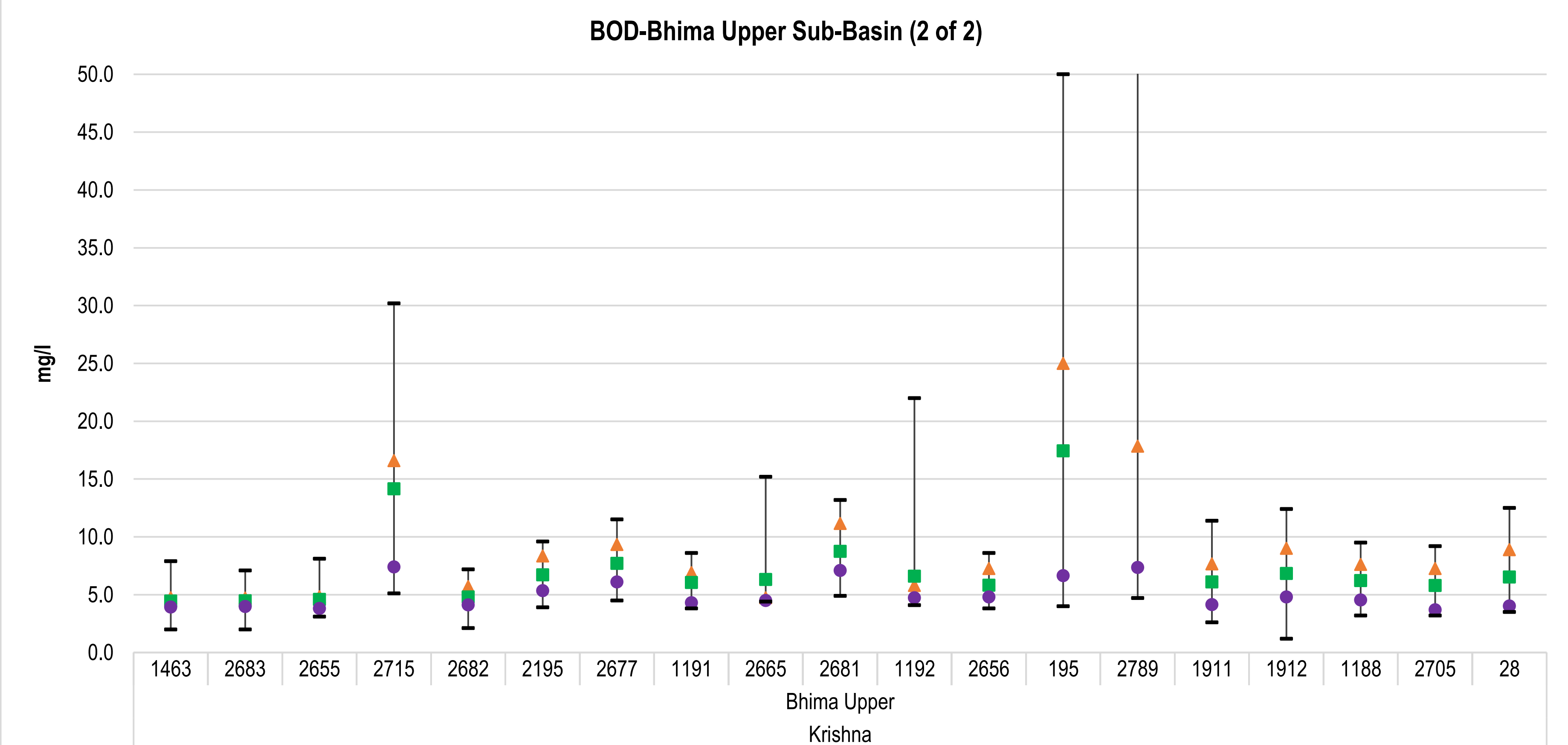
Table No. 18: Surface water quality monitoring stations in Krishna Basin (1 of 2) Sub Basin –Bhima Upper (1 of 2)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	2692	Pawana	Pawana at Ravet Weir, Pune	Ravet	Haweli	Pune
NWMP	2680	Mutha	Mutha at Khadakvasla Dam Pune	Kadakvasla	Haweli	Pune
NWMP	2693	Pawana	Pawana at Chinchwadgaon, Pune	Chinchwadgaon	Haweli	Pune
NWMP	2694	Pawana	Pawana at Pimprigaon, Pune	Pimprigaon	Haweli	Pune
NWMP	2193	Mula	Mula at Aundh Bridge -Aundgaon	Aundhgaon	Haweli	Pune
NWMP	2690	Pawana	Pawana at Kasarwadi Pune	Kasarwadi	Haweli	Pune
NWMP	2196	Pawana	Pawana at Sangavigaon, Pune	Sangavigaon	Haweli	Pune
NWMP	1189	Bhima	Bhima at Pune(Mutha) at U/s of Vithalwadi near Sankar Mandir	Vithalwadi	Haweli	Pune
NWMP	2691	Pawana	Pawana at Dapodi Bridge at Pawana-Mulla Sangan Pune	Dapodi	Haweli	Pune
NWMP	2194	Mula	Mula at Harrison Bridge near Mula -Pawana Sangam	Bopodi	Haweli	Pune
NWMP	2679	Mutha	Mutha at Deccan Bridge, Pune	Deccan	Pune	Pune
NWMP	2669	Indrayani	Indrayani at U/s of Moshigaon, Pune	Moshigaon	Haweli	Pune
NWMP	2678	Mutha	Mutha near Veer Savarkar Bhavan	Pune M.C	Pune	Pune
NWMP	2191	Mutha	Mutha at Sangam Bridge Near Ganpathi Ghat	Shivaji Nagar	Pune	Pune
NWMP	2668	Indrayani	Indrayani at D/s of Moshi village	Moshi	Haveli	Pune
NWMP	1190	Bhima	Bhima at D/s of Bundgarden, Pune	Yerwada	Haweli	Pune
NWMP	2197	Indrayani	Indrayani at D/s of Alandigaon, Pune	Alandigaon	Haweli	Pune
NWMP	2192	Mula-Mutha	Mula-Mutha at Mundhwa Bridge	Mundhawa	Haweli	Pune



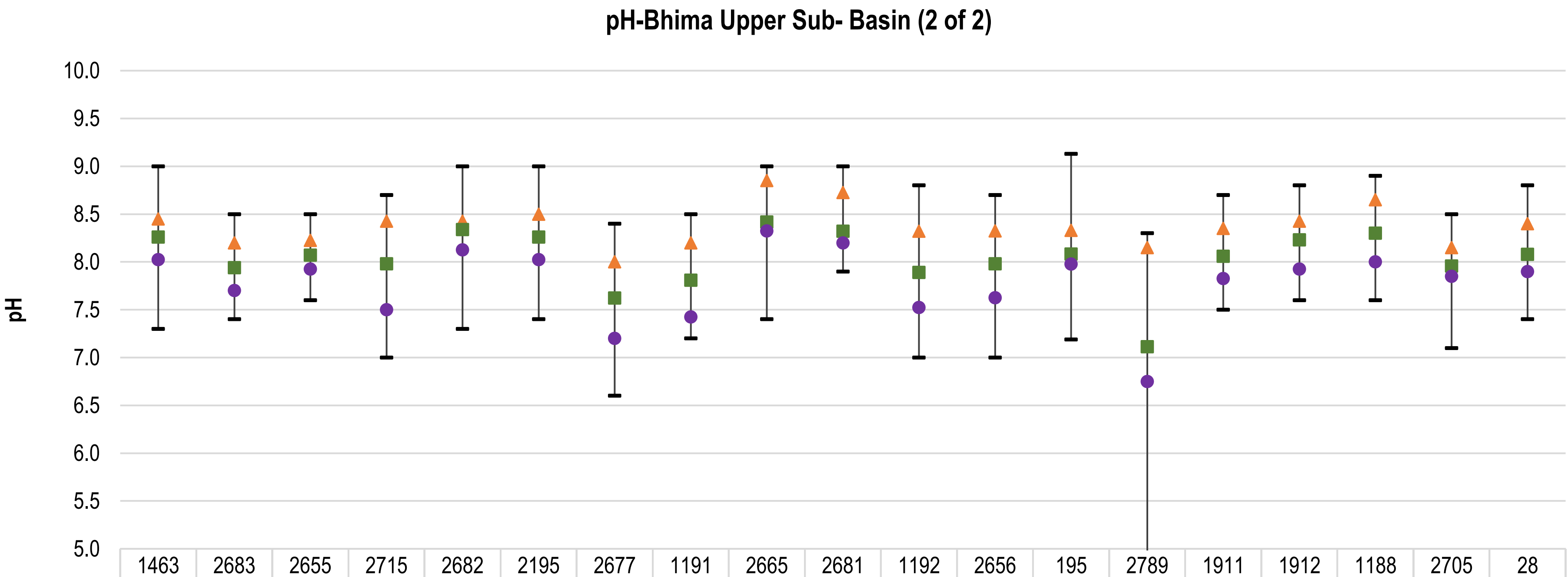
	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	2789	1911	1912	1188	2705	28
Max	7.3	7.4	7.4	7.2	7.2	7.4	7.1	7.3	7.8	6.9	7.2	7.3	6.8	7.1	7.5	7.1	7.4	7.4	7.4
75 Perc	7.1	7.1	7.2	6.5	7.1	7.1	6.6	7.1	7.2	6.3	7.1	7.1	6.4	6.5	7.0	6.9	7.1	7.2	7.1
Avg	6.7	6.7	6.6	5.0	6.6	5.4	5.3	5.5	7.3	5.1	5.8	5.6	4.6	6.1	6.5	6.1	6.5	6.8	6.2
25 Perc	6.7	6.7	6.2	4.6	6.1	4.2	4.0	4.0	7.1	3.9	4.6	3.5	3.5	5.7	6.1	5.8	5.9	6.9	5.0
Min	5.3	3.8	4.9	0.8	5.2	2.8	3.4	2.1	7.1	1.8	2.3	2.7	1.2	4.9	4.1	3.2	4.7	4.8	3.9

Figure No. 29: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (2 of 2)



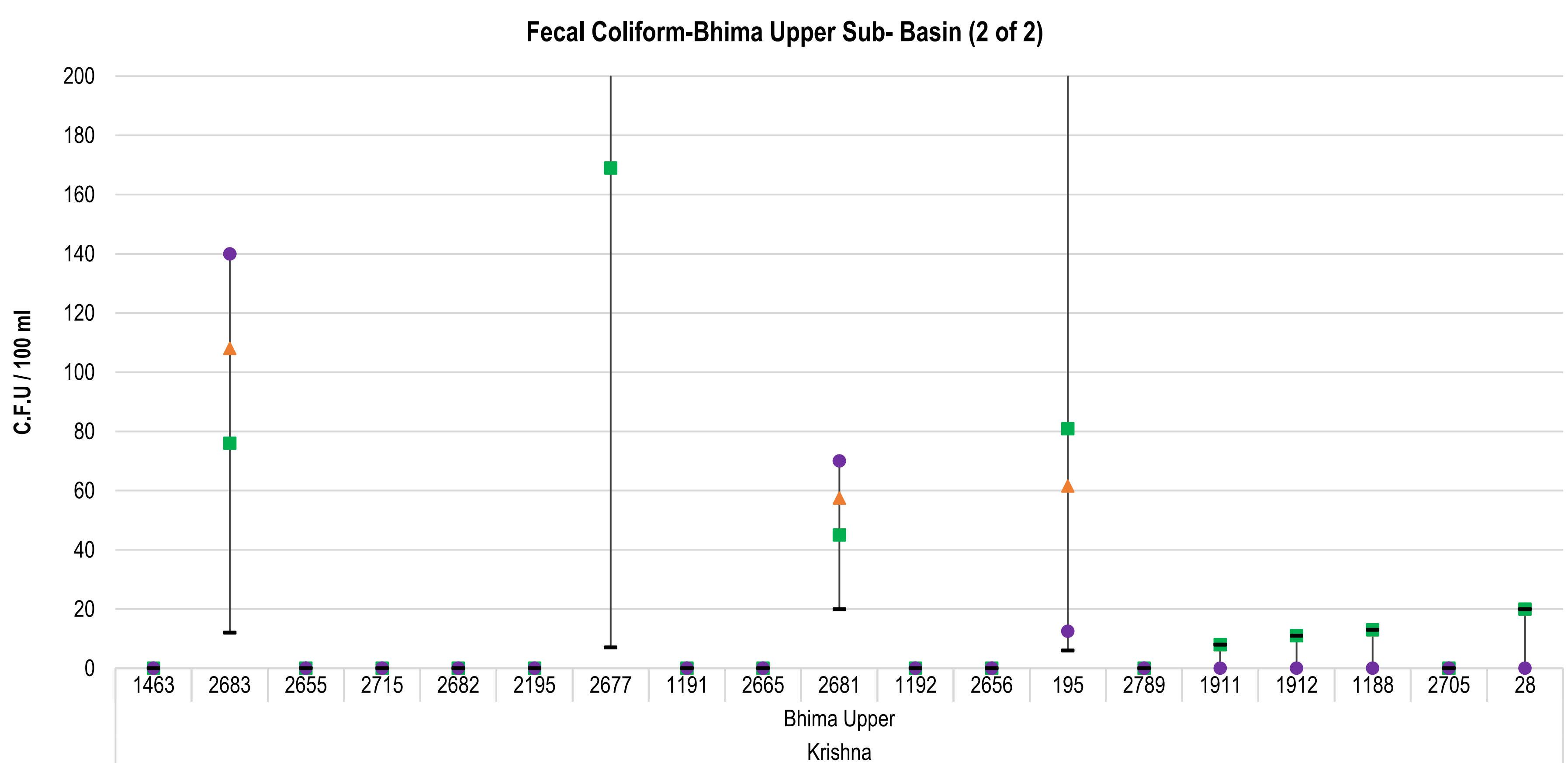
	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	2789	1911	1912	1188	2705	28
Max	7.9	7.1	8.1	30.2	7.2	9.6	11.5	8.6	15.2	13.2	22.0	8.6	50.0	480.0	11.4	12.4	9.5	9.2	12.5
75 Perc	4.7	4.7	4.8	16.6	5.7	8.4	9.4	6.9	4.7	11.2	5.8	7.3	25.0	17.9	7.7	9.0	7.6	7.3	8.9
Avg	4.4	4.5	4.6	14.2	4.8	6.7	7.7	6.1	6.3	8.8	6.6	5.8	17.4	78.2	6.1	6.8	6.2	5.8	6.5
25 Perc	3.9	4.0	3.8	7.4	4.1	5.4	6.1	4.3	4.5	7.1	4.7	4.8	6.7	7.4	4.2	4.8	4.6	3.7	4.0
Min	2.0	2.0	3.1	5.1	2.1	3.9	4.5	3.8	4.4	4.9	4.1	3.8	4.0	4.7	2.6	1.2	3.2	3.2	3.5

Figure No. 30: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (2 of 2)



Bhima Upper Krishna	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	2789	1911	1912	1188	2705	28
Max	9.0	8.5	8.5	8.7	9.0	9.0	8.4	8.5	9.0	9.0	8.8	8.7	9.1	8.3	8.7	8.8	8.9	8.5	8.8
75 Perc	8.5	8.2	8.2	8.4	8.4	8.5	8.0	8.2	8.9	8.7	8.3	8.3	8.3	8.2	8.4	8.4	8.7	8.2	8.4
Avg	8.3	7.9	8.1	8.0	8.3	8.3	7.6	7.8	8.4	8.3	7.9	8.0	8.1	7.1	8.1	8.2	8.3	8.0	8.1
25 Perc	8.0	7.7	7.9	7.5	8.1	8.0	7.2	7.4	8.3	8.2	7.5	7.6	8.0	6.8	7.8	7.9	8.0	7.9	7.9
Min	7.3	7.4	7.6	7.0	7.3	7.4	6.6	7.2	7.4	7.9	7.0	7.0	7.2	3.7	7.5	7.6	7.6	7.1	7.4

Figure No. 31: Trend of pH levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (2 of 2)



	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	2789	1911	1912	1188	2705	28
Max	0	140	0	0	0	0	250	0	0	70	0	0	500	0	8	11	13	0	20
75 Perc	0	108	0	0	0	0	250	0	0	57.5	0	0	61.5	0	8	11	13	0	20
Avg	0	76	0	0	0	0	169	0	0	45	0	0	80.9091	0	8	11	13	0	20
25 Perc	0.0	140.0	0.0	0.0	0.0	0.0	250.0	0.0	0.0	70.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0
Min	0	12	0	0	0	0	7	0	0	20	0	0	6	0	8	11	13	0	20

Figure No. 32: Trend of Fecal Coliform levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (2 of 2)

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

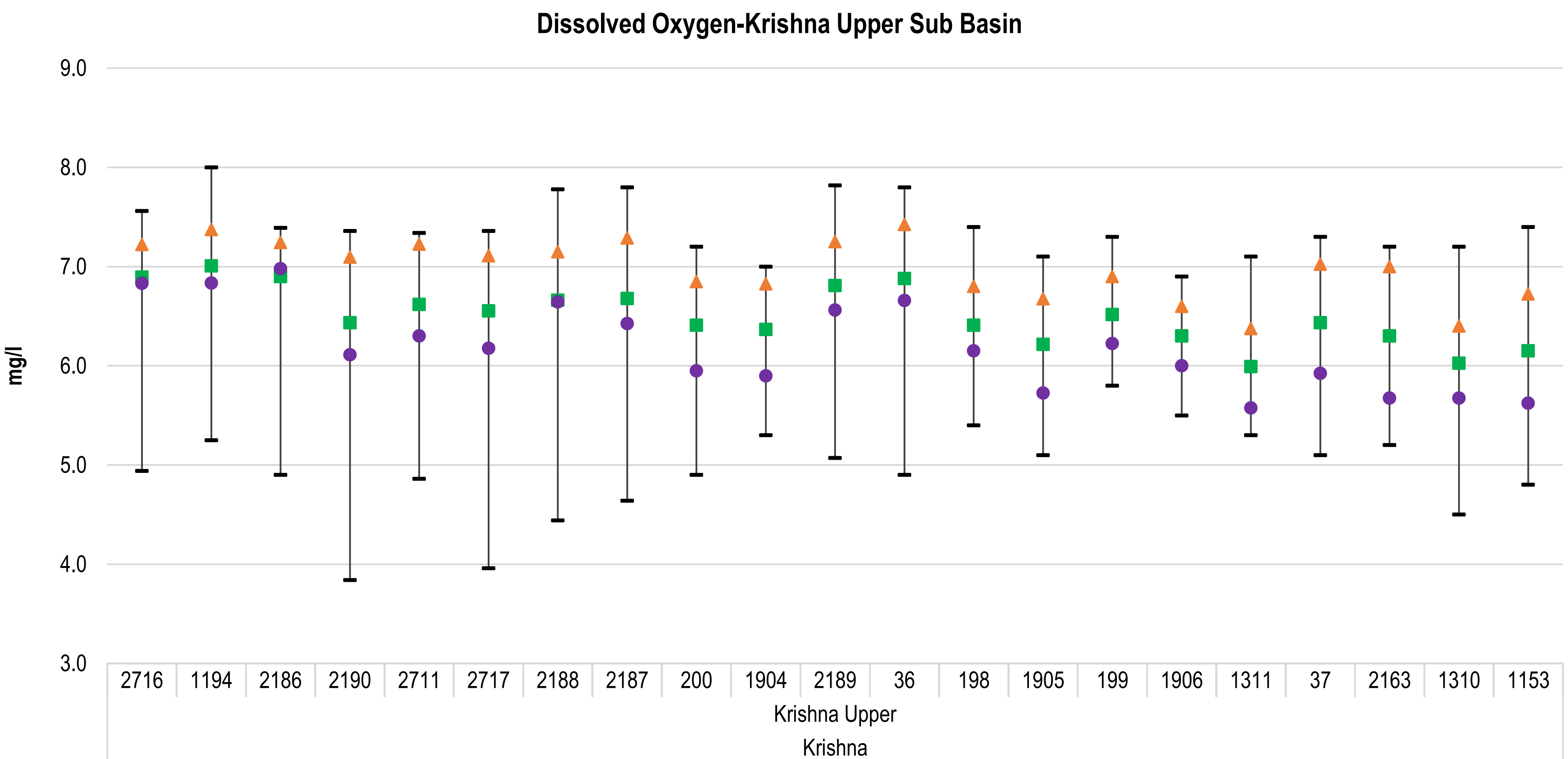
Apr	62	65	61	59	65	59	59	70	26	23	72	65	48	26	56	71	63	65	65
May	75	77	71		73	73	.	81	70	69	78	76	27	38	74		77	76	77
Jun	69	64	57		63	49	65	73		58	71	71	27	49	59	49	60	58	58
Jul	71	78	74	55	65	76	67	74	64	59	77	64	46	14	62	67	64	62	61
Aug	63	61	71	54	63	59	50	61	64	46	68	60	64	.	57	54	55	.	53
Sep	69	71	73	.	71	70	61	69	.	56	71	78	67	.	73	56	.	79	74
Oct	75	78	78	77	75	76	70	76	78	70	66	79	48	73	74	69	66	73	71
Nov	71	72	73		61	46	51	50	74	55	55	53	54	54	75	73	69	72	74
Dec	72	77	78		70	52	51	47		56	47	63	53	67	71	72	66		74
Jan	61	57	54		60	43	51	57		34	49	41	68		54	50	67		67
Feb	59	69	64	23	60	45	58	59	.	40	64	48	30		63	61	60		55
Mar	63	59	65	31	65	45	58	52	.	49	27	48	43		67	63			54
Station code	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	2789	1911	1912	1188	2705	28
Sub -Basin	Bhima Upper (2 of 2)																		

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

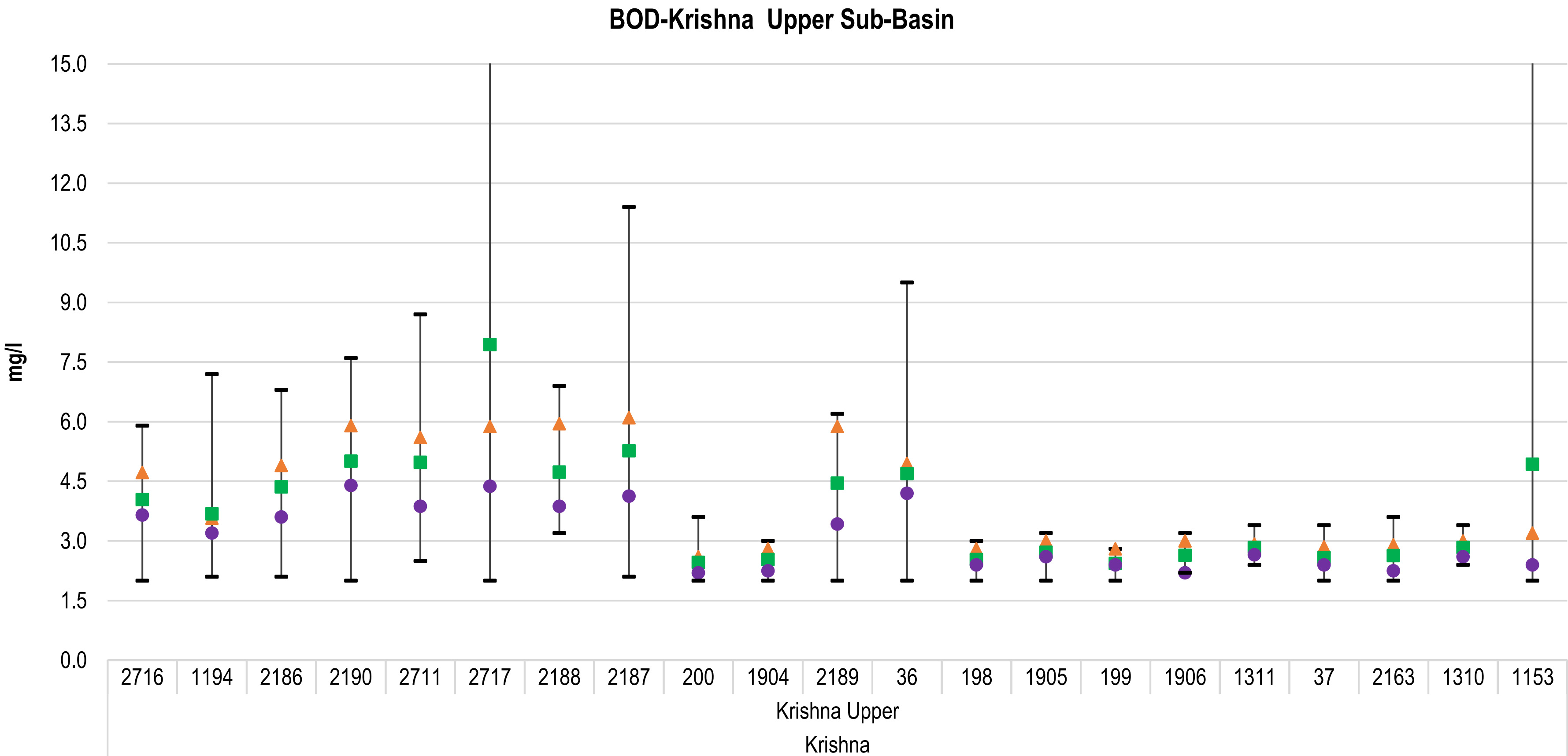
Table No. 19: Surface water monitoring stations at Krishna Basin (1 of 2) Sub Basin Bhima Upper (2 of 2)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	1463	Nira	Nira at Sarola bridge	Sarola	Bhor	Pune
NWMP	2683	Nira	Nira at Shindewadi	Shindewadi, Shirwal	Khandala	Satara
NWMP	2655	Bhima	Bhima at Koregaon near Koregaon Bridge, Pune	Koregaon	Shirur	Pune
NWMP	2715	Vel	Vel at Shikrapur, Pune	Shikrapur	Shirur	Pune
NWMP	2682	Nira	Nira at U/s of Jubilant Organosis Pune	Nira(Datta ghat)	Baramati	Pune
NWMP	2195	Nira	Nira at D/s of Jubilant Organosis Pune	Nimbut	Baramati	Pune
NWMP	2677	Mula-Mutha	Mula-Mutha at D/s of Theur, Pune	Theur	Haweli	Pune
NWMP	1191	Bhima	Bhima after confluence with Mula-Mutha at Pargaon near Vasant Bandara	Pargaon	Daund	Pune
NWMP	2665	Ghod	Ghod at Shirur, Pune	Shirur	Shirur	Pune
NWMP	2681	Nira	Nira at Sangavi	Sangavi	Phaltan	Satara
NWMP	1192	Bhima	Bhima at Daund near Mahadev temple	Daund	Daund	Pune
NWMP	2656	Bhima	Bhima Backwater of Ujani Dam near raw water pump house	Kumbargaon	Indapur	Pune
SWMP	195	Sina	Sina Bridge At Burudgaon Road, A/P Ahmednagar, Taluka & District Ahmednagar	Burudgaon	Ahmednagar	Ahmednagar
NWMP	2789	Nalla	Nalla at D/s of Alkai Mandir, Solapur	Aklai	Malshiras	Solapur
NWMP	1911	Chandrabhaga	Chandrabhaga at U/s of Pandharpur town	Gursale	Pandarpur	Solapur
NWMP	1912	Chandrabhaga	Chandrabhaga at D/s of Pandharpur town near Vishnupant Mandir	Gopalpur	Pandarpur	Solapur
NWMP	1188	Bhima	Bhima at Narshingpur near Sangam Bridge after confluence with Nira	Narsingpur	Malshiros	Solapur
NWMP	2705	Sina	Sina near Laboti till naka Solapur	Laboti	Mohal	Solapur
NWMP	28	Bhima	Bhima at Takli	Takali	South Solapur	Solapur



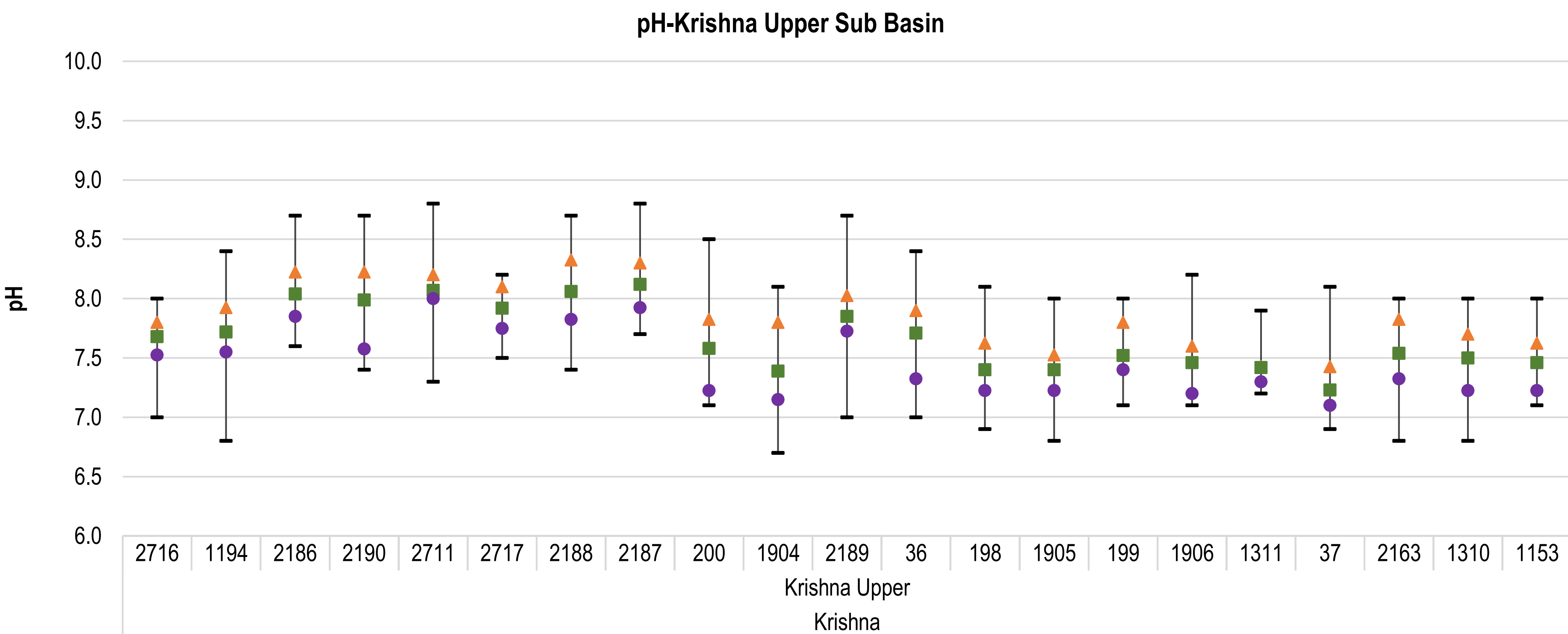
	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Max	7.6	8.0	7.4	7.4	7.3	7.4	7.8	7.8	7.2	7.0	7.8	7.8	7.4	7.1	7.3	6.9	7.1	7.3	7.2	7.2	7.4
75 Perc	7.2	7.4	7.2	7.1	7.2	7.1	7.2	7.3	6.9	6.8	7.3	7.4	6.8	6.7	6.9	6.6	6.4	7.0	7.0	6.4	6.7
Avg	6.9	7.0	6.9	6.4	6.6	6.6	6.7	6.7	6.4	6.4	6.8	6.9	6.4	6.2	6.5	6.3	6.0	6.4	6.3	6.0	6.2
25 Perc	6.8	6.8	7.0	6.1	6.3	6.2	6.6	6.4	6.0	5.9	6.6	6.7	6.2	5.7	6.2	6.0	5.6	5.9	5.7	5.7	5.6
Min	4.9	5.3	4.9	3.8	4.9	4.0	4.4	4.6	4.9	5.3	5.1	4.9	5.4	5.1	5.8	5.5	5.3	5.1	5.2	4.5	4.8

Figure No. 33: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Krishna upper sub basin -Krishna Basin



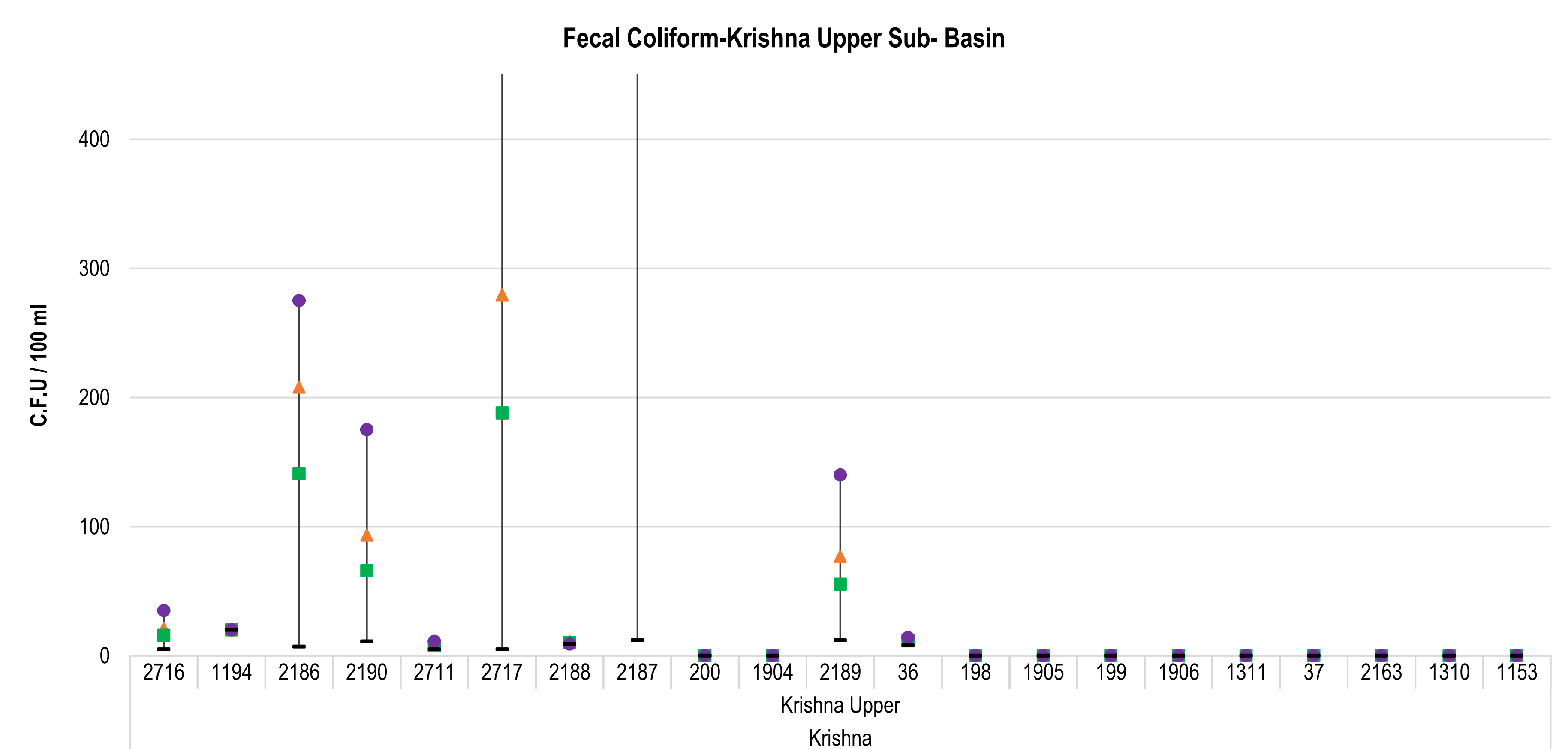
	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Max	5.9	7.2	6.8	7.6	8.7	42.0	6.9	11.4	3.6	3.0	6.2	9.5	3.0	3.2	2.8	3.2	3.4	3.4	3.6	3.4	30.0
75 Perc	4.7	3.6	4.9	5.9	5.6	5.9	6.0	6.1	2.6	2.8	5.9	5.0	2.8	3.0	2.8	3.0	2.9	2.9	2.9	3.0	3.2
Avg	4.0	3.7	4.4	5.0	5.0	7.9	4.7	5.3	2.5	2.5	4.5	4.7	2.5	2.7	2.4	2.6	2.8	2.6	2.6	2.8	4.9
25 Perc	3.7	3.2	3.6	4.4	3.9	4.4	3.9	4.1	2.2	2.3	3.4	4.2	2.4	2.6	2.4	2.2	2.7	2.4	2.3	2.6	2.4
Min	2.0	2.1	2.1	2.0	2.5	2.0	3.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.0	2.0	2.4	2.0

Figure No. 34: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Krishna upper sub basin - Krishna Basin



	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Max	8.0	8.4	8.7	8.7	8.8	8.2	8.7	8.8	8.5	8.1	8.7	8.4	8.1	8.0	8.0	8.2	7.9	8.1	8.0	8.0	8.0
75 Perc	7.8	7.9	8.2	8.2	8.2	8.1	8.3	8.3	7.8	7.8	8.0	7.9	7.6	7.5	7.8	7.6	7.4	7.4	7.8	7.7	7.6
Avg	7.7	7.7	8.0	8.0	8.1	7.9	8.1	8.1	7.6	7.4	7.9	7.7	7.4	7.4	7.5	7.5	7.4	7.2	7.5	7.5	7.5
25 Perc	7.5	7.6	7.9	7.6	8.0	7.8	7.8	7.9	7.2	7.2	7.7	7.3	7.2	7.2	7.4	7.2	7.3	7.1	7.3	7.2	7.2
Min	7.0	6.8	7.6	7.4	7.3	7.5	7.4	7.7	7.1	6.7	7.0	7.0	6.9	6.8	7.1	7.1	7.2	6.9	6.8	6.8	7.1

Figure No. 35: Trend of pH levels recorded at WQMS at Krishna upper sub basin -Krishna Basin



	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Max	35	20	275	175	11	550	11	900	0	0	140	14	0	0	0	0	0	0	0	0	0
75 Perc	21	20	208	93.5	9	279.5	11	678	0	0	77	14	0	0	0	0	0	0	0	0	0
Avg	15.667	20	141	66	7.6667	188	10.333	456	0	0	55.333	12	0	0	0	0	0	0	0	0	0
25 Perc	35.0	20.0	275.0	175.0	11.0	550.0	9.0	900.0	0.0	0.0	140.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min	5	20	7	11	5	5	9	12	0	0	12	8	0	0	0	0	0	0	0	0	0

Figure No. 36: Trend of Fecal Coliform recorded at WQMS at Krishna upper sub basin -Krishna Basin

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

Apr	76	77	76	66	64	63	67	55	81	81	73	66	79	80	81	78	78	76	77	77	77
May	81	82	80	76	82	81	79	79	78	72	83	80	75	74	76	75	76	74	73	76	75
Jun	73	82	70	59	65	68	59	56	77	80	65	73	76	82	77	.	82	79	83	83	80
Jul	79	70	73	80	72	60	76	71	70	77	69	76	75	77	77	76	72	72	74	76	58
Aug	71	69	53	58	65	58	69	48	80	81	58	68	79	79	78	.	82	80	79	79	78
Sep	77	78	75	74	73	74	76	73	74	75	77	76	77	77	77	82	79	77	79	78	80
Oct	76	76	76	76	74	75	70	73	80	81	78	78	80	78	79	.	79	79	77	78	81
Nov	76	74	70	66	69	70	69	75	73	67	72	75	82	69	73	73	69	78	71	63	65
Dec	76	79	73	68	74	66	74	78	75	77	73	76	76	72	75	.	75	80	71	70	74
Jan	78	59	55	72	75	79	73	54	85	72	77	76	83	75	80	.	73	84	81	70	80
Feb	74	65	69	68	62	68	66	65	77	58	69	73	75	55	77	.	54	77	50	52	71
Mar	65	71	62	58	64	57	57	61	76	78	68	64	75	81	82	.	79	83	83	79	79
Station code	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Sub - Basin	Krishna Upper																				

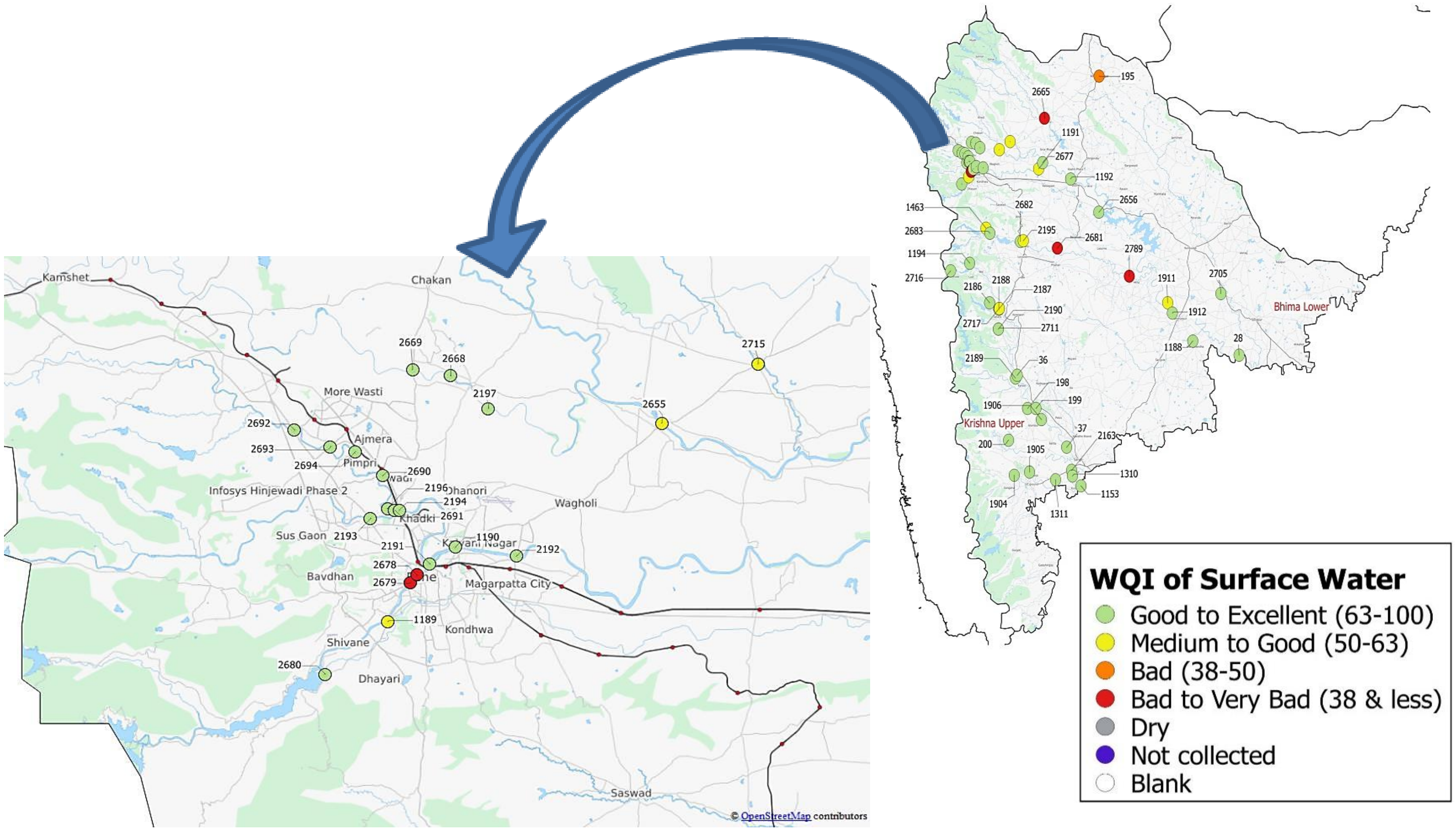
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

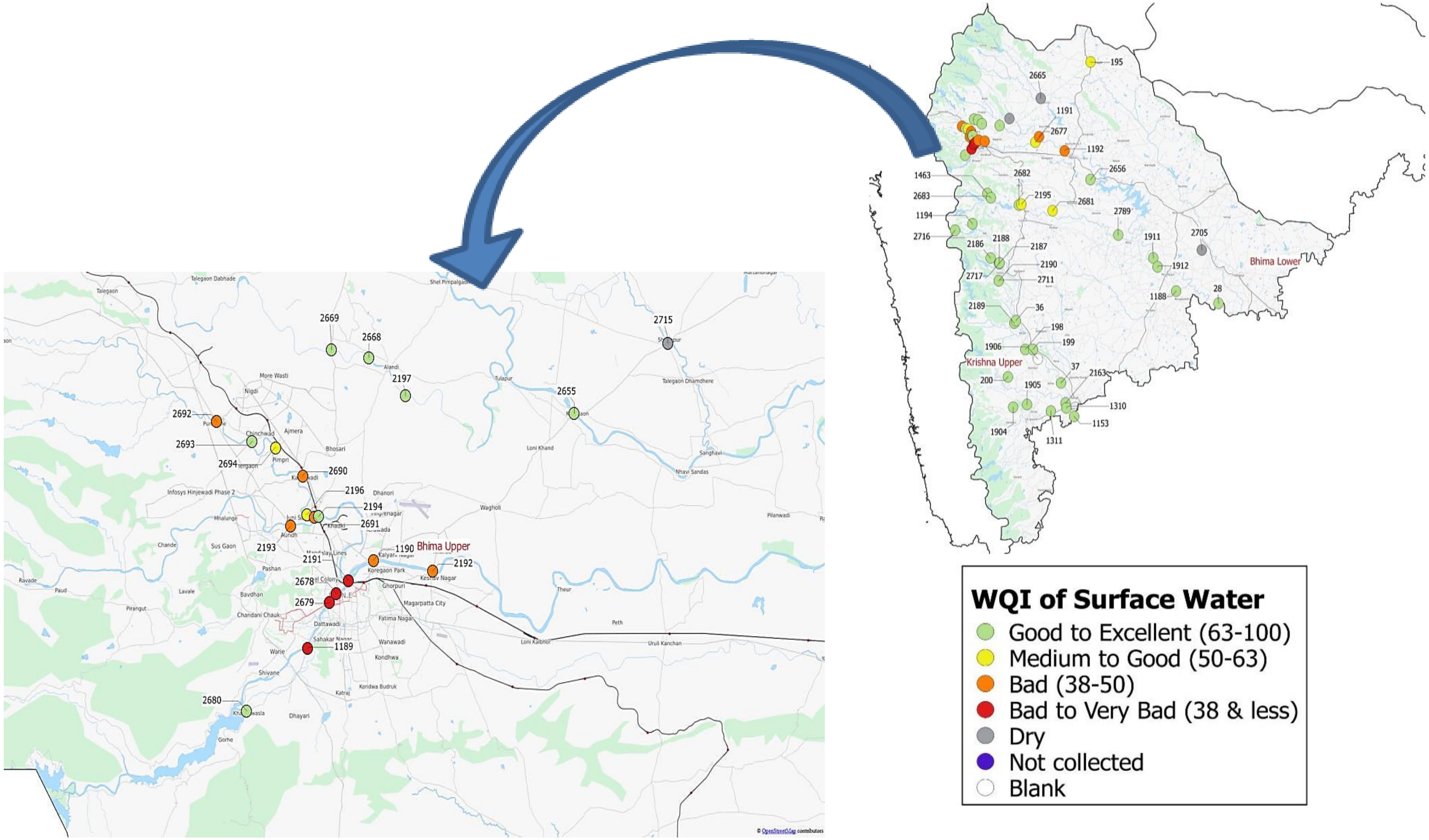
Table No. 20: Surface water quality monitoring stations in Krishna Basin (1 of 2): Sub basin Bhima upper (1 of 3)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	2716	Venna	Venna at Mahabaleshwar	Mahabaleshwar	Mahabaleshwar n	Satara
NWMP	1194	Krishna	Krishna at Dhom Dam	Wai	Mahabaleshwar	Satara
NWMP	2186	Venna	Venna at Varya, Satara	Varye	Satara	Satara
NWMP	2190	Krishna	Krishna at Wai	Wai	Wai	Satara
NWMP	2711	Urmodi	Urmodi at Nagthane Satara	Nagthane	Satara	Satara
NWMP	2717	Venna	Venna at Mahuli	Mahuli	Satara	Satara
NWMP	2188	Krishna	Krishna at Krishna-Venna Sangam, Mahuli	Mahuli	Mahuli	Satara
NWMP	2187	Krishna	Krishna at Kshetra Mahuli Satara	Kshetra Mahuli	Mahuli	Satara
SWMP	200	Warna	Mangle Bridge, (After Confluence of Morna)	Mangle	Shirala	Sangli
NWMP	1904	Panchganga	U/s of Kolhapur town near Balinga Pumping Station	Balinga	Karvir	Kolhapur
NWMP	2189	Koyna	Koyna at Karad	Karad	Karad	Satara
NWMP	36	Krishna	Krishna at Krishna Bridge, Karad	Karad	Karad	Satara
SWMP	198	Krishna	Bahe KT Weir, Bahe, Taluka - Walwa, District - Sangli	Bahe	Walwa	Sangli
NWMP	1905	Panchaganga	Panchaganga at D/s of Kolhapur town at Gandhi nagar near NH-4 bridge and MIDC intake well	Uchegaon	Kolhapur	Kolhapur
SWMP	199	Krishna	Borgaon KT Weir, Borgaon, Taluka - Walwa, District - Sangli	Borgaon	Walwa	Sangli
NWMP	1906	Krishna	Krishna at Walwa, D/s of Islampur near Vithal Temple	Walwa	Walwa	Sangli
NWMP	1311	Panchganga	Panchganga at Ichalkaranji near MIDC intake well	Shiradhwad (Ichalkaranji ghat)	Hatkanangale	Kolhapur
NWMP	37	Krishna	Krishna at Maighat, Sangli	Gawali gally	Miraj	Sangli
NWMP	2163	Panchganga	Panchganga at Shirol near Shirol intake well	Shirol	Shirol	Kolhapur
NWMP	1310	Krishna	Krishna at Kurundwad	Narshingwadi, Kurundwad	Shirol	Kolhapur
NWMP	1153	Krishna	Krishna at Rajapur Weir	Rajapur	Shirol	Kolhapur

Spatial map of Surface WQI at Krishna Basin (April 2015)

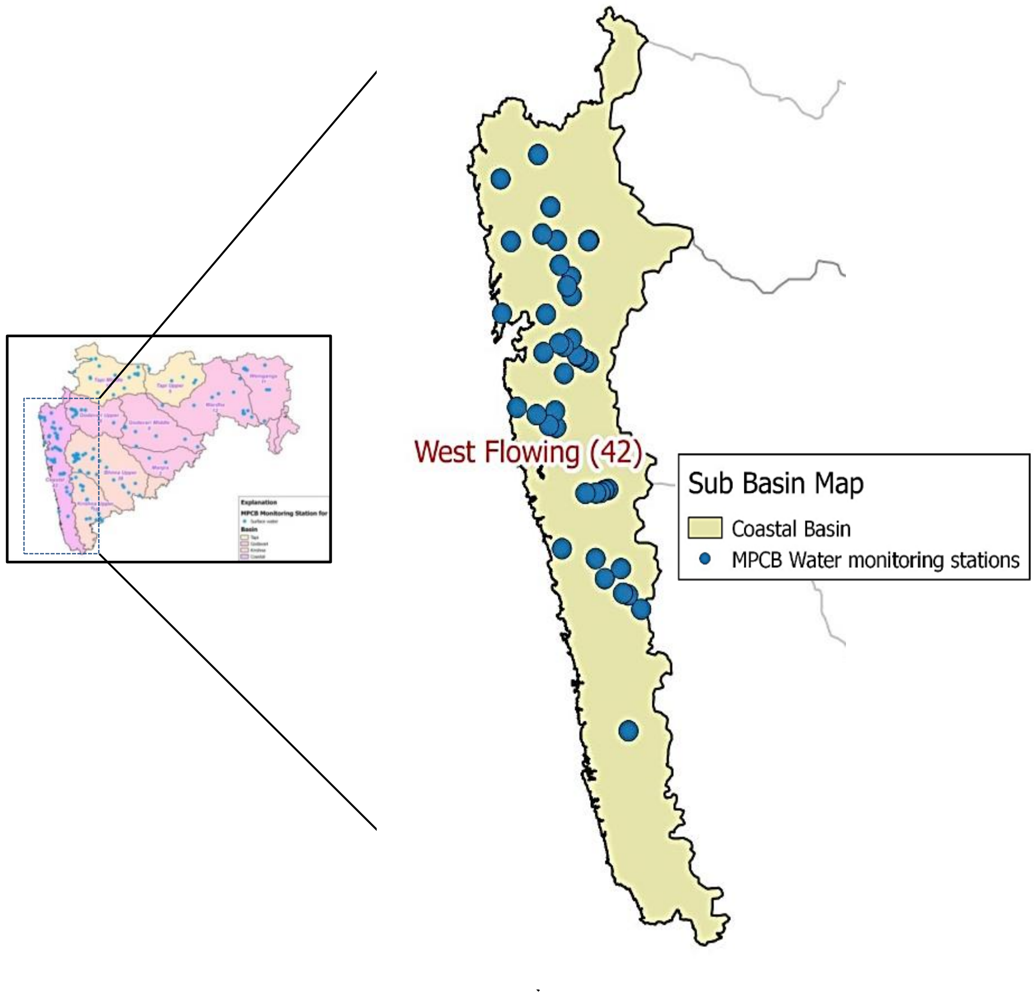


Spatial map of Surface WQI at Krishna Basin (December 2015)



West Flowing Rivers

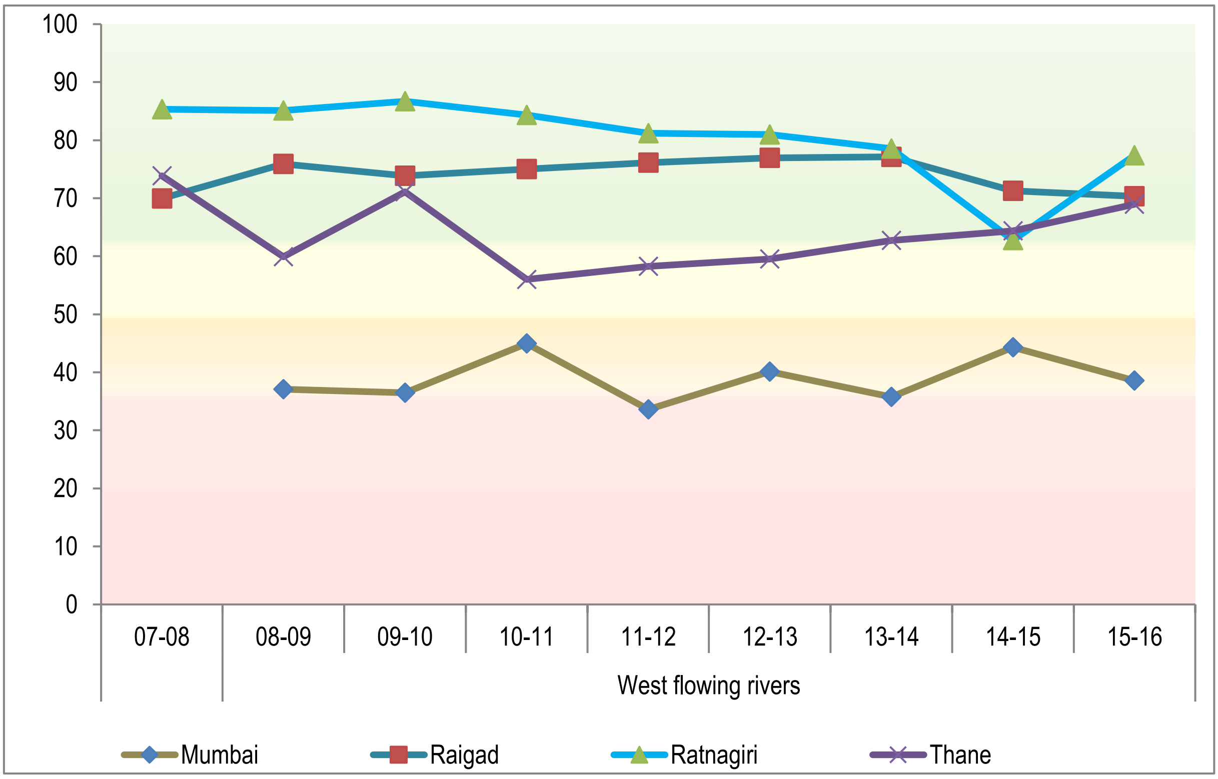
Maharashtra has many westwards flowing s originating from the Western Ghats like Damanganga, Surya, Vaitarna, Ulhas, Savitri, Kundalika, Patalganga, Vashisti, Shastri, Karli, Terekhol and so on[27]. These are an important source of drinking water, agricultural applications and industrial purposes and are known to contribute about 44.54% of the yield at 75% dependability of Maharashtra. Rivers like Vaitarna, Patalganga, Ulhas, and 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



Map No. 7: Network of surface water quality monitoring stations in West flowing s basin

[27] 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. 37: Trend of annual average WQI across districts of West Flowing 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 s in that district.

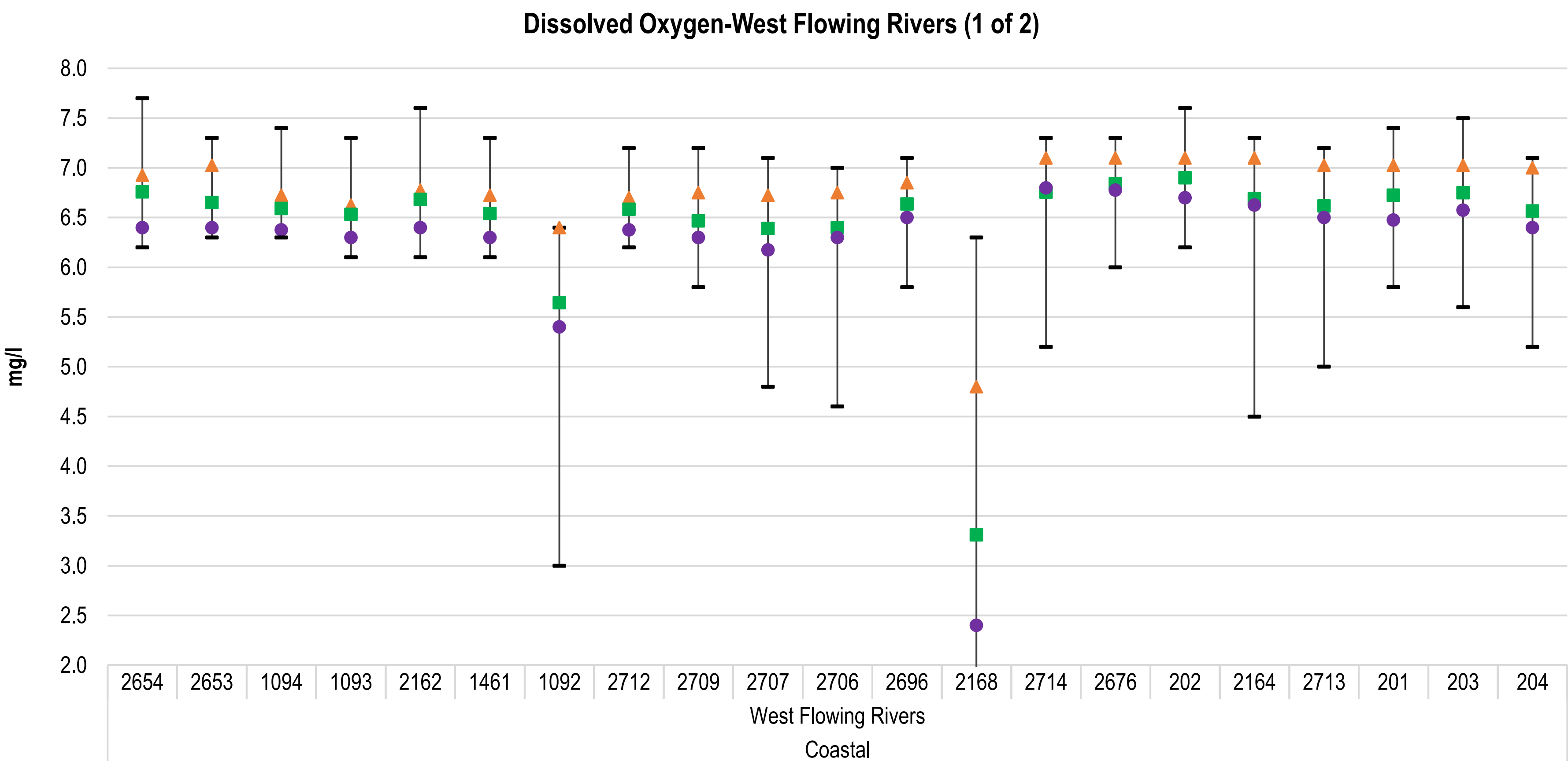
Figure No. 38: Trend of average occurrence for different category of WQI in West flowing

The intra basin performance of west flowing and nalla across four districts of the state are depicted in the Figure No. 37 and the average annual occurrence of different category of Water Quality Index across all WQMS is depicted in the Figure No. 38.

The results showed that among four districts, namely Thane, Mumbai, Raigad and Ratnagiri, the annual average WQI of Mumbai were consistently in Bad to Medium category (38-63) across all the years. This year in 2015-16 WQI has also shown a decline which indicates the deteriorating water quality in Mumbai.

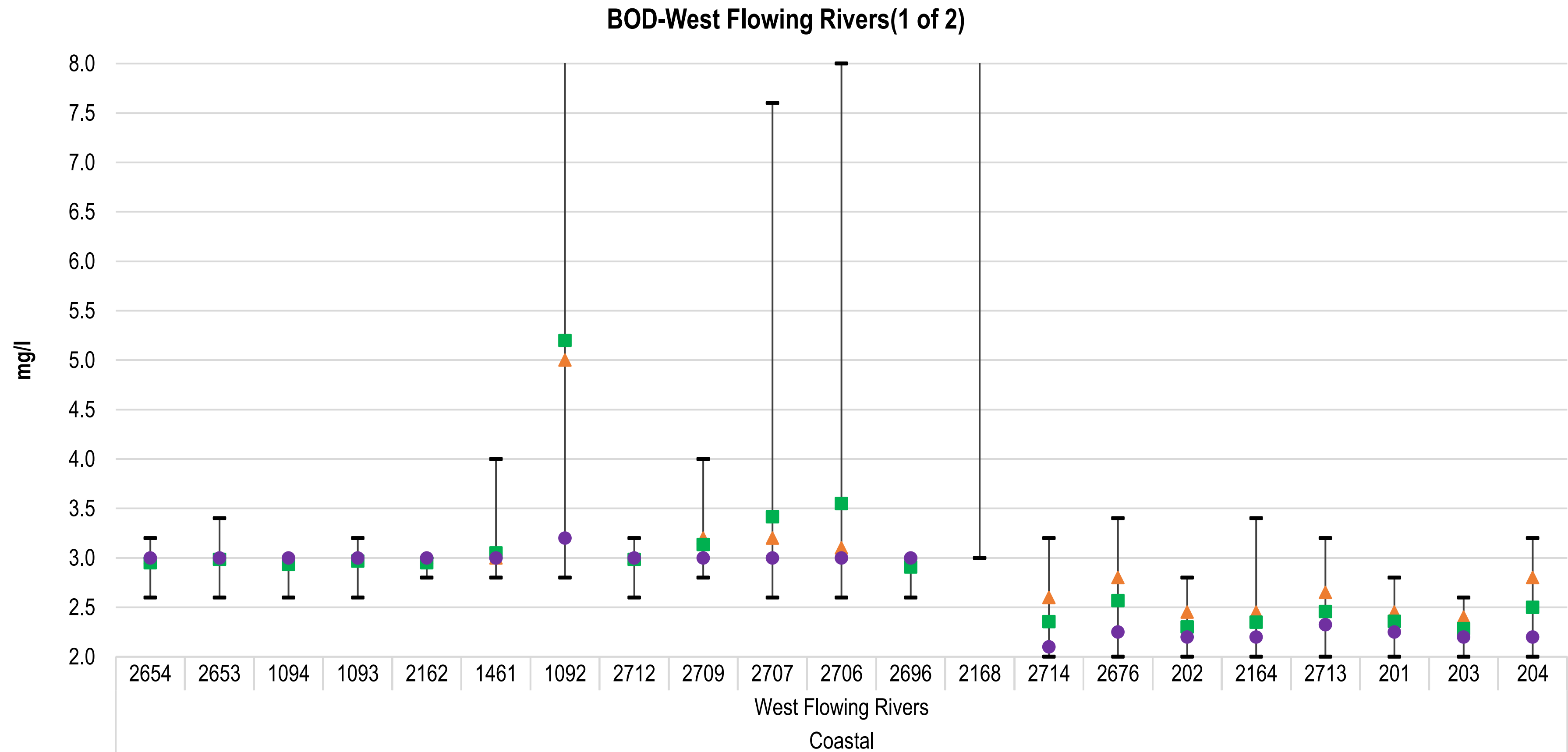
Raigad, Ratnagiri and Thane were in Good to Excellent (63-100) category. Thane and Ratnagiri have shown improvement in its category this year compared to last year (2014-15). Even though the WQI for Raigad is in Good to Excellent category, a decreasing trend could be observed over the years.

Figure No. 38 shows average annual occurrence of WQI across WQM stations of coastal basin for west flowing s and nallas. In the year 2015-16, West flowing s shows the a decrease in the occurrence of Medium to Good category of WQI as compared to last 7 years.The decline trend in WQI maybe due to unavailaibility of data. The occurrence of Medium to Good category has increased this year.



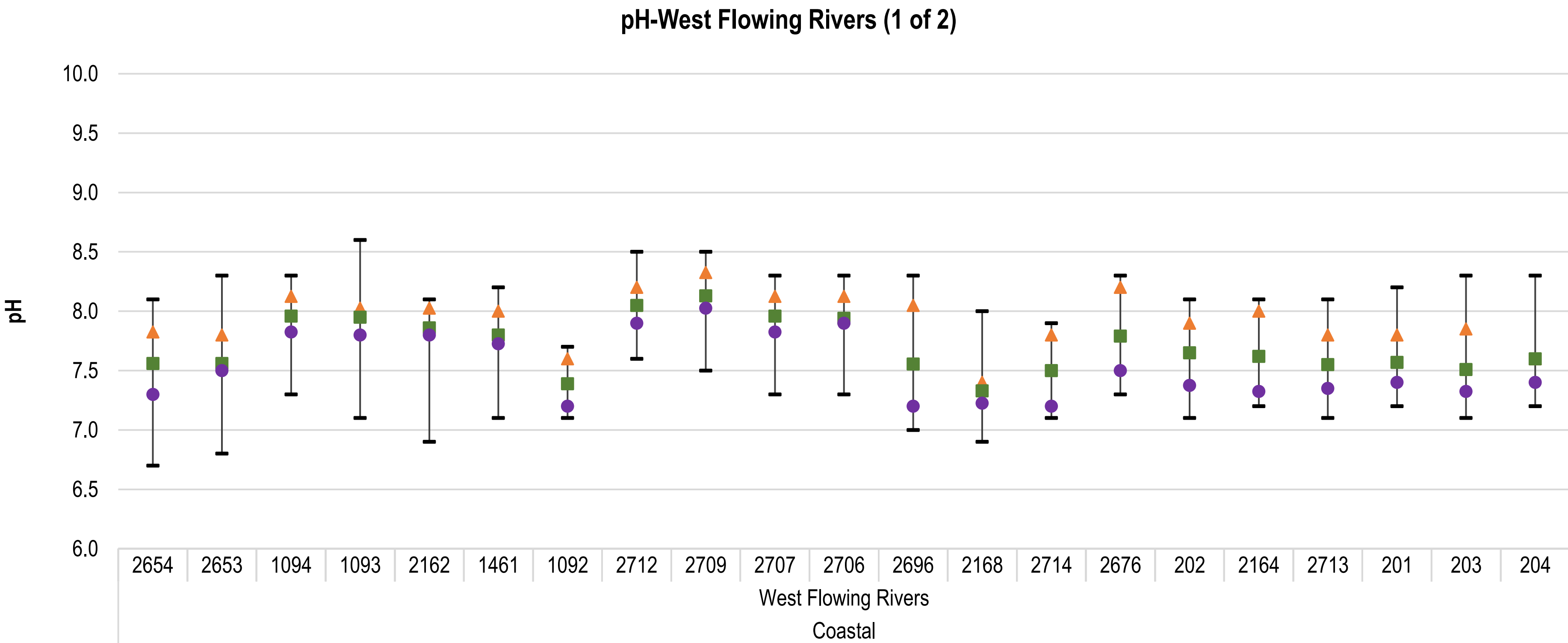
	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Max	7.7	7.3	7.4	7.3	7.6	7.3	6.4	7.2	7.2	7.1	7.0	7.1	6.3	7.3	7.3	7.6	7.3	7.2	7.4	7.5	7.1
75 Perc	6.9	7.0	6.7	6.6	6.8	6.7	6.4	6.7	6.8	6.7	6.8	6.9	4.8	7.1	7.1	7.1	7.1	7.0	7.0	7.0	7.0
Avg	6.8	6.7	6.6	6.5	6.7	6.5	5.6	6.6	6.5	6.4	6.4	6.6	3.3	6.8	6.8	6.9	6.7	6.6	6.7	6.8	6.6
25 Perc	6.4	6.4	6.4	6.3	6.4	6.3	5.4	6.4	6.3	6.2	6.3	6.5	2.4	6.8	6.8	6.7	6.6	6.5	6.5	6.6	6.4
Min	6.2	6.3	6.3	6.1	6.1	6.1	3.0	6.2	5.8	4.8	4.6	5.8	0.9	5.2	6.0	6.2	4.5	5.0	5.8	5.6	5.2

Figure No. 39: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at West flowing s (Coastal basin) (1 OF 2)



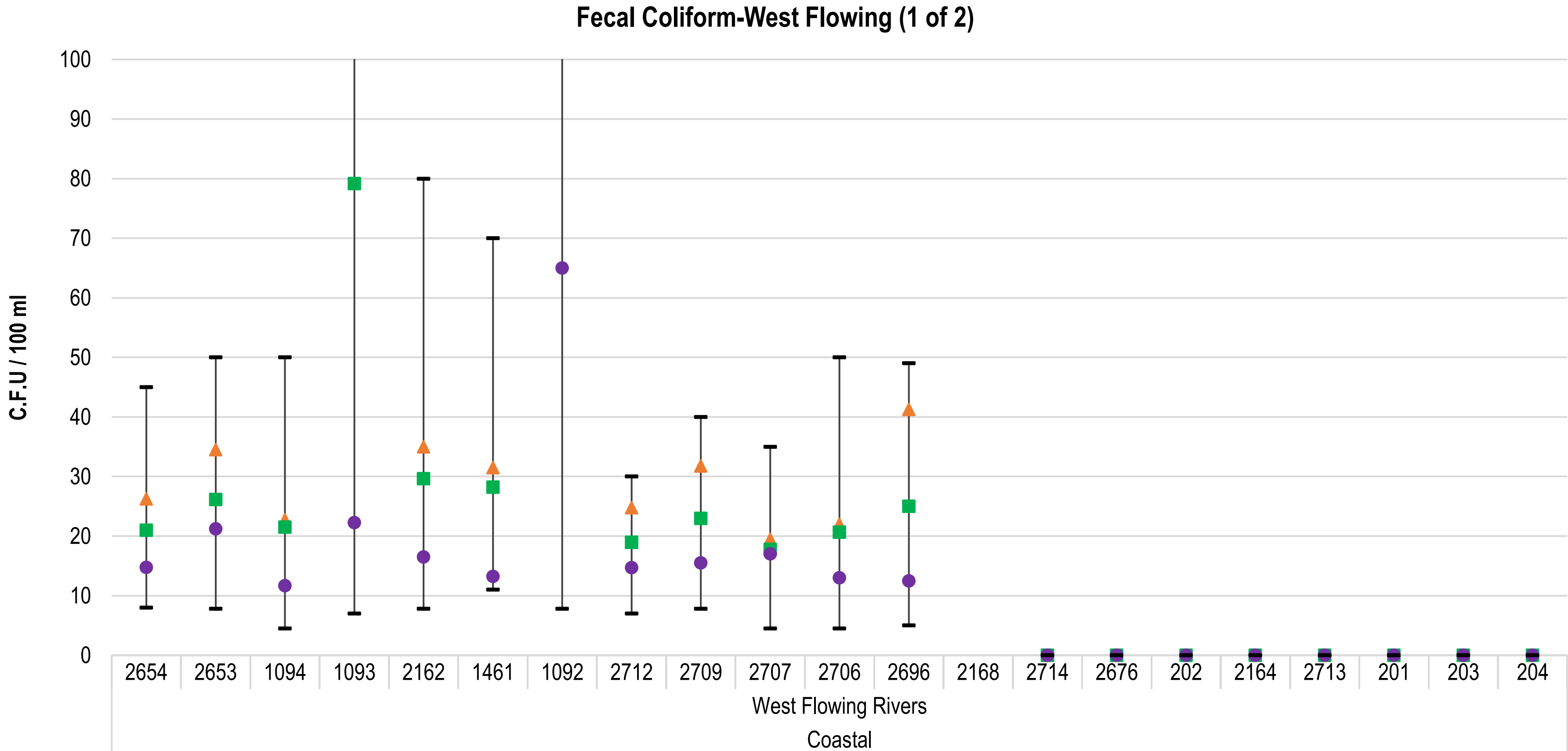
	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Max	3.2	3.4	3.0	3.2	3.0	4.0	14.0	3.2	4.0	7.6	8.0	3.0	70.0	3.2	3.4	2.8	3.4	3.2	2.8	2.6	3.2
75 Perc	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	3.2	3.2	3.1	3.0	48.8	2.6	2.8	2.5	2.5	2.7	2.5	2.4	2.8
Avg	3.0	3.0	2.9	3.0	3.0	3.1	5.2	3.0	3.1	3.4	3.6	2.9	37.1	2.4	2.6	2.3	2.4	2.5	2.4	2.3	2.5
25 Perc	3.0	3.0	3.0	3.0	3.0	3.0	3.2	3.0	3.0	3.0	3.0	3.0	18.8	2.1	2.3	2.2	2.2	2.3	2.3	2.2	2.2
Min	2.6	2.6	2.6	2.6	2.8	2.8	2.8	2.6	2.8	2.6	2.6	2.6	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Figure No. 40: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at West flowing riverss (Coastal basin) (1 of 2)



	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Max	8.1	8.3	8.3	8.6	8.1	8.2	7.7	8.5	8.5	8.3	8.3	8.3	8.0	7.9	8.3	8.1	8.1	8.1	8.2	8.3	8.3
75 Perc	7.8	7.8	8.1	8.0	8.0	8.0	7.6	8.2	8.3	8.1	8.1	8.1	7.4	7.8	8.2	7.9	8.0	7.8	7.8	7.9	7.6
Avg	7.6	7.6	8.0	8.0	7.9	7.8	7.4	8.1	8.1	8.0	7.9	7.6	7.3	7.5	7.8	7.7	7.6	7.6	7.6	7.5	7.6
25 Perc	7.3	7.5	7.8	7.8	7.8	7.7	7.2	7.9	8.0	7.8	7.9	7.2	7.2	7.2	7.5	7.4	7.3	7.4	7.4	7.3	7.4
Min	6.7	6.8	7.3	7.1	6.9	7.1	7.1	7.6	7.5	7.3	7.3	7.0	6.9	7.1	7.3	7.1	7.2	7.1	7.2	7.1	7.2

Figure No. 41: Trend of pH levels recorded at WQMS at West flowing rivers (Coastal basin) (1 of 2)



	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Max	45	50	50	250	80	70	920	30	40	35	50	49	1600	0	0	0	0	0	0	0	0
75 Perc	26.25	34.5	22.75	115	35	31.5	220	24.75	31.75	19.5	22	41.25	905	0	0	0	0	0	0	0	0
Avg	21	26.15	21.53	79.167	29.644	28.2	269.31	18.98	22.98	17.755	20.664	25	688.33	0	0	0	0	0	0	0	0
25 Perc	14.8	21.3	11.7	22.3	16.5	13.3	65.0	14.7	15.5	17.0	13.0	12.5	225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min	8	7.8	4.5	7	7.8	11	7.8	7	7.8	4.5	4.5	5	110	0	0	0	0	0	0	0	0

Figure No. 42: Trend of Fecal Coliform recorded at WQMS at West flowing rivers (Coastal basin) (1 of 2)

Water Quality Index of WQMS on West Flowing rivers (1 of 2)

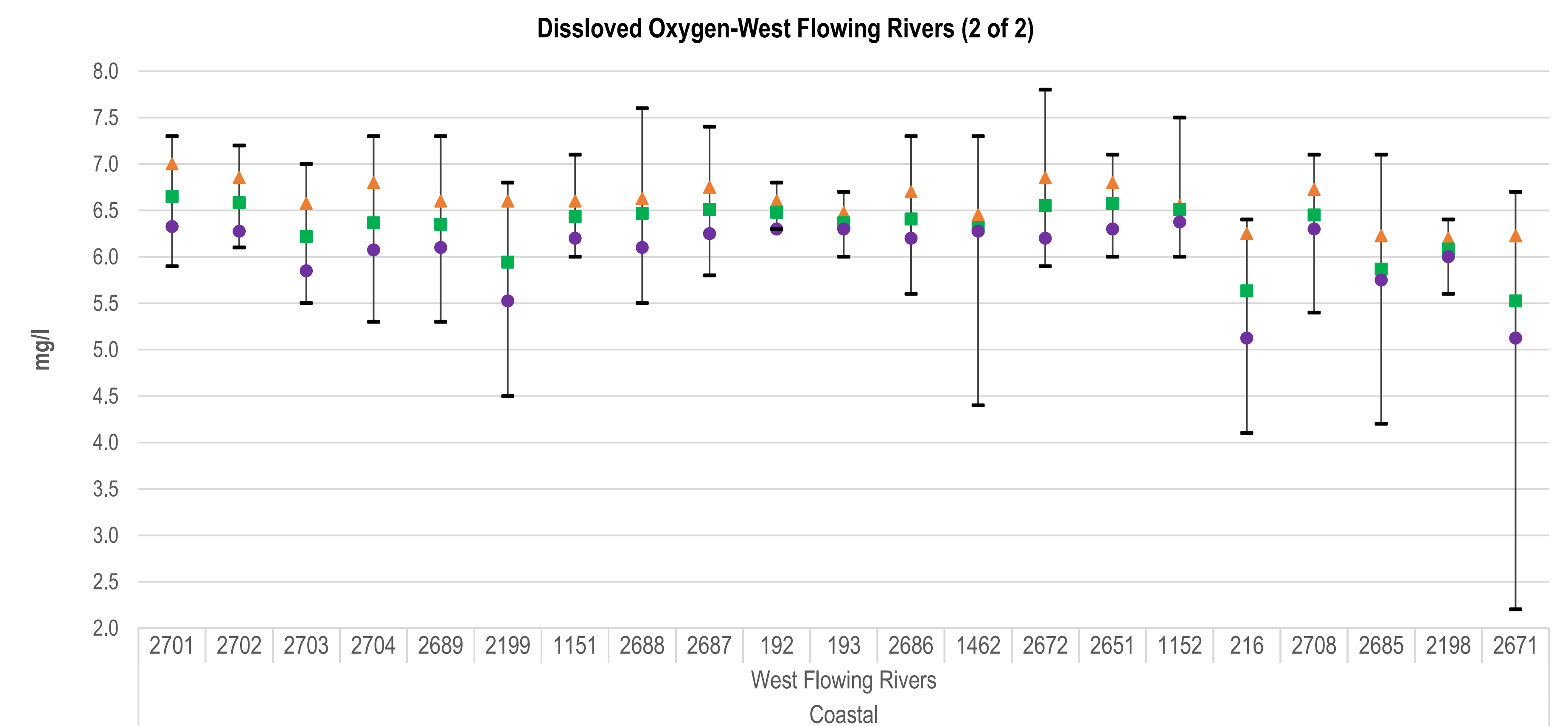
Apr	72	70	69	60	68	67	46	67	62	72	73	71	30	.	75	76	76	78	82	80	80
May	70	68	68	62	68	71	56	71	70	69	67	68	28	.	73	78	74	74	76	78	74
Jun	76	74	74	76	79	78	66	74	75	73	75	73	48	.	77	77	78	79	81	82	77
Jul	71	75	54	71	54	50	75	54	55	70	72	.	56	83	80	85	85	80	77	76	80
Aug	75	73	51	72	56	73	68	71	71	72	72	79	67	79	74	79	81	79	78	80	81
Sep	72	69	71	71	72	70	62	72	67	57	59	73	36	79	72	75	77	78	74	74	75
Oct	73	71	72	65	69	72	62	68	69	72	67	72	37	78	78	79	81	79	79	78	79
Nov	70	70	70	68	70	71	62	74	67	69	67	68	34	68	77	77	63	66	78	76	74
Dec	71	71	69	63	70	67	.	69	66	74	73	71	41	80	82	78	83	81	82	84	81
Jan	71	70	67	62	68	67		67	66	71	70	69	34	79	75	83	78	77	84	80	
Feb	73	71	81	74	76	74		70	68	72	75	76	25	59	55	82	59	58	77	77	.
Mar	72	71	70	68	69	70	68	65	67	70	68	77	25	83	81	78	83	84	82	84	
Station code	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Sub - Basin	West Flowings (1 of 2)																				

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

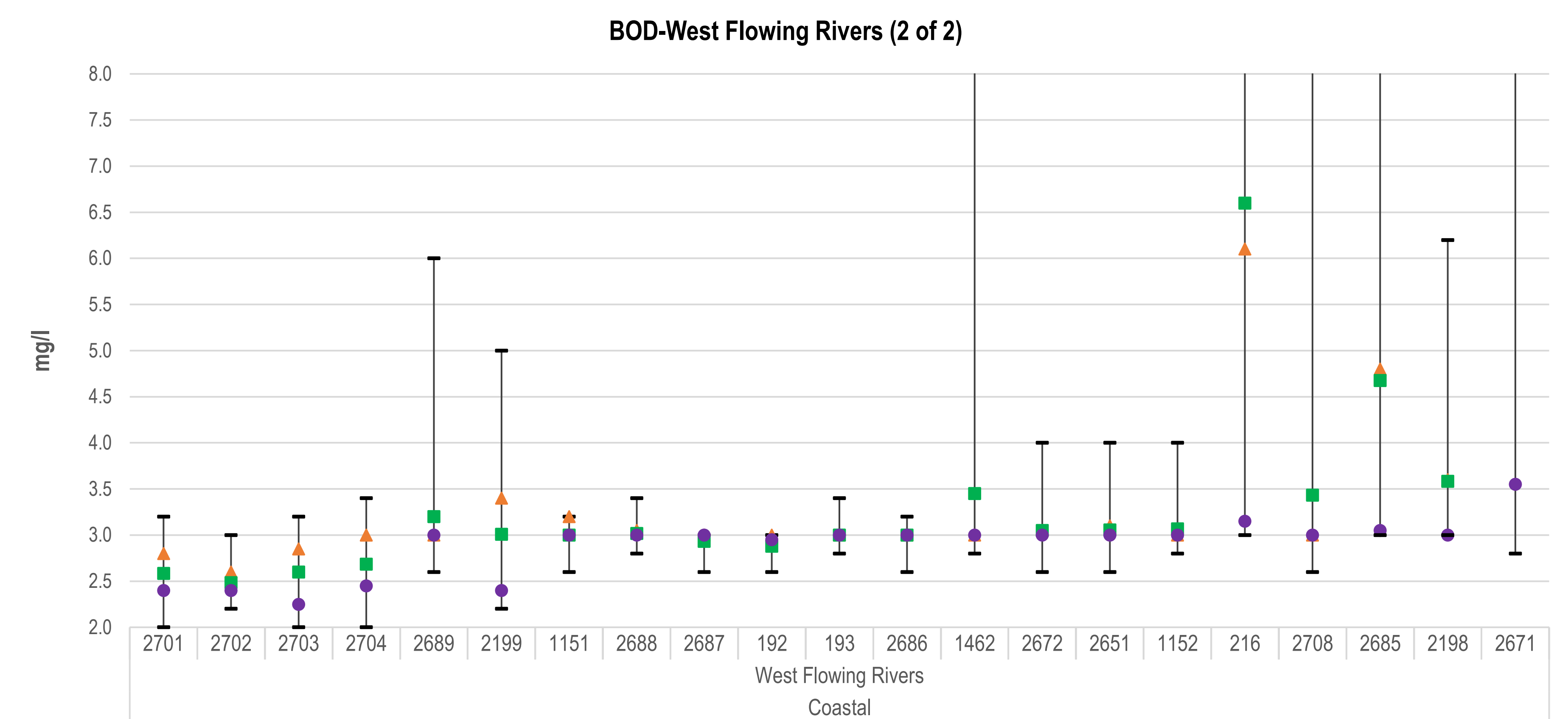
Table No. 21: Surface water monitoring stations at West Flowing rivers (1 of 2)

Program	Station ID	River	Station Name	Village	Taluka	District
NWMP	2654	Bhatsa	Bhatsa at D/s of Liberty Oil Mills	Satne	Shahapur	Thane
NWMP	2653	Bhatsa	Bhatsa at D/s of Liberty Oil Mills	Satne	Shahapur	Thane
NWMP	1094	Ulhas	Ulhas at U/s of Badlapur water works	Kulgaon	Ambernath	Thane
NWMP	1093	Ulhas	Ulhas at U/s of NRC Bund	Mohane	Kalyan	Thane
NWMP	2162	Ulhas	Ulhas at Jambhul water works	Jambhul	Ambernath	Thane
NWMP	1461	Bhatsa	Bhatsa at D/s of Pise Dam	Pise	Bhiwandi	Thane
NWMP	1092	Kalu	Kalu at Atale village	Atale	Kalyan	Thane
NWMP	2712	Vaitarna	Vaitarna near Road Bridge	Gandhare	Wada	Thane
NWMP	2709	Tansa	Tansa near road bridge	Dakewali	Wada	Thane
NWMP	2707	Surya	Surya at MIDC pumping station	Garvashet	Palghar	Thane
NWMP	2706	Surya	Surya U/s of Surya Dam	Dhamni	Vikramgad	Thane
NWMP	2696	Pelhar	Pelhar dam	Pelhar	Vasai	Palghar
NWMP	2168	Mithi	Mithi at near bridge	Mahim	Bandra	Mumbai
NWMP	2714	Vashishti	Vashishti at U/s of Pophali near Konphansawane Bridge	Pophali	Chiplun	Ratnagiri
NWMP	2676	Muchkundi	Muchkundi at Waked Ratnagiri near M/s Asahi India Glass	Waked	Lanja	Ratnagiri
SWMP	202	Vashisti	Vashisti At Khadpoli, Taluka Chiplun, District - Ratnagiri	Khadpoli	Chiplun	Ratnagiri
NWMP	2164	Vashishti	Vashishti at U/s of Three M Paper Mills near M/s Multifilms Plastic Pvt Ltd	Kherdi	Chiplun	Ratnagiri
NWMP	2713	Vashishti	Vashishti at D/s of Three M Paper Mills near Chiplun water intake Jackwell	Kherdi	Chiplun	Ratnagiri
SWMP	201	Sonpatra	Sonpatra At Kotwali Village, Taluka - Khed, District - Ratnagiri	Kotwali	Khed	Ratnagiri
SWMP	203	Jagbudi	Jagbudi , D/S of Khed City, Taluka - Khed, District Ratnagiri	Khed City	Khed	Ratnagiri
SWMP	204	Jog	Jog at Dapoli, Taluka Dapoli, District - Rantnagiri	Dapoli	Dapoli	Ratnagiri



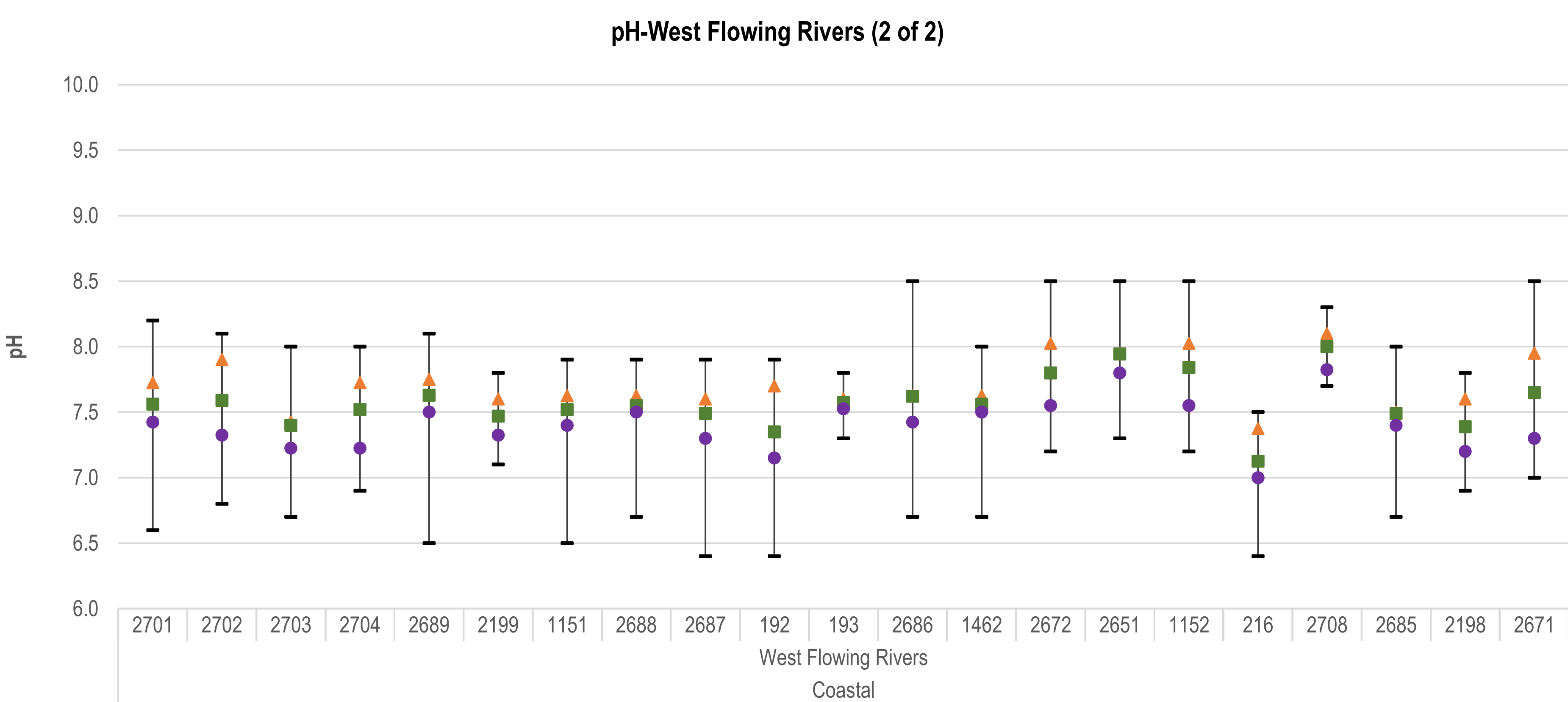
	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2708	2685	2198	2671
Max	7.3	7.2	7.0	7.3	7.3	6.8	7.1	7.6	7.4	6.8	6.7	7.3	7.3	7.8	7.1	7.5	6.4	7.1	7.1	6.4	6.7
75 Perc	7.0	6.9	6.6	6.8	6.6	6.6	6.6	6.6	6.8	6.6	6.5	6.7	6.5	6.9	6.8	6.6	6.3	6.7	6.2	6.2	6.2
Avg	6.7	6.6	6.2	6.4	6.4	5.9	6.4	6.5	6.5	6.5	6.4	6.4	6.3	6.6	6.6	6.5	5.6	6.5	5.9	6.1	5.5
25 Perc	6.3	6.3	5.9	6.1	6.1	5.5	6.2	6.1	6.3	6.3	6.3	6.2	6.3	6.2	6.3	6.4	5.1	6.3	5.8	6.0	5.1
Min	5.9	6.1	5.5	5.3	5.3	4.5	6.0	5.5	5.8	6.3	6.0	5.6	4.4	5.9	6.0	6.0	4.1	5.4	4.2	5.6	2.2

Figure No. 43: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at West flowing riverss (Coastal basin) (2 of 2)



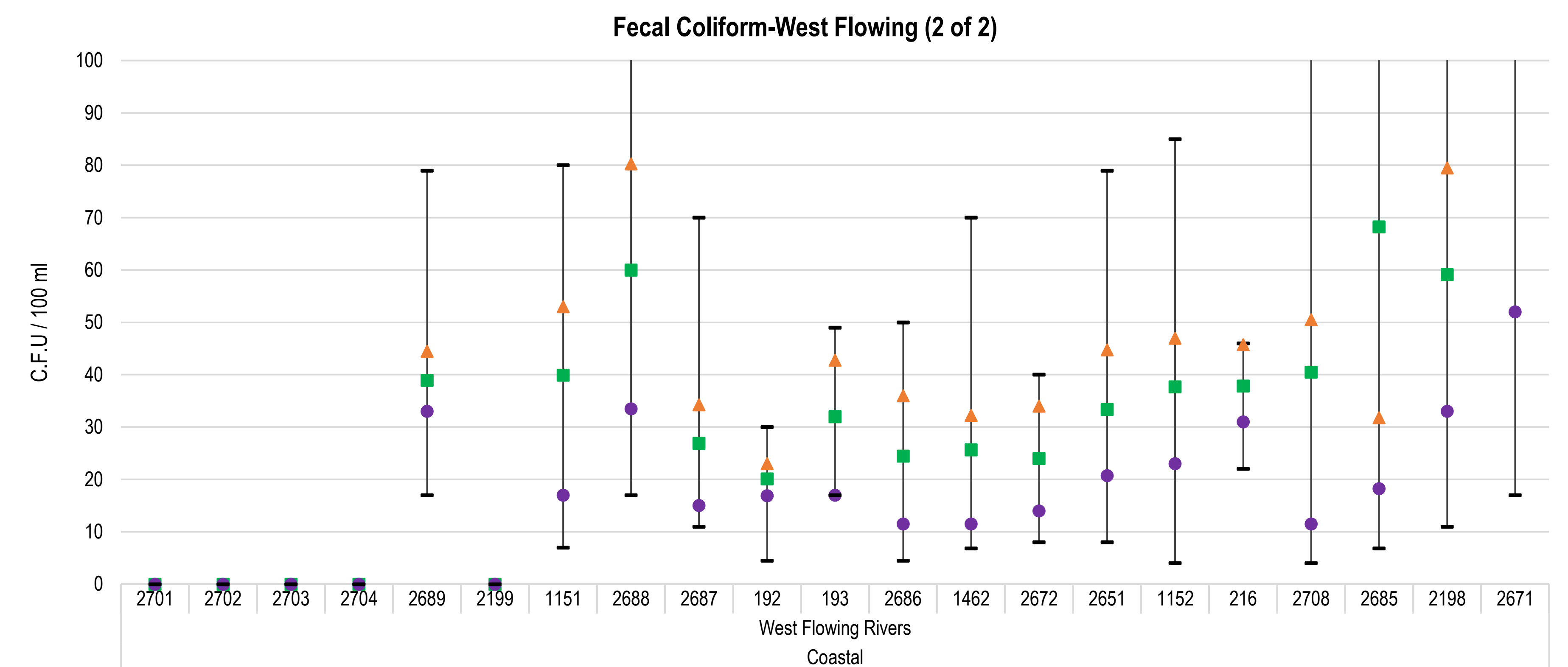
	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2708	2685	2198	2671
Max	3.2	3.0	3.2	3.4	6.0	5.0	3.2	3.4	3.0	3.0	3.4	3.2	8.4	4.0	4.0	4.0	20.0	9.0	9.5	6.2	40.0
75 Perc	2.8	2.6	2.9	3.0	3.0	3.4	3.2	3.1	3.0	3.0	3.0	3.0	3.0	3.1	3.1	3.0	6.1	3.0	4.8	3.6	10.3
Avg	2.6	2.5	2.6	2.7	3.2	3.0	3.0	3.0	2.9	2.9	3.0	3.0	3.5	3.1	3.1	3.1	6.6	3.4	4.7	3.6	9.2
25 Perc	2.4	2.4	2.3	2.5	3.0	2.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.2	3.0	3.1	3.0	3.6
Min	2.0	2.2	2.0	2.0	2.6	2.2	2.6	2.8	2.6	2.6	2.8	2.6	2.8	2.6	2.6	2.8	3.0	2.6	3.0	3.0	2.8

Figure No. 44: Trend ofBiological Oxygen Demand (BOD) levels recorded at WQMS at West flowing rivers (Coastal basin) (2 of 2)



	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2708	2685	2198	2671
Max	8.2	8.1	8.0	8.0	8.1	7.8	7.9	7.9	7.9	7.9	7.8	8.5	8.0	8.5	8.5	8.5	7.5	8.3	8.0	7.8	8.5
75 Perc	7.7	7.9	7.4	7.7	7.8	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.6	8.0	8.0	8.0	7.4	8.1	7.5	7.6	8.0
Avg	7.6	7.6	7.4	7.5	7.6	7.5	7.5	7.6	7.5	7.4	7.6	7.6	7.6	7.8	7.9	7.8	7.1	8.0	7.5	7.4	7.7
25 Perc	7.4	7.3	7.2	7.2	7.5	7.3	7.4	7.5	7.3	7.2	7.5	7.4	7.5	7.6	7.8	7.6	7.0	7.8	7.4	7.2	7.3
Min	6.6	6.8	6.7	6.9	6.5	7.1	6.5	6.7	6.4	6.4	7.3	6.7	6.7	7.2	7.3	7.2	6.4	7.7	6.7	6.9	7.0

Figure No. 45 : Trend of pH levels recorded at WQMS at West flowing s (Coastal basin) (2 of 2)



	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2708	2685	2198	2671
Max	0	0	0	0	79	0	80	140	70	30	49	50	70	40	79	85	46	170	350	140	550
75 Perc	0	0	0	0	44.5	0	53	80.25	34.25	23	42.75	36	32.25	34	44.75	47	45.75	50.5	31.75	79.5	125
Avg	0	0	0	0	38.9091	0	39.9167	60	26.9167	20.1	32	24.4583	25.65	24	33.4	37.6667	37.8333	40.4833	68.2333	59.0909	160.333
25 Perc	0.0	0.0	0.0	0.0	33.0	0.0	17.0	33.5	15.0	16.9	17.0	11.5	11.5	14.0	20.8	23.0	31.0	11.5	18.3	33.0	52.0
Min	0	0	0	0	17	0	7	17	11	4.5	17	4.5	6.8	8	8	4	22	4	6.8	11	17

Figure No. 46: Trend of Fecal Coliform recorded at WQMS at West flowing rivers (Coastal basin) (2 of 2)

Water Quality Index of WQMS on West Flowing rivers (Coastal basin) (2 of 2)

Apr	73	74	73	74	62	77	68	71	74	70	72	64	70	69	70	65	60	70	62	66	43
May	76	78	78	77	68	76	68	72	73	.	.	71	71	64	64	63	.	66	67	66	48
Jun	74	82	78	78	72	77	74	74	77	.	.	77	78	76	75	80	.	75	59	67	53
Jul	81	81	76	74	53	71	71	70	72	73	72	78	76	52	52	75	68	51	63	72	67
Aug	79	80	83	75	71	76	74	69	73	71	71	73	72	75	73	73	70	69	69	70	71
Sep	74	74	76	77	70	78	75	69	72	.	.	74	74	74	69	69	.	67	71	71	70
Oct	77	80	78	79	69	76	68	62	70	.	.	68	70	70	69	70	.	73	72	69	56
Nov	74	76	77	77	69	80	68	66	71	72	70	71	68	66	.	69	70	69	71	68	65
Dec	79	74	78	76	64	67	70	69	70	.	.	71	71	70	63	64	.	73	70	.	67
Jan	82	80	76	84	66	81	65	65	65	.	70	72	72	65	66	65	71	68	70	69	63
Feb	56	55	51	54	74	48	71	71	72	73	73	71	70	76	76	74	53	71	71	66	58
Mar	76	78	82	79	72	80	74	69	74	.	.	73	60	71	71	69	.	68	58	67	41
Station code	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2708	2685	2198	2671
Sub -Basin	West Flowing s (2 of 2)																				

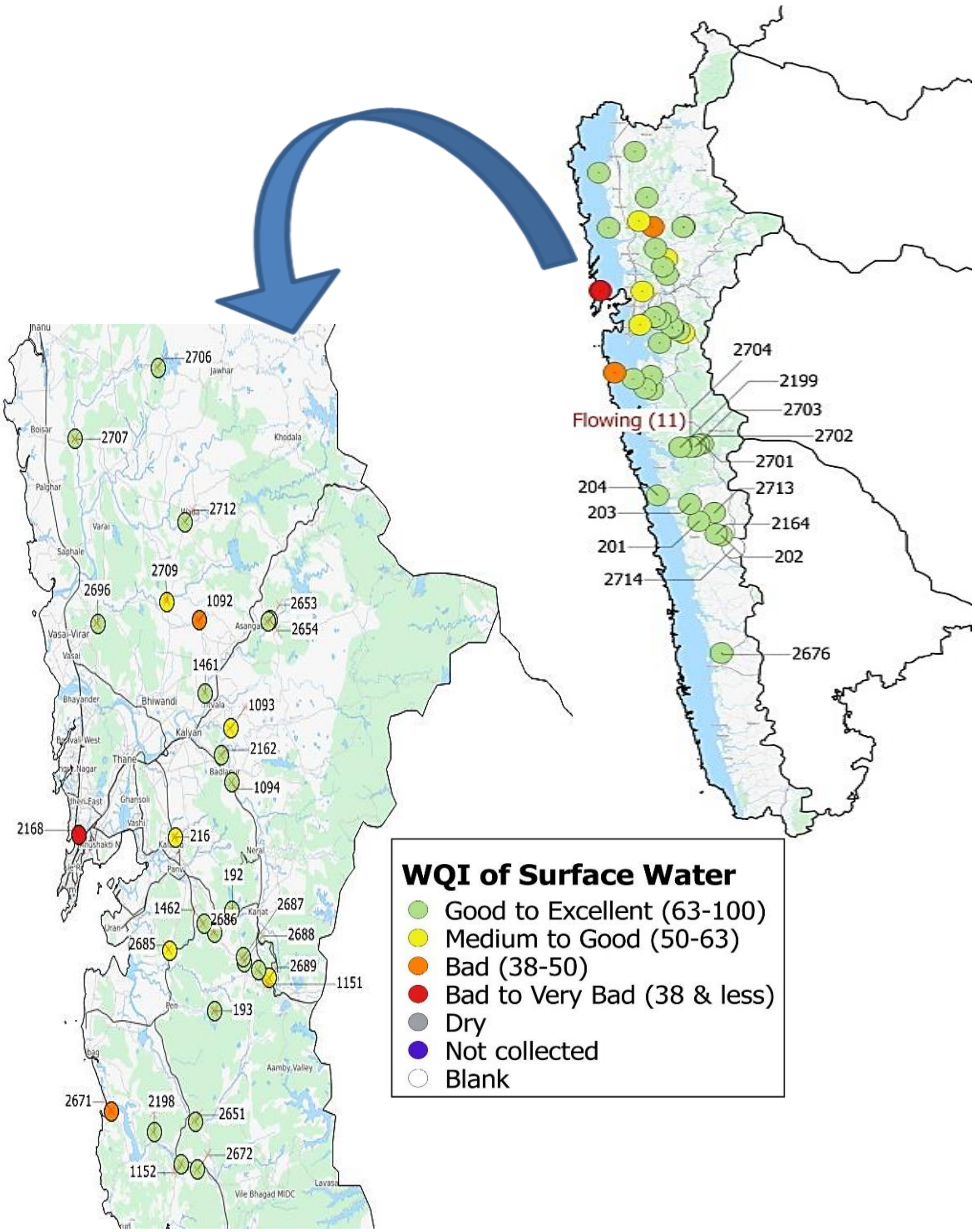
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

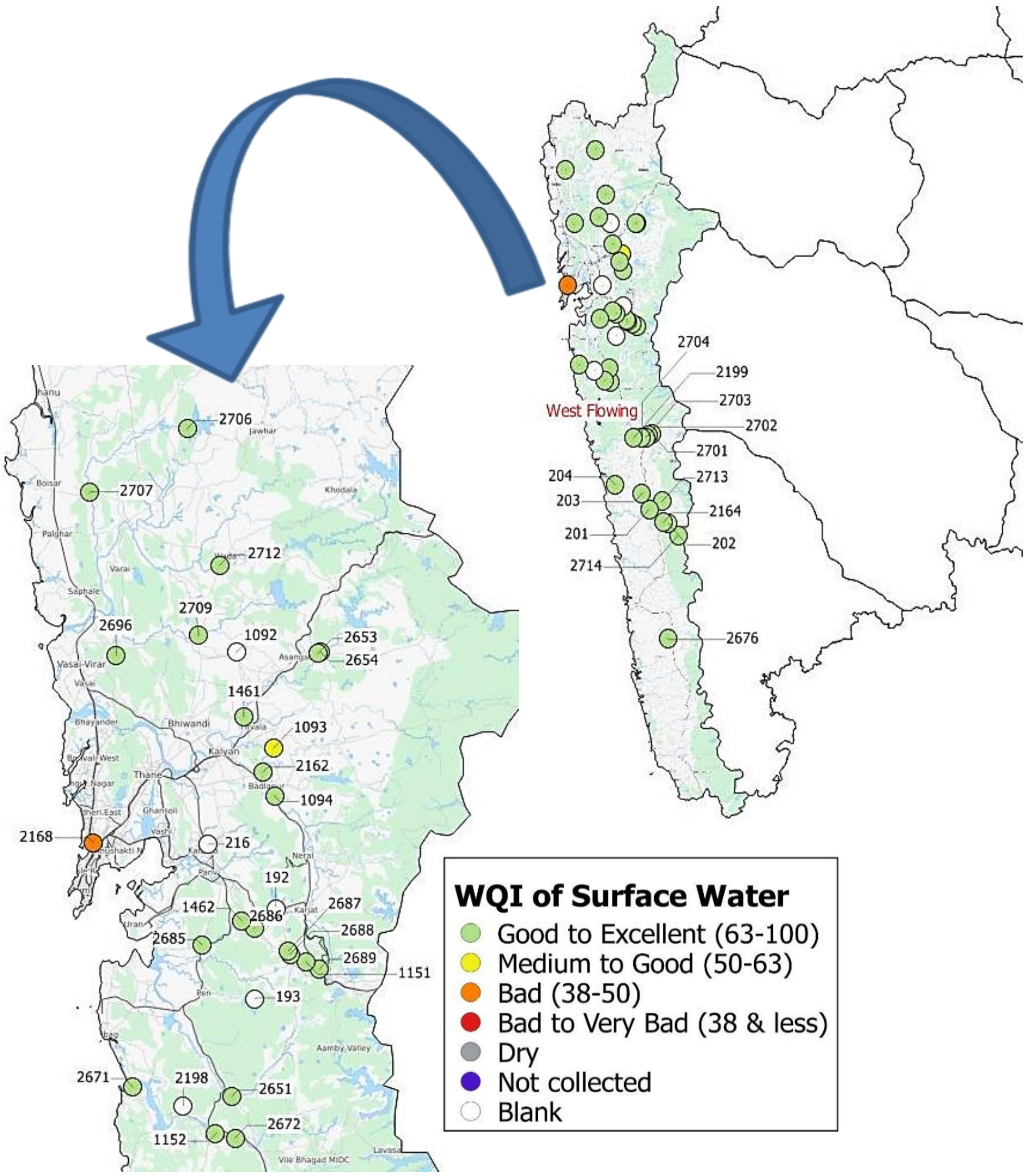
Table No. 22: Surface water quality monitoring stations on West flowing s (2 of 2)

Program	Station ID	River	Station Name	Village	Taluka	District
NWMP	2701	Savitri	Savitri Jackwell at Upsa kendra	Nangalwadi	Mahad	Raigad
NWMP	2702	Savitri	Savitri at Shedav Doh	Shedav Dov	Mahad	Raigad
NWMP	2703	Savitri	Savitri at Dadli Bridge	Dadli	Mahad	Raigad
NWMP	2704	Savitri	Savitri at Muthavali village	Muthavali	Mahad	Raigad
NWMP	2689	Patalganga	Patalganga at Gagangiri Maharaj Temple	Khopoli	Khalapur	Raigad
NWMP	2199	Savitri	Savitri at Ovale village	Ovale	Mahad	Raigad
NWMP	1151	Patalganga	Patalganga at Shilphata Bridge	Khopoli	Khalapur	Raigad
NWMP	2688	Patalganga	Patalganga at Savroli Bridge	Savroli	Khalapur	Raigad
NWMP	2687	Patalganga	Patalganga at Khalapur pumping house	Khalapur	Khalapur	Raigad
SWMP	192	Dam	Morbe Dam, Taluka - Khalapur, District - Raigad	Khalapur	Khalapur	Raigad
SWMP	193	Balganga	Balganga , Village Ransai, Taluka - Khalapur, District - Raigad	Ransai	Khalapur	Raigad
NWMP	2686	Patalganga	Patalganga at Vyal pump house	Vyal	Khalapur	Raigad
NWMP	1462	Patalganga	Patalganga near intake of MIDC water works(Turade w/w)	Turade	Khalapur	Raigad
NWMP	2672	Kundalika	Kundalika at Dhatav at Jackwell	Dhatav	Roha	Raigad
NWMP	2651	Amba	Amba at D/s of Waken Bridge	Waken Phata	Roha	Raigad
NWMP	1152	Kundalika	Kundalika at Roha Bridge	Roha	Roha	Raigad
SWMP	216	Kasardi	Near Ganesh Ghat	Taloja	Panvel	Raigad
NWMP	2708	Surya	Surya at Intake of Vasai-Virar water scheme	Masvan	Palghar	Thane
NWMP	2685	Patalganga	Patalganga at D/s of Kharpada Bridge	Kharpada	Khalapur	Raigad
NWMP	2198	Kundalika	Kundalika at Are Khurd (Saline Zone)	Are Khurd	Roha	Raigad
NWMP	2671	Kundalik	Kundalik near Salav Bridge (Saline Zone)	Salav	Roha	Raigad

Spatial map of Surface WQI of West Flowing rivers (April 2015)

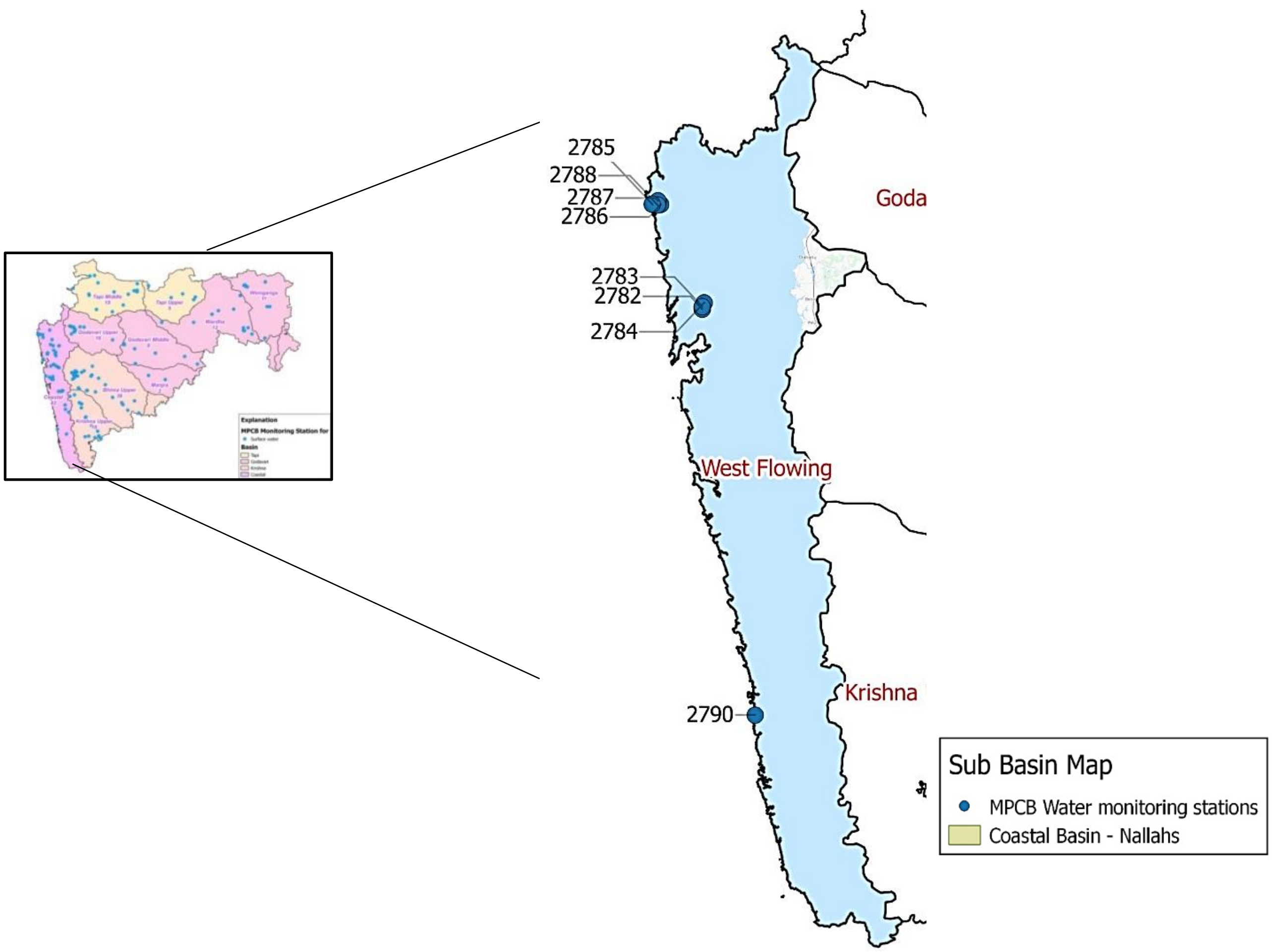


Spatial map of Surface WQI of West Flowing rivers (December 2015)

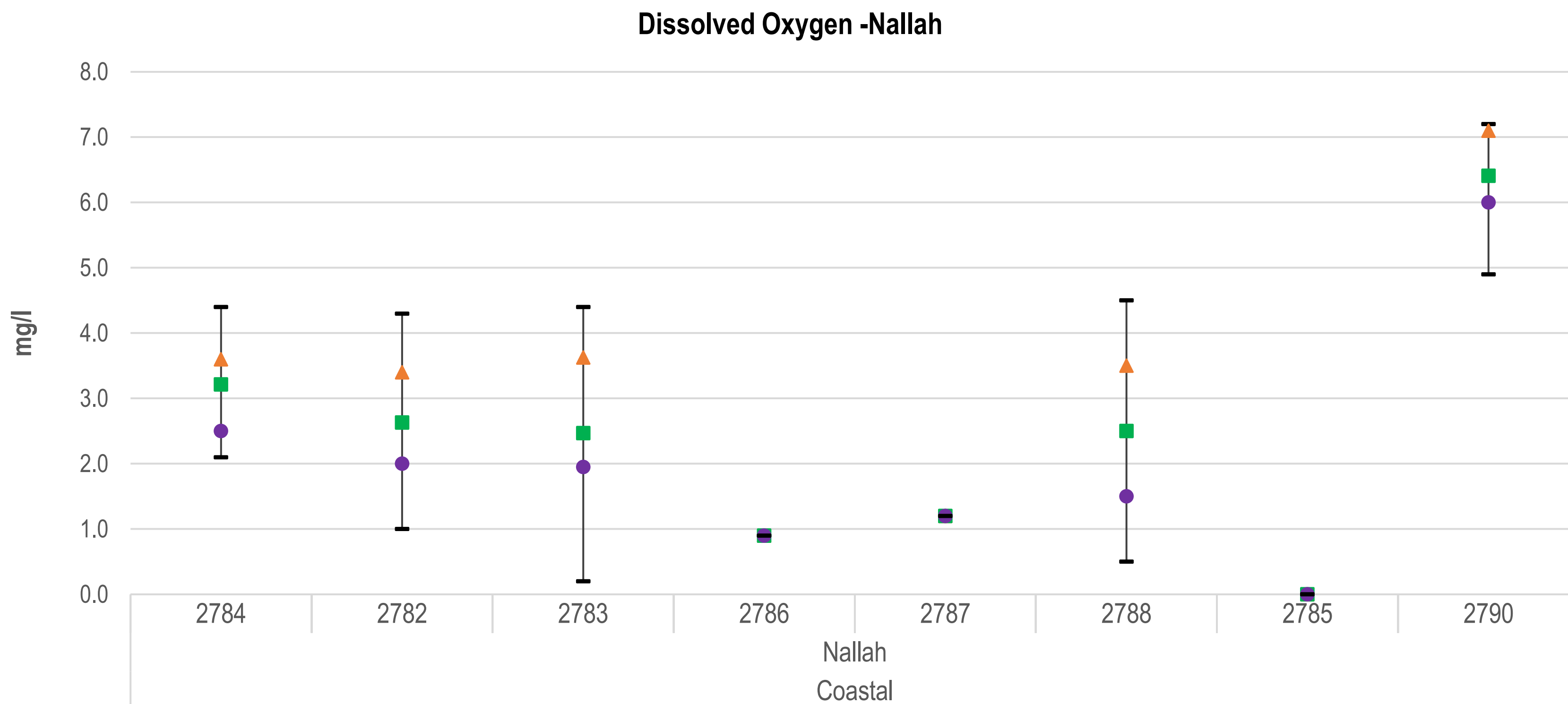


Nallahs

There are total 12 nallahs across Maharashtra. Out of 12 nallahs, 8 are located on West flowing s, 2 on Tapi basin (SWMP), 1 on Krishna basin and remaining 1 on Godavari basin. The 4 nallahs along the Tapi, Krishna and Godavari basin are covered in respective basin, whereas the details of remaining 8 nallahs are given in section below. The majority of nallahs of coastal basin are located in Thane district. The BPT Navpur, Sandoz nalla and Rabodi nalla of Thane are noted to be polluted throughout the year.

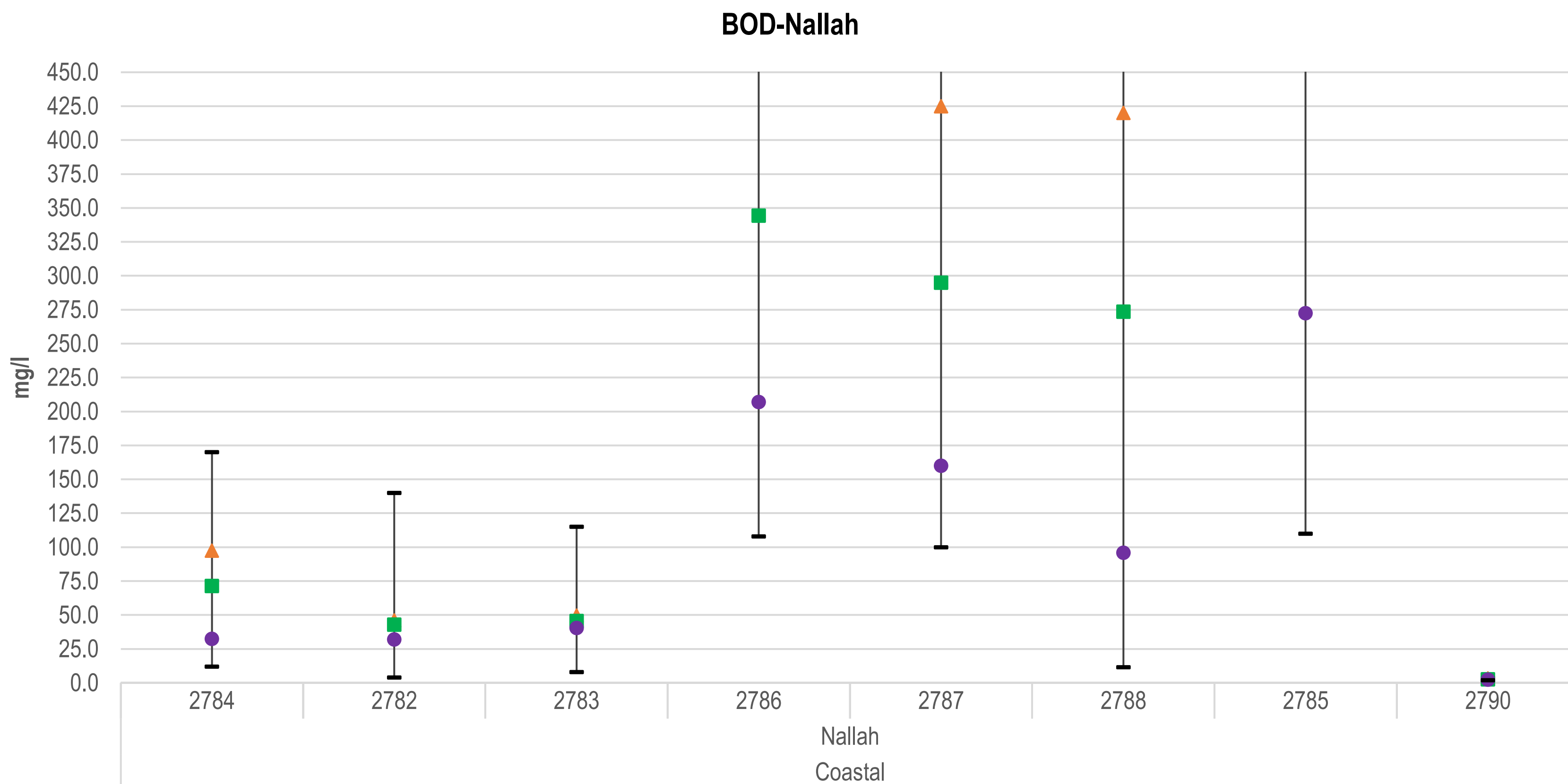


Map No. 8: Network of surface water quality monitoring stations on Nallahs



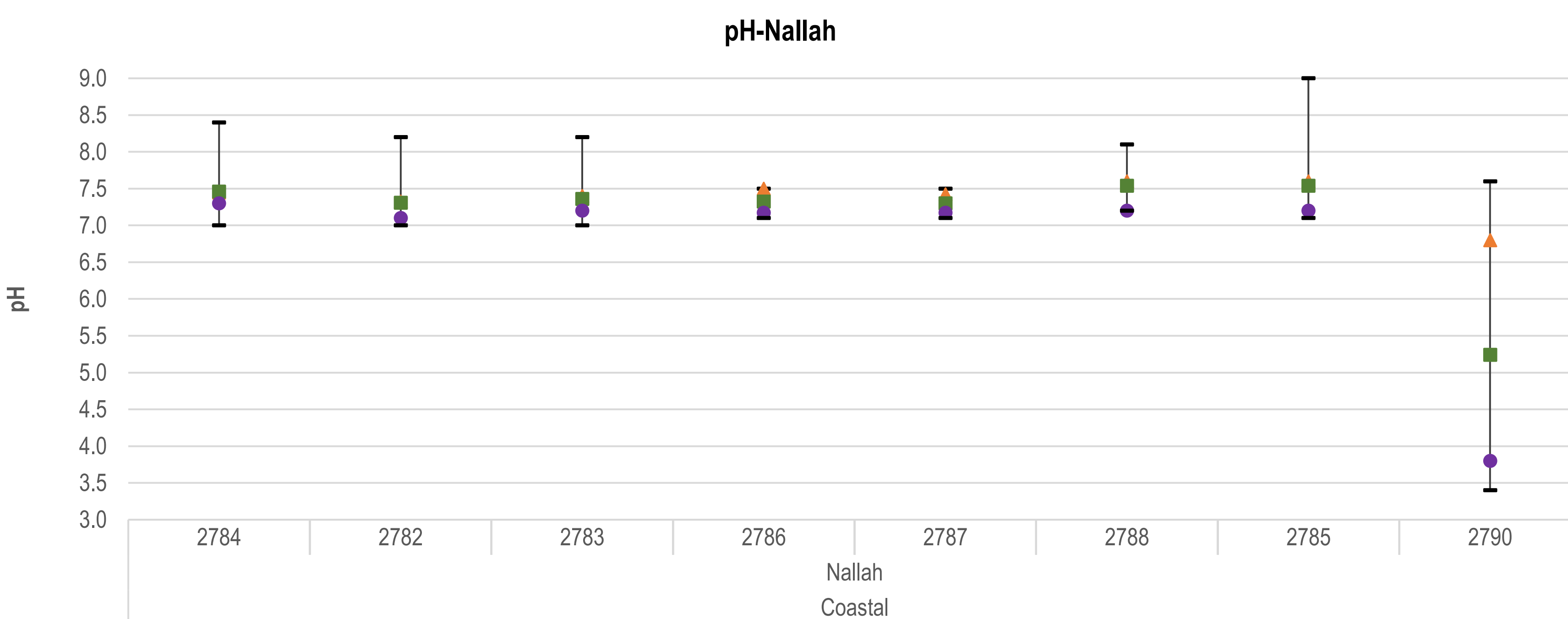
	2784	2782	2783	2786	2787	2788	2785	2790
Max	4.4	4.3	4.4	0.9	1.2	4.5	0.0	7.2
75 Perc	3.6	3.4	3.6	0.9	1.2	3.5	0.0	7.1
Avg	3.2	2.6	2.5	0.9	1.2	2.5	0.0	6.4
25 Perc	2.5	2.0	2.0	0.9	1.2	1.5	0.0	6.0
Min	2.1	1.0	0.2	0.9	1.2	0.5	0.0	4.9

Figure No. 47 : Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Nallah (Coastal basin)



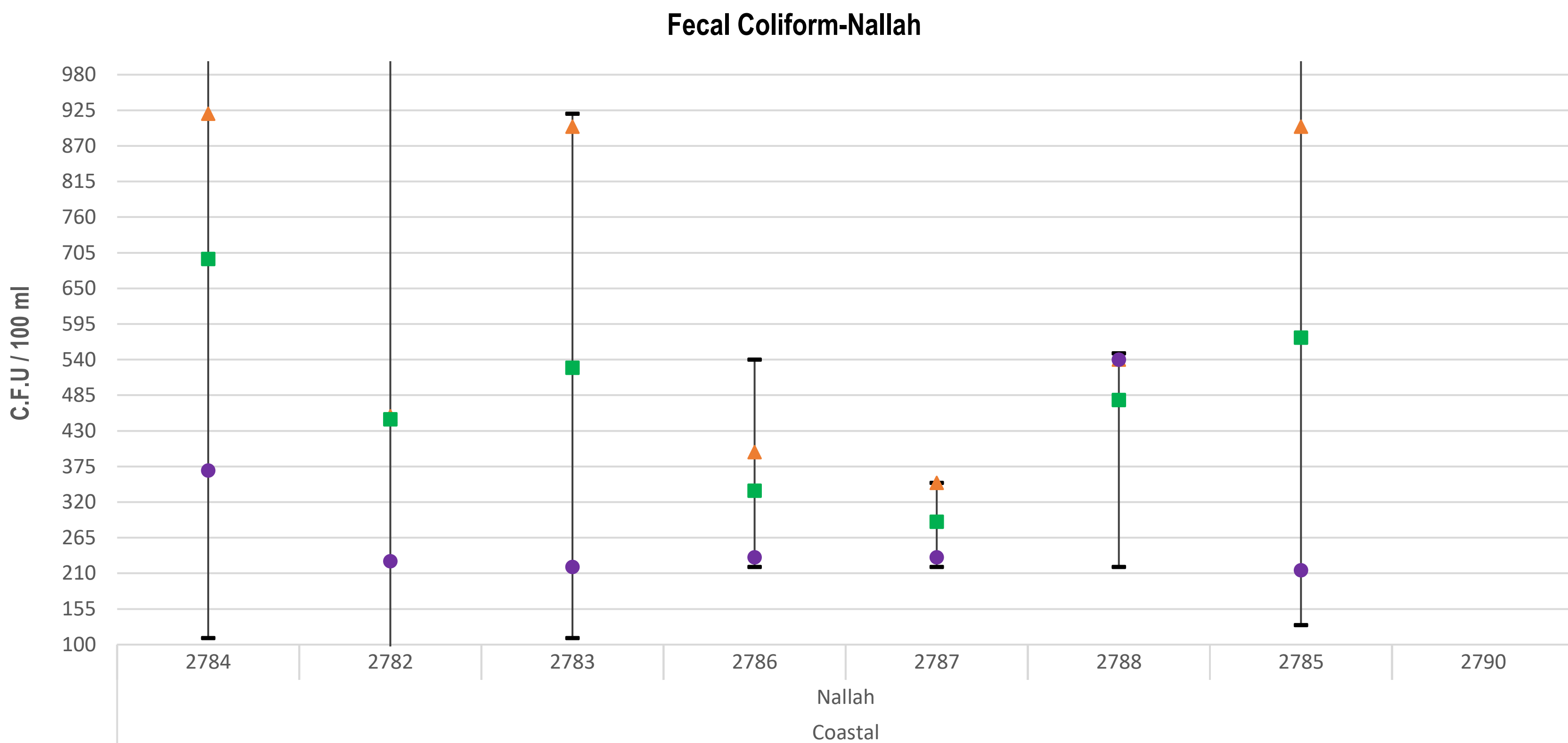
	2784	2782	2783	2786	2787	2788	2785	2790
Max	170.0	140.0	115.0	550.0	500.0	580.0	875.0	3.8
75 Perc	97.5	46.0	49.5	497.5	425.0	420.0	700.0	3.4
Avg	71.5	43.0	45.7	344.5	295.0	273.5	552.5	2.7
25 Perc	32.5	32.0	40.5	207.0	160.0	96.0	272.5	2.4
Min	12.0	4.0	8.0	108.0	100.0	11.5	110.0	2.0

Figure No. 48 : Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Nallah (Coastal basin)



	2784	2782	2783	2786	2787	2788	2785	2790
Max	8.4	8.2	8.2	7.5	7.5	8.1	9.0	7.6
75 Perc	7.5	7.3	7.4	7.5	7.4	7.6	7.6	6.8
Avg	7.5	7.3	7.4	7.3	7.3	7.5	7.5	5.2
25 Perc	7.3	7.1	7.2	7.2	7.2	7.2	7.2	3.8
Min	7.0	7.0	7.0	7.1	7.1	7.2	7.1	3.4

Figure No. 49: Trend of pH levels recorded at WQMS at Nallah (Coastal basin)



	2784	2782	2783	2786	2787	2788	2785	2790
Max	1600	1600	920	540	350	550	1600	0
75 Perc	920	452.5	900	397.5	350	540	900	0
Avg	695.4166667	447.9166667	527.5	337.5	290	478	574.1666667	0
25 Perc	368.8	228.8	220.0	235.0	235.0	540.0	215.0	0.0
Min	110	80	110	220	220	220	130	0

Figure No. 50 : Trend of Fecal Coliform levels recorded at WQMS at Nallah (Coastal basin)

Water Quality Index for WQMS at Nallah (Coastal basin)

Apr	25	36	27				27	54
May	29	31	29				23	56
Jun	32	50	34			42	22	60
Jul	35	37	33	31	35	31	30	
Aug	46	36	38	31	31	27	29	77
Sep	39	52	53	30	30	29	34	Not collected
Oct	42	41	45	30	29	30	29	Not collected
Nov	28	30	39				29	76
Dec	37	41	37				31	62
Jan	37	42	42				22	84
Feb	28	29	36				26	70
Mar	20	29	21				28	80
Station code	2784	2782	2783	2786	2787	2788	2785	2790
Sub -Basin	Nallah							

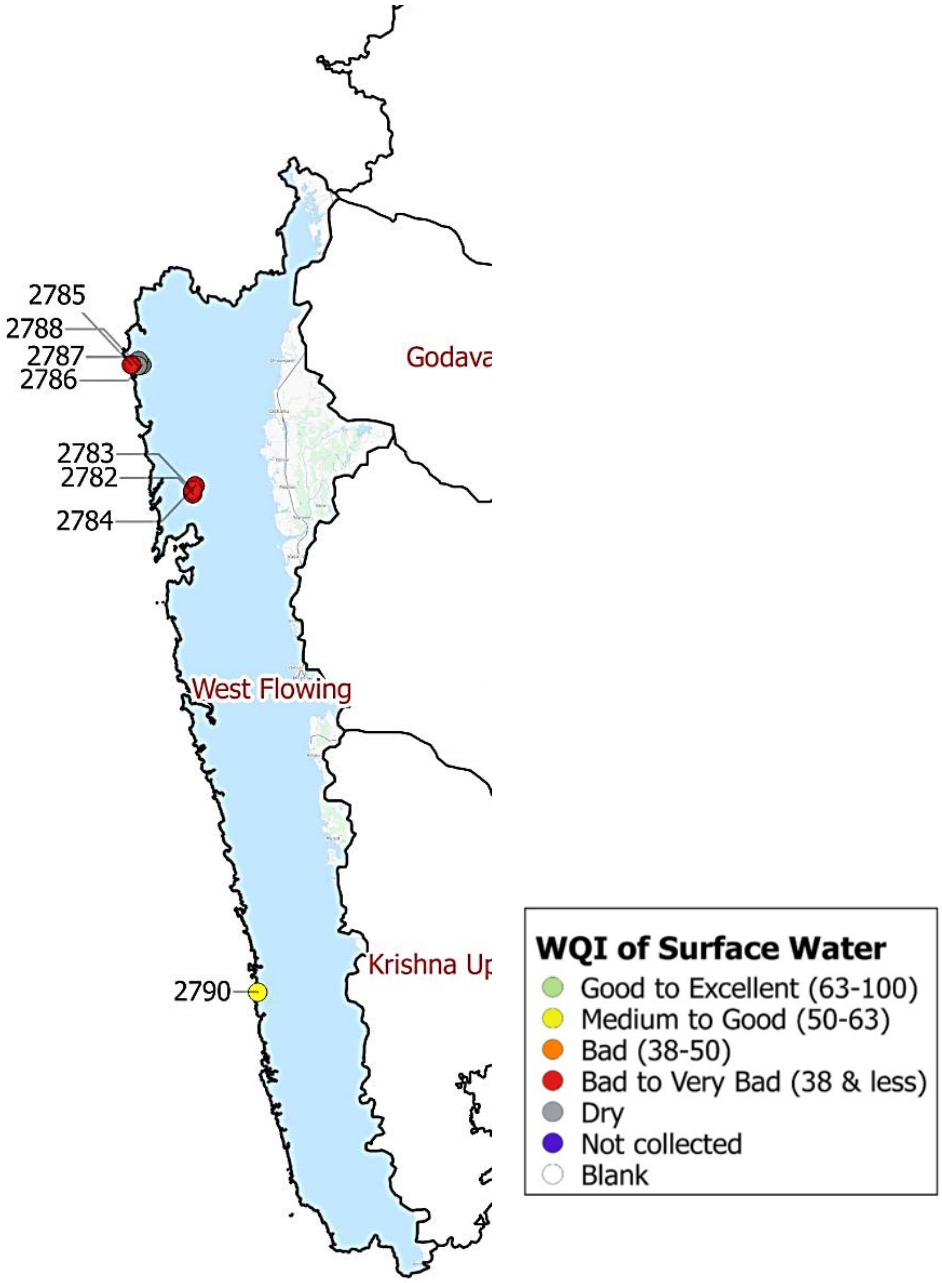
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

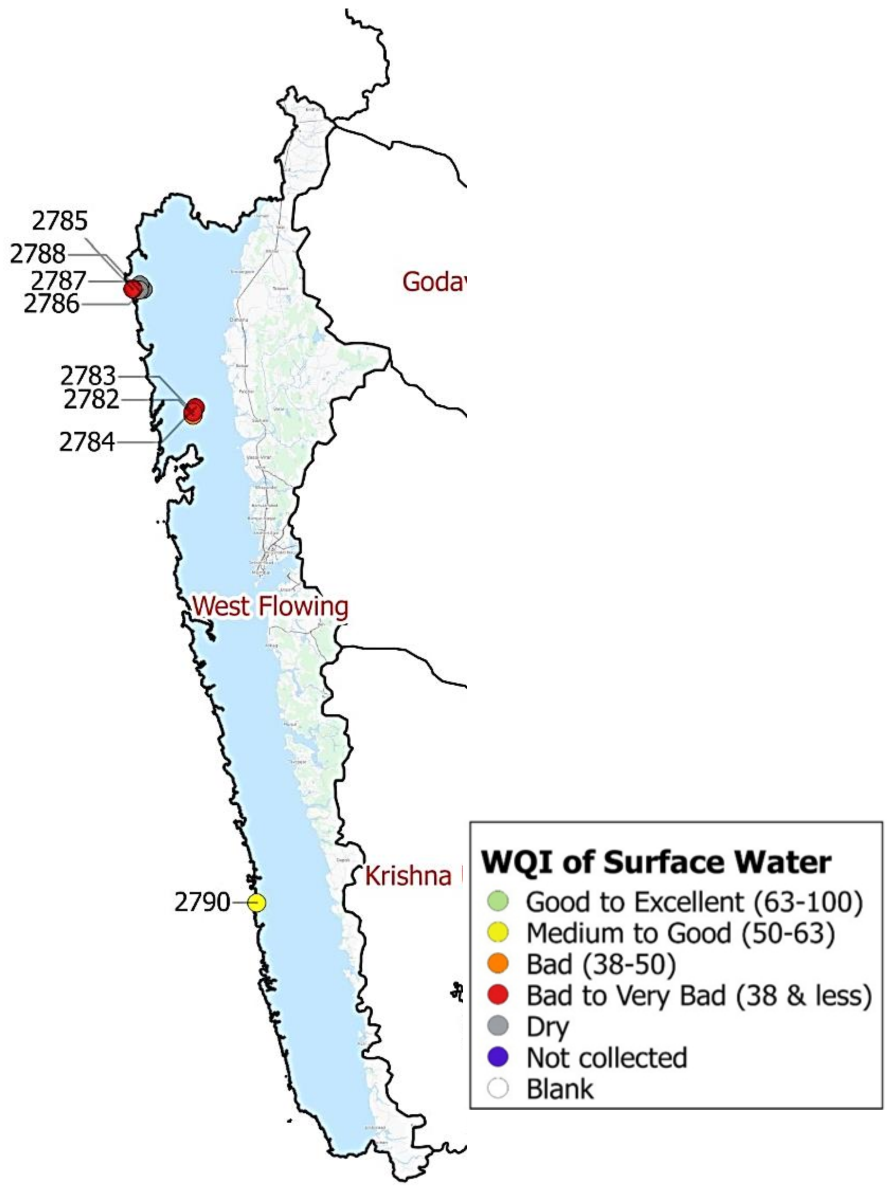
Table No. 23: Surface water monitoring stations at Nallahs

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	2784	Sandoz nalla	Sandoz Nalla	Sandozbaug	Thane	Thane
NWMP	2782	Rabodi nalla	Rabodi Nalla	Rabodi	Thane	Thane
NWMP	2783	Colour Chem nalla	Colour Chem Nalla	Majiwada	Thane	Thane
NWMP	2786	Tarapur MIDC nalla	Tarapur MIDC Nalla, near sump No1	MIDC Tarapur	Palghar	Palghar
NWMP	2787	Tarapur MIDC nalla	Tarapur MIDC Nalla	MIDC Tarapur	Palghar	Palghar
NWMP	2788	Tarapur MIDC nalla	Tarapur MIDC Nalla near sump-III	MIDC Tarapur	Palghar	Palghar
NWMP	2785	BPT Navapur	BPT Navapur	Navapur	Palghar	Palghar
NWMP	2790	Pimpal-Paneri nalla	Pimpal-Paneri Nalla at Ratnagiri near Finolex Industries	Yahganigaon	Ratnagiri	Ratnagiri

Spatial map of Surface WQI of Nallahs (April 2015)



Spatial map of Surface WQI of Nallahs (Dec 2015)



Saline (Sea and Creek) Water Quality

Ranking seventh largest in the world in terms of coastline, India has 7,517 km long coastline out of which 5,423 km belongs to peninsular India and remaining 2,094 km to the Andaman, Nicobar and Lakshadweep Islands. India has 43 % sandy beaches; 11 %, rocky coast including cliffs; and 46 %, mudflats or marshy coast. It is estimated that nearly 250 million people live within area of 50 km from the coastline of India. This coastline supports a huge human population, which is dependent on the rich coastal and marine resources for economic growth[28].

Rapid industrialization has taken place along the coastline of India. Among the coastlines, industrial pollution is recorded high on coast of West Bengal, Tamil Nadu, Gujarat, Maharashtra and Andhra Pradesh. It is estimated about 8000 industries release 390 million tonnes of effluents annually into the Indian coastal waters either directly or indirectly.

Disposal of Municipal solid waste also acts as source of marine pollution. Municipal waste consists of degradable and non- degradable waste which comprises of plastic, rubber, glass, heavy metals and so on. The discarded plastic waste leads to entanglement, suffocation and ingestion of aquatic life. Consumption of plastic by the marine animals causes disruption of the endocrine system and reduction in reproduction rate[29]. Heavy metals such as mercury, lead, nickel, arsenic, and cadmium, could also accumulate in the tissues of many species in a bio accumulation process. Recreational activities like tourism and oil spills from shipping industries also contribute to coastal pollution.

Being a coastal state, Maharashtra is bestowed with a 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.

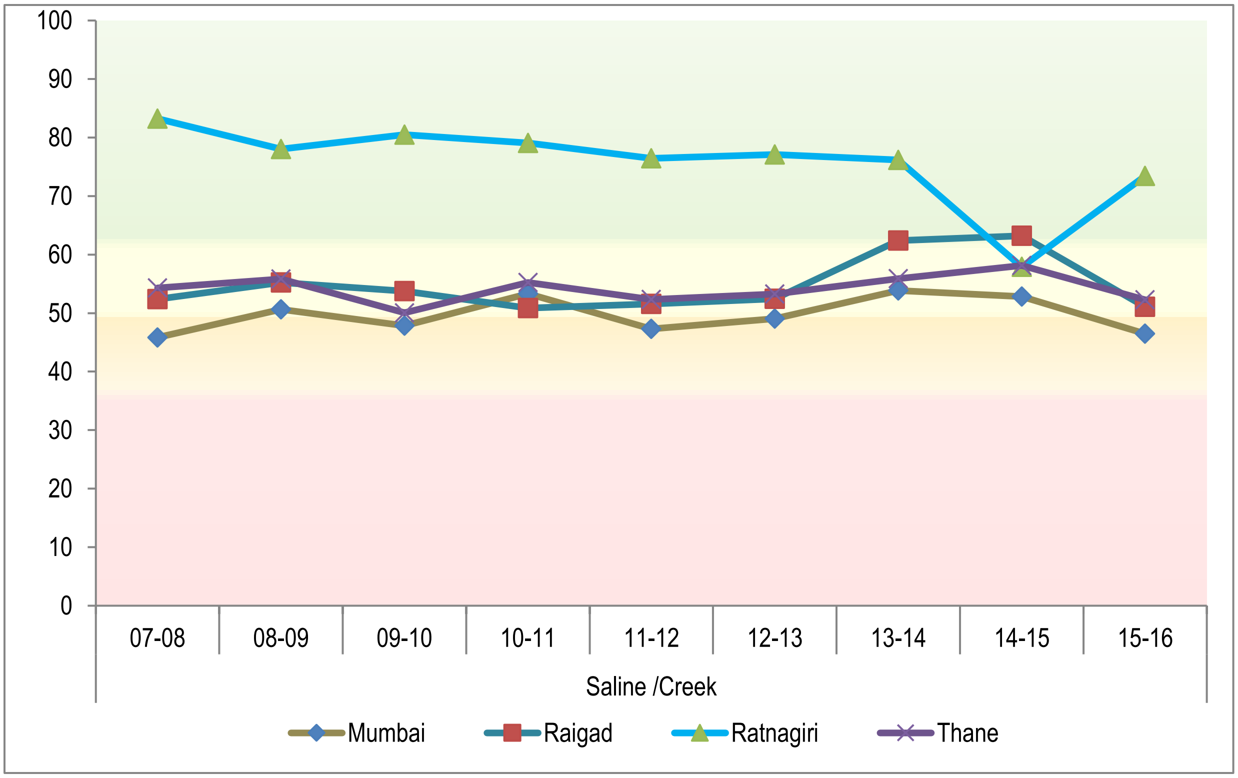
Given the fact that water pollution on the coastal front shall directly impact the marine ecosystem and also the humans, it is of significant importance to monitor sea water quality.

MPCB has 36 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 an illustrative manner.

[28] UNDP,Review paper: *Status of coastal and marine ecosystem management in South Asia*,2012

[29] A. Duraisamy, S. Latha, *Impact of pollution on marine environment -A case study of coastal Chennai*,2011

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. 51: Trend of annual average WQI across districts of Coastal 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 s bodies in that district.

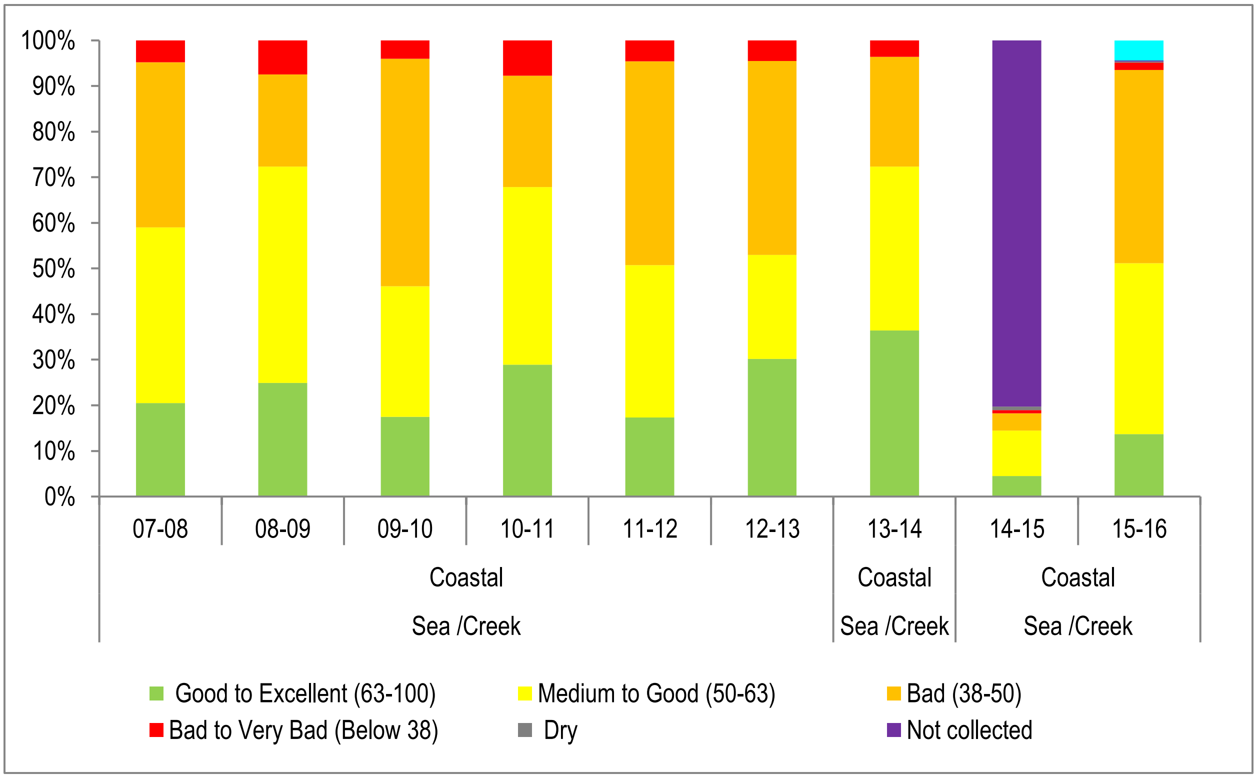
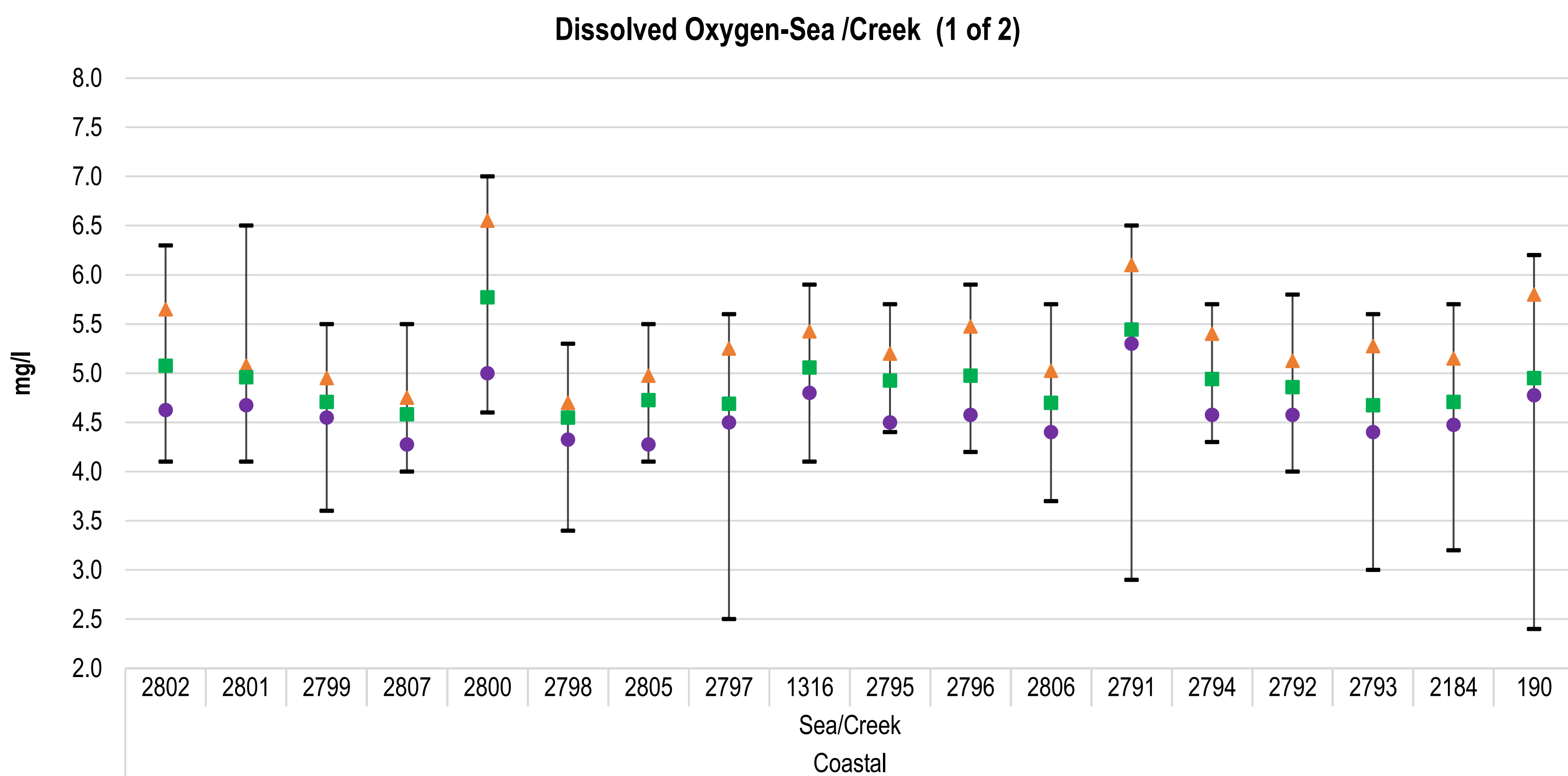


Figure No. 52: Trend of average occurrence for different category of WQI Coastal basin

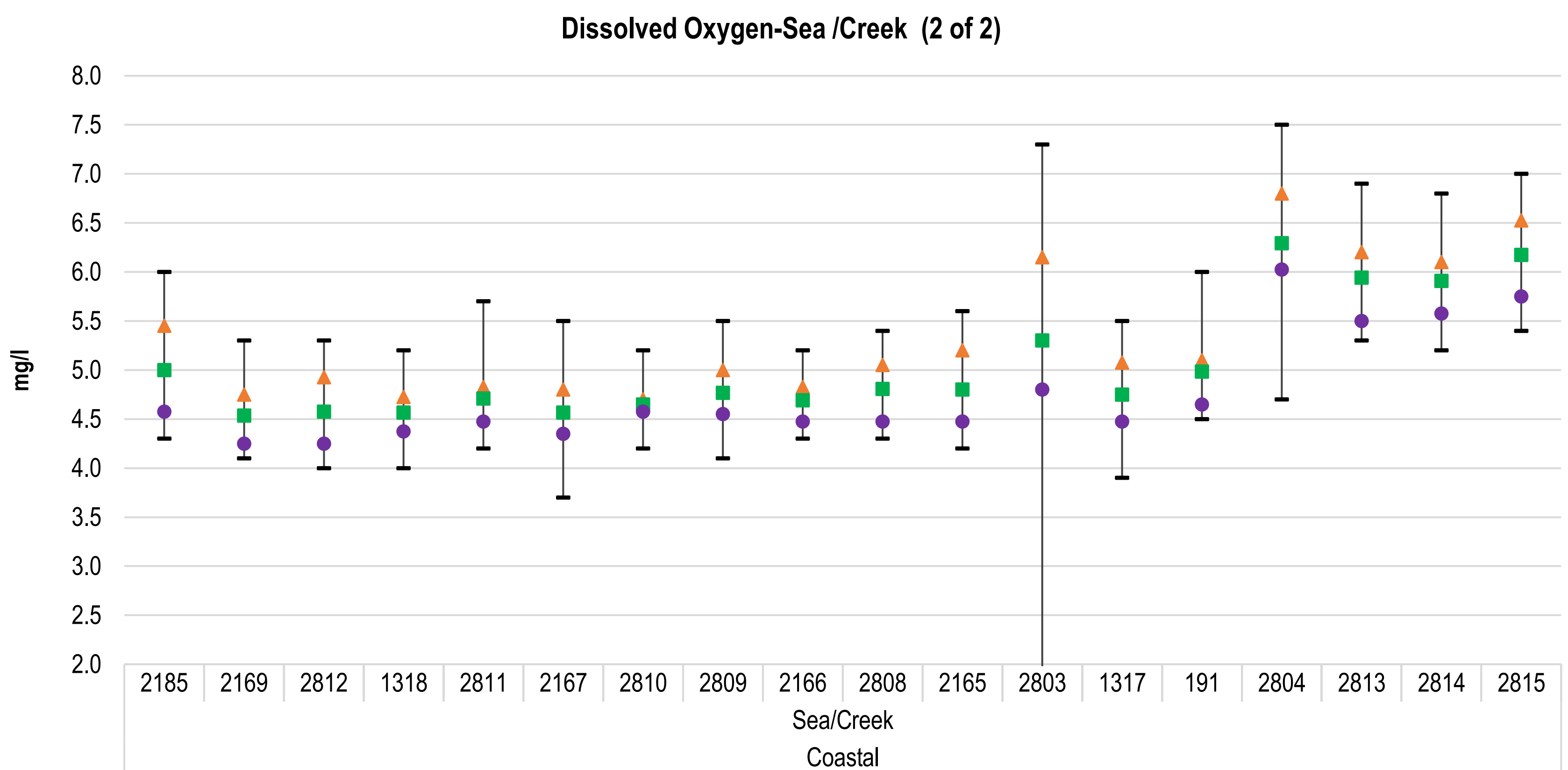
The water quality results for the test conducted for the year 2015-16 showed that among the four coastal districts, the sea/creek water quality at Thane, Raigad and Mumbai were in 'Bad to Medium' category (38-63). A decreasing trend was also be observed in the water quality at these 3 districts. Irrespective of the sudden decrease in the average water quality of Ratnagiri district last year, this year the water quality was in the Good to Excellent category (63-100).

The trend in average occurrence for WQI across the WQMS was noted and it is observed that occurrence of Medium to good category has increased across the past 9 years. The Bad to Very Bad category has also shown a decline over the years which indicates the improving water quality. But the category of 'Good to Excellent' has shown a decrease this year while a growth in 'Medium to Good' and 'Bad' has increased. This indicates that even though the 'Bad to Very Bad' is decreasing, the other 2 categories are increasing which shall add the 'Bad to Very Bad' category. (Figure No. 52).



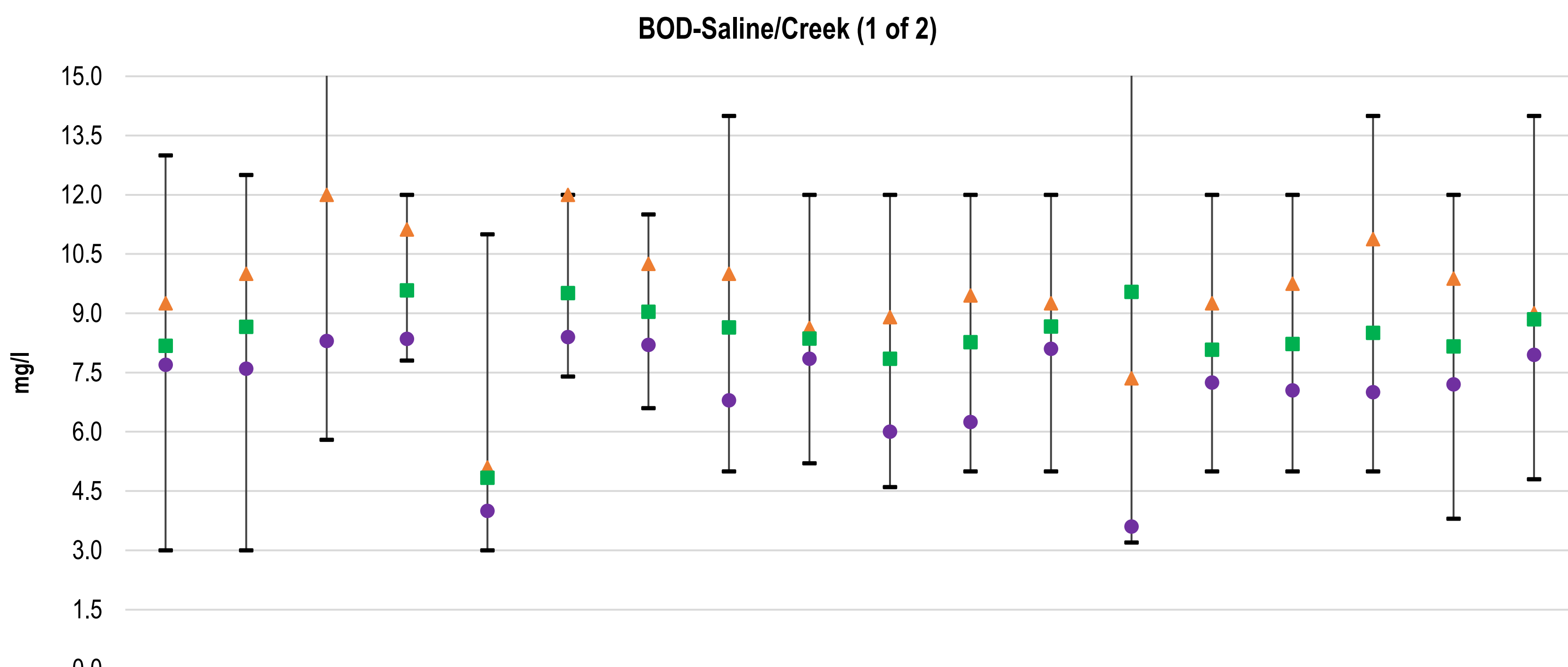
	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
Max	6.3	6.5	5.5	5.5	7.0	5.3	5.5	5.6	5.9	5.7	5.9	5.7	6.5	5.7	5.8	5.6	5.7	6.2
75 Perc	5.7	5.1	5.0	4.8	6.6	4.7	5.0	5.3	5.4	5.2	5.5	5.0	6.1	5.4	5.1	5.3	5.2	5.8
Avg	5.1	5.0	4.7	4.6	5.8	4.6	4.7	4.7	5.1	4.9	5.0	4.7	5.4	4.9	4.9	4.7	4.7	5.0
25 Perc	4.6	4.7	4.6	4.3	5.0	4.3	4.3	4.5	4.8	4.5	4.6	4.4	5.3	4.6	4.6	4.4	4.5	4.8
Min	4.1	4.1	3.6	4.0	4.6	3.4	4.1	2.5	4.1	4.4	4.2	3.7	2.9	4.3	4.0	3.0	3.2	2.4

Figure No. 53: Trend of Dissoved Oxygen (DO) levels recorded at WQMS monitoring sea and creek water (1 of 2)



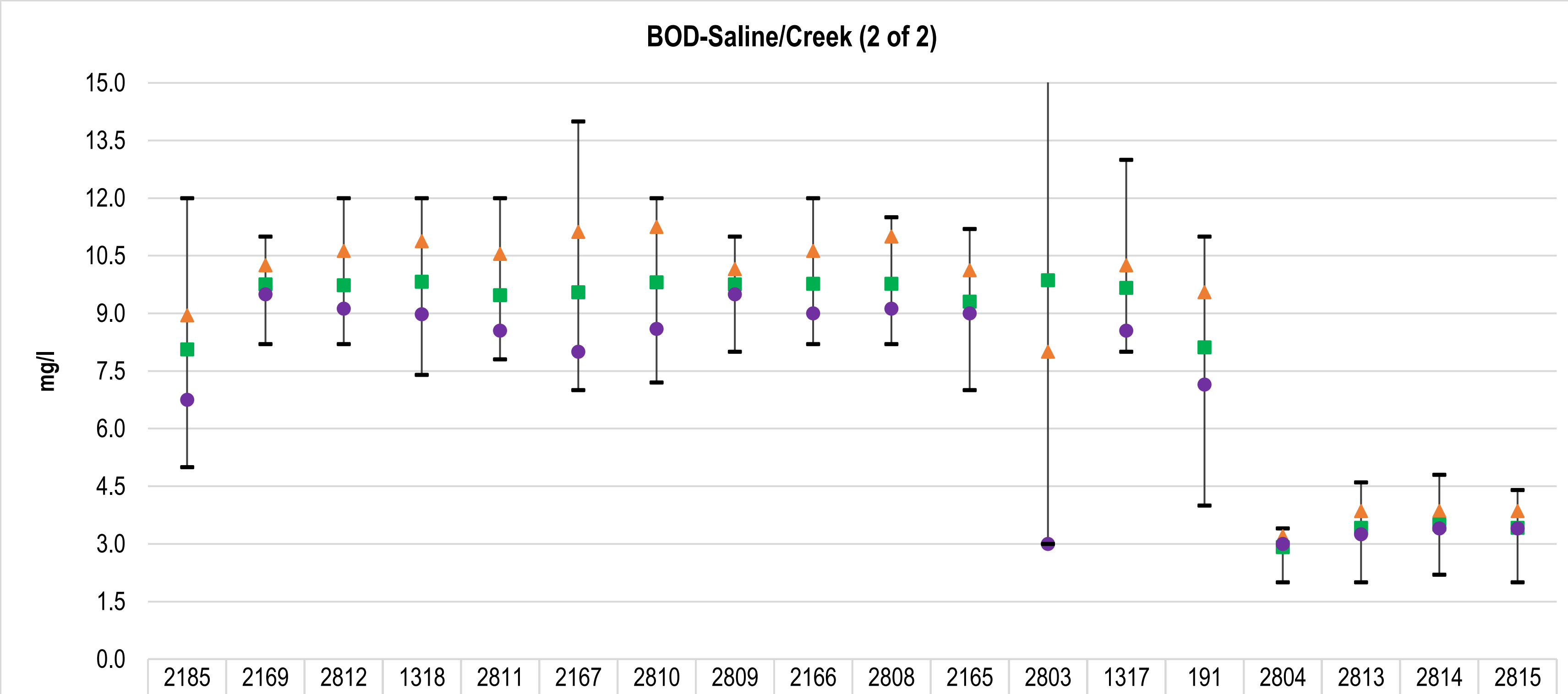
	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
Max	6.0	5.3	5.3	5.2	5.7	5.5	5.2	5.5	5.2	5.4	5.6	7.3	5.5	6.0	7.5	6.9	6.8	7.0
75 Perc	5.5	4.8	4.9	4.7	4.8	4.8	4.7	5.0	4.8	5.1	5.2	6.2	5.1	5.1	6.8	6.2	6.1	6.5
Avg	5.0	4.5	4.6	4.6	4.7	4.6	4.7	4.8	4.7	4.8	4.8	5.3	4.8	5.0	6.3	5.9	5.9	6.2
25 Perc	4.6	4.3	4.3	4.4	4.5	4.4	4.6	4.6	4.5	4.5	4.5	4.8	4.5	4.7	6.0	5.5	5.6	5.8
Min	4.3	4.1	4.0	4.0	4.2	3.7	4.2	4.1	4.3	4.3	4.2	0.8	3.9	4.5	4.7	5.3	5.2	5.4

Figure No. 54: Trend of Dissoved Oxygen (DO) levels recorded at WQMS monitoring sea and creek water (2 of 2)



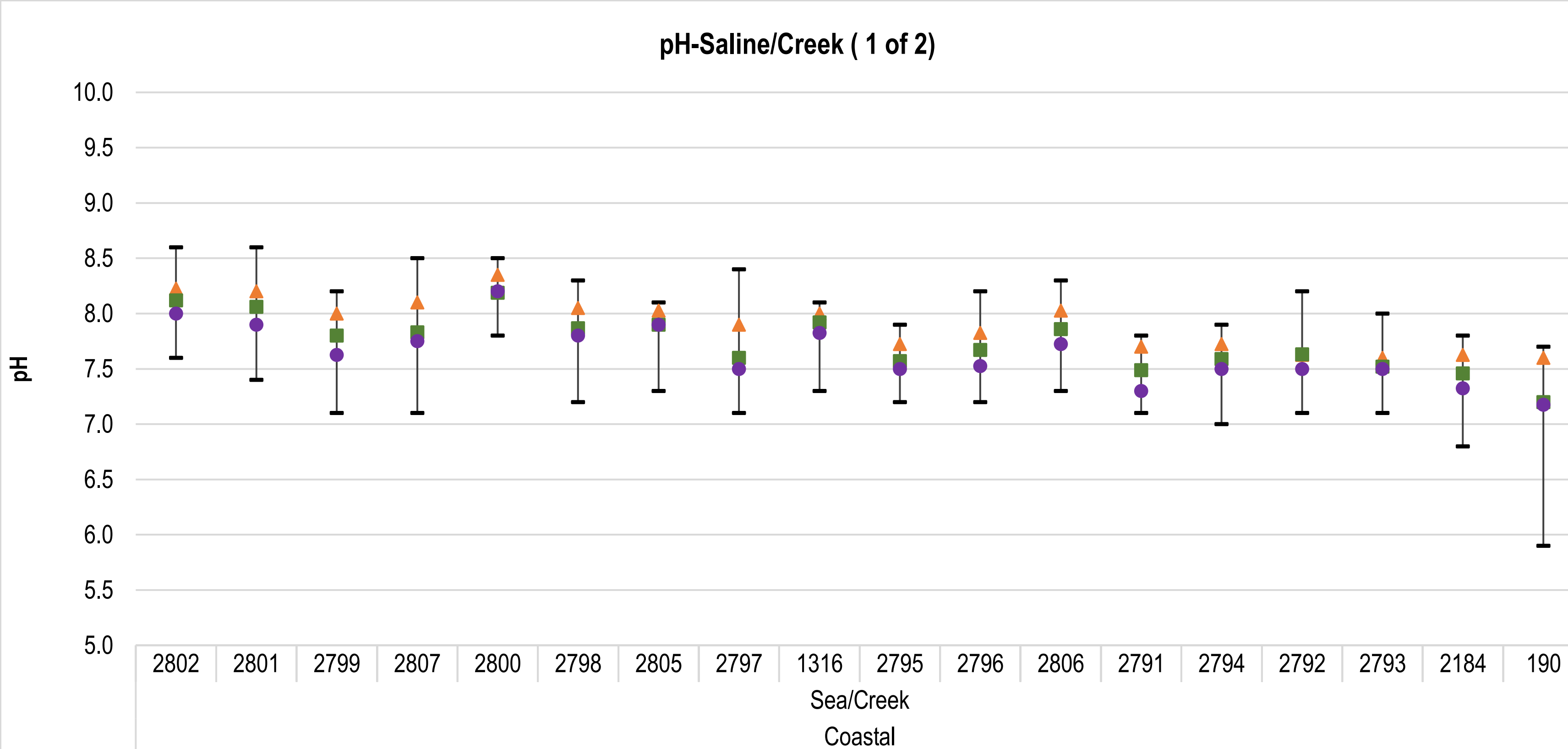
	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
	Saline /Creek Coastal																	
Max	13.0	12.5	420.0	12.0	11.0	12.0	11.5	14.0	12.0	12.0	12.0	12.0	42.0	12.0	12.0	14.0	12.0	14.0
75 Perc	9.3	10.0	12.0	11.1	5.1	12.0	10.3	10.0	8.6	8.9	9.5	9.3	7.4	9.3	9.8	10.9	9.9	9.0
Avg	8.2	8.7	43.8	9.6	4.8	9.5	9.0	8.6	8.4	7.9	8.3	8.7	9.5	8.1	8.2	8.5	8.2	8.9
25 Perc	7.7	7.6	8.3	8.4	4.0	8.4	8.2	6.8	7.9	6.0	6.3	8.1	3.6	7.3	7.1	7.0	7.2	8.0
Min	3.0	3.0	5.8	7.8	3.0	7.4	6.6	5.0	5.2	4.6	5.0	5.0	3.2	5.0	5.0	5.0	3.8	4.8

Figure No. 55: Trend ofBiological Oxygen Demand (BOD) levels recorded at WQMS monitoring sea and creek water (1 of 2)



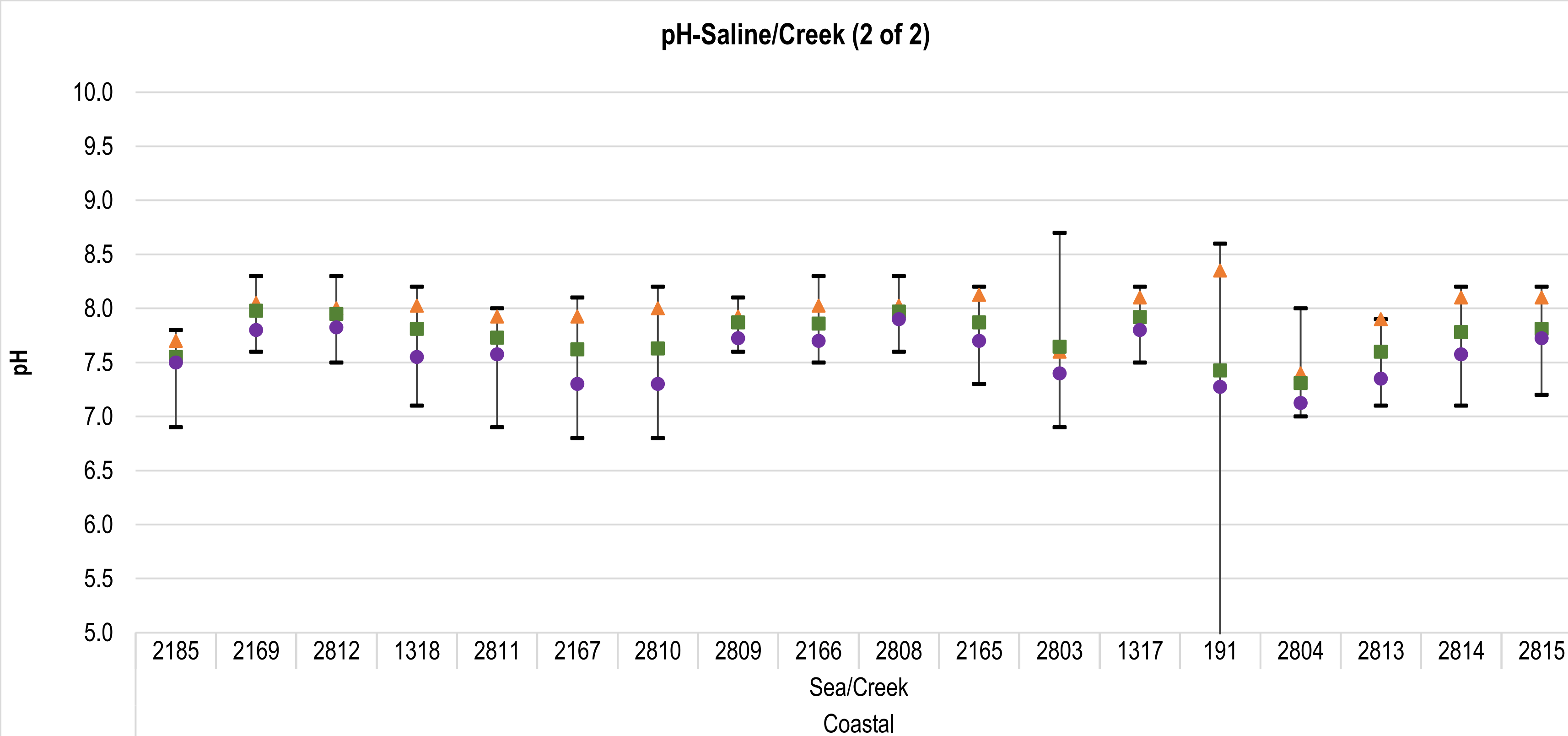
	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
Max	12.0	11.0	12.0	12.0	12.0	14.0	12.0	11.0	12.0	11.5	11.2	52.0	13.0	11.0	3.4	4.6	4.8	4.4
75 Perc	9.0	10.3	10.6	10.9	10.6	11.1	11.3	10.2	10.6	11.0	10.1	8.0	10.3	9.6	3.2	3.9	3.9	3.9
Avg	8.1	9.8	9.7	9.8	9.5	9.6	9.8	9.8	9.8	9.8	9.3	9.9	9.7	8.1	2.9	3.4	3.5	3.4
25 Perc	6.8	9.5	9.1	9.0	8.6	8.0	8.6	9.5	9.0	9.1	9.0	3.0	8.6	7.2	3.0	3.3	3.4	3.4
Min	5.0	8.2	8.2	7.4	7.8	7.0	7.2	8.0	8.2	8.2	7.0	3.0	8.0	4.0	2.0	2.0	2.2	2.0

Figure No. 56: Trend ofBiological Oxygen Demand (BOD) levels recorded at WQMS monitoring sea and creek water (2 of 2)



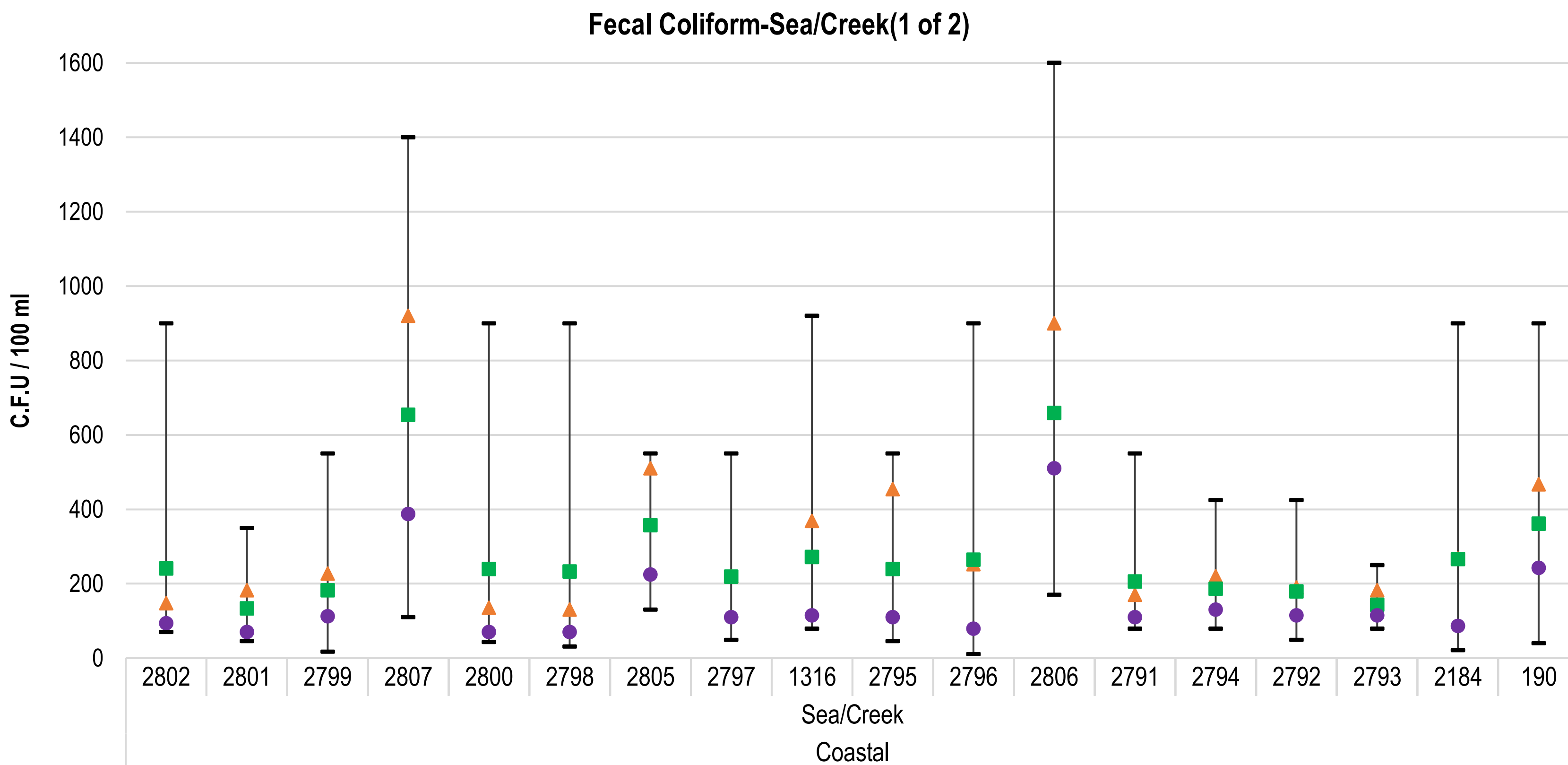
	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
Max	8.6	8.6	8.2	8.5	8.5	8.3	8.1	8.4	8.1	7.9	8.2	8.3	7.8	7.9	8.2	8.0	7.8	7.7
75 Perc	8.2	8.2	8.0	8.1	8.4	8.1	8.0	7.9	8.0	7.7	7.8	8.0	7.7	7.7	7.6	7.6	7.6	7.6
Avg	8.1	8.1	7.8	7.8	8.2	7.9	7.9	7.6	7.9	7.6	7.7	7.9	7.5	7.6	7.6	7.5	7.5	7.2
25 Perc	8.0	7.9	7.6	7.8	8.2	7.8	7.9	7.5	7.8	7.5	7.5	7.7	7.3	7.5	7.5	7.5	7.3	7.2
Min	7.6	7.4	7.1	7.1	7.8	7.2	7.3	7.1	7.3	7.2	7.2	7.3	7.1	7.0	7.1	7.1	6.8	5.9

Figure No. 57: Trend of pH levels recorded at WQMS monitoring sea and creek water (1 of 2)



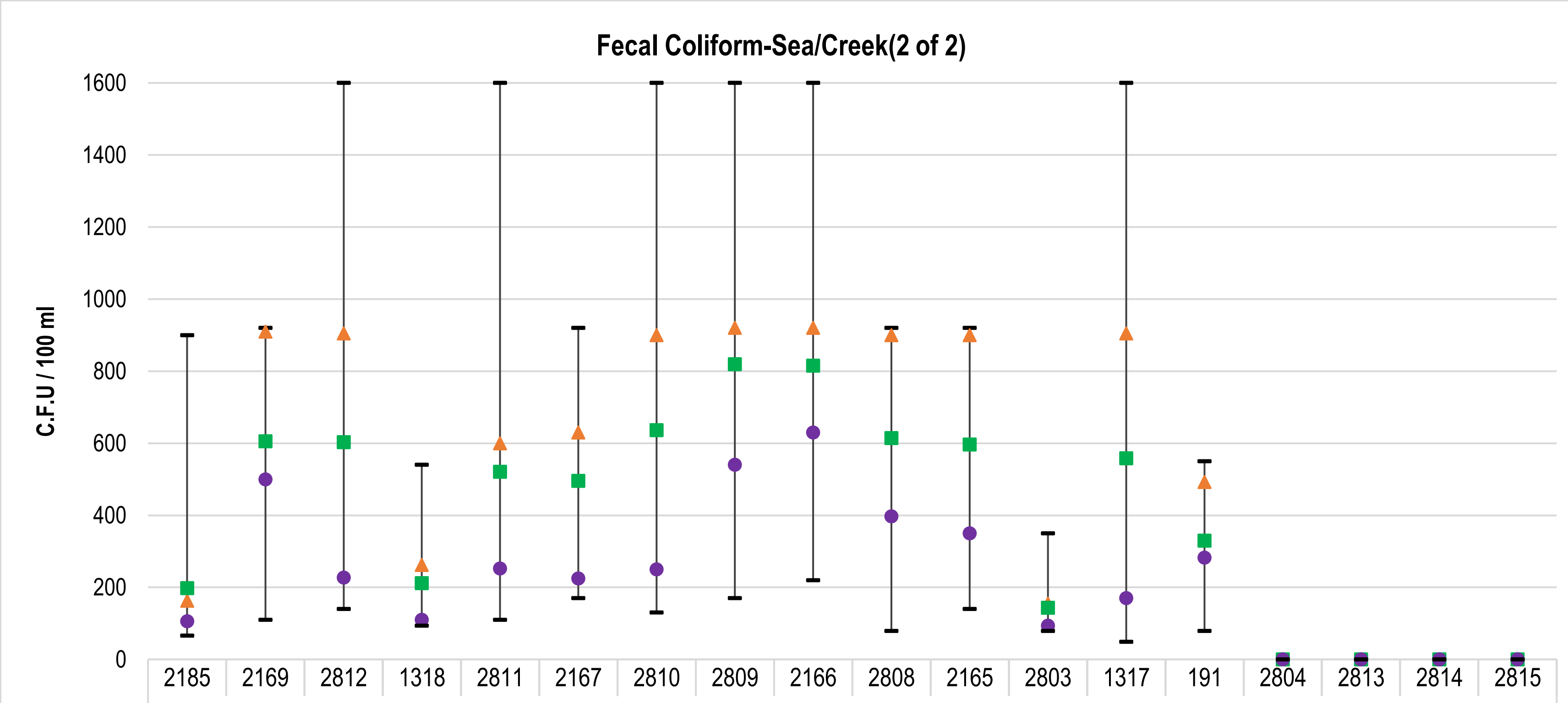
	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
Max	7.8	8.3	8.3	8.2	8.0	8.1	8.2	8.1	8.3	8.3	8.2	8.7	8.2	8.6	8.0	7.9	8.2	8.2
75 Perc	7.7	8.1	8.0	8.0	7.9	7.9	8.0	7.9	8.0	8.0	8.1	7.6	8.1	8.4	7.4	7.9	8.1	8.1
Avg	7.6	8.0	8.0	7.8	7.7	7.6	7.6	7.9	7.9	8.0	7.9	7.6	7.9	7.4	7.3	7.6	7.8	7.8
25 Perc	7.5	7.8	7.8	7.6	7.6	7.3	7.3	7.7	7.7	7.9	7.7	7.4	7.8	7.3	7.1	7.4	7.6	7.7
Min	6.9	7.6	7.5	7.1	6.9	6.8	6.8	7.6	7.5	7.6	7.3	6.9	7.5	4.8	7.0	7.1	7.1	7.2

Figure No. 58: Trend of pH levels recorded at WQMS monitoring sea and creek water (2 of 2)



	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
Max	900	350	550	1400	900	900	550	550	920	550	900	1600	550	425	425	250	900	900
75 Perc	147.5	182.5	227.5	920	135	130	510	220	368.75	453.75	252.5	900	170	220	190	182.5	267.5	467.5
Avg	241.33	133.92	182.5	654.17	239.09	232.45	357.5	218.91	271.5	239.25	264.58	659.17	205.8	186.58	179.42	143	266.5	361.67
25 Perc	94.0	70.0	112.5	387.5	70.0	70.0	225.0	110.0	115.0	110.0	79.0	510.0	110.0	130.0	115.0	115.0	86.8	242.5
Min	70	46	17	110	43	31	130	49	79	46	11	170	79	79	49	79	21	40

Figure No. 59: Trend of Fecal coliform levels recorded at WQMS monitoring sea and creek water (1 of 2)



	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
Max	900	920	1600	540	1600	920	1600	1600	1600	920	920	350	1600	550	0	0	0	0
75 Perc	162.5	910	905	262.5	600	630	900	920	920	900	900	155	905	492.5	0	0	0	0
Avg	198	605.45	602.92	211.73	520.83	495.42	636.67	819.17	815	614.08	596.67	143.73	558.25	329.83	0	0	0	0
25 Perc	106.0	500.0	227.5	110.0	252.5	225.0	250.0	540.0	630.0	397.5	350.0	94.0	170.0	282.3	0.0	0.0	0.0	0.0
Min	66	110	140	94	110	170	130	170	220	79	140	79	49	79	0	0	0	0

Figure No. 60: Trend of Fecal coliform levels recorded at WQMS monitoring sea and creek water (2 of 2)

Water quality Index for WQMS monitoring Sea and Creek water (1 of 2)

Apr	40	47	42	40	54	37	42	35	47	44	45	42	39	48	45	43	42	37
May	45	50	49	46	55	46	44	47	48	46	42	44	55	47	47	50	39	.
Jun	48	48	44	43	48	.	45	46	53	50	48	42	56	47	49	45	51	.
Jul	53	47	48	43	.	49	42	.	51	56	53	49	65	62	61	60	54	47
Aug	52	53	51	48	61	55	52	61	53	63	59	59	60	57	58	57	62	52
Sep	61	64	52	41	66	50	48	54	52	53	55	47	60	54	51	52	62	.
Oct	49	49	30	49	56	36	53	50	51	56	53	44	70	51	55	55	55	.
Nov	60	53	60	48	56	55	48	54	51	49	62	46	67	54	55	56	56	58
Dec	52	52	51	49	60	53	47	60	50	61	62	54	.	63	59	60	60	.
Jan	55	57	56	47	54	49	45	49	52	64	49	42	Dry	58	58	60	52	55
Feb	52	54	52	47	63	54	55	58	58	58	60	52	35	56	60	58	56	61
Mar	53	53	54	47	59	56	57	62	54	59	62	45	61	55	53	57	60	.
Station code	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
Sub - Basin	Sea/Creek (1 of 2)																	

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected	No data

Table No. 24: Surface water quality monitoring stations monitoring Sea/Creek water (1 of 2)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	2802	Dahanu creek	Dahanu Creek at Dahanu Fort	Danugaon	Dahanu	Thane
NWMP	2801	Savta creek	Savta Creek	Savta	Dahanu	Thane
NWMP	2799	Dandi creek	Dandi Creek	Dandi	Palghar	Thane
NWMP	2807	Navapur sea	Navapur Sea	Navapur	Palghar	Thane
NWMP	2800	Sarwali creek	Sarwali Creek	Sarwali	Palghar	Thane
NWMP	2798	Kharekuran Murbe creek	Kharekuran Murbe Creek	Kharekuran	Palghar	Thane
NWMP	2805	Arnala sea	Arnala Sea	Arnala	Vasai	Thane
NWMP	2797	Bhayander creek	Bhayander Creek at D/s of Railway Bridge at Jasal Park Choupathy	Navghar	Bhayander	Thane
NWMP	1316	Bassein creek	Bassein creek at Vasai Fort, Thane	Bassein	Vasai	Thane
NWMP	2795	Ulhas creek	Ulhas Creek at Gaimukh at Nagla Bunder on Ghod Bunder Road	Nagla	Thane	Thane
NWMP	2796	Ulhas creek	Ulhas Creek at Versova Bridge	Versova	Vasai	Thane
NWMP	2806	Uttan sea	Uttan Sea at Bhayander	Uttan	Bhayander	Thane
NWMP	2791	Ulhas creek	Ulhas Creek at Reti Bunder, D/s of Kalyan-Bhiwandi Bridge	Kalyan	Kalyan	Thane
NWMP	2794	Ulhas creek	Ulhas Creek at Kolshet Reti Bunder	Kolshet	Thane	Thane
NWMP	2792	Ulhas creek	Ulhas Creek at Mumbra Reti Bunder	Mumbra	Thane	Thane
NWMP	2793	Thane creek	Thane Creek at Kalwa Road Bridge	Kalwa	Thane	Thane
NWMP	2184	Vashi creek	Vashi Creek at Airoli Bridge	Airoli	Thane	Thane
SWMP	190	Creek water	TTC Creek At Ghansoli Jetty	Ghansoli	Thane	Thane

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

Apr		41	42	47	45	43	43	46	45	46	47	58	42	45	79	79	72	71
May	49	44	48	45	43	41	41	41	41	42	43	65	43	.	76	71	72	71
Jun	51	45	44	48	43	44	44	47	45	45	46	52	50	.	80	76	70	70
Jul	52	43	42	46	45	43	44	42	42	45	42	59	52	44	71	73	69	77
Aug	61	50	50	51	54	50	48	51	48	52	60	58	53	52	79	72	67	68
Sep	55	43	48	53	49	51	44	46	45	44	47	56	48	.	78	76	70	71
Oct	57	44	45	58	51	52	51	47	41	46	45	66	48	.	80	68	71	68
Nov	54	.	43	46	48	54	54	44	47	47	43	67	45	47	70	73	68	70
Dec	63	42	45	51	47	51	50	44	46	43	44	63	45	.	71	68	72	74
Jan	51	45	50	50	49	45	47	45	51	48	50	56	53	47	86	73	70	73
Feb	51	51	48	53	51	48	46	46	43	45	48	38	47	52	78	75	69	71
Mar	.	45	42	51	48	49	49	42	45	45	45	.	44	.	81	80	78	80
Station code	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
Sub -Basin	Sea/Creek (2 of 2)																	

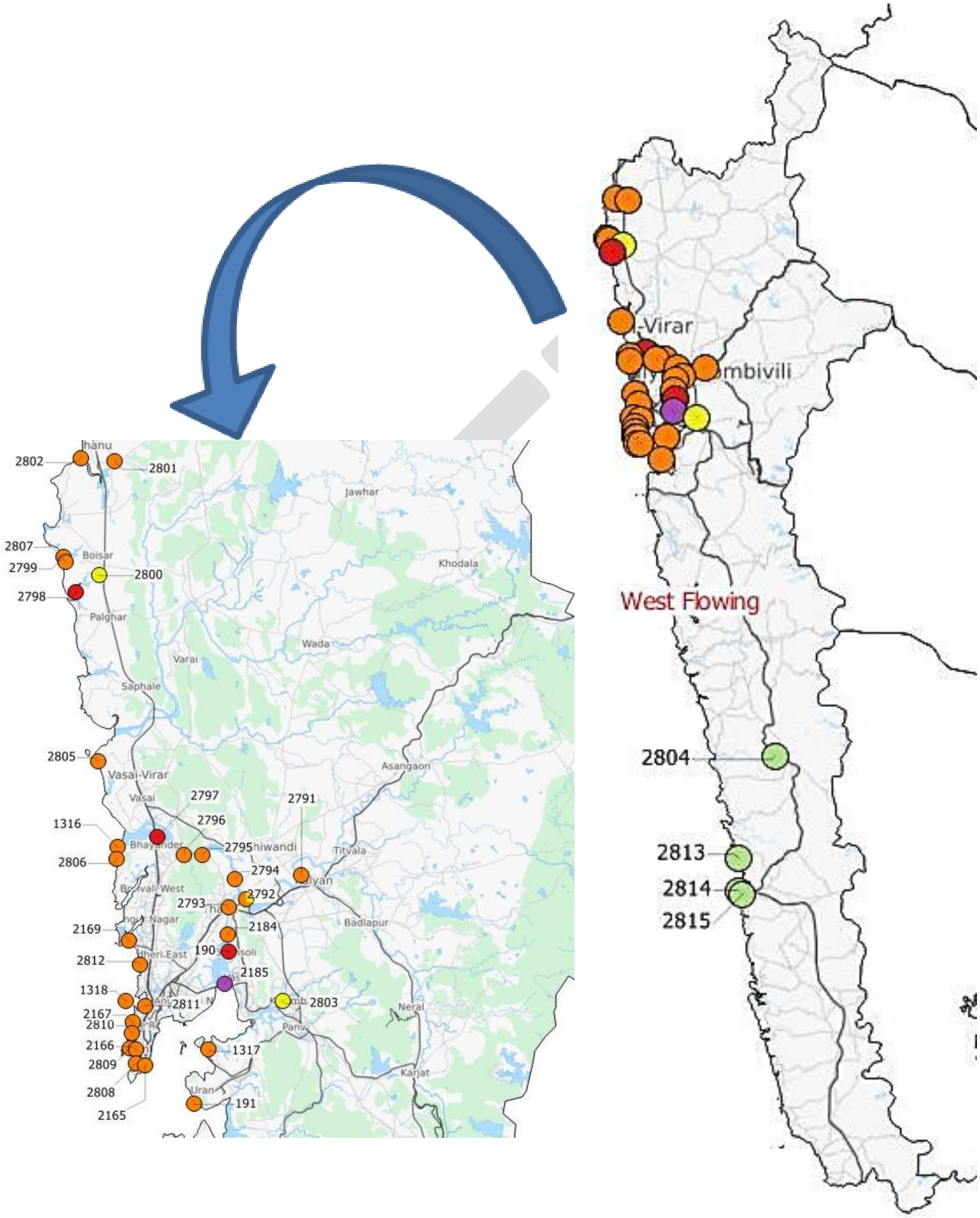
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	Not Collected

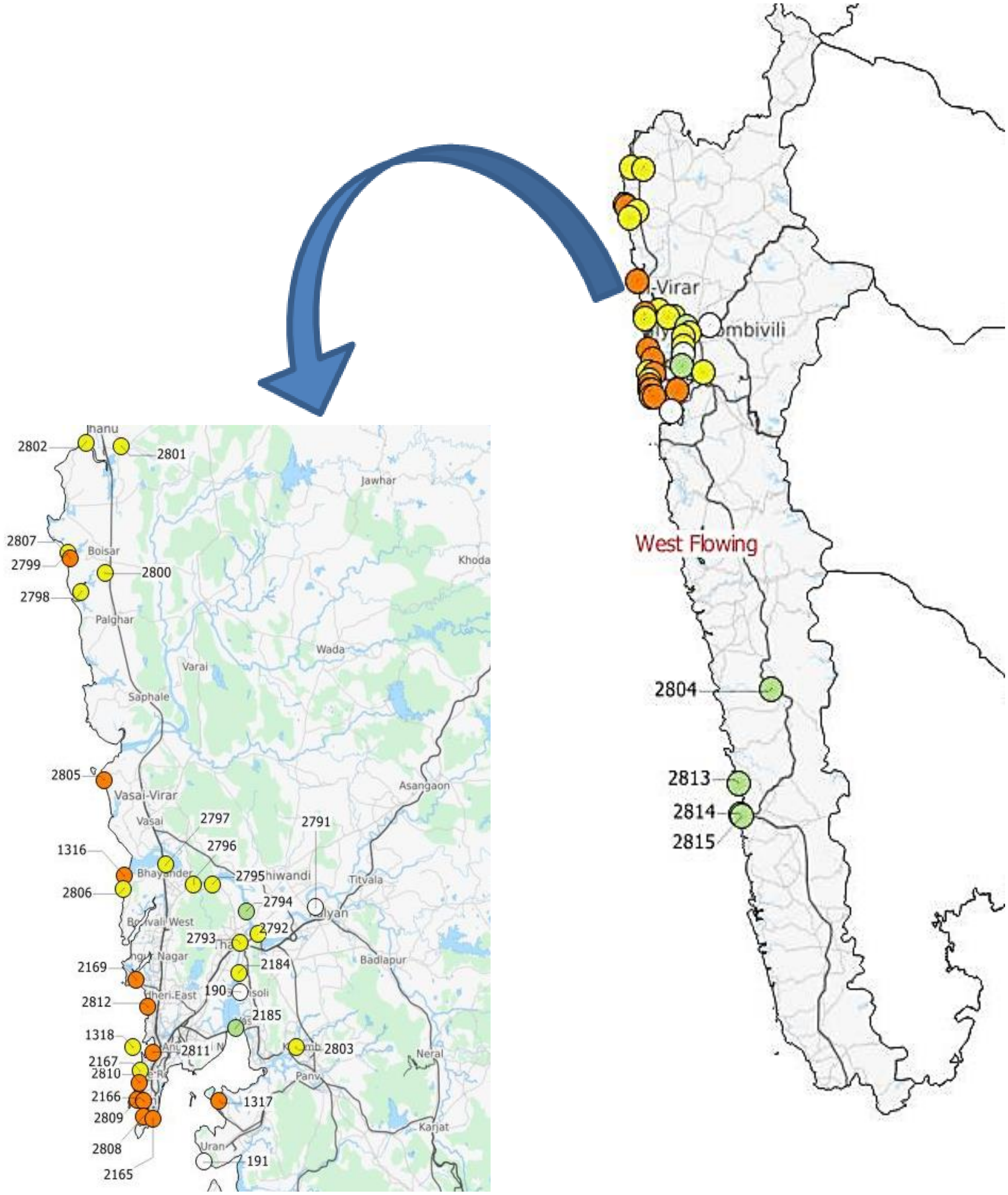
Table No. 25: Surface water quality monitoring stations monitoring Sea/Creek water (2 of 2)

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
NWMP	2185	Vashi creek	Vashi Creek at Vashi Bridge	Vashi	Thane	Thane
NWMP	2169	Sea	Sea Water at Varsova Beach	Versova	Andheri	Mumbai
NWMP	2812	Sea	Sea Water at Juhu Beach	Juhugaon	Santacruz	Mumbai
NWMP	1318	Mahim creek	Mahim creek at Mahim Bay	Mahim	Bandra	Mumbai
NWMP	2811	Sea	Sea Water at Shivaji Park (Dadar Choupathy)	Dadar	Dadar	Mumbai
NWMP	2167	Sea	Sea Water at Worli Seaface	Worli	Worli	Mumbai
NWMP	2810	Sea	Sea Water at Haj Ali	Worli	Worli	Mumbai
NWMP	2809	Sea	Sea Water at Malabar Hill	Walkeshwar	Mumbai	Mumbai
NWMP	2166	Sea	Sea Water at Charni Road Choupathy	Girgaon	Mumbai	Mumbai
NWMP	2808	Sea	Sea Water at Nariman Point	Colaba	Colaba	Mumbai
NWMP	2165	Sea	Sea Water at Gateway of India	Colaba	Colaba	Mumbai
NWMP	2803	Panvel creek	Panvel Creek at Kopra Bridge	Kopra	Panvel	Raigad
NWMP	1317	Thane creek	Thane creek at Elephanta Island	Gharapuri, Elephanta Island	Uran	Raigad
SWMP	191	Sea Water	Arabian Sea behind ONGC Uran	Uran	Uran	Raigad
NWMP	2804	Karambavane creek	Karambavane Creek at Chiplun	Karambavane	Chiplun	Ratnagiri
NWMP	2813	Sea	Sea Water at Ganapatipule	Ganapatipule	Ratnagiri	Ratnagiri
NWMP	2814	Sea	Sea Water at Bhagwati Bunder, Ratnagiri near Ultra Tech Cement Jetty	Mirkarwada	Ratnagiri	Ratnagiri
NWMP	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 2015)

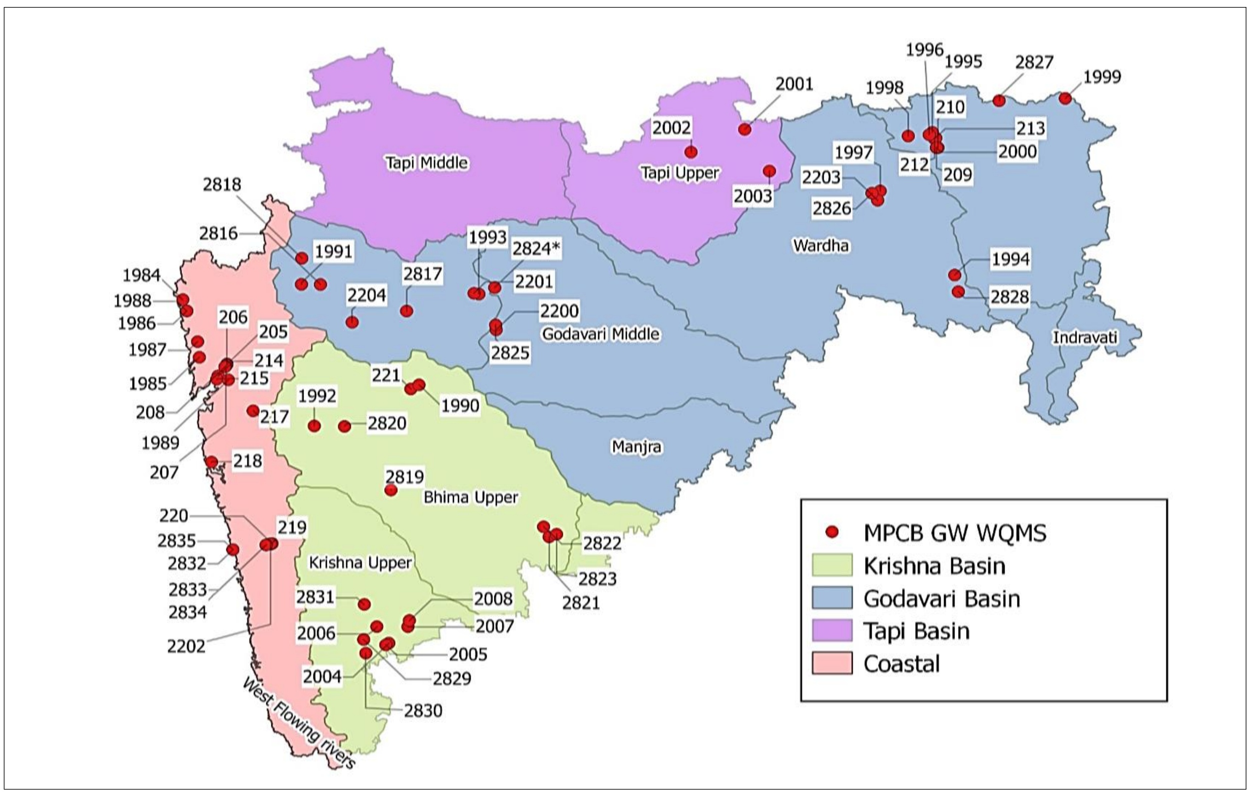


Spatial map of WQI for Sea and Creek Water (December 2015)



Groundwater Quality

Water located beneath the earth's surface in soil pore spaces and aquifers formed due to formation of cracks in the rocks is termed as Groundwater. It is recharged from rain and surface water and at times the only source for water supply in regions. Groundwater constitutes about two thirds of the freshwater resources of the world[30] and accounts for nearly 80 per cent of the rural and 50 per cent of the urban water needs in India[31]. Groundwater is intensively drawn for agricultural, irrigationand industrial purposes. The accumulation and inadequade disposal of waste generated by the industries leads to groundwater pollution. The overall estimates of ground water resources of the entire country shows a marginal decrease about 2 bcm as compared to 2004[32]. 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. 9.



Map No. 9: Network of ground water quality monitoring stations in Maharashtra

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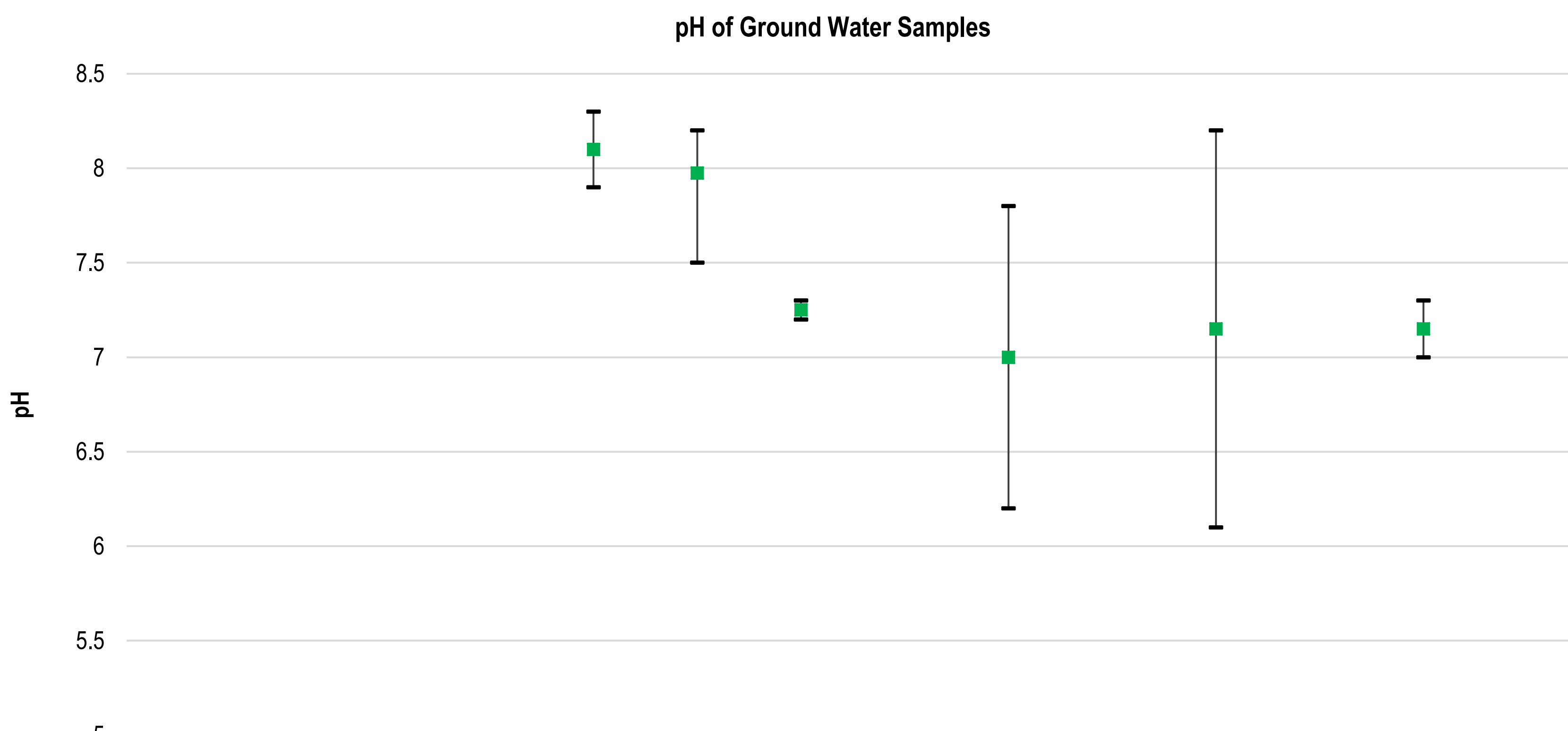
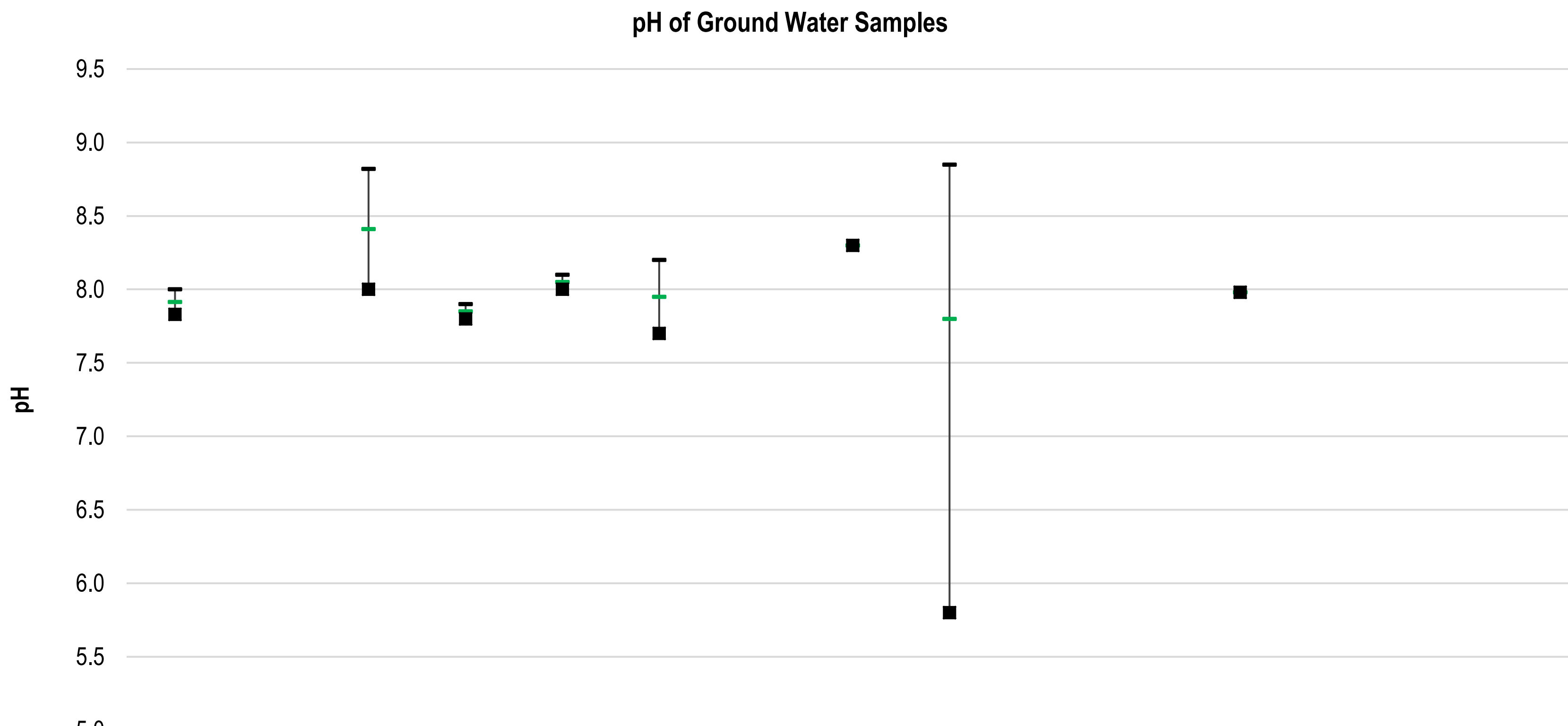
[30]UNESCO/WHO/UNEP, *Water Quality Assessments - A Guide to Use of Biota, Sediments and Water in Environmental Monitoring - Second Edition*
[31]M. Dinesh Kumar and Tushaar Shah, *Groundwater Pollution and Contamination in India: The Emerging Challenge*
[32] Central ground water committee, *Groundwater Year Book –India 2013-14*



	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
	Kalyan				Navi Mumbai		Raigad			Thane				
Max					8.3	8.2	7.3		7.8		8.2		7.3	0.0
Average					8.1	8.0	7.3		7.0		7.2		7.2	0.0
Min					7.9	7.5	7.2		6.2		6.1		7.0	0.0

Max Average Min

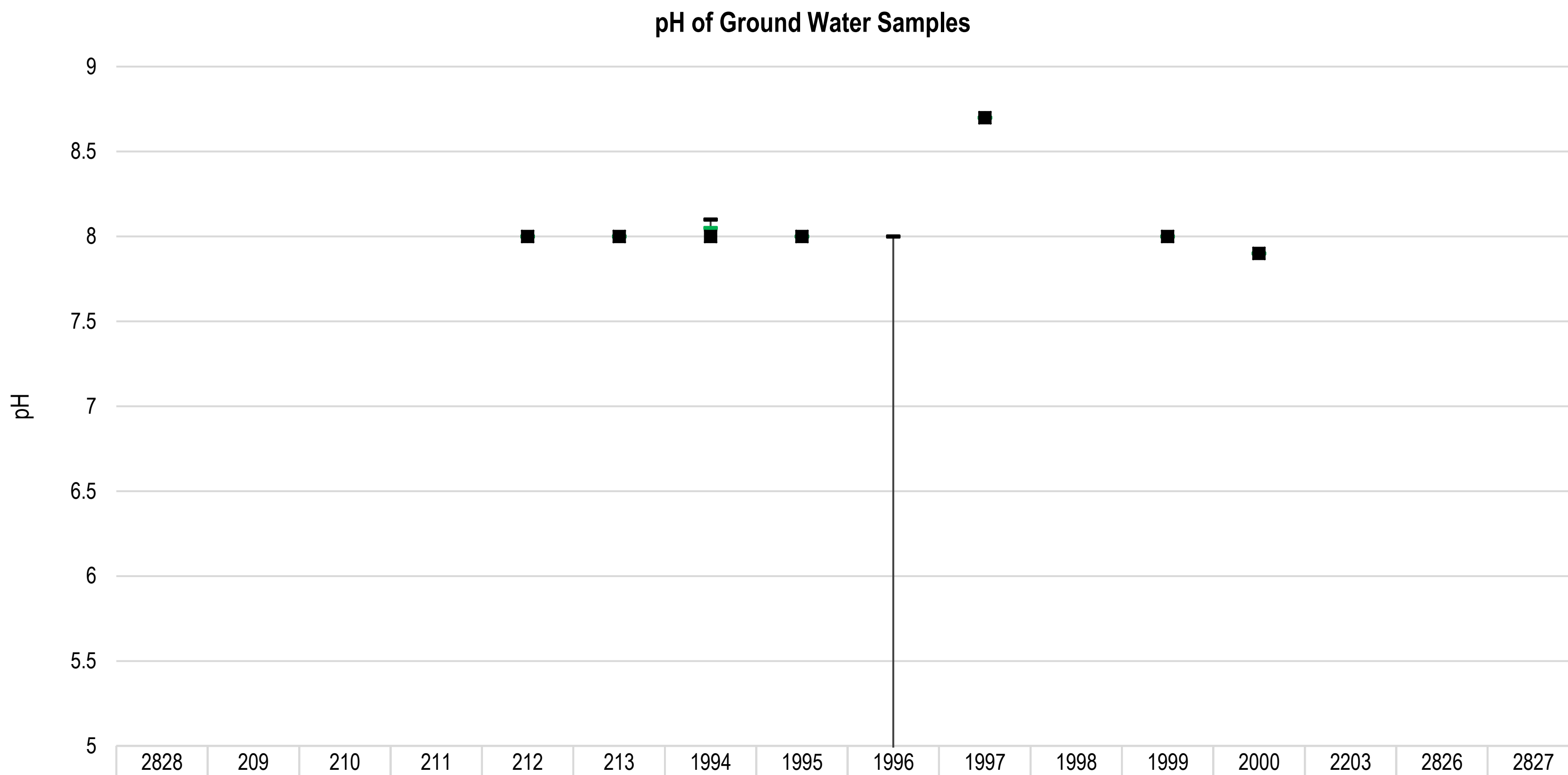
Figure No.61: Parametric values of pH recorded at WQMS monitoring groundwater atKalyan, Navi Mumbai, Raigad and Thane.



	Amravati			Aurangabad					Nashik						
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
Max	8.0	0.0	8.8	7.9	8.1	8.2	0.0	8.3	8.9	0.0		8.0			
Average	7.9	0.0	8.4	7.9	8.1	8.0	0.0	8.3	7.8	0.0		8.0			
Min	7.8	0.0	8.0	7.8	8.0	7.7	0.0	8.3	5.8	0.0		8.0			

Max Average Min

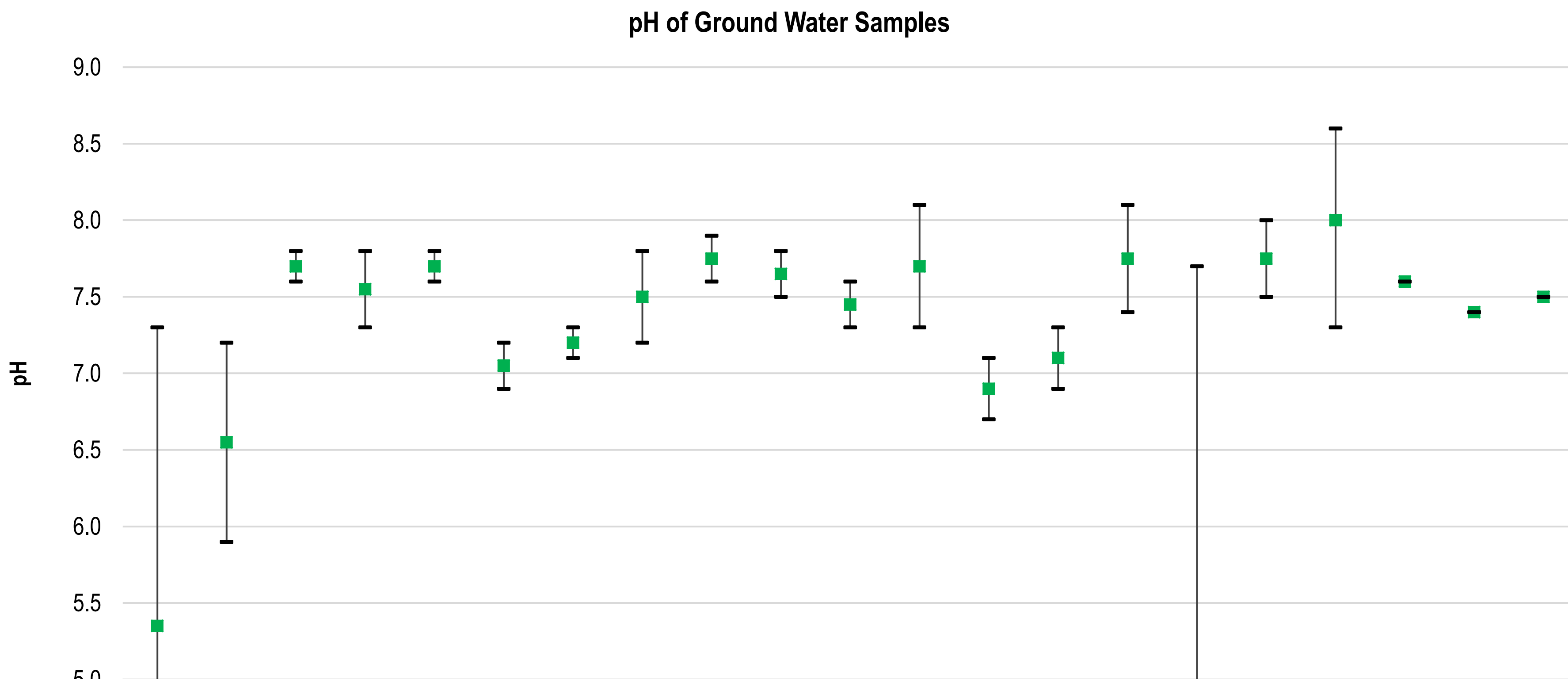
Figure No.62: Parametric values of pH recorded at WQMS monitoring groundwater at Amravati, Aurangabad and Nashik.



	2828	209	210	211	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max					8.0	8.0	8.1	8.0	8.0	8.7		8.0	7.9			
Average					8.0	8.0	8.1	8.0	4.0	8.7		8.0	7.9			
Min					8.0	8.0	8.0	8.0	0.0	8.7		8.0	7.9			

Max Average Min

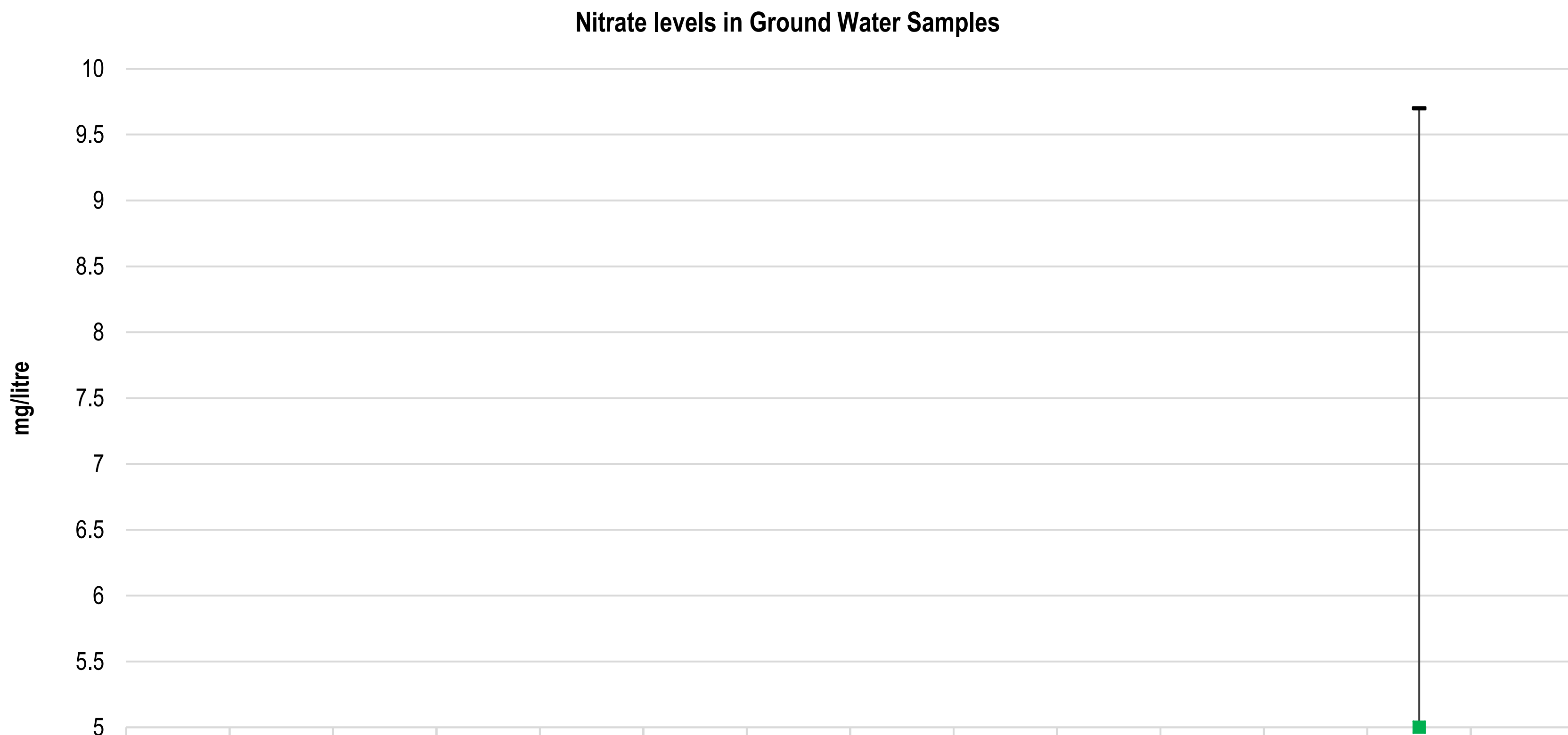
Figure No.63: Parametric values of pH recorded at WQMS monitoring groundwater at Chandrapur and Nagpur.



	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	1992	2819	2820	2821	2822	2823
	Kolhapur															Pune					
Max	7.3	7.2	7.8	7.8	7.8	7.2	7.3	7.8	7.9	7.8	7.6	8.1	7.1	7.3	8.1	7.7	8.0	8.6	7.6	7.4	7.5
Average	5.4	6.6	7.7	7.6	7.7	7.1	7.2	7.5	7.8	7.7	7.5	7.7	6.9	7.1	7.8	3.9	7.8	8.0	7.6	7.4	7.5
Min	3.4	5.9	7.6	7.3	7.6	6.9	7.1	7.2	7.6	7.5	7.3	7.3	6.7	6.9	7.4	0.0	7.5	7.3	7.6	7.4	7.5

Max Average Min

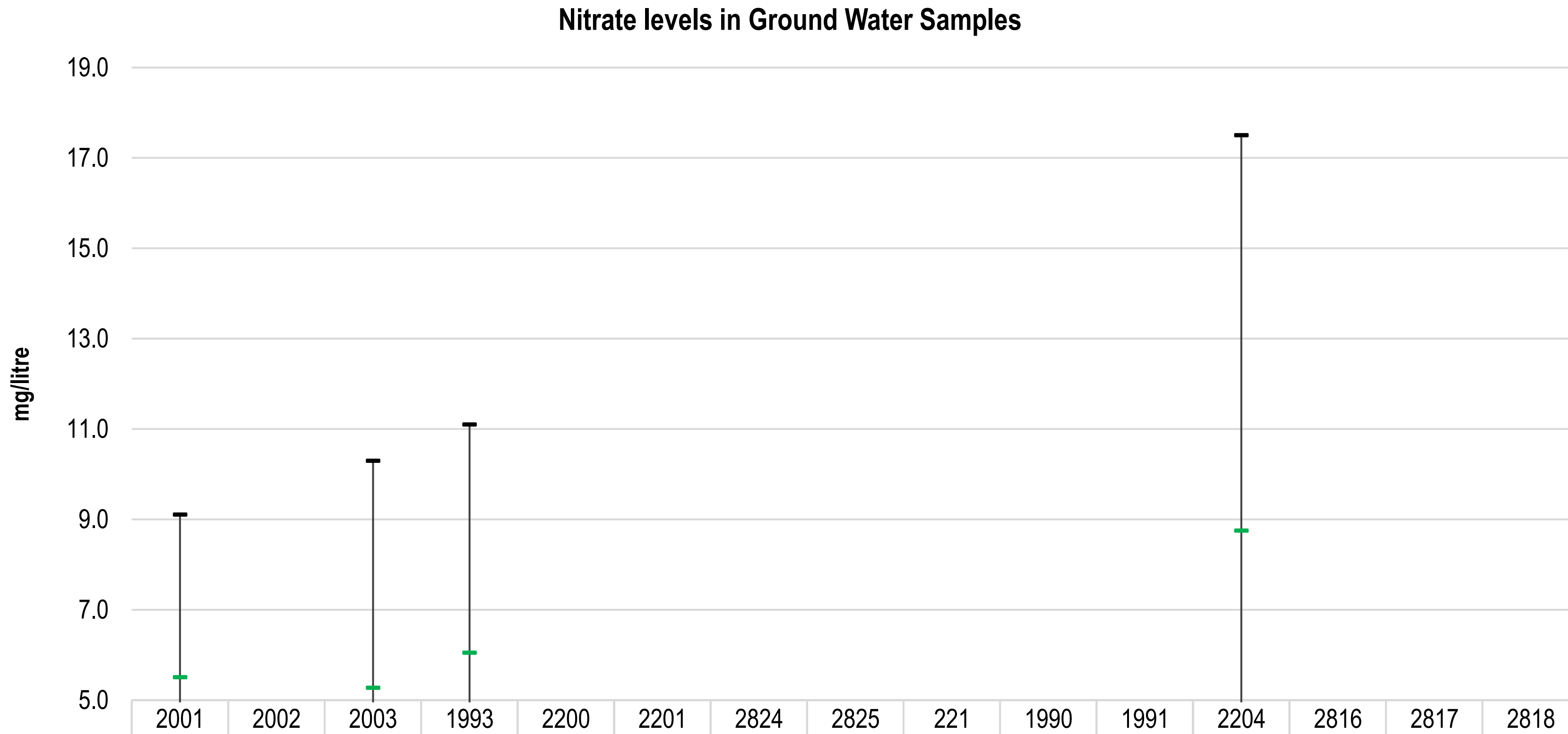
Figure No.64: Parametric values of pH recorded at WQMS monitoring groundwater at Kolhapur and Pune



	Kalyan				Navi Mumbai		Raigad			Thane				
	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
Max					0.8	0.8	0.6		3.2		3.2		9.7	0.0
Average					0.8	0.5	0.5		1.8		2.1		5.0	0.0
Min					0.8	0.2	0.3		0.3		0.9		0.3	0.0

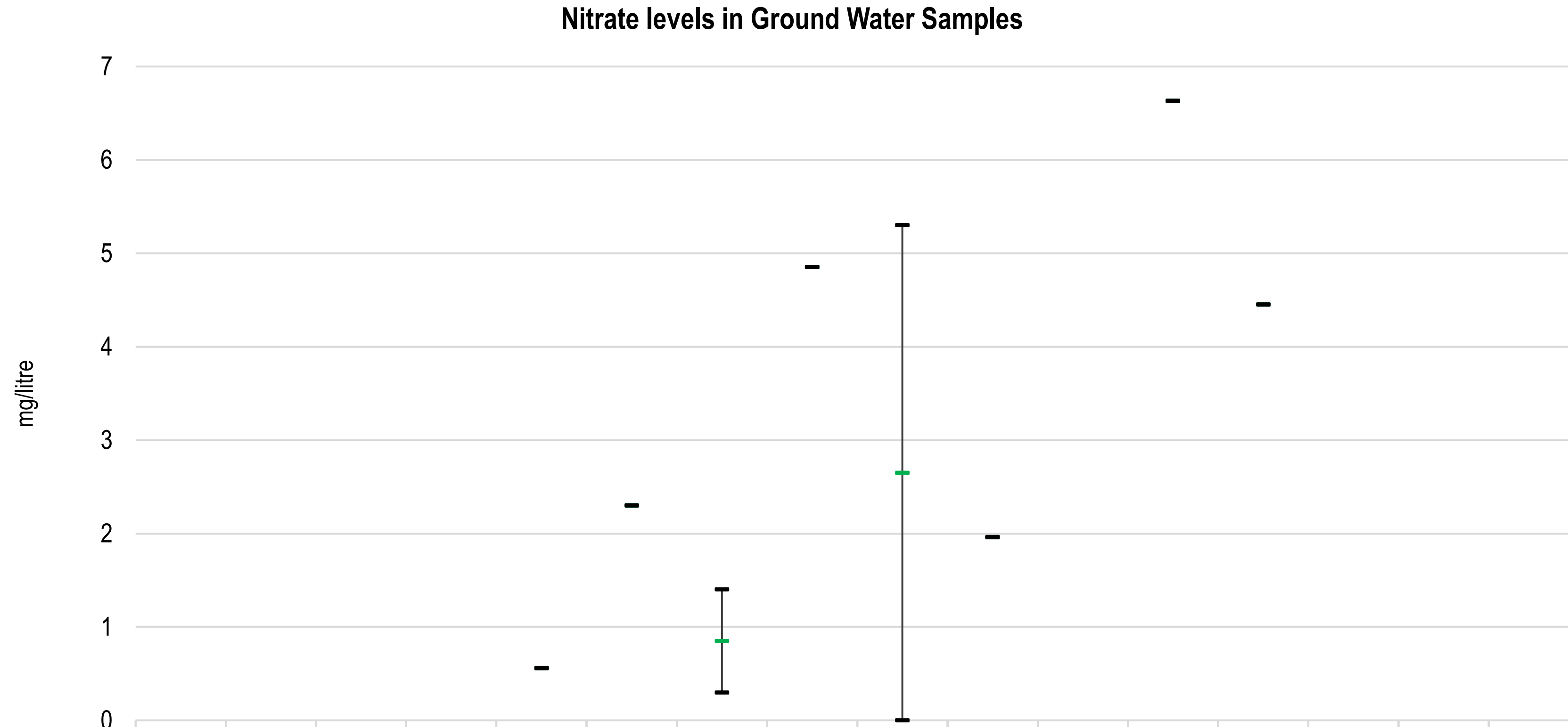
Max Average Min

Figure No.65: Parametric values of Nitrate recorded at WQMS monitoring groundwater at Kalyan, Navi Mumbai, Raigad and Thane.



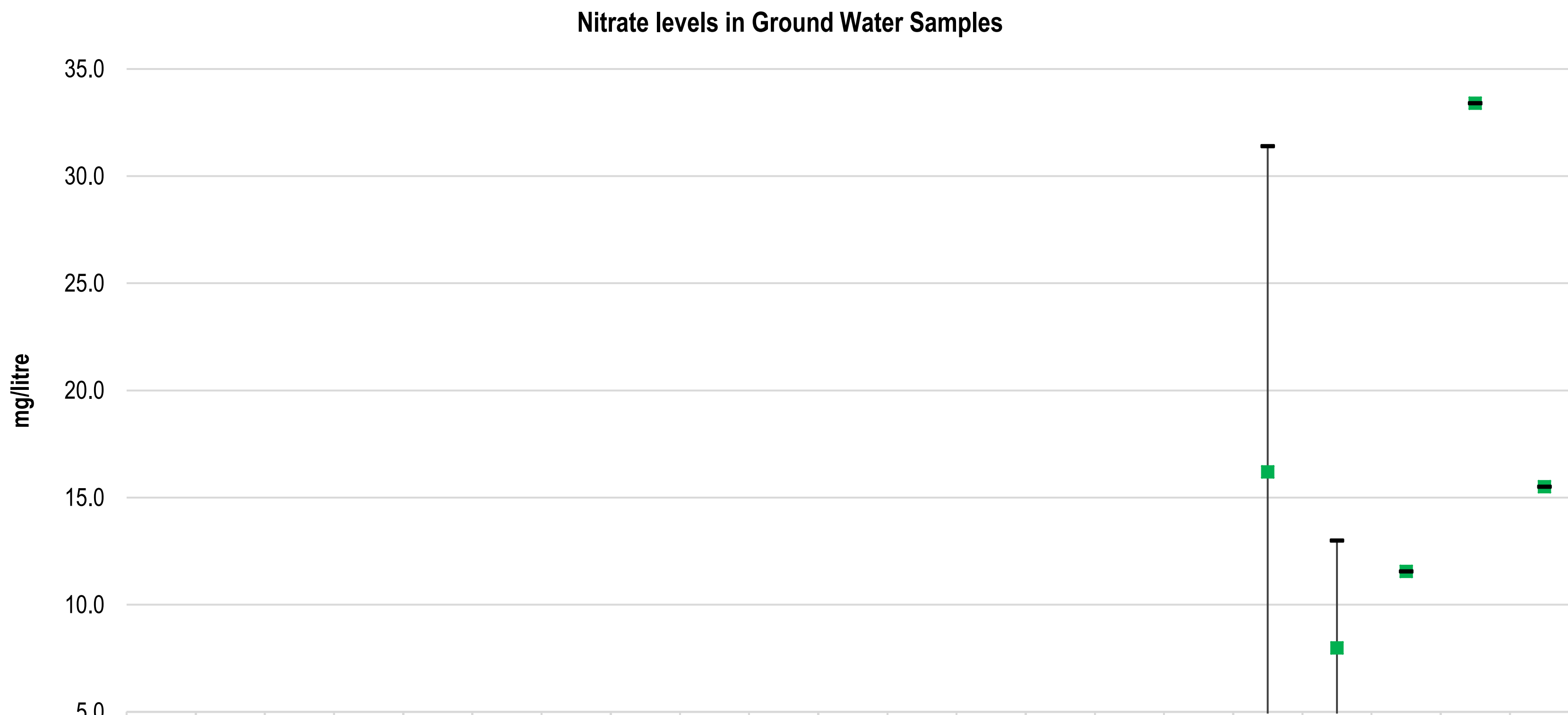
	Amravati			Aurangabad					Nashik						
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
Max	9.1	0.0	10.3	11.1	2.8	0.4	0.0	0.3	2.7	0.0		17.5			
Average	5.5	0.0	5.3	6.1	1.4	0.3	0.0	0.2	1.1	0.0		8.8			
Min	1.9	0.0	0.2	1.0	0.0	0.1	0.0	0.0	0.0	0.0		0.0			

Figure No.66: Parametric values of Nitrate recorded at WQMS monitoring groundwater at Amravati, Aurangabad and Nashik.



	2828	209	210	211	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max					0.6	2.3	1.4	4.9	5.3	2.0		6.6	4.5			
Average					0.6	2.3	0.8	4.9	2.7	2.0		6.6	4.5			
Min					0.6	2.3	0.3	4.9	0.0	2.0		6.6	4.5			

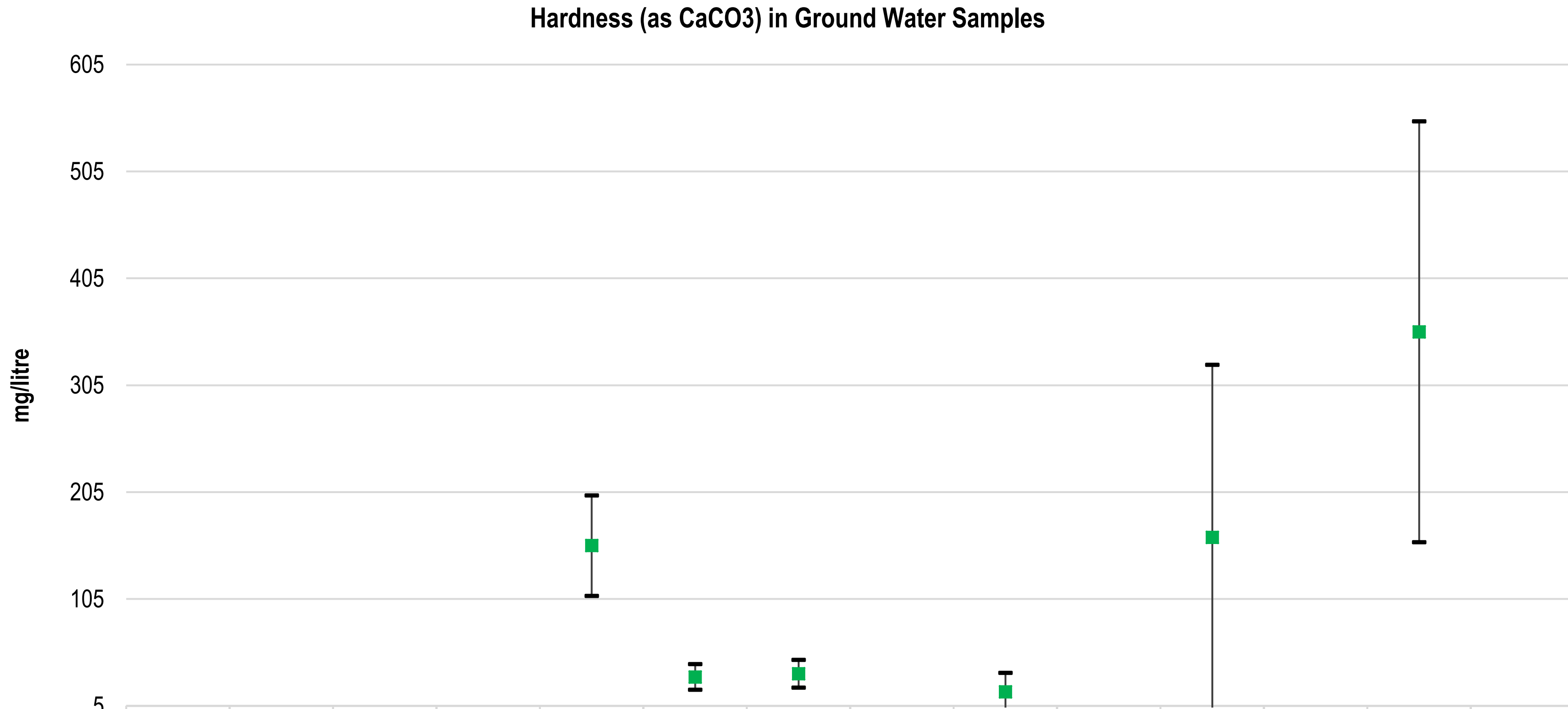
Figure No.67: Parametric values of Nitrate recorded at WQMS monitoring groundwater at Chandrapur and Nagpur.



	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	1992	2819	2820	2821	2822	2823
	Kolhapur															Pune					
Max	0.5	0.5	0.4	0.6	0.3	0.3	0.4	0.4	0.5	0.4	0.2	0.6	0.3	0.5	0.4	1.6	31.4	13.0	11.6	33.4	15.5
Average	0.3	0.3	0.3	0.5	0.3	0.2	0.2	0.3	0.3	0.4	0.2	0.4	0.2	0.4	0.3	0.8	16.2	8.0	11.6	33.4	15.5
Min	0.1	0.2	0.3	0.4	0.3	0.2	0.1	0.2	0.2	0.4	0.2	0.2	0.2	0.3	0.1	0.0	1.0	1.1	11.6	33.4	15.5

Max Average Min

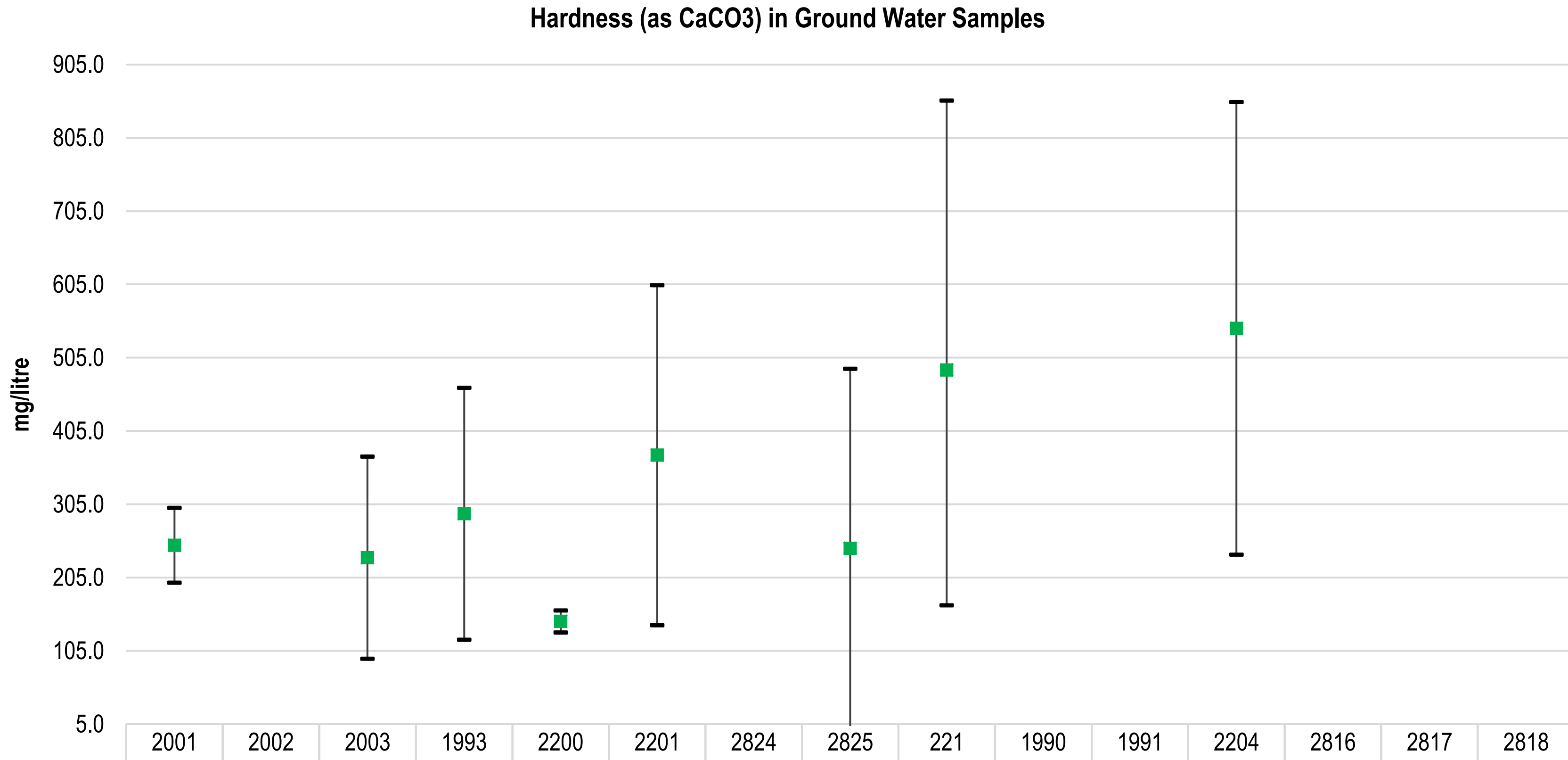
Figure No.68: Parametric values of Hardness at $CaCo_3$ recorded at WQMS monitoring groundwater at Kolhapur and Pune.



	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
	Kalyan				Navi Mumbai		Raigad			Thane				
Max					202.0	44.0	48.0		36.0		324.0		552.0	0.0
Average					155.0	32.0	35.0		18.1		162.5		355.0	0.0
Min					108.0	20.0	22.0		0.1		1.0		158.0	0.0

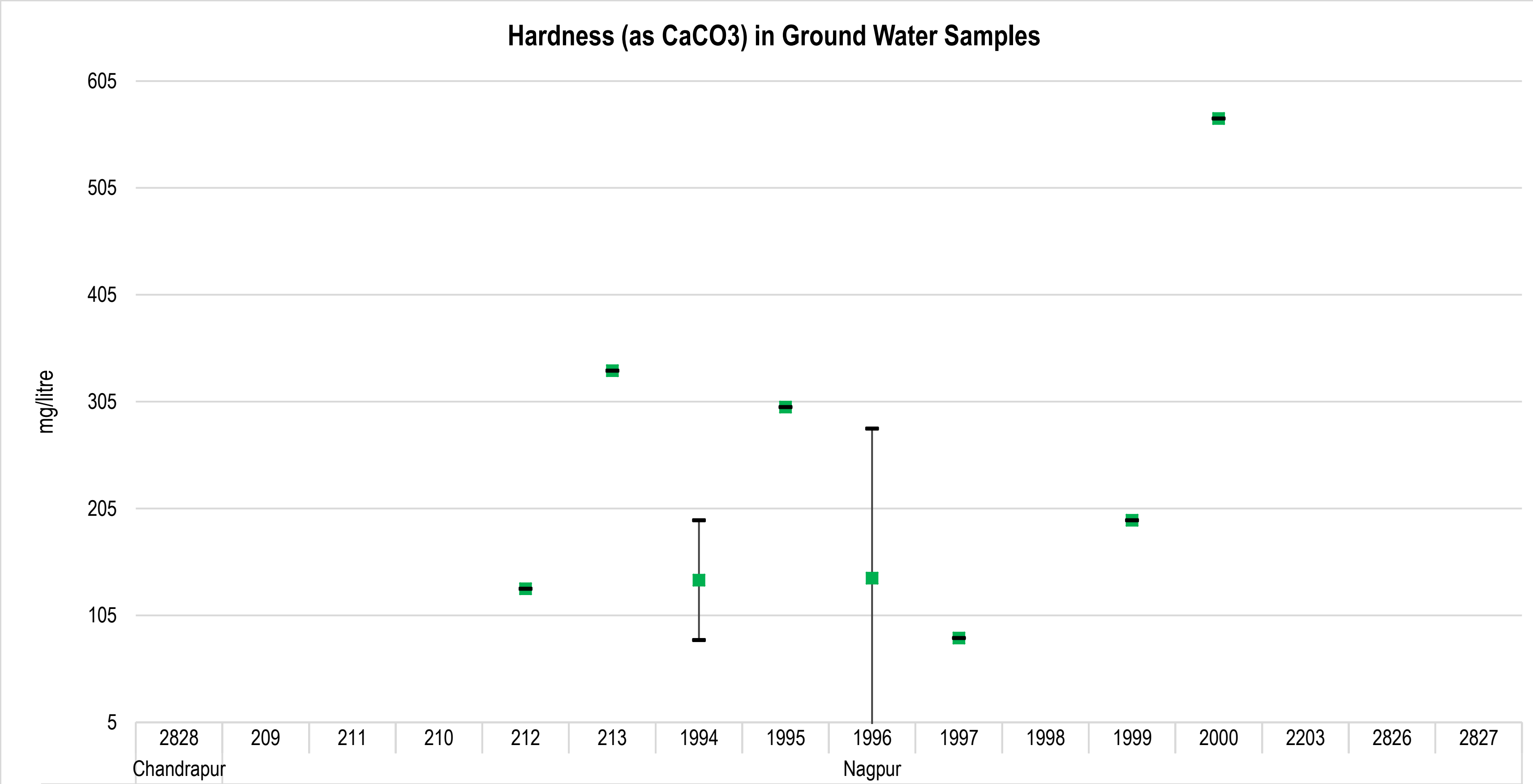
Max Average Min

Figure No.69: Parametric values of Hardness at CaCo3 recorded at WQMS monitoring groundwater at Kalyan, Navi Mumbai, Raigad and Thane.



	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
	Amravati			Aurangabad					Nashik						
Max	300.0	0.0	370.0	464.0	160.0	604.0	0.0	490.0	856.0	0.0		854.0			
Average	249.0	0.0	232.0	292.0	145.0	372.0	0.0	245.0	488.1	0.0		545.0			
Min	198.0	0.0	94.0	120.0	130.0	140.0	0.0	0.0	166.9	0.0		236.0			

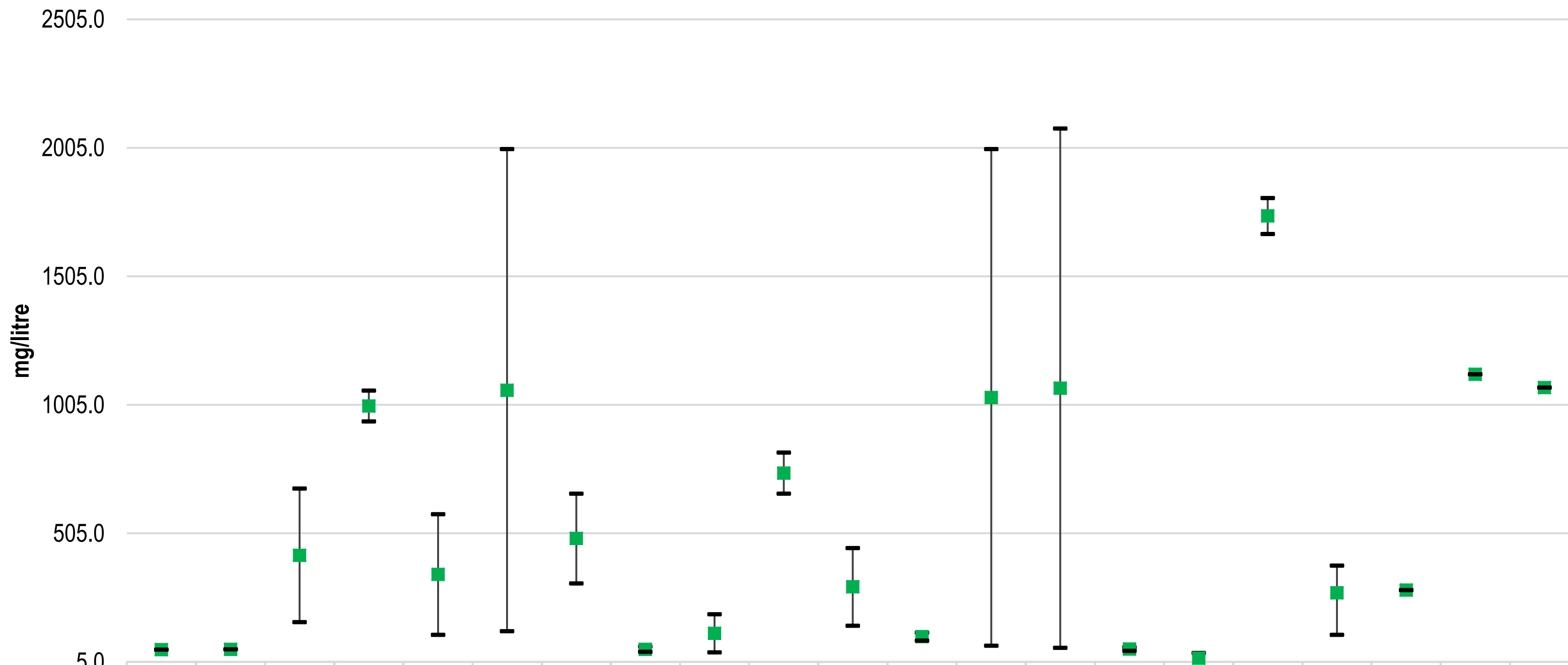
Figure No.70: Parametric values of Hardness at CaCo3 recorded at WQMS monitoring groundwater at Amrawati, Aurangabad and Nashik.



	2828	209	211	210	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max					130.0	334.0	194.0	300.0	280.0	84.0		194.0	570.0			
Average					130.0	334.0	138.0	300.0	140.0	84.0		194.0	570.0			
Min					130.0	334.0	82.0	300.0	0.0	84.0		194.0	570.0			

Figure No.71: Parametric values of Fluoride recorded at WQMS monitoring groundwater at Chandrapur and Nagpur

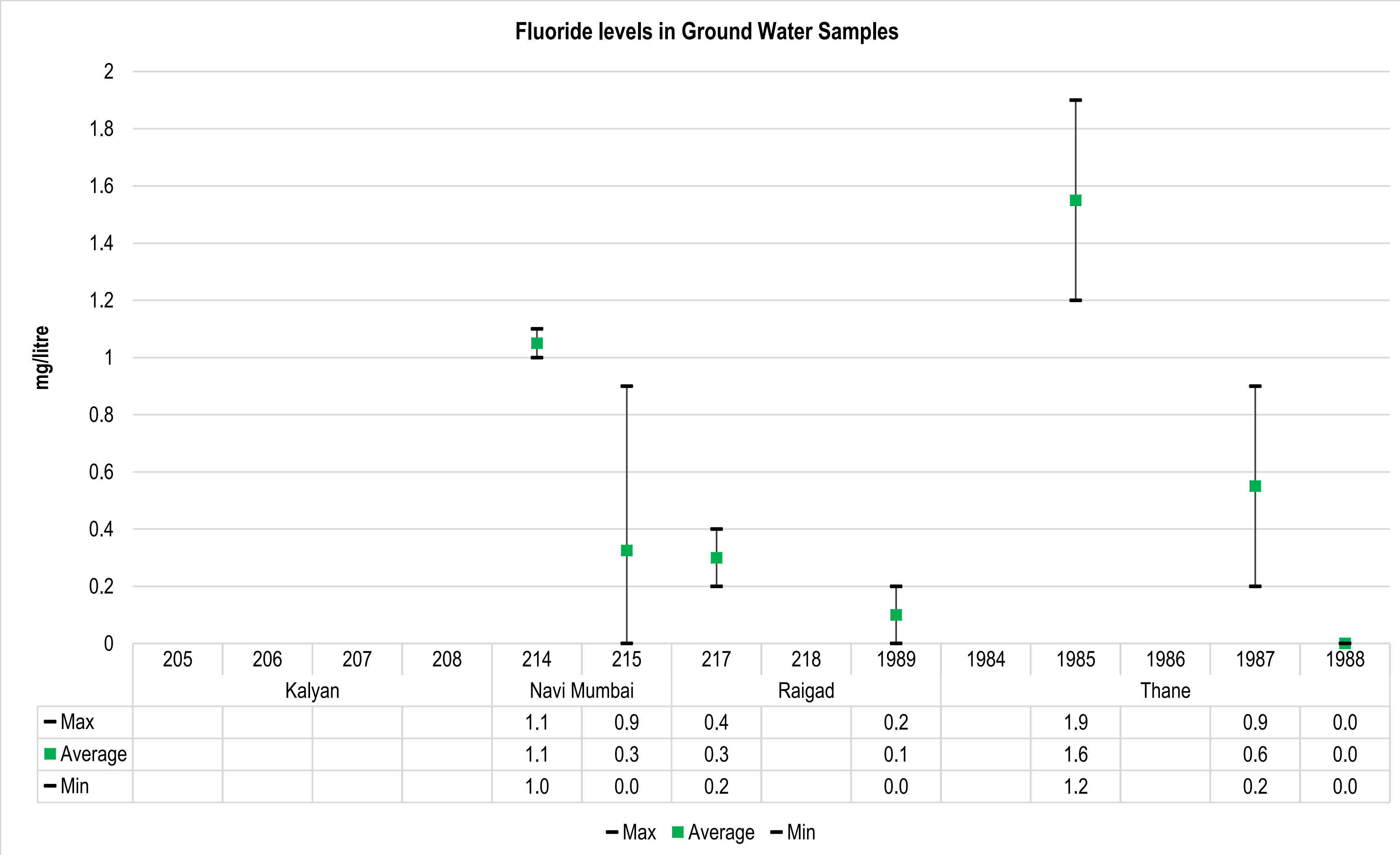
Hardness (as CaCO3) in Ground Water Samples



	Kolhapur															Pune					
	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	1992	2819	2820	2821	2822	2823
Max	52.0	54.0	680.0	1060.0	580.0	2000.0	660.0	64.0	190.0	820.0	448.0	118.0	2000.0	2080.0	62.0	40.0	1810.0	380.0	284.0	1124.0	1072.0
Average	52.0	54.0	420.0	1000.0	345.0	1062.0	485.0	54.0	116.0	740.0	297.0	103.0	1034.0	1070.0	55.0	20.0	1740.0	274.0	284.0	1124.0	1072.0
Min	52.0	54.0	160.0	940.0	110.0	124.0	310.0	44.0	42.0	660.0	146.0	88.0	68.0	60.0	48.0	0.0	1670.0	110.0	284.0	1124.0	1072.0

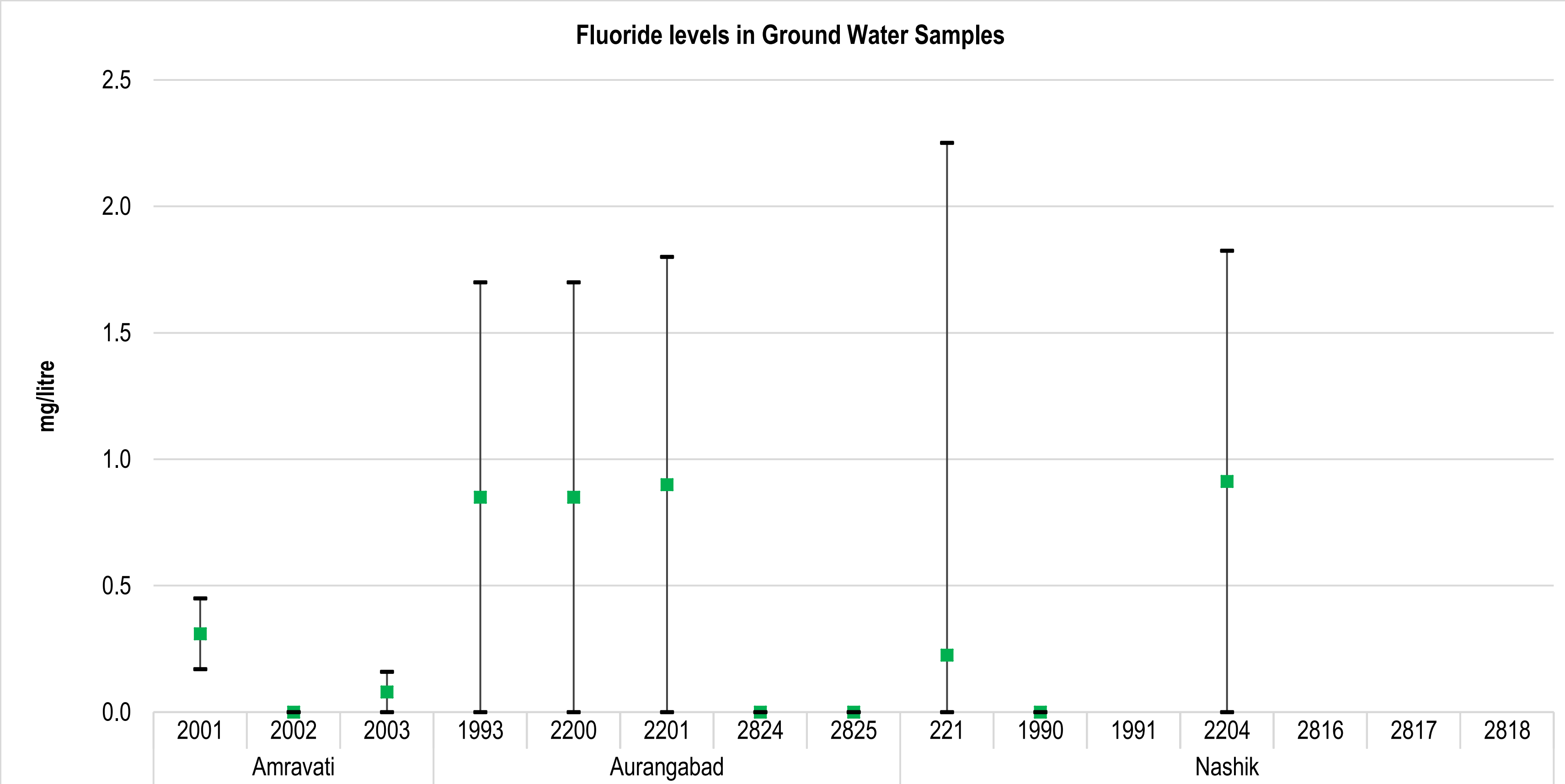
Max Average Min

Figure No.72: Parametric values of Fluoride recorded at WQMS monitoring groundwater at Kolhapur and Pune



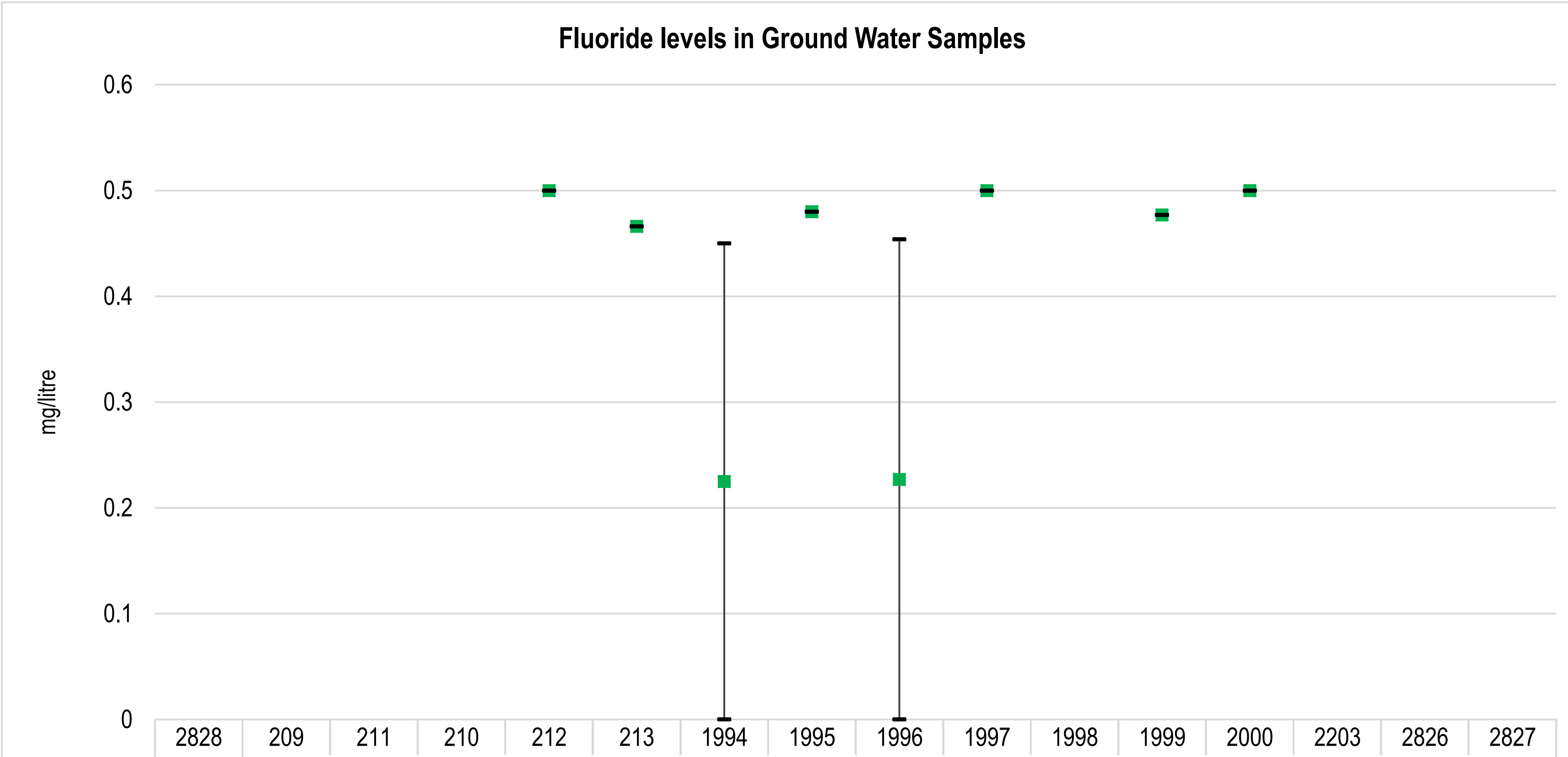
	Kalyan				Navi Mumbai		Raigad			Thane				
	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
Max					1.1	0.9	0.4		0.2		1.9		0.9	0.0
Average					1.1	0.3	0.3		0.1		1.6		0.6	0.0
Min					1.0	0.0	0.2		0.0		1.2		0.2	0.0

Figure No.73: Parametric values of Fluoride recorded at WQMS monitoring groundwater at Kalyan, Navi Mumbai, Raigad and Thane



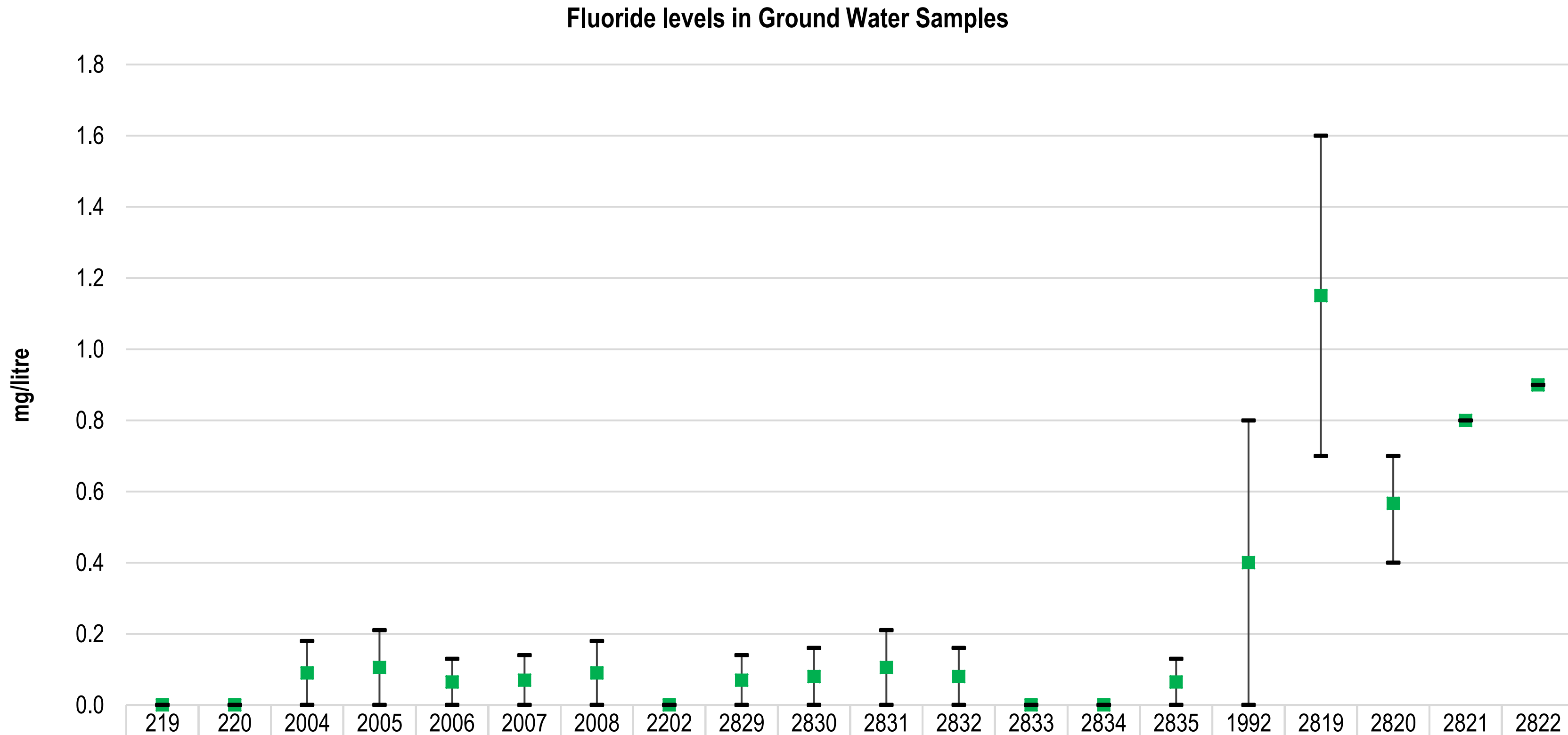
	Amravati			Aurangabad					Nashik						
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
Max	0.5	0.0	0.2	1.7	1.7	1.8	0.0	0.0	2.3	0.0		1.8			
Average	0.3	0.0	0.1	0.9	0.9	0.9	0.0	0.0	0.2	0.0		0.9			
Min	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			

Figure No.74: Parametric values of Fluoride recorded at WQMS monitoring groundwater at Amravati, Aurangabad and Nashik



	Chandrapur	Nagpur														
	2828	209	211	210	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
Max					0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5			
Average					0.5	0.5	0.2	0.5	0.2	0.5		0.5	0.5			
Min					0.5	0.5	0.0	0.5	0.0	0.5		0.5	0.5			

Figure No.75: Parametric values of Fluoride recorded at WQMS monitoring groundwater at Chandrapur and Nagpur.



	Kolhapur															Pune				
	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	1992	2819	2820	2821	2822
Max	0.0	0.0	0.2	0.2	0.1	0.1	0.2	0.0	0.1	0.2	0.2	0.2	0.0	0.0	0.1	0.8	1.6	0.7	0.8	0.9
Average	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.4	1.2	0.6	0.8	0.9
Min	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	0.0	0.7	0.4	0.8	0.9

Figure No.76: Parametric values of Fluoride recorded at WQMS monitoring groundwater at Kolhapur and Pune.

Water Quality Index for ground water at Kalyan, Navi Mumbai, Raigad and Thane.

Apr					67		29		23		175	Dry	62	
Oct					93		22		23		55	Not collected	167	
Station Code	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
RO	Kalyan				Navi Mumbai		Raigad			Thane				

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry	Not Collected	No data

Table No. 26: Groundwater quality monitoring stations at Kalyan, Navi Mumbai, Raigad and Thane.

Programme	Regional Office	Station ID	Station Name	District	Taluka	Type of well	Village
SWMP	Kalyan	205	Dug well opp. KAMA office, MIDC Ph-I, Dombivali	Kalyan	Dombivali	Dug well	MIDC,Dombivali
SWMP	Kalyan	206	Dug well near Mamta Hospital, Milap Nagar, Dombivali	Kalyan	Dombivali	Dug well	MIDC,Dombivali
SWMP	Kalyan	207	Dug well at pimpleshwar Temple, MIDC Ph-II, Dombivali	Kalyan	Dombivali	Dug well	MIDC,Dombivali
SWMP	Kalyan	208	Dug well addjusent to M/S. Altra pure chem., Sr. No. 45, Hissa No. 3, MIDC Ph-II, Dombivali.	Kalyan	Dombivali	Dug well	MIDC,Dombivali
SWMP	Navi Mumbai	214	Borewell at TTCWMA, Mahape	Thane	Thane	Borewell	TTCWMA,Mahape
SWMP	Navi Mumbai	215	Well water at Turbhe Store, Turbhe	Thane	Thane	Well	Turbhe
SWMP	Raigad	217	Borewell water at village Milgaon, Taluka - Khalapur, District - Raigad.	Raigad	Khalapur	Borewell	Milgaon

Programme	Regional Office	Station ID	Station Name	District	Taluka	Type of well	Village
SWMP	Raigad	218	Borewell water near MSW site, Murud - Janjira.			Borewell	Murud Janjira
NWMP	Raigad	1989	Bore well at MWML Site at Taloja	Raigad	Panvel	Bore well	Karawla- Taloja
NWMP	Thane	1984	Bore well at M/s Tata Iron {} Steel Co. Ltd, S-76	Thane	Palghar	Bore well	MIDCTarapur, Industrial Estate, Tarapur
NWMP	Thane	1985	Dug well at 5 Star Industrial Estate	Thane	Mira-Bhayander	Dug well	Kashimira
NWMP	Thane	1986	Bore well at Motapada	Thane	Dahanu	Bore well	Motapada
NWMP	Thane	1987	Bore well at Vasai	Thane	Vasai	Bore well	Gokhiware
NWMP	Thane	1988	Bore well at Gharatwadi, Palghar	Thane	Palghar	Bore well	Aliyali

Water Quality Index for ground water at Amravati, Aurangabad and Nashik.

Apr	**74**	Dry	**38**	**85**	**99**	**101**	**Station closed**	Dry	**138**			**429**			
Oct	112	Not collected	104	139	48	166	Station closed	139	189			110			
Station Code	2001	2002	2003	1993	2200	2201	2824*	2825	221	1990	1991	2204	2816	2817	2818
RO	Amravati			Aurangabad					Nashik						

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry	Not Collected	No Data

Table No. 27: Groundwaterquality monitoring stations at Amravati, Aurangabad and Nashik.

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
NWMP	Amravati	2001	Tube well at water treatment plant of M.C.Achalpur near Post Office.	Amravati	Achalpur	Tube well	Paratwada
NWMP	Amravati	2002	Bore well Opp. Gajanan Maharaj Temple at Anjangaon road.	Akola	Akot	Bore well	Anjangaon
NWMP	Amravati	2003	Dug well at Plot No- 4, Street No. 49-C, at Nehru Bal Udyan Azad Maidan, owned by Yavatmal M.C.	Yavatmal	Yavatmal	Dug well	Nehru Bal Udyan Azad Maidan
NWMP	Aurangabad	1993	Dug well at Pandarpur, Gangapur, Aurangabad	Aurangabad	Gangapur	Dug well	Pandharpur
NWMP	Aurangabad	2200	Bore Well at Katpur, Near Z.P.School	Aurangabad	Paithan	Bore well	Katpur
NWMP	Aurangabad	2201	Dug Well at Ranjangaon	Aurangabad	Gangapur	Dug well	Ranjangaon
NWMP	Aurangabad	2824	Dug Well at Naregaon	Aurangabad	Aurangabad	Dug well	Naregaon
NWMP	Aurangabad	2825	Bore Well at Wahegaon, near Zilla Parishet School	Aurangabad	Paithan	Bore well	Wahegaon
SWMP	Nashik	221	well water of Bappaji, Akolner,	Nashik	Ahmadnag	well	Akolner

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
			Ahmadnagar, Nashik		ar		
NWMP	Nashik	1990	Bore well at BMW Site , Burudgaon	Ahmadnagar	Ahmednagar	Bore well	Burudgaon
NWMP	Nashik	1991	Bore well at MSW Site, Pathardi, Nashik	Nashik	Nashik	Bore well	Pathardi
NWMP	Nashik	2204	Dug well at Gunjalwadi, Sangamner near Primary Health Care Center.	Ahmadnagar	Sangamner	Dug well	Gunjalwadi
NWMP	Nashik	2816	Dug Well of Mr. Sampat Walunj, near M/s. Mahajeet Clayton	Nashik	Nashik	Dug well	Shinde village
NWMP	Nashik	2817	Bore Well at Chitali near Wagh vasthi	Ahmadnagar	Rahata	Bore well	Chitali
NWMP	Nashik	2818	Bore Well at M/s. Spectron Ethers Rasegaon near Siddeshwar Mahadev Mandir	Nashik	Dindori	Bore well	Rasegaon

Water Quality Index for ground water at Chandrapur and Nagpur.

Apr				60	128	36	107	110	69	Dry	72	182			
Oct	174					71									
Station Code	2828	209	210	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
RO	Chandrapur	Nagpur													

Legend

Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry	Not Collected	No data

Table No. 28: Groundwater quality monitoring stations at Chandrapur and Nagpur.

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
NWMP	Chandrapur	2828	Dug Well near Jilla Parishad Primary School Visapur	Chandrapur	Ballarpur	Dug well	Visapur
SWMP	Nagpur	209	Bore well near Pardhi House, Bhandewadi, Nagpur	Nagpur	#N/A	Bore well	Bhandewadi
SWMP	Nagpur	210	Bore well near Dearao Kale House, Bhandewadi, Nagpur	Nagpur	#N/A	Bore well	Bhandewadi
SWMP	Nagpur	212	Grampanchayat Mhasala, Dugwell On Nalla At Mhasala, Taluka - Kamptee, District - Nagpur	Nagpur	Kamptee	Dug well	Mhasala
SWMP	Nagpur	213	Grampanchayat Kawtha, Dugwell At Kawtha, Taluka - Kamptee, District - Nagpur	Nagpur	Kamptee	Dug well	Kawtha

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
NWMP	Nagpur	1994	Dug well At TPS Durgapur near Naseeb Kirana {} general Store.	Chandrapur	Chandrapur	Dug well	Durgapur
NWMP	Nagpur	1995	Gram Panchayath Dug well , Near Balaji Gajbhiye House, Khaperkheda	Nagpur	Saoner	Dug well	Khaperkheda(Ward No.4)
NWMP	Nagpur	1996	Gram Panchayath Dug well , Near Jagadamba G M S Mandir Sahakari Sanstha	Nagpur	Kamptee	Dug well	Koradi
NWMP	Nagpur	1997	Bore well near Primary Health Centre, Raipur(Hingna)	Nagpur	Hingna	Bore well	Raipur
NWMP	Nagpur	1998	Gram Panchayat Dug well near Gram Panchayat Office, Brahmni	Nagpur	Kalmeshwar	Dug well	Brahmni
NWMP	Nagpur	1999	Bore well Near Gram Panchayat, Changera.	Gondia	Gondia	Bore well	Changera
NWMP	Nagpur	2000	Dug well near Sarode Kirana Store, Bhandewadi, Nagpur	Nagpur	Nagpur	Dug well	Bhandewadi
NWMP	Nagpur	2203	Hand Pump in the premises of Z.P.Primary School	Wardha	wardha	Hand pump	Bhugaon
NWMP	Nagpur	2826	Dug Well near Railway Station, Cottaon Market	Wardha	wardha	Dug well	Wardha
NWMP	Nagpur	2827	Bore Well near Railway crossing at Dongi Buzurg	Bandara	Tumsar	Bore well	Dongri-Buzurg

Water Quality Index for ground water at Kolhapur and Pune.

Apr	42	33	208	329	228	582	222	28	26	206	157	52	644	660	33	37	560	67			
Oct	27	29	65	249	55	64	139	29	72	218	72	41	29	30	30		472	115	107	338	316
Station Code	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	1992	2819	2820	2821	2822	2823
RO	Kolhapur																Pune				

Legend

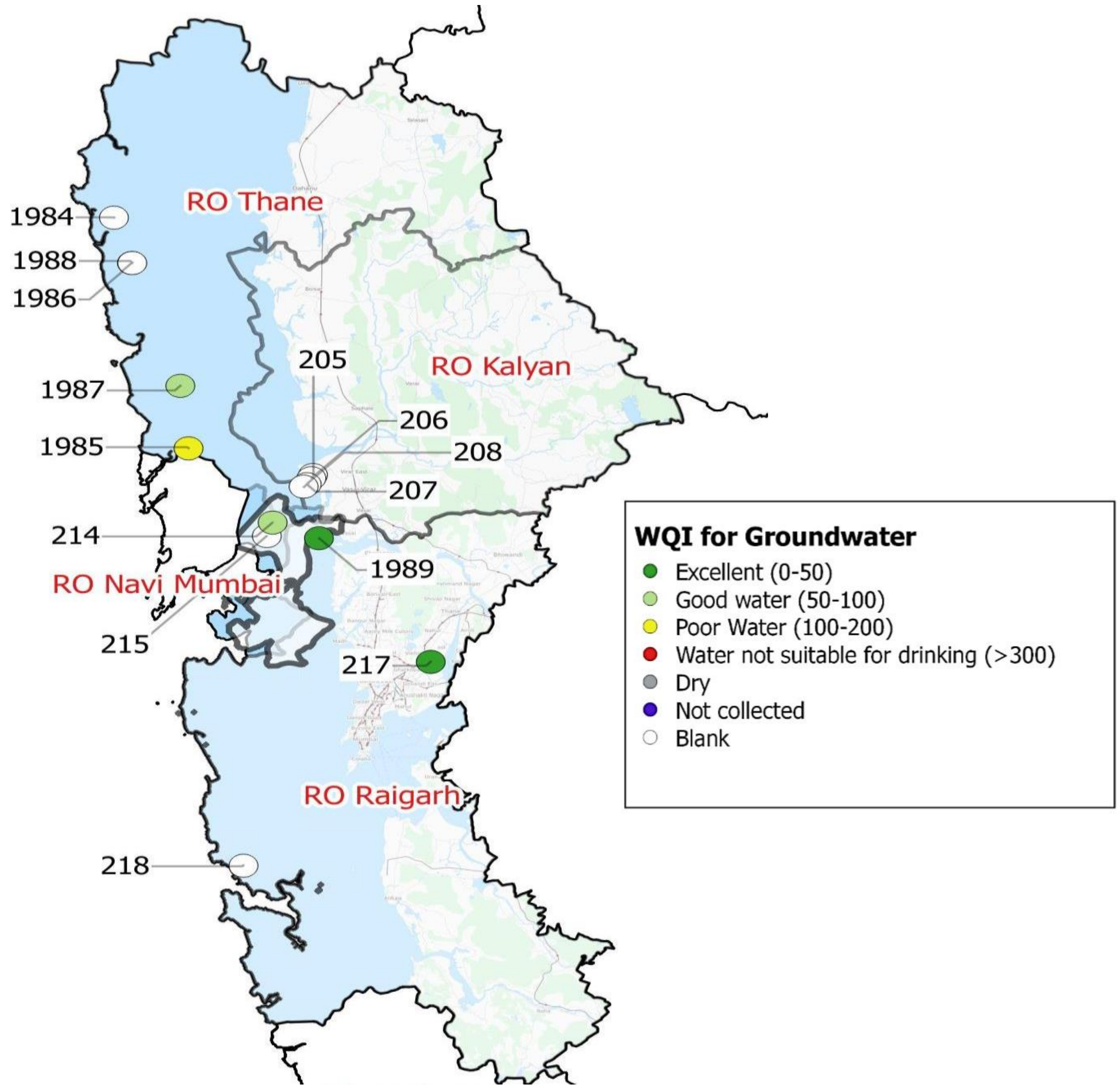
Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry	Not Collected	No data

Table No. 29: Groundwater quality monitoring stations at Kolhapur and Pune.

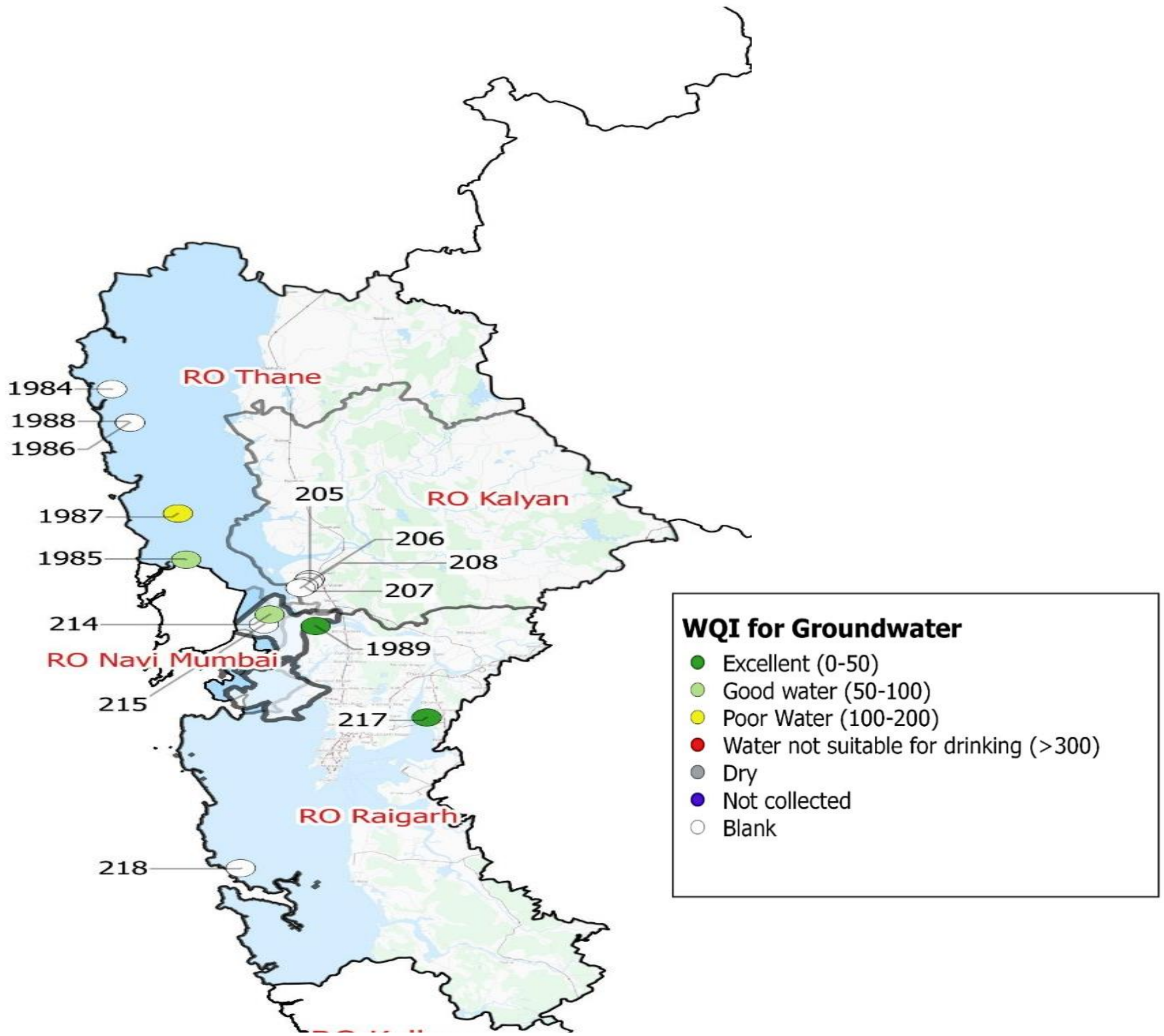
Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
SWMP	Kolhapur	219	Commen well Water At Patwardhan, Lote, Taluka - Khed, District - Rantnagiri	Ratnagiri	Khed	Well	Lote
SWMP	Kolhapur	220	Dugwell backside Excel India At Chalkewadi, Taluka - Khed, District - Ratnagiri.	Ratnagiri	Khed	Dug well	Chalkewadi
NWMP	Kolhapur	2004	Bore well at Parvati Industrial Estate, Yadrav, Kolhapur	Kolhapur	Shirol	Bore well	Yadrav
NWMP	Kolhapur	2005	Bore well at Khanjirenagar, Kolhapur	Kolhapur	Hatkanangale	Bore well	Khanjirenagar
NWMP	Kolhapur	2006	Bore well at Shinoli near M/s Aqua Alloy Steel.	Kolhapur	Chandgad	Bore well	Shinoli
NWMP	Kolhapur	2007	Bore well at Savali, near Gram Panchayat office.	Sangli	Miraj	Bore well	Savali
NWMP	Kolhapur	2008	Dug well at Sambarwadi, owned by Shri. Kishan Hali Rajput.	Sangli	Miraj	Dug well	Sambarwadi
NWMP	Kolhapur	2202	Dug Well at Ghane Kunt, near Awashi, onwed	Ratnagiri	Khed	Dug well	Ghane Kunt

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
			by shri Rajendra Amre				
NWMP	Kolhapur	2829	Bore Well at MIDC Shiroli near M/s. Pratibha Enterprises	Kolhapur	Hatkanangale	Bore well	Shiroli
NWMP	Kolhapur	2830	Bore Well at MIDC Gokul Shirgaon	Kolhapur	Karvir	Bore well	Gokul-Shirgaon
NWMP	Kolhapur	2831	Dug Well at Sakharali near MIDC Islampur near Krishna Milk Industry	Sangli	Walwa	Dug well	Sakharali
NWMP	Kolhapur	2832	Dug Well No.1 at Brahmanwadi-Anjanwel, owned by Shri Vaidya	Ratnagiri	Guhagar	Dug well	Anjanwel
NWMP	Kolhapur	2833	Dug Well No.1 at Group Gram Panchayat at Arketwadi, near Masjid	Ratnagiri	Khed	Dug well	Arketwadi
NWMP	Kolhapur	2834	Dug Well No.2 at Arketwadi	Ratnagiri	Khed	Dug well	Arketwadi
NWMP	Kolhapur	2835	Dug Well No.2 at owned by Group Gram Panchayat, Brahmanwadi-Anjanwel	Ratnagiri	Guhagar	Dug well	Anjanwel
NWMP	Pune	1992	Dug well at MSW Site, owned by Shri.Dattu Kondiba Borate at Borate Vasthi.	Pune	Haveli	Dug well	Moshi
NWMP	Pune	2819	Dug Well Owned by Shri Deshmukh	Pune	Baramati	Dug well	Malegaon
NWMP	Pune	2820	Dug Well Owned by Shri Shivaji Baban Darekar	Pune	Shirur	Dug well	Sanaswadi
NWMP	Pune	2821	Bore Well at Bale Railway Station premises Owned by Shri Digambar Joshi	Solapur	North Solapur	Bore well	Dahegaon
NWMP	Pune	2822	Bore Well near Chincholi	Solapur	Mohol	Bore well	Chincholi
NWMP	Pune	2823	Bore Well at Shete Vasti near old Tuljapur Road	Solapur	Solapur	Dug well	Shete vasthi, Tuljapur Naka

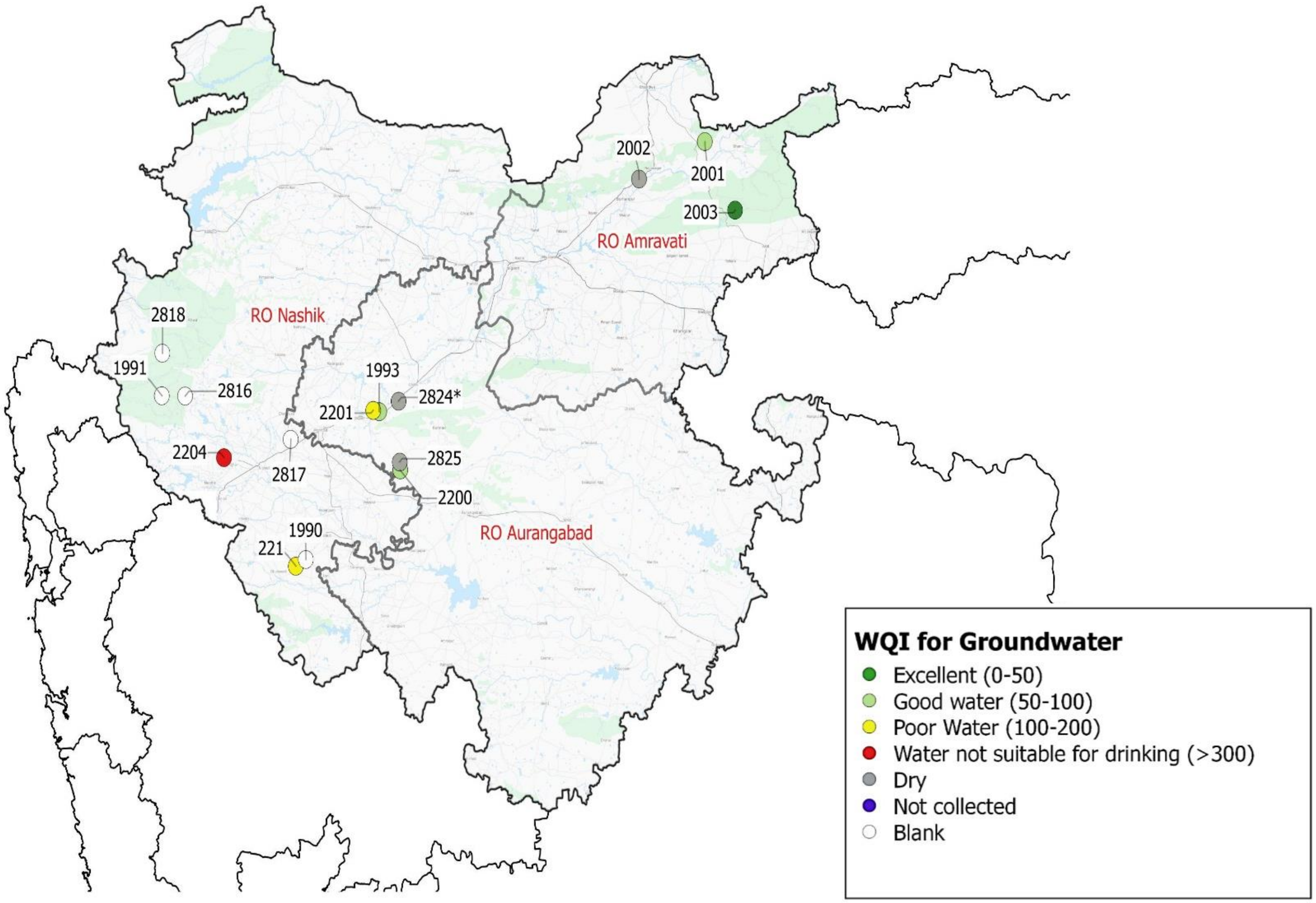
Spatial map for Ground WQI in Kalyan, Navi Mumbai, Raigad and Thane 2015-16 (April 2015)



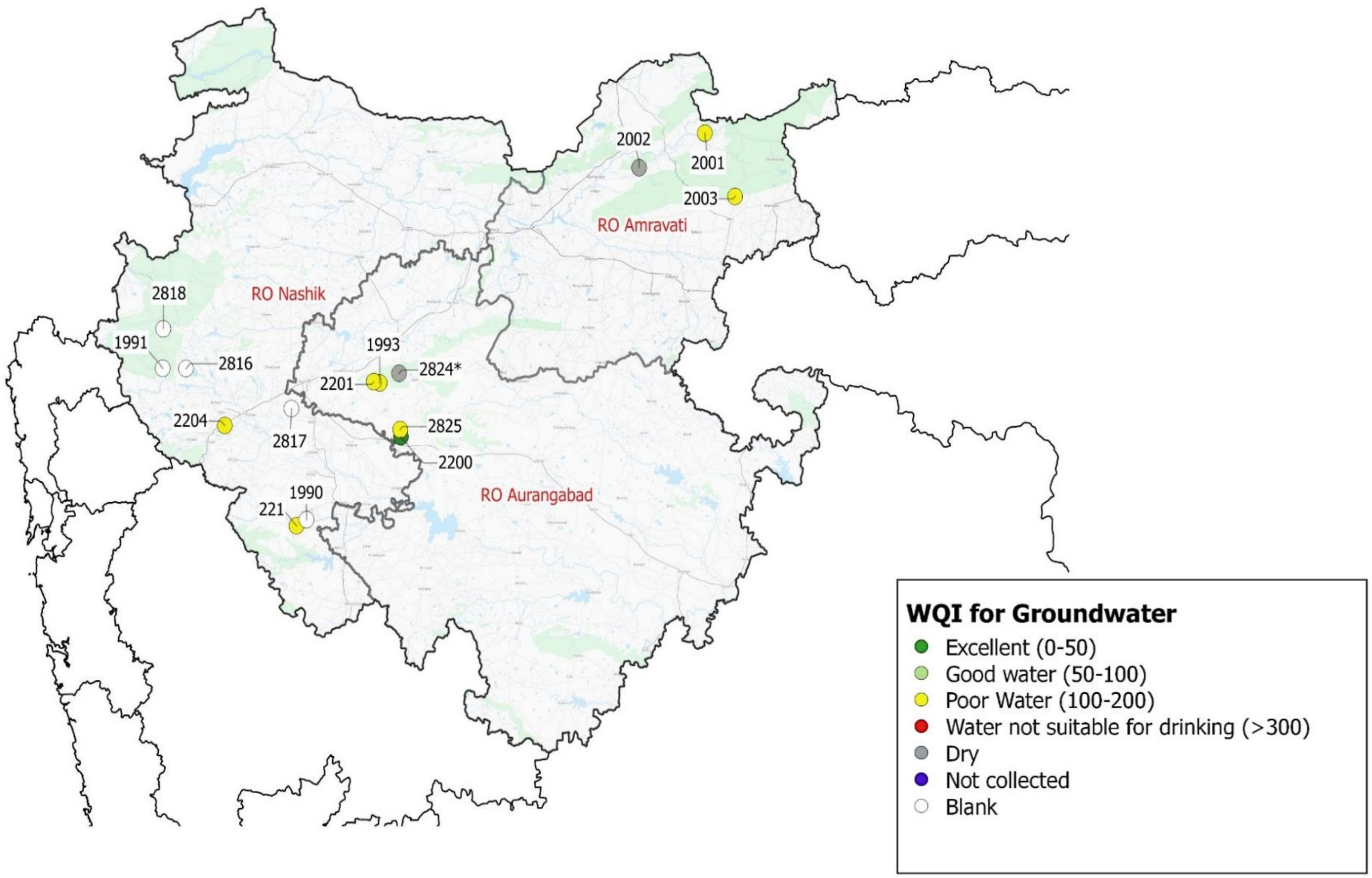
Spatial map for Ground WQI in Kalyan, Navi Mumbai, Raigad and Thane 2015-16 (October 2015)



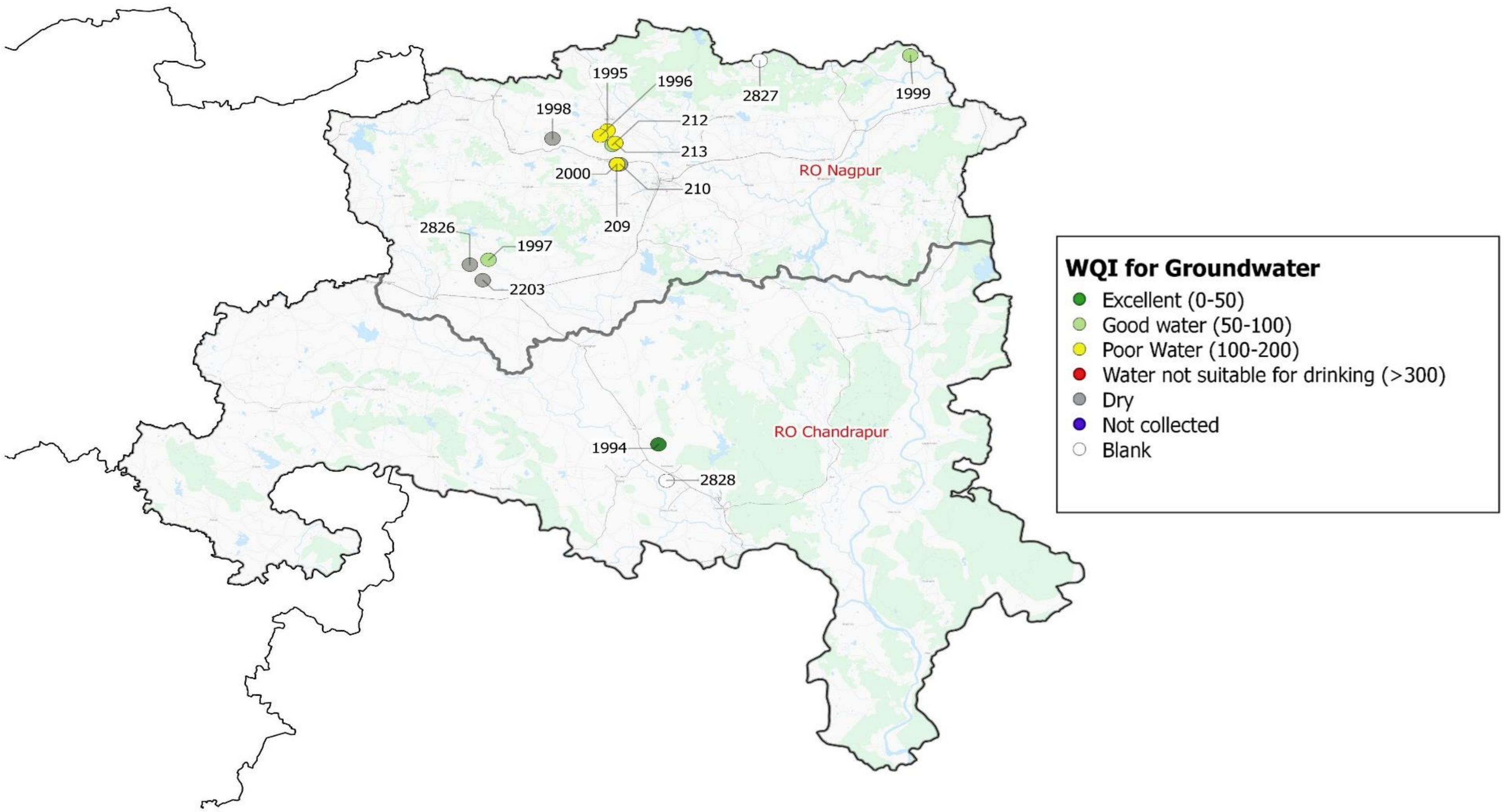
Spatial map for Ground WQI in Amravati, Aurangabad and Nashik 2015-16 (April 2015)



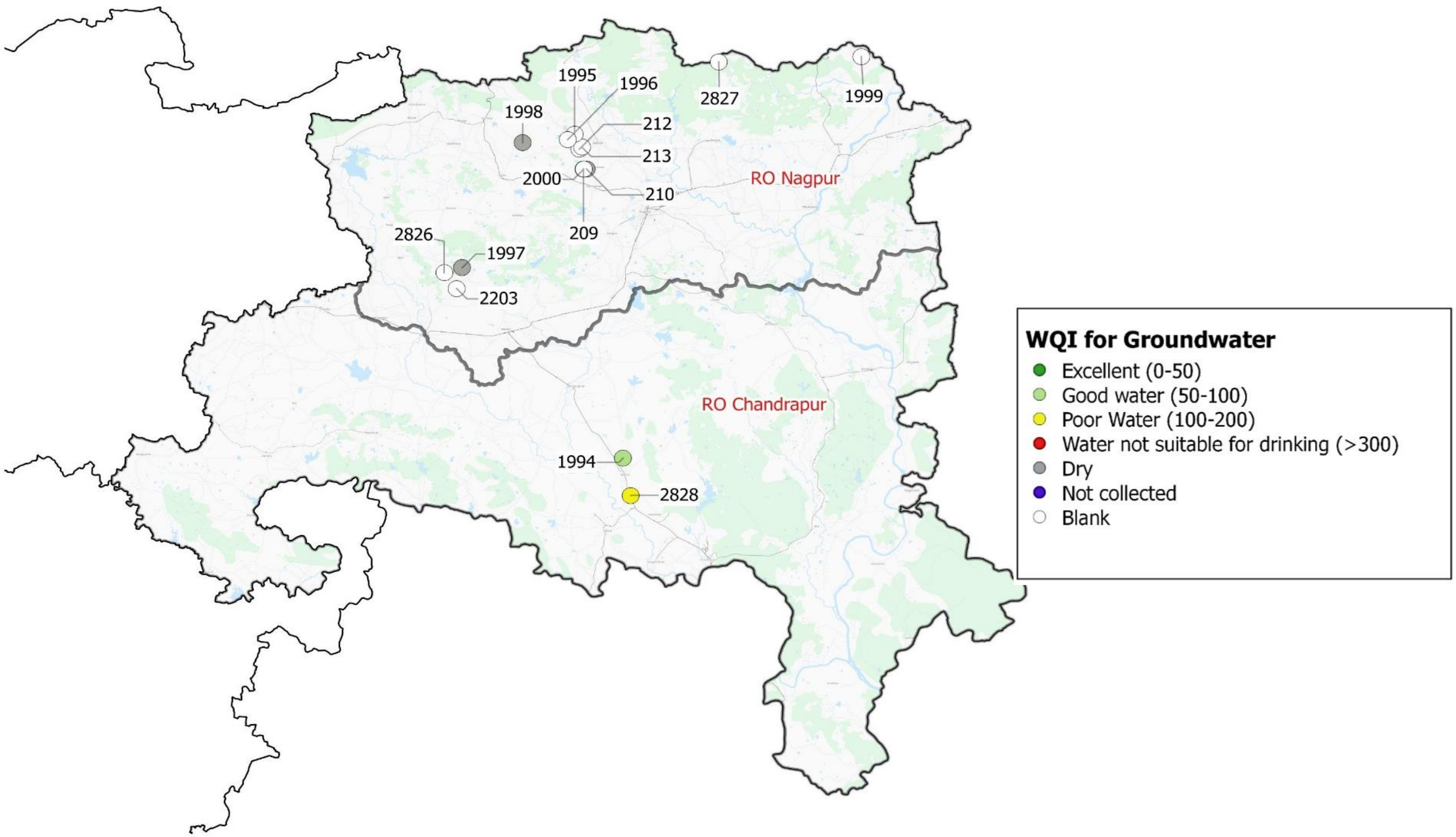
Spatial map for Ground WQI in Amravati, Aurangabad and Nashik 2015-16 (October 2015)



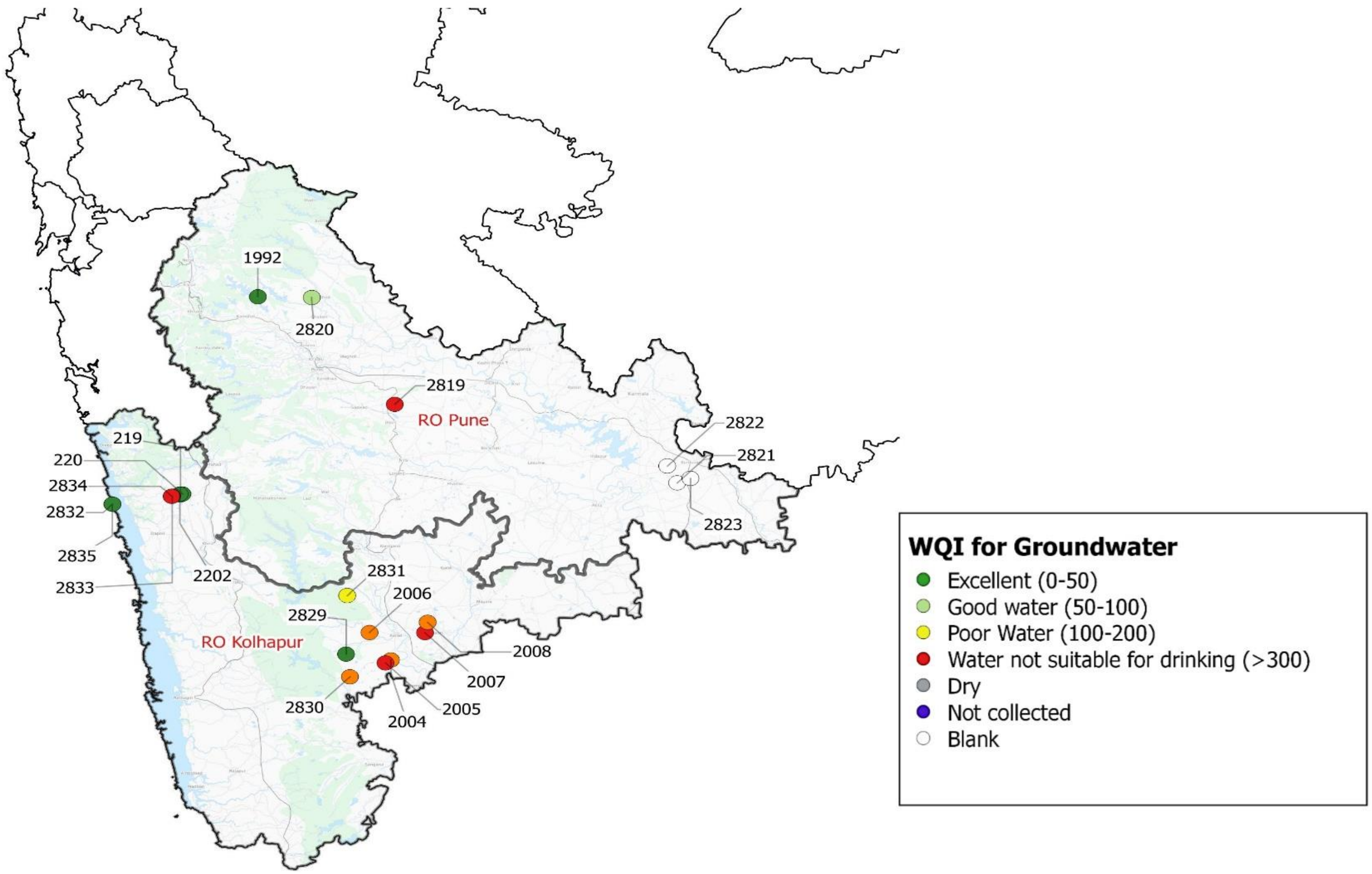
Spatial map for Ground WQI in Chandrapur and Nagpur 2015-16 (April 2015)



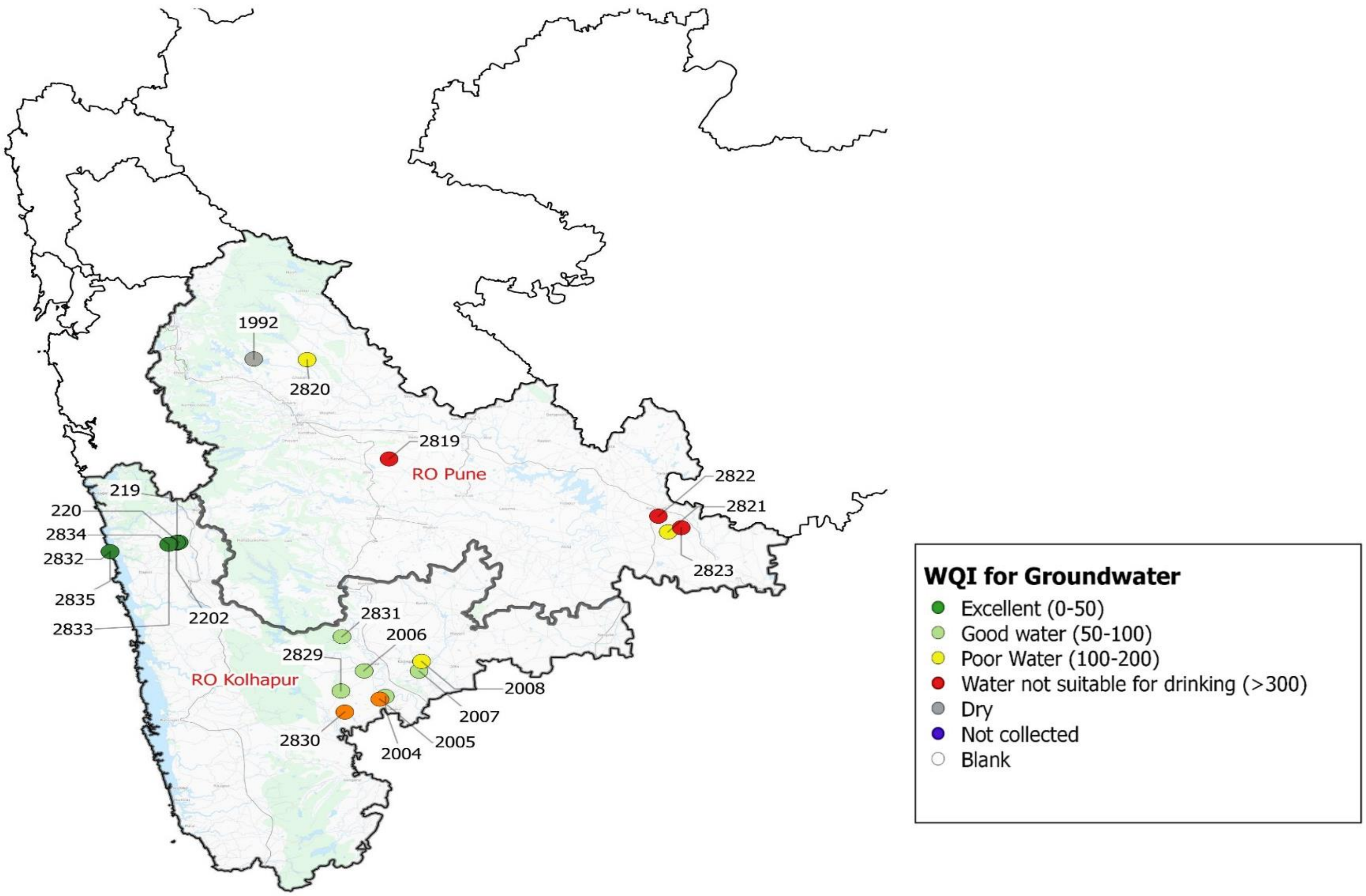
Spatial map for Ground WQI in Chandrapur and Nagpur 2015-16 (October 2015)



Spatial map for Ground WQI in Kolhapur and Pune 2015-16 (April 2015)



Spatial map for Ground WQI in Kolhapur and Pune 2015-16 (October 2015)



Conclusion

In the year 2015-16, surface and groundwater were mostly found to be polluted near the urbanized and industrialized areas of Pune, Mumbai, Thane, Chandrapur, and Solapur and so on. Most of the stations were recorded with the dry category which could be attributed to low rainfall in the year. Station No. 179 and 2673 from Aurangabad region were found to be dry throughout the year.

The basins of Tapi, Godavari, West Flowing rivers and Coastal have recorded a decreasing trend in their annual average Water Quality Index (WQI) while Krishna basin showed an increasing trend for its WQI. Station No. 186 and 187 on Nag River (Nagpur region) had the annual average WQI in Bad to Very Bad category throughout the year. This was highly polluted compared all the other rivers in the basin, which is a serious cause of concern and should immediately be investigated further for the cause of pollution.

Stations on nallahs at BPT Navpur, Sandoz and Rabodi from Thane region also recorded the WQI in Bad to Very Bad category throughout the year. This indicated pollution mostly due to the release of waste water from the industrial area of Thane. Considering the intra basin scenario of Krishna basin, Bhima Upper sub basin was found to be more polluted than Krishna Upper.

Out of 65 water monitoring stations of groundwater, Station no. 2819 dug well in Pune recorded the water quality in Bad to Very Bad category throughout the year. Raigad region recorded the water quality of ground water in excellent category. The levels of Total Hardness, pH, Fluoride and Nitrate were recorded to be high in 2015-16.

Annex I – RO wise summary of WQI in 2015-16

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, 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 2015-16 and presents the gist of the water quality index for the respective stations for months of May and December.

RO – Amravati

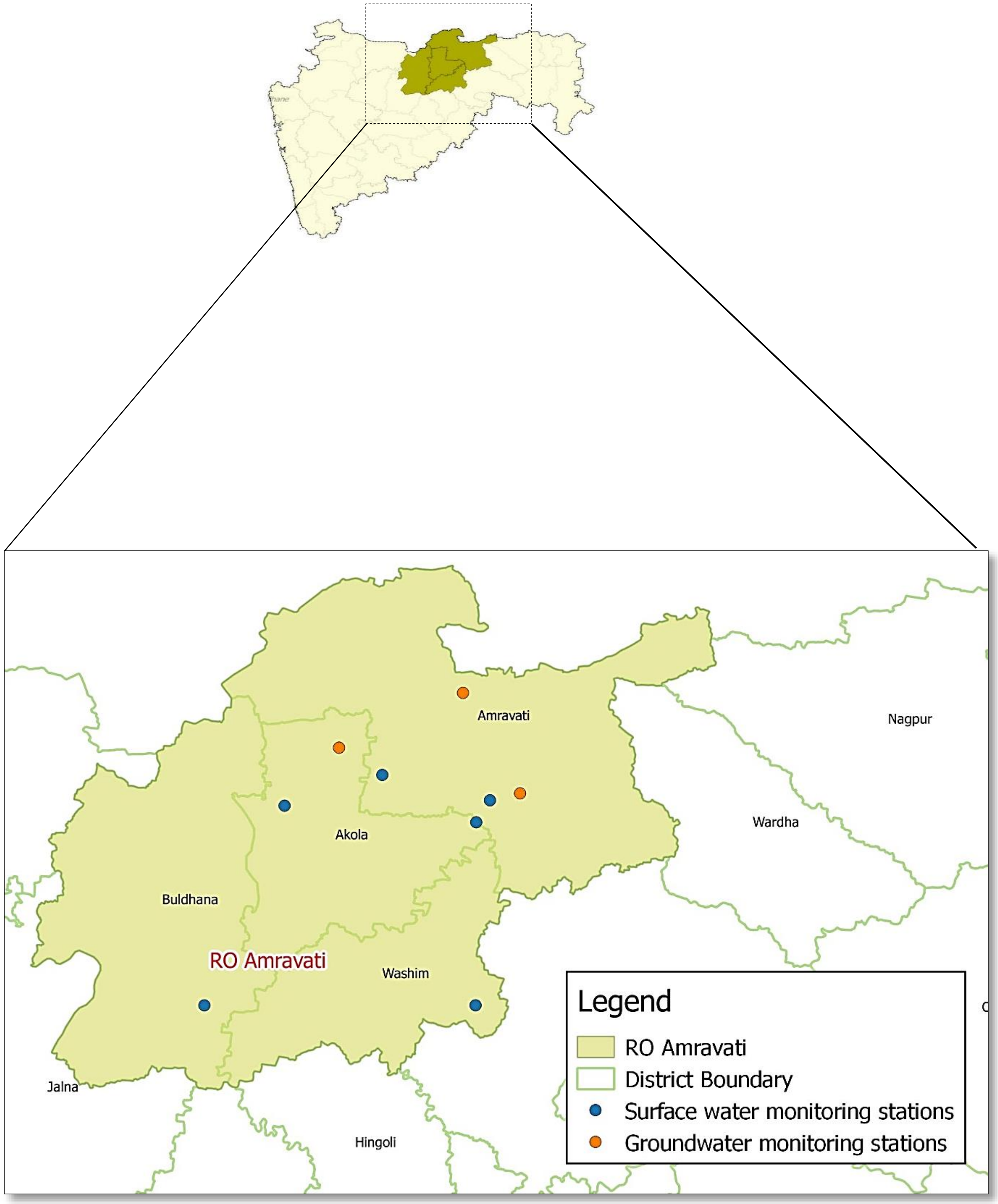

Nagpur
Amravati
Akola
Wardha
Buldhana
RO Amravati
Washim
Jalna
Hingoli
Legend
RO Amravati
District Boundary
Surface water monitoring stations
Groundwater monitoring stations

Table No. 30: Water quality Index for surface and ground water monitoring at Amravati-RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
SW	2700	Purna near Achalpur-Amravati Road Bridge, Asegaon			51	Amravati	Chandur bazaar	Asegaon
SW	2695	Pedhi near Road Bridge at Dadhi-Pedhi village	38	48	45	Amravati	Chandur Bazar	Asegaon
SW	1913	Purna at Dhupeshwar at U/s of Malkapur Water works	46	53	53	Akola	Akola	Malkapur
SW	2155	Purna at D/s of confluence of Morna & Purna at Andhura village	49	48	54	Akola	Balapur	Andura
SW	2699	Penganga at Mehkar-Buldana Road Bridge			52	Buldana	Mehkar	Mehkar
SW	2675	Morna at D/s of Railway Bridge		46	50	Akola	Akola	Akola
SW	2697	Penganga near water supply scheme of Umarkhed MC	51	65	55	Yavatmal	Umarkhed	Belkhed
SW	2698	Penganga D/s of Isapur Dam	60	65	57	Yavatmal	Pusad	Isapur
GW	2001	Tube well at water treatment plant of M.C.Achalpur near Post Office.	74	112	93	Amravati	Achalpur	Paratwada
GW	2002	Bore well Opp. Gajanan Maharaj Temple at Anjangaon road.		Not collected		Akola	Akot	Anjangaon
GW	2003	Dug well at Plot No- 4, Street No. 49-C, at Nehru Bal Udyan Azad Maidan, owned by Yavatmal M.C.	38	14	71	Yavatmal	Yavatmal	Nehru Bal Udyan Azad Maidan

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	Dry	Not collected
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry	Not collected

RO – Aurangabad

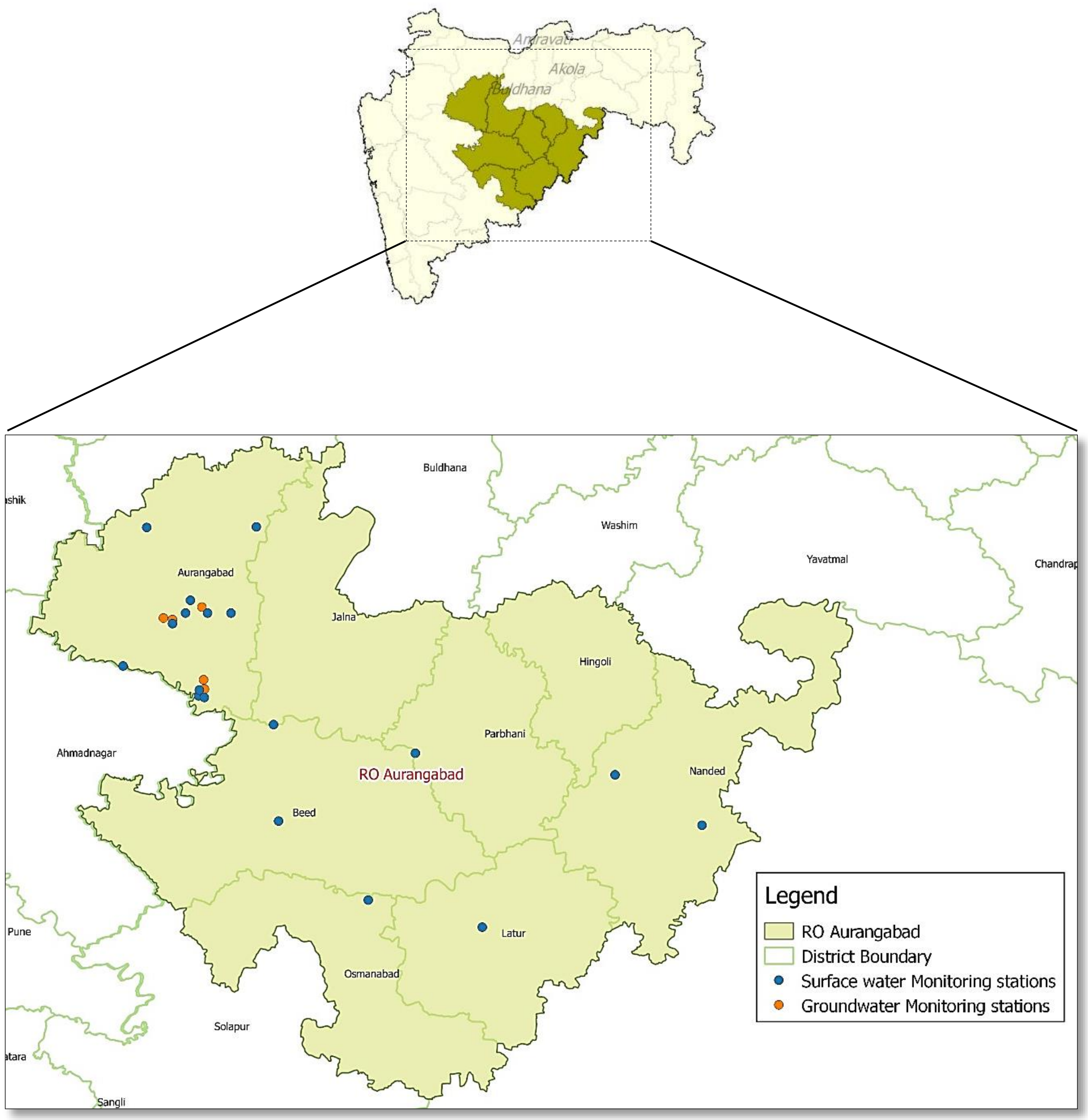


Table No. 31: Water quality Index for surface and ground water monitoring at Aurangabad-RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
SW	2160	Godavari at U/s of Aurangabad Reservoir Kaigaon Tokka near, Kaigaon Bridge	72	78	72	Aurangabad	Gangapur	Kaigaon
SW	178	Kannad - D/S of Kannad near Bridge	Dry	Dry	68	Aurangabad	Kannad	Kannad
SW	181	Aurangabad - Near Patoda Village	58	56	62	Aurangabad	Aurangabad	Aurangabad
SW	180	Aurangabad - Near Holly cross bridge	54	52	60	Aurangabad	Aurangabad	Aurangabad
SW	184	Aurangabad - Harsool Dam	Dry	66	66	Aurangabad	Aurangabad	Aurangabad
SW	1312	Godavari at Jaikwadi Dam, Paithan	70	78	73	Aurangabad	Paithan	Paithan
SW	2158	Godavari at Paithan U/s of Paithan Intake pump house	75	79	73	Aurangabad	Paithan	Jayakwadi
SW	2159	Godavari at D/s of Paithan at Pathegaon bridge	74	80	74	Aurangabad	Paithan	Pathegaon
SW	182	Aurangabad - Near Chikhalthana Bridge	49	Dry	63	Aurangabad	Aurangabad	Aurangabad
SW	183	Aurangabad - At Sukhna Dam	Dry	62	58	Aurangabad	Aurangabad	Aurangabad
SW	179	Sillod - D/S of Sillod near bridge at bhavan	Dry	Dry	Dry	Aurangabad	Sillod	Sillod
SW	2161	Godavari at Jalna Intake water pump house Shahagad	80	73	75	Jalna	Ambad	Shahabad
SW	2657	Bindusara at Beed, near Intake water pump house at Dam	73	Dry	71	Beed	Beed	Paligaon
SW	12	Godavari at Dhalegaon	67	Dry	71	Parbhani	Pathari	Dhalegaon
SW	1210	Godavari at Intake of pump house	72	77	76	Nanded	Nanded	Vishnupuri
SW	1209	Godavari at Raher	76	76	75	Nanded	Nayagaon	Raher
SW	2157	Godavari at Latur Water intake near pump house	75	76	73	Osmanabad	Kalumb	Dhamegaon
SW	2673	Manjra at D/s of Latur, near Latur-Nanded Bridge	Dry	Dry	Dry	Latur	Latur	Bhatkheda
GW	1993	Dug well at Pandarpur, Gangapur, Aurangabad	85	139	112	Aurangabad	Gangapur	Pandharpur
GW	2200	Bore Well at Katpur, Near Z.P.School	99	48	74	Aurangabad	Paithan	Katpur
GW	2201	Dug Well at Ranjangaon	2	166	133	Aurangabad	Gangapur	Ranjangaon
GW	2824*	Dug Well at Naregoan	Station closed	Station closed	Station closed	Aurangabad	Aurangabad	Naregoan
GW	2825	Bore Well at Wahegaon, near Zilla Parishet School	Dry	139	139	Aurangabad	Paithan	Wahegaon

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	Dry
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry

RO – Chandrapur

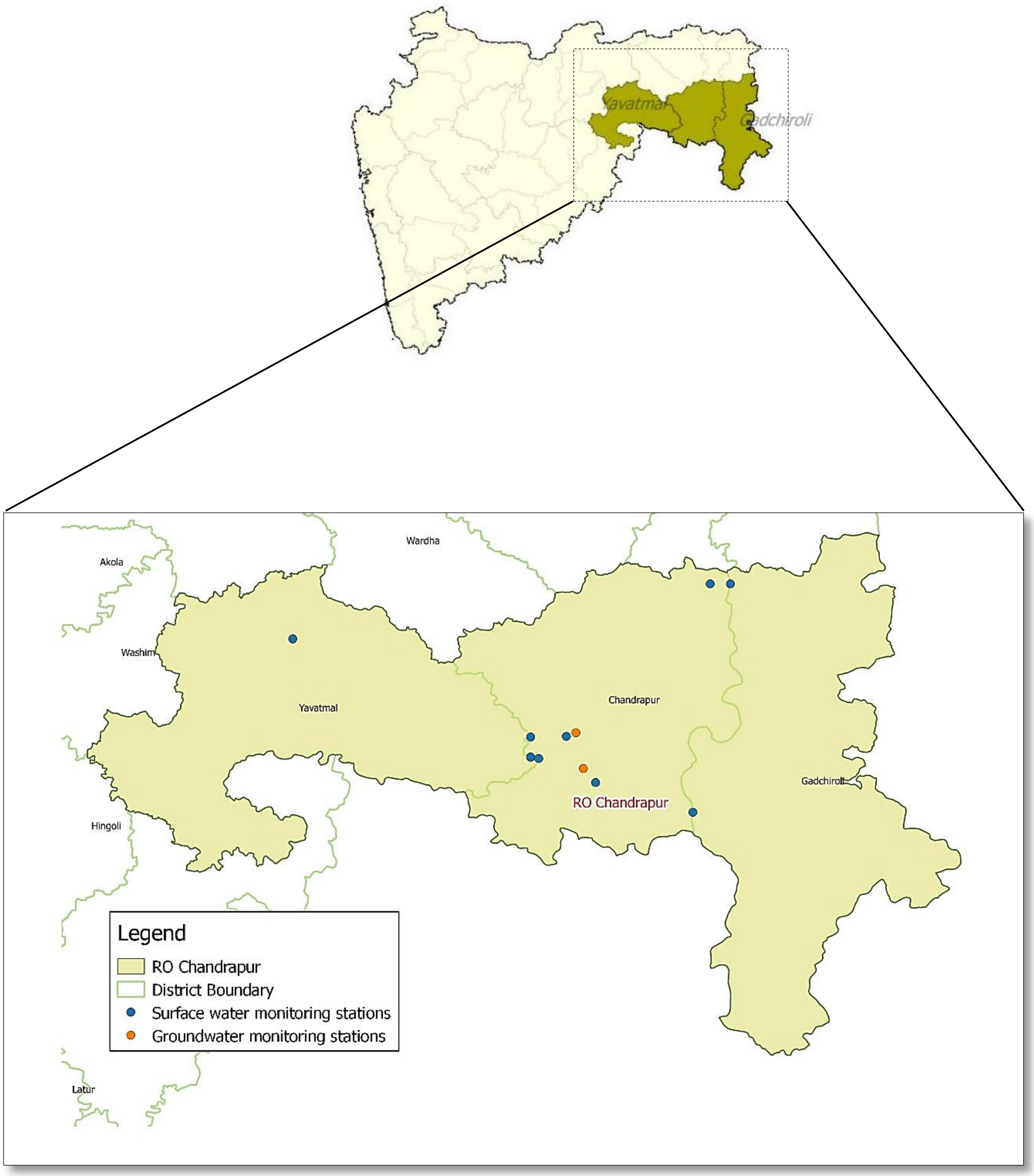


Table No. 32: Water quality Index for surface and ground water monitoring at Chandrapur RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
SW	2697	Penganga near water supply scheme of Umarkhed MC	51	65	55	Yavatmal	Umarkhed	Belkhed
SW	2698	Penganga D/s of Isapur Dam	60	65	57	Yavatmal	Pusad	Isapur
SW	2174	Wardha at D/s of ACC Ghuggus	46	67	55	Chandrapur	Chandrapur	Ghuggus
SW	2721	Wardha at U/s of ACC Ghuggus	54	66	55	Chandrapur	Chandrapur	Ghuggus
SW	2720	Wardha at U/s of Erai	60	69	63	Chandrapur	Chandrapur	Hadasti
SW	2156	Wardha at confluence point of Penganga & Wardha	62	66	61	Yavatmal	Wani	Jugad
SW	2719	Wardha at D/s of Erai	57	63	56	Chandrapur	Chandrapur	Hadasti
SW	1212	Wardha at Rajura bridge	52	64	54	Chandrapur	Chandrapur	Rajura
SW	2175	Wainganga at U/s of Gaurav Paper Mills near Jack Well	51	66	57	Chandrapur	Chandrapur	Bramhpuri
SW	2176	Wainganga at D/s of Gaurav Paper Mills Near Jackwell	52	63	55	Chandrapur	Chandrapur	Bramhpuri
SW	11	Wainganga at Ashti	58	63	57	Chandrapur	Gondpipri	Ashti
GW	2003	Dug well at Plot No- 4, Street No. 49-C, at Nehru Bal Udyan Azad Maidan, owned by Yavatmal M.C.	38	14	71	Yavatmal	Yavatmal	Nehru Bal Udyan Azad Maidan
GW	2828	Dug Well near Jilla Parishad Primary School Visapur	.	174	174	Chandrapur	Ballarpur	Visapur
GW	1994	Dug well At TPS Durgapur near Naseeb Kirana {} general Store.	36	72	53	Chandrapur	Chandrapur	Durgapur

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

RO – Kalyan

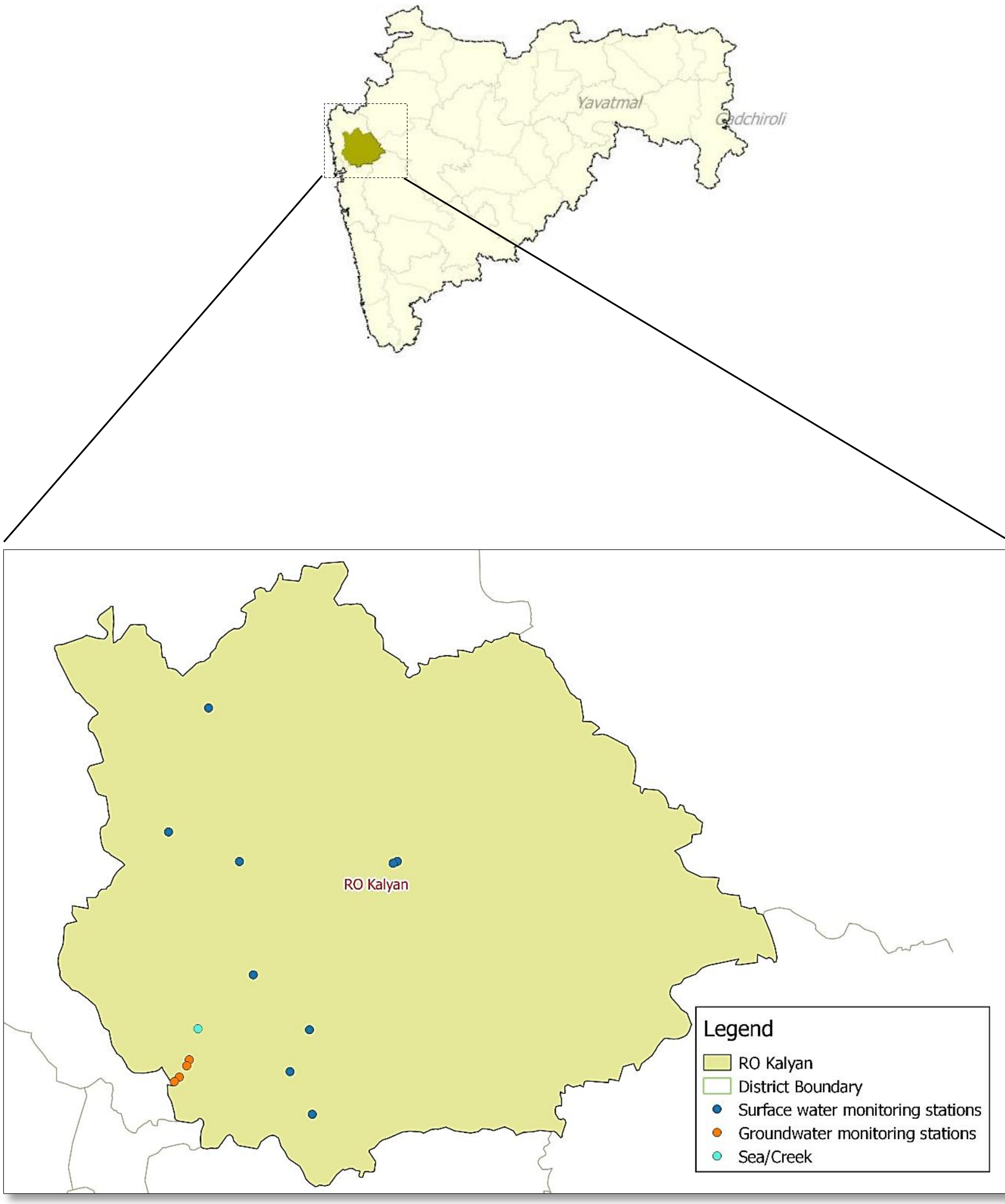

Yavatmal
Gadchiroli
RO Kalyan
Legend
RO Kalyan
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Sea/Creek

Table No. 33: Water quality Index for surface and ground water monitoring at Kalyan-RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
Saline	2791	Ulhas Creek at Reti Bunder, D/s of Kalyan-Bhiwandi Bridge	39	.	57	Thane	Kalyan	Kalyan
SW	2654	Bhatsa at D/s of Liberty Oil Mills	72	71	72	Thane	Shahapur	Satne
SW	2653	Bhatsa at D/s of Liberty Oil Mills	70	71	71	Thane	Shahapur	Satne
SW	1094	Ulhas at U/s of Badlapur water works	69	69	68	Thane	Ambernath	Kulgaon
SW	1093	Ulhas at U/s of NRC Bund	60	63	68	Thane	Kalyan	Mohane
SW	2162	Ulhas at Jambhul water works	68	70	68	Thane	Ambernath	Jambhul
SW	1461	Bhatsa at D/s of Pise Dam	67	67	69	Thane	Bhiwandi	Pise
SW	1092	Kalu at Atale village	46	.	63	Thane	Kalyan	Atale
SW	2712	Vaitarna near Road Bridge	67	69	69	Thane	Wada	Gandhare
SW	2709	Tansa near road bridge	62	66	67	Thane	Wada	Dakewali
Saline	2791	Ulhas Creek at Reti Bunder, D/s of Kalyan-Bhiwandi Bridge	39	.	57	Thane	Kalyan	Kalyan
GW	206	Dug well near Mamta Hospital, Milap Nagar, Dombivali	.	.	.	Kalyan	Dombivali	MIDC,Dombivali
GW	207	Dug well at pimpleshwar Temple, MIDC Ph-II, Dombivali	.	.	.	Kalyan	Dombivali	MIDC,Dombivali
GW	208	Dug well addjusent to M/S. Altra pure chem., Sr. No. 45, Hissa No. 3, MIDC Ph-II, Dombivali.	.	.	.	Kalyan	Dombivali	MIDC,Dombivali

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

RO – Kolhapur

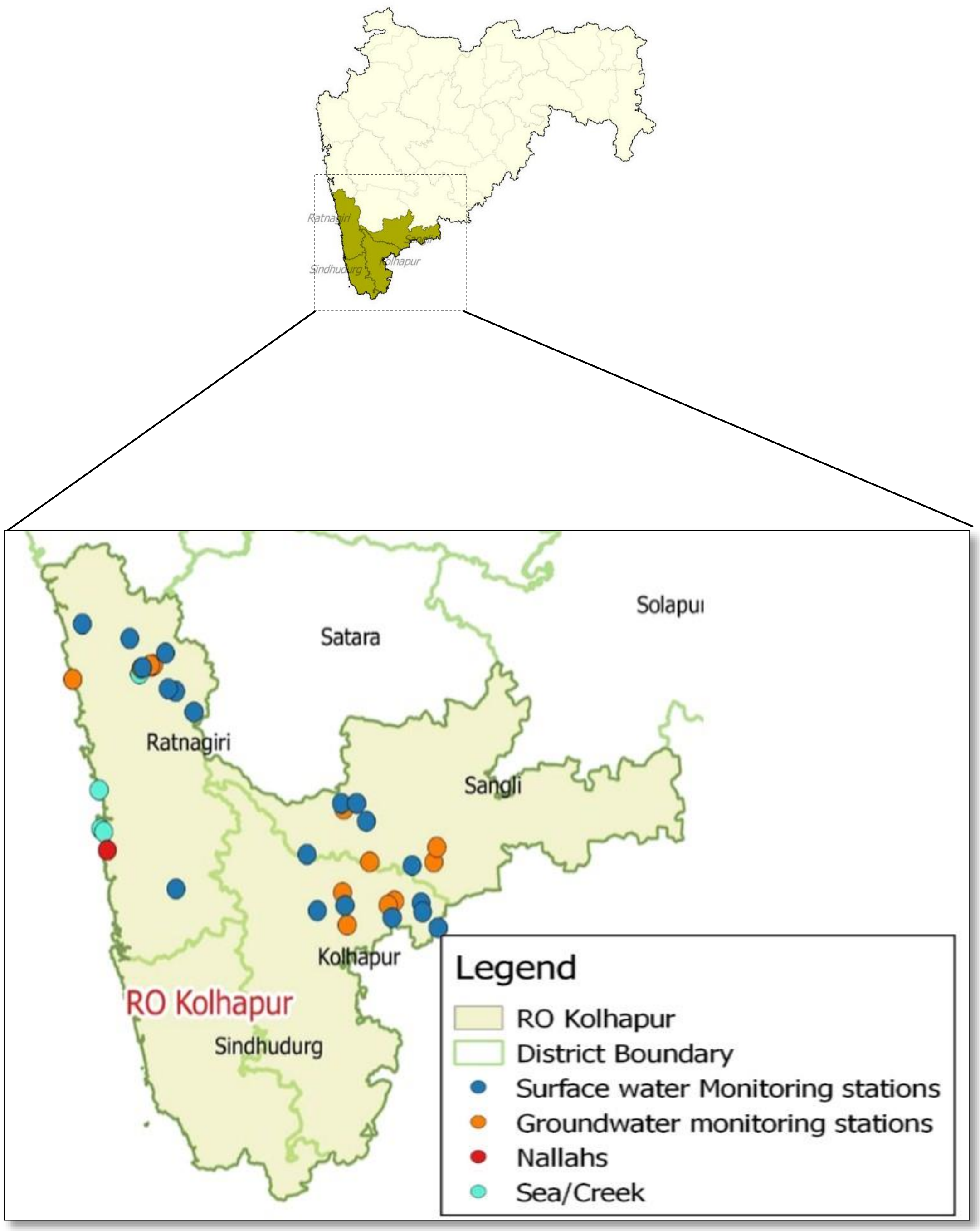

Satara
Ratnagiri
Sangli
Kolhapur
RO Kolhapur
Sindhudurg
Legend
RO Kolhapur
District Boundary
Surface water Monitoring stations
Groundwater monitoring stations
Nallahs
Sea/Creek

Table No. 34 Water quality Index for surface and ground water monitoring at Kolhapur-RO – 2015-16

Type	Station code	Station Name	April	Dec/ Oct	Average	District	Taluka	Village
SW	200	Mangle Bridge, Mangle, Taluka - Shirala, District - Sangli	81	75	77	Sangli	Shirala	Mangle
SW	1904	Panchganga at U/s of Kolhapur town near Balinga Pumping Station	81	77	75	Kolhapur	Karvir	Balinga
SW	198	Bahe KT Weir, Bahe, Taluka - Walwa, District - Sangli	79	76	78	Sangli	Walwa	Bahe
SW	1905	Panchaganga at D/s of Kolhapur town at Gandhi nagar near NH-4 bridge and MIDC intake well	80	72	75	Kolhapur	Kolhapur	Uchegaon
SW	199	Borgaon KT Weir, Borgaon, Taluka - Walwa, District - Sangli	81	75	78	Sangli	Walwa	Borgaon
SW	1906	Krishna at Walwa, D/s of Islampur near Vithal Temple	78	.	77	Sangli	Walwa	Walwa
SW	1311	Panchganga at Ichalkaranji near MIDC intake well	78	75	75	Kolhapur	Hatkanangale	Shiradhwad (Ichalkaranji ghat)
SW	37	Krishna at Maighat, Sangli	76	80	78	Sangli	Miraj	Gawali gally
SW	2163	Panchganga at Shirol near Shirol intake well	77	71	75	Kolhapur	Shirol	Shirol
SW	1310	Krishna at Kurundwad	77	70	73	Kolhapur	Shirol	Narshingwadi, Kurundwad
SW	1153	Krishna at Rajapur Weir	77	74	75	Kolhapur	Shirol	Rajapur
Saline	2804	Karambavane Creek at Chiplun	79	71	77	Ratnagiri	Chiplun	Karambavane
Saline	2813	Sea Water at Ganapatipule	79	68	74	Ratnagiri	Ratnagiri	Ganapatipule
Saline	2814	Sea Water at Bhagwati Bunder, Ratnagiri near Ultra Tech Cement Jetty	72	72	71	Ratnagiri	Ratnagiri	Mirkarwada
Saline	2815	Madvi Sea Water at Ratnagiri near Jodhale Maruti Temple	71	74	72	Ratnagiri	Ratnagiri	Madvigaon
SW	2714	Vashishti at U/s of Pophali near Konphansawane Bridge	.	80	77	Ratnagiri	Chiplun	Pophali
SW	2676	Muchkundi at Waked Ratnagiri near M/s Asahi India Glass	75	82	75	Ratnagiri	Lanja	Waked
SW	202	Vashisti At Khadpoli, Taluka Chiplun, District - Ratnagiri	76	78	79	Ratnagiri	Chiplun	Khadpoli
SW	2164	Vashishti at U/s of Three M Paper Mills near M/s Multifilms Plastic Pvt Ltd	76	83	77	Ratnagiri	Chiplun	Kherdi
SW	2713	Vashishti at D/s of Three M Paper Mills near Chiplun water intake Jackwell	78	81	76	Ratnagiri	Chiplun	Kherdi
SW	201	Sonpatra At Kotwali Village, Taluka - Khed, District - Ratnagiri	82	82	79	Ratnagiri	Khed	Kotwali
SW	203	Jagbudi , D/S of Khed City, Taluka - Khed, District Ratnagiri	80	84	79	Ratnagiri	Khed	Khed City
SW	204	Jog at Dapoli, Taluka Dapoli, District - Rantnagiri	80	81	78	Ratnagiri	Dapoli	Dapoli
Nalla	2790	Pimpal-Paneri Nalla at Ratnagiri near Finolex Industries	54	62	69	Ratnagiri	Ratnagiri	Yahganigaon
GW	219	Commen well Water At Patwardhan, Lote, Taluka - Khed, District - Rantnagiri	42	27	35	Ratnagiri	Khed	Lote
GW	220	Dugwell backside Excel India At Chalkewadi, Taluka - Khed, District - Ratnagiri.	33	29	31	Ratnagiri	Khed	Chalkewadi

Type	Station code	Station Name	April	Dec/ Oct	Average	District	Taluka	Village
GW	2004	Bore well at Parvati Industrial Estate, Yadrav, Kolhapur	28	65	136	Kolhapur	Shirol	Yadrav
GW	2005	Bore well at Khanjirenagar, Kolhapur	329	249	289	Kolhapur	Hatkanangale	Khanjirenagar
GW	2006	Bore well at Shinoli near M/s Aqua Alloy Steel.	228	55	142	Kolhapur	Chandgad	Shinoli
GW	2007	Bore well at Savali, near Gram Panchayat office.	583	64	323	Sangli	Miraj	Savali
GW	2008	Dug well at Sambarwadi, owned by Shri. Kishan Hali Rajput.	222	139	19	Sangli	Miraj	Sambarwadi
GW	2202	Dug Well at Ghane Kunt, near Awashi, onwed by shri Rajendra Amre	28	29	28	Ratnagiri	Khed	Ghane Kunt
GW	2829	Bore Well at MIDC Shiroli near M/s. Pratibha Enterprises	26	72	49	Kolhapur	Hatkanangale	Shiroli
GW	2830	Bore Well at MIDC Gokul Shirgaon	26	218	212	Kolhapur	Karvir	Gokul-Shirgaon
GW	2831	Dug Well at Sakharali near MIDC Islampur near Krishna Milk Industry	157	72	114	Sangli	Walwa	Sakharali
GW	2832	Dug Well No.1 at Brahmanwadi-Anjanwel, owned by Shri Vaidya	52	41	46	Ratnagiri	Guhagar	Anjanwel
GW	2833	Dug Well No.1 at Group Gram Panchayat at Arketwadi, near Masjid	644	29	336	Ratnagiri	Khed	Arketwadi
GW	2834	Dug Well No.2 at Arketwadi	66	30	345	Ratnagiri	Khed	Arketwadi
GW	2835	Dug Well No.2 at owned by Group Gram Panchayat, Brahmanwadi-Anjanwel	33	3	31	Ratnagiri	Guhagar	Anjanwel

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

RO – Mumbai

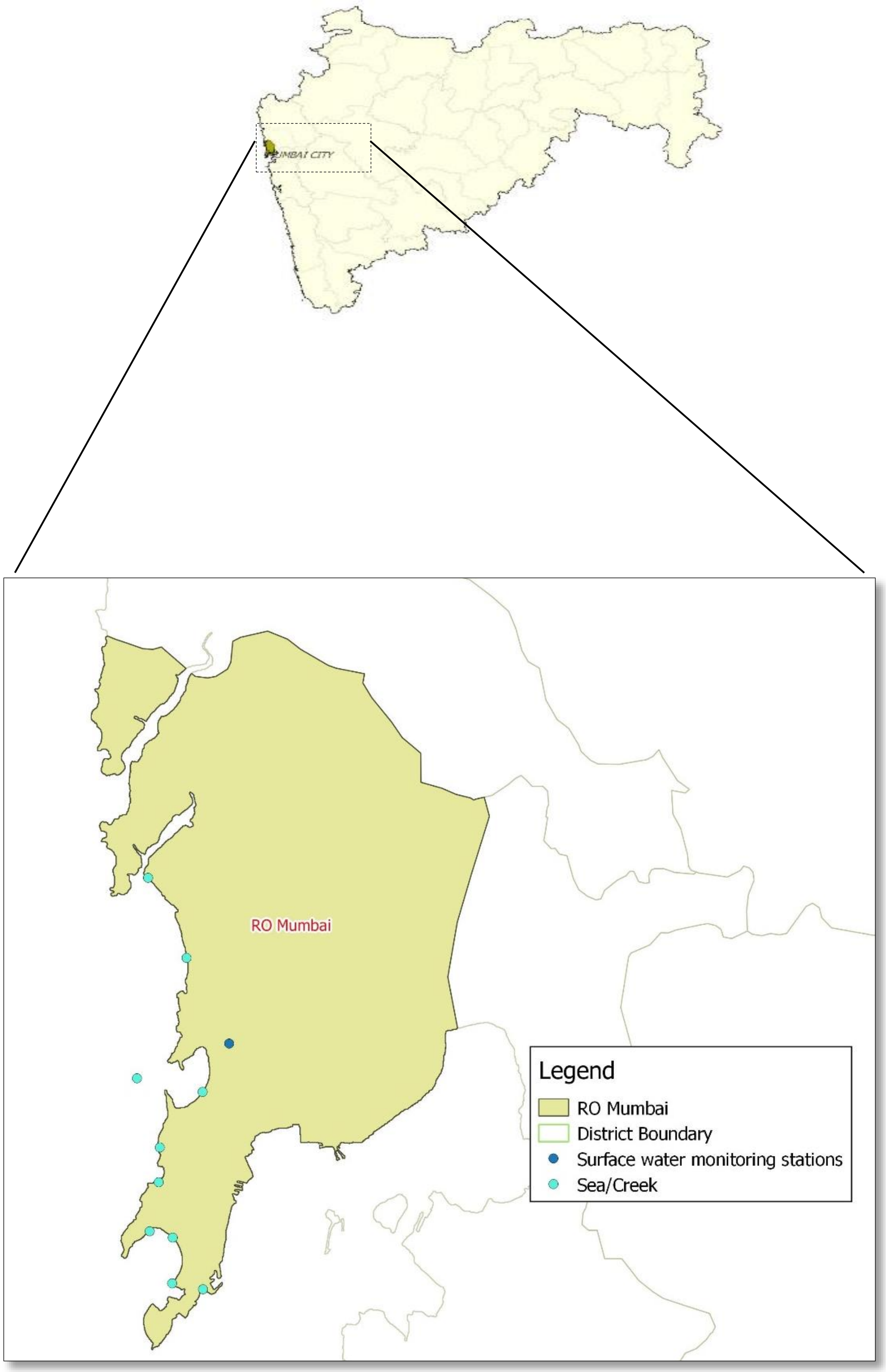

MUMBAI CITY
RO Mumbai
Legend
RO Mumbai
District Boundary
Surface water monitoring stations
Sea/Creek

Table No. 35: Water quality Index for surface and ground water monitoring at Mumbai-RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
SW	2168	Mithi at near bridge	30	41	39	Mumbai	Bandra	Mahim
Saline	2169	Sea Water at Varsova Beach	41	42	45	Mumbai	Andheri	Versova
Saline	2812	Sea Water at Juhu Beach	42	45	46	Mumbai	Santacruz	Juhugaon
Saline	1318	Mahim creek at Mahim Bay	47	51	50	Mumbai	Bandra	Mahim
Saline	2811	Sea Water at Shivaji Park (Dadar Choupathy)	45	47	48	Mumbai	Dadar	Dadar
Saline	2167	Sea Water at Worli Seaface	43	51	48	Mumbai	Worli	Worli
Saline	2810	Sea Water at Haj Ali	43	50	47	Mumbai	Worli	Worli
Saline	2809	Sea Water at Malabar Hill	46	44	45	Mumbai	Mumbai	Walkeshwar
Saline	2166	Sea Water at Charni Road Choupathy	45	46	45	Mumbai	Mumbai	Girgaon
Saline	2808	Sea Water at Nariman Point	46	43	46	Mumbai	Colaba	Colaba
Saline	2165	Sea Water at Gateway of India	47	44	47	Mumbai	Colaba	Colaba

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

RO – Nagpur

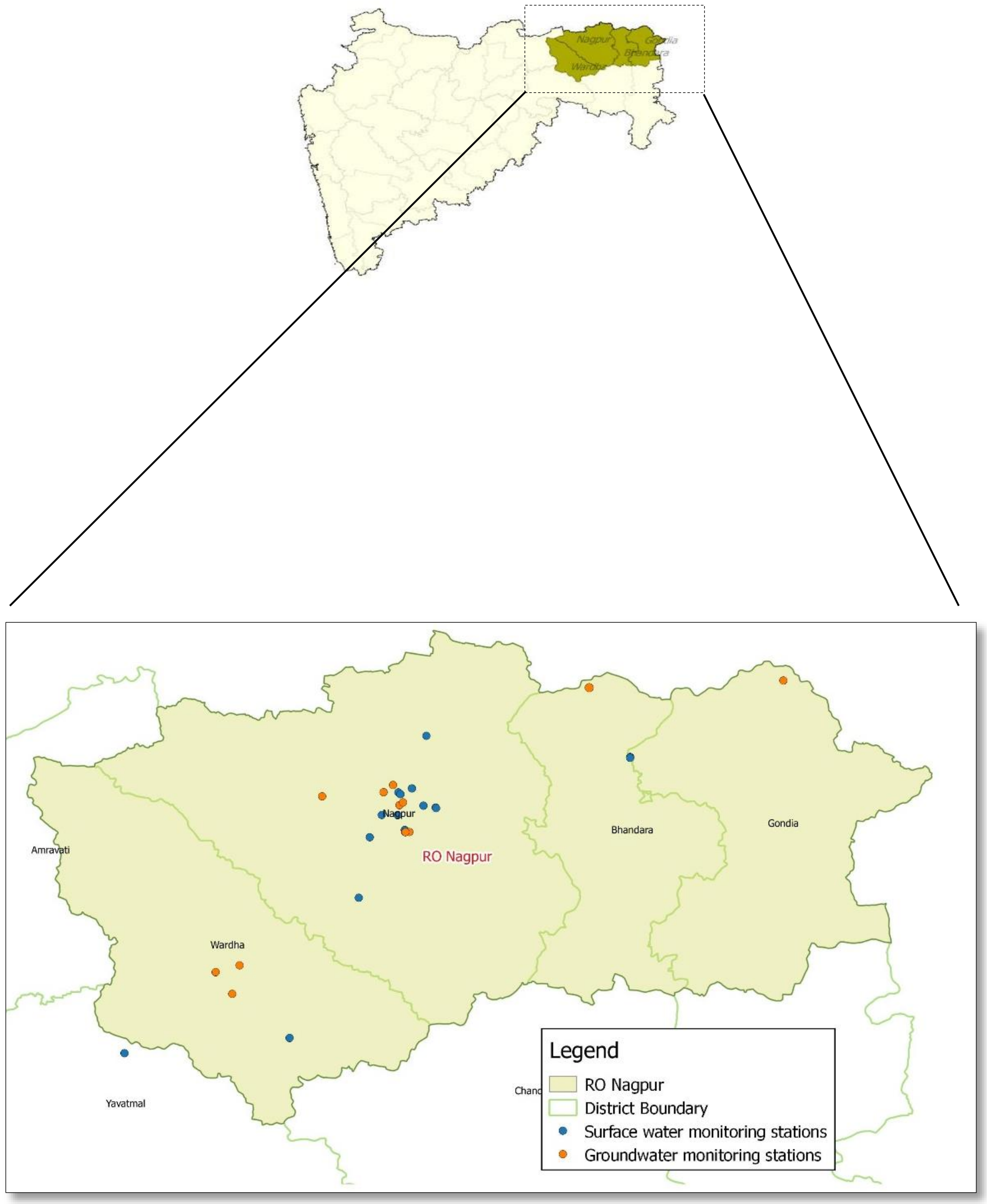

Amravati
Nagpur
RO Nagpur
Bhandara
Gondia
Wardha
Yavatmal
Legend
RO Nagpur
District Boundary
Surface water monitoring stations
Groundwater monitoring stations

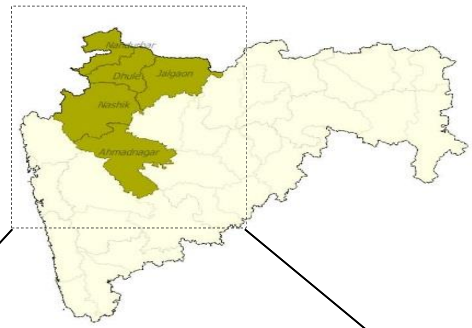
Table No. 36: Water quality Index for surface and ground water monitoring at Nagpur-RO – 2015-16

Type	Station code	Station Name	April	Dec /Oct	Average	District	Taluka	Village
SW	1315	Wardha at Pulgaon Railway Bridge	56	49	52	Wardha	wardha	Pulgaon
SW	2723	Wena at D/s of Mohata Mills, near Bridge on Hinganghat-Wadner Road	51	48	50	Wardha	Hinganghat	Hinganghat
SW	2174	Wardha at D/s of ACC Ghuggus	46	67	55	Chandrapur	Chandrapur	Ghuggus
SW	2721	Wardha at U/s of ACC Ghuggus	54	66	55	Chandrapur	Chandrapur	Ghuggus
SW	2720	Wardha at U/s of Erai	60	69	63	Chandrapur	Chandrapur	Hadasti
SW	2719	Wardha at D/s of Erai	57	63	56	Chandrapur	Chandrapur	Hadasti
SW	1212	Wardha at Rajura bridge	52	64	54	Chandrapur	Chandrapur	Rajura
SW	2722	Wena at U/s of Mohata Mills, nearby Brigde on Hinganghat Wadner Road	54	53	57	Wardha	Hinganghat	Hinganghat
SW	185	Nag Near, Ambazari Lake, Nagpur	48	63	51	Nagpur	Nagpur	Nagpur
SW	189	Pill Near, Mankapur on Koradi Road, Nagpur	28	32	47	Nagpur	Nagpur	Nagpur
SW	188	Pill Near, Wanjra Layout Kamptee Road, Nagpur	39	30	38	Nagpur	Nagpur	Nagpur
SW	211	Grampanchayat Suradevi Intake well On Kolar At Suradevi, Taluka -Kamptee, District -Nagpur	56	.	56	Nagpur	Kamptee	Suradevi
SW	1909	Kanhan at D/s of Nagpur	31	55	53	Nagpur	Kuhi	Agargaon
SW	186	Nag Near, Bhandewadi Bridge, Nagpur	29	34	32	Nagpur	Nagpur	Nagpur
SW	1910	Wainganga after confluence with Kanhan	30	57	53	Nagpur	Kuhi	Ambhora
SW	1908	Kolar before confluence with Kanhan at Waregaon Bridge	55	58	55	Nagpur	Kamptee	Waregaon
SW	187	Nag Near, Asoli Bridge, Bhandara Road, Nagpur	29	34	33	Nagpur	Nagpur	Nagpur
SW	2170	Kanhan (Wainganga basin) at U/s of M/s Vidharba Paper Mill	56	55	57	Nagpur	Parseoni	Sinora
SW	2171	Kanhan (Wainganga basin) at D/s of M/s Vidharbha Paper Mills	53	46	54	Nagpur	Parseoni	Sinora
SW	2173	Wainganga at U/s of Ellora Paper Mills	51	.	59	Bandara	Tumsar	Tumsar
SW	2172	Wainganga at D/s of Ellora Paper Mill	54	.	54	Bandara	Tumsar	Tumsar
SW	2175	Wainganga at U/s of Gaurav Paper Mills near Jack Well	51	66	57	Chandrapur	Chandrapur	Bramhpuri
SW	2176	Wainganga at D/s of Gaurav Paper Mills Near Jackwell	52	63	55	Chandrapur	Chandrapur	Bramhpuri
SW	11	Wainganga at Ashti	58	63	57	Chandrapur	Gondpipri	Ashti
GW	209	Bore well near Pardhi House, Bhandewadi, Nagpur				Nagpur	Nagpur	Bhandewadi
GW	210	Bore well near Dearao Kale House, Bhandewadi, Nagpur				Nagpur	Nagpur	Bhandewadi
GW	212	Grampanchayat Mhasala, Dugwell On Nalla At Mhasala, Taluka - Kamptee, District - Nagpur	6	.	3	Nagpur	Kamptee	Mhasala
GW	213	Grampanchayat Kawtha, Dugwell At Kawtha, Taluka - Kamptee, District - Nagpur	128	.	65	Nagpur	Kamptee	Kawtha
GW	1994	Dug well At TPS Durgapur near Naseeb Kirana {} general Store.	36	72	53	Chandrapur	Chandrapur	Durgapur

Type	Station code	Station Name	April	Dec /Oct	Average	District	Taluka	Village
GW	1995	Gram Panchayath Dug well , Near Balaji Gajbhiye House, Khaperkheda	17	.	54	Nagpur	Saoner	Khaperkheda(Ward No.4)
GW	1996	Gram Panchayath Dug well , Near Jagadamba G M S Mandir Sahakari Sanstha	11	.	55	Nagpur	Kamptee	Koradi
GW	1997	Bore well near Primary Health Centre, Raipur(Hingna)	69	Not collected	69	Nagpur	Hingna	Raipur
GW	1998	Gram Panchayat Dug well near Gram Panchayat Office, Brahmni	Dry	Not collected	Dry	Nagpur	Kalmeshwar	Brahmni
GW	1999	Bore well Near Gram Panchayat, Changera.	72	.	36	Gondia	Gondia	Changera
GW	2000	Dug well near Sarode Kirana Store, Bhandewadi, Nagpur	183	.	91	Nagpur	Nagpur	Bhandewadi
GW	2203	Hand Pump in the premises of Z.P.Primary School	Not collected	.	.	Wardha	wardha	Bhugaon
GW	2826	Dug Well near Railway Station, Cottaon Market	Not collected	.	.	Wardha	wardha	Wardha
GW	2827	Bore Well near Railway crossing at Dongi Buzurg	.	.	.	Bandara	Tumsar	Dongri-Buzurg

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

RO – Nashik



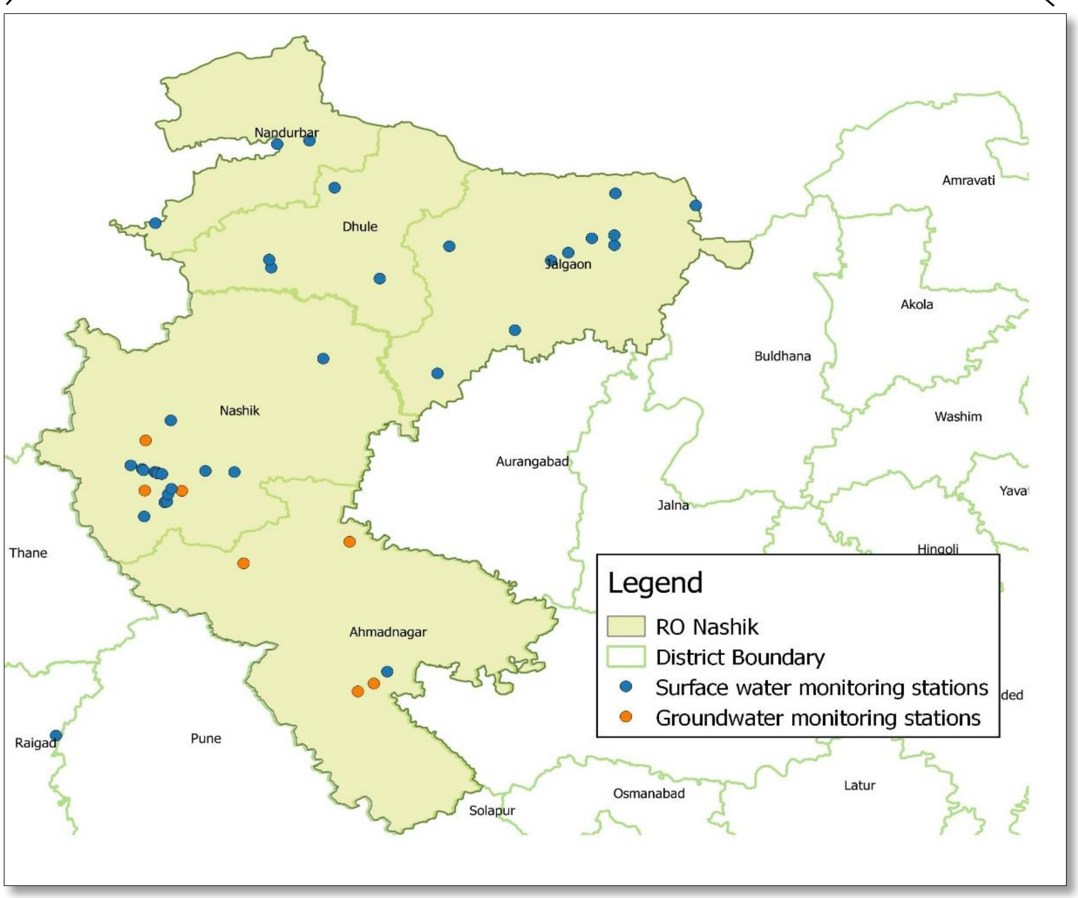

Nandurbar
Dhule
Jalgaon
Amravati
Akola
Buldhana
Washim
Nashik
Aurangabad
Jalna
Yava
Hingoli
Thane
Ahmadnagar
Raigad
Pune
Solapur
Osmanabad
Latur
ded
Legend
RO Nashik
District Boundary
Surface water monitoring stations
Groundwater monitoring stations

Table No. 37: Water quality Index for surface and ground water monitoring at Nashik -RO – 2015-16

Type	Station code	Station Name	April	Dec/ Oct	Average	District	Taluka	Village
SW	1313	Tapi at Ajnad	55	79	65	Jalgaon	Raver	Ajnad
SW	2659	Burai before confluece to Tapi	Dry	Dry	59	Dhule	Dhule	Mukudas
SW	1251	Tapi at Bhusawal	56	64	65	Jalgaon	Bhusawal	Bhusawal Railway Colony
SW	2674	Mor near Padalshe	Dry	Dry	56	Jalgaon	Jalgaon	Padalashe
SW	2718	Waghur at Sakegaon before Confluence with Tapi	Dry	Dry	51	Jalgaon	Jalgaon	Sakegaon
SW	196	Lowki Nalla At Khedi, Taluka & District - Jalgaon	39	67	59	Jalgaon	Khedi	Khedi
SW	1252	Girna at Jalgaon at intake of Girna pump house	Dry	Dry	50	Jalgaon	Jalgaon	Girna pump house area
SW	2667	Hiwara D/s of Pachora	Dry	Dry	46	Jalgaon	Jalgaon	Pachora
SW	2658	Bori D/s of Amalner	Dry	Dry	52	Jalgaon	Jalgaon	Amalner
SW	2710	Titur D/s of Chalisgaon	Dry	Dry	62	Jalgaon	Jalgaon	Chalisgaon
SW	197	Moti Nalla before Confluence with Panjara Dhule, Taluka & District - Dhule	49	47	50	Dhule	Dhule	Dhule
SW	2652	Amravati D/s of Dondaicha	Dry	Dry	64	Dhule	Dhule	Dondaicha
SW	1253	Girna at Malegaon at Malegaon road bridge	.	.	63	Nashik	Malegaon	Malegaon
SW	2666	Gomai D/s of Shahada	Dry	Dry	55	Dhule	Dhule	Shahada
SW	1314	Tapi at Ubad village near Gujrat border	60	54	64	Nandurbar	Shahada	Ubad
SW	2684	Panzara near Panzarakan SSK Ltd	Dry	Dry	61	Dhule	Dhule	Panzare
SW	2670	Kan near Sakri water works	Dry	Dry	65	Dhule	Dhule	Sakri
SW	1907	Rangavali at D/s of Navapur near Rangavali bridge	Dry	Dry	65	Nandurbar	Navapur	Navapur
SW	195	Sina Bridge At Burudgaon Road, A/P Ahmednagar, Taluka & District Ahmednagar	48	53	48	Ahmednagar	Ahmednagar	Burudgaon
SW	1095	Godavari at U/s of Gangapur Dam	57	71	68	Nashik	Nashik	Gangapur
SW	2177	Godavari near Someshwar Temple	53	72	67	Nashik	Nashik	Someshwar
SW	2178	Chikhali Nalla Meets Godavari	.	62	58	Nashik	Nashik	Chikhali
SW	2661	Darna at Aswali (Darna Dam)	60	71	68	Nashik	Igatpuri	Aswali
SW	2179	Godavari at Hanuman Ghat	50	60	65	Nashik	Nashik	Nashik city
SW	1096	Godavari at Panchavati at Ramkund	44	67	63	Nashik	Nashik	Panchavati
SW	1211	Godavari at Nashik D/s of near Amardham	47	60	63	Nashik	Nashik	Gadgebaba Maharaj Nagar
SW	2180	Godavari at near Tapovan	52	65	63	Nashik	Nashik	Tapovan
SW	2181	Godavari at Kapila -Godavari confluence point	47	71	65	Nashik	Nashik	Tapovan

Type	Station code	Station Name	April	Dec/ Oct	Average	District	Taluka	Village
SW	2662	Darna at MES site Pumping station	60	71	67	Nashik	Nashik	Bhagur
SW	2663	Darna at Bhagur Pumping station near Pandhurli Bridge	57	71	68	Nashik	Nashik	Bhagur
SW	2664	Darna at Sansari	58	70	69	Nashik	Nashik	Sansari
SW	194	Kadwa at Awankhed Village, Taluka - Dindori, District - Nashik	55	Dry	62	Nashik	Dindori	Awankhed Village
SW	2660	Darna at Chehedi pumping station	57	71	68	Nashik	Nashik	Chehedi
SW	2182	Godavari at Saikheda	61	67	67	Nashik	Niphad	Saikheda
SW	2183	Godavari at Nandur-Madhameshwar Dam	55	70	67	Nashik	Niphad	Nandur
SW	2689	Patalganga at Gagangiri Maharaj Temple	62	64	68	Raigad	Khalapur	Khopoli
GW	221	well water of Bappaji, Akolner, Ahmadnagar, Nashik	138	189	163	Nashik	Ahmadnagar	Akolner
GW	1990	Bore well at BMW Site , Burudgaon	.	.	.	Ahmadnagar	Ahmednagar	Burudgaon
GW	1991	Bore well at MSW Site, Pathardi, Nashik	.	.	.	Nashik	Nashik	Pathardi
GW	2204	Dug well at Gunjalwadi, Sangamner near Primary Health Care Center.	429	11	270	Ahmadnagar	Sangamner	Gunjalwadi
GW	2816	Dug Well of Mr. Sampat Walunj, near M/s. Mahajeet Clayton	.	.	.	Nashik	Nashik	Shinde village
GW	2817	Bore Well at Chitali near Wagh vasthi	.	.	.	Ahmadnagar	Rahata	Chitali
GW	2818	Bore Well at M/s. Spectron Ethers Rasegaon near Siddeshwar Mahadev Mandir	.	.	.	Nashik	Dindori	Rasegaon

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

RO – Navi Mumbai

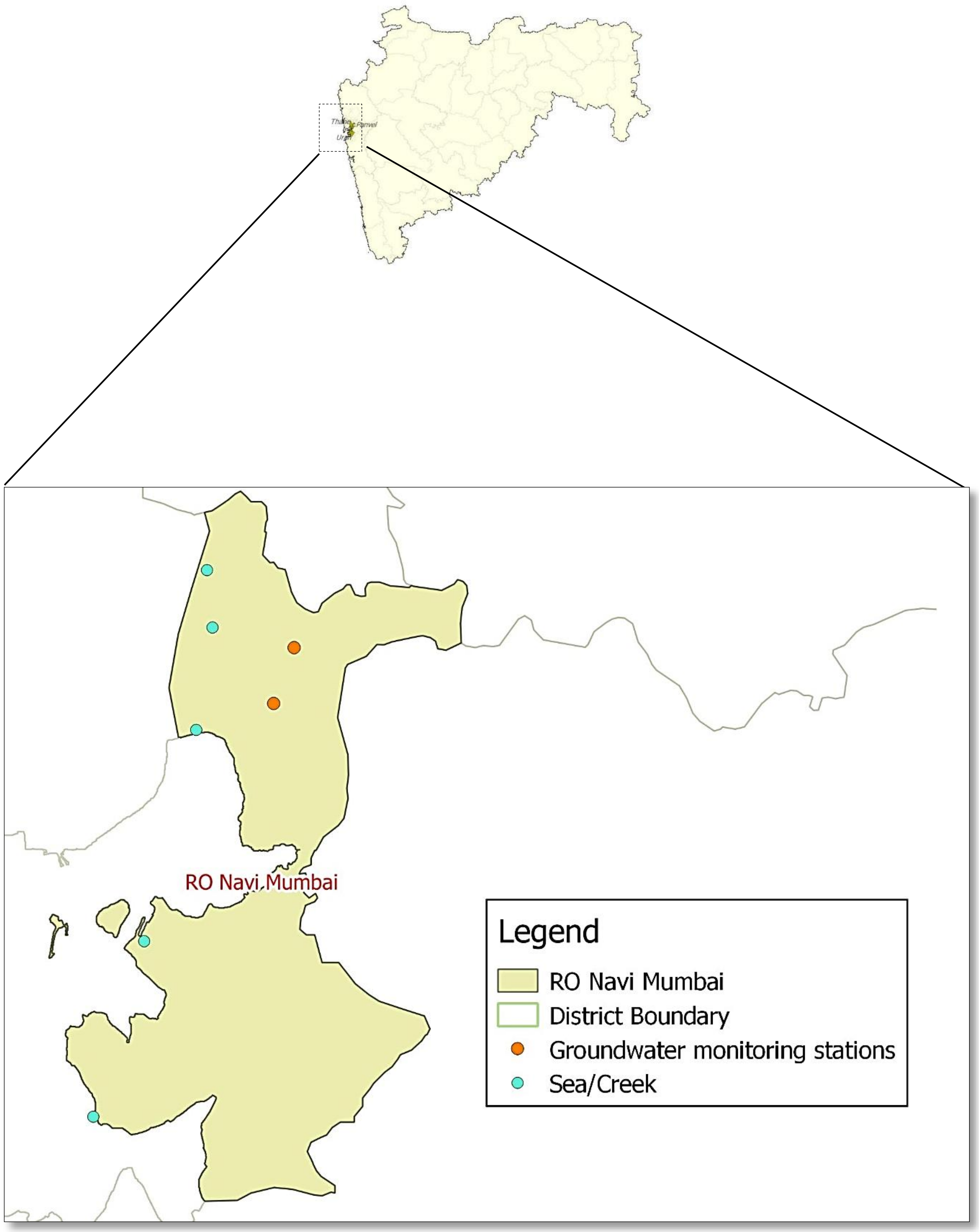
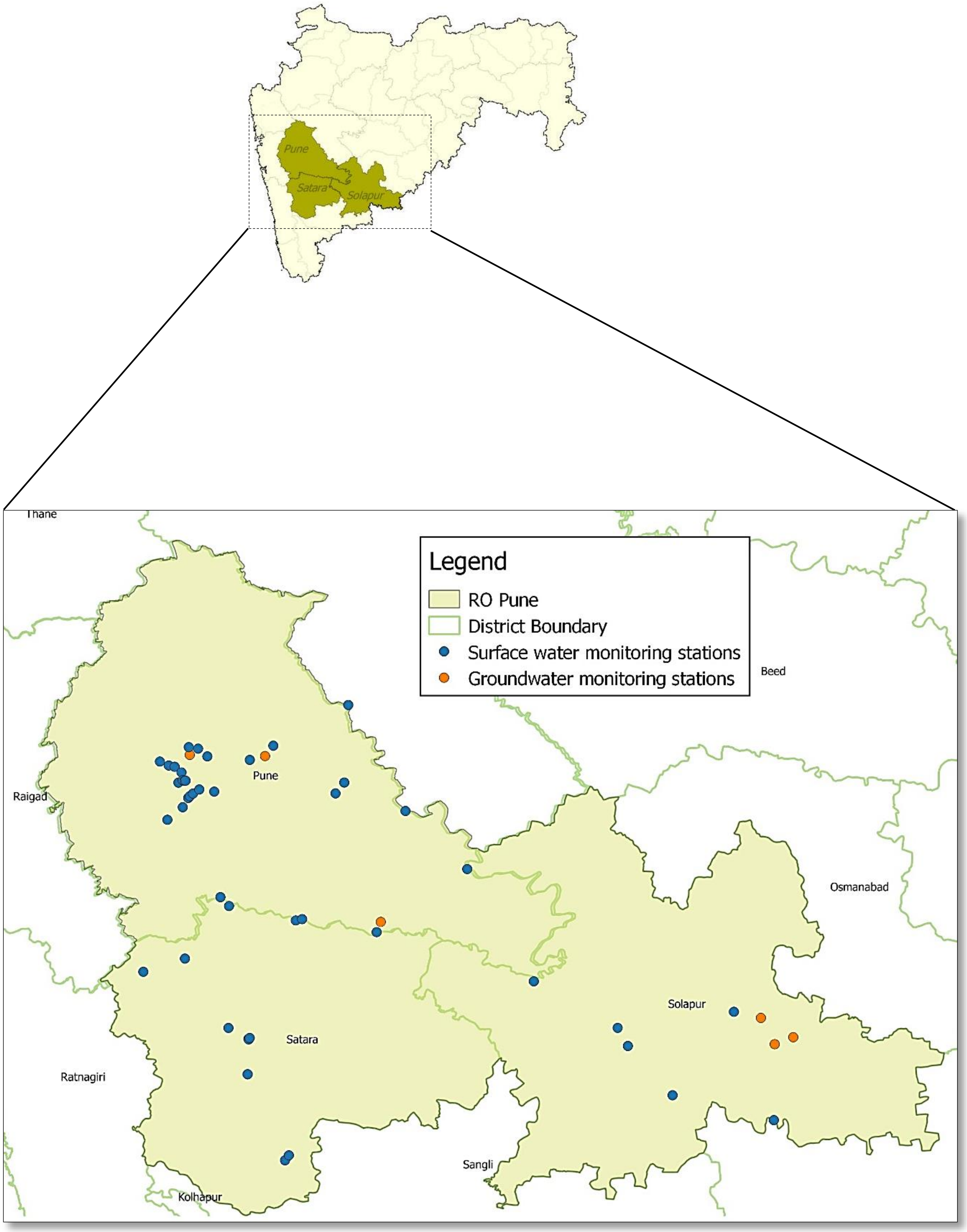


Table No. 38: Water quality Index for surface and ground water monitoring at Navi Mumbai-RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
Saline	2184	Vashi Creek at Airoli Bridge	42	60	54	Thane	Thane	Airoli
Saline	190	TTC Creek At Ghansoli Jetty	37	.	52	Thane	Thane	Ghansoli
Saline	2185	Vashi Creek at Vashi Bridge	Not collected	63	54	Thane	Thane	Vashi
Saline	1317	Thane creek at Elephanta Island	42	45	48	Raigad	Uran	Gharapuri, Elephanta Island
Saline	191	Arabian Sea behind ONGC Uran	45	.	48	Raigad	Uran	Uran
SW	216	Kasardi near Ganesh Ghat	60	.	65	Raigad	Panvel	Taloja
GW	214	Borewell at TTCWMA, Mahape	67	93	80	Thane	Thane	TTCWMA,Mahape
GW	215	Well water at Turbhe Store, Turbhe	.	.	.	Thane	Thane	Turbhe

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

RO – Pune



Pune
Satara
Solapur
Legend
RO Pune
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Thane
Raigad
Pune
Beed
Osmanabad
Satara
Solapur
Ratnagiri
Sangli
Kolhapur

Table No. 39: Water quality Index for surface and ground water monitoring at Pune-RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
SW	2692	Pawana at Ravet Weir, Pune	81	45	65	Pune	Haweli	Ravet
SW	2680	Mutha at Khadakvasla Dam Pune	76	78	72	Pune	Haweli	Kadakvasla
SW	2693	Pawana at Chinchwadgaon, Pune	68	71	53	Pune	Haweli	Chinchwadgaon
SW	2694	Pawana at Pimprigaon, Pune	66	54	53	Pune	Haweli	Pimprigaon
SW	2193	Mula at Aundh Bridge -Aundgaon	64	46	58	Pune	Haweli	Aundhgaon
SW	2690	Pawana at Kasarwadi Pune	68	42	44	Pune	Haweli	Kasarwadi
SW	2196	Pawana at Sangavigaon, Pune	70	52	54	Pune	Haweli	Sangavigaon
SW	1189	Bhima at Pune(Mutha) at U/s of Vithalwadi near Sankar Mandir	61	28	47	Pune	Haweli	Vithalwadi
SW	2691	Pawana at Dapodi Bridge at Pawana-Mulla Sangan Pune	70	49	55	Pune	Haweli	Dapodi
SW	2194	Mula at Harrison Bridge near Mula -Pawana Sangam	66	79	58	Pune	Haweli	Bopodi
SW	2679	Mutha at Deccan Bridge, Pune	29	27	41	Pune	Pune	Deccan
SW	2669	Indrayani at U/s of Moshigaon, Pune	73	70	65	Pune	Haweli	Moshigaon
SW	2678	Mutha near Veer Savarkar Bhavan	30	29	44	Pune	Pune	Pune M.C
SW	2191	Mutha at Sangam Bridge Near Ganpathi Ghat	63	31	42	Pune	Pune	Shivaji Nagar
SW	2668	Indrayani at D/s of Moshi village	69	67	64	Pune	Haveli	Moshi
SW	1190	Bhima at D/s of Bundgarden, Pune	74	40	52	Pune	Haweli	Yerwada
SW	2197	Indrayani at D/s of Alandigaon, Pune	63	68	64	Pune	Haweli	Alandigaon
SW	2192	Mula-Mutha at Mundhwa Bridge	64	42	56	Pune	Haweli	Mundhawa
SW	1463	Nira at Sarola bridge	62	72	67	Pune	Bhor	Sarola
SW	2683	Nira at Shindewadi	65	77	69	Satara	Khandala	Shindewadi, Shirwal
SW	2655	Bhima at Koregaon near Koregaon Bridge, Pune	61	78	68	Pune	Shirur	Koregaon
SW	2715	Vel at Shikrapur, Pune	59	Dry	50	Pune	Shirur	Shikrapur
SW	2682	Nira at U/s of Jubilant Organosis Pune	65	70	66	Pune	Baramati	Nira(Datta ghat)
SW	2195	Nira at D/s of Jubilant Organosis Pune	59	52	58	Pune	Baramati	Nimbut
SW	2677	Mula-Mutha at D/s of Theur, Pune	59	51	58	Pune	Haweli	Theur
SW	1191	Bhima after confluence with Mula-Mutha at Pargaon near Vasant Bandara	70	47	64	Pune	Daund	Pargaon
SW	2665	Ghod at Shirur, Pune	26	Dry	62	Pune	Shirur	Shirur
SW	2681	Nira at Sangavi	23	56	51	Satara	Phaltan	Sangavi
SW	1192	Bhima at Daund near Mahadev temple	72	47	62	Pune	Daund	Daund
SW	2656	Bhima Backwater of Ujani Dam near raw water pump house	65	63	62	Pune	Indapur	Kumbargaon
SW	2789	Nalla at D/s of Alkai Mandir, Solapur	26	67	46	Solapur	Malshiras	Aklai

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
SW	1911	Chandrabhaga at U/s of Pandharpur town	56	71	65	Solapur	Pandarpur	Gursale
SW	1912	Chandrabhaga at D/s of Pandharpur town near Vishnupant Mandir	71	72	62	Solapur	Pandarpur	Gopalpur
SW	1188	Bhima at Narshingpur near Sangam Bridge after confluence with Nira	63	66	65	Solapur	Malshiros	Narsingpur
SW	2705	Sina near Laboti till naka Solapur	65	Dry	69	Solapur	Mohal	Laboti
SW	28	Bhima at Takli	65	74	65	Solapur	South Solapur	Takali
SW	2716	Venna at Mahabaleshwar	76	76	75	Satara	Mahabaleshwar	Mahabaleshwar
SW	1194	Krishna at Dhom Dam	77	79	74	Satara	Mahabaleshwar	Wai
SW	2186	Venna at Varya, Satara	76	73	69	Satara	Satara	Varye
SW	2190	Krishna at Wai	66	68	68	Satara	Wai	Wai
SW	2711	Urmodi at Nagthane Satara	64	74	70	Satara	Satara	Nagthane
SW	2717	Venna at Mahuli	63	66	68	Satara	Satara	Mahuli
SW	2188	Krishna at Krishna-Venna Sangam, Mahuli	67	74	70	Satara	Mahuli	Mahuli
SW	2187	Krishna at Kshetra Mahuli Satara	55	78	66	Satara	Mahuli	Kshetra Mahuli
SW	2189	Koyna at Karad	73	73	72	Satara	Karad	Karad
SW	36	Krishna at Krishna Bridge, Karad	66	76	73	Satara	Karad	Karad
GW	1992	Dug well at MSW Site,owned by Shri.Dattu Kondiba Borate at Borate Vasthi.	37	Not collected	37	Pune	Haveli	Moshi
GW	2819	Dug Well Owned by Shri Deshmukh	560	472	516	Pune	Baramati	Malegaon
GW	2820	Dug Well Owned by Shri Shivaji Baban Darekar	67	115	10	Pune	Shirur	Sanaswadi
GW	2821	Bore Well at Bale Railway Station premises Owned by Shri Digambar Joshi	.	17	17	Solapur	North Solapur	Dahegaon
GW	2822	Bore Well near Chincholi	.	338	338	Solapur	Mohol	Chincholi
GW	2823	Bore Well at Shete Vasti near old Tuljapur Road	.	317	317	Solapur	Solapur	Shete vasthi, Tuljapur Naka

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

RO – Raigad

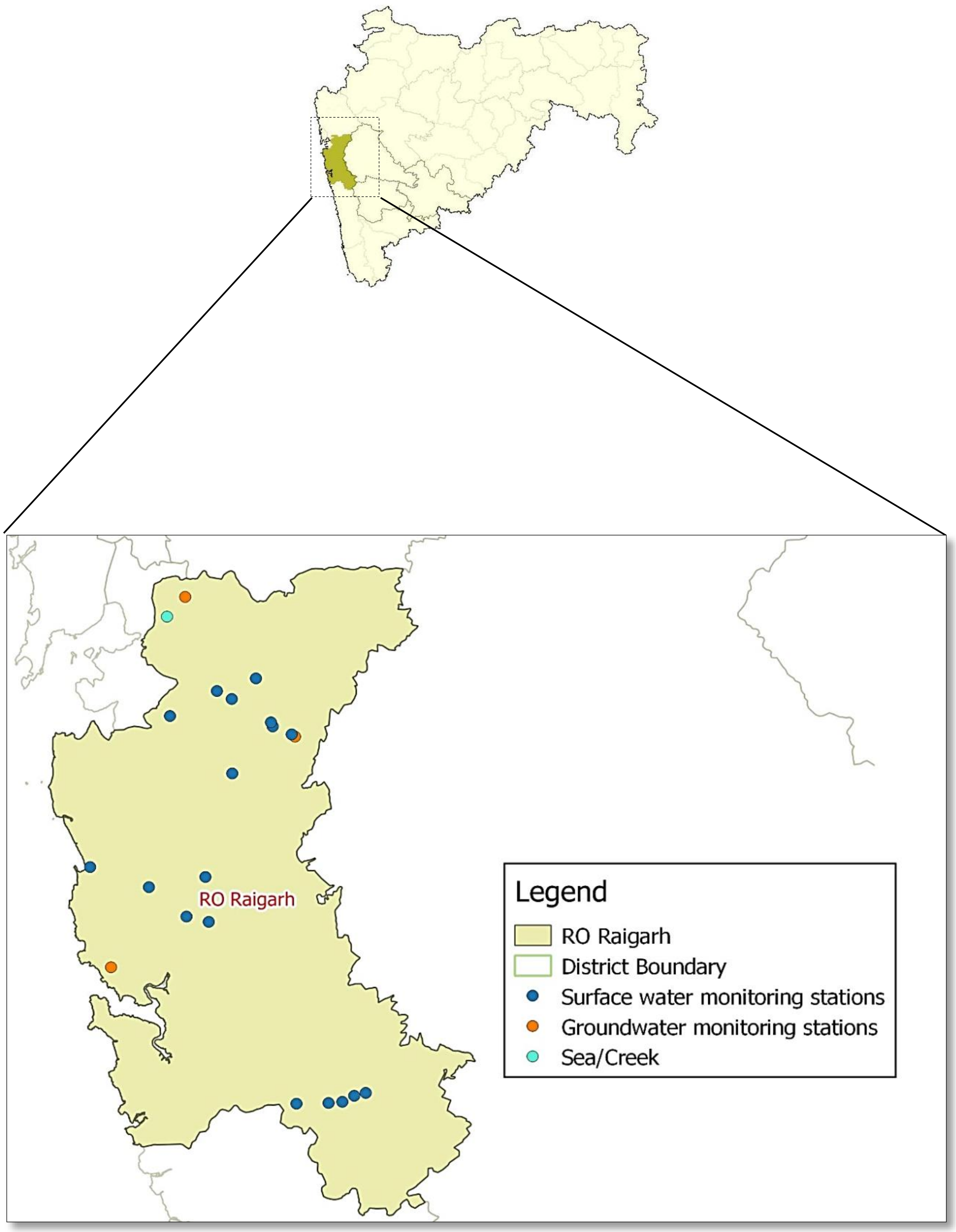

RO Raigarh
Legend
RO Raigarh
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Sea/Creek

Table No. 40: Water quality Index for surface and ground water monitoring at Raigad RO – 2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
Saline	2803	Panvel Creek at Kopra Bridge	58	63	58	Raigad	Panvel	Kopra
SW	2701	Savitri Jackwell at Upsa kendra	73	79	75	Raigad	Mahad	Nangalwadi
SW	2702	Savitri at Shedav Doh	74	74	76	Raigad	Mahad	Shedav Dov
SW	2703	Savitri at Dadli Bridge	73	78	75	Raigad	Mahad	Dadli
SW	2704	Savitri at Muthavali village	74	76	75	Raigad	Mahad	Muthavali
SW	2199	Savitri at Ovale village	77	67	74	Raigad	Mahad	Ovale
SW	1151	Patalganga at Shilphata Bridge	68	70	71	Raigad	Khalapur	Khopoli
SW	2688	Patalganga at Savroli Bridge	71	69	69	Raigad	Khalapur	Savroli
SW	2687	Patalganga at Khalapur pumping house	74	70	72	Raigad	Khalapur	Khalapur
SW	192	Morbe Dam, Taluka - Khalapur, District - Raigad	70	.	72	Raigad	Khalapur	Khalapur
SW	193	Balganga , Village Ransai, Taluka - Khalapur, District - Raigad	72	.	71	Raigad	Khalapur	Ransai
SW	2686	Patalganga at Vyal pump house	64	71	72	Raigad	Khalapur	Vyal
SW	1462	Patalganga near intake of MIDC water works(Turade w/w)	70	71	71	Raigad	Khalapur	Turade
SW	2672	Kundalika at Dhatav at Jackwell	69	70	69	Raigad	Roha	Dhatav
SW	2651	Amba at D/s of Waken Bridge	70	63	68	Raigad	Roha	Waken Phata
SW	1152	Kundalika at Roha Bridge	65	64	70	Raigad	Roha	Roha
SW	2685	Patalganga at D/s of Kharpada Bridge	62	70	67	Raigad	Khalapur	Kharpada
SW	2198	Kundalika at Are Khurd (Saline Zone)	66	.	68	Raigad	Roha	Are Khurd
SW	2671	Kundalik near Salav Bridge (Saline Zone)	43	67	58	Raigad	Roha	Salav
GW	217	Borewell water at village Milgaon, Taluka - Khalapur, District - Raigad.	29	22	25	Raigad	Khalapur	Milgaon
GW	218	Borewell water near MSW site, Murud - Janjira.	.	.	.	0	Murud	Murud Janjira
GW	1989	Bore well at MWML Site at Taloja	23	23	24	Raigad	Panvel	Karawla- Taloja

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	Dry		No data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for	Dry	Not	No data

RO – Thane

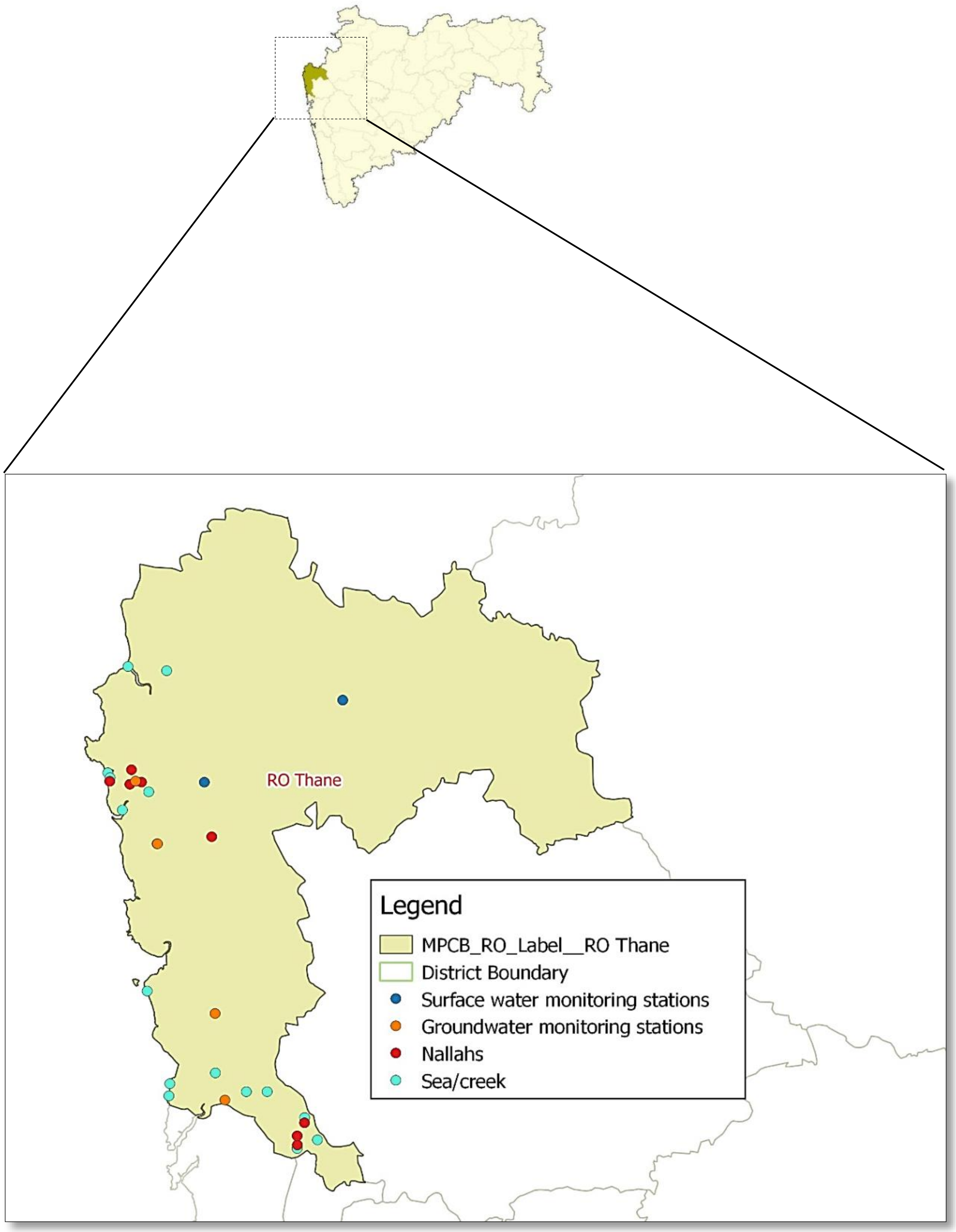

RO Thane
Legend
MPCB_RO_Label__RO Thane
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Nallahs
Sea/creek

Table No. 41: Water quality index for surface and groundwater monitoring at Thane RO -2015-16

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
Saline	2802	Dahanu Creek at Dahanu Fort	40	52	52	Thane	Dahanu	Danugaon
Saline	2801	Savta Creek	47	52	52	Thane	Dahanu	Savta
Saline	2799	Dandi Creek	42	51	49	Thane	Palghar	Dandi
Saline	2807	Navapur Sea	40	49	46	Thane	Palghar	Navapur
Saline	2800	Sarwali Creek	54	60	57	Thane	Palghar	Sarwali
Saline	2798	Kharekuran Murbe Creek	37	53	49	Thane	Palghar	Kharekuran
Saline	2805	Arnala Sea	42	47	48	Thane	Vasai	Arnala
Saline	2797	Bhayander Creek at D/s of Railway Bridge at Jasal Park Choupathy	35	60	52	Thane	Bhayander	Navghar
Saline	1316	Bassein creek at Vasai Fort, Thane	47	50	52	Thane	Vasai	Bassein
Saline	2795	Ulhas Creek at Gaimukh at Nagla Bunder on Ghod Bunder Road	44	61	55	Thane	Thane	Nagla
Saline	2796	Ulhas Creek at Versova Bridge	45	62	54	Thane	Vasai	Versova
Saline	2806	Uttan Sea at Bhayander	42	54	47	Thane	Bhayander	Uttan
Saline	2794	Ulhas Creek at Kolshet Reti Bunder	48	63	54	Thane	Thane	Kolshet
Saline	2792	Ulhas Creek at Mumbra Reti Bunder	45	59	54	Thane	Thane	Mumbra
Saline	2793	Thane Creek at Kalwa Road Bridge	43	60	54	Thane	Thane	Kalwa
SW	2707	Surya at MIDC pumping station	72	74	70	Thane	Palghar	Garvashet
SW	2706	Surya U/s of Surya Dam	73	73	70	Thane	Vikramgad	Dhamni
SW	2696	Pelhar dam	71	71	72	Palghar	Vasai	Pelhar
Nalla	2784	Sandoz Nalla	25	37	33	Thane	Thane	Sandozbaug
Nalla	2782	Rabodi Nalla	36	41	38	Thane	Thane	Rabodi
Nalla	2783	Colour Chem Nalla	27	37	36	Thane	Thane	Majiwada
Nalla	2708	Surya at Intake of Vasai-Virar water scheme	70	73	68	Thane	Palghar	Masvan
Nalla	2786	Tarapur MIDC Nalla, near sump No1	Dry	Dry	31	Palghar	Palghar	MIDC Tarapur
Nalla	2787	Tarapur MIDC Nalla	Dry	Dry	31	Palghar	Palghar	MIDC Tarapur
Nalla	2788	Tarapur MIDC Nalla near sump-III	Dry	Dry	32	Palghar	Palghar	MIDC Tarapur
Nalla	2785	BPT Navapur	27	31	28	Palghar	Palghar	Navapur
GW	1984	Bore well at M/s Tata Iron {} Steel Co. Ltd, S-76	.	.	.	Thane	Palghar	MIDCTarapur, Industrial Estate, Tarapur
GW	1985	Dug well at 5 Star Industrial Estate	175	55	115	Thane	Mira-Bhayander	Kashimira

Type	Station code	Station Name	April	Dec/Oct	Average	District	Taluka	Village
GW	1986	Bore well at Motapada	Dry	Not collected	Dry	Thane	Dahanu	Motapada
GW	1987	Bore well at Vasai	62	167	114	Thane	Vasai	Gokhiware
GW	1988	Bore well at Gharatwadi, Palghar	.	.	.	Thane	Palghar	Aliyali

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	Dry		No data
Ground Water	Excellent	Good	Poor	Very Poor	Not suitable for drinking	Dry	Not Collected	No data

Annex II – List of Pending Writ petitions

List of writ petition / PIL pending before the honb'le high court of judicature Mumbai , Nagpur, Aurangabad bench				
Sr No	**Name of the parties**	**Pil no.**	**Region**	**Subject matter**
1	Vikas Raghunath Patil V/s. The State of Maharashtra & Ors	21204 of 2010	Pune	River of Indrayani
2	Lalit Vathade V/s MPCB	85/2015	Aurangabad	Bank of Panzra
3	Bombay Environment Action Group V/s. Union of India	Writ Petition no. 4564/88		Regarding pollution of Patalganga
4	Shri Prakash Jadhav	Writ Petition no. 3366/08	Nagpur	Wardha, Painganga & Wainganga major water polluting sources.
5	Daattatraya Hari Mane V/s. The state of Maharashtra & Ors	183/2012	Kolhapur	Pollution of Panchganga
6	Narsinh S/o Laxmanrao Jadhav V/s. The State of Maharashtra & Ors	130/2014	Aurangabad	Sukhna and Kham
Application Pending National Green Tribunal Wz, Pune, Regd . Pollution Matters Before Ngt, Nagpur & Pune				
Sr No.	**Name Of The Parties**	**Application / Appeal No.**	**Region**	**Subject Matter**
1	Court In Own Motion V/s. The State of Maharashtra & Ors	114/2014	Nagpur	Pollution in Vidarbha Region
2	M/s. Janardhan Kundlikrao Pharande & Anr V/s. M.O.E.F & Ors	07/2014 (wz)	Pune	Regarding Nira Pollution
3	Mrs. Indu Gupta & Ors V/s. Goel Ganga Group & Ors	39/2015	Pune	Regarding Ram Nadi Pollution
4	Subhash Ramkrishna Patil V/s. MPCB	55/2015	Pune	Reg. RRZ policy

Annex III – List of Polluted Stretches across Maharashtra

Priority Rank							
	1	**2**	**3**	**4**	**5**	**Dry**	**Non-Polluted**
	Mithi		Girna	Amravati	Darna	Manjra	Amba
			Hiwara	Bhima	Godavari		Bhatsa
			Mula-Mutha	Bindusara	Koyna		Kan
			Pedhi	Chandrabhaga	Nira		Krishna
			Vel	Ghod	Panzara		Kundalika
			Waghur	Gomai	Patalganga		Mutha
				Indrayani	Rangavali		Panchganga
				Kanhan	Sina		Pelhar
				Mor	Tapi		Savitri
				Morna	Urmodi		Surya
				Mula			Ulhas
				Pawana			Vaitarna
				Penganga			Vashishti
				Purna			
				Venna			
				Wainganga			
				Wardha			
				Wena			
Total	**1**	**0**	**6**	**18**	**10**	**1**	**13**

Note**:** ***In 2015-16 Manjra was found dry through out hence is not included in any of the categories however in 2014-15 the same stretch was in Priority 5.***

Observations:

The overall increase in water quality is recorded as:

- Only 1 (Mithi) is noted to be in Priority 1 category in the year 2015-16.
- No is recorded in Priority 2.
- Priority 3 records decrease in number of rivers from 8 rivers (2014-15) to 6 rivers.
- As for priority 4 the number of stretches have increase to 18 in 2015-16 as compared to 10 in the previous year 2014-15.
- The number of rivers in priority 5 is decrease from 20 (2014-15) to 10 in the current year 2015-16.

This indicates that the polluted stretches have shown improvement and hence slipped in the priority ranks considerably. This may be attributed to consistent efforts from MPCB to curb water pollution by implementing stringent vigilance and promoting best practices.

Annex IV – Status of Sewage Treatment in Municipal Corporations of Maharashtra

	Name of Municipal Corporation	Class	District		Sewage Generation MLD	Sewage Treatment MLD	Percentage Treatment (%)	Disposal	Type of Treatment
1	Ahmednagar Corporation	B	Ahmednagar	Seena	60	0	0	Open Nalla	-
2	Akola Corporation	D	Akola	Morna - Tapi	48	0	0	Morna	No any treatment facility i.e. STP not provided.
3	Amravati Corporation	D	Amaravati	Pedhi - Tapi	92	30.5	33.15	Amba Nalla to Pedhi	ASP
4	Aurangabad Corporation	D	Aurangabad	Godavari	107	9	8.41	Sukhna Dr. Salim ali Lake Kham	ASP, SBR
5	Bhiwandi-Nizampur Corporation	D	Thane	Creek	84	17	20.24	Kamavari Creek	
6	Chandrapur Corporation	D	Chandrapur	Irai - Wardha	30	30	100	Erai	
7	Dhule Corporation	D	Dhule	Panjara	48	0	0	Panzara	-
8	Jalgaon Corporation	D	Jalgaon	Tapi	48	0	0	Nalla to Girna	-
9	Kalyan-Dombivli Corporation	D	Thane	Creek	200	30	15	Ulhas creek	Primary Clarifier
10	Kolhapur Corporation	D	Kolhapur	Panchganga	96	43.5	45.31	Panchaganga	Primary, Trickling Filter, SBR
11	Latur Corporation	D	Latur	Manjara	24	0	0	Local Nalla to Manjara	-

	Name of Municipal Corporation	Class	District		Sewage Generation MLD	Sewage Treatment MLD	Percentage Treatment (%)	Disposal	Type of Treatment
12	Malegaon Corporation	C	Nashik	Mousam & Girana	28	0	0	Mausam Local to Girna	-
13	Mira-Bhayander Corporation	C	Thane	Creek	93	3.5	3.76	Creek	Primary,
14	Municipal Corporation of Grater Mumbai	A	Mumbai	Creek	2671	2028	75.93	Marine outfall Malad Creek Thane Creek Gorai Creek	Partly Primary Treatment (Bar Screen, Grit Chamber/sedimentation). And Partly Primary Treatment followed by Aerated Lagoons
15	Nagpur Corporation	B	Nagpur	Nag	345	85	24.64	Nag	Full fledged STP based on ASP with bio gas generation
16	Nanded-Waghala Corporation	D	Nanded	Godavari	48	38	80	Local Nalla to Godavari	1) Bondar STP- Anaerobic Lagoons, Facultative Tank. 2) Elichpur STP- ASP
17	Nashik Corporation	A	Nashik	Godavari	280	210	75	Godavari Darna	UASB Reactor & ASP
18	Navi Mumbai Corporation	C	Thane		280	230	82.14	Creek	SBR
19	Parbhani Corporation	D	Parbhani	Purna - Godavari	10	0	0	Godavari	-

	Name of Municipal Corporation	Class	District		Sewage Generation MLD	Sewage Treatment MLD	Percentage Treatment (%)	Disposal	Type of Treatment
20	Pimpri-Chinchwad Corporation	C	Pune	Mula, Pavana and Indrayani	291	230	79.03	Pawana	SBR
21	Pune Corporation	B	Pune	Ram	744	567	76.21	Mutha	ASP, SBR
				Mula				Mula	
				Mutha				Ram	
22	Sangali-Miraj Kupwad Corporation	D	Sangali	Krishna	52.5	27	68.57	Krishna	Primary + Oxidation Pond
23	Solapur Corporation	D	Solapur	Seena	88	0	0	Nalla to Seena	-
24	Thane Corporation	C	Thane	Creek	350	120	34.29	Thane creek	SBR
25	Ulhasnagar Corporation	D	Thane	Creek	90	28	31.11	Waldhuni	Primary Clarifier
26	Vasai Virar Region Corporation	D	Thane	Creek	175.4	0	0	-	-
	Total			**Total**	**6382.9**	**3726.5**	**58.38**		

Status of Sewage Treatment in A class Municipal Council in Maharashtra					
Sr No.	**A Class Municipal Council**	**Effluent Generated**	**Effluent treated (MLD)**	**Treatment (%)**	**Disposal**
1	Achalpur	8.5	0	0	Local nalla to chandrabhaga
2	Bhusaval	11.4	0	0	Nalla to Tapi

Status of Sewage Treatment in A class Municipal Council in Maharashtra					
3	Wardha	18	0	0	Dham
4	Gondia	18.28	0	0	Weinganga
5	Ichalkaranji	32	14	37.35%	Panchganga
6	Ambernath	30	28	93.33%	Local nalla to Waldhuni
7	Barshi	15	0	0	Lendi nalla
	Total	**133.18**	**42**	**1.3068**	

	Status of Sewage Treatment in B – Class Council in Maharashtra				
Sr No.	B-Class Municipal Council	Effluent generated (MLD)	Effluent treated (MLD)	Treatment (%)	Disposal
1	Anjangaon	2.28	0	0.00%	Local nalla to Sahanura
2	Warud	2.4	0	0.00%	Local nalla to Wardha
3	Washim	4	0	0.00%	Local nalla to Katepurna
4	Karanja	4	0	0.00%	Local nalla to Wardha
5	Akot	0.8	0	0.00%	local nalla to Purna
6	Buldhana	0.62	0	0.00%	Local nalla to Penganga
7	Khamgoan	0.886	0	0.00%	local nalla to Purna
8	Shegoan	4	2	50.00%	Local nalla to Mann
9	Malkapur	0.5	0	0.00%	Local nalla to Nalganga
10	Chikhali	0.485	0	0.00%	Local nalla to Penganga
11	Sangamner	3.8	0	0.00%	Pavara
12	Kopargaan	7	0	0.00%	Darna and Nandur Madhmeshwar Dam
13	Shrirampur	2.5	0	0.00%	Bhandadara Dam

	Status of Sewage Treatment in B – Class Council in Maharashtra				
14	Pochara	32	0	0.00%	Girna
15	Amalner	3.15	0	0.00%	Bori
16	Chalisgoan	7.21	0	0.00%	Girna
17	Sawadha	0.57	0	0.00%	Tubewell
18	Chopada	3.2	0	0.00%	Tapi
19	Shirpur	32	0	0.00%	Karanvada Tapi and dam
20	Daudai	18	0	0.00%	Tapi and Amravati
21	Nandurbar	45	0	0.00%	Chivan and Jharali dam
22	Kamthi	8	0	0.00%	Kanhan
23	Hinganghat	1.53	0	0.00%	Wena r
24	Umred	4.5	0	0.00%	Aam
25	Bhandara	13.52	0	0.00%	Weinganga
26	Tumsar	6.35	0	0.00%	Weinganga
27	Chiplun	7	0	0.00%	Vashishthi
28	Vita	4.87	0	0.00%	Krishna
29	Islampur	9	0	0.00%	Krishna
30	Khudgoan Badlapur	18	0	0.00%	Ulhas
31	Gangakhed	2	0	0.00%	Godavari
32	Hingoli	4.2	0	0.00%	Kayadhu
33	Wasmat	2.5	0	0.00%	Ughadi
34	Degalura	15	0	0.00%	Sharaj nalla
35	Udgir	5.4	0	0.00%	Local nalla to lendhi
36	Osmanabad	5.3	0	0.00%	Local nalla to Bhogawati
37	Dhaud	4.2	0	0.00%	Bhima
38	Baramati	4.2	0	0.00%	Kanha
39	Pandharpur	12	15	100.00%	Irrigation
	Total	**301.971**	**17**	**1.5**	

Status of Sewage Treatment in C class Municipal Council Nagar in Maharashtra					
Sr No.	**C-Class Municipal Council**	**Effluent generated (MLD)**	**Effluent treated (MLD)**	**Treatment (%)**	**Disposal**
1	Chandur Railway	1.8	0	0.00%	Local Nalla to Wardha
2	Chilakhadara	0.4	0	0.00%	Local Nalla to Chandrabhaga
3	Daryapur	2	0	0.00%	Local Nalla to Chandrabhaga
4	Chandur Bazaar	1.2	0	0.00%	Local Nalla to Purna
5	Dhamangaon Railway	1.8	0	0.00%	Local Nalla to Wardha
6	Sedurajana Ghat	1.6	0	0.00%	Local Nalla to Wardha
7	Morshi	3.2	0	0.00%	Local Nalla to Wardha
8	Mangarularpir	2.4	0	0.00%	Local Nalla to Wardha
9	Risod	1.6	0	0.00%	Local Nalla to Penganga
10	Murtizapur	0.388	0	0.00%	Local Nalla to Purna
11	Patur	0.22	0	0.00%	Local Nalla to Bordi
12	Balapur	0.39	0	0.00%	Local Nalla to Mann
13	Telhara	0.18	0	0.00%	Local Nalla to Purna
14	Jalgoan Jamod	0.26	0	0.00%	Local Nalla to Purna
15	Mehekar	0.377	0	0.00%	Local Nalla to Penganga
16	Deulgoan raja	1.4	0	0.00%	Local Nalla to Amana
17	Sindkhed Raja	0.13	0	0.00%	Local Nalla to Khadakpurna
18	Nandura	1.5	0	0.00%	Local Nalla to Gyan ganga
19	Lonar	0.2	0	0.00%	Lendhi/Ambar Lake to Lonar dam
20	Alibaug	4.4	0	0.00%	Sea
21	Khopoli	5.6	0	0.00%	Patalganga
22	Pen	4.8	0	0.00%	Bhogeshwari
23	Murud -Janjhira	1.3	0	0.00%	Sea
24	Satana	1.47	0	0.00%	Local nalla to Girna

Status of Sewage Treatment in C class Municipal Council Nagar in Maharashtra					
25	Nandagoan	1.2	0	0.00%	Local nalla to Girna
26	Sinnar	4.3	0	0.00%	Local nalla to Darna
27	Bhagur	0.87	0	0.00%	Local nalla to Darna
28	Tribakeshwar	1	0.7	70.00%	Local nalla to Godavari
29	Yeola	2.8	0	0.00%	Local nalla to Palkhed dam
30	Manmad	6	0	0.00%	Local nalla to Waghad dam
31	Igatpuri	4.2	0	0.00%	Local nalla to Darna
32	Shrigonda	1.9	0	0.00%	Local nalla to Ghod canal
33	Pathardi	2	0	0.00%	Local nalla to Jayakwadi dam
34	Rahata	6	0	0.00%	Local nalla to Darna dam
35	Rahuri	2.7	0	0.00%	Mula dam
36	Devlali pravaha	3	0	0.00%	Mula dam
37	Erandol	9.1	0	0.00%	Local Nalla to Anjani and Girna
38	Parola	3.49	0	0.00%	Local Nalla to Bori
39	Raver	11	0	0.00%	Local Nalla toTapi
40	Faizpur	0.7	0	0.00%	Local Nalla to Suki
41	Yawal	0.28	0	0.00%	Local Nalla to Borewell
42	Dharangaon	8.4	0	0.00%	Local Nalla to Anjani /Tapi
43	Jamner	11	0	0.00%	Local Nalla to Kang
44	Bhadgaon	9.5	0	0.00%	Local Nalla to Girna
45	Navapur	10.02	0	0.00%	Local Nalla to Rangawali
46	Shahada	12	0	0.00%	Local Nalla to Gomati
47	Taloda	12	0	0.00%	Local Nalla to Vihiri
48	Arvi	0.41	0	0.00%	Bakadi
49	Pulgoan	0.36	0	0.00%	Wardha
50	Deoli	0.15	0	0.00%	Yashoda
51	Sindhi	0.15	0	0.00%	Wena
52	Wadi	1	0	0.00%	Nag
53	Tiroda	3.4	0	0.00%	Weinganga

Status of Sewage Treatment in C class Municipal Council Nagar in Maharashtra					
54	Paoni	3.41	0	0.00%	Weinganga
55	Kurundwad	0.8	0	0.00%	Panchganga
56	Kagal	2.4	0	0.00%	Irrigation
57	Gadhinglaj	2.4	0	0.00%	Irrigation
58	Murgud	0.64	0	0.00%	Irrigation
59	Malkapur	0.2	0	0.00%	Irrigation
60	Panhala	0.45	0	0.00%	Irrigation
61	Wadgoan	0.9	0	0.00%	Irrigation
62	Jaisinghpur	4.64	0	0.00%	Irrigation
63	Tasgoan	2.63	0	0.00%	Irrigation
64	Ashta	2.1	0	0.00%	Krishna
65	Jaat	1.5	0	0.00%	Irrigation
66	Purna	1.45	0	0.00%	Local Nalla to Thuna
67	Selu	2.1	0	0.00%	Local Nalla to Dudhana
68	Jintur	0.537	0	0.00%	Local Nalla to Ullti
69	Pathri	2.2	0	0.00%	Local Nalla to Godavari
70	Manvat	0.66	0	0.00%	Local Nalla to Laghu lake
71	Sonpeth	0.3	0	0.00%	Local Nalla to Weinganga
72	Kalamnuri	1.8	0	0.00%	Local Nalla to Weinganga
73	Ausa	3.6	0	0.00%	
74	Ahmedpur	1.8	0	0.00%	Local Nalla to Manyara
75	Nilanga	1.7	0	0.00%	
76	Kalamb	1.55	0	0.00%	Local Nalla to Manjara
77	Murum	1.25	0	0.00%	Local Nalla to Benitura
78	Naldurg	1.2	0	0.00%	Local Nalla to Bori
79	Tuljapur	1.9	0	0.00%	Local Nalla to Bori
80	Paranda	1	0	0.00%	Local Nalla to Sinna
81	Bhum	1.3	0	0.00%	Local Nalla to Banganga
82	Umerga	2.4	0	0.00%	Local Nalla to Benitura

Status of Sewage Treatment in C class Municipal Council Nagar in Maharashtra					
83	Paithan	2.4	1.7	0.00%	Local Nalla to Godavari
84	Kannad	2.4	1.7	0.00%	Local Nalla to Shivana
85	Sillod	3	2.2	0.00%	Local Nalla to Dudhana
86	Gangapur	1.5	1.1	0.00%	Local Nalla to Godavari
87	Vaijapur	2.6	1.85	0.00%	Local Nalla to Godavari
88	Khuldabad	0.9	0.65	0.00%	Local Nalla to Godavari
89	Indapur	2.4	0	0.00%	Bhima
90	Jejuri	2.4	0	0.00%	Kahna
91	Saswad	4	0	0.00%	Kahna
92	Bhor	0.9	0	0.00%	Neera
93	Wai	4.8	0	0.00%	
94	Karmala	1.4	0	0.00%	Irrigation
95	Akkalkot	0.4	0	0.00%	Irrigation
96	Mangalwedha	1.22	0	0.00%	Irrigation
97	Kurduwadi	1.45	0	0.00%	Local Nalla
98	Dudhani	0.56	0	0.00%	Irrigation
99	Maidargi	0.77	0	0.00%	Irrigation
100	Junnar	2.2	0	0.00%	Mina
	Total	**251.662**	**9.9**	**0.7**	

Status of Sewage Treatment in A class Nagar Panchayat in Maharashtra					
Sr No.	**A Class Municipal Council**	**Effluent Generated (MLD)**	**Effluent treated (MLD)**	**Treatment (%)**	**Disposal**
1	Warora	4.5	0	0	Local nalla to Wardha
2	Yavatmal	8.69	0	0	Local nalla to Jamwadi lake
3	Jalna	18.5	0	0	Local Nalla
4	Beed	11	0	0	Local Nalla
5	Satara	12.8	0	0	

Status of Sewage Treatment in A class Nagar Panchayat in Maharashtra					
	Total	55.49	0	0	

	Staus of Sewage Treatment in B class Nagar Panchayat in Maharashtra				
Sr No.	**B class Nagar Panchayat**	**Effluent generated (MLD)**	**Effluent treated (MLD)**	**Treatment (%)**	**Disposal**
1	Dahanu	4	0	0.00%	Nalla
2	Palghar	2.4	0	0.00%	Nalla
3	Ratnagiri	[illegible]	0	0.00%	Sea
4	Ballarpur	8.4	0	0.00%	Local nalla to Wardha
5	Bhadrawati	2.1	0	0.00%	Local nalla to Wardha
6	Pusad	4.02	0	0.00%	Local nalla to Pus
7	Wani	4.11	0	0.00%	Local nalla to Nirguda
8	Gircholi	2.8	0	0.00%	Local nalla to Weinganga
9	Ambajogai	5	0	0.00%	Local Nalla
10	Karad	10.5	7.5	40.00%	Irrigation
11	Phaltan	5	0	0.00%	Girna
12	Talegoan	8.5	0	0.00%	Indrayani
	Total	65.63	7.5	0.4	

Status of Sewage Treatment in C- Class Nagar Panchayat in Maharashtra					
Sr No.	C- Class Nagar Panchayat	Effluent generated (MLD)	Effluent treated (MLD)	Treatment (%)	Disposal
1	Matharen	1.1	0	0.00%	Matheran valley
2	Karjat	4.8	0	0.00%	Ulhas
3	Roha nagar	2.8	0	0.00%	Kundalika
4	Shrivardhan	1.09	0	0.00%	Sea

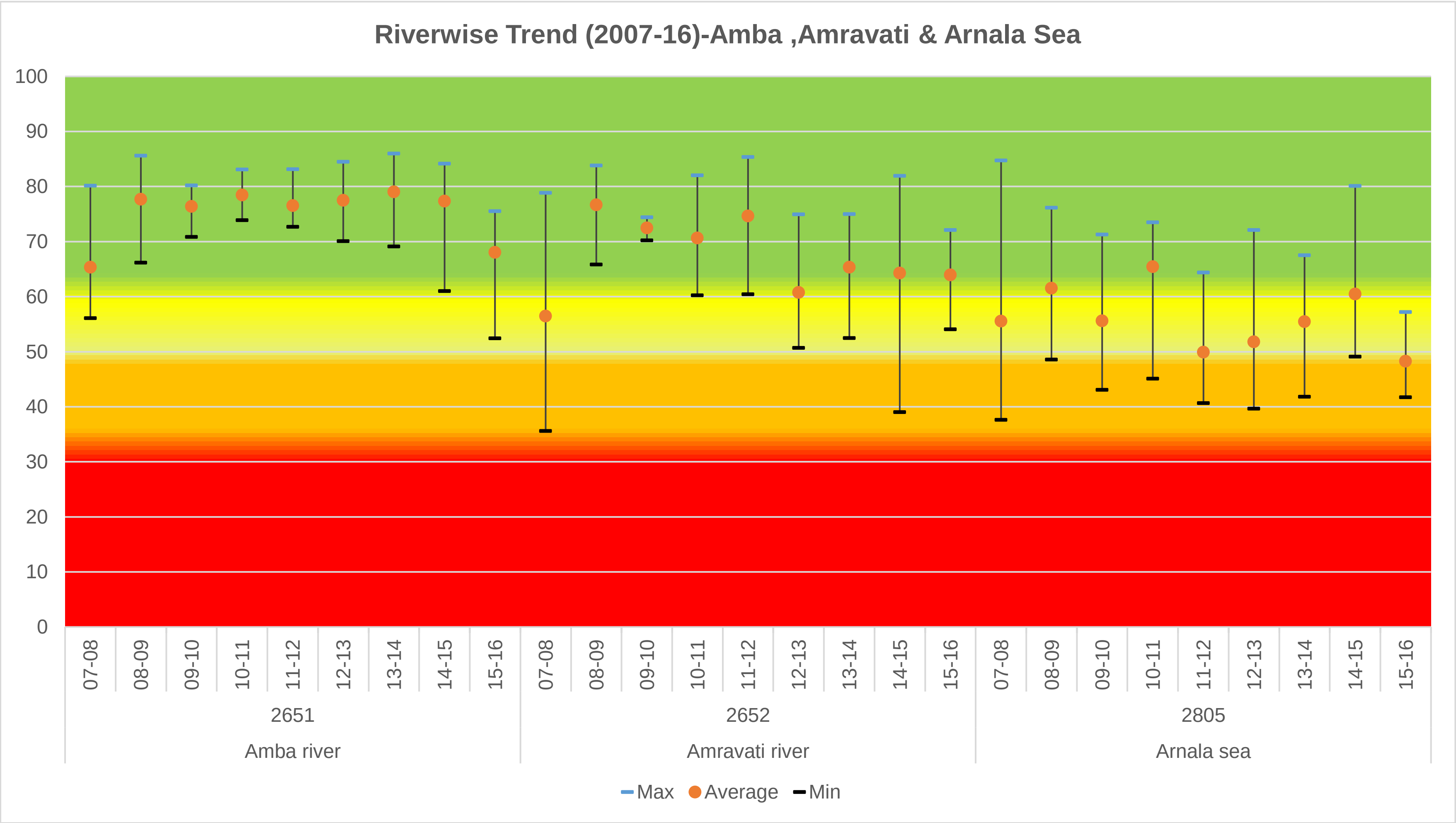
Status of Sewage Treatment in C- Class Nagar Panchayat in Maharashtra					
5	Panvel	18	0	0.00%	Panvel creek
6	Jawhar	1.5	0	0.00%	Creek
7	Katol	5.6	0	0.00%	Local Nalla
8	Khapa	0.61	0	0.00%	Local Nalla
9	Narkhed	1.4	0	0.00%	Kolar
10	Ramtek	0.835	0	0.00%	Local Nalla
11	Kalmeshwar	2.2	0	0.00%	Local Nalla
12	Saoner	4	0	0.00%	Kanhan
13	Mohapa	0.52	0	0.00%	Local Nalla
14	Mowad	0.56	0	0.00%	Kolar
15	Khed	2.5	0	0.00%	Jagbudi
16	Malvan	0.5	0	0.00%	Sea
17	Sawantwadi	2.5	0	0.00%	Palankande lake
18	Rajapur	2.0	0	0.00%	Arjuna
19	Rajura	2.1	0	0.00%	Local Nalla to Wardha
20	Mul	1.4	0	0.00%	Local Nalla to Mul
21	Bramhapuri	2.8	0	0.00%	Local Nalla to Weinganga
22	Dwarka	1.82	0	0.00%	Local Nalla to Kupati
23	Digras	2.02	0	0.00%	Local Nalla to Penganga
24	Pandharkavda	1.99	0	0.00%	Local Nalla to Khoni
25	Ghatanji	1.16	0	0.00%	Local Nalla to Waghali

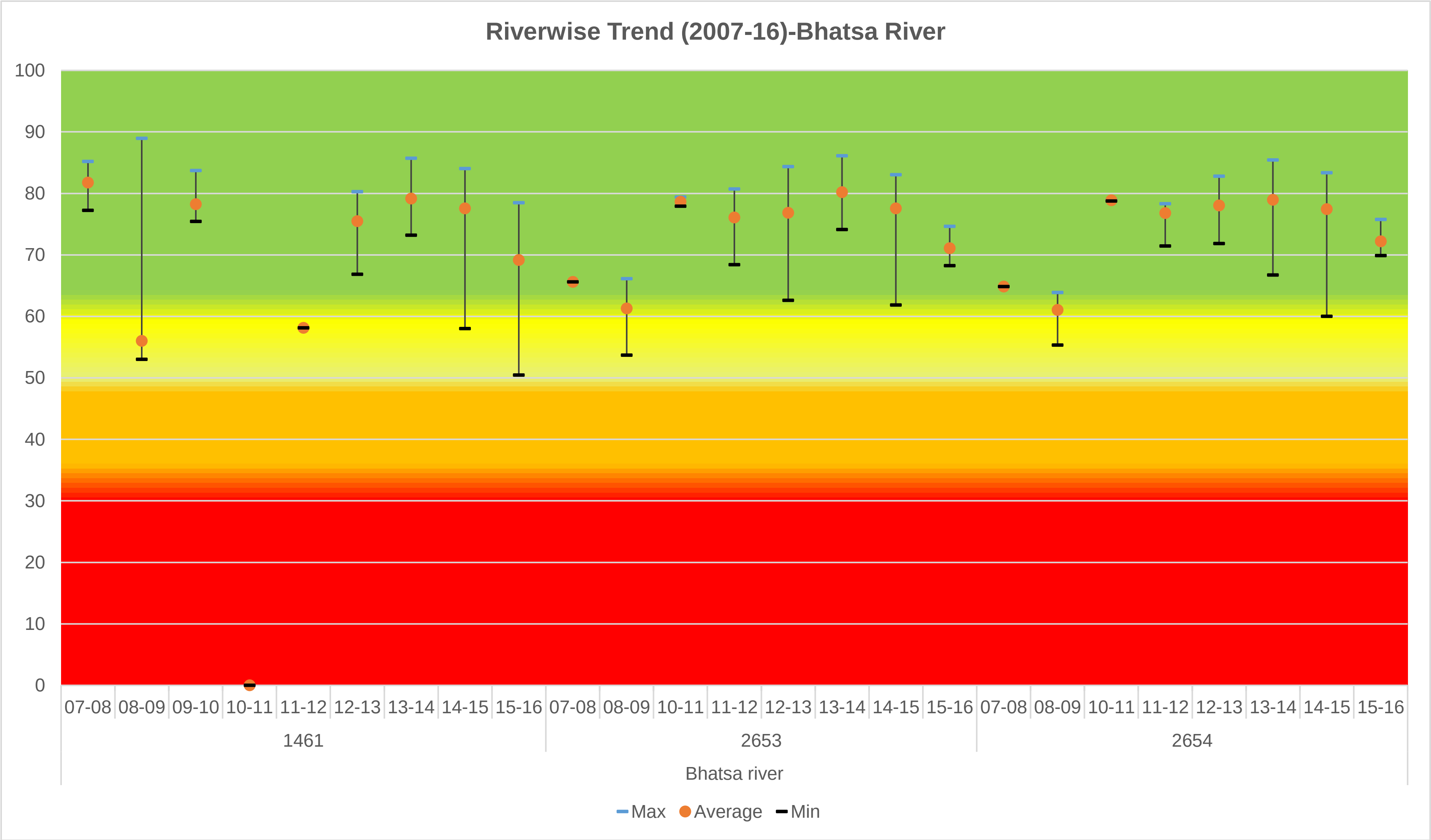
Status of Sewage Treatment in C- Class Nagar Panchayat in Maharashtra					
26	Ner Nawabpur	1.5	0	0.00%	Local Nalla to Weinganga
27	Loha	0.5	0	0.00%	Nalla
28	Kandhar	0.5	0	0.00%	Nalla
29	Mudkhed	1.6	0	0.00%	Nalla
30	Dharmabad	2.5	0	0.00%	Nalla
31	Bhokar	20	0	0.00%	Nalla
32	Hadgoan	0.35	0	0.00%	Nalla
33	Mukhed	12	0	0.00%	Nalla
34	Kinwat	0.3	0	0.00%	Nalla
35	Kundalwadi	0.5	0	0.00%	Nalla
36	Biloli	1	0	0.00%	Nalla
37	Ambad	2.5	0	0.00%	Local Nalla
38	Bhokardan	0.7	0	0.00%	Local Nalla
39	Partur	2.3	0	0.00%	Local Nalla
40	Dharur	1.4	0	0.00%	Local Nalla
41	Georai	2.2	0	0.00%	Local Nalla
42	Majalgoan	2.8	0	0.00%	Local Nalla
43	Mahabaleshwar	6	2.5	90.00%	Irrigation & Hotel gardening

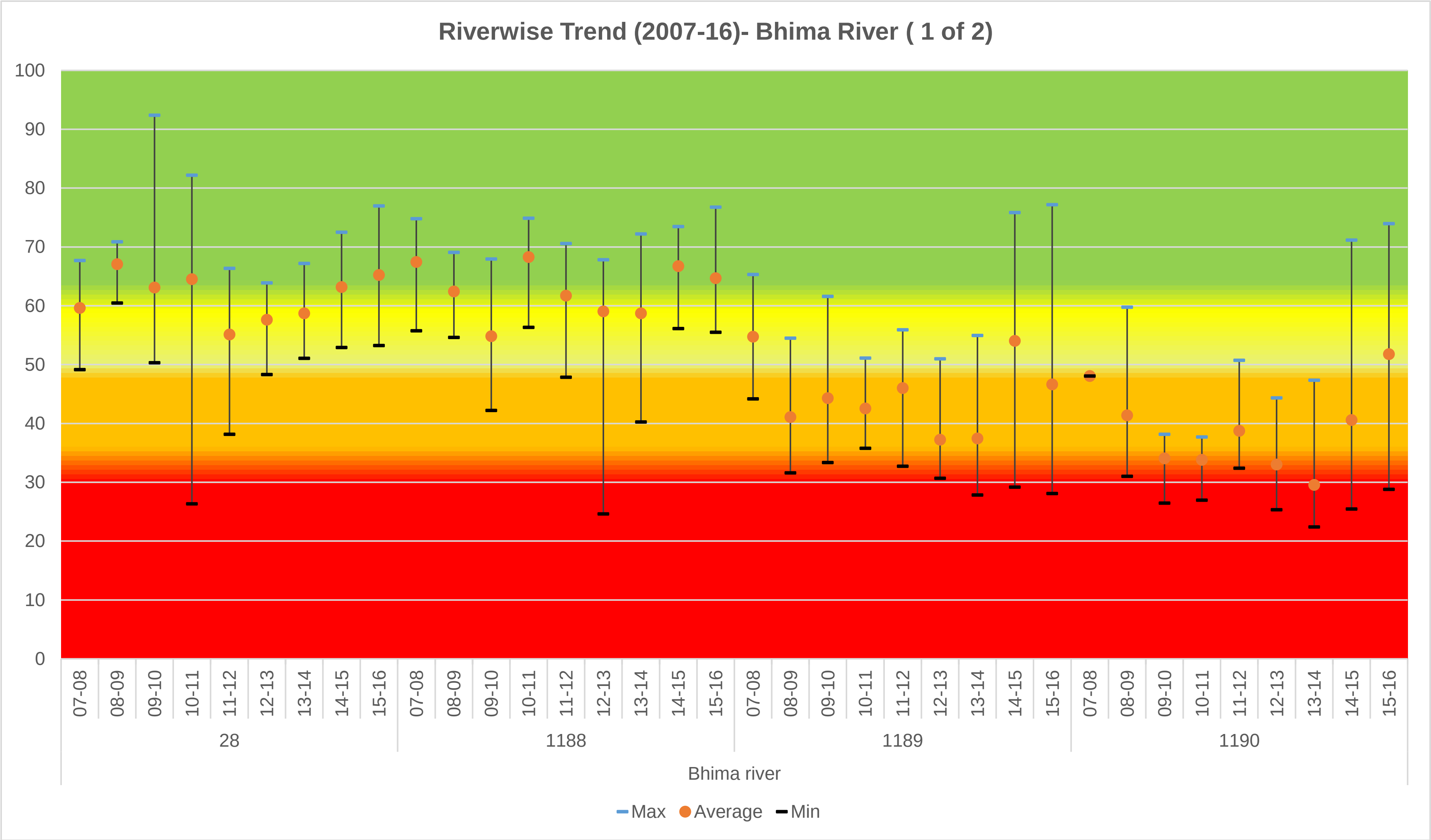
Status of Sewage Treatment in C- Class Nagar Panchayat in Maharashtra					
44	Panchgani	0.975	1.3	90.00%	Irrigation & Hotel gardening
45	Rahimatpur	0.8	0	0.00%	
46	Mhaswad	2.1	0	0.00%	
47	Sangola	1.79	0	0.00%	Local Nalla
48	Lonavala	18	3.69	20.50%	Indrayani
49	Alandi	2.5	0	0.00%	Indrayani
50	Shirur	3.5	3.5	100.00%	Ghodnadi
51	Uran	2.8	0	0.00%	Uran creek
52	Vengurla	2.5	0	0.00%	Sea
53	Umar khed	2.04	0	0.00%	Local Nalla to Penganga
54	Wadsa-Desaiganj	8.4	0	0.00%	Local Nalla to Weinganga
55	Umri	0.3	0	0.00%	Nalla
56	Mahad	3.3	0	0.00%	Savitri
	Total	**173.46**	**10.99**	**3.005**	

Annex V – Data Sets of Water Quality Monitored in 2015-16

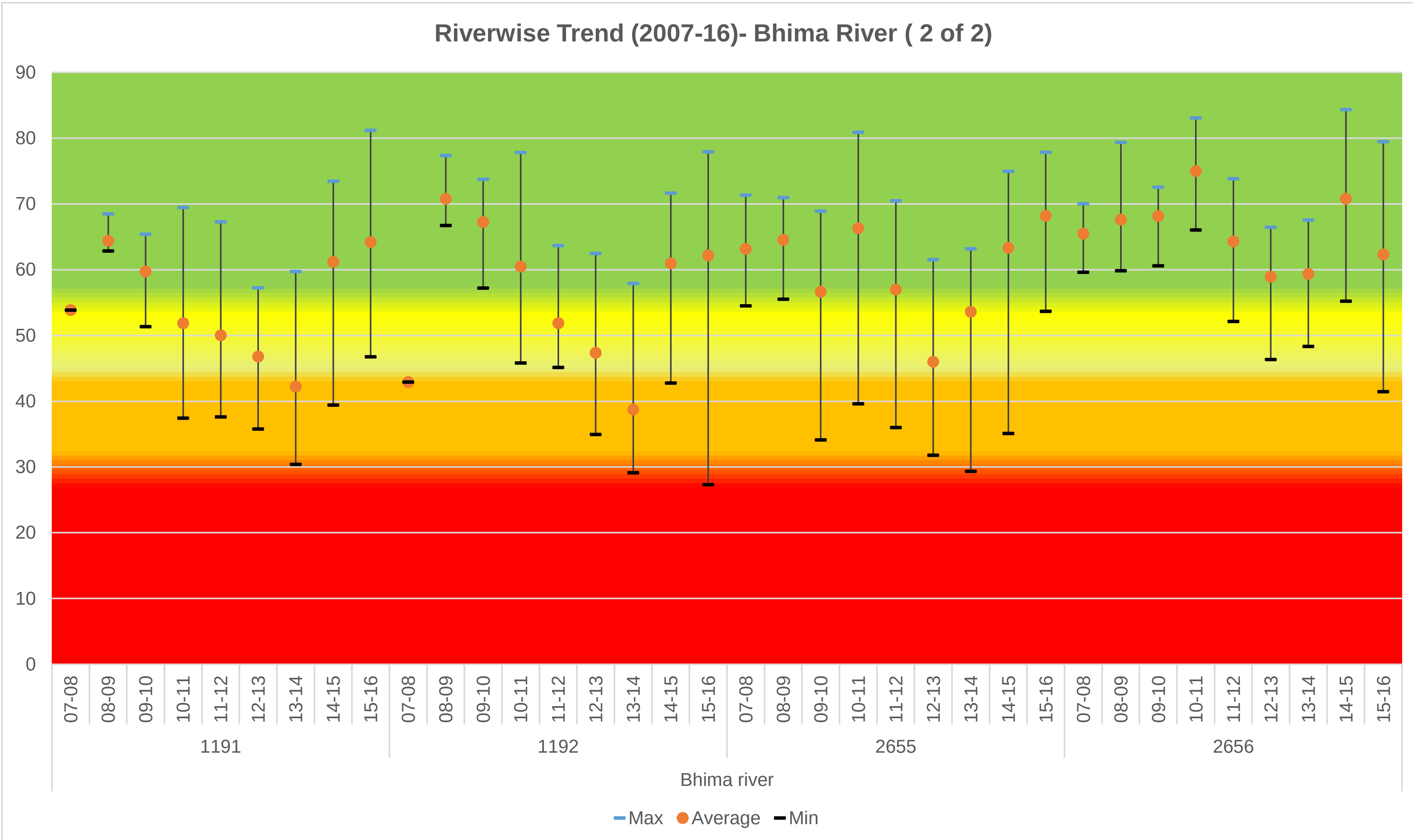
Riverwise Trend in WQI (2007-16)



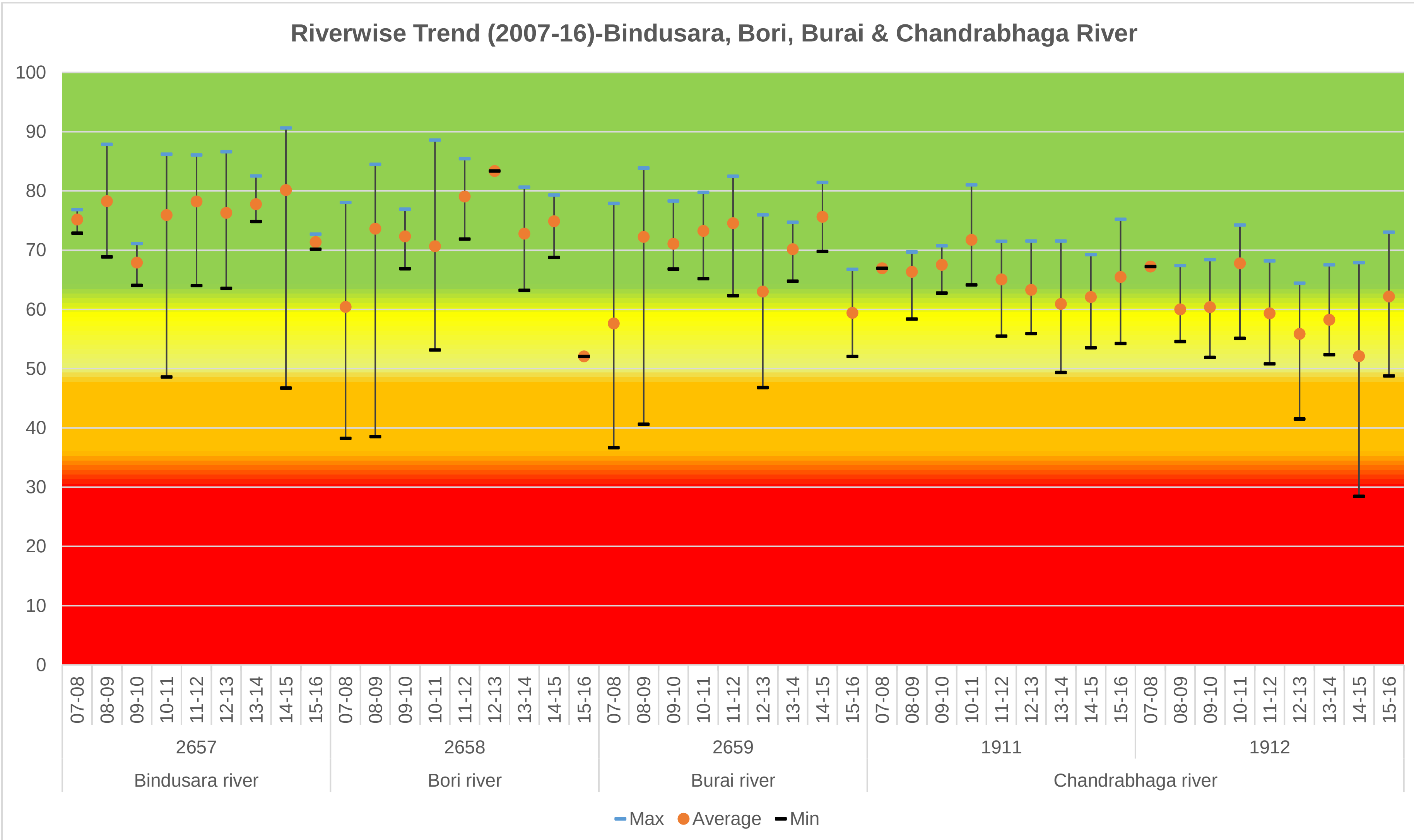

Riverwise Trend (2007-16)-Bhatsa River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
10-11
11-12
12-13
13-14
14-15
15-16
1461
2653
2654
Bhatsa river
Max
Average
Min

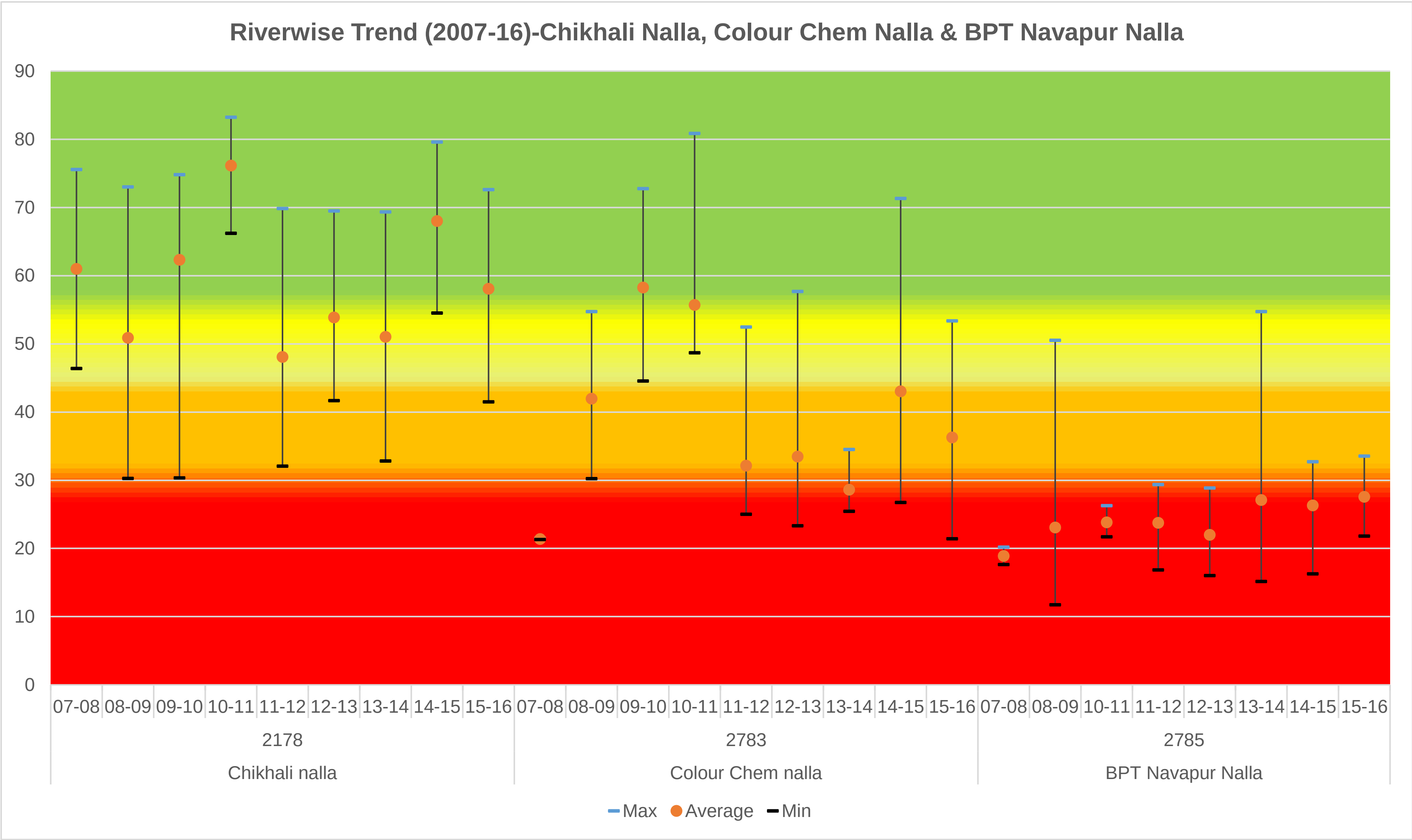


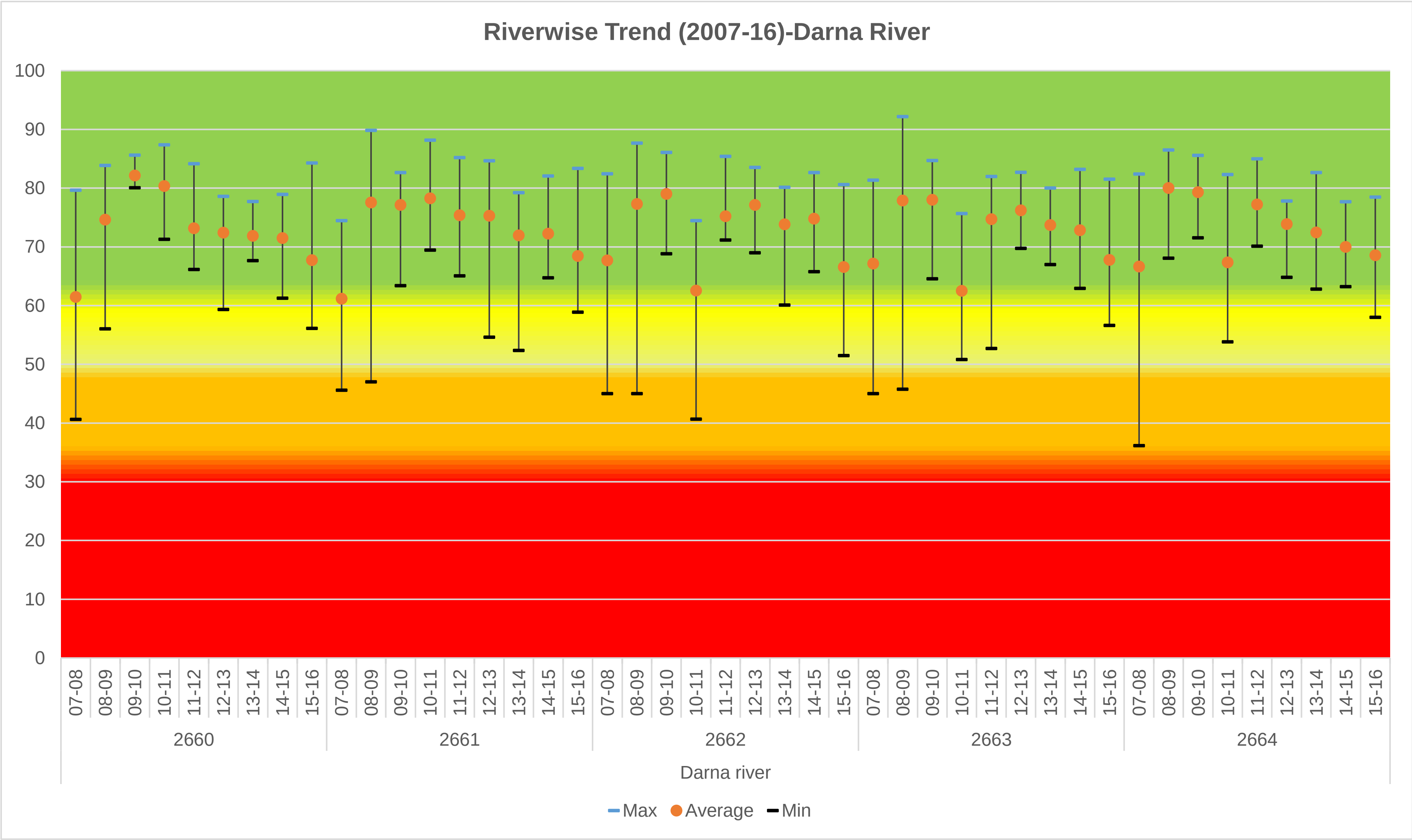
Riverwise Trend (2007-16)- Bhima River (1 of 2)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
28
1188
1189
1190
Bhima river
Max
Average
Min

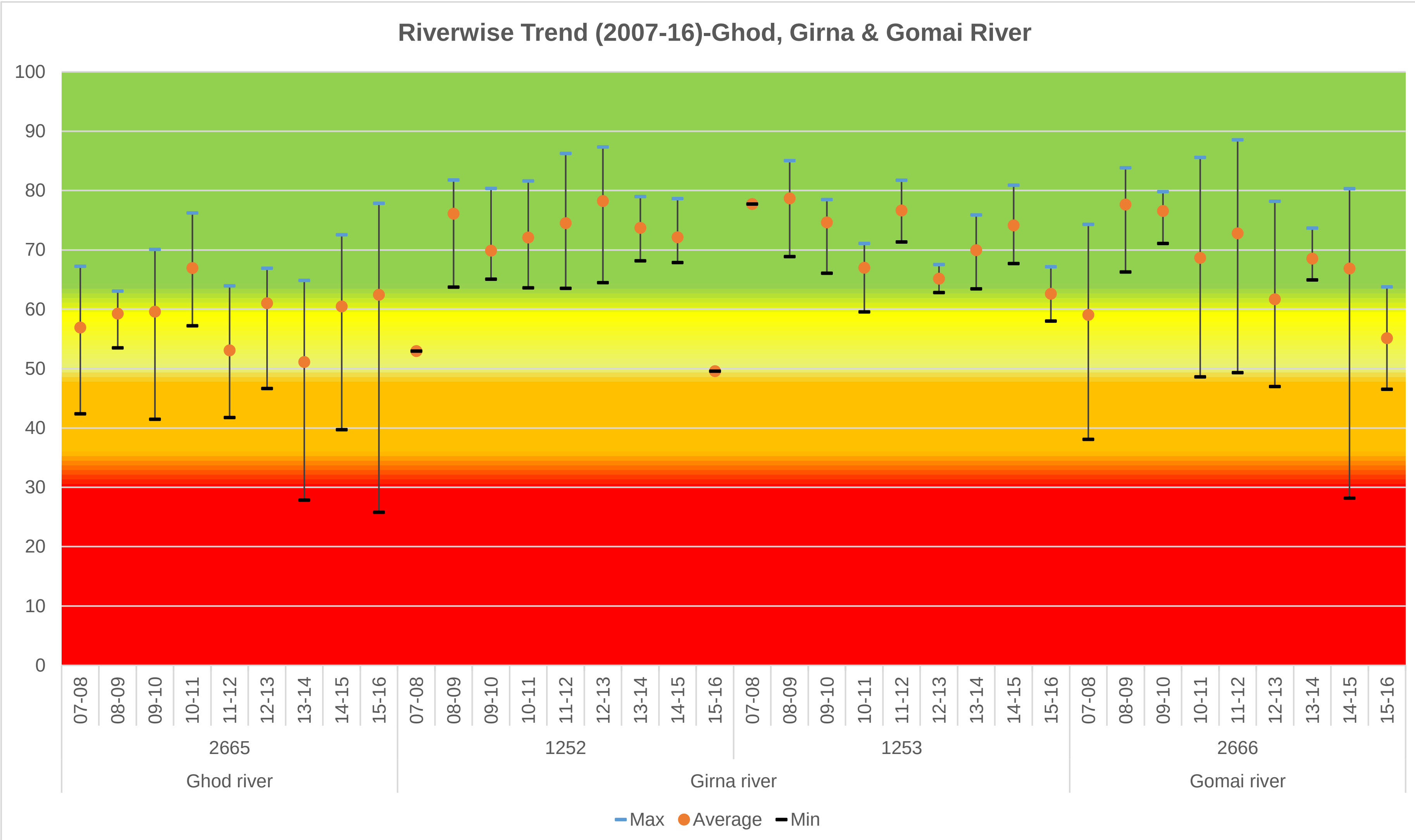


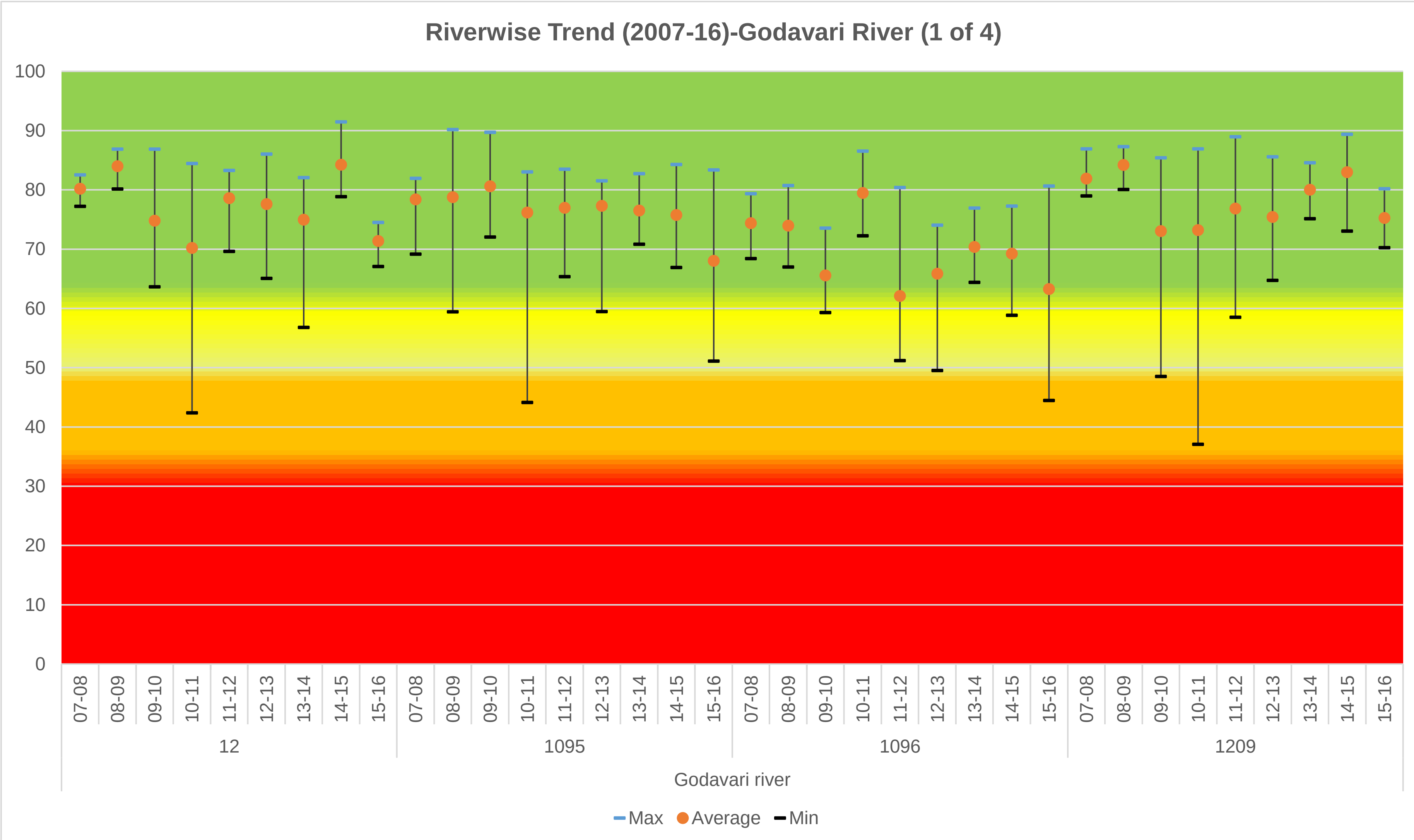
Riverwise Trend (2007-16)- Bhima River (2 of 2)
0
10
20
30
40
50
60
70
80
90
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1191
1192
2655
2656
Bhima river
Max
Average
Min

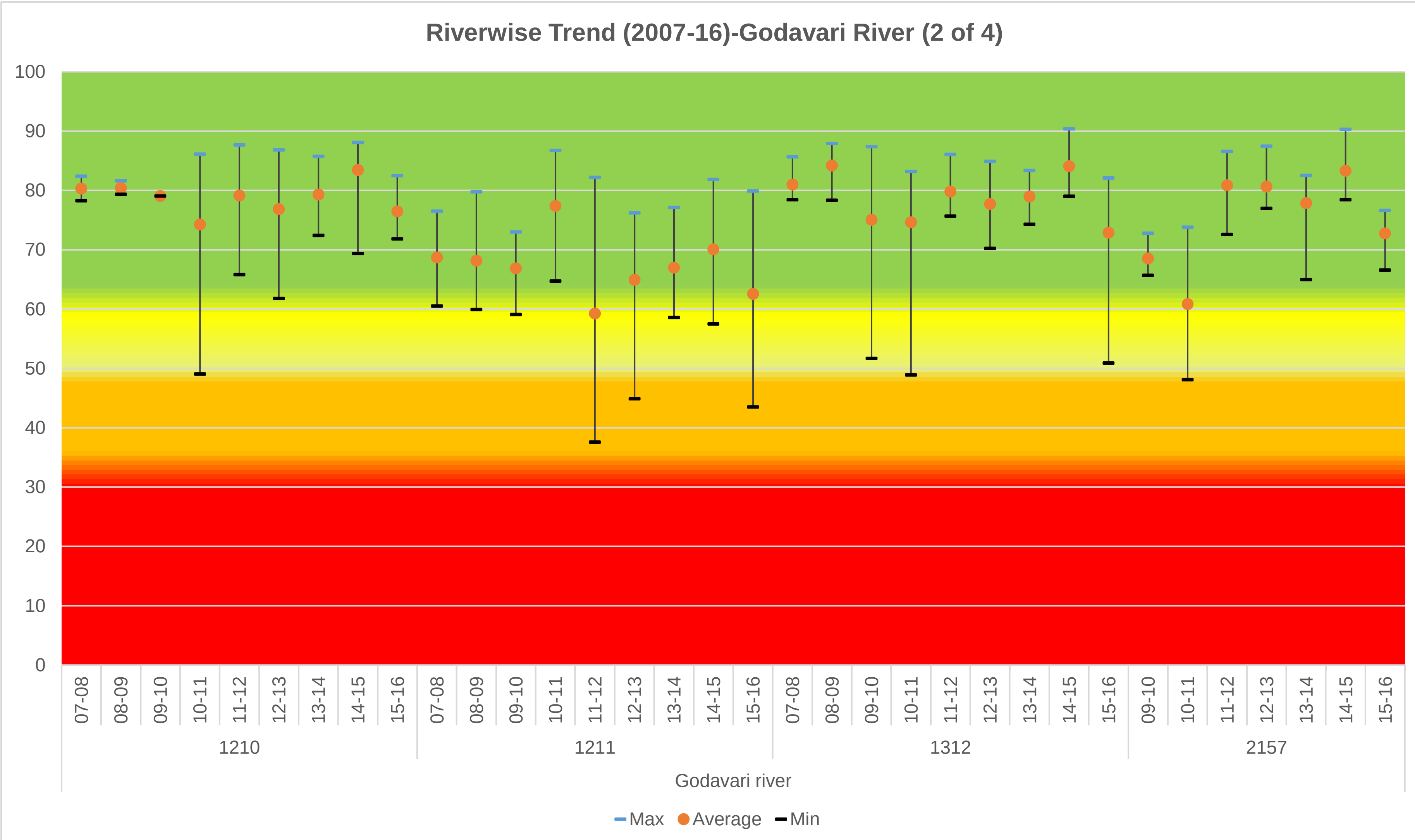

Riverwise Trend (2007-16)-Bindusara, Bori, Burai & Chandrabhaga River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2657
2658
2659
1911
1912
Bindusara river
Bori river
Burai river
Chandrabhaga river
Max
Average
Min

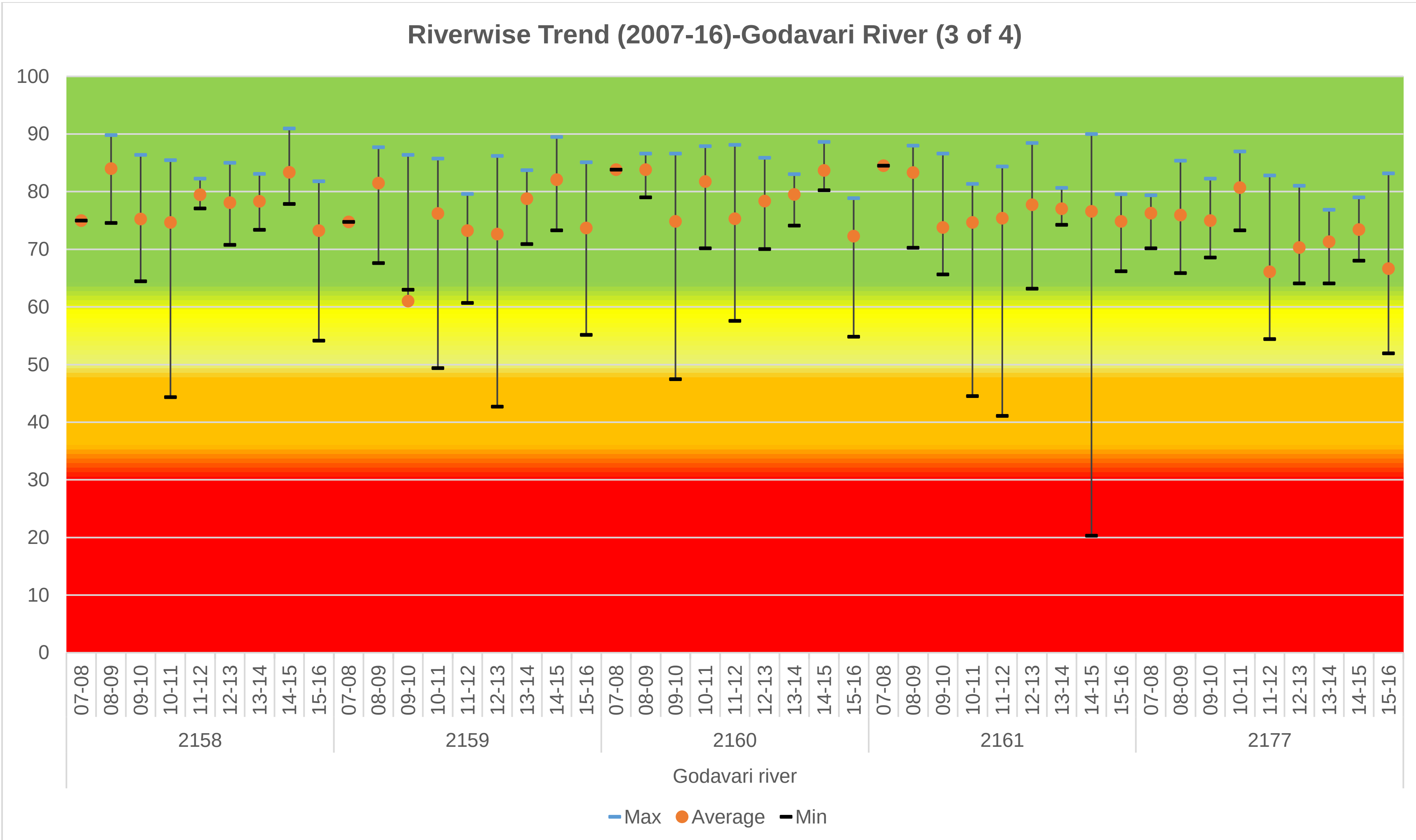

Riverwise Trend (2007-16)-Chikhali Nalla, Colour Chem Nalla & BPT Navapur Nalla
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16 07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16 07-08 08-09 10-11 11-12 12-13 13-14 14-15 15-16
2178
Chikhali nalla
2783
Colour Chem nalla
2785
BPT Navapur Nalla
Max
Average
Min

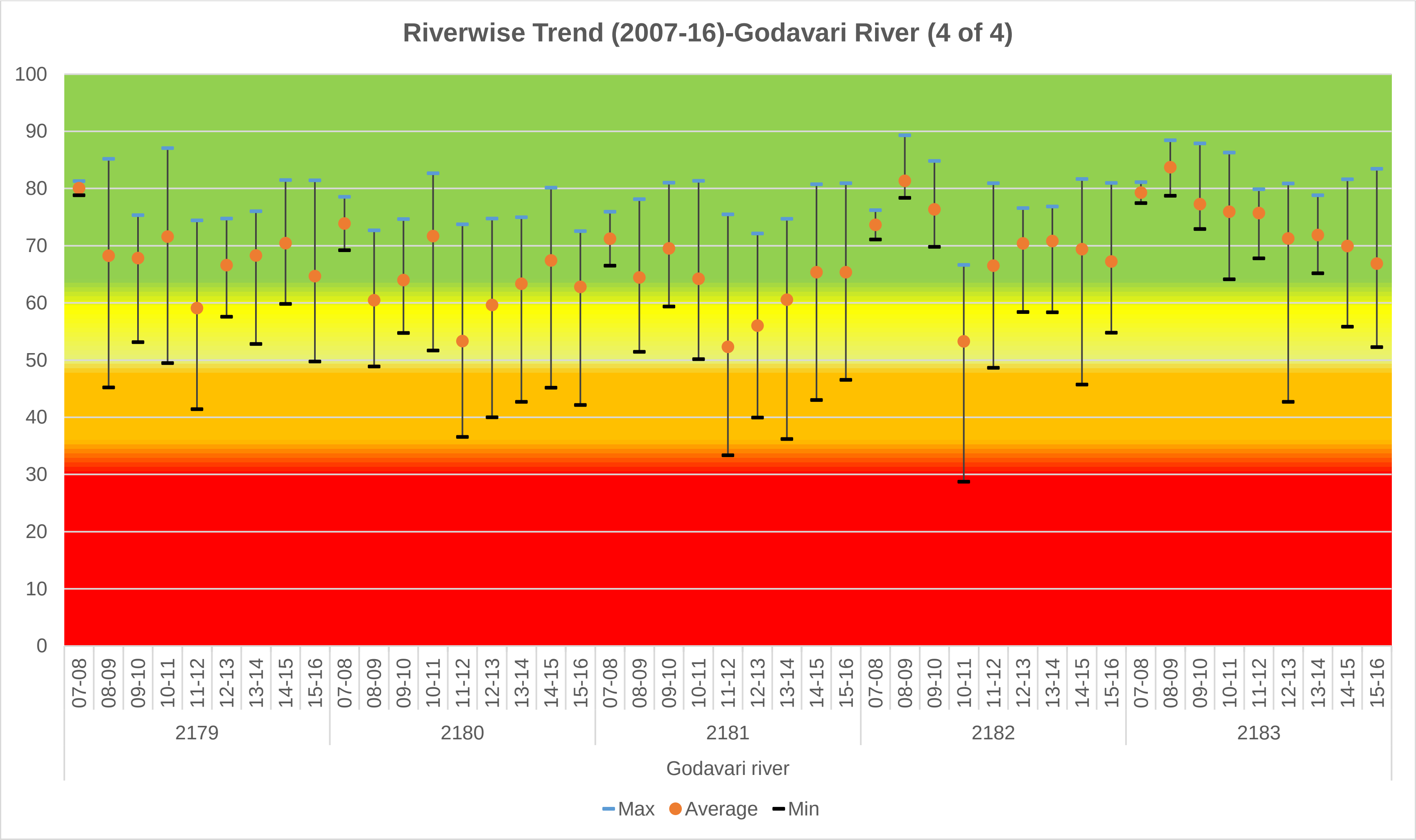

Riverwise Trend (2007-16)-Darna River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2660
2661
2662
2663
2664
Darna river
Max
Average
Min

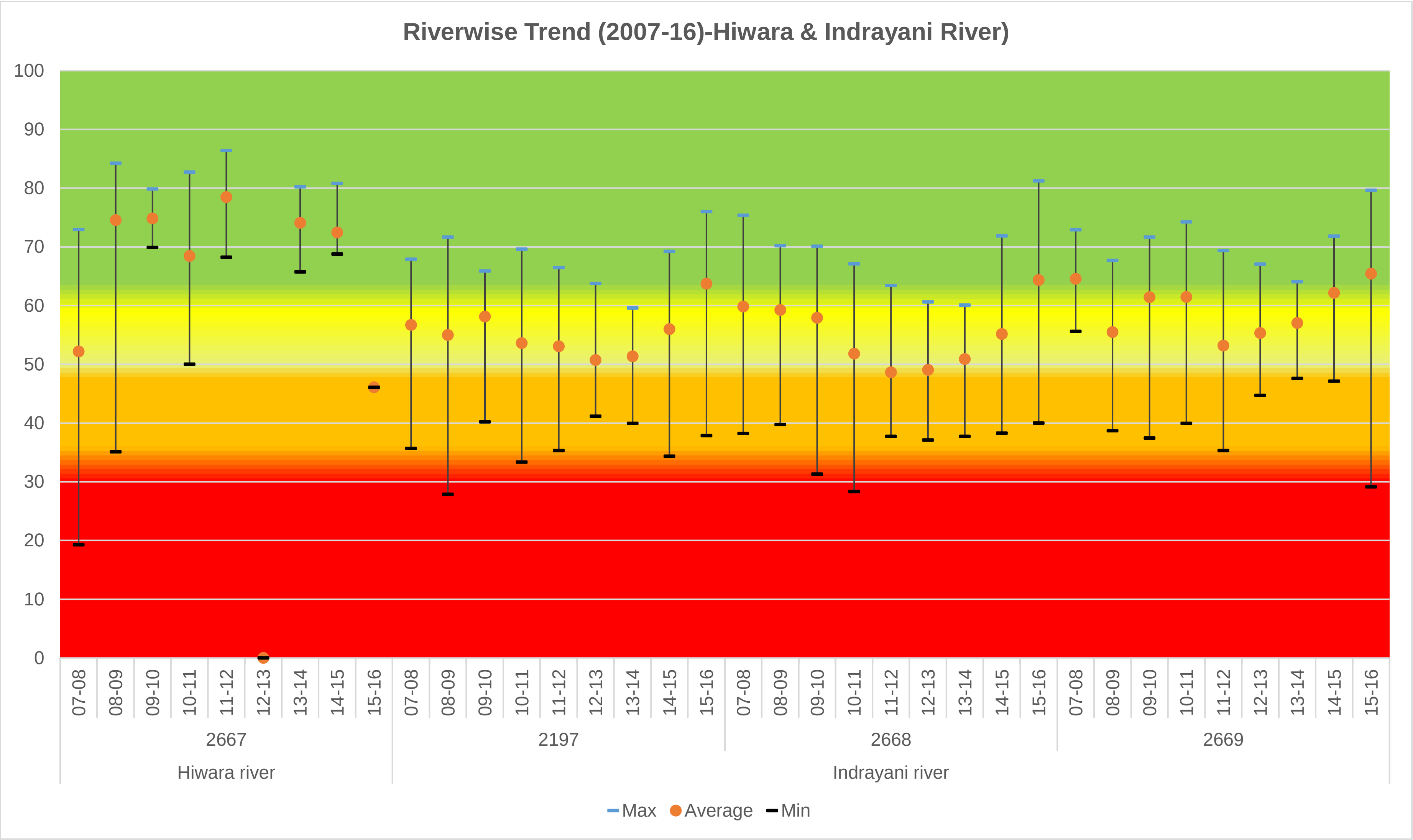

Riverwise Trend (2007-16)-Ghod, Girna & Gomai River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2665
1252
1253
2666
Ghod river
Girna river
Gomai river
Max
Average
Min

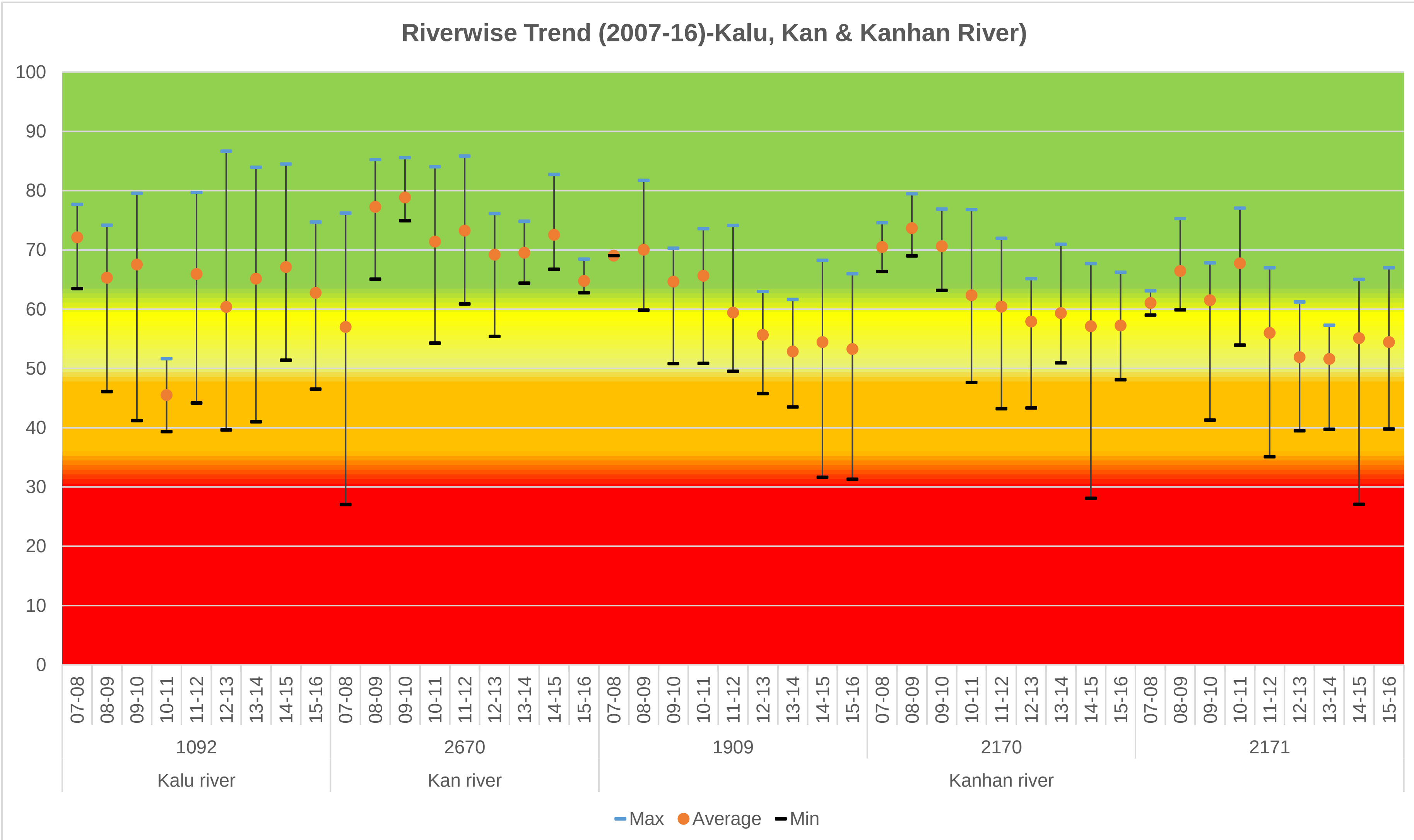

Riverwise Trend (2007-16)-Godavari River (1 of 4)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
12
1095
1096
1209
Godavari river
Max
Average
Min


Riverwise Trend (2007-16)-Godavari River (2 of 4)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1210
1211
1312
2157
Godavari river
Max
Average
Min

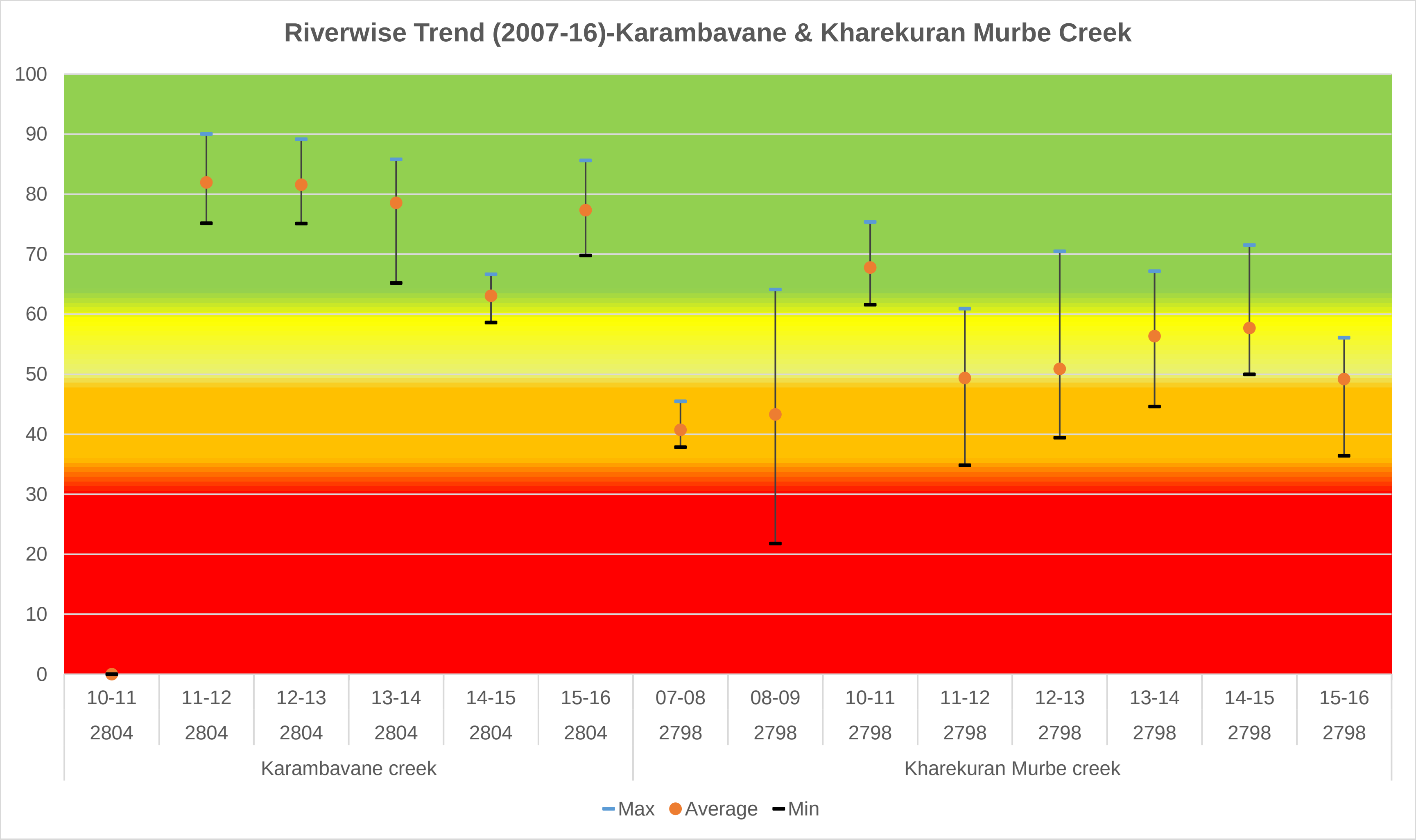

Riverwise Trend (2007-16)-Godavari River (3 of 4)
100
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2158
2159
2160
2161
2177
Godavari river
Max
Average
Min

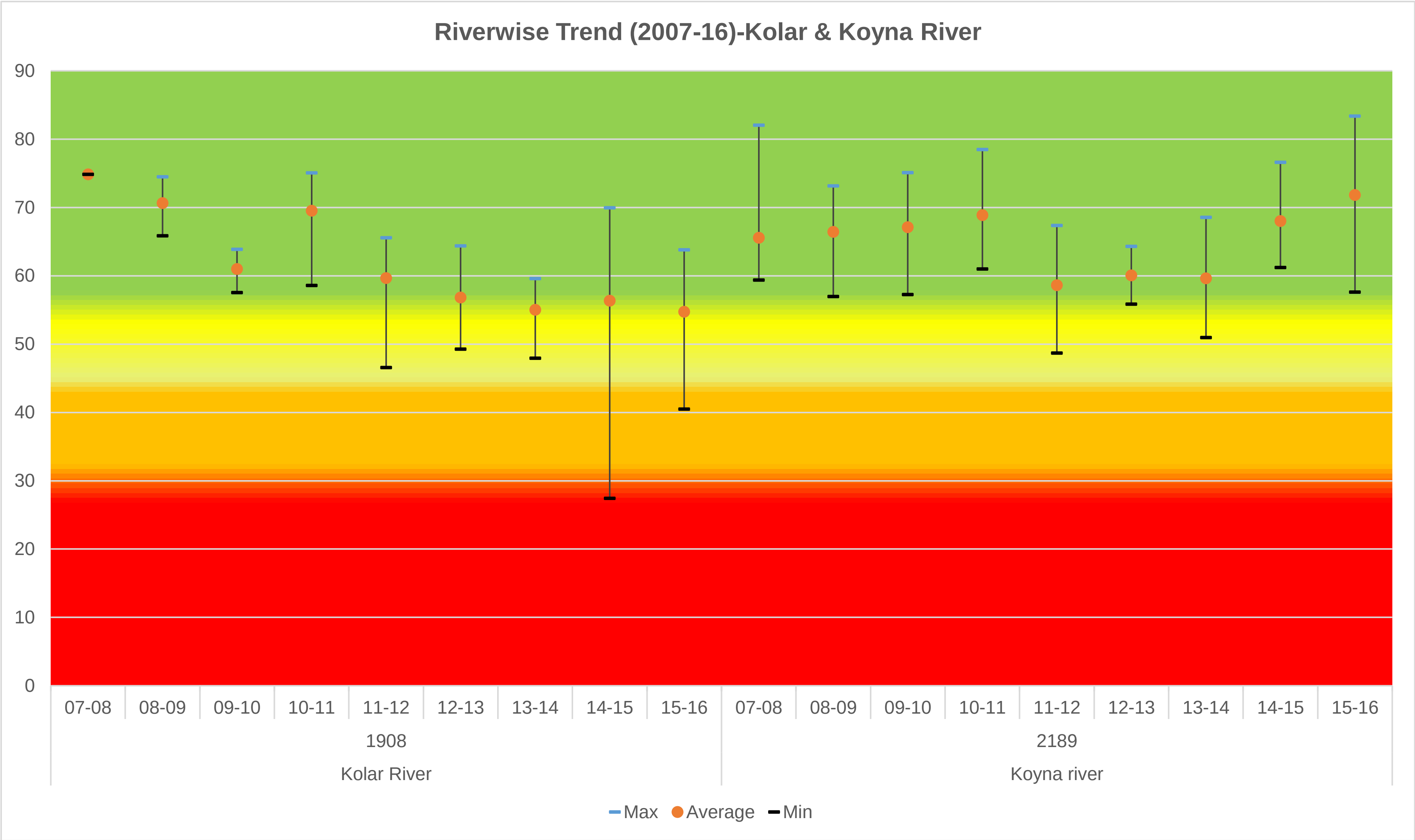

Riverwise Trend (2007-16)-Godavari River (4 of 4)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2179
2180
2181
2182
2183
Godavari river
Max
Average
Min

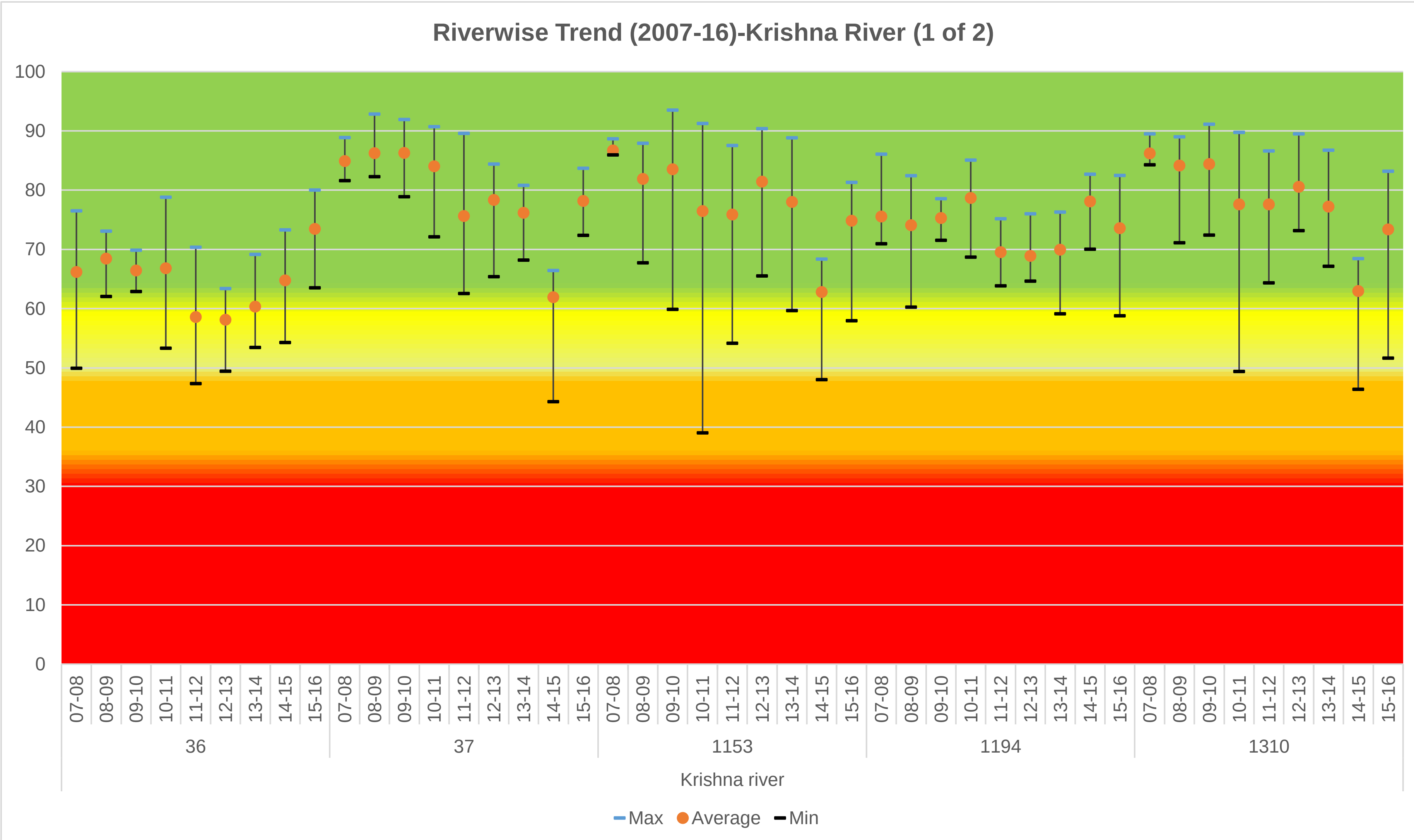

Riverwise Trend (2007-16)-Hiwara & Indrayani River)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2667
2197
2668
2669
Hiwara river
Indrayani river
Max
Average
Min

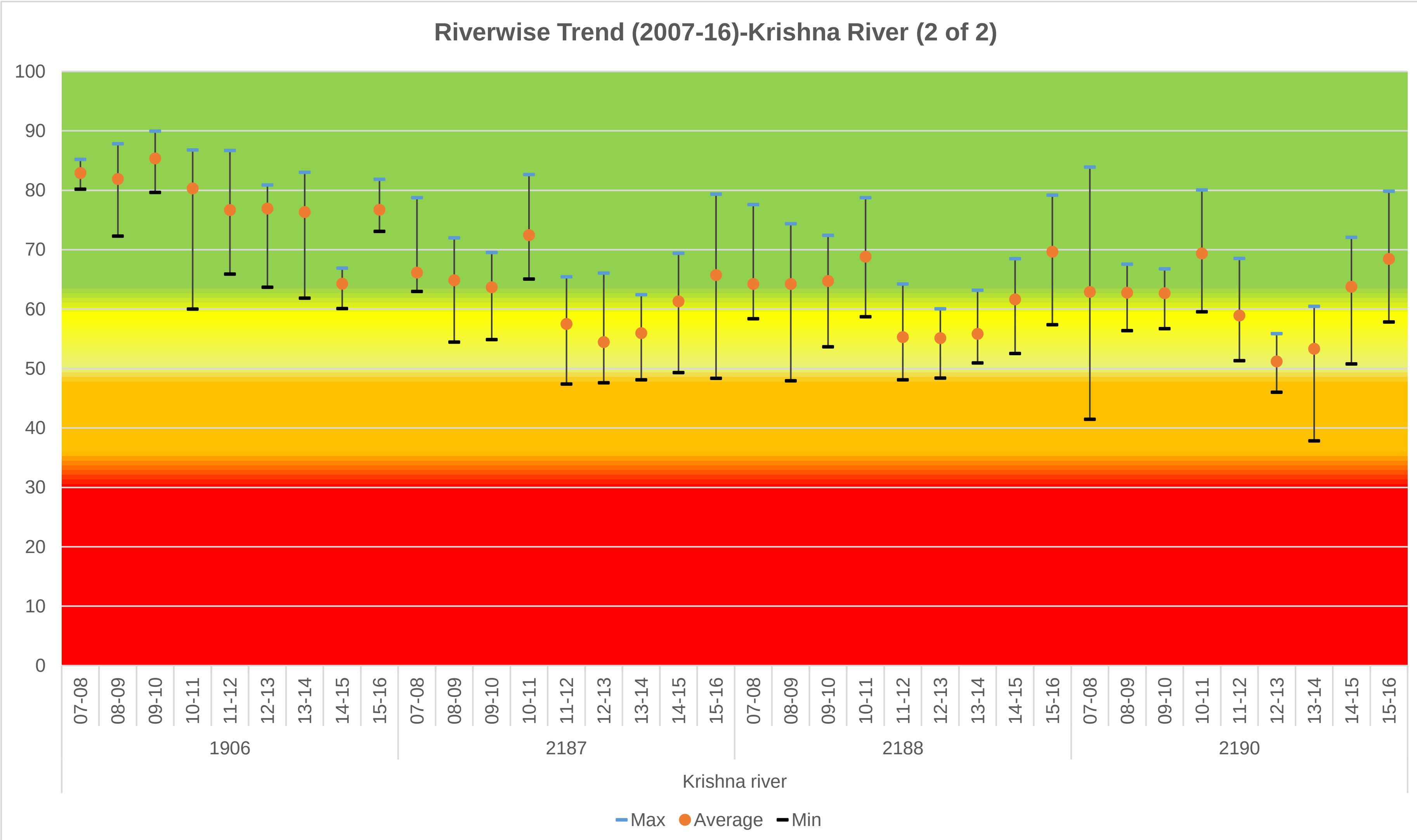


Riverwise Trend (2007-16)-Kalu, Kan & Kanhan River)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1092
Kalu river
2670
Kan river
1909
2170
2171
Kanhan river
Max
Average
Min

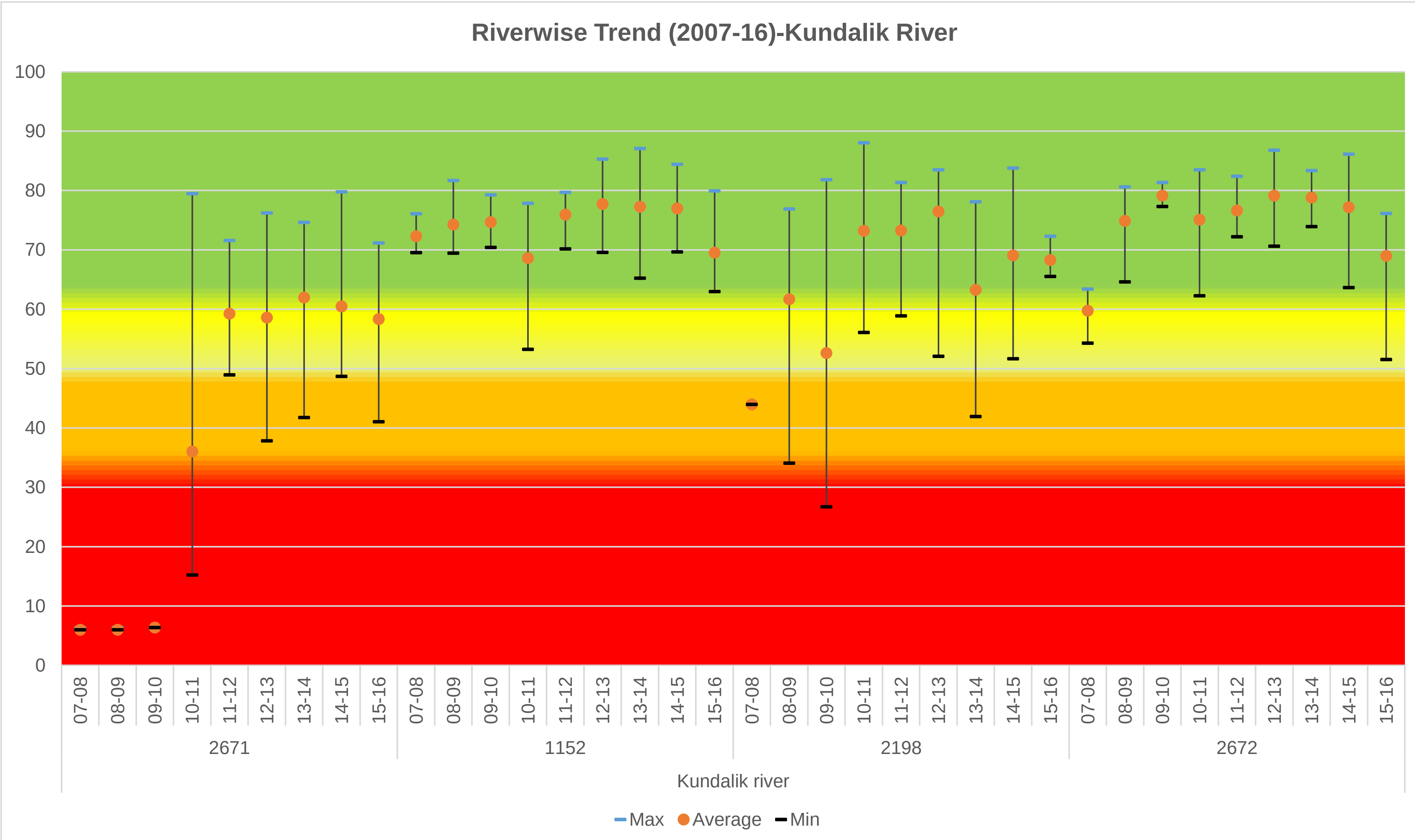

Riverwise Trend (2007-16)-Karambavane & Kharekuran Murbe Creek
100
90
80
70
60
50
40
30
20
10
0
10-11
2804
11-12
2804
12-13
2804
13-14
2804
14-15
2804
15-16
2804
07-08
2798
08-09
2798
10-11
2798
11-12
2798
12-13
2798
13-14
2798
14-15
2798
15-16
2798
Karambavane creek
Kharekuran Murbe creek
Max
Average
Min


Riverwise Trend (2007-16)-Kolar & Koyna River
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1908
2189
Kolar River
Koyna river
Max
Average
Min

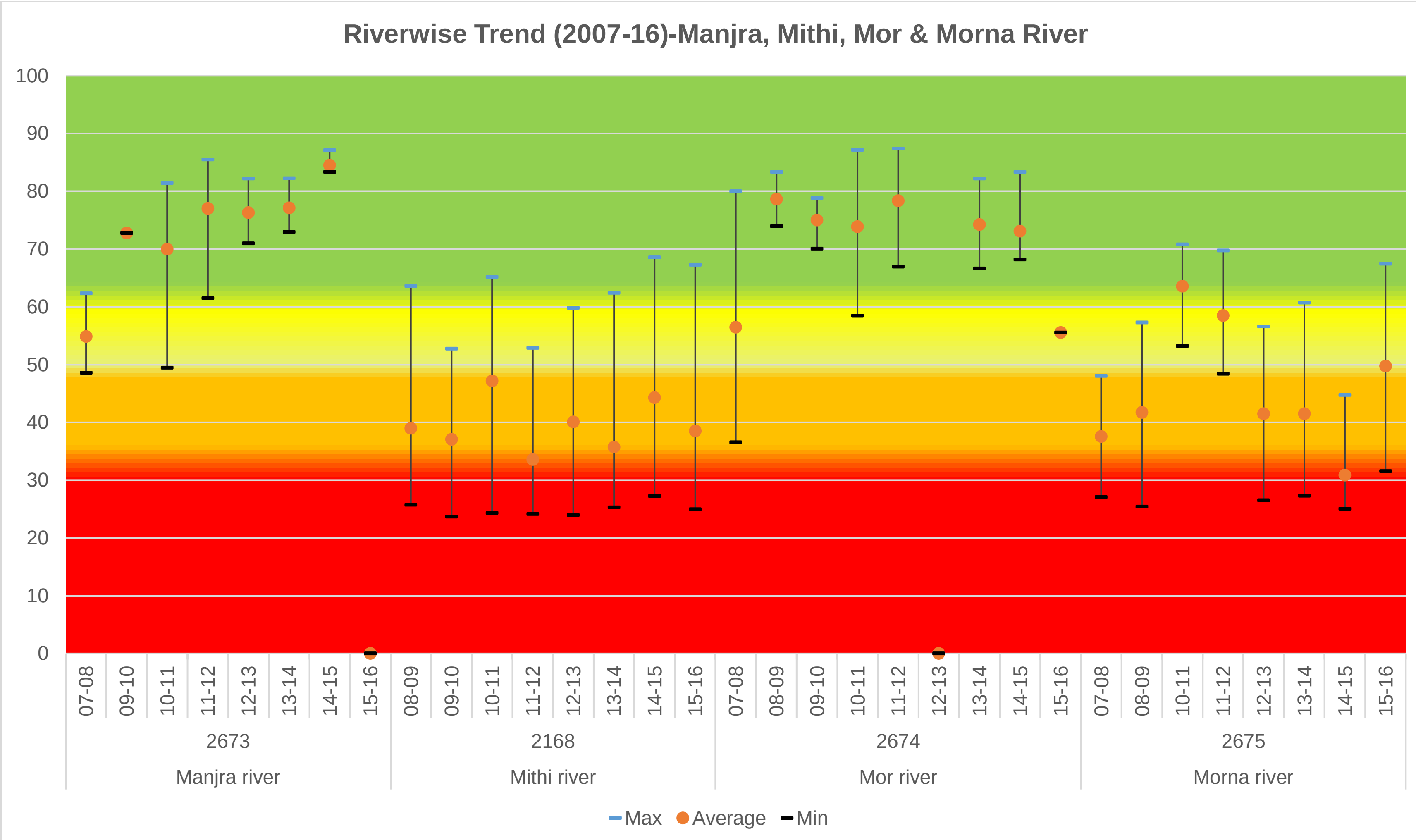

Riverwise Trend (2007-16)-Krishna River (1 of 2)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
36
37
1153
1194
1310
Krishna river
Max
Average
Min

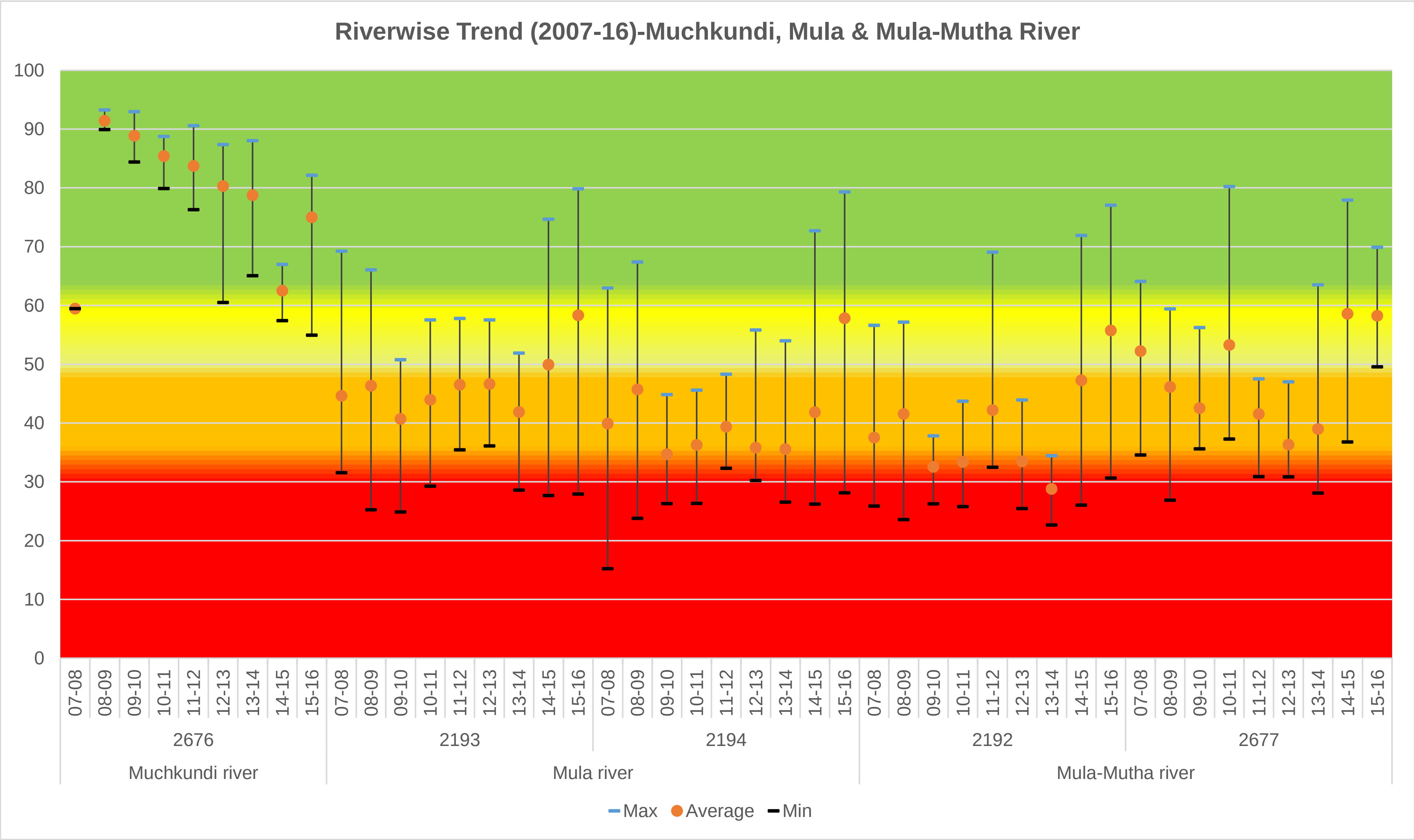


Riverwise Trend (2007-16)-Krishna River (2 of 2)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1906
2187
2188
2190
Krishna river
Max
Average
Min

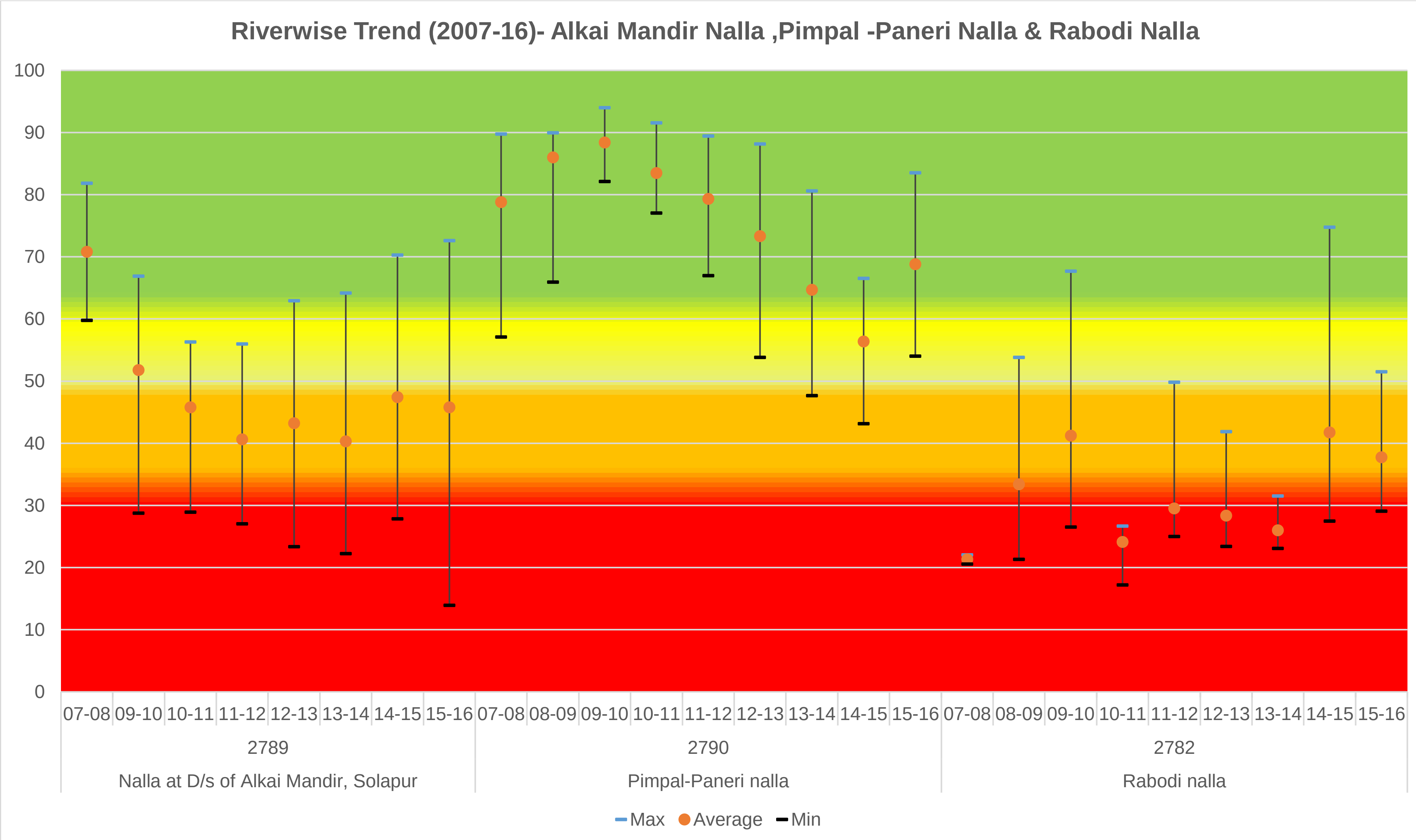


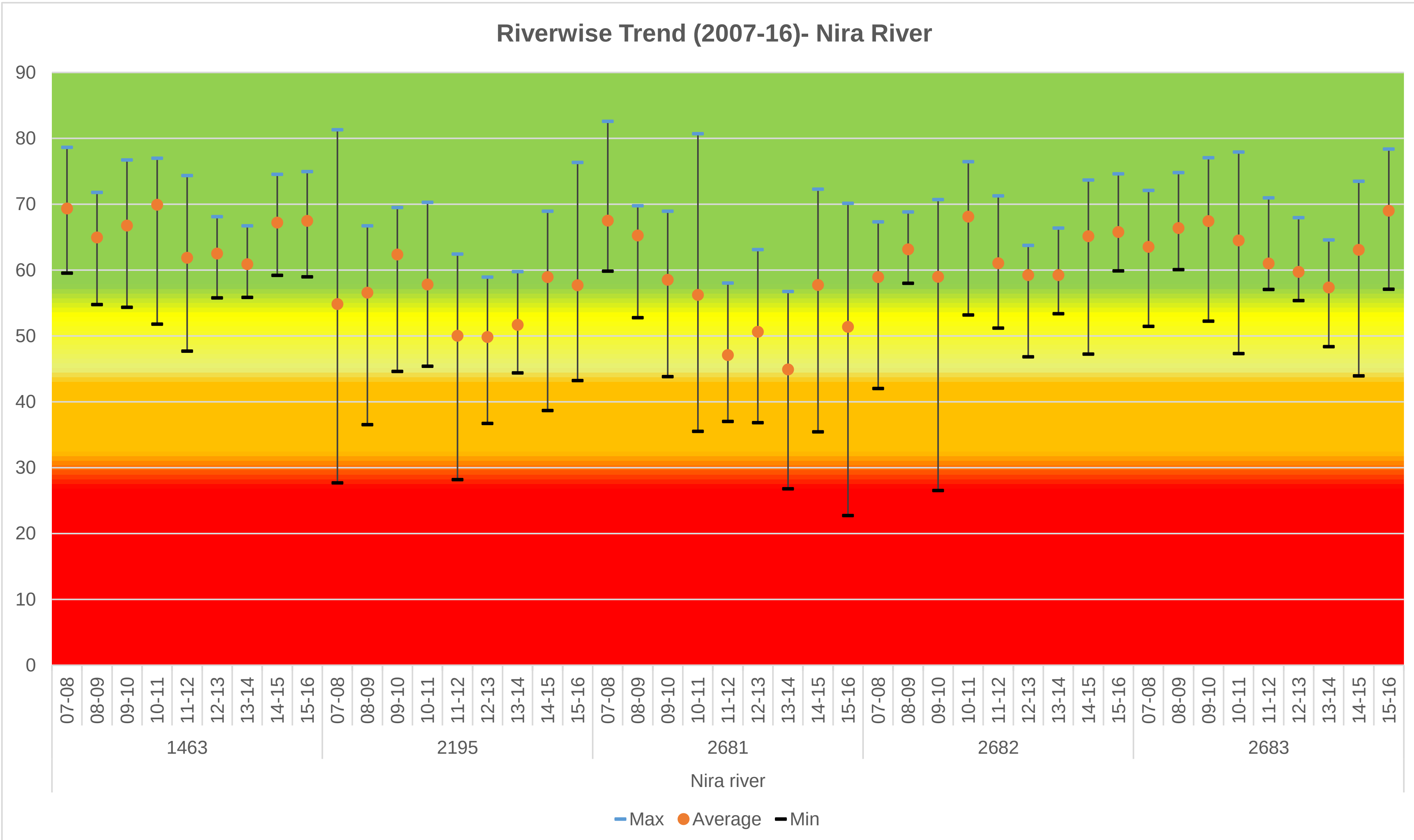
Riverwise Trend (2007-16)-Kundalik River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2671
1152
2198
2672
Kundalik river
Max
Average
Min


Riverwise Trend (2007-16)-Manjra, Mithi, Mor & Morna River
100
90
80
70
60
50
40
30
20
10
0
07-08
09-10
10-11
11-12
12-13
13-14
14-15
15-16
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
10-11
11-12
12-13
13-14
14-15
15-16
2673
Manjra river
2168
Mithi river
2674
Mor river
2675
Morna river
Max
Average
Min

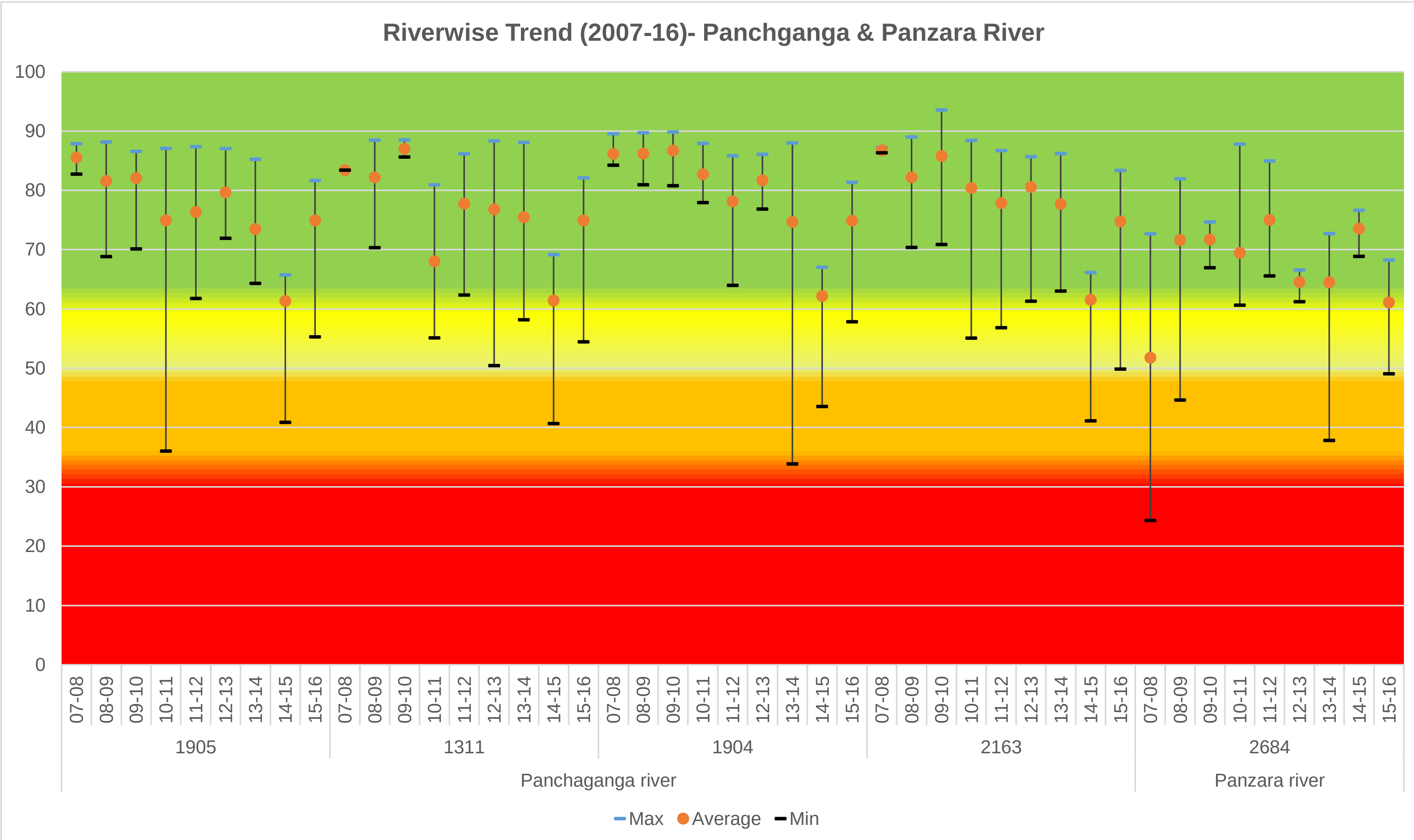


Riverwise Trend (2007-16)-Muchkundi, Mula & Mula-Mutha River
100
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2676
2193
2194
2192
2677
Muchkundi river
Mula river
Mula-Mutha river
Max
Average
Min

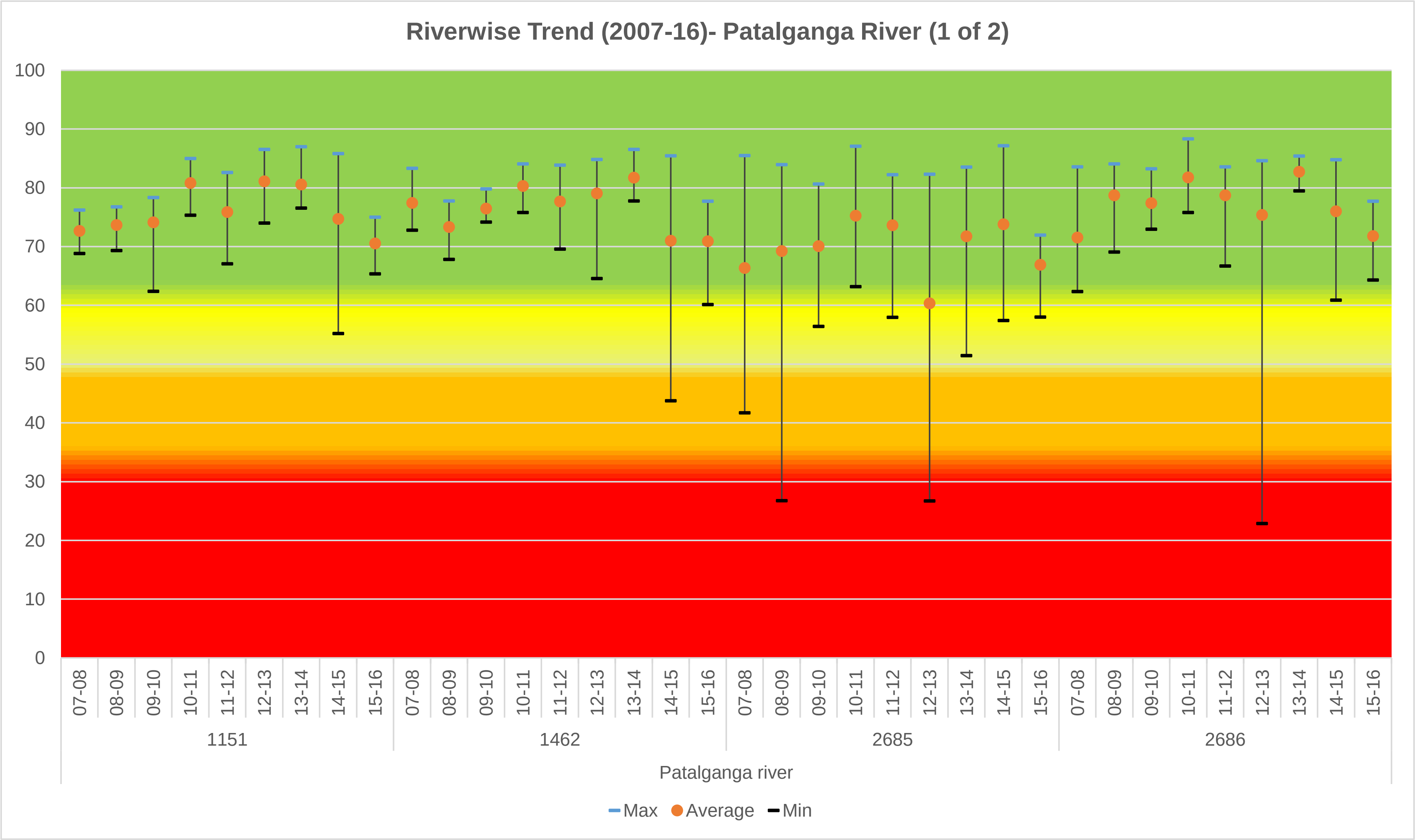

Riverwise Trend (2007-16)- Alkai Mandir Nalla ,Pimpal -Paneri Nalla & Rabodi Nalla
100
90
80
70
60
50
40
30
20
10
0
07-08 09-10 10-11 11-12 12-13 13-14 14-15 15-16 07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16 07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2789
Nalla at D/s of Alkai Mandir, Solapur
2790
Pimpal-Paneri nalla
2782
Rabodi nalla
Max
Average
Min

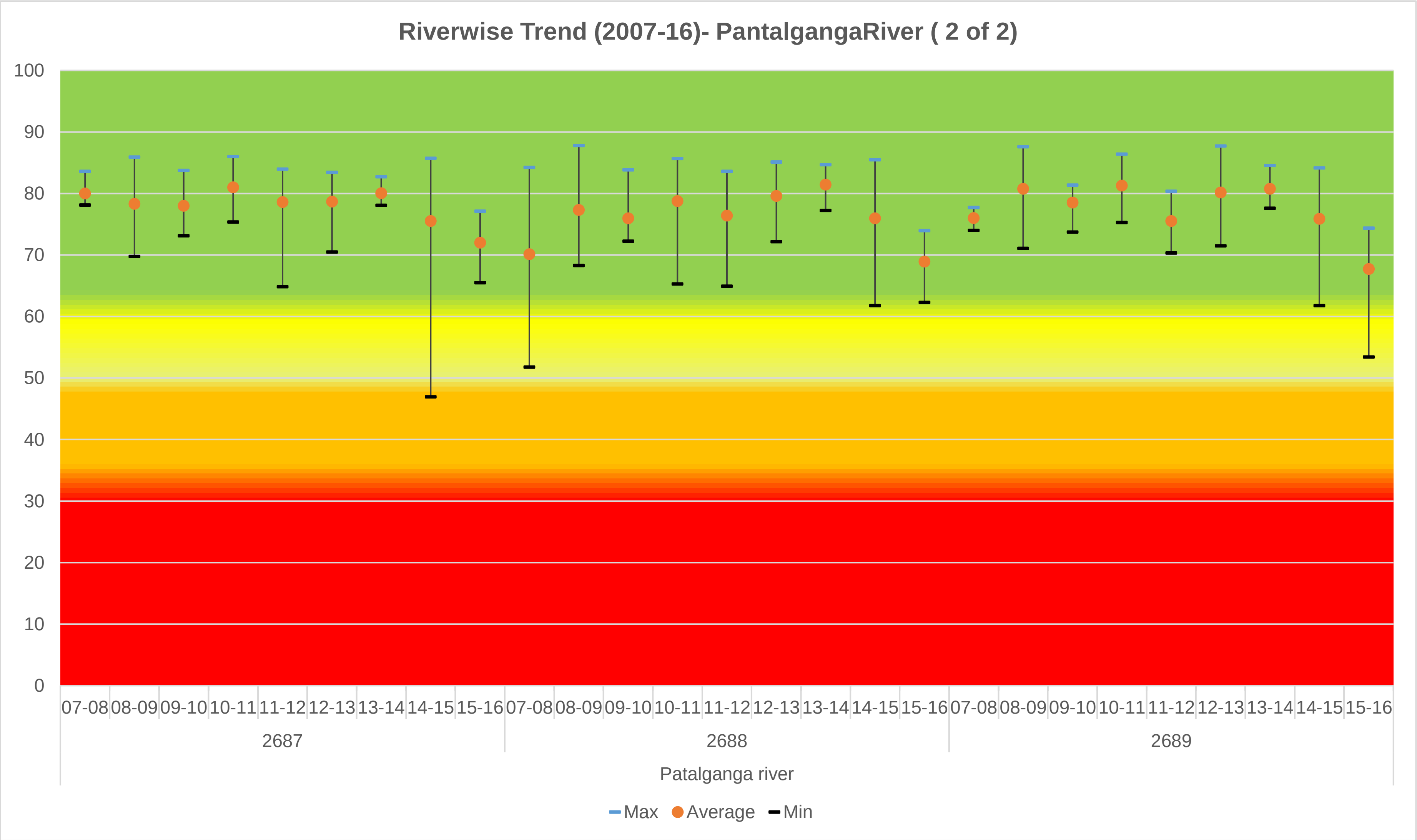


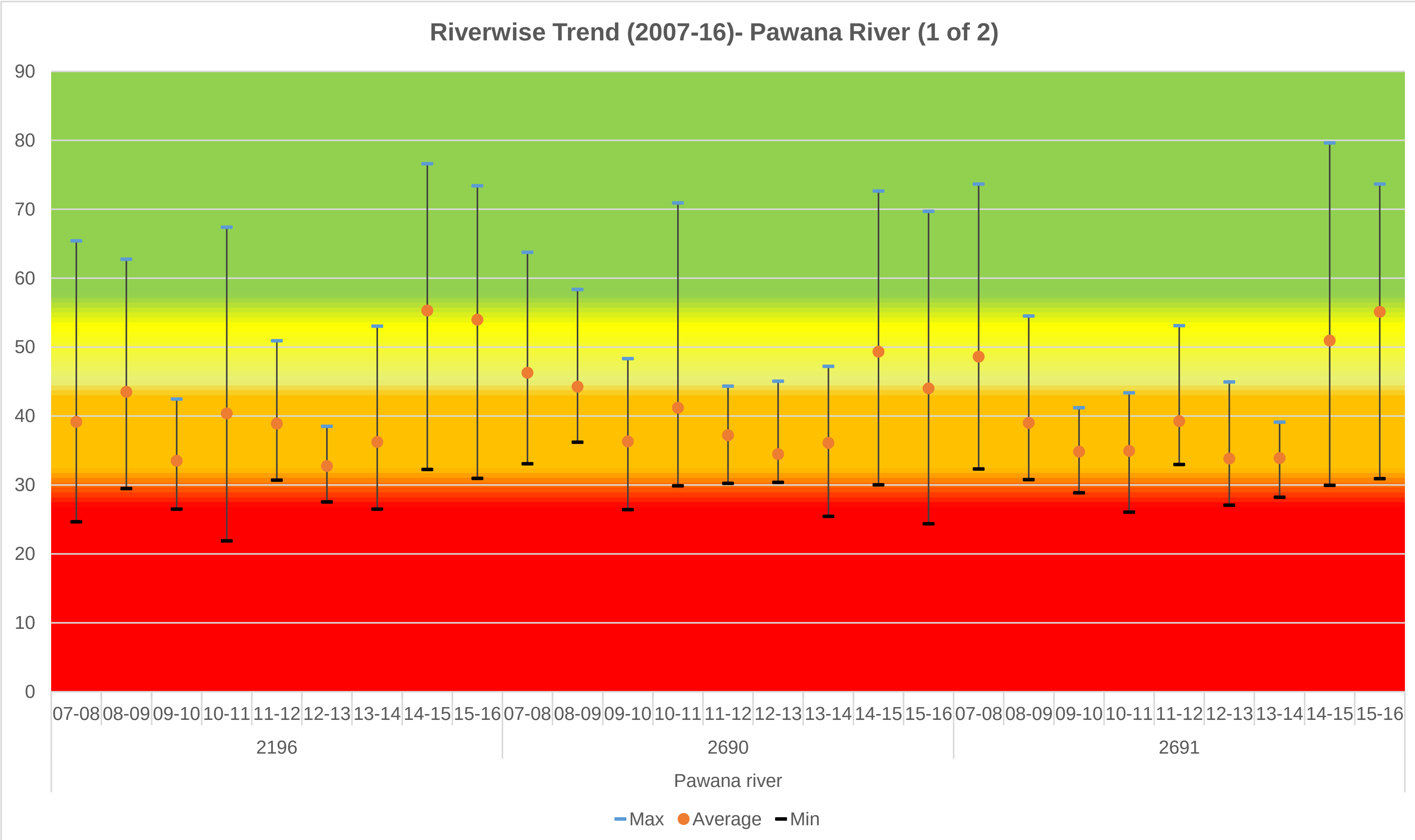
Riverwise Trend (2007-16)- Nira River
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1463
2195
2681
2682
2683
Nira river
Max
Average
Min



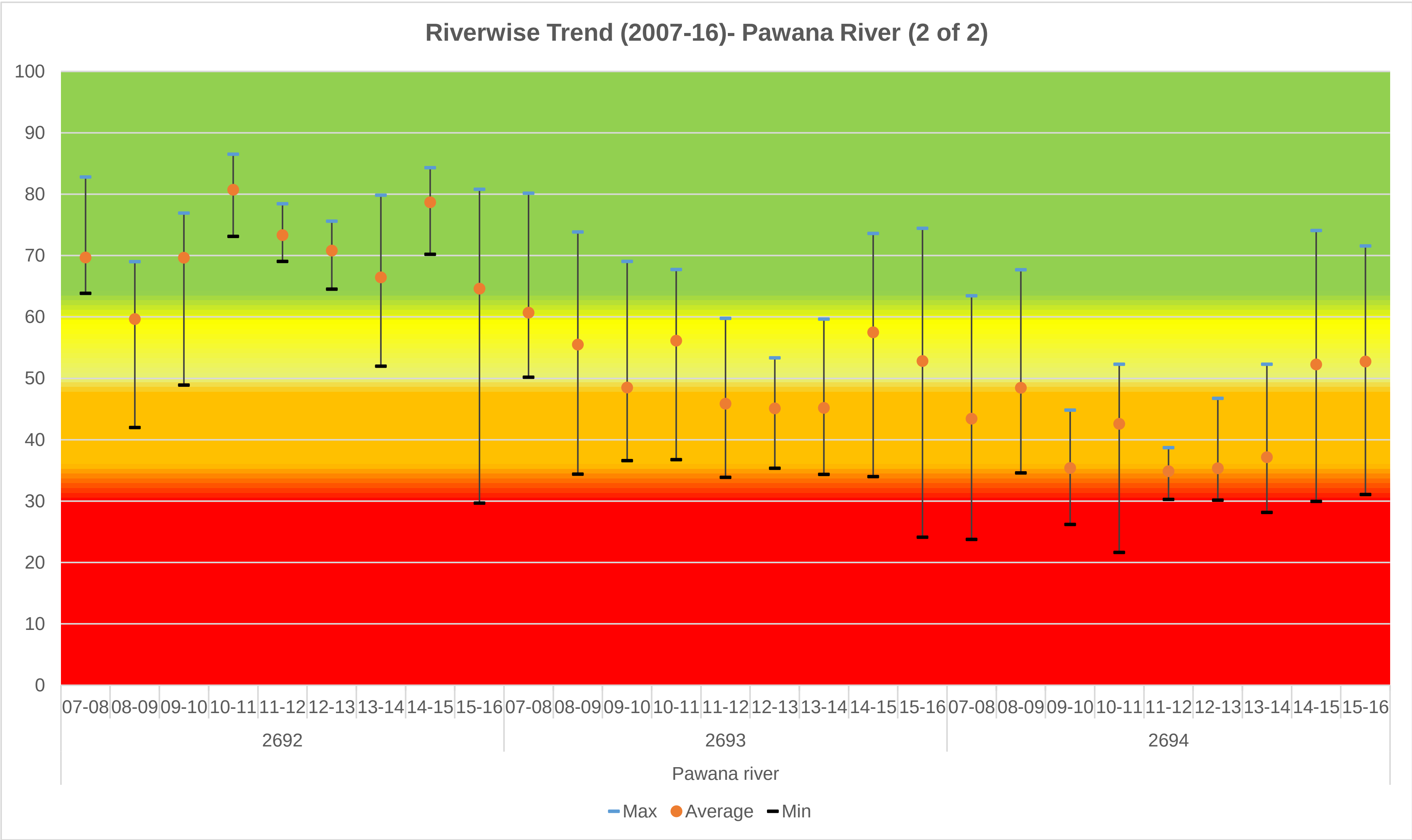
Riverwise Trend (2007-16)- Panchganga & Panzara River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1905
1311
1904
2163
2684
Panchaganga river
Panzara river
Max
Average
Min


Riverwise Trend (2007-16)- Patalganga River (1 of 2)
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1151
1462
2685
2686
Patalganga river
Max
Average
Min

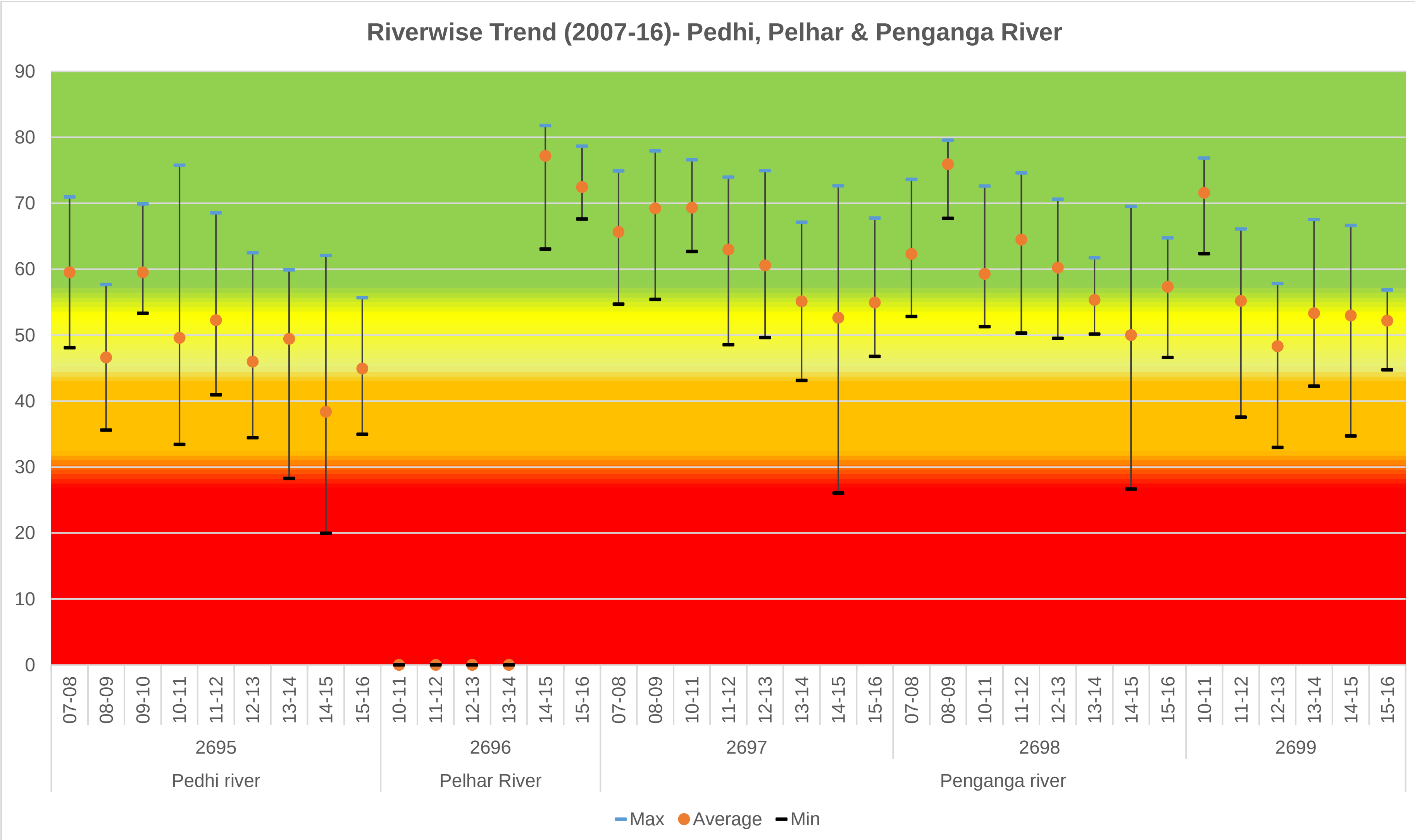

Riverwise Trend (2007-16)- PantalgangaRiver (2 of 2)
100
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2687
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2688
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2689
Patalganga river
Max
Average
Min

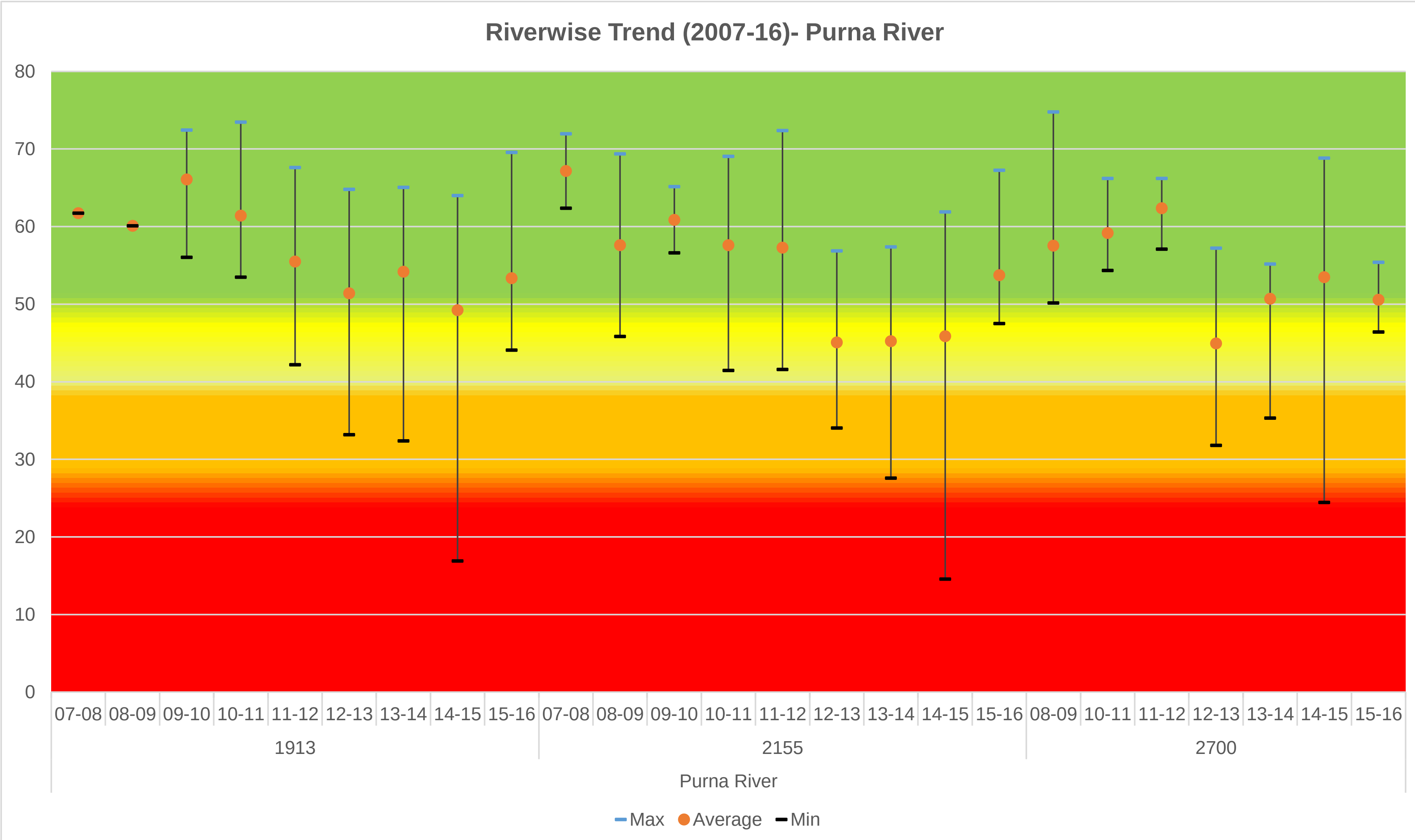


Riverwise Trend (2007-16)- Pawana River (1 of 2)
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2196
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2690
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2691
Pawana river
Max
Average
Min

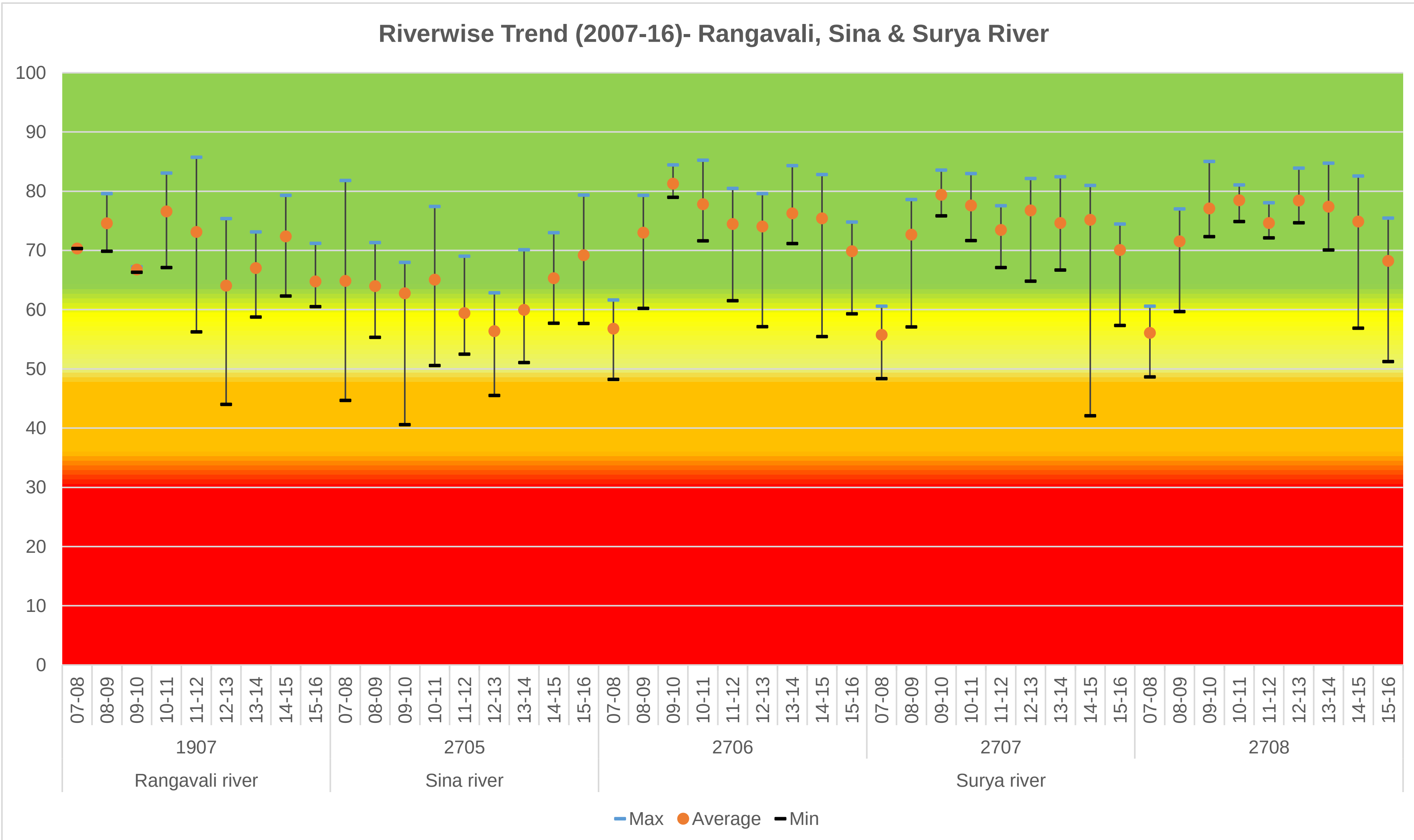


Riverwise Trend (2007-16)- Pawana River (2 of 2)
100
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2692
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2693
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2694
Pawana river
Max
Average
Min

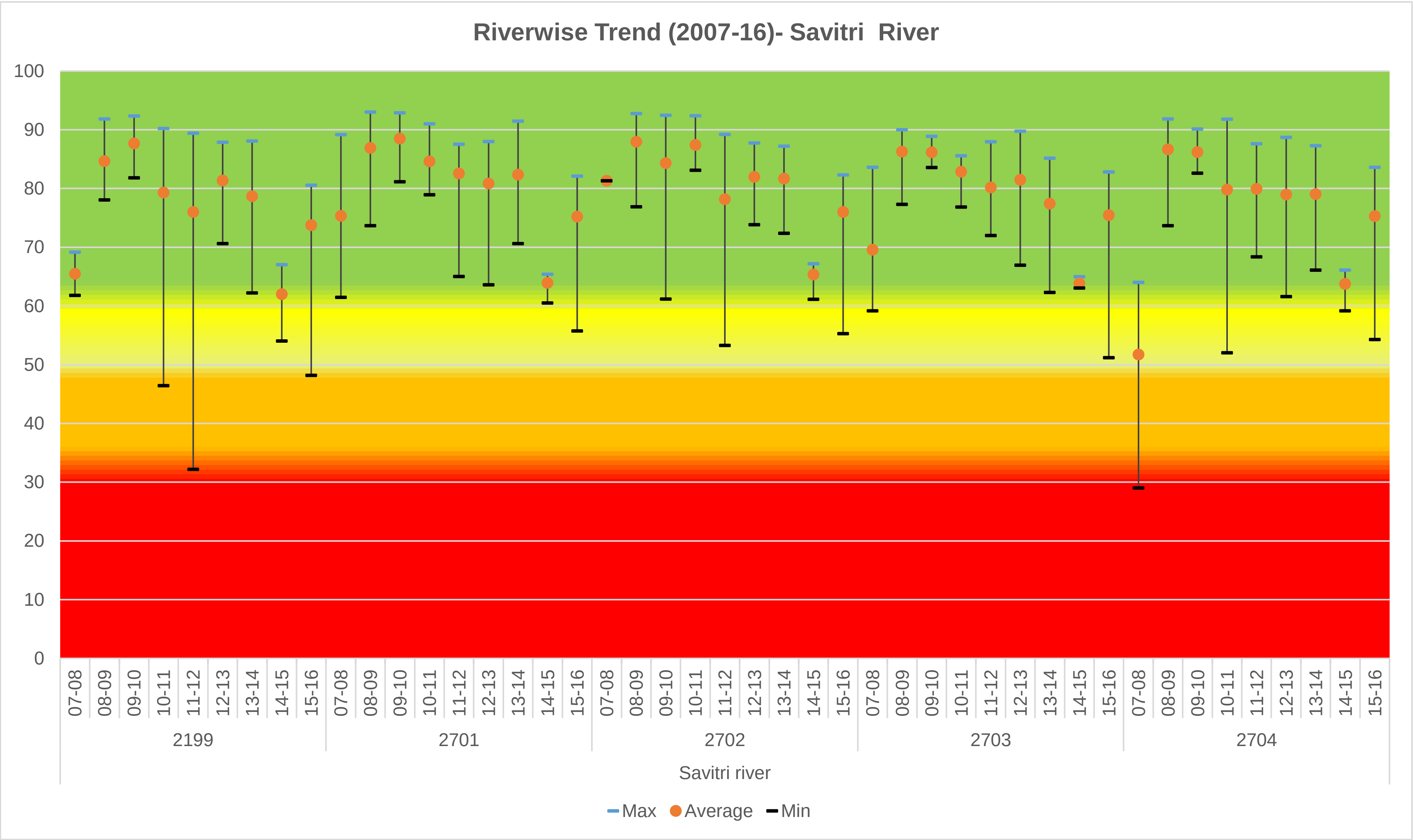

Riverwise Trend (2007-16)- Pedhi, Pelhar & Penganga River
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
10-11
11-12
12-13
13-14
14-15
15-16
10-11
11-12
12-13
13-14
14-15
15-16
2695
2696
2697
2698
2699
Pedhi river
Pelhar River
Penganga river
Max
Average
Min



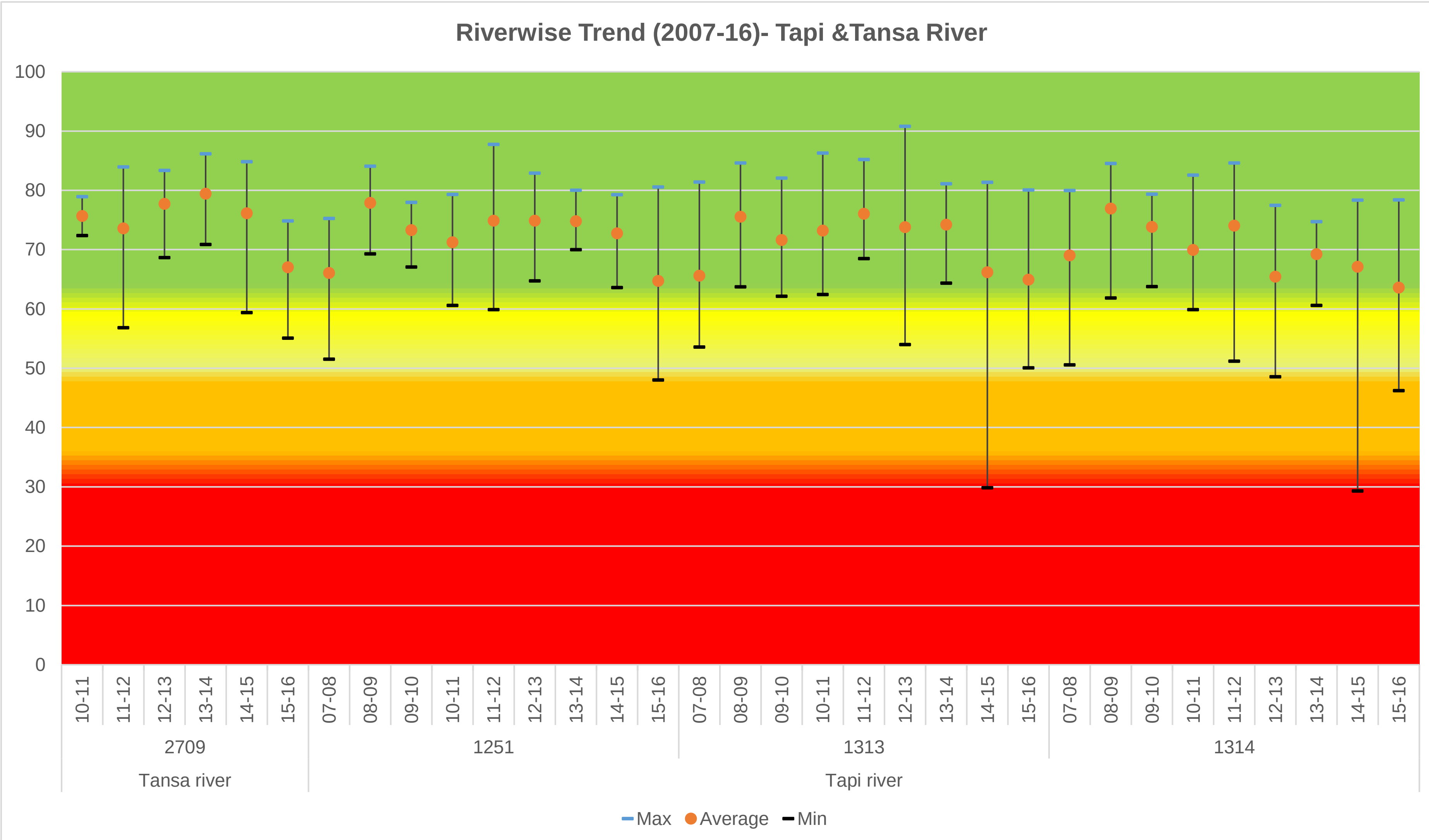
Riverwise Trend (2007-16)- Purna River
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
08-09
10-11
11-12
12-13
13-14
14-15
15-16
1913
2155
2700
Purna River
Max
Average
Min

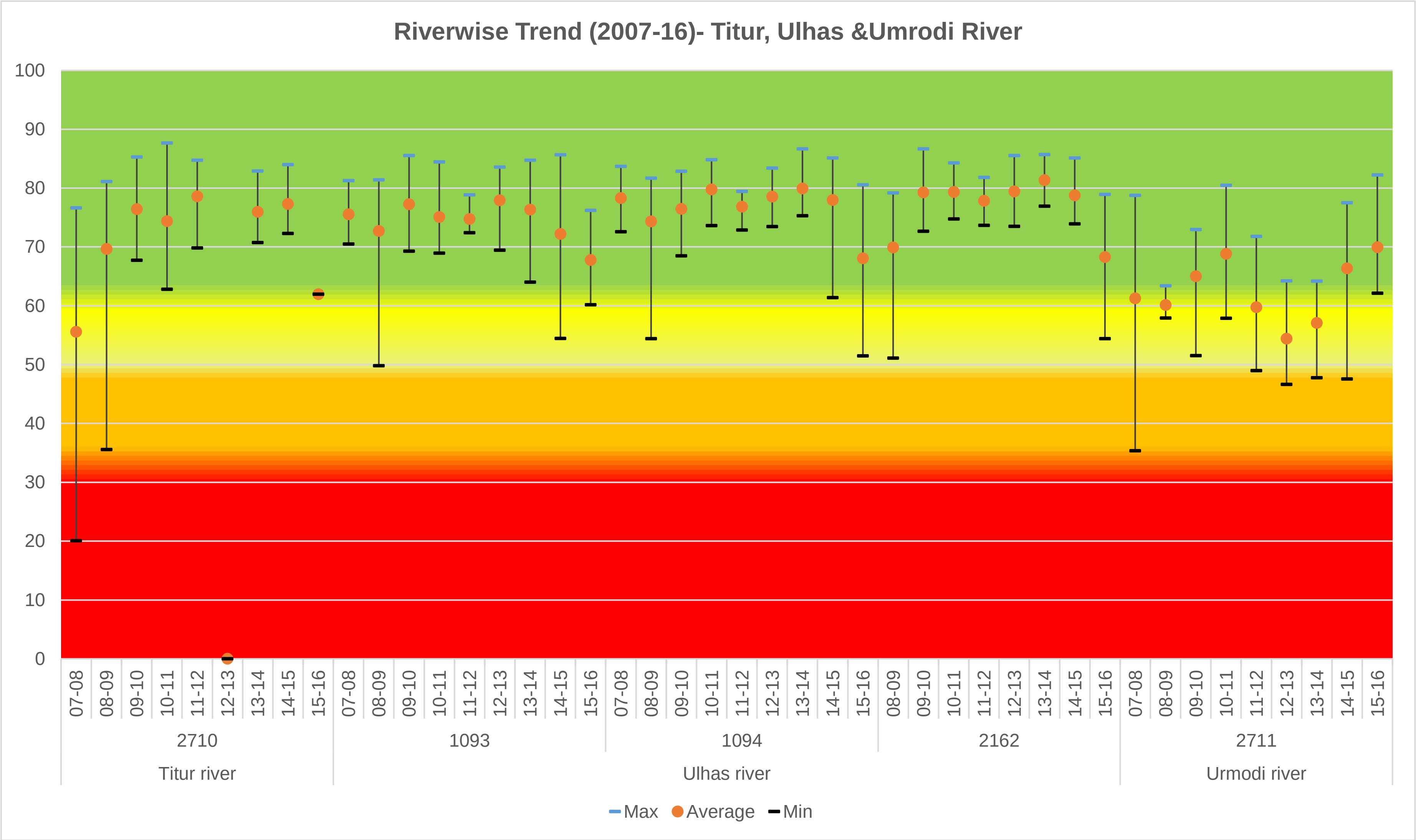


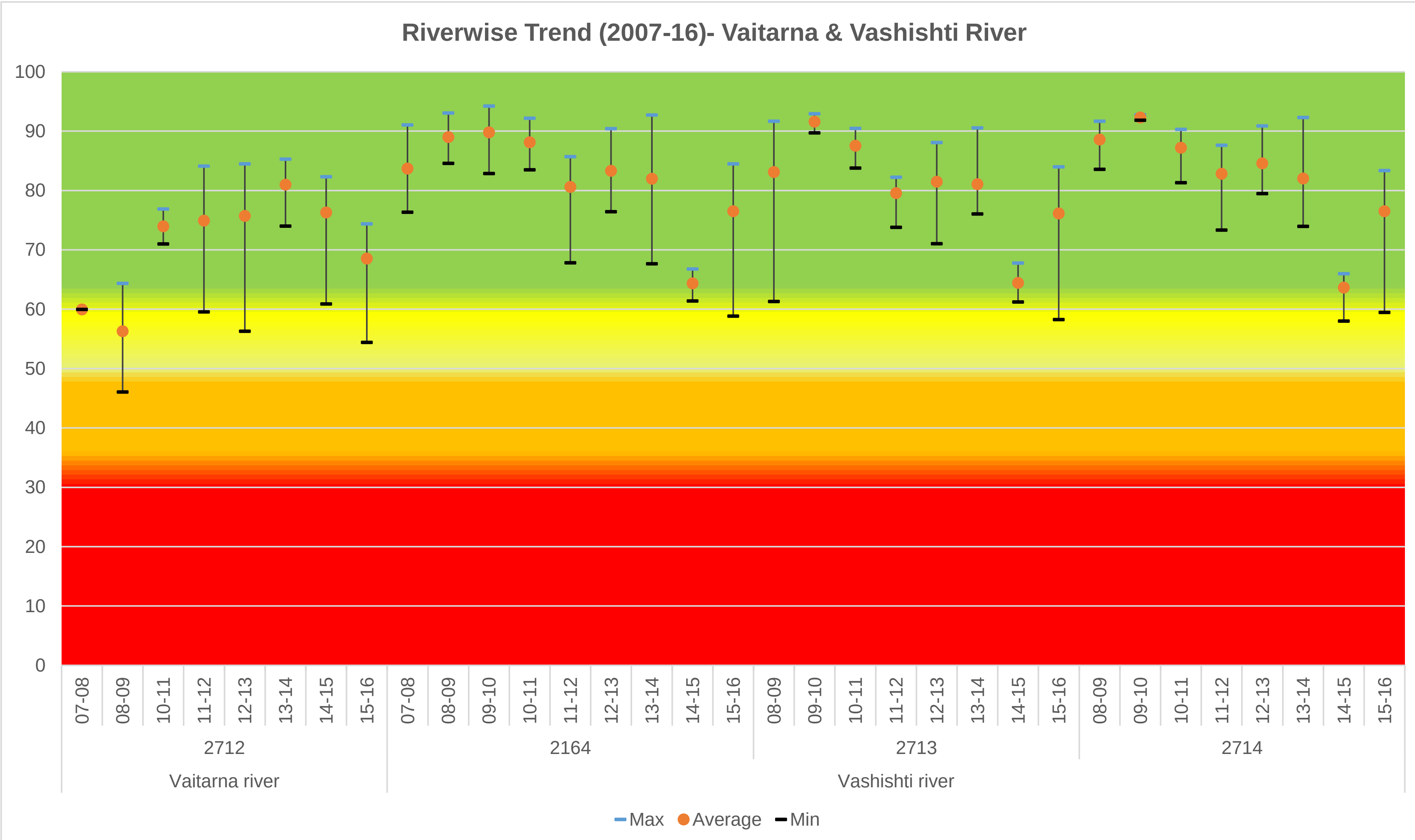
Riverwise Trend (2007-16)- Rangavali, Sina & Surya River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1907
2705
2706
2707
2708
Rangavali river
Sina river
Surya river
Max
Average
Min

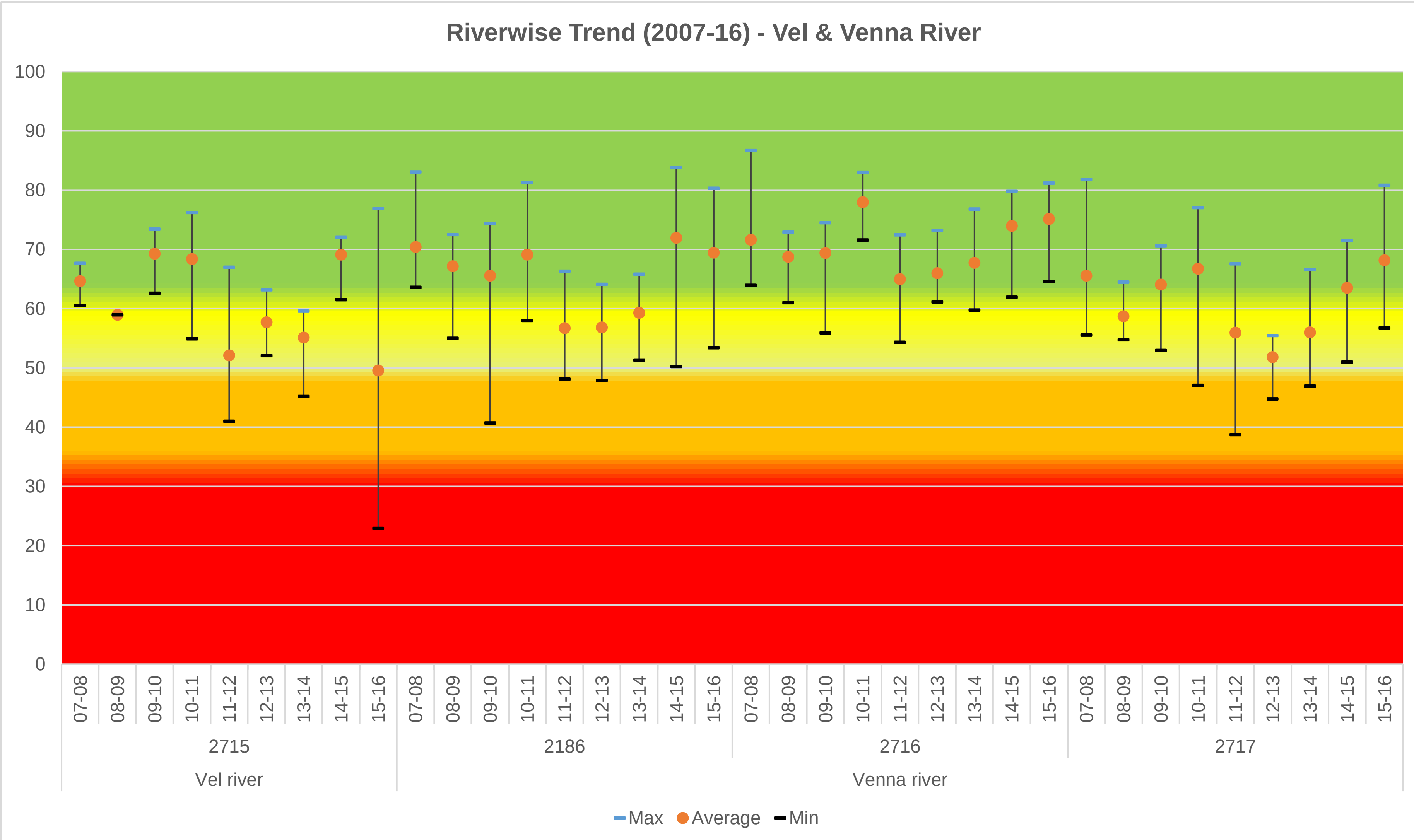


Riverwise Trend (2007-16)- Savitri River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2199
2701
2702
2703
2704
Savitri river
Max
Average
Min

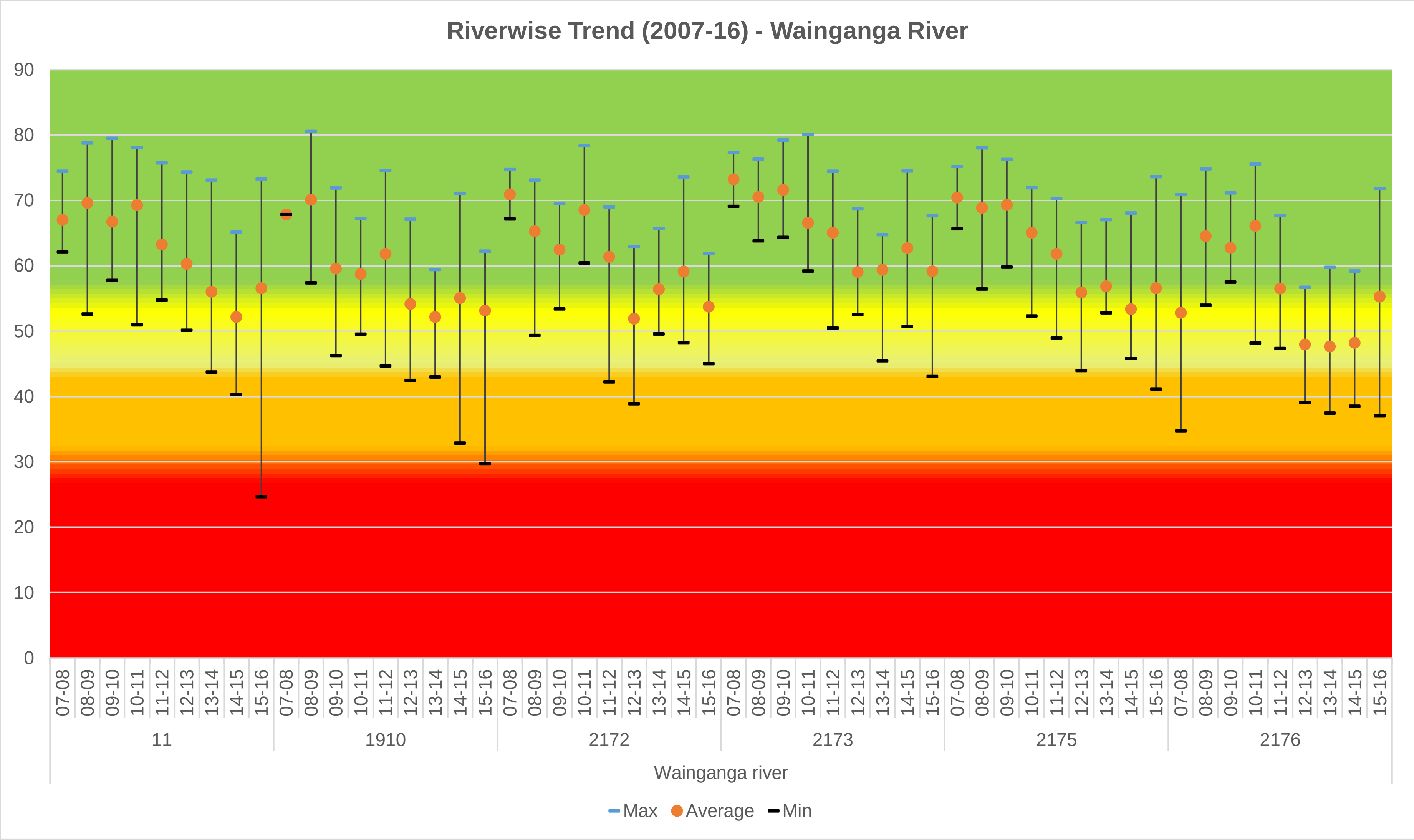

Riverwise Trend (2007-16)- Tapi &Tansa River
100
90
80
70
60
50
40
30
20
10
0
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2709
1251
1313
1314
Tansa river
Tapi river
Max
Average
Min

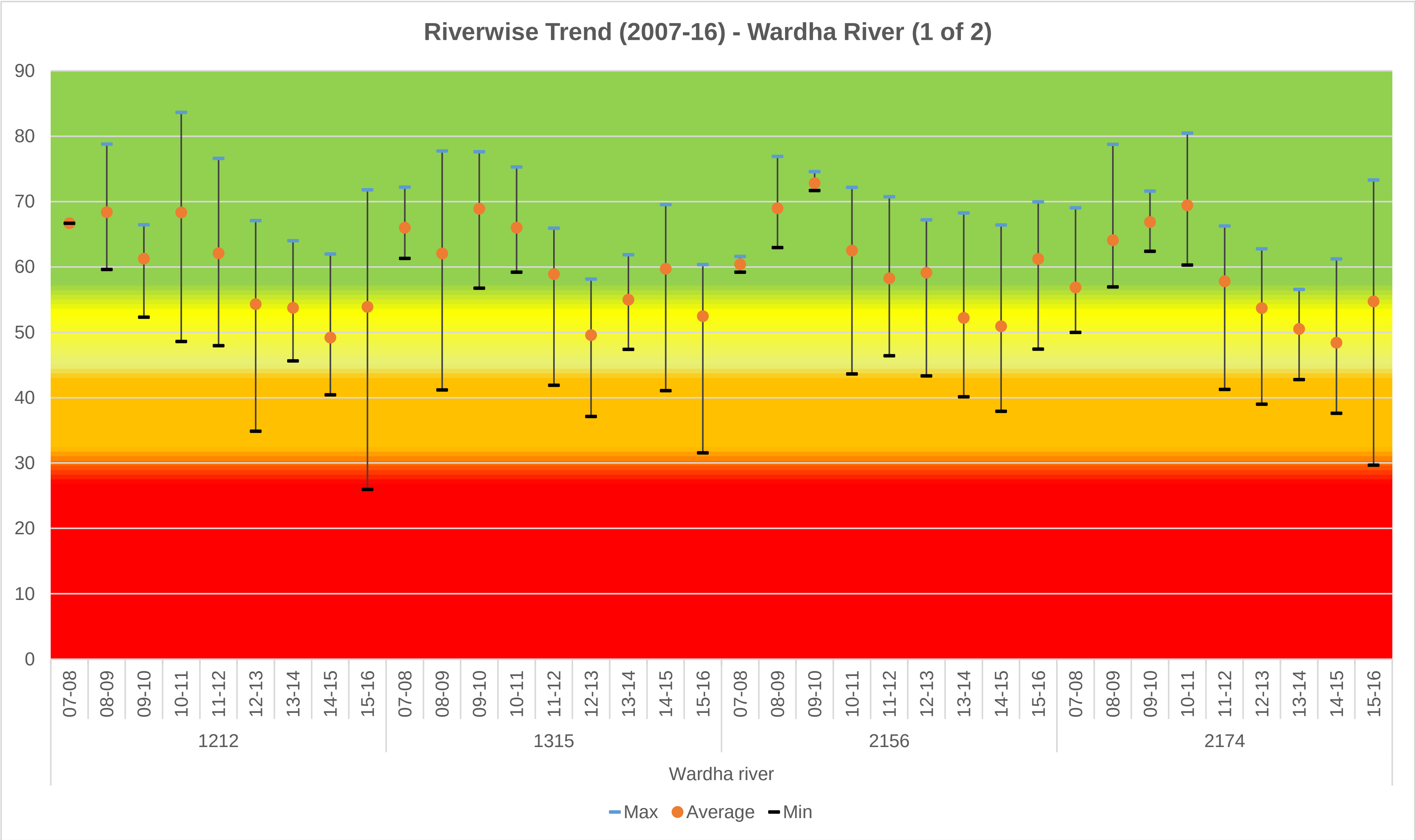

Riverwise Trend (2007-16)- Titur, Ulhas &Umrodi River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2710
1093
1094
2162
2711
Titur river
Ulhas river
Urmodi river
Max
Average
Min


Riverwise Trend (2007-16)- Vaitarna & Vashishti River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
10-11
11-12
12-13
13-14
14-15
15-16
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2712
2164
2713
2714
Vaitarna river
Vashishti river
Max
Average
Min

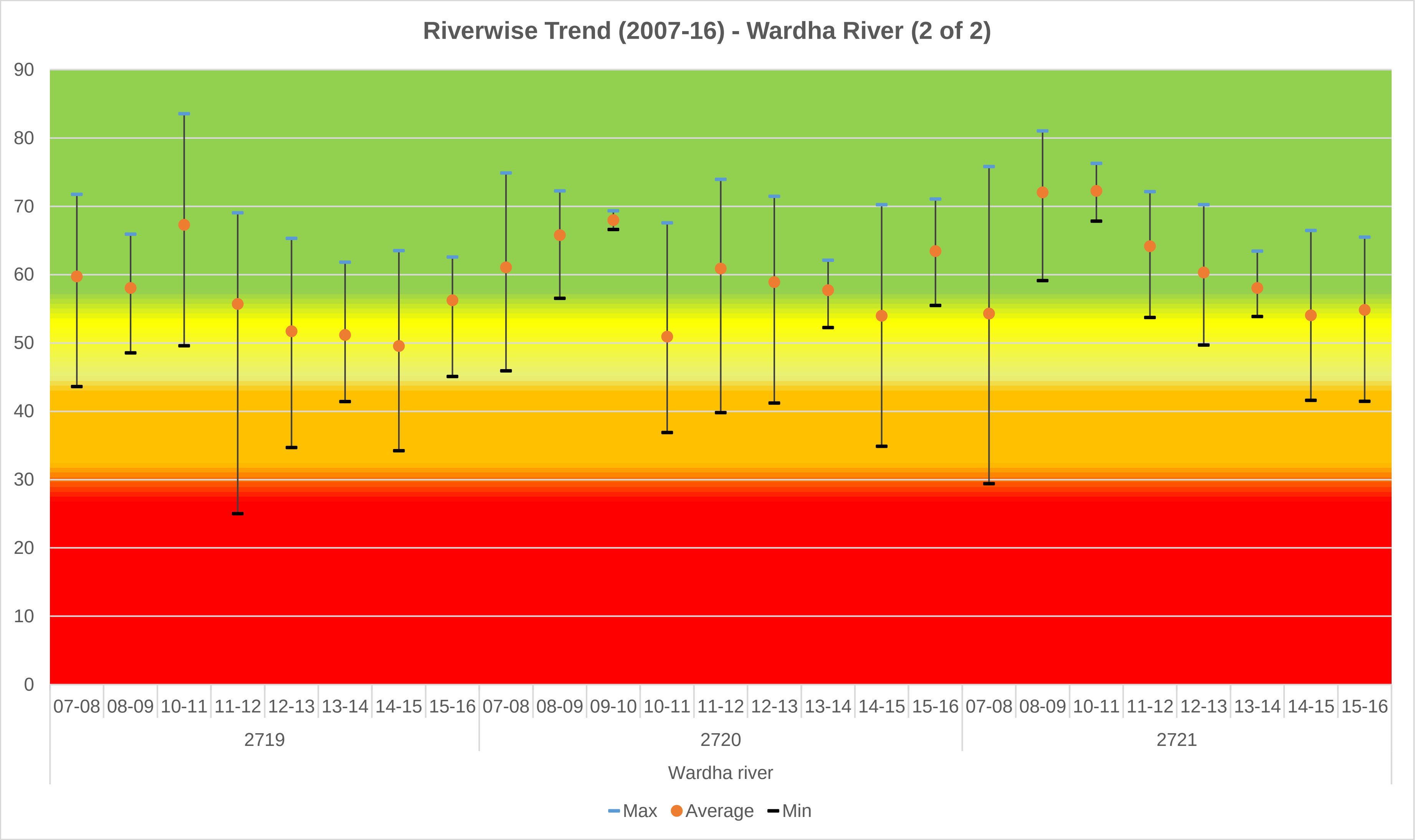


Riverwise Trend (2007-16) - Vel & Venna River
100
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
2715
2186
2716
2717
Vel river
Venna river
Max
Average
Min

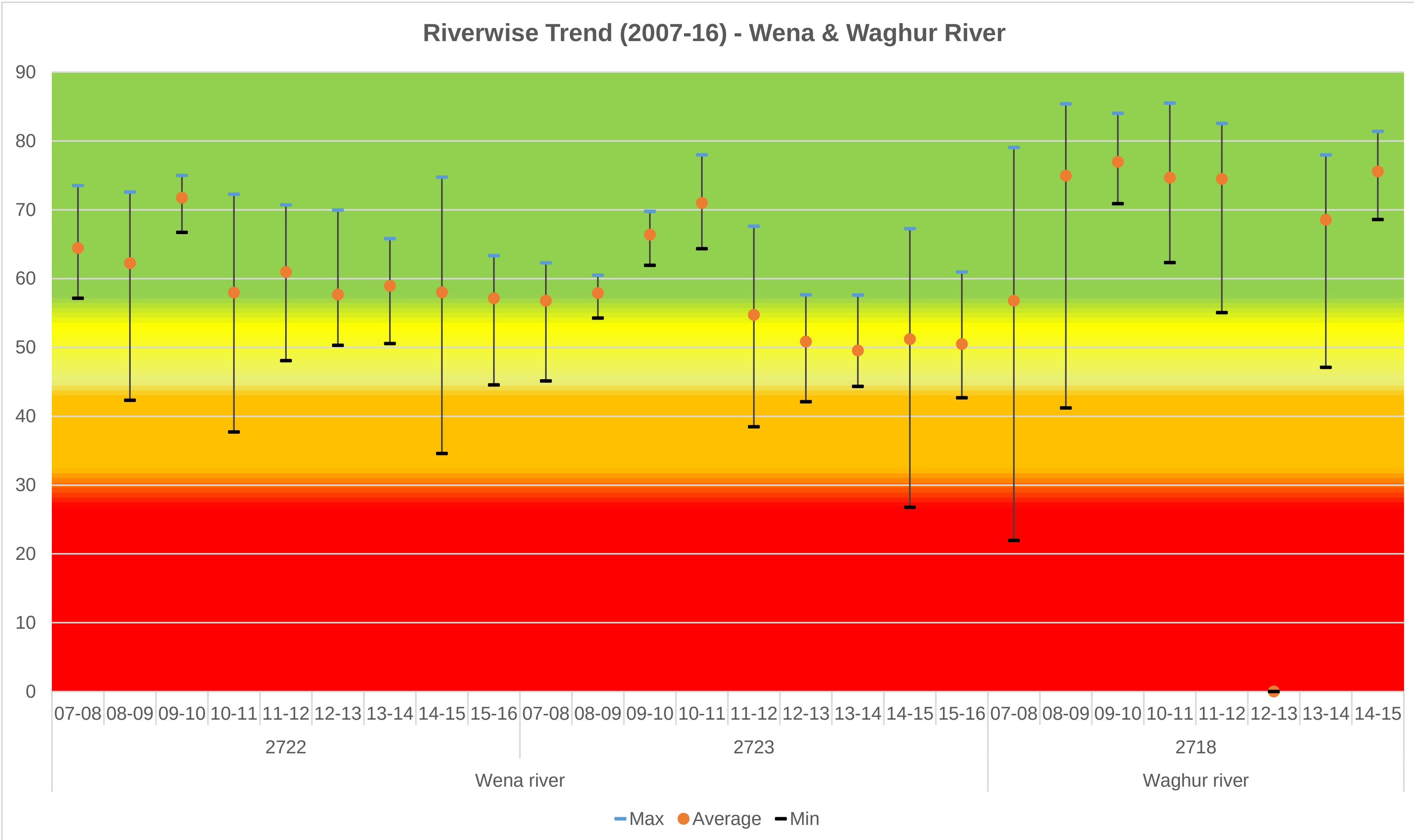

Riverwise Trend (2007-16) - Wainganga River
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
11
1910
2172
2173
2175
2176
Wainganga river
Max
Average
Min



Riverwise Trend (2007-16) - Wardha River (1 of 2)
90
80
70
60
50
40
30
20
10
0
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
1212
1315
2156
2174
Wardha river
Max
Average
Min



Riverwise Trend (2007-16) - Wardha River (2 of 2)
90
80
70
60
50
40
30
20
10
0
07-08 08-09 10-11 11-12 12-13 13-14 14-15 15-16
2719
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
2720
07-08 08-09 10-11 11-12 12-13 13-14 14-15 15-16
2721
Wardha river
Max Average Min


Riverwise Trend (2007-16) - Wena & Waghur River
90
80
70
60
50
40
30
20
10
0
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16
07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15
2722
2723
2718
Wena river
Waghur river
Max
Average
Min

Stationwise Trend in WQI (2007-16)

Saline water

Raigad & Ratnagiri District

Station Name	District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
Thane creek at Elephanta Island	Raigad	1317	57	56	59	59	49	50	55	57	48		Quality Deteriorated	-2.29
Panvel Creek at Kopra Bridge	Raigad	2803		56		47	55	55	70	69	58		No Significant Change	0.55
Arabian Sea behind ONGC Uran	Raigad	191									48			
Karambavane Creek at Chiplun	Ratnagiri	2804					82	82	79	63	77		Quality Deteriorated	-1.43
Sea Water at Ganapatipule	Ratnagiri	2813	75	79	87	83	75	77	76	62	74		No Significant Change	-0.23
Madvi Sea Water at Ratnagiri near Jodhale Maruti Temple	Ratnagiri	2815	76	83	86	85	78	73	76	53	72		No Significant Change	-0.59
Sea Water at Bhagwati Bunder, Ratnagiri near Ultra Tech Cement Jetty	Ratnagiri	2814	75	81	86	83	74	76	75	54	71		No Significant Change	-0.79

CAGR: Compound Annual Growth Rate= ((End value/Start value) ^ (1/Number of intervals))- 1

Number of intervals = (Number of observations)-1 *100

Calculation:

Station code: 1317

WQI of 2015-16 (End value) → 48; WQI of 2007-08 (Start value) → 57; Number of intervals→ 08

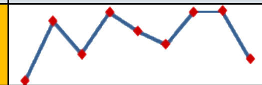
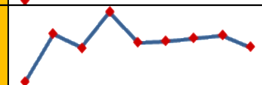
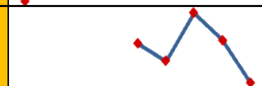
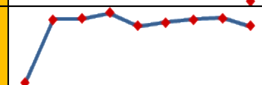
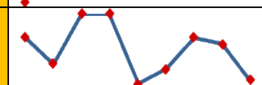
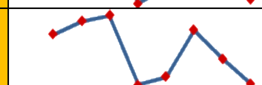
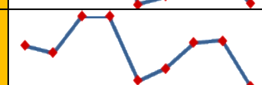
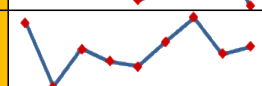
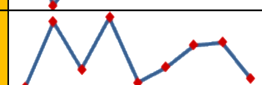
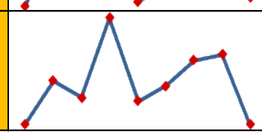
CAGR %= ((End value/Start Value) ^1/Number of intervals))- 1 X 100

= ((48/57) ^ (1/8)-1 *100

= -2.29%

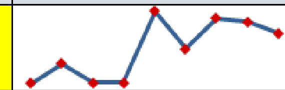
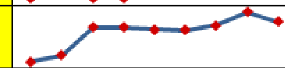
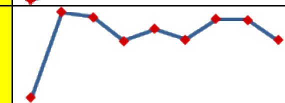
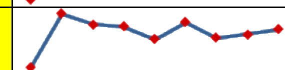
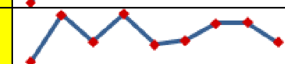
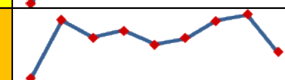
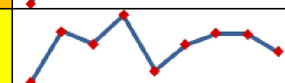
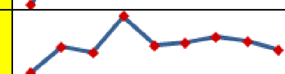
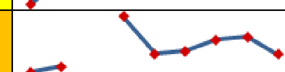
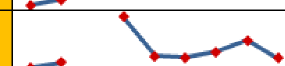
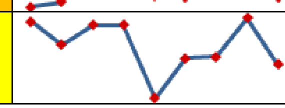
=Quality Deteriorated

Mumbai District

Station Name	District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
Sea Water at Malabar Hill	Mumbai	2809	41	53	46	54	51	48	55	55	45		Quality Improved	1.25
Sea Water at Shivaji Park (Dadar Choupathy)	Mumbai	2811	36	52	47	60	49	50	51	52	48		Quality Improved	3.69
Sea Water at Haj Ali	Mumbai	2810					51	49	54	51	47		Quality Deteriorated	-2.13
Sea Water at Worli Seaface	Mumbai	2167	0	53	54	59	48	51	53	55	48		Quality Deteriorated	-1.54
Sea Water at Gateway of India	Mumbai	2165	55	50	60	60	46	49	55	54	47		Quality Deteriorated	-2.14
Sea Water at Varsova Beach	Mumbai	2169		54	57	58	45	46	55	50	45		Quality Deteriorated	-2.66
Sea Water at Charni Road Choupathy	Mumbai	2166	54	52	60	60	46	49	54	55	45		Quality Deteriorated	-2.20
Mahim creek at Mahim Bay	Mumbai	1318	53	44	49	48	47	51	54	49	50		No Significant Change	-0.85
Sea Water at Juhu Beach	Mumbai	2812	44	57	47	58	45	48	52	53	46		No Significant Change	0.48
Sea Water at Nariman Point	Mumbai	2808	46	52	49	60	49	51	54	55	46		No Significant Change	-0.04

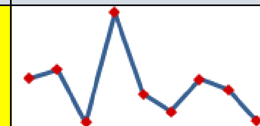
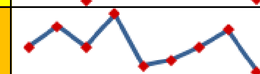
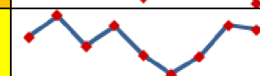
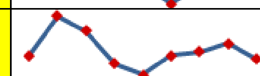
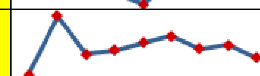
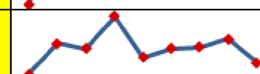
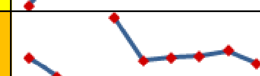
For calculation of CAGR refer to Pg No.270

Thane District (1 of 2)

Station Name	District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
Ulhas Creek at Reti Bunder, D/s of Kalyan-Bhiwandi Bridge	Thane	2791	43	48	43	43	63	52	61	60	57		Quality Improved	3.54
Sarwali Creek	Thane	2800	44	46	56	56	55	55	56	61	57		Quality Improved	3.28
Ulhas Creek at Gaimukh at Nagla Bunder on Ghod Bunder Road	Thane	2795	44	60	59	55	57	55	59	59	55		Quality Improved	2.69
Vashi Creek at Vashi Bridge	Thane	2185	44	59	56	55	52	56	52	53	54		Quality Improved	2.60
Ulhas Creek at Versova Bridge	Thane	2796	48	62	54	63	53	55	60	60	54		Quality Improved	1.43
Uttan Sea at Bhayander	Thane	2806	38	59	53	55	50	52	59	61	47		Quality Improved	2.89
Bhayander Creek at D/s of Railway Bridge at Jasal Park Choupathy	Thane	2797	43	58	55	63	47	54	58	58	52		Quality Improved	2.38
Dahanu Creek at Dahanu Fort	Thane	2802	42	53	50	66	53	55	57	55	52		Quality Improved	2.53
Kharekuran Murbe Creek	Thane	2798	41	43		68	49	51	56	58	49		Quality Improved	2.39
Navapur Sea	Thane	2807	41	43		69	47	46	49	56	46		Quality Improved	1.46
Vashi Creek at Airoli Bridge	Thane	2184	61	57	60	60	49	55	55	61	54		Quality Deteriorated	-1.47

For calculation of CAGR refer to Pg No.270

Thane Ditrict (2 of 2)

Sub Basin	Station Name	District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
Creek	Bassein creek at Vasai Fort, Thane	Thane	1316	58	59	51	67	55	53	57	56	52		Quality Deteriorated	-1.33
Sea	Arnala Sea	Thane	2805	56	62	56	65	50	52	55	60	48		Quality Deteriorated	-1.74
Creek	Thane Creek at	Thane	2793	53	57	52	55	50	47	50	55	54		No Significant Change	0.28
Creek	Ulhas Creek at	Thane	2792	55	63	60	54	51	55	56	57	54		No Significant Change	-0.15
Creek	Ulhas Creek at	Thane	2794	52	61	55	55	57	58	56	56	54		No Significant Change	0.63
Creek	Savta Creek	Thane	2801	49	57	56	64	54	56	56	58	52		No Significant Change	0.72
Creek	Dandi Creek	Thane	2799	52	42		72	51	52	53	55	49		No Significant Change	-0.69
Creek	TTC Creek At Ghansoli	Thane	190									52			

For calculation of CAGR refer to Pg No.270

Surface water

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
11	68	70	67	69	63	6	56	52	57		Quality Deteriorated	-2.20
12	8	84	75	7	79	78	75	84	71		Quality Improved	31.14
28	60	68	63	65	55	58	59	63	65		Quality Improved	1.13
36	66	68	66	67	59	58	6	65	73		Quality Improved	1.31
37	85	86	86	84	76	78	76	62	78		Quality Deteriorated	-1.03
178									68			
179												
180									60			
181									62			
182									63			
183									58			
184									66			
185									6			
186									32			
187									33			
188									38			

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
189									47			
192									72			
193									71			
194									62			
195									48			
196									59			
197									50			
198									78			
199									78			
200									77			
201									79			
202									79			
203									79			
204									78			
216									65			

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
1092	72	65	68	45	66	6	65	67	63		Quality Deteriorated	-1.73
1093	76	73	77	76	75	78	76	72	68		Quality Deteriorated	-1.35
1094	78	74	76	80	77	79	80	78	68		Quality Deteriorated	-1.66
1095	78	79	9	76	77	77	77	76	69		Quality Deteriorated	-1.65
1096	74	74	66	79	63	66	7	69	63		Quality Deteriorated	-2.00
1151	73	74	74	9	76	81	9	75	8		Quality Deteriorated	-24.67
1152	72	74	75	69	76	78	77	77	70		No Significant Change	-0.48
1153	87	82	84	76	76	81	78	63	75		Quality Deteriorated	-1.83
1188	67	62	55	68	62	59	59	67	65		No Significant Change	-0.52
1189	55	42	44	43	46	37	37	54	47		Quality Deteriorated	-1.98
1190	48	41	34	34	39	33	30	5	52		No Significant Change	0.82
1191	54	64	60	52	5	47	42	61	64		Quality Improved	2.23
1192	43	8	67	6	52	47	39	7	62		Quality Improved	4.74

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
1194	76	74	75	79	70	69	70	78	74		No Significant Change	-0.33
1209	82	84	73	73	77	75	8	83	75		Quality Deteriorated	-1.05
1210	8	8	80	74	79	77	79	83	76		Quality Improved	32.02
1211	69	68	67	77	59	65	67	8	63		Quality Deteriorated	-1.16
1212	67	68	61	68	63	54	54	49	54		Quality Deteriorated	-2.62
1251	66	78	73	71	75	75	75	73	65		No Significant Change	-0.30
1252	53	77	70	73	74	78	74	73	50		No Significant Change	-0.82
1253	78	79	75	67	77	65	70	74	63		Quality Deteriorated	-2.67
1310	86	84	84	78	78	9	77	63	73		Quality Deteriorated	-2.00
1311	83	82	87	69	78	77	75	61	75		Quality Deteriorated	-1.33
1312	9	84	75	75	80	78	79	85	73		Quality Improved	29.92
1313	66	76	72	73	76	74	74	66	65		No Significant Change	-0.13
1314	69	77	74	70	75	65	69	68	64		Quality Deteriorated	-1.04
1315	66	62	69	66	59	50	55	60	52		Quality Deteriorated	-2.82

For calculation of CAGR refer to Pg No.270

Station Code	Fiscal Year 07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
1461	82	57	78		58	75	79	78	69		Quality Deteriorated	-2.07
1462	77	73	76	8	78	80	82	8	8		Quality Deteriorated	-24.80
1463	69	65	67	70	62	63	7	67	67		No Significant Change	-0.35
1904	86	86	87	83	78	82	75	62	75		Quality Deteriorated	-1.74
1905	86	82	82	75	76	80	73	61	75		Quality Deteriorated	-1.64
1906	83	82	85	8	77	77	76	64	77		No Significant Change	-0.97
1907	7	75	67	77	73	65	67	72	65		Quality Improved	31.27
1908	75	8	7	70	60	57	55	56	55		Quality Deteriorated	-3.84
1909	69	7	65	66	59	56	53	54	53		Quality Deteriorated	-3.22
1910	68	7	60	59	62	54	52	55	53		Quality Deteriorated	-3.00
1911	67	66	68	72	65	63	7	62	65		No Significant Change	-0.28
1912	67	6	6	68	59	56	58	52	62		No Significant Change	-0.98
1913	62	7	67	61	55	51	54	49	53		Quality Deteriorated	-1.81
2155	67	58	7	58	57	46	45	46	54		Quality Deteriorated	-2.75

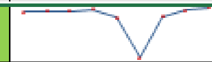
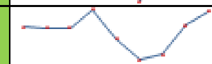
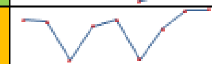
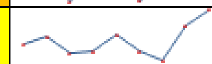
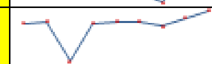
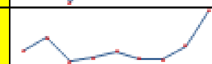
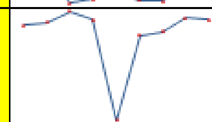
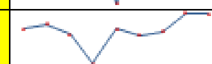
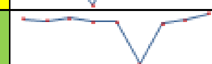
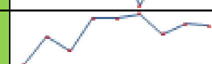
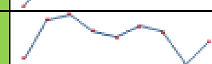
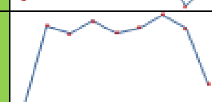
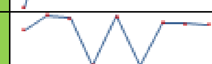
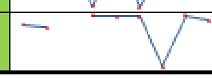
For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2156	6	69	73	62	58	59	52	6	61		Quality Improved	32.50
2157			69	7	9	9	78	83	73		Quality Improved	1.00
2158	76	84	75	75	79	79	78	83	73		No Significant Change	-0.39
2159	75	82	61	76	73	73	79	83	74		No Significant Change	-0.18
2160	84	84	75	82	75	78	80	84	72		Quality Deteriorated	-1.84
2161	85	83	74	75	75	78	77	77	75		Quality Deteriorated	-1.51
2162		70	79	79	78	79	81	79	68		No Significant Change	-0.33
2163	87	82	86	8	78	9	78	62	75		Quality Deteriorated	-1.85
2164	84	89	90	88	9	83	82	64	77		Quality Deteriorated	-1.13
2168		40	38	47	34	5	36	44	39		No Significant Change	-0.47
2170	7	74	8	62	6	58	59	57	57		Quality Improved	28.99
2171	61	66	62	68	56	52	52	56	54		Quality Deteriorated	-1.49
2172	8	65	62	69	61	52	56	59	54		Quality Improved	27.00

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	**07-08**	**08-09**	**09-10**	**10-11**	**11-12**	**12-13**	**13-14**	**14-15**	**15-16**	**Trend**	**Quality**	**CAGR %**
2173	73	8	72	67	65	59	59	63	59		Quality Deteriorated	-2.63
2174	57	65	67	69	58	54	6	48	55		No Significant Change	-0.48
2175	7	69	69	66	62	56	57	53	57		Quality Improved	28.89
2176	53	65	63	66	57	48	48	48	55		No Significant Change	0.58
2177	76	76	75	9	67	7	71	73	67		Quality Deteriorated	-1.67
2178	7	6	62	76	49	54	51	68	59		Quality Improved	30.55
2179	9	68	68	72	60	67	68	7	65		Quality Improved	28.42
2180	74	6	64	72	53	60	63	67	63		Quality Deteriorated	-2.01
2181	71	64	70	64	52	56	7	65	65		Quality Deteriorated	-1.06
2182	74	81	76	53	66	7	8	69	67		Quality Deteriorated	-1.13
2183	79	84	77	76	76	71	72	70	67		Quality Deteriorated	-2.10
2186	7	67	66	69	57	57	59	72	69		Quality Improved	32.33
2187	66	65	64	72	58	54	56	61	66		No Significant Change	-0.07
2188	64	64	65	69	55	55	56	62	70		Quality Improved	1.02

For calculation of CAGR refer to Pg No.270

	Fiscal Year										
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2189	66	66	67	69	59	7	60	68	72		Quality Improved	1.15
2190	63	63	63	69	59	51	53	64	68		Quality Improved	1.07
2191	35	33	3	29	34	4	27	41	42		Quality Improved	2.57
2192	38	42	33	33	42	33	29	47	56		Quality Improved	5.07
2193	45	46	5	44	46	47	42	50	58		Quality Improved	3.40
2194	40	46	35	36	39	36	36	42	58		Quality Improved	4.75
2195	55	57	62	58	5	50	52	59	58		No Significant Change	0.64
2196	39	43	33	4	39	33	36	55	54		Quality Improved	4.09
2197	57	55	58	54	54	6	51	56	64		Quality Improved	1.45
2198	44	62	53	73	73	76	63	70	68		Quality Improved	5.66
2199	65	85	88	79	76	81	79	63	74		Quality Improved	1.50
2651	65	78	76	78	77	78	80	77	69		No Significant Change	0.60
2652	56	77	72	8	75	7	65	64	64		Quality Improved	1.56
2653	66	61		79	76	77	8	78	72		Quality Improved	1.09

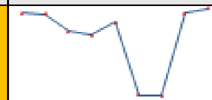
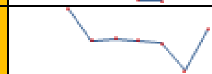
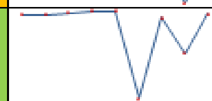
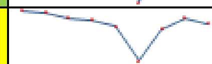
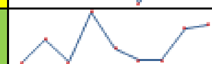
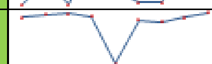
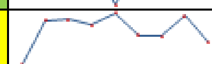
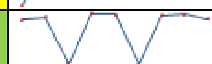
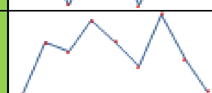
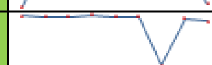
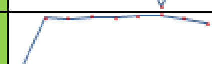
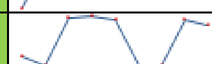
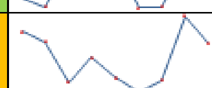
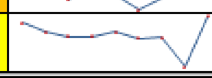
For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2654	65	61		79	77	78	79	77	72		Quality Improved	1.35
2655	63	65	57	66	57	46	54	63	68		No Significant Change	0.97
2656	65	68	68	75	64	59	59	8	62		No Significant Change	-0.61
2657	75	78	68	76	78	76	78	8	71		No Significant Change	-0.65
2658	6	74	72	8	80	83	73	75	53		Quality Improved	30.02
2659	58	72	72	73	75	63	7	76	59		No Significant Change	0.38
2660	61	75	82	8	73	72	72	71	68		Quality Improved	1.22
2661	61	78	77	78	75	75	72	72	68		Quality Improved	1.41
2662	68	77	79	63	75	77	74	75	67		No Significant Change	-0.21
2663	67	78	78	62	75	76	74	73	68		No Significant Change	0.11
2664	67	8	79	67	77	74	72	70	69		No Significant Change	0.36
2665	57	59	60	67	54	61	51	6	62		Quality Improved	1.14

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2666	59	78	77	69	73	62	69	67	55		No Significant Change	-0.92
2667	52	75	75	68	78		75	72	46		Quality Deteriorated	-1.54
2668	60	59	58	52	49	49	6	55	64		No Significant Change	0.92
2669	65	55	61	61	53	55	57	62	65		No Significant Change	0.17
2670	57	77	79	71	73	69	70	73	65		Quality Improved	1.61
2671		5	6	36	59	59	62	6	58		Quality Improved	43.50
2672	60	75	79	75	77	79	79	77	69		Quality Improved	1.87
2673	55		73	7	78	76	77	85			Quality Deteriorated	-100.00
2674	56	79	75	74	78		74	74	56		No Significant Change	-0.20
2675	38	42		64	59	41	41	4	50		Quality Improved	3.58
2676	59	91	89	85	84	8	79	63	75		Quality Improved	2.99
2677	52	46	43	53	42	36	39	59	58		Quality Improved	1.37

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2678	42	41	33	32	38	4	3	42	44		No Significant Change	0.62
2679			60	32	33	31	29	5	41		Quality Deteriorated	-6.00
2680	71	72	73	75	74	8	69	42	72		No Significant Change	0.18
2681	68	65	59	56	48	6	45	58	51		Quality Deteriorated	-3.37
2682	59	63	59	68	61	59	59	65	66		Quality Improved	1.38
2683	64	66	67	65	7	60	57	64	69		Quality Improved	1.11
2684	52	72	72	69	75	65	64	74	62		Quality Improved	2.21
2685	66	69	7	75	74	6	72	74	67		No Significant	0.10
2686	72	79	77	82	79	75	83	76	72		No Significant Change	0.05
2687	80	78	78	82	79	79	8	76	72		Quality Deteriorated	-1.31
2688	7	77	76	79	76	80	81	76	69		Quality Improved	32.75
2689	23	9	79	81	76	8	9	76	68		Quality Improved	14.34
2690	46	44	36	41	37	34	37	49	44		No Significant Change	-0.63
2691	49	40	35	35	39	34	34	6	55		Quality Improved	1.59

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2692	70	60	70	9	73	8	66	79	65		No Significant Change	-0.94
2693	7	55	49	56	46	46	45	57	53		Quality Improved	29.42
2694	43	48	35	43	35	35	37	52	53		Quality Improved	2.46
2695	60	47	60	50	52	46	49	38	45		Quality Deteriorated	-3.45
2696								77	72		Quality Deteriorated	-6.15
2697	66	69		69	63	7	55	53	55		Quality Deteriorated	-2.20
2698	62	76		59	64	6	55	50	57		Quality Deteriorated	-1.03
2699				72	55	48	53	53	52		Quality Deteriorated	-6.13
2700		58		59	62	45	6	53	6		Quality Deteriorated	-28.38
2701	75	87	89	85	83	9	82	64	75		No Significant Change	-0.01
2702	81	88	84	87	78	82	82	65	76		No Significant Change	-0.83
2703	70	86	86	83	8	81	77	64	75		Quality Improved	1.02
2704	52	87	86	80	80	79	80	64	75		Quality Improved	4.81

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	Trend	Quality	CAGR %
2705	65	64	63	66	59	56	60	65	69		No Significant Change	0.81
2706	57	73	81	78	74	74	76	75	70		Quality Improved	2.62
2707	56	73	79	78	73	77	75	75	8		Quality Deteriorated	-21.67
2708	57	72	77	78	75	78	77	75	68		Quality Improved	2.30
2709				76	74	78	79	76	67		Quality Deteriorated	-2.40
2710	56	70	76	74	79		76	77	62		Quality Improved	1.37
2711	61	7	66	69	60	54	58	66	70		Quality Improved	1.68
2712	60	56		74	75	76	9	76	69		Quality Improved	1.68
2713		83	92	88	80	82	82	64	76		Quality Deteriorated	-1.25
2714		89	92	87	83	85	82	64	77		Quality Deteriorated	-2.07
2715	65	59	69	68	52	58	55	69	50		Quality Deteriorated	-3.27
2716	72	69	69	78	65	66	68	74	75		No Significant Change	0.60
2717	66	59	65	67	56	52	56	64	68		No Significant Change	0.48

For calculation of CAGR refer to Pg No.270

	Fiscal Year											
Station Code	**07-08**	**08-09**	**09-10**	**10-11**	**11-12**	**12-13**	**13-14**	**14-15**	**15-16**	**Trend**	**Quality**	**CAGR %**
2718	57	75	77	75	74		69	76	51		Quality Deteriorated	-1.26
2719	60	58		67	56	52	51	50	56		No Significant Change	-0.75
2720	62	66	68	6	7	59	58	54	63		No Significant Change	0.38
2721	54	73		72	64	6	58	55	55		No Significant Change	0.12
2722	64	62	72	58	7	58	59	59	57		Quality Deteriorated	-1.50
2723	57	58	66	71	55	6	50	51	5		Quality Deteriorated	-25.32
2782	21	33	41	24	30	28	26	42	38		Quality Improved	7.40
2783	21	42	58	28	32	33	29	43	36		Quality Improved	6.84
2784	55	44	56	26	3	3	27	42	33		Quality Deteriorated	-6.18
2785	19	24		24	24	22	27	26	28		Quality Improved	4.82
2786	19	20		18	23	26	39	46	4		Quality Deteriorated	-18.98
2787	20	18		3	43	24	35	39	31		Quality Improved	5.80
2788	34	13		16	19	3	33	36	32		No Significant Change	-0.75
2789	8		52	46	5	43	4	47	46		Quality Improved	24.60
2790	79	87	88	83	79	73	65	56	69		Quality Deteriorated	-1.68

For calculation of CAGR refer to Pg No.270

Maharashtra Pollution Control Board

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