WATER QUALITY STATUS OF MAHARASHTRA

2018-19

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

The Energy & Resources Institute

Water Quality Status of Maharashtra 2018-19

(Compilation of Water Quality Data Recorded by MPCB)

July 2019

Prepared by

The Energy and Resources Institute

...towards global sustainable development

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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 2018 to March 2019. Also National Sanitation Foundation, USA's formula has been used to calculate Water Quality Index (WQI) to depict the water quality in an 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 2018-19. Among the basins in 2018-19 year, west flowing rivers recorded majority of the observations in 'Good to Excellent" category followed by Godavari basin and Krishna basin. In 2018-19 "Pranhita & others" sub-basin of Godavari basin has recorded the highest percentage of observations in Good to Excellent category followed by Manjra & Godavari Middle. 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, Hon'ble Principal Secretary (Environment) Govt. of Maharashtra, Shri Anil Diggikar, IAS and Hon'ble Chairman, MPC Board, Shri Sudhir Shrivastava* 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 Ms. Pranali Chavan, Research Associate*- 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.

Date: September 2019

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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
GIS	Geographical Information System
GSDA	Ground water Surveys & Development Agency
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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1 Executive Summary

Freshwater and Marine water ecosystems are complex with interlinked physical, chemical and biological systems. Humans, through day to day activities, cause changes in these attributes thus affecting the aquatic living resources over time. In the case of fresh water resources, municipal sewage, agricultural run-off and industrial effluents gets discharged into streams, lakes and rivers thereby making these water resources unsuitable for drinking purpose. Since water is a universal solvent, most of the pollutants (chemicals) get dissolved easily which degrades the overall water quality. Therefore, it is necessary to conduct periodic monitoring of water resource. It not only helps in recording the levels of various pollutants in water bodies but also help policymakers; government bodies to formulate policies that can help protect the human health and the environment.

Water quality is measured by collecting water samples for lab analysis or by using probes which can record data at a single point in time or logged at regular intervals over an extended period. In India, water quality management is performed under the provision of the Water (Prevention and Control of pollution) act, 1974[1]. The main objective of this act is to restore and maintain the integrity of national aquatic resources by prevention and control of pollution. This act defines various functions for the Central pollution Control Board (CPCB) at the apex level and State pollution Control Boards at the state level.

Maharashtra Pollution Control Board (MPCB), being the state nodal agency under CPCB, regularly monitors the water quality across 294 Water Quality Monitoring Stations (WQMS) for both surface water (176 on rivers, 36 on sea/creeks, 12 on drains, 4 dams) and ground water (29 borewells, 35 dug-well, 1 handpump, 1 tubewell) under two programs of National Water Quality Monitoring Program (NWMP) and State Water Quality Monitoring Program (SWMP). MPCB conducts monitoring of surface water samples on a monthly basis while ground water samples get monitored twice a year.

The report compiles statistically analyzed data for the year 2018-19. Performance of surface and ground water quality (Maharashtra state) is depicted in the form of illustrations and spatial representations. The report entails information of Water Quality Index (WQI) for surface water which includes major basins (Tapi, Godavari, Krishna, and West Flowing) as well as the water samples representing saline (sea/creek) and ground water. The WQI provides a single entity (number) which expresses the overall situation of a particular water body at a particular period after assessing several water parameters for that particular water body. The index simplifies the complex parametric data into comprehensive information for easy understanding. It also helps to identify on going and future problems with the water in the region.

The WQI has been determined based on the formula developed by National Sanitation Foundation (NSF) and modified by CPCB[2]..

[1] http://mpcb.gov.in/envtdata/QAQC-%20An%20Overview-%20VAM.pdf

[2] http://mpcb.gov.in/images/pdf/WaterQuality0709/Chapter3_WQ.pdf

1.1 Surface Water Quality (SW)

The Maharashtra Pollution Control Board (MPCB) monitors WQMS for total 43 parameters as as shown in Table No 7 . Out of these 4 parmeters namely pH, Dissolved Oxygen, Biochemical Oxygen Demand (BOD) and Fecal Coliform are considered for calculating WQI. Upon determining the WQI, the water quality is described for easy understanding and interpretation as shown in Table No 1

Table No 1: Classification of Water Quality for Surface Water

Water Quality Index - Surface Water			
WQI	Quality Classification	Remarks	Colour Code
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	

Source: http://www.mpcb.gov.in/envtdata/Ebulletin_pdf/E_bulletin_Oct2016.pdf

In 2018-19, MPCB carried out surface water quality monitoring at about 228 stations located on various rivers, sea, creek and nallahs. Rivers coming under 4 major basins namely Tapi, Godavari, Krishna and West flowing rivers were placed in respective basin and sub-basins (Table No 2).

Out of total 228 Surface WQMS, majority of the stations 150 WQMS recorded under Good to Excellent water Quality as compared to 75 WQMS recorde in the previous year. The highest numbers of WQMS under the Good to Excellent quality category is observed for the West Flowing Rivers.The share of WQMS in 'Medium to Good'has decreased from 97 in previous year 2017-18 as compared to 43 WQMS in the current year. The Purna river, Amravati river, Gomai and Burai river were oserved to be dry throughout the year 2018-19

As seen in Figure No. 1, In terms of the number of observations under the 'Good to Excellent' category of Water Quality Index (WQI), all sub basins except Tapi Middle sub basin has shown improvement as compared to the previous year. In middle Tapi, the observations under Good to Excellent have declined by ~35%. About 0.5% of observations have been noted under Bad category of Water Quality Index in Middle Tapi. Kindly note that overall about 45% of data is observed under Dry category in the upper Tapi Basin, Upper and Middle Godavari Basin, Wardha, Wainganga, Upper Bhima, Upper Krishna and West flowing sub basins accounting for about 45% increased as compared to the previous year (2017-18) .Also, observations under 'Bad to Very Bad' category have increased in Upper Tapi and Upper Bhima sub basins. In contrast, Tapi Middle, Upper Godavari, Godavari Middle, Manjra, Pranhita and others and Krishna Upper sub basins did not record any observations under 'Bad to Very Bad category'.

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

Basin	Sub basin	Name of Rivers	G2E	M2G	B	B2V	Dry	Grand Total
Tapi	Tapi Upper	Tapi, Purna, Pedhi	2	2			1	5
	Tapi Middle	Tapi, Girna, Rangavali, Amravati, Bori, Burai, Gomai, Hiwara, Kan, Mor, Panzara, Titur, Waghur	11	1			3	15
Godavari 1	Godavari Upper	Godavari, Darna, Harsool Dam, Kadwa River, Kham River and Shivna River	19	1				20
	Godavari Middle	Godavari, Bindusara, Sukhna and Purna	10				1	11
	Manjra	Godavari, Manjra	2					2
Godavari 2	Wardha	Wardha, Penganga,Wena and Morna	11		1			12
	Wainganga	Kolar, Kanhan, Wainganga,Wena, Pill and Nag	10	1	2	2		15
	Pranhita & Others	Wainganga	1					1
Krishna	Bhima Upper	Bhima, Nira, Chandrabhaga, Mutha, Ghod, Indrayani, Pawana, Sina, Vel, Mula-Mutha,Mula	12	10	14			36
	Krishna Upper	Krishna, Panchganga, Koyna, Urmodi, Venna,Warna	20	1				21
Coastal	West Flowing Rivers	Kalu, Ulhas, Patalganga, Bhatsa, Vashishti, Mithi, Kundalika, Savitri, Amba, Kundalik, Muchkundi, Surya, Tansa, Vaitarna , Balganga,Jog, Jagbudi,Sonpatra,Tansa	40	1		1		42
	Sea/Creek	Dahanu creek,Dandi creek,Karambavane creek,Kharekuran Murbe creek,Madvi sea,Mahim creek,Navapur sea,Panvel creek,Sarwali creek,Savta creek,Thane creek,Ulhas creek,Uttan sea,Vashi creek	9	25	2			36
Nallah	Nallah	Rabodi nallah, Colour Chem nallah, Sandoz nalla, BPT Navapur, Tarapur MIDC nallah, Pimpal-Paneri nallah, Chikali Nallah,Nallah at Alkai Mandir,Moti Nallah and Lowki Nallah	3	1		8		12
Grand Total			**150**	**43**	**19**	**11**	**5**	**228**

Legend

G2E: Good to Excellent	M2G: Medium to Good	B: Bad	B2V: Bad to Very bad	Dry	No data

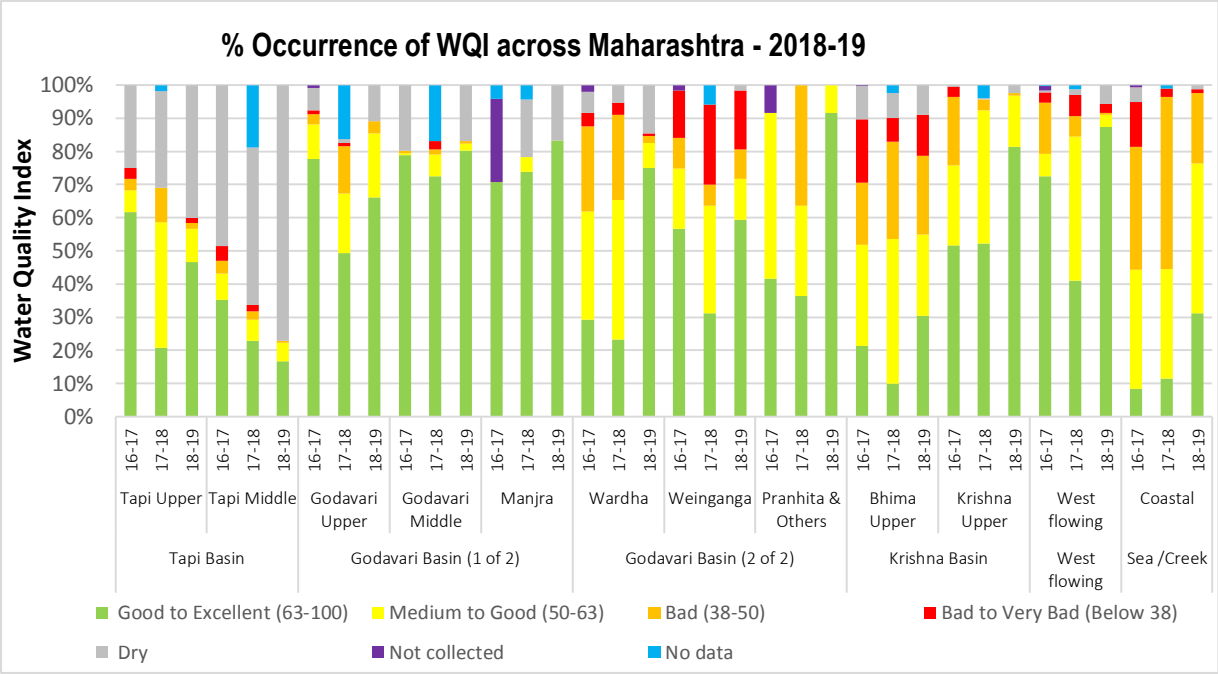

Figure No. 1: Average occurrence of different category of WQI across WQMS in respective sub basins of Maharashtra

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.*

Table No 3 highlights corresponding details of WQMS on of the polluted locations which recorded WQI<50 for more than 50% of the observations. The districts of Nagpur, Ahmednagar, Jalgaon, Pune, Akola, Thane and Palghar have polluted rivers as per the analyzed data.

Table No 3: WQMS which recordd WQI as polluted for more than 50% observations in 2018-19

Sr No.	Station Code	Water Body	Station Name	Village	Taluka	District
1	186	SW	Nag River Near, Bhandewadi Bridge, Nagpur	Nagpur	Nagpur	Nagpur
2	187	SW	Nag River Near, Asoli Bridge, Bhandara Road, Nagpur	Nagpur	Nagpur	Nagpur
3	188	SW	Pill River Near, Wanjra Layout Kamptee Road, Nagpur	Nagpur	Nagpur	Nagpur
4	189	SW	Pill River Near, Mankapur on Koradi Road, Nagpur	Nagpur	Nagpur	Nagpur
5	195	SW	Sina River Bridge At Burudgaon Road, A/P Ahmednagar, Taluka & District Ahmednagar	Burudgaon	Ahmednagar	Ahmednagar
6	196	SW	Lowki Nalla At Khedi, Taluka & District - Jalgaon	Khedi	Khedi	Jalgaon
7	1189	SW	Bhima river at Pune(Mutha river) at U/s of Vithalwadi near Sankar Mandir	Vithalwadi	Haweli	Pune
8	1190	SW	Bhima river at D/s of Bundgarden, Pune	Yerwada	Haweli	Pune
9	2165	Saline	Sea Water at Gateway of India	Colaba	Colaba	Mumbai
10	2166	Saline	Sea Water at Charni Road Choupathy	Girgaon	Mumbai	Mumbai

Sr No.	Station Code	Water Body	Station Name	Village	Taluka	District
11	2168	SW	Mithi River at near bridge	Mahim	Bandra	Mumbai
12	2191	SW	Mutha River at Sangam Bridge Near Ganpathi Ghat	Shivaji Nagar	Pune	Pune
13	2192	SW	Mula-Mutha River at Mundhwa Bridge	Mundhawa	Haweli	Pune
14	2193	SW	Mula River at Aundh Bridge - Aundgaon	Aundhgaon	Haweli	Pune
15	2194	SW	Mula River at Harrison Bridge near Mula -Pawana Sangam	Bopodi	Haweli	Pune
16	2196	SW	Pawana River at Sangavigaon, Pune	Sangavigaon	Haweli	Pune
17	2675	SW	Morna River at D/s of Railway Bridge	Akola	Akola	Akola
18	2678	SW	Mutha River near Veer Savarkar Bhavan	Pune M.C	Pune	Pune
19	2679	SW	Mutha River at Deccan Bridge, Pune	Deccan	Pune	Pune
20	2690	SW	Pawana River at Kasarwadi Pune	Kasarwadi	Haweli	Pune
21	2691	SW	Pawana River at Dapodi Bridge at Pawana-Mulla Sangan Pune	Dapodi	Haweli	Pune
22	2693	SW	Pawana River at Chinchwadgaon, Pune	Chinchwadgaon	Haweli	Pune
23	2694	SW	Pawana River at Pimprigaon, Pune	Pimprigaon	Haweli	Pune
24	2782	Nalla	Rabodi Nalla	Rabodi	Thane	Thane
25	2783	Nalla	Colour Chem Nalla	Majiwada	Thane	Thane
26	2784	Nalla	Sandoz Nalla	Sandozbaug	Thane	Thane
27	2785	Nalla	BPT Navapur	Navapur	Palghar	Palghar
28	2786	Nalla	Tarapur MIDC Nalla, near sump No1	MIDC Tarapur	Palghar	Palghar
29	2787	Nalla	Tarapur MIDC Nalla	MIDC Tarapur	Palghar	Palghar
30	2788	Nalla	Tarapur MIDC Nalla near sump-III	MIDC Tarapur	Palghar	Palghar

In case of Saline water quality, monitoring takes place at 36 locations representing 4 districts along the Maharashtra coastline. There are total of 10 Saline WQMS installed in Mumbai district whereas the districts of Thane, Raigad and Ratnagiri have total of 19, 3 and 4 saline WQMS installed respectively. There is no WQMS installed in Sindhudurg district.

It has been observed that, the samples of sea water collected from Thane and Mumbai district have been consistently recording WQI in the category of 'Bad' to 'Medium'. This might be mainly attributed to the human settlements and industrial establishments around the creeks and near the sea shore in Mumbai. Untreated/semi treated sewage generated from these sources gets mixed directly into the creek and sea water of Mumbai and Thane which could be the possible reason behind the lower WQI.

1.2 Ground water Quality (GW)

There are about 66 ground water monitoring stations across the state.The WQI for groundwater is calculated considered 11 parameters (pH, Total Hardness, Calcium, Magnesium, Chloride, Total Dissolved Solids, Fluoride, Nitrate and Sulphate) out of total parameters as presented in Table No 7 of Section 3.1 of of this report. .Based on concentration of the parameter and specific weight as assigned by CPCB, the water Quality Index is determined. Based on the WQI, water quality is categorized into different color code as below (Table No 4)

Table No 4: Classification of Water Quality for Ground water

Water Quality Index – Ground Water		
WQI	**Water Quality**	**Colour Code**
<50	Excellent	
50-100	Good Water	
100-200	Poor Water	
200-300	Very Poor Water	
>300	Water Unsuitable for Drinking	

Source: http://www.mpcb.gov.in/envtdata/Ebulletin_pdf/E_bulletin_English_March2017_13062017.pdf

Table No 5: Annual Average WQI for Groundwater WQMS across MPCB Regional Offices.

Regional Office	Total Stations	Excellent	Good water	Poor Water	Very poor	Water Unsuitable for Drinking	Dry
Amravati	3		2	1			
Aurangabad	5						5
Chandrapur	2			2			
Kalyan	4						4
Kolhapur	15	4	1	7	3		
Nagpur	14			12			2
Nashik	7		1	1			5
Navi Mumbai	2						2
Pune	6		1	4	1		
Raigad	3			1		1	1
Thane	5	1		3			1
Grand Total	**66**	**5**	**5**	**31**	**4**	**1**	**20**

In the year 2018-19, out of 66 WQMS, 5 WQMS (4 in Kolhapur followed by 1 Thane) are observed under 'Excellent' quality category throughout the year, followed by 5 WQMS (2 in Amravati, and 1 WQMS each in Kolhapur, Nashik and Pune in 'Good' water category.the remaining 30 WQMS under 'Poor water' quality and 4 WQMS under 'Very Poor Water' Quality category were noted. The station code 217- Borewell water at village Milgaon, Khalapur Taluka of Raigad district recorded water quality under 'Water Unsuitable for Drinking' category due to high levels of high levels of total hardness (1920 mg/l),

Magnesium (630 mg/l),Chlorides(1365 mg/l), and Calcium (1290 mg/l) and Total Dissolved solids (4442 mg/l).

The pH levels for all ground WQMS were observed in the range of 6.9-8.9.In terms of Fluoride, station code -209 (Bore Well near Pardhi House, Bhandewadi, Nagpur), 210 (Bore Well near Dearao Kale House, Bhandewadi,Nagpur) and 212 (Dug well on Nalla At Mhasala, Grampanchayat Kawtha,Nagpur) recorded about 2.1-2.5mg/l times higher than the limit (1 mg/l) as per IS 10500 : 2012[3] . In case of Nitrate, the levels were found to be well within the limits (45 mg/l).

Thus it is concluded that, in the current year 2018-19 about 54% of total observations (2734) fall under Good to excellent category followed by 17% of observations in the range of Medium to Good. About 15% of total observations is noted to be under Polluted category. About 13% of total observations are observed to be under Dry category. In terms of groundwater, highest number of WQMS in Kolhapur region is observed in Éxcellent to Good water 'category followed by Amravati Region. The Nagpur region has maximum number of WQMS being observed under 'Poor to Very Poor' water quality.

[3] http://cgwb.gov.in/Documents/WQ-standards.pdf

2 Introduction

2.1 Water Pollution

As per the World Health Organization (WHO), Water pollution is defined as any change in the physical, chemical and biological properties of water that has negative impacts on living beings .It is a cause of grave concern due to the limited fresh water sources on the earth. Degradation of these sources due to pollution will lead to water scarcity, ecosystem degradation and negative impacts on human health. By 2025, half of the world's population is estimated to be living in water-stressed areas[4]. Thus, assessing and controlling water pollution is of utmost importance.

Pollutants may enter water bodies through either point source i.e. when contaminant is released from a single location or non-point sources i.e. contaminants enter from a large, widespread area. Discharge of effluents, storm sewer outfall, leachate from waste disposal sites are examples of point sources while agriculture runoff, bacteria and microbes from agriculture and livestock areas, erosion from logging are examples of non-point sources.

In India, the major sources of water pollution include domestic sewage, agricultural run-off and discharge of industrial effluents[5,6]. Nutrient pollution from agricultural runoff results in algal blooms. In addition, various pathogenic microbes also cause water pollution. Heavy metal contamination in water bodies occurs due to effluents from tanneries, electroplating, mining, etc [3,7]. Further, disposal of solid wastes like plastics, metal cans and glass objects and immersion of idols during religious events also pollute water. The contaminants may dissolve in water or remain suspended in the water body. Some of these contaminants may leach down into sediments and groundwater aquifers, causing contamination of groundwater. Also leaching of toxic substances from duping grounds pollutes groundwater.

Globally, 785 million people a basic drinking-water service, including 144 million people who are dependent on surface water and at least 2 billion people use a drinking water source that is contaminated with feces1. Fecal contamination of water can transmit diseases such diarrhea, cholera, dysentery, typhoid, and polio. It is estimated to result in 485 000 diarrheal deaths each year worldwide. Other diseases caused include vomiting, skin and kidney problems and gastroenteritis[8]. Apart from health impacts, water pollution also affects the aquatic life. For instance, consumption of plastic pieces by aquatic fauna, Thinning of shells of shellfish and crustaceans, reduced fertility, weak egg shells, coral bleaching, reduced dissolved oxygen levels are some examples[9,10].

Given the importance of water in sustaining life, periodic assessment of water resources is important. This report assesses the water quality status of the surface and ground water resources of Maharashtra.

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[4] WHO 2017

[5] Vyas et al. Environment impact of idol immersion activity lakes of Bhopal,India.2006

[6] Suthar et al. Assessment of metals in water and sediments of Hindon River, India: Impact of industrial and urban discharges. 2013

[7] Bhagure and Mirgane. Heavy metal concentrations in groundwaters and soils of Thane Region of Maharashtra, India. Environmental monitoring and assessment. 2011

[8] Halder and Islam. Water pollution and its impact on the human health. 2017

[9] *Gall and Thompson*. The impact of debris on marine life. *2015*

[10] *Islam and Tanaka*. Impacts of pollution on coastal and marine ecosystems including coastal and marine fisheries and approach for management: a review and synthesis. *2004*

2.2 Water Pollution Act

Considering the need of maintaining water quality, the Ministry of Environment Forests and Climate Change (MoEF&CC) enacted the Water Pollution (Prevention and Control) Act, in the year 1974. The act conferred powers and to the Central Pollution Control Board in order to check and control water pollution and improve water quality. Later, the Water (Prevention and Control of Pollution) Cess Act was enacted in the year 1997. The act was enacted to levy and collect a cess/ tax on water consumed by stakeholders operating and carrying out certain industrial activities.

2.3 National Water Quality Monitoring Program

The CPCB and State Pollution Control Board (SPCB) collaborated to establish a network of monitoring stations across the country. Water samples are analyzed for 28 parameters - 9 core parameters and 19 other physico-chemical and bacteriological parameters and field observations. 9 trace metals and 15 pesticides are also analyzed in selected samples. Bio monitoring is carried out at specific locations. Owing to limited resources, a limited numbers of organic pollution related parameters are monitored. Micro pollutants (Toxic Metals & POPs) are assessed only once a year.

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3 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)[11] and the third largest in terms of area (30.7Mha).[12]. The total geographical area of the state is divided into 5 basins, namely Godavari, Tapi, Narmada, Krishna and West flowing rivers of the Konkan region.

In Maharashtra, water quality is monitored by various agencies namely Hydrology Project (SW), Ground water 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).

3.1 Monitoring network in Maharashtra –

The water quality testing under NWMP in Maharashtra is monitored by MPCB (state nodal agency). Monitoring is carried out at 294 station, (176 are on rivers, 36 on sea/creek, 12 on nallahs and 66 ground water), the highest across all states of Maharashtra Table No 6. MPCB has infrastructure to monitor 44 parameters including field observations, general parameters, core parameters and trace metals (Table No 7). The water samples are monitored with a monthly and six monthly frequency for surface and ground water stations respectively.

Table No 6: Basin and water body typewise tally of WQMS in Maharashtra

	Water body	**Basin**				
		Tapi	Godavari	Krishna	West Flowing Rivers	**Grand Total**
Surface Water	Rivers	20	60	57	40	176
	Dam		2		2	4
	Sea				16	16
	Creek				20	20
	Nalla	2	1	1	8	12
Groundwater	Bore well	1	10	10	8	29
	Dug well	1	14	6	13	34
	Hand pump		1			1
	Tube well	1				1
	Well		1			1
Total		**25**	**88**	**74**	**107**	**294**

[11] Census 2011

[12] Centre for Technology Alternatives for Rural Areas,Water resources of Maharashtra State

Table No 7: 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 $CaCO_3$	Iron
8		Fecal Coliform	Calcium $CaCO_3$	Arsenic
9		Total coliform	Magnesium $CaCO_3$	Mercury
10			Sulphate	Pesticides
11			Sodium	
12			Total dissolved solids	
13			Total fixed solids	
14			Total suspended solids	
15			Phosphate	
16			Boron	
17			Potassium	
18			Fluoride	

4 Methodology

The comprehensive data sets recorded by WQMS across the state were organised basin wise for evaluation for both surface and ground water 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 8. 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 ground water 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 8: 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	17
Godavari 1	Godavari Upper	Godavari, Darna, Harsool Dam, Kadwa River, Kham River and Shivna River	28
	Godavari Middle	Godavari, Bindusara, Sukhna and Purna	14
	Manjra	Godavari, Manjra	2
Godavari 2	Wardha	Wardha, Penganga,Wena and Morna	17
	Wainganga	Kolar, Kanhan, Wainganga,Wena, Pill and Nag	26
	Pranhita and others	Wainganga	1
Krishna	Bhima Upper	Bhima, Nira, Chandrabhaga, Mutha, Ghod, Indrayani, Pawana, Sina, Vel, Mula-Mutha,Mula	45
	Krishna Upper	Krishna, Panchganga, Koyna, Urmodi, Venna,Warna	29
West Flowing rivers		Kalu, Ulhas, Patalganga, Bhatsa, Vashishti, Mithi, Kundalika, Savitri, Amba, Kundalik, Muchkundi, Surya, Tansa, Vaitarna , Balganga,Jog, Jagbudi,Sonpatra,Tansa	59
		Rabodi nallah, Colour Chem nallah, Sandoz nalla, BPT Navapur, Tarapur MIDC nallah, Pimpal-Paneri nallah, Chikali Nallah,Nallah at Alkai Mandir,Moti Nallah and Lowki Nallah	12
Saline		Dahanu creek,Dandi creek,Karambavane creek,Kharekuran Murbe creek,Madvi sea,Mahim creek,Navapur sea,Panvel creek,Sarwali creek,Savta creek,Thane creek,Ulhas creek,Uttan sea,Vashi creek	36
Total			**294**

4.1 Spatial Maps

- **Sub -basin level maps**
  Of the 5 major basin, Narmada basin comprises of just 0.5%[13] 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[14] (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.

4.2 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 for the years 2008 to 2019 was provided by MPCB. 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.

4.3 Water Quality Index Calculation

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

[13] Maharashtra Water Resources Regulatory Authority, http://www.mwrra.org/introduction.php?link=wr
[14] 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;

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

Where;

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

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

P= number of water quality parameters

4.3.1 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 9 and the equations used to determine the sub index values are given Table No 10. 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 11.

Table No 9: 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 10: 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 11: 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 2017-18- Biological Oxygen Demand (BOD), Dissolved Oxygen (DO), pH, Fecal Coliform (FC)

Station Name	:	Pedhi River near Road Bridge at Dadhi-Pedhi village Station Code : 2695			
Sub basin	:	Tapi Upper	Basin	:	Godavari
BOD	:	4.8 mg/l	DO	:	5.3 mg/l
FC	:	94 MPN/100 ml	pH	:	7.5

Formula

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

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 = 4.8 mg/l

Since 4.8 lies in range (0-10), the corresponding formula is used Table No.11

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

= 96.67 – 7 X 4.8

= 63.07 X Modified Weights by CPCB for BOD (Table No.10)

= 63.07 X 0.19

= 11.983

Sub index for Dissolved Oxygen (DO)

DO value = 5 .3 mg/l

DO (saturation %) = 5 .3 /6.5 X 100 [6.5 has been taken as constant as per DO vs temp]

= 82

Since 82 lies in range (40-100), the corresponding formula is used from Table No.11

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

= (-13.55) + 1.17 X 82

= 54 X Modified Weights by CPCB for DO (Table No.10)

= 54* 0.31

= 16.74

Sub index for Fecal Coliform (FC)

Fecal Coliform value = 94 MPN/100ml

Since 94 lies in range (0-10^3), the corresponding formula is used from Table No.11

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

= 97.2-26.6 X log 94

= 45 X Modified Weights by CPCB for FC (Table No.10)

= 45 X 0.28

= 12.6

Sub Index for pH

pH value = 7.5

Since 7.5 lies in range (7.3-10), the corresponding formula is used from Table No.11

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

= 316.96-29.85 X 7.5

= 93 X Modified Weights by CPCB for pH (Table No.10)

= 93 X 0.22

= 20.46

WQI of Pedhi River near Road Bridge at Dadhi-Pedhi village

WQI = $\sum$ (sub –index of all parameters)

= $\sum$ (11.98+16.7+12.6+20.46)

= 62

Quality Classification: Medium to Good

4.3.2 WQI for ground water

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[15]. The relative weights of the same have been determined (Table No 12) for the parameters monitored and recorded by MPCB for the water samples monitored in the year 2018-19.These weights indicate the relative harmfulness when present in water. The maximum weight assigned is 5 and minimum is 1.

Table No 12: Relative Weight of chemical parameters used for calculating WQI for Ground water

Chemical Parameters	**Indian Standards for Drinking Water Quality[16]**		**Weight (Wi)**			
	Acceptable Limit	Permissible Limits	Weight	Relative Weight	Weight w/o Iron, Manganese and Bicarbonate	Relative Weight w/o Iron, Manganese and Bicarbonate
pH	6.5-8.5	No relaxation	4	0.09756	4	0.13333
Total Hardness (TH)	300	600	2	0.04878	2	0.06667
Calcium	75	200	2	0.04878	2	0.06667
Magnesium	30	No relaxation	2	0.04878	2	0.06667
Bicarbonate	244	732	3	0.07317	-	-
Chloride	250	1000	3	0.07317	3	0.10000
Total Dissolved Solids (TDS)	500	2000	4	0.09756	4	0.13333
Fluoride	1	1.5	4	0.09756	4	0.13333
Manganese	0.1	0.3	4	0.09756	-	-
Nitrate	45	No relaxation	5	0.12195	5	0.16667
Iron	0.3	No relaxation	4	0.09756	-	-
Sulphate	200	400	4	0.09756	4	0.13333
			41	1	30	1

Source: BIS 10500 and CPCB 2001

The 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.

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

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

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 13

Table No 13: Ground water 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	

4.3.3 Sample Calculation for determining Ground WQI

Station name : Gram Panchayat Dug well near Gram Panchayat Office, Brahmni

Station code	: 1998	Sub basin	: Wainganga	Basin	: Godavari
Calcium	:18 mg/l	Chlorides	: 475 mg/l	Fluoride: 0.268	
Magnesium	: 26 mg/l	Nitrate	: 0.36 mg/l	Sulphate: 5 mg/l	
pH	: 7.1	TDS	: 1980 mg/l	TH	: 44 mg/l

Formula

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

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 ground water 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 = 7.1

Sub index (pH) = Concentration /Standard X 100

= 7.1/7.5 X 100

= 94.6 X relative weight (Table no. 13)

= 94.6 X 0.13333

= 12.621

Sub index for Total hardness

Total hardness = 44

Sub index (TH) = Concentration /Standard X 100

= 44/ 300*100

= 14.6 X relative weight (Table no. 13)

= 14.6 X 0.06667

= 0.977

Sub index Calcium

Calcium = 18

Sub index (Calcium) = Concentration /Standard *100

= 18/ 75 X 100

= 24 X relative weight (Table no. 13)

= 24 X 0.0666

= 1.6

Sub index for Chloride

Chloride = 475

Sub index (Chloride) = Concentration /Standard X 100

= 475/ 250 X 100

= 190 X relative weight (Table no. 13)

= 190 X 0.1

= 19

Sub index for Fluoride

Fluoride = 0.268

Sub index (Fluoride) = Concentration /Standard X 100

= 0.268/ 1 X 100

= 0.268X relative weight (Table no. 13)

= 0.268 X 0.1333

= 26.8

Sub index for Magnesium

Magnesium = 26

Sub index (Mg) = Concentration/ Standard X 100

= 26/ 30*100

= 86.6 X relative weight (Table no. 13)

= 86.6 X 0.06667

= 5.77

Sub index for Nitrate

Nitrate = 0.36

Sub index (Nitrate) = Concentration/ Standard X 100

= 0.36/45 *100

= 0.8 X relative weight (Table no. 13)

= 0.8 X 0.16667

= 0.133

Sub index for Sulphate

Sulphate = 5

Sub index (Sulphate) = Concentration/ Standard X 100

= 5/ 200 X 100

= 2.5 X relative weight (Table no. 13)

= 2.5 X 0.13333

= 0.33

Total Dissolved Solids

Total Dissolved Solids= 1980

Sub index (TDS) = Concentration/ Standard X 100

= 1980/ 500 X 100

= 396 X relative weight (Table no. 13)

= 396 X 0.13333

= 52.798

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

WQI = ∑ (sub –index of all parameters)

= ∑ (12.621 + 0.97 + 1.6+ 19 + 26.8+ 5.77 + 0.133+ 0.33+ 52.798)

= 97

Quality Classification: Good Water

4.3.4 CAGR: Compound Annual Growth Rate

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

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

Sample Calculation for determining CAGR

Example Station code: 1317
WQI

(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

5 Surface Water Quality

The surface water resources i.e. the water available in country's rivers, lakes, reservoirs, streams and creeks are vitally important to meet our daily life water need. The surface water is used for drinking, agricultural and industrial purposes. Ecosystem associated with these resources provide habitat for many plant and animal species. In India, Monsoon is main source of surface water. The Annual utilizable surface water resources of India are estimated to be 690 Km^3 [17]. Rapid industrialization and Urbanization is putting an immense pressure on these resources. The quality of surface water resources is also deteriorating because of increasing pollutant loads from point and non-point sources.

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 2018-19 are represented in the Table No 14. 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 14: **List of monitoring stations across different type of water bodies under MPCB**

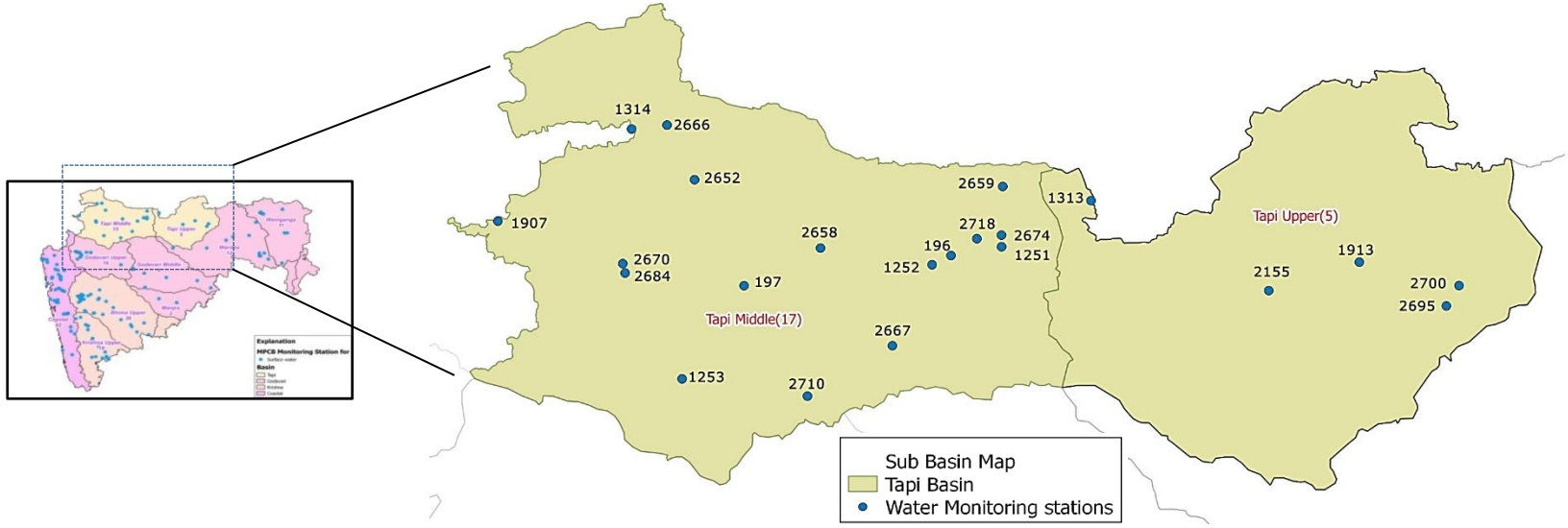
Water Quality monitoring stations	
Water Bodies	**2018-19**
Rivers	176
Sea and Creek	36
Nalla	12
Dams	4
Total	**228**

The following section presents the illustrations of the parameters pH, DO, BOD and FC recorded across the 228 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.

[17] http://www.iisc.ernet.in/currsci/sep102005/794.pdf

5.1 Tapi Basin

Map No. 1: Network of surface water quality monitoring stations in Tapi basin

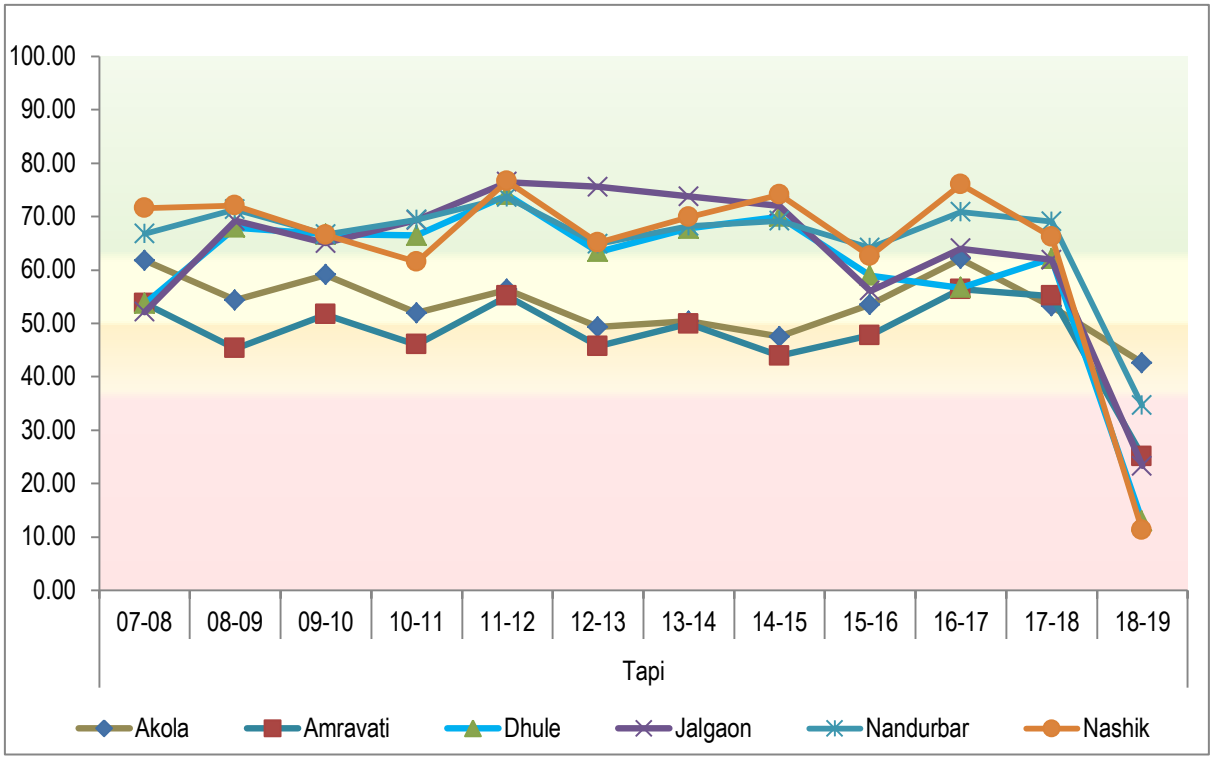


The Tapi Basin is situated in the northern part of the Deccan plateau. The basin extends over states of Madhya Pradesh, Maharashtra and Gujarat with a coverage area of about 65,145 sq. km which is nearly 2% of the total geographic area of the country[18]. Nearly 80% of the basin lies in the state of Maharashtra followed 15% in Madhya Pradesh and nearly 6% in Gujarat. Rivers like Purna, Girna, Gomai, Panzara, Pedhi and Arna are some of the major tributaries of Tapi river system[19]. A list of the station and the codes has been provided below in. Table No 15

[18] http://cwc.gov.in/regionaloffices/ntbo/Water%20Year%20Book/Tapi%20WYB2011-12.pdf

[19] http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Tapi

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. 2: Trend of annual average WQI across districts of Tapi basin

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

The intra basin performance of Tapi basin across six districts of the state is depicted in Figure No. 2. It is important to note that during 2018-19, majority of the observations (68%) recorded under "Dry" category.

In 2018-19, Annual average WQI of Akola belonged to "Bad" category as compared to "Medium to Good" recorded in 2017-18. Similar decreasing pattern was observed in WQI of Nandurbar, Jalgaon, Nashik and Dhule ("Good to Excellent to "Bad to Very Bad") in 2018-19.

Note: 68% of the observations in Tapi basin were recorded in ''Dry'' category.

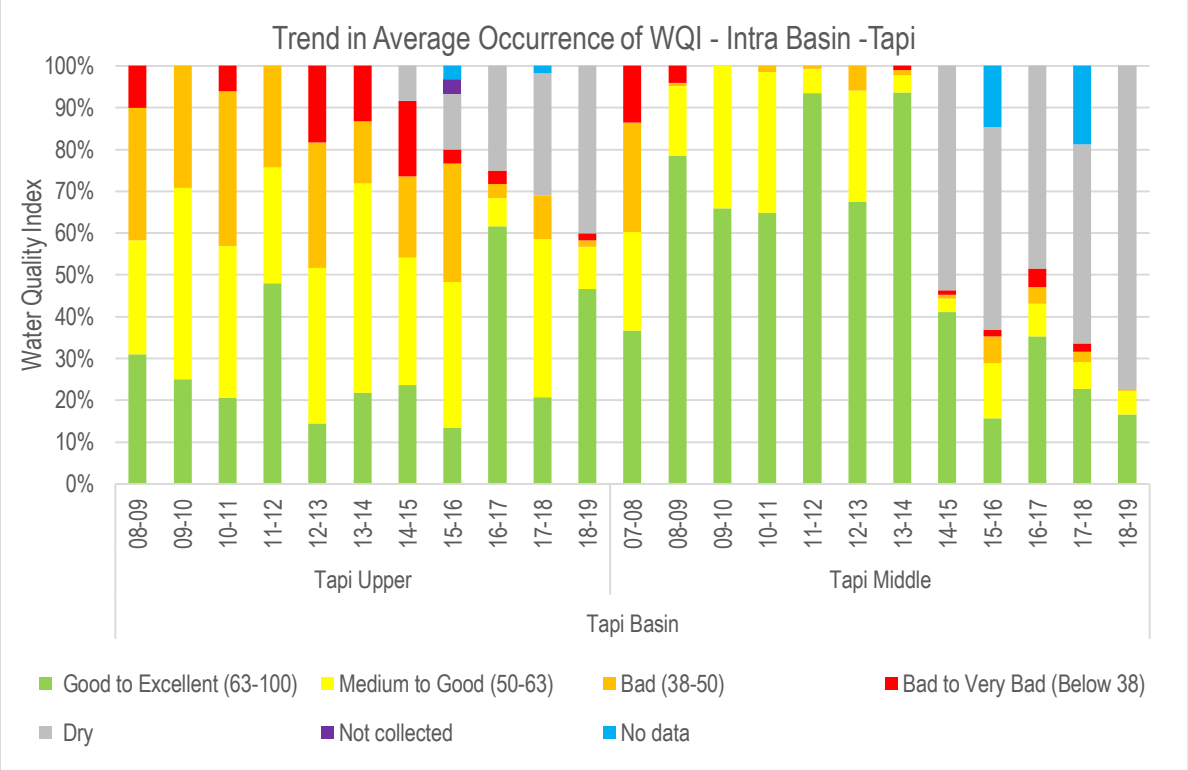
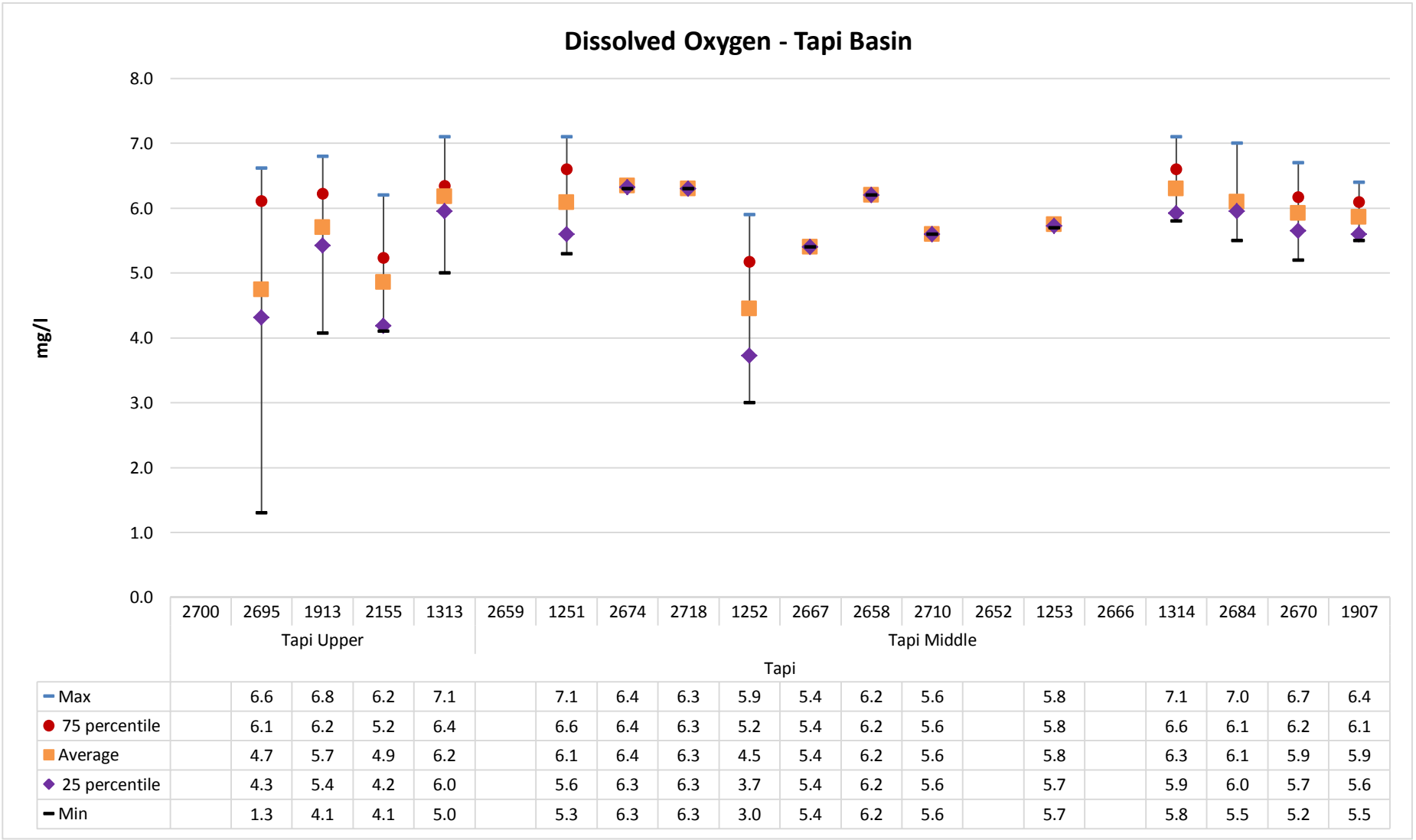


Figure No. 3: Trend in Average occurrence for different category of WQI in Tapi Basin

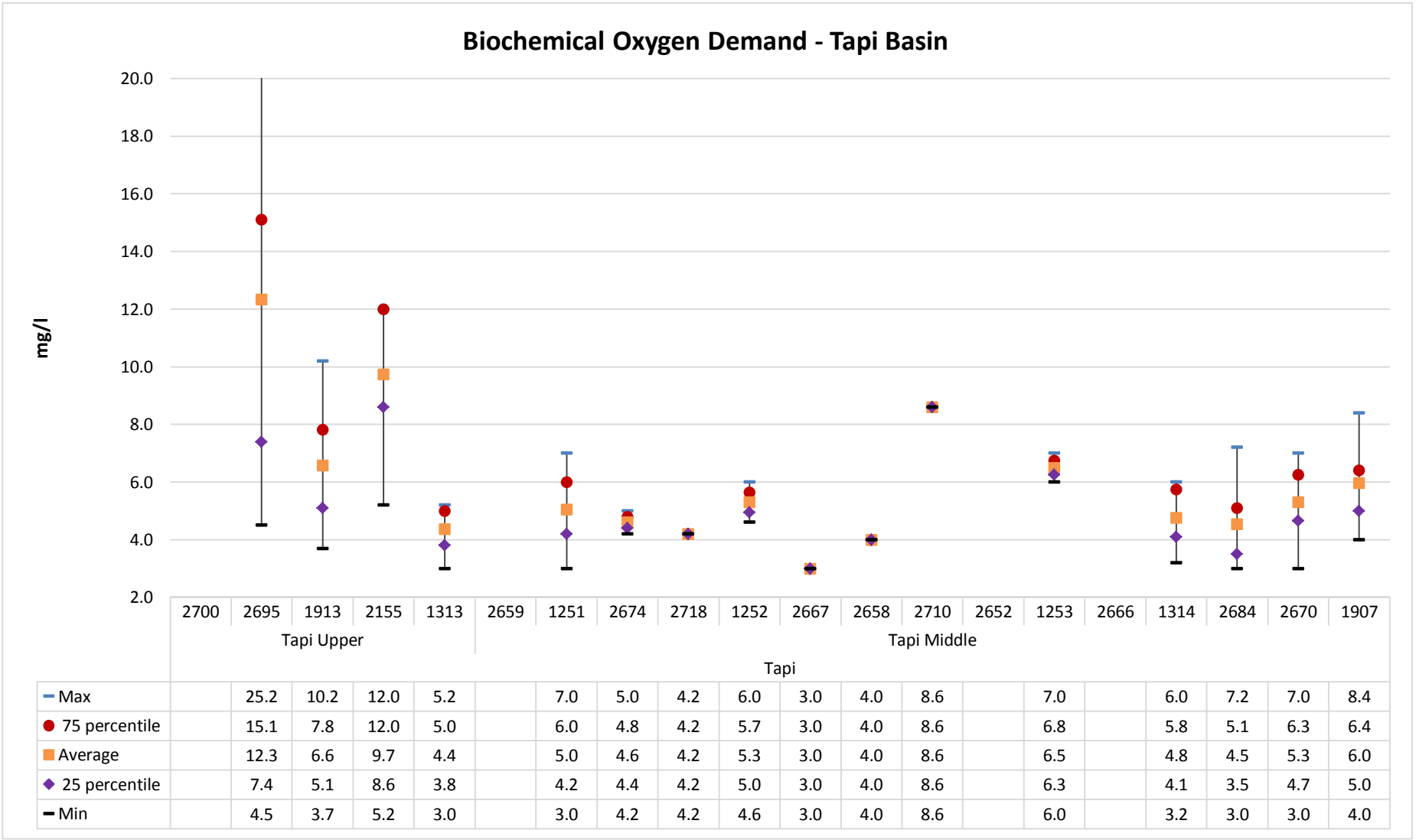
Figure No. 3, depicts the interbasin analysis for Tapi Basin for the year 2018-19. It was important to note that, majority of the observations, both for Tapi Upper (40%) and Tapi Middle (77.2%) were found to be under "Dry" category. In Tapi Upper, more than 46% (46.6%) of the observations were recorded under ''Good toExcellent'' category while Tapi Middle recorded more than 16% (16.6%) of the total observations under this category.

In case of ''Medium to Good'' category, Tapi Upper recorded 10% of the total observations wgereas Tapi Middle recorded more than 5% (5.5%) in the same category. Around 2% of the observations from Tapi Upper (1.66%) were recorded under "Bad" WQI category compared to 0.5% in Tapi Middle basin. Similaly, 1.6% of the observatins from Tapi Upper were recorded under ''Bad to Vary Bad'' category whereas, Tapi Middle recorded no observation under this category.



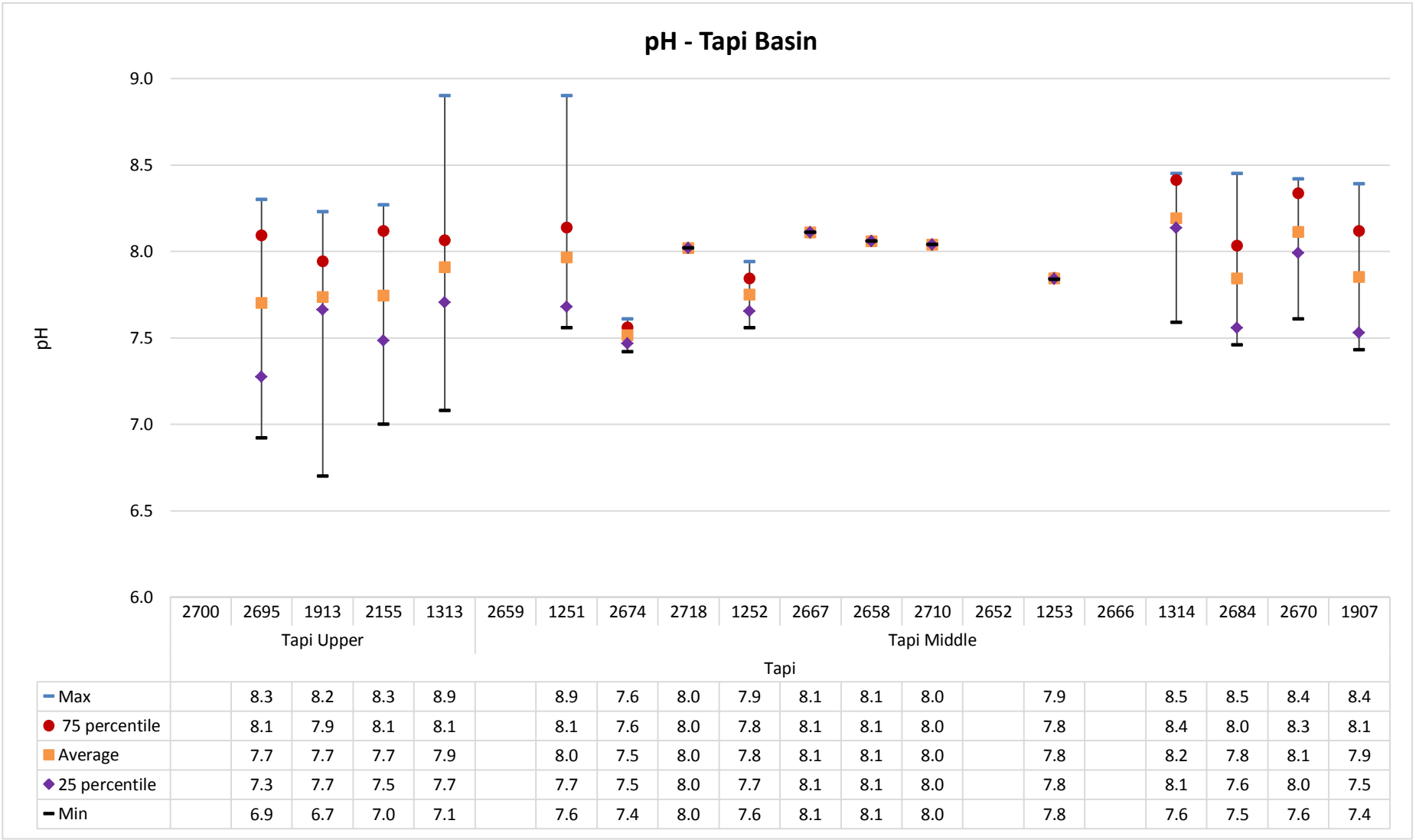
	2700	2695	1913	2155	1313	2659	1251	2674	2718	1252	2667	2658	2710	2652	1253	2666	1314	2684	2670	1907
	Tapi Upper					Tapi Middle														
	Tapi																			
Max		6.6	6.8	6.2	7.1		7.1	6.4	6.3	5.9	5.4	6.2	5.6		5.8		7.1	7.0	6.7	6.4
75 percentile		6.1	6.2	5.2	6.4		6.6	6.4	6.3	5.2	5.4	6.2	5.6		5.8		6.6	6.1	6.2	6.1
Average		4.7	5.7	4.9	6.2		6.1	6.4	6.3	4.5	5.4	6.2	5.6		5.8		6.3	6.1	5.9	5.9
25 percentile		4.3	5.4	4.2	6.0		5.6	6.3	6.3	3.7	5.4	6.2	5.6		5.7		5.9	6.0	5.7	5.6
Min		1.3	4.1	4.1	5.0		5.3	6.3	6.3	3.0	5.4	6.2	5.6		5.7		5.8	5.5	5.2	5.5

Figure No. 4: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Tapi basin



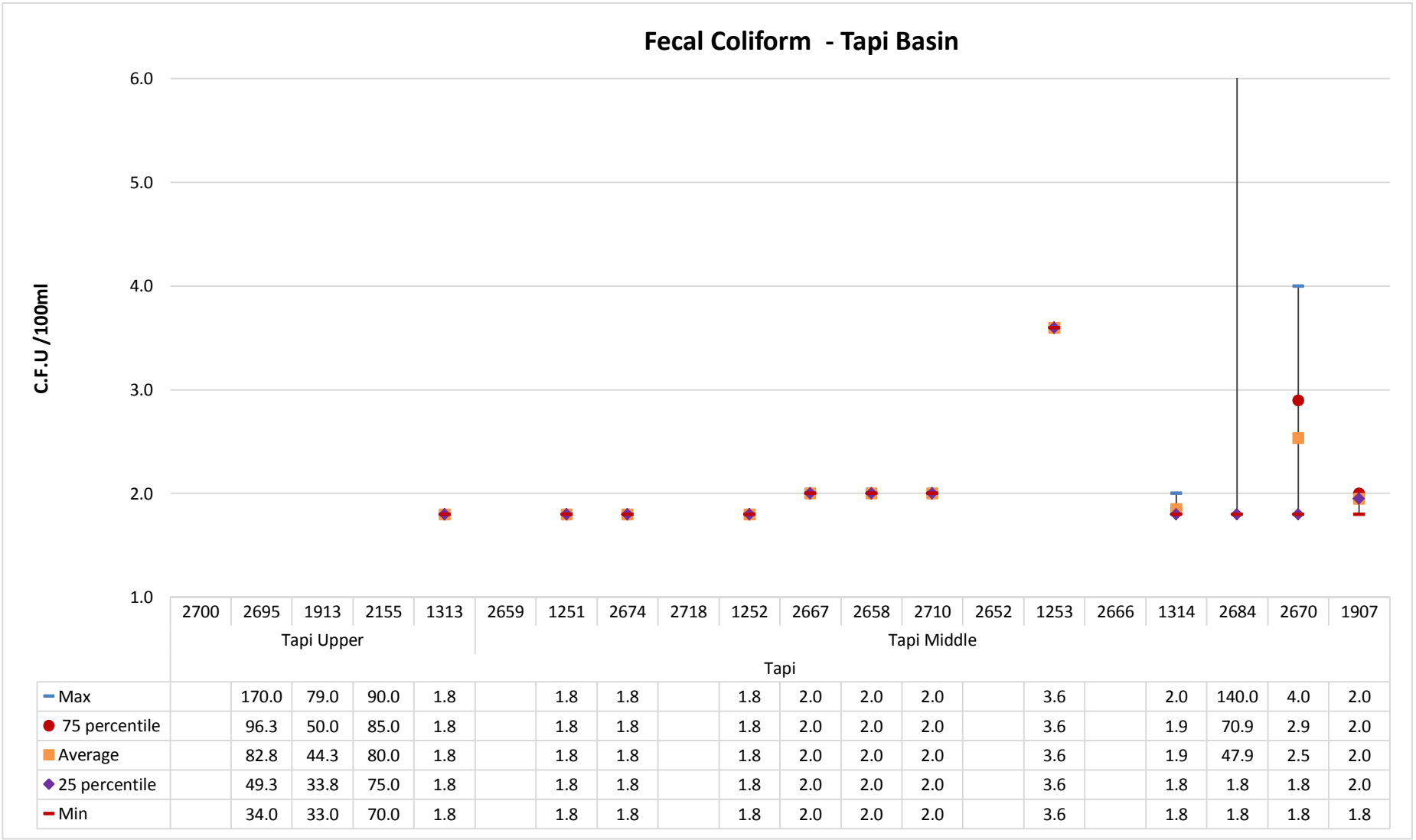
	2700	2695	1913	2155	1313	2659	1251	2674	2718	1252	2667	2658	2710	2652	1253	2666	1314	2684	2670	1907
Max		25.2	10.2	12.0	5.2		7.0	5.0	4.2	6.0	3.0	4.0	8.6		7.0		6.0	7.2	7.0	8.4
75 percentile		15.1	7.8	12.0	5.0		6.0	4.8	4.2	5.7	3.0	4.0	8.6		6.8		5.8	5.1	6.3	6.4
Average		12.3	6.6	9.7	4.4		5.0	4.6	4.2	5.3	3.0	4.0	8.6		6.5		4.8	4.5	5.3	6.0
25 percentile		7.4	5.1	8.6	3.8		4.2	4.4	4.2	5.0	3.0	4.0	8.6		6.3		4.1	3.5	4.7	5.0
Min		4.5	3.7	5.2	3.0		3.0	4.2	4.2	4.6	3.0	4.0	8.6		6.0		3.2	3.0	3.0	4.0

Figure No. 5: Trend of BOD levels recorded at WQMS at Tapi basin



	2700	2695	1913	2155	1313	2659	1251	2674	2718	1252	2667	2658	2710	2652	1253	2666	1314	2684	2670	1907
		Tapi Upper					Tapi Middle													
		Tapi																		
Max		8.3	8.2	8.3	8.9		8.9	7.6	8.0	7.9	8.1	8.1	8.0		7.9		8.5	8.5	8.4	8.4
75 percentile		8.1	7.9	8.1	8.1		8.1	7.6	8.0	7.8	8.1	8.1	8.0		7.8		8.4	8.0	8.3	8.1
Average		7.7	7.7	7.7	7.9		8.0	7.5	8.0	7.8	8.1	8.1	8.0		7.8		8.2	7.8	8.1	7.9
25 percentile		7.3	7.7	7.5	7.7		7.7	7.5	8.0	7.7	8.1	8.1	8.0		7.8		8.1	7.6	8.0	7.5
Min		6.9	6.7	7.0	7.1		7.6	7.4	8.0	7.6	8.1	8.1	8.0		7.8		7.6	7.5	7.6	7.4

Figure No. 6: Trend of pH levels recorded at WQMS at Tapi basin



	2700	2695	1913	2155	1313	2659	1251	2674	2718	1252	2667	2658	2710	2652	1253	2666	1314	2684	2670	1907
Max		170.0	79.0	90.0	1.8		1.8	1.8		1.8	2.0	2.0	2.0		3.6		2.0	140.0	4.0	2.0
75 percentile		96.3	50.0	85.0	1.8		1.8	1.8		1.8	2.0	2.0	2.0		3.6		1.9	70.9	2.9	2.0
Average		82.8	44.3	80.0	1.8		1.8	1.8		1.8	2.0	2.0	2.0		3.6		1.9	47.9	2.5	2.0
25 percentile		49.3	33.8	75.0	1.8		1.8	1.8		1.8	2.0	2.0	2.0		3.6		1.8	1.8	1.8	2.0
Min		34.0	33.0	70.0	1.8		1.8	1.8		1.8	2.0	2.0	2.0		3.6		1.8	1.8	1.8	1.8

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

Water Quality Index for WQMS in Tapi Basin

Apr	Dry	63	72	Dry	86	Dry	60	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry	79			
May	Dry	63	72	Dry	82	Dry	76	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry	86			
Jun	Dry	38	67	Dry		Dry								Dry		Dry	86		74	
Jul	Dry	68	66	Dry	78	Dry	79	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry	56	57	54	83
Aug	Dry	56	56	57	87	Dry	86	88	Dry	85	Dry	Dry	Dry	Dry	78	Dry	81	83	87	84
Sep	Dry	41	57	54	78	Dry	78	65	61	42	82	85	76	Dry	56	Dry	58	60	83	58
Oct	Dry	57	73	70	85	Dry	81	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry		54		
Nov	Dry	67	73	Dry	87	Dry	87	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry				80
Dec	Dry	75	73	Dry	89	Dry	91	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry		64		
Jan	Dry	74	77	Dry	87	Dry	82	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry				80
Feb	Dry	Dry	78	Dry	86	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry		72		
Mar	Dry	Dry	75	Dry	87	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry		90		
Station Code	2700	2695	1913	2155	1313	2659	1251	2674	2718	1252	2667	2658	2710	2652	1253	2666	1314	2684	2670	1907
Sub Basin	Tapi Upper					Tapi Middle														
Basin	Tapi																			

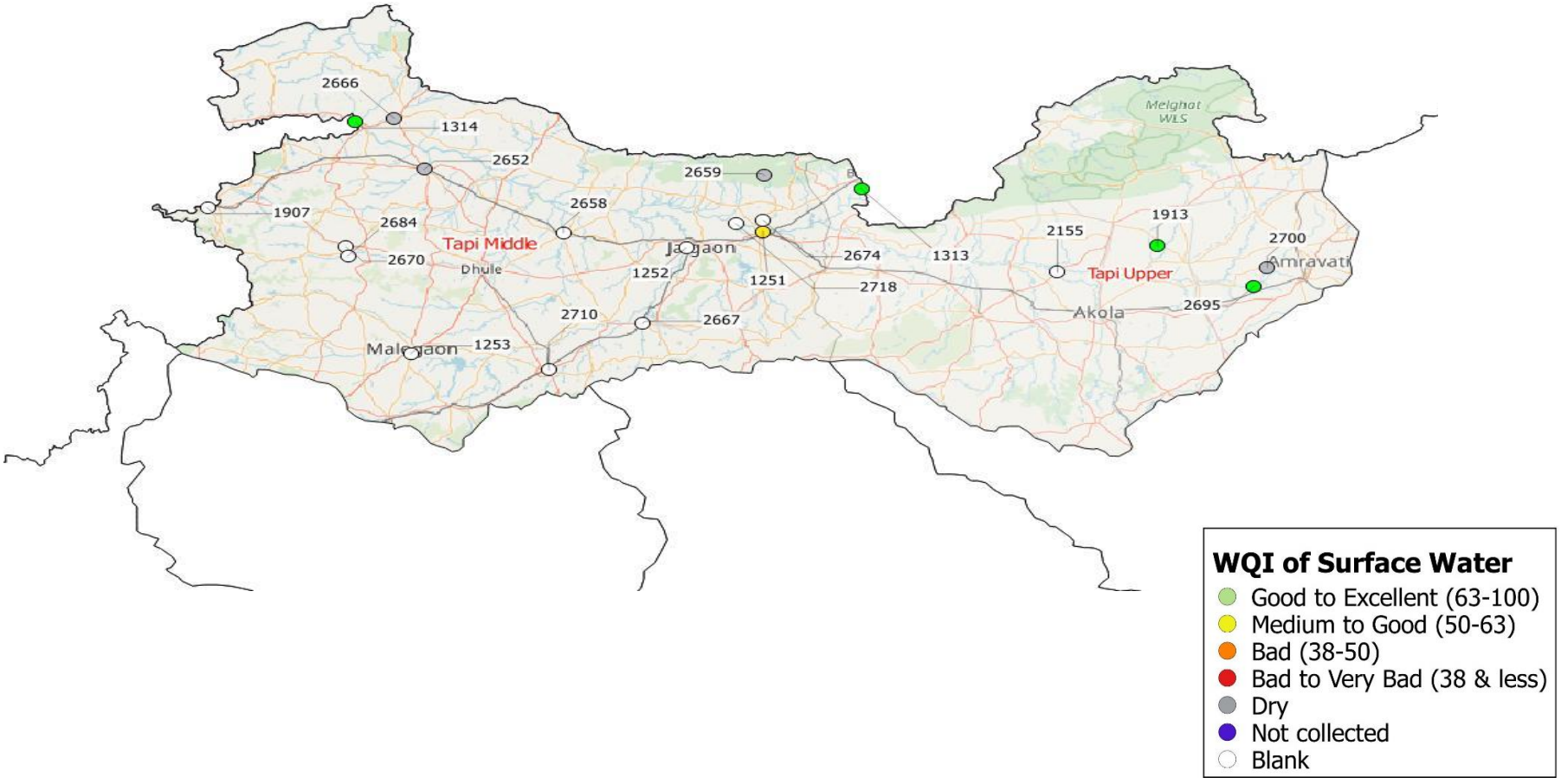
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

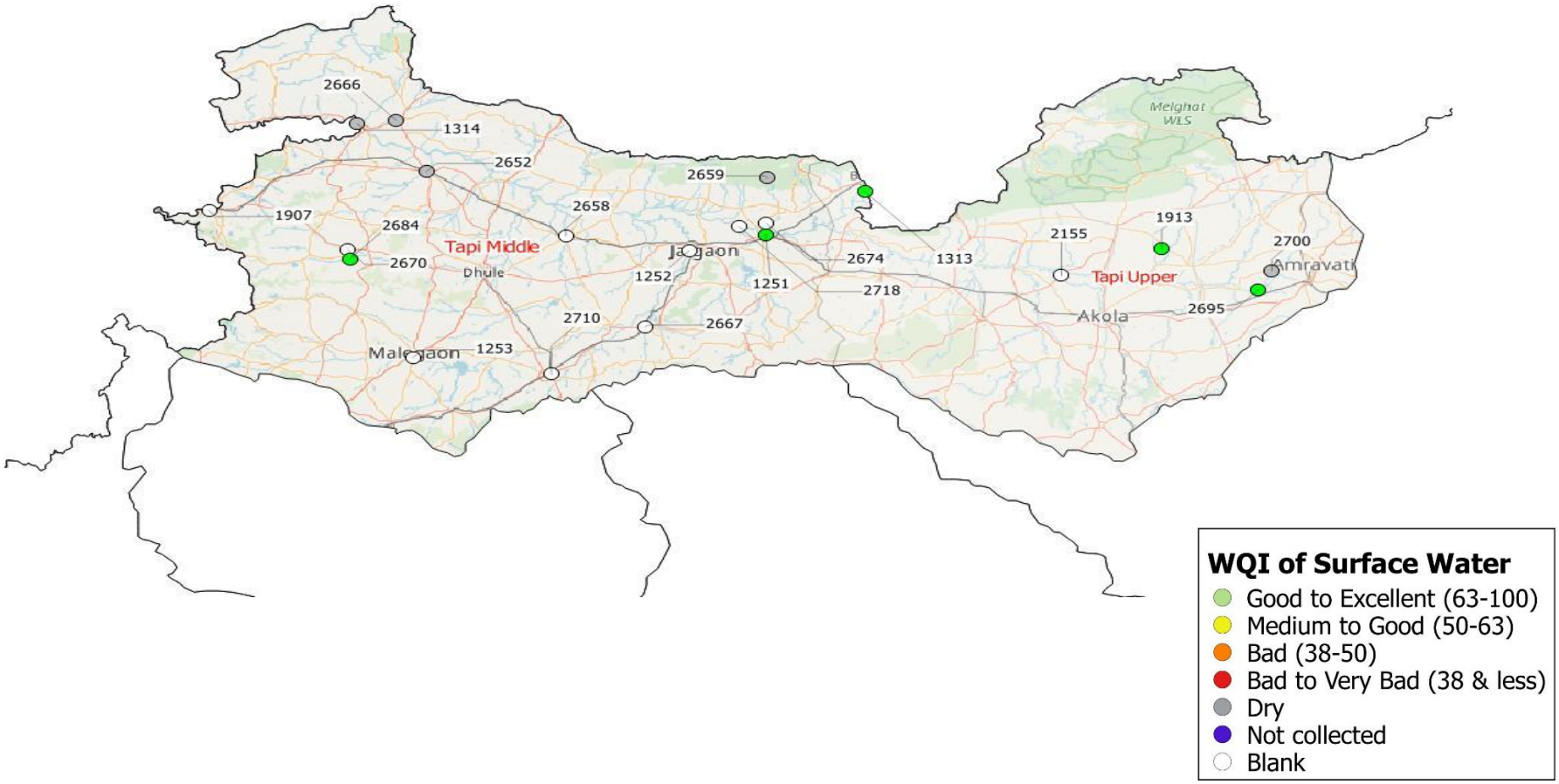
Table No 15: Surface water quality monitoring stations in Tapi basin

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
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
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

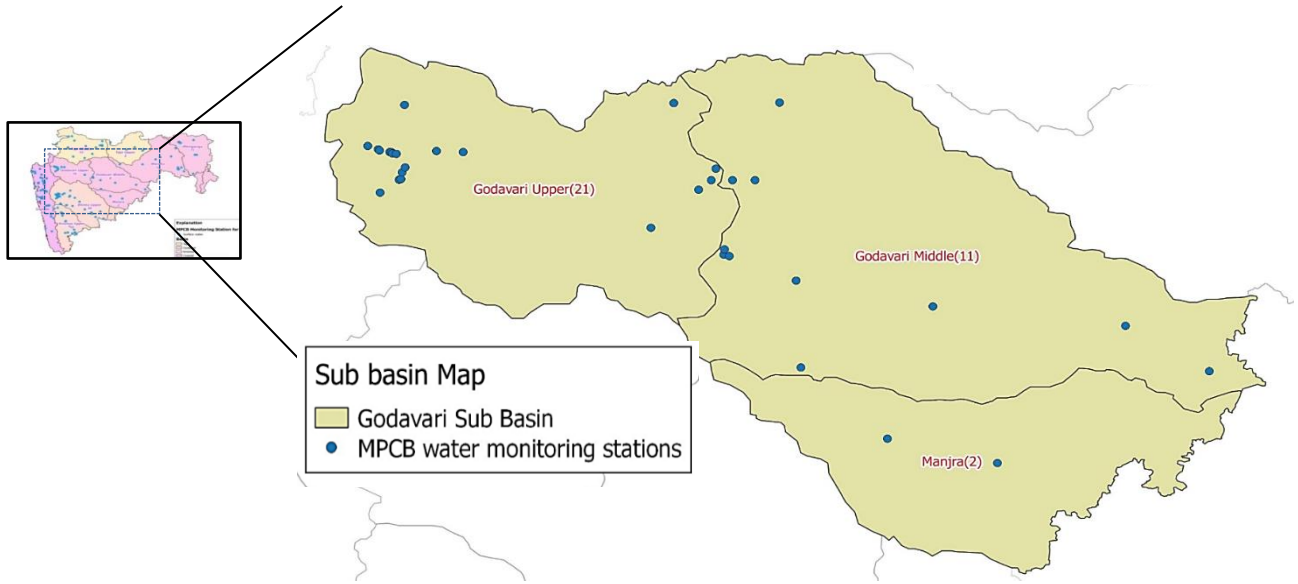
Spatial map of Surface WQI at Tapi Basin (April -2018)



Spatial map of Surface WQI at Tapi Basin (December-2018)



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

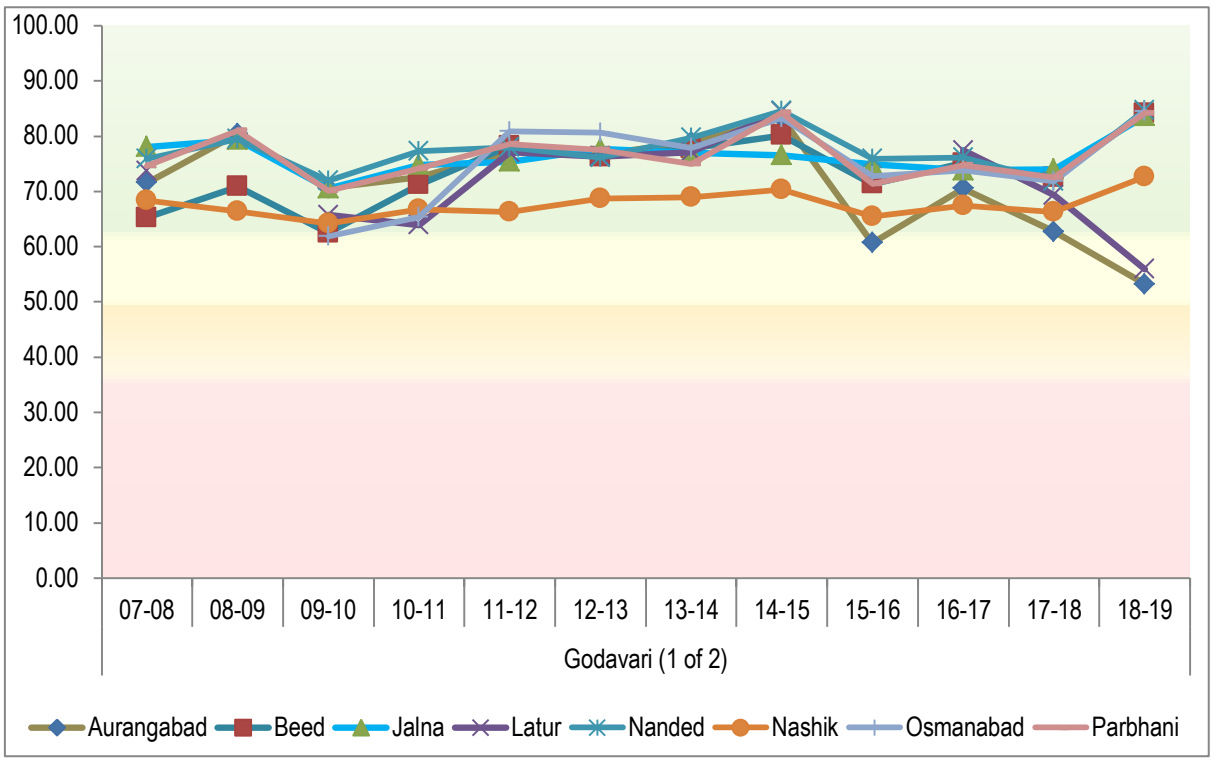


Map No. 2: Network of surface water quality monitoring stations in Godavari basin 1 of 2 –Godavari upper, Godavari middle and Manjra Sub basin

The Godavari basin extends over states of Maharashtra (48.65%), Andhra Pradesh (23.40%), Chhattisgarh (12.49%), Madhya Pradesh (8.63%), Orissa (5.67%) and Karnataka (1.41%). The basin area accounts for nearly 10% of the total geographical area of the country. The total length of the river from its origin (Trimbakeshwar, Nashik) to outfall into Bay of Bengal is around 1,465 km, making it the second largest river in India.

In Maharashtra, the Godavari Basin could be divided into six sub-basins namely Godavari Upper, Godavari Middle, Manjra, Wardha, Wainganga, Indravati and Pranhita. For analysis purpose, these sub-basins have been categorized into two, Godavari 1 Basin comprising of Godavari Upper, Godavari Middle and Manjra sub-basin and Godavari 2 covering Wardha, Wainganga, Indravati and Pranhita.

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. 8: Trend of annual average WQI across districts of Godavari basin (1 of 2)

Note:

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

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. 8. Godavari basin (1 of 2) records annual average WQI of Aurnagabad, Beed, Jalna, Latur, Nanded, Nashik, Osmanabad and Parbhani districts.

In 2018-19, Except Aurnagabad and Latur, The WQI of all other mentioned districts are in Good to Excellent category (63-100). In caseof Aurnbagabad, WQI reduced further from 62 in 2017-18 to 53 in 2018-19 whereas WQI in Latur was recorded under ''Medium to Good" category compared to "Good to Excellent" recorded in 2017-18 indicating deterioration of water quality in current year.

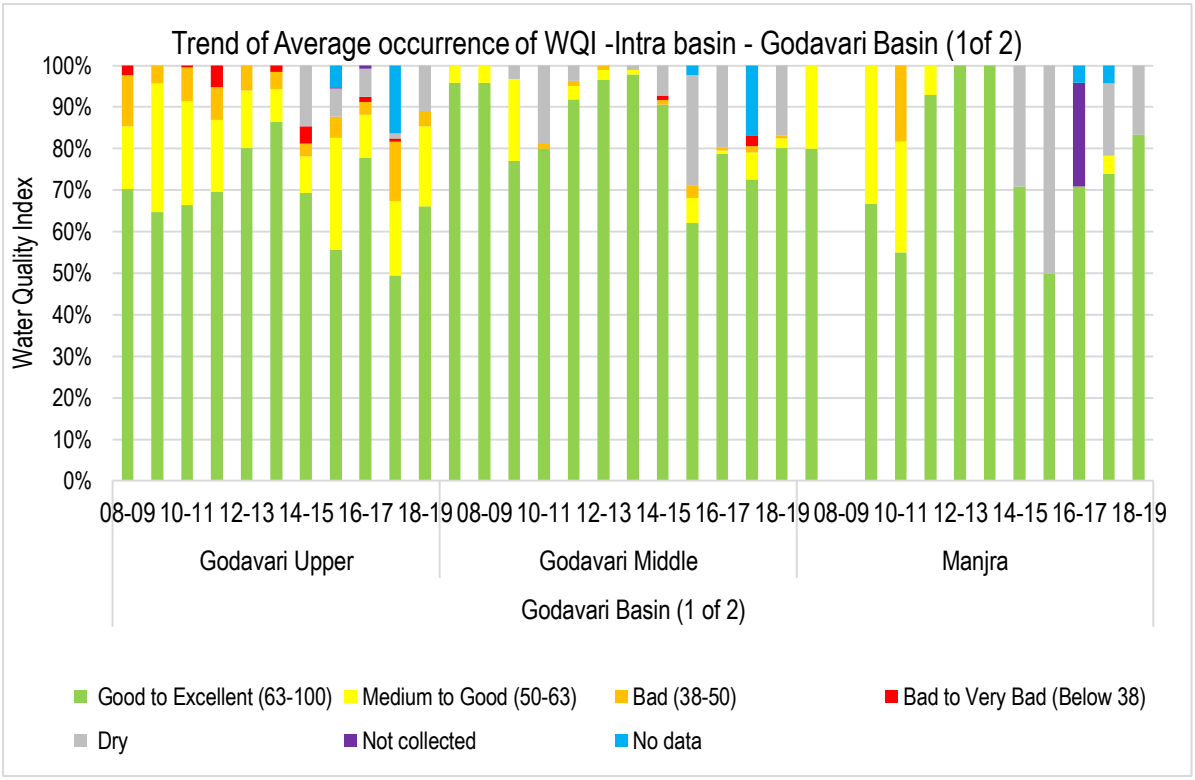


Figure No. 9: Trend of average occurrence for different category of WQI in Godavari basin (1 of 2)

Basin 1 consists of 34 surface water monitoring stations (21 on Upper Godavari, 11 on Middle Godavari and 2 on Manjra). The list of the station and the codes has been provided below in Table No 16 and Table No 17. Figure No. 9 depicts the inter basin performance of Godavari river.

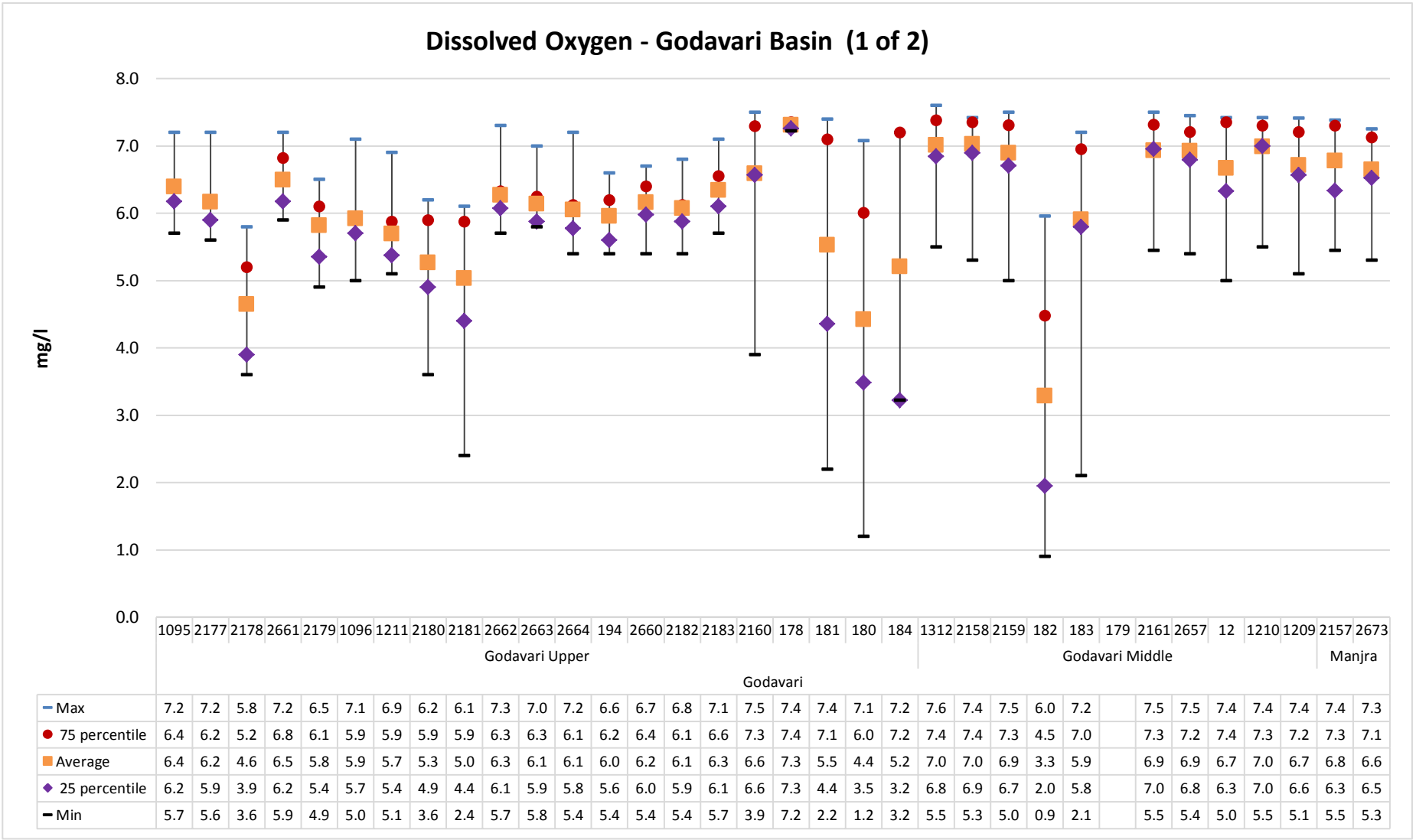
In the year 2018-19, around 66% of the observations of Godavari Upper were found to be in "Good to Excellent" category while same category was observed in around 80% and 83% observations of Godavari Middle and Manjra sub basins respectively.

The extent of observations coming under "Medium to Good" category was higher in Godavari Upper (~19%) compared to about 2% in Godavari Middle. No observation was recorded under "Medium to Good"in Manjra sub basin.

Similar trend was observed in case of observations coming under "Bad" category with % share recorded in Godavari Upper (3.765), followed by Godavari Middle (0.76%) and no observation in Manjra sub basin.

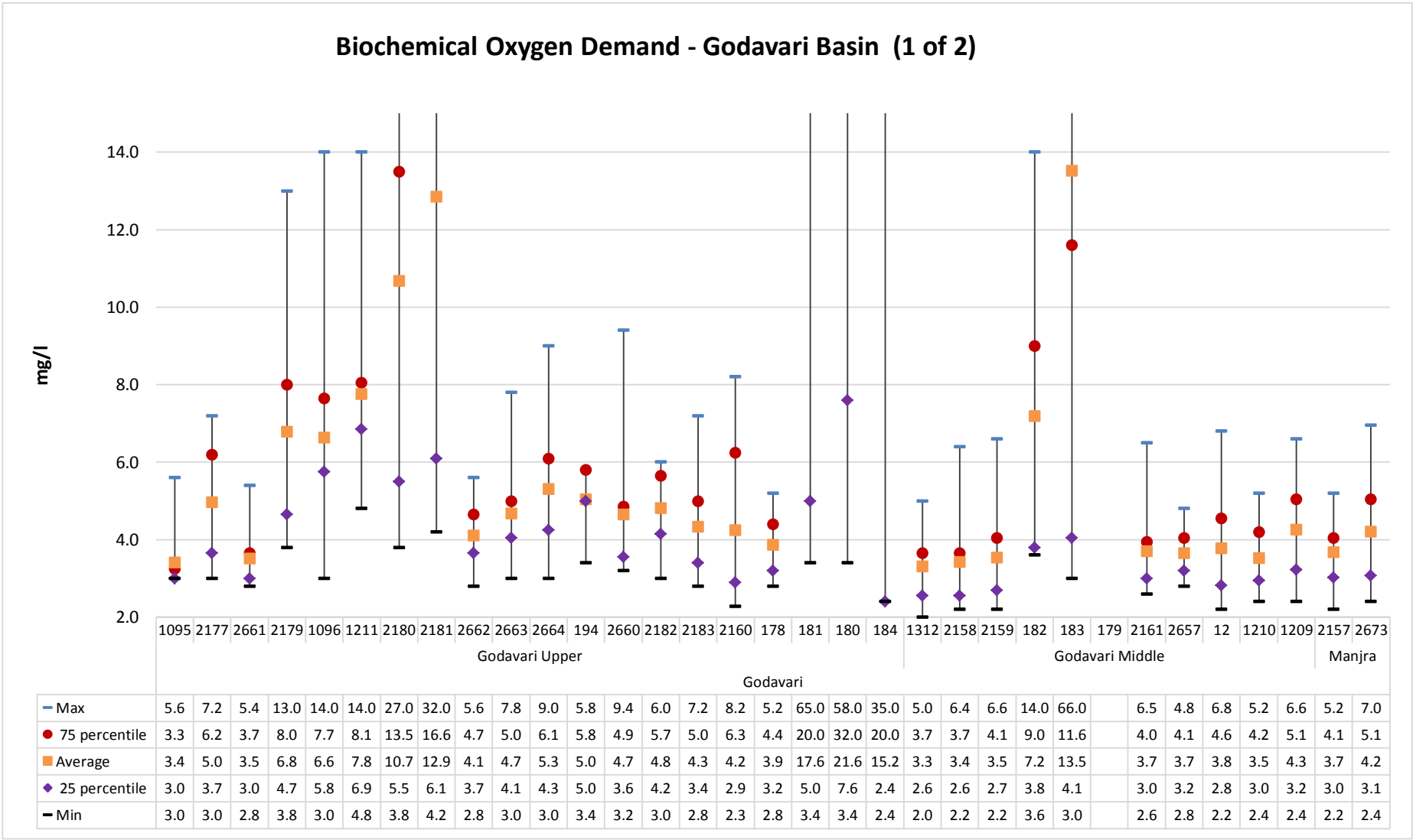
This year (2018-19), observations under "Bad to Very Bad" category were recorded only at Godavari Upper (1.66%).

"Dry" category observations were recorded in all 3 sub basins with highest share recorded at Godavari Middle (16.79%) followed by Manjra sub basin (16.66%) and Godavari Upper (10.87%).



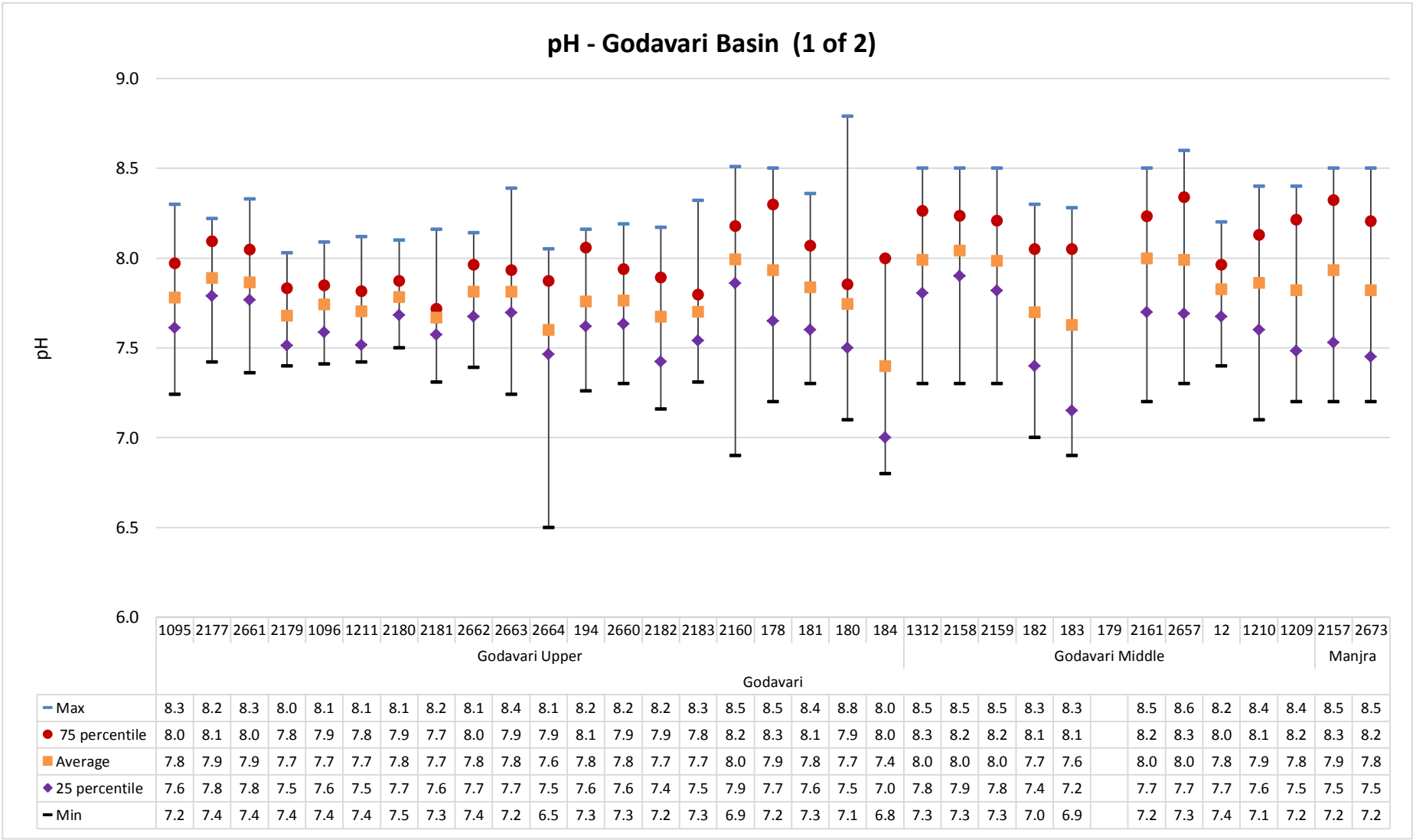
	1095	2177	2178	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																					Godavari Middle											Manjra	
	Godavari																																		
Max	7.2	7.2	5.8	7.2	6.5	7.1	6.9	6.2	6.1	7.3	7.0	7.2	6.6	6.7	6.8	7.1	7.5	7.4	7.4	7.1	7.2	7.6	7.4	7.5	6.0	7.2		7.5	7.5	7.4	7.4	7.4	7.4	7.3
75 percentile	6.4	6.2	5.2	6.8	6.1	5.9	5.9	5.9	5.9	6.3	6.3	6.1	6.2	6.4	6.1	6.6	7.3	7.4	7.1	6.0	7.2	7.4	7.4	7.3	4.5	7.0		7.3	7.2	7.4	7.3	7.2	7.3	7.1
Average	6.4	6.2	4.6	6.5	5.8	5.9	5.7	5.3	5.0	6.3	6.1	6.1	6.0	6.2	6.1	6.3	6.6	7.3	5.5	4.4	5.2	7.0	7.0	6.9	3.3	5.9		6.9	6.9	6.7	7.0	6.7	6.8	6.6
25 percentile	6.2	5.9	3.9	6.2	5.4	5.7	5.4	4.9	4.4	6.1	5.9	5.8	5.6	6.0	5.9	6.1	6.6	7.3	4.4	3.5	3.2	6.8	6.9	6.7	2.0	5.8		7.0	6.8	6.3	7.0	6.6	6.3	6.5
Min	5.7	5.6	3.6	5.9	4.9	5.0	5.1	3.6	2.4	5.7	5.8	5.4	5.4	5.4	5.4	5.7	3.9	7.2	2.2	1.2	3.2	5.5	5.3	5.0	0.9	2.1		5.5	5.4	5.0	5.5	5.1	5.5	5.3

Figure No. 10: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Godavari basin (1of 2)



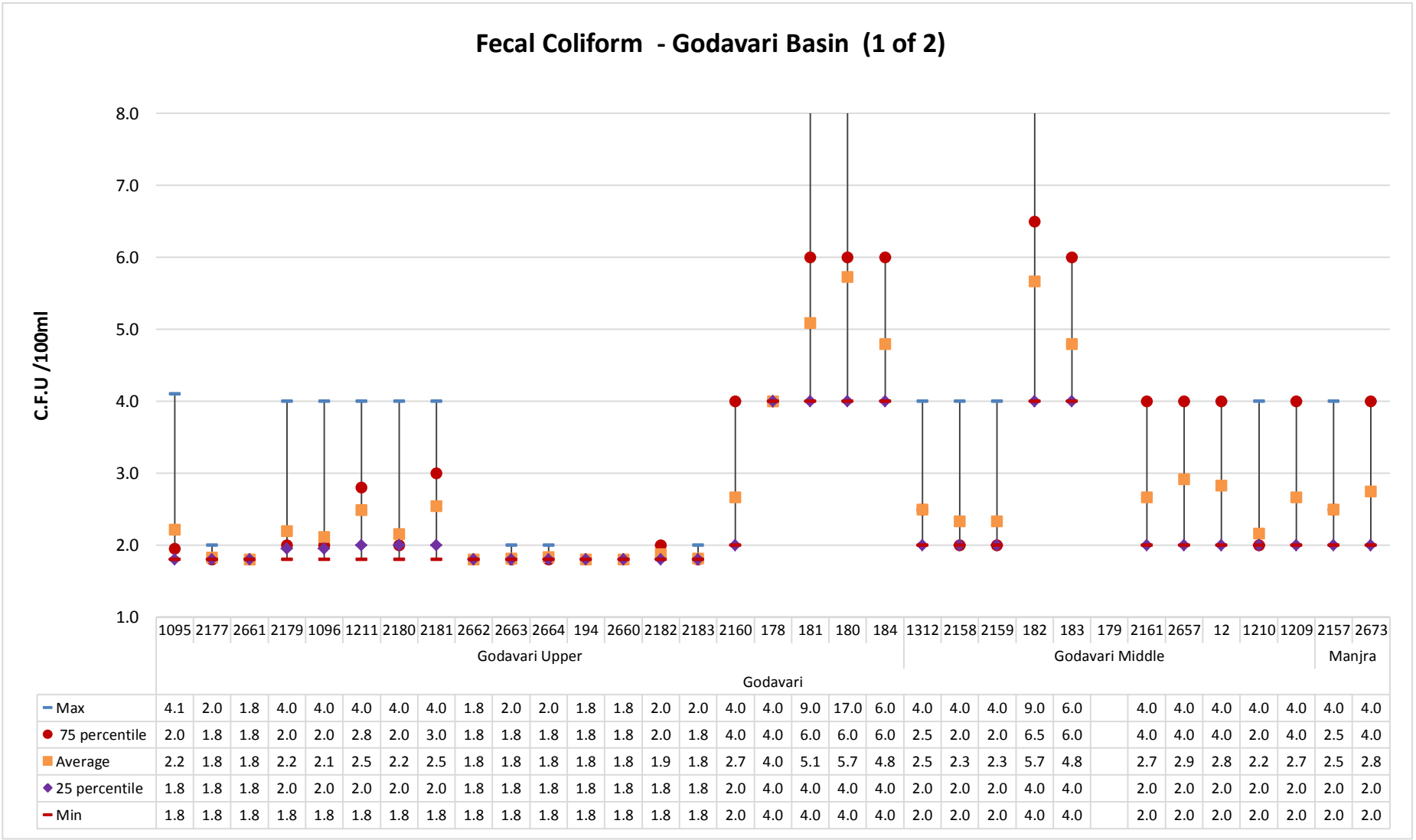
	1095	2177	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
	Godavari Upper																				Godavari Middle											Manjra
	Godavari																															
Max	5.6	7.2	5.4	13.0	14.0	14.0	27.0	32.0	5.6	7.8	9.0	5.8	9.4	6.0	7.2	8.2	5.2	65.0	58.0	35.0	5.0	6.4	6.6	14.0	66.0		6.5	4.8	6.8	5.2	6.6	5.2	7.0
75 percentile	3.3	6.2	3.7	8.0	7.7	8.1	13.5	16.6	4.7	5.0	6.1	5.8	4.9	5.7	5.0	6.3	4.4	20.0	32.0	20.0	3.7	3.7	4.1	9.0	11.6		4.0	4.1	4.6	4.2	5.1	4.1	5.1
Average	3.4	5.0	3.5	6.8	6.6	7.8	10.7	12.9	4.1	4.7	5.3	5.0	4.7	4.8	4.3	4.2	3.9	17.6	21.6	15.2	3.3	3.4	3.5	7.2	13.5		3.7	3.7	3.8	3.5	4.3	3.7	4.2
25 percentile	3.0	3.7	3.0	4.7	5.8	6.9	5.5	6.1	3.7	4.1	4.3	5.0	3.6	4.2	3.4	2.9	3.2	5.0	7.6	2.4	2.6	2.6	2.7	3.8	4.1		3.0	3.2	2.8	3.0	3.2	3.0	3.1
Min	3.0	3.0	2.8	3.8	3.0	4.8	3.8	4.2	2.8	3.0	3.0	3.4	3.2	3.0	2.8	2.3	2.8	3.4	3.4	2.4	2.0	2.2	2.2	3.6	3.0		2.6	2.8	2.2	2.4	2.4	2.2	2.4

Figure No. 11: Trend of BOD levels recorded at WQMS at Godavari basin (1 of 2)



	1095	2177	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	8.3	8.2	8.3	8.0	8.1	8.1	8.1	8.2	8.1	8.4	8.1	8.2	8.2	8.2	8.3	8.5	8.5	8.4	8.8	8.0	8.5	8.5	8.5	8.3	8.3		8.5	8.6	8.2	8.4	8.4	8.5	8.5
75 percentile	8.0	8.1	8.0	7.8	7.9	7.8	7.9	7.7	8.0	7.9	7.9	8.1	7.9	7.9	7.8	8.2	8.3	8.1	7.9	8.0	8.3	8.2	8.2	8.1	8.1		8.2	8.3	8.0	8.1	8.2	8.3	8.2
Average	7.8	7.9	7.9	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.6	7.8	7.8	7.7	7.7	8.0	7.9	7.8	7.7	7.4	8.0	8.0	8.0	7.7	7.6		8.0	8.0	7.8	7.9	7.8	7.9	7.8
25 percentile	7.6	7.8	7.8	7.5	7.6	7.5	7.7	7.6	7.7	7.7	7.5	7.6	7.6	7.4	7.5	7.9	7.7	7.6	7.5	7.0	7.8	7.9	7.8	7.4	7.2		7.7	7.7	7.7	7.6	7.5	7.5	7.5
Min	7.2	7.4	7.4	7.4	7.4	7.4	7.5	7.3	7.4	7.2	6.5	7.3	7.3	7.2	7.3	6.9	7.2	7.3	7.1	6.8	7.3	7.3	7.3	7.0	6.9		7.2	7.3	7.4	7.1	7.2	7.2	7.2

Figure No. 12: Trend of pH levels recorded at WQMS at Godavari basin (1 of 2)



	1095	2177	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	4.1	2.0	1.8	4.0	4.0	4.0	4.0	4.0	1.8	2.0	2.0	1.8	1.8	2.0	2.0	4.0	4.0	9.0	17.0	6.0	4.0	4.0	4.0	9.0	6.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
75 percentile	2.0	1.8	1.8	2.0	2.0	2.8	2.0	3.0	1.8	1.8	1.8	1.8	1.8	2.0	1.8	4.0	4.0	6.0	6.0	6.0	2.5	2.0	2.0	6.5	6.0		4.0	4.0	4.0	2.0	4.0	2.5	4.0
Average	2.2	1.8	1.8	2.2	2.1	2.5	2.2	2.5	1.8	1.8	1.8	1.8	1.8	1.9	1.8	2.7	4.0	5.1	5.7	4.8	2.5	2.3	2.3	5.7	4.8		2.7	2.9	2.8	2.2	2.7	2.5	2.8
25 percentile	1.8	1.8	1.8	2.0	2.0	2.0	2.0	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	4.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Min	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	4.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0

Figure No. 13: 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	9	86	85	87	86	80	81	Dry	85	86	86	82	86	85	84	75		65	51	59
May	84	86	57	57	81	51	55	52	60	60	56		57	54	57	77		44	69	58
Jun	79	83	87	89	81	85	83	Dry	81	83	89	80	90	84	91	67		49	42	43
Jul	91	87	62	87	86	85	77	84	63	63	59		64	60	62	83		81	80	84
Aug	91	79	85	73	81	72	62	54	86	82	83		85	82	84	84	88	89	47	84
Sep	63	81	87	75	82	77	72	64	86	87	78		62	60	87	83	77	80	43	
Oct	63	56	87	60	83	81	59	58	90	85	83		61	60	80	82	82	75	68	
Nov	65	60	90	84	81	78	85	62	86	84	83	82	60	86	89	82				
Dec	66	58	87	59	86	84	72	74	90	83	84	89	53	66	92	86		70	59	
Jan	60	58	89	49	71	77	62	63	83	84	84	63	62	62	90	85		78	76	
Feb	64	61	90	80	82	77	69	72	87	87	87		65	86	88	80		71	79	
Mar	92	87	92	84	80	78	88	86	88	90	88		62	64	93	87		41	43	
Station Code	1095	2177	2661	2179	1096	1211	2180	2181	2662	2663	2664	194	2660	2182	2183	2160	178	181	180	184
Sub Basin	Godavari Upper																			
Basin	Godavari																			

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

Table No 16: 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	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	84	88	86			Dry	83	82	80	89	75	83	78
May	86	86	74		65	Dry	89	84	82	90	88	90	91
Jun	86	83	92		52	Dry	85	92	79	84	80	84	83
Jul	83	81	83	81	84	Dry	84	81	87	85	84	84	83
Aug	86	85	86	59	88	Dry	84	86	86	88	89	85	88
Sep	80	84	85	55	80	Dry	79	81	87	79	82	79	79
Oct	84	84	84		82	Dry	83	82	86	84	83	83	84
Nov	84	84	83			Dry	83	81	82	85	84	84	86
Dec	89	87	86		80	Dry	86	84	83	86	86	84	Dry
Jan	86	87	89		83	Dry	83	85	87	86	85	88	Dry
Feb	85	82	86		76	Dry	77	86	83	83	84	82	Dry
Mar	83	83	82		44	Dry	87	87	87	88	86	87	Dry
Station Code	1312	2158	2159	182	183	179	2161	2657	12	1210	1209	2157	2673
Sub Basin	Godavari Middle											Manjra	
Basin	Godavari												

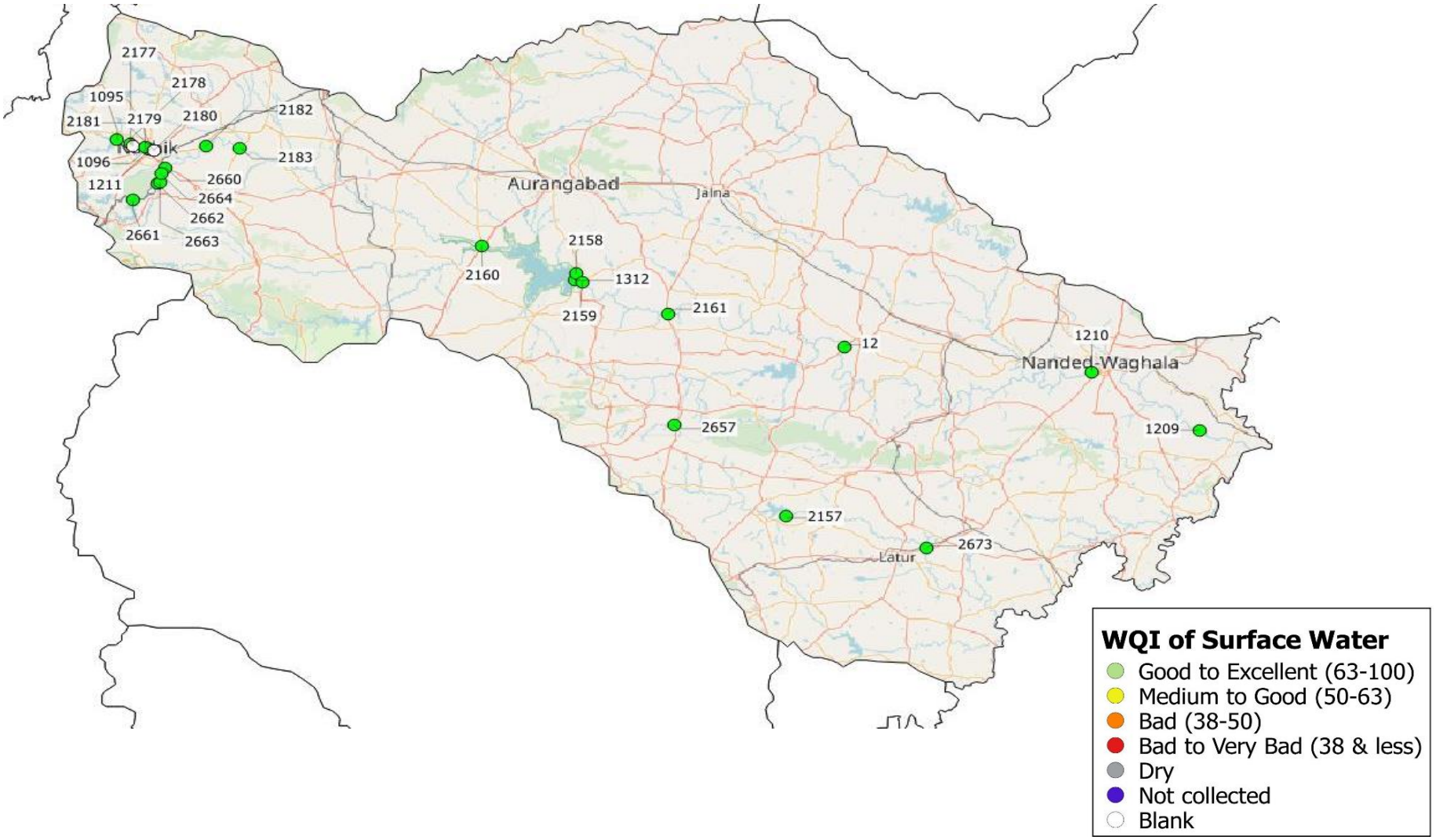
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

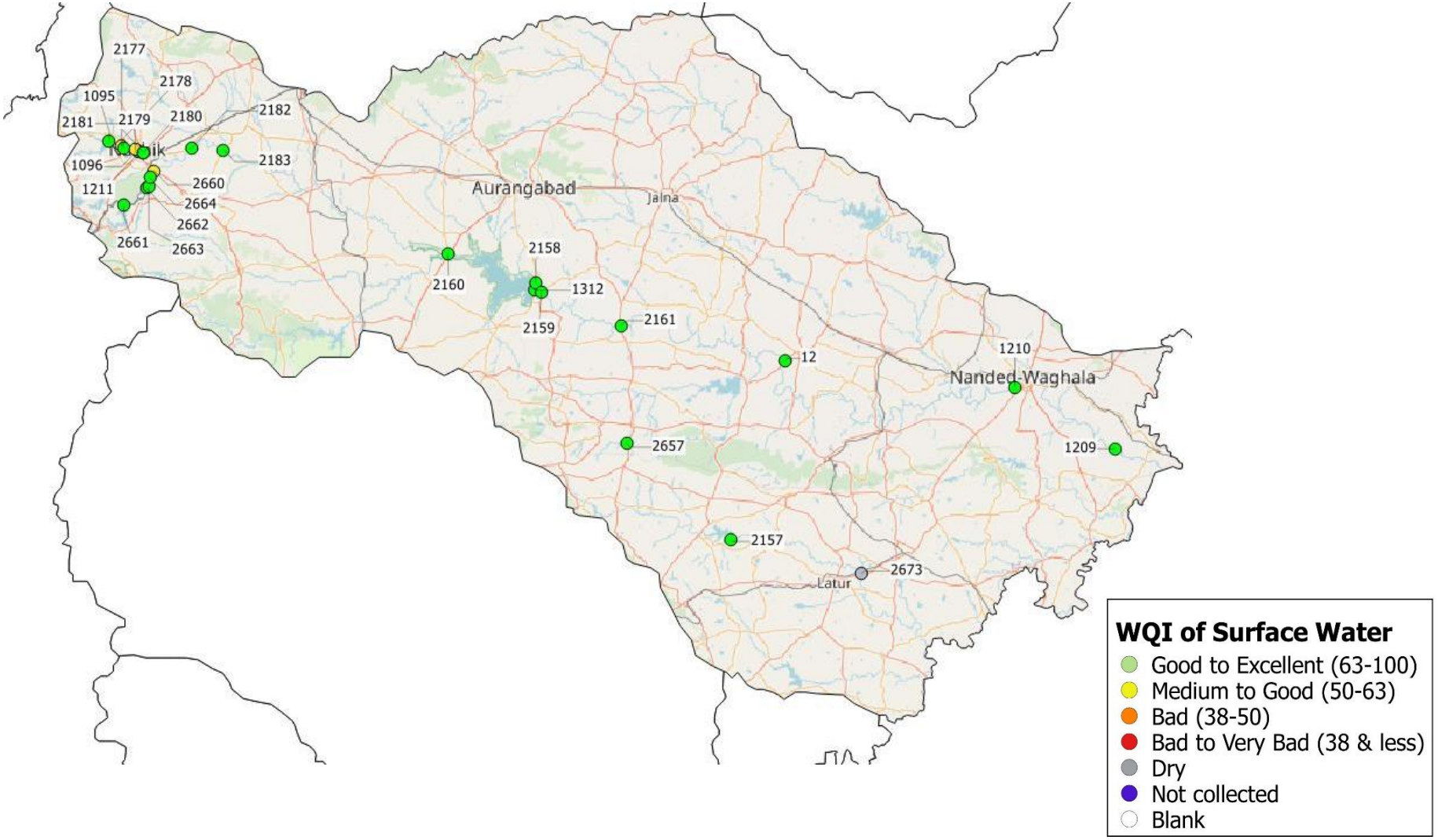
Table No 17: Surface water quality monitoring stations in Godavari Basin (1of 2)

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

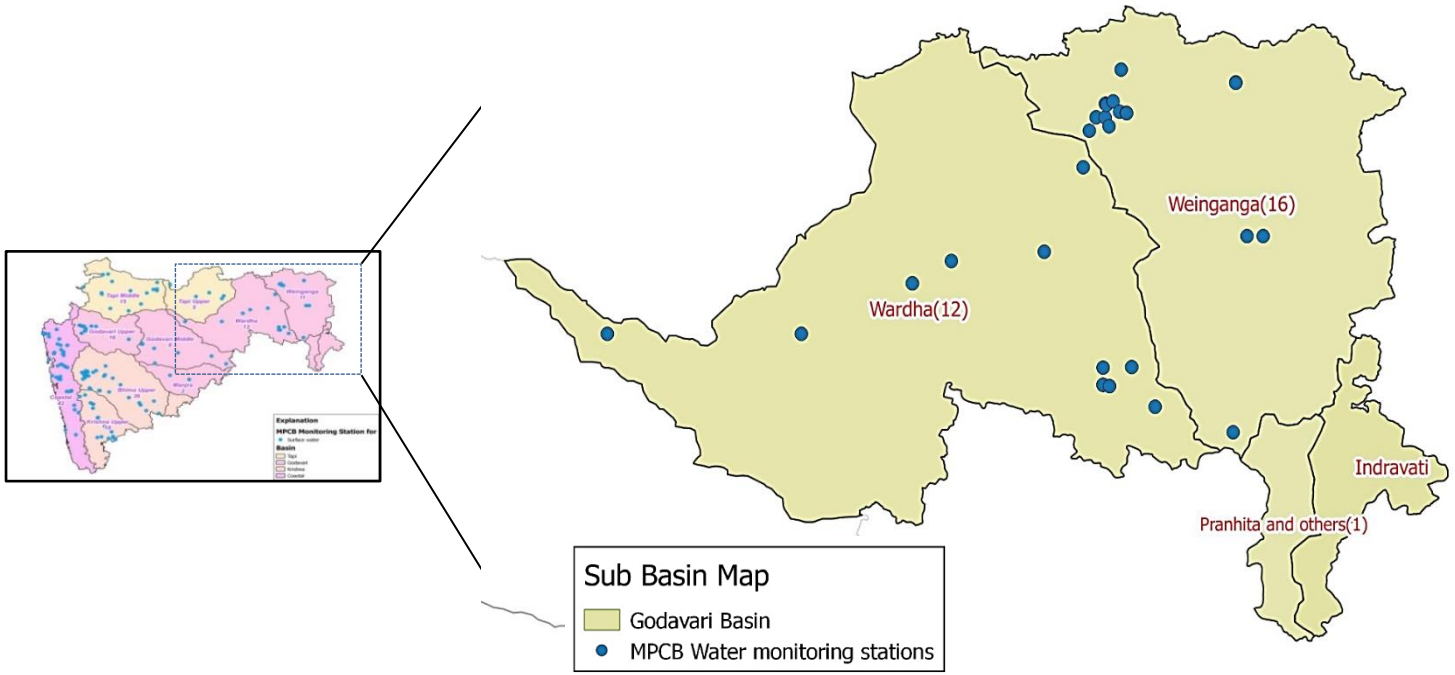
Spatial map of SurfaceWQI at Godavari Basin (1 of 2) (April 2018)



Spatial map of Surface WQI at Godavari Basin (1 of 2) (December 2018)



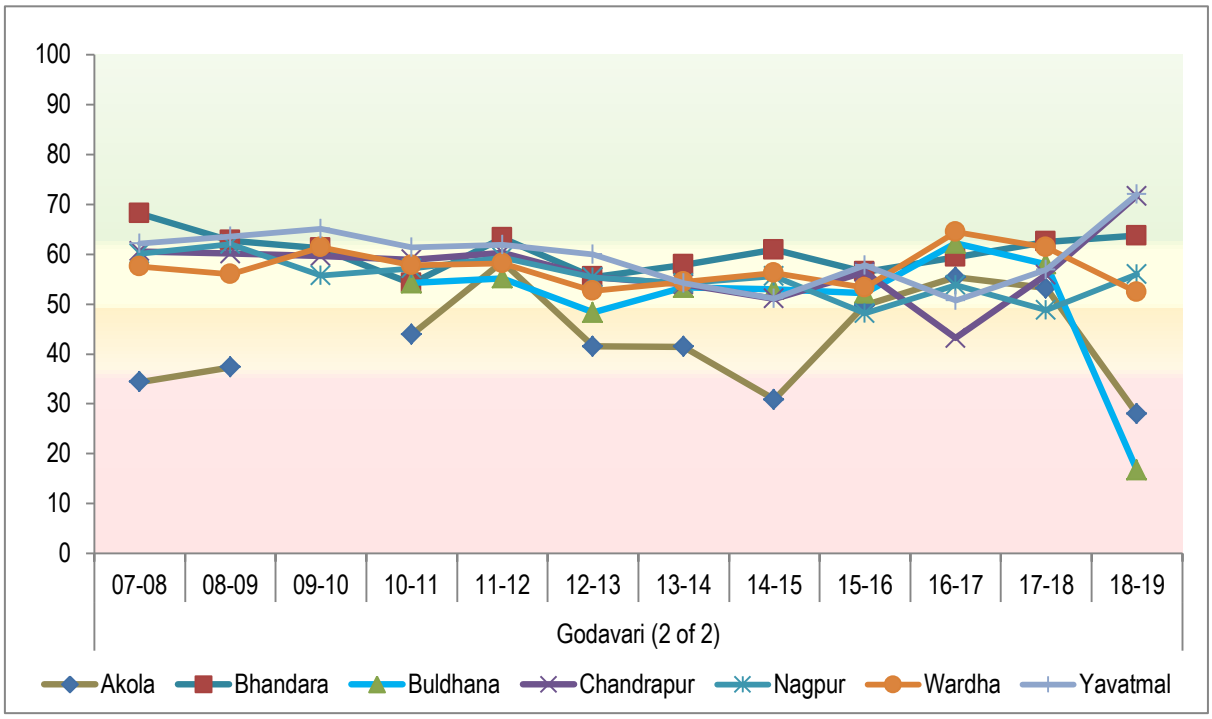
5.3 Godavari Basin (2 of 2): Wardha, Wainganga and Pranhita Sub basin



Map No. 3: Network of surface water quality monitoring stations in Godavari basin 2 of 2 –Wardha, Wainganga and Pranhita Sub basin

In basin 2, there are a total 29 surface water monitoring stations (12 on Wardha, 16 on Wainganga and 1 on Pranhita). The list of stations and codes has been provided below in Table No 18 and Table No 19

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. 14: Trend of annual average WQI across districts of Godavari basin (2 of 2)

Note:

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

Figure No. 15 depicts the intra basin performance of Godavari basin (2 of 2) across seven districts of the state. The annual average WQI of Bhandara was found to be in "Good to Excellent" category with slight improvenement from 62.5 to 63.7. WQI of Chandrapur (56 to 71) and Yavatamal (57 to 72) increased considerably from "Medium to Good'' to "Good to Excellent" indicating improvement in water quality in these districts. Similar improving shift in WQI was observed in Nagpur (from 48 to 56).

However, WQI of Wardha (from 61 to 52), Buldhana (58 to 17) and Akola (53 to 28) showed considerable reduction indicating increased level of pollution especially in Buldhana and Akola which recorded WQI in "Medium to Good'' category in 2017-18; recorded WQI in "Bad to Very Bad" category in 2018-19.

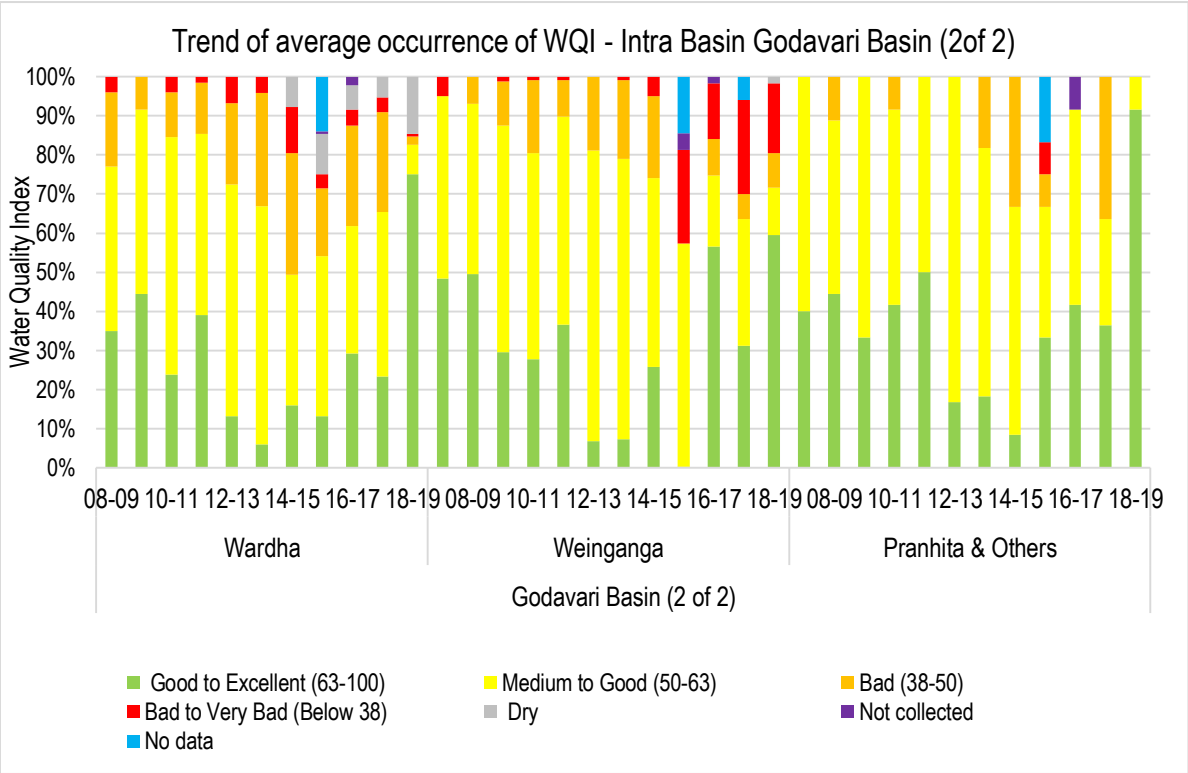
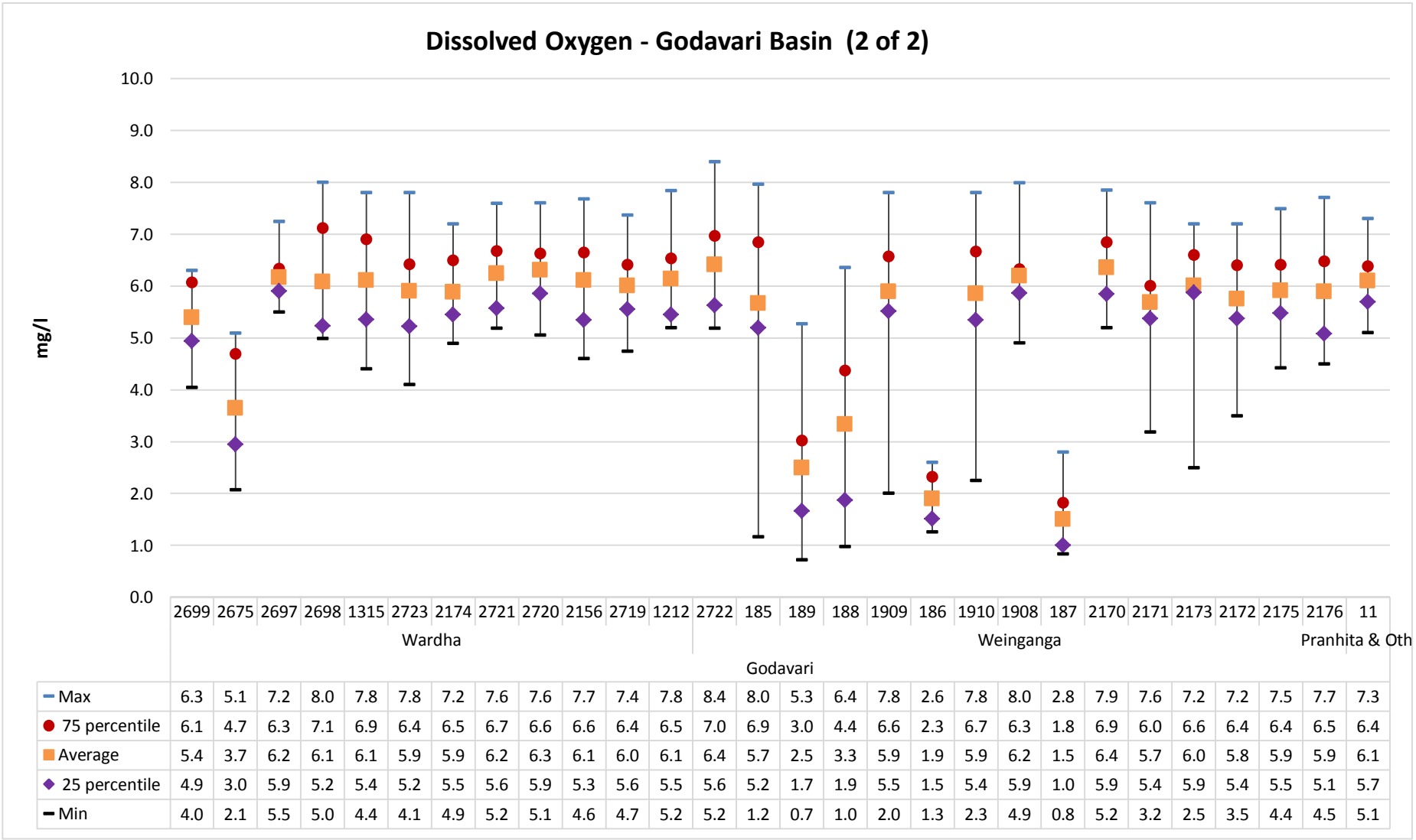


Figure No. 15: Trend of average occurrence for different category of WQI in Godavari basin (2 of 2)

The trend of inter sub basin wise water quality for Godavari basin (2 of 2) is described in Figure No. 15. In 2018-19, around 75%, 60% and 92% of the total observations from Manjra, Wainganga and Pranhita & others were recorded under "Good to Excellent" category respectively. On the other hand, the extent of "Moderate to Good" WQI category was observed highest at Wainganga (~12%), followed by Pranhita & others (~8%) and Wardha (~8%).

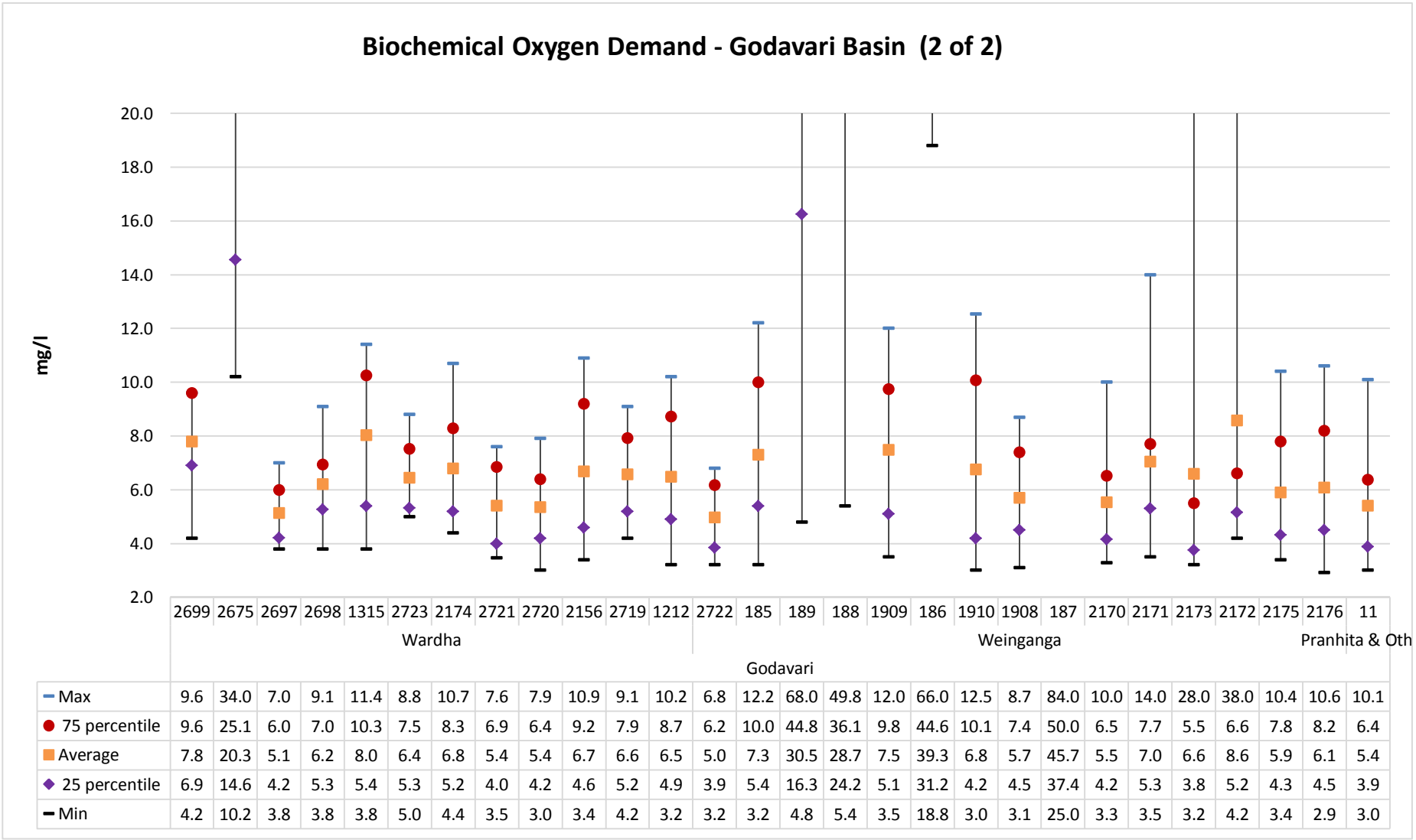
The % share of WQI under "Bad" category was recorded only at Wainganga (~9%) and Wardha (~2%) while that of "Bad to Vary Bad" category were recorded at Wainganga (~18%) and Wardha (0.7%) indicating high level of pollution as compared to Pranhita & others.

As far as "Dry" category is concerned, 14.6% of the observations from Wardha sub basin and ~2% from Wainganga fell under this category.



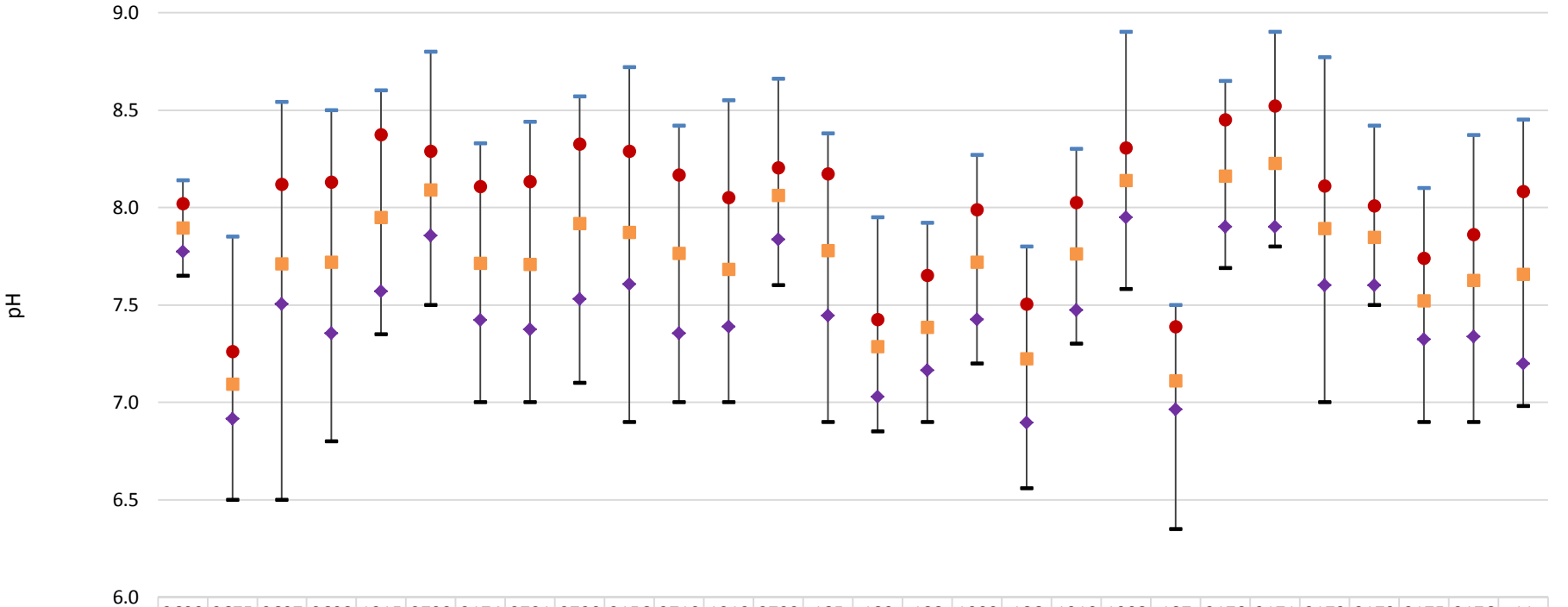
	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Max	6.3	5.1	7.2	8.0	7.8	7.8	7.2	7.6	7.6	7.7	7.4	7.8	8.4	8.0	5.3	6.4	7.8	2.6	7.8	8.0	2.8	7.9	7.6	7.2	7.2	7.5	7.7	7.3
75 percentile	6.1	4.7	6.3	7.1	6.9	6.4	6.5	6.7	6.6	6.6	6.4	6.5	7.0	6.9	3.0	4.4	6.6	2.3	6.7	6.3	1.8	6.9	6.0	6.6	6.4	6.4	6.5	6.4
Average	5.4	3.7	6.2	6.1	6.1	5.9	5.9	6.2	6.3	6.1	6.0	6.1	6.4	5.7	2.5	3.3	5.9	1.9	5.9	6.2	1.5	6.4	5.7	6.0	5.8	5.9	5.9	6.1
25 percentile	4.9	3.0	5.9	5.2	5.4	5.2	5.5	5.6	5.9	5.3	5.6	5.5	5.6	5.2	1.7	1.9	5.5	1.5	5.4	5.9	1.0	5.9	5.4	5.9	5.4	5.5	5.1	5.7
Min	4.0	2.1	5.5	5.0	4.4	4.1	4.9	5.2	5.1	4.6	4.7	5.2	5.2	1.2	0.7	1.0	2.0	1.3	2.3	4.9	0.8	5.2	3.2	2.5	3.5	4.4	4.5	5.1

Figure No. 16: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Godavari basin (2 of 2)



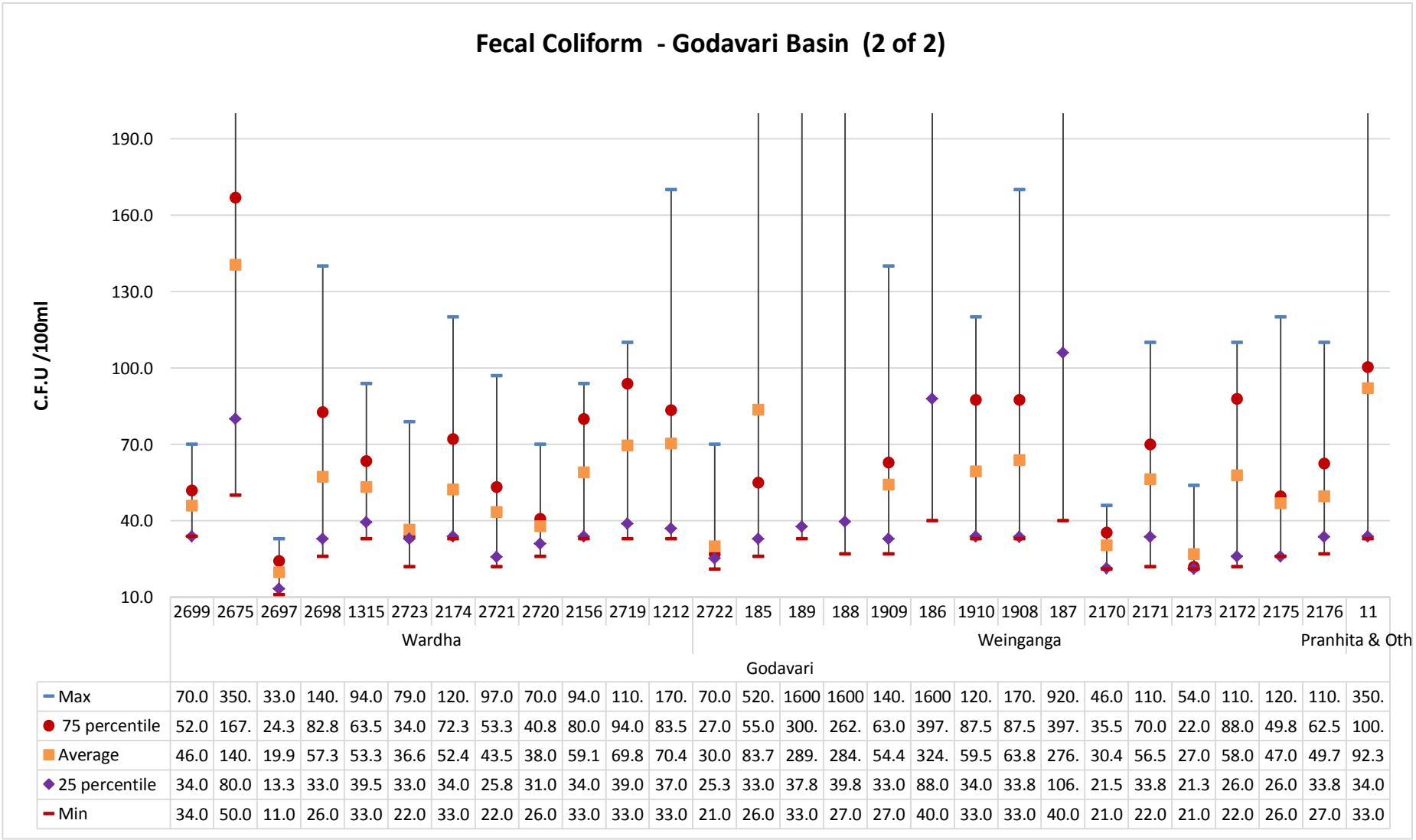
	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Max	9.6	34.0	7.0	9.1	11.4	8.8	10.7	7.6	7.9	10.9	9.1	10.2	6.8	12.2	68.0	49.8	12.0	66.0	12.5	8.7	84.0	10.0	14.0	28.0	38.0	10.4	10.6	10.1
75 percentile	9.6	25.1	6.0	7.0	10.3	7.5	8.3	6.9	6.4	9.2	7.9	8.7	6.2	10.0	44.8	36.1	9.8	44.6	10.1	7.4	50.0	6.5	7.7	5.5	6.6	7.8	8.2	6.4
Average	7.8	20.3	5.1	6.2	8.0	6.4	6.8	5.4	5.4	6.7	6.6	6.5	5.0	7.3	30.5	28.7	7.5	39.3	6.8	5.7	45.7	5.5	7.0	6.6	8.6	5.9	6.1	5.4
25 percentile	6.9	14.6	4.2	5.3	5.4	5.3	5.2	4.0	4.2	4.6	5.2	4.9	3.9	5.4	16.3	24.2	5.1	31.2	4.2	4.5	37.4	4.2	5.3	3.8	5.2	4.3	4.5	3.9
Min	4.2	10.2	3.8	3.8	3.8	5.0	4.4	3.5	3.0	3.4	4.2	3.2	3.2	3.2	4.8	5.4	3.5	18.8	3.0	3.1	25.0	3.3	3.5	3.2	4.2	3.4	2.9	3.0

Figure No. 17: 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	8.1	7.9	8.5	8.5	8.6	8.8	8.3	8.4	8.6	8.7	8.4	8.6	8.7	8.4	8.0	7.9	8.3	7.8	8.3	8.9	7.5	8.7	8.9	8.8	8.4	8.1	8.4	8.5
75 percentile	8.0	7.3	8.1	8.1	8.4	8.3	8.1	8.1	8.3	8.3	8.2	8.1	8.2	8.2	7.4	7.7	8.0	7.5	8.0	8.3	7.4	8.5	8.5	8.1	8.0	7.7	7.9	8.1
Average	7.9	7.1	7.7	7.7	7.9	8.1	7.7	7.7	7.9	7.9	7.8	7.7	8.1	7.8	7.3	7.4	7.7	7.2	7.8	8.1	7.1	8.2	8.2	7.9	7.8	7.5	7.6	7.7
25 percentile	7.8	6.9	7.5	7.4	7.6	7.9	7.4	7.4	7.5	7.6	7.4	7.4	7.8	7.4	7.0	7.2	7.4	6.9	7.5	8.0	7.0	7.9	7.9	7.6	7.6	7.3	7.3	7.2
Min	7.7	6.5	6.5	6.8	7.4	7.5	7.0	7.0	7.1	6.9	7.0	7.0	7.6	6.9	6.9	6.9	7.2	6.6	7.3	7.6	6.4	7.7	7.8	7.0	7.5	6.9	6.9	7.0

Figure No. 18: 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	70.0	350.	33.0	140.	94.0	79.0	120.	97.0	70.0	94.0	110.	170.	70.0	520.	1600	1600	140.	1600	120.	170.	920.	46.0	110.	54.0	110.	120.	110.	350.
75 percentile	52.0	167.	24.3	82.8	63.5	34.0	72.3	53.3	40.8	80.0	94.0	83.5	27.0	55.0	300.	262.	63.0	397.	87.5	87.5	397.	35.5	70.0	22.0	88.0	49.8	62.5	100.
Average	46.0	140.	19.9	57.3	53.3	36.6	52.4	43.5	38.0	59.1	69.8	70.4	30.0	83.7	289.	284.	54.4	324.	59.5	63.8	276.	30.4	56.5	27.0	58.0	47.0	49.7	92.3
25 percentile	34.0	80.0	13.3	33.0	39.5	33.0	34.0	25.8	31.0	34.0	39.0	37.0	25.3	33.0	37.8	39.8	33.0	88.0	34.0	33.8	106.	21.5	33.8	21.3	26.0	26.0	33.8	34.0
Min	34.0	50.0	11.0	26.0	33.0	22.0	33.0	22.0	26.0	33.0	33.0	33.0	21.0	26.0	33.0	27.0	27.0	40.0	33.0	33.0	40.0	21.0	22.0	21.0	22.0	26.0	27.0	33.0

Figure No. 19: 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	Dry	29	78	68	52	57	74	65	78	62	69	74
May	Dry	61	76	67	Dry	Dry	66	68	69	67	59	73
Jun	Dry	40	74	67			68	73	73	60	65	65
Jul	Dry	57	72	65	68	73	68	74	70	64	64	63
Aug	69	47	77	71	63	65	64	70	79	68	71	70
Sep	55	54	79	67	63	68	63	75	77	73	72	67
Oct	76	49	77	77	79	75	73	73	69	76	70	68
Nov	Dry	Dry	75	78	75	71	72	82	72	77	74	81
Dec	Dry	Dry	78	72	69	73	79	78	75	73	72	69
Jan	Dry	Dry	78	73	Dry	70	74	73	75	71	71	73
Feb	Dry	Dry	77	68	Dry	64	73	75	71	65	72	72
Mar	Dry	Dry	81	69	Dry	70	70	70	71	76	78	73
Station Code	2699	2675	2697	2698	1315	2723	2174	2721	2720	2156	2719	1212
Sub Basin	Wardha											
Basin	Godavari											

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

Table No 18: 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- Wainganga and Pranhita

Apr	65	53	25	25	64	24	73	68	24	71	67	64	57	75	81	77
May	Dry	69	34	27	47	28	44	58	29	65	61	60	56	59	66	73
Jun		72	36	42	66	37	74	70	31	77	66	56	56	66	60	66
Jul	76	70	53	39	67	37	68	66	40	75	68	75	70	72	64	61
Aug	70	70	40	51	72	36	66	67	32	74	61	80	73	64	63	73
Sep	69	40	42	40	65	33	62	71	34	55	65	74	73	74	71	72
Oct	80	58	37	31	79	34	78	74	42	63	50	26	33	75	70	68
Nov	76	72	35	39	72	36	73	74	33	74	67	78	71	83	76	77
Dec	76	76	73	78	72	41	69	75	38	76	70	61	62	74	75	79
Jan	71	71	68	75	77	33	76	68	33	71	71	72	70	80	79	75
Feb	75	75	44	47	77	42	76	75	38	76	75	59	54	79	75	74
Mar	73	71	17	35	Dry	33	72	71	35	76	71	74	73	78	75	70
Station Code	2722	185	189	188	1909	186	1910	1908	187	2170	2171	2173	2172	2175	2176	11
Sub Basin	Wainganga															Pranhita & Others
Basin	Godavari															

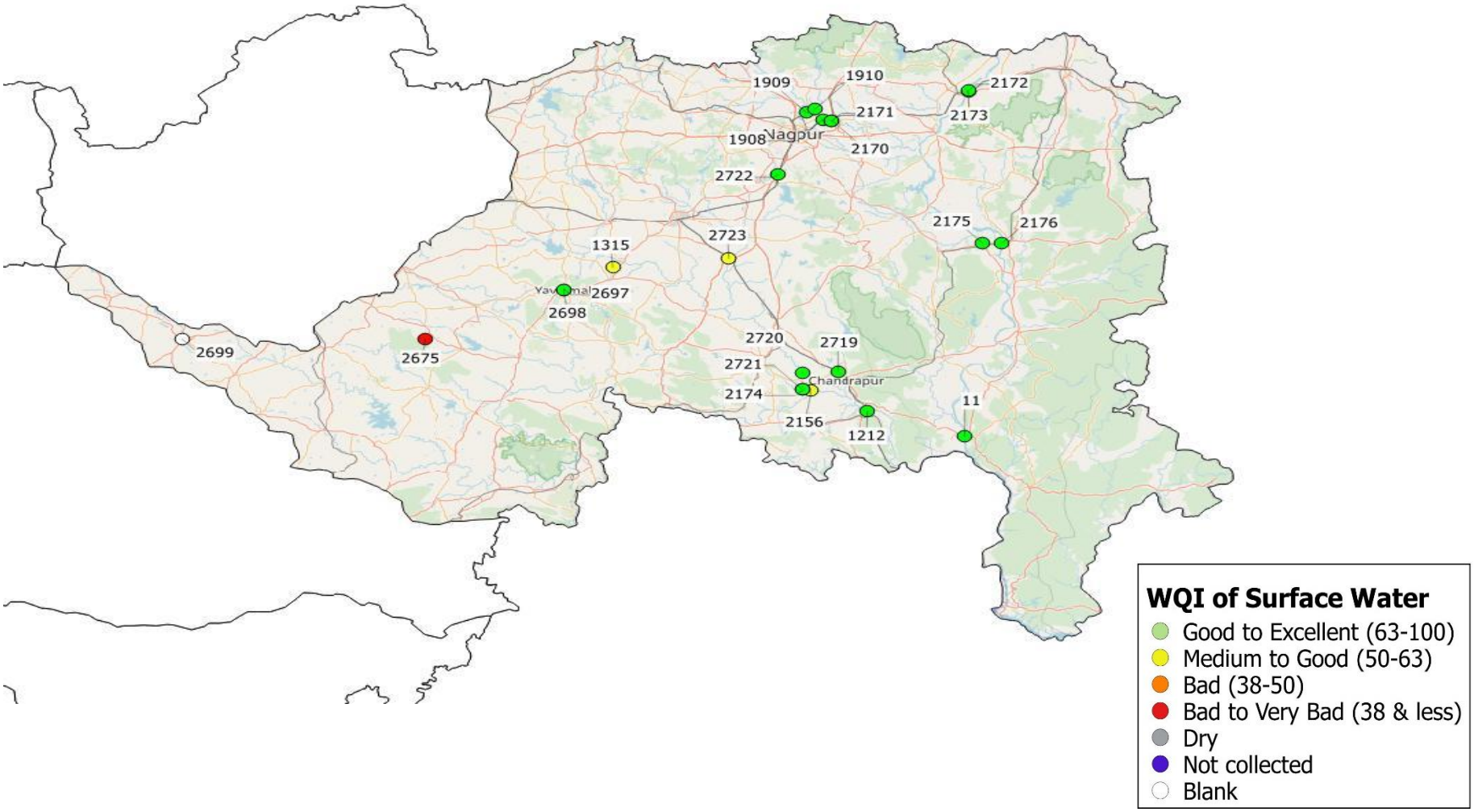
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

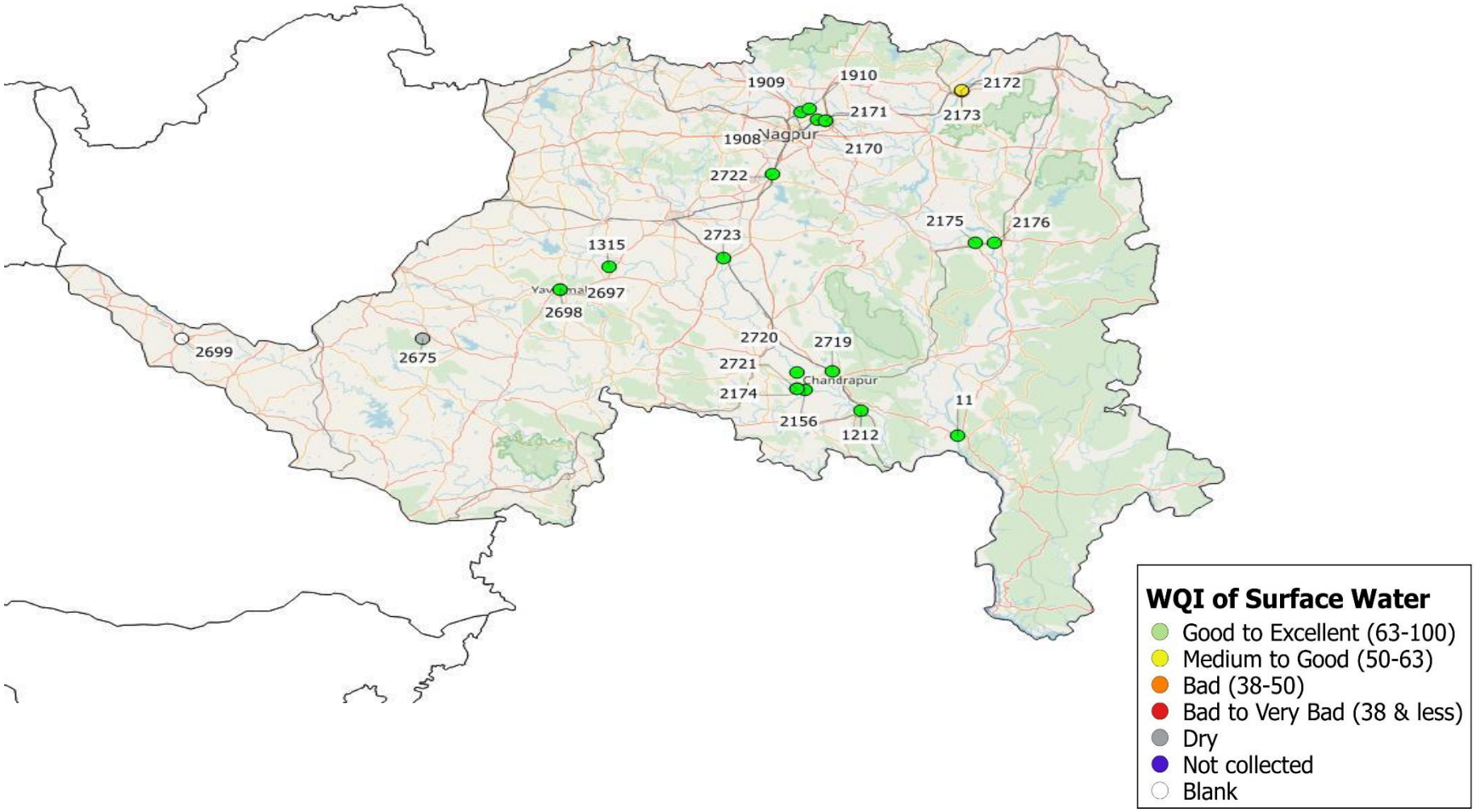
Table No 19: Surface water quality monitoring stations in Godavari Basin (2 of 2)

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

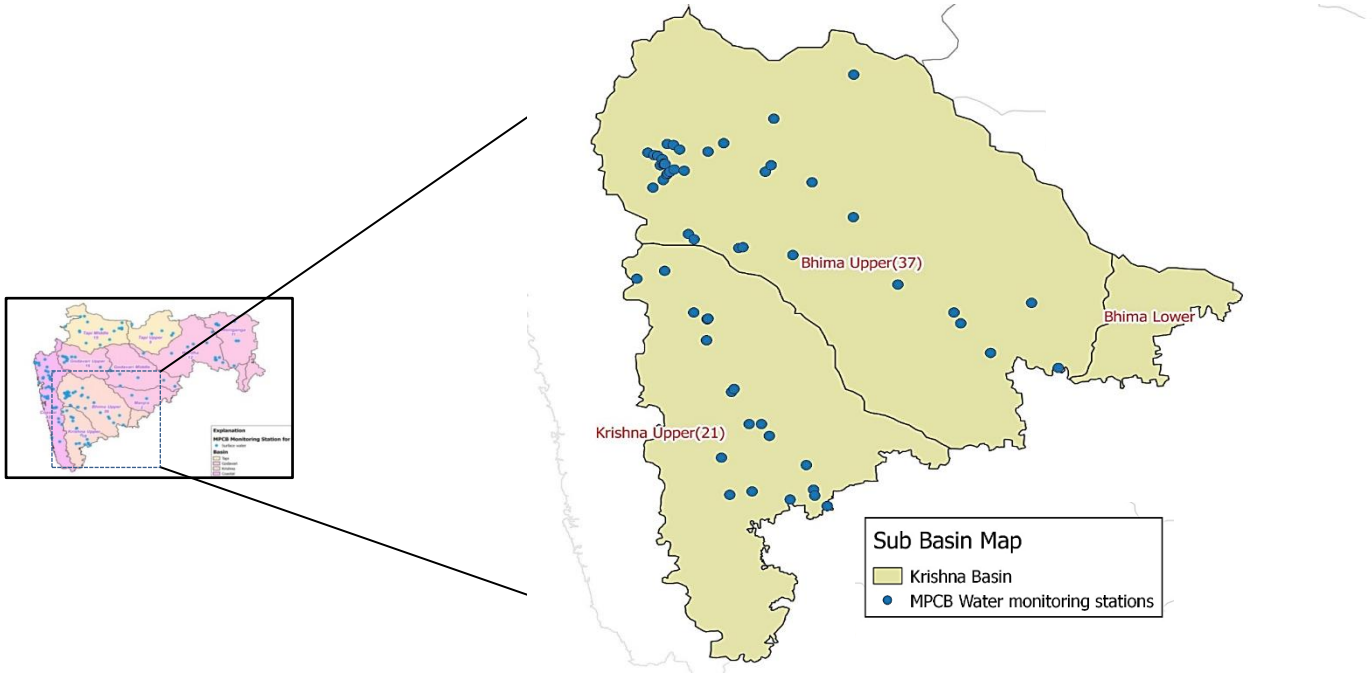
Spatial map of Surface WQI in Godavari Basin (2 of 2) (April 2018)



Spatial map of Surface WQI in Godavari Basin (2 of 2) (December 2018)



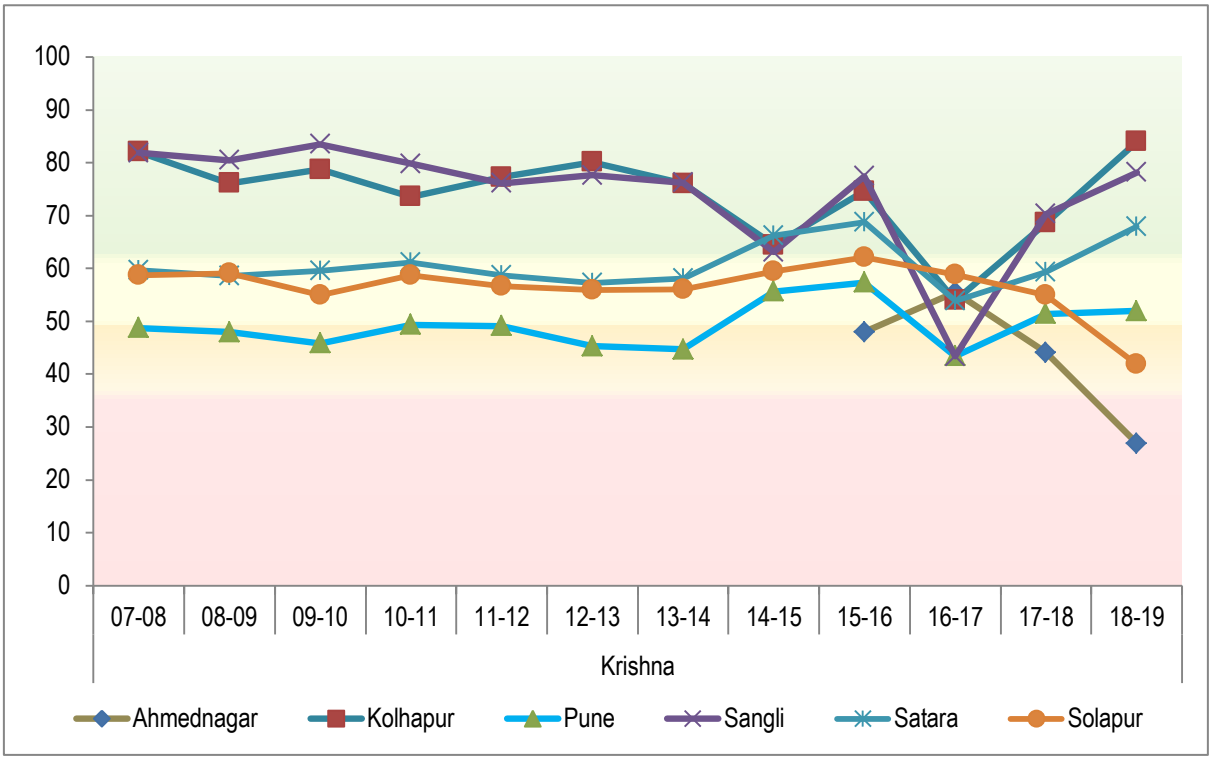
5.4 Krishna Basin



Map No. 4: Network of surface water quality monitoring stations in Krishna basin

Krishna river basin covers a total area of around 2, 58,948 sq. km, extends over the states of Andhra Pradesh, Maharashtra and Karnataka which is nearly 8% of the total geographical area of the country. The length of the river is about 1400km which drains the Deccan plateau and discharges into the Bay of Bengal. Its major tributaries are the Ghataprabha, the Malaprabha, The Bhima, the Tungbhadra, the Munneru and the Musi River. The Krishna basin is divided into Krishna Upper (21 stations) and Bhima Upper (37 stations) for analysis in this report

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. 20: Trend of annual average WQI across districts of Krishna basin

Note:

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

The intra basin performance of Krishna Basin across six districts is depicted in the Figure No. 20. Out of 6 districts, Kolhapur (68 to 83), Sangli (70 to 78) and Satara (59 to 67) showed significant improvement in WQI. All 3 districts recorded WQI in"Good to Excellent" category. Pune showed very marginal improvement (from 51.4 to 51.9) and recorded WQI in "Medium to Good" category.

However, decreasing trend in WQI was observed in Ahmednagar ("Bad to Very Bad") and Solapur ("Medium to Good" to "Bad") indicating decrease in Water quality and increase in pollution level.

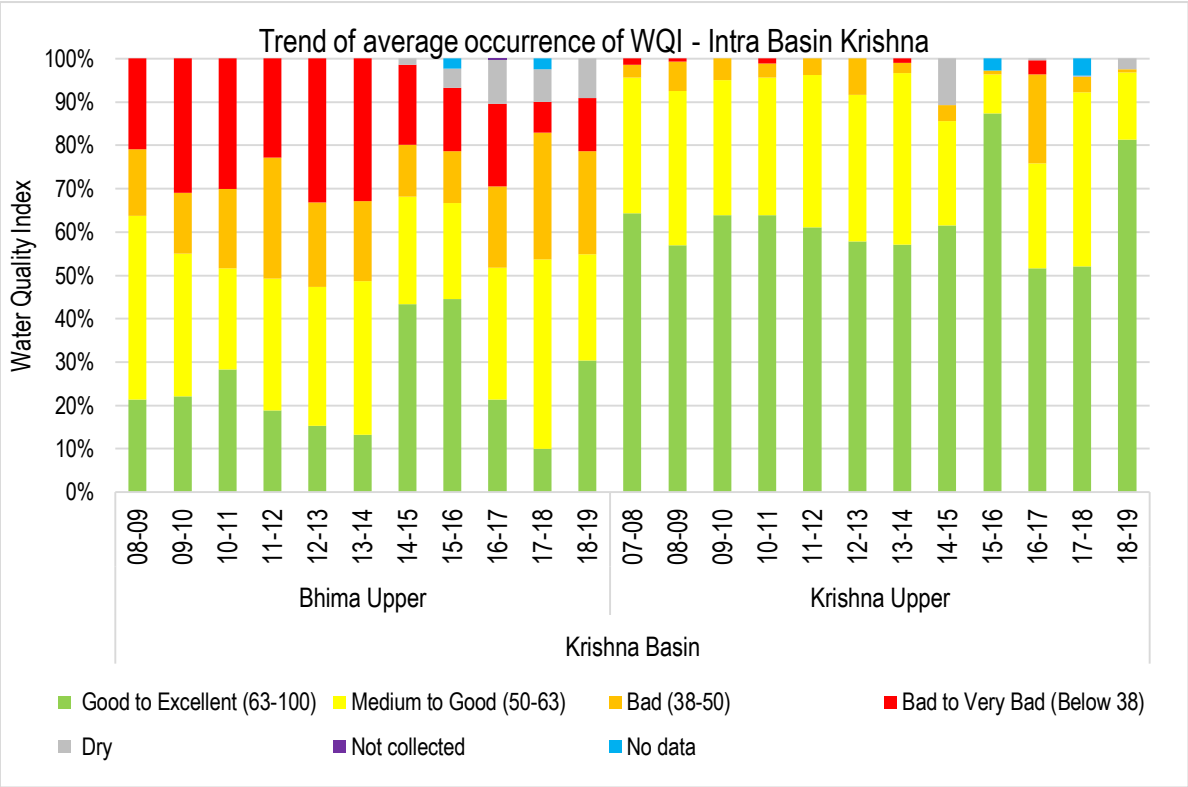


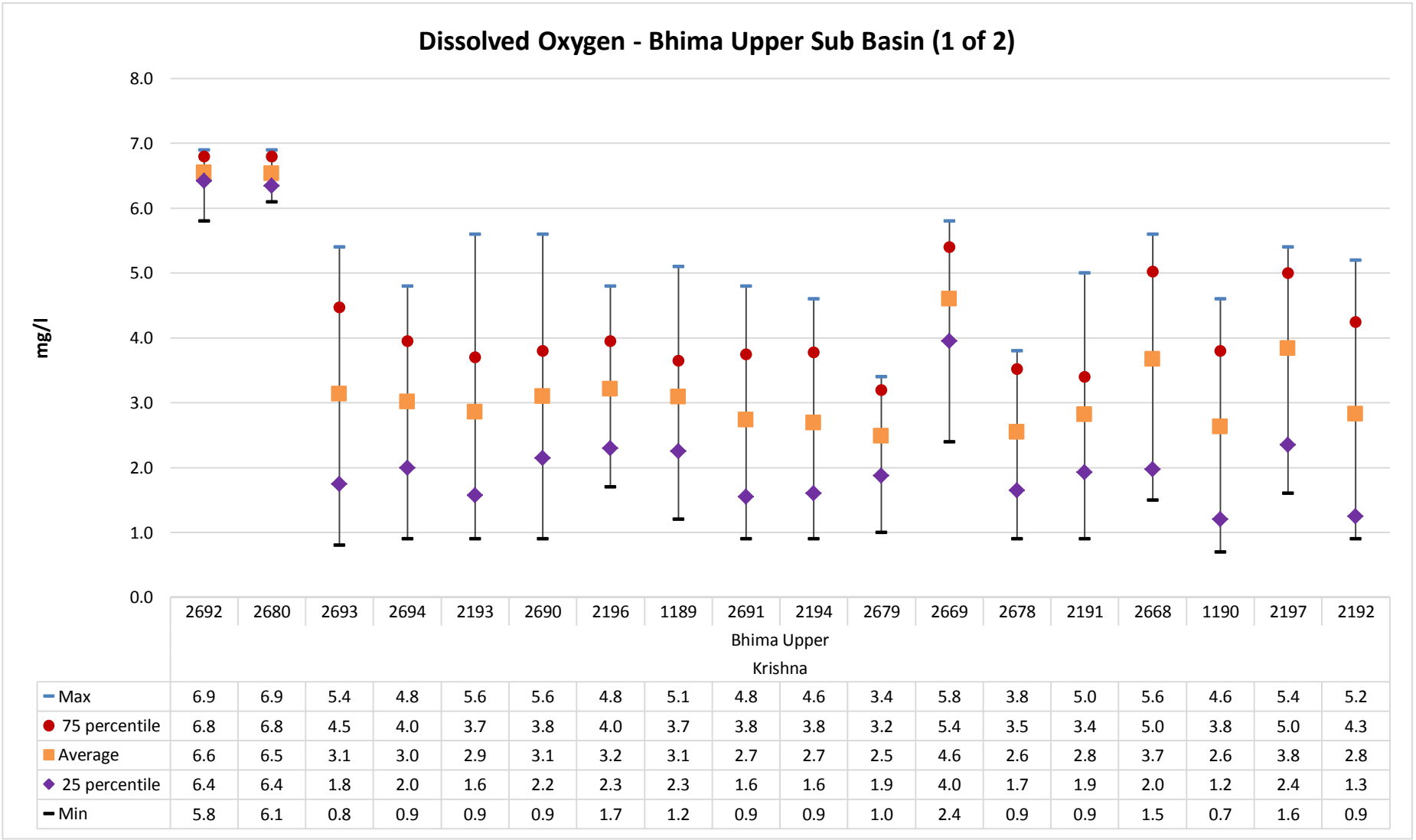
Figure No. 21: Trend of average occurrence for different category of WQI in Krishna basin

Inter sub basin results for Krishna basin are depicted in Figure No. 21. Around 81% of the total observations from Krishna Upper were recorded under "Good to Excellent" category comapred to ~30% of the observations in Bhima Upper. However, It is important to note that both sub basins recorded increase in % of "Good to Excellent" category observations as comaperd to last year (from ~52% in 2017-18 to 81% in 2018-19 in Krishna Upper and ~10% to ~30% in Bhima Upper) which shows improvement in water quality in both sub basins.

Similar trend was observed in case of "Medium to Good" WQI category with ~25% observations (2018-19) in Bhima Upper (from ~44% in 2017-18) and ~15% of the observations in Krishna Upper (from ~40% in 2017-18).

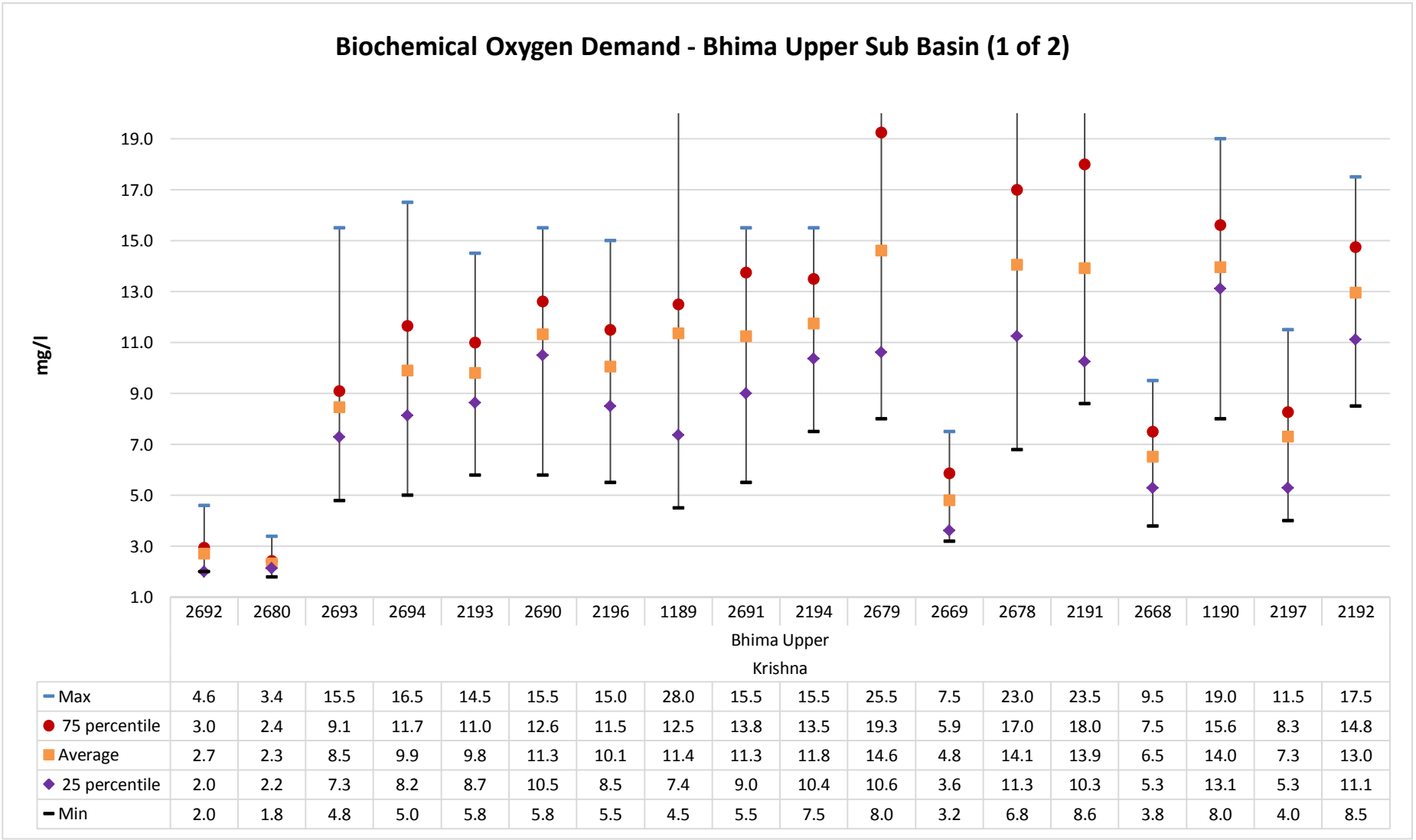
The maximum occurrence of "Bad" category is recorded in Bhima Upper (~24%) compared to only 0.8% in Krishna Upper basin. Around 13% of the observations were recorded under "Bad to Very Bad" in Bhima Upper. Not even a single observation was recorded under this category from Krishna Upper.

Around 9% and 2% of the observations from Bhima Upper and Krishna Upper basin respectively were recorded as "Dry".



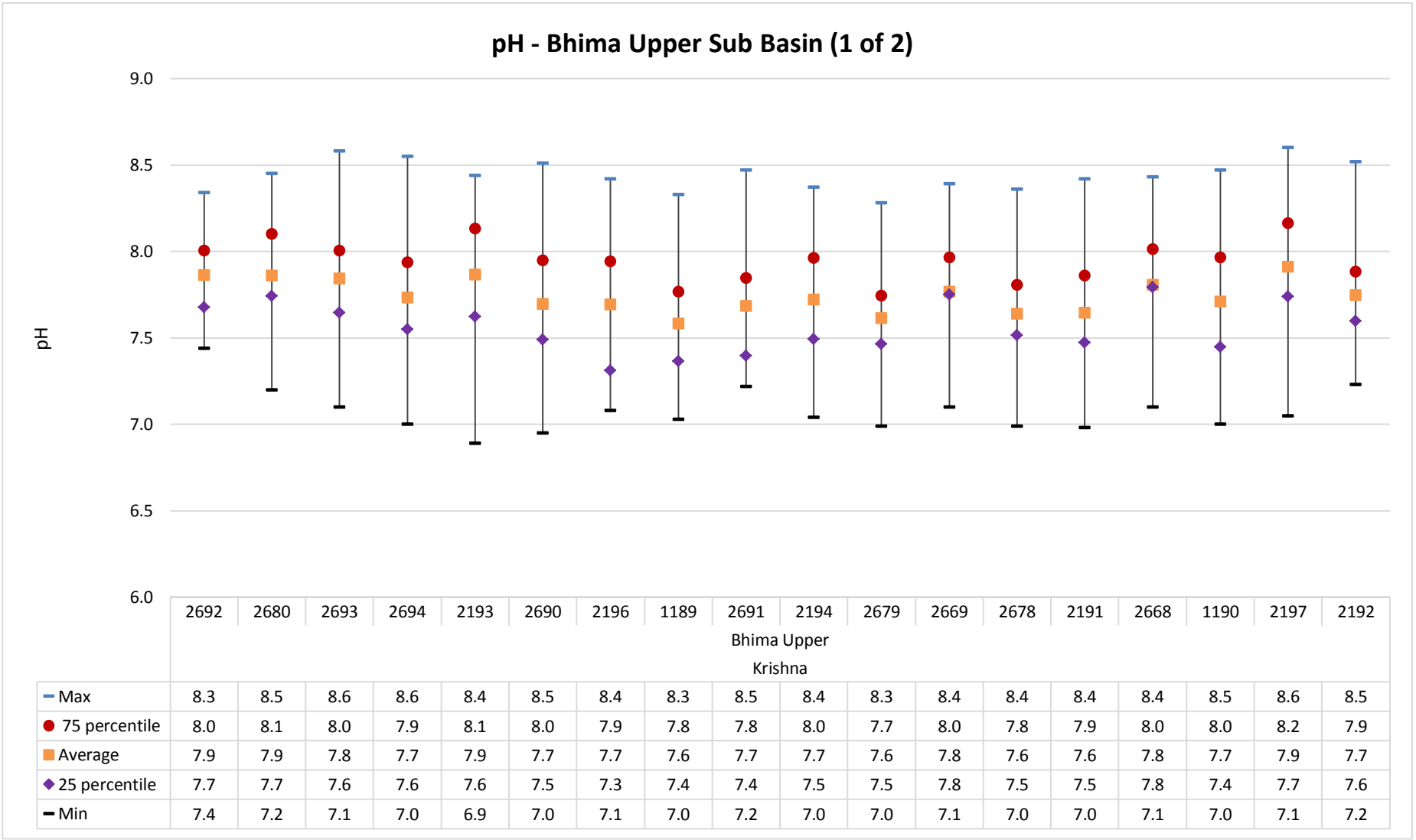
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192
	Bhima Upper Krishna																	
Max	6.9	6.9	5.4	4.8	5.6	5.6	4.8	5.1	4.8	4.6	3.4	5.8	3.8	5.0	5.6	4.6	5.4	5.2
75 percentile	6.8	6.8	4.5	4.0	3.7	3.8	4.0	3.7	3.8	3.8	3.2	5.4	3.5	3.4	5.0	3.8	5.0	4.3
Average	6.6	6.5	3.1	3.0	2.9	3.1	3.2	3.1	2.7	2.7	2.5	4.6	2.6	2.8	3.7	2.6	3.8	2.8
25 percentile	6.4	6.4	1.8	2.0	1.6	2.2	2.3	2.3	1.6	1.6	1.9	4.0	1.7	1.9	2.0	1.2	2.4	1.3
Min	5.8	6.1	0.8	0.9	0.9	0.9	1.7	1.2	0.9	0.9	1.0	2.4	0.9	0.9	1.5	0.7	1.6	0.9

Figure No. 22: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (1 of 2)



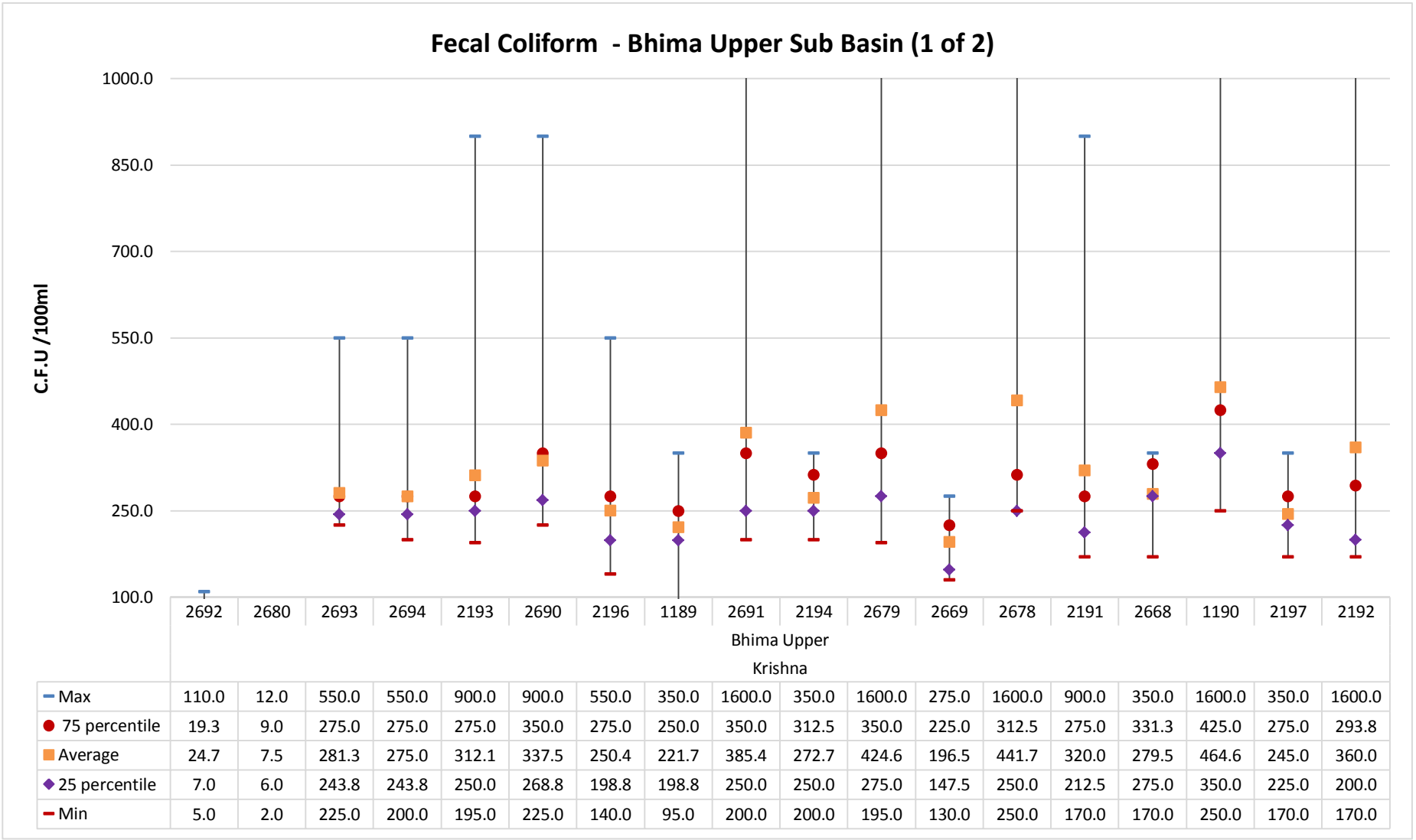
	2692	2680	2693	2694	2193	2690	2196	1189	2691	2194	2679	2669	2678	2191	2668	1190	2197	2192
Max	4.6	3.4	15.5	16.5	14.5	15.5	15.0	28.0	15.5	15.5	25.5	7.5	23.0	23.5	9.5	19.0	11.5	17.5
75 percentile	3.0	2.4	9.1	11.7	11.0	12.6	11.5	12.5	13.8	13.5	19.3	5.9	17.0	18.0	7.5	15.6	8.3	14.8
Average	2.7	2.3	8.5	9.9	9.8	11.3	10.1	11.4	11.3	11.8	14.6	4.8	14.1	13.9	6.5	14.0	7.3	13.0
25 percentile	2.0	2.2	7.3	8.2	8.7	10.5	8.5	7.4	9.0	10.4	10.6	3.6	11.3	10.3	5.3	13.1	5.3	11.1
Min	2.0	1.8	4.8	5.0	5.8	5.8	5.5	4.5	5.5	7.5	8.0	3.2	6.8	8.6	3.8	8.0	4.0	8.5

Figure No. 23: 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
	Bhima Upper Krishna																	
Max	8.3	8.5	8.6	8.6	8.4	8.5	8.4	8.3	8.5	8.4	8.3	8.4	8.4	8.4	8.4	8.5	8.6	8.5
75 percentile	8.0	8.1	8.0	7.9	8.1	8.0	7.9	7.8	7.8	8.0	7.7	8.0	7.8	7.9	8.0	8.0	8.2	7.9
Average	7.9	7.9	7.8	7.7	7.9	7.7	7.7	7.6	7.7	7.7	7.6	7.8	7.6	7.6	7.8	7.7	7.9	7.7
25 percentile	7.7	7.7	7.6	7.6	7.6	7.5	7.3	7.4	7.4	7.5	7.5	7.8	7.5	7.5	7.8	7.4	7.7	7.6
Min	7.4	7.2	7.1	7.0	6.9	7.0	7.1	7.0	7.2	7.0	7.0	7.1	7.0	7.0	7.1	7.0	7.1	7.2

Figure No. 24: 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	110.0	12.0	550.0	550.0	900.0	900.0	550.0	350.0	1600.0	350.0	1600.0	275.0	1600.0	900.0	350.0	1600.0	350.0	1600.0
75 percentile	19.3	9.0	275.0	275.0	275.0	350.0	275.0	250.0	350.0	312.5	350.0	225.0	312.5	275.0	331.3	425.0	275.0	293.8
Average	24.7	7.5	281.3	275.0	312.1	337.5	250.4	221.7	385.4	272.7	424.6	196.5	441.7	320.0	279.5	464.6	245.0	360.0
25 percentile	7.0	6.0	243.8	243.8	250.0	268.8	198.8	198.8	250.0	250.0	275.0	147.5	250.0	212.5	275.0	350.0	225.0	200.0
Min	5.0	2.0	225.0	200.0	195.0	225.0	140.0	95.0	200.0	200.0	195.0	130.0	250.0	170.0	170.0	250.0	170.0	170.0

Figure No. 25: 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)

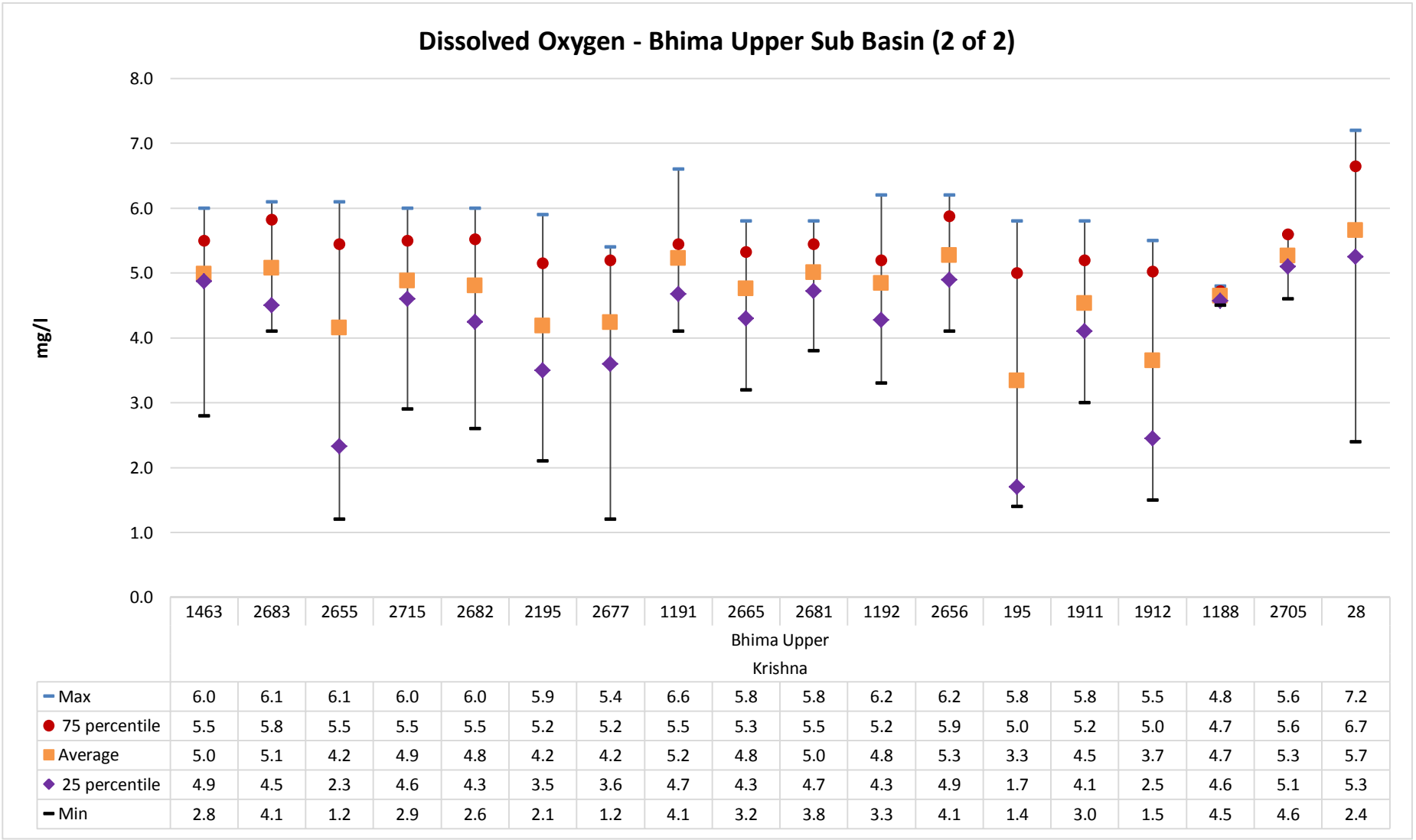
Apr	76	83	58	55	64	58	51	46	50	56	42	62	43	43	63	54	62	56
May	82	89	60	47	58	49	51	52	50	49	42	Dry	44	43	59	44	58	49
Jun	85	78	50	49	50	49	56	58	55	50	45	64	44	58	Dry	47	57	58
Jul	87	87	59	56	49	51	53	35	49	47	46	66	49	48	65	46	66	49
Aug	85	87	59	57	48	59	58	58	57	47	51	69	53	48	61	47	59	50
Sep	71	64	54	42	45	38	45	34	33	30	31	69	31	37	64	33	61	34
Oct	85	83	48	48	45	43	52	53	49	47	44	67	41	48	55	43	54	40
Nov	88	86	44	46	42	42	45	58	45	39	42	58	42	40	38	36	38	40
Dec	87	89	40	41	38	37	43	40	38	37	39	64	38	40	42	30	44	39
Jan	85	85	35	36	35	31	31	44	31	31	32	44	32	23	40	29	40	32
Feb	78	83	43	41	34	33	39	46	37	33	35	54	35	35	42	33	41	35
Mar	76	84	31	32	32	32	40	48	38	31	33	Dry	32	31	Dry	30	51	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)																	
Basin	Krishna																	

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

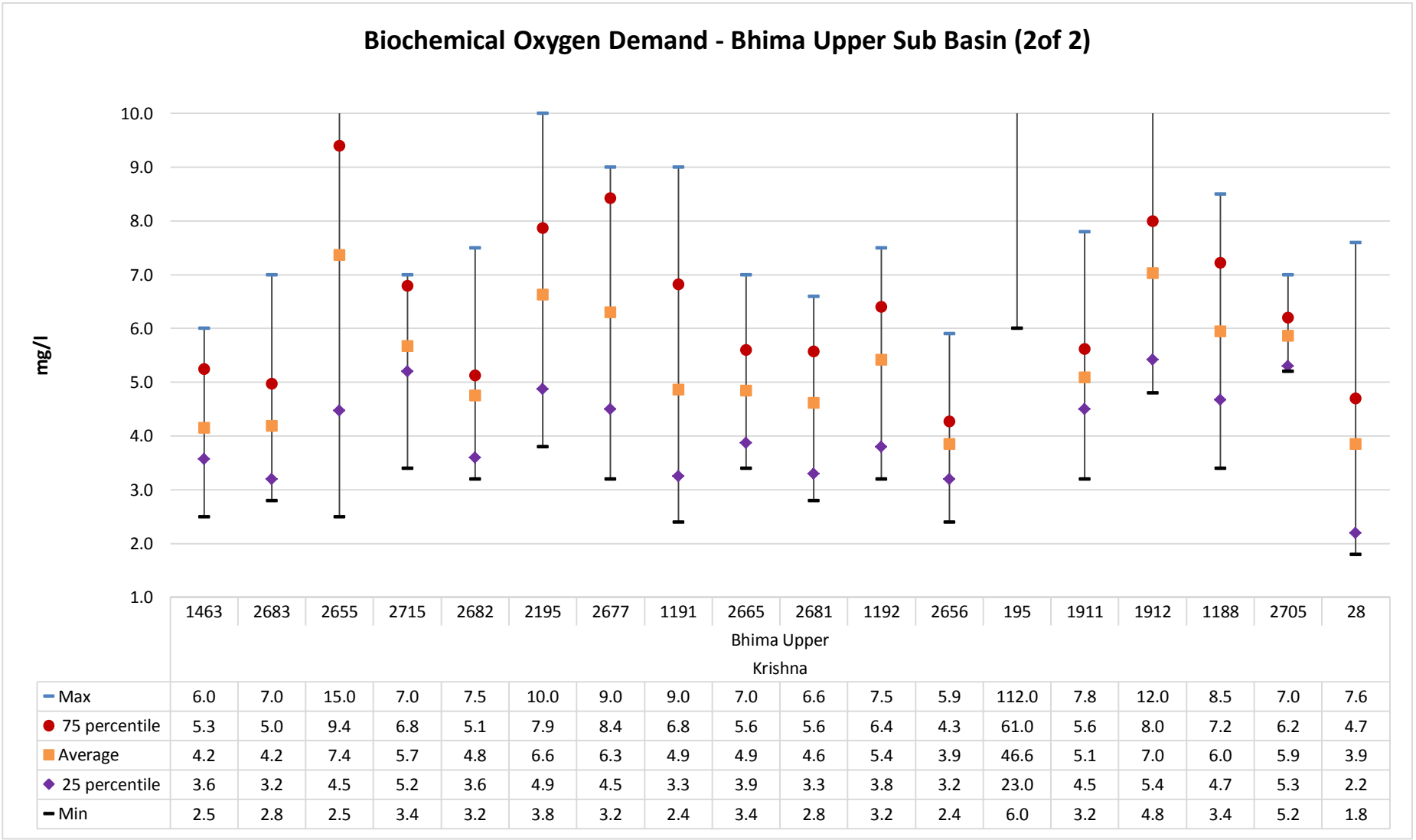
Table No 20: Surface water quality monitoring stations in Krishna Basin (1 of 2) Sub Basin –Bhima Upper (1 of 2)

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



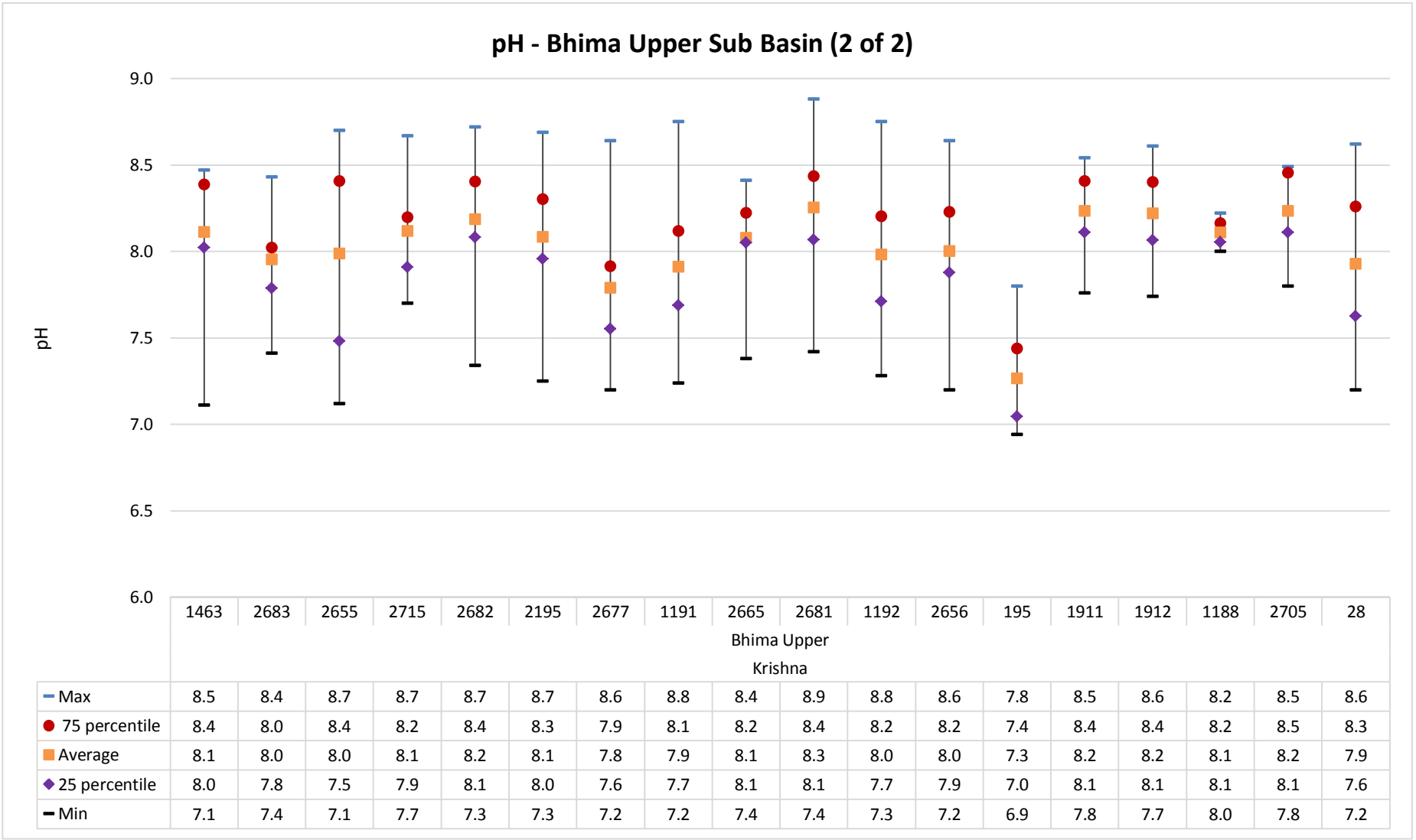
	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	1911	1912	1188	2705	28
	Bhima Upper Krishna																	
Max	6.0	6.1	6.1	6.0	6.0	5.9	5.4	6.6	5.8	5.8	6.2	6.2	5.8	5.8	5.5	4.8	5.6	7.2
75 percentile	5.5	5.8	5.5	5.5	5.5	5.2	5.2	5.5	5.3	5.5	5.2	5.9	5.0	5.2	5.0	4.7	5.6	6.7
Average	5.0	5.1	4.2	4.9	4.8	4.2	4.2	5.2	4.8	5.0	4.8	5.3	3.3	4.5	3.7	4.7	5.3	5.7
25 percentile	4.9	4.5	2.3	4.6	4.3	3.5	3.6	4.7	4.3	4.7	4.3	4.9	1.7	4.1	2.5	4.6	5.1	5.3
Min	2.8	4.1	1.2	2.9	2.6	2.1	1.2	4.1	3.2	3.8	3.3	4.1	1.4	3.0	1.5	4.5	4.6	2.4

Figure No. 26: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Bhima upper sub basin -Krishna Basin (2 of 2)



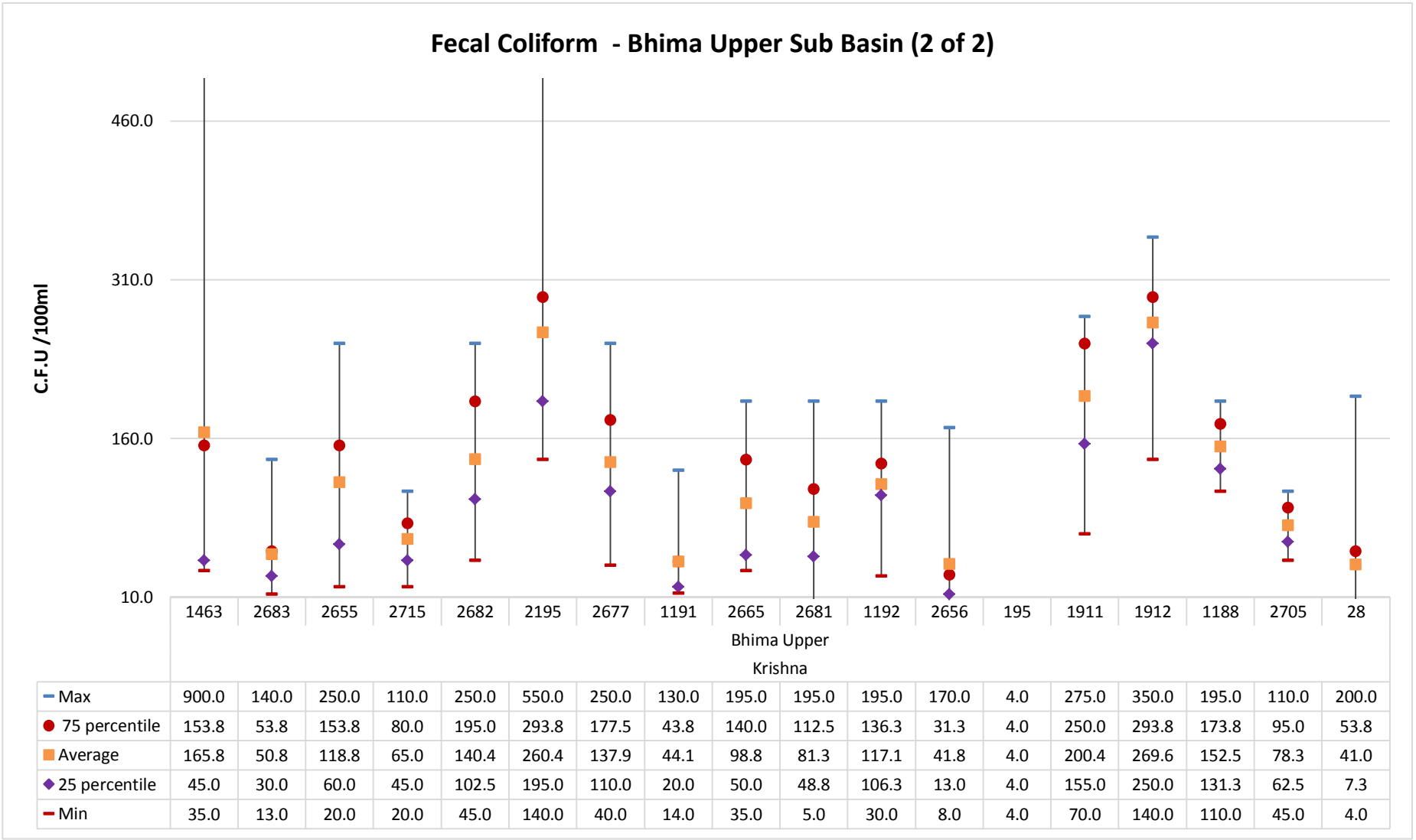
	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	1911	1912	1188	2705	28
Max	6.0	7.0	15.0	7.0	7.5	10.0	9.0	9.0	7.0	6.6	7.5	5.9	112.0	7.8	12.0	8.5	7.0	7.6
75 percentile	5.3	5.0	9.4	6.8	5.1	7.9	8.4	6.8	5.6	5.6	6.4	4.3	61.0	5.6	8.0	7.2	6.2	4.7
Average	4.2	4.2	7.4	5.7	4.8	6.6	6.3	4.9	4.9	4.6	5.4	3.9	46.6	5.1	7.0	6.0	5.9	3.9
25 percentile	3.6	3.2	4.5	5.2	3.6	4.9	4.5	3.3	3.9	3.3	3.8	3.2	23.0	4.5	5.4	4.7	5.3	2.2
Min	2.5	2.8	2.5	3.4	3.2	3.8	3.2	2.4	3.4	2.8	3.2	2.4	6.0	3.2	4.8	3.4	5.2	1.8

Figure No. 27: Trend of Biological Oxygen Demand (BOD) 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	1911	1912	1188	2705	28
	Bhima Upper Krishna																	
Max	8.5	8.4	8.7	8.7	8.7	8.7	8.6	8.8	8.4	8.9	8.8	8.6	7.8	8.5	8.6	8.2	8.5	8.6
75 percentile	8.4	8.0	8.4	8.2	8.4	8.3	7.9	8.1	8.2	8.4	8.2	8.2	7.4	8.4	8.4	8.2	8.5	8.3
Average	8.1	8.0	8.0	8.1	8.2	8.1	7.8	7.9	8.1	8.3	8.0	8.0	7.3	8.2	8.2	8.1	8.2	7.9
25 percentile	8.0	7.8	7.5	7.9	8.1	8.0	7.6	7.7	8.1	8.1	7.7	7.9	7.0	8.1	8.1	8.1	8.1	7.6
Min	7.1	7.4	7.1	7.7	7.3	7.3	7.2	7.2	7.4	7.4	7.3	7.2	6.9	7.8	7.7	8.0	7.8	7.2

Figure No. 28: 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	1911	1912	1188	2705	28
Max	900.0	140.0	250.0	110.0	250.0	550.0	250.0	130.0	195.0	195.0	195.0	170.0	4.0	275.0	350.0	195.0	110.0	200.0
75 percentile	153.8	53.8	153.8	80.0	195.0	293.8	177.5	43.8	140.0	112.5	136.3	31.3	4.0	250.0	293.8	173.8	95.0	53.8
Average	165.8	50.8	118.8	65.0	140.4	260.4	137.9	44.1	98.8	81.3	117.1	41.8	4.0	200.4	269.6	152.5	78.3	41.0
25 percentile	45.0	30.0	60.0	45.0	102.5	195.0	110.0	20.0	50.0	48.8	106.3	13.0	4.0	155.0	250.0	131.3	62.5	7.3
Min	35.0	13.0	20.0	20.0	45.0	140.0	40.0	14.0	35.0	5.0	30.0	8.0	4.0	70.0	140.0	110.0	45.0	4.0

Figure No. 29: 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)

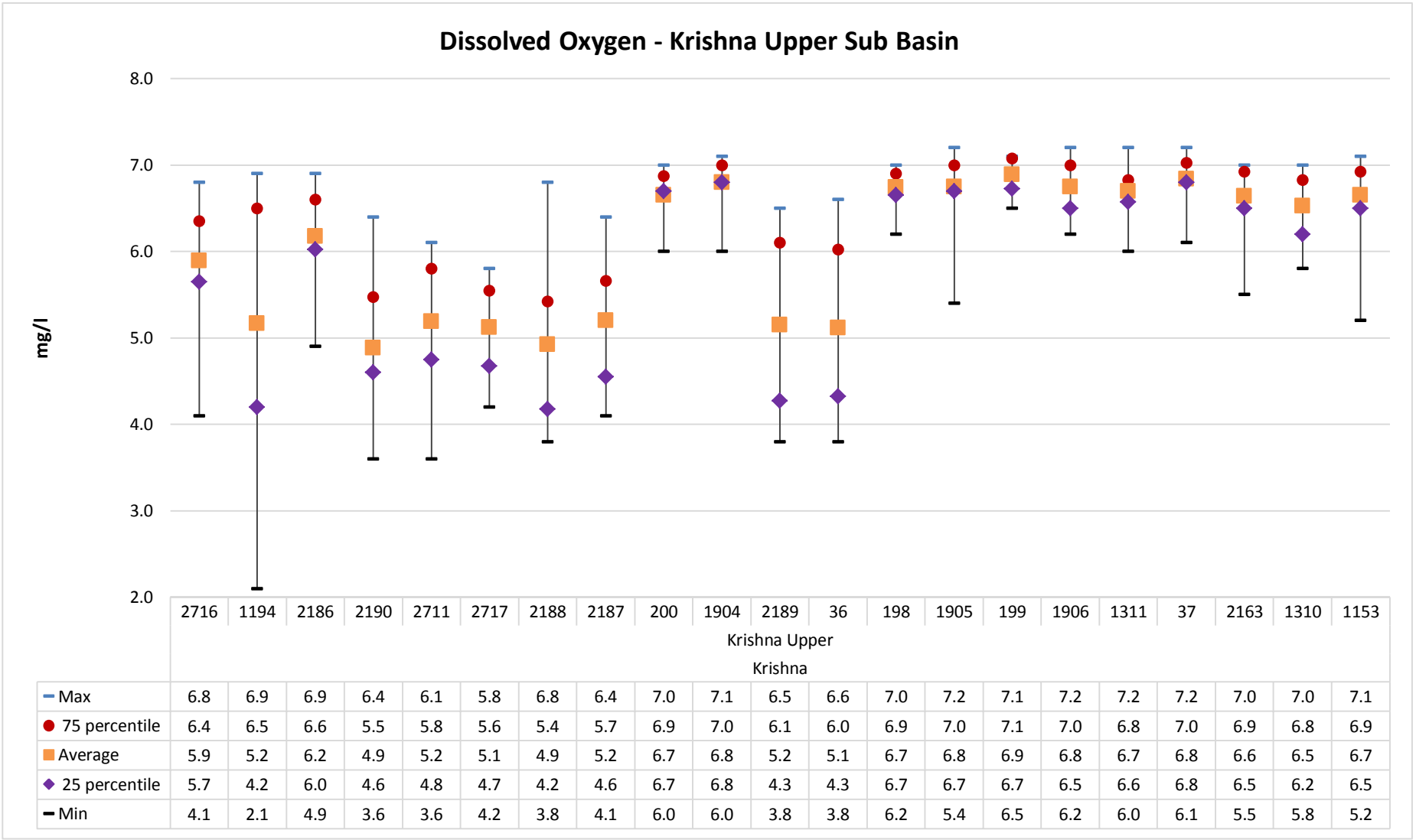
Apr	65	70	64	Dry	63	65	61	69	73	67	69	77	48	63	59	Dry	68	69
May	70	73	64	63	66	60	60	59	62	64	60	61		59	56	Dry	64	69
Jun	71	75	59	Dry	62	60	62	70	Dry	65	69	79		60	54	Dry	Dry	85
Jul	74	67	70	74	75	67	66	67	66	59	63	76		62	58	Dry	Dry	86
Aug	70	69	70	69	65	58	67	69	65	59	65	73	20	55	49	Dry	Dry	90
Sep	61	66	69	65	67	57	60	62	71	72	64	72	60	68	66	59	62	88
Oct	57	76	69	Dry	69	50	70	82	52	71	74	73	48	61	54	61	Dry	61
Nov	69	64	42	Dry	63	51	59	66	68	70	59	65	56	61	53	Dry	Dry	86
Dec	53	70	80	Dry	48	44	60	84	Dry	58	71	72		53	39	Dry	Dry	86
Jan	68	76	46	52	54	49	39	76	53	76	52	76	49	50	37	Dry	Dry	84
Feb	63	73	34	Dry	62	58	60	72	Dry	66	64	72		58	37	Dry	Dry	45
Mar	60	58	31	Dry	50	38	51	67	Dry	57	52	72	42	53	41	Dry	Dry	47
Station Code	1463	2683	2655	2715	2682	2195	2677	1191	2665	2681	1192	2656	195	1911	1912	1188	2705	28
Sub Basin	Bhima Upper (2 of 2)																	
Basin	Krishna																	

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

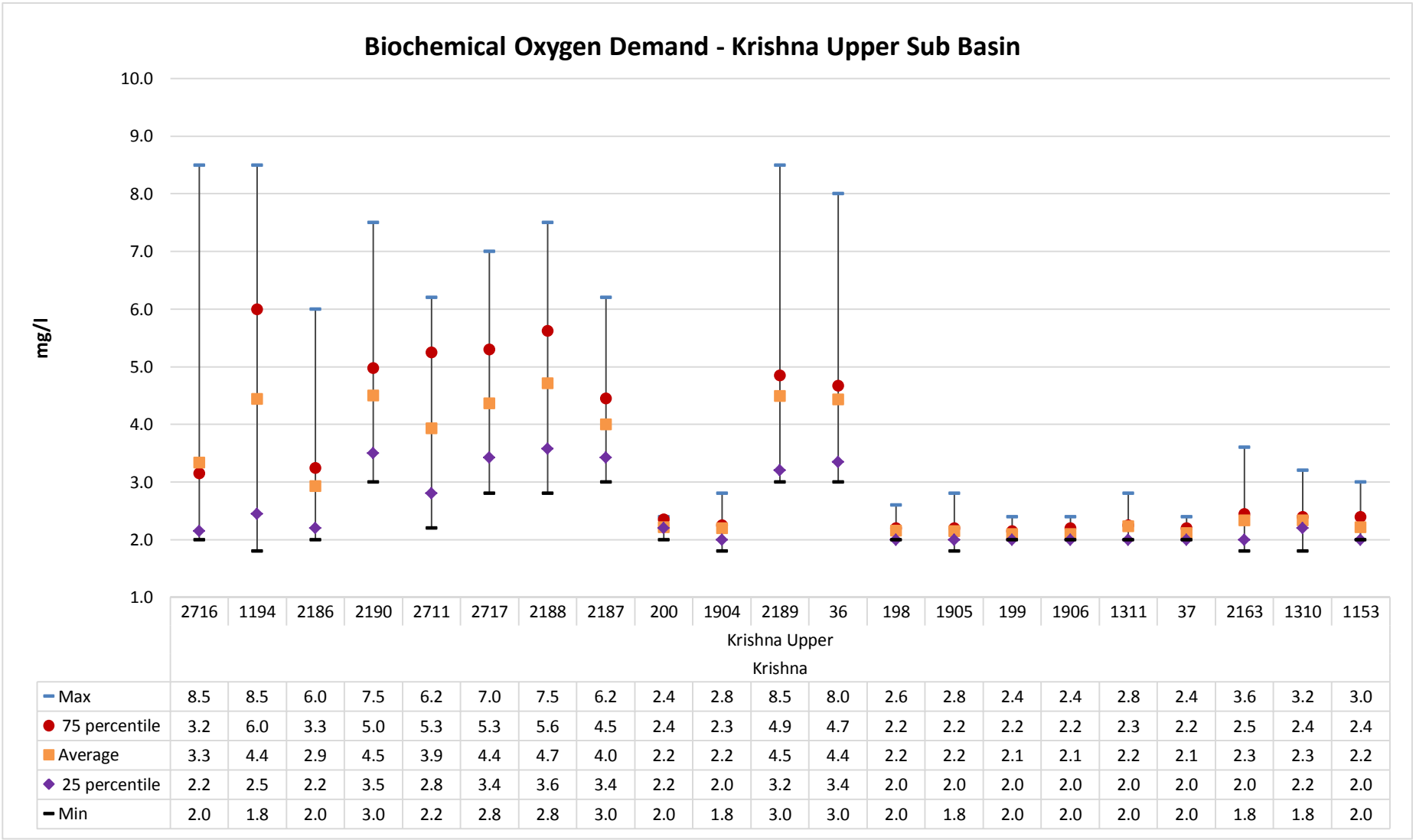
Table No 21: Surface water monitoring stations at Krishna Basin (1 of 2) Sub Basin Bhima Upper (2 of 2)

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	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



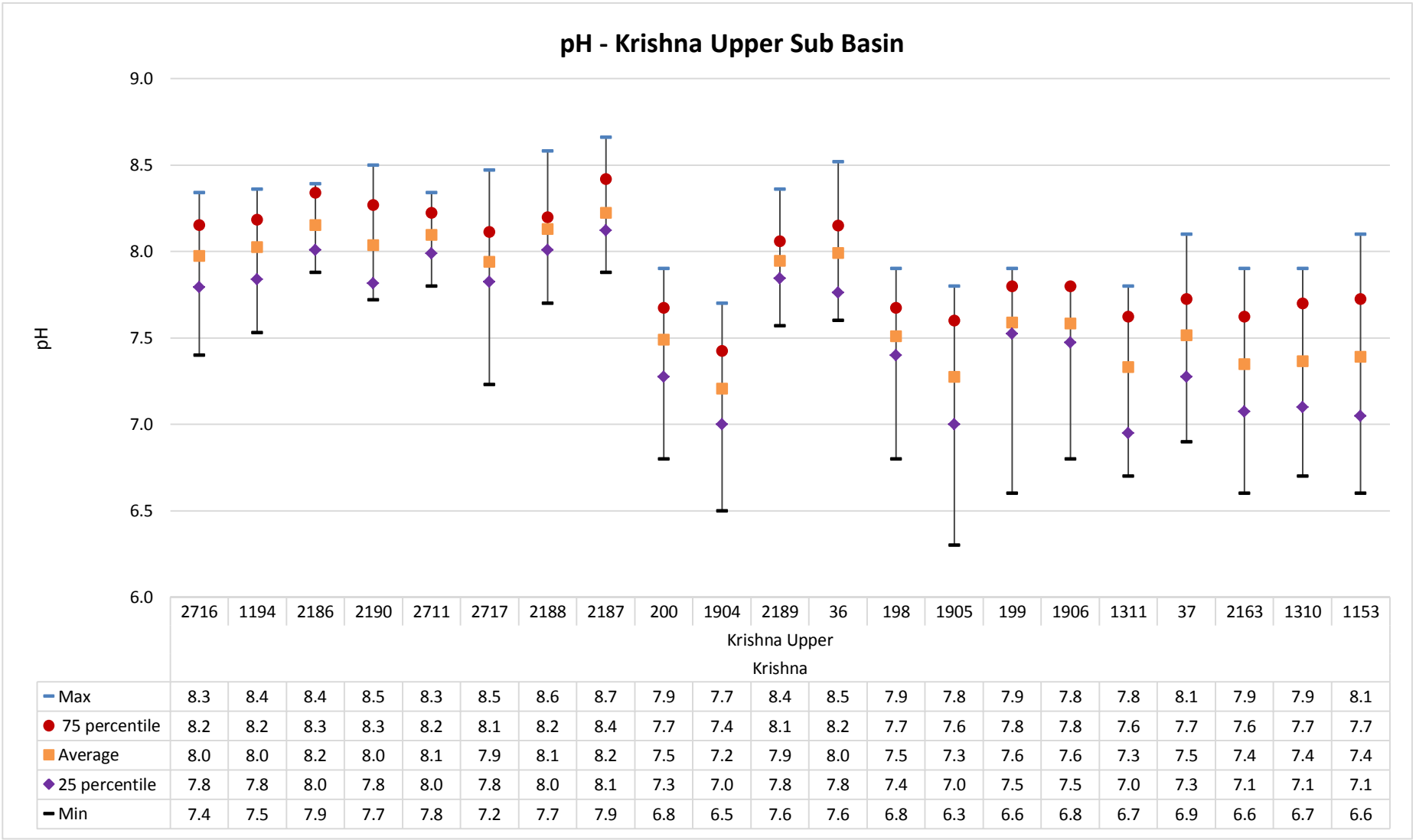
	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Max	6.8	6.9	6.9	6.4	6.1	5.8	6.8	6.4	7.0	7.1	6.5	6.6	7.0	7.2	7.1	7.2	7.2	7.2	7.0	7.0	7.1
75 percentile	6.4	6.5	6.6	5.5	5.8	5.6	5.4	5.7	6.9	7.0	6.1	6.0	6.9	7.0	7.1	7.0	6.8	7.0	6.9	6.8	6.9
Average	5.9	5.2	6.2	4.9	5.2	5.1	4.9	5.2	6.7	6.8	5.2	5.1	6.7	6.8	6.9	6.8	6.7	6.8	6.6	6.5	6.7
25 percentile	5.7	4.2	6.0	4.6	4.8	4.7	4.2	4.6	6.7	6.8	4.3	4.3	6.7	6.7	6.7	6.5	6.6	6.8	6.5	6.2	6.5
Min	4.1	2.1	4.9	3.6	3.6	4.2	3.8	4.1	6.0	6.0	3.8	3.8	6.2	5.4	6.5	6.2	6.0	6.1	5.5	5.8	5.2

Figure No. 30: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Krishna upper sub basin -Krishna Basin



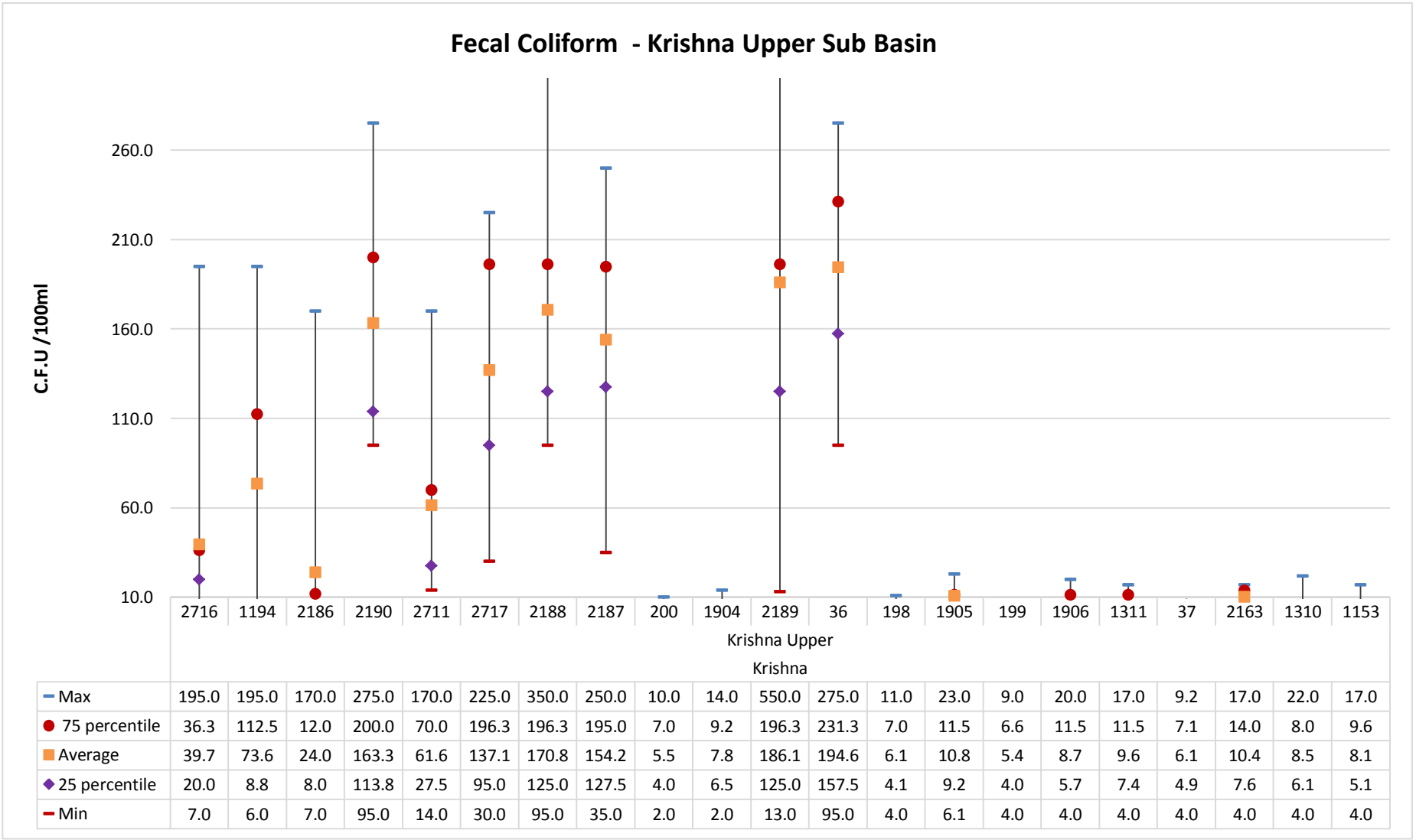
	2716	1194	2186	2190	2711	2717	2188	2187	200	1904	2189	36	198	1905	199	1906	1311	37	2163	1310	1153
Max	8.5	8.5	6.0	7.5	6.2	7.0	7.5	6.2	2.4	2.8	8.5	8.0	2.6	2.8	2.4	2.4	2.8	2.4	3.6	3.2	3.0
75 percentile	3.2	6.0	3.3	5.0	5.3	5.3	5.6	4.5	2.4	2.3	4.9	4.7	2.2	2.2	2.2	2.2	2.3	2.2	2.5	2.4	2.4
Average	3.3	4.4	2.9	4.5	3.9	4.4	4.7	4.0	2.2	2.2	4.5	4.4	2.2	2.2	2.1	2.1	2.2	2.1	2.3	2.3	2.2
25 percentile	2.2	2.5	2.2	3.5	2.8	3.4	3.6	3.4	2.2	2.0	3.2	3.4	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.0
Min	2.0	1.8	2.0	3.0	2.2	2.8	2.8	3.0	2.0	1.8	3.0	3.0	2.0	1.8	2.0	2.0	2.0	2.0	1.8	1.8	2.0

Figure No. 31: 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	8.3	8.4	8.4	8.5	8.3	8.5	8.6	8.7	7.9	7.7	8.4	8.5	7.9	7.8	7.9	7.8	7.8	8.1	7.9	7.9	8.1
75 percentile	8.2	8.2	8.3	8.3	8.2	8.1	8.2	8.4	7.7	7.4	8.1	8.2	7.7	7.6	7.8	7.8	7.6	7.7	7.6	7.7	7.7
Average	8.0	8.0	8.2	8.0	8.1	7.9	8.1	8.2	7.5	7.2	7.9	8.0	7.5	7.3	7.6	7.6	7.3	7.5	7.4	7.4	7.4
25 percentile	7.8	7.8	8.0	7.8	8.0	7.8	8.0	8.1	7.3	7.0	7.8	7.8	7.4	7.0	7.5	7.5	7.0	7.3	7.1	7.1	7.1
Min	7.4	7.5	7.9	7.7	7.8	7.2	7.7	7.9	6.8	6.5	7.6	7.6	6.8	6.3	6.6	6.8	6.7	6.9	6.6	6.7	6.6

Figure No. 32: 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	195.0	195.0	170.0	275.0	170.0	225.0	350.0	250.0	10.0	14.0	550.0	275.0	11.0	23.0	9.0	20.0	17.0	9.2	17.0	22.0	17.0
75 percentile	36.3	112.5	12.0	200.0	70.0	196.3	196.3	195.0	7.0	9.2	196.3	231.3	7.0	11.5	6.6	11.5	11.5	7.1	14.0	8.0	9.6
Average	39.7	73.6	24.0	163.3	61.6	137.1	170.8	154.2	5.5	7.8	186.1	194.6	6.1	10.8	5.4	8.7	9.6	6.1	10.4	8.5	8.1
25 percentile	20.0	8.8	8.0	113.8	27.5	95.0	125.0	127.5	4.0	6.5	125.0	157.5	4.1	9.2	4.0	5.7	7.4	4.9	7.6	6.1	5.1
Min	7.0	6.0	7.0	95.0	14.0	30.0	95.0	35.0	2.0	2.0	13.0	95.0	4.0	6.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0

Figure No. 33: 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	74	83	75	65	72	69	66	65	88	88	69	71	88	86	86	84	87	89	85	86	86
May	77	81	78	65	76	65	66	65	86	85	70	67	84	84	85	83	85	88	86	85	83
Jun	70	76	80	66	72	72	61	63	86	84	66	63	88	77	86	88	83	84	78	80	74
Jul	61	64	74	62	69	62	65	67	88	65	53	60	87	60	87	87	64	89	61	62	65
Aug	77	64	83	66	74	62	60	60		86	74	73		86		83	84	84	86	88	92
Sep	79	60	72	72	69	64	62	73	87	88	69	72	88	86	85	85	83	86	86	86	86
Oct	81	87	84	54	77	68	75	71		86	74	75		84		83	85	85	86	87	86
Nov	74	42	76	66	67	65	61	64	85	86	70	59	87	84	88	88	86	90	89	85	90
Dec	82	59	83	65	78	73	59	62	89	89	61	59	89	87	87	88	90	85	88	89	88
Jan	88	47	82	59	53	74	62	68	86	90	58	60	88	86	86	88	86	87	86	88	85
Feb	80	83	79	59	63	59	57	60	90	87	64	60	87	85	88	88	86	89	87	88	88
Mar	73	86	82	58	64	63	54	61	88	87	59	53	87	87	88	87	89	86	87	87	85
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																				
Basin	Krishna																				

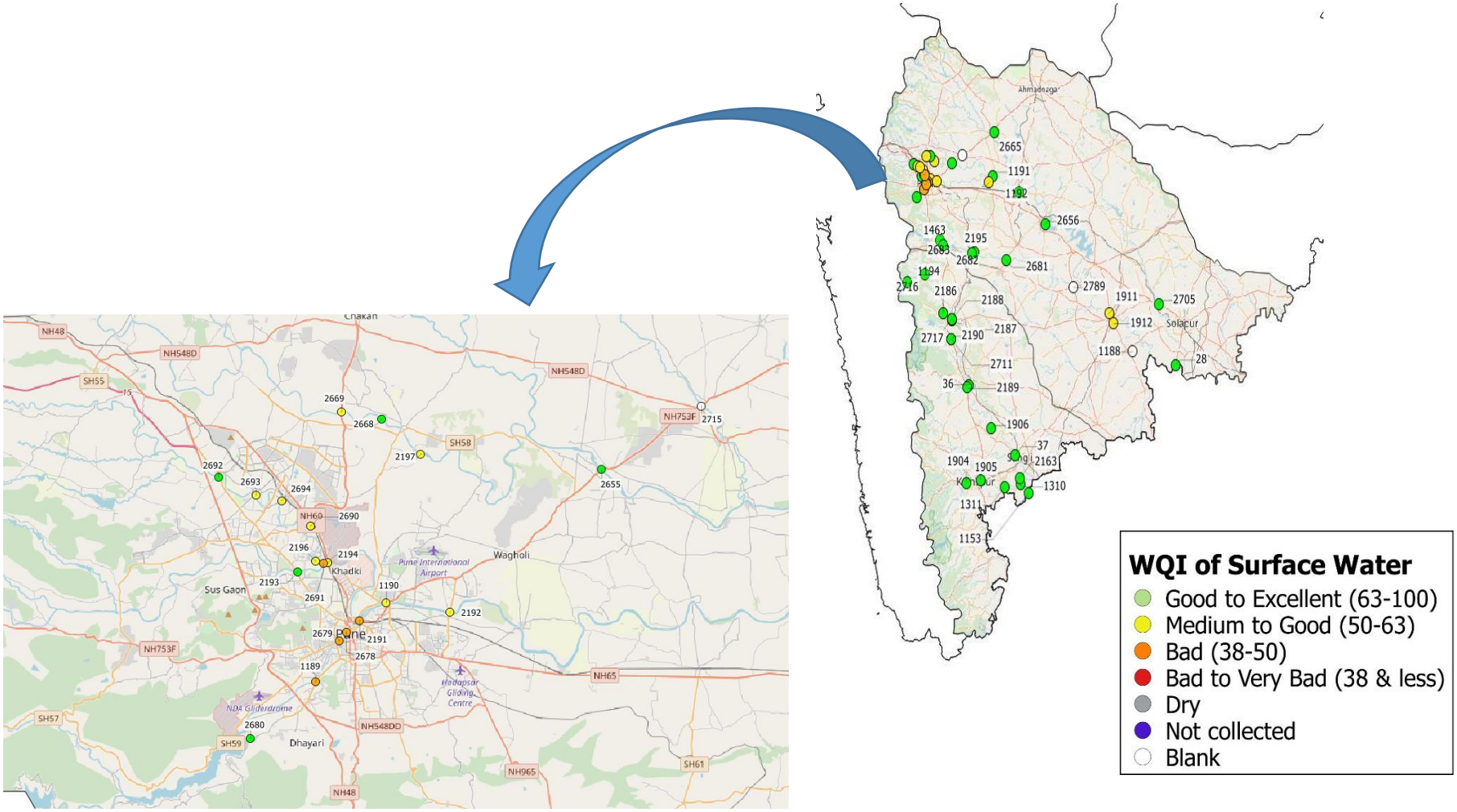
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

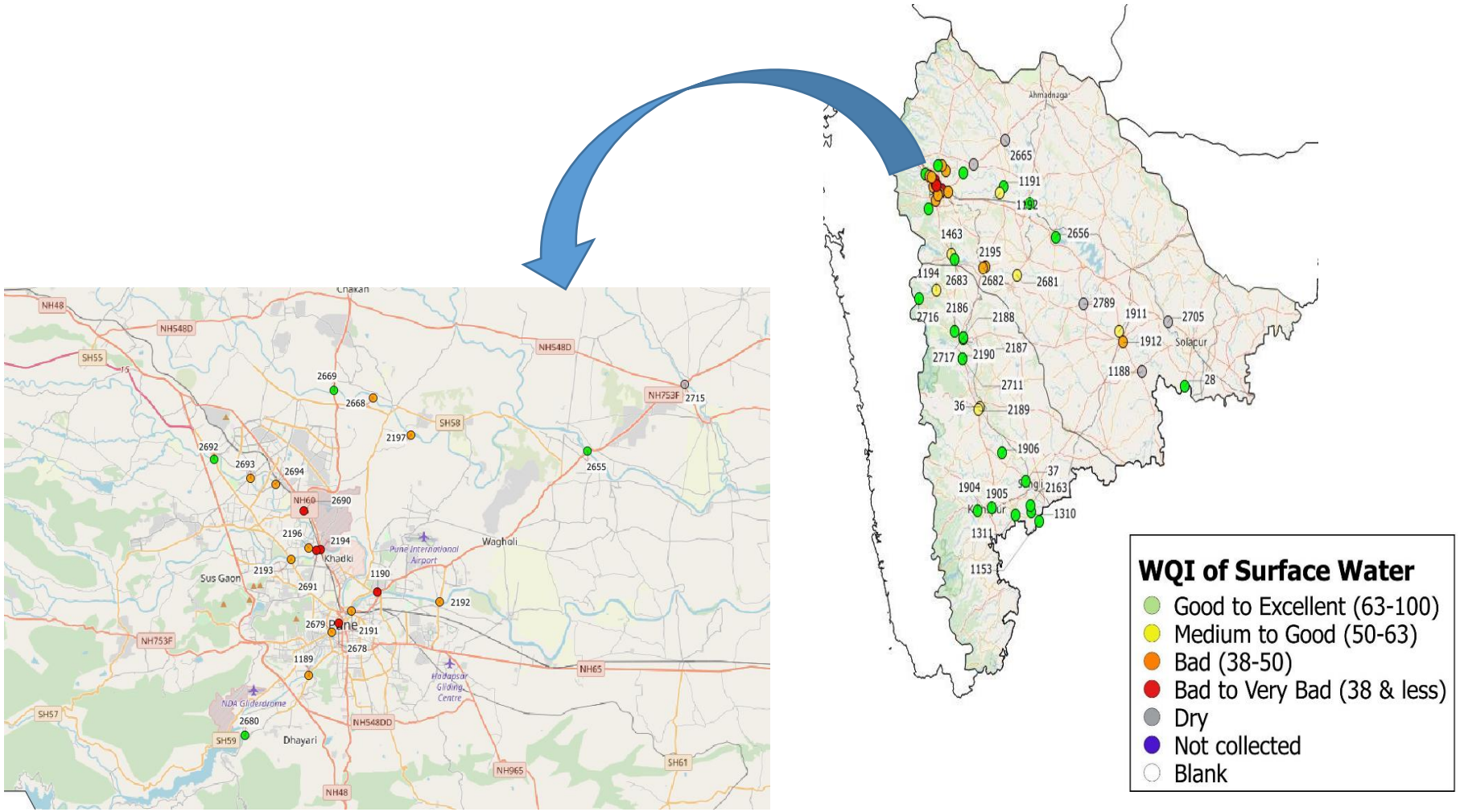
Table No 22: Surface water quality monitoring stations in Krishna Basin (2 of 2): Sub basin Krishna upper

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 2018)



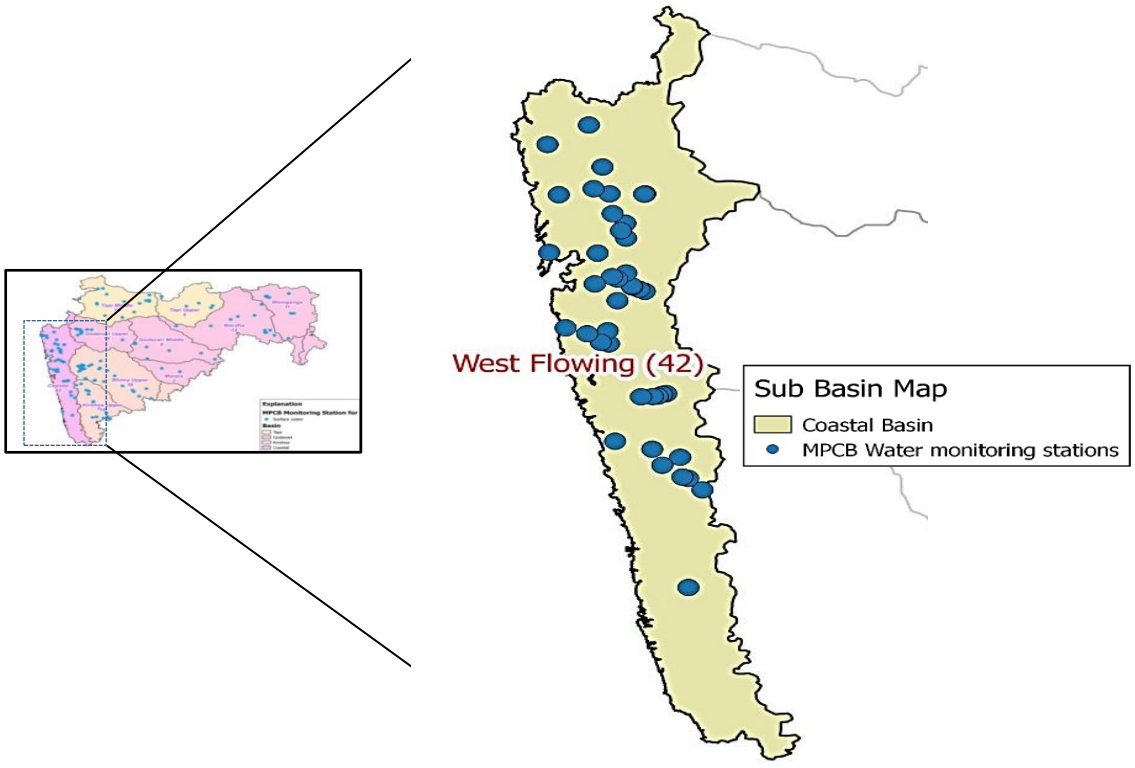
Spatial map of Surface WQI at Krishna Basin (December 2018)



5.5 West Flowing Rivers

Maharashtra has more than 11 important west flowing rivers which include Surya, Vaitarna, Ulhas, Savitri, Kundalika, Patalganga, Vashishti, and so on. Along with these important rivers, there are many smaller rivers which run westwards and join the creek at the end. These rivers overall contribute to about 44.54% of the yield at 75% dependability of Maharashtra state[20]. Compared to East flowing rivers, the West flowing rivers of Peninsular India are fewer and smaller Map No. 5.Unlike East flowing rivers, these rivers do not form deltas, but only estuaries[21].

These Rivers are important source of drinking water, agricultural and industrial applications. The overall geographical area covered due to West flowing river basins in Maharashtra is around 3.16 Mha (Million hectares) which is 10.7% of the total geographical area of Maharashtra state[22].Many industrial complexes are lie very close to Ulhas, Patalganga, Amba and few other tributaries which are prone to water pollution due to release of industrial effluents. To monitor the overall status of the river system, MPCB has installed total 41 WQMS along the west flowing rivers.



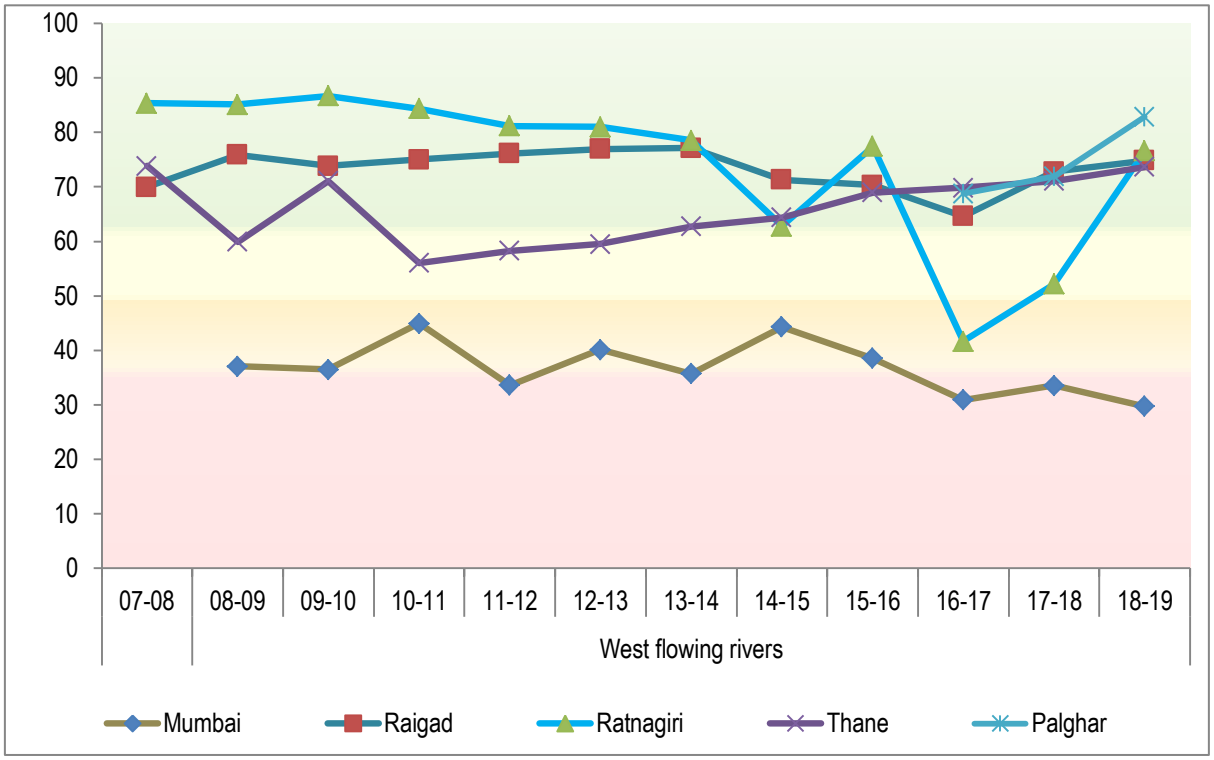
Map No. 5: Network of surface water quality monitoring stations in West flowing rivers basin

[20] https://sandrp.files.wordpress.com/2018/03/rivers_of_maharashtra_dec_2011.pdf

[21] https://www.pmfias.com/west-flowing-rivers-narmada-tapti-sabarmati-mahi-luni-ghaggar-rivers-sahyadris-western-ghats/

[22] https://sandrp.files.wordpress.com/2017/04/maharashtra-report.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. 34: 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 rivers in that district.

Figure No. 37 depicts the intra basin performance of west flowing rivers across five districts of the state.The results showed that all districts, except Mumbai have shown improvement in annual average WQI. In case of Mumbai, WQI ("Bad to Very Bad") decreased further from 33 to 29 indicating water quality deterioration in Mumbai. Raigad, Thane and Palghar recorded further improvement in WQI ("Good to Excellent") from 72 to 74, 71 to 73 and 72 to 83 repectively.

Similar improvement was recorded in Ratnagiri and WQI was found to be improved from"Medium to Good" to "Good to Excellent" category (52 to 76) thereby indicating significant improvement in water quality.

From Figure No. 35 it is observed that the percentage of extent of observations falling under "Good to Excellent" category increased considerably from 41% in 2017-18 to around 87% in current year. Decreasing trend was observed in the observations coming under "Medium to good" category (from ~43% in 2017-18 to ~4% in 2018-19).

Similar decreasing trend was recorded, both in the cases of "Bad" category observations (from 6% to 0.6%) and "Bad to Very Bad" category observations (from more than 6% to around 2.6%).

Around 5.7% of the total observations were found to be under "Dry" category in 2018-19.

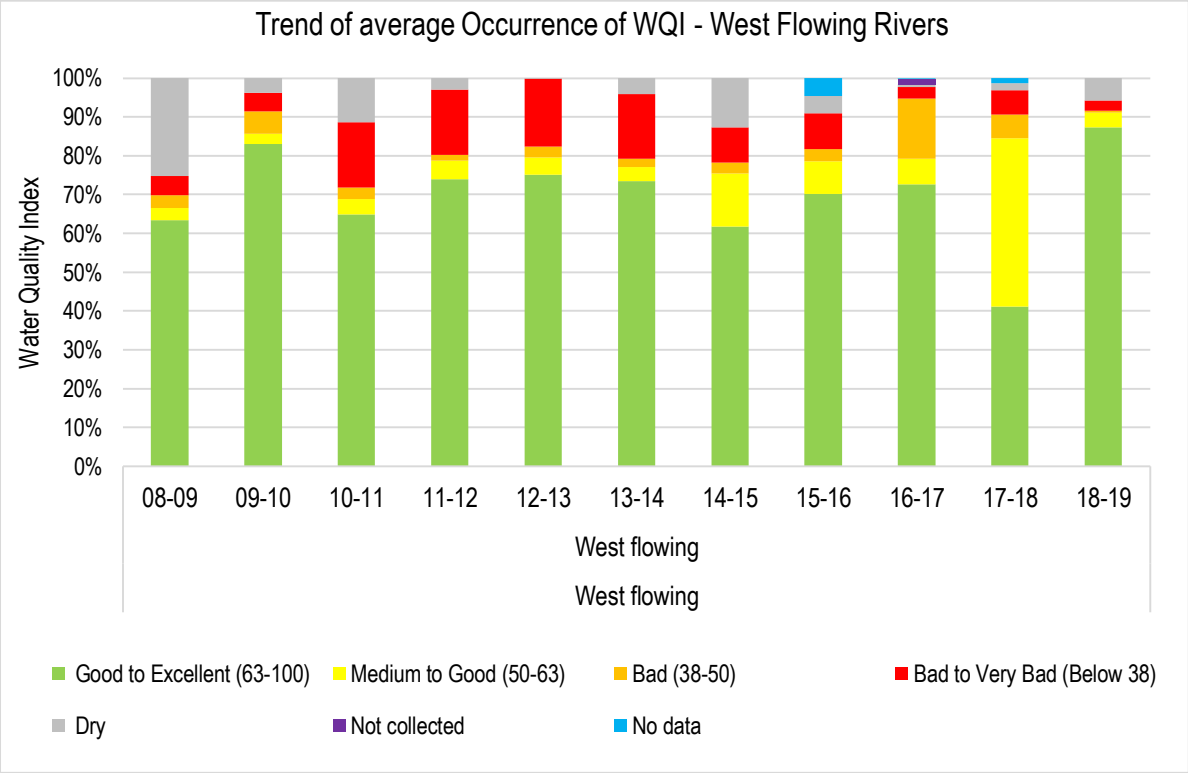
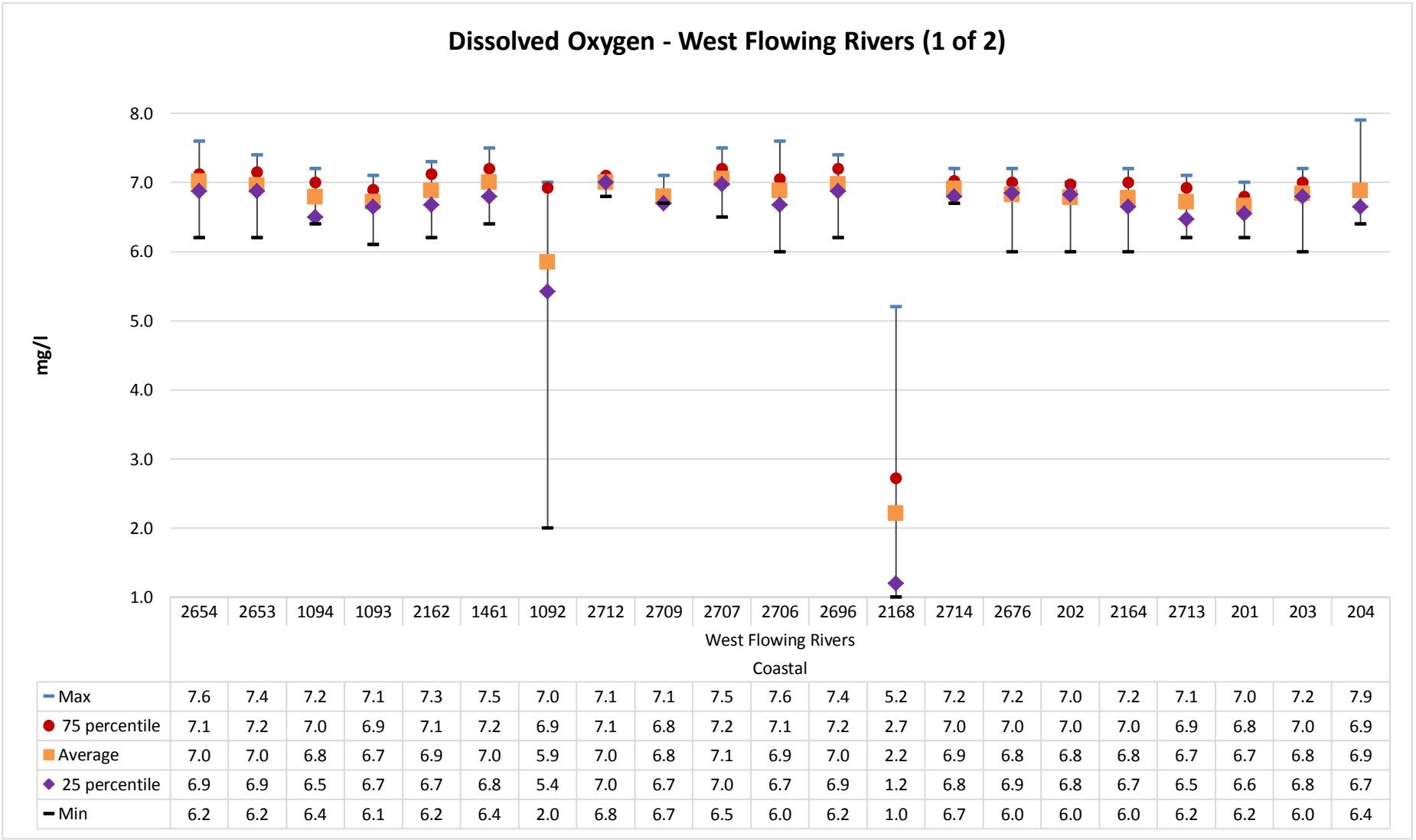
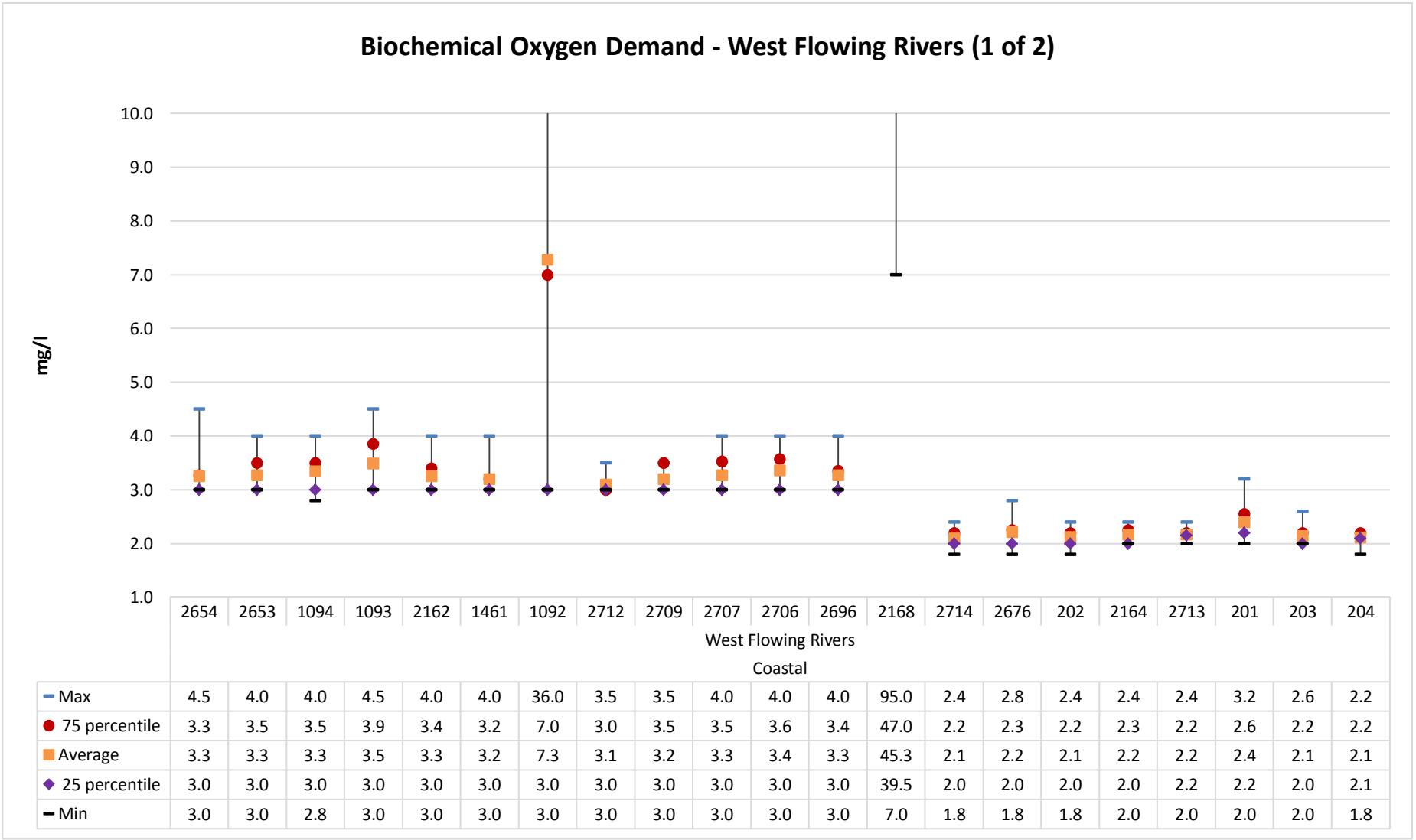


Figure No. 35: Trend of Average occurrence for different category of WQI in West flowing rivers



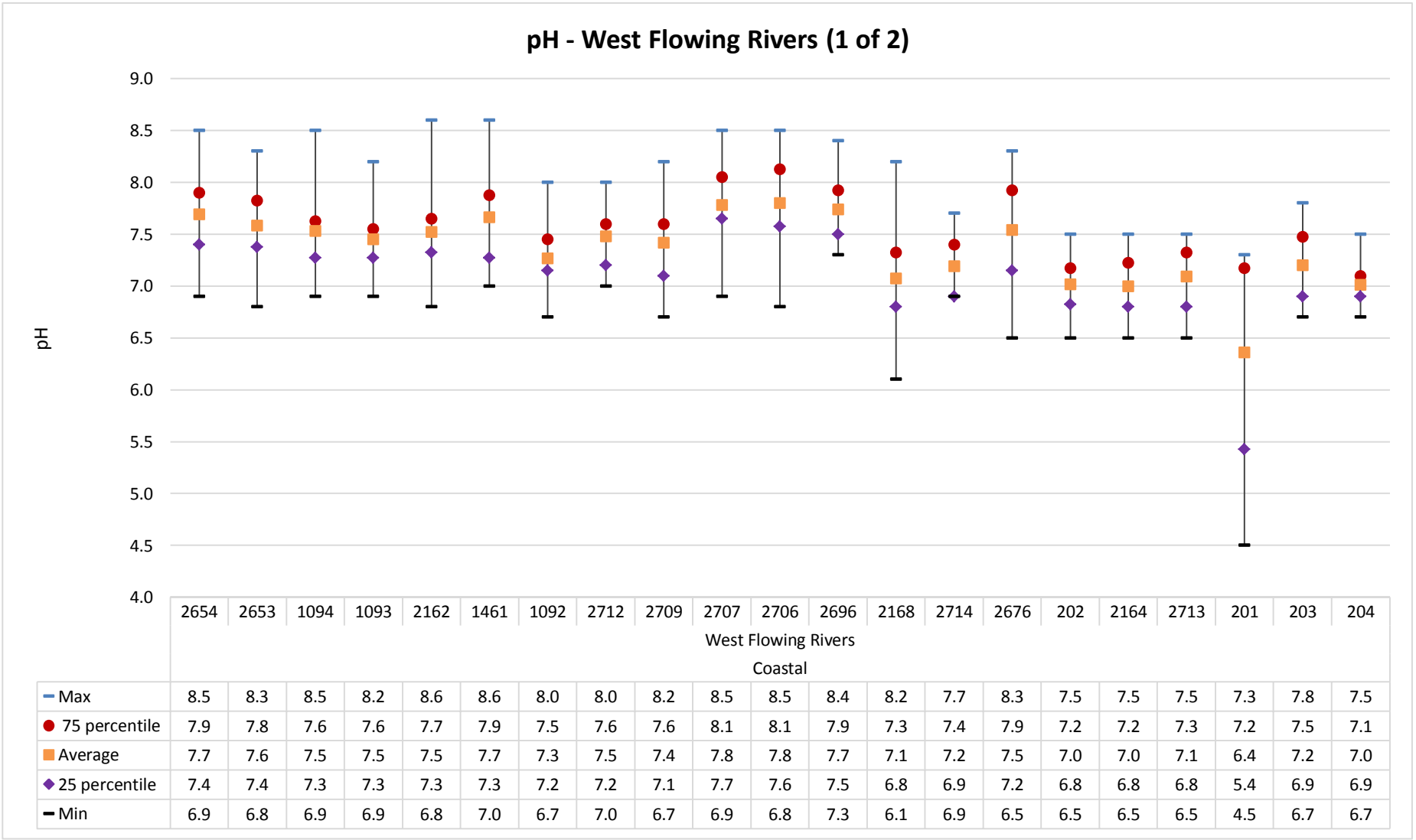
	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Max	7.6	7.4	7.2	7.1	7.3	7.5	7.0	7.1	7.1	7.5	7.6	7.4	5.2	7.2	7.2	7.0	7.2	7.1	7.0	7.2	7.9
75 percentile	7.1	7.2	7.0	6.9	7.1	7.2	6.9	7.1	6.8	7.2	7.1	7.2	2.7	7.0	7.0	7.0	7.0	6.9	6.8	7.0	6.9
Average	7.0	7.0	6.8	6.7	6.9	7.0	5.9	7.0	6.8	7.1	6.9	7.0	2.2	6.9	6.8	6.8	6.8	6.7	6.7	6.8	6.9
25 percentile	6.9	6.9	6.5	6.7	6.7	6.8	5.4	7.0	6.7	7.0	6.7	6.9	1.2	6.8	6.9	6.8	6.7	6.5	6.6	6.8	6.7
Min	6.2	6.2	6.4	6.1	6.2	6.4	2.0	6.8	6.7	6.5	6.0	6.2	1.0	6.7	6.0	6.0	6.0	6.2	6.2	6.0	6.4

Figure No. 36: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at West flowing rivers (Coastal basin) (1 OF 2)



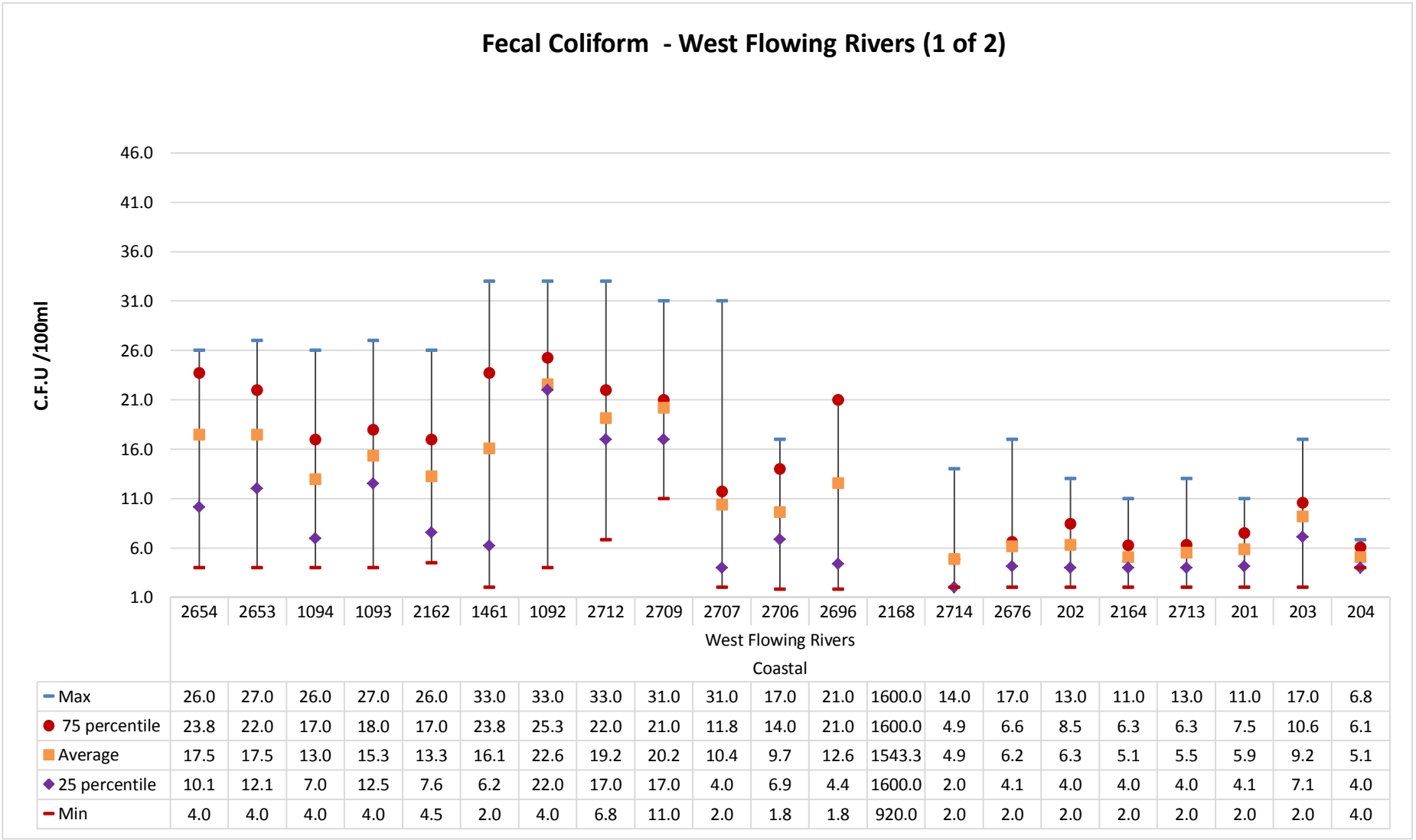
	2654	2653	1094	1093	2162	1461	1092	2712	2709	2707	2706	2696	2168	2714	2676	202	2164	2713	201	203	204
Max	4.5	4.0	4.0	4.5	4.0	4.0	36.0	3.5	3.5	4.0	4.0	4.0	95.0	2.4	2.8	2.4	2.4	2.4	3.2	2.6	2.2
75 percentile	3.3	3.5	3.5	3.9	3.4	3.2	7.0	3.0	3.5	3.5	3.6	3.4	47.0	2.2	2.3	2.2	2.3	2.2	2.6	2.2	2.2
Average	3.3	3.3	3.3	3.5	3.3	3.2	7.3	3.1	3.2	3.3	3.4	3.3	45.3	2.1	2.2	2.1	2.2	2.2	2.4	2.1	2.1
25 percentile	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	39.5	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.1
Min	3.0	3.0	2.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	1.8	1.8	1.8	2.0	2.0	2.0	2.0	1.8

Figure No. 37: Trend of Biological Oxygen Demand (BOD) 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
	West Flowing Rivers																				
	Coastal																				
Max	8.5	8.3	8.5	8.2	8.6	8.6	8.0	8.0	8.2	8.5	8.5	8.4	8.2	7.7	8.3	7.5	7.5	7.5	7.3	7.8	7.5
75 percentile	7.9	7.8	7.6	7.6	7.7	7.9	7.5	7.6	7.6	8.1	8.1	7.9	7.3	7.4	7.9	7.2	7.2	7.3	7.2	7.5	7.1
Average	7.7	7.6	7.5	7.5	7.5	7.7	7.3	7.5	7.4	7.8	7.8	7.7	7.1	7.2	7.5	7.0	7.0	7.1	6.4	7.2	7.0
25 percentile	7.4	7.4	7.3	7.3	7.3	7.3	7.2	7.2	7.1	7.7	7.6	7.5	6.8	6.9	7.2	6.8	6.8	6.8	5.4	6.9	6.9
Min	6.9	6.8	6.9	6.9	6.8	7.0	6.7	7.0	6.7	6.9	6.8	7.3	6.1	6.9	6.5	6.5	6.5	6.5	4.5	6.7	6.7

Figure No. 38: 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	26.0	27.0	26.0	27.0	26.0	33.0	33.0	33.0	31.0	31.0	17.0	21.0	1600.0	14.0	17.0	13.0	11.0	13.0	11.0	17.0	6.8
75 percentile	23.8	22.0	17.0	18.0	17.0	23.8	25.3	22.0	21.0	11.8	14.0	21.0	1600.0	4.9	6.6	8.5	6.3	6.3	7.5	10.6	6.1
Average	17.5	17.5	13.0	15.3	13.3	16.1	22.6	19.2	20.2	10.4	9.7	12.6	1543.3	4.9	6.2	6.3	5.1	5.5	5.9	9.2	5.1
25 percentile	10.1	12.1	7.0	12.5	7.6	6.2	22.0	17.0	17.0	4.0	6.9	4.4	1600.0	2.0	4.1	4.0	4.0	4.0	4.1	7.1	4.0
Min	4.0	4.0	4.0	4.0	4.5	2.0	4.0	6.8	11.0	2.0	1.8	1.8	920.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0

Figure No. 39: 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)

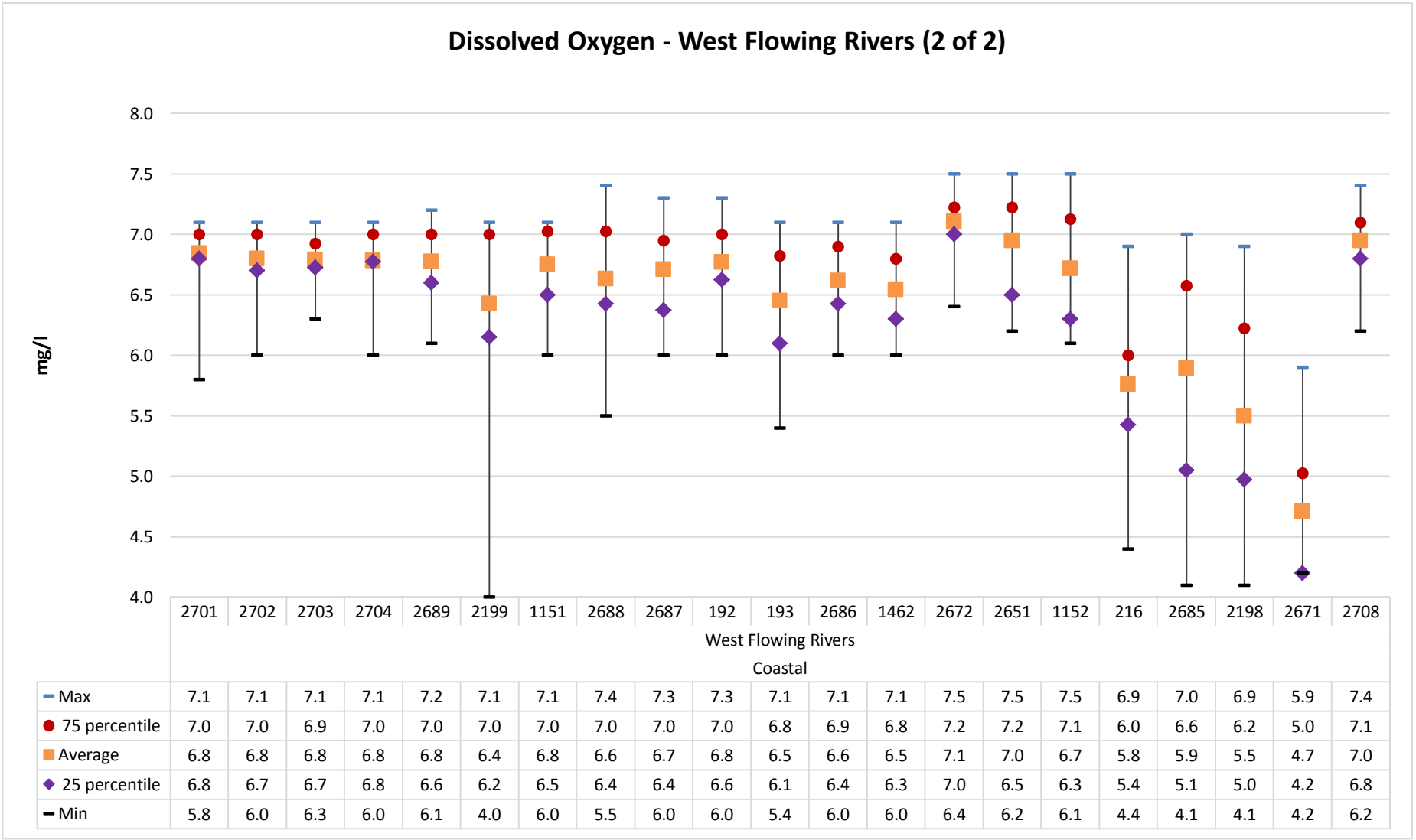
Apr	77	83	84	82	84	87	75	Dry	Dry	85	90	84	24	88	86	89	90	88	93	86	
May	83	82	80	82	81	80	63	Dry	Dry	83	85	87	21	86	86	85	86	87	86	85	
Jun	85	85	88	88	87	88	84	Dry	Dry	86	86	81	26	85	62	86	87	89	88	87	
Jul	80	82	81	81	84	81	81	81	82	84	77	82	61	87	88	84	85	87	83	85	86
Aug	79	81	81	81	81	81	83	80	78	79	81	82	24	88	82	88	84	83	77	86	86
Sep	81	82	85	84	82	89	84	80	79	80	78	79	29	91	62	85	86	87	75	84	88
Oct	86	81	87	85	84	78	84	85	83	84	85	90	29	89	85		86	87			
Nov	83	84	86	82	84	83	46	84	84	80	83	80	24	87	91	90	86	89	80	84	88
Dec	82	83	83	82	82	80	65	Dry	Dry	81	80	79	31	92	88	89	90	91	83	92	88
Jan	84	80	83	81	79	75	80	Dry	Dry	85	83	80	24	92	85		91	92			
Feb	79	80	82	87	84	82	81	Dry	Dry	77	77	85	25	90	85	89	92	91	89	84	90
Mar	76	77	85	83	82	84	79	Dry	Dry	86	82	85	38	89	85	88	90	90	89	85	88
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 Flowing Rivers (1 of 2)																				
Basin	Coastal																				

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

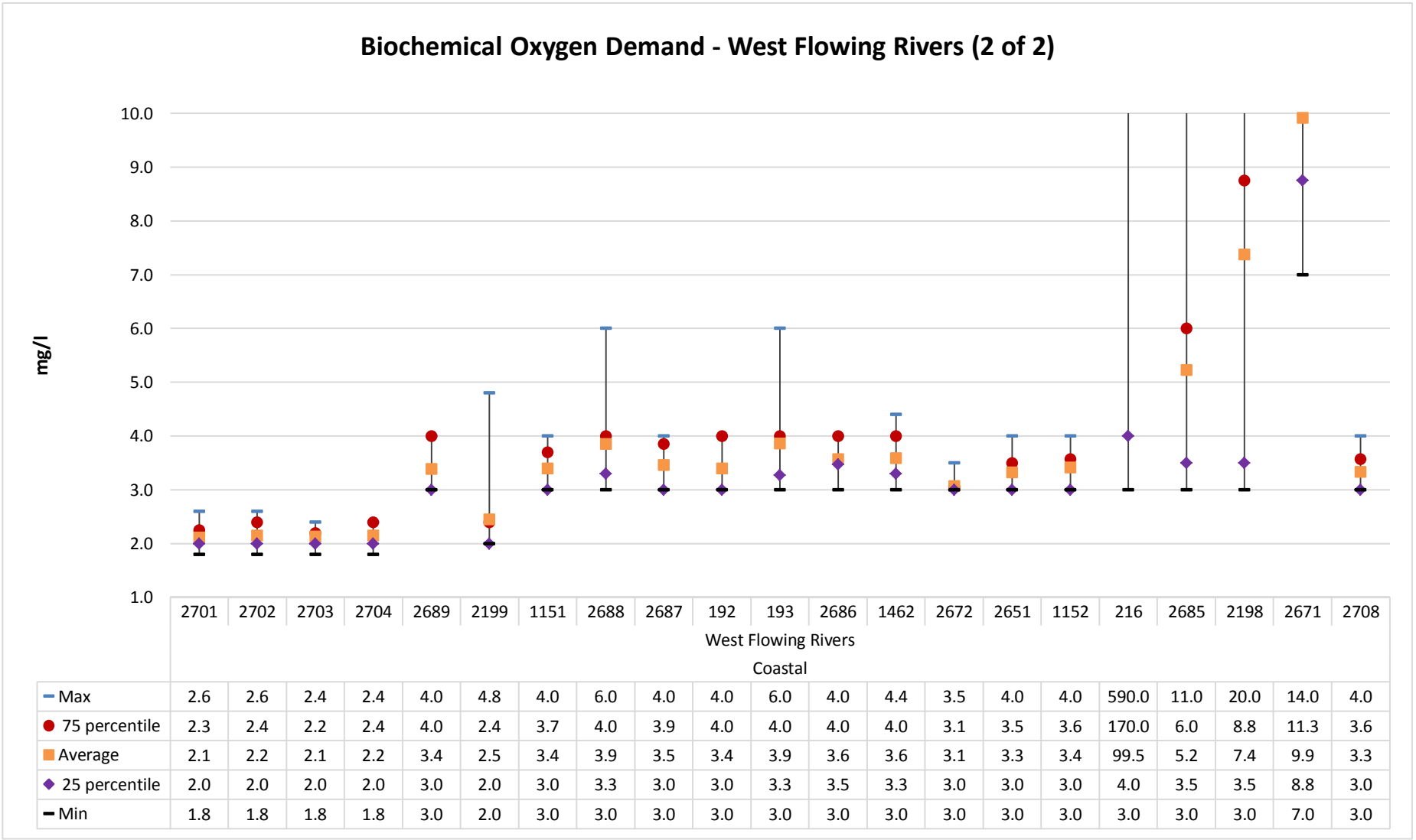
Table No 23: Surface water monitoring stations at West Flowing Rivers (1 of 2)

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



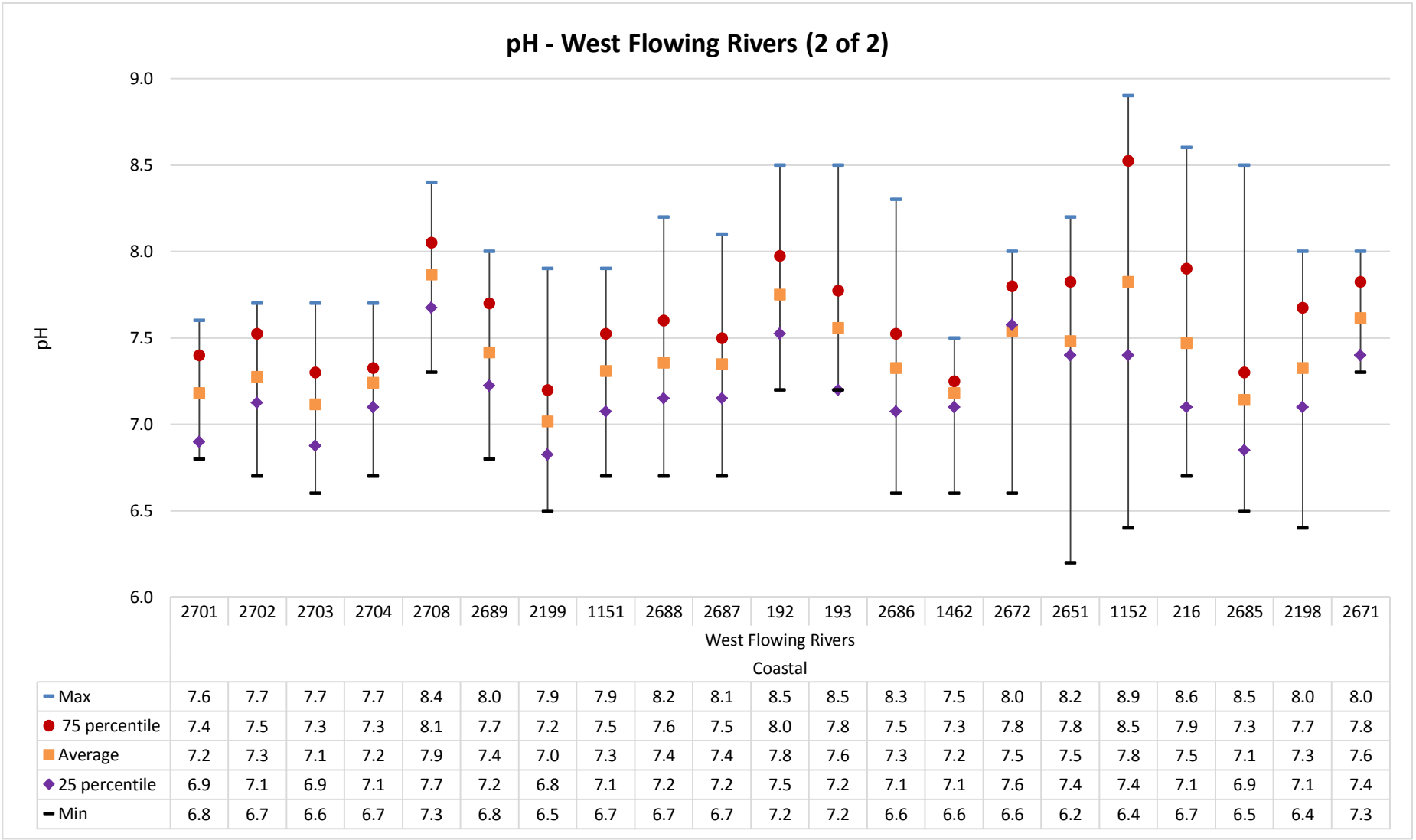
	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2685	2198	2671	2708
Max	7.1	7.1	7.1	7.1	7.2	7.1	7.1	7.4	7.3	7.3	7.1	7.1	7.1	7.5	7.5	7.5	6.9	7.0	6.9	5.9	7.4
75 percentile	7.0	7.0	6.9	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.8	6.9	6.8	7.2	7.2	7.1	6.0	6.6	6.2	5.0	7.1
Average	6.8	6.8	6.8	6.8	6.8	6.4	6.8	6.6	6.7	6.8	6.5	6.6	6.5	7.1	7.0	6.7	5.8	5.9	5.5	4.7	7.0
25 percentile	6.8	6.7	6.7	6.8	6.6	6.2	6.5	6.4	6.4	6.6	6.1	6.4	6.3	7.0	6.5	6.3	5.4	5.1	5.0	4.2	6.8
Min	5.8	6.0	6.3	6.0	6.1	4.0	6.0	5.5	6.0	6.0	5.4	6.0	6.0	6.4	6.2	6.1	4.4	4.1	4.1	4.2	6.2

Figure No. 40: Trend of Dissolved Oxygen (DO) levels recorded at WQMS at West flowing rivers (Coastal basin) (2 of 2)



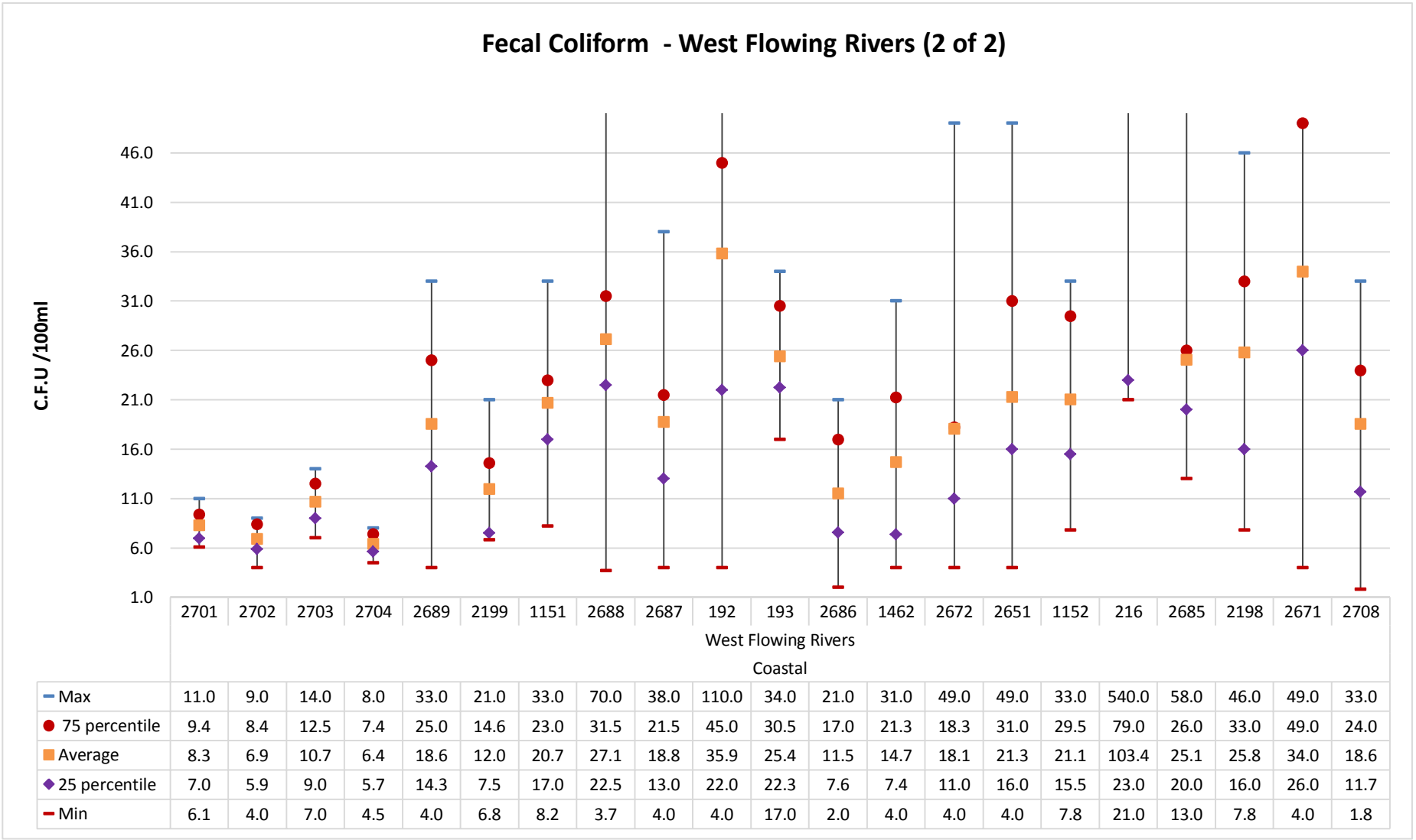
	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2685	2198	2671	2708
Max	2.6	2.6	2.4	2.4	4.0	4.8	4.0	6.0	4.0	4.0	6.0	4.0	4.4	3.5	4.0	4.0	590.0	11.0	20.0	14.0	4.0
75 percentile	2.3	2.4	2.2	2.4	4.0	2.4	3.7	4.0	3.9	4.0	4.0	4.0	4.0	3.1	3.5	3.6	170.0	6.0	8.8	11.3	3.6
Average	2.1	2.2	2.1	2.2	3.4	2.5	3.4	3.9	3.5	3.4	3.9	3.6	3.6	3.1	3.3	3.4	99.5	5.2	7.4	9.9	3.3
25 percentile	2.0	2.0	2.0	2.0	3.0	2.0	3.0	3.3	3.0	3.0	3.3	3.5	3.3	3.0	3.0	3.0	4.0	3.5	3.5	8.8	3.0
Min	1.8	1.8	1.8	1.8	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	3.0

Figure No. 41: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at West flowing rivers (Coastal basin) (2 of 2)



	2701	2702	2703	2704	2708	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2685	2198	2671
Max	7.6	7.7	7.7	7.7	8.4	8.0	7.9	7.9	8.2	8.1	8.5	8.5	8.3	7.5	8.0	8.2	8.9	8.6	8.5	8.0	8.0
75 percentile	7.4	7.5	7.3	7.3	8.1	7.7	7.2	7.5	7.6	7.5	8.0	7.8	7.5	7.3	7.8	7.8	8.5	7.9	7.3	7.7	7.8
Average	7.2	7.3	7.1	7.2	7.9	7.4	7.0	7.3	7.4	7.4	7.8	7.6	7.3	7.2	7.5	7.5	7.8	7.5	7.1	7.3	7.6
25 percentile	6.9	7.1	6.9	7.1	7.7	7.2	6.8	7.1	7.2	7.2	7.5	7.2	7.1	7.1	7.6	7.4	7.4	7.1	6.9	7.1	7.4
Min	6.8	6.7	6.6	6.7	7.3	6.8	6.5	6.7	6.7	6.7	7.2	7.2	6.6	6.6	6.6	6.2	6.4	6.7	6.5	6.4	7.3

Figure No. 42 : Trend of pH 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	2685	2198	2671	2708
Max	11.0	9.0	14.0	8.0	33.0	21.0	33.0	70.0	38.0	110.0	34.0	21.0	31.0	49.0	49.0	33.0	540.0	58.0	46.0	49.0	33.0
75 percentile	9.4	8.4	12.5	7.4	25.0	14.6	23.0	31.5	21.5	45.0	30.5	17.0	21.3	18.3	31.0	29.5	79.0	26.0	33.0	49.0	24.0
Average	8.3	6.9	10.7	6.4	18.6	12.0	20.7	27.1	18.8	35.9	25.4	11.5	14.7	18.1	21.3	21.1	103.4	25.1	25.8	34.0	18.6
25 percentile	7.0	5.9	9.0	5.7	14.3	7.5	17.0	22.5	13.0	22.0	22.3	7.6	7.4	11.0	16.0	15.5	23.0	20.0	16.0	26.0	11.7
Min	6.1	4.0	7.0	4.5	4.0	6.8	8.2	3.7	4.0	4.0	17.0	2.0	4.0	4.0	4.0	7.8	21.0	13.0	7.8	4.0	1.8

Figure No. 43: 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	66	66	67	68	82	61	83	81	82	83	81	85	86	80	76	76	73	77	62	63	86
May	84	86	85	84	85	80	81	83	86	80	76	88	86	85	80	81	63	72	57	74	80
Jun	63	65	67	64	84	65	82	74	83			80	89	86	84	63	40	63	68	59	84
Jul	86	86	86	89	82	87	81	81	80	76	82	82	82	76	77	79	77	82	66	61	84
Aug	68	65	65	67	79	66	81	83	79	80	81	84	84	80	83	81	77	83	81	64	79
Sep	67	67	69	70	83	67	83	81	83	76	78	87	82	81	82	82	78	84	82	69	77
Oct	67	68	67	66	85	67	84	82	83	82	78	84	87	84	84	87	79	87	85	65	82
Nov	65	68	66	67	81	50	81	82	80	80	75	80	80	83	81	79	72	80	84	67	80
Dec	65	68	63	67	82	66	81	76	84	77	83	82	85	81	83	77	38	63	59	61	81
Jan	68	64	68	69	82	67	83	82	85	81	82	89	84	79	78	76	56	56	74	57	83
Feb	67	68	68	68	82	67	83	79	83			84	83	81	77	72	30	79	75	71	74
Mar	88	89	86	87	80	83	81	80	82	80	83	83	85	79	78	73	64	80	75	63	77
Station Code	2701	2702	2703	2704	2689	2199	1151	2688	2687	192	193	2686	1462	2672	2651	1152	216	2685	2198	2671	2708
Sub Basin	West Flowing Rivers (2 of 2)																				
Basin	Coastal																				

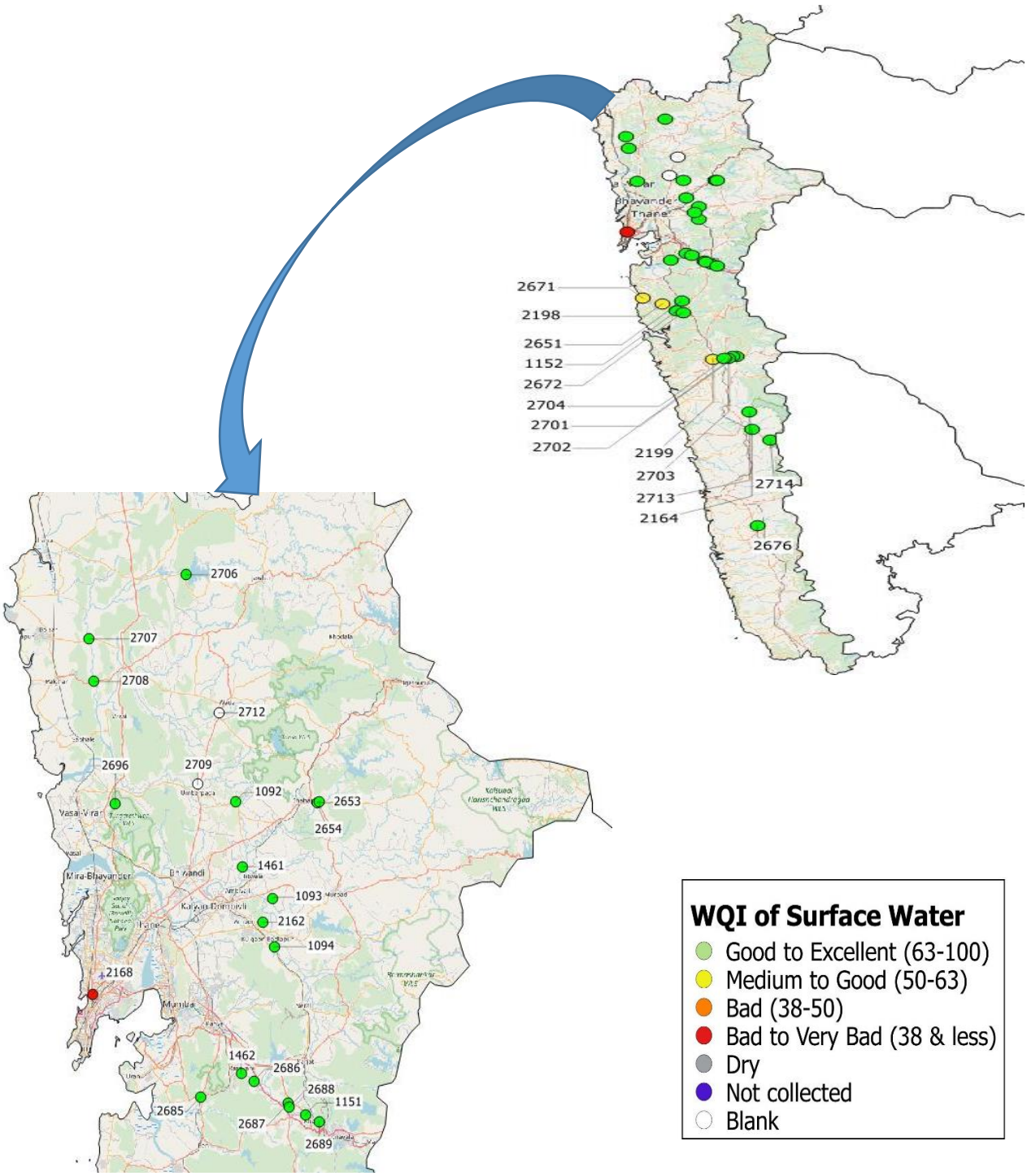
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

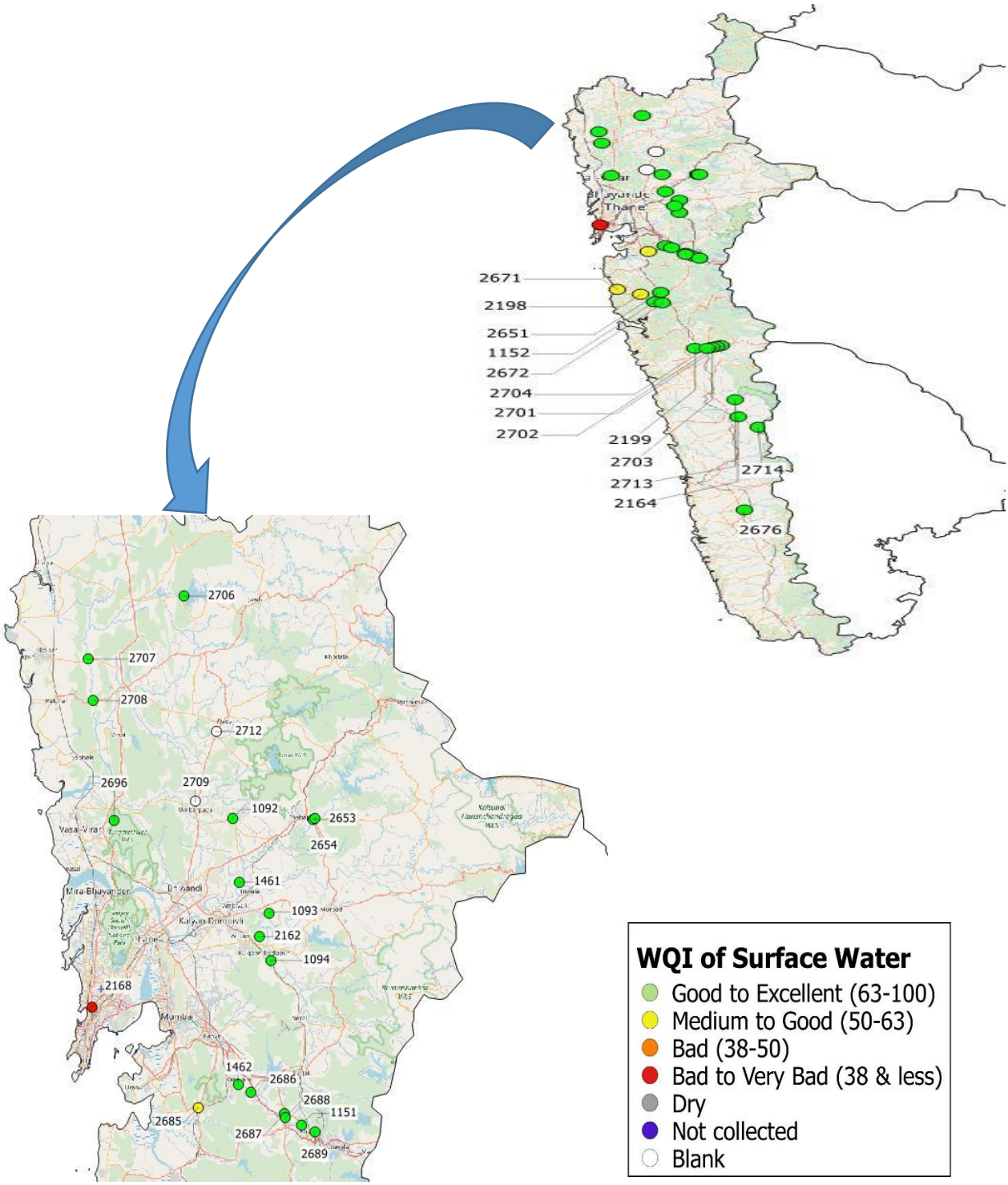
Table No 24: **Surface water quality monitoring stations on West flowing rivers (2 of 2)**

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 2018)

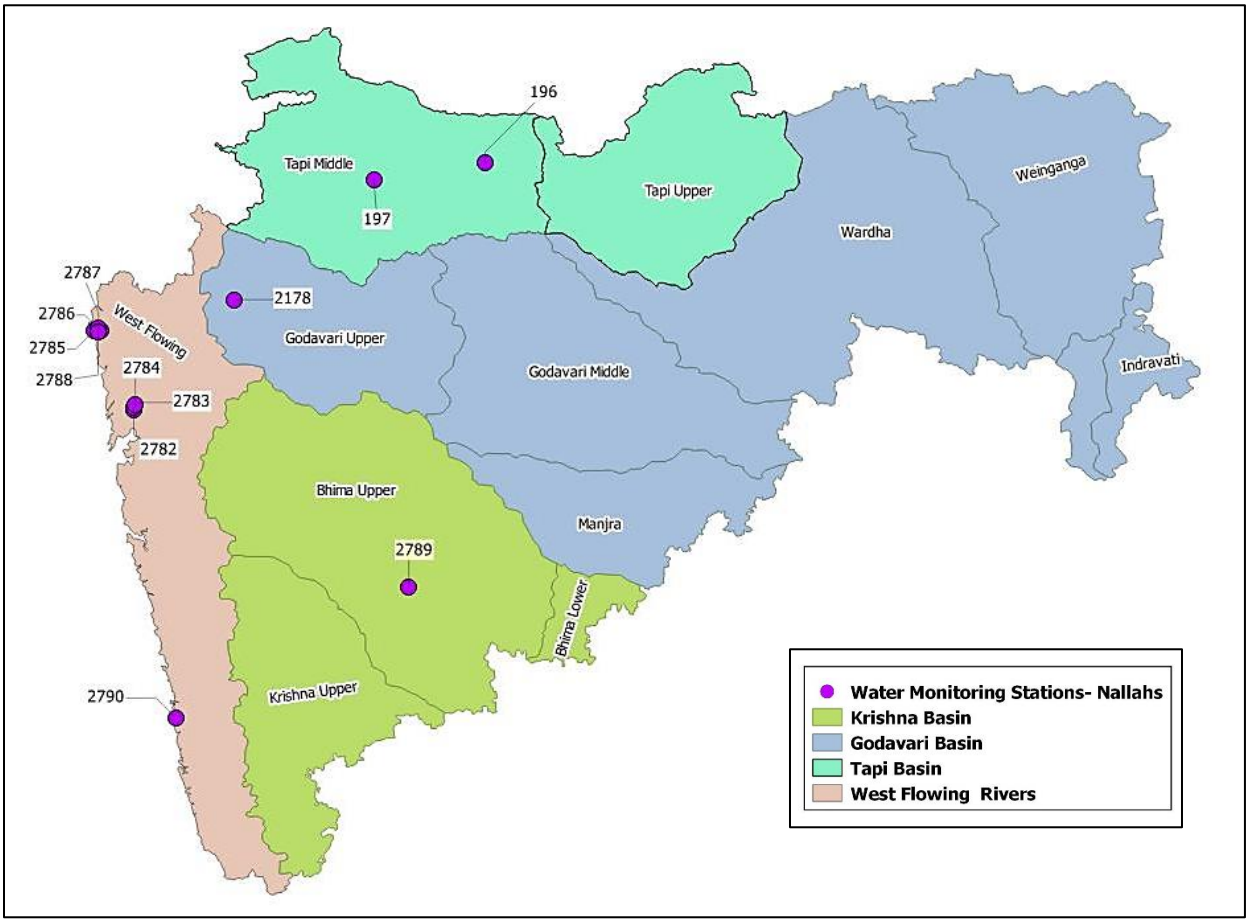


Spatial map of Surface WQI of West Flowing rivers (December 2018)

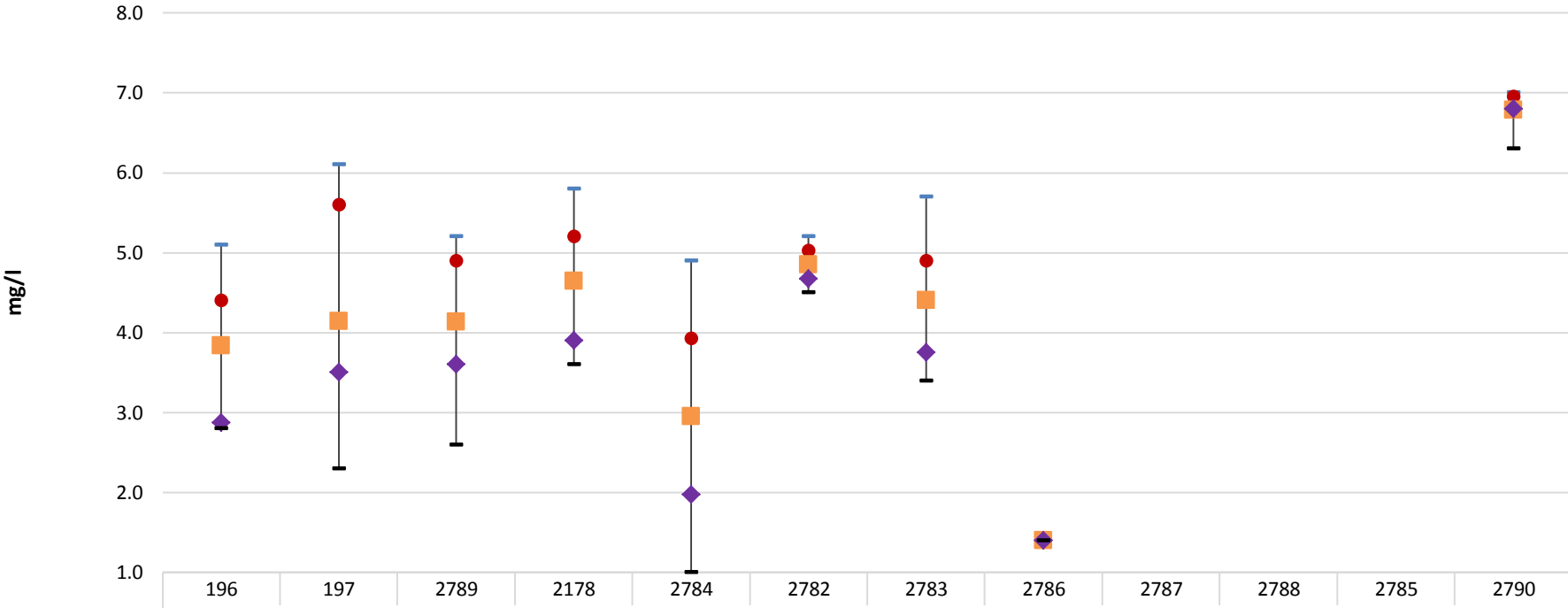


5.6 Nallahs

There are 12 water monitoring stations across nallahs in the state. The majority of nallahs of the coastal basin are located in Thane district. The Sandoz nallah, BPT Navpur nallah and Rabodi nalla of Thane are noted to be polluted throughout the year.

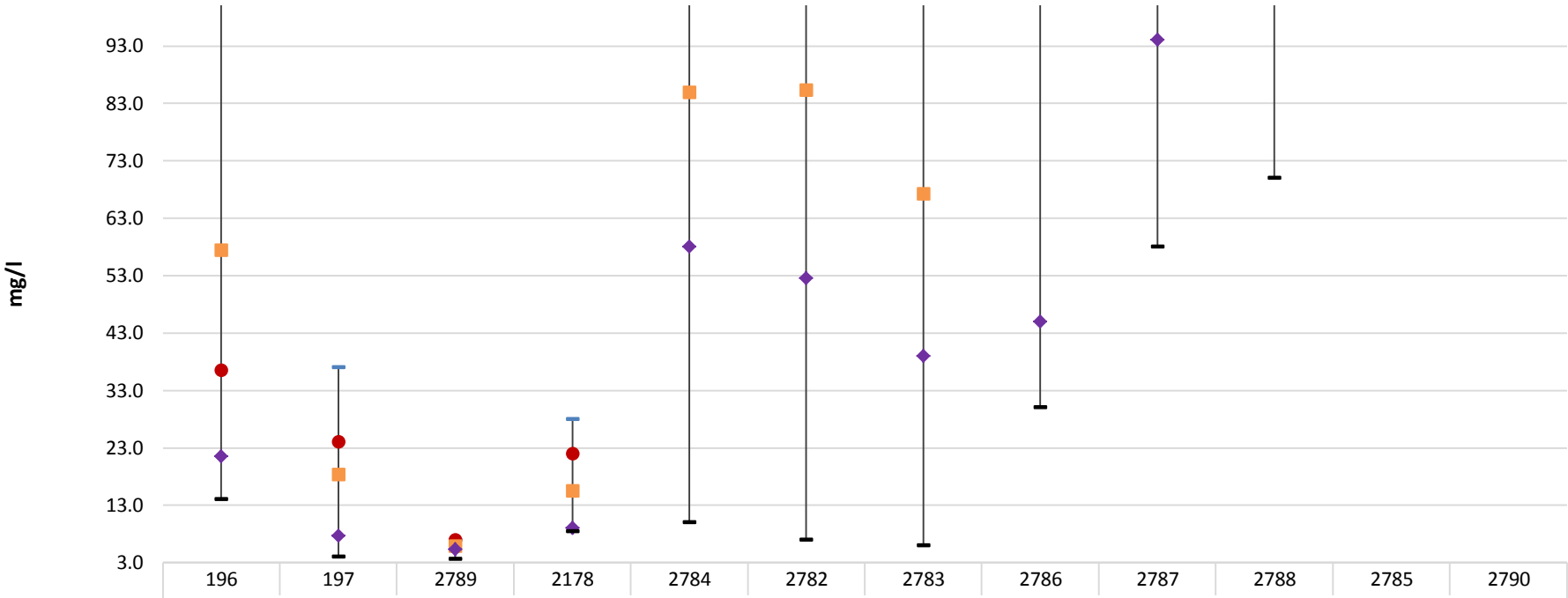


Map No. 6: Network of surface water quality monitoring stations on Nallahs



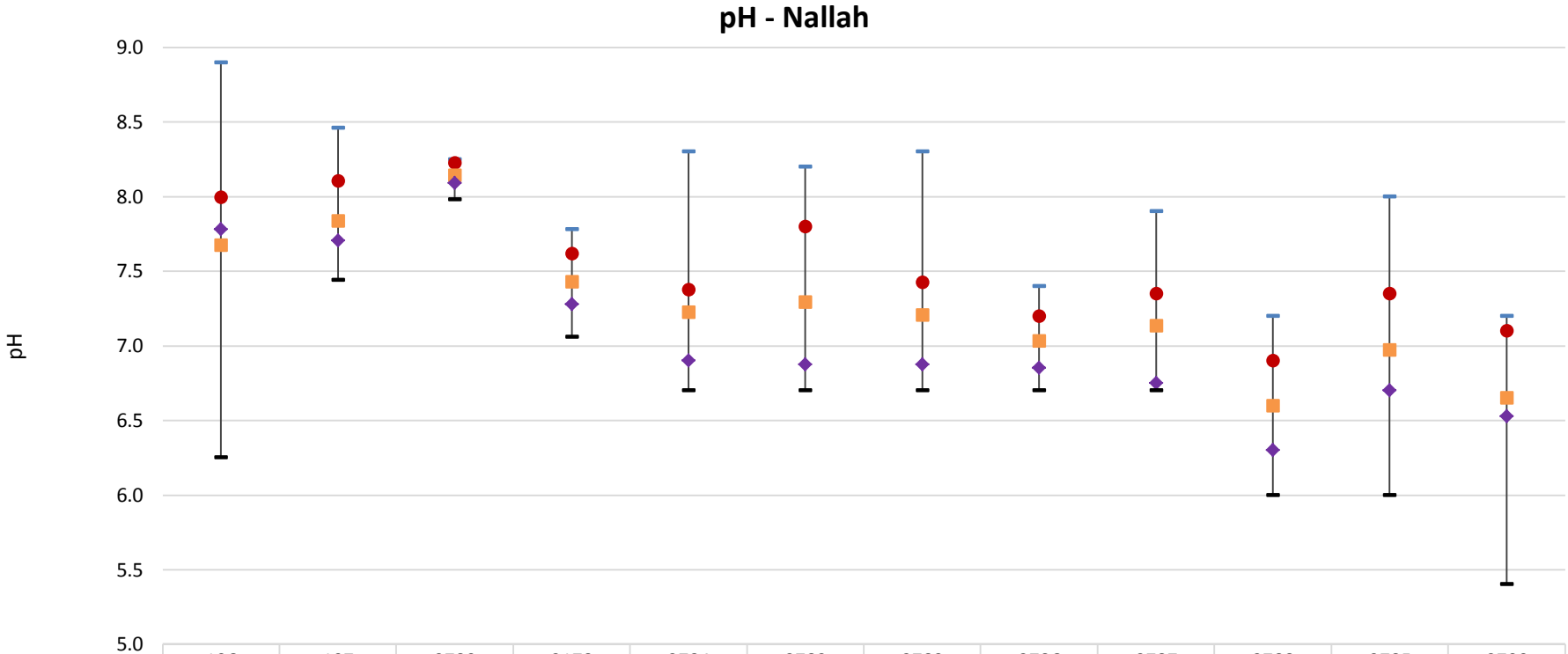
	196	197	2789	2178	2784	2782	2783	2786	2787	2788	2785	2790
Max	5.1	6.1	5.2	5.8	4.9	5.2	5.7	1.4				7.0
75 percentile	4.4	5.6	4.9	5.2	3.9	5.0	4.9	1.4				7.0
Average	3.8	4.1	4.1	4.6	3.0	4.9	4.4	1.4				6.8
25 percentile	2.9	3.5	3.6	3.9	2.0	4.7	3.8	1.4				6.8
Min	2.8	2.3	2.6	3.6	1.0	4.5	3.4	1.4				6.3

Figure No. 44 : Trend of Dissolved Oxygen (DO) levels recorded at WQMS at Nallah (Coastal basin)



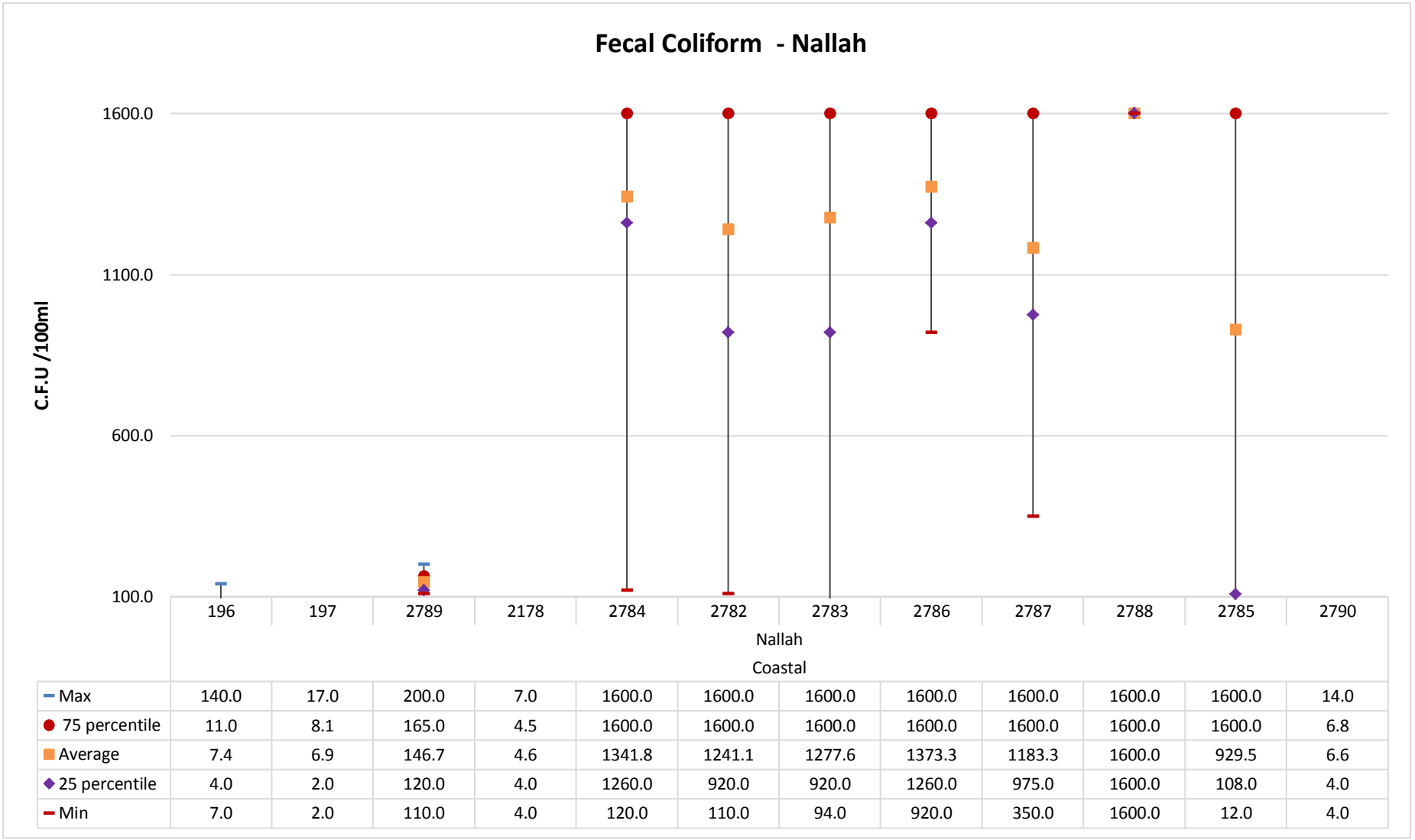
	196	197	2789	2178	2784	2782	2783	2786	2787	2788	2785	2790
Max	210.0	37.0	7.0	28.0	160.0	210.0	150.0	1950.0	725.0	950.0	1700.0	2.6
75 percentile	36.5	24.0	7.0	22.0	112.5	118.8	115.0	1005.0	427.5	730.0	1050.0	2.4
Average	57.4	18.3	5.9	15.5	84.9	85.3	67.3	680.0	304.3	510.0	884.5	2.3
25 percentile	21.5	7.6	5.3	9.0	58.0	52.5	39.0	45.0	94.0	290.0	762.5	2.3
Min	14.0	4.0	3.6	8.4	10.0	7.0	6.0	30.0	58.0	70.0	180.0	2.0

Figure No. 45 : Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS at Nallah (Coastal basin)



	196	197	2789	2178	2784	2782	2783	2786	2787	2788	2785	2790
Max	8.9	8.5	8.3	7.8	8.3	8.2	8.3	7.4	7.9	7.2	8.0	7.2
75 percentile	8.0	8.1	8.2	7.6	7.4	7.8	7.4	7.2	7.4	6.9	7.4	7.1
Average	7.7	7.8	8.1	7.4	7.2	7.3	7.2	7.0	7.1	6.6	7.0	6.7
25 percentile	7.8	7.7	8.1	7.3	6.9	6.9	6.9	6.9	6.8	6.3	6.7	6.5
Min	6.3	7.4	8.0	7.1	6.7	6.7	6.7	6.7	6.7	6.0	6.0	5.4

Figure No. 46: Trend of pH levels recorded at WQMS at Nallah (Coastal basin)



	196	197	2789	2178	2784	2782	2783	2786	2787	2788	2785	2790
Max	140.0	17.0	200.0	7.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	14.0
75 percentile	11.0	8.1	165.0	4.5	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	6.8
Average	7.4	6.9	146.7	4.6	1341.8	1241.1	1277.6	1373.3	1183.3	1600.0	929.5	6.6
25 percentile	4.0	2.0	120.0	4.0	1260.0	920.0	920.0	1260.0	975.0	1600.0	108.0	4.0
Min	7.0	2.0	110.0	4.0	120.0	110.0	94.0	920.0	350.0	1600.0	12.0	4.0

Figure No. 47 : Trend of Fecal Coliform levels recorded at WQMS at Nallah (Coastal basin)

Water Quality Index for WQMS at Nallah (Coastal basin)

Apr	44	55	Dry	Dry	32	33	31	Dry	Dry	Dry	40	Dry
May	39	52	Dry	Dry	25	26	26	Dry	Dry	Dry	28	81
Jun			Dry	Dry	27	24	24	Dry	Dry	Dry	27	67
Jul	24	67	Dry	61	52	60	64	31	24	18	26	
Aug	15	84	Dry	65	31	52	51	26	27	Dry	Dry	Dry
Sep	45	75	63	71	16	16	33	23	23	Dry	22	Dry
Oct	16	82	63	74	25	23	26	Dry	Dry	Dry	30	Dry
Nov	39		Dry	68	24	21	25	Dry	Dry	Dry	28	Dry
Dec	36	49	Dry	75	28	20	26	Dry	Dry	Dry	20	76
Jan	30	50	43	61	23	24	25	Dry	Dry	Dry	36	89
Feb	31	45	Dry	70	25	24	24	Dry	Dry	Dry	24	89
Mar		73	Dry	54	25	23	24	Dry	Dry	Dry	23	86
Station Code	196	197	2789	2178	2784	2782	2783	2786	2787	2788	2785	2790
Sub Basin	Nallah											
Basin	Nallah											

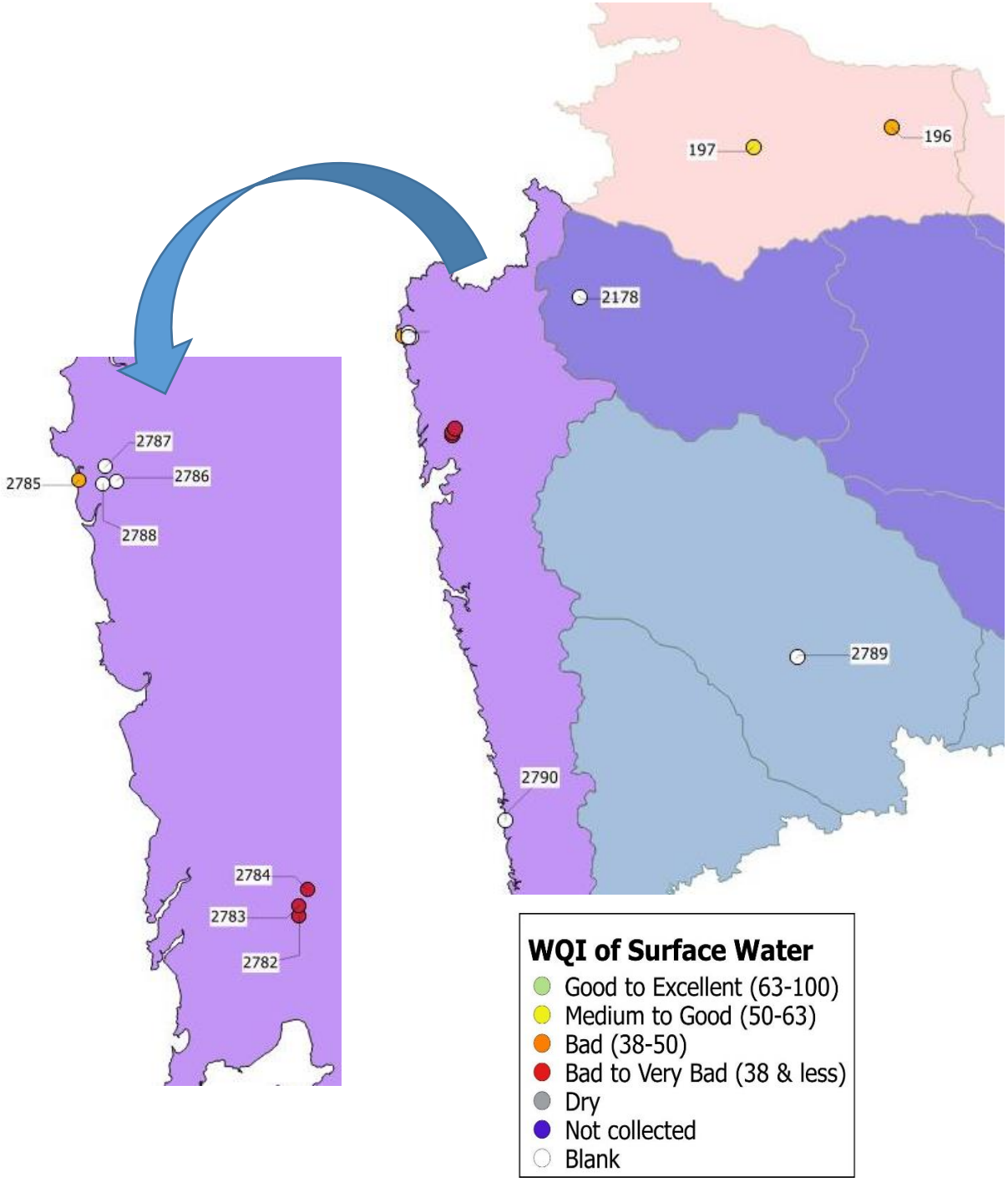
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

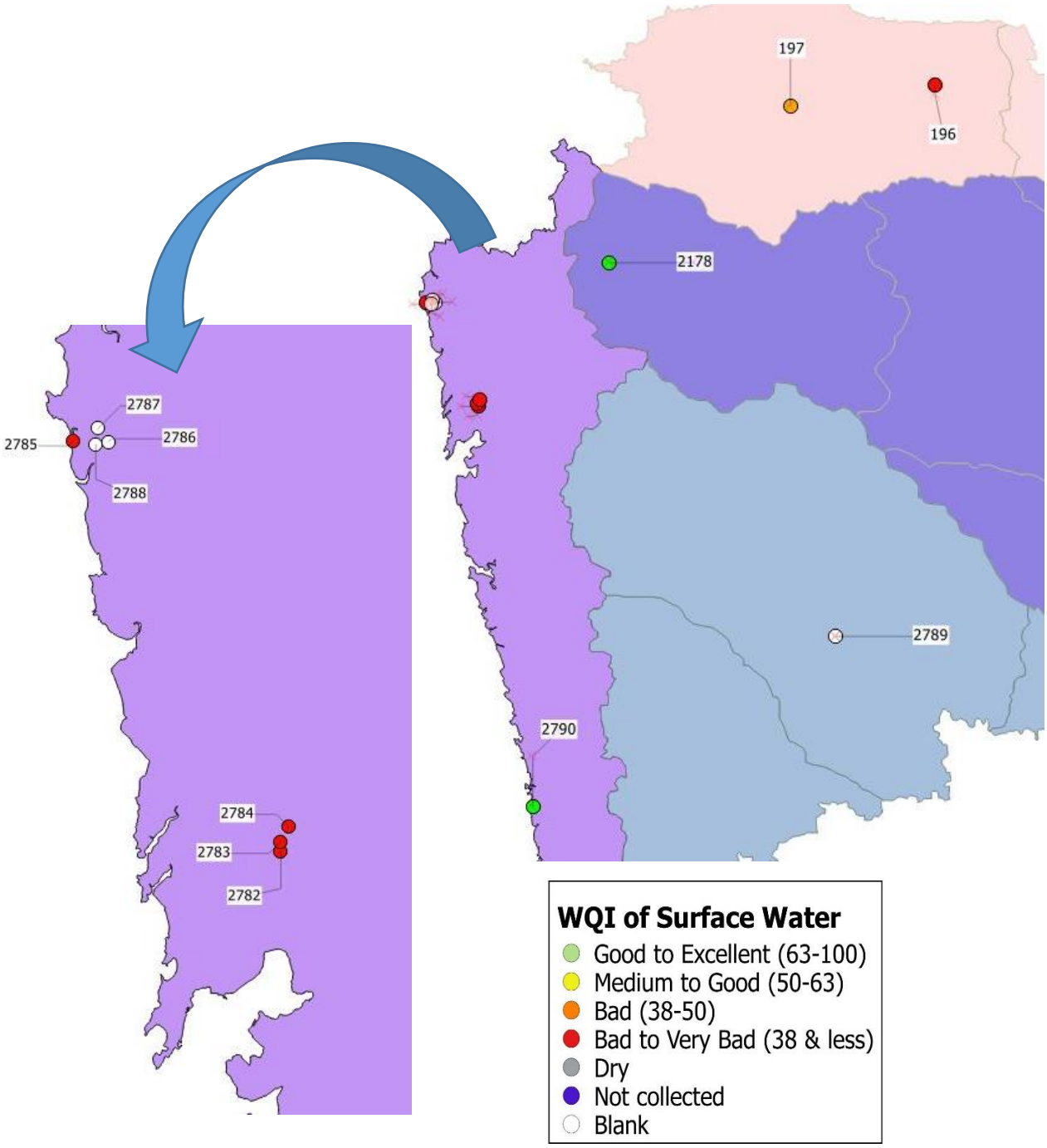
Table No 25: Surface water monitoring stations at Nallahs

Program	Station ID	River/Nalla	Station Name	Village	Taluka	District
SWMP	196	Lowki Nalla	Lowki Nalla At Khedi, Taluka & District - Jalgaon	Khedi	Khedi	Jalgaon
SWMP	197	Moti Nalla	Moti Nalla before Confluence with Panjara Dhule, Taluka & District - Dhule	Dhule	Dhule	Dhule
NWMP	2178	Chikhali nalla	Chikhali Nalla Meets Godavari	Chikhali	Nashik	Nashik
NWMP	2789	Nalla	Nalla at D/s of Alkai Mandir, Solapur	Aklai	Malshiras	Solapur
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 2018)



Spatial map of Surface WQI of Nallahs (Dec 2018)



5.7 Saline (Sea and Creek) Water Quality

The coast is a unique environment where land, sea and atmosphere interact and interplay which influences a strip of spatial zone defined as 'Coastal zone'[23]. India has 7,517 km long coastline which is seventh largest in the world. Out of 7,517 km, 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. This coastline supports a huge human population, which is dependent on the rich coastal and marine resources for economic growth[24].

Indian coastline has witnessed rapid industrialization along the coastline especially in the states of Gujarat, Maharashtra, Tamilnadu, and west Bengal. Industries from these areas releases their effeluents into the indian coastal waters either directly or indirectly which creates a problem of water pollution which is affects coastal and marine environment and the native communities depending on these fragile ecosystem.

Apart from the industrial effeluents, disposal of municipal solid waste from nearby human settlements and tourists also pose a great threat to coastal ecosystem.Municipal waste consists of degradable and non- degradable waste which comprises of plastic, rubber, glass, heavy metals and so on. The discarded and dumped solid waste especially plastic waste becomes a major threat to coastal and marine organisms.Recreational activities like tourism and oil spills from shipping industries also contribute to coastal pollution.

In case of Maharashtra, coastline is bound by Arabian Sea in the west and western ghatrs in the east. The state is bestowed with a coast line of about 720 kms. The coastal stretch constitutes 7 districts namely Mumbai city, Mumbai suburban, Thane, palghar, Raigad, Ratnagiri and Sindhudurg. Rochy coast, sandy shores Muddy and Mangrove shore are some of the coastal types found prevalently along with few patches of corals in some places like Malvan[25]. These coastal areas contribute considerably to state's tourism sector. These patches are also significant for various livelihood opportunities since they support occupations like fishing and salt production in the state. But all these things put immnse pressure on coastal resources and leads to water pollution which directly impact the coastal and marine ecosystem. It also affects humans who are dependent on coastal and marine resources. Hence it is very important to continuously monitor sea water quality.

For monitoring purpose, MPCB has installed 45 monitoring stations (36 along sea/creek especially along the sensitive and pollution prone areas of state's coastline and12 along the nallahs). 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.

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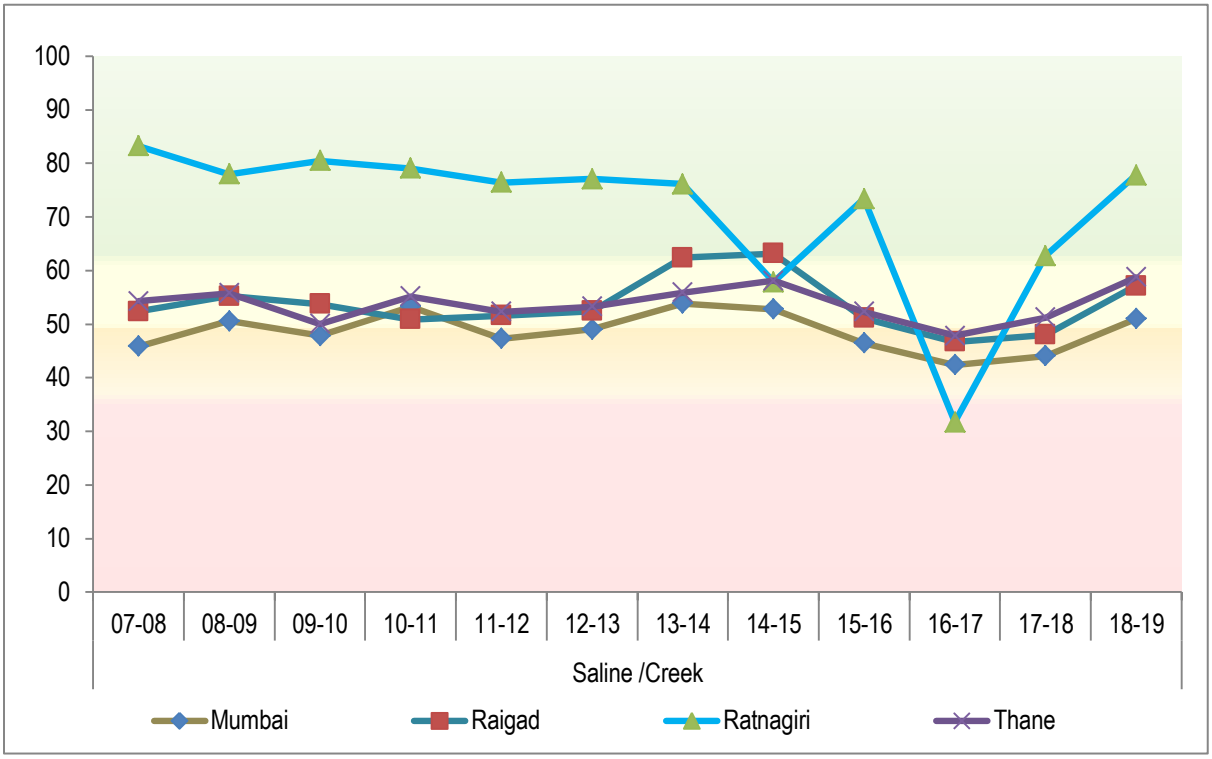
[23] http://keralaczma.gov.in/pdfs//Coastal_Zones_of_India.pdf

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

[25] https://www.indiaspend.com/wp-content/uploads/2018/11/National-Assessment-of-Shoreline-Changes-NCCR-report.pdf

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. 48: 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. 48 depicts the intra basin performance of west flowing rivers across four districts of the state. In 2018-19, All 4 districts recorded improvement in WQI as comaperd to previous year.

The annual average WQI of Mumbai and Raigad shifted from "Bad" category to "Medium to Good" category while Thane; though remained in "Medium to Good" category, recorded slight improvement (from 51 to 58) in WQI. WQI of Ratnagiri too remained in same category ("Good ot Excellent") but improved from 62 to 77.

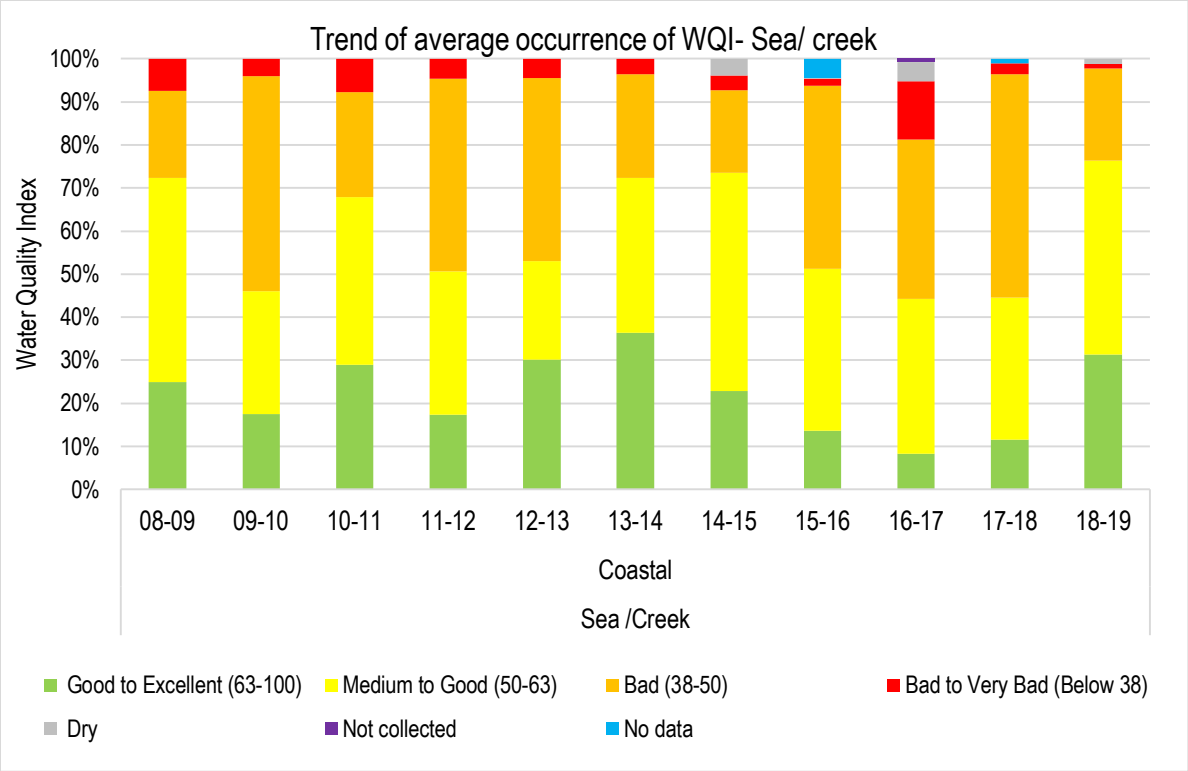
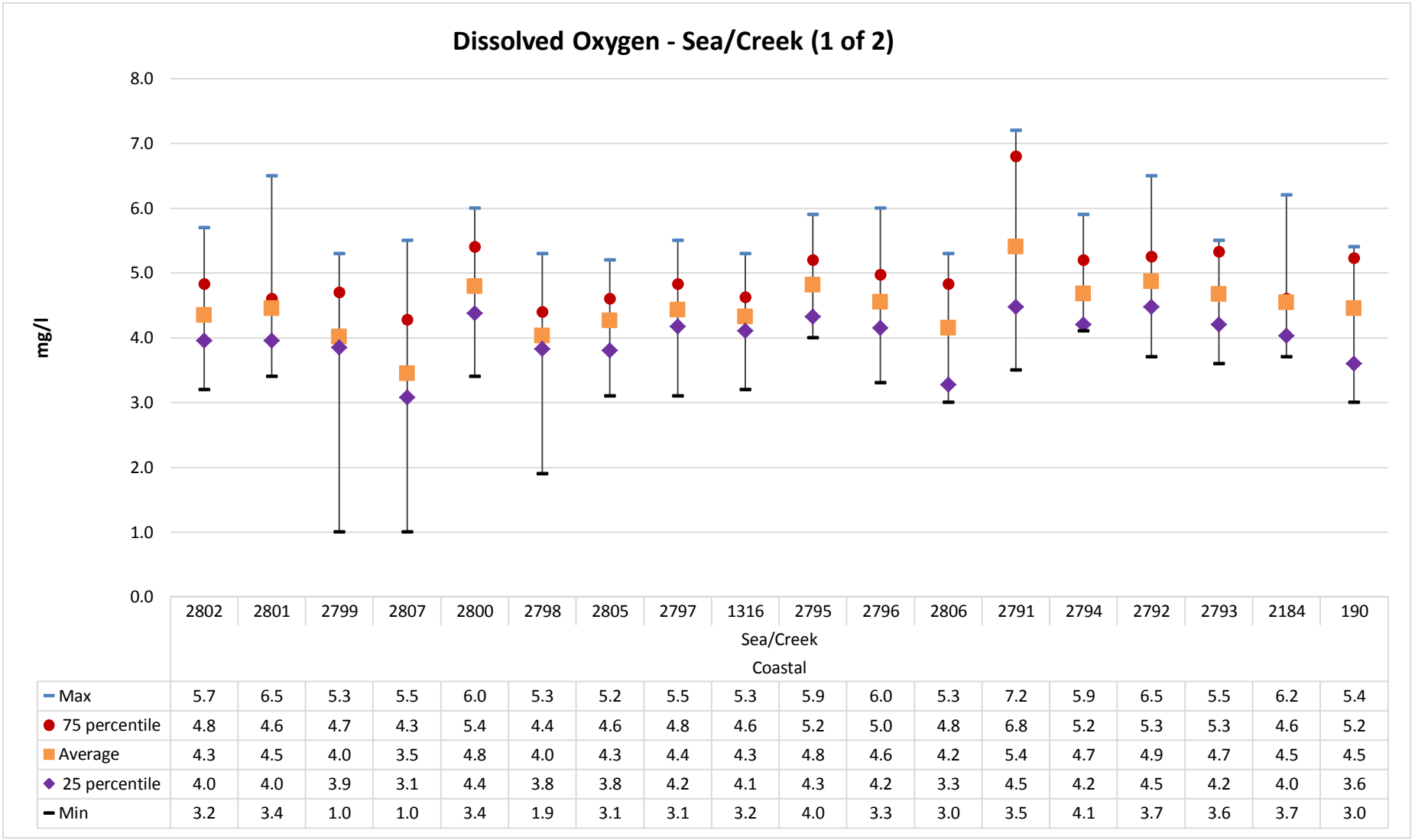


Figure No. 49: Trend of average occurrence for different category of WQI Coastal basin

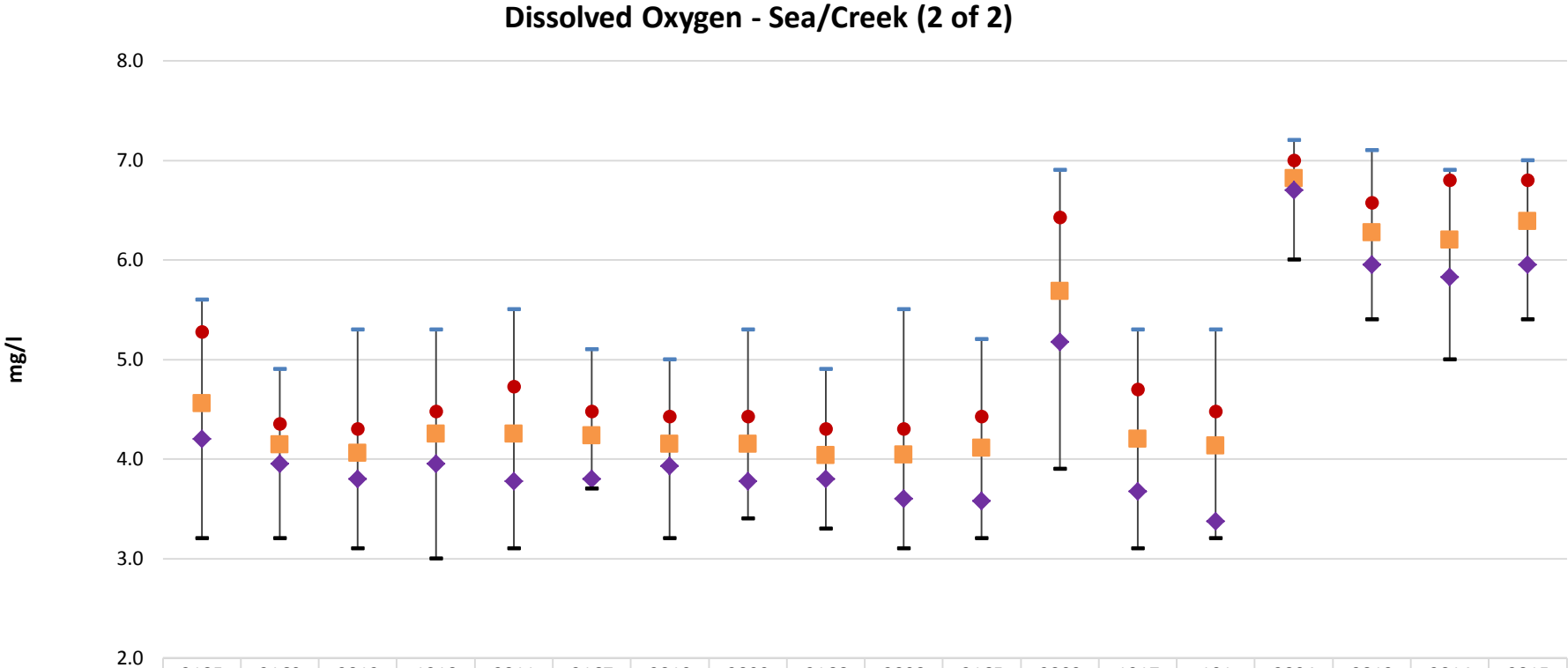
As depicted in Figure No. 49, it is observed that the % of observations coming under "Good to Excellent" and "Medium to Good" is increased considerably as compared to last year (11.5% to 31.2% and 32.9% to 45.1% respectively in 2018-19) indicating an improvement in water quality and decrease in pollution level.

Similarly, observations recorded under "Bad" category too recorded a dip from 52% in 2017-18 to 21.3% in 2018-19. In case of "Bad to Very Bad", slight decrease was recorded with % of observations deceased from 2.5% (2017-18) to 1.15% in 2018-19.



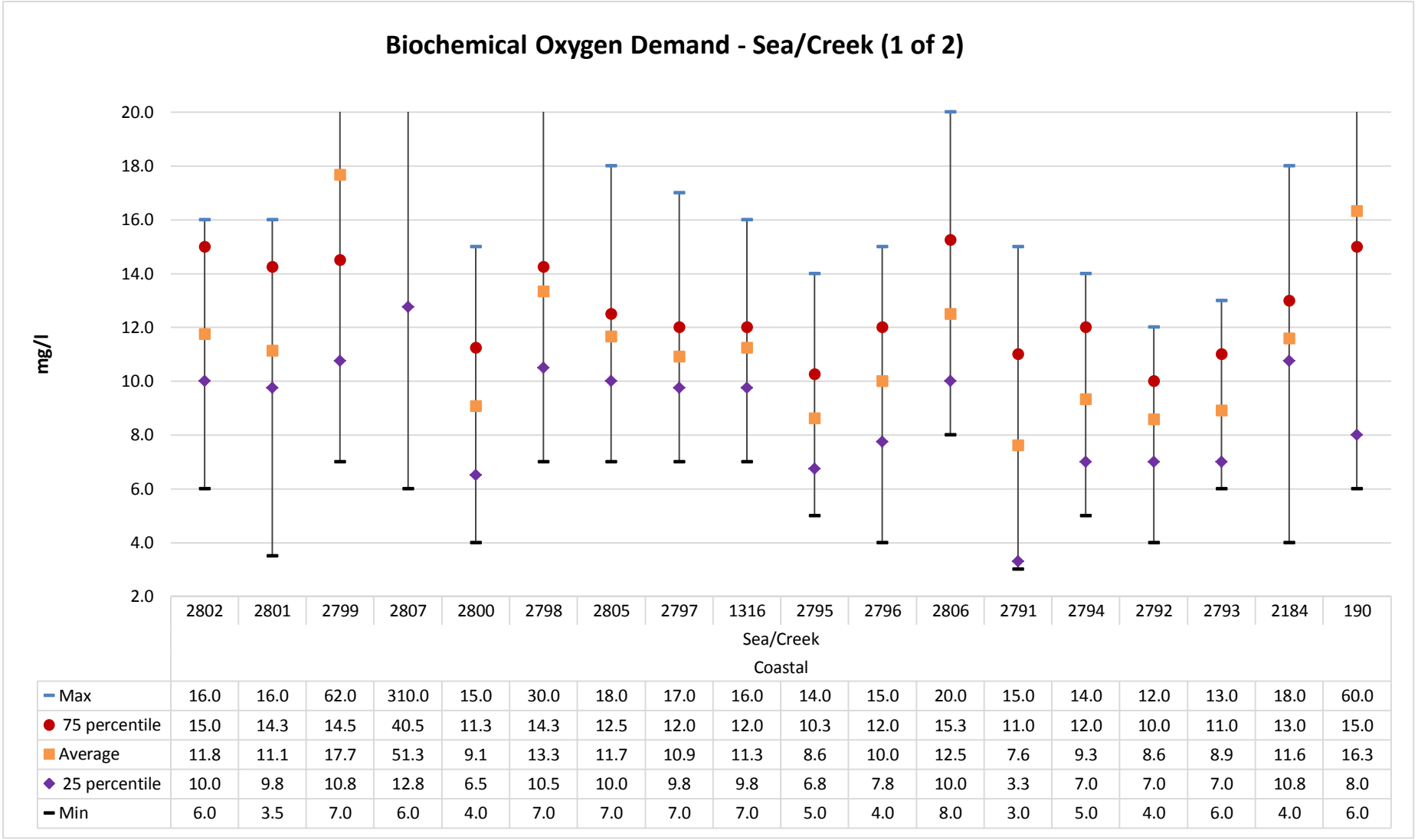
	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
Max	5.7	6.5	5.3	5.5	6.0	5.3	5.2	5.5	5.3	5.9	6.0	5.3	7.2	5.9	6.5	5.5	6.2	5.4
75 percentile	4.8	4.6	4.7	4.3	5.4	4.4	4.6	4.8	4.6	5.2	5.0	4.8	6.8	5.2	5.3	5.3	4.6	5.2
Average	4.3	4.5	4.0	3.5	4.8	4.0	4.3	4.4	4.3	4.8	4.6	4.2	5.4	4.7	4.9	4.7	4.5	4.5
25 percentile	4.0	4.0	3.9	3.1	4.4	3.8	3.8	4.2	4.1	4.3	4.2	3.3	4.5	4.2	4.5	4.2	4.0	3.6
Min	3.2	3.4	1.0	1.0	3.4	1.9	3.1	3.1	3.2	4.0	3.3	3.0	3.5	4.1	3.7	3.6	3.7	3.0

Figure No. 50: Trend of Dissolved Oxygen (DO) levels recorded at WQMS monitoring sea and creek water (1 of 2)



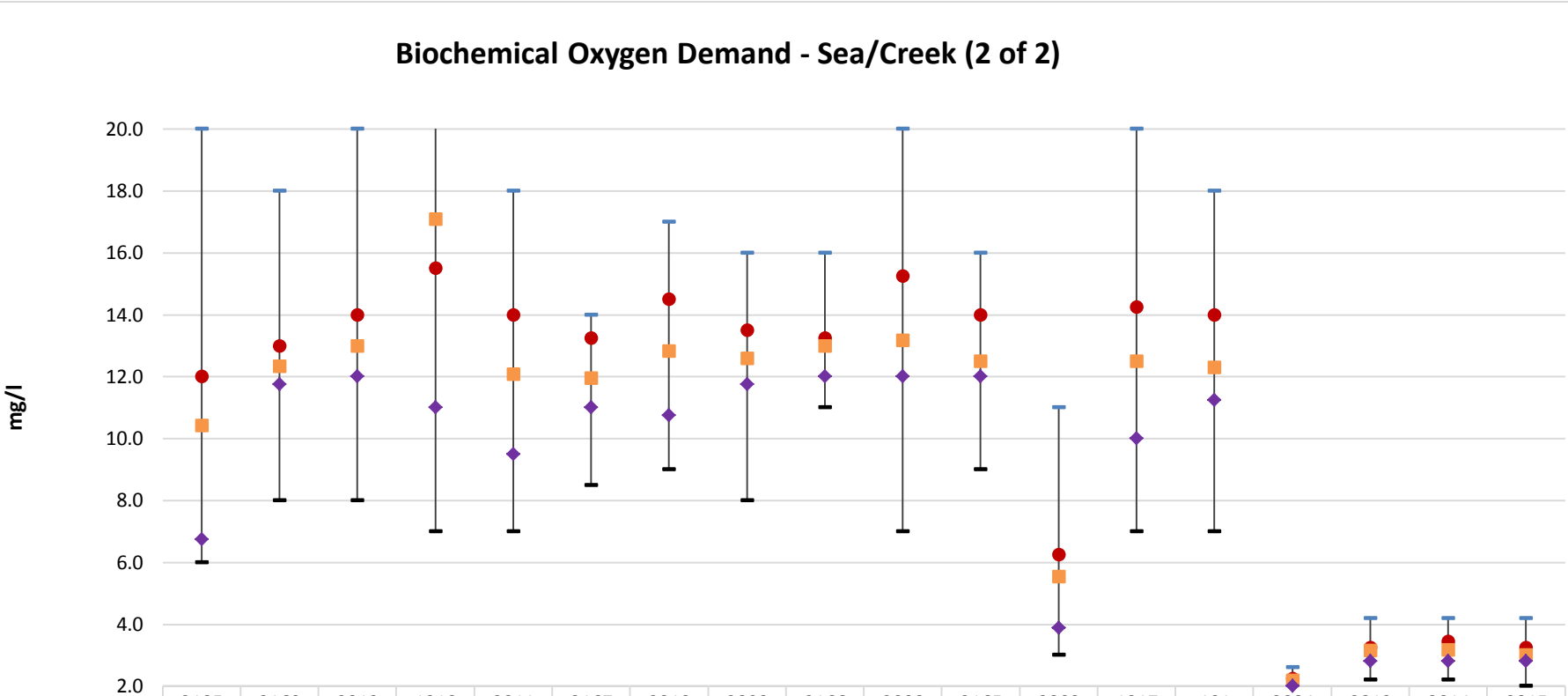
	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
	Sea/Creek																	
	Coastal																	
Max	5.6	4.9	5.3	5.3	5.5	5.1	5.0	5.3	4.9	5.5	5.2	6.9	5.3	5.3	7.2	7.1	6.9	7.0
75 percentile	5.3	4.4	4.3	4.5	4.7	4.5	4.4	4.4	4.3	4.3	4.4	6.4	4.7	4.5	7.0	6.6	6.8	6.8
Average	4.6	4.1	4.1	4.3	4.3	4.2	4.2	4.2	4.0	4.0	4.1	5.7	4.2	4.1	6.8	6.3	6.2	6.4
25 percentile	4.2	4.0	3.8	4.0	3.8	3.8	3.9	3.8	3.8	3.6	3.6	5.2	3.7	3.4	6.7	6.0	5.8	6.0
Min	3.2	3.2	3.1	3.0	3.1	3.7	3.2	3.4	3.3	3.1	3.2	3.9	3.1	3.2	6.0	5.4	5.0	5.4

Figure No. 51: Trend of Dissolved Oxygen (DO) levels recorded at WQMS monitoring sea and creek water (2 of 2)



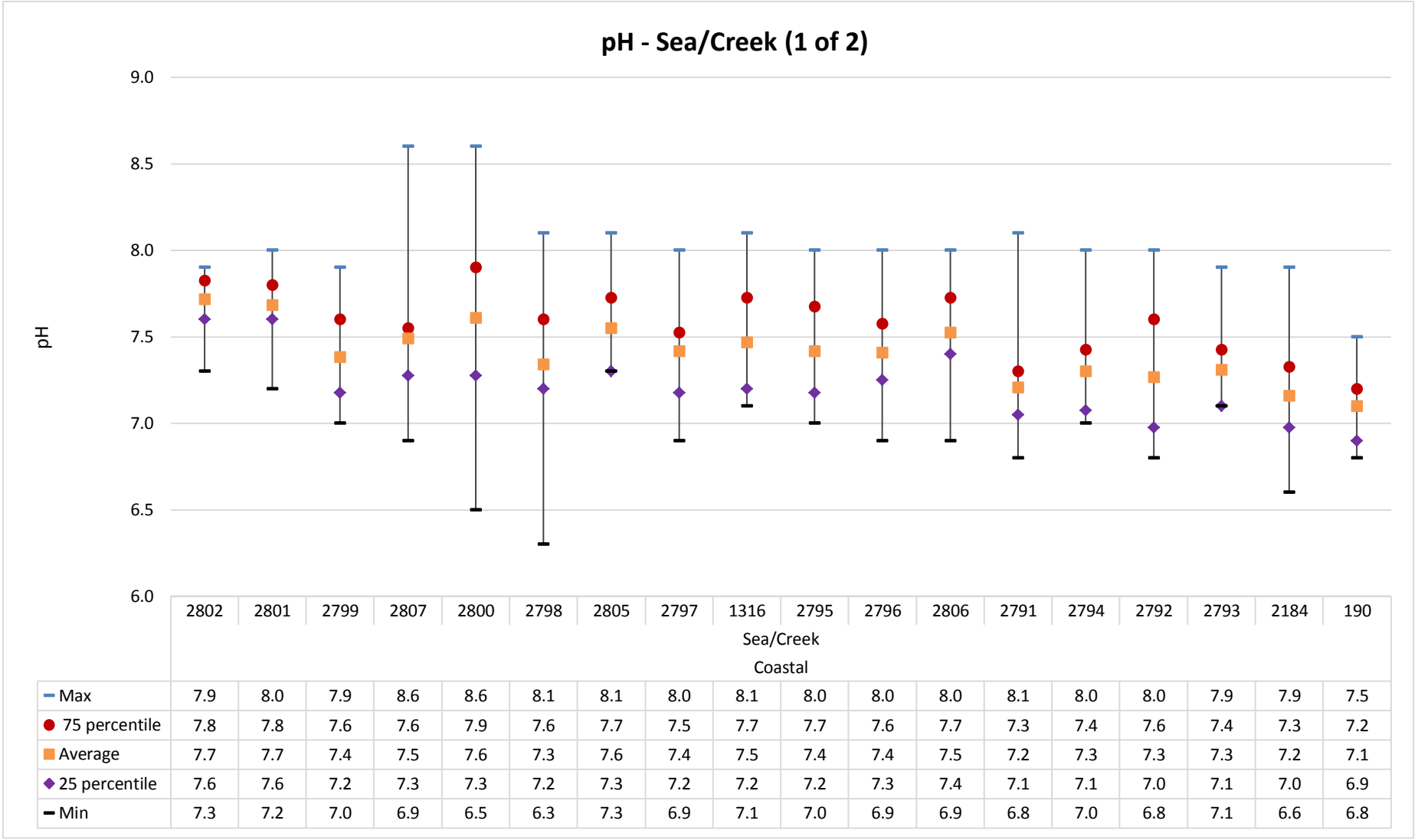
	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
	Sea/Creek																	
	Coastal																	
Max	16.0	16.0	62.0	310.0	15.0	30.0	18.0	17.0	16.0	14.0	15.0	20.0	15.0	14.0	12.0	13.0	18.0	60.0
75 percentile	15.0	14.3	14.5	40.5	11.3	14.3	12.5	12.0	12.0	10.3	12.0	15.3	11.0	12.0	10.0	11.0	13.0	15.0
Average	11.8	11.1	17.7	51.3	9.1	13.3	11.7	10.9	11.3	8.6	10.0	12.5	7.6	9.3	8.6	8.9	11.6	16.3
25 percentile	10.0	9.8	10.8	12.8	6.5	10.5	10.0	9.8	9.8	6.8	7.8	10.0	3.3	7.0	7.0	7.0	10.8	8.0
Min	6.0	3.5	7.0	6.0	4.0	7.0	7.0	7.0	7.0	5.0	4.0	8.0	3.0	5.0	4.0	6.0	4.0	6.0

Figure No. 52: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS monitoring sea and creek water (1 of 2)



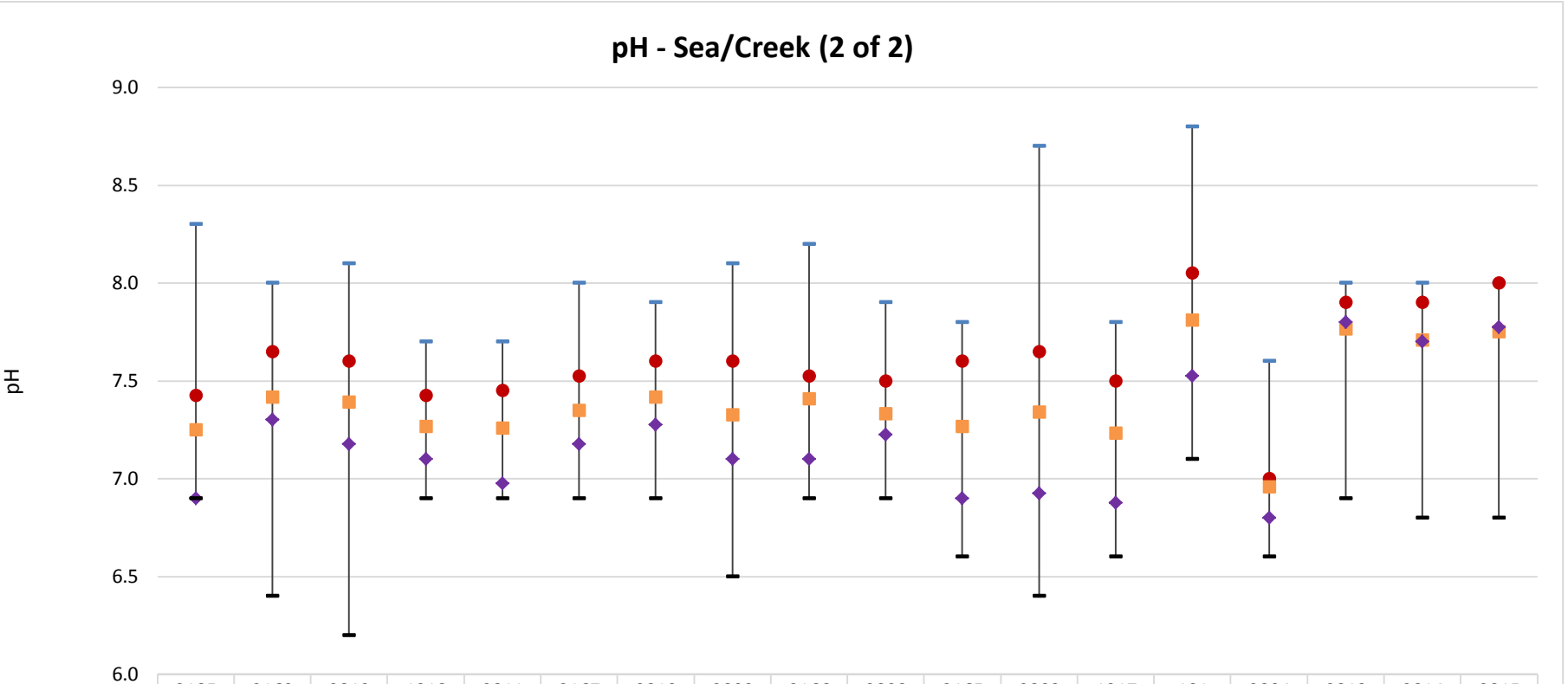
	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
Max	20.0	18.0	20.0	45.0	18.0	14.0	17.0	16.0	16.0	20.0	16.0	11.0	20.0	18.0	2.6	4.2	4.2	4.2
75 percentile	12.0	13.0	14.0	15.5	14.0	13.3	14.5	13.5	13.3	15.3	14.0	6.3	14.3	14.0	2.3	3.3	3.5	3.3
Average	10.4	12.3	13.0	17.1	12.1	12.0	12.8	12.6	13.0	13.2	12.5	5.5	12.5	12.3	2.2	3.2	3.2	3.0
25 percentile	6.8	11.8	12.0	11.0	9.5	11.0	10.8	11.8	12.0	12.0	12.0	3.9	10.0	11.3	2.0	2.8	2.8	2.8
Min	6.0	8.0	8.0	7.0	7.0	8.5	9.0	8.0	11.0	7.0	9.0	3.0	7.0	7.0	1.8	2.2	2.2	2.0

Figure No. 53: Trend of Biological Oxygen Demand (BOD) levels recorded at WQMS monitoring sea and creek water (2 of 2)



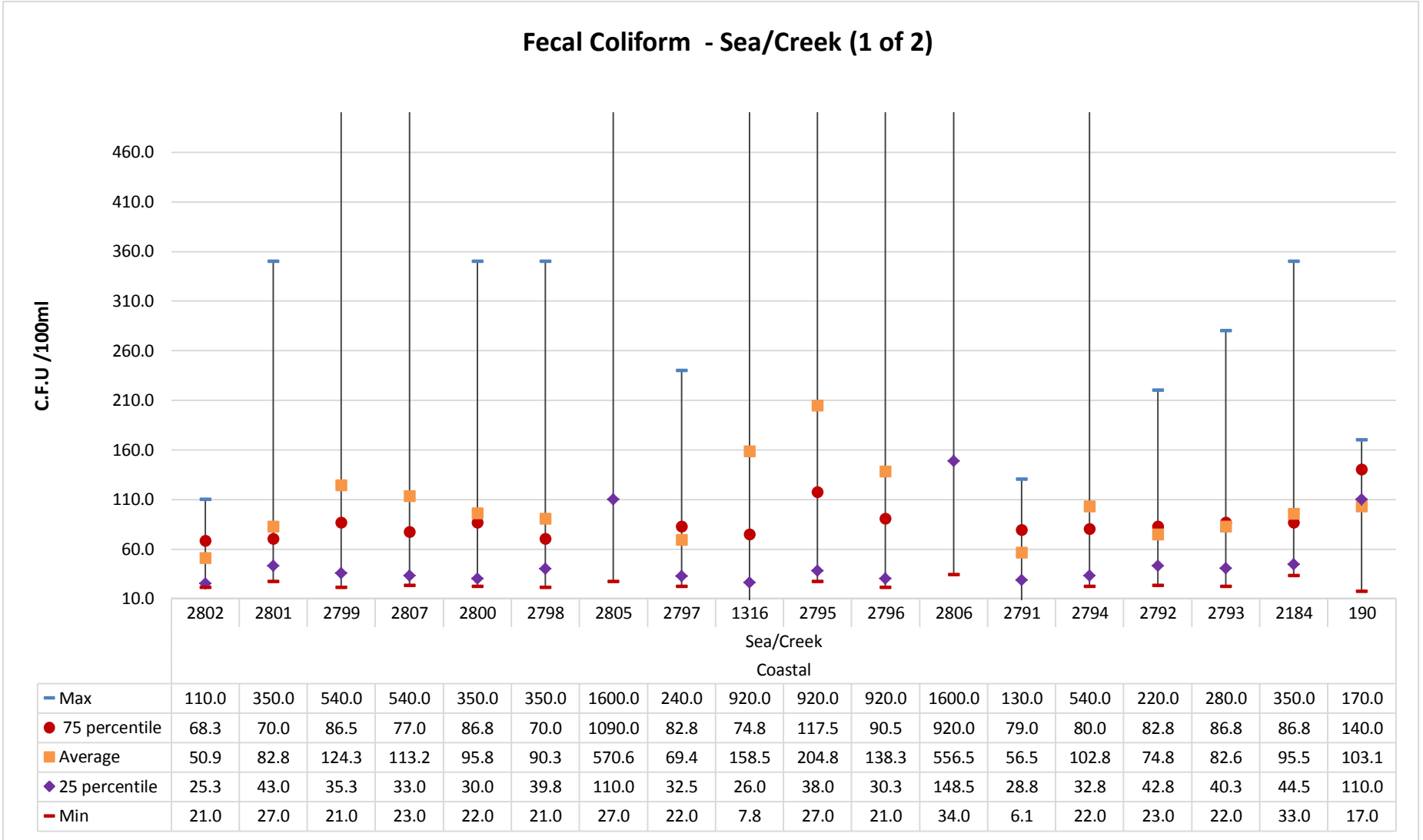
	2802	2801	2799	2807	2800	2798	2805	2797	1316	2795	2796	2806	2791	2794	2792	2793	2184	190
Max	7.9	8.0	7.9	8.6	8.6	8.1	8.1	8.0	8.1	8.0	8.0	8.0	8.1	8.0	8.0	7.9	7.9	7.5
75 percentile	7.8	7.8	7.6	7.6	7.9	7.6	7.7	7.5	7.7	7.7	7.6	7.7	7.3	7.4	7.6	7.4	7.3	7.2
Average	7.7	7.7	7.4	7.5	7.6	7.3	7.6	7.4	7.5	7.4	7.4	7.5	7.2	7.3	7.3	7.3	7.2	7.1
25 percentile	7.6	7.6	7.2	7.3	7.3	7.2	7.3	7.2	7.2	7.2	7.3	7.4	7.1	7.1	7.0	7.1	7.0	6.9
Min	7.3	7.2	7.0	6.9	6.5	6.3	7.3	6.9	7.1	7.0	6.9	6.9	6.8	7.0	6.8	7.1	6.6	6.8

Figure No. 54: Trend of pH levels recorded at WQMS monitoring sea and creek water (1 of 2)



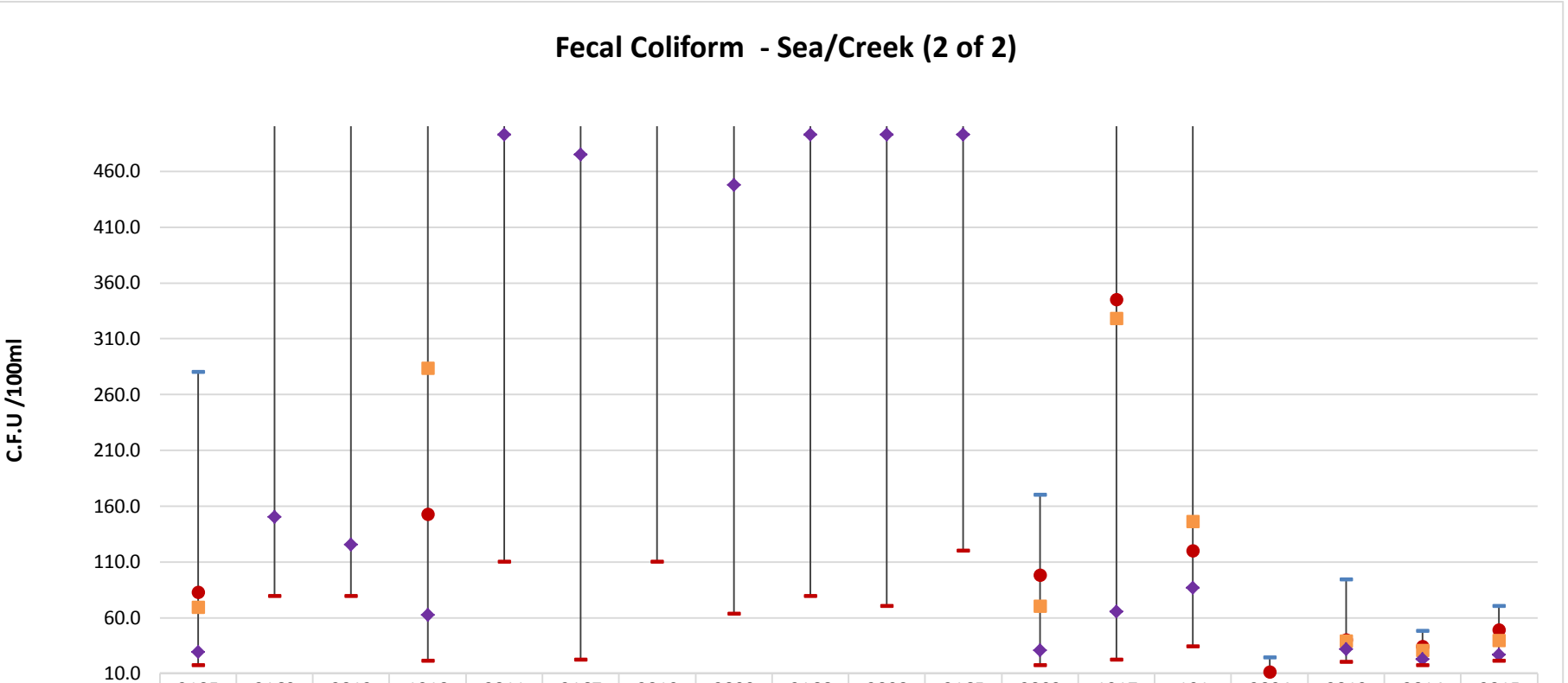
	2185	2169	2812	1318	2811	2167	2810	2809	2166	2808	2165	2803	1317	191	2804	2813	2814	2815
	Sea/Creek																	
	Coastal																	
Max	8.3	8.0	8.1	7.7	7.7	8.0	7.9	8.1	8.2	7.9	7.8	8.7	7.8	8.8	7.6	8.0	8.0	8.0
75 percentile	7.4	7.7	7.6	7.4	7.5	7.5	7.6	7.6	7.5	7.5	7.6	7.7	7.5	8.1	7.0	7.9	7.9	8.0
Average	7.3	7.4	7.4	7.3	7.3	7.4	7.4	7.3	7.4	7.3	7.3	7.3	7.2	7.8	7.0	7.8	7.7	7.8
25 percentile	6.9	7.3	7.2	7.1	7.0	7.2	7.3	7.1	7.1	7.2	6.9	6.9	6.9	7.5	6.8	7.8	7.7	7.8
Min	6.9	6.4	6.2	6.9	6.9	6.9	6.9	6.5	6.9	6.9	6.6	6.4	6.6	7.1	6.6	6.9	6.8	6.8

Figure No. 55: 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	110.0	350.0	540.0	540.0	350.0	350.0	1600.0	240.0	920.0	920.0	920.0	1600.0	130.0	540.0	220.0	280.0	350.0	170.0
75 percentile	68.3	70.0	86.5	77.0	86.8	70.0	1090.0	82.8	74.8	117.5	90.5	920.0	79.0	80.0	82.8	86.8	86.8	140.0
Average	50.9	82.8	124.3	113.2	95.8	90.3	570.6	69.4	158.5	204.8	138.3	556.5	56.5	102.8	74.8	82.6	95.5	103.1
25 percentile	25.3	43.0	35.3	33.0	30.0	39.8	110.0	32.5	26.0	38.0	30.3	148.5	28.8	32.8	42.8	40.3	44.5	110.0
Min	21.0	27.0	21.0	23.0	22.0	21.0	27.0	22.0	7.8	27.0	21.0	34.0	6.1	22.0	23.0	22.0	33.0	17.0

Figure No. 56: 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	280.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	170.0	1600.0	540.0	24.0	94.0	48.0	70.0
75 percentile	82.8	920.0	1090.0	152.5	920.0	920.0	1090.0	1090.0	920.0	920.0	1600.0	98.0	345.0	120.0	11.0	40.0	33.8	48.8
Average	69.0	628.3	756.6	283.4	733.3	715.1	921.7	794.4	782.8	693.3	1051.7	70.0	327.9	146.3	9.3	39.0	30.5	39.6
25 percentile	29.0	150.0	125.0	62.3	492.5	475.0	777.5	447.5	492.5	492.5	492.5	30.5	65.0	86.8	6.6	31.5	22.5	26.8
Min	17.0	79.0	79.0	21.0	110.0	22.0	110.0	63.0	79.0	70.0	120.0	17.0	22.0	34.0	4.0	20.0	17.0	21.0

Figure No. 57: 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	58	58	40	43	53	43	52	58	60	55	54	50	64	60	54	57	58	59
May	48	51	50	49	63	48	42	46	50	56	46	44	58	56	56	54	55	
Jun	48	50	45	44	45	43	52	57	42	47	58	48	87	53	57	58	53	
Jul	72	70	70	70	72	69	51	63	64	73	67	52	76	65	65	68	64	65
Aug	70	79	66	59	78	68	59	72	58	67	76	58	73	68	67	67	43	66
Sep	64	60	63	53	68	59	52	61	66	73	72	50	80	74	77	70	81	
Oct	59	56	39	40	73	62	72	72	72	63	64	67	84	63	74	61	35	73
Nov	66	65	65	40	59	61	59	59	63	73	60	58	65	69	68	70	59	65
Dec	59	59	58	63	60	59	53	60	63	61	64	61	60	63	59	60	56	59
Jan	58	57	57	51	59	60	57	62	60	68	62	53	62	64	64	60	63	32
Feb	54	58	55	37	63	56	49	57	57	55	57	48	65	63	67	73	55	49
Mar	60	53	57	53	55	53	57	62	61	67	61	44	52	58	61	62	57	47
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)																	
Basin	Coastal																	

Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

Table No 26: 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 Chowpatty	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	63	48	49	48	52	56	49	52	50	54	51	60	54		84	71	73	73
May	61	50	48	51	48	49	48	44	47	48	47	67	55	46	86	77	71	74
Jun	54	45	43	49	45	45	47	43	42	40	44	66	42	52	88	57	55	56
Jul	70	59	53	68	62	56	51	53	48	47	49	78	59	53	86	76	77	81
Aug	69	60	59	64	61	56	53	58	53	61	56	73	64	65	84	81	78	77
Sep	68	51	51	61	49	55	49	60	50	54	55	80	50		80	65	64	61
Oct	60	53	54	64	57	61	52	49	57	60	57	81	63	64	85	78	80	80
Nov	61	55	55	58	47	51	54	54	50	50	47	75	63	56	88	77	82	79
Dec	63	49	49	61	54	52	52	54	54	52	52	68	64	57	86	83	83	83
Jan	57	46	44	34	50	48	49	49	48	49	48	52	57	52	87	80	81	81
Feb	70	55	54	34	54	47	54	47	48	49	43	78	53	48	86	78	80	79
Mar	51	47	46	50	42	47	44	45	48	45	45	70	42	47	86	78	79	78
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)																	
Basin	Coastal																	

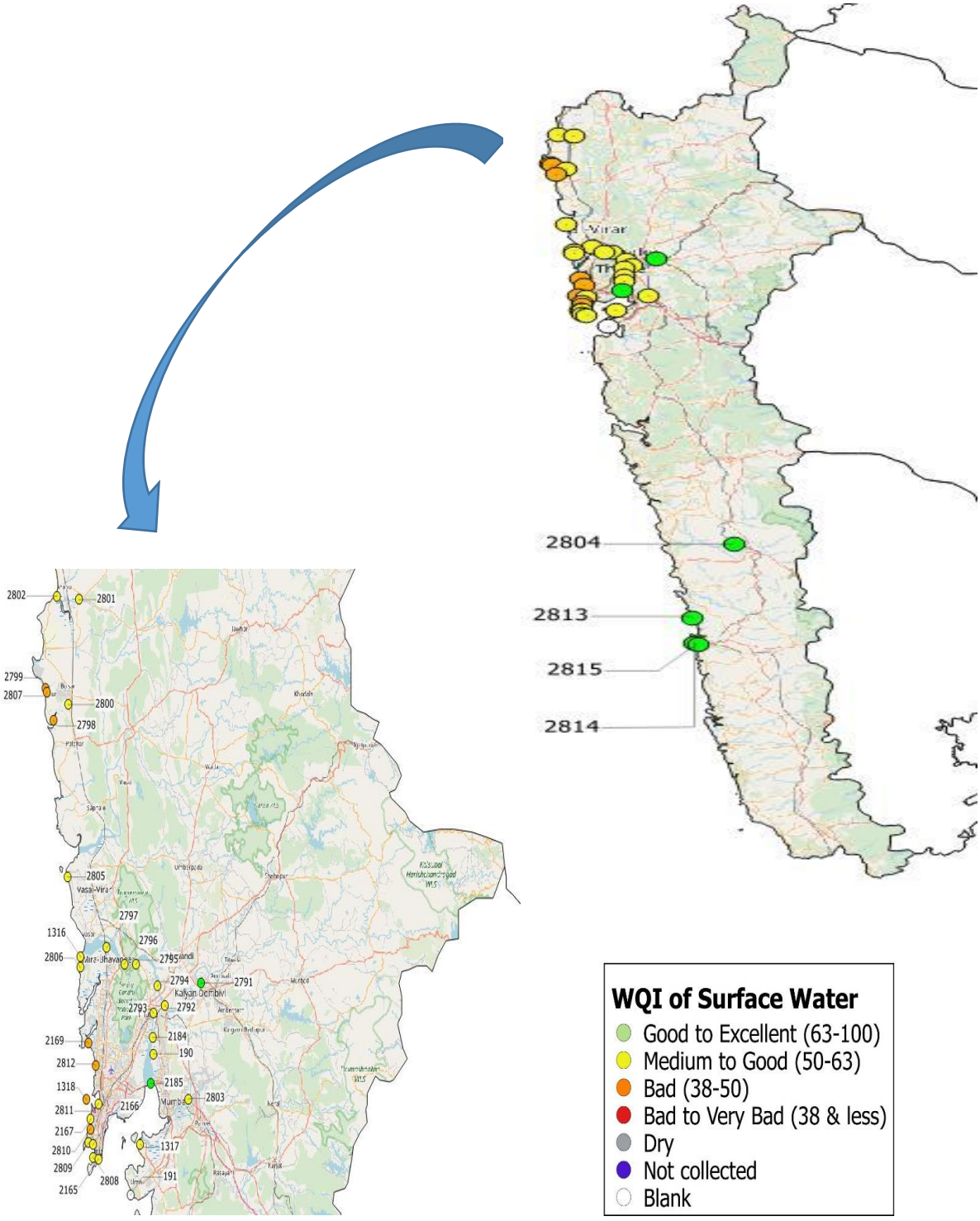
Legend

Good to Excellent	Medium to good	Bad	Bad to Very Bed	Dry	No data

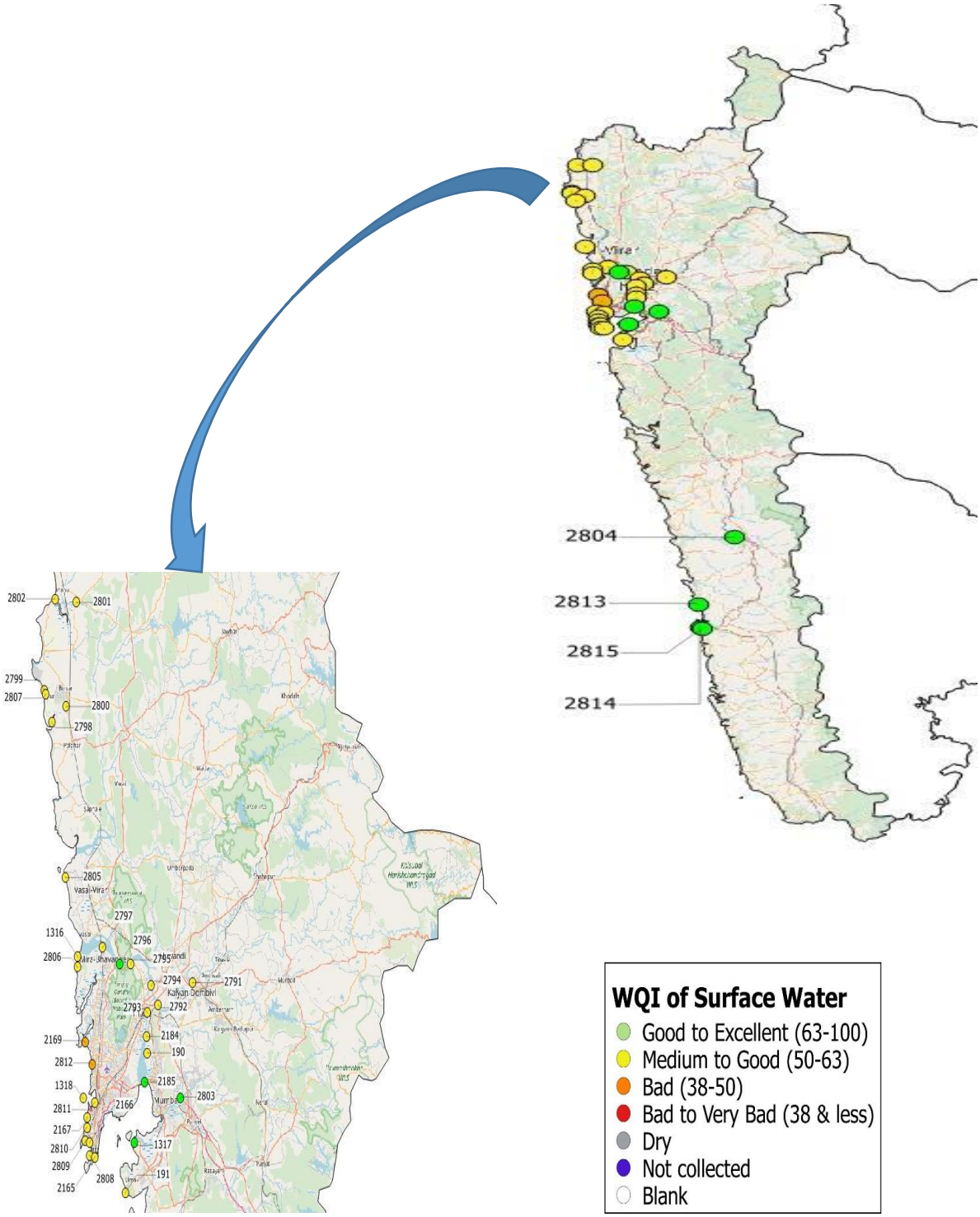
Table No 27: Surface water quality monitoring stations monitoring Sea/Creek water (2 of 2)

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 Chowpatty)	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 Chowpatty	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 2018)



Spatial map of WQI for Sea and Creek Water (December 2018)



6 Ground Water Quality

Water which exists underground in saturated zones beneath the land surface can be termed as 'Groundwater'. It fills the pores, cracks and spaces in underground materials such as sand, gravel, soil and rock. It is the most preferred source of water for various sectors in India owing to its availability, dependability and low capital cost involved in extraction operations. In India, groundwater has become a backbone of drinking water and irrigation supply systems. Around 80% of India's drinking water needs are dependent on groundwater and 2/3rd of water for irrigation comes from groundwater sources[26]. Thus, groundwater has become a major alternative to surface water for irrigation and domestic use purposes.

In case of Maharashtra state, a large area of state's geography is occupied by hard rocks (Basalt + Metamorphic). This puts limitations on availability and development of groundwater due to adverse hydrogeological configuration[27]. Thus, Central Ground Water Board (CGWB), Ground water Survey and Development Agency (GSDA) and MPCB monitors the ground water quality across various districts of the state. For this purpose, MPCB has installed 66 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.

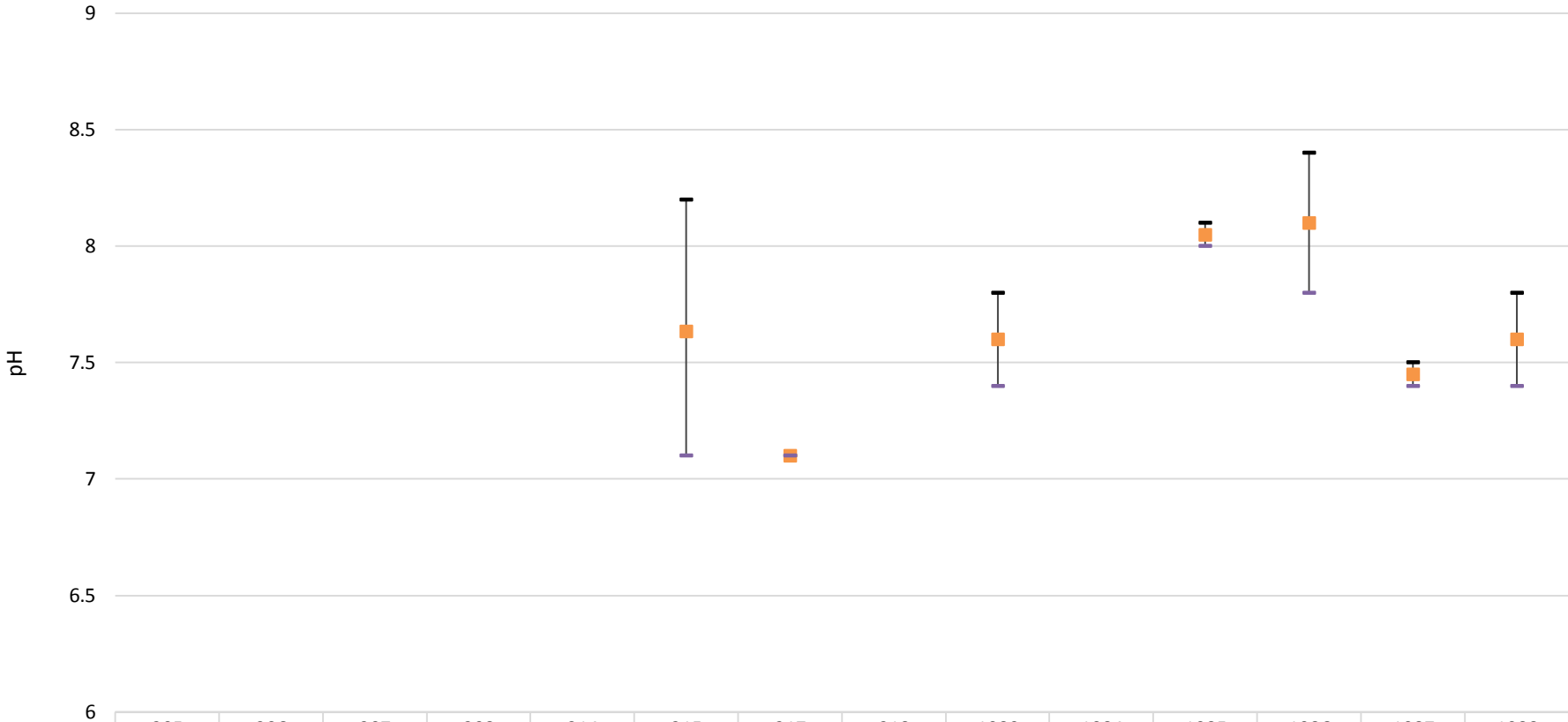
The total WQMS for year 2018-19 are represented in the Table No 28

Table No 28: List of Groundwater Quality Monitoring stations

Water Quality monitoring stations	
Water Bodies	**2018-19**
Bore well	29
Dug well	35
Tube well	1
Hand pump	1
Total	**66**

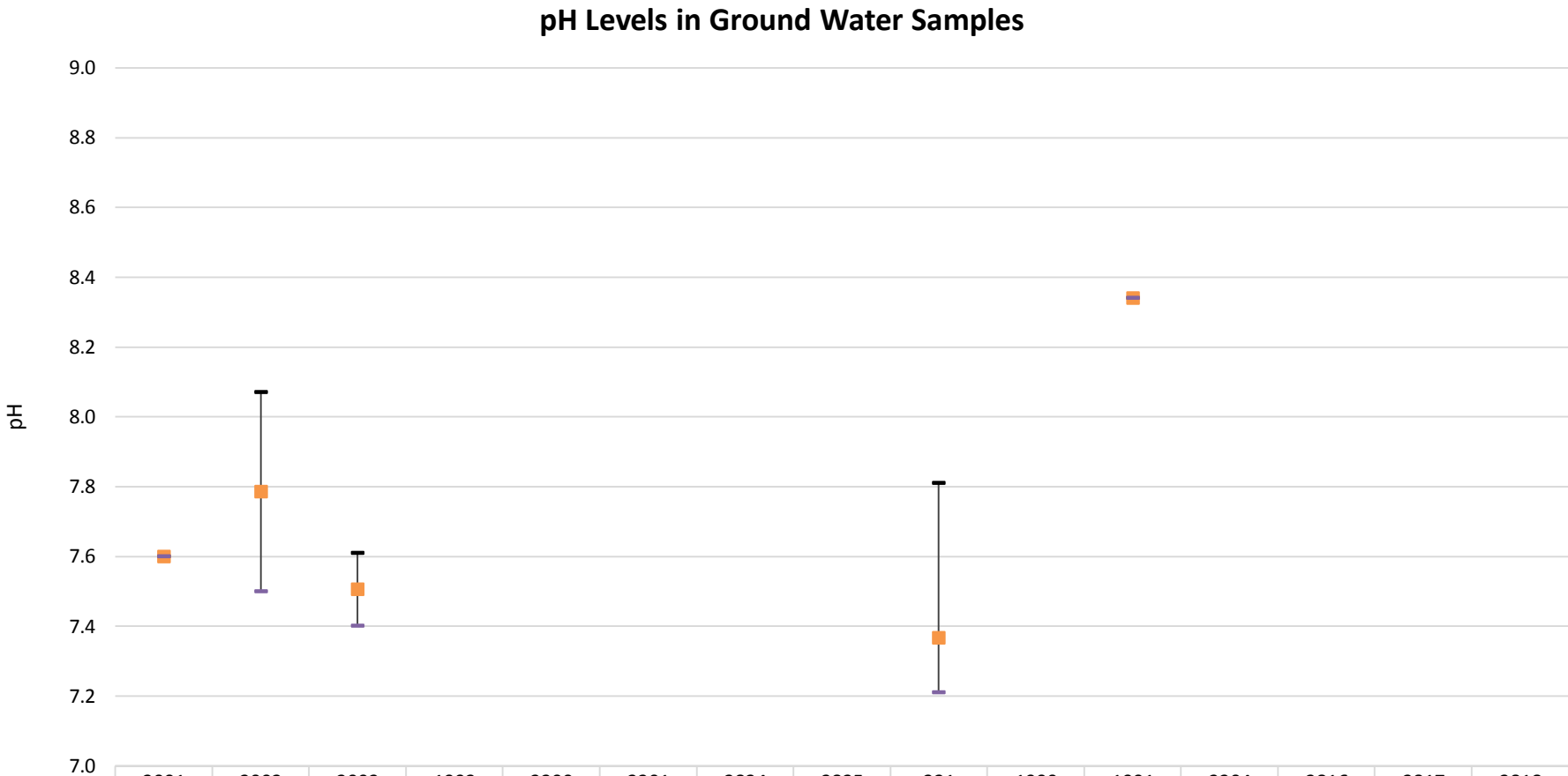
[26] https://timesofindia.indiatimes.com/india/the-worlds-highest-and-most-reckless-user-of-groundwater/articleshow/64515989.cms

[27] https://gsda.maharashtra.gov.in/english/index.php/About_us



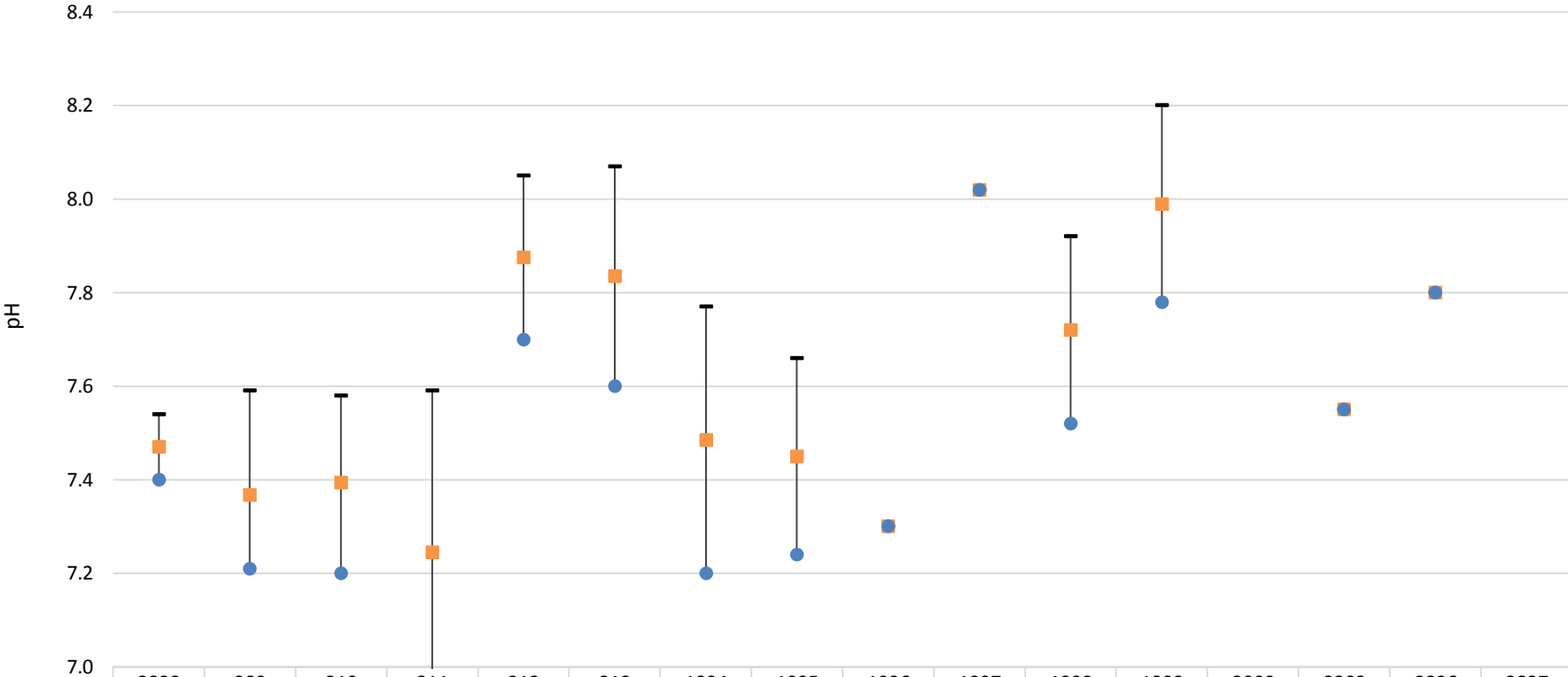
	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
	Kalyan				Navi Mumbai		Raigad			Thane				
Max						8.2	7.1		7.8		8.1	8.4	7.5	7.8
Average						7.6	7.1		7.6		8.1	8.1	7.5	7.6
Min						7.1	7.1		7.4		8.0	7.8	7.4	7.4

Figure No. 58: Parametric values of pH recorded at WQMS monitoring ground water at Kalyan, Navi Mumbai, Raigad and Thane.



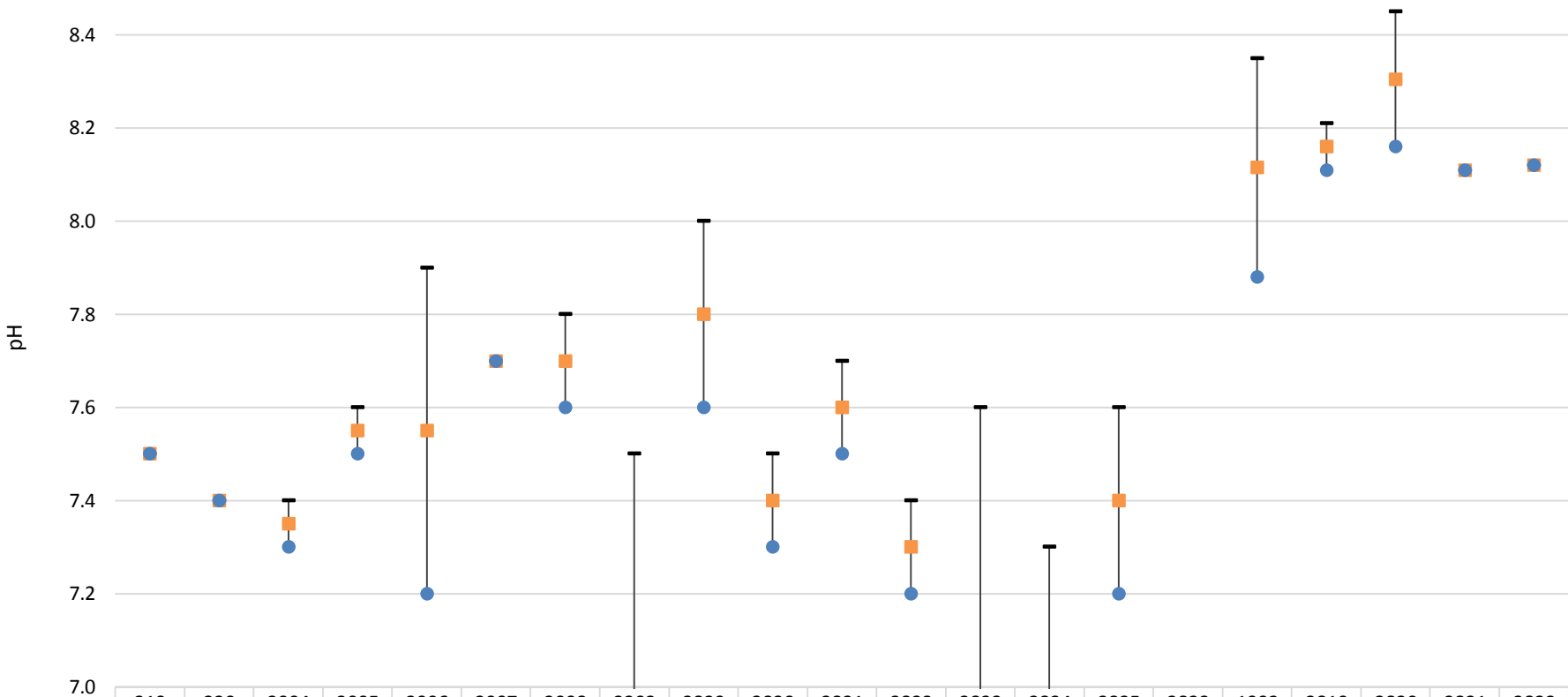
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
	Amravati			Aurangabad					Nashik						
Max	7.6	8.1	7.6						7.8		8.3				
Average	7.6	7.8	7.5						7.4		8.3				
Min	7.6	7.5	7.4						7.2		8.3				

Figure No. 59: Parametric values of pH recorded at WQMS monitoring ground water at Amravati, Aurangabad and Nashik.



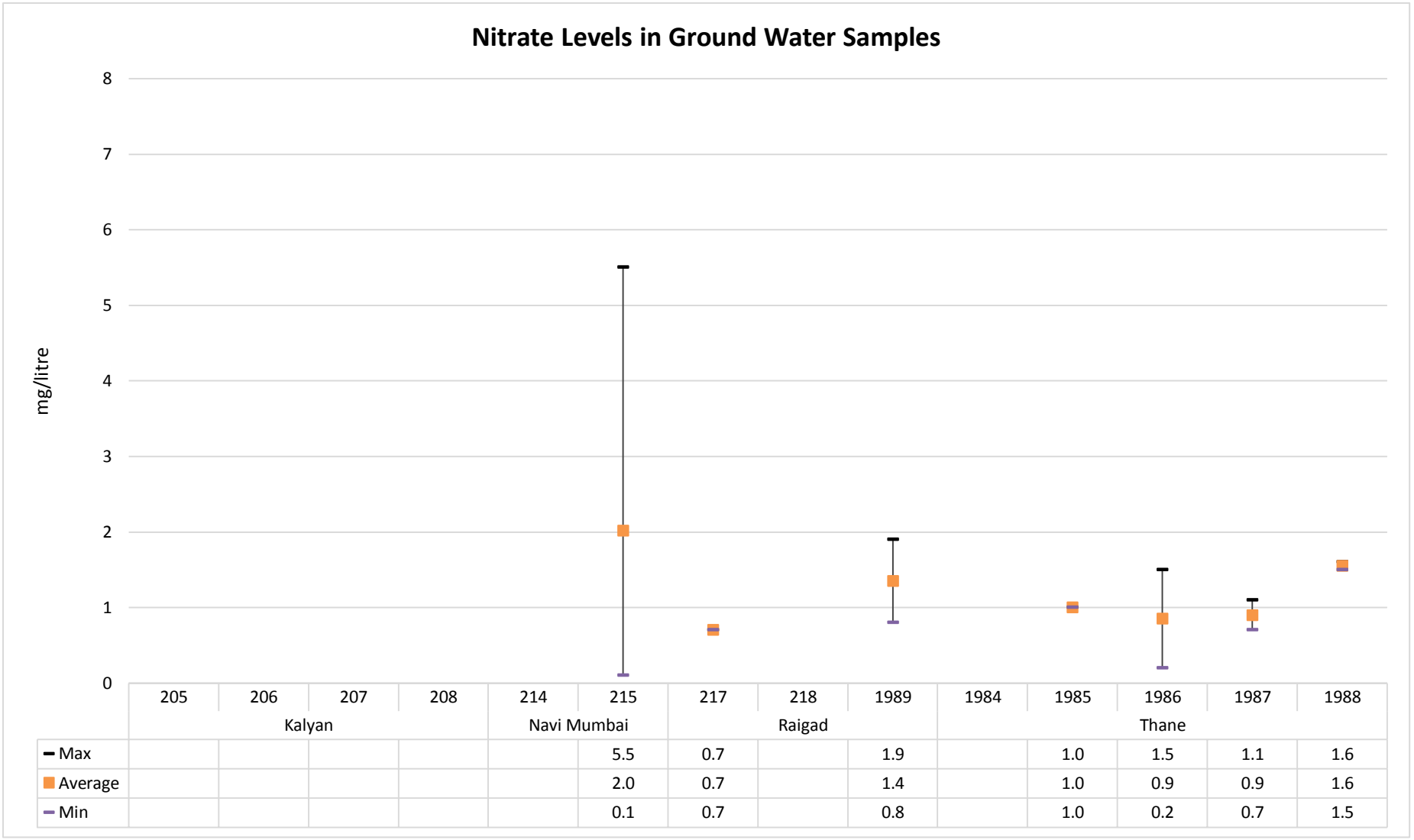
	2828	209	210	211	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max	7.5	7.6	7.6	7.6	8.1	8.1	7.8	7.7	7.3	8.0	7.9	8.2		7.6	7.8	
Average	7.5	7.4	7.4	7.2	7.9	7.8	7.5	7.5	7.3	8.0	7.7	8.0		7.6	7.8	
Min	7.4	7.2	7.2	6.9	7.7	7.6	7.2	7.2	7.3	8.0	7.5	7.8		7.6	7.8	

Figure No. 60: Parametric values of pH recorded at WQMS monitoring ground water at Chandrapur and Nagpur.



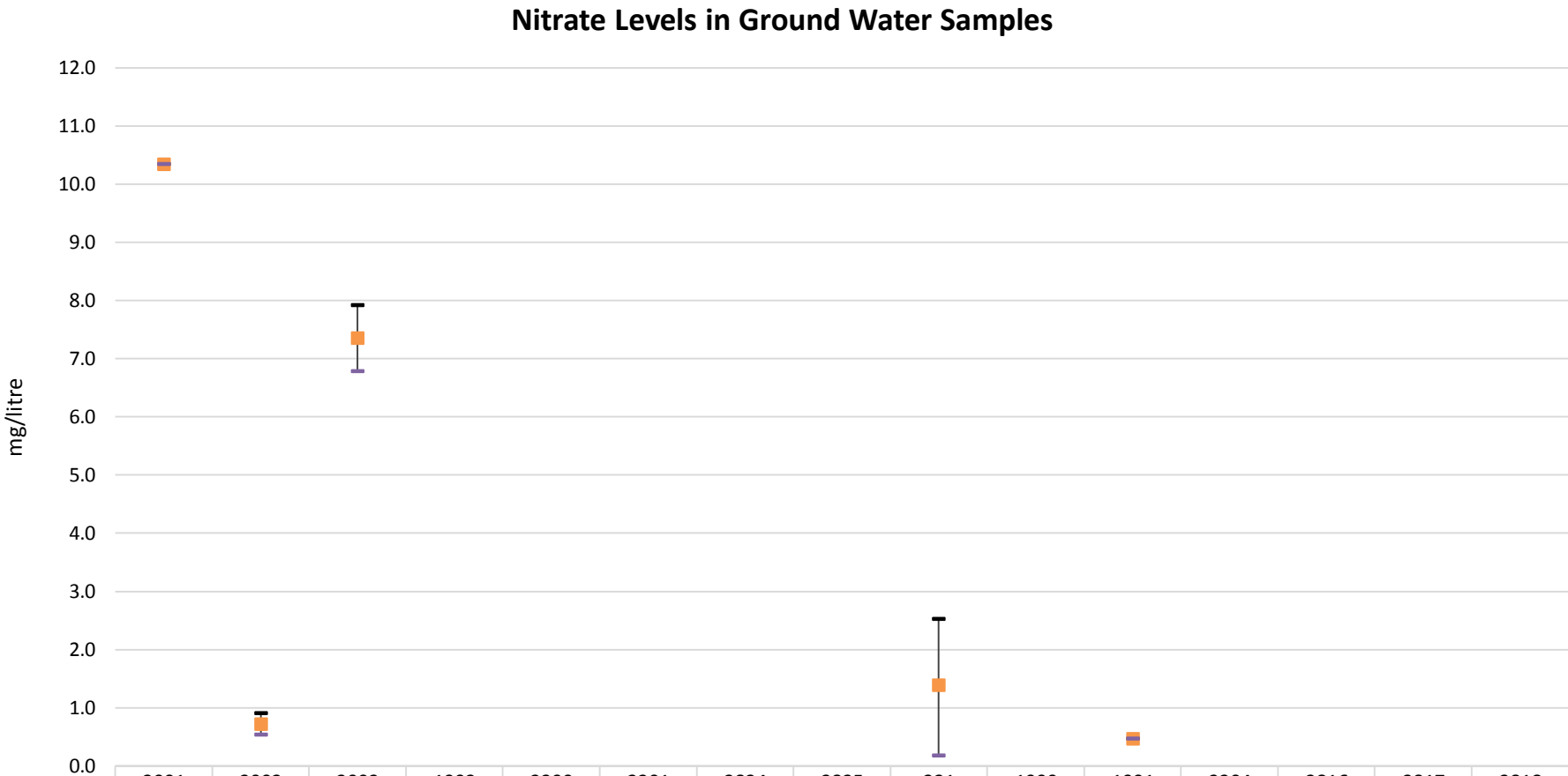
	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	2823	1992	2819	2820	2821	2822
	Kolhapur															Pune					
Max	7.5	7.4	7.4	7.6	7.9	7.7	7.8	7.5	8.0	7.5	7.7	7.4	7.6	7.3	7.6	8.5	8.4	8.2	8.5	8.1	8.1
Average	7.5	7.4	7.4	7.6	7.6	7.7	7.7	6.9	7.8	7.4	7.6	7.3	7.0	7.0	7.4	8.5	8.1	8.2	8.3	8.1	8.1
Min	7.5	7.4	7.3	7.5	7.2	7.7	7.6	6.3	7.6	7.3	7.5	7.2	6.3	6.6	7.2	8.5	7.9	8.1	8.2	8.1	8.1

Figure No. 61: Parametric values of pH recorded at WQMS monitoring ground water at Kolhapur and Pune.



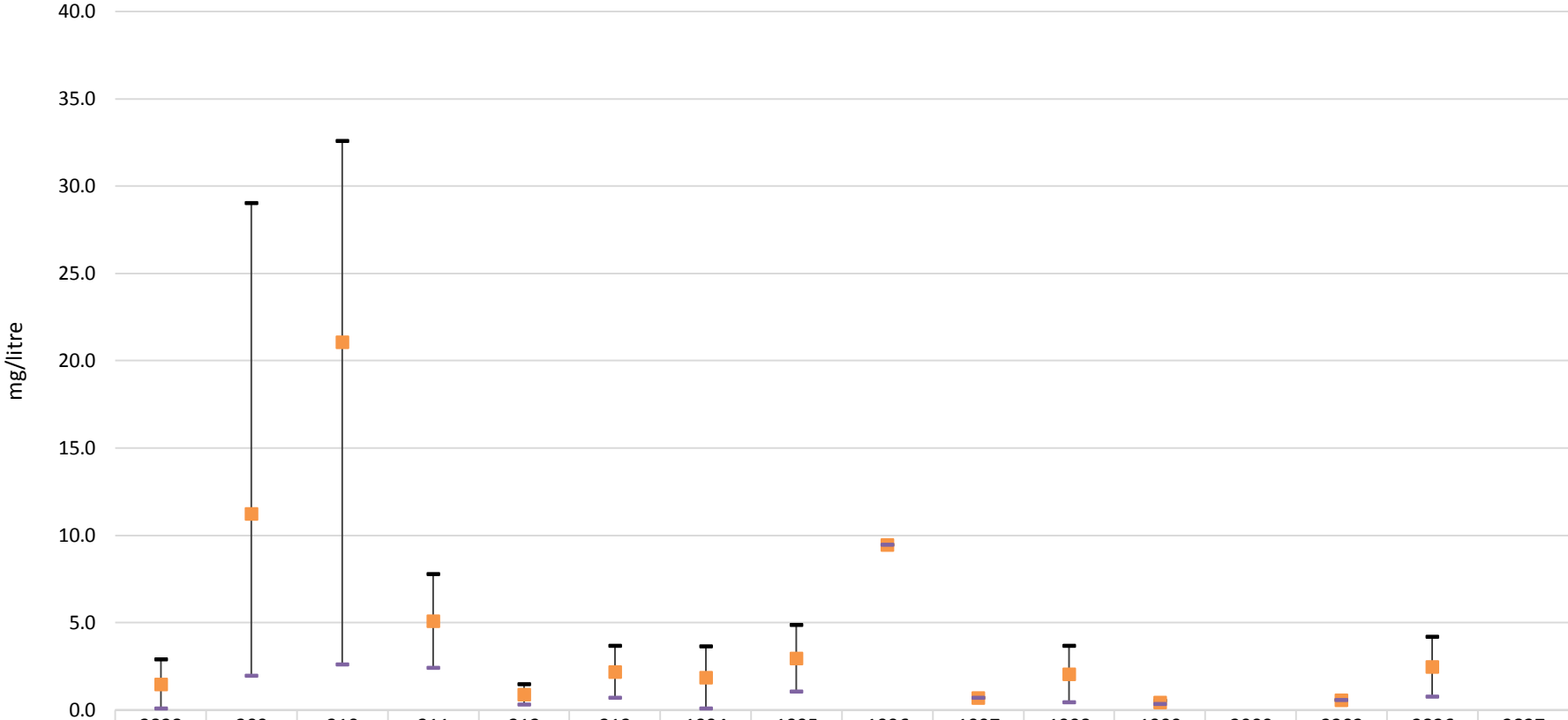
	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
	Kalyan				Navi Mumbai		Raigad			Thane				
Max						5.5	0.7		1.9		1.0	1.5	1.1	1.6
Average						2.0	0.7		1.4		1.0	0.9	0.9	1.6
Min						0.1	0.7		0.8		1.0	0.2	0.7	1.5

Figure No. 62: Parametric values of Nitrate recorded at WQMS monitoring ground water at Kalyan, Navi Mumbai, Raigad and Thane.



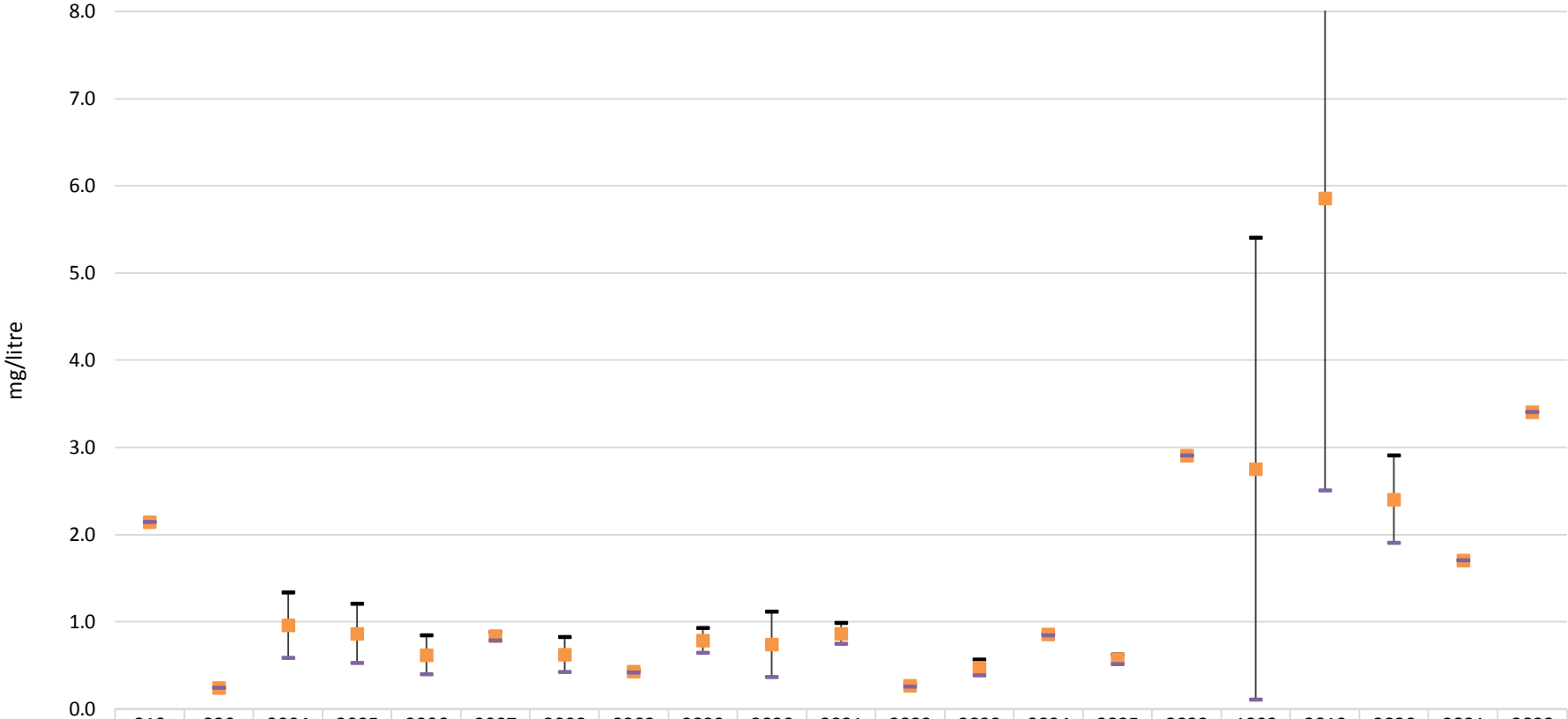
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
	Amravati			Aurangabad					Nashik						
Max	10.3	0.9	7.9						2.5		0.5				
Average	10.3	0.7	7.4						1.4		0.5				
Min	10.3	0.5	6.8						0.2		0.5				

Figure No. 63: Parametric values of Nitrate recorded at WQMS monitoring ground water at Amravati, Aurangabad and Nashik.



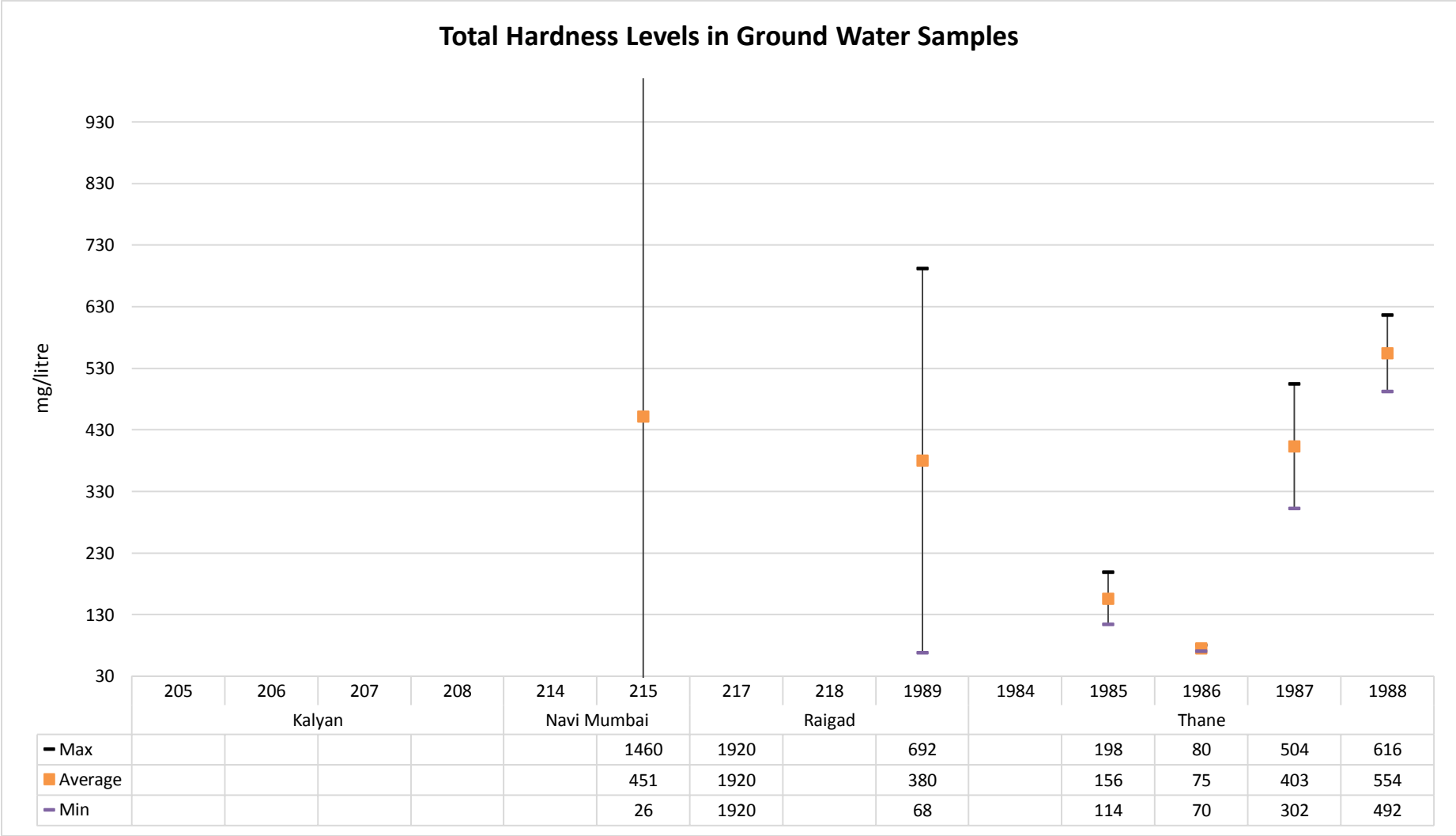
	2828	209	210	211	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max	2.9	29.0	32.6	7.7	1.4	3.7	3.6	4.9	9.4	0.7	3.7	0.5		0.5	4.2	
Average	1.5	11.2	21.0	5.1	0.9	2.2	1.8	2.9	9.4	0.7	2.0	0.4		0.5	2.5	
Min	0.1	1.9	2.6	2.4	0.3	0.7	0.1	1.0	9.4	0.7	0.4	0.3		0.5	0.7	

Figure No. 64: Parametric values of Nitrate recorded at WQMS monitoring ground water at Chandrapur and Nagpur.



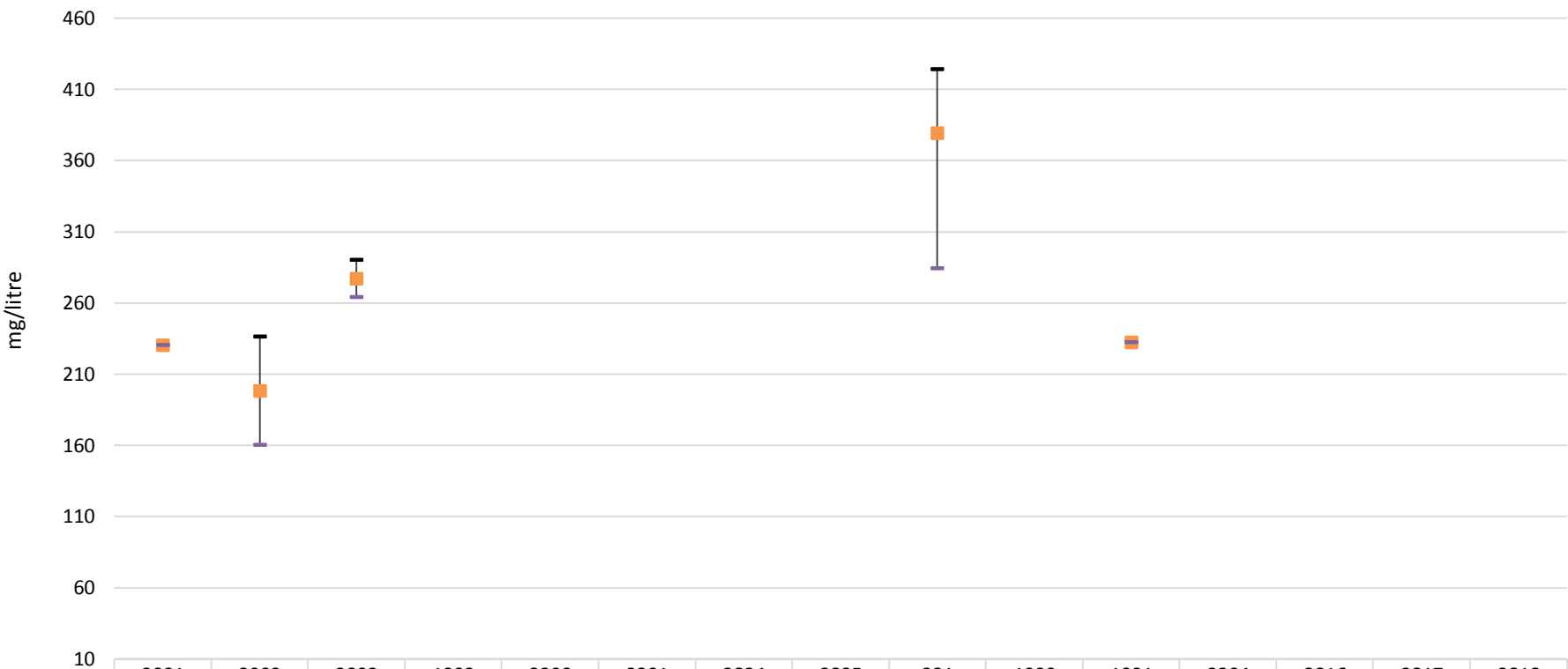
	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	2823	1992	2819	2820	2821	2822
	Kolhapur															Pune					
Max	2.1	0.2	1.3	1.2	0.8	0.9	0.8	0.4	0.9	1.1	1.0	0.3	0.6	0.9	0.6	2.9	5.4	9.2	2.9	1.7	3.4
Average	2.1	0.2	1.0	0.9	0.6	0.8	0.6	0.4	0.8	0.7	0.9	0.3	0.5	0.9	0.6	2.9	2.8	5.9	2.4	1.7	3.4
Min	2.1	0.2	0.6	0.5	0.4	0.8	0.4	0.4	0.6	0.4	0.7	0.3	0.4	0.8	0.5	2.9	0.1	2.5	1.9	1.7	3.4

Figure No. 65: Parametric values of Nitrate recorded at WQMS monitoring ground water at Kolhapur and Pune.



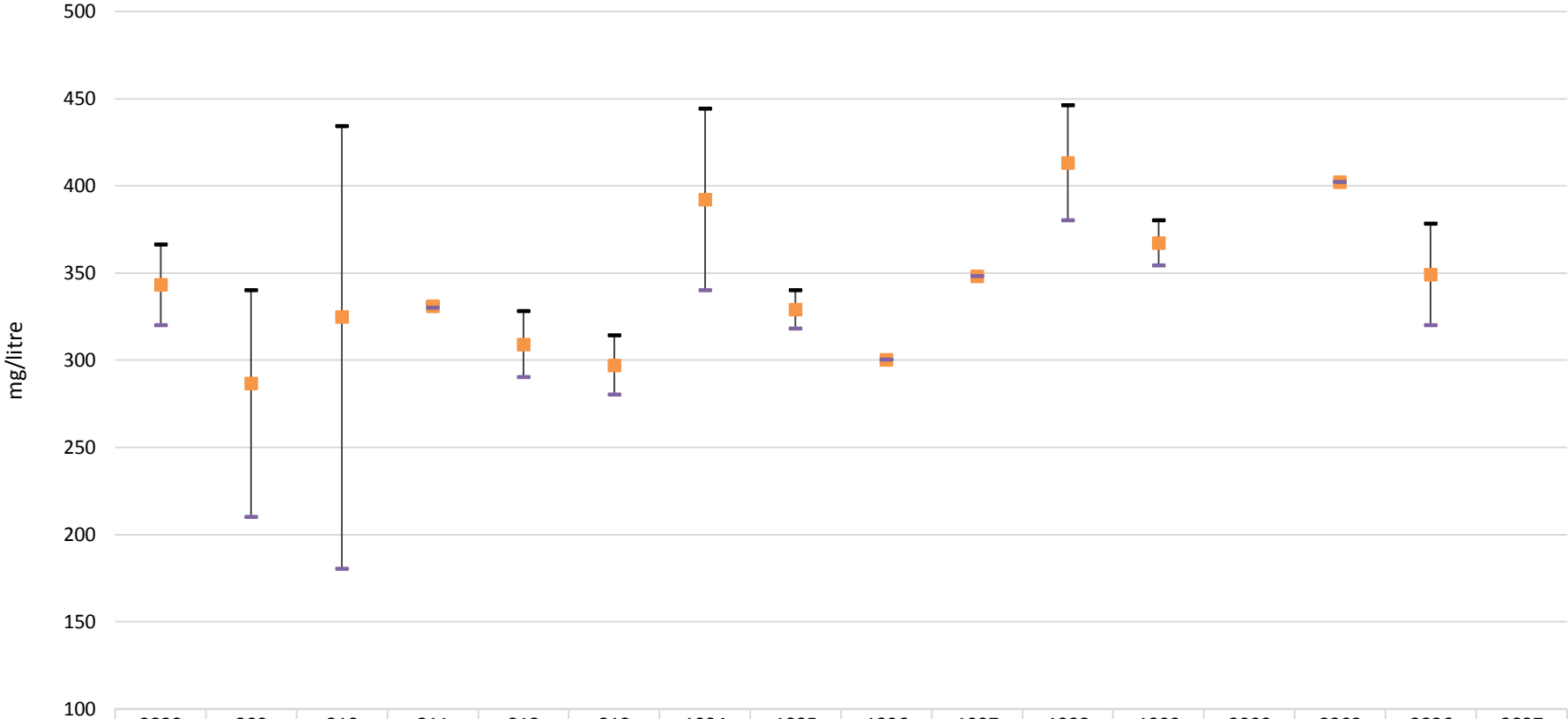
	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
	Kalyan				Navi Mumbai		Raigad			Thane				
Max						1460	1920		692		198	80	504	616
Average						451	1920		380		156	75	403	554
Min						26	1920		68		114	70	302	492

Figure No. 66: Parametric values of Hardness at $CaCO_3$ recorded at WQMS monitoring ground water at Kalyan, Navi Mumbai, Raigad and Thane.



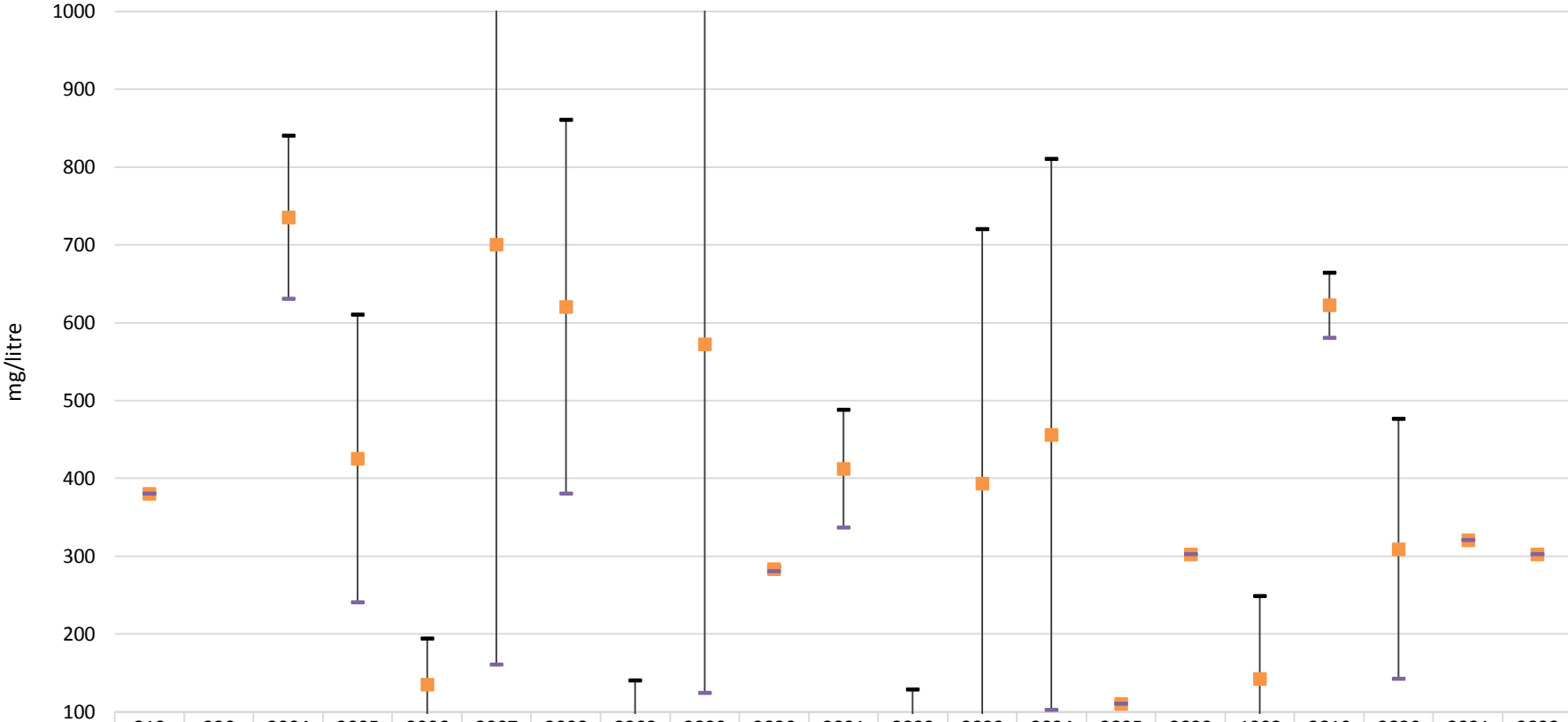
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
	Amravati			Aurangabad					Nashik						
Max	230	236	290						424		232				
Average	230	198	277						379		232				
Min	230	160	264						284		232				

Figure No. 67: Parametric values of Hardness at $CaCO_3$ recorded at WQMS monitoring ground water at Amravati, Aurangabad and Nashik.



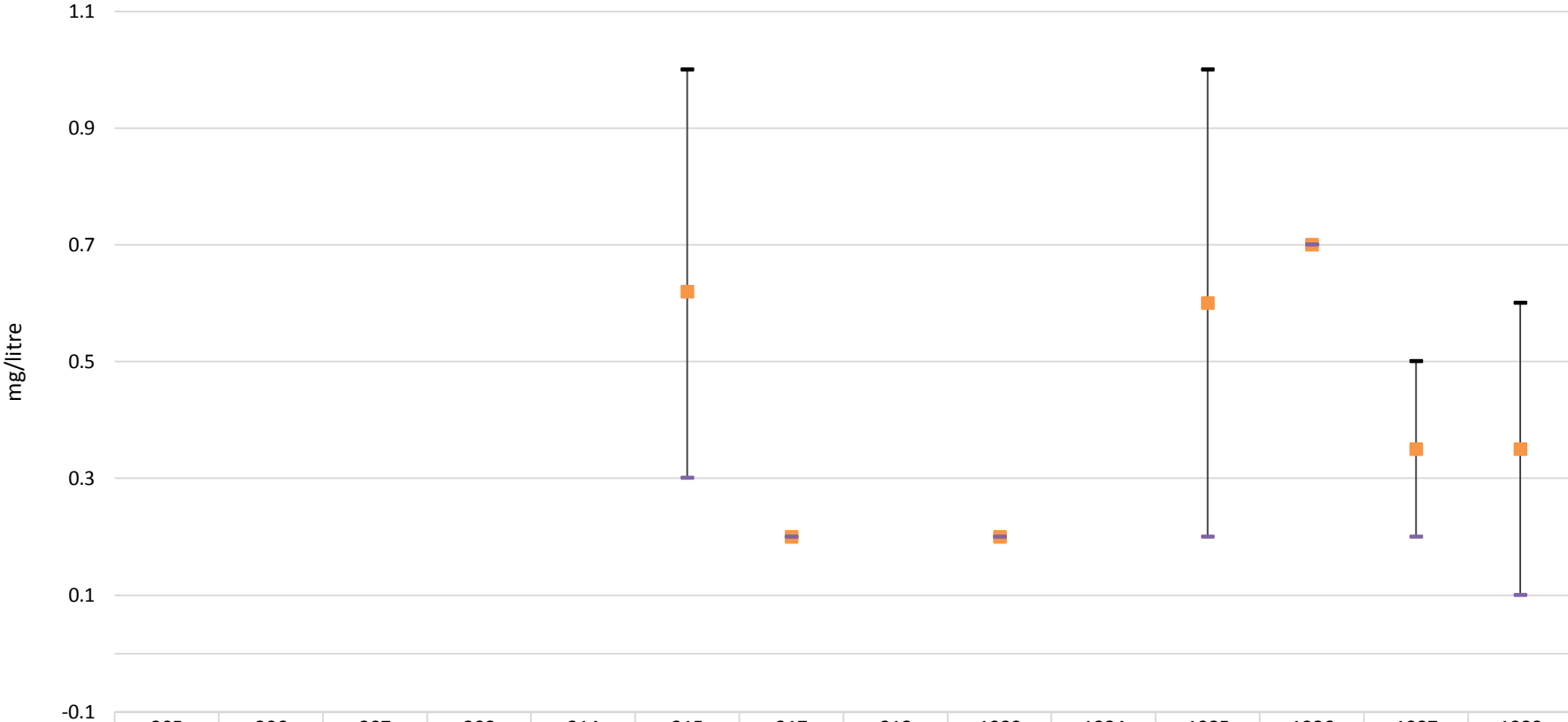
	2828	209	210	211	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max	366	340	434	332	328	314	444	340	300	348	446	380		402	378	
Average	343	287	325	331	309	297	392	329	300	348	413	367		402	349	
Min	320	210	180	330	290	280	340	318	300	348	380	354		402	320	

Figure No. 68 Parametric values of Hardness at $CaCO_3$ recorded at WQMS monitoring ground water at Chandrapur and Nagpur



	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	2823	1992	2819	2820	2821	2822
	Kolhapur															Pune					
Max	380	74	840	610	194	1240	860	140	1020	286	488	128	720	810	110	302	248	664	476	320	302
Average	380	74	735	425	135	700	620	90	572	283	412	78	393	456	110	302	142	622	309	320	302
Min	380	74	630	240	76	160	380	40	124	280	336	28	66	102	110	302	36	580	142	320	302

Figure No. 69: Parametric values of Hardness at $CaCO_3$ recorded at WQMS monitoring ground water at Kolhapur and Pune

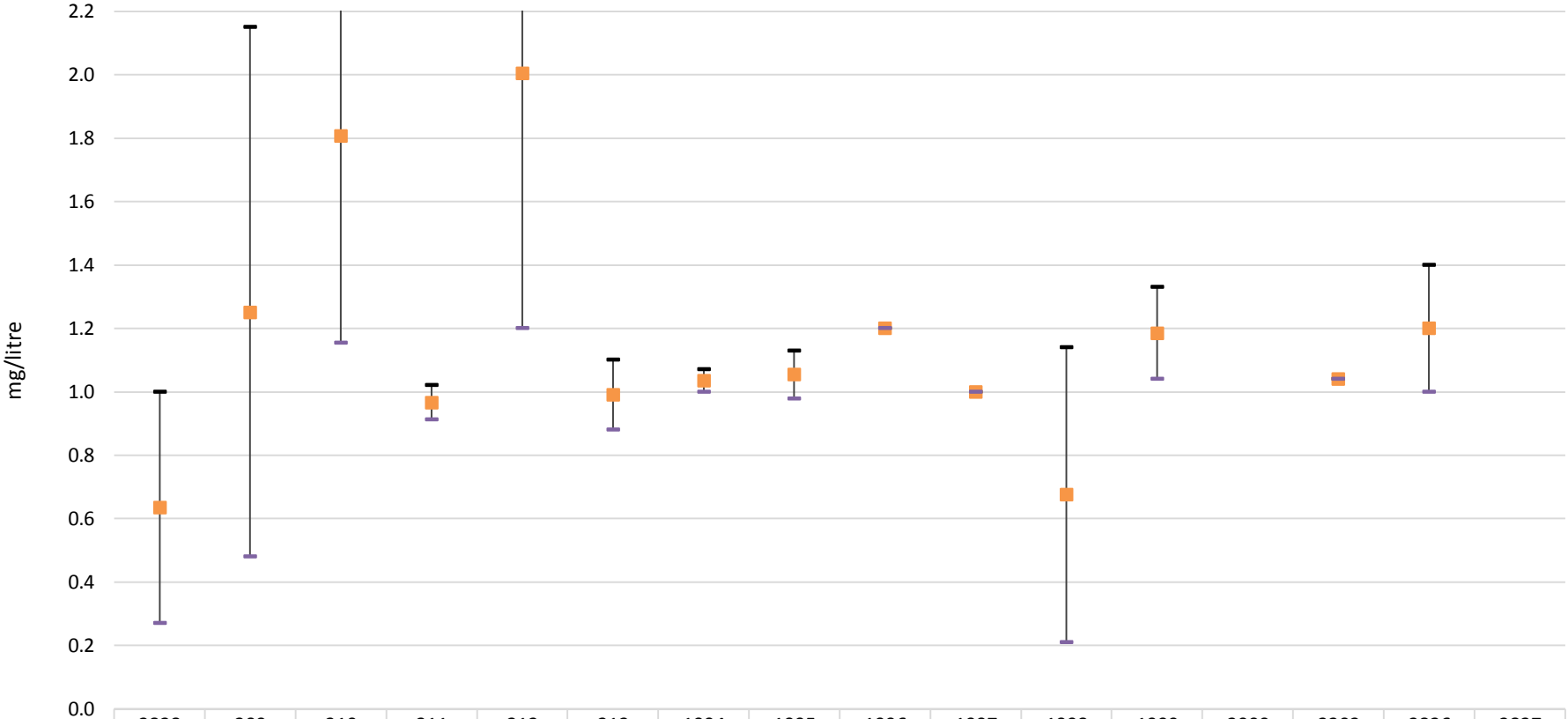


	205	206	207	208	214	215	217	218	1989	1984	1985	1986	1987	1988
	Kalyan				Navi Mumbai		Raigad			Thane				
Max						1.0	0.2		0.2		1.0	0.7	0.5	0.6
Average						0.6	0.2		0.2		0.6	0.7	0.4	0.4
Min						0.3	0.2		0.2		0.2	0.7	0.2	0.1

Figure No. 70: Parametric values of Fluoride recorded at WQMS monitoring ground water at Kalyan, Navi Mumbai, Raigad and Thane

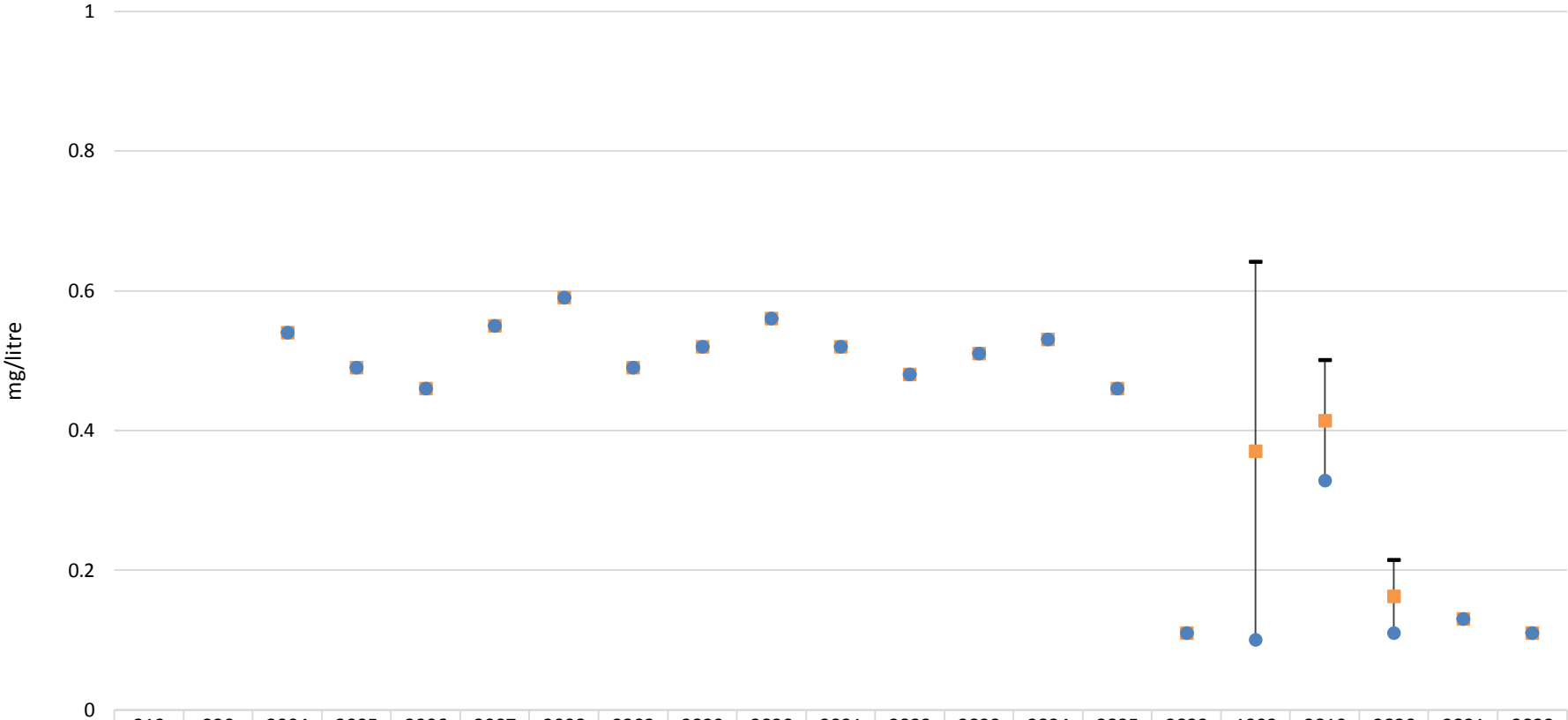
	2001	2002	2003	1993	2200	2201	2824	2825	221	1990	1991	2204	2816	2817	2818
	Amravati			Aurangabad					Nashik						
Max	0.2	1.9	1.0												
Average	0.2	1.4	1.0												
Min	0.2	1.0	0.9												

Figure No. 71: Parametric values of Fluoride recorded at WQMS monitoring ground water at Amravati, Aurangabad and Nashik



	2828	209	210	211	212	213	1994	1995	1996	1997	1998	1999	2000	2203	2826	2827
	Chandrapur								Nagpur							
Max	1.0	2.2	2.5	1.0	2.8	1.1	1.1	1.1	1.2	1.0	1.1	1.3		1.0	1.4	
Average	0.6	1.3	1.8	1.0	2.0	1.0	1.0	1.1	1.2	1.0	0.7	1.2		1.0	1.2	
Min	0.3	0.5	1.2	0.9	1.2	0.9	1.0	1.0	1.2	1.0	0.2	1.0		1.0	1.0	

Figure No. 72: Parametric values of Fluoride recorded at WQMS monitoring ground water at Chandrapur and Nagpur.



	219	220	2004	2005	2006	2007	2008	2202	2829	2830	2831	2832	2833	2834	2835	2823	1992	2819	2820	2821	2822
	Kolhapur															Pune					
Max			0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.1	0.6	0.5	0.2	0.1	0.1
Average			0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.1	0.4	0.4	0.2	0.1	0.1
Min			0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.3	0.1	0.1	0.1

Figure No. 73: Parametric values of Fluoride recorded at WQMS monitoring ground water at Kolhapur and Pune.

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

Apr	Dry	Dry	Dry	Dry	Dry	Dry	495	Dry	200	Dry	181	29	138	194
Oct	Dry	Dry	Dry	Dry	Dry	Dry	495	Dry	40	Dry	162	56	209	194
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	No data

Table No 29: **Ground water 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	**80**	**80**	**105**						**115**		**68**				
Oct		71	140						98						
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	No data

Table No 30: Ground waterquality 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, Ahmadnagar, Nashik	Nashik	Ahmadnagar	well	Akolner
NWMP	Nashik	1990	Bore well at BMW Site , Burudgaon	Ahmadnagar	Ahmednaga	Bore	Burudgaon

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
					r	well	
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	103	160	170	121	162	104	114	122	122	Dry	109	124	Dry		117	Dry
Oct	122	137	141	113	100	97	144	106		101	129	97		113	106	
Station Code	2828	209	210	211	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	No data

Table No 31: **Ground water 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	Bhandewadi	Borewell	Bhandewadi
SWMP	Nagpur	210	Bore well near Dearao Kale House, Bhandewadi, Nagpur	Nagpur	Bhandewadi	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
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	Nagpur	Kamptee	Dug well	Koradi

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
			M S Mandir Sahakari Sanstha				
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	**108**	**33**	**262**	**207**	**64**	**484**	**231**	**54**	**282**	**91**	**180**	**46**	**323**	**351**	**40**	**25**	**208**	**148**	**104**	**106**	**109**
Oct			187	97	44	75	120	28	70	111	171	27	36	50	46	81	207	52			
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

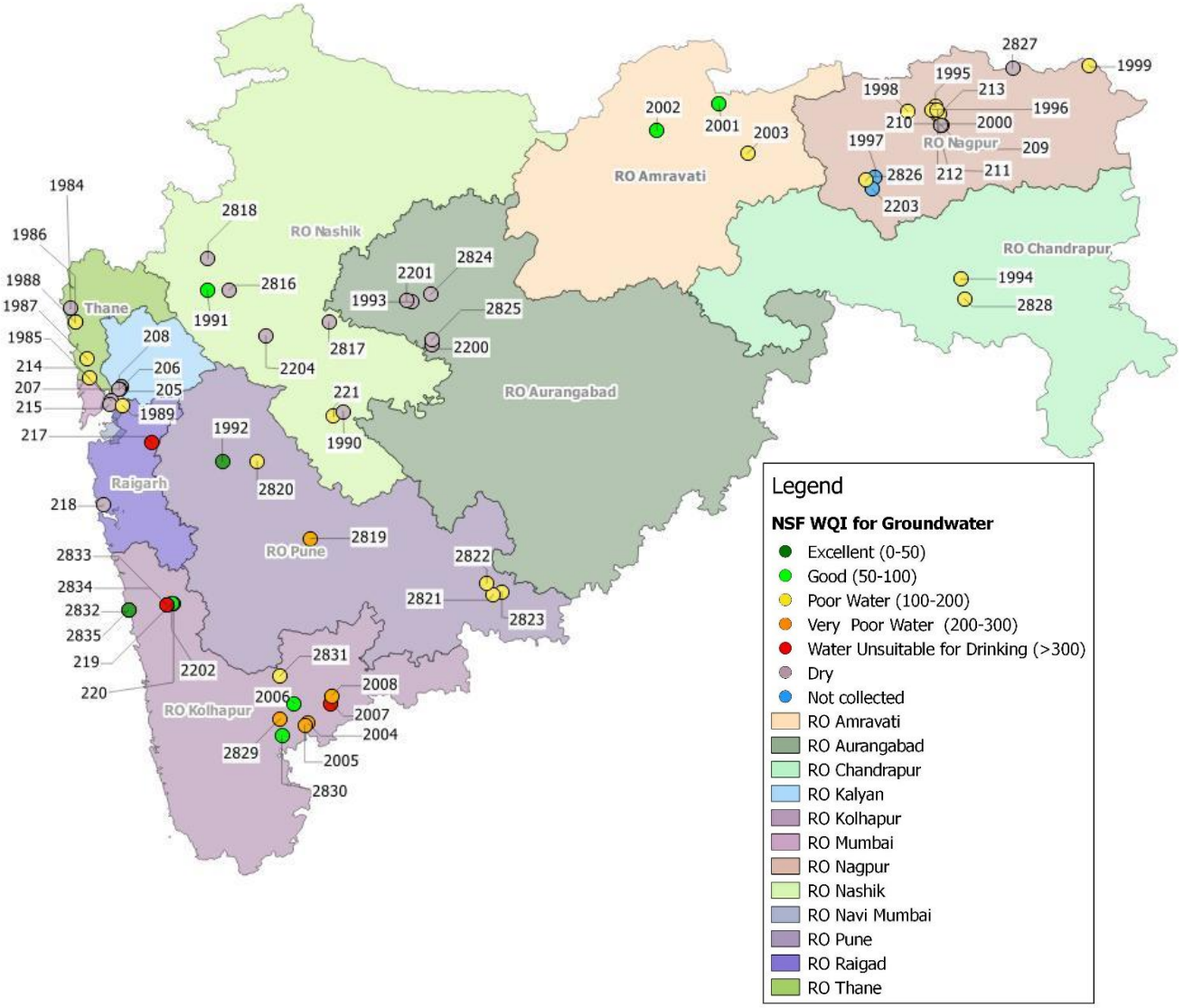
Excellent	Good	Poor	Very Poor	Not Suitable for drinking	Dry	No data

Table No 32: Ground water quality monitoring stations at Kolhapur and Pune.

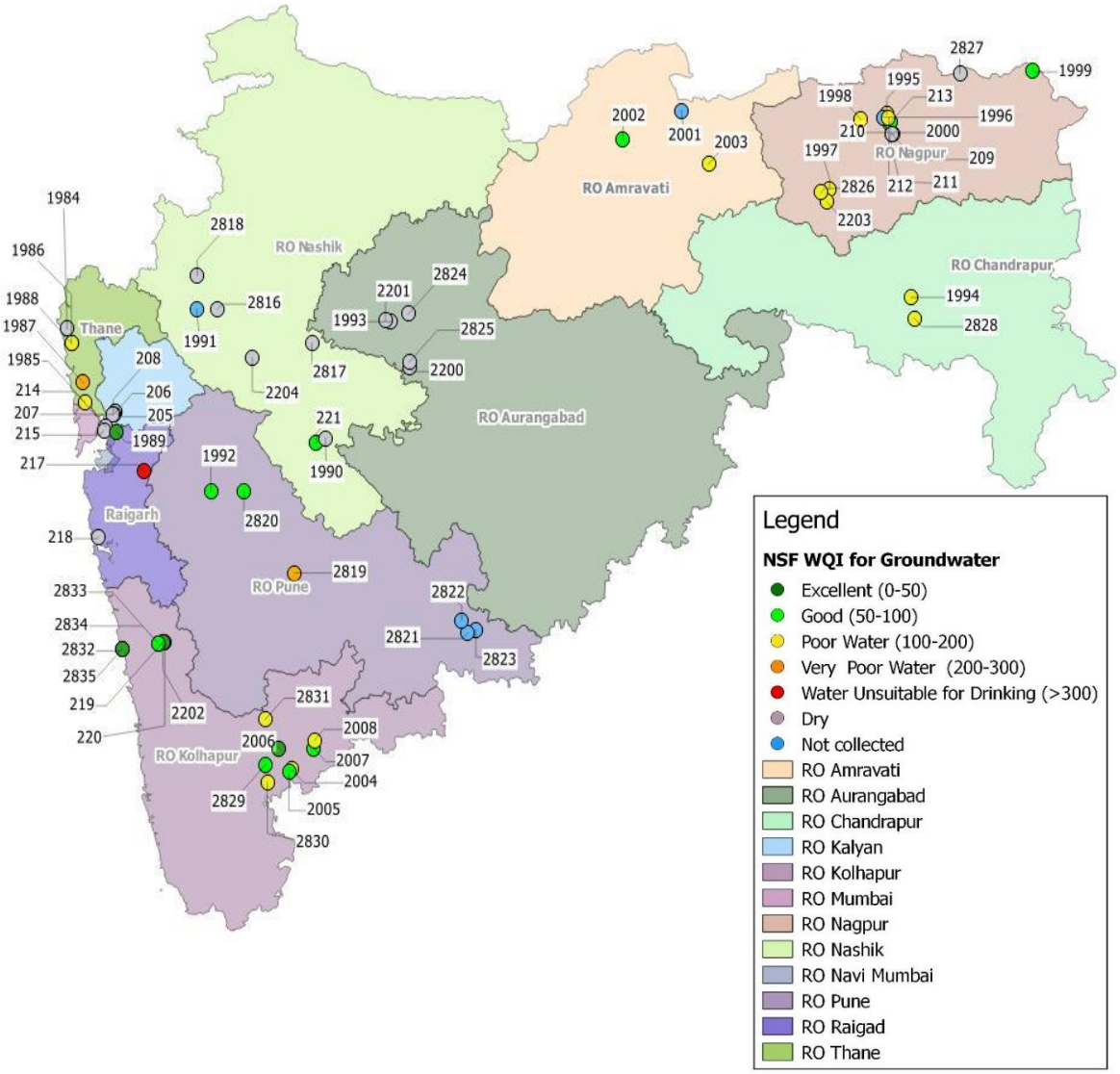
Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
SWMP	Kolhapur	219	Commen well Water At Patwardhan, Lote, Taluka - Khed, District - Rantnagiri	Ratnagiri	Khed	Well	Lote
SWMP	Kolhapur	220	Dugwell backside Excel India At Chalkewadi, Taluka - Khed, District - Ratnagiri.	Ratnagiri	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 by shri Rajendra Amre	Ratnagiri	Khed	Dug well	Ghane Kunt
NWMP	Kolhapur	2829	Bore Well at MIDC Shiroli near M/s. Pratibha Enterprises	Kolhapur	Hatkanangale	Bore well	Shiroli

Programme	Regional Office	Station ID	Station Name	District	Taluka		Village
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 Maharashtra 2018-19 (April 2018)



Spatial map for Ground WQI in Maharashtra 2018-19 (October 2018)



7 Conclusion

MPCB has established network across 294 stations 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, 34 Dugwell, 1 Handpump, 1 Tubewell, 1 Well) under two programs of NWMP (National Water Quality Monitoring Program) and SWMP (State Water Quality Monitoring Program).to monitor the water quality across the state.

In terms of surface water, WQMS installed at West flowing rivers recorded majority of the observations under 'Good to Excellent' – Non-polluted category followed by Godavari basin and Krishna basin. It was found that over 87% of the total observations recorded from these WQMS installed came under non-polluted category. In case of Godavari basin, the extent of 'Good to Excellent' observations were found to be higher in the Sub basin of Pranhita & others (91.6%), followed by Manjra (83.3%), Godavari Middle (80.1%) while Krishna Upper (Krishna Basin) recorded over 81% of the observations under similar category. On the contrary, WQMS installed on both sub basins of Tapi basin i.e. Tapi Upper and Tapi Middle showed comparatively high level of pollution/degradation in water quality as only around 46% and 16% of the total observations respectively were recorded under non-polluted category. In case of Nallas, especially nallas from Thane RO; WQMS recorded water quality in 'Bad to Very Bad' category consistently which might be due to release of untreated or semi treated effluents form near settlements and industries.

In case of water quality of Ground water, only 1 WQMS installed at borewell at Village Milgaon, Khalapur, Raigad recorded water quality 'unsuitable for drinking' throughout the year. Significant improvement was recorded as compared to 2017-18, at WQMS (Pune RO) installed at Bore well near Chincholi ['unsuitable for drinking' to 'Poor water']. Similar recording was observed at dug well owned by Shri Deshmukh [(from 'unsuitable for drinking' to 'Very Very Poor']. Compared to 2017-18, Dug well at MSW site, Borate Vasthi recorded water quality from 'Poor' category to 'Good'category in 2018-19. In Kolhapur RO, monitoring station installed at Parvati Industrial Estate witnessed increase in water pollution as the recorded water quality is come under 'Very Very Poor' category in 2018-19 as compared to 'Poor water' recorded in 2017-18. Similar situation is observed in Nagpur RO where 2 stations namely Bore well near Primary Health center, Rajura and Hand pump in the premises of Z.P. Primary school recorded water quality from 'Good Water' in 2017-18 to 'Poor water' in 2018-19.

Annex I – RO wise summary of WQI in 2018-19

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 2018-19 and presents the gist of the water quality index for the respective stations for months of April and December/October.

RO – Amravati

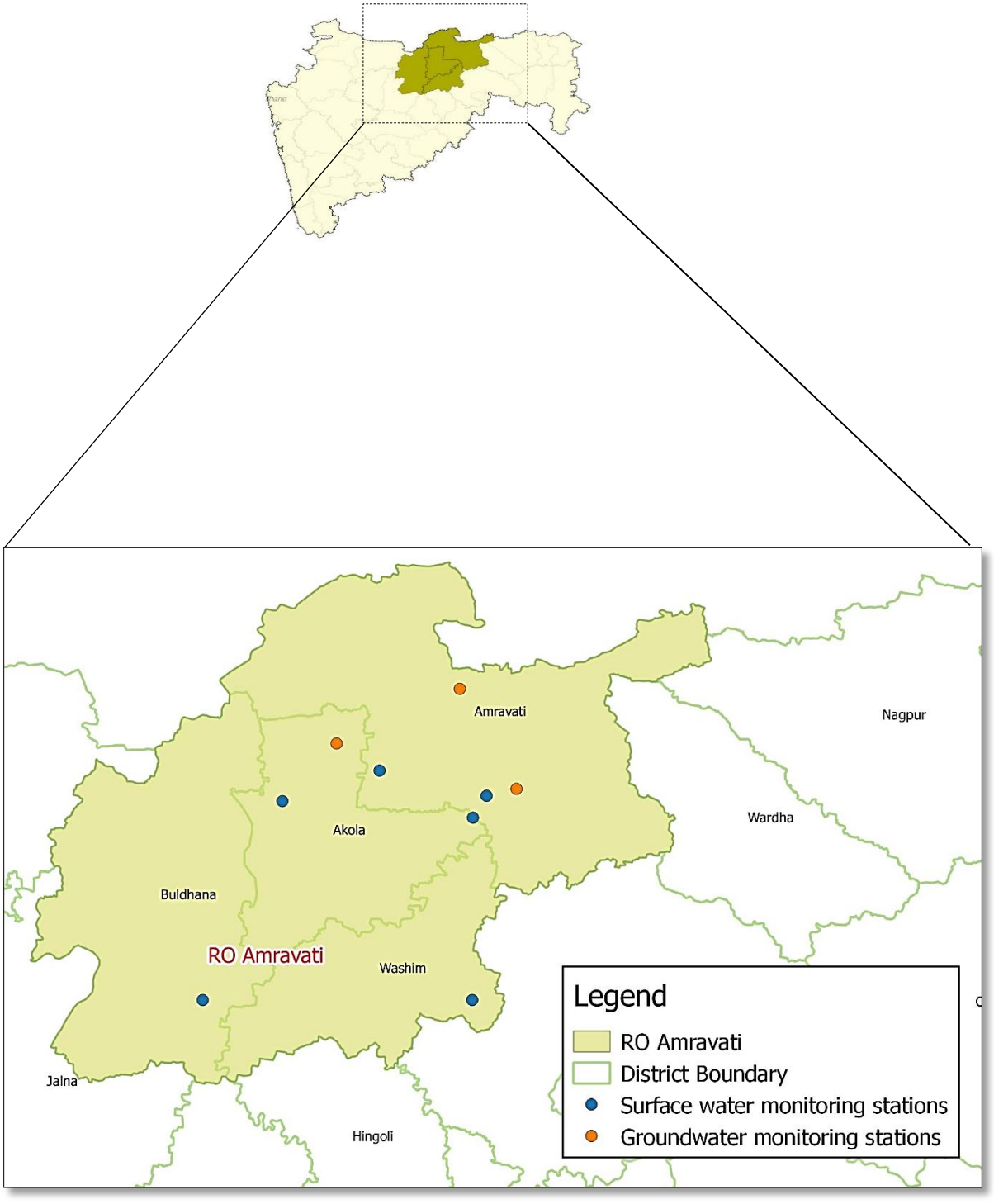

Amravati
Nagpur
Akola
Wardha
Buldhana
RO Amravati
Washim
Jalna
Hingoli
Legend
RO Amravati
District Boundary
Surface water monitoring stations
Groundwater monitoring stations

Table No 33: Water quality Index for surface and ground water monitoring at Amravati-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	1913	Purna River at Dhupeshwar at U/s of Malkapur Water works	72	73	70	Akola	Akola	Malkapur
	2155	Purna River at D/s of confluence of Morna & Purna at Andhura village	No data	No data	61	Akola	Balapur	Andura
	2675	Morna River at D/s of Railway Bridge	29	No data	48	Akola	Akola	Akola
	2695	Pedhi River near Road Bridge at Dadhi-Pedhi village	63	75	60	Amravati	Chandur Bazar	Asegaon
	2697	Penganga River near water supply scheme of Umarkhed MC	78	78	77	Yavatmal	Umarkhed	Belkhed
	2698	Penganga River D/s of Isapur Dam	68	72	70	Yavatmal	Pusad	Isapur
	2699	Penganga River at Mehkar-Buldana Road Bridge	No data	No data	67	Buldana	Mehkar	Mehkar
	2700	Purna River near Achalpur-Amravati Road Bridge, Asegaon	Dry	Dry	Dry	Amravati	Chandur bazaar	Asegaon
GW	2001	Tube well at water treatment plant of M.C.Achalpur near Post Office.	80	No data	80	Amravati	Achalpur	Paratwada
	2002	Bore well Opp. Gajanan Maharaj Temple at Anjangaon road.	80	71	75	Akola	Akot	Anjangaon
	2003	Dug well at Plot No- 4, Street No. 49-C, at Nehru Bal Udyan Azad Maidan, owned by Yavatmal M.C.	105	140	123	Yavatmal	Yavatmal	Nehru Bal Udyan Azad Maidan

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

RO – Aurangabad

Table No 34: Water quality Index for surface and ground water monitoring at Aurangabad-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	12	Godavari River at Dhalegaon	80	83	84	Parbhani	Pathari	Dhalegaon
	178	Kannad - D/S of Kannad near Bridge	No data	No data	82	Aurangabad	Kannad	Kannad
	179	Sillod - D/S of Sillod near bridge at bhavan	Dry	Dry	Dry	Aurangabad	Sillod	Sillod
	180	Aurangabad - Near Holly cross bridge	51	59	60	Aurangabad	Aurangabad	Aurangabad
	181	Aurangabad - Near Patoda Village	65	70	67	Aurangabad	Aurangabad	Aurangabad
	182	Aurangabad - Near Chikhalthana Bridge	No data	No data	65	Aurangabad	Aurangabad	Aurangabad
	183	Aurangabad - At Sukhna Dam	No data	80	73	Aurangabad	Aurangabad	Aurangabad
	184	Aurangabad - Harsool Dam	59	No data	66	Aurangabad	Aurangabad	Aurangabad
	1209	Godavari River at Raher	75	86	84	Nanded	Nayagaon	Raher
	1210	Godavari River at Intake of pump house	89	86	86	Nanded	Nanded	Vishnupuri
	1312	Godavari river at Jaikwadi Dam, Paithan	84	89	85	Aurangabad	Paithan	Paithan
	2157	Godavari River at Latur Water intake near pump house	83	84	85	Osmanabad	Kalumb	Dhamegaon
	2158	Godavari River at Paithan U/s of Paithan Intake pump house	88	87	84	Aurangabad	Paithan	Jayakwadi
	2159	Godavari River at D/s of Paithan at Pathegaon bridge	86	86	85	Aurangabad	Paithan	Pathegaon
	2160	Godavari River at U/s of Aurangabad Reservoir Kaigaon Tokka near, Kaigaon Bridge	75	86	81	Aurangabad	Gangapur	Kaigaon
	2161	Godavari River at Jalna Intake water pump house Shahagad	83	86	84	Jalna	Ambad	Shahabad
	2657	Bindusara River at Beed, near Intake water pump house at Dam	82	84	84	Beed	Beed	Paligaon
	2673	Manjra River at D/s of Latur, near Latur-Nanded Bridge	78	No data	84	Latur	Latur	Bhatkheda
GW	1993	Dug well at Pandarpur, Gangapur, Aurangabad	Dry	Dry	Dry	Aurangabad	Gangapur	Pandharpur
	2200	Bore Well at Katpur, Near Z.P.School	Dry	Dry	Dry	Aurangabad	Paithan	Katpur
	2201	Dug Well at Ranjangaon	Dry	Dry	Dry	Aurangabad	Gangapur	Ranjangaon
	2824	Dug Well at Naregaon	Dry	Dry	Dry	Aurangabad	Aurangabad	Naregaon
	2825	Bore Well at Wahegaon, near Zilla Parishet School	Dry	Dry	Dry	Aurangabad	Paithan	Wahegaon

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

RO – Chandrapur

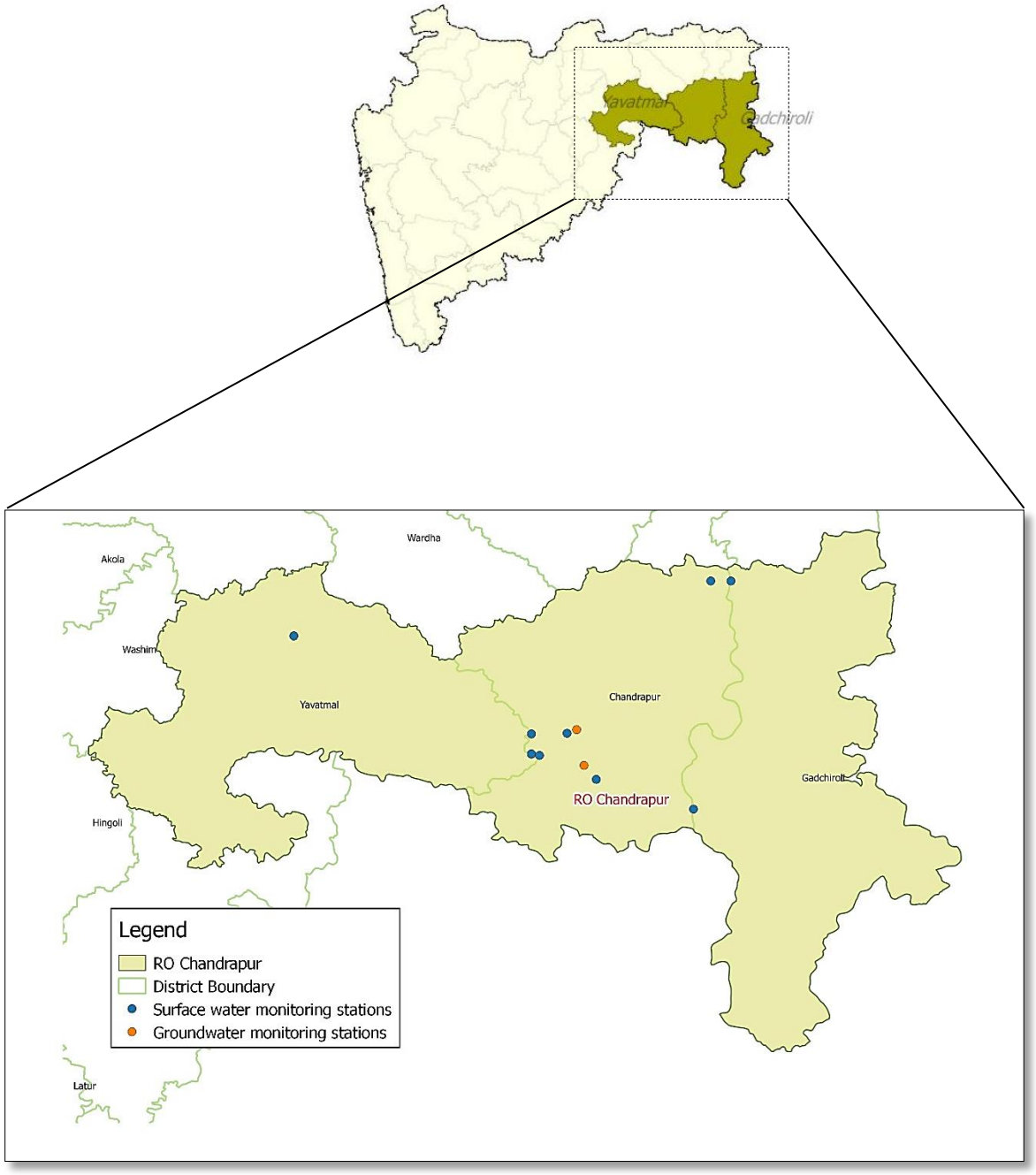


Table No 35: Water quality Index for surface and ground water monitoring at Chandrapur RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	2156	Wardha River at confluence point of Penganga & Wardha	62	73	69	Yavatmal	Wani	Jugad
	11	Wainganga River at Ashti	77	79	72	Chandrapur	Gondpipri	Ashti
	1212	Wardha river at Rajura bridge	74	69	71	Chandrapur	Chandrapur	Rajura
	2174	Wardha River at D/s of ACC Ghuggus	74	79	70	Chandrapur	Chandrapur	Ghuggus
	2175	Wainganga at U/s of Gaurav Paper Mills near Jack Well	75	74	73	Chandrapur	Chandrapur	Bramhpuri
	2176	Wainganga River at D/s of Gaurav Paper Mills Near Jackwell	81	75	71	Chandrapur	Chandrapur	Bramhpuri
	2719	Wardha River at D/s of Erai River	69	72	70	Chandrapur	Chandrapur	Hadasti
	2720	Wardha River at U/s of Erai River	78	75	73	Chandrapur	Chandrapur	Hadasti
	2721	Wardha River at U/s of ACC Ghuggus	65	78	73	Chandrapur	Chandrapur	Ghuggus
GW	2828	Dug Well near Jilla Parishad Primary School Visapur	103	122	113	Chandrapur	Ballarpur	Visapur
	1994	Dug well At TPS Durgapur near Naseeb Kirana {} general Store.	114	144	129	Chandrapur	Chandrapur	Durgapur

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

RO – Kalyan

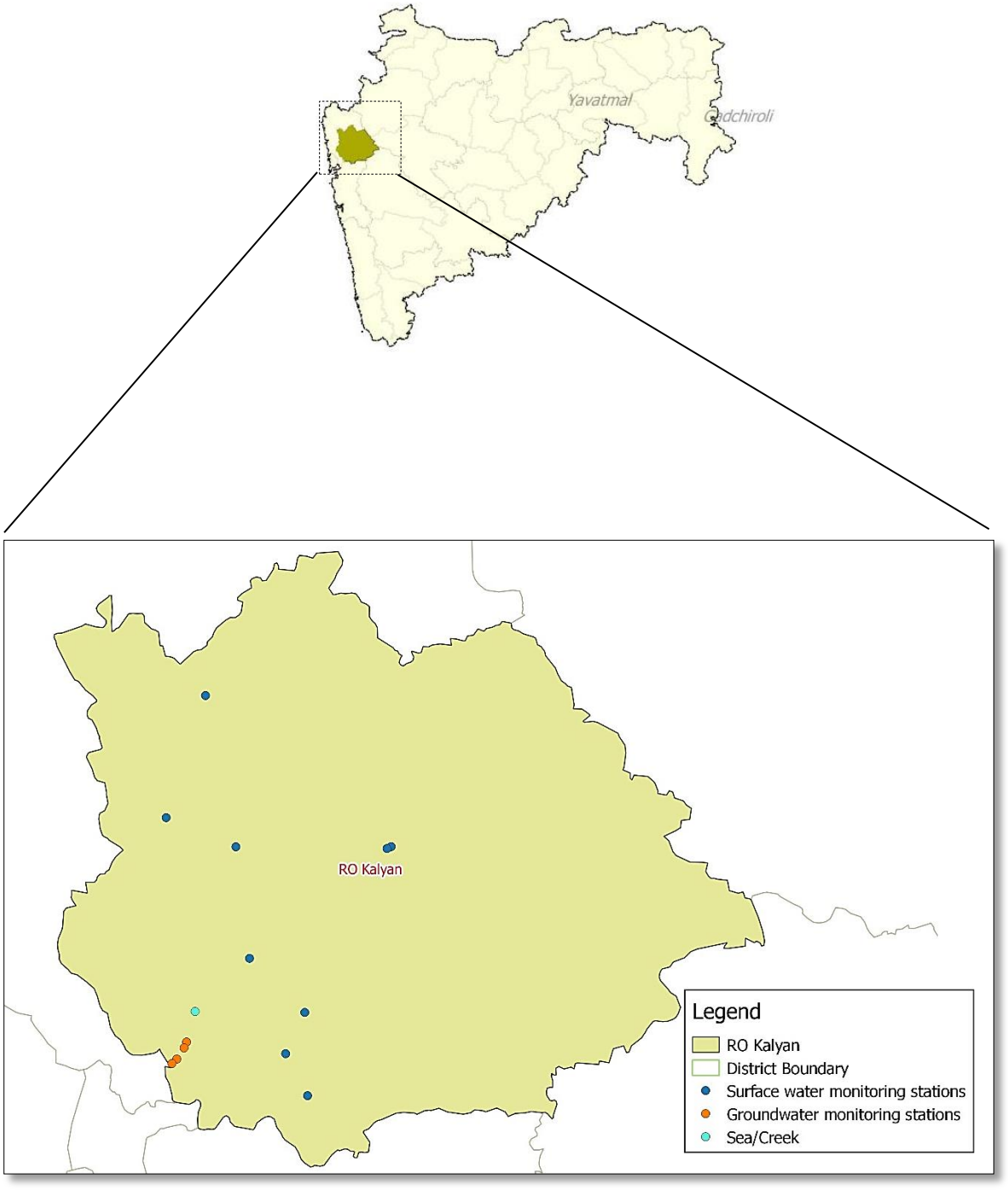

Yavatmal
RO Kalyan
Legend
RO Kalyan
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Sea/Creek

Table No 36: Water quality Index for surface and ground water monitoring at Kalyan-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	1092	Kalu River at Atale village	75	65	75	Thane	Kalyan	Atale
	1093	Ulhas river at U/s of NRC Bund	82	82	83	Thane	Kalyan	Mohane
	1094	Ulhas River at U/s of Badlapur water works	84	83	84	Thane	Ambernath	Kulgaon
	1461	Bhatsa river at D/s of Pise Dam	87	80	82	Thane	Bhiwandi	Pise
	2162	Ulhas River at Jambhul water works	84	82	83	Thane	Ambernath	Jambhul
	2653	Bhatsa River at D/s of Liberty Oil Mills	83	83	82	Thane	Shahapur	Satne
	2654	Bhatsa River at D/s of Liberty Oil Mills	77	82	81	Thane	Shahapur	Satne
	2709	Tansa River near road bridge	No data	No data	81	Thane	Wada	Dakewali
	2712	Vaitarna River near Road Bridge	No data	No data	82	Thane	Wada	Gandhare
Saline	2791	Ulhas Creek at Reti Bunder, D/s of Kalyan-Bhiwandi Bridge	64	60	69	Thane	Kalyan	Kalyan
GW	205	Dug well opp. KAMA office, MIDC Ph-I, Dombivali	Dry	Dry	Dry	Kalyan	Dombivali	MIDC,Dombivali
	206	Dug well near Mamta Hospital, Milap Nagar, Dombivali	Dry	Dry	Dry	Kalyan	Dombivali	MIDC,Dombivali
	207	Dug well at pimpleshwar Temple, MIDC Ph-II, Dombivali	Dry	Dry	Dry	Kalyan	Dombivali	MIDC,Dombivali
	208	Dug well addjusent to M/S. Altra pure chem., Sr. No. 45, Hissa No. 3, MIDC Ph-II, Dombivali.	Dry	Dry	Dry	Kalyan	Dombivali	MIDC,Dombivali

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

RO – Kolhapur

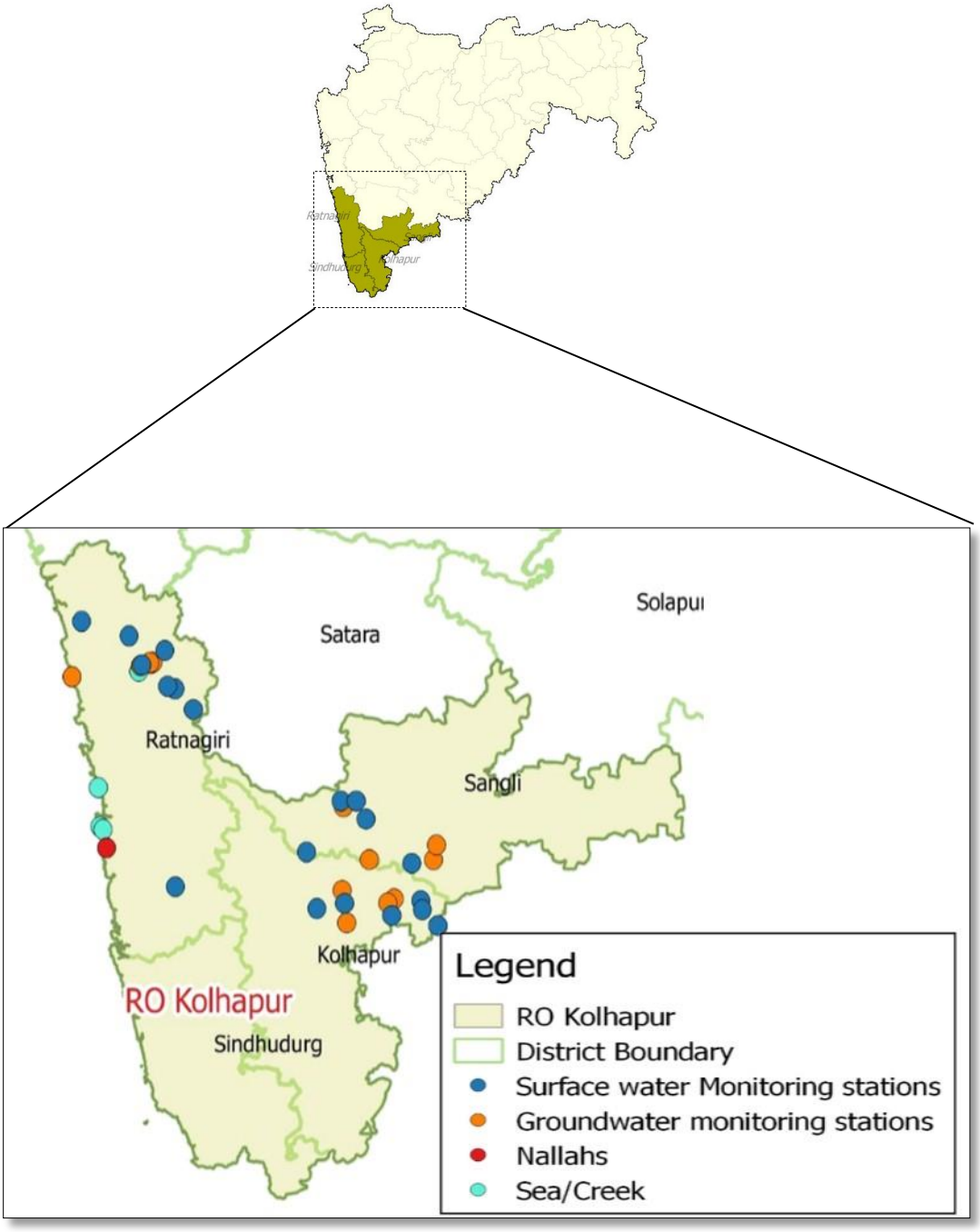

Satara
Solapur
Ratnagiri
Sangli
Kolhapur
RO Kolhapur
Sindhudurg
Legend
RO Kolhapur
District Boundary
Surface water Monitoring stations
Groundwater monitoring stations
Nallahs
Sea/Creek

Table No 37: Water quality Index for surface and ground water monitoring at Kolhapur-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	37	Krishna River at Maighat, Sangli	89	85	87	Sangli	Miraj	Gawali gally
	198	Bahe KT Weir, Bahe, Taluka - Walwa, District - Sangli	88	89	87	Sangli	Walwa	Bahe
	199	Borgaon KT Weir, Borgaon, Taluka - Walwa, District - Sangli	86	87	87	Sangli	Walwa	Borgaon
	200	Mangle Bridge, Mangle, Taluka - Shirala, District - Sangli	88	89	87	Sangli	Shirala	Mangle
	201	Sonpatra River At Kotwali Village, Taluka - Khed, District - Ratnagiri	93	83	84	Ratnagiri	Khed	Kotwali
	202	Vashisti River At Khadpoli, Taluka Chiplun, District - Ratnagiri	89	89	87	Ratnagiri	Chiplun	Khadpoli
	203	Jagbudi River, D/S of Khed City, Taluka - Khed, District Ratnagiri	86	92	86	Ratnagiri	Khed	Khed City
	204	Jog river at Dapoli, Taluka Dapoli, District - Rantnagiri	No data	88	88	Ratnagiri	Dapoli	Dapoli
	1153	Krishna River at Rajapur Weir	86	88	84	Kolhapur	Shirol	Rajapur
	1310	Krishna River at Kurundwad	86	89	84	Kolhapur	Shirol	Narshingwadi, Kurundwad
	1311	Panchganga River at Ichalkaranji near MIDC intake well	87	90	84	Kolhapur	Hatkanangale	Shiradhwad (Ichalkaranji ghat)
	1904	Panchganga River at U/s of Kolhapur town near Balinga Pumping Station	88	89	85	Kolhapur	Karvir	Balinga
	1905	Panchaganga river at D/s of Kolhapur town at Gandhi nagar near NH-4 bridge and MIDC intake well	86	87	83	Kolhapur	Kolhapur	Uchegaon
	1906	Krishna river at Walwa, D/s of Islampur near Vithal Temple	84	88	86	Sangli	Walwa	Walwa
	2163	Panchganga River at Shirol near Shirol intake well	85	88	84	Kolhapur	Shirol	Shirol
	2164	Vashishti River at U/s of Three M Paper Mills near M/s Multifilms Plastic Pvt Ltd	90	90	88	Ratnagiri	Chiplun	Kherdi
	2676	Muchkundi River at Waked Ratnagiri near M/s Asahi India Glass	86	88	82	Ratnagiri	Lanja	Waked
	2713	Vashishti River at D/s of Three M Paper Mills near Chiplun water intake Jackwell	88	91	88	Ratnagiri	Chiplun	Kherdi
	2714	Vashishti River at U/s of Pophali near Konphansawane Bridge	88	92	89	Ratnagiri	Chiplun	Pophali
Nalla	2790	Pimpal-Paneri Nalla at Ratnagiri near Finolex Industries	No data	76	81	Ratnagiri	Ratnagiri	Yahganigaon
Saline	2804	Karambavane Creek at Chiplun	84	86	85	Ratnagiri	Chiplun	Karambavane
	2813	Sea Water at Ganapatipule	71	83	75	Ratnagiri	Ratnagiri	Ganapatipule

	2814	Sea Water at Bhagwati Bunder, Ratnagiri near Ultra Tech Cement Jetty	73	83	75	Ratnagiri	Ratnagiri	Mirkarwada
	2815	Madvi Sea Water at Ratnagiri near Jodhale Maruti Temple	73	83	75	Ratnagiri	Ratnagiri	Madvigaon
GW	219	Commen well Water At Patwardhan, Lote, Taluka - Khed, District - Rantnagiri	108	No Data	108	Ratnagiri	Khed	Lote
	220	Dugwell backside Excel India At Chalkewadi, Taluka - Khed, District - Ratnagiri.	33	No Data	33	Ratnagiri	Khed	Chalkewadi
	2004	Bore well at Parvati Industrial Estate, Yadrav, Kolhapur	262	187	224	Kolhapur	Shirol	Yadrav
	2005	Bore well at Khanjirenagar, Kolhapur	207	97	152	Kolhapur	Hatkanangale	Khanjirenagar
	2006	Bore well at Shinoli near M/s Aqua Alloy Steel.	64	44	54	Kolhapur	Chandgad	Shinoli
	2007	Bore well at Savali, near Gram Panchayat office.	484	75	279	Sangli	Miraj	Savali
	2008	Dug well at Sambarwadi, owned by Shri. Kishan Hali Rajput.	231	120	175	Sangli	Miraj	Sambarwadi
	2202	Dug Well at Ghane Kunt, near Awashi, onwed by shri Rajendra Amre	54	28	41	Ratnagiri	Khed	Ghane Kunt
	2829	Bore Well at MIDC Shiroli near M/s. Pratibha Enterprises	282	70	176	Kolhapur	Hatkanangale	Shiroli
	2830	Bore Well at MIDC Gokul Shirgaon	91	111	101	Kolhapur	Karvir	Gokul-Shirgaon
	2831	Dug Well at Sakharali near MIDC Islampur near Krishna Milk Industry	180	171	176	Sangli	Walwa	Sakharali
	2832	Dug Well No.1 at Brahmanwadi-Anjanwel, owned by Shri Vaidya	46	27	37	Ratnagiri	Guhagar	Anjanwel
	2833	Dug Well No.1 at Group Gram Panchayat at Arketwadi, near Masjid	323	36	180	Ratnagiri	Khed	Arketwadi
	2834	Dug Well No.2 at Arketwadi	351	50	200	Ratnagiri	Khed	Arketwadi
	2835	Dug Well No.2 at owned by Group Gram Panchayat, Brahmanwadi-Anjanwel	40	46	43	Ratnagiri	Guhagar	Anjanwel

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

RO – Mumbai

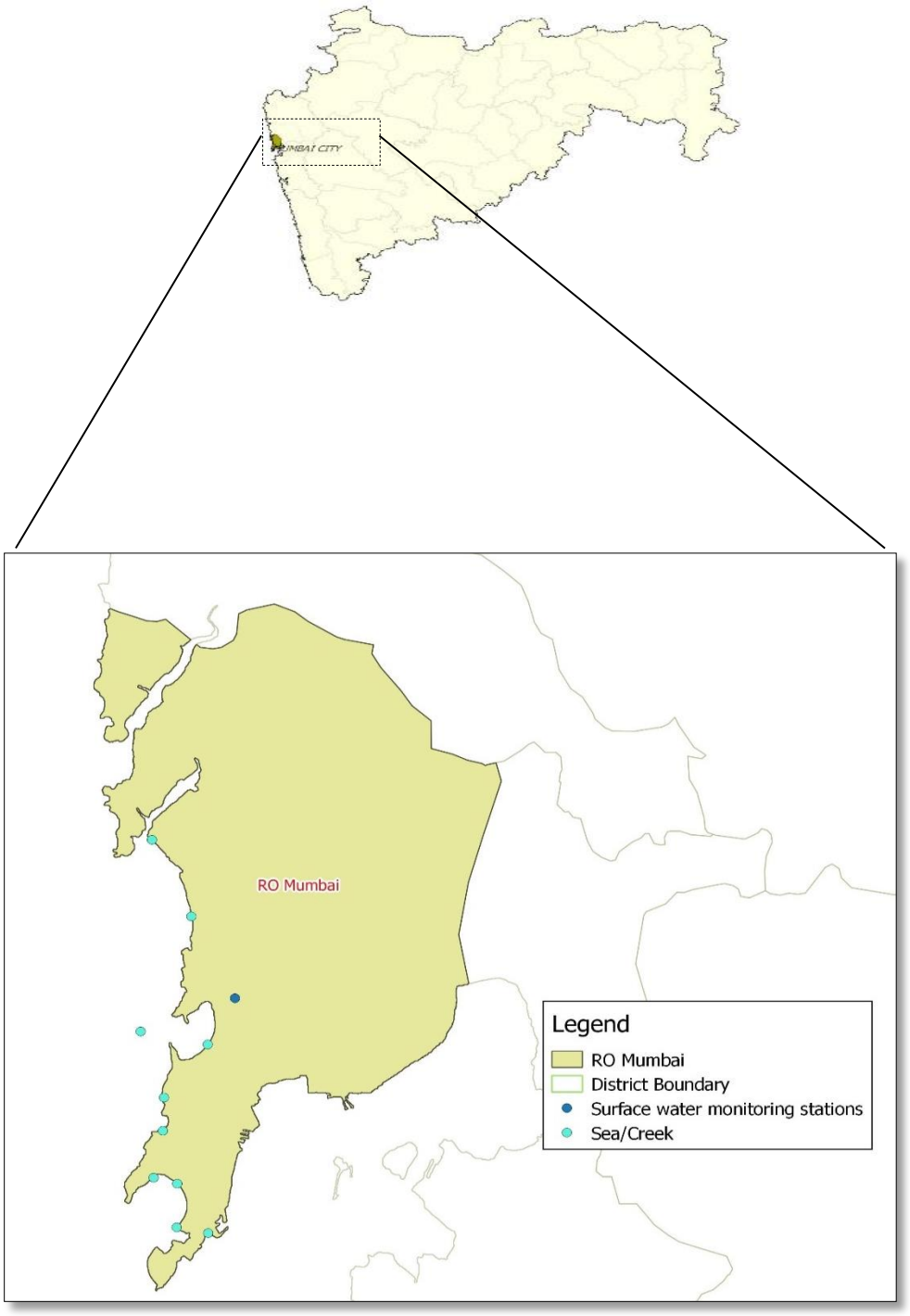

MUMBAI CITY
RO Mumbai
Legend
RO Mumbai
District Boundary
Surface water monitoring stations
Sea/Creek

Table No 38: Water quality Index for surface and ground water monitoring at Mumbai-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	2168	Mithi River at near bridge	24	31	30	Mumbai	Bandra	Mahim
Saline	1318	Mahim creek at Mahim Bay	48	61	54	Mumbai	Bandra	Mahim
	2165	Sea Water at Gateway of India	51	52	49	Mumbai	Colaba	Colaba
	2166	Sea Water at Charni Road Choupathy	50	54	50	Mumbai	Mumbai	Girgaon
	2167	Sea Water at Worli Seaface	56	52	52	Mumbai	Worli	Worli
	2169	Sea Water at Varsova Beach	48	49	52	Mumbai	Andheri	Versova
	2808	Sea Water at Nariman Point	54	52	51	Mumbai	Colaba	Colaba
	2809	Sea Water at Malabar Hill	52	54	51	Mumbai	Mumbai	Walkeshwar
	2810	Sea Water at Haj Ali	49	52	50	Mumbai	Worli	Worli
	2811	Sea Water at Shivaji Park (Dadar Choupathy)	52	54	52	Mumbai	Dadar	Dadar
	2812	Sea Water at Juhu Beach	49	49	50	Mumbai	Santacruz	Juhugaon

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

RO – Nagpur

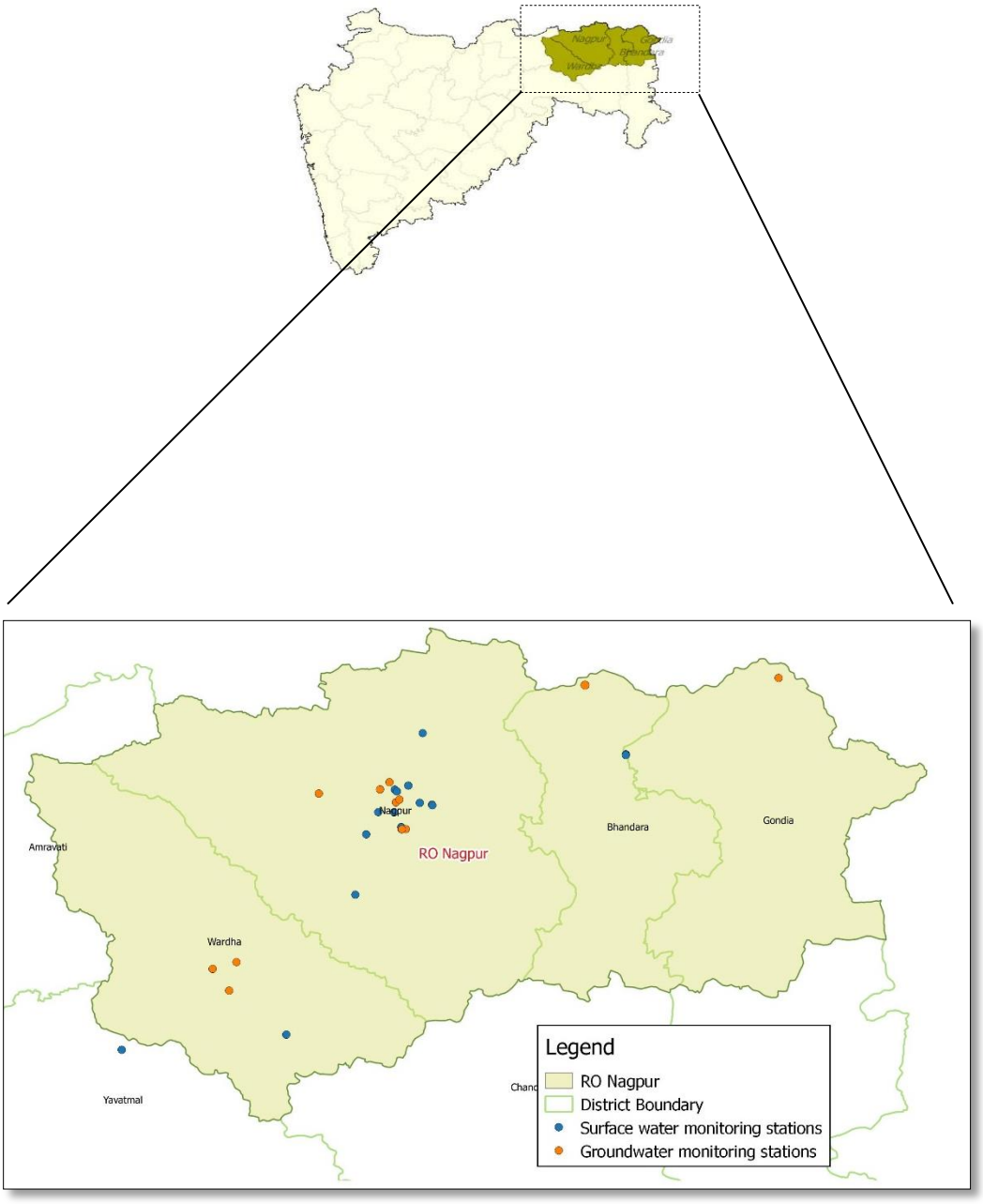

Nagpur
Gondia
Bhandara
Wardha
Nagpur
RO Nagpur
Amravati
Bhandara
Gondia
Wardha
Yavatmal
Legend
RO Nagpur
District Boundary
Surface water monitoring stations
Groundwater monitoring stations

Table No 39: Water quality Index for surface and ground water monitoring at Nagpur-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	185	Nag River Near, Ambazari Lake, Nagpur	53	76	66	Nagpur	Nagpur	Nagpur
	186	Nag River Near, Bhandewadi Bridge, Nagpur	24	41	35	Nagpur	Nagpur	Nagpur
	187	Nag River Near, Asoli Bridge, Bhandara Road, Nagpur	24	38	34	Nagpur	Nagpur	Nagpur
	188	Pill River Near, Wanjra Layout Kamptee Road, Nagpur	25	78	44	Nagpur	Nagpur	Nagpur
	189	Pill River Near, Mankapur on Koradi Road, Nagpur	25	73	42	Nagpur	Nagpur	Nagpur
	1315	Wardha River at Pulgaon Railway Bridge	52	69	67	Wardha	wardha	Pulgaon
	1908	Kolar river before confluence with Kanhan river at Waregaon Bridge	68	75	70	Nagpur	Kamptee	Waregaon
	1909	Kanhan river at D/s of Nagpur	64	72	69	Nagpur	Kuhi	Agargaon
	1910	Wainganga river after confluence with Kanhan river	73	69	69	Nagpur	Kuhi	Ambhora
	2170	Kanhan River (Wainganga basin) at U/s of M/s Vidharba Paper Mill	71	76	71	Nagpur	Parseoni	Sinora
	2171	Kanhan River (Wainganga basin) at D/s of M/s Vidharbha Paper Mills	67	70	66	Nagpur	Parseoni	Sinora
	2172	Wainganga River at D/s of Ellora Paper Mill	57	62	62	Bandara	Tumsar	Tumsar
	2173	Wainganga River at U/s of Ellora Paper Mills	64	61	65	Bandara	Tumsar	Tumsar
	2722	Wena River at U/s of Mohata Mills, nearby Brigde on Hinganghat Wadner Road	65	76	73	Wardha	Hinganghat	Hinganghat
	2723	Wena River at D/s of Mohata Mills, near Bridge on Hinganghat-Wadner Road	57	73	69	Wardha	Hinganghat	Hinganghat
	211	Grampanchayat Suradevi Intake well On Kolar River At Suradevi, Taluka - Kamptee, District -Nagpur	121	113	117	Nagpur	Kamptee	Suradevi
GW	209	Bore well near Pardhi House, Bhandewadi, Nagpur	160	137	148	Nagpur	Nagpur	Bhandewadi
	210	Bore well near Dearao Kale House, Bhandewadi, Nagpur	170	141	156	Nagpur	Nagpur	Bhandewadi
	212	Grampanchayat Mhasala, Dugwell On Nalla At Mhasala, Taluka - Kamptee, District - Nagpur	162	100	131	Nagpur	Kamptee	Mhasala
	213	Grampanchayat Kawtha, Dugwell At Kawtha, Taluka - Kamptee, District - Nagpur	104	97	101	Nagpur	Kamptee	Kawtha
	1995	Gram Panchayath Dug well , Near Balaji Gajbhiye House, Khaperkheda	122	106	114	Nagpur	Saoner	Khaperkheda(Ward No.4)
	1996	Gram Panchayath Dug well , Near Jagadamba G M S Mandir Sahakari Sanstha	122	No data	122	Nagpur	Kamptee	Koradi

	1997	Bore well near Primary Health Centre, Raipur(Hingna)	No data	101	101	Nagpur	Hingna	Raipur
	1998	Gram Panchayat Dug well near Gram Panchayat Office, Brahmni	109	129	119	Nagpur	Kalmeshwar	Brahmni
	1999	Bore well Near Gram Panchayat, Changera.	124	97	111	Gondia	Gondia	Changera
	2000	Dug well near Sarode Kirana Store, Bhandewadi, Nagpur	Dry	Dry	Dry	Nagpur	Nagpur	Bhandewadi
	2203	Hand Pump in the premises of Z.P.Primary School	No data	113	113	Wardha	wardha	Bhugaon
	2826	Dug Well near Railway Station, Cottaon Market	117	106	112	Wardha	wardha	Wardha
	2827	Bore Well near Railway crossing at Dongi Buzurg	Dry	Dry	Dry	Bandara	Tumsar	Dongri-Buzurg

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

RO – Nashik

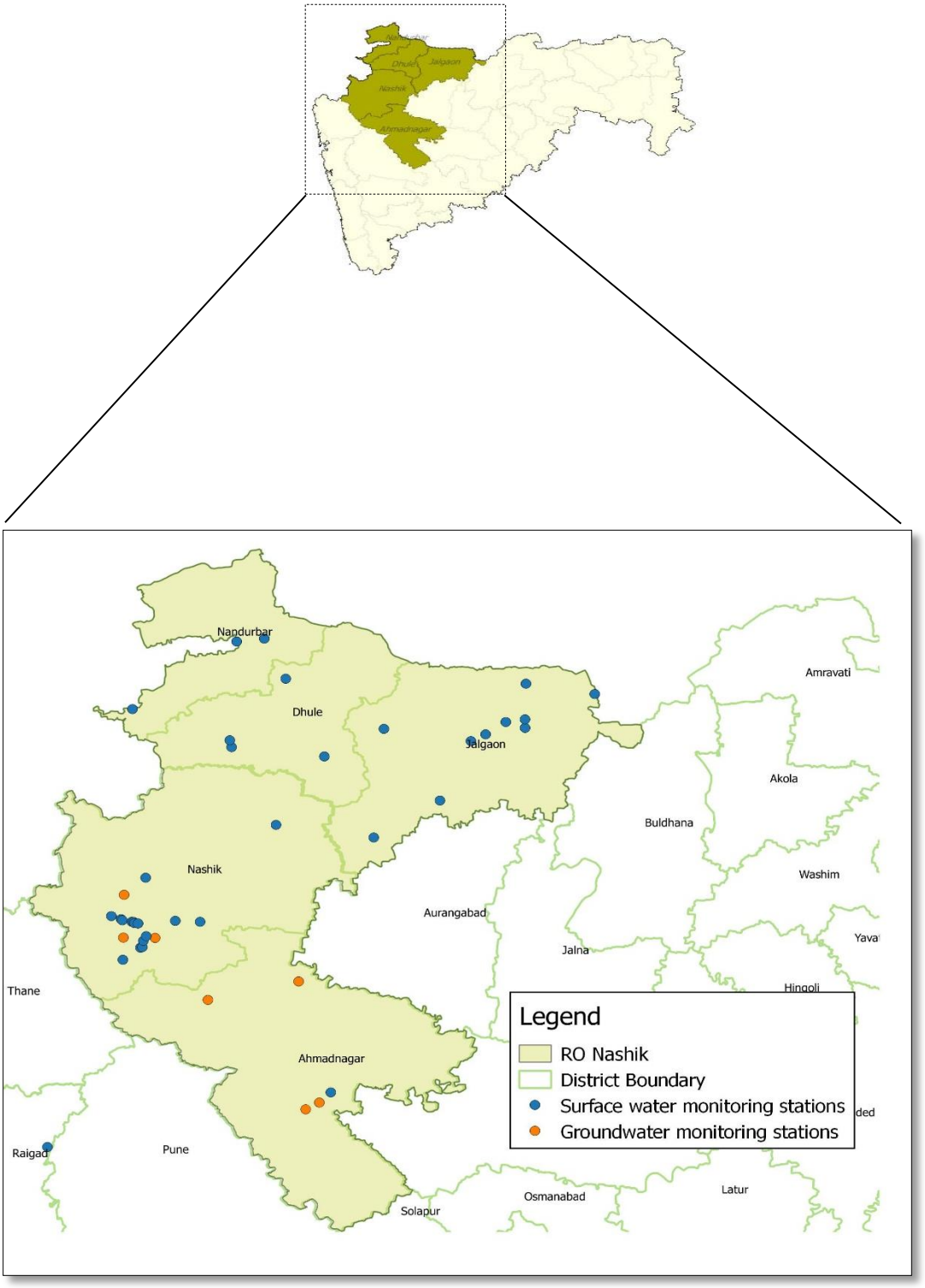

Nandurbar
Dhule
Jalgaon
Nashik
Ahmadnagar
Thane
Raigad
Pune
Solapur
Aurangabad
Jalna
Amravati
Akola
Buldhana
Washim
Hingoli
Osmanabad
Latur
Legend
RO Nashik
District Boundary
Surface water monitoring stations
Groundwater monitoring stations

Table No 40: Water quality Index for surface and ground water monitoring at Nashik -RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	194	Kadwa River at Awankhed Village, Taluka - Dindori, District - Nashik	82	89	79	Nashik	Dindori	Awankhed Village
	195	Sina River Bridge At Burudgaon Road, A/P Ahmednagar, Taluka & District Ahmednagar	48	No data	46	Ahmednagar	Ahmednagar	Burudgaon
	1095	Godavari River at U/s of Gangapur Dam	85	66	75	Nashik	Nashik	Gangapur
	1096	Godavari River at Panchavati at Ramkund	86	86	82	Nashik	Nashik	Panchavati
	1211	Godavari River at Nashik D/s of near Amardham	80	84	77	Nashik	Nashik	Gadgebaba Maharaj Nagar
	1251	Tapi River at Bhusawal	60	91	80	Jalgaon	Bhusawal	Bhusawal Railway Colony
	1252	Girna river at Jalgaon at intake of Girna pump house	No data	No data	63	Jalgaon	Jalgaon	Girna pump house area
	1253	Girna river at Malegaon at Malegaon road bridge	No data	No data	67	Nashik	Malegaon	Malegaon
	1313	Tapi River at Ajnad	86	89	85	Jalgaon	Raver	Ajnad
	1314	Tapi river at Ubad village near Gujrat border	79	No data	74	Nandurbar	Shahada	Ubad
	1907	Rangavali river at D/s of Navapur near Rangavali bridge	No data	No data	77	Nandurbar	Navapur	Navapur
	2177	Godavari River near Someshwar Temple	86	58	73	Nashik	Nashik	Someshwar
	2179	Godavari River at Hanuman Ghat	87	59	74	Nashik	Nashik	Nashik city
	2180	Godavari River at near Tapovan	81	72	72	Nashik	Nashik	Tapovan
	2181	Godavari River at Kapila -Godavari confluence point	No data	74	67	Nashik	Nashik	Tapovan
	2182	Godavari River at Saikheda	85	66	71	Nashik	Niphad	Saikheda
	2183	Godavari River at Nandur-Madhameshwar Dam	84	92	83	Nashik	Niphad	Nandur
	2652	Amravati River D/s of Dondaicha	Dry	Dry	Dry	Dhule	Dhule	Dondaicha
	2658	Bori River D/s of Amalner	No data	No data	85	Jalgaon	Jalgaon	Amalner
	2659	Burai River before confluece to Tapi River	Dry	Dry	Dry	Dhule	Dhule	Mukudas
	2660	Darna River at Chehedi pumping station	86	53	67	Nashik	Nashik	Chehedi
	2661	Darna River at Aswali (Darna Dam)	85	87	83	Nashik	Igatpuri	Aswali
	2662	Darna River at MES site Pumping station	85	90	82	Nashik	Nashik	Bhagur
	2663	Darna River at Bhagur Pumping station near Pandhurli Bridge	86	83	81	Nashik	Nashik	Bhagur

	2664	Darna River at Sansari	86	84	80	Nashik	Nashik	Sansari
	2666	Gomai River D/s of Shahada	Dry	Dry	Dry	Dhule	Dhule	Shahada
	2667	Hiwara River D/s of Pachora	No data	No data	82	Jalgaon	Jalgaon	Pachora
	2670	Kan River near Sakri water works	No data	No data	74	Dhule	Dhule	Sakri
	2674	Mor River near Padalshe	No data	No data	77	Jalgaon	Jalgaon	Padalashe
	2684	Panzara River near Panzarakan SSK Ltd	No data	64	69	Dhule	Dhule	Panzare
	2689	Patalganga River at Gagangiri Maharaj Temple	82	82	82	Raigad	Khalapur	Khopoli
	2710	Titur River D/s of Chalisgaon	No data	No data	76	Jalgaon	Jalgaon	Chalisgaon
	2718	Waghur River at Sakegaon before Confluence with Tapi River	No data	No data	61	Jalgaon	Jalgaon	Sakegaon
Nalla	196	Lowki Nalla At Khedi, Taluka & District - Jalgaon	44	36	32	Jalgaon	Khedi	Khedi
	197	Moti Nalla before Confluence with Panjara river Dhule, Taluka & District - Dhule	55	49	63	Dhule	Dhule	Dhule
	2178	Chikhali Nalla Meets Godavari River	No data	75	67	Nashik	Nashik	Chikhali
GW	221	well water of Bappaji, Akolner, Ahmadnagar, Nashik	115	98	107	Nashik	Ahmadnagar	Akolner
	1990	Bore well at BMW Site , Burudgaon	Dry	Dry	Dry	Ahmadnagar	Ahmednagar	Burudgaon
	1991	Bore well at MSW Site, Pathardi, Nashik	68	No data	68	Nashik	Nashik	Pathardi
	2204	Dug well at Gunjalwadi, Sangamner near Primary Health Care Center.	Dry	Dry	Dry	Ahmadnagar	Sangamner	Gunjalwadi
	2816	Dug Well of Mr. Sampat Walunj, near M/s. Mahajeet Clayton	Dry	Dry	Dry	Nashik	Nashik	Shinde village
	2817	Bore Well at Chitali near Wagh vasthi	Dry	Dry	Dry	Ahmadnagar	Rahata	Chitali
	2818	Bore Well at M/s. Spectron Ethers Rasegaon near Siddeshwar Mahadev Mandir	Dry	Dry	Dry	Nashik	Dindori	Rasegaon

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

RO – Navi Mumbai

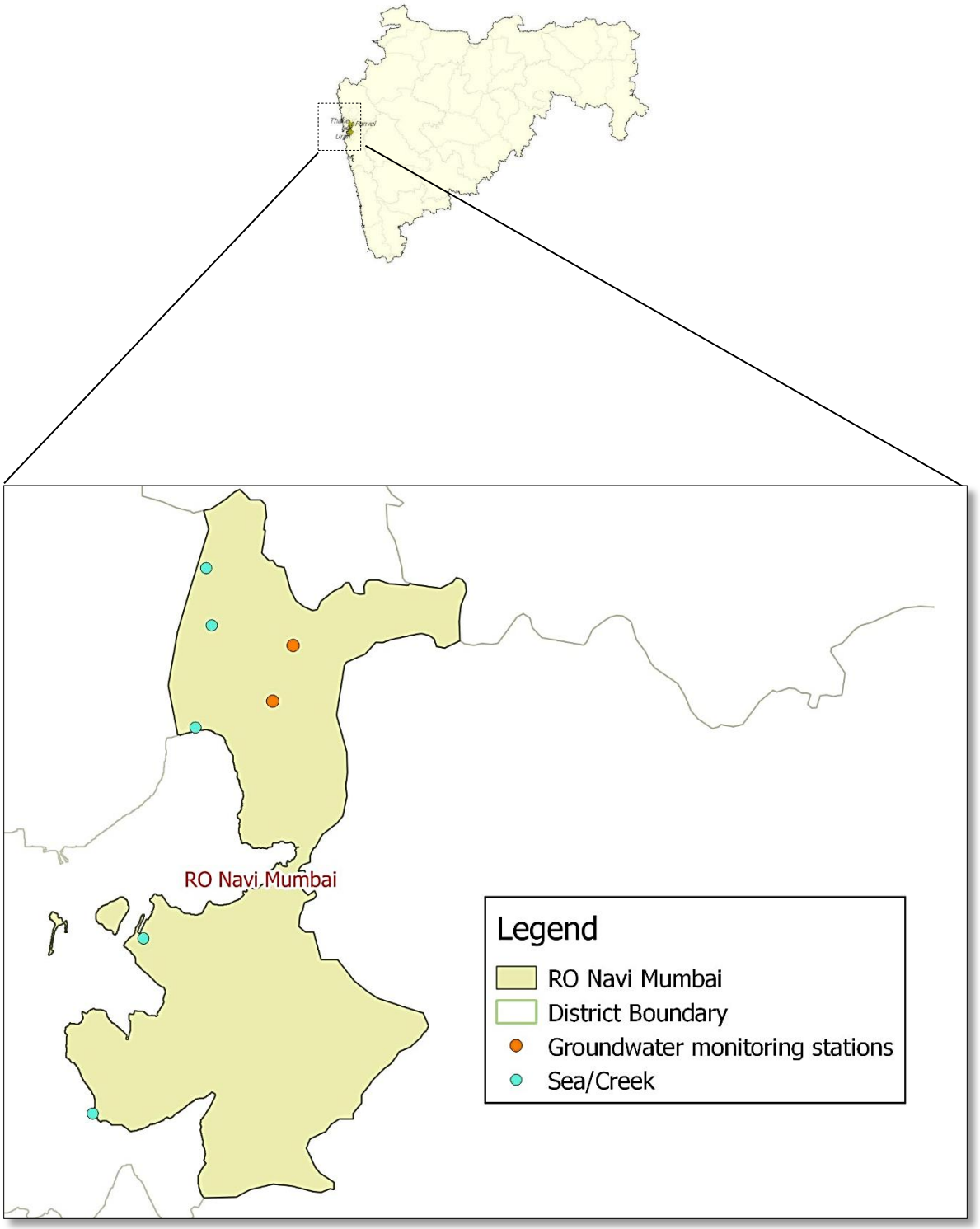


Table No 41: Water quality Index for surface and ground water monitoring at Navi Mumbai-RO – 2018-19`

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	216	Kasardi River near Ganesh Ghat	73	38	62	Raigad	Panvel	Taloja
Saline	191	Arabian Sea behind ONGC Uran	No data	57	54	Raigad	Uran	Uran
	190	TTC Creek At Ghansoli Jetty	59	59	57	Thane	Thane	Ghansoli
	1317	Thane creek at Elephanta Island	54	64	56	Raigad	Uran	Gharapuri, Elephanta Island
	2184	Vashi Creek at Airoli Bridge	58	56	57	Thane	Thane	Airoli
	2185	Vashi Creek at Vashi Bridge	63	63	62	Thane	Thane	Vashi
GW	214	Borewell at TTCWMA, Mahape	Dry	Dry	Dry	Thane	Thane	TTCWMA,Mahape
	215	Well water at Turbhe Store, Turbhe	Dry	Dry	Dry	Thane	Thane	Turbhe

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

RO – Pune

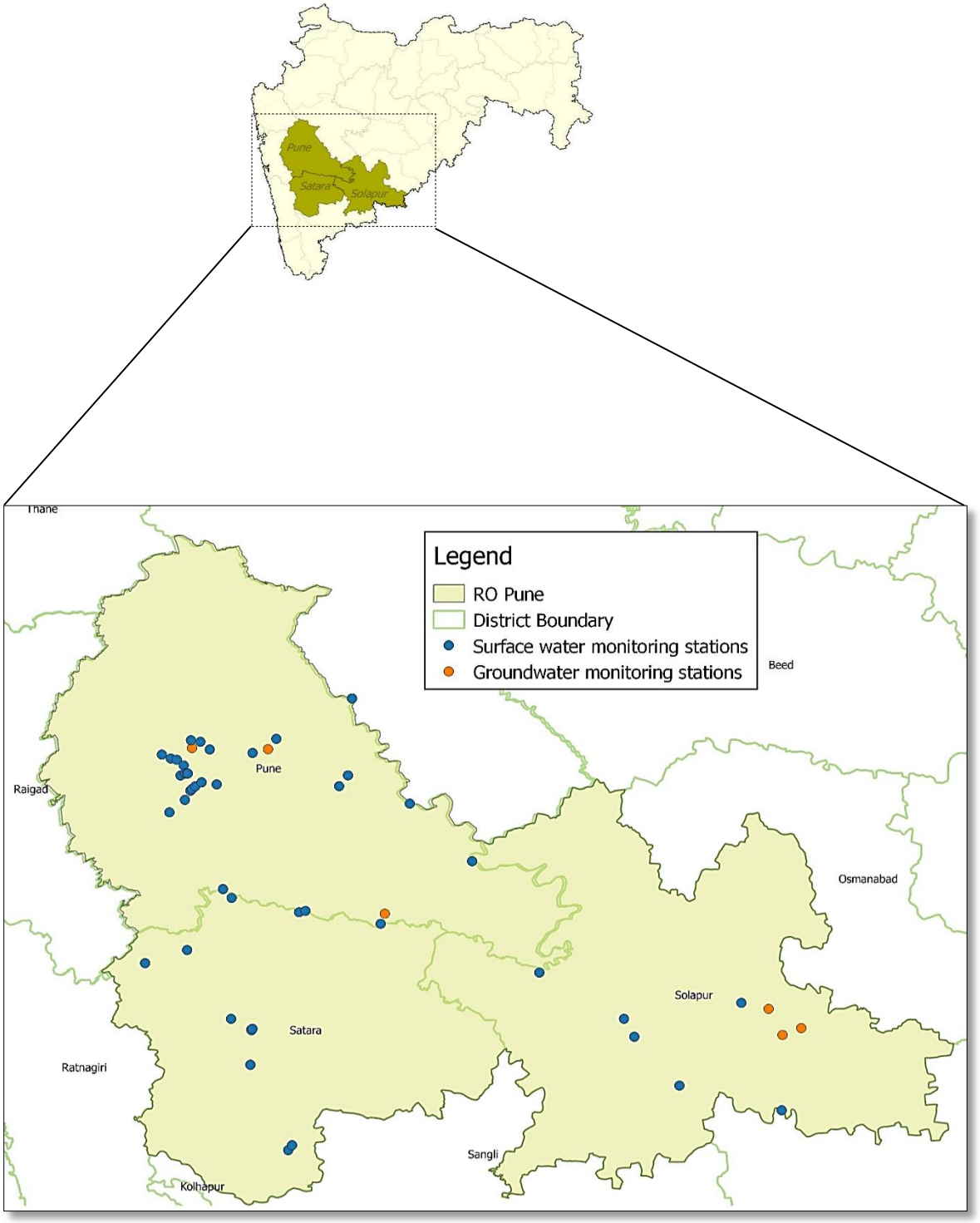

Pune
Satara
Solapur
Legend
RO Pune
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Thane
Beed
Raigad
Pune
Osmanabad
Solapur
Satara
Ratnagiri
Sangli
Kolhapur

Table No 42: Water quality Index for surface and ground water monitoring at Pune-RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	28	Bhima River at Takli	69	86	75	Solapur	South Solapur	Takali
	36	Krishna River at Krishna Bridge, Karad	71	59	64	Satara	Karad	Karad
	1188	Bhima River at Narshingpur near Sangam Bridge after confluence with Nira	No data	No data	60	Solapur	Malshiros	Narsingpur
	1189	Bhima river at Pune(Mutha river) at U/s of Vithalwadi near Sankar Mandir	46	40	48	Pune	Haweli	Vithalwadi
	1190	Bhima river at D/s of Bundgarden, Pune	54	30	39	Pune	Haweli	Yerwada
	1191	Bhima river after confluence with Mula-Mutha at Pargaon near Vasant Bandara	69	84	70	Pune	Daund	Pargaon
	1192	Bhima river at Daund near Mahadev temple	69	71	63	Pune	Daund	Daund
	1194	Krishna river at Dhom Dam	83	59	69	Satara	Mahabaleshwar	Wai
	1463	Nira river at Sarola bridge	65	53	65	Pune	Bhor	Sarola
	1911	Chandrabhaga river at U/s of Pandharpur town	63	53	59	Solapur	Pandarpur	Gursale
	1912	Chandrabhaga river at D/s of Pandharpur town near Vishnupant Mandir	59	39	50	Solapur	Pandarpur	Gopalpur
	2186	Venna River at Varya, Satara	75	83	79	Satara	Satara	Varye
	2187	Krishna River at Kshetra Mahuli Satara	65	62	65	Satara	Mahuli	Kshetra Mahuli
	2188	Krishna River at Krishna-Venna Sangam, Mahuli	66	59	62	Satara	Mahuli	Mahuli
	2189	Koyna River at Karad	69	61	66	Satara	Karad	Karad
	2190	Krishna River at Wai	65	65	63	Satara	Wai	Wai
	2191	Mutha River at Sangam Bridge Near Ganpathi Ghat	43	40	41	Pune	Pune	Shivaji Nagar
	2192	Mula-Mutha River at Mundhwa Bridge	56	39	43	Pune	Haweli	Mundhawa
	2193	Mula River at Aundh Bridge -Aundgaon	64	38	45	Pune	Haweli	Aundhgaon
	2194	Mula River at Harrison Bridge near Mula -Pawana Sangam	56	37	41	Pune	Haweli	Bopodi
	2195	Nira River at D/s of Jubilant Organosis Pune	65	44	55	Pune	Baramati	Nimbut
	2196	Pawana River at Sangavigaon, Pune	51	43	47	Pune	Haweli	Sangavigaon

	2197	Indrayani River at D/s of Alandigaon, Pune	62	44	53	Pune	Haweli	Alandigaon
	2655	Bhima River at Koregaon near Koregaon Bridge, Pune	64	80	58	Pune	Shirur	Koregaon
	2656	Bhima River Backwater of Ujani Dam near raw water pump house	77	72	72	Pune	Indapur	Kumbargaon
	2665	Ghod River at Shirur, Pune	73	No data	64	Pune	Shirur	Shirur
	2668	Indrayani River at D/s of Moshi village	63	42	53	Pune	Haveli	Moshi
	2669	Indrayani River at U/s of Moshigaon, Pune	62	64	62	Pune	Haweli	Moshigaon
	2677	Mula-Mutha River at D/s of Theur, Pune	61	60	60	Pune	Haweli	Theur
	2678	Mutha River near Veer Savarkar Bhavan	43	38	40	Pune	Pune	Pune M.C
	2679	Mutha River at Deccan Bridge, Pune	42	39	40	Pune	Pune	Deccan
	2680	Mutha River at Khadakvasla Dam Pune	83	89	83	Pune	Haweli	Kadakvasla
	2681	Nira River at Sangavi	67	58	65	Satara	Phaltan	Sangavi
	2682	Nira River at U/s of Jubilant Organosis Pune	63	48	62	Pune	Baramati	Nira(Datta ghat)
	2683	Nira River at Shindewadi	70	70	70	Satara	Khandala	Shindewadi, Shirwal
	2690	Pawana River at Kasarwadi Pune	58	37	43	Pune	Haweli	Kasarwadi
	2691	Pawana River at Dapodi Bridge at Pawana-Mulla Sangan Pune	50	38	44	Pune	Haweli	Dapodi
	2692	Pawana River at Ravet Weir, Pune	76	87	82	Pune	Haweli	Ravet
	2693	Pawana River at Chinchwadgaon, Pune	58	40	48	Pune	Haweli	Chinchwadgaon
	2694	Pawana River at Pimprigaon, Pune	55	41	46	Pune	Haweli	Pimprigaon
	2705	Sina River near Laboti till naka Solapur	68	No data	65	Solapur	Mohal	Laboti
	2711	Urmodi River at Nagthane Satara	72	78	69	Satara	Satara	Nagthane
	2715	Vel River at Shikrapur, Pune	No data	No data	64	Pune	Shirur	Shikrapur
	2716	Venna River at Mahabaleshwar	74	82	76	Satara	Mahabaleshwar	Mahabaleshwar
	2717	Venna River at Mahuli	69	73	66	Satara	Satara	Mahuli
Nalla	2789	Nalla at D/s of Alkai Mandir, Solapur	No data	No data	56	Solapur	Malshiras	Aklai

GW	1992	Dug well at MSW Site, owned by Shri.Dattu Kondiba Borate at Borate Vasthi.	25	81	53	Pune	Haveli	Moshi
	2819	Dug Well Owned by Shri Deshmukh	208	207	208	Pune	Baramati	Malegaon
	2820	Dug Well Owned by Shri Shivaji Baban Darekar	148	52	100	Pune	Shirur	Sanaswadi
	2821	Bore Well at Bale Railway Station premises Owned by Shri Digambar Joshi	104	No Data	104	Solapur	North Solapur	Dahegaon
	2822	Bore Well near Chincholi	106	No Data	106	Solapur	Mohol	Chincholi
	2823	Bore Well at Shete Vasti near old Tuljapur Road	109	No Data	109	Solapur	Solapur	Shete vasthi, Tuljapur Naka

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

RO – Raigad

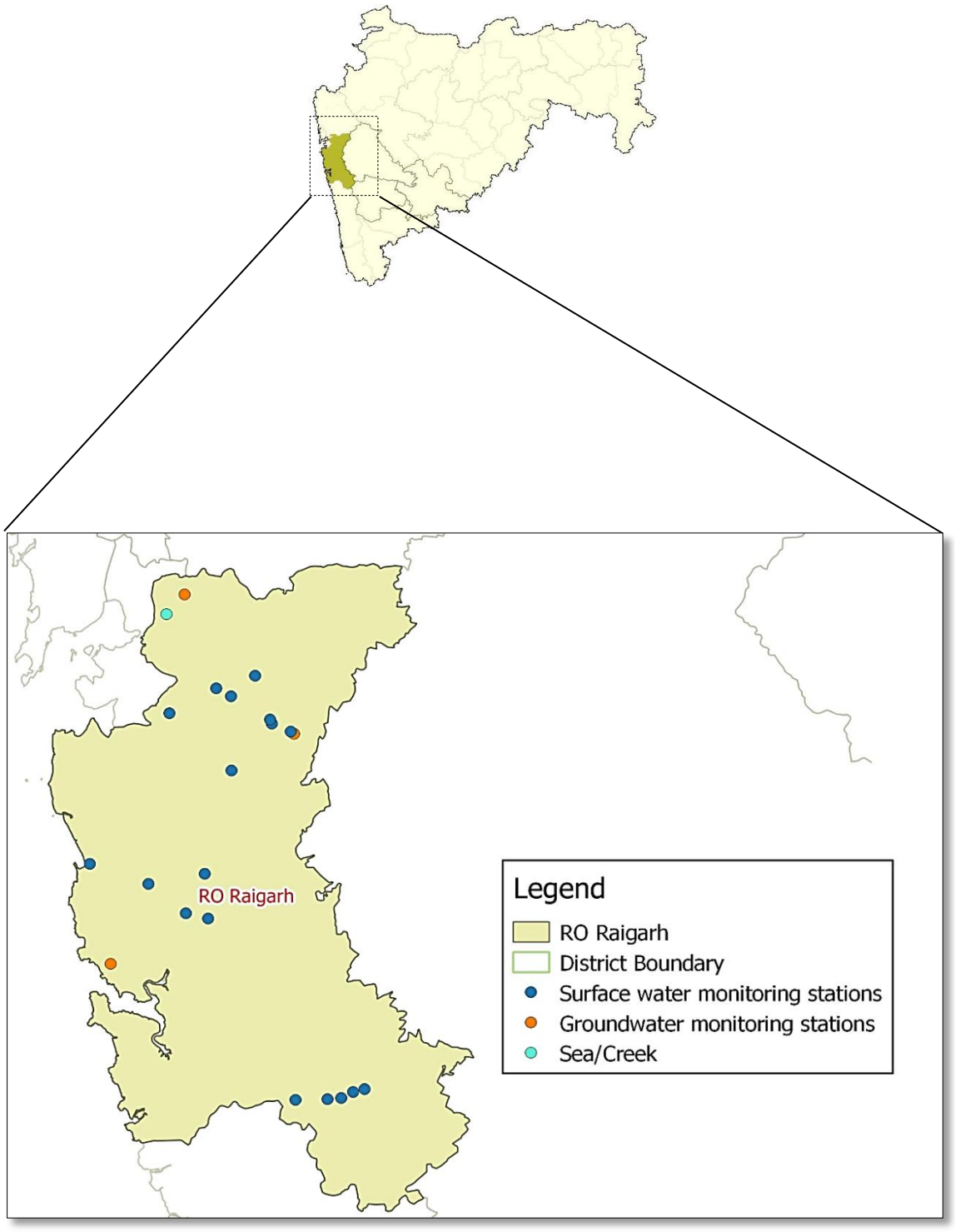

RO Raigarh
Legend
RO Raigarh
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Sea/Creek

Table No 43: Water quality Index for surface and ground water monitoring at Raigad RO – 2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	192	Morbe Dam, Taluka - Khalapur, District - Raigad	83	77	80	Raigad	Khalapur	Khalapur
	193	Balganga River, Village Ransai, Taluka - Khalapur, District - Raigad	81	83	80	Raigad	Khalapur	Ransai
	1151	Patalganga River at Shilphata Bridge	83	81	82	Raigad	Khalapur	Khopoli
	1152	Kundalika River at Roha Bridge	76	77	77	Raigad	Roha	Roha
	1462	Patalganga near intake of MIDC water works(Turade w/w)	86	85	84	Raigad	Khalapur	Turade
	2198	Kundalika River at Are Khurd (Saline Zone)	62	59	72	Raigad	Roha	Are Khurd
	2199	Savitri River at Ovale village	61	66	69	Raigad	Mahad	Ovale
	2651	Amba River at D/s of Waken Bridge	76	83	80	Raigad	Roha	Waken Phata
	2671	Kundalik River near Salav Bridge (Saline Zone)	63	61	64	Raigad	Roha	Salav
	2672	Kundalika River at Dhatav at Jackwell	80	81	81	Raigad	Roha	Dhatav
	2685	Patalganga River at D/s of Kharpada Bridge	77	63	75	Raigad	Khalapur	Kharpada
	2686	Patalganga River at Vyal pump house	85	82	84	Raigad	Khalapur	Vyal
	2687	Patalganga River at Khalapur pumping house	82	84	83	Raigad	Khalapur	Khalapur
	2688	Patalganga River at Savroli Bridge	81	76	80	Raigad	Khalapur	Savroli
	2701	Savitri River Jackwell at Upsa kendra	66	65	71	Raigad	Mahad	Nangalwadi
	2702	Savitri River at Shedav Doh	66	68	71	Raigad	Mahad	Shedav Dov
	2703	Savitri River at Dadli Bridge	67	63	71	Raigad	Mahad	Dadli
	2704	Savitri River at Muthavali village	68	67	72	Raigad	Mahad	Muthavali
GW	217	Borewell water at village Milgaon, Taluka - Khalapur, District - Raigad.	495	495	495	Raigad	Khalapur	Milgaon
	218	Borewell water near MSW site, Murud - Janjira.	Dry	Dry	Dry	Raigad	Murud	Murud Janjira
	1989	Bore well at MWML Site at Taloja	200	40	120	Raigad	Panvel	Karawla-Taloja
Saline	2803	Panvel Creek at Kopra Bridge	60	68	71	Raigad	Panvel	Kopra

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

RO – Thane

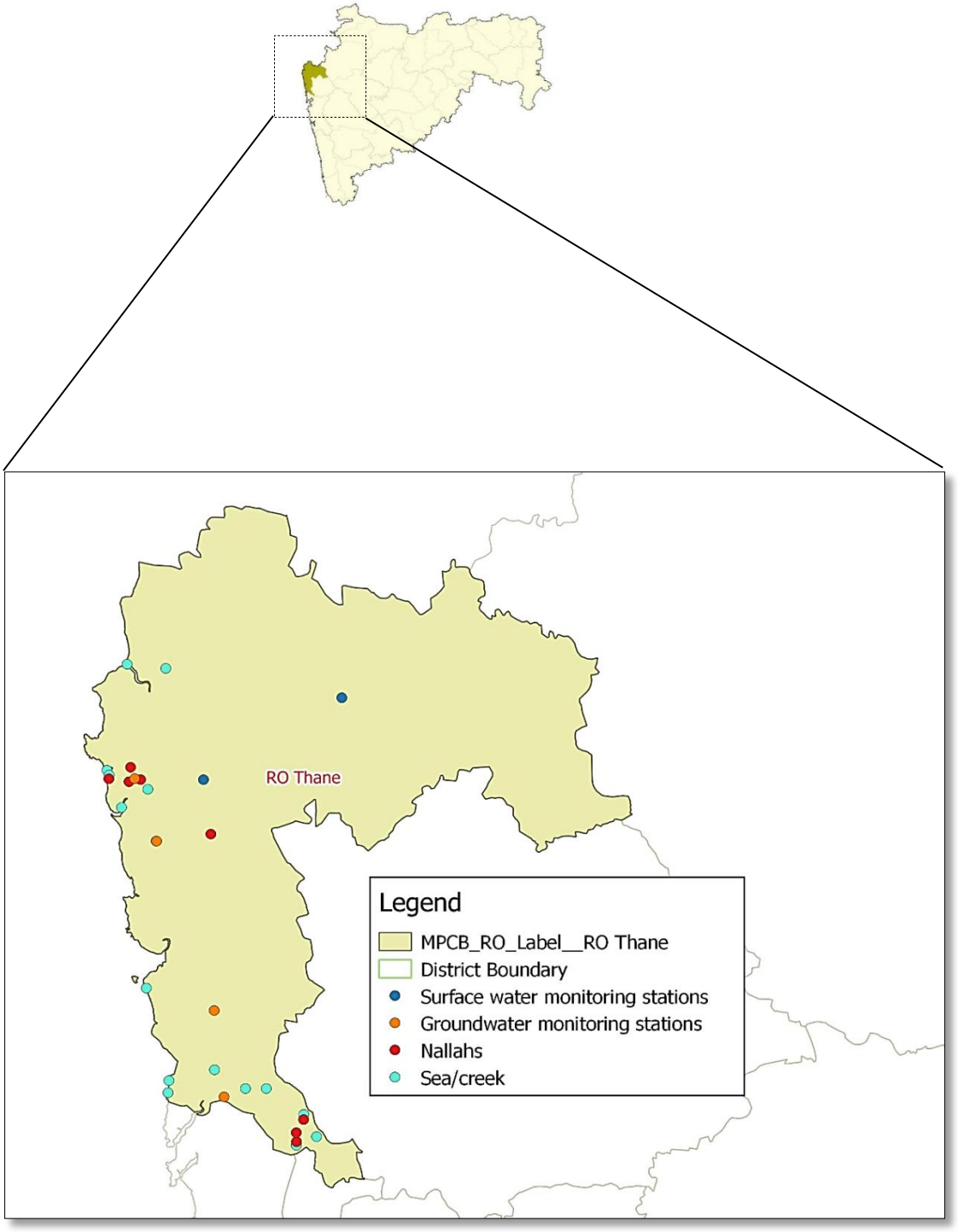

RO Thane
Legend
MPCB_RO_Label__RO Thane
District Boundary
Surface water monitoring stations
Groundwater monitoring stations
Nallahs
Sea/creek

Table No 44: Water quality index for surface and ground water monitoring at Thane RO -2018-19

Type	Station Code	Station Name	Apr	Dec/Oct	Average	District	Taluka	Village
SW	2706	Surya River U/s of Surya Dam	90	80	82	Thane	Vikramgad	Dhamni
	2707	Surya River at MIDC pumping station	85	81	82	Thane	Palghar	Garvashet
	2708	Surya River at Intake of Vasai-Virar water scheme	86	81	81	Thane	Palghar	Masvan
	2696	Pelhar dam	84	79	83	Palghar	Vasai	Pelhar
Saline	2805	Arnala Sea	52	53	55	Thane	Vasai	Arnala
	2806	Uttan Sea at Bhayander	50	61	53	Thane	Bhayander	Uttan
	2807	Navapur Sea	43	63	50	Thane	Palghar	Navapur
	1316	Bassein creek at Vasai Fort, Thane	60	63	60	Thane	Vasai	Bassein
	2792	Ulhas Creek at Mumbra Reti Bunder	54	59	64	Thane	Thane	Mumbra
	2793	Thane Creek at Kalwa Road Bridge	57	60	64	Thane	Thane	Kalwa
	2794	Ulhas Creek at Kolshet Reti Bunder	60	63	63	Thane	Thane	Kolshet
	2795	Ulhas Creek at Gaimukh at Nagla Bunder on Ghod Bunder Road	55	61	63	Thane	Thane	Nagla
	2796	Ulhas Creek at Versova Bridge	54	64	62	Thane	Vasai	Versova
	2797	Bhayander Creek at D/s of Railway Bridge at Jasal Park Choupathy	58	60	61	Thane	Bhayander	Navghar
	2798	Kharekuran Murbe Creek	43	59	57	Thane	Palghar	Kharekuran
	2799	Dandi Creek	40	58	55	Thane	Palghar	Dandi
	2800	Sarwali Creek	53	60	62	Thane	Palghar	Sarwali
	2801	Savta Creek	58	59	60	Thane	Dahanu	Savta
	2802	Dahanu Creek at Dahanu Fort	58	59	60	Thane	Dahanu	Danugaon
GW	1984	Bore well at M/s Tata Iron {} Steel Co. Ltd, S-76	Dry	Dry	Dry	Thane	Palghar	MIDCTarapur, Industrial Estate, Tarapur
	1985	Dug well at 5 Star Industrial Estate	181	162	171	Thane	Mira-Bhayander	Kashimira
	1986	Bore well at Motapada	29	56	43	Thane	Dahanu	Motapada
	1987	Bore well at Vasai	138	209	174	Thane	Vasai	Gokhiware
	1988	Bore well at Gharatwadi, Palghar	194	194	194	Thane	Palghar	Aliyali

Nalla	2782	Rabodi Nalla	33	20	29	Thane	Thane	Rabodi
	2783	Colour Chem Nalla	31	26	32	Thane	Thane	Majiwada
	2784	Sandoz Nalla	32	28	28	Thane	Thane	Sandozbaug
	2785	BPT Navapur	40	20	28	Palghar	Palghar	Navapur
	2786	Tarapur MIDC Nalla, near sump No1	No data	No data	27	Palghar	Palghar	MIDC Tarapur
	2787	Tarapur MIDC Nalla	No data	No data	25	Palghar	Palghar	MIDC Tarapur
	2788	Tarapur MIDC Nalla near sump-III	No data	No data	23	Palghar	Palghar	MIDC Tarapur

Surface Water		Good to Excellent	Medium to Good	Bad	Bad to Very Bad	Dry	Not collected	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 Petitions/ Public Interest Litigations pending before the Hon'ble High Court of Judicature at Bombay (Mumbai/ Aurangabad / Nagpur Bench)

Sr.No	Name of the Parties	Writ Petitions/ Public Interest Litigation	Region	Subject matter
1	Hirali Foundation V/s State of Maharashtra & Ors	PIL No.24/2018	Kalyan	Regarding Waldhuni river pollution
2	Madan Purkar V/s KMC	PIL No.58/2013		

List of the Applications/Appeals pending before the Hon'ble National Green Tribunal, Principal Bench, New Delhi / Western Zone, Pune

Sr.No.	Name of the Parties	Application /Appeal No.	Region	Subject matter
1.	Jeevitnadi v/s Municipal Council Wai & Ors.	57/2018	Pune	Regd. prohibition of work of concretization inside the blue line of Krishna river and other incidental directions.
2.	News Item published in "The Hindu" authored by Shri Jacob Koshy Titled "More river stretches are now critically polluted".	673/2018	State of Maharashtra	Regd. pollution of river stretches in the State of Maharashtra.
3	Dr. Balkrishna Shelar V/s State of Maharashtra & ORS	988/2018	Kolhapur	
4	Arvind P mhatre V/s MoEF & Ors	163/2017 in Original application No. 125/2018	Navi Mumbai	

Annex III – List of Polluted Stretches across Maharashtra

Priority wise Polluted River Stretches as per CPCB Report September 2018				
Priority I (9)	**Priority II (6)**	**Priority III (14)**	**Priority IV (10)**	**Priority V (14)**
Godavari	Bhima	Ghod	Bindusar	Amba
Kalu	Indrayani	Kanhan	Bori	Bhatsa
Kundalika	Mula-mutha	Kolar	Chandrabhaga	Gomai
Mithi	Pawana	Krishna	Darna	Kan
Morna	Wainganga	Mor	Girna	Manjeera
Mula	Wardha	Patalganga	Hiwara	Panchganga
Mutha		Pedhi	Koyna	Panzara
Nira		Penganga	Pehlar	Rangavali
Vel		Purna	Sina	Savitri
		Tapi	Titur	Surya
		Urmodi		Tansa
		Venna		Ulhas
		Waghur		Vaitarna
		Wena		Vashisti

Prioritywise Polluted River Stretches as on January 2019					
Priority I (4)	**Priority II (4)**	**Priority III (8)**	**Priority IV (10)**	**Priority V (15)**	**Meeting to Bathing standards (3)**
Godavari	Bhima	Indrayani	Darna	Amba	Panchganga
Mithi	Kalu	Kanhan	Kolar	Bhatsa	Urmodi
Morna	Kundalika	Mula	Krishna	Bindusar	Vashisti
Wainganga	Mutha	Mula-mutha	Nira	Chandrabhaga	
		Pawana	Panzara	Ghod	
		Pedhi	Patalganga	Koyna	
		Purna	Penganga	Manzara	
		Wardha	Rangavali	Pehlar	
			Tapi	Savitri	
			Vel	Surya	
				Tansa	
				Ulhas	
				Vaitarna	
				Venna	
				Wena	
Dry river stretches : Bori, Girna, Gomai, Hiwara, Kan, Mor, Sina, Titur, Waghur					

Source: Maharashtra Polluiton Control Board.

Annex IV – Status of Sewage Treatment of Maharashtra

Municipal Corporations

Sr No.	Name of Municipal Corporation	Class	District	River / creek	Seawage Generation MLD	Sewage Treatment MLD	Percentage Treatment (%)	Disposal	25% provision
1	Amravati Municipal Corporation	D	Amravati	Pedhi/Purna	95	44	46.31%	Pedhi/Purna	Yes
2	Akola Municipal Corporation	D	Akola	Morna \ puna	45	0	0.00%	Morna \ puna	Yes
3	Mumbai Municipal Corporation	A	Mumbai	Arabian sea	2727	1850	67.84%	Arabian sea	Yes
4	Navi Mumbai Municipal Corporation	A	Thane	Divale and Vashi creek	205	205	100.00%	Divale and Vashi creek	Yes
5	Nashik Municipal Corporation	B	Nashik	Godavari	300	270	90.00%	Godavari river	Yes
6	Malegaon Municipal Corporation	B	Malegaon	Mousam	15	0	0.00%	Domestic sewage is released into Mousam river without treatment. This river further merges with Girna river	Yes
7	Ahmednagar Corporation	D	Ahmednagar	Pravara	60	0	0.00%	Pravara	Yes
8	Dhule Municipal Corporation	D	Dhule	Panjara	36	0	0.00%	Panjara	Yes
9	Jalgaon Municipal Corporation	D	Jalgaon	Girna	48	0	0.00%	Girna	Yes
10	Thane Municipal Corporation	C	Thane	Thane creek	336	152	45.23%	Thane creek	Yes

Sr No.	Name of Municipal Corporation	Class	District	River / creek	Seawage Generation MLD	Sewage Treatment MLD	Percentage Treatment (%)	Disposal	25% provision
11	Mira-Bhayandar Municipal Corporation	C	Thane	Creek	108	56.5	52.31%	creek	Yes
12	Vasai-Virar City Municipal Corporation	C	Palghar	Creek	105	0	0.00%	creek	Yes
13	Nagpur Municipal Corporation	A	Nagpur	Nag	450	230	51.11%	Nag	Yes
14	Kolhapur Municipal Corporation	D	Kolhapur	Panchaganga	96	72	52.00%	Agriculture and others.	Yes
15	Kupwad Miraj Sangli Municipal Corporation	D	Sangli	Krishna	82.2	36.2	43.90%	Krishna river	Yes
16	Chandrapur Corporation	C	Chandrapur	Irai and Jharapata River	41	0	0.00%	Irai and Jharapata River	Yes
17	Bhiwandi Municipal nijamapura	D	Thane	Kamavari creek	90	30	33.33%	Kamavari creek	No
18	Kalyan Dombivali Municipal Corporation	D	Thane	Ulhas Creek	216	48	22.22%	Ulhas Creek	Yes
19	Ulhasnagar Municipal Corporation	C	Thane	Salt water area near Ulhas river	64	0	0.00%	Waldhuni	Yes
20	Aurangabad Corporation	A	Aurangabad	Sukhna, Kham	107	107	100.00%	Sukhna, Kham	Yes
21	Nanded Municipal Corporation Waghala	D	Nanded	Godavari	48	48	100.00%	Godavari	Yes
22	Latur Municipal	D	Latur	Manjara	24	0	0.00%	Local nalla to Manjara river	Yes
23	Parbhani Corporation	D	Parbhani	Purna Godavari	10	0	0	Godavari river	Yes
24	Pune Municipal Corporation	B	Pune	Mula-Mutha	1222	567	46.39%	Mula-Mutha	Yes
25	Pimpri-Chinchwad Municipal Corporation cincavda	C	Pune	Mula, Pawana and indrayani	312	265	84.93%	Setup of Domestic sewage treatment system	Yes
26	Solapur Corporation	D	Solapur	Sina	100	100	100.00%	Sina	Yes
27	Panvel Municipal	D	Raigad	Panvel / Kamothe Creek	164	156	95.12%	Panvel / Kamothe Creek	Yes

Municipal Councils

Status of Sewage Treatment in A Class Municipal Council in Maharashtra							
Sr No.	**Municipal Council**	**District**	**River / creek**	**Effluent Generated MLD**	**Effluent Treated MLD**	**% Treatment**	**Disposal**
1	Achalpur	Amravati	Chandrabhagha	2.3	0	0	Chandrabhagha
2	Bhusawal	Jalgaon	Tapi river	11.4	0	0	Tapi river
3	Wardha	Wardha	Dham	18	0	0	Dham
4	Gondia	Gondia	Wainganga	18.28	0	0	Wainganga
5	Ichalkaranji	Kolhapur	Panchaganga	32	14	37.50	Panchaganga
6	Warora	Chandrapur	Wardha river	4.5	0	0	Wardha river
7	Yavatmal	Yavatmal	Chardoha and Nilona Dam	8.69	0	0	Jamwadi pond
8	Ambernath	Thane	----	30	28	93.33	28 MLD sewage is disposed in Waldhuni Nala.
9	Jalna	Jalna	Godavari	18.5	0	0	Local Nalla
10	Beed	Beed	Bindusara	11	0	0	Local Nalla
11	Satara	Satara	Krishna and Venna	12.8	0	0	No treatment on Sewage
12	Barshi	Solapur	Bhogavati	15	0	0	Lendi Nalla

Status of Sewage Treatment in B Class Municipal Council in Maharashtra							
Sr No.	**Municipal Council**	**District**	**River / creek**	**Effluent Generated MLD**	**Effluent Treated MLD**	**% Treatment**	**Disposal**
1	Anjangaon	Amravati	Sahanur	2.28	0	0	Sahanur
2	Varud	Amravati	Wardha	2.4	0	0	Wardha
3	Washim	Washim	Katepurna	4	0	0	Katepurna
4	Karanja Lad	Washim	Wardha	4	0	0	Wardha
5	Akot	Akola	Purna	0.8	0	0	Purna
6	Buldhana	Buldhana	Painganga	0.62	0	0	Painganga
7	Khamgaon	Buldhana	Purna	0.886	0	0	Purna
8	Shegaon	Buldhana	Mann	4	2	50.0	Mann
9	Malkapur	Buldhana	Nalganga	0.5	0	0	Nalganga
10	Chikhli	Buldhana	Painganga	0.485	0	0	Painganga
11	Sangamner	Ahmednagar	Pravara River	3.8	0	0	Pravara River
12	Kopargoan	Ahmednagar	Darna-Nandur-Madhmeshwar	7	0	0	Darna-Nandur- Madhmeshwar
13	Shrirampur	Ahmednagar	Bhandadara dam	2.5	0	0	Bhandadara dam
14	Pachora	Jalgaon	Girna river	32	0	0	Girna river
15	Amalner	Jalgaon	Bori river	3.15	0	0	Bori river
16	Chalisgoan	Jalgaon	Girna river	7.21	0	0	Girna river
17	Savada	Jalgaon	Tubewell	0.57	0	0	Tubewell

Status of Sewage Treatment in B Class Municipal Council in Maharashtra							
18	Chopra	Jalgaon	Tapi river	3.2	0	0	Tapi river
19	Shirpur	Dhule	Karanvada dam and river Tapi	32	0	0	Karanvada dam and river Tapi
20	Daudai	Dhule	Tapi and Amravati	18	0	0	Tapi and Amravati
21	Nandurbar	Nandurbar	Chivan river and Jharali dam	45	0	0	Chivan river and Jharali dam
22	Dahanu	Palghar	...	4	0	0	Nalla/Creek
23	Palghar	Palghar	...	2.4	0	0	Nalla/Creek
24	Kamthi	Nagpur	Kanhan	8	0	0	Kanhan
25	Hinganghat	Wardha	Vena	1.53	0	0	Vena
26	Umred	Nagpur	Aam	4.5	0	0	Aam
27	Bhandara	Bhandara	Wainganga	13.52	0	0	Wainganga
28	Tumsar	Bhandara	Vainganga	6.35	0	0	Wainganga
29	Chiplun	Ratnagiri	Vashishthi	7	0	0	Vashishthi
30	Vita	Sangli	Krishna	4.87	0	0	Krishna
31	Islamapur	Sangli	Krishna	9	0	0	Krishna
32	Ratnagiri	Ratnagiri	Panavala Lake	8.8	0	0	Arabian sea

Status of Sewage Treatment in B Class Municipal Council in Maharashtra							
33	Ballarpur	Chandrapur	Wardha river	8.4	0	0	Wardha river
34	Bhadravati	Chandrapur	Kondha Nalla	2.1	0	0	Wardha river
35	Pusad	Yavatmal	Puss river	4.02	0	0	Puss river
36	Vani	Yavatmal	Nirguda river	4.11	0	0	Nirguda river
37	Gadchiroli	Gadchiroli	Wainganga	2.8	0	0	Wainganga
38	Kulgaon-Badlapur	Thane	----	18	0	0	Ulhas river
39	Gangakhed	Parbhani	Godavari	2	0	0	Godavari
40	Hingoli	Hingoli	Kayadhu	4.2	0	0	Kayadhu
41	Basmath	Hingoli	Ugadi	2.5	0	0	Ugadi
42	Deglur	Nanded	Lendi	15	0	0	Nalla
43	Udgir	Latur	Lendi	5.4	0	0	Lendi
44	Osmanabad	Osmanabad	Bhogavati	5.3	0	0	Bhogavati
45	Ambajogai	Beed	Manjara	5	0	0	Local Nalla
46	Daund	Pune	Bhima	4.2	0	0	Bhima
47	Baramati municipal	Pune	Karha	4.2	0	0	Karha
48	Karad	Satara	Krishna and Koyna	10.5	7.5	40.0	Farming and gardening

Status of Sewage Treatment in B Class Municipal Council in Maharashtra							
49	Phaltan	Satara	Neera	5	0	0	Sewage water is not Treated
50	Pandharpur	Solapur	Bhima	12	15	100	Agriculture
51	Talegaon	Pune	Indrayani	8.5	0	0	Indrayani

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
Sr No.	**Municipal Council**	**District**	**River / creek**	**Effluent Generated MLD**	**Effluent Treated MLD**	**% Treatment**	**Disposal**
1	Chandur Railway	Amravati	Wardha	1.8	0	0	Wardha
2	Chilakhadara	Amravati	Chandrabhagha	0.4	0	0	Local nalla to Chandrabhagha
3	Daryapura	Amravati	Chandrabhagha	2	0	0	Local nalla to Chandrabhagha
4	Chandur Bazaar	Amravati	Purna	1.2	0	0	Local nalla to Purna
5	Dhamangaon Railway	Amravati	Wardha	1.8	0	0	Local nalla to Wardha
6	Shedurajana Ghat	Amravati	Wardha	1.6	0	0	Local nalla to Wardha
7	Morshi municipality	Amravati	Wardha	3.2	0	0	Local nalla to Wardha
8	Mangarulapir	Washim	Wardha	2.4	0	0	Local nalla to Wardha

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
9	Risod	Washim	Painganga	1.6	0	0	Painganga
10	Murtizapur	Akola	Purna	0.388	0	0	Purna
11	Patur	Akola	Bordi	0.22	0	0	Bordi
12	Balapur	Akola	Mann	0.39	0	0	Mann
13	Telhara	Akola	Purna	0.18	0	0	Purna
14	Jalgaon - Jamod	Buldhana	Purna	0.26	0	0	Purna
15	Mehkar	Buldhana	Painganga	0.377	0	0	Painganga
16	Deulagaonraja	Buldhana	Amana	1.4	0	0	Amana
17	Sindhkhedraja	Buldhana	Khadakpurna	0.13	0	0	Khadakpurna
18	Nandura	Buldhana	Gyanganga	1.5	0	0	Gyanganga
19	Lonar	Buldhana	Lendi/ Amber lake to Lonar lake	0.2	0	0	Lendi/ Amber lake to Lonar lake
20	Uran	Raigad	-	2.8	0	0	Uran creek
21	Alibaug	Raigad	Amba river	4.4	0	0	Sea
22	Khopoli	Raigad	Patalganga river	5.6	0	0	Patalganga river
23	Matheran	Raigad	Ulhas river	1.1	0	0	Matheran Darikhore
24	Karjat	Raigad	Pej river	4.8	0	0	Ulhas river

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
25	Pen	Raigad	Bhogesvari river	4.8	0	0	Bhogesvari river
26	Murud-janjira city council	Raigad	Garambi dam	1.3	0	0	Sea
27	Roha town Council	Raigad	Kundalika river	2.8	0	0	Kundalika river
28	Mahad town council	Raigad	Kurle Dam	3.3	0	0	Savitri river
29	Srivardhan city council	Raigad	Ranwali Dam	1.09	0	0	Sea
30	Panvel Municipal Council	Raigad	Morbe Dam	18	0	0	Panvel creek
31	Satana	Nashik	Girna	1.47	0	0	Girna
32	Nandagaon	Nashik	Dahegaon / Girna Dam	1.2	0	0	Girna river
33	Sinnar	Nashik	Darna river	4.3	0	0	Darna river
34	Bhagur	Nashik	Darna river	0.87	0	0	Darna river
35	Trimbakeshwar	Nashik	Godavari river	1	0.7	70.0	Godavari river
36	Yeola	Nashik	Palkhed dam	2.8	0	0	Palkhed dam
37	Manmad	Nashik	Wagad dam	6	0	0	Wagad dam

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
38	Igatpuri	Nashik	Darna river	4.2	0	0	Darna river
39	Srigonda	Ahmednagar	Ghod canal	1.9	0	0	Ghod canal
40	Pathardi	Ahmednagar	Jayakwadi dam	2	0	0	Jayakwadi dam
41	Rahata	Ahmednagar	Ajwa-kalwa darna dam	6	0	0	Ajwa-kalwa darna dam
42	Rahuri	Ahmednagar	Moola Dam	2.7	0	0	Moola Dam
43	Deolali Parvara	Ahmednagar	Moola Dam	3	0	0	Moola Dam
44	Erandol	Jalgaon	Anjani and Girna River	9.1	0	0	Anjani and Girna River
45	Parola	Jalgaon	Bori river	3.49	0	0	Bori river
46	Raver	Jalgaon	Tapi river	11	0	0	Tapi river
47	Faizpur	Jalgaon	Suki river	0.7	0	0	Suki river
48	Yawal	Jalgaon	Bore Well	0.28	0	0	Bore Well
49	Dharangoan	Jalgaon	Anjani / Tapi River	8.4	0	0	Anjani / Tapi River
50	Jamner	Jalgaon	Kang river	11	0	0	Kang river

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
51	Bhadaganva	Jalgaon	Girna river	9.5	0	0	Girna river
52	Navapur	Nandurbar	Rangavli	10.02	0	0	Rangavli
53	Shahada	Nandurbar	Gomti river	12	0	0	Gomti river
54	Taloda	Nandurbar	Vihiri	12	0	0	Vihiri
55	Jawhar Municipal Council	Palghar	...	1.5	0	0	creek
56	Municipal Parishad Katol	Nagpur	Nala local	5.6	0	0	Nala local
57	Khapa	Nagpur	Nala local	0.61	0	0	Nala local
58	Municipal Parishad Narkhed	Nagpur	Kolar	1.4	0	0	Kolar
59	Ramtek city Parishad	Nagpur	Nala local	0.835	0	0	Nala local
60	Kalmeshwar Nagar Parishad	Nagpur	Nala local	2.2	0	0	Nala local
61	Municipal Parishad Saoner-	Nagpur	Kanhan	4	0	0	Kanhan
62	Mohapa	Nagpur	Nala local	0.52	0	0	Nala local

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
63	Movad	Nagpur	Kolar	0.56	0	0	Kolar
64	Arvi	Wardha	Bakadi local river	0.41	0	0	Bakadi local river
65	Pulgaon	Wardha	Wardha	0.36	0	0	Wardha
66	Deoli	Wardha	Yashoda	0.15	0	0	Yashoda
67	Sindi (railway)	Wardha	Vena	0.15	0	0	Vena
68	Wadi	Nagpur	Nag	1	0	0	Nag
69	Tiroda	Gondia	Vainganga	3.4	0	0	Vainganga
70	Pavani	Bhandara	Vainganga	3.41	0	0	Vainganga
71	Khed City Council	Ratnagiri	Jagabudi	2.5	0	0	Jagabudi
72	Kurundwad	Kolhapur	Krishna	0.8	0	0	Panchganga
73	Kagal	Kolhapur	Dudhaganga	2.4	0	0	Agriculture
74	Gadhingalaj	Kolhapur	Hiranya keshi	2.4	0	0	Agriculture
75	Murgud	Kolhapur	Piraji Lake	0.64	0	0	Agriculture
76	Malkapur	Kolhapur	Karadvi	0.2	0	0	Agriculture
77	Panhala	Kolhapur	Kasari	0.45	0	0	Agriculture

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
78	Wadgaon	Kolhapur	Varna	0.9	0	0	Agriculture
79	Jaisingapur	Kolhapur	Krishna	4.64	0	0	Agriculture
80	Tasgaon	Sangli	Krishna	2.63	0	0	Nalla/Agriculture
81	Ashta	Sangli	Krishna	2.1	0	0	Krishna
82	Jat	Sangli	Lake	1.5	0	0	Nalla/Agriculture
83	Malvan City Council	Sindhudurg	Dhamapur Lake	0.5	0	0	Sea
84	Vengurla City Council	Sindhudurg	Nisaan Lake	2.5	0	0	Sea
85	Sawantwadi town council	Sindhudurg	Palanekanda Lake	2.5	0	0	Palanekanda Lake
86	Rajapur city council	Ratnagiri	Arjuna	2	0	0	Arjuna
87	Rajur Town Council	Chandrapur	Wardha river	2.1	0	0	Wardha river
88	Mul Town Council	Chandrapur	Mul	1.4	0	0	Mul
89	Bramhapuri city council	Chandrapur	Vainganga	2.8	0	0	Vainganga

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
90	Umarkhed city council	Yavatmal	Painganga river	2.04	0	0	Painganga river
91	Darwha city council	Yavatmal	Kupati river	1.82	0	0	Kupati river
92	Digras Municipal Council	Yavatmal	Nadgaon dam	2.02	0	0	Painganga
93	Pandharkawda Municipal Council	Yavatmal	Khuni river	1.99	0	0	Khuni river
94	Ghatanji city council	Yavatmal	Adan river	1.16	0	0	Adan river
95	Ner - Navabapur	Yavatmal	Patraj dam	1.5	0	0	Patraj dam
96	Wardsa - Desaiganj	Gadchiroli	Vainganga	8.4	0	0	Vainganga
97	Purna	Parbhani	Purna	1.45	0	0	Purna
98	Salou	Parbhani	Dudhana	2.1	0	0	Dudhana
99	Jinntur	Parbhani	Ulti	0.537	0	0	Ulti
100	Pathri	Parbhani	Godavari	2.2	0	0	Godavari
101	Manvat	Parbhani	Jahri laghu lake	0.66	0	0	Jahri laghu lake

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
102	Sonapeth	Parbhani	Vann	0.3	0	0	Vann
103	Kalamnuri	Hingoli	Kayadhu	1.8	0	0	Kayadhu
104	Loha	Nanded	Neeranak	0.5	0	0	Local Nalla
105	Kandahar	Nanded	Manyada	0.5	0	0	Local Nalla
106	Mukhed	Nanded	Mohanavati	1.6	0	0	Local Nalla
107	Dharmabad Council	Nanded	Godavari	2.5	0	0	Local Nalla
108	Bhokar Council	Nanded	Sudha	20	0	0	Local Nalla
109	Hadgaon Council	Nanded	Painganga	0.35	0	0	Local Nalla
110	Mugkhed	Nanded	Seeta	12	0	0	Local Nalla
111	Kinwat Council	Nanded	Painganga	0.3	0	0	Local Nalla
112	Umari Council	Nanded	Kudala	0.3	0	0	Local Nalla
113	Kundalavadi Council	Nanded	Godavari	0.5	0	0	Local Nalla
114	Biloli Council	Nanded	Manjara	1	0	0	Local Nalla

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
115	Ausa Municipality	Latur	-	3.6	0	0	Local Nalla
116	Ahmedpur Municipality	Latur	Manyara	1.8	0	0	Local Nalla
117	Nilanga Municipality	Latur	-	1.7	0	0	Ground
118	Kalamb municipality	Osmanabad	Manjara	1.55	0	0	Manjara
119	Murum Municipality	Osmanabad	Benitura	1.25	0	0	Benitura
120	Naldurg Municipality	Osmanabad	Bori	1.2	0	0	Bori
121	Tujapur Municipality	Osmanabad	Bori	1.9	0	0	Bori
122	Paranda Municipality	Osmanabad	Sina	1	0	0	Sina
123	Bhum Municipality	Osmanabad	Banganga	1.3	0	0	Banganga
124	Umarag Municipality	Osmanabad	Benitura	2.4	0	0	Benitura

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
125	Paithan The Municipality	Aurangabad	Godavari	2.4	1.7	0	Godavari
126	Kannad city Corporation	Aurangabad	Sivana	2.4	1.7	0	Sivana
127	SILLOD	Aurangabad	Dudhana	3	2.2	0	Dudhana
128	Gangapur	Aurangabad	Godavari	1.5	1.1	0	Godavari
129	Vaijapura	Aurangabad	Godavari	2.6	1.85	0	Godavari
130	Khultabad	Aurangabad	Godavari	0.9	0.65	0	Godavari
131	Ambad	Jalna	Godavari	2.5	0	0	Local Nalla
132	Bhokardan	Jalna	Khelna	0.7	0	0	Local Nalla
133	Partur	Jalna	Dudhana	2.3	0	0	Local Nalla
134	Dharur	Beed	Manjara	1.4	0	0	Local Nalla
135	Gevarai	Beed	Godavari	2.2	0	0	Local Nalla
136	Majalagaon	Beed	Sindhaphana	2.8	0	0	Local Nalla

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
137	Indapur	Pune	Bhima	2.4	0	0	Bhima
138	Jejuri municipality	Pune	Karha	2.4	0	0	Karha
139	Sasvad municipality	Pune	Karha	4	0	0	Karha
140	Bor	Pune	Nira river (Bhataghar dam)	0.9	0	0	Nira
141	Wai Council	Satara	Krishna	4.8	0	0	Krishna
142	Mahabaleshwar giristhana	Satara	Koyna and Venna	6	2.5	90.0	For agriculture and for the use of hotel garden
143	Panchgani Municipal Council giristhana	Satara	Krishna and Venna	0.975	1.3	90.0	For agriculture and for the use of hotel garden
144	Rahimatapur Council	Satara	Krishna	0.8	0	0	Sewage not treated
145	Mhaswad Council	Satara	Manganga	2.1	0	0	Sewage not treated
146	Karmala	Solapur	Sina	1.4	0	0	Agriculture
147	Sangola	Solapur	Bhima	1.79	0	0	Local Nalla

Status of Sewage Treatment in C Class Municipal Council in Maharashtra							
148	Akkalkot	Solapur	Bori	0.4	0	0	Agriculture
149	Mangalvedha	Solapur	Bhima	1.22	0	0	Agriculture
150	Kurduwadi	Solapur	Sina	1.45	0	0	Local Nalla
151	Dudhani The municipality	Solapur	Bori	0.56	0	0	Agriculture
152	Maindargi	Solapur	Bori	0.77	0	0	Agriculture
153	Lonavala Municipal Council	Pune	Indrayani	18	3.69	20.50	Indrayani
154	Alandi Municipal Council	Pune	Indrayani	2.5	0	0	Indrayani
155	Shirur Council	Pune	Ghod river	3.5	3.5	100	Ghod river
156	Junnar Council	Pune	Mina river	2.2	0	0	Mina river
157	Chakan municipality	Pune	Bhima river	4	0	0	Bhima river
158	Rajgurunagar municipality	Pune	Bhima river	4	0	0	Bhima river

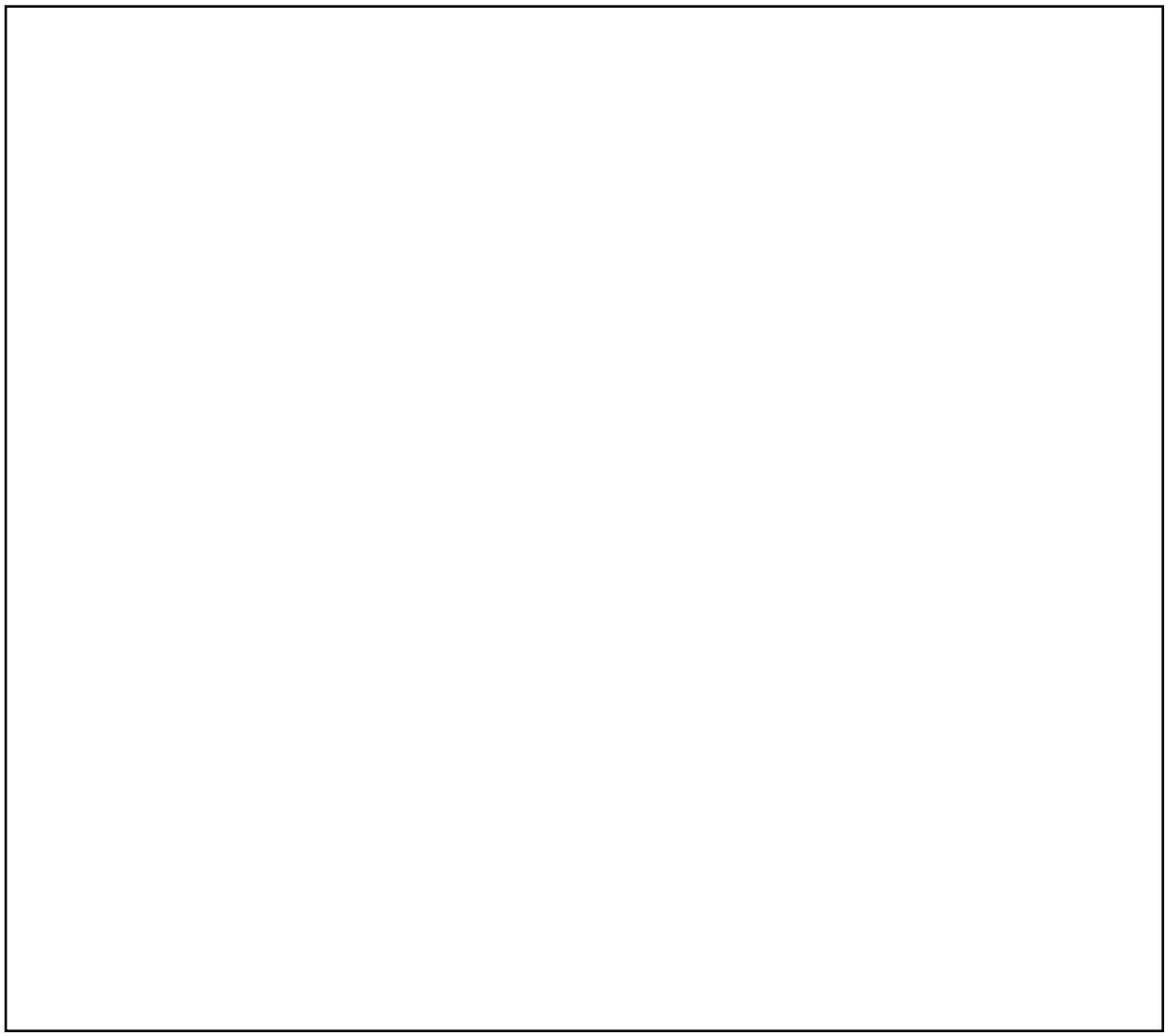
Nagar Panchyat

Sr No.	Nagar Panchyat	District	River / creek	Effluent Generated MLD	Effluent Treated MLD	% Treatment	Disposal
1	Shirdi Nagar Panchayat	Ahmednagar	Darna -Gangapur canal	3.8	2.8	90	Darna river
2	Guhagar	Ratnagiri	-	0.6	0	0	Sea
3	Dapoli	Ratnagiri	Jog	3	0	0	Jog
4	Kankavli	Sindhudurg	Gad	1.2	0	0	Gad
5	Mahar	Nanded	Painganga	0.15	0	0	Local Nalla
6	Malkapur	Satara	Koyna	6.75	0	0	Sewage not treated
7	Shahpur	Thane	Bhatasa river	0.5	0	0	Bhatasa river
8	Murbad	Thane	Murabadi river	2	0	0	Murabadi river

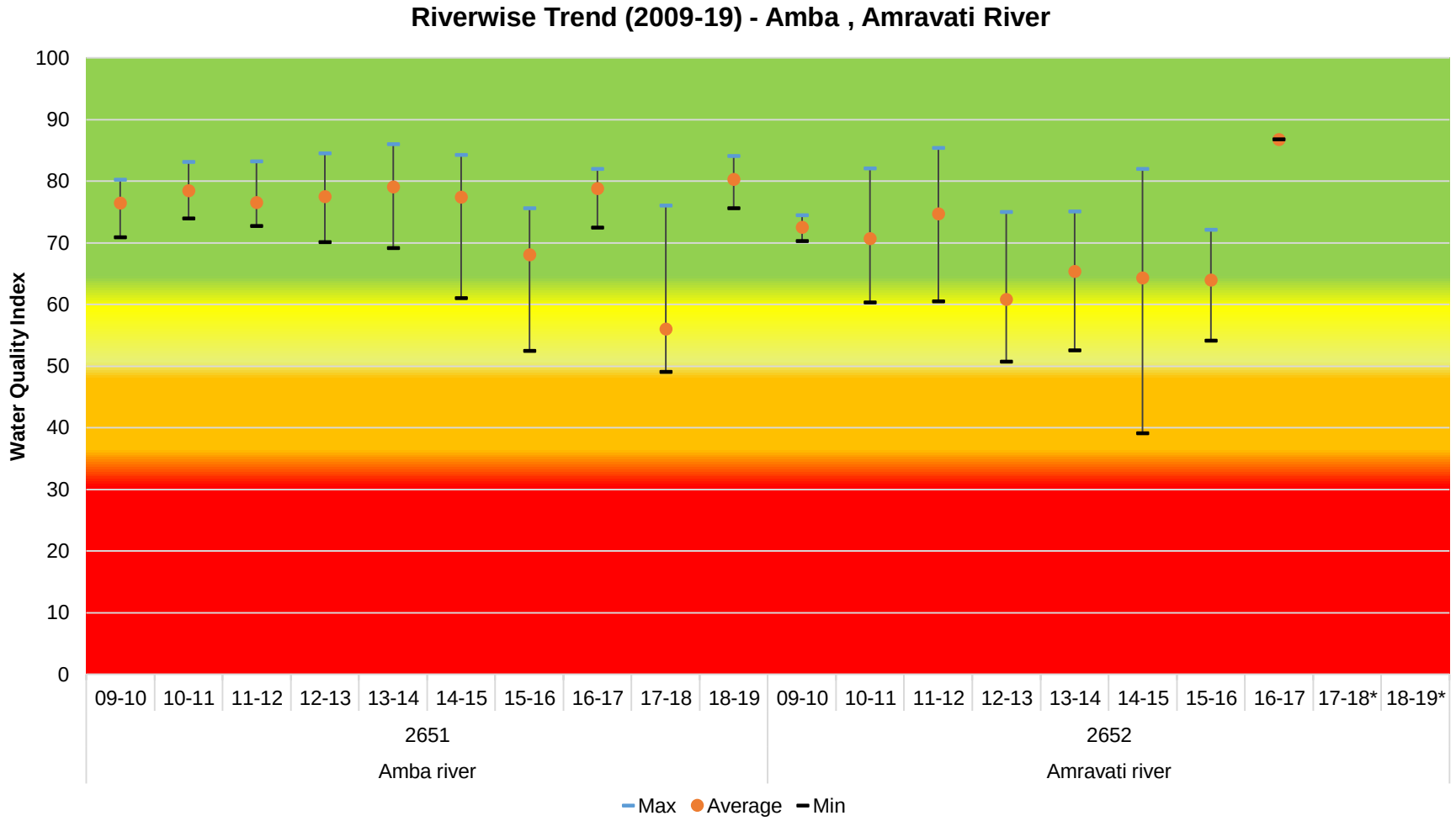
Cantonment

Sr No.	Nagar Panchyat	District	River / creek	Effluent Generated MLD	Effluent Treated MLD	% Treatment	Disposal
1	Deolali	Nashik	Darna river	0.74	0	0	Darna river
2	Bhingar	Ahmednagar	Mul dam	2	0	0	Mul dam
3	Aurangabad camp	Aurangabad	Kham river	1.5	1.1	0	Kham river
4	Dehu camp	Pune	Indrayani	6	0	0	Indrayani
5	Pune camp	Pune	Mula river	22.8	0	0	Mula river
6	Khadaki camp	Pune	Mula river	6	6	100	Mula river

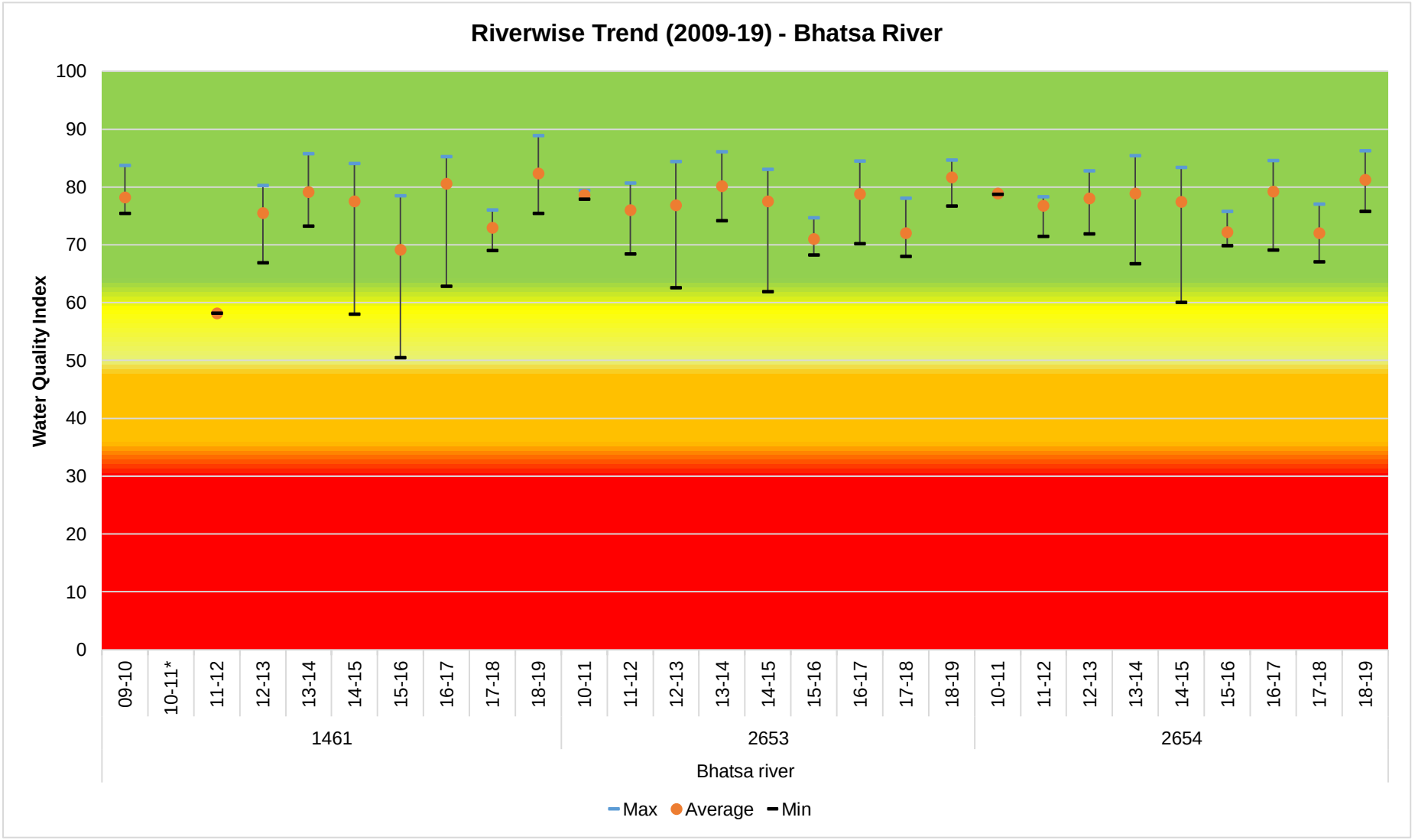
Annex V – Data Sets of Water Quality Monitored in 2018-19



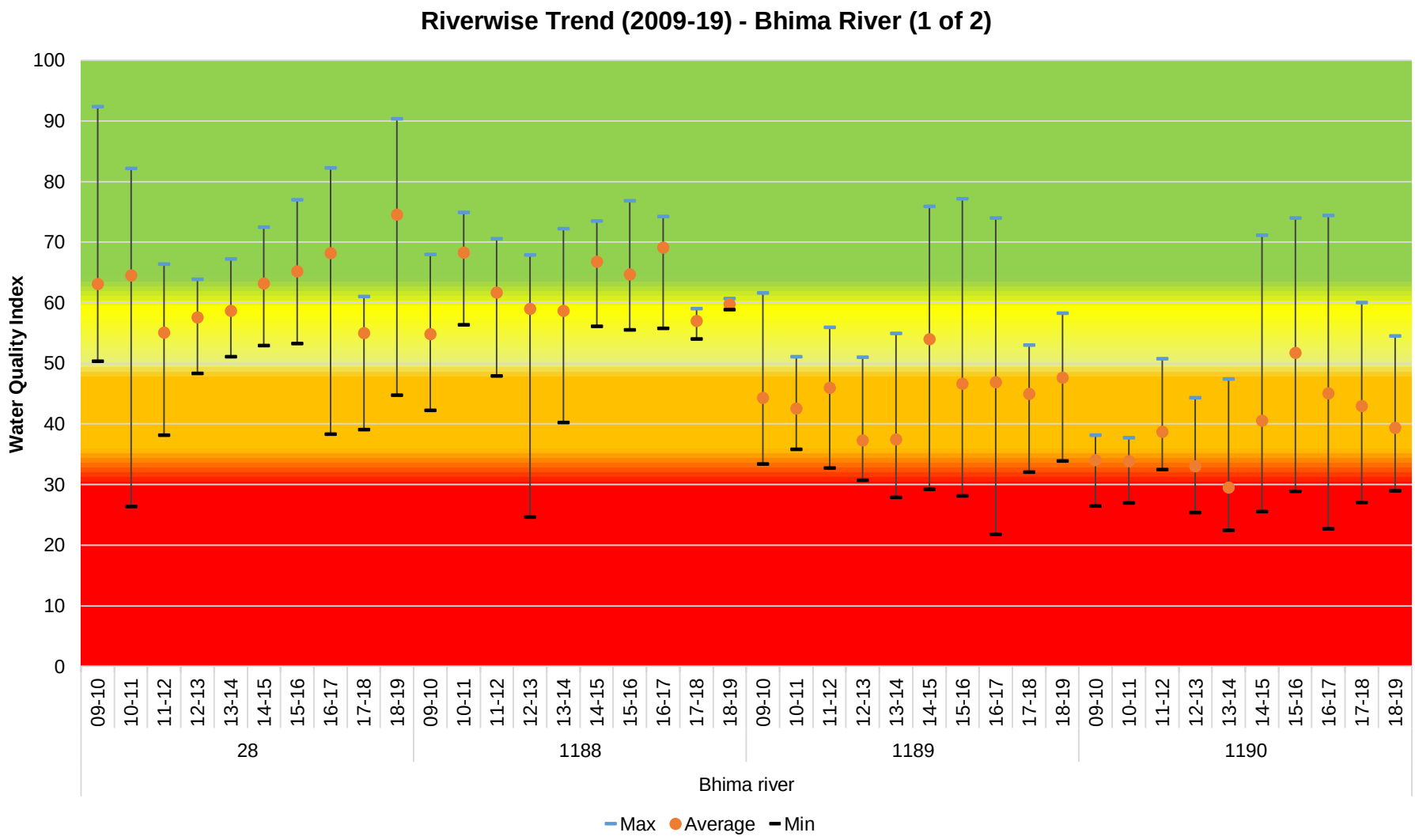
Riverwise Trend in WQI (2009-19)



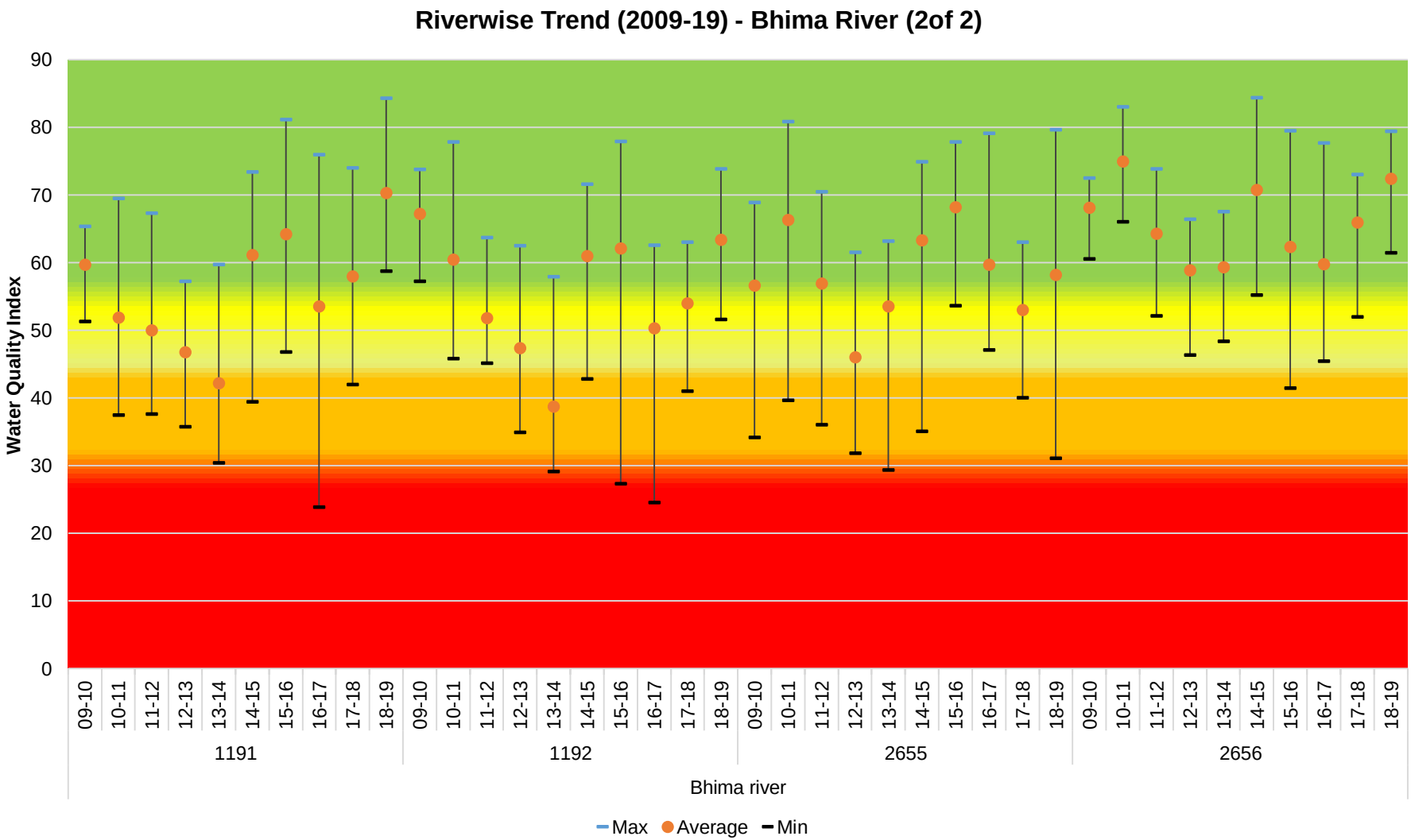
Note:* Stations are Dry/ No data available for respective year



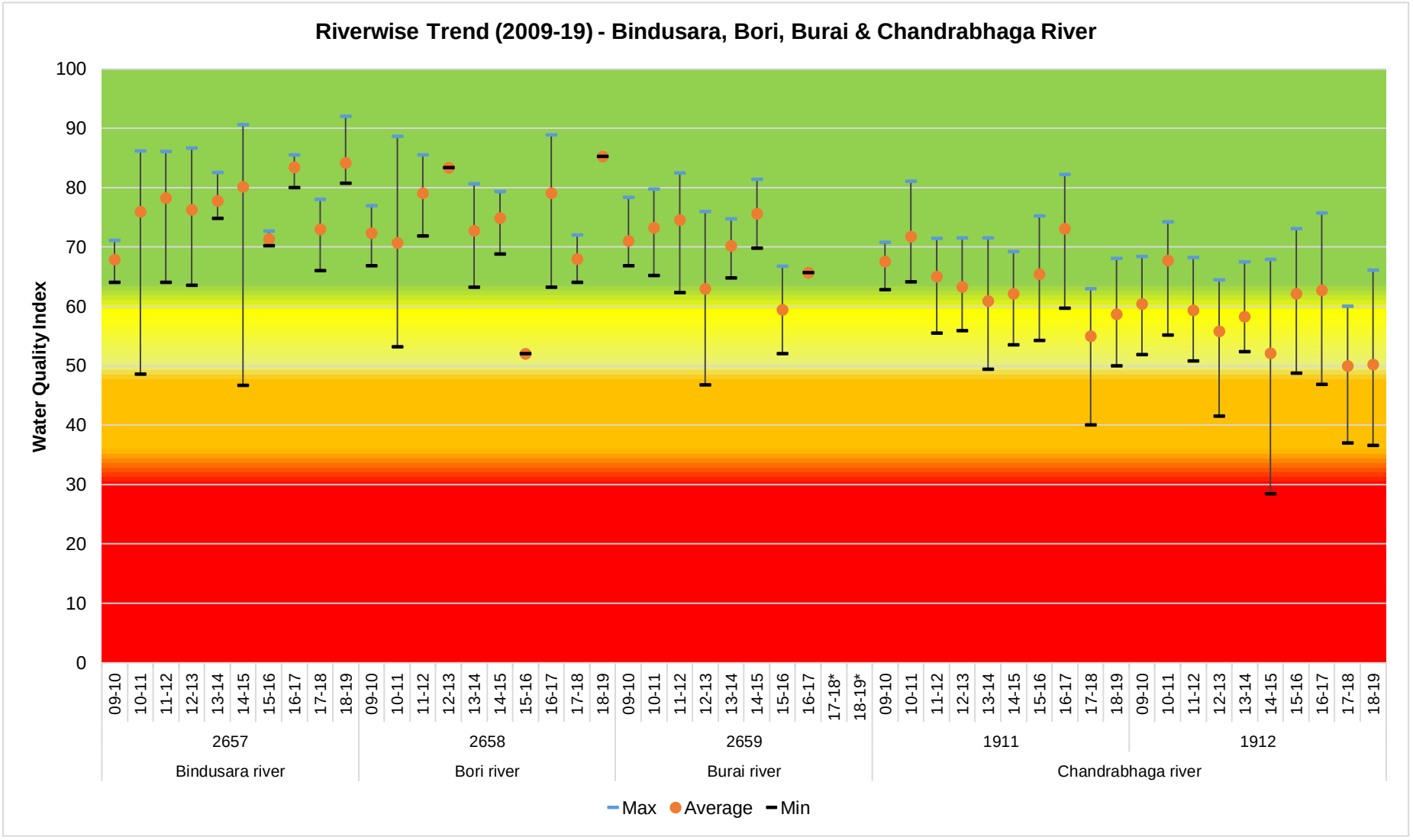
Note:* Stations are Dry/ No data available for respective year



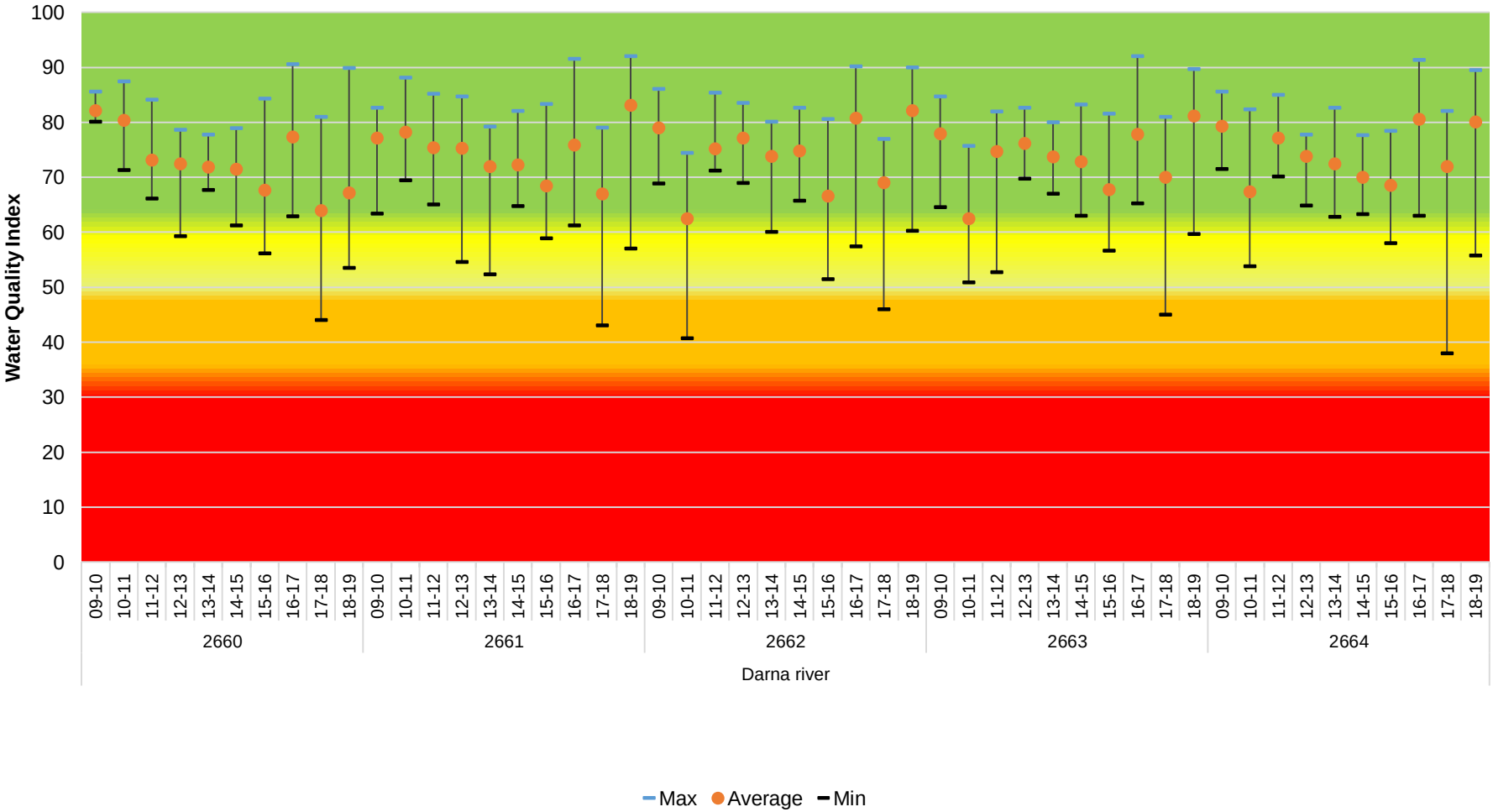
Note:* Stations are Dry/ No data available for respective year



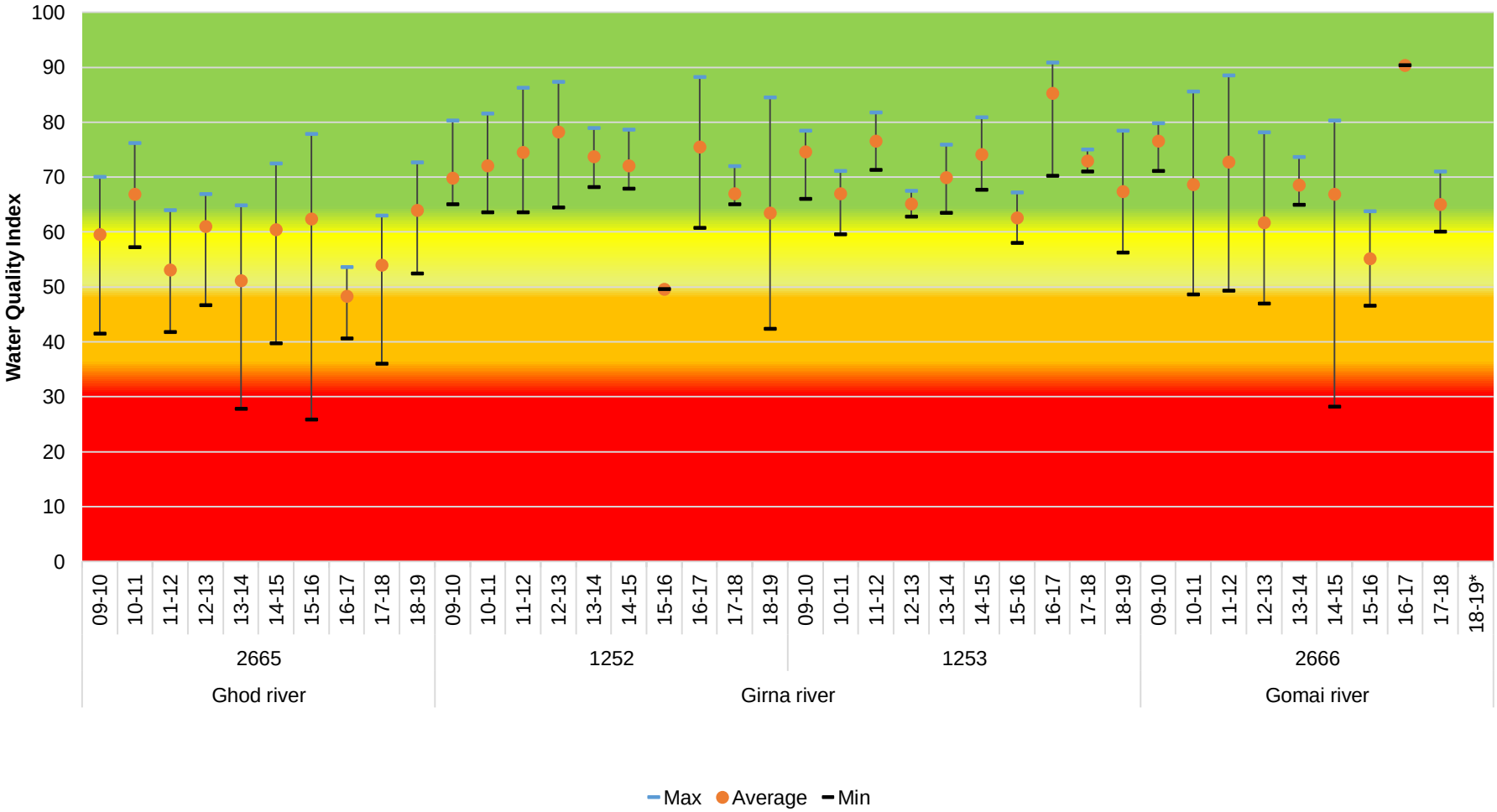
Note:* Stations are Dry/ No data available for respective year



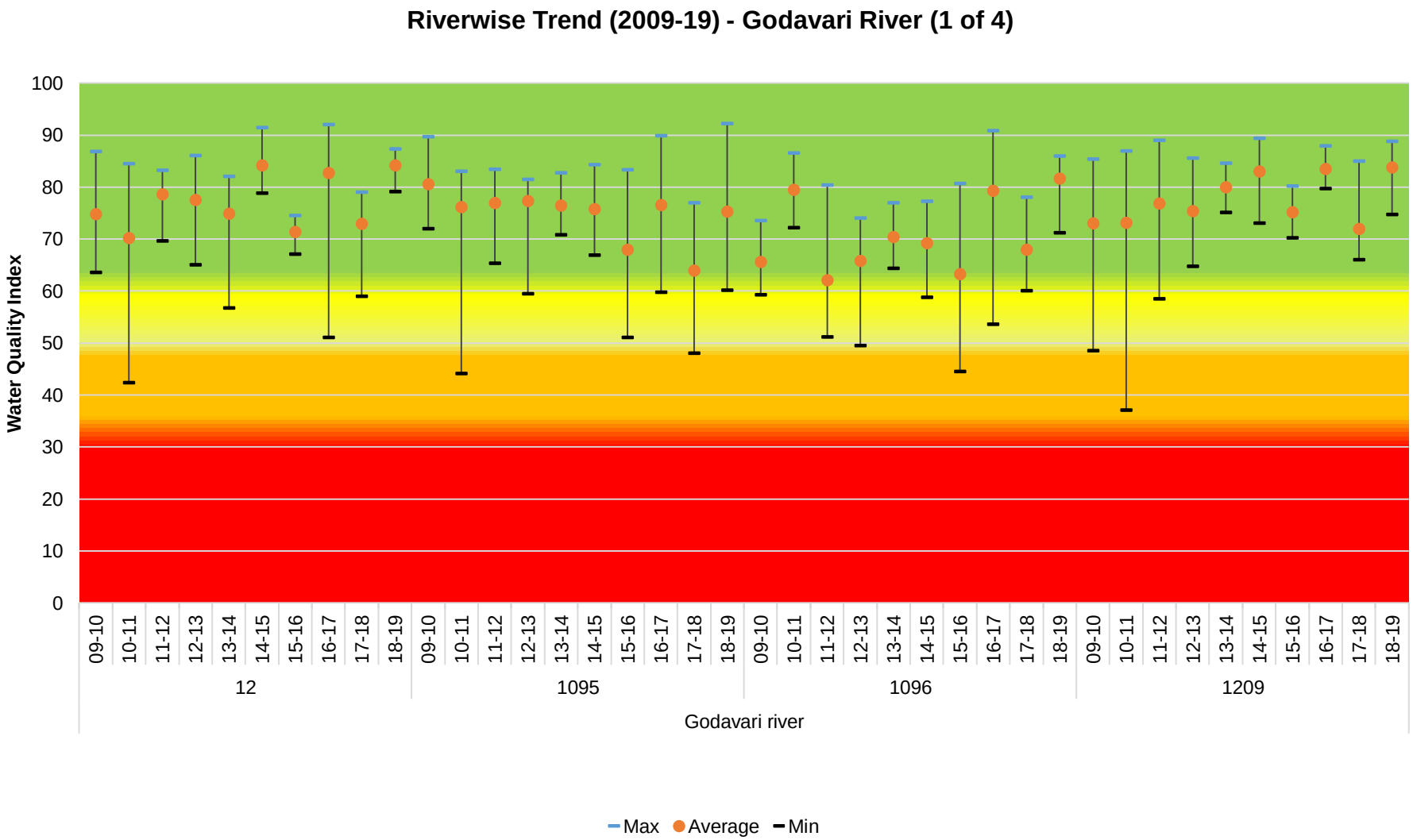
Note:* Stations are Dry/ No data available for respective year



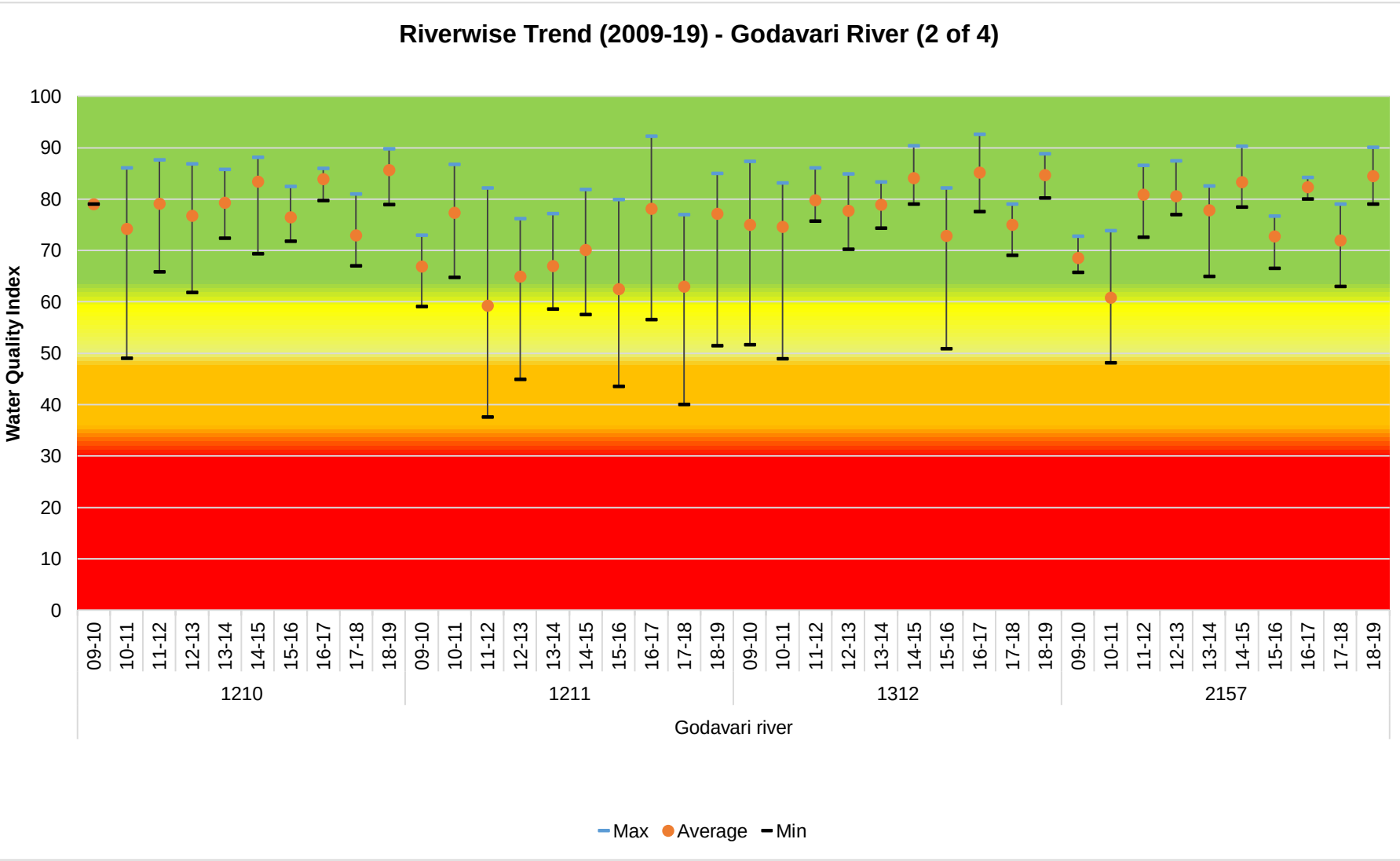
Note:* Stations are Dry/ No data available for respective year



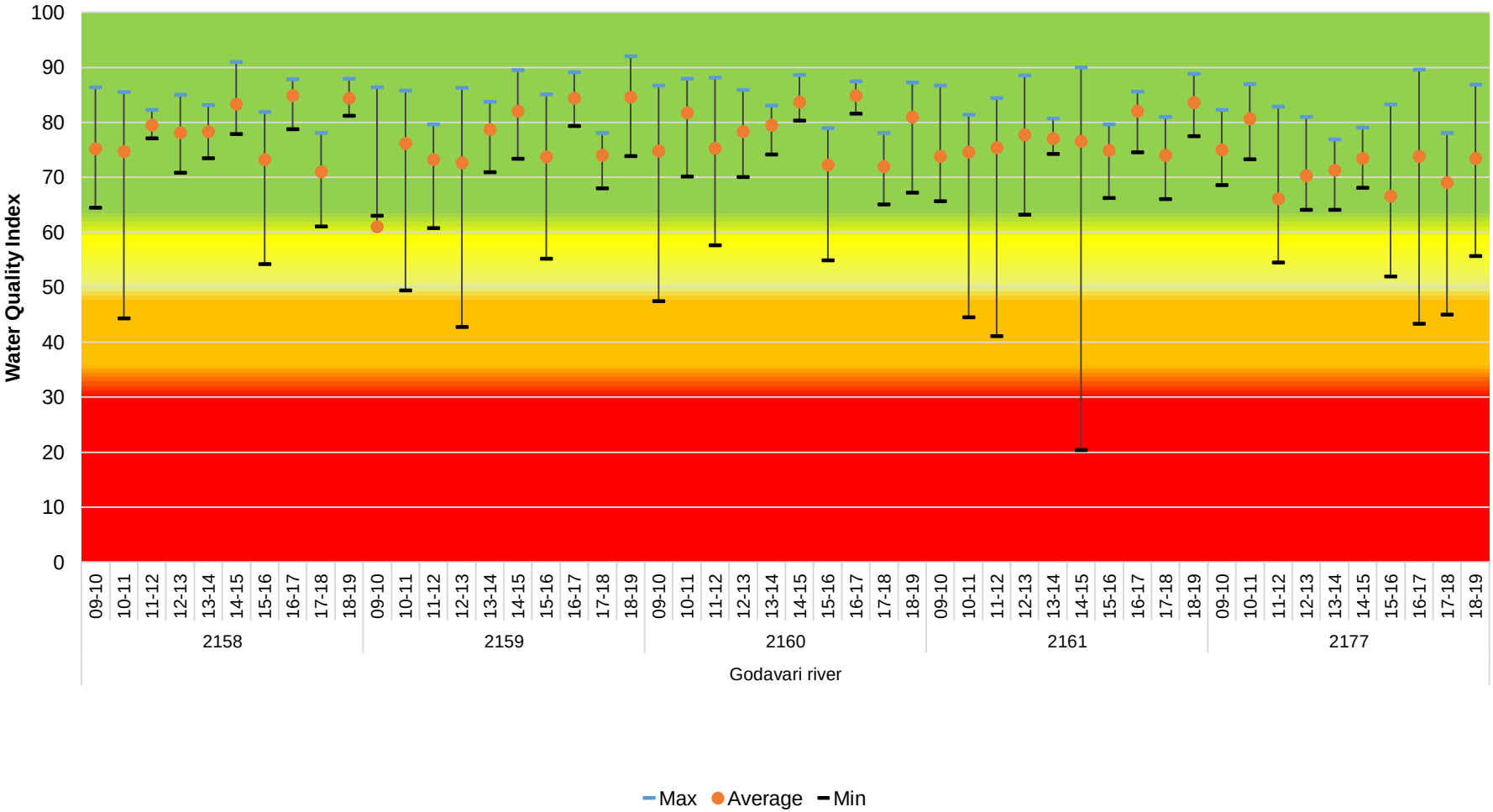
Note:* Stations are Dry/ No data available for respective year



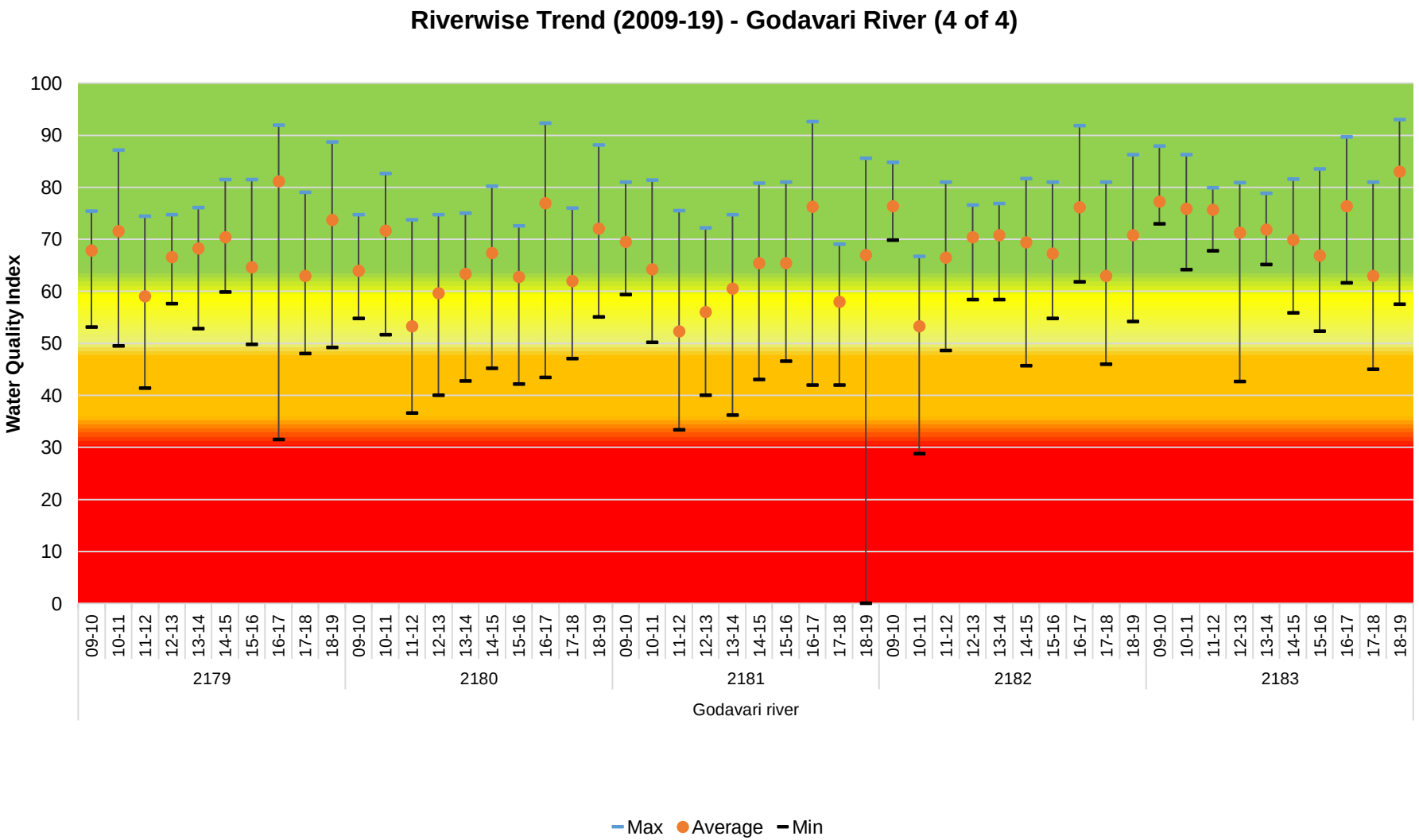
Note:* Stations are Dry/ No data available for respective year



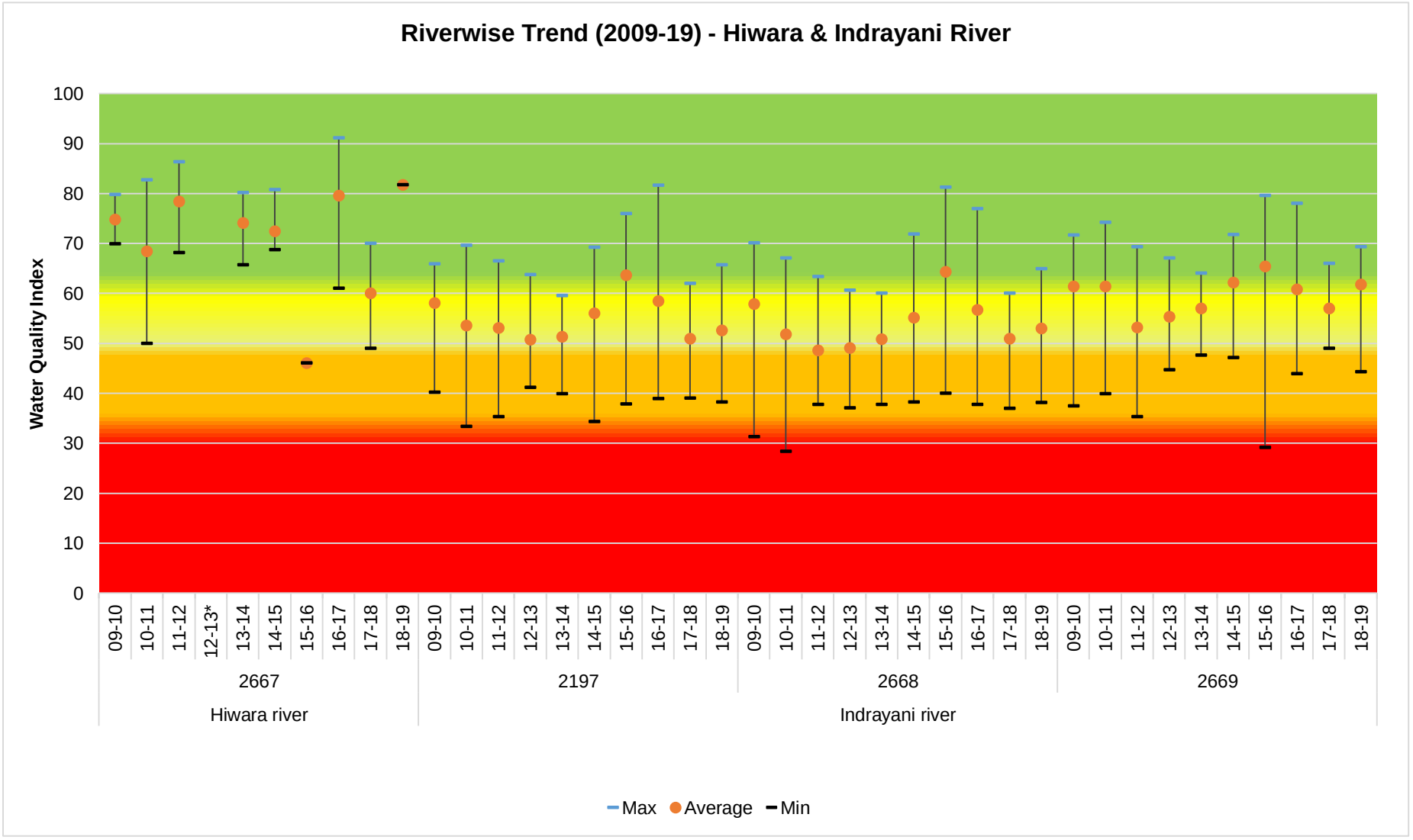
Note:* Stations are Dry/ No data available for respective year



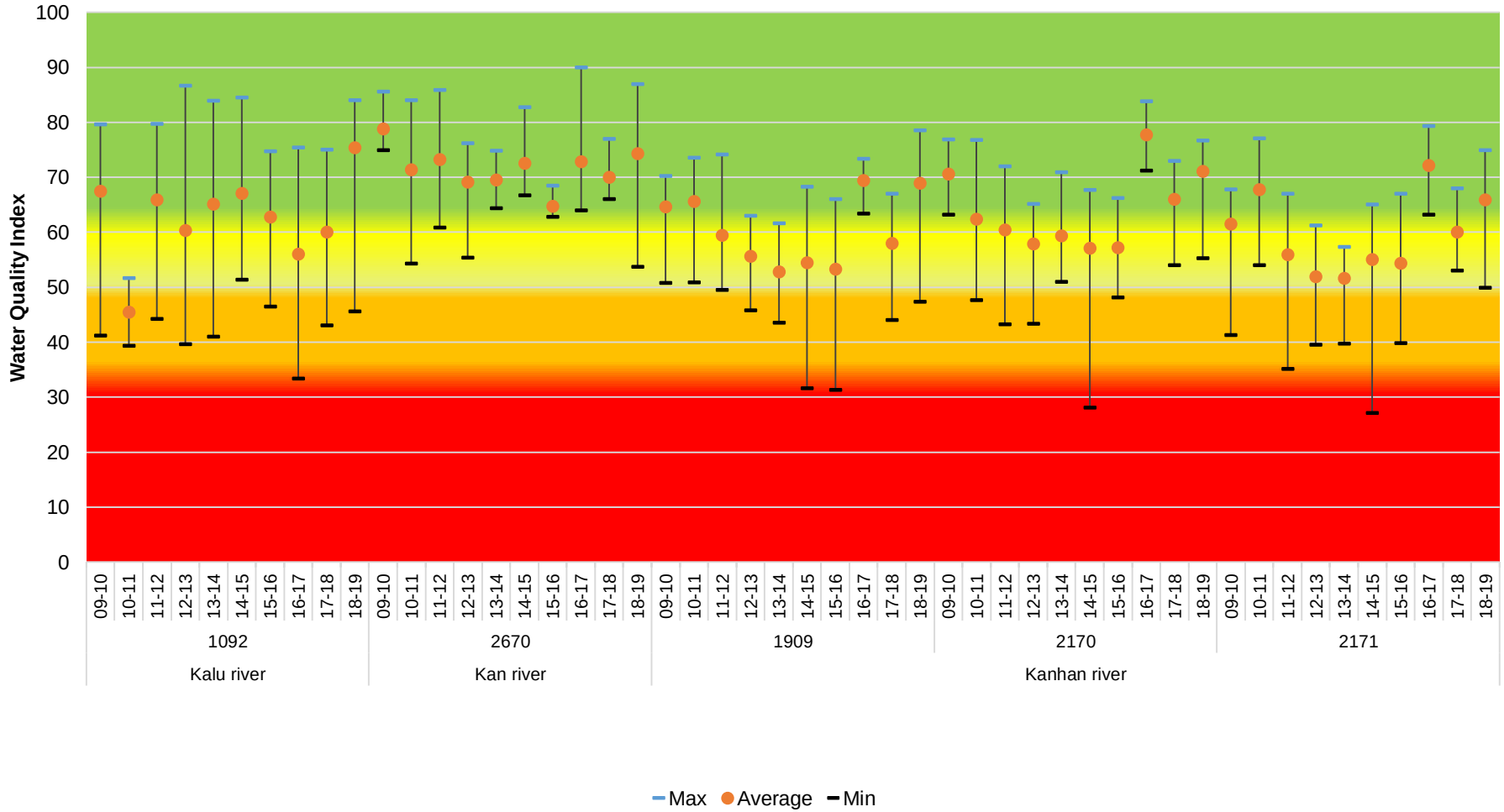
Note:* Stations are Dry/ No data available for respective year



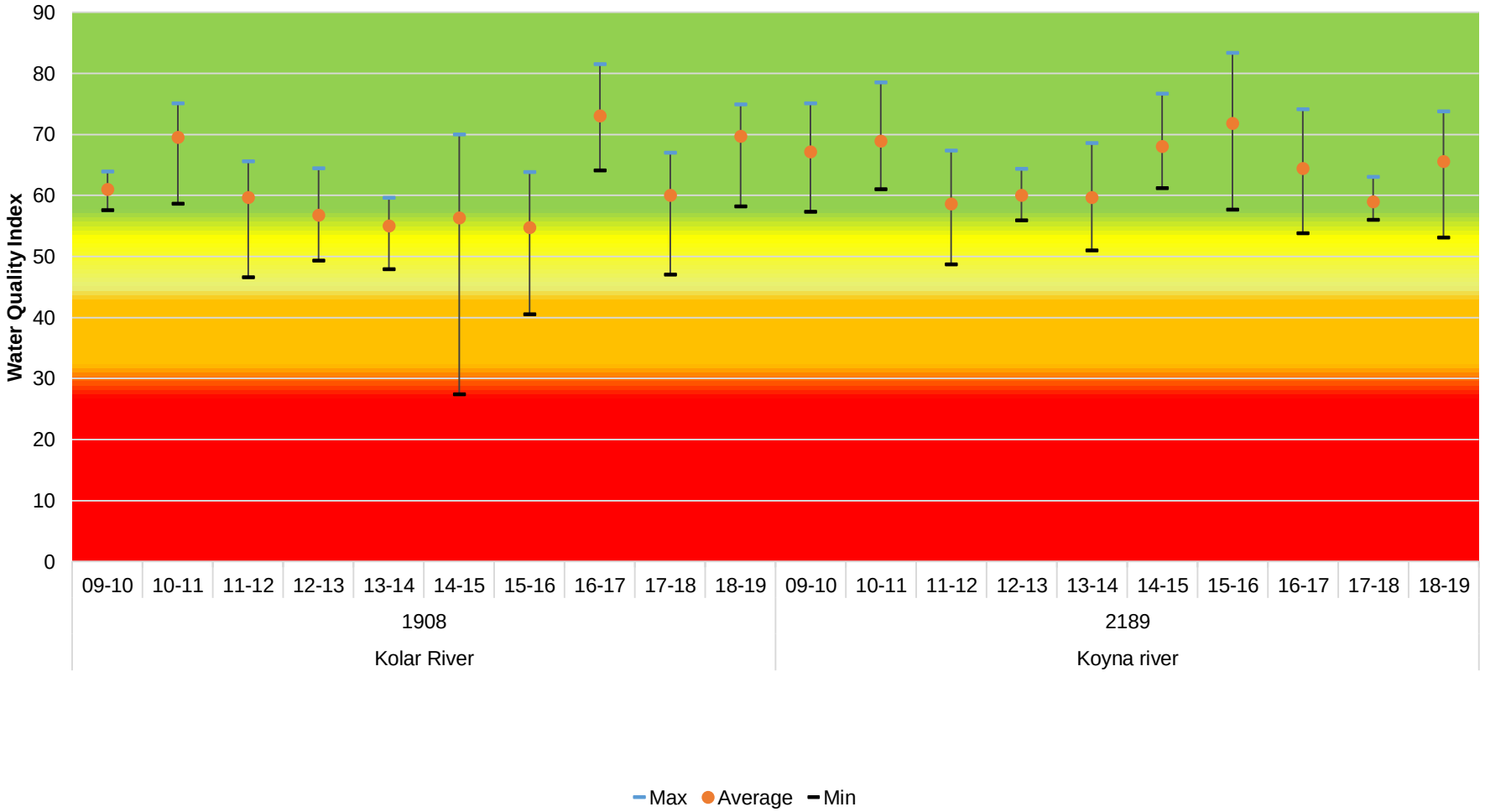
Note:* Stations are Dry/ No data available for respective year



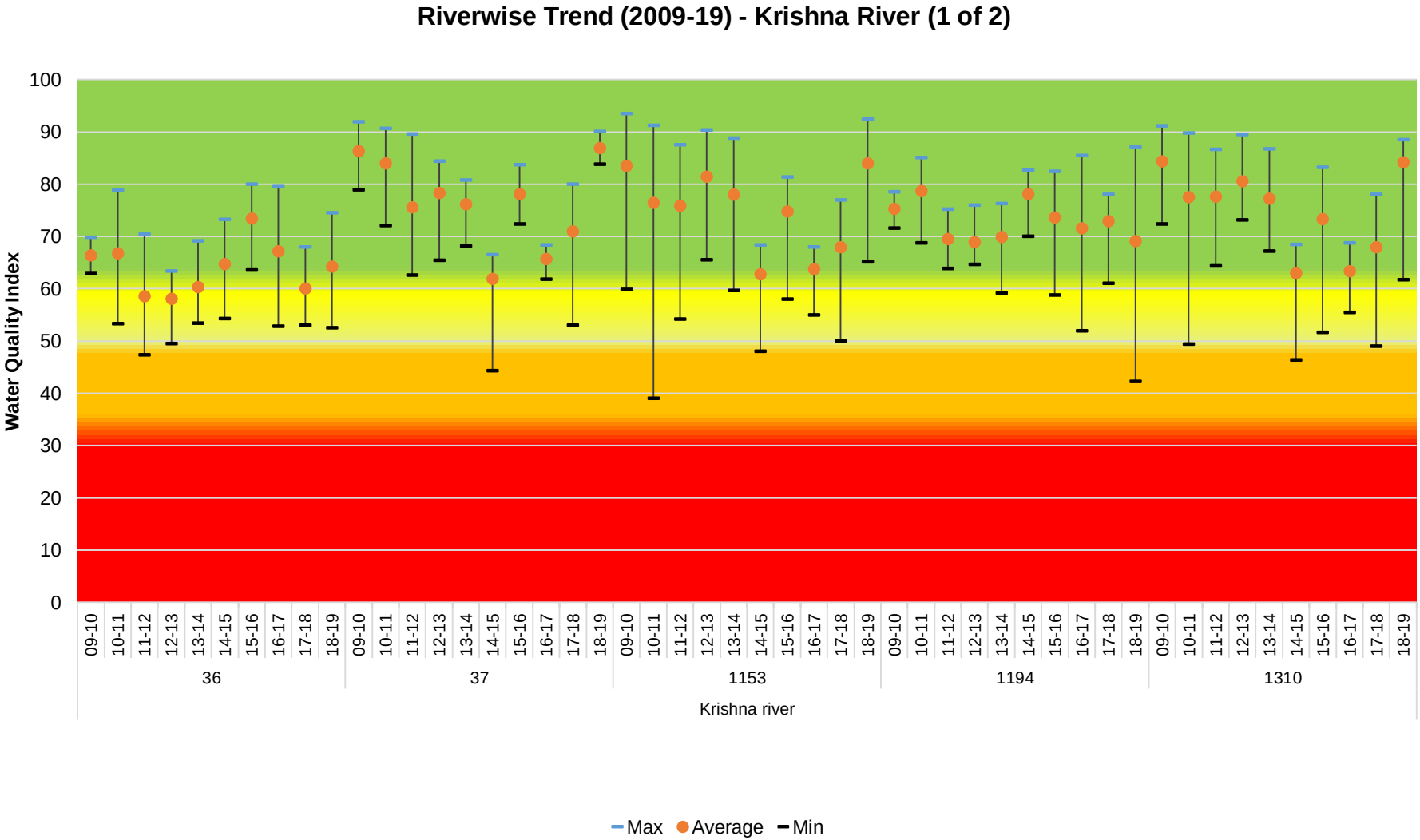
Note:* Stations are Dry/ No data available for respective year



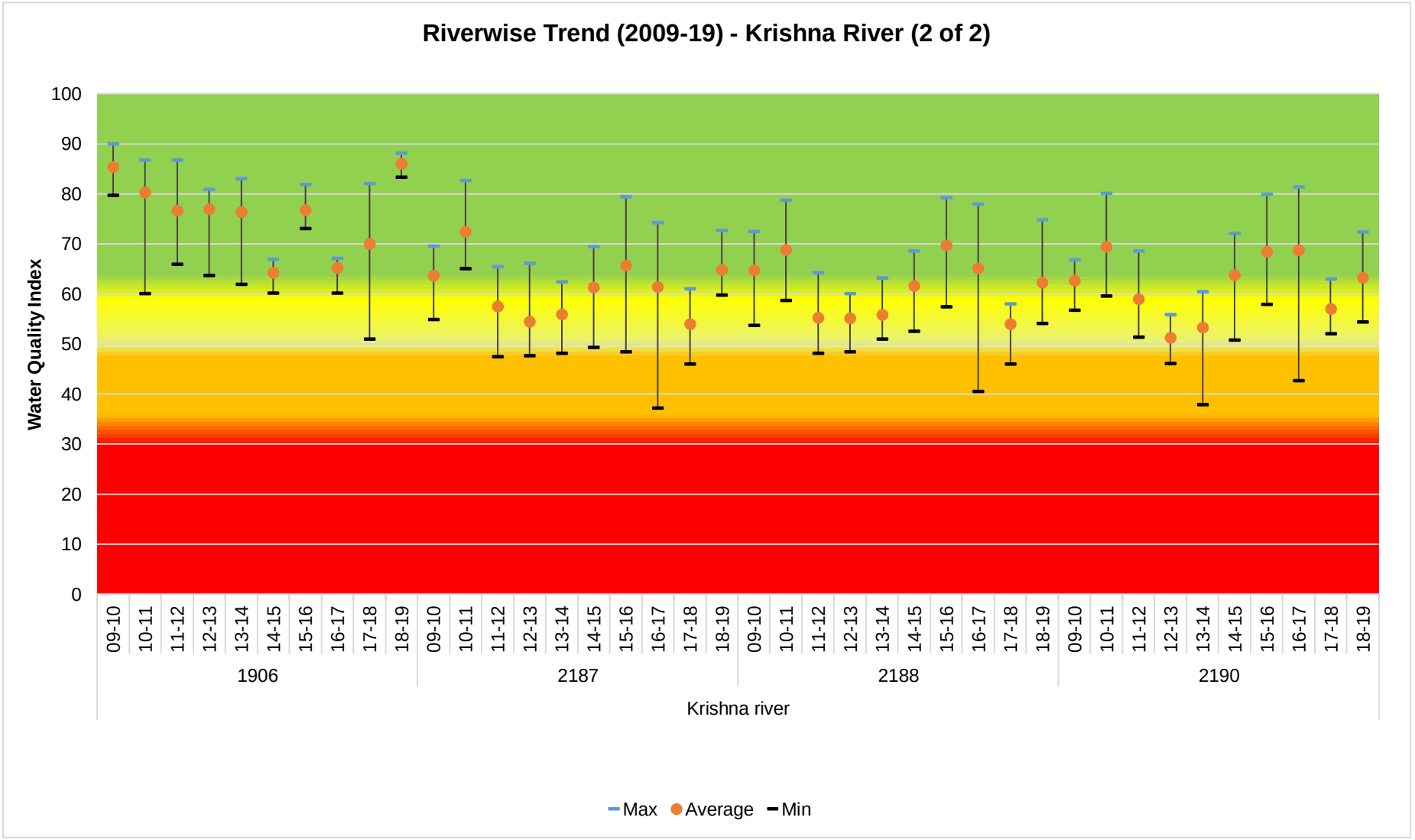
Note:* Stations are Dry/ No data available for respective year



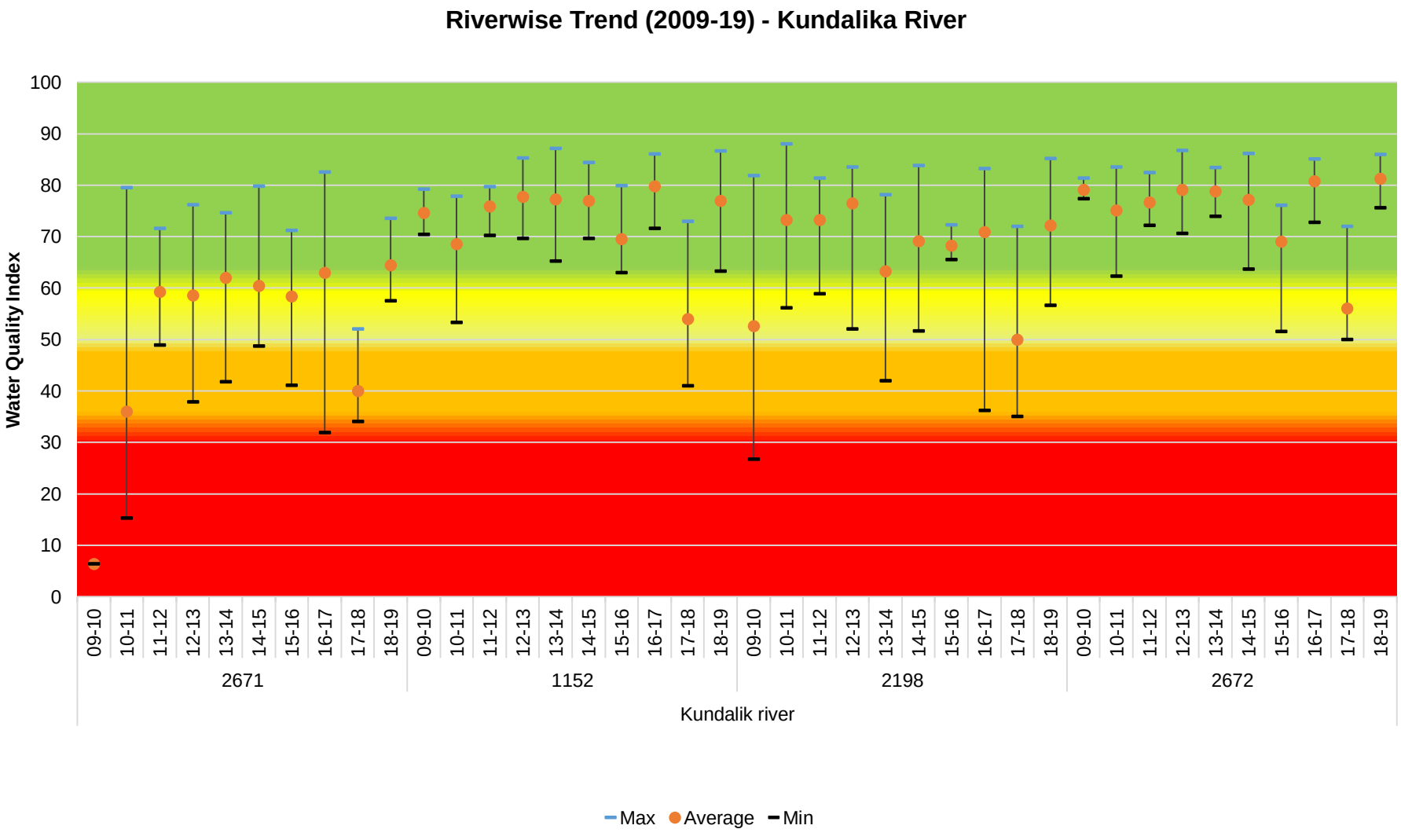
Note:* Stations are Dry/ No data available for respective year



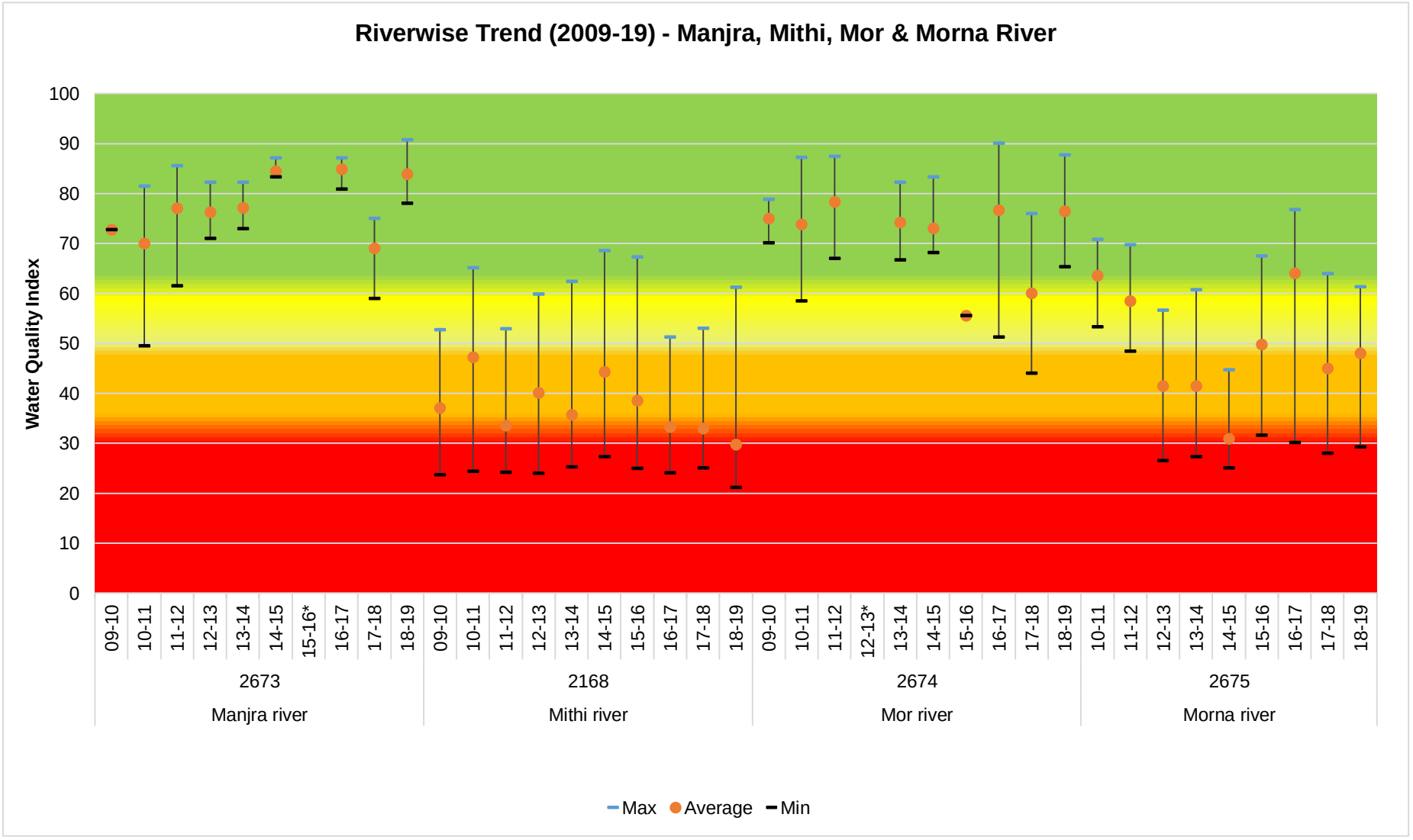
Note:* Stations are Dry/ No data available for respective year



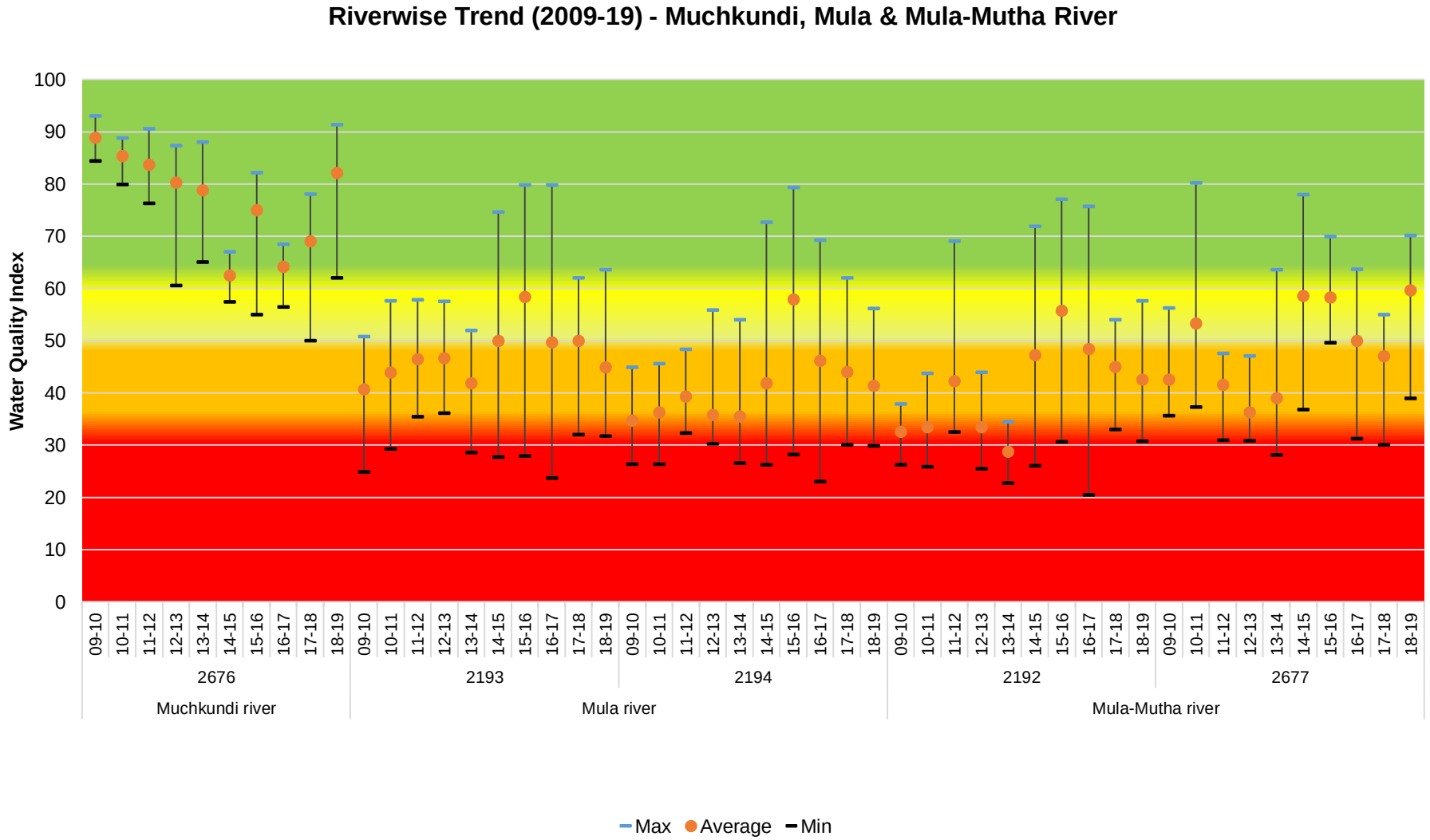
Note:* Stations are Dry/ No data available for respective year



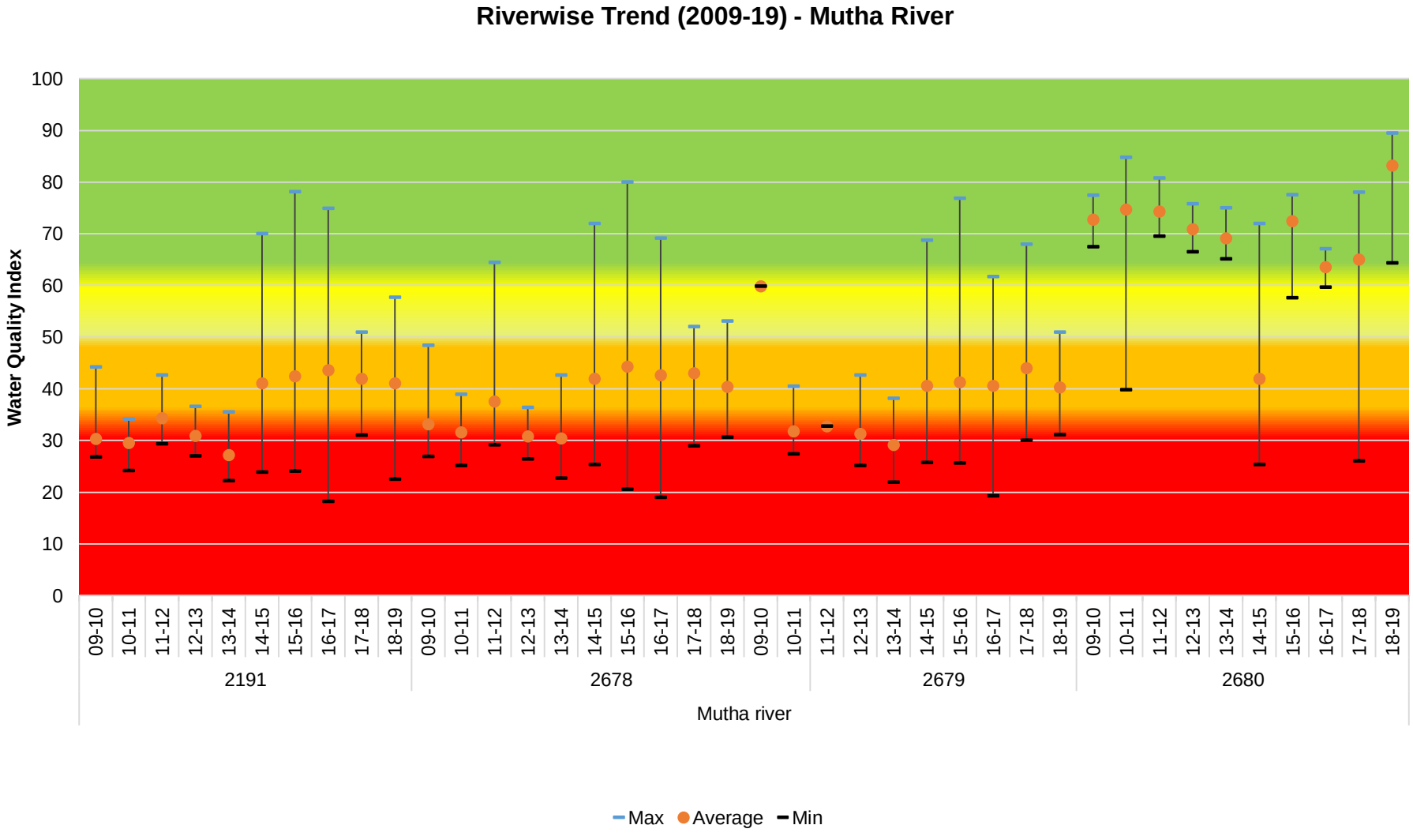
Note:* Stations are Dry/ No data available for respective year



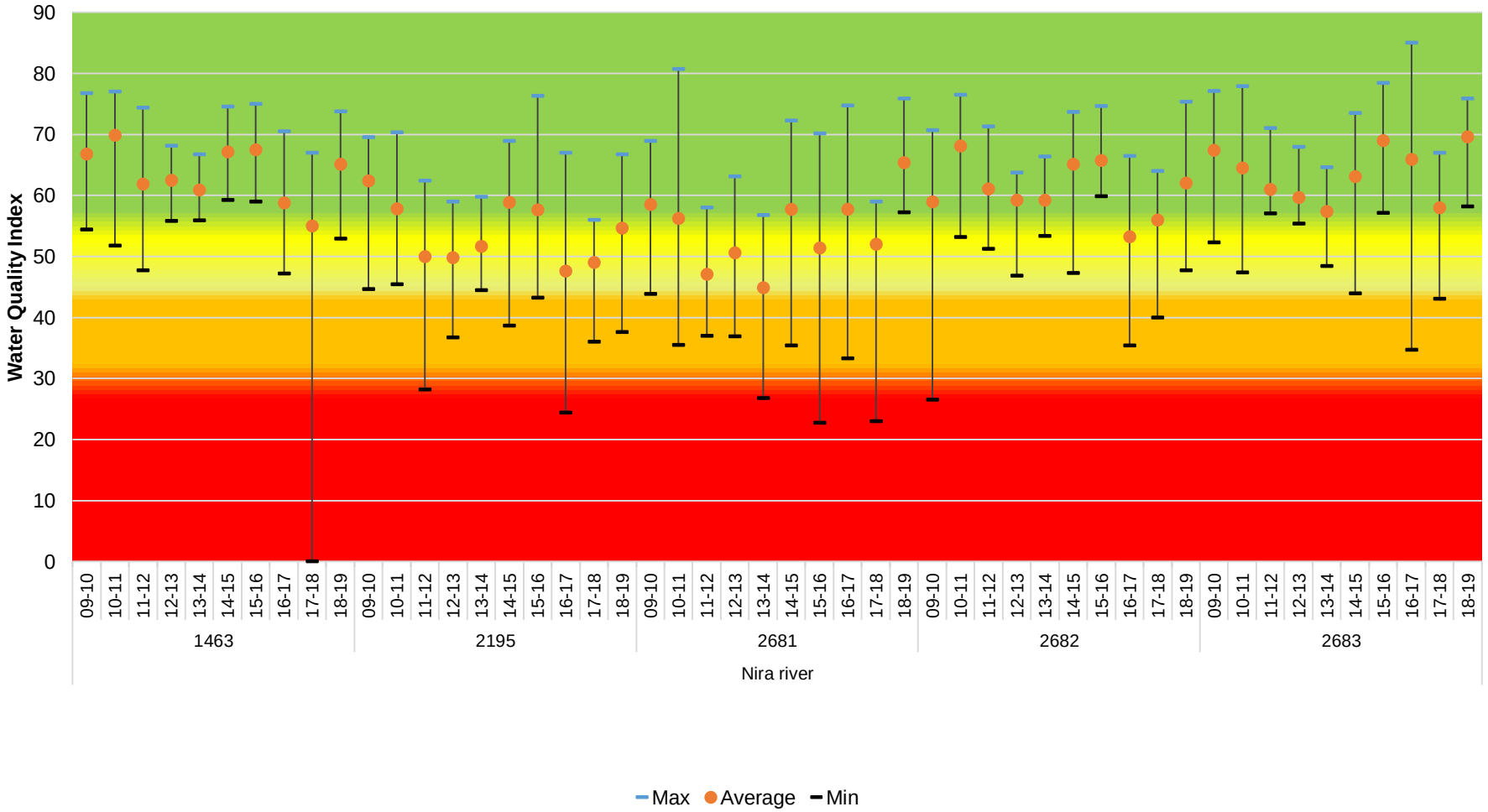
Note:* Stations are Dry/ No data available for respective year



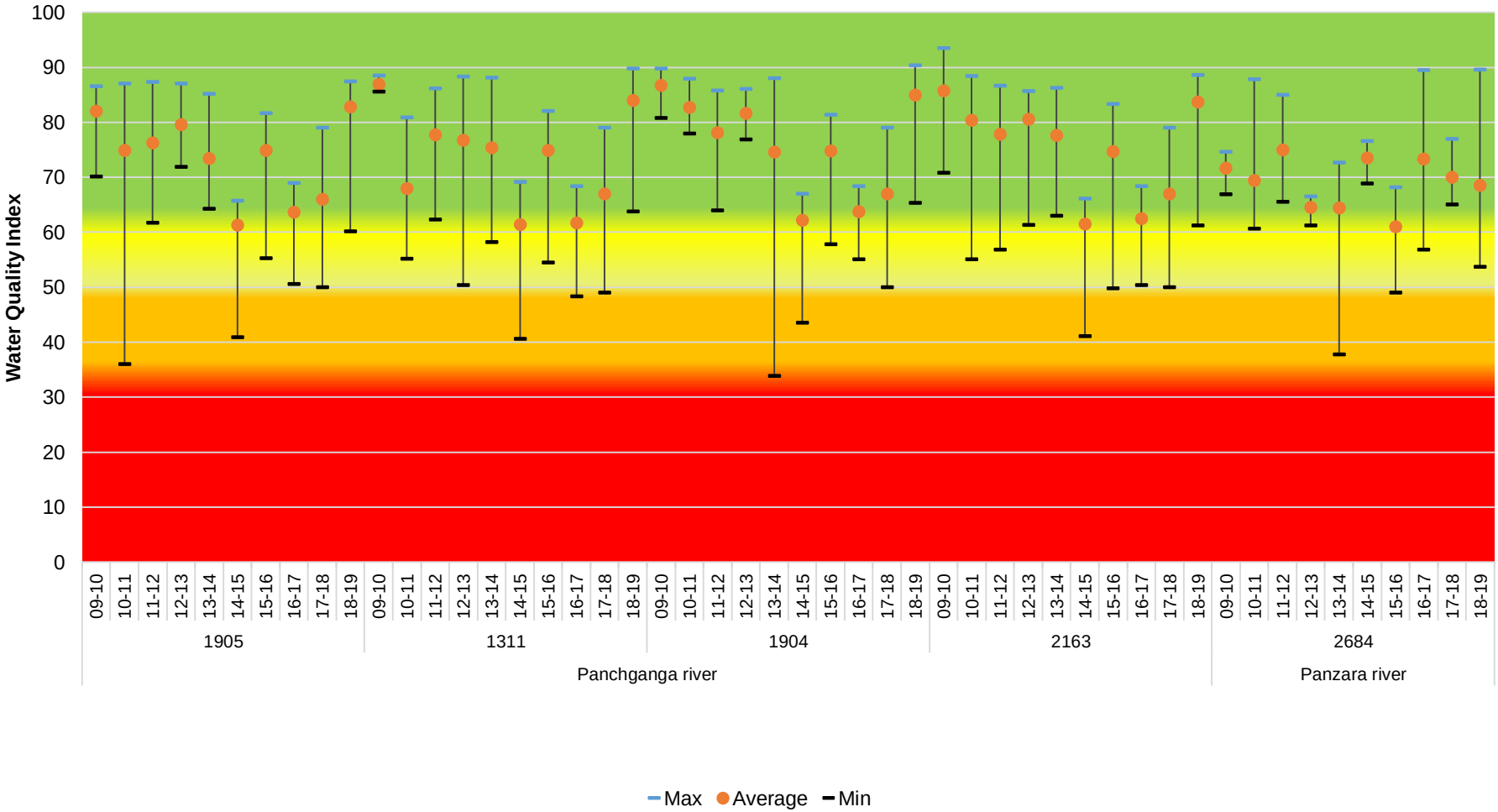
Note:* Stations are Dry/ No data available for respective year



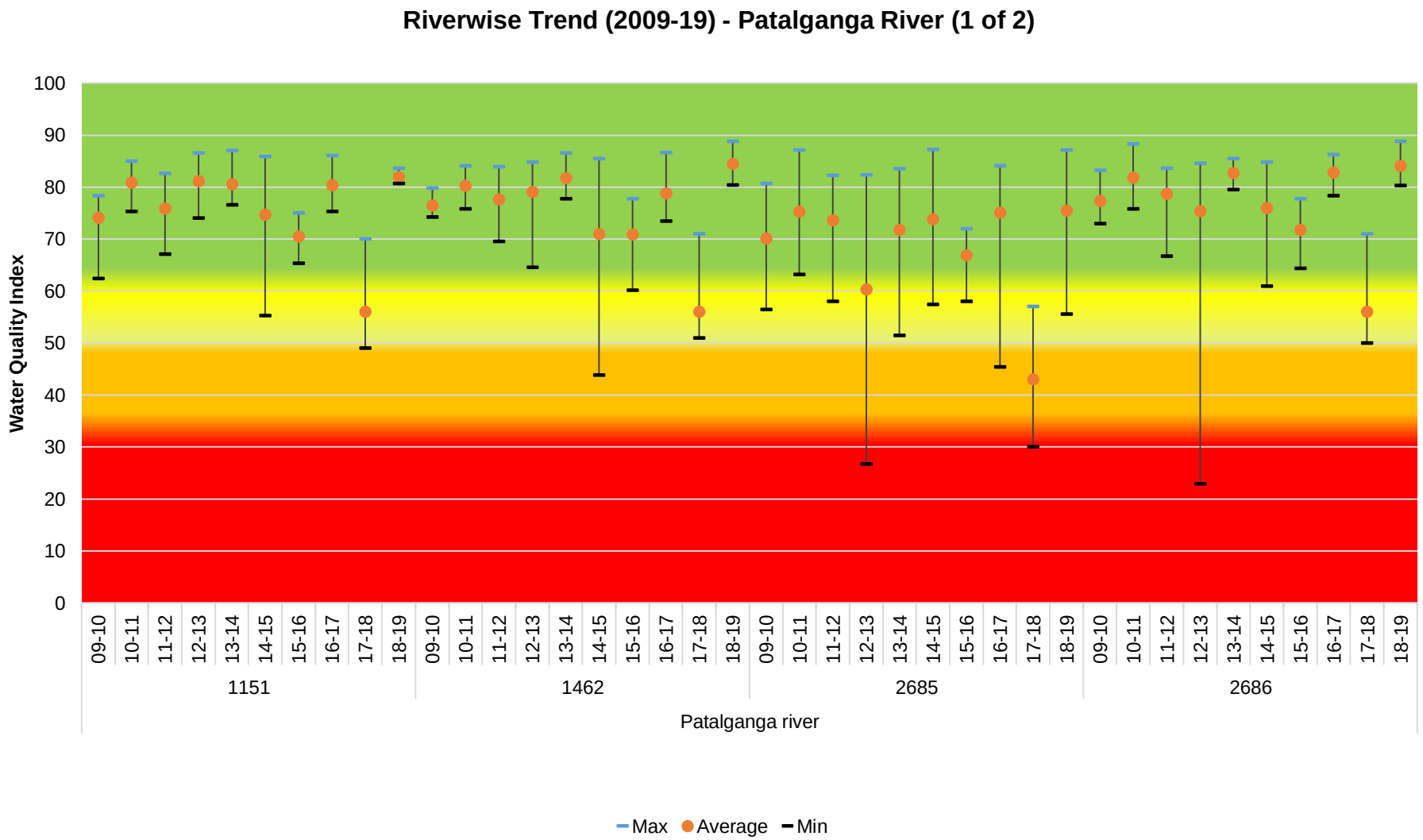
Note:* Stations are Dry/ No data available for respective year



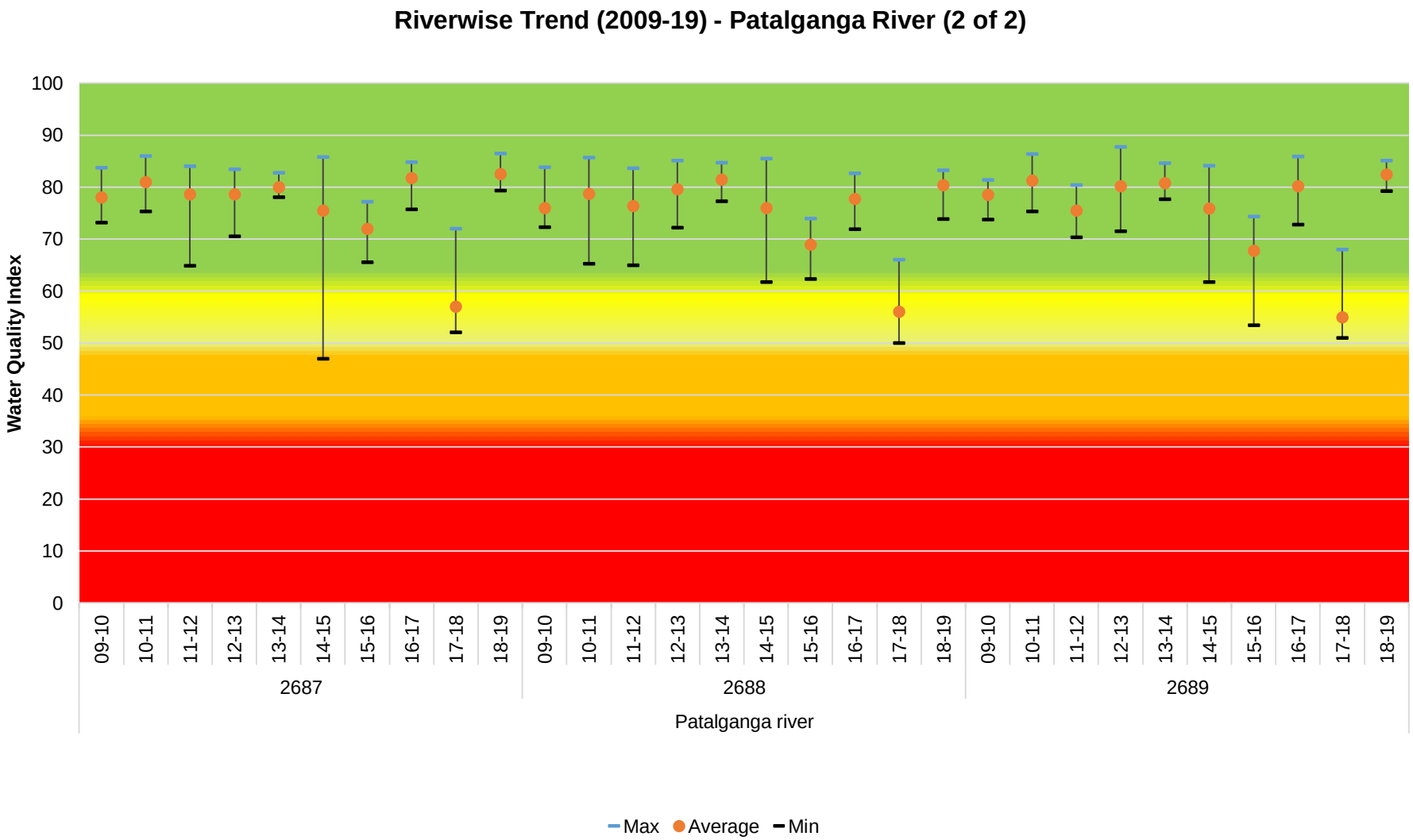
Note:* Stations are Dry/ No data available for respective year



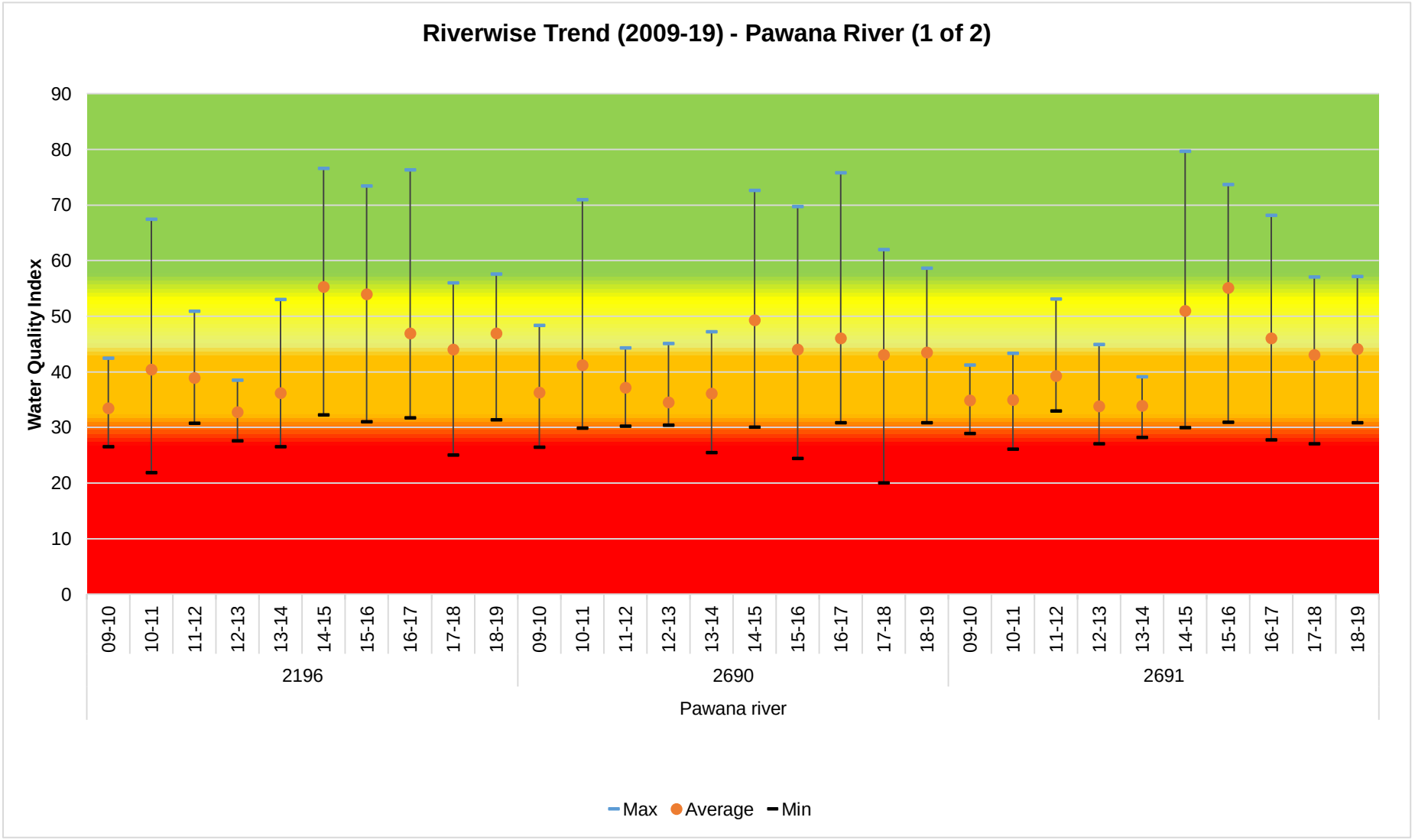
Note:* Stations are Dry/ No data available for respective year



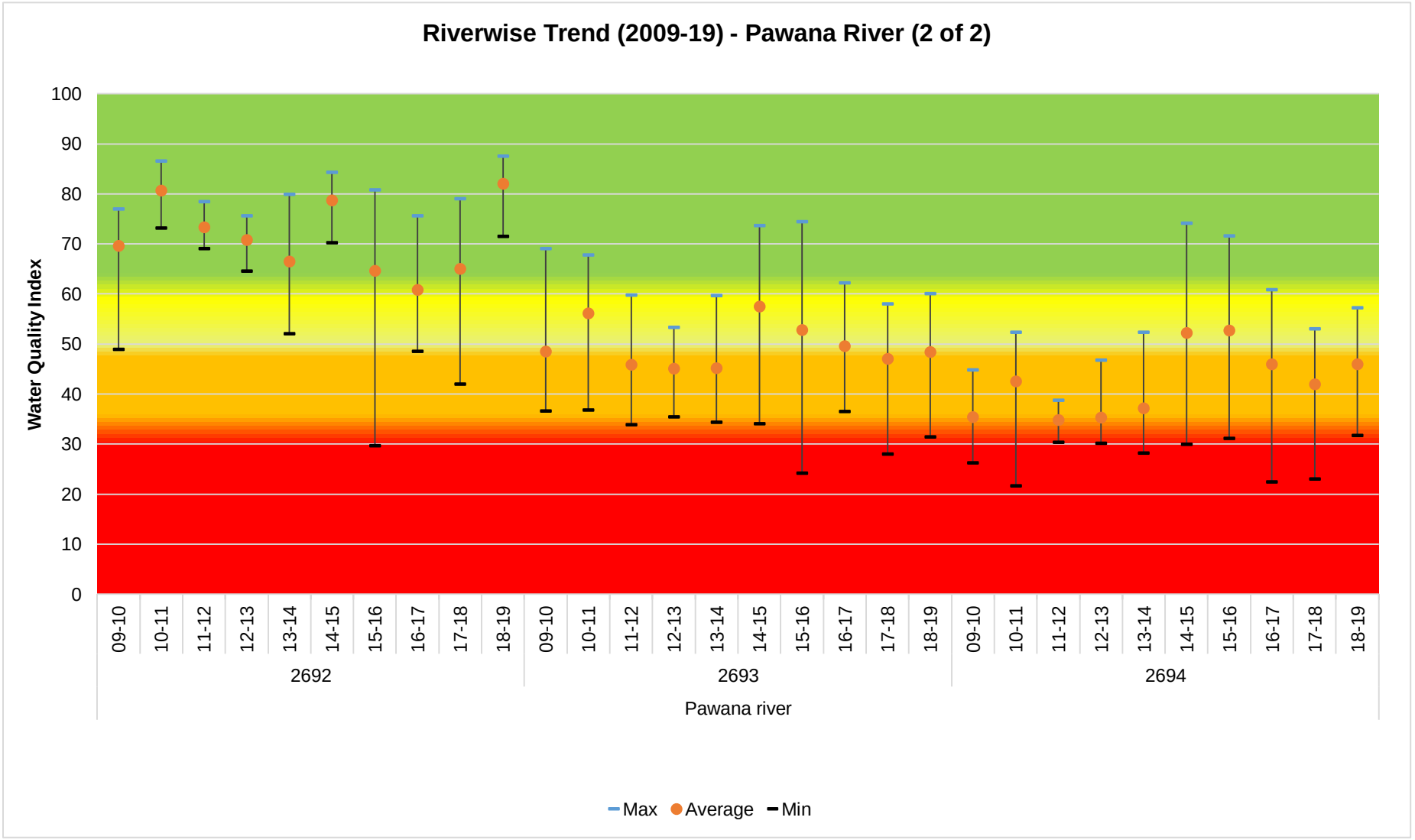
Note:* Stations are Dry/ No data available for respective year



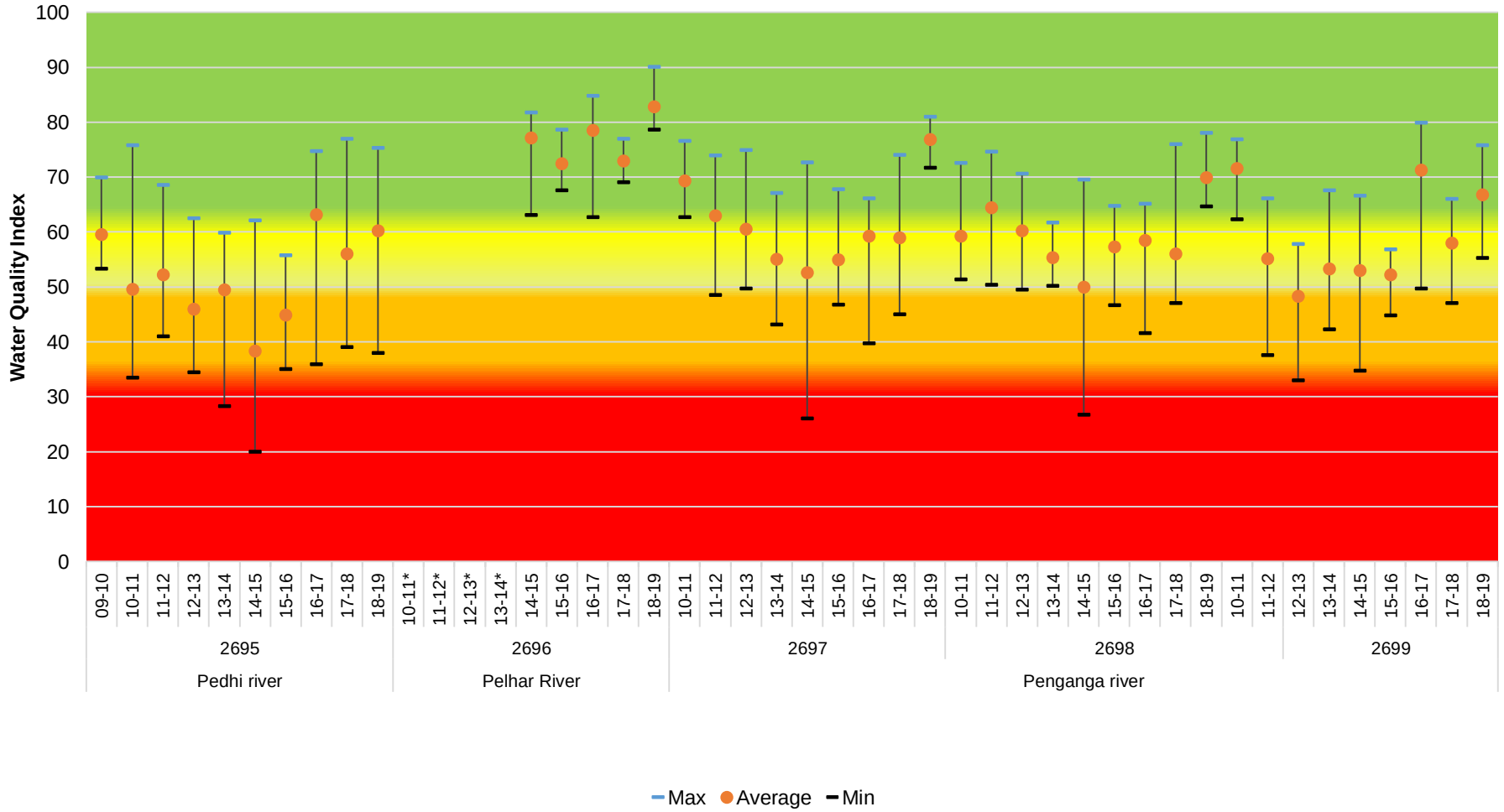
Note:* Stations are Dry/ No data available for respective year



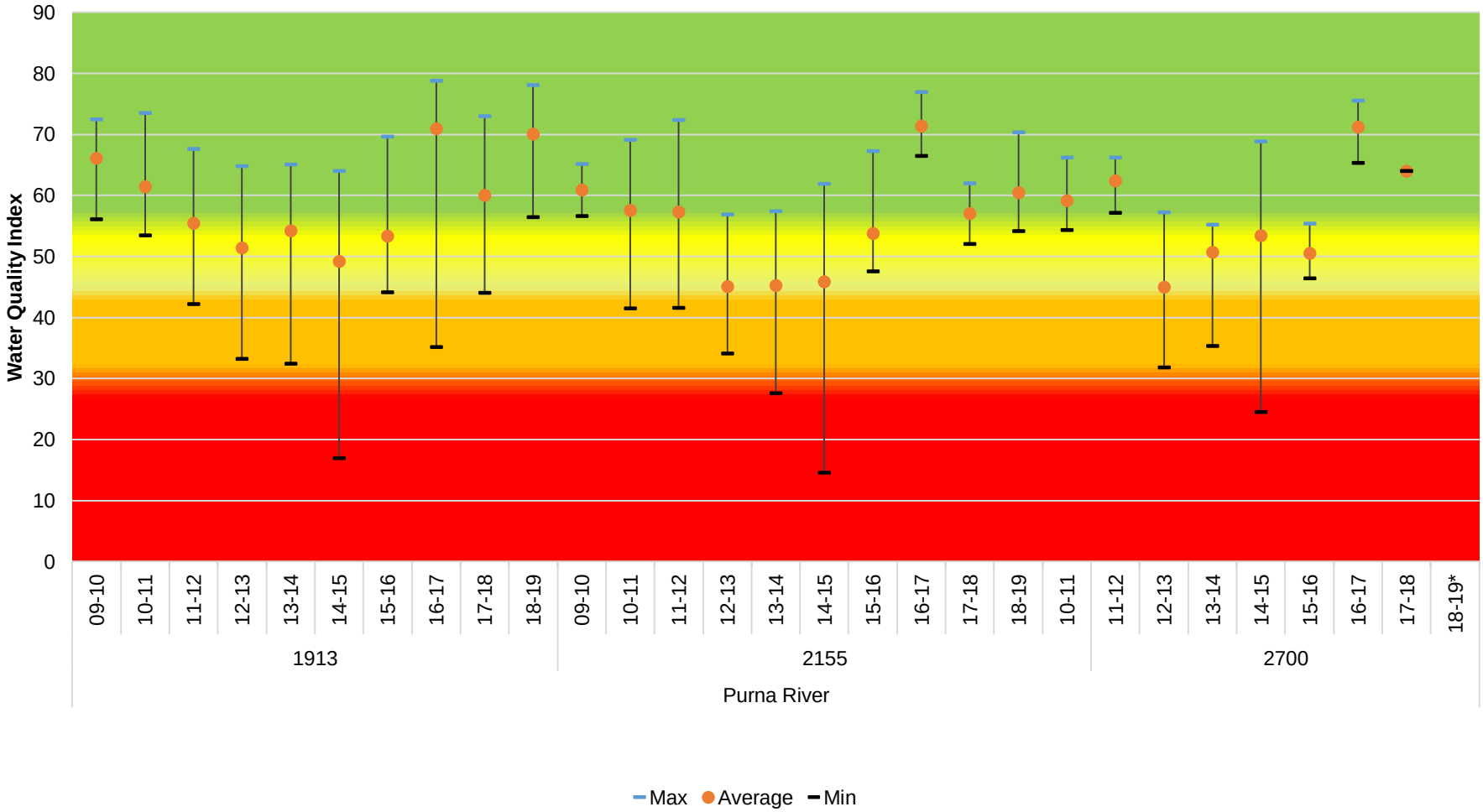
Note:* Stations are Dry/ No data available for respective year



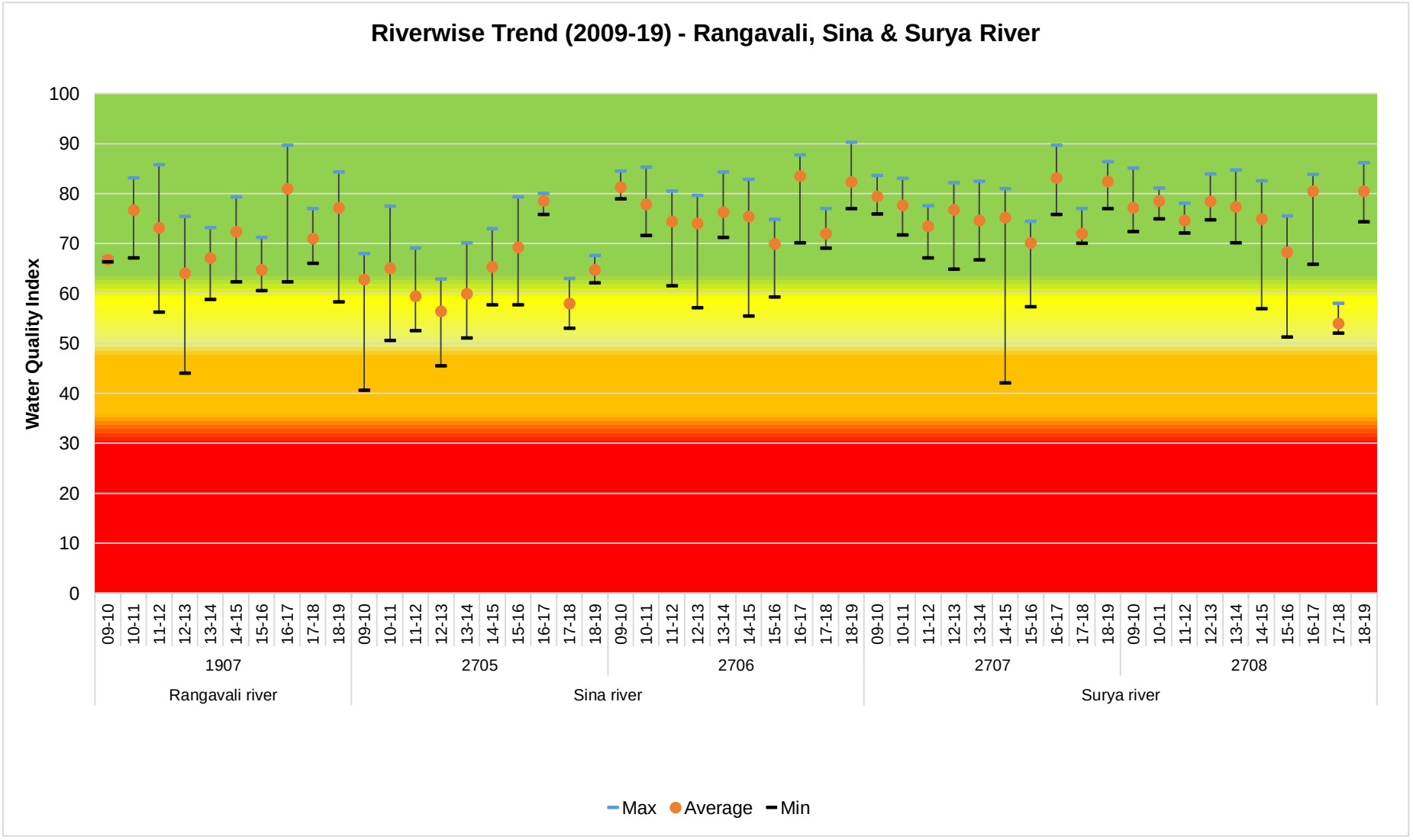
Note:* Stations are Dry/ No data available for respective year



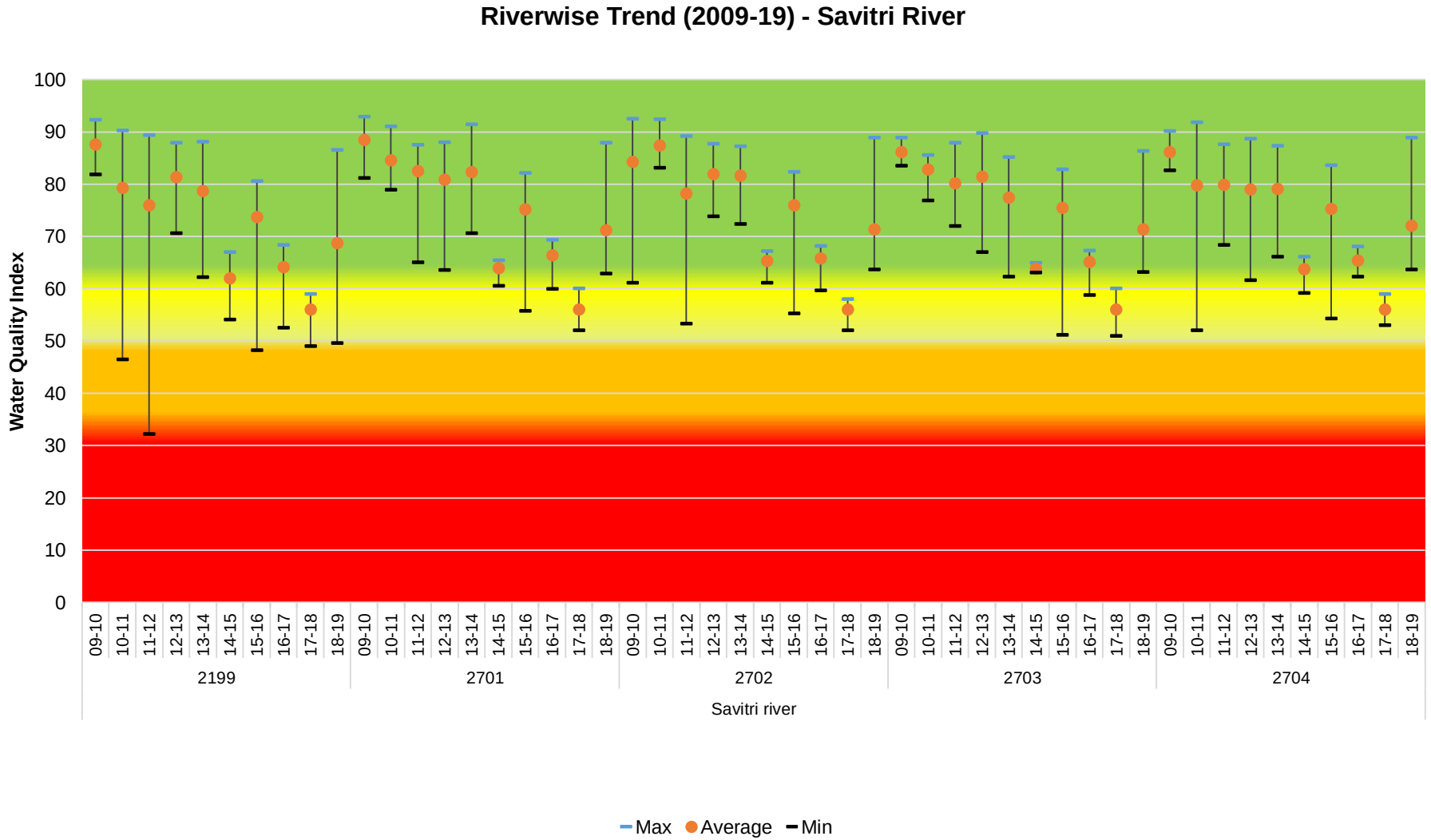
Note:* Stations are Dry/ No data available for respective year



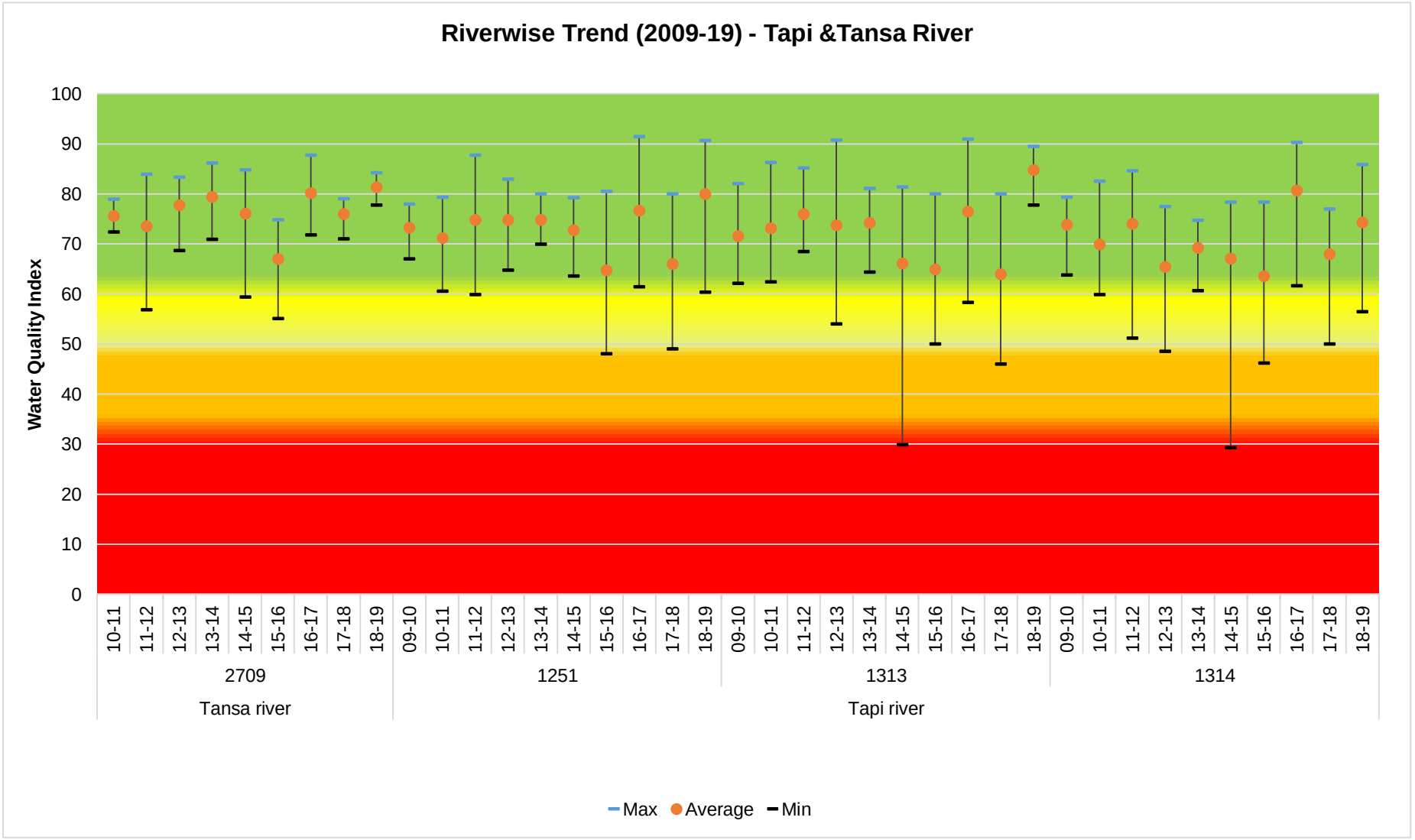
Note:* Stations are Dry/ No data available for respective year



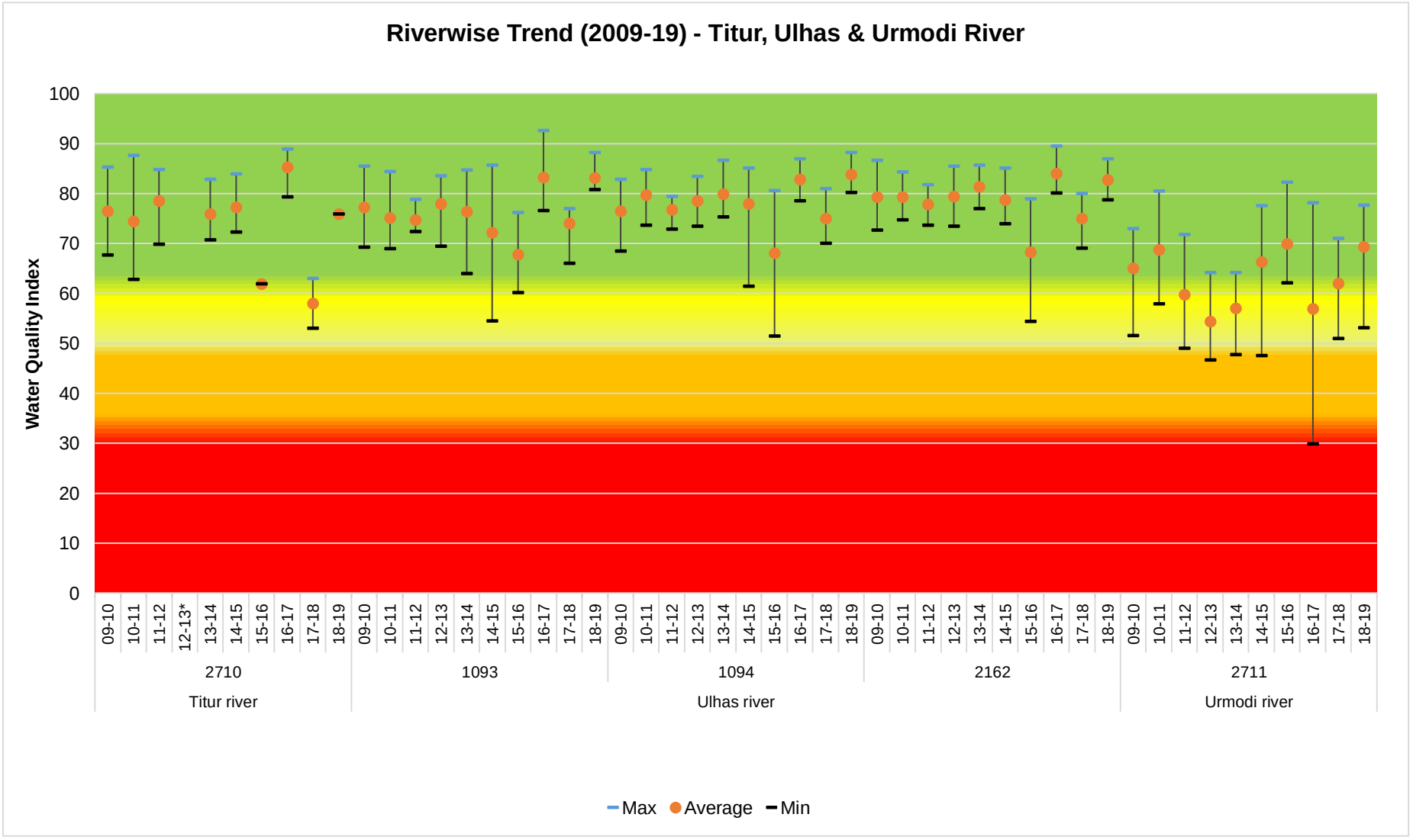
Note:* Stations are Dry/ No data available for respective year



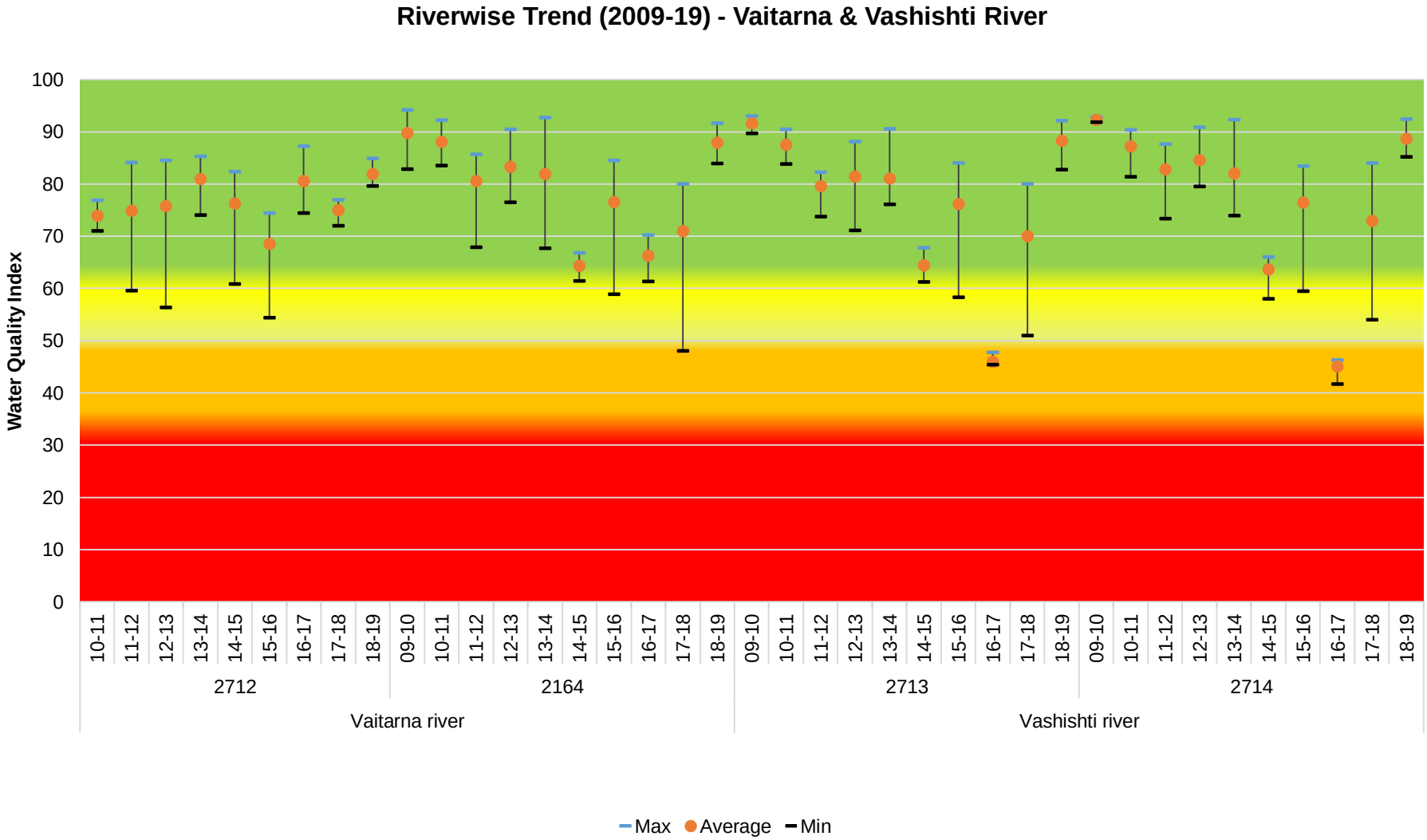
Note:* Stations are Dry/ No data available for respective year



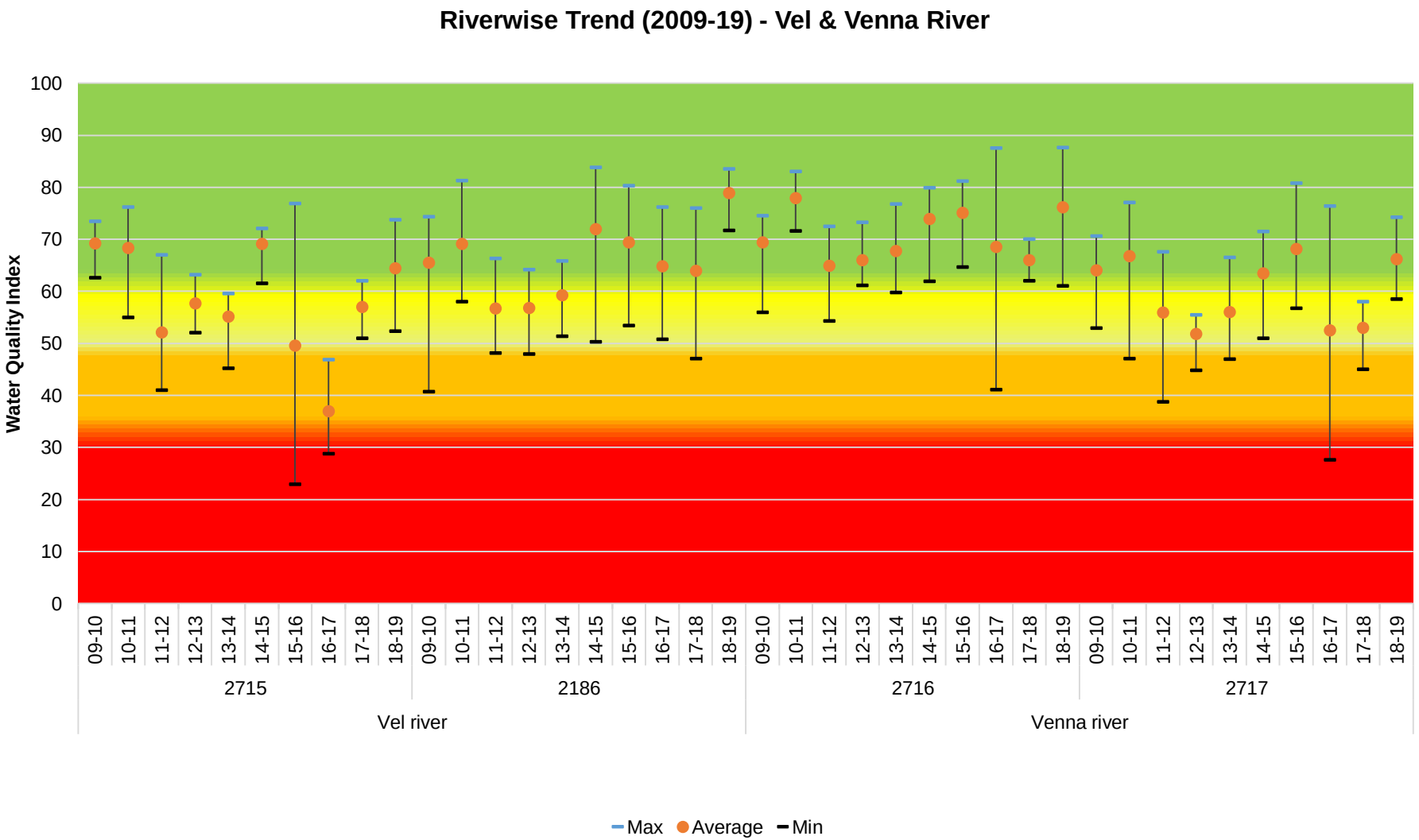
Note:* Stations are Dry/ No data available for respective year



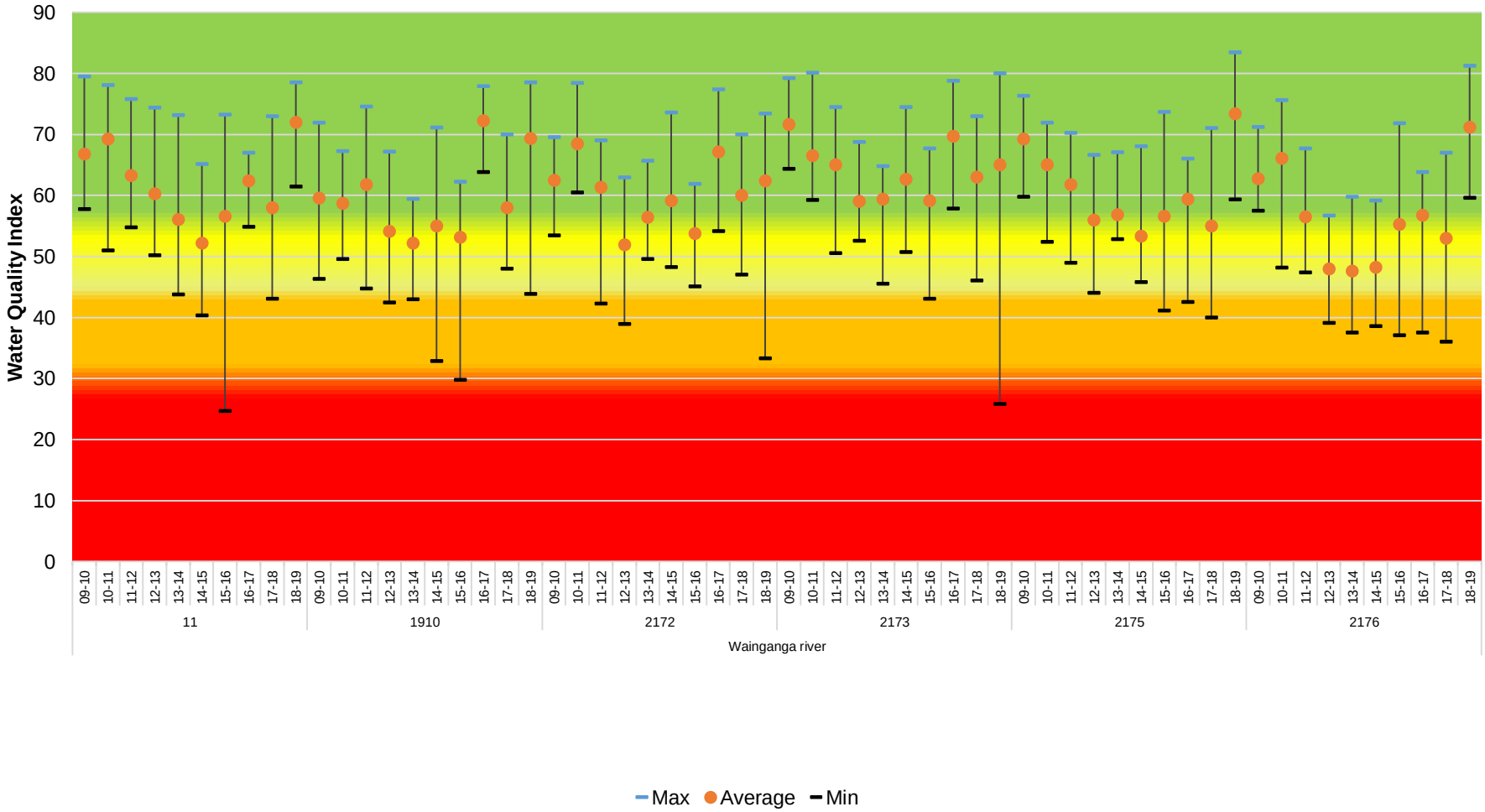
Note:* Stations are Dry/ No data available for respective year



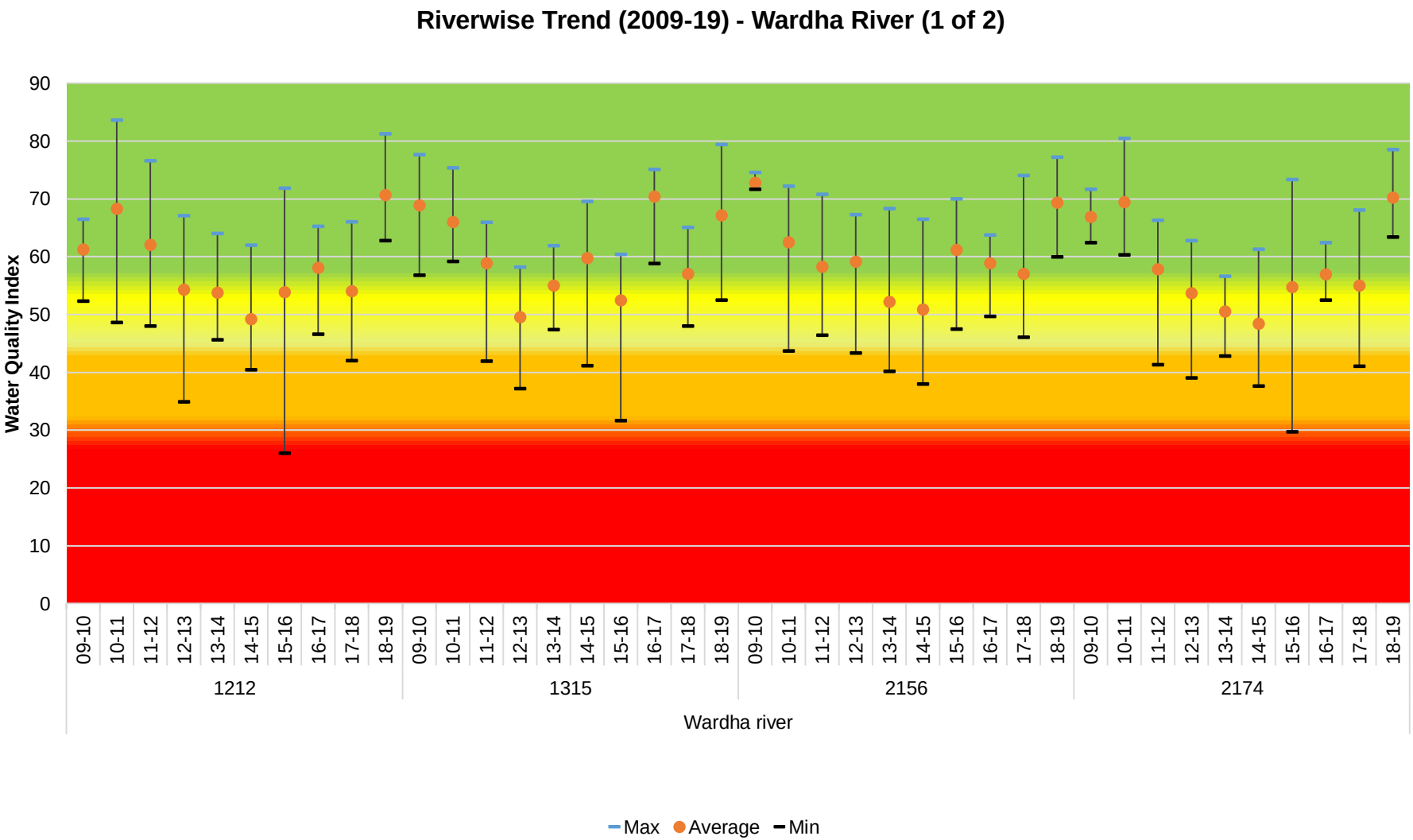
Note:* Stations are Dry/ No data available for respective year



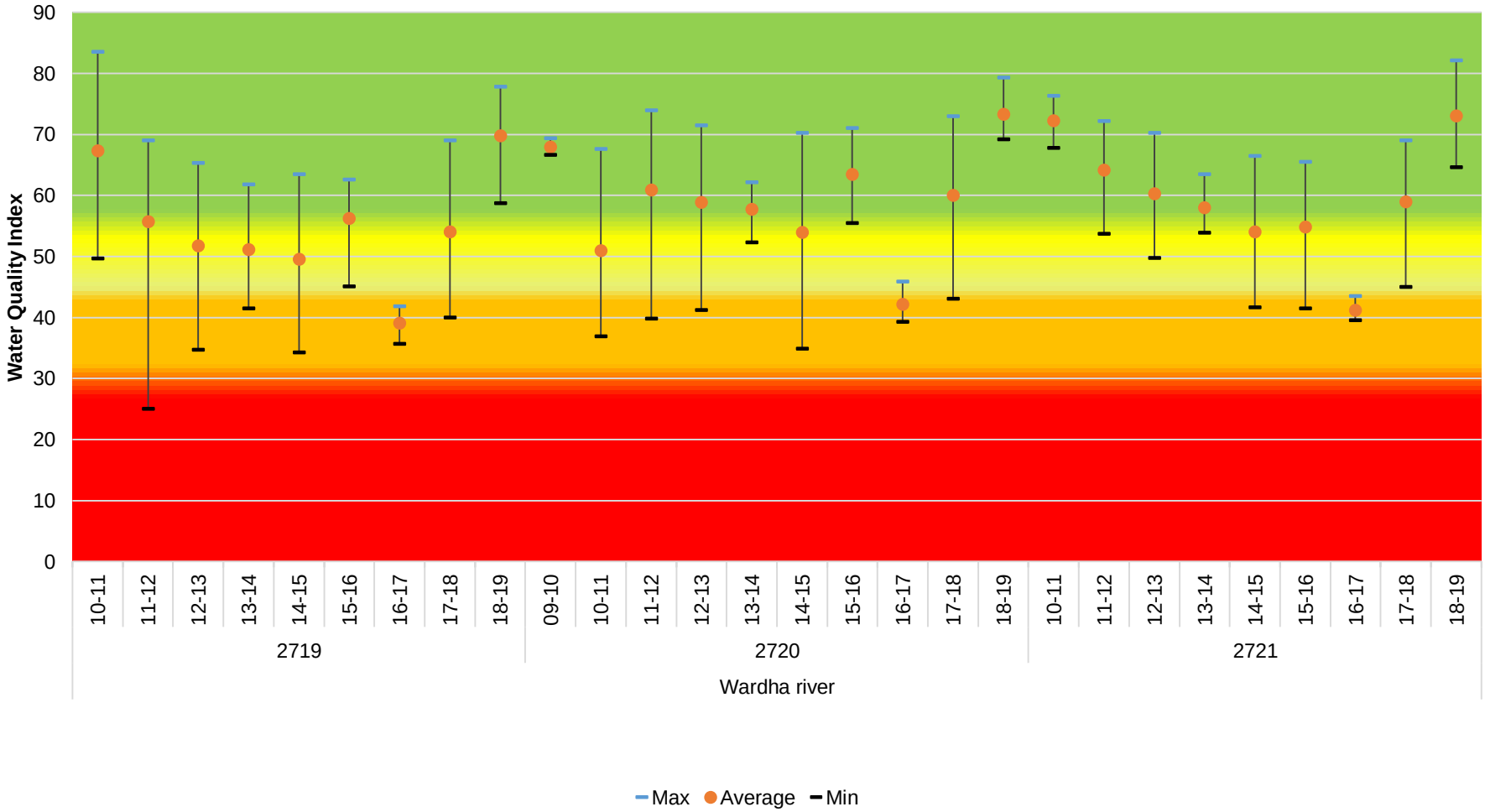
Note:* Stations are Dry/ No data available for respective year



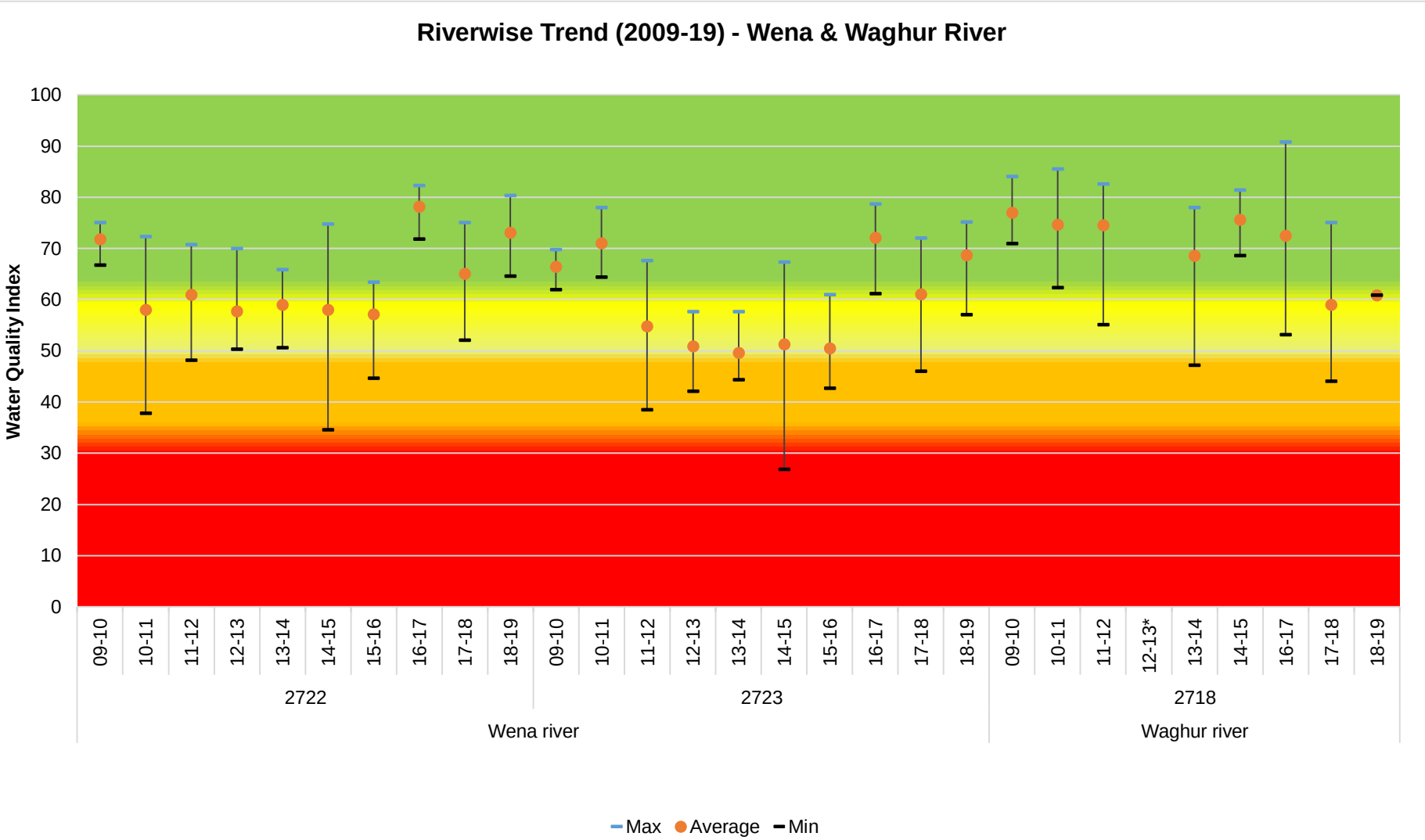
Note:* Stations are Dry/ No data available for respective year



Note:* Stations are Dry/ No data available for respective year



Note:* Stations are Dry/ No data available for respective year

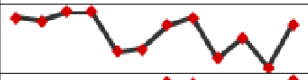
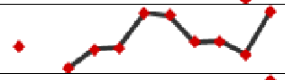
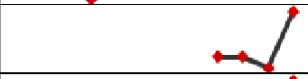
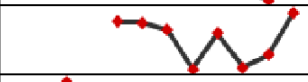
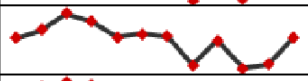
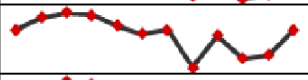
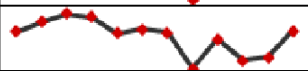


Note:* Stations are Dry/ No data available for respective year

Stationwise Trend in WQI (2007-19)

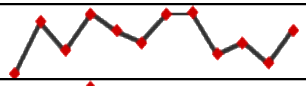
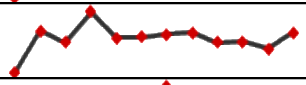
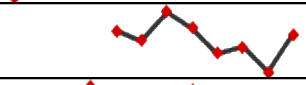
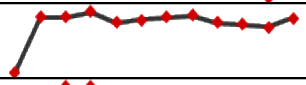
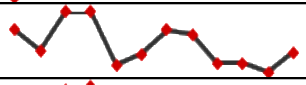
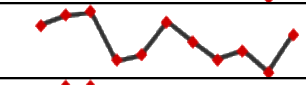
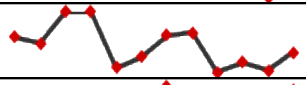
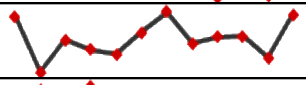
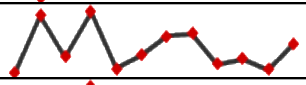
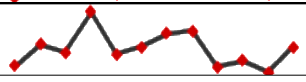
Saline water

Raigad & Ratnagiri District

District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	Trend	Quality	CAGR %
Raigad	1317	57	56	59	59	49	50	55	57	48	52	45	56		No Significant Change	-0.25
Raigad	2803		56		47	55	55	70	69	58	58	52	71		Quality Improved	2.01
Raigad	191									48	48	46	54		Quality Improved	1.03
Ratnagiri	2804					82	82	79	63	77	64	69	85		No Significant Change	0.35
Ratnagiri	2813	75	79	87	83	75	77	76	62	74	60	62	75		No Significant Change	0.03
Ratnagiri	2815	76	83	86	85	78	73	76	53	72	58	60	75		No Significant Change	-0.03
Ratnagiri	2814	75	81	86	83	74	76	75	54	71	59	61	75		No Significant Change	0.00

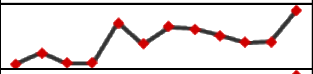
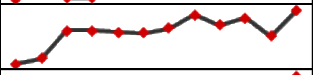
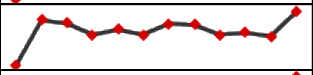
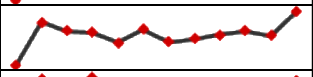
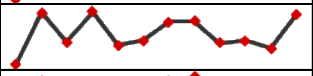
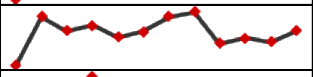
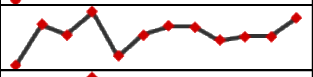
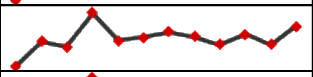
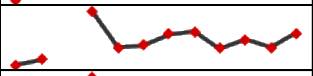
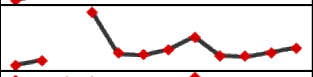
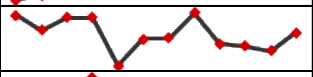
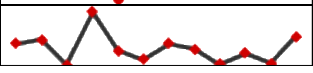
CAGR: Compound Annual Growth Rate= ((End value/Start value) ^ (1/Number of intervals)) - 1
Number of intervals = (Number of observations)-1 *100
Calculation:
Station code: 1317
WQI of 2018-19 (End value) →56; WQI of 2007-08 (Start value) → 57; Number of intervals→ 12
CAGR %= ((End value/Start Value) ^1/Number of intervals)) - 1 X 100
= ((56/57) ^ (1/12)-1 *100
= -0.25%
=No significant Change

Mumbai District

District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	Trend	Quality	CAGR %
Mumbai	2809	41	53	46	54	51	48	55	55	45	48	43	51		Quality Improved	1.82
Mumbai	2811	36	52	47	60	49	50	51	52	48	48	45	52		Quality Improved	3.12
Mumbai	2810					51	49	54	51	47	48	43	50		No Significant Change	-0.12
Mumbai	2167	0	53	54	59	48	51	53	55	48	47	43	52		No Significant Change	-0.15
Mumbai	2165	55	50	60	60	46	49	55	54	47	47	44	49		No Significant Change	-0.95
Mumbai	2169		54	57	58	45	46	55	50	45	47	41	52		No Significant Change	-0.42
Mumbai	2166	54	52	60	60	46	49	54	55	45	47	45	50		No Significant Change	-0.63
Mumbai	1318	53	44	49	48	47	51	54	49	50	50	46	54		No Significant Change	0.03
Mumbai	2812	44	57	47	58	45	48	52	53	46	47	45	50		Quality Improved	1.13
Mumbai	2808	46	52	49	60	49	51	54	55	46	47	44	51		No Significant Change	0.88

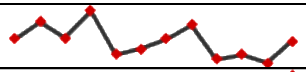
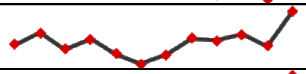
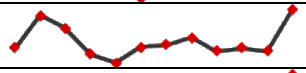
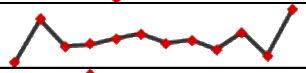
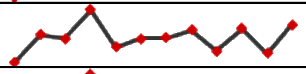
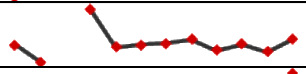
Note: For calculation of CAGR refer to Page No. 263

Thane District (1 of 2)

District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	Trend	Quality	CAGR %
Thane	2791	43	48	43	43	63	52	61	60	57	53	53	69		Quality Improved	3.99
Thane	2800	44	46	56	56	55	55	56	61	57	60	54	62		Quality Improved	2.89
Thane	2795	44	60	59	55	57	55	59	59	55	56	54	63		Quality Improved	2.96
Thane	2185	44	59	56	55	52	56	52	53	54	56	54	62		Quality Improved	2.87
Thane	2796	48	62	54	63	53	55	60	60	54	55	53	62		Quality Improved	2.07
Thane	2806	38	59	53	55	50	52	59	61	47	49	48	53		Quality Improved	2.86
Thane	2797	43	58	55	63	47	54	58	58	52	54	54	61		Quality Improved	2.83
Thane	2802	42	53	50	66	53	55	57	55	52	56	52	60		Quality Improved	2.88
Thane	2798	41	43		68	49	51	56	58	49	54	49	57		Quality Improved	2.81
Thane	2807	41	43		69	47	46	49	56	46	45	48	50		Quality Improved	1.75
Thane	2184	61	57	60	60	49	55	55	61	54	53	52	57		No Significant Change	-0.59
Thane	1316	58	59	51	67	55	53	57	56	52	55	52	60		No Significant Change	0.30

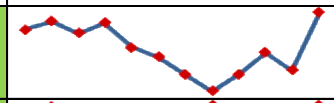
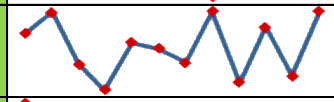
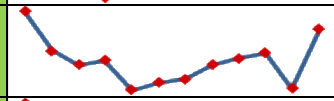
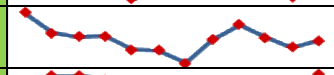
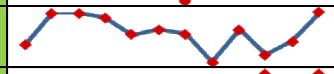
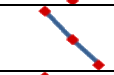
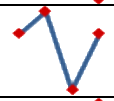
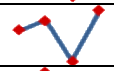
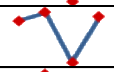
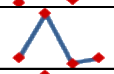
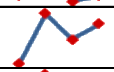
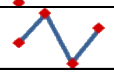
Note: For calculation of CAGR refer to Page No. 263

Thane Ditrict (2 of 2)

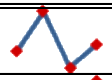
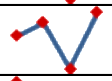
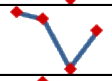
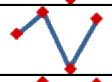
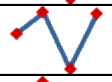
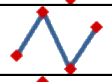
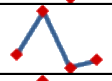
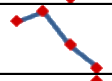
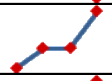
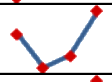
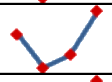
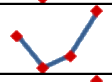
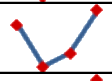
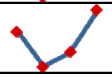
District	Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	Trend	Quality	CAGR %
Thane	2805	56	62	56	65	50	52	55	60	48	50	47	55		No Significant Change	-0.15
Thane	2793	53	57	52	55	50	47	50	55	54	56	53	64		Quality Improved	1.50
Thane	2792	55	63	60	54	51	55	56	57	54	55	54	64		Quality Improved	1.28
Thane	2794	52	61	55	55	57	58	56	56	54	58	53	63		Quality Improved	1.65
Thane	2801	49	57	56	64	54	56	56	58	52	59	52	60		Quality Improved	1.59
Thane	2799	52	42		72	51	52	53	55	49	52	48	55		No Significant Change	0.54
Thane	190									52	53	51	57		No Significant Change	0.86

Note: For calculation of CAGR refer to Page No. 263

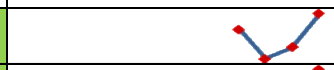
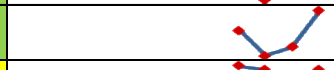
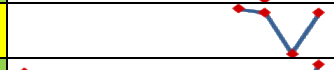
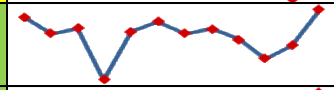
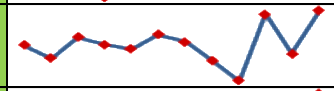
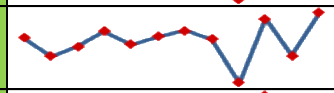
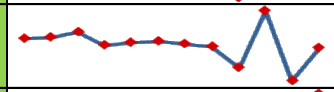
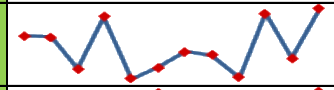
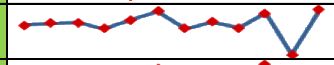
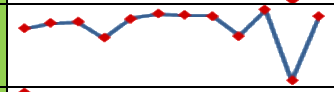
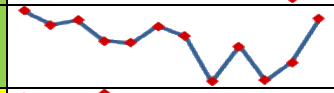
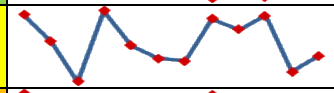
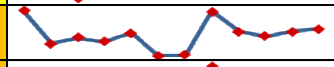
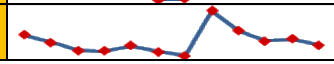
Surface water

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
11	68	70	67	69	63	61	56	52	57	62	57	72		No Significant Change	0.53
12	80	84	75	70	79	78	75	84	71	81	73	84		No Significant Change	0.41
28	80	68	63	65	55	58	59	63	65	67	56	75		No Significant Change	-0.62
36	81	68	66	67	59	58	51	65	73	66	60	64		Quality Deteriorated	-1.91
37	70	86	86	84	76	78	76	62	78	66	72	87		Quality Improved	1.78
178									68	82	66	82		Quality Improved	22.81
179										81	38	Dry		No Significant Change	0.00
180									60	67	42	60		No Significant Change	0.00
181									62	65	53	67		Quality Improved	17.24
182									63	68	40	65		Quality Improved	15.94
183									58	76	58	73		Quality Improved	17.14
184									66	81	64	66		Quality Improved	16.08
185									51	71	60	66		Quality Improved	16.15
186									32	38	28	35		Quality Improved	10.05

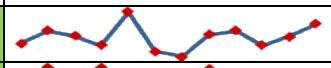
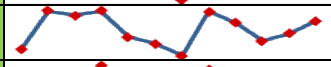
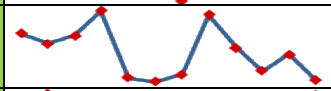
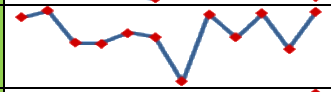
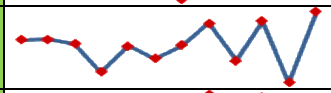
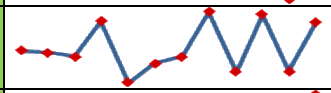
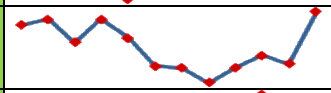
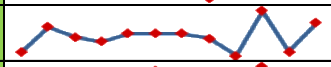
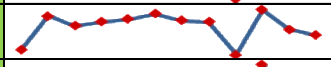
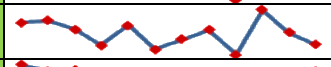
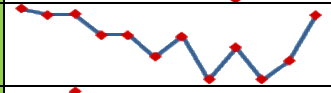
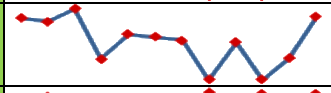
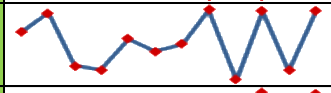
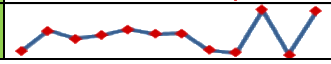
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
187									33	40	30	34		Quality Improved	9.86
188									38	41	29	44		Quality Improved	12.28
189									47	45	31	42		Quality Improved	11.78
192									72	83	55	80		Quality Improved	17.92
193									71	81	56	80		Quality Improved	17.96
194									62	88	55	79		Quality Improved	17.91
195									48	60	44	46		Quality Improved	12.69
196									59	65	45	32		Quality Improved	9.28
197									50	54	54	63		Quality Improved	15.68
198									78	64	69	87		Quality Improved	18.84
199									78	64	69	87		Quality Improved	18.78
200									77	64	69	87		Quality Improved	18.84
201									79	65	69	84		Quality Improved	18.48
202									79	65	71	87		Quality Improved	18.84

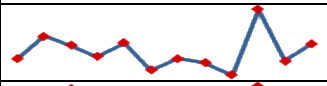
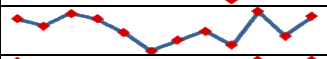
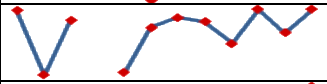
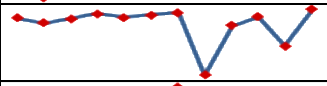
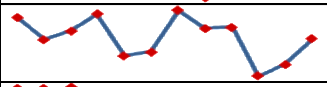
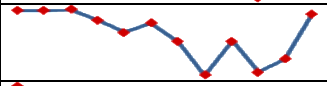
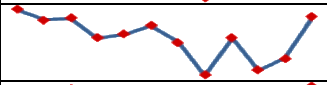
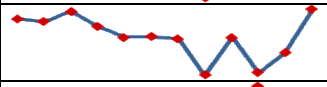
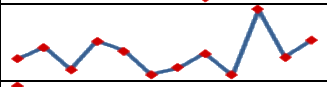
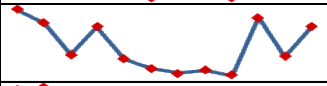
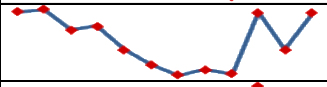
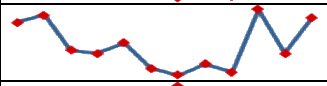
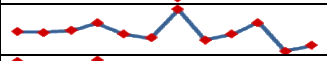
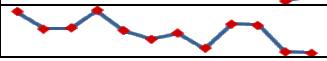
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
203									79	66	71	86		Quality Improved	18.68
204									78	65	70	88		Quality Improved	18.89
216									65	62	34	62		Quality Improved	15.53
1092	72	65	68	45	66	70	65	67	63	54	60	75		No Significant Change	0.37
1093	76	73	77	76	75	78	76	72	68	82	74	83		No Significant Change	0.80
1094	78	74	76	80	77	79	80	78	68	82	74	84		No Significant Change	0.57
1095	78	79	81	76	77	77	77	76	69	88	64	75		No Significant Change	-0.34
1096	74	74	66	79	63	66	70	69	63	80	68	82		No Significant Change	0.78
1151	73	74	74	71	76	81	70	75	71	80	55	82		Quality Improved	1.01
1152	72	74	75	69	76	78	77	77	70	79	53	77		No Significant Change	0.52
1153	87	82	84	76	76	81	78	63	75	63	69	84		No Significant Change	-0.27
1188	67	62	55	68	62	59	59	67	65	67	57	60		No Significant Change	-1.00
1189	55	42	44	43	46	37	37	54	47	45	47	48		Quality Deteriorated	-1.15
1190	48	41	34	34	39	33	30	70	52	43	45	39		Quality Deteriorated	-1.72

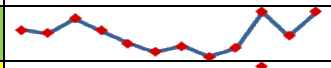
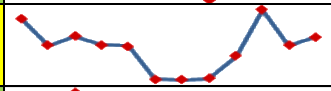
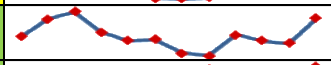
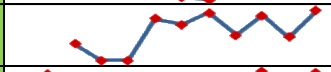
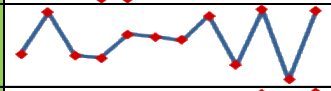
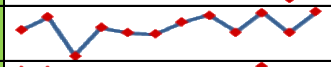
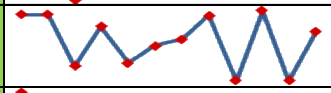
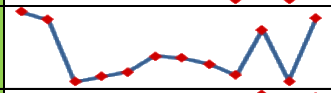
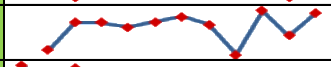
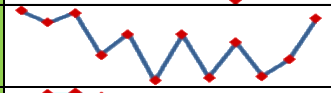
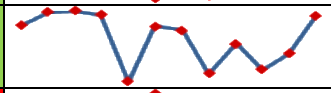
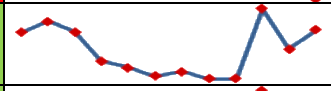
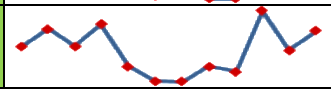
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
1191	54	64	60	52	81	47	42	61	64	52	59	70		Quality Improved	2.25
1192	43	71	67	71	52	47	39	70	62	49	55	63		Quality Improved	3.31
1194	76	74	75	79	70	69	70	78	74	70	73	69		No Significant Change	-0.73
1209	82	84	73	73	77	75	61	83	75	83	72	84		No Significant Change	0.19
1210	80	80	80	74	79	77	79	83	76	84	72	86		No Significant Change	0.54
1211	69	68	67	77	59	65	67	80	63	79	63	77		No Significant Change	0.97
1212	67	68	61	68	63	54	54	49	54	57	55	71		No Significant Change	0.49
1251	66	78	73	71	75	75	75	73	65	86	66	80		Quality Improved	1.58
1252	53	77	70	73	74	78	74	73	50	81	67	63		Quality Improved	1.52
1253	78	79	75	67	77	65	70	74	63	84	73	67		Quality Deteriorated	-1.18
1310	86	84	84	78	78	70	77	63	73	63	69	84		No Significant Change	-0.19
1311	83	82	87	69	78	77	75	61	75	61	69	84		No Significant Change	0.06
1312	81	84	75	75	80	78	79	85	73	85	75	85		No Significant Change	0.37
1313	66	76	72	73	76	74	74	66	65	85	64	85		Quality Improved	2.16

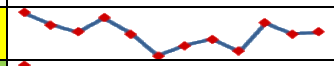
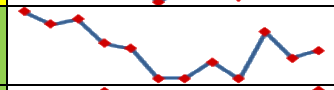
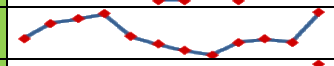
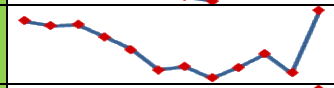
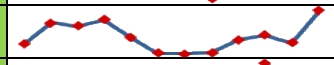
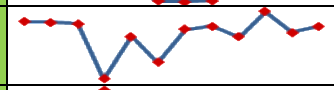
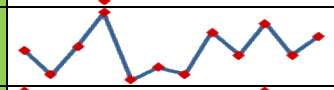
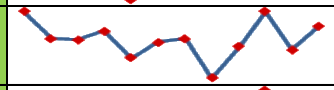
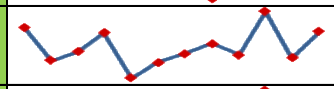
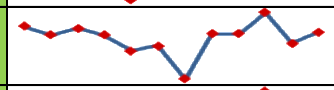
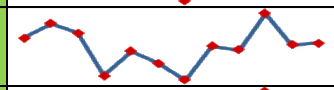
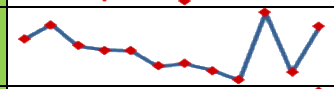
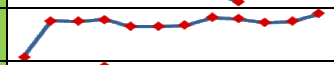
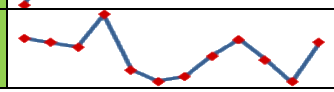
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
1314	69	77	74	70	75	65	69	68	64	86	68	74		No Significant Change	0.61
1315	66	62	69	66	59	50	55	60	52	70	57	67		No Significant Change	0.15
1461	82	57	78		58	75	79	78	69	82	73	82		No Significant Change	0.06
1462	77	73	76	81	78	80	82	31	71	78	55	84		No Significant Change	0.73
1463	69	65	67	70	62	63	71	67	67	58	60	65		No Significant Change	-0.52
1904	86	86	87	83	78	82	75	62	75	63	68	85		No Significant Change	-0.11
1905	86	82	82	75	76	80	73	61	75	63	67	83		No Significant Change	-0.27
1906	83	82	85	80	77	77	76	64	77	65	72	86		No Significant Change	0.31
1907	70	75	67	77	73	65	67	72	65	88	71	77		No Significant Change	0.77
1908	75	71	61	70	60	57	55	56	55	72	60	70		No Significant Change	-0.59
1909	69	70	65	66	59	56	53	54	53	69	60	69		No Significant Change	-0.03
1910	68	70	60	59	62	54	52	55	53	72	59	69		No Significant Change	0.18
1911	67	66	68	72	65	63	80	62	65	72	56	59		Quality Deteriorated	-1.08
1912	67	60	60	68	59	56	58	52	62	62	51	50		Quality Deteriorated	-2.40

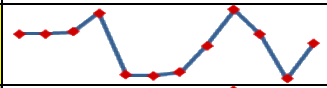
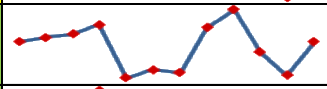
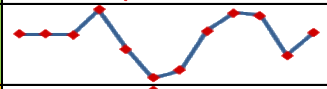
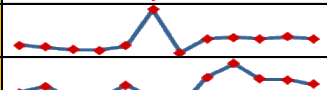
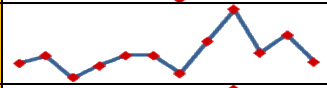
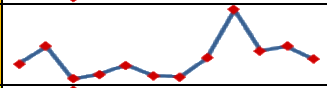
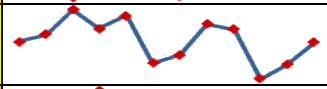
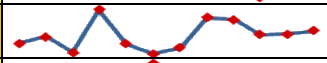
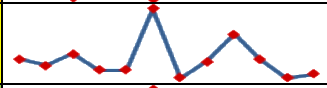
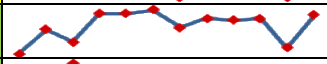
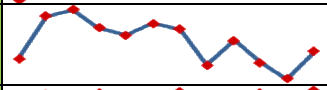
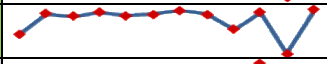
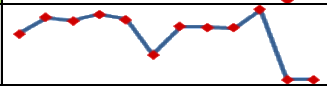
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
1913	62	60	67	61	55	51	54	49	53	70	59	70		Quality Improved	1.06
2155	67	58	61	58	57	46	45	46	54	70	57	61		No Significant Change	-0.87
2156	60	69	73	62	58	59	52	51	61	58	57	69		Quality Improved	1.16
2157			69	61	61	81	78	83	73	82	72	85		Quality Improved	1.76
2158	76	84	75	75	79	79	78	83	73	85	70	84		No Significant Change	0.93
2159	75	82	61	76	73	73	79	83	74	84	73	85		Quality Improved	1.04
2160	84	84	75	82	75	78	80	84	72	85	72	81		No Significant Change	-0.29
2161	85	83	74	75	75	78	77	77	75	82	74	84		No Significant Change	-0.09
2162		70	79	79	78	79	81	79	68	84	75	83		Quality Improved	1.42
2163	87	82	86	70	78	60	78	62	75	62	68	84		No Significant Change	-0.30
2164	84	89	90	88	61	83	82	64	77	66	72	88		No Significant Change	0.40
2168		40	38	47	34	61	36	44	39	32	34	30		Quality Deteriorated	-2.41
2170	70	74	71	62	60	58	59	57	57	77	66	71		No Significant Change	0.08
2171	61	66	62	68	56	52	52	56	54	72	61	66		No Significant Change	0.59

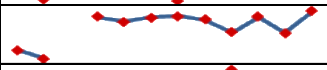
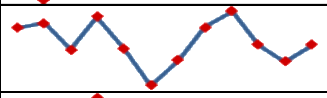
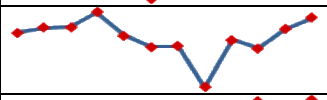
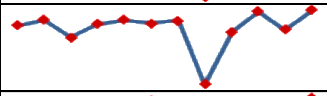
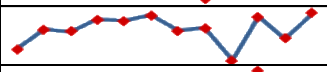
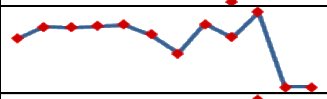
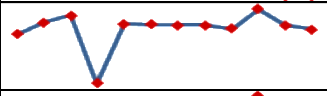
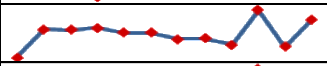
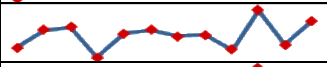
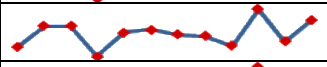
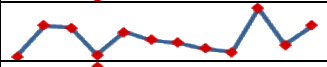
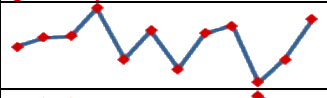
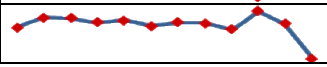
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2172	71	65	62	69	61	52	56	59	54	66	61	62		Quality Deteriorated	-1.06
2173	73	71	72	67	65	59	59	63	59	69	64	65		No Significant Change	-0.98
2174	57	65	67	69	58	54	51	48	55	57	55	70		Quality Improved	1.78
2175	70	69	69	66	62	56	57	53	57	61	55	73		No Significant Change	0.35
2176	53	65	63	66	57	48	48	48	55	58	54	71		Quality Improved	2.52
2177	76	76	75	40	67	51	71	73	67	83	69	73		No Significant Change	-0.32
2178	61	51	62	76	49	54	51	68	59	72	59	67		No Significant Change	0.74
2179	80	68	68	72	60	67	68	51	65	80	63	74		No Significant Change	-0.69
2180	74	60	64	72	53	60	63	67	63	80	62	72		No Significant Change	-0.20
2181	71	64	70	64	52	56	30	65	65	82	58	67		No Significant Change	-0.51
2182	74	81	76	53	66	60	51	69	67	87	70	71		No Significant Change	-0.33
2183	79	84	77	76	76	71	72	70	67	87	69	83		No Significant Change	0.39
2186	7	67	66	69	57	57	59	72	69	64	65	79		Quality Improved	21.82
2187	66	65	64	72	58	54	56	61	66	60	54	65		No Significant Change	-0.17

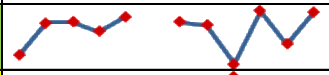
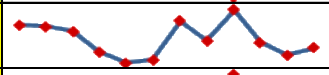
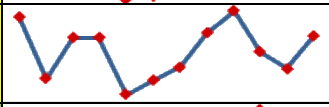
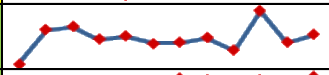
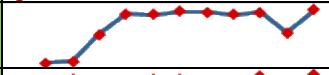
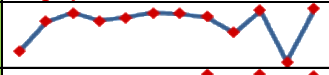
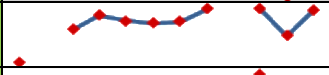
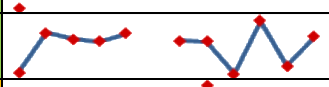
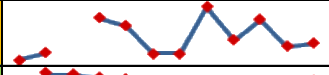
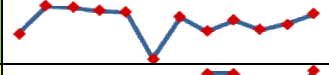
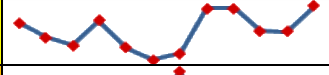
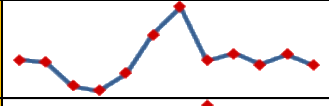
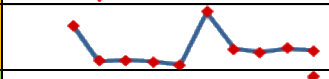
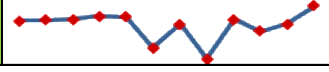
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2188	64	64	65	69	55	55	56	62	70	64	54	62		No Significant Change	-0.26
2189	66	66	67	69	59	60	60	68	72	64	59	66		No Significant Change	0.00
2190	63	63	63	69	59	51	53	64	68	68	57	63		No Significant Change	0.06
2191	35	33	30	29	34	71	27	41	42	41	43	41		Quality Improved	1.43
2192	38	42	33	33	42	33	29	47	56	46	46	43		Quality Improved	1.05
2193	45	46	41	44	46	47	42	50	58	47	52	45		No Significant Change	0.04
2194	40	46	35	36	39	36	36	42	58	44	46	41		No Significant Change	0.30
2195	55	57	62	58	61	50	52	59	58	46	49	55		No Significant Change	-0.02
2196	39	43	33	60	39	33	36	55	54	45	45	47		Quality Improved	1.52
2197	57	55	58	54	54	71	51	56	64	57	51	53		No Significant Change	-0.64
2198	44	62	53	73	73	76	63	70	68	70	48	72		Quality Improved	4.22
2199	65	85	88	79	76	81	79	63	74	64	56	69		No Significant Change	0.40
2651	65	78	76	78	77	78	80	77	69	78	54	80		Quality Improved	1.73
2652	56	77	72	80	75	31	65	64	64	87	No data	Dry		No Significant Change	0.00

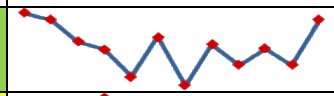
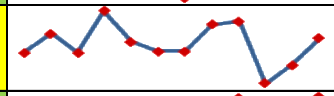
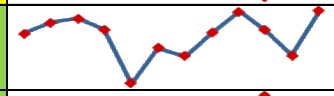
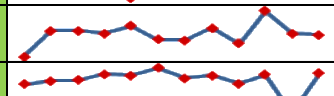
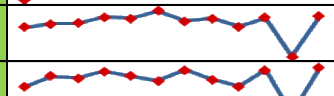
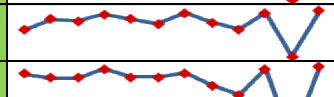
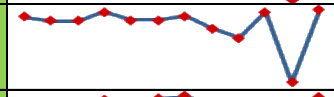
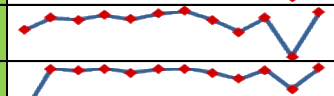
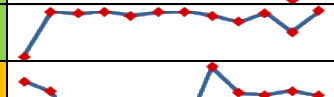
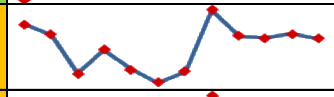
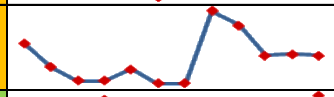
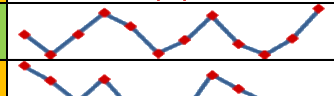
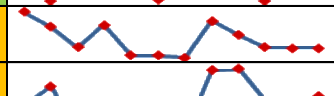
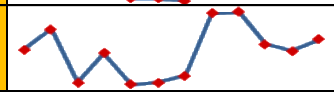
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2653	66	61		79	76	77	61	78	72	78	72	82		Quality Improved	1.84
2654	65	61		79	77	78	79	77	72	79	72	81		Quality Improved	1.90
2655	63	65	57	66	57	46	54	63	68	58	53	58		No Significant Change	-0.67
2656	65	68	68	75	64	59	59	41	62	58	67	72		No Significant Change	0.84
2657	75	78	68	76	78	76	78	41	71	83	73	84		No Significant Change	0.95
2658	60	74	72	80	80	83	73	75	53	83	68	85		Quality Improved	2.91
2659	58	72	72	73	75	63	40	76	59	90	No data	Dry		No Significant Change	0.00
2660	61	75	82	8	73	72	72	71	68	89	72	67		No Significant Change	0.74
2661	61	78	77	78	75	75	72	72	68	89	67	83		Quality Improved	2.59
2662	68	77	79	63	75	77	74	75	67	88	69	82		Quality Improved	1.63
2663	67	78	78	62	75	76	74	73	68	87	70	81		Quality Improved	1.59
2664	67	80	79	67	77	74	72	70	69	88	72	80		Quality Improved	1.55
2665	57	59	60	67	54	61	51	60	62	48	54	64		No Significant Change	0.96
2666	59	78	77	69	73	62	69	67	55	90	65	Dry		Quality Improved	Dry

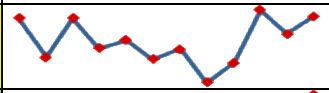
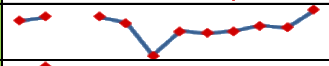
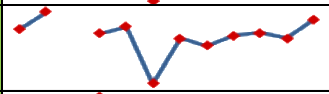
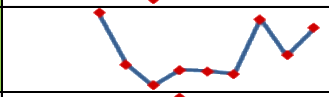
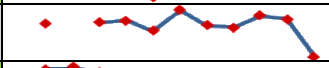
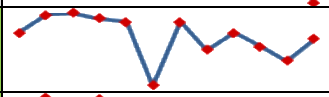
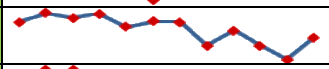
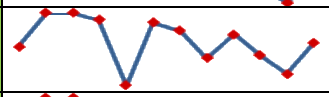
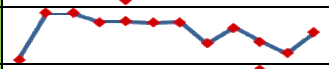
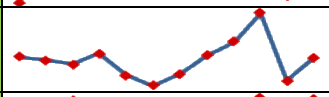
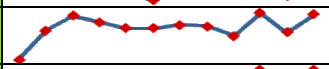
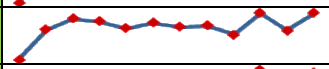
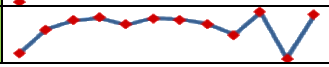
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2667	52	75	75	68	78		75	72	46	83	60	82		Quality Improved	3.80
2668	60	59	58	52	49	49	61	55	64	55	51	53		Quality Deteriorated	-1.01
2669	65	55	61	61	53	55	57	62	65	59	57	62		No Significant Change	-0.36
2670	57	77	79	71	73	69	70	73	65	89	70	74		Quality Improved	2.25
2671		5	6	36	59	59	62	61	58	61	38	64		Quality Improved	24.47
2672	60	75	79	75	77	79	79	77	69	80	55	81		Quality Improved	2.59
2673	55		73	81	78	76	77	85		85	69	84		Quality Improved	3.60
2674	56	79	75	74	78		74	74	56	86	60	77		Quality Improved	2.56
2675	38	42		64	59	41	41	71	50	63	46	48		Quality Improved	2.07
2676	59	91	89	85	84	31	79	63	75	64	70	82		Quality Improved	2.73
2677	52	46	43	53	42	36	39	59	58	49	48	60		Quality Improved	1.11
2678	42	41	33	32	38	51	60	42	44	40	44	40		No Significant Change	-0.37
2679			60	32	33	31	29	71	41	39	42	40		Quality Deteriorated	-3.25
2680	71	72	73	75	74	51	69	42	72	63	69	83		Quality Improved	1.29

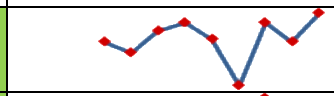
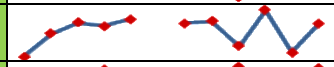
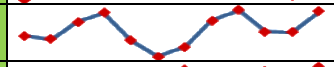
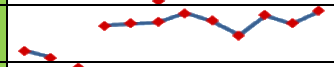
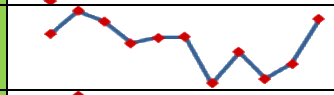
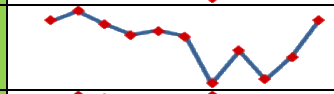
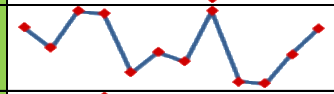
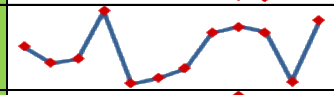
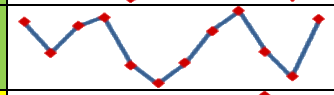
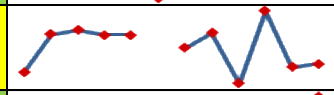
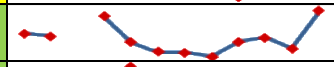
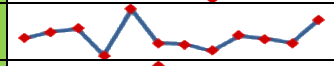
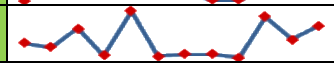
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2681	68	65	59	56	48	60	45	58	51	56	51	65		No Significant Change	-0.27
2682	59	63	59	68	61	59	59	65	66	52	56	62		No Significant Change	0.43
2683	64	66	67	65	50	60	57	64	69	64	58	70		No Significant Change	0.76
2684	52	72	72	69	75	65	64	74	62	87	70	69		Quality Improved	2.37
2685	66	69	70	75	74	81	72	74	67	74	42	75		Quality Improved	1.08
2686	72	79	77	82	79	75	83	76	72	83	54	84		Quality Improved	1.36
2687	80	78	78	82	79	79	80	76	72	82	55	83		No Significant Change	0.26
2688	70	77	76	79	76	80	81	76	69	77	55	80		Quality Improved	1.15
2689	23	81	79	81	76	81	81	76	68	80	54	82		Quality Improved	11.15
2690	46	44	36	41	37	34	37	49	44	44	44	43		No Significant Change	-0.53
2691	49	40	35	35	39	34	34	60	55	44	45	44		No Significant Change	-0.80
2692	70	60	70	80	73	60	66	79	65	60	67	82		Quality Improved	1.37
2693	61	55	49	56	46	46	45	57	53	49	48	48		Quality Deteriorated	-1.87
2694	43	48	35	43	35	35	37	52	53	45	43	46		No Significant Change	0.47

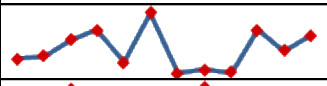
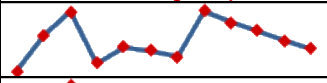
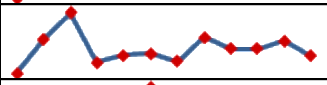
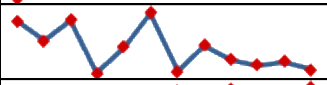
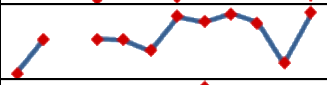
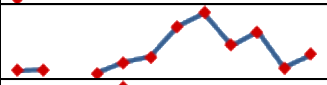
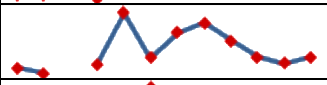
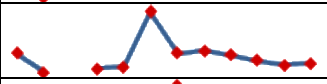
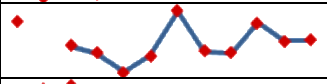
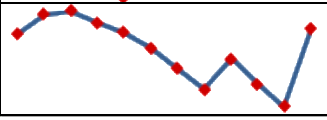
Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2695	60	47	60	50	52	46	49	38	45	62	54	60		No Significant Change	0.09
2696								77	72	80	73	83		No Significant Change	0.59
2697	66	69		69	63	30	55	53	55	60	58	77		Quality Improved	1.32
2698	62	76		59	64	21	55	50	57	59	55	70		No Significant Change	0.97
2699				72	55	48	53	53	52	70	58	67		No Significant Change	-0.58
2700		58		59	62	45	81	53	51	70	64	Dry		Quality Improved	Dry
2701	75	87	89	85	83	40	82	64	75	66	56	71		No Significant Change	-0.47
2702	81	88	84	87	78	82	82	65	76	66	56	71		Quality Deteriorated	-1.08
2703	70	86	86	83	50	81	77	64	75	65	56	71		No Significant Change	0.21
2704	52	87	86	80	80	79	80	64	75	65	57	72		Quality Improved	2.80
2705	65	64	63	66	59	56	60	65	69	78	58	65		No Significant Change	-0.02
2706	57	73	81	78	74	74	76	75	70	83	72	82		Quality Improved	3.14
2707	56	73	79	78	73	77	75	75	70	83	72	82		Quality Improved	3.31
2708	57	72	77	78	75	78	77	75	68	82	54	81		Quality Improved	2.94

Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2709				76	74	78	79	76	67	79	76	81		No Significant Change	0.61
2710	56	70	76	74	79		76	77	62	84	58	76		Quality Improved	2.63
2711	61	60	66	69	60	54	58	66	70	63	62	69		Quality Improved	1.05
2712	60	56		74	75	76	81	76	69	80	75	82		Quality Improved	2.64
2713		83	92	88	80	82	82	64	76	66	72	88		No Significant Change	0.50
2714		89	92	87	83	85	82	64	77	65	74	89		No Significant Change	0.01
2715	65	59	69	68	52	58	55	69	50	49	57	64		No Significant Change	-0.03
2716	72	69	69	78	65	66	68	74	75	74	65	76		No Significant Change	0.52
2717	66	59	65	67	56	52	56	64	68	59	53	66		No Significant Change	0.08
2718	57	75	77	75	74		69	76	51	86	59	61		No Significant Change	0.56
2719	60	58		67	56	52	51	50	56	58	53	70		Quality Improved	1.30
2720	62	66	68	51	80	59	58	54	63	61	59	73		Quality Improved	1.47
2721	54	73		72	64	81	58	55	55	60	59	73		Quality Improved	2.50
2722	64	62	72	58	81	58	59	59	57	78	66	73		Quality Improved	1.05

Note: For calculation of CAGR refer to Page No. 263

Station Code	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19		Quality	CAGR %
2723	57	58	66	71	55	80	50	51	50	71	61	69		Quality Improved	1.60
2782	21	33	41	24	30	28	26	42	38	35	32	29		Quality Improved	2.54
2783	21	42	58	28	32	33	29	43	36	36	41	32		Quality Improved	3.32
2784	55	44	56	26	41	60	27	42	33	30	32	28		Quality Deteriorated	-5.62
2785	19	24		24	24	22	27	26	28	26	20	28		Quality Improved	3.25
2786	19	20		18	23	26	39	46	31	37	21	27		Quality Improved	2.70
2787	20	18		21	43	24	35	39	31	24	22	25		Quality Improved	1.75
2788	34	13		16	19	80	33	36	32	26	21	23		Quality Deteriorated	-3.31
2789	71		52	46	30	43	80	47	46	70	55	56		Quality Deteriorated	-1.91
2790	79	87	88	83	79	73	65	56	69	59	49	81		No Significant Change	0.26

Note: For calculation of CAGR refer to Page No. 263

Maharashtra Pollution Control Board
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