ANDHRA PRADESH POLLUTION CONTROL BOARD
D. No. 33-26-14 D/2, Near Sunrise Hospital, Pushpa Hotel Centre,
Chalamalavari Street, Kasturibaipet, Vijayawada – 520 010
Website: www.pcb.ap.gov.in

Lr.No. CRZ/Legal/NGT-829 of 2019/2019 366 **23.11.2020**

To
The Chairman,
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi – 110032.

Sir,

Sub: APPCB – CRZ - Hon'ble NGT (Principal Bench), New Delhi order dated 21.09.2020 in O.A. No. 829/2019 – Action Plan - Submitted – Reg.

Ref:
1. CPCB directions dated: 31.08.2020
2. Hon'ble NGT, New Delhi Order dated 21.09.2020 in O.A.No.829 of 2019 in the matter of Lt. Col. Sarvadaman Singh Oberoi vs Union of India & Ors

**

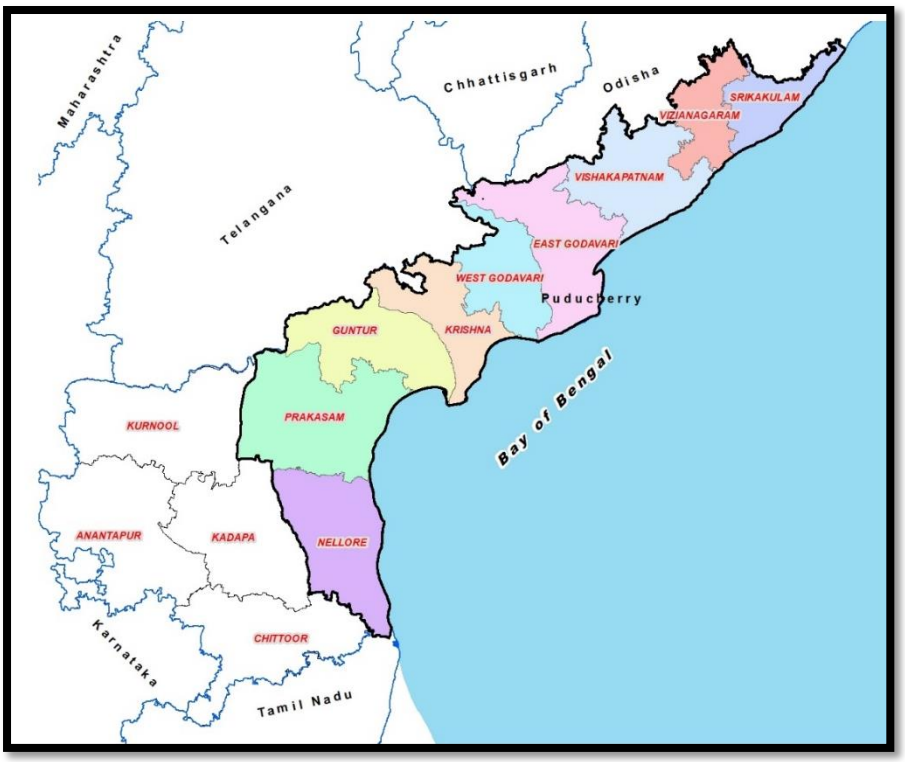
This has references to the above, the Action Plan for the Control of Coastal Pollution for the State of Andhra Pradesh in compliance to Hon'ble NGT order dated 21.09.2020 in 0.A. NO. 829 of 2019 in the matter of Lt. Col. Sarvadaman Singh Oberoi vs Union of India & Ors, is herewith enclosed for information and necessary action.

Yours faithfully,

Encl: As above

MEMBER SECRETARY

ACTION PLAN
for
Control of Coastal Pollution
of
Andhra Pradesh (Srikakulam to Nellore)



Report in compliance of orders of the Hon'ble National Green Tribunal (O.A.No.829 of 2019 Order dated: 21.09.2020)

Submitted to:
Central Pollution Control Board, New Delhi

ANDHRA PRADESH POLLUTION CONTROL BOARD
VIJYAWADA, A.P.

CONTENTS

ABBREVIATIONS

S. No.	Acronym	Abbreviation
1	CPCB	Central Pollution Control Board
2	IDA	Industrial Development Area
3	MA&UD	Municipal Administration and Urban Development Department
4	NGT	National Green Tribunal
5	CRC	Coastal Rejuvenation Committee
6	SPCB	State Pollution Control Board
7	APPCB	Andhra Pradesh State Pollution Control Board
8	UTs	Union Territories
9	GVMC	Greater Visakhapatnam Municipal Corporation
10	NCCR	National Centre for Coastal Research

S. No.	Acronym	Abbreviation
1	BOD	Bio-chemical Oxygen Demand
2	COD	Chemical oxygen demand
3	DO	Dissolved oxygen
4	ETP	Effluent Treatment Plant
5	KLD	Kilo Liters per Day
6	LPCD	Liters per capita per day
7	MLD	Million Liters per day
8	MSW	Municipal Solid Waste
9	OCEMS	Online continuous effluent monitoring system
10	STP	Sewage Treatment Plant
11	TPD	Tons Per Day
12	TDS	Total Dissolved Solids
13	TOC	Total organic carbon
14	TSS	Total suspended solids
15	TSDF	Treatment storage and disposal facility
16	ULB	Urban Local Body
17	ZLD	Zero Liquid Discharge
18	MRF	Material Recovery Facility
19	CBWTF	Common Bio-medical Waste Treatment Facility
20	C&D Waste	Construction & Demolition Waste
21	E-Waste	Electronic Waste
22	MTA	Metric Tons per Annum
23	SLF	Scientific Land Facility
24	SL	Sample Location

1. Executive Summary

Information on "Municipal Sewage, Industrial effluent and Waste Management scenario in Coastal Areas"
in compliance to Hon'ble NGT order passed in O.A. No. 829 of 2019

Table 1.1

Sl.No.	Contents		
1	**Basic Information**		
	Name of the SPCB/PCC	:	Andhra Pradesh Pollution Control Board, Vijayawada
2	**Categorization of Coastal Areas in the State/UT (Please indicate location-wise relevant category indicated below)**		
	Coastal area location		9 Districts are located in Coastal Area covering a length of 975 KMs Coastal Line.
(i)	**SW-I (Salt Pans, Shell Fishing, Mãriculture and Ecologically Sensitive Zone)**		
	Salt Pans	:	i. Naupada Village, Santhabommali Mandal & Bhavanapadu Village, Vajrapukotturu Mandal in Srikakulam District; ii. Machilipatnam in Krishna District; iii.Kothapalem, Repalle Mandal in Guntur; iv. Kothapatnam area & China Ganjam Village in Prakasam District; v. Iskapalli Village, Alur Mandal in Nellore District, Andhra Pradesh
	Ecologically Sensitive Zone	:	i. Krishna Wildlife Sanctuary in Krishna & Guntur Districts; ii. Coringa Wildlife Santuary, Kakinada, East Godavari District; 3. Pulicat Lake Bird Sanctuary in Nellore District, Andhra Pradesh.
(ii)	**SW-II (Bathing, Contact Water Sports and Commercial Fishing)**		
	Bathing	:	i. Visakhapatnam, Visakhapatnam District ii. Rajamahendravaram, East Godavari

			District, Andhra Pradesh.
`	`-	:	i. Bandaruvanipeta, Budagatlapalem, Bhavanapadu, Kalingapatnam in Srikakulam District; ii.Visakhapatnam Urban, Pudimaka in Visakhapatnam District; iii. Kakinada in East Godavari District; iv.Biyyaputippa in West Godavari District; v.Machilipatnam in Krishna District; vi. Nizampatnam in Guntur District; vii. Kothapatnam, Vodarevu,Ramayapattanam in Prakasam District and viii. Krishnapatnama Port area in Nellore District, Andhra Pradesh.
(iii)	**SW-III (Industrial cooling, Recreation (non-contact and Aesthetics)**		
	Industrial Cooling	:	i. Parawada, Simhadri, Visakhpatnam, Visakhapatnam Distrct; ii. Nelatur & Pynampuram Villages, Painapuram Village, Muthukur Mandal; Vakarlapudi& Sivarampuram Villages, Muthukur Mandal and Tamminapatnam & Mommidi Villages, Chilakur Mandal, SPSR Nellore District, Andhra Pradesh.
	Recreation (non-cont) and Aesthetics	:	i.Visakhpatnam, Visakhpatanma District; ii. Suryalanka beach, Bapatla, Guntur District; iii.Chirala, Prakasam District, Andhra Pradesh.
(iv)	**SW-IV (Harbour)**	:	i. Visakhapatnam & Gannavaram in Visakhapatnam District; ii Kakinada in East Godavari District; iii. Machilipatnam, Krishna District; iv. Krishnapatnam Port, SPSR Nellore District, Andhra Pradesh
(v)	**SW-V (Navigation and Controlled Waste Disposal)**	:	NIL

3	**Major cities/ Towns located in Coastal Areas in the State/UT**		
(i)	Major Cities/Towns located in Coastal Areas		i. Visakhapatnam, Visakhapatnam District; ii. Kakinada, East Godavari District; iii. Chirala in Prakasam District; Andhra Pradesh
(ii)	Major Drains outfall into Creeks/ Estuaries/ Sea Water and their total numbers	:	31 Nos. i. Creeks in Tekkali, Kuppili, Balarampuram, Komaravanipeta, Pukkalapeta and Donkaluru in Srikakulam District; (6 Nos.) ii. Major Drains - 13 Nos. in Visakhapatnam, Visakhapatnam District; iii. Teki Drain & Tulya bhaga drain in East Godavari District; (2 Nos.) iv.Yenamadurru Drain, Gonteru & Uppeteru (3 No.) in West Godavari District; v. Gunderu drain,Sivaganga drain, Lazzabanda drain, Pedalanka drain & Thalapalem drain in Krishna District; (5 Nos.) vi. Nallamada drain in Guntur District; vii. Kunderu drain in Prakasam District, Andhra Pradesh.
4	**Status of Sewage Generation, its Treatment and Disposal in Coastal Areas**		
(i)	Total Sewage Generation in Coastal Areas in the State/UT (in MLD)	:	249.72 MLD i. 204 MLD: ULBs - Greater Visakhapatnam Municipal Corporation (GVMC) in Visakhapatnam District; ii. 36 MLD: Kakinada Municipal Corporation in East Godavari District; iii. 9.72 MLD: Chirala Municipality in Prakasam District;
(ii)	Total No. of STPs in Coastal Areas	:	18 Nos (18 Nos in GVMC in Visakhapatnam District)
(iii)	Total Installed Capacity of STPs (in MLD)	:	177.0 MLD

(iv)	Actual total sewage treated in STPs at present (in MLD)	:	100.95 MLD
(v)	Gap in Sewage Treatment in coastal areas (in MLD)	:	72.72 MLD (249.72 MLD - 177.0 MLD)
(vi)	No. of STPs presently under construction to meet the gap in Sewage treatment in Coastal areas in the State/UT	:	3 Nos. i. 2 Nos at GVMC in Visakhapatnam District of Capacities – 2.0 MLD & 46.0 MLD; ii. 1 Nos at Kakinada in East Godavari District of capacity – 5.0 MLD;
(viii)	Quantity of untreated sewage discharged into Coastal water (in MLD)	:	148.77 MLD (i. 103.05 MLD GVMC in Visakhapatnam District; (ii. 36 MLD Kakinada Municipal Corporation in East Godavari District; (iii. 9.72 MLD: Chirala Municipality in Prakasam District)
(ix)	Quantity of treated sewage discharged into Coastal water (in MLD)	:	60.95 MLD (Out of 100.95 MLD, 40.0 MLD is utilized in watering the Green Belt, dust suppression and wetting operations). 5.0 MLD – Port Trust for dust suppression. 10.0 MLD – Golf Court for wetting. 25.00 MLD – Watering for green belt/plantation by GVMC. An MOU is entered between GVMC & Industries (M/s. HPCL & M/s. RIL) for utilization of treated sewage water of 75.0 MLD.
5.	**Status of industries in coastal areas**		
(i)	Total No. of industries located in Coastal areas	:	165 Nos. (3 Nos. - Srikakulam District; 3 Nos. - Vizianagaram District; 13 Nos. - Visakhapatnam District; 83 Nos. - East Godavari District (out of 83 Nos., 60 Nos. are Prawn Seed Hatcheries Processing units); 12 Nos. – Guntur District (Prawn Hatcheries only);

			58 Nos. – Prakasam District (out of 58 Nos., 52 Nos. are small scale dyeing units, 3 Nos. Prawn Processing); 5 Nos. - SPSR Nellore District) **Note:** In Visakhapatnam District, i. M/s. Ramky Pharmacity (India) Ltd., has been issued single consent with single discharge point which houses 86 Nos of Industries. ii. M/s. Hetero Infrastructure SEZ Ltd., has been issued single consent with single discharge point which houses 4 Nos of industries. iii. M/s. Brandix India Apparel City Pvt. Ltd., APSEZ has been issued single consent with single discharge point which housed 14 Nos of industries. iv. Atchutapuram SEZ has been issued single consent with single discharge point which houses 22 Nos of industries. **** Earlier the total industries in the District were communicated instead of the industries near to the Coastal areas.**
(ii)	Category wise No. of industries	:	
	(a) Total No. of 17 Category Highly Polluting Industries	:	25 Nos. (3 Nos. - Srikakulam District; 2 Nos. - Vizianagaram District; 12 Nos. - Visakhapatnam District; 3 Nos. - East Godavari District; 5 Nos. - SPSR Nellore District ;) **Note:** In Visakhapatnam District, i. M/s. Ramky Pharmacity (India) Ltd., has been issued single consent with single discharge point which houses 86 Nos of Industries. ii. M/s. Hetero Infrastructure SEZ Ltd., has been issued single consent with single discharge point which

			houses 4 Nos of industries. iii. Atchutapuram SEZ has been issued single consent with single discharge point which houses 22 Nos of industries. **** Earlier the total industries in the District were communicated instead of the industries near to the Coastal areas.**
	(b) Total No. of Grossly Polluting Industries	:	Nil
6.	**Status on Industrial Effluent Generation and CETPs in Coastal Areas**		
(i)	Total industrial effluent generated by industries (in MLD)	:	2764.62 MLD (Out of this, once through cooliing water is 2481.33 MLD). (0.9 MLD - Srikakulam District; 1.3145 MLD - Vizianagaram District; 2725.37 MLD - Visakhapatnam District*; 15.35 MLD - East Godavari District; 1.694 MLD - Prakasam District; 20 MLD - Nellore District **) *2461.33 MLD once through cooling which is discharged into the sea. **20 MLD once through cooling which is discharged into the sea. The total industrial effluent generation is 283.29 MLD excluding once through cooling.
(ii)	Total No. of industries having captive ETPs	:	53 Nos. (3 Nos. - Srikakulam District; 3 Nos. - Vizianagaram District; 12 Nos. - Visakhapatnam District; 23 Nos. - East Godavari District; 12 Nos. - Prakasam District;)
(iii)	Total No. of Captive ETPs operating by industries complying with discharge norms	:	53 Nos. (3 Nos. - Srikakulam District; 3 Nos. - Vizianagaram District; 12 Nos. - Visakhapatnam District; 23 Nos. - East Godavari District; 12 Nos. - Prakasam District;)

(iv)	Total treated effluent discharged in Coastal areas (in MLD)	:	2756.97 MLD (Out of this, once through cooliing water is 2481.33 MLD). (0.9 MLD - Srikakulam District; 1.3145 MLD - Vizianagaram District; 2725.37 MLD - Visakhapatnam District*; 7.7 MLD - East Godavari District; 1.694 MLD - Prakasam District; 20 MLD - Nellore District **) *2461.33 MLD once through cooling which is discharged into the sea. **20 MLD once through cooling which is discharged into the sea. ***However 7.65 MLD (2764.62 MLD – 2756.97 MLD) is treated in ZLD system by the industries in Kakinada, East Godavari District.
(v)	No. of CETPs located in the Coastal areas	:	3 Nos.
	(a) Location wise CETPs with installed capacity (in MLD)	:	1) Parwada, Visakhapatnam, Andhra Pradesh (5 MLD - LTDs 3.5 MLD & HTDS-1.5 MLD). 2) M/s Brandix India Apparel City Pvt. Ltd, APSEZ, Atchuthapuram (M), Visakhapatnam., Andhra Pradesh (20 MLD). 3) M/s. Atchutapuram Effluent Treatment plant (1.5 MLD).
	(b) No. of industries having membership of CETPs	:	126 Nos. (126 Nos. - CETPs, Visakhapatnam)
(vi)	Gap in industrial effluent treatment in coastal areas (in MLD)	:	Nil
(vii)	Total untreated industrial effluent discharged in Coastal water (in MLD)	:	No untreated industrial effluent is discharged into the Coastal Waters.

7.	**Waste management scenario in coastal areas**		
S. No.	**Type of Waste**		**Quantity of waste generation (MTA) in the State**
(i)	Hazardous waste		3,09,560.8752 MTA The generated waste by the industries is disposed to TSDFs (2 Nos.) which is authorized by APPCB.
(ii)	Bio-medical waste		1,432.718 MTA The generated waste by the HCEs is disposed to CBWTFs (9 Nos.) which is authorized by APPCB.
(iii)	Municipal solid waste		5,66,780 MTA The generated waste by the ULBs is disposed through material recovery facilities, waste to energy plants and SLFs, which are authorized by the APPCB.
(iv)	Plastic waste		21,553.75 MTA The generated waste by the ULBs is utilized for road construction, disposed to material recovery facility, registered recyclers and cement plants, which are authorized by the APPCB.
(v)	e-waste		0.075 MTA The generated waste from the ULBs is disposed to authorized e-waste processing units 3 nos.
(vi)	C&D waste		40,432 MTA The C&D waste generated is collected through waste call centres and collection centres and disposed through authorized C&D waste processing facilities.
	* No Solid Waste is disposed into the Coastal Waters. All the wastes are disposed into the Common Waste treatment Facilities.		

9.	**Water Quality of Coastal waters (From 2010 – 11 to 2019-20)& Summary**		
(i)	No. of water quality monitoring stations	:	40 Stations
(a)	CPCB	:	12 Nos.
(b)	SPCB	:	28 Nos.
	The Water Quality Analysis of the Coastal Waters results reveals that all the 40 monitored locations are complying with the primary water quality criteria for SW-IV norms notified under Environment Protection rules 1986 except for the parameters pertaining to DO, pH & BOD at the locations of the sea waters is complying to the marine primary water quality criteria SW-IV parameters at some of the sample locations in Visakhapatnam & East Godavari Districts. At present the MA&UD; Government of A.P has started construction of STPs: 2 Nos. at GVMC Visakhapatnam with capacities 2.0 MLD & 46.0 MLD and 1 No. at Kakinada, East Godavari with a capacity of 5.0 MLD STPs. The STPs will be commissioned by December 2021.		

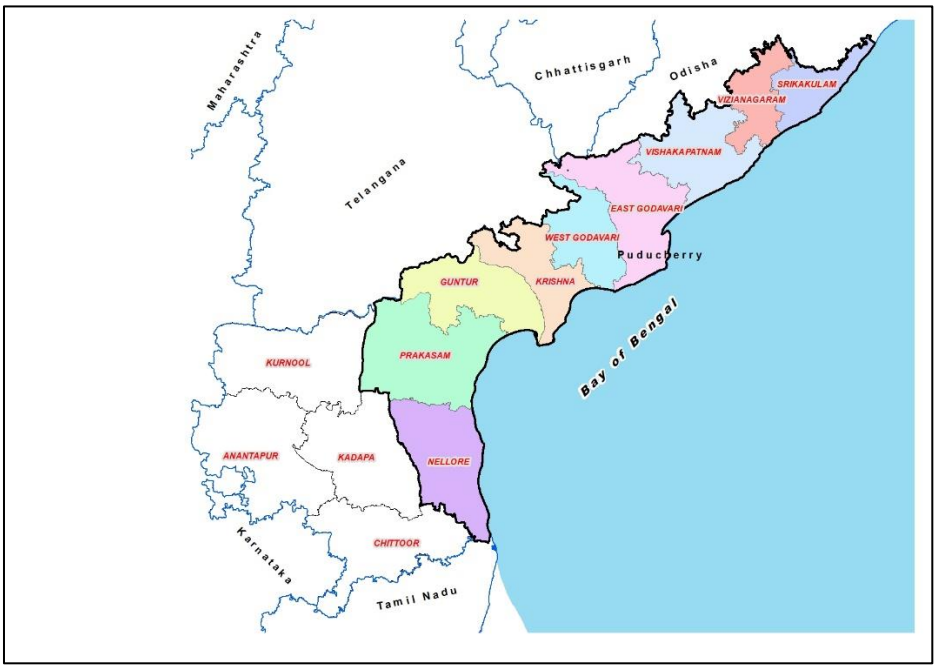
2.0 Preamble

In the State of Andhra Pradesh, 9 Districts are having coastal line covering a distance of 975 Kms., starting from Srikakulam to Nellore. The details of coast line stretches and the latitude and longitudes of the District coast line is as detailed below:

Table 2.1

Sl. No	District	Length of the Coast Line (Kms.)	From		To	
			Latitude	Longitude	Latitude	Longitude
1	Srikakulam	163	19° 4' 37.901" N	84° 45'54.277" E	18° 4' 41.846" N	83° 39' 50.461" E
2	Vizianagaram	21	18° 4' 41.846" N	83° 39' 50.461" E	17° 56' 51.440" N	83° 31' 29.971" E
3	Vishakapatnam	141	17° 56' 51.440" N	83° 31' 29.971" E	17°14' 54.641" N	82° 32' 28.901" E
4	East Godavari	173	17° 14' 54.641" N	82° 32' 28.901" E	16° 19' 0.784" N	81° 42' 47.617" E
5	West Godavari	17	16° 19' 0.784" N	81° 42' 47.617" E	16° 20' 49.518" N	81° 33' 31.608" E
6	Krishna	125	16° 20' 49.518" N	81° 33' 31.608" E	15° 42' 25.267" N	80°50' 0.582" E
7	Guntur	72	15° 42' 25.267" N	80° 50' 0.582" E	15° 47' 50.796" N	80° 25' 2.704" E
8	Prakasam	100	15° 47' 50.796" N	80° 25' 2.704" E	15° 0' 23.438" N	80° 3' 14.326" E
9	Nellore	164	15° 0' 23.438" N	80° 3' 14.326" E	13° 33' 52.071" N	80° 16' 7.249" E
		975				

Map 2.1
AP Coastal Map (Not to Scale)



The present action plan has been prepared in compliance to the directions given by Hon'ble NGT in O.A.No.829 of 2019 for taking remedial action for rejuvenation of Coastal Water Stretches in Andhra Pradesh.

3.0 Hon'ble NGT Directions in O.A.No.829 of 2019

Hon'ble NGT, while referring to the observations of the Hon'ble Supreme Court in Indian Council for Enviro Legal Actions V/s UOI (Union of India), (1996) 3 SCC 2012 that degradation of coastal areas was a matter of serious concern and effected aesthetic and Environment which required Environmental Management Plans to ensure that coastal water remains fit for Human and Aquatic Life, and issued the following directions to the 13 coastal State Pollution Control Board / Pollution Control Committees to comply with:

i. Ensure proper treatment and disposal of industrial effluent generated from water polluting industries located in the coastal State / UTs by ensuring installation of captive ETPs or disposal of industrial effluent through CETPs by prescribing PETS Standards under consent mechanism and for safe disposal or utilization of treated effluents in accordance with the disposal modes permitted under Environment (Protection) Act, 1986.

ii. Ensure proper treatment and disposal of industrial hazardous waste generated from hazardous waste generating industries located in the coastal States / UTs and to ensure requisite infrastructure for environmentally sound management of generated hazardous waste in accordance with the Hazardous and Other Waste (Management & Transboundary Movement) Rules, 2016 as amended notified under the Environment (Protection) Act, 1986.

iii. Associate with National Center for Coastal Research (NCCR), Chennai under Ministry of Earth Sciences for monitoring and assessment of coastal waters within the jurisdiction of the coastal States / UTs up to 5 Km from shore and to evolve strategies for protection of the coastal areas in association with Coastal Zone Management Authority in the State.

iv. Prepare time bound comprehensive action plans along with implementing agencies in consultation with the respective Coastal Zone Management Authority for Control of Coastal Pollution in the States / UTs, and submit to CPCB within three months from the date of issuance of these directions i.e. by 25th November 2020.

4.0 CPCB Directions:

Central Pollution Control Board issued directions under section 18 (1) (B) of the water (Prevention and Control of Pollution) Act, 1986 in the matter of control of Marine Pollution in Coastal States / UTs, vide F. No. 14011 (O. A. No. 829) / 1/WQM-I/2020-5562, dated 31.08.2020. The directions are:

a) Directions under Section 33 of water (Prevention of Control of Pollution) Act 1974, shall be issued to all the concerned Local Bodies / Urban Bodies / Municipalities / Authorities in the Coastal areas of Andhra Pradesh within 15 days from the date of issuance of these directions:

   i. To set up for sewage collection, convince treatment and its disposal to cover the entire local / urban / coastal area within the respective jurisdiction.

   ii. To develop adequate capacity of sewage treatment using convention STPs or other technology and ensue to comply with the discharge norms as prescribed by the Andhra Pradesh SPCB under consent mechanism prescribed under Water Act, 1974.

   iii. For ensuring treatment and use of treated sewage for non-portable purposes such as industrial process Railways & Bus cleaning flushing of toilets through dual piping, construction activities, horticulture and irrigation etc.

   iv. To set up requisite facilities for collection, transportation, treatment and disposal of Municipal Solid Waste, Plastic Waste, Construction and Demolition Waste generated as well as bio-mining of the existing legacy dumpsites in accordance with the Solid Waste Management Rules, 2016, Plastic Waste Management Rules, 2016 and Construction & Demolition Waste Management Rules, 2016 as amended respectively, notified under the Environment (Protection) Act, 1986, in the coastal areas within the respective jurisdiction of the State / UT.

   v. For periodic cleaning and removal of plastic waste/solid waste in coastal areas to prevent marine pollution and for ensuring its safe disposal in accordance with the provisions notified under the Environment (Protection) Act, 1986.

   vi. To submit a time bound action plan for management of sewage, municipal solid waste, plastic waste, C & D waste generated in the respective jurisdiction of the local / urban bodies in coastal areas as mentioned in afore-said paras, within a period of two months from the date of issuance of these directions.

b) That Andhra Pradesh Pollution Control Board (APPCB) shall

i. Ensure proper treatment and disposal of industrial effluent generated from water polluting industries located in the coastal areas of the Andhra Pradesh State by ensuring installation of captive ETPs or disposal of industrial effluent through CETPs by prescribing PETP Standards under consent mechanism and for safe disposal or utilization of treated effluents in accordance with the disposal modes permitted under Environment (Protection) Act, 1986.

ii. Ensure proper treatment and disposal of industrial hazardous waste generated from hazardous waste generating industries located in the coastal areas of the Andhra Pradesh State and to ensure requisite infrastructure for environmentally sound management of generated hazardous waste in accordance with the Hazardous and Other Waste (Management & Transboundary Movement) Rules, 2016 as amended notified under the Environment (Protection) Act, 1986.

iii. Associate with National Center for Coastal Research (NCCR), Chennai under Ministry of Earth Sciences for monitoring and assessment of coastal waters within the jurisdiction of the Andhra Pradesh up to 5 km from shore and to evolve strategies for protection of the coastal areas in association with Coastal Zone Management Authority in the State.

iv. Prepare time bound comprehensive action plans along with implementing agencies in consultation with Andhra Pradesh State Coastal Zone Management Authority for control of coastal Pollution and Andhra Pradesh, State, and submit to CPCB within three months from the date of issuance of these directions i.e. by 25 November 2020.

5.0 Action Plan:

The Coastal Areas of Andhra Pradesh has been classified into four zones such as SW- 1 (Salt Pas, Shell Fishing, Mariculture and Ecologically Sensitive Zone), SW-11 (Bathing, Contact Water Sports and Commercial Fishing), SW-Ill (Industrial Cooling, Recreation) and SW-IV (Harbour). There are 3 major towns/cities present in the coastal areas of AP State and about 30 major drains outfall into Creek/Estuaries/Sea Water of Indian Ocean. Major industries located are Iron & Steel; Petro Chemical; Port activity; Fertilizers, Thermal Power Plants & Bulk Drug units etc.

The Hon'ble NGT in Original Application No. 829/2019, dated 21.09.2020 while disposing the case ordered the States to submit comprehensive action plan along with implementation agencies for the control of coastal pollution. In compliance to the orders of the Hon'ble NGT the action plan for the control of coastal pollution is as below:

The components of the action plan are

- Sewage Management
- **Industrial Effluent Management**
- **Waste management**

5.1 Status of Sewage Management Scenario in AP Coastal Areas

In Andhra Pradesh coastal areas, total sewage generation is 249.72 MLD (i.e. 204 MLD Greater Visakhapatnam Municipal Corporation (GVMC) in Visakhapatnam District, Kakinada Municipal Corporation-36 MLD; Chirala Municipality, Prakasam District - 9.72 MLD). In total 18 STPs are existing in GVMC, Visakhapatnam, with an installed capacity of 177.0 MLD. The total sewage treated in 18 STPs is about 100.95 MLD and the gap in sewage treatment in coastal areas of AP is 148.77 MLD.

At present the MA&UD; Government of A.P has started construction of STPs: 2 Nos. at GVMC Visakhapatnam with capacities 2.0 MLD & 46.0 MLD and 1 No. at Kakinada, East Godavari with a capacity of 5.0 MLD STPs. The STPs will be commissioned by December 2021.

The APPCB will pursue with the MA&UD, Govt. of A.P for further facilities based on the gaps.

5.2 Status on Industrial Effluent Management Scenario in Coastal Areas

5.2.1 Total Industries:

There are 165 industries located in the coastal areas of Andhra Pradesh i.e. Srikakulam District (3), Vizianagaram District (3), Vishakhapatnam District (13); East Godavari District (83), Prakasam District (58), SPSR Nellore District (5).

In Visakhapatnam District, 86 Nos. of industries are located in M/s. Ramky Pharmacity (India) Ltd., 4 Nos. of industries in M/s. Hetero Infrastructure SEZ Ltd., 14 Nos. of industries in M/s. Brandix India Apparel City Pvt. Ltd, APSEZ, 22 Nos. of industries in M/s. Atchutapuram SEZ, which are issued with single consent with single discharge point. In East Godavari District, out of 83 Nos., 60 Nos. are Prawn Seed Hatcheries units; in Guntur District all 12 Nos. are Prawn Hatcheries; in Prakasam District, out of 58 Nos., 52 Nos. are small scale dyeing units, 3 Nos. Prawn Processing;

Earlier the total industries in the entire Districts were communicated instead of the industries located near to the Coastal areas.

5.2.2 17 Category Industries:

There are 25 numbers of 17 categories highly polluting industries present in the coastal areas (i.e. Srikakulam District-3 nos.; Vizianagaram District-2 nos.; Visakhapatnam District-12 nos.; East Godavari District-3 nos.; SPSR Nellore District-5 nos).

In Visakhapatnam District, 86 Nos. of industries are located in M/s. Ramky Pharmacity (India) Ltd., 4 Nos. of industries in M/s. Hetero Infrastructure SEZ Ltd., 22 Nos. of industries in M/s. Atchutapuram SEZ, which are issued with single consent with single discharge point.

Earlier the total industries in the entire Districts were communicated instead of the industries located near to the Coastal areas.

5.2.3 Total Industrial Effluent Generation:

Total industrial effluent generated by the industries is about 2764.62 MLD (i.e. Srikakulam district- 0.90 MLD; Vizianagaram district- 1.3145 MLD, Visakhapatnam District- 2725.37 MLD; East Godavari District- 15.35 MLD; Prakasam District-1.694 MLD; SPSR Nellore District-20 MLD).

Out of 2764.62 MLD, 2481.33 MLD of effluent is once through cooling waste water (Visakhapatnam District - 2461.33 MLD and 20 MLD - Nellore District) and **industrial effluent is only** 283.29 MLD.

In total 53 Nos. of industries are having captive ETPs, complying to the effluent discharge norms (i.e. Srikakulam District-3 nos.; Vizianagaram District-3 nos.; Visakhapatnam District -12 nos; East Godavari District-23 nos.; Prakasam District - 12 Nos.).

There are 3 CETPs having installed capacity of 25.07 MLD i.e. CETP at Parawada, Visakhapatnam, Andhra Pradesh (5 MLD - LTDs 3.5 MLD & HTDS-1.5 MLD), CETP at M/s Brandix India Apparel City Pvt. Ltd, APSEZ, Atchuthapuram (M), Visakhapatnam, Andhra Pradesh (20 MLD), CETP at M/s. Atchutapuram SEZ (1.5 MLD), Visakhapatnam, Andhra Pradesh About 169 industries are having membership of 3 CETPs.

5.2.4 Treated effluent disposal into sea:

The APPCB is regularly monitoring the treated effluent disposal into sea by the industries and CETPs. The industries and CETPs are permitted to discharge the treated effluent through marine out fall in the sea in the presence of APPCB officials only after the effluents are meeting the discharge standards. Total treated effluent discharged in coastal areas is about 2756.97 MLD including once through cooling water of 2481.33 MLD (i.e. Srikakulam district- 0.90 MLD; Vizianagaram district-1.3145 MLD, Visakhapatnam District- 2725.37 MLD; East Godavari District- 7.7 MLD; Prakasam District-1.694 MLD; SPSR Nellore District-20 MLD).

Total industrial effluent generated by the industries is about 2764.62 MLD including once through cooling of 2481 MLD. The Total treated effluent discharged in coastal areas is about 2756.97 MLD. Effluent of 7.65 MLD is disposed of by adopting ZLD system. **Hence, no untreated industrial effluent is discharged into the Coastal Waters.**

The APPCB will continue the monitoring of the industrial effluent discharge into the sea waters and ensure that, the untreated industrial effluents are not permitted to discharge into the sea through regular vigilance.

5.3 Waste Management scenario in coastal areas of Andhra Pradesh:

5.3.1 **Hazardous waste** is generated is about 3, 09,560.8752 MTA. The waste is disposed to 02 Nos. of Hazardous Waste Treatment Storage and Disposal Facilities (TSDFs) authorized by APPCB [viz., 1) M/s. Coastal Waste Management Project, (A division of M/s. Ramky Enviro Engineers Ltd.,) at JN Pharma City, Parawada, Visakhapatnam, Andhra Pradesh. (9,50,000 MT); 2) M/s. Coastal Waste Management Project (CWMP), Unit 2 (A Division of Mumbai Waste Management Limited), Raviguntapalli village, Rapur Mandal, Nellore District, Andhra Pradesh (95,000 MT).

5.3.2 **Bio-medical Waste** generated is 1,432.718 MTA and is disposed off through 9 Common Bio-medical Waste Treatment Facilities (CBWTFs) authorized by APPC B.

Common Bi-medical Waste Treatment Facilities in Coastal Districts Andhra Pradesh

Table 5.1

S. No.	District	Name & Address of CBWTF
1	Srikakulam	M/s. Rainbow Industries, Sy.No. 21/1, Pathakunkam(V), Laveru(M), Srikakulam District.
2	Visakhaptnam	M/s. Maridi Eco Industries (Andhra) Pvt. Ltd., Sy.No.314, Kapulupada, Bheemunipatnam (M), Visakhaptnam District.
3	Visakhapatnam	M/s. Vasishta Environ Care, Plot No 27A25, Denotified Area AP SEZ, Atchutapuram Rambilli (M), Visakhapatnam District.
4	East Godavari	M/s. EVB Technologies (P) Ltd., Sy.No.560, Kanavaram(V), Rajanagaram(M), East Godavari District.
5	West Godavari	M/s Safenviron & Associates, R.S.No.181/1, Nallamadu (V), Ungutur (M), West Godavari District.
6	Krishna	M/s. Safenviron (Unit-II), Sy.No.164/1A, Dharmavarapupadu Thanda (V), Jaggaiahpet (M), Krishna District.
7	Guntur	M/s. Safenviron, Chinakakani (V), Mangalagiri (M), Guntur District.
8	Prakasam	M/s. Ongole Medical Waste Treatment Facility, Sy.No.316/1, Kanduluru (V), Tanguturu (M), Prakasam District
9	SPSR Nellore	M/s. S S Bio Care, S.No 61, Plot No-2, APIIC, Attivaram village, Ozili (M), SPSR Nellore District.

5.3.3 **Municipal solid waste** is generated at 5,66,780 MTA; The generated waste by the ULBs is disposed through material recovery facilities, waste to energy plants and SLFs, which are authorized by the APPCB i.e., M/s. Jindal Urban Waste Management (Viskahapatnam) Ltd., for Waste to Energy Plant (which is under construction) to produce 15 MWH power by utilizing solid waste of 4,08,800 TPA generated in 2 ULBs (i.e., Srikakulam & GVMC), 2 Nos (GVMC & Chirala) of Scientific Land Facility (SLF) and with 33,945 TPA capacity and Material Recovery Facilities (MRFs) to recover the material from the municipal solid waste.

5.3.4 **Plastic waste** is generated at 21,553.75 MTA, the generated waste by the ULBs is utilized for road construction, disposed to material recovery facility, registered recyclers and cement plants, which are authorized by the APPCB. The non-recyclable plastic waste generated is being utilized for road construction by GVMC & Kakinada Municipal Corporations. About 16.5 Tons of plastic waste utilized to lay about 9 Kms. road. Material Recovery Facilities (MRFs) have been established to recover the plastic waste from the municipal solid waste. The recyclable plastic waste is being sent to registered recyclers. The non-recyclable plastic waste is being sent to cement plants for co-incineration. Authorization issued to 8 cement units to use non-recyclable plastic waste as an alternative fuel (co-incineration).

5.3.5 **E-waste** generation is 0.075 MTA, The generated waste from the ULBs is disposed to authorized e-waste processing units 3 nos. The APPCB issued authorization to the following dismantling facilities to handle the e-waste as per E-Waste Management Rules:

1) M/s. Green waves Environmental Solutions, Visakhapatnam of capacity- 40 TPM.
2) M/s. Veera Waste Management, Visakhapatnam of capacity – 19.4 TPD.
3) M/s. Apna Bhoomi, Srikakulam of capacity – 1 TPD

5.3.6 **C&D waste** is generated at about 40432 MTA. The C&D waste generated is collected through waste call centres and collection centres and disposed through authorized C&D waste processing facilities. Authorization is issued by APPCB to 2 Nos (M/s. Pro Enviro C&D Waste Management Pvt. Ltd., Visakhapatnam and Pro Enviro C&D Waste Management Pvt. Ltd., Vijayawada) with capacity of 102200 TPA. The end product of sand and gravel from the Construction & Demolition Waste Processing Facilities is being supplied to industries and also being used in construction of roads.

The APPCB will continue the monitoring of the Solid Waste generated and their disposal and ensure that, the Solid Wastes are not disposed into the sea through regular vigilance.

6.0 Monitoring of Water Quality of Coastal Waters:

The APPCB is regularly monitoring the Water quality of coastal waters under NWMP. The water quality is monitored at 40 (12 CPCB & 28 APPCB) locations. District wise sampling locations are as below:

Table 6.1

Sl. No.	District	Sampling Locations
1.	Srikakulam	3 Nos.
2.	Vizianagaram	1 Nos.
3.	Visakhapatnam	13 Nos.
4.	East Godavari	9 Nos.
5.	West Godavari	1 Nos.
6.	Prakasam	2 Nos.
7.	Nellore	4 Nos.
8.	Guntur	3 Nos.
9.	Krishna	4 Nos.
	Total:	**40 Nos.**

Table 6.2: Annual Average values of quality of coastal waters of Bay of Bengal

Coastal water quality monitoring data - Andhra Pradesh (Annual average values for the period from 2010-11 to 2019-20)									
S. No.	**Sample Description**	**YEAR**	**DO**	**pH**	**TSS**	**BOD**	**NO_3 -N**	**NH_3 - N**	**PO_4**
I. Srikakulam District									
1	Confluence of marine outfall of M/s Dr. Reddy Labs Ltd., & M/s. Aurobindo Pharma Ltd., Pydibheemavaram.(Ranasthalam) SL-1	2010-11	5	7.4	9	1.8	0.5	0.04	0.8
		2011-12	7.2	7.8	8	2	0.3	0.01	0.1
		2012-13	6.2	7.5	244	2.6	0.64	0.2	0.08
		2013-14	6.7	8.1	34	1.4	0.14	0.22	0.39
		2014-15	6.8	8.1	80	1.3	0.1	0.1	0.58
		2015-16	5.5	7.7	55	1.3	0.4	0.2	0.3
		2016-17	5.7	7.2	93	1.6	1.1	0.08	0.14
		2017-18	6.3	7.6	40	1.4	0.6	0.21	0.12
		2018-19	5.7	7.6	102	1.3	0.53	2.15	0.03
		2019-20	5.9	7.7	64	1.8	0.57	0.03	0.03
2	Confluence point of river Vamsadhara at Kalingapatnam.	2010-11	6.7	7.8	7	1.5	0.25	0.05	0.45
		2011-12	5.4	8	12	1	0.4	BDL	0.5
		2012-13	6.6	7.5	224	2.2	0.66	0.01	0.11

	SL-2	2013-14	6.6	7.5	--	1.9	0.27	0.24	0.97
		2014-15	6.6	7.8	46	1.7	0.5	0.3	0.7
		2015-16	5.6	7.6	46	1.5	0.8	0.4	0.3
		2016-17	5.9	7.2	116	1.5	0.62	0.12	0.08
		2017-18	6.5	7.1	103	1.9	1.0	0.2	0.5
		2018-19	6.1	7.4	80	1.5	1.6	0.2	0.3
		2019-20	7	7.4	77	2.2	0.76	0.09	0.03
3	Confluence of river Nagavali at Peda Ganagalavani peta. SL-3	2010-11	5.9	7.6	5	1.4	0.8	BDL	0.25
		2011-12	5.6	7.8	8	1	0.4	0.01	0.1
		2012-13	6.8	7.4	240	2	0.63	0.02	0.06
		2013-14	6.7	7.9	57	1.8	0.11	0.37	0.83
		2014-15	6.7	7.9	31	1.7	0.09	0.21	0.83
		2015-16	6	7.7	43	1.5	0.4	0.3	0.5
		2016-17	5.5	7.3	74	1.5	1.4	0.06	0.066
		2017-18	6.3	7.5	44	1.4	0.73	0.08	0.16
		2018-19	5.8	7.6	112	1.5	1.47	0.11	0.03
		2019-20	6.4	7.4	106	2.3	0.71	0.2	0.03
II. Vizianagaram District									
4	Confluence of marine outfall of M/s. Matrix Laboratories Ltd., Thammayyapalem. SL-4	2010-11	5.4	8	9	1.4	1.08	0.02	0.1
		2011-12	6.8	7.7	10	2	0.4	0.04	0.1
		2012-13	6.6	7.5	230	2.2	0.65	0.08	0.08
		2013-14	6.7	8.1	37	1.2	0.18	0.11	0.48
		2014-15	6.7	8.1	24	1.1	0.17	0.07	0.02
		2015-16	5.8	7.4	39	1.3	0.4	0.07	0.24
		2016-17	5.8	7.2	89	1.9	0.8	0.05	0.18
		2017-18	6.6	7.7	85	1.3	0.8	0.01	0.33
		2018-19	5.9	7.7	89	1.4	0.5	1.02	0.02
		2019-20	5.6	7.6	61	1.8	0.52	0.03	0.03
III. Visakhapatnam District									
5	Confluence of marine outfall of M/s. Divi's Laboratories Ltd., Chippada. SL-5	2010-11	6	7.42	8	1.1	1.19	0.04	0.26
		2011-12	7.5	8.2	10	2	0.3	0.03	0.1
		2012-13	6.9	7.4	400	2	0.79	0.04	0.18
		2013-14	6.7	7.9	28	1.2	1.12	0.51	0.8
		2014-15	6.7	7.8	26	1.2	0.95	0.4	0.7
		2015-16	5.6	7.6	52	1.4	0.3	0.1	0.2
		2016-17	6.5	7.1	88	2.4	0.6	0.1	0.09
		2017-18	5.8	7.5	119	1.2	0.59	0.06	0.24
		2018-19	5.6	7.64	115	1.4	0.52	0.05	0.18
		2019-20	5.7	7.5	84	2.3	0.63	0.17	0.08
6	Confluence point of	2010-11	6.8	7.4	5	1.6	0.9	BDL	0.08

	Gosthani river joining the sea near Bheemili municipal office. SL-6	2011-12	5.7	7.9	12	1	0.6	0.03	0.2
		2012-13	7	7.2	430	2.6	1.02	0.1	0.22
		2013-14	6.9	8.1	46	1.2	0.26	0.51	0.85
		2014-15	6.9	8	30	1.2	0.19	0.42	0.84
		2015-16	6.3	7.7	51	1.5	0.4	0.1	0.9
		2016-17	6.2	7.3	120	2	0.6	0.09	0.12
		2017-18	6.8	7.7	93	1.7	1.68	0.28	0.31
		2018-19	5.1	7.68	118	1.3	1.13	0.84	0.09
		2019-20	5.8	7.5	92	2.5	1.22	0.04	0.18
7	Confluence point of Gambheeram Gedda joining the sea near Excel Hatcheries, Mangamma varipeta, Bheemili Road. SL-7	2010-11	6.4	7.25	6	1.5	2.2	BDL	0.15
		2011-12	6.2	8	16	2	0.7	ND	0.2
		2012-13	6.8	7.2	415	2	1.05	0.14	0.03
		2013-14	6.9	8	29	1.4	1.02	0.56	0.83
		2014-15	6.8	8	29	1.4	0.94	0.4	0.78
		2015-16	6.3	7.7	44	2.3	1.1	0.3	1.3
		2016-17	5.3	7.6	96	2.2	3.8	0.2	0.6
		2017-18	5.9	7.8	52	1.7	4.6	0.45	0.6
		2018-19	5	7.6	77	1.3	4.96	0.53	1.54
		2019-20	5	7.5	62	2.8	5.6	0.18	0.9
8	Confluence point of Sewage joining the sea at Shanti Ashramam. SL-8	2010-11	5.5	7.9	7	1	1.8	0.05	0.18
		2011-12	6	8.1	6	1	0.5	ND	1.2
		2012-13	6.9	6.9	410	2.2	1.33	1.2	0.38
		2013-14	6.7	7.9	48	1.4	0.77	0.55	0.81
		2014-15	6.7	7.9	48	1.4	0.7	0.41	0.81
		2015-16	5.9	7.8	45	1.5	0.9	0.3	0.9
		2016-17	5.8	7.3	126	2.2	1.1	0.06	0.15
		2017-18	5.9	7.5	118	1.7	4.1	0.17	0.2
		2018-19	5.1	7.46	109	1.3	1.51	0.12	0.08
		2019-20	5	7.5	62	2.8	5.6	0.18	0.9
9	Confluence point of Sewage joining the sea at Fishing Harbour. SL-9	2010-11	6.2	7.42	6	1.6	1.3	BDL	0.28
		2011-12	5.6	7.9	8	1	0.4	0.19	1.1
		2012-13	7.1	6.9	390	2.2	1.31	1.2	0.14
		2013-14	6.6	7.9	55	1.2	0.94	0.8	0.69
		2014-15	6.5	7.9	53	1.3	0.9	0.7	0.69
		2015-16	5.2	7.5	53	1.6	0.5	0.2	0.8
		2016-17	5.9	7.2	129	2.2	0.8	0.05	0.14
		2017-18	6.7	7.5	98	1.7	1.13	0.04	0.16
		2018-19	5	7.53	91	1.2	0.87	0.06	0.05
		2019-20	4.7	7.4	93	2.2	0.92	0.01	0.1
10	Sea water collected	2010-11	5.8	8	8	1.2	1.4	0.04	0.09

	at Visakhapatnam Port Trust jetty near Marine Department. SL-10	2011-12	6.4	7.8	10	2	1	0.02	0.1
		2012-13	7.2	7.4	420	2.6	0.79	0.3	0.16
		2013-14	6.7	7.7	65	1.3	0.76	1.01	1.94
		2014-15	6.7	7.7	65	1.3	0.75	0.9	1.9
		2015-16	5.5	7.4	44	1.5	0.8	0.3	0.7
		2016-17	6.1	7.3	113	2.4	1.2	0.37	0.25
		2017-18	6.5	7.6	114	1.6	0.98	0.67	0.41
		2018-19	5.1	7.72	91	1.3	1.55	0.41	0.35
		2019-20	3.6	7.3	91	3.4	1.19	0.07	0.09
11	Confluence of sewage of lavender canal joining the sea at harbour. SL-11	2010-11	6.7	7.5	8	1.8	0.89	0.06	0.28
		2011-12	5.2	8.3	12	2	3.2	ND	2.1
		2012-13	6.6	6.9	390	2	1.2	1.3	0.08
		2013-14	6.8	7.9	43	1.3	0.63	1.48	1.88
		2014-15	6.8	7.9	43	1.3	11.5	1.48	1.88
		2015-16	5.1	7.5	39	1.5	1.3	0.4	1.9
		2016-17	5.5	7.3	81	1.4	2.0	0.71	0.72
		2017-18	6.1	7.6	98	1.6	6.6	0.2	1.24
		2018-19	4.7	7.5	100	1.4	4.91	0.91	1.14
		2019-20	3	8	119	16	6.22	2.3	1.8
12	Confluence point of Mehadrigedda surplus coarse along with all the industrial effluents joining the sea at parallel bridge near dockyard. SL-12	2010-11	5.8	6.2	5	2	1.54	0.07	0.55
		2011-12	7.2	7.9	16	1	0.8	0.02	0.6
		2012-13	6.2	7.1	470	2.6	1.5	1.5	0.11
		2013-14	6.9	7.9	40	1.3	0.121	0.86	1.61
		2014-15	6.9	7.9	39	1.3	0.09	0.85	9.2
		2015-16	5.4	7.4	50	1.4	0.8	0.13	1.8
		2016-17	5.6	7	94	1.7	2.2	0.14	0.5
		2017-18	5.9	7.4	97	1.6	5.18	0.06	0.22
		2018-19	4.7	7.3	88	1.2	4.95	0.95	0.94
		2019-20	3.8	7.4	95	11.2	3.03	0.37	1.57
13	Confluence point of steel plant effluent joining the sea at Gangavaram creek near Dibbapalem. SL-13	2010-11	5	7.0	6	1	2	BDL	1.5
		2011-12	7.4	7.4	8	1	3.3	0.01	1.8
		2012-13	6.9	7.6	460	2.6	0.83	BDL	0.04
		2013-14	6.7	8.0	30	1.2	0.53	0.47	0.64
		2014-15	6.6	8.0	33	1.2	0.14	0.24	0.47
		2015-16	5.8	7.6	51	1.4	0.5	0.1	0.4
		2016-17	6.1	7.3	100	5.6	0.7	0.08	0.16
		2017-18	6	7.4	96	2	4.4	0.07	BDL
		2018-19	5.7	7.8	118	1.5	0.6	0.06	0.03
		2019-20	5.6	7.6	87.3	4.5	2	0.03	0.08

14	Confluence point of steel plant effluent joining the sea near Appikonda village. SL-14	2010-11	5.8	8.3	7	1.5	1.54	0.05	0.65
		2011-12	7.6	8.2	12	2	0.9	0.1	0.1
		2012-13	7	7.6	380	2.2	0.82	BDL	0.09
		2013-14	6.7	7.9	33	1.2	0.146	0.44	0.45
		2014-15	6.5	8.1	25.1	1.2	0.63	0.21	0.59
		2015-16	6	7.7	47	1.6	0.7	0.1	0.3
		2016-17	6.2	7.3	125	2.4	0.9	0.18	0.12
		2017-18	6.5	7.4	129	1.6	0.59	0.02	0.27
		2018-19	6	7.8	117	1.4	0.54	0.03	0.03
		2019-20	5	7.8	123	8	1.8	0.4	0.05
15	Confluence point of Mutyalammapalem gedda Joining the sea at Mutyalammapalem near NTPC SL-15	2010-11	5.7	8.31	8	1.6	1.6	0.06	0.75
		2011-12	7.2	8.1	6	2	0.8	0.4	1.1
		2012-13	7.2	7.4	400	2	0.9	BDL	0.08
		2013-14	6.2	8.1	25	1.2	0.65	0.62	0.59
		2014-15	6.7	8	30	1.2	0.53	0.26	0.64
		2015-16	6.3	7.6	45	1.4	0.3	0.1	0.5
		2016-17	6	7.1	99	2.7	1	0.06	0.17
		2017-18	6.4	7.2	91	1.6	1.71	0.02	0.17
		2018-19	5.6	7.4	127	1.3	1.38	0.19	0.03
		2019-20	5.5	7.7	103	2	0.55	0.04	0.03
16	Confluence point of River Sarada and River Varaha at Bangarammapalem. SL-16	2010-11	6	8.24	7	1.5	2.4	0.03	0.08
		2011-12	5.2	7.9	10	1	1	ND	0.1
		2012-13	3.8	7.4	86	1.3	0.16	0.08	0.036
		2013-14	6.5	8	48	1.3	0.19	0.48	0.4
		2014-15	6.5	8	45	1.3	0.16	0.29	0.38
		2015-16	5.8	7.6	46	1.5	0.3	0.03	0.34
		2016-17	6.3	7.23	126	2.9	0.65	0.17	0.04
		2017-18	6.4	7.3	109	1.6	0.56	0.34	0.11
		2018-19	5.9	7.74	119	1.3	0.6	0.05	0.03
		2019-20	6	8	55	2	0.5	0.02	0.03
17	Rushikonda beach SL-17	2019-20	6	7.7	64.8	1.7	0.4	0.03	0.04
IV. East Godavari District									
18	Sea water collected near Uppada, Kakinada. SL-18	2010-11	6.2	8.5	6	1.4	0.9	0.04	0.1
		2011-12	5.6	7.6	6	1	0.4	0	0.1
		2012-13	4.4	7.4	200	1.4	0.65	BDL	BDL
		2013-14	6.8	8	31	1.3	0.47	0.29	0.63
		2014-15	6.8	8	31	1.3	0.39	0.26	0.64

		2015-16	6	8	42	1.0	1.0	0.1	0.4
		2016-17	5.6	7.3	103	2.0	1.4	0.15	0.04
		2017-18	6.6	7.7	77	1.5	1.3	0.05	0.18
		2018-19	6.3	7.8	100	15.7	1.3	0.07	0.06
		2019-20	5.8	7.6	53	2.1	1.31	0.03	0.09
19	Sea water collected near Kumbhabhishekam temple, Kakinada. SL-19	2010-11	5.8	7	9.0	1.6	1.52	0.05	0.16
		2011-12	5	7.3	8	1.0	1.6	0	1.2
		2012-13	4.8	7.3	198	1.4	0.98	0.3	0.02
		2013-14	6.8	7.7	27	1.2	0.61	0.52	1.16
		2014-15	6.8	7.7	27	1.2	0.35	0.47	1.16
		2015-16	5.8	7.5	56	1.7	0.9	0.4	0.7
		2016-17	5.6	7.16	120	1.9	1.4	0.24	0.12
		2017-18	6.4	7.4	109	1.3	1.7	0.21	0.16
		2018-19	6.1	7.4	91	1.6	1.9	0.3	0.27
		2019-20	4.4	7.4	37	2.9	2.3	0.04	0.28
20	Sea water collected near Deep water port, Kakinada (1 km away from jetty). SL-20	2010-11	6.8	7.58	7	1	2.32	BDL	0.08
		2011-12	6	7.9	12	2	0.2	0	0.1
		2012-13	4.6	7	40	1	1.92	0.38	0.06
		2013-14	6.8	7.7	32	1.2	0.11	0.84	1.29
		2014-15	6.8	7.7	32	1.2	0.07	0.84	1.31
		2015-16	4.2	7.5	38	1.3	0.8	0.4	0.8
		2016-17	5.5	7.3	77	1.5	1.5	0.16	0.14
		2017-18	6	7.6	70	2.9	2.51	0.23	0.28
		2018-19	4.6	7.6	76	1.3	3.4	0.23	0.43
		2019-20	4.7	7.5	50	2.2	2.3	0.03	0.22
21	Confluence point of River Thandava at Pentakota. SL-21	2010-11	6.8	8	4	1.2	1.15	0.06	0.05
		2011-12	5.4	6.8	8	1	1.1	0.2	0.1
		2012-13	4.2	7.3	210	2	0.64	BDL	0.02
		2013-14	6.7	8	37	1.3	0.32	0.35	0.52
		2014-15	6.7	8	38	1.3	0.24	0.26	0.52
		2015-16	6	7.5	44	1.6	0.6	0.5	0.5
		2016-17	6.4	7.2	103	2.1	1.1	0.13	0.06
		2017-18	6.9	7.4	68	1.5	1.2	0.03	0.12
		2018-19	6.5	7.7	100	1.63	1.1	0.08	0.06
		2019-20	5.6	7.6	77	1.8	0.7	0.02	0.06
22	Sample collected from Upputeru channel Opp.Circle Telecom Training Centre, Kakinada.	2010-11	7	7.3	6	1.5	1.33	0.04	0.12
		2011-12	5.8	7.8	14	1	1.7	0	1
		2012-13	5.2	7	36	1.2	2.24	0.34	0.044
		2013-14	7	7.6	33	1.3	0.41	0.86	1
		2014-15	7.1	7.6	28	1.3	0.16	0.99	1.14

	SL-22	2015-16	4.5	7.3	43	2.3	0.9	0.3	0.8
		2016-17	4.9	7.2	85	1.7	1.6	0.28	0.25
		2017-18	5.6	7.4	74	1.3	2.3	0.25	0.33
		2018-19	4.9	7.5	60	1.3	3.2	0.4	0.47
		2019-20	5.8	7.6	53	2.1	1.31	0.03	0.09
23	Sample collected from Upputeru channel near Indrapalem, Kakinada (Confluence of East Eleru drain and Bikkavolu drain). SL-23	2010-11	6.8	7.15	7	1.4	2.8	0.01	0.25
		2011-12	6.2	7.5	16	2	2.4	0	2.1
		2012-13	5.4	7	32	1	2.2	1.8	0.04
		2013-14	6.8	7.7	38	1.3	0.56	0.78	1.12
		2014-15	6.8	7.3	38	1.2	0.42	0.82	1.12
		2015-16	4.9	7.4	38	1.5	0.6	0.2	1.8
		2016-17	5.5	7.3	65	1.7	1.6	0.28	0.22
		2017-18	5.9	7.5	45	1.5	2.4	0.13	0.3
		2018-19	5	7.7	60	1.3	2.5	0.37	0.31
		2019-20	2.9	7.2	33	3.2	2.88	0.03	0.4
24	Confluence point of Chollangi snanala revu and Ramannapalem drain. SL-24	2010-11	6.4	7.45	9	1.5	3.3	0.02	0.15
		2011-12	5.2	7.9	10	1	2.6	0	2.1
		2012-13	4.6	7.3	110	1.4	2.5	2.16	0.08
		2013-14	6.9	7.8	31	1.2	0.12	0.41	0.78
		2014-15	6.9	7.8	32	1.2	0.11	0.38	0.81
		2015-16	5.6	7.4	30	1.4	0.8	0.4	1
		2016-17	5.7	7.1	58	1.8	1.7	0.07	0.16
		2017-18	6.1	7.5	59	2	2.04	0.19	0.23
		2018-19	5.4	7.6	82	1.4	1.8	0.07	0.14
		2019-20	2.5	7.4	74	3	2.3	0.01	0.23
25	Confluence point of River Gautami Godavari at Bhairavapalem village. SL-25	2010-11	5.8	7.9	8	1.2	2.4	0.01	0.19
		2011-12	5.4	7.8	8	1	0.4	0	0.1
		2012-13	4.4	7.3	260	2	3.5	0.22	0.09
		2013-14	6.9	7.9	42	1.3	0.16	0.8	0.68
		2014-15	6.9	7.9	42	1.3	0.12	0.88	0.68
		2015-16	6.5	7.5	48	1.4	0.3	0.3	1.4
		2016-17	6.2	7.24	100	1.8	1.26	0.08	0.12
		2017-18	6.5	7.3	90	1.8	1.3	0.15	0.18
		2018-19	5.9	7.5	102	1.4	1.06	0.1	0.05
		2019-20	6.3	7.3	126	2.1	1.4	0.04	0.05
26	Confluence point of River Vynateya Godavari at Vodalarevu village, near Amalapuram.	2010-11	7	6.5	7	1.4	2.3	BDL	0.07
		2011-12	5	7.6	14	1	0.4	0	0.1
		2012-13	4.8	7.2	300	2.2	1.2	0.12	0.02
		2013-14	6.9	7.9	43	1.3	0.21	0.32	0.639

	SL-26	2014-15	6.9	7.9	43	1.3	0.11	0.32	0.64
		2015-16	6.6	7.6	48	1.6	0.3	0.1	1.5
		2016-17	5.8	7.1	104	1.7	1.8	0.04	0.06
		2017-18	6.1	7.5	115	1.4	0.53	0.04	0.19
		2018-19	6.1	7.6	124	1.5	1	0.08	0.05
		2019-20	6.2	7.4	149	2.2	1.21	0.02	0.05
V. West Godavari District									
27	Confluence point of River Vashista Godavari at Chinnamynavanilanka. SL-27	2010-11	7.2	8	9	1	1.8	BDL	0.18
		2011-12	5.2	7.7	6	2	2.9	0	0.4
		2012-13	4.6	7.2	160	1.4	1.1	0.16	0.16
		2013-14	7	7.7	20	1.2	0.27	0.24	0.39
		2014-15	7	7.7	20	1.2	0.24	0.24	0.39
		2015-16	6.6	7.6	47	1.7	0.5	0.04	0.7
		2016-17	5.3	6.3	123	1.95	0.8	0.032	0.09
		2017-18	6.1	7.5	115	1.4	0.53	0.04	0.19
		2018-19	6	7.5	101	1.4	0.85	0.49	0.23
		2019-20	6.7	7.6	69	2.1	0.73	0.04	0.06
VI. Prakasam District									
28	Kothapatnam beach. SL-28	2014-15	5.5	8.14	--	0.7	--	--	--
		2015-16	6.7	7.8	--	2	0.8	--	0.1
		2016-17	5.5	7.9	--	2.2	0.8	--	BDL
		2017-18	6.4	7.7	--	4.2	0.7	--	BDL
		2018-19	5.6	7.5	--	3.7	0.88	--	BDL
		2019-20	5.5	7.8	--	3.03	0.89	--	BDL
29	Vadarevu Beach, Chirala. SL-29	2014-15	6.3	8.16	--	0.7	--	--	--
		2015-16	5.8	7.8	--	1.5	0.4	--	0.1
		2016-17	5.7	7.8	--	2.1	0.6	--	BDL
		2017-18	6.4	7.5	--	3.8	0.7	--	BDL
		2018-19	5.6	7.8	--	3.9	0.6	--	BDL
		2019-20	5.4	7.6	--	3.2	1.04	--	BDL
VII. Nellore District									
30	Loading Point - Krishnapatnam port. SL-30	2014-15	5.7	8.04	--	0.8	--	--	--
		2015-16	6.3	7.83	--	1.8	0.8	--	0.1
		2016-17	5.9	7.7	--	2.3	0.9	--	BDL
		2017-18	6	7.6	--	4	0.7	--	BDL
		2018-19	5.4	7.6	--	3.9	1.0	--	BDL
		2019-20	5.3	7.7	--	3	0.99	--	BDL
31	Pulicat lake-Bheemulavaripalem.	2014-15	5	8	--	0.8	--	--	--
		2015-16	5.7	7.7	--	2.2	1.7	--	BDL
		2016-17	6	7.6	--	2.6	1.2	--	BDL

	SL-31	2017-18	6.3	7.5	--	3.9	1.4	--	BDL
		2018-19	5.4	7.3	--	3.9	2.1	--	BDL
		2019-20	5.5	7.8	--	3.1	1.22	--	BDL
32	North Extent Krishnapatnam port. SL-32	2014-15	5.7	8.01	--	0.7	--	--	--
		2015-16	6.2	7.19	--	1.8	0.8	--	0.1
		2016-17	5.8	7.6	--	2.1	0.7	--	BDL
		2017-18	6.6	7.6	--	4	0.8	--	BDL
		2018-19	5.7	7.5	--	3.7	1.03	--	BDL
		2019-20	5.5	7.7	--	3.2	1.02	--	BDL
33	South Extent – Krishnapatnam port. SL-33	2014-15	6	8.04	--	0.6	--	--	--
		2015-16	6.2	7.72	--	1.9	0.8	--	0.1
		2016-17	6.1	7.7	--	2.2	0.8	--	BDL
		2017-18	6.5	7.6	--	4	0.7	--	BDL
		2018-19	5.6	7.6	--	3.6	0.9	--	BDL
		2019-20	5.6	7.8	--	3	1.05	--	BDL
VIII. Guntur District									
34	Fishing Harbar , Nizampatnam. SL-34	2014-15	5.8	7.97	--	1.1	--	--	--
		2015-16	6.1	7.77	--	2.4	0.44	--	BDL
		2016-17	5.8	7.8	--	2.2	0.6	--	BDL
		2017-18	6.9	7.5	--	3.8	0.7	--	BDL
		2018-19	5.2	7.9	--	3.9	0.51	--	BDL
		2019-20	5.7	7.7	--	3.3	1.75	--	BDL
35	Fishing Harbar, After confluence with sea,Nizampatnam Nizampatnam. SL-35	2014-15	5.8	7.97	--	1.1	--	--	--
		2015-16	6.1	7.77	--	2.4	0.44	--	BDL
		2016-17	5.8	7.8	--	2.2	0.6	--	BDL
		2017-18	6.9	7.5	--	3.8	0.7	--	BDL
		2018-19	5.2	7.9	--	3.9	0.51	--	BDL
		2019-20	5.5	7.7	--	3.2	1.12	--	BDL
36	Suryalanka Beach. SL-36	2014-15	5.7	8.08	--	0.7	--	--	--
		2015-16	6.1	7.83	--	2	0.5	--	0.1
		2016-17	5.7	7.8	--	2.3	0.7	--	BDL
		2017-18	6.4	7.7	--	3.7	0.72	--	BDL
		2018-19	5.5	7.81	--	4.1	0.51	--	BDL
		2019-20	5.6	7.6	--	3.2	1.13	--	BDL
IX. Krishna District									
37	Manginapudi beach, Machilipatnam.	2014-15	5.9	8.0	--	0.7	--	--	--
		2015-16	5.7	7.6	--	2	0.85	--	BDL
		2016-17	5.9	7.8	--	2.1	0.6	--	BDL

	SL-37	2017-18	6.4	7.4	--	3.9	0.7	--	BDL
		2018-19	5.6	7.7	--	4	0.6	--	BDL
		2019-20	5.5	7.6	--	3.1	1.1	--	BDL
38	Upputeru after confluence with sea, Etiparru. SL-38	2014-15	5.8	7.77	--	0.8	--	--	--
		2015-16	6.1	7.52	--	2.5	0.8	--	0.1
		2016-17	5.6	7.7	--	2	0.7	--	BDL
		2017-18	6.7	7.3	--	4	0.7	--	BDL
		2018-19	5.7	7.6	--	3.9	1.2	--	BDL
		2019-20	5.6	7.7	--	3.3	1.5	--	BDL
39	Upputeru before confluence with sea, Pedatadika. SL-39	2014-15	5.8	7.9	--	0.7	--	--	--
		2015-16	6	7.48	--	2.2	1.1	--	BDL
		2016-17	5.7	7.8	--	1.8	0.66	--	BDL
		2017-18	6.5	7.5	--	4.1	0.8	--	BDL
		2018-19	5.8	7.6	--	3.8	1.4	--	BDL
		2019-20	5.6	7.7	--	3.2	1.4	--	BDL
40	River Krishna at confluence with sea at Palakayathippa beach, Hamsaladeevi. SL-40	2014-15	5.8	7.82	--	0.6	--	--	--
		2015-16	6.5	7.6	--	1.7	1.04	--	BDL
		2016-17	5.9	7.7	--	2.2	0.61	--	BDL
		2017-18	6.4	7.4	--	3.9	0.7	--	BDL
		2018-19	5.8	7.6	--	3.9	0.6	--	BDL
		2019-20	5.5	7.9	--	3.2	0.9	--	BDL
Note: All values are expressed in mg/l except pH.									

Table 6.3

LEGENDS
DO - Dissolved Oxygen
BOD - Bio-Chemical Oxygen Demand
TSS - Total Suspended Solids
NO3 - N - Nitrate Nitrogen
NH3 - N - Ammonical Nitrogen
PO4 - Phosphates
BDL: Below detectable limit.

Category	**DO**	**pH**	**TSS**	**BOD**	**NO_3-N**	**NH_3-N**	**PO4**
Standard SW- I	5.0	6.5 - 8.5	--	--	--	--	--
Standard SW- II	4.0	6.5 - 8.5	--	3.0	--	--	--

Standard SW- III	3.0	6.5 - 8.5	--	--	--	--	--
Standard SW- IV	3.0	6.5 - 9.0	--	5.0	--	--	--
Standard SW- V	3.0	6.0 - 9.0	--	--	--	--	--
Note: All values are expressed in mg/l except pH.							
Standard SW- I: For salt pans, shell fishing, mariculture and ecologically sensitive zone.							
Standard SW- II: For bathing, contact water sports and commercial fishing.							
Standard SW- III: For industrial cooling, recreation (non-contact) and aesthetics.							
Standard SW- IV: For harbour waters.							
Standard SW- V: For navigation and controlled waste disposal.							

As per sea water quality carried out for the period from 2010 – 11 to 2019-20 at 40 locations in the coastal area the annual average values indicates pH (6.2 – 8.5), D.O (2.5 – 7.6 mg/L), TSS (4.0 - 873.0 mg/L, BOD (0.6 – 16.0 mg/L), NO3-N (0.09 – 6.6 mg/L), NH3-N (0.01 – 2.3 mg/L), Inorganic PO4- (0.02 - 9.2 mg/L), and the results reveals that all the 40 monitored locations annual average values are complying with the Primary Water Quality Criteria for SW-IV norms notified under the Environment (Protection) Rules, 1986, except for the following as below:

Table 6.4

No. of locations monitored	**No. of locations not complying to the marine primary water quality criteria parameter**			**Remarks**
	DO	**pH**	**BOD**	
40 (CPCB – 12 & APPCB – 28)	2 (SL – 23, SL – 24)	2 (SL – 12, SL – 27)	4 (SL–11, SL–12, SL-14, SL-18)	Sea water Bay of Bengal at other locations are complying with criteria parameters. Proposals for establishment of STPs are submitted for the treatment of the sewage to meet the water quality.

The Water Quality Analysis of the Coastal Waters results reveals that all the 40 monitored locations are complying with the primary water quality criteria for SW-IV norms notified under Environment Protection rules 1986 except for the parameters pertaining to

DO, pH & BOD at the sample locations in Visakhapatnam & East Godavari Districts (ie. Confluence of sewage of lavender canal joining the sea at harbour, Confluence point of Mehadrigedda surplus coarse along with all the industrial effluents joining the sea at parallel bridge near dockyard, Confluence point of steel plant effluent joining the sea near Appikonda village, Sea water collected near Uppada, Kakinada, Sample collected from Upputeru channel near Indrapalem, Kakinada and Confluence point of Chollangi snanala revu and Ramannapalem drain).

At present the MA&UD; Government of A.P has started construction of STPs: 2 Nos. at GVMC Visakhapatnam with capacities 2.0 MLD & 46.0 MLD and 1 No. at Kakinada, East Godavari with a capacity of 5.0 MLD STPs. The STPs will be commissioned by December 2021.

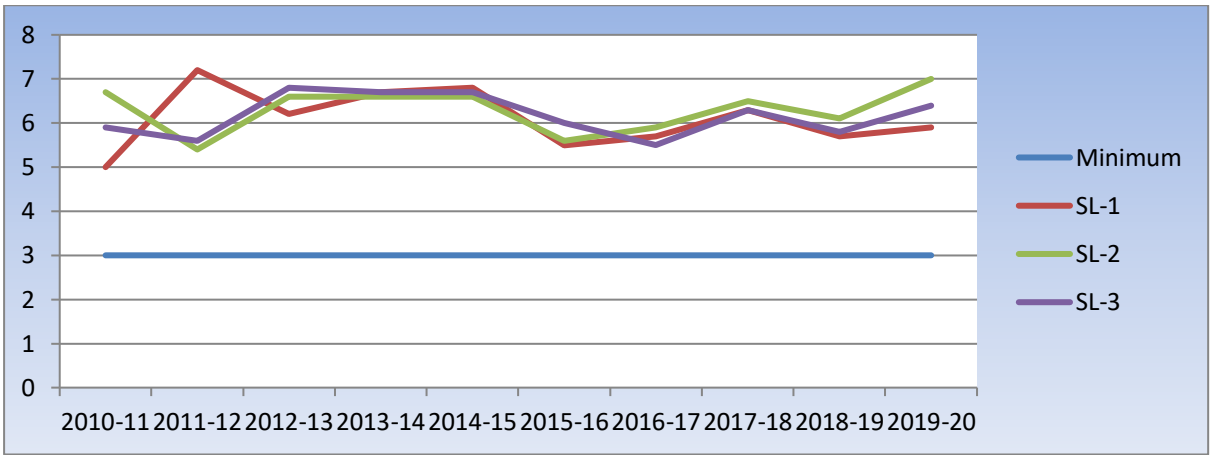
In light of the full-fledged treatment systems provided by the industries, no significant industrial pollution is caused to coastal waters of Andhra Pradesh. However, Urban Local Bodies (ULBs) need to manage the domestic sewage and solid waste as per the existing rules and regulations of the relevant Acts to ensure the wholesomeness of coastal waters of Bay of Bengal all along the 975 kms coast of Andhra Pradesh. **The APPCB is regularly monitoring the coastal waters of Bay of Bengal along with the stretch of 975 Kms. at 40 locations covering all the Coastal Districts in A.P regularly on monthly basis.**

7. 0 Graphical Representation of Coastal Water Quality

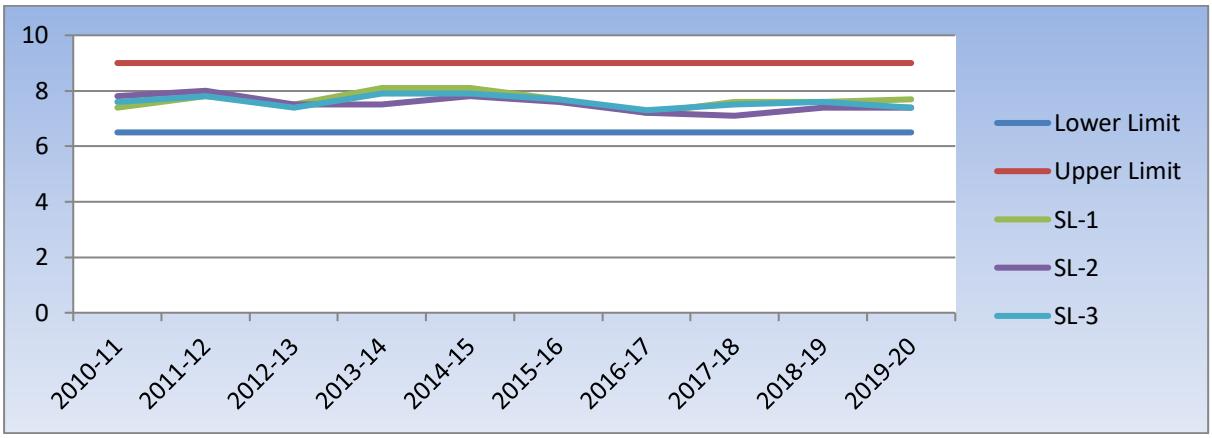
The Graphical representation of coastal water monitoring data of 40 locations District wise for the year 2010–11 to 2019-20 is as below:

District: Srikakulam – 3 Sample locations (SL-1, SL-2 & SL-3)

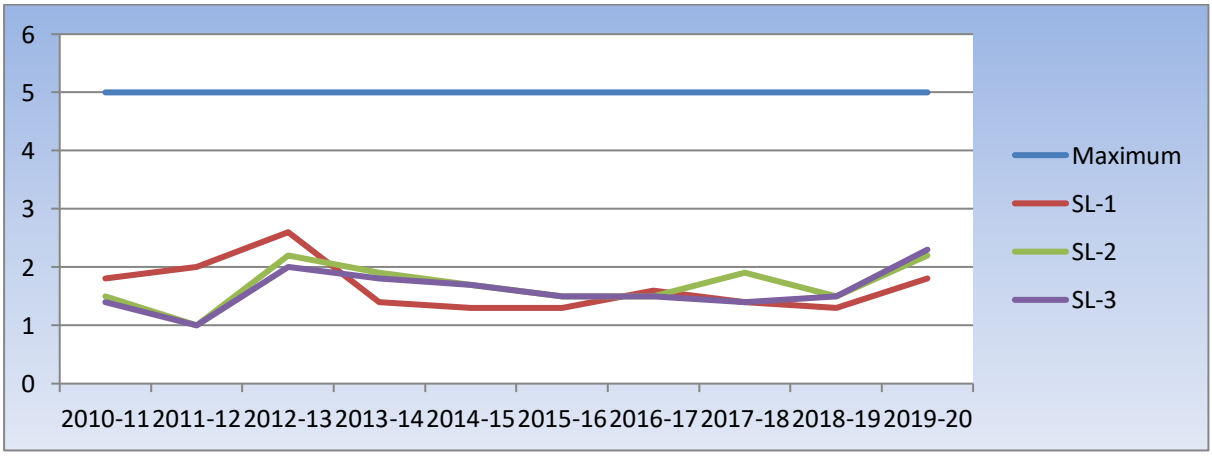
Graph – 7.1 for DO



Graph – 7.2 for pH

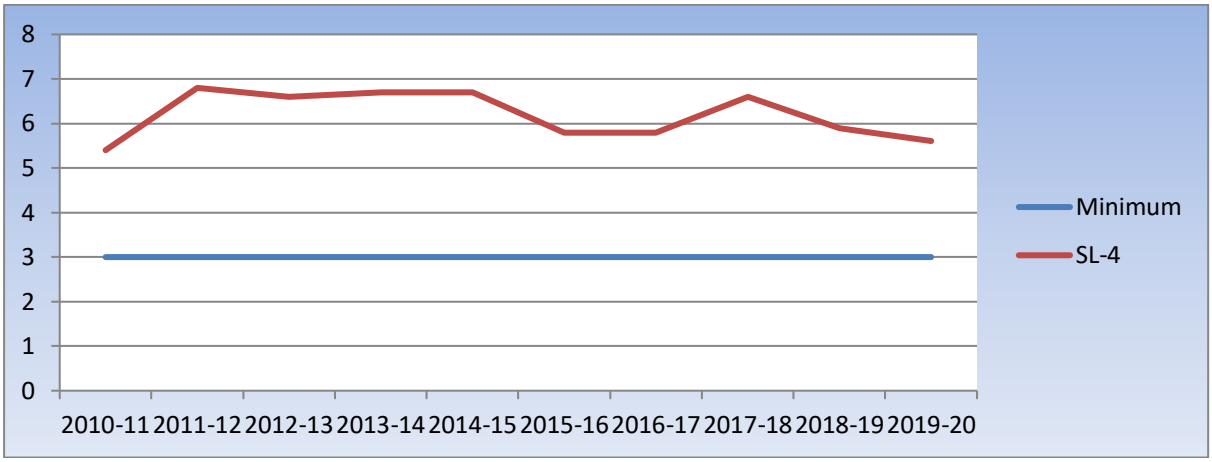


Graph – 7.3 for BOD

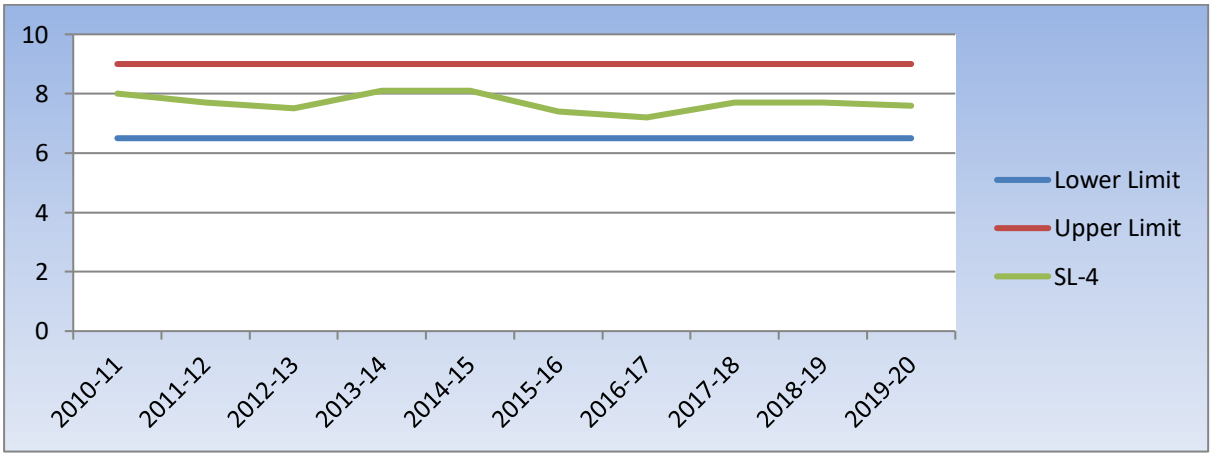


District: Vizianagaram – 1 Sample location (SL-4)

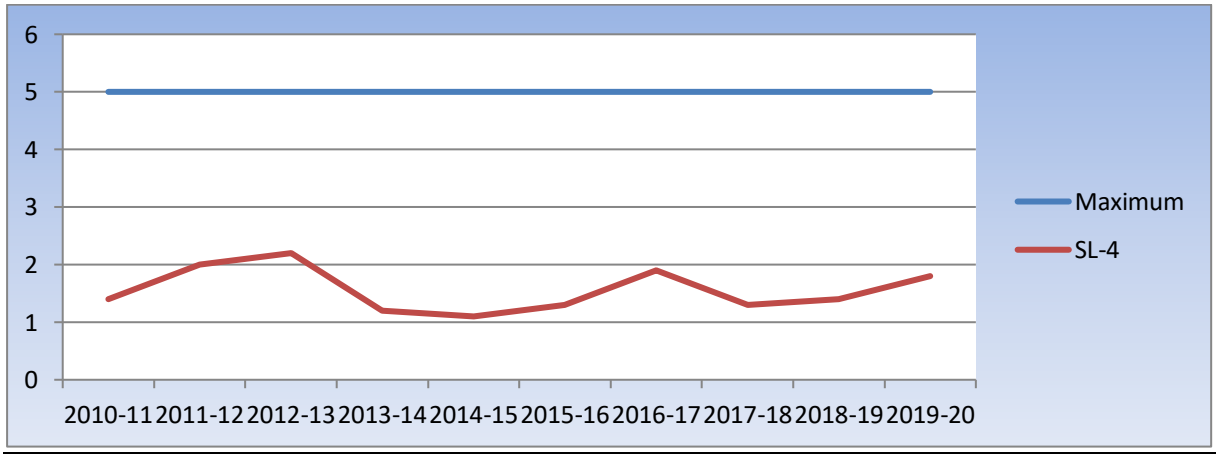
Graph – 7.4 for DO



Graph – 7.5 for pH

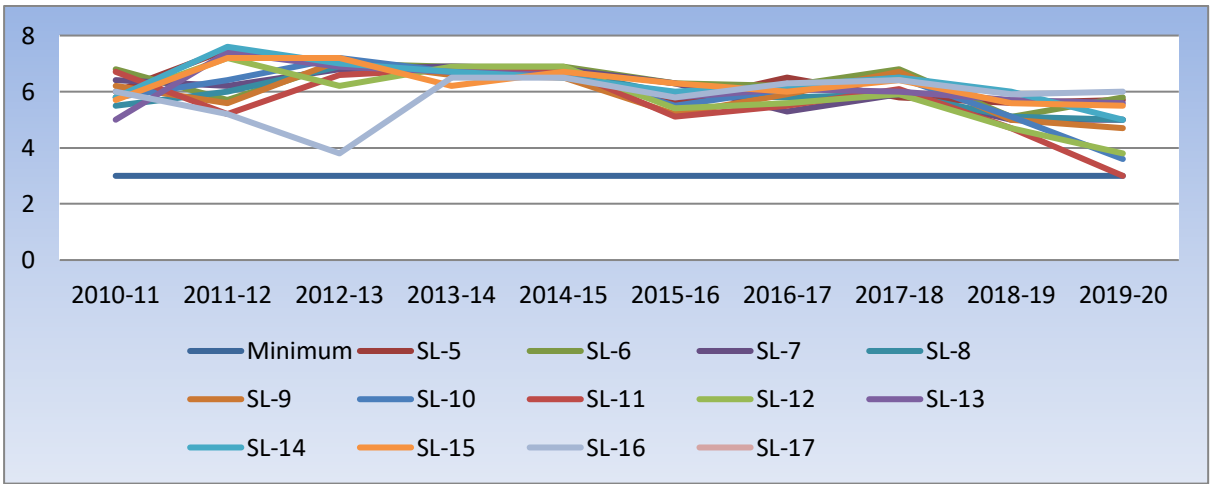


Graph – 7.6 for BOD

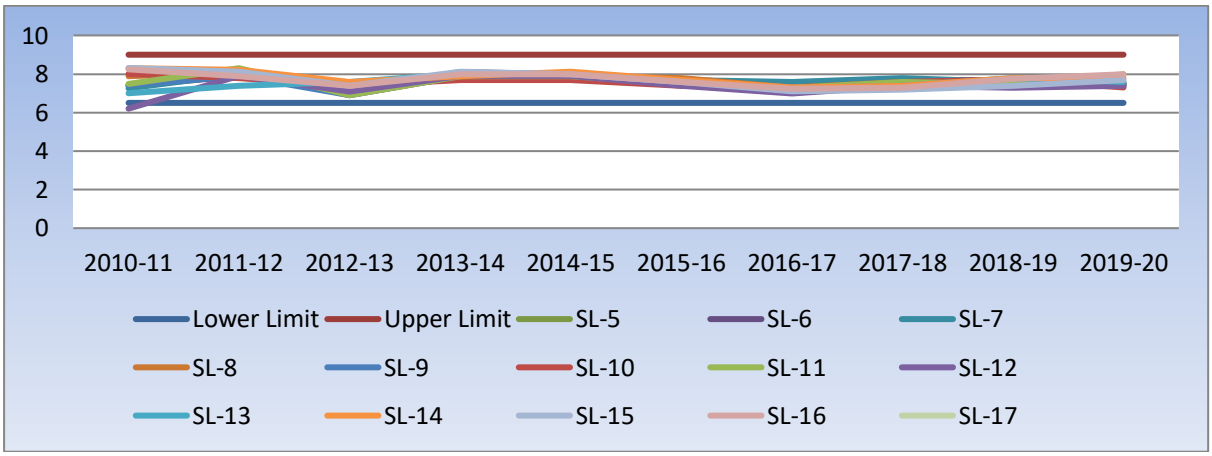


District: Visakhapatnam – 13 Sample locations (SL-5, SL-6, SL-7, SL-8, SL-9, SL-10, SL-11, SL-12, SL-13, SL-14, SL-15, SL-16 & SL-17)

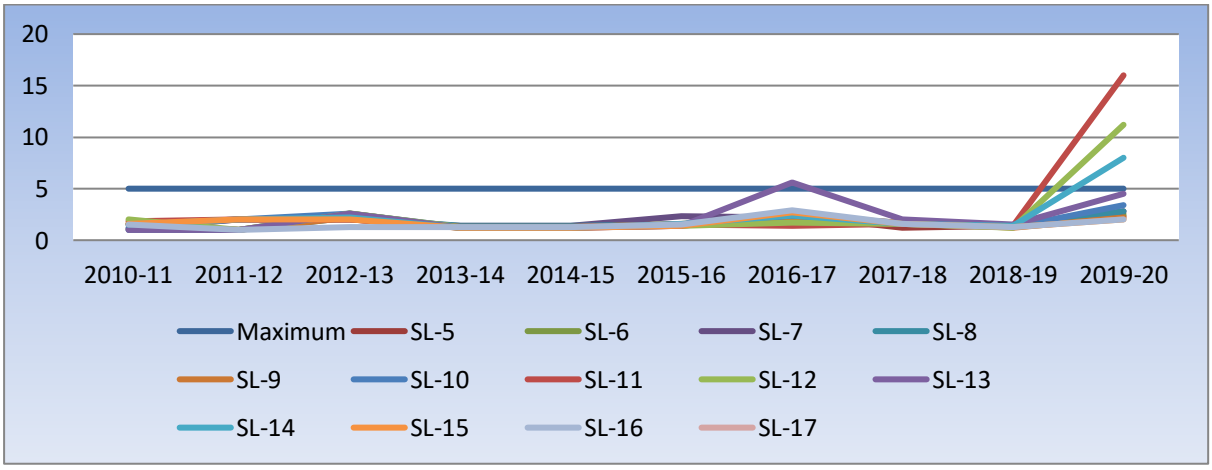
Graph – 7.7 for DO



Graph – 7.8 for pH

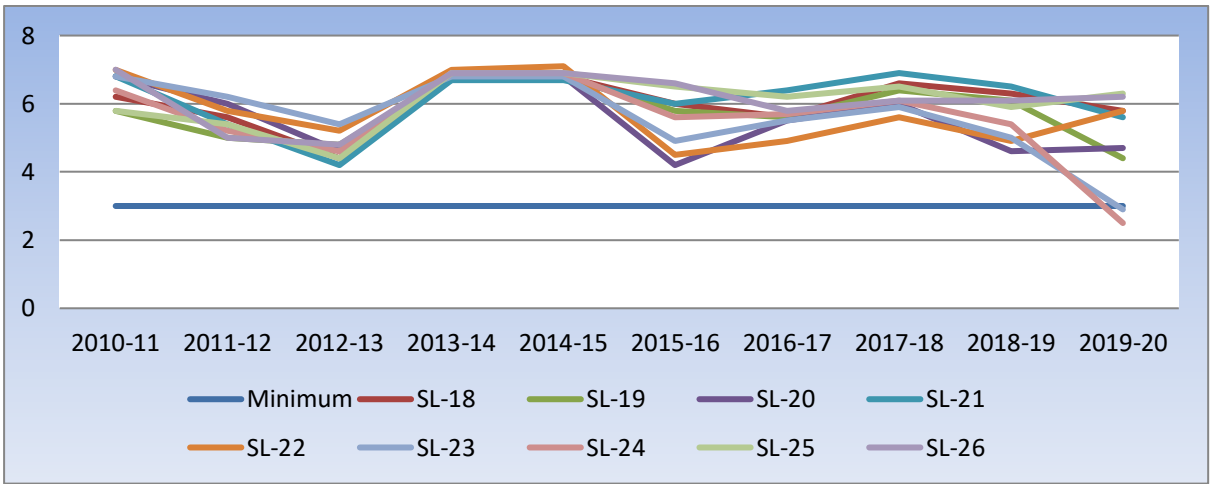


Graph – 7.9 for BOD

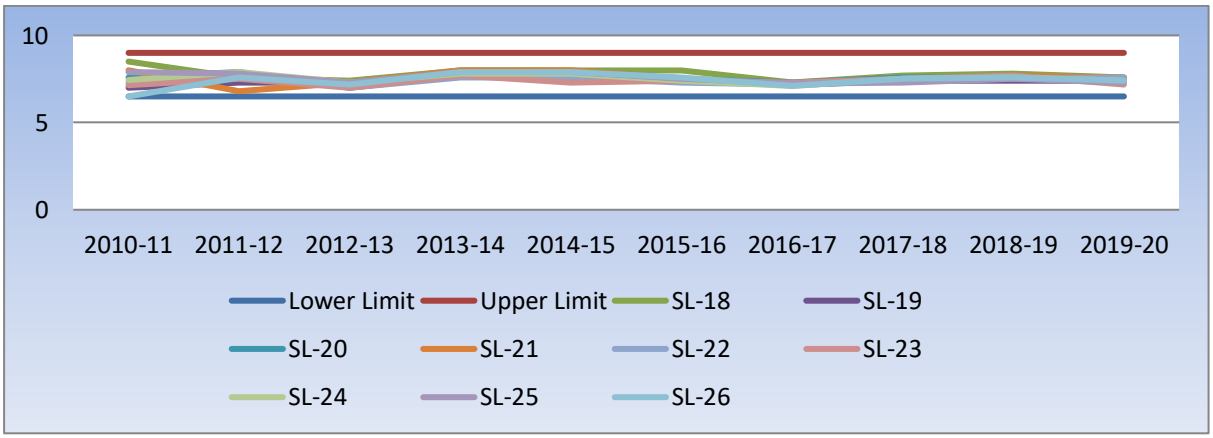


District: East Godavari – 9 Sample locations (SL-18, SL-19, SL-20, SL-21, SL-22, SL-23, SL-24, SL-25 & SL-26)

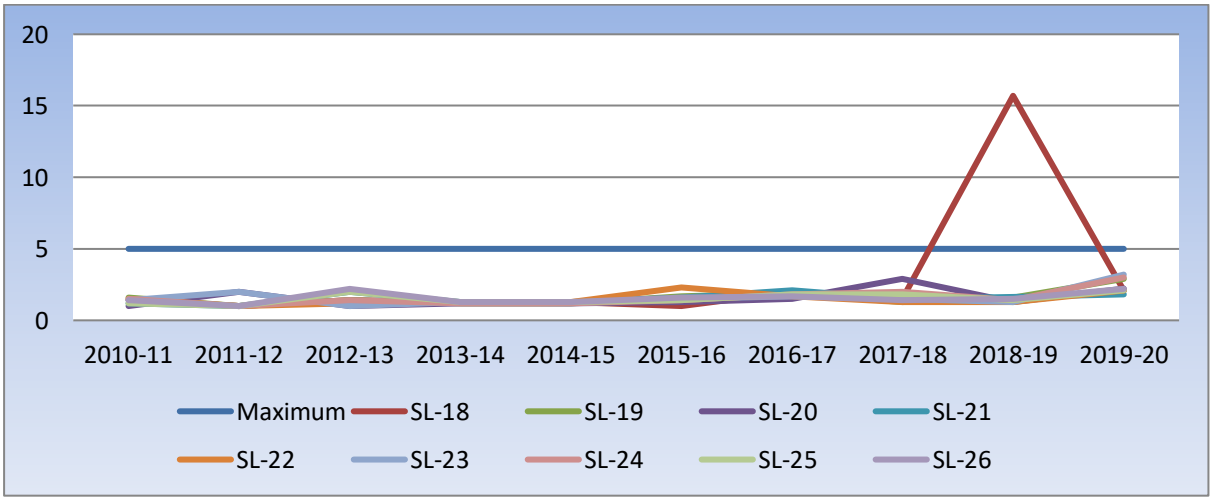
Graph – 7.10 for DO



Graph – 7.11 for pH

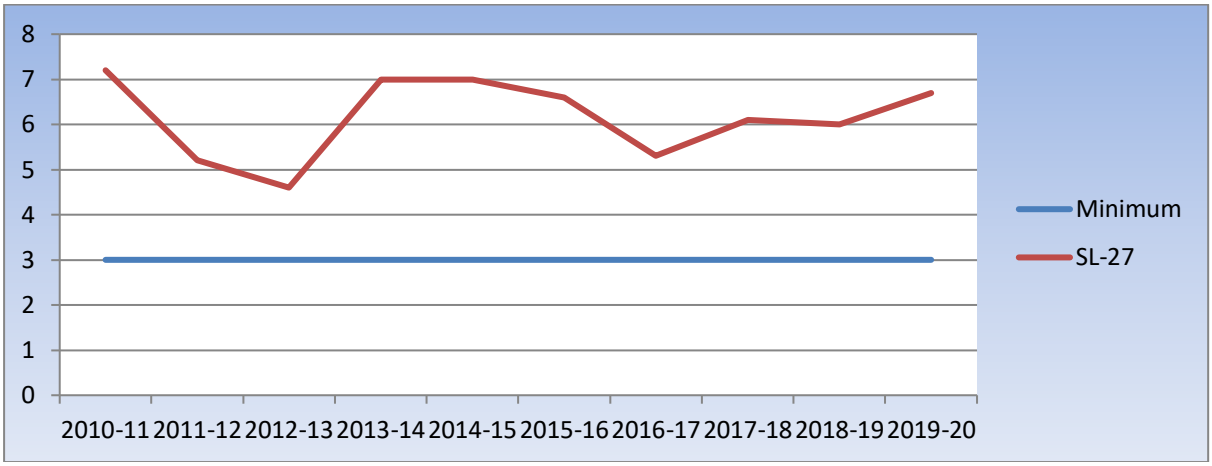


Graph – 7.12 for BOD

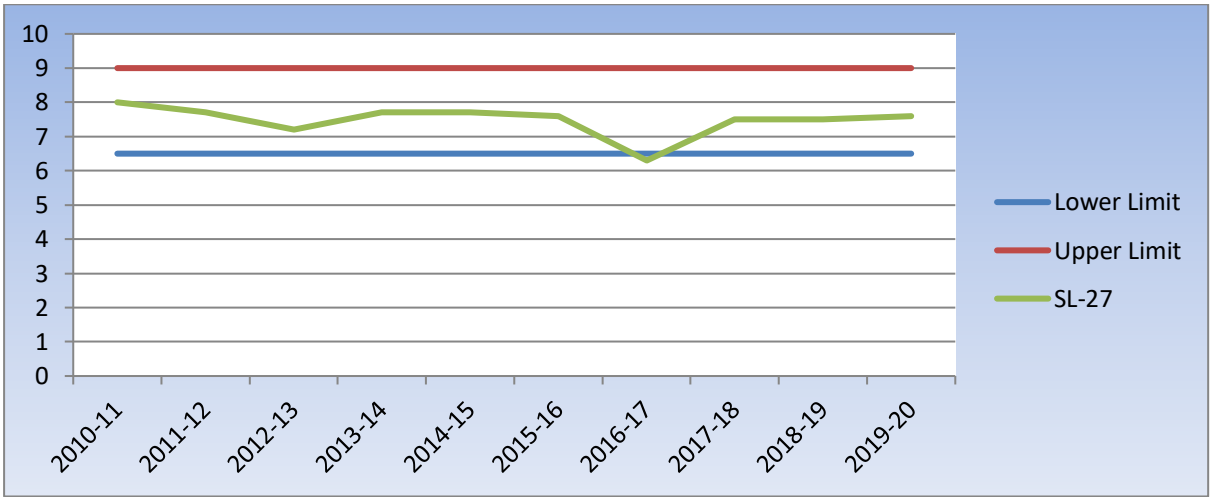


District: West Godavari – 1 Sample location (SL-27)

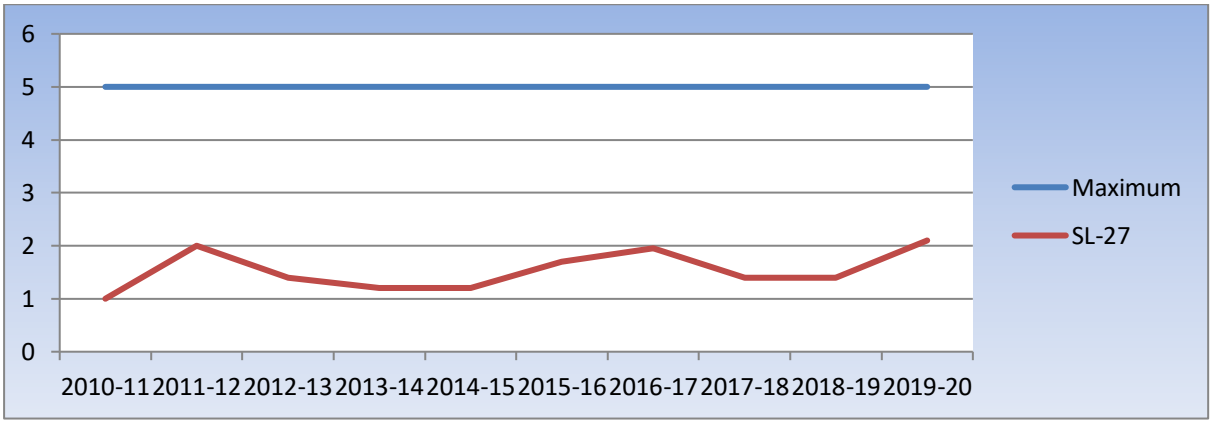
Graph – 7.13 for DO



Graph – 7.14 for pH

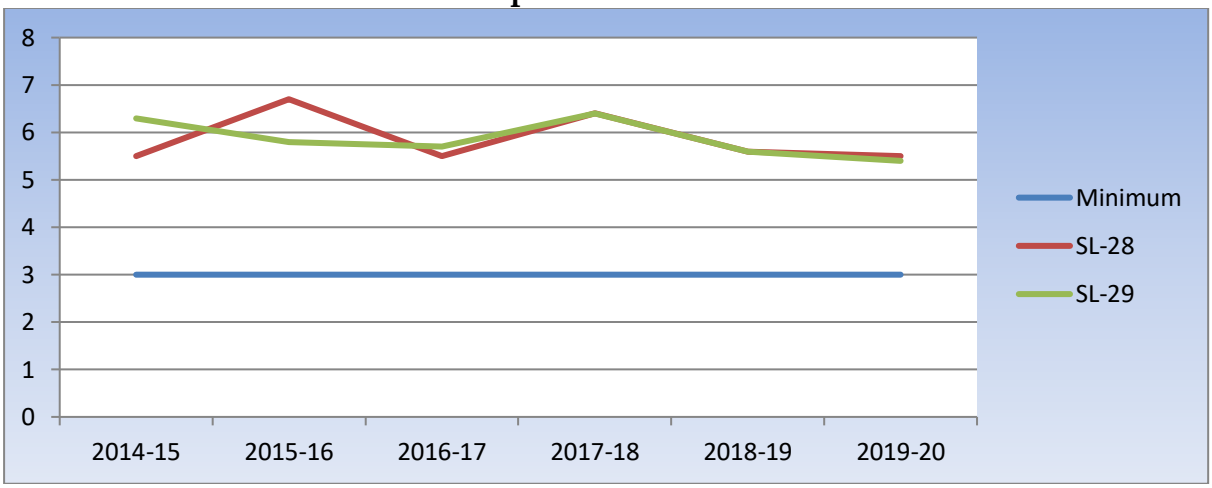


Graph – 7.15 for BOD

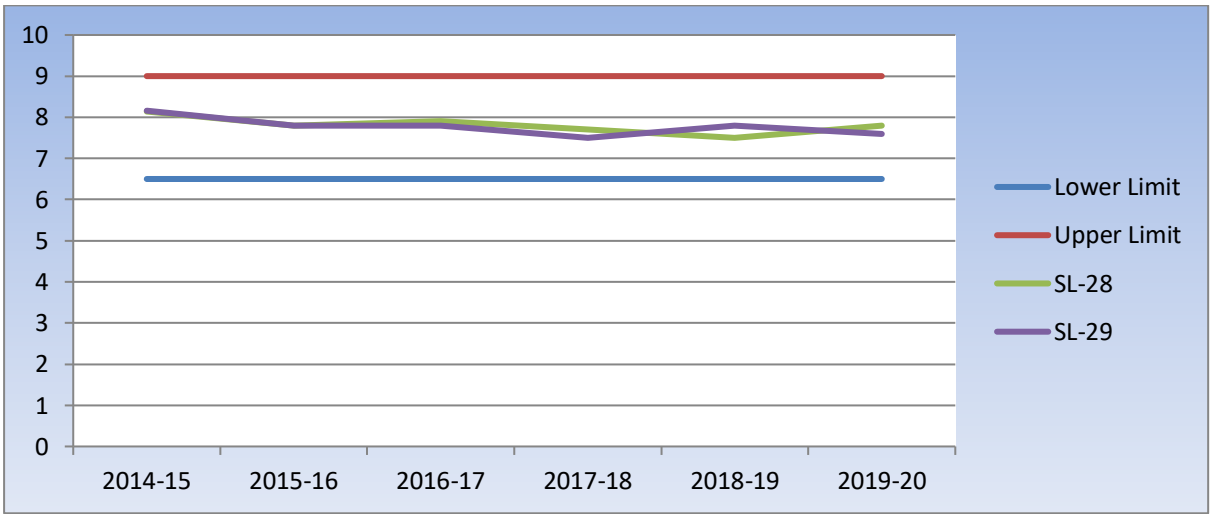


District: Prakasam – 2 Sample locations (SL-28 & SL-29)

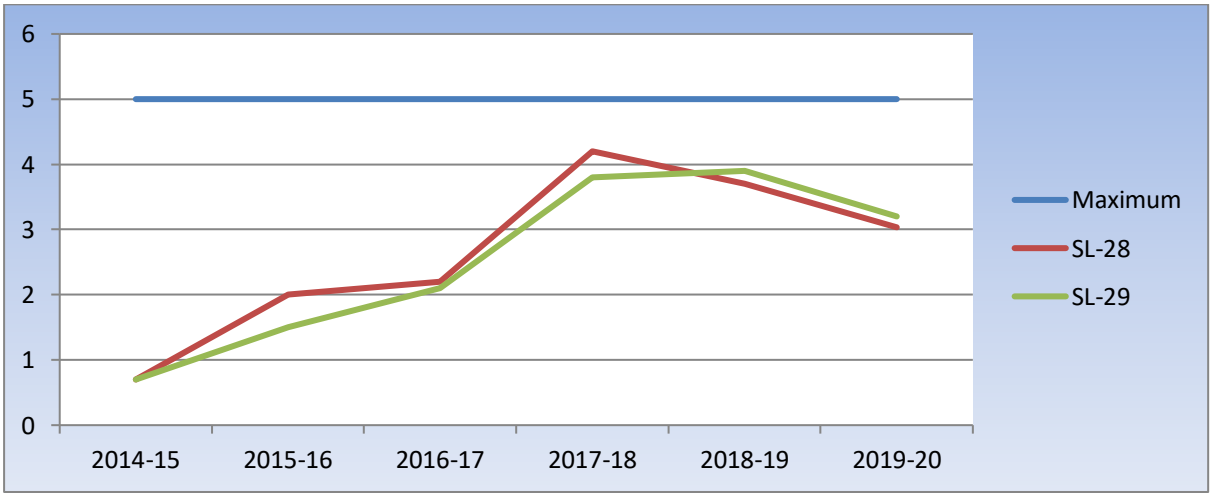
Graph – 7.16 for DO



Graph – 7.17 for pH

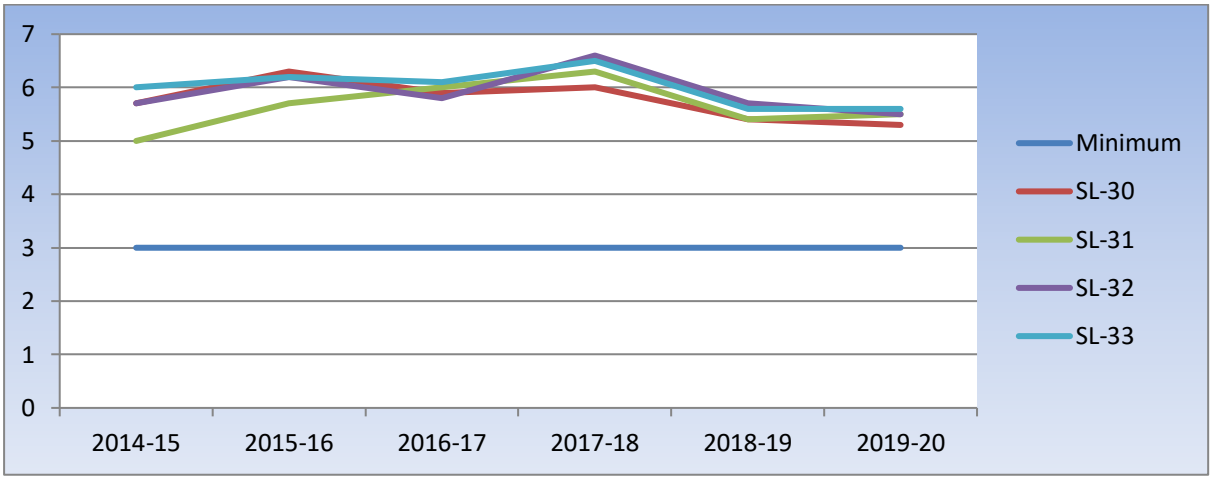


Graph – 7.18 for BOD

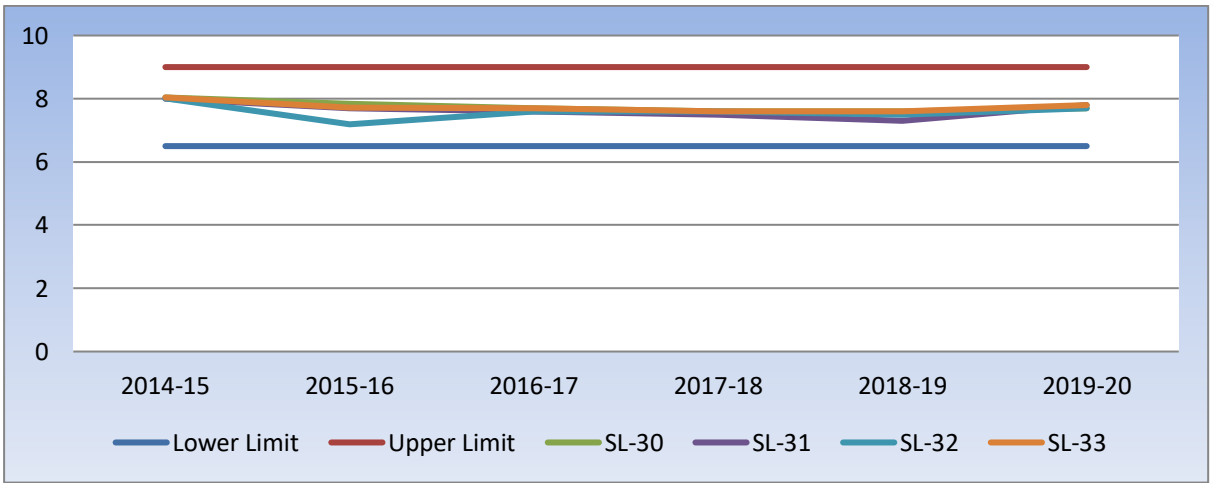


District: Nellore – 4 Sample locations (SL-30, SL-31, SL-32 & SL-33)

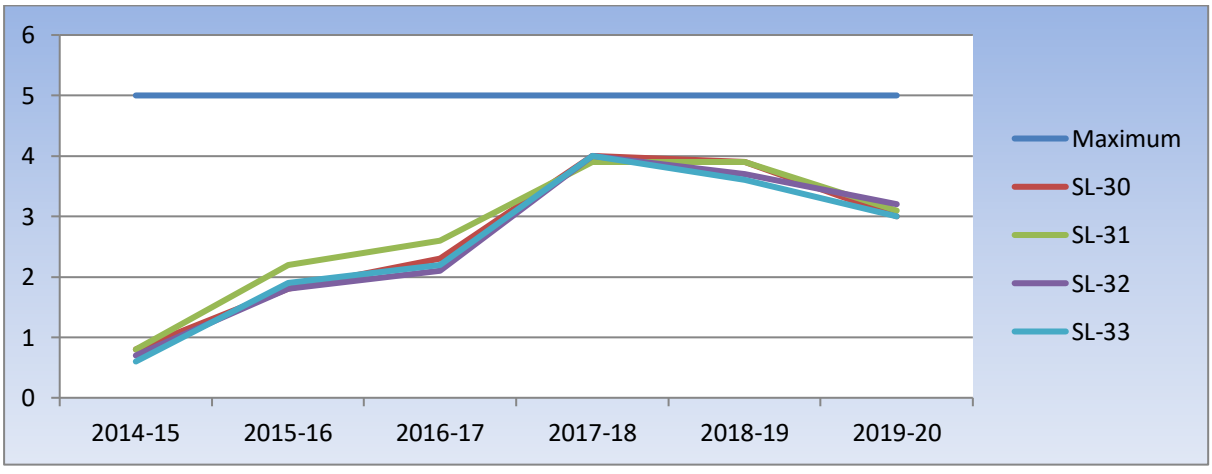
Graph – 7.19 for DO



Graph – 7.20 for pH

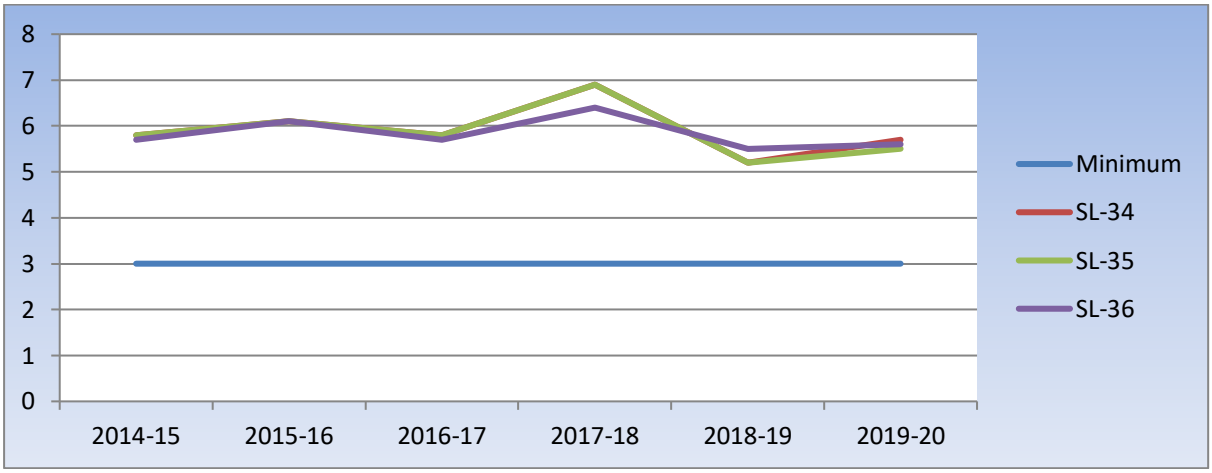


Graph – 7.21 for BOD

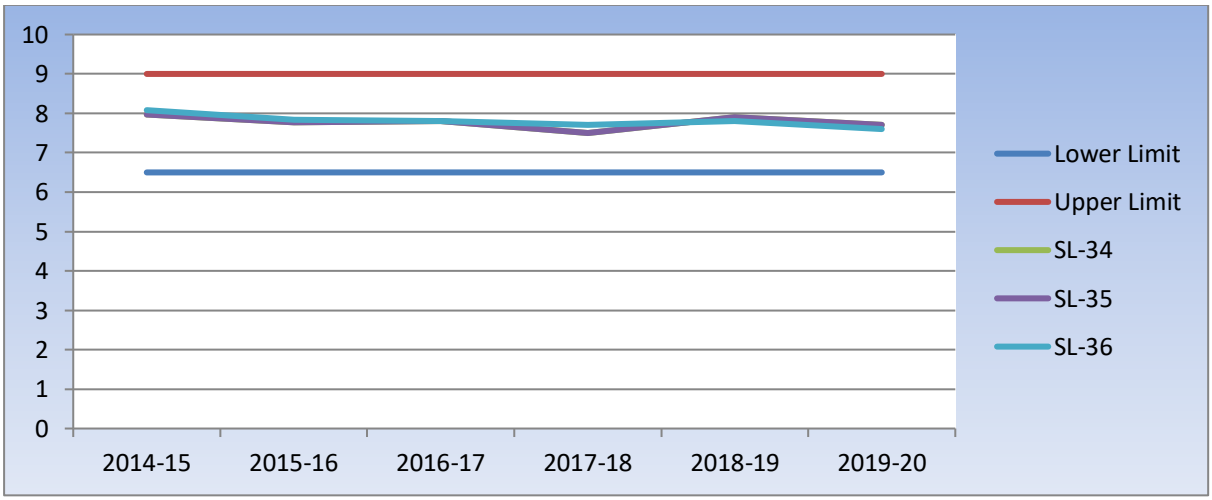


District: Guntur – 3 Sample locations (SL-34, SL-35 & SL-36)

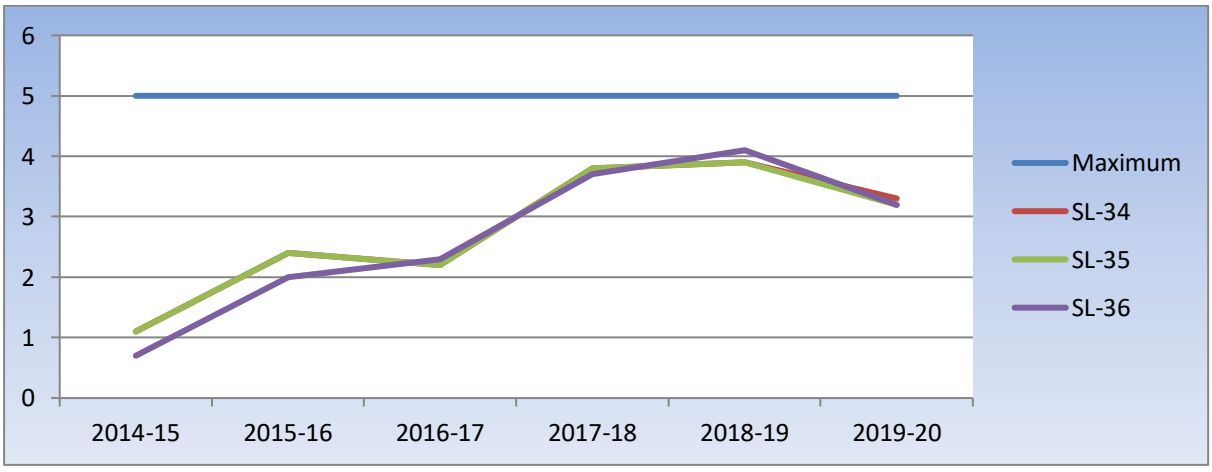
Graph – 7.22 for DO



Graph – 7.23 for pH

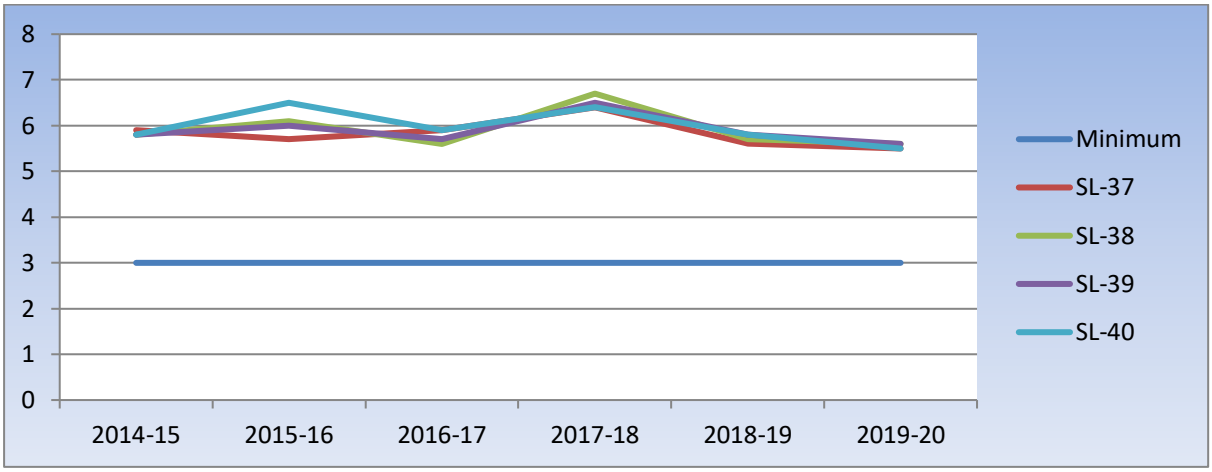


Graph – 7.24 for BOD

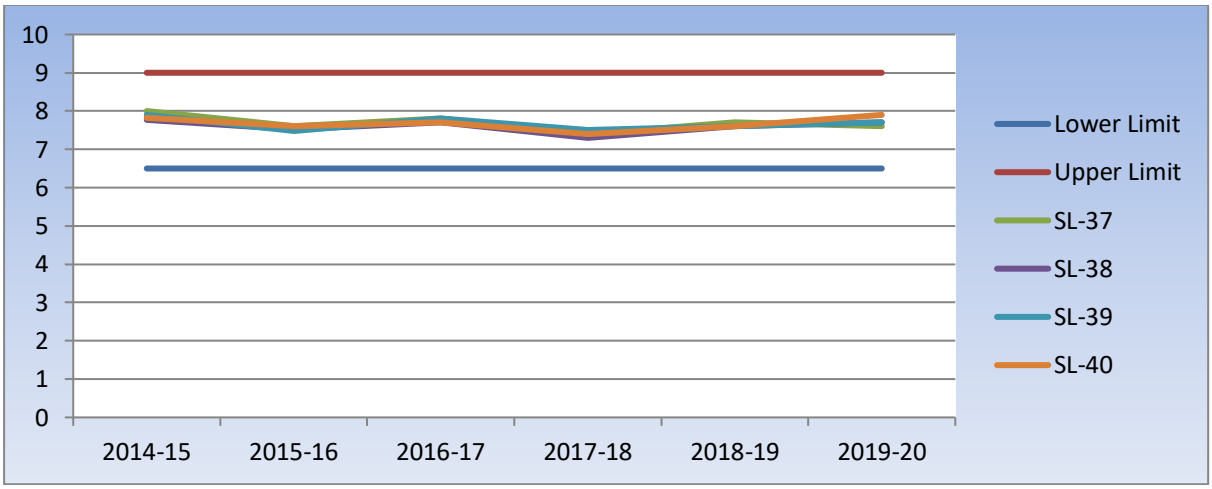


District: Krishna– 4 Sample locations (SL- 37, SL-38, SL-39 & SL-40)

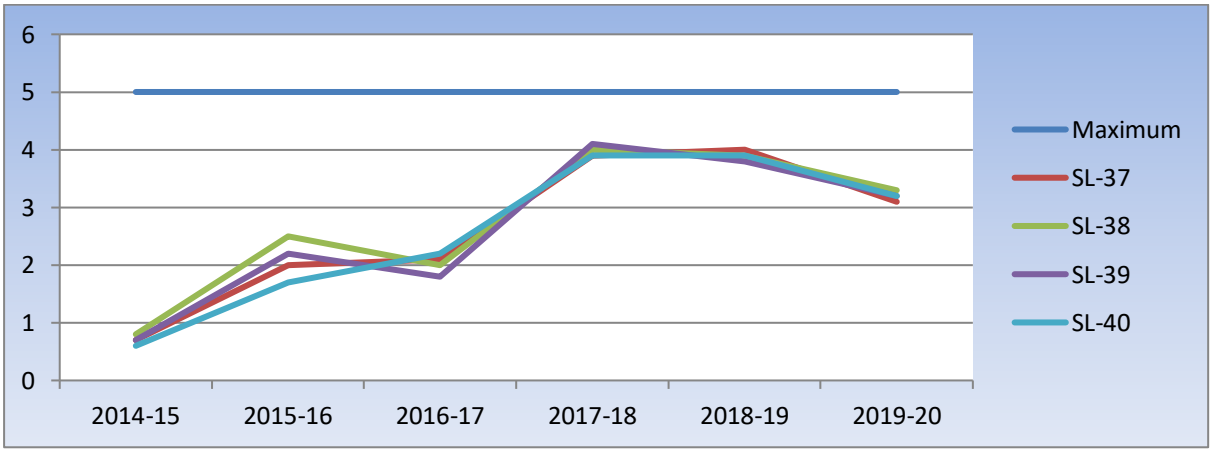
Graph – 7.25 for DO



Graph – 7.26 for pH



Graph – 7.27 for BOD



8.0 Action Plan for control of Coastal Pollution in Andhra Pradesh:

Table 8.1

S. No.	Activity	Timeline	Responsibility
1	Water quality monitoring of sea coast at 40 locations in association with NCCR, Chennai.	To be continued	Andhra Pradesh Pollution Control Board and NCCR.
2	Monitoring of performance of STPs for compliance.	To be continued	APPCB / Municipal authorities
3	Monitoring of industrial discharges of all industrial establishment including marine discharge units for compliance.	To be continued	Andhra Pradesh Pollution Control Board / Industries
4	To develop adequate capacity of sewage treatment using convention STPs or other technology and ensue to comply with the discharge norms as prescribed by the Andhra Pradesh SPCB under consent mechanism prescribed under Water Act, 1974.	December 2021	Municipal Administration & Urban Development Department / DMA / ULBs.
5	To set up for sewage collection, convince treatment and its disposal to cover the entire local / urban / coastal area within the respective jurisdiction.	December 2021	Municipal Administration & Urban Development Department / DMA / ULBs.
6	To set up requisite facilities for collection, transportation, treatment and disposal of Municipal Solid Waste, Plastic Waste, Construction and Demolition Waste generated as well as bio-mining of the existing legacy dumpsites in accordance with the Solid Waste Management Rules, 2016, Plastic Waste Management Rules, 2016 and Construction & Demolition Waste Management Rules, 2016 as amended respectively, notified under the Environment (Protection) Act, 1986, in the coastal areas within the respective jurisdiction of the State / UT.	Facilities established. To be monitored continuously	Municipal Administration & Urban Development Department / DMA / ULBs/APPCB.

7	For periodic cleaning and removal of plastic waste/solid waste in coastal areas to prevent marine pollution and for ensuring its safe disposal in accordance with the provisions notified under the Environment (Protection) Act, 1986.	To be continuously monitored	APPCB and Municipal Administration & Urban Development Department / DMA / ULBs.

9.0 Conclusion:

From the above it can be inferred that, there is no significant industrial pollution caused due to the full fledged effluent treatment systems provided by the industries. The coastal waters at some places (*i.e. Confluence of sewage of lavender canal joining the sea at harbour, Confluence point of Mehadrigedda surplus coarse along with all the industrial effluents joining the sea at parallel bridge near dockyard, Confluence point of steel plant effluent joining the sea near Appikonda village in Visakhapatnam District & Sea water collected near Uppada, Kakinada, Sample collected from Upputeru channel near Indrapalem, Kakinada and Confluence point of Chollangi snanala revu and Ramannapalem drainin East Godavari District*) are contaminated due to the flow of untreated sewage through the drains joining the sea. The MA&UD Department is proposing to develop adequate capacity of Sewage Treatment Systems (STPs) along with requisite facilities for collection, transportation & treatment of sewage.

The APPCB will follow up the establishment of adequate facilities with the MA&UD Department. Also regular monitoring will be carried out for assessing the water quality of the sea waters to meet the marine primary water quality criteria parameters. The APPCB along with the other stake holder Departments will adhere to the action plan being submitted in maintaining the water quality by implementing all the measures for solid waste management and effluent/sewage management.

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