WASTE WATER MANAGEMENT – MUSI RIVER

Gowlapalli Rohit - 2021101113

HYDRO INFORMATICS – INDIVIDUAL ASSESSMENT

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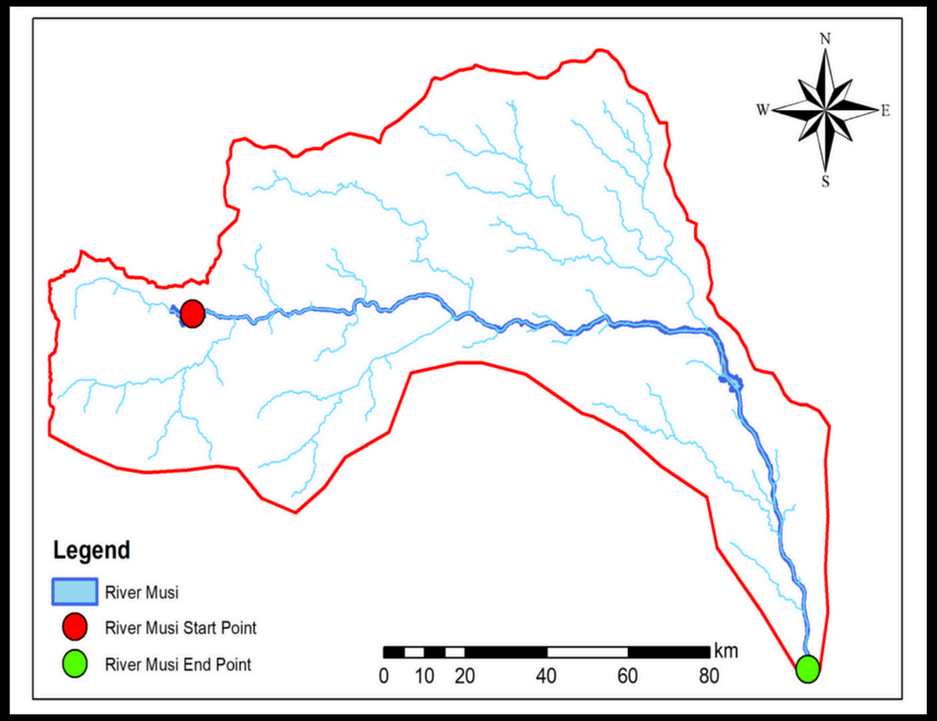
INDIVIDUAL ASSESSMENT

INTRODUCTION

HYDRO INFORMATICS

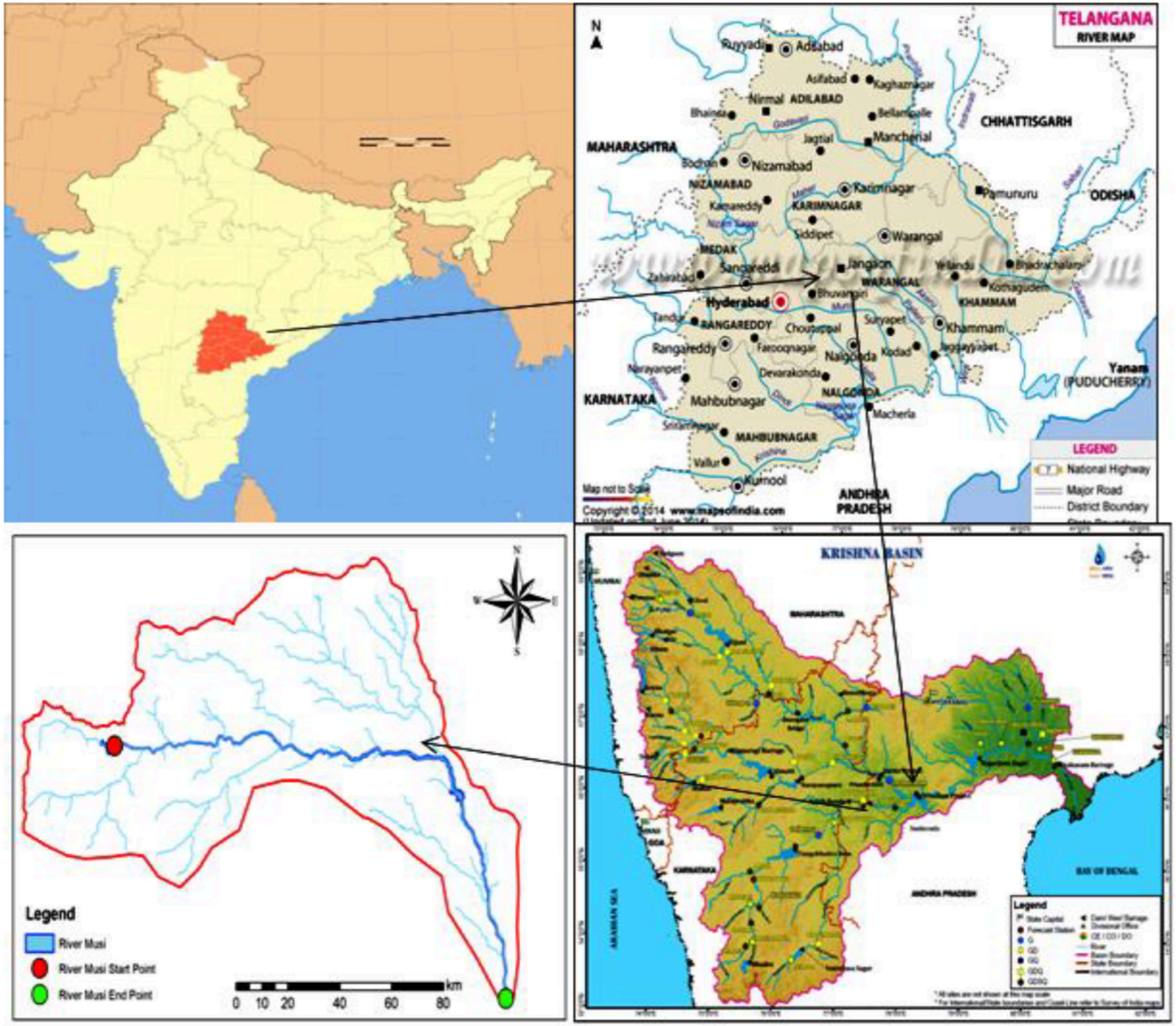
MUSI RIVER



- The Musi River originates in the Anantagiri hills and flows into the Osmansagar and Himayatsagar reservoirs, it consists of 2 rivulets Esi (8 kms) and Musa (13 kms) which then converge into Musi River thus being the water sources for Hyderabad for over a century.

- The reservoirs were constructed in the Nizam’s reign after devastating floods in 1908. Land around the reservoirs is a Government protected conservation area.

- Within Hyderabad, the Musi runs nearly dry. The loss of water is likely to be caused due to the impounding of river water in reservoirs and the degradation of catchment areas. Unchecked urban development and construction over natural rainwater channels and water tanks have disrupted the drainage patterns of the region. Untreated sewage as well as industrial effluents now flow into the river, which is severely polluted


TELANGANA
RIVER MAP
N
Adilabad
Asifabad
Kaghaznagar
Nirmal
ADILABAD
Bellampalle
CHHATTISGARH
Bhainsa
Godavari
Jagtial
Mancherial
MAHARASHTRA
Nizamabad
NIZAMABAD
Kamareddy
Manjira
KARIMNAGAR
Karimnagar
Pamunuru
ODISHA
Siddipet
Warangal
MEDAK
Sangareddy
Jangaon
Bhadrachalam
Zaheerabad
WARANGAL
Bhuvanagiri
Kothagudem
Hyderabad
KHAMMAM
Musi
RANGAREDDY
Suryapet
Khammam
Tandur
Chowtuppal
Rangareddy
Farooqnagar
Nalgonda
Kodad
Jaggayyapet
Narayanpet
Dindi
Devarakonda
Yanam
(PUDUCHERRY)
KARNATAKA
Mahbubnagar
NALGONDA
Dindi
Macherla
Srisailam Dam
MAHBUBNAGAR
Krishna
Vallur
Kurnool
Map not to Scale
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ANDHRA PRADESH
LEGEND
National Highway
Major Road
District Boundary
N
W
E
S
Legend
River Musi
River Musi Start Point
River Musi End Point
0 10 20 40 60 80
km
KRISHNA BASIN
MAHARASHTRA
KARNATAKA
GOA
ANDHRA PRADESH
ARABIAN SEA
BAY OF BENGAL
Legend
State Capital
Forecast Station
G
GD
GQ
GDQ
GDSG
Basin Boundary
State Boundary

INDIVIDUAL ASSESSMENT

WATER ISSUE

HYDRO INFORMATICS

Table - 28: Number of Polluted River Stretches in Telangana

S NO.	RIVER	POLLUTED RIVER STRETCH/ LOCATION	MAX BOD OBSERVED (mg/L)	PRIORITY CLASS
1.	GODAVARI	ALONG BASARA, MANCHERIAL TO RAMAGUNDAM, ALONG KALESHWARAM, ALONG KAMALAPUR, ALONG BHADRACHALAM	24.0	II
2.	KARAKAVAGU	ALONG PALONCHA	4.0	V
3.	KINNERSANI	ALONG KHAMMAM	6.0	V
4.	KRISHNA	ALONG WADAPALLY	3.2	V
5.	MANAIR	KARIMNAGAR TO SOMNAPALLI	16.0	III
6.	MANJEERA	SANGAREDDY TO GOWDICHARLA	6.0	V
7.	MUNNERU	ALONG KHAMMAM	6.0	V
8.	MUSI	BAPUGHAT TO RUDRAVELLY, KASANIGUDA TO VALIGONDA	66.0	I
9.	NAKKAVAGU	ALONG BACHUGUDEM	11.0	III

Musi is placed under Priority-I (BOD > 30mg/L) of Polluted River Stretches

MOTIVATION

Ensuring the quality of water resources is essential for safeguarding public health, supporting ecosystem integrity, and sustaining economic activities. The Musi River, a vital water body in our region, faces increasing threats from pollution due to various anthropogenic activities. The deterioration of water quality in the Musi River has significant implications for both human populations and the environment. Therefore, it is imperative to conduct comprehensive assessments of water quality parameters to understand the extent of pollution and devise effective strategies for its management.

OBJECTIVES

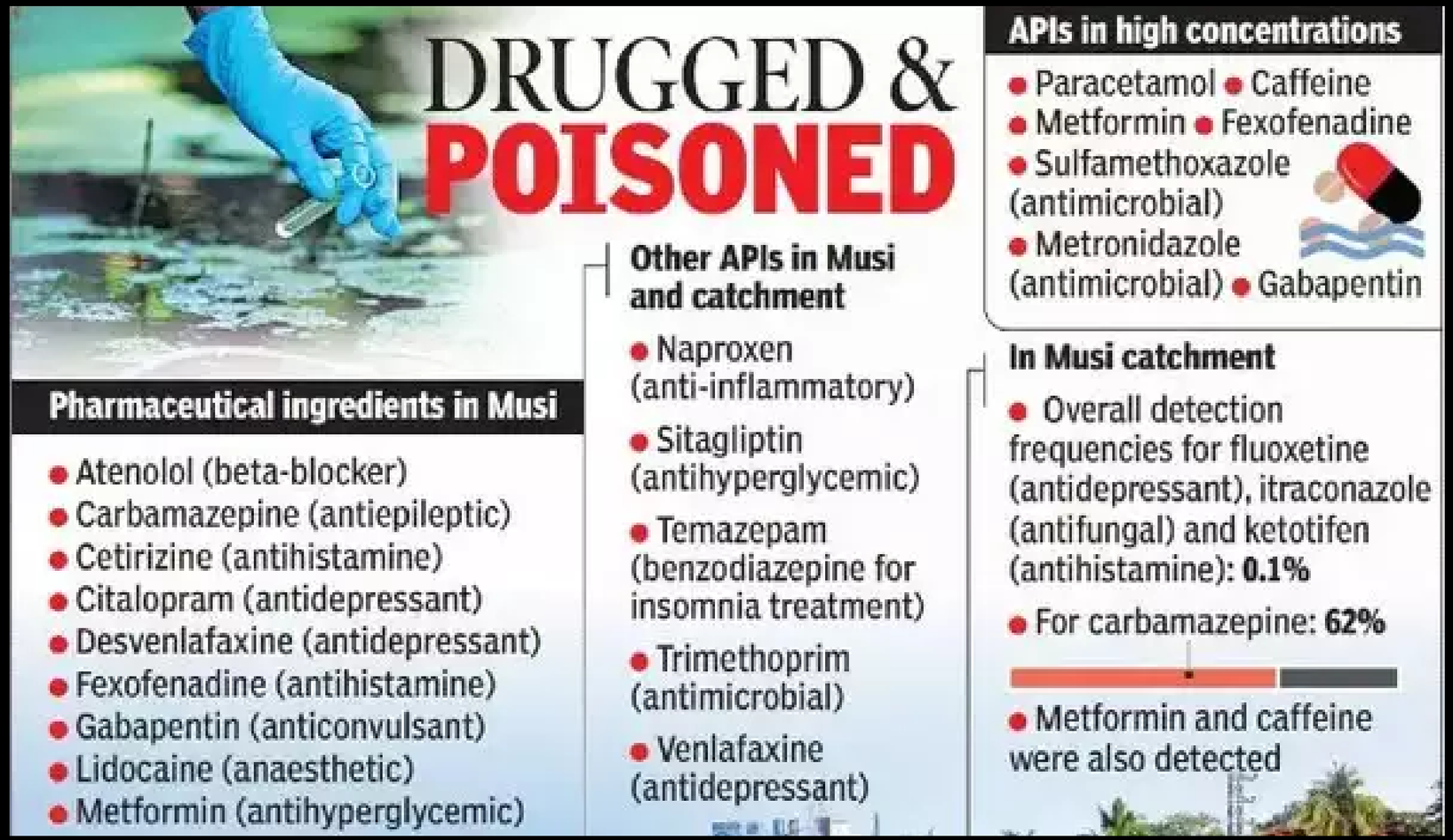
Assessment of Water Quality Parameters

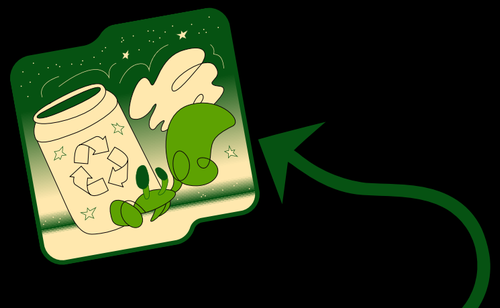
Evaluation of Current Waste Water Management Initiatives

Recommendations for Policy and Practice

SOURCES OF RIVER MUSI POLLUTION – POINT SOURCES

- INFLUX OF UNTREATED DOMESTIC SEWAGE
- TREATED INDUSTRIAL EFFLUENTS FROM CETP's
- PHARMACEUTICAL - CHEMICAL WASTE





CONCERNED WATER ISSUES

01 RIVER WATER QUALITY

02 WASTE WATER MANAGEMENT

INDIVIDUAL ASSESSMENT

DATA COLLECTION

HYDRO INFORMATICS

DATA SOURCES

Telangana State
POLLUTION CONTROL BOARD

Home | About us | Laboratory | Environment Standards | Environmental Clearance | Industry Guide | Compliance Inspection under Water & Air Acts | Download | BMW Mgmt | Annual Reports | CBIPM Project | RTI | FAQs

D. Musi River Data

II. Musi River Annual Average Data for the period 2014 to 2022

- Dissolved Oxygen (DO) - mg/L
- Biological Oxygen Demand (BOD) - mg/L
- Conductivity - mS/cm
- Total Coliform - MPN/100ml
- Ammonia - mg/L
- Boron - mg/L
- SAR - mg/L
- pH

Station Name	DO	pH	Conductivity	BOD	Coliform	Ammonia	Boron	SAR	Year
Gandipet	5.1	6.10	209	2	300	<1	<0.01	0.9	2014
Bapughat	2.1	7.50	928	36	5213	<1	0.2	1.2	2014
Moosarambagh	0.7	7.56	1417	58	6220	<1	0.3	1.8	2014
Nagole	3.9	7.76	1211	29	97	<1	0.25	1.9	2014
Peerjadiguda	0.3	7.55	1378	43	6840	<1	0.18	1.0	2014
Pratapasingaram	0.1	7.48	1188	50	4888	<1	0.30	0.6	2014
Pillaipalli	1.1	7.61	1347	28	1020	<1	<0.01	1.9	2014
Rudravelly	6.0	8.00	1567	6	220	<1	1.2	2.5	2014
Valigonda	-	-	-	-	-	-	-	-	2014
Kasaniguda	5.2	8.20	1548	2	80	<1	3.60	2.5	2014
Bheemaram	-	-	-	-	-	-	-	-	2014
Wadapally	5.1	8.00	1012	3	30	<1	0.30	2.0	2014
Gandipet	3.2	7.20	412	2.0	55	<1	0.08	0.4	2015
Bapughat	1.3	7.57	1162	24	5960	<1	0.28	1.8	2015
Moosarambagh	<0.1	7.34	1406	68	8580	<1	0.42	1.9	2015
Nagole	2.0	7.00	1233	7	906	<1	0.88	1.9	2015
Peerjadiguda	0.7	7.39	1346	31	6220	<1	0.20	1.0	2015
Pratapasingaram	3.0	7.09	1521	6	715	<1	0.09	1.6	2015
Pillaipalli	0.9	7.49	1296	29	1150	<1	0.50	1.5	2015
Rudravelly	5.7	7.80	1430	8.0	480	<1	0.90	2.0	2015
Valigonda	-	-	-	-	-	-	-	-	2015
Kasaniguda	5.8	7.33	174	2.0	78	<1	1.30	1.6	2015
Bheemaram	-	-	-	-	-	-	-	-	2015

12 SAMPLING LOCATIONS FOR DATA COLLECTION

River Musi at Pillaipalli	U/s of Musi at Gandipet (OsmanSagar Lake)
River Musi at Rudravelly Bridge	Musi sample at Bapughat Sangam U/s of Musi
River Musi at Kasaniguda	River Musi at Moosarambagh bridge, Hyderabad
Bheemaram Bridge , Nalgonda District	River Musi at Nagole Bridge
River Krishna at Wadapally	River Musi at Peerjadiguda
River Musi at Valigonda Bridge	D/s of Musi at Pratapasingaram

INDIVIDUAL ASSESSMENT

ANALYSIS

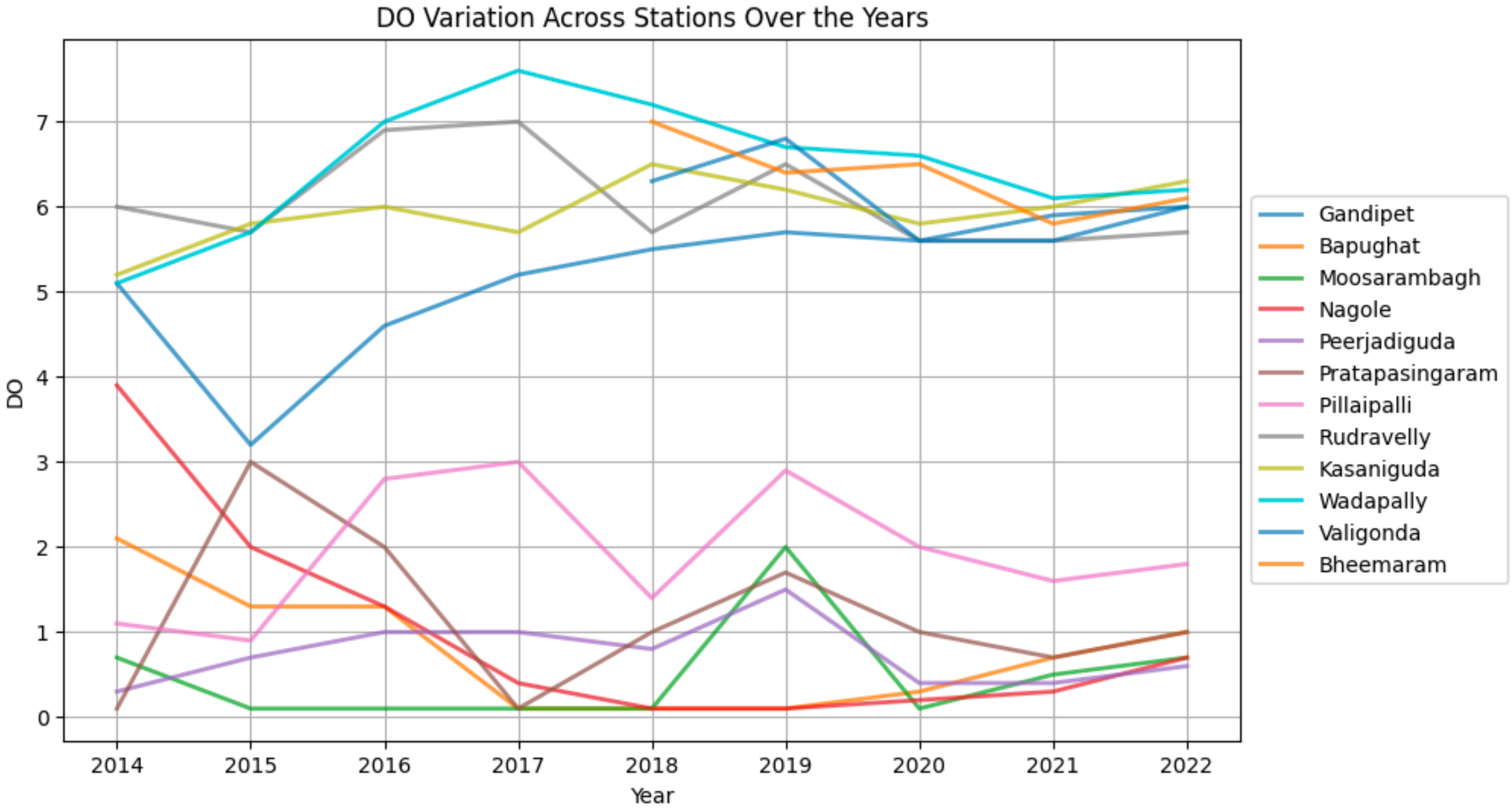
HYDRO INFORMATICS

PERMISSIBLE LIMITS

Level of TDS (milligrams per litre)	Rating
Less than 300	Excellent
300 - 600	Good
600 - 900	Fair
900 - 1,200	Poor
Above 1,200	Unacceptable

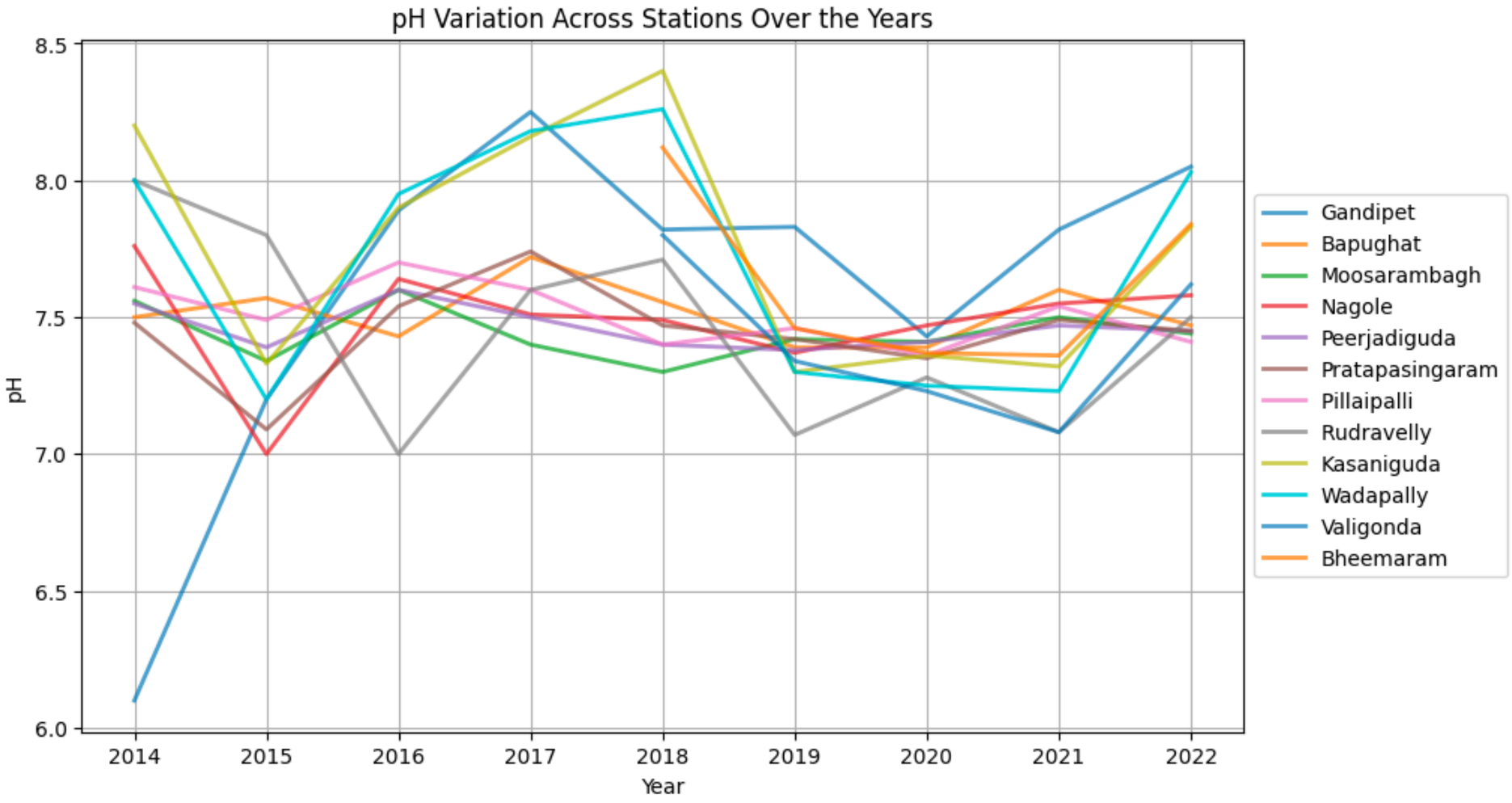
Parameter	Permissible Limits by CPCB (mg/l)
BOD	30
COD	250
Oil and Grease	10
TSS	100
Total Hardness	180
Kjeldahl Nitrogen	20
pH	7.5

DISSOLVED OXYGEN



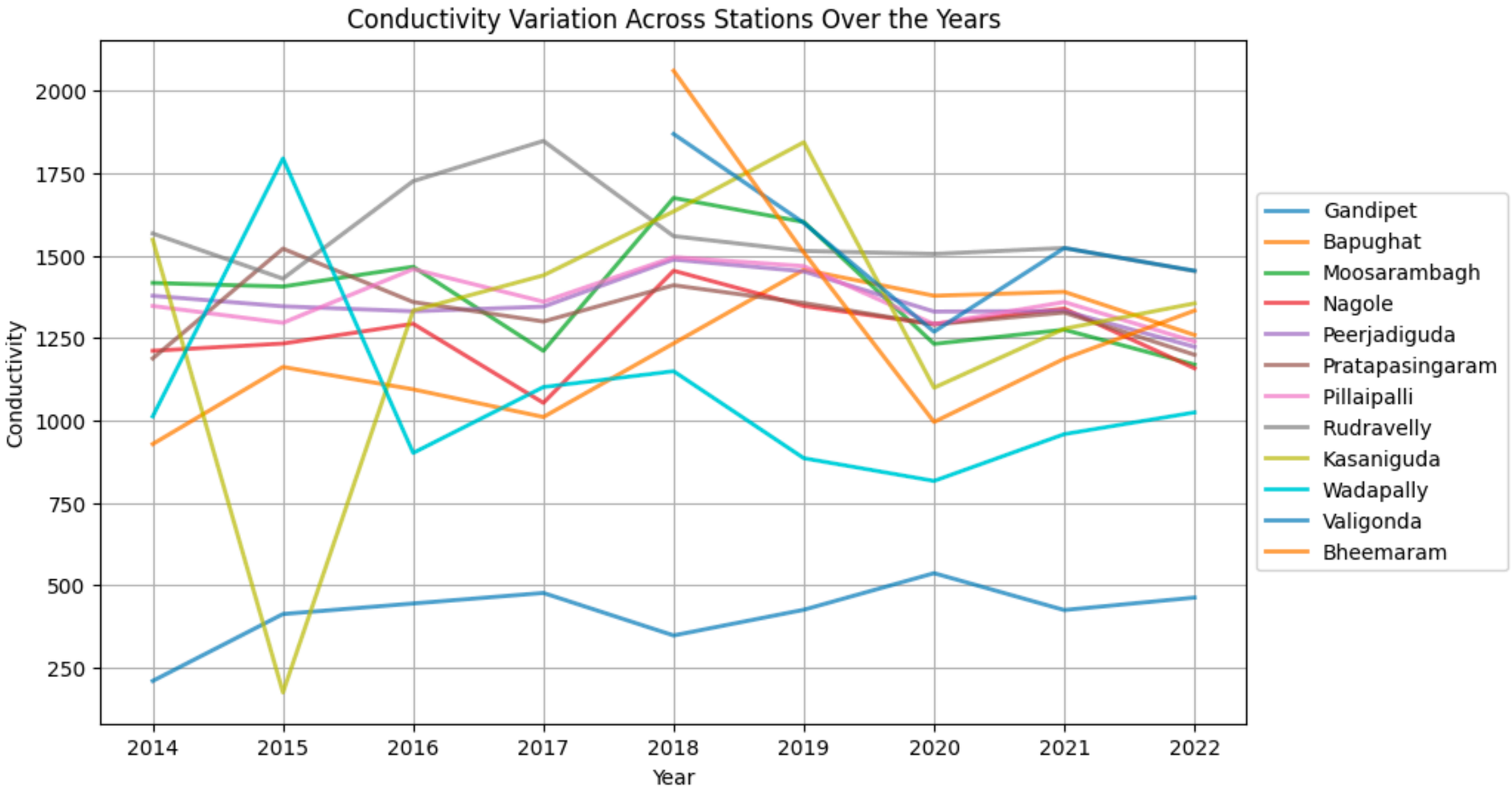
Mann-Kendall Trend Test: Gandipet - Increasing Trend , p-value: 0.002499

PH



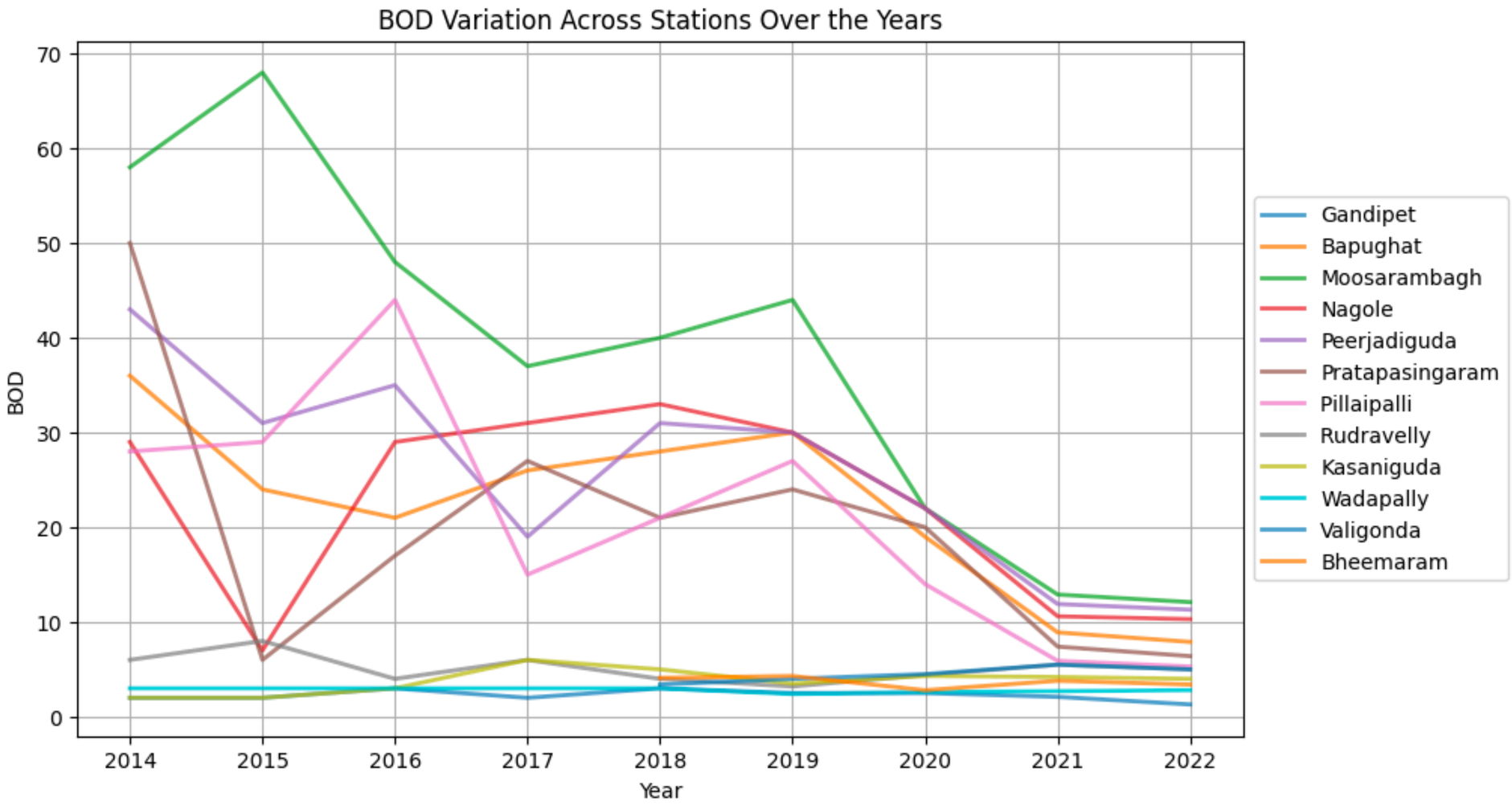
Mann-Kendall Trend Test: No significant trends were observed

CONDUCTIVITY



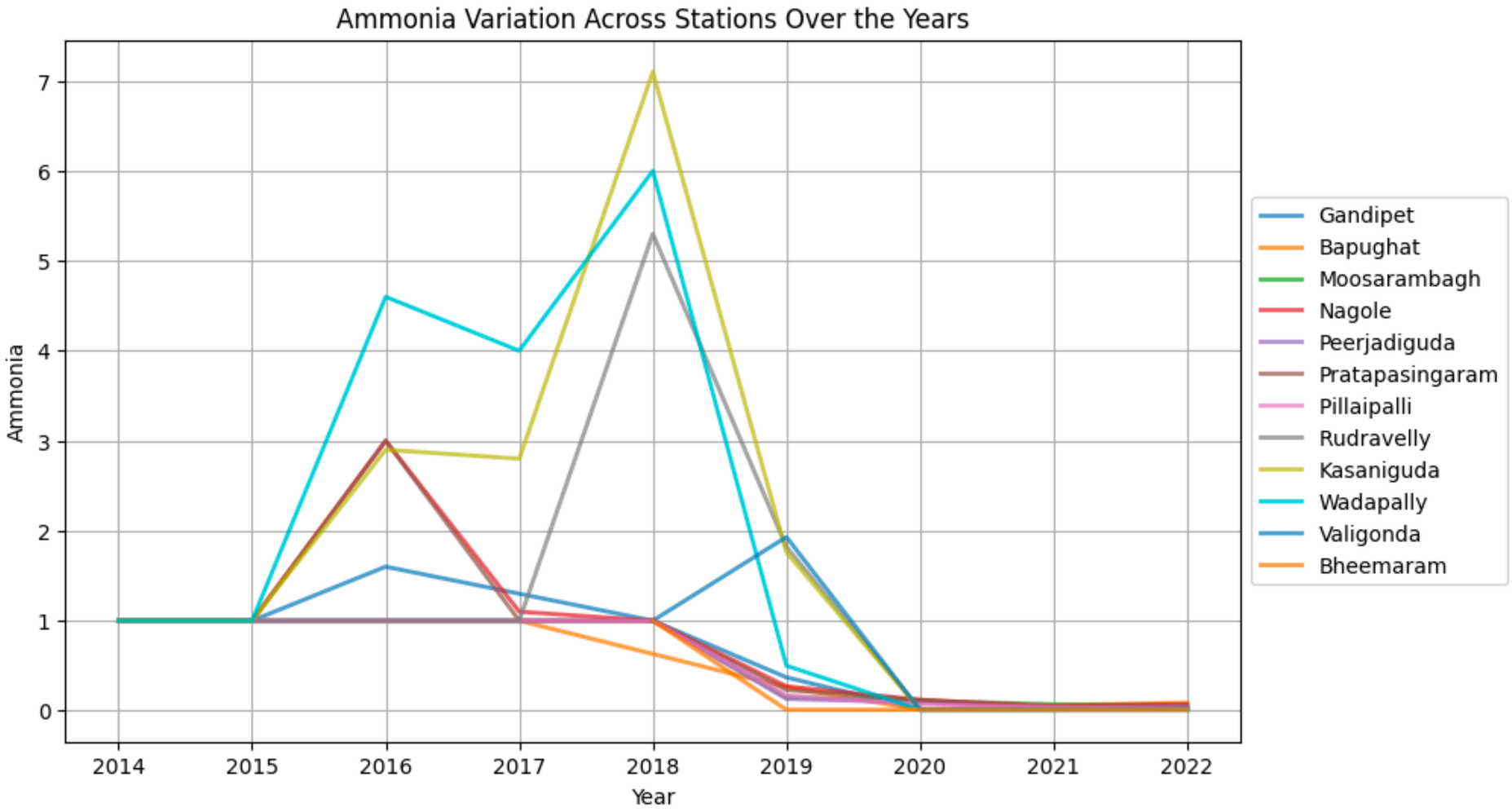
Mann-Kendall Trend Test: No significant trends were observed

BIOLOGICAL OXYGEN DEMAND



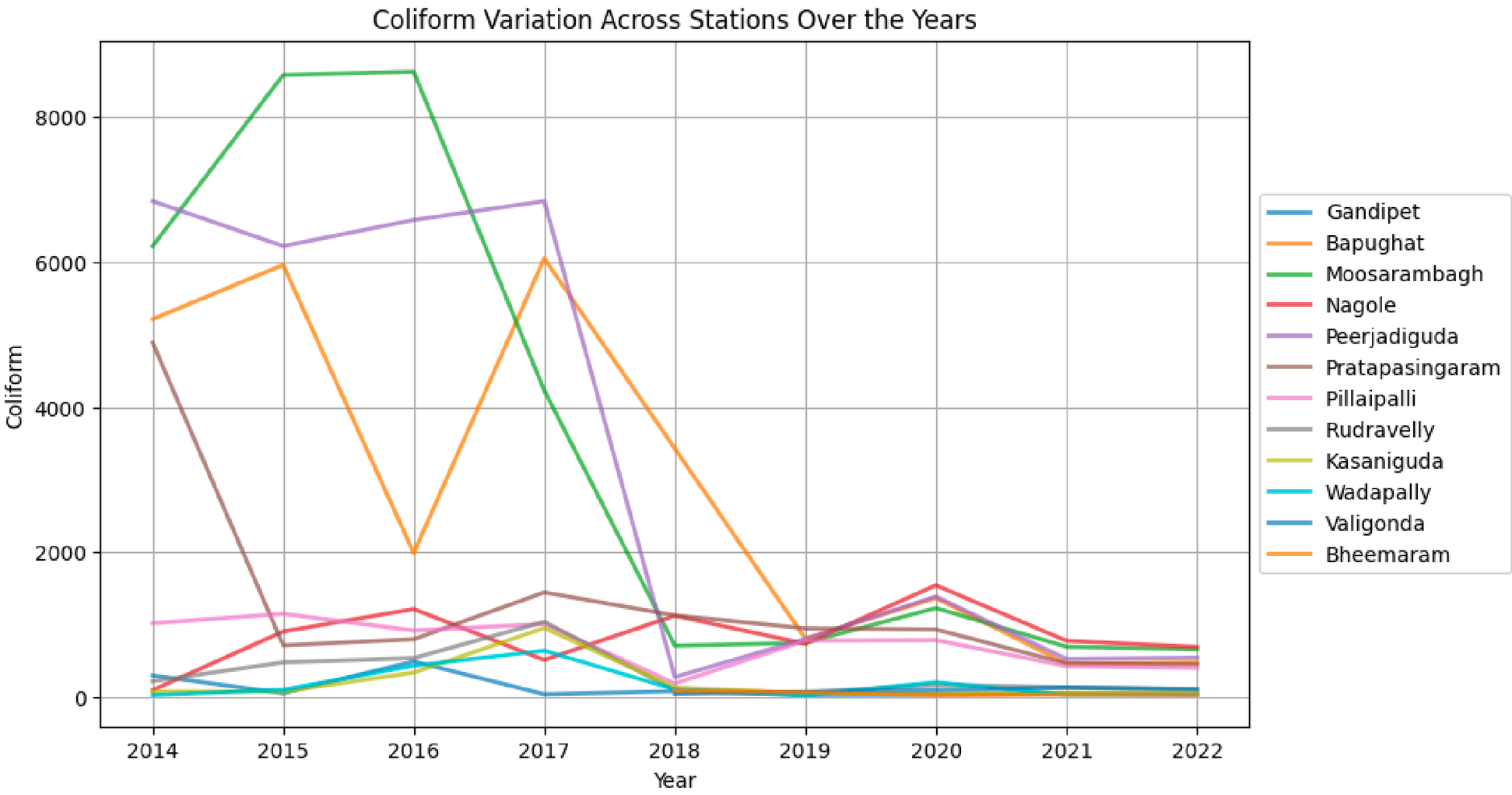
Mann-Kendall Trend Test: Bapughat, Moosarambagh, Peerjadiguda, Pillaipalli
Decreasing trends with p-value<0.05

AMMONIA



Mann-Kendall Trend Test: Bapughat, Moosarambagh, Peerjadiguda, Pillaipalli
Decreasing trends with p-value<0.05

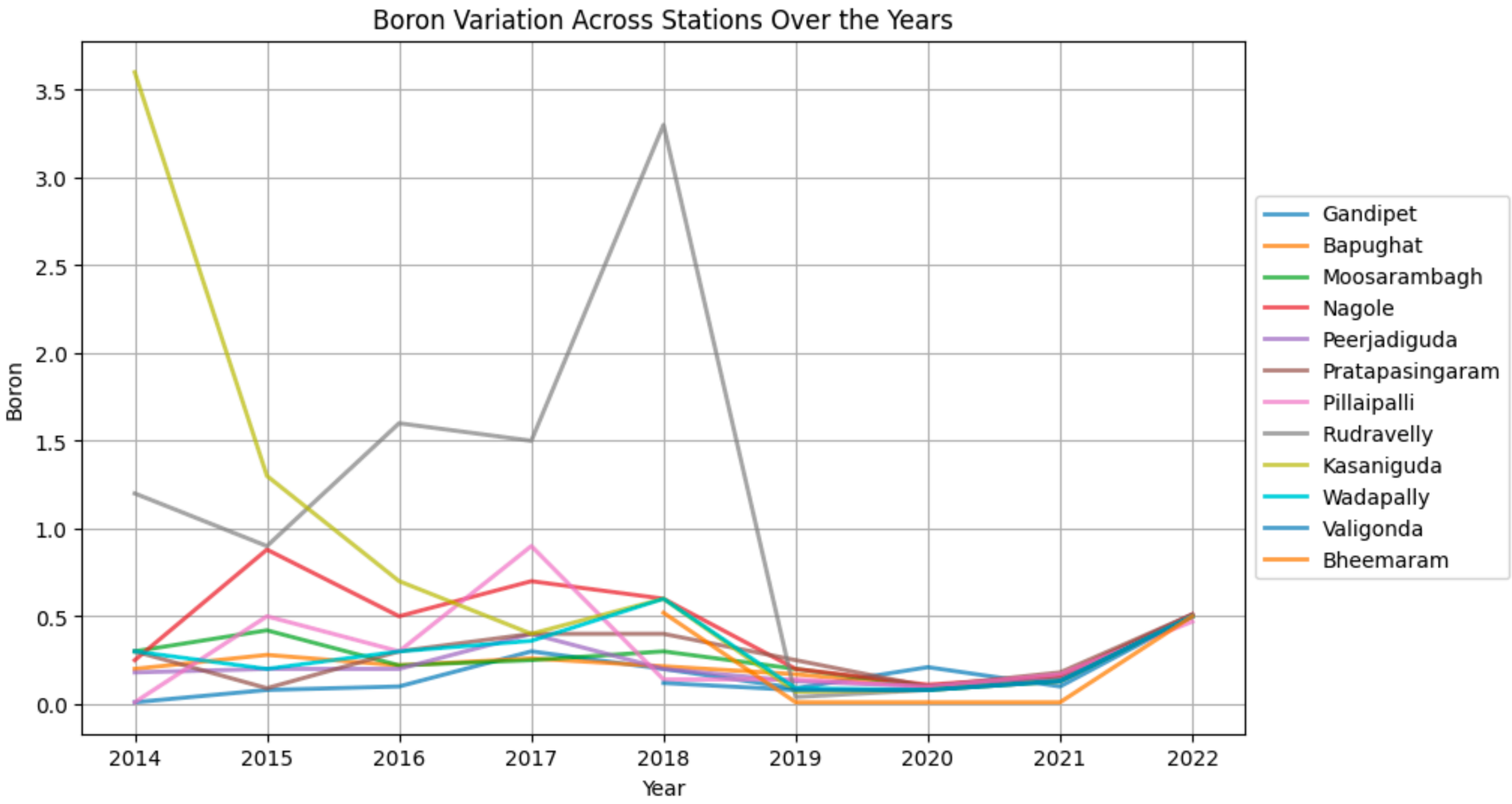
COLIFORM



Mann-Kendall Trend Test:

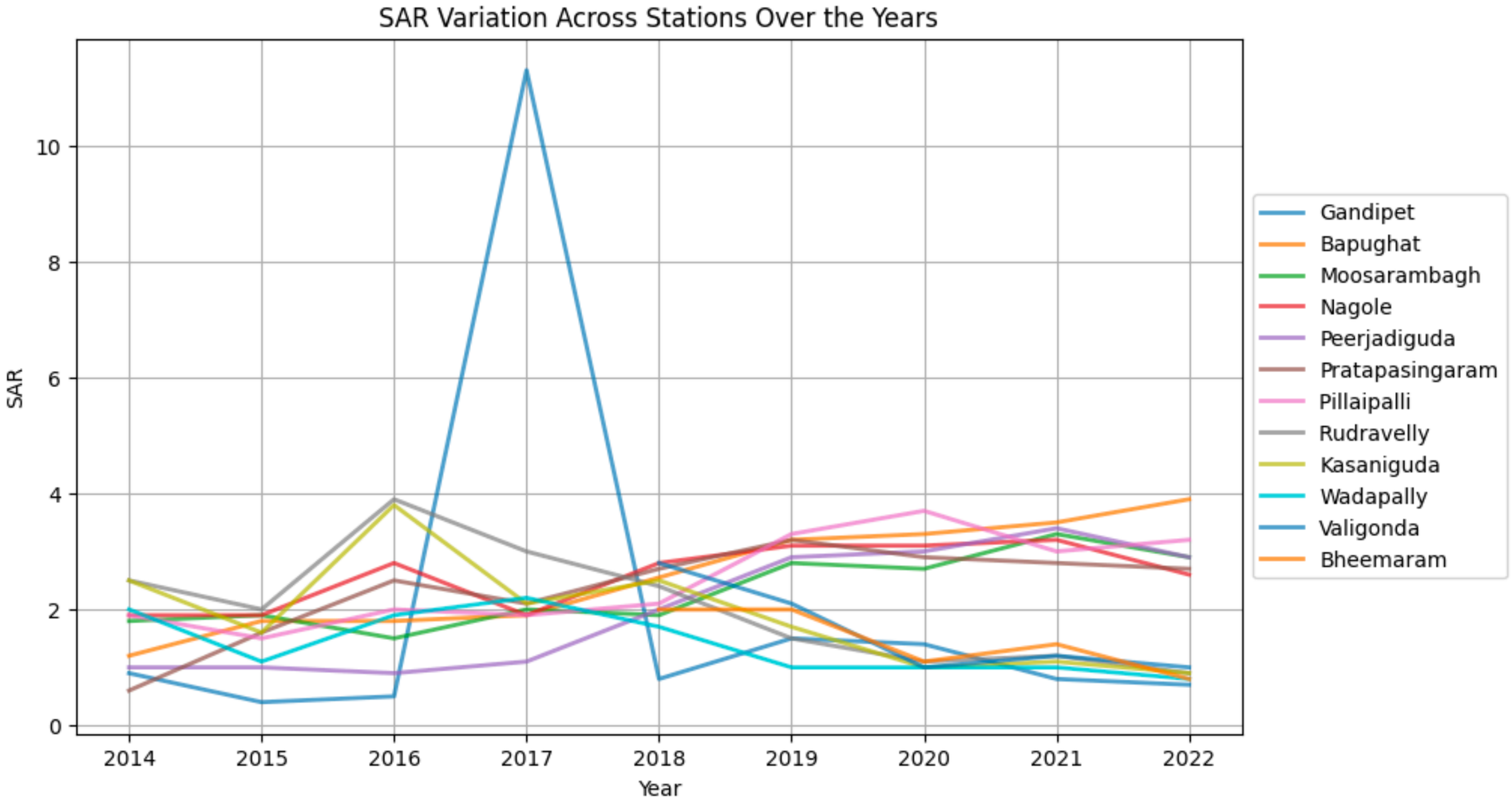
Moosarambagh, Pillaipalli
Decreasing trends with p-value<0.05

BORON



Mann-Kendall Trend Test: Kasaniguda - Decreasing Trend , p-value: 0.047604

SAR

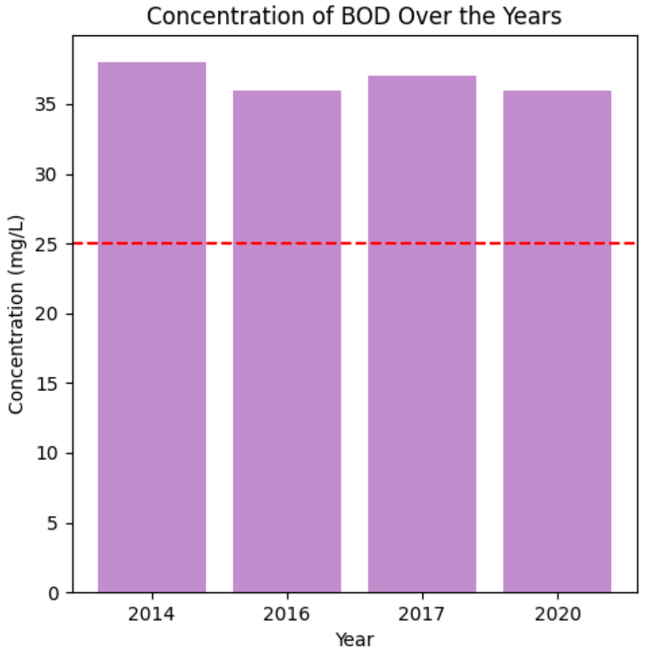


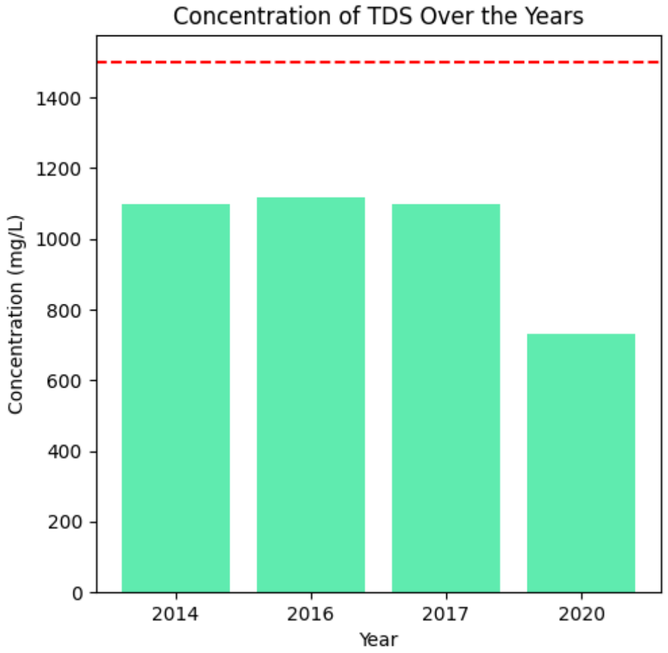
Mann-Kendall Trend Test:

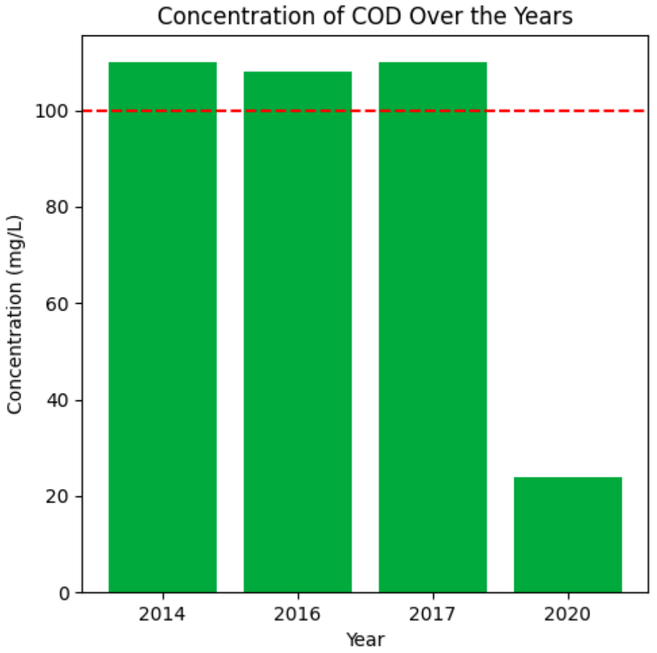
Bapughat, Moosarambagh : Decreasing trends

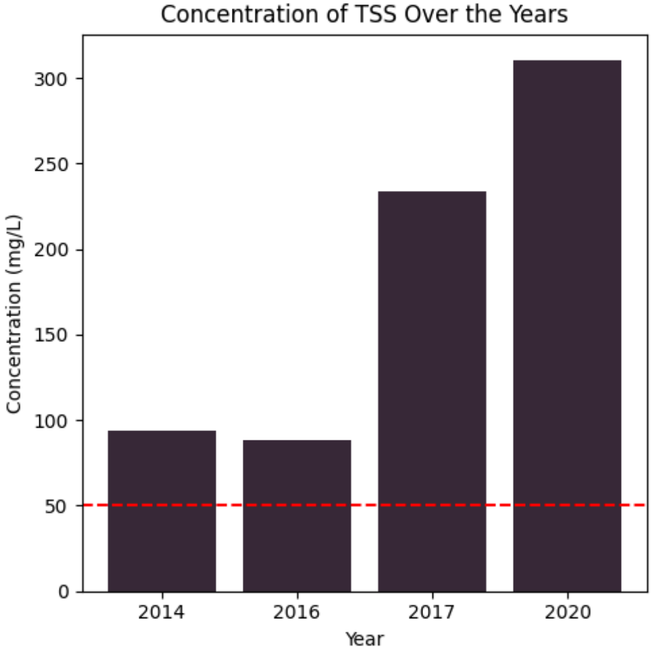
Kasaniguda, Wadapally : Increasing trends

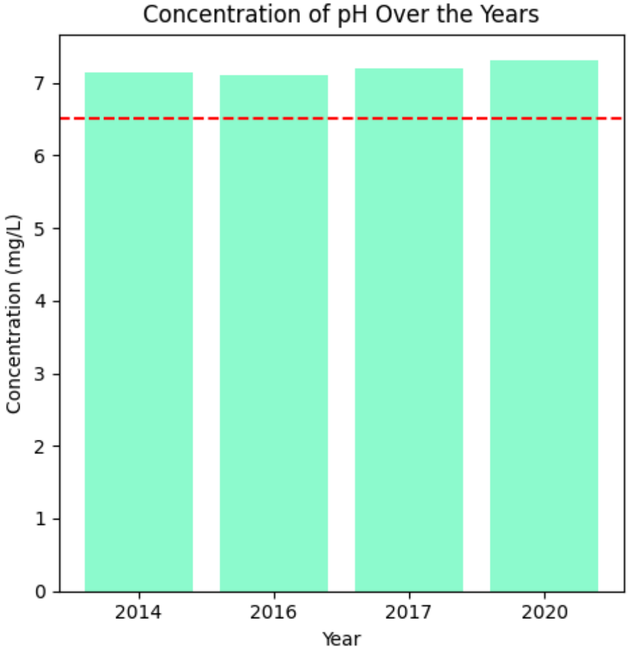
SURFACE WATER QUALITY WITH PERMISSIBLE LIMITS OF US-EPA (1992) STANDARDS FOR WASTEWATER REUSE

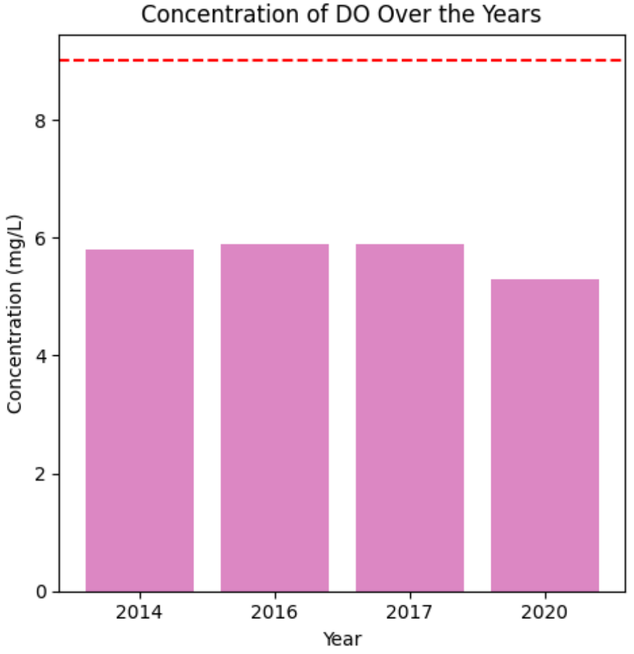




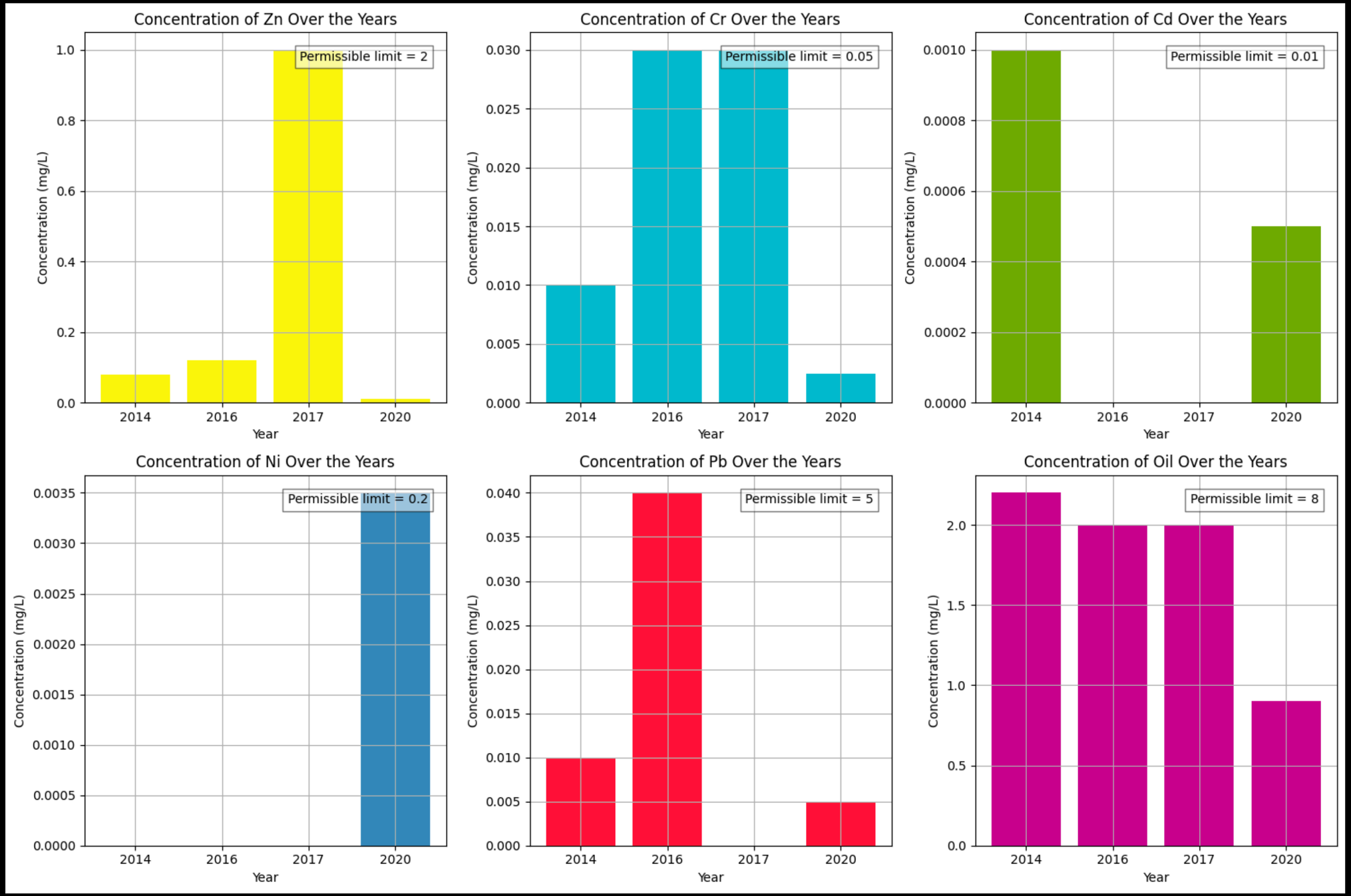








SURFACE WATER QUALITY WITH PERMISSIBLE LIMITS OF US-EPA (1992) STANDARDS FOR WASTEWATER REUSE



MULTIPLE REGRESSION ANALYSIS

- FOUR MLR MODELS ARE DEVELOPED TO PREDICT SODIUM ADSORPTION RATIO (SAR), ELECTRICAL CONDUCTIVITY (EC), BIOLOGICAL OXYGEN DEMAND (BOD) AND DISSOLVED OXYGEN (DO).

- F-TESTS AND T-TESTS ARE CARRIED OUT TO MEASURE THE GOODNESS OF FIT OF THE MLR MODELS DEVELOPED. F-TEST DETERMINES THE SIGNIFICANT RELATION BETWEEN THE DEPENDENT VARIABLE AND THE INDEPENDENT VARIABLES.

Input model parameters	MLR model equations	Multiple R	R Square
EC, B, NH_3, pH	SAR = 0.002 EC - 2.98 B + 3.28 NH_3 - 1.35 pH + 9.59	0.76	0.58
pH, SAR, B	EC = 373.21 pH + 190.68 SAR + 532.65 B -2111.94	0.77	0.59
pH, DO, SAR	BOD = 0.46 pH - 2.45 DO + 2.84 SAR - 1.10	0.69	0.48
pH, BOD,	DO = -0.538 pH -0.091 BOD + 5.6	0.54	0.30

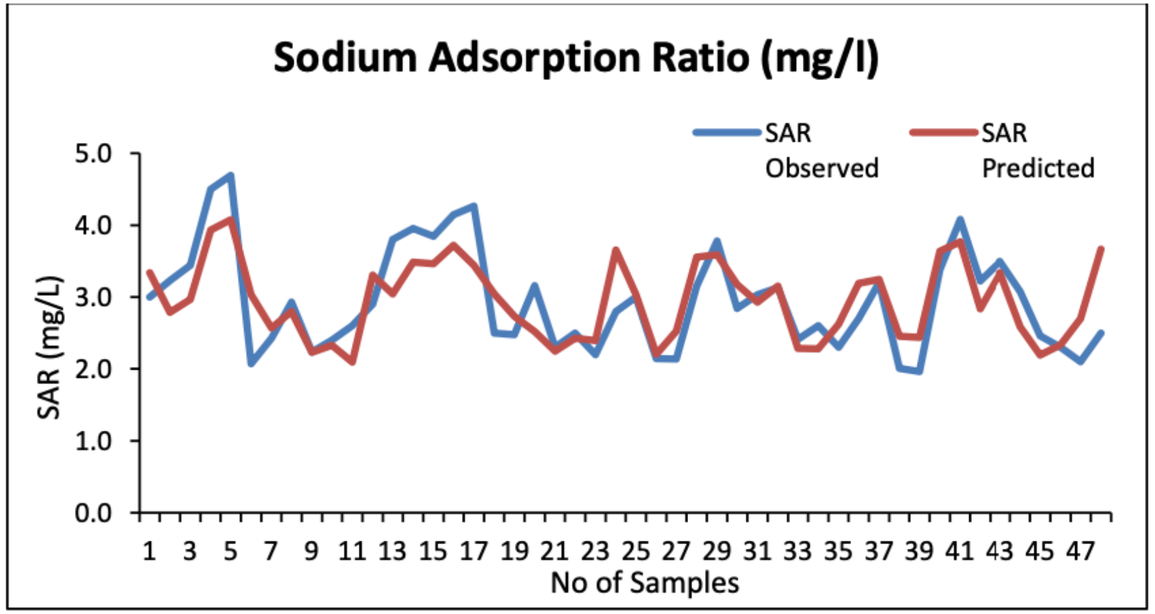
PREDICTION OF SODIUM ADSORPTION RATIO (SAR)

SAR = 0.002 EC - 2.98 B + 3.28 NH3 - 1.35 pH + 9.59

Multiple R	0.766225264
R Square	0.587101156
Adjusted R Square	0.548691961
Observations	48

	df	SS	MS	F	Significance F
Regression	4	13.764471	3.44111778	15.285	7.49724E-08
Residual	43	9.6803321	0.225124005		
Total	47	23.444803			

	Coefficients	t Stat (observed)	P-value
Constant	9.591147	3.720185546	0.00057257
EC	0.002886	7.543910318	2.11735E-09
B	-2.989994	-3.495540365	0.001111034
NH_3	3.284165	2.122557446	0.039589026
pH	-1.351381	-3.823728453	0.000419438



S. No.	Independent Variables	t-statistic observed	t- critical at 5%	t critical at 10%
1	Constant	3.720	-	-
2	EC	7.54	1.678	1.30
3	B	-3.49	1.678	1.30
4	NH_3	2.12	1.678	1.30
5	pH	-3.82	1.678	1.30

Regression *df*	Residual *df*	$F_{observed}$	$F_{critical}$ at 5% level of significance	$F_{critical}$ at 10% level of significance
4	43	15.285	2.589	2.080

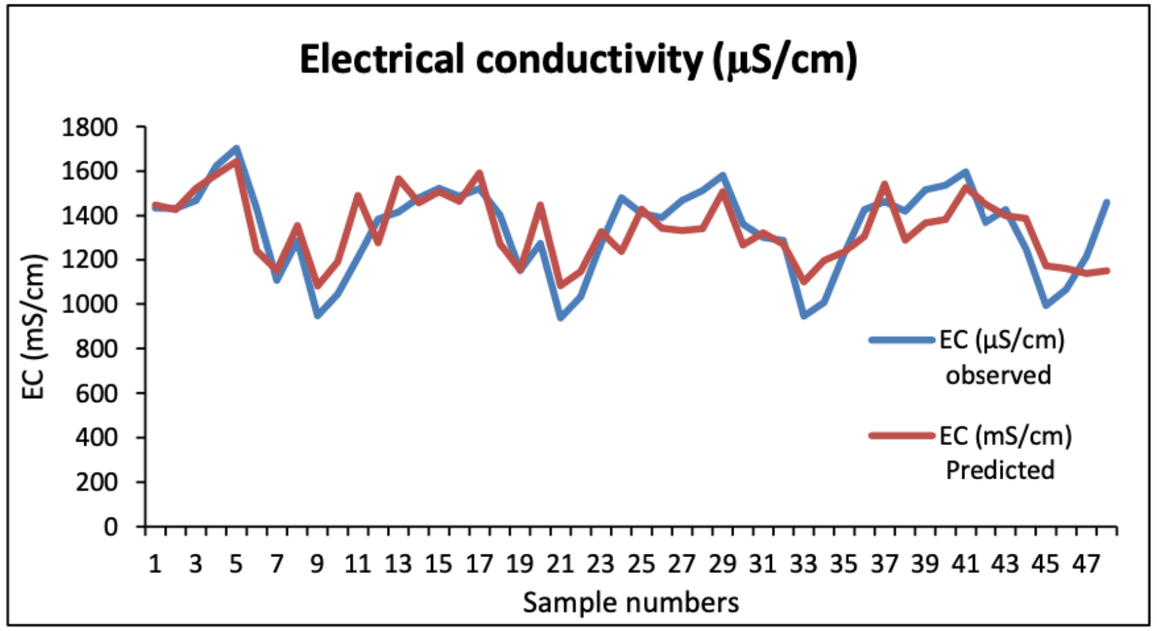
PREDICTION OF ELECTRICAL CONDUCTIVITY (EC)

EC = 373.21 pH + 190.68 SAR + 532.65 B -2111.94

Multiple R	0.771232346
R Square	0.594799331
Adjusted R Square	0.567172013
Observations	48

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1074435.94	358145.31	21.529	9.84432E-09
Residual	44	731947.97	16635.18		
Total	47	1806383.91			

	Coefficients	**t Stat**	**P-value**
Constant	-2111.948903	-2.927501947	0.005391707
pH	373.2102494	4.014903532	0.000228218
SAR	190.6829673	7.061773273	9.28154E-09
B	532.6572296	3.513041734	0.00103816



S. No.	**Independent Variables**	**t- statistic observed**	**t- critical at 5%**	**t -critical at 10%**
1	Constant	-	-	-
2	pH	4.014	1.678	1.30
3	SAR	7.061	1.678	1.30
4	B	3.513	1.678	1.30

Regression *df*	**Residual *df***	**F observed**	**F critical at 5% level of significance**	**F critical at 10% level of significance**
3	44	21.52	2.816	2.213

PREDICTION OF BIOLOGICAL OXYGEN DEMAND (BOD)

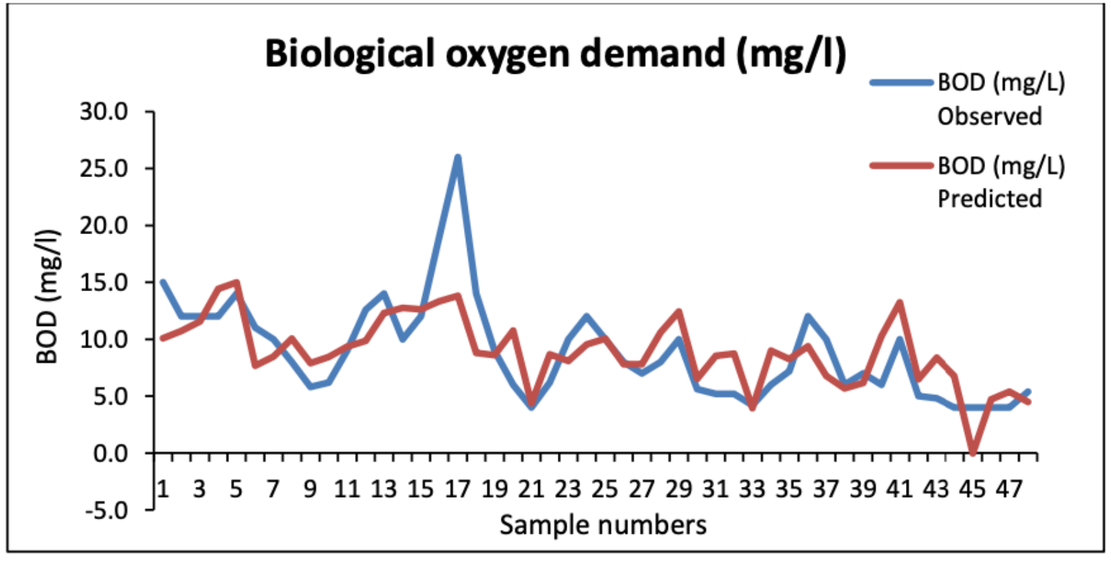
BOD = 0.46 pH - 2.45 DO + 2.84 SAR - 1.10

Multiple R	0.693425263
R Square	0.480838596
Adjusted R Square	0.445441227
Observations	48

	df	SS	MS	F	Significance F
Regression	3	427.43	142.4772843	13.584	2.08198E-06
Residual	44	461.49	10.48859425		
Total	47	888.93			

	Coefficients	*t Stat*	*P-value*
Constant	-1.10012096	-0.060854491	0.951750674
pH	0.461773783	0.198686165	0.843423482
DO	-2.45975645	-3.806563436	0.000432307
SAR	2.846468379	4.091819394	0.000179693

Regression *df*	Residual *df*	$F_{observed}$	$F_{critical}$ at 5% level of significance	$F_{critical}$ at 10% level of significance
3	44	13.584	2.816	2.213



S. No.	Independent Variables	t-observed	t-critical at 5%	t-critical at 10%	t-critical at 20%	t-critical at 25%	t-critical at 30%	t-critical at 40%	t-critical at 45%
1	Constant	-	-	-	-	-	-	-	-
2	pH	0.198	1.678	1.30	0.850	0.680	0.528	0.254	0.126
3	DO	-3.806	1.678	1.30	0.850	0.680	0.528	0.254	0.126
4	SAR	4.091	1.678	1.30	0.850	0.680	0.528	0.254	0.126

PREDICTION OF DISSOLVED OXYGEN (DO)

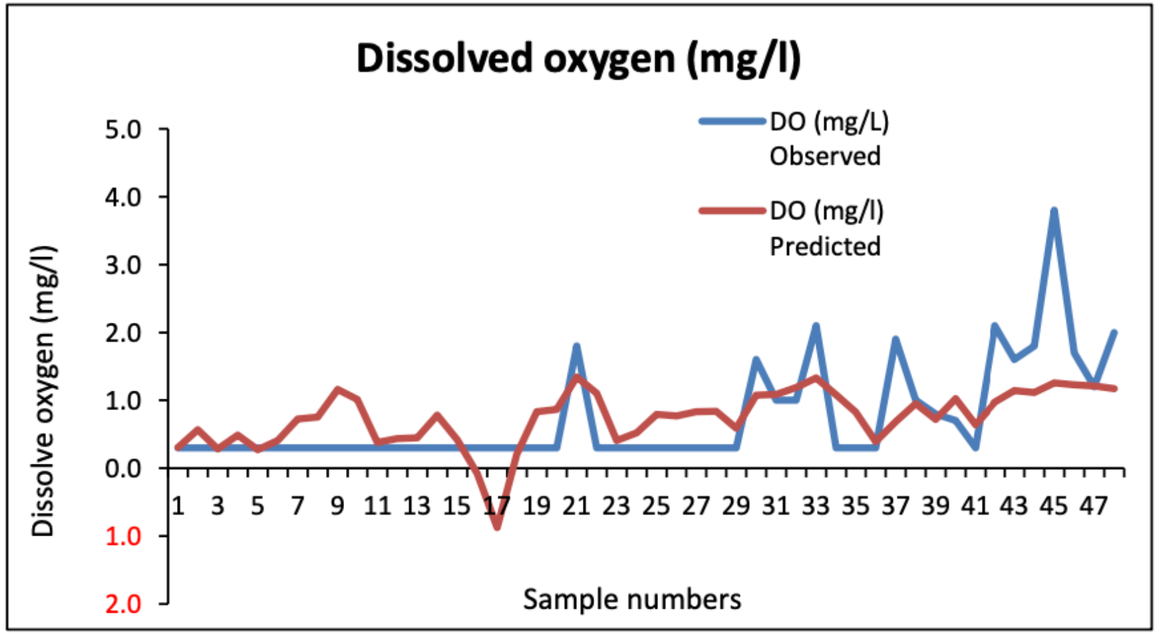
DO = -0.538 pH -0.091 BOD + 5.6

Multiple R	0.54883331
R Square	0.301218002
Adjusted R Square	0.270161024
Observations	48

	df	SS	MS	F	Significance F
Regression	2	8.21063795	4.10531897	9.69888328	0.00031454
Residual	45	19.0474871	0.42327749		
Total	47	27.258125			

	Coefficients	t Stat	P-value
Constant	5.60784920	1.64727161	0.106468735
pH	-0.5381417	-1.18858761	0.240836853
BOD	-0.0919731	-4.21384306	0.000119143

Regression *df*	Residual *df*	Fobserved	F critical at 5% level of significance	F critical at 10% level of significance
2	45	9.698	3.204	2.425



S. No.	Independent Variables	t observed	t critical at 5%	t critical at 10%	t critical at 20%	t critical at 25%	t critical at 30%	t critical at 40%	t critical at 45%
1	pH	-1.188	1.677	1.30	0.850	0.680	0.528	0.254	0.126
2	BOD	-4.213	1.677	1.30	0.850	0.680	0.528	0.254	0.126

INDIVIDUAL ASSESSMENT

CURRENT STATUS

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SEWERAGE STATUS AND TREATMENT

Polluted River Stretch	Million Litres per Day (MLD)				Funding / implementing agency
	Sewage Generation	Existing STPs Capacity	Gap of sewage to be treated	Proposed STPs no & (MLD)	
Musi (P-I)	1960	772.3	1187	31 (1259.5)	Admn. sanction for 17 STPs with 376.5 MLD given under HAM

- HMWSSB engaged M/s Shah Technical Consultants to prepare Comprehensive Sewerage Master Plan in HUA upto ORR limit
- The projected Sewage Generation for the year 2021 is 1960MLD out of which the existing treatment capacity available is 772.3MLD
- The gap of 1187.7 MLD sewage flows through 185 drains and joins various water bodies which in turn joins River Musi

S.No	Name of the STP	Capacity (MLD)
1	Amberpet	339.00
2	Nagole	172.00
3	Nallacheruvu	30.00
4	Attapur 1	51.00
5	Attapur 2	23.00
6	Pedda Cheruvu, Nacharam	10.00
7	Miralam Tank 1	10.00
8	Miralam Tank 2	5.00
9	Durgam Cheruvu, SLP	5.00
10	Patel Cheruvu, Nacharam	2.50
11	Saroor Nagar	2.50
12	Langer House	1.20
13	Noor Mohammad Kunta	4.00
14	Safilguda, Malkajgiri	0.60
15	Khajakunta, Metro, KKP	12.00
16	Khajaguda, Gachibowli	7.00
17	Nanakramguda, Gachibowli	4.50
18	JVR Park, Nagarjuna Circle	0.50
19	Lingam Kunta, BHEL	30.00
20	Gopanapally, SLP	4.50
21	Khairathabad	20
22	Patigadda	30
23	Ragadhamuni cheruvu	5
24	Kishnakanth park	0.5
25	Pragathi nagar	2.5
	Total	**772.30**

TREATMENT AND DISPOSAL OF INDUSTRIAL EFFLUENTS

- In order to treat effluents of various industries in watershed of Musi, 4 common efficient treatment facilities viz. MANA CETP, IDPL, JETL, PETL have been operating to cover different industrial clusters in the Hyderabad city.
- The CETPs have installed the OCEMS and are connected to the CPCB and TSPCB servers

S. No.	Name of the Facility	Type of Treatment	Capacity	Member industries	Status
3	M/s.MANA Treatment Plant Ltd., / M/s Indwa Technologies Pvt. Ltd., Mallapuram (V), Uppal (M), Medchal District.	The CETP receiving the Low TDS industrial and domestic effluents from 48 member industries from IDA Mallapur, 37 member industries from IDA Nacharam and 48 member industries from other areas.	2000 KLD	137 Nos.	In operation Meeting the discharge standards.
4	M/s.Patancheru Effluent Treatment Plant, Patancheru, Hyderabad.	LTDS effluent is treated by Chemical methods followed by Membrane bio-reactor	LTDS-3000 KLD	135 Nos.	In operation Meeting the discharge standards.

S. No.	Name of the Facility	Type of Treatment	Capacity	Member industries	Status
1	M/s.Jeedimetla Effluent Treatment Plant, Jeedimetla, Hyderabad.	LTDS- Chemical followed by biological treatment HTDS-MEE	LTDS-1500 KLD HTDS-200 KLD	300 Nos.	In operation Meeting the discharge standards.
2	M/s.Indian Drugs and Pharmaceuticals Ltd, Balanagar, Hyderabad.	Waste water of industries from Food Processing, Formulation Units, Oil Extraction Units etc. located in Hyderabad and Mahaboobnagar Districts and sewage generated from IDPL Hostel and township.	700 KLD	83 Nos.	In operation Meeting the discharge standards.

- The treated wastewaters from CETPs are further being treated along with domestic sewage in STPs.
- The treated sewage from STPs is being disposed into Musi River, after meeting the standards

INDIVIDUAL ASSESSMENT

SURVEY

HYDRO INFORMATICS

INTERVIEW WITH STAKEHOLDERS

“In the 1970s and 1980s, this area was covered with fields. After that, during the period of the then local public representative, Sarojini Pulla Reddy who also previously served as the Mayor of Hyderabad, there were public latrines constructed all around the river.Post that, the community halls and houses came up. And during the local public representative leader Indra Sena Reddy’s tenure, he helped build a dedicated space for the washerfolk community to carry on their traditional occupation of washing clothes. All this was vacant space along the river and houses came up slowly. But the floods and pollution also destroyed everything.”

“Right from Chanchalguda (a particular place in Hyderabad) , all the bathukammas (the flower arrangements made by women) are brought to the neighborhood of Moosa Nagar along the river where women dance together during the festival and then leave the bathukammas into the Musi river. All of this has stopped now.”

“When we were young, women from Azampura and Malakpet (two places from Hyderabad) would come here along the river to come and enjoy Bathukamma and leave flowers in the river. It used to be such joy. The nights would feel like day. And it was divine (Mashallah).”

INDIVIDUAL ASSESSMENT

INITIATIVES TAKEN

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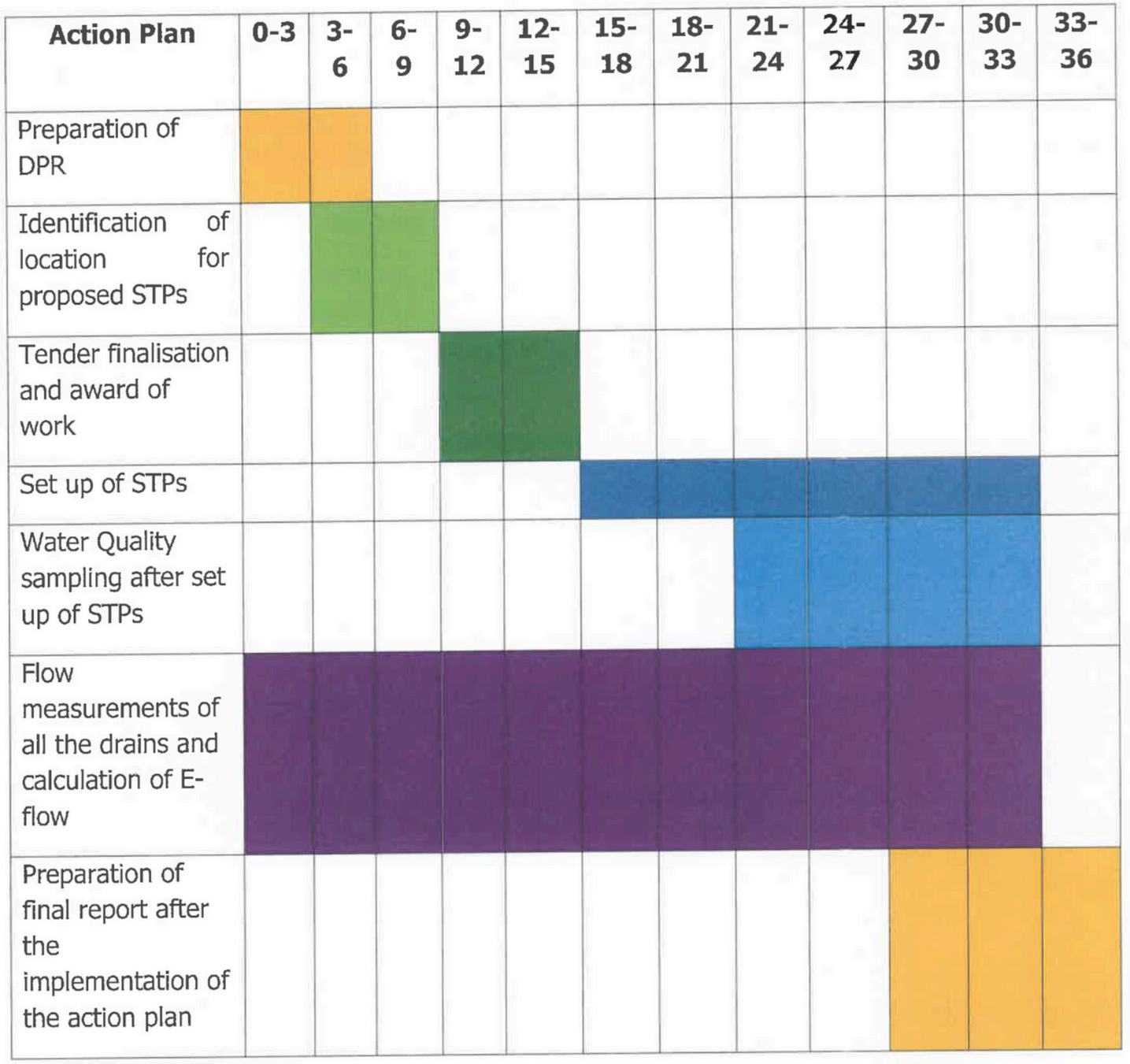
ACTION PLAN

Restoration of Musi River



Action Plan	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	24-27	27-30	30-33	33-36
Preparation of DPR												
Identification of location for proposed STPs												
Tender finalisation and award of work												
Set up of STPs												
Water Quality sampling after set up of STPs												
Flow measurements of all the drains and calculation of E-flow												
Preparation of final report after the implementation of the action plan												

INITIATIVES - ACTION PLAN

01 NEW SEWAGE TREATMENT PLANTS

02 IN-SITU TREATMENT

03 CO-TREATMENT OF SEPTAGE AT EXISTING STP'S FOR ORR AREAS

04 FAECAL SLUDGE TREATMENT PLANTS AT PROPOSED STP SITES

05 INSTALLATION OF OCEM'S AT ALL EXISTING STP'S

06 RIVER-FRONT ACTIVITIES

07 REMOVAL OF ENCROACHMENTS

SEWAGE TREATMENT PLANTS

- The Government has accorded administrative sanction for one package for construction of 17 STPs with a capacity of 376.5 MLD

Sl.No.	Location of the proposed STP	Capacity (in MLD)
1	Ambar Cheruvu, Pragathi Nagar	37.00
2	Chinna Maisamma Cheruvu	14.50
3	Nalla Cheruvu, Kukatpally	15.00
4	Khajakunta	22.00
5	Yellammakunta Lake, Jaya Nagar	13.50
6	Fathe Nagar	100.00
7	Vennelagadda	5.00
8	Gayatri Nagar, Chintal	5.00
9	Fox Sagar Lake	14.00
10	Shivalaya Nagar Cheruvu	14.00
11	Pariki Cheruvu, Kandri Gutta	28.00
12	Miyapur Patel Cheruvu	7.00
13	Gangaram Cheruvu	20.00
14	Mullakathuva Cheruvu	33.50
15	Kamuni Cheruvu	20.00
16	Durgam Cheruvu	7.00
17	Khajaguda	21.00
	Total	**376.5**

IN-SITU TREATMENT

- HMWSSB has identified a gap of 1174 MLD of sewage flowing through 185 drains to water bodies.

- They have issued a work order for preparation of a DPR for in-situ remediation of drains leading to the river Musi.

- HMWSSSB has submitted a proposal of Rs.528.30 Crores for taking up in-situ remediation of 1174 MLD sewage at Rs.45 Lakh per MLD to Government.

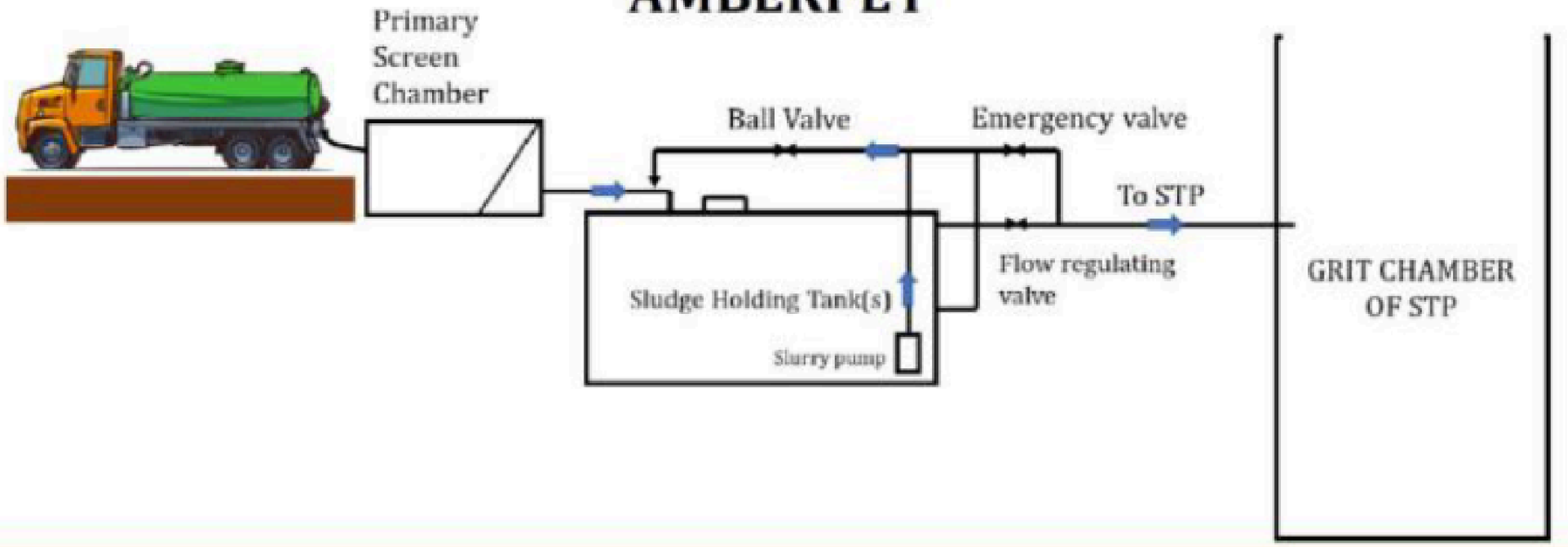
GHMC

TOWARDS ODF++

HMWSSB
HYDERABAD METROPOLITAN
WATER SUPPLY & SEWERAGE BOARD

FAECAL SLUDGE AND SEPTAGE MANAGEMENT FACILITY

AMBERPET



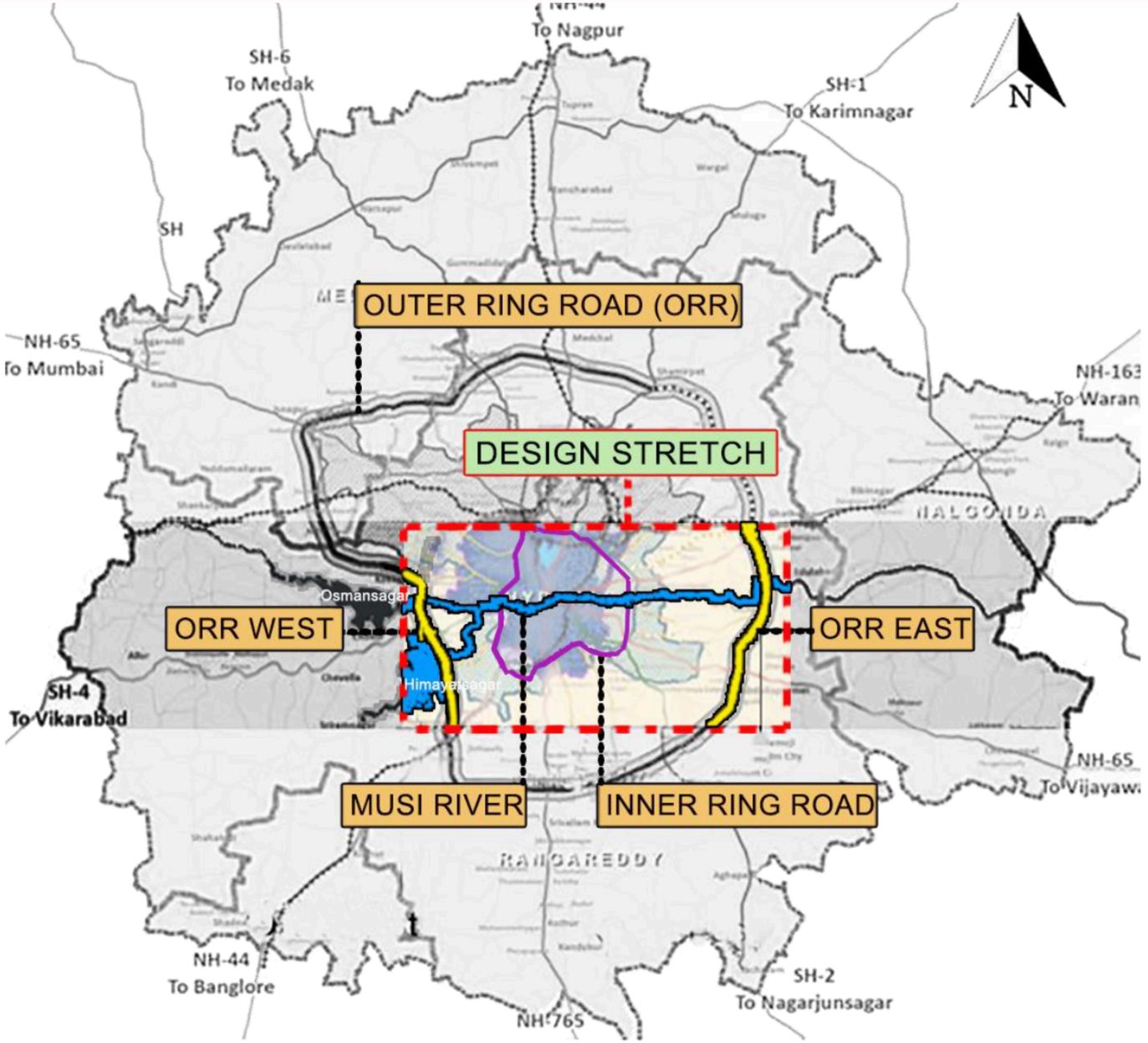
MUSI RIVER REVITALIZATION PROJECT

The project for Musi Revitalization along the entire river
corridor of 57.5 kms is conceived over 3 Scales and
time lines:

- The **Launch:** A six- month project from the time
  of finalization of designs to revitalize 3km stretch
  of the Musi riverfront in the historic precinct in
  the core of the city.

- The **Landmark:** Concept plan for a two year
  transformation for the river corridor of 54.5 kms.

- The **Legacy:** Strategies that sustain and protects
  the river, communities and environment along the
  entire corridor.



INDIVIDUAL ASSESSMENT

POTENTIAL SOLUTIONS

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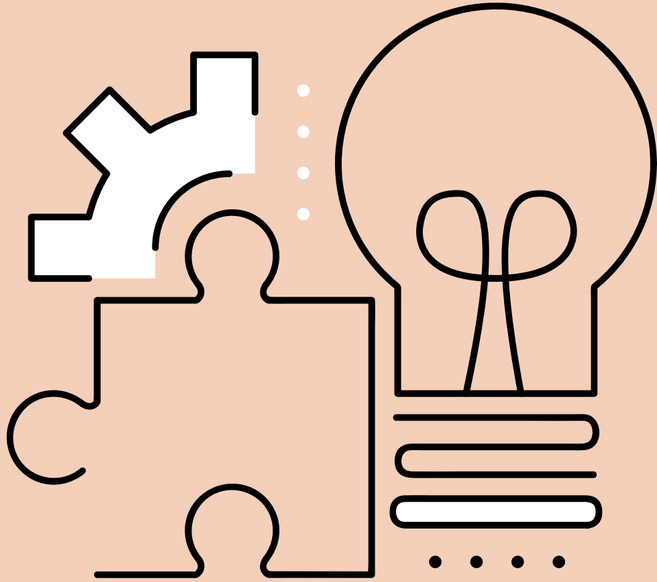
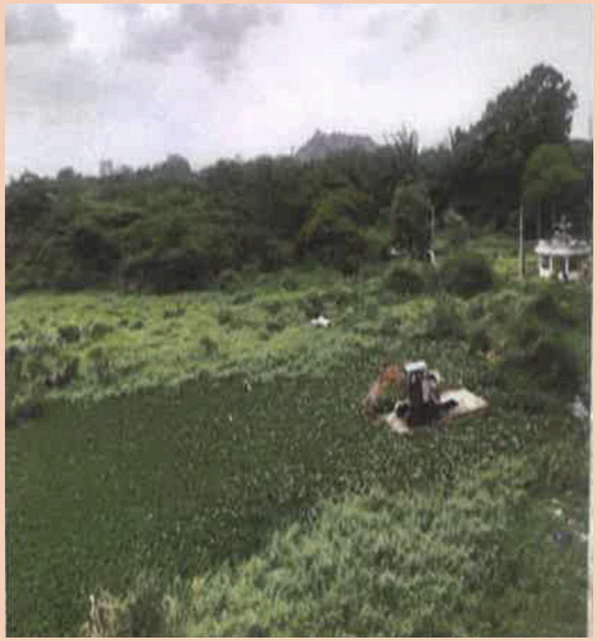
POTENTIAL SOLUTIONS



- Removal of Juliflora,Shrubs and Silt for free flow of River without Stagnation
- Removal of Water Hyacinth at Ziaguda
- Clearing Debris & Shrubs between Salarjung Bridge to Chaderghat Bridge which could potentially avoid Floods
- **STORM-WATER MANAGEMENT**
- **COMMUNITY ENGAGEMENT AND AWARENESS**
- **SOURCE CONTROL MEASURES**
- **ECOLOGICAL RESTORATION**



INDIVIDUAL ASSESSMENT

CHALLENGES

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CHALLENGES

1. **Water contamination :** Slums and informal settlements lack adequate sanitation infrastructure and waste from these settlements flows into the river through storm water drains. The sources of industrial effluents are difficult to track, as informal industries are scattered through the city. It is difficult to monitor or enforce regulations and they may be costly and burdensome for informal sector firms.
2. **Laws and Regulations:** While India has fairly strong environmental conservation laws and regulations at the national, state and municipal level, including the Environment Protection Act, 1986 and the Water Act, 1974, enforcement is weak. Unauthorized construction activities are rampant, as enforcement capacity is limited
3. **Slum Communities and Livelihoods:** Poor migrants lack access to formal housing & land and typically settle on marginal or public lands such as riverbanks. The challenge is to minimize the loss of homes and livelihoods and balance environmental protection and sustainability concerns with the welfare of the city's poor and vulnerable.
4. **The Road:** An elevated road linking the Eastern and Western ends of the extended Hyderabad metropolitan area is a core element of the Government's requirements for the Musi River Corridor.The challenge is to the integrate the critical transport component with the larger vision for a sustainable, revitalized Musi River

INDIVIDUAL ASSESSMENT

THANK YOU

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