INDUSTRIAL TRAINING MINI PROJECT PRESENTATION

Mohd Haziq bin Mohd Fazi

UiTM Pasir Gudang (Diploma in Chemical Engineering)

Department of Environment Negeri Sembilan

19th February 2018-15th June 2018

MINI PROJECT PRESENTATION OUTLINE

1. Industrial Training Placement Schedule
2. Industrial Training Activities
3. Introduction To Industrial Training Mini Project
4. Water Quality Index Classification

MINI PROJECT PRESENTATION OUTLINE

5. Uses of The Classes of Water

6. Parameters of The Water Quality Index

7. Introduction to Malacca River Water Basin

8. Location of The Malacca River Water Basin

MINI PROJECT PRESENTATION OUTLINE

9. Trend of The WQI Parameters for Malacca River Basin (2012-2016)

INDUSTRIAL TRAINING PLACEMENT SCHEDULE

1. INDUSTRIAL TRAINING PLACEMENT SCHEDULE

TARIKH	19/02-02/03	05/03-16/03	19/03-30/03	02/04-13/04	16/04-27/04	30/04-11/5	14/05-25/05
UNIT	Lesen & Pendidikan	Pengawasan & BTM	PAT & Notifikasi	NSU	NSB	EIA & Post EIA	Aduan & Kontigensi

INDUSTRIAL TRAINING ACTIVITIES

2. INDUSTRIAL TRAINING ACTIVITIES

WEEK 1 ➡ WEEK 2

- Reporting in to the Department of Environment Negeri Sembilan.
- Having a short briefing session regarding the industrial training placement schedule as well as the functions of each department present by the supervisor.
- Experienced the emission control from diesel engine procedure by the ***Motorized Vehicle, Asset and Technical Store Unit*** at Sendayan ValleyTech.
- Prepare a progress report for the Annual Year Report 2017.
- Follow the ***Licensing Unit*** to ***Kualiti Alam Sdn Bhd*** and attended a meeting together with ***Department of Occupational Safety and Health (DOSH)*** and ***Fire Hazmat (Hazardous Material) Team*** regarding the safety issues at the plant. (e.g.: CCTV and Emergency Respond Command Centre).


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2. INDUSTRIAL TRAINING ACTIVITIES

WEEK 3 ➡ WEEK 4

- Attend an exhibition of Department of Environment in a launching ceremony of SK and SMK Warisan Puteri inaugurated by Menteri Besar Negeri Sembilan.
- Going for emission control from diesel engine inspection on lorries that carried scheduled waste at Sendayan ValleyTech
- Prepare a progress report for the Annual Year Report 2017.
- Patrolling the area around Tampin, Kuala Pilah and Port Dickson to identify any vehicles that emit an excessive amount of exhaust gaseous.
- Having an enforcement visit together with ***NSU Unit*** to several factories located in Nilai to identify the effectiveness and the overall performance of the company in terms of the scheduled waste management as well as the water treatment system.


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2. INDUSTRIAL TRAINING ACTIVITIES

WEEK 5 ➡ WEEK 6

- Prepare a progress report for the Annual Year Report 2017.
- Having a visit to PUSPAKOM Seremban and enforcement patrolling to the workshops located in Taman Tunku Jaafar.
- Record the minute meeting for ***PAT & Notifikasi Unit*** regarding the licensing and development in the area of Nilai, Tampin and Jelebu.
- Testing out the quality of groundwater located in Kualiti Alam Sdn Bhd and Senawang for several parameters (e.g.: ***temperature, pH, NH_4^+, NH_3*** and ***turbidity***).
- Going for groundwater sampling located in Kualiti Alam Sdn Bhd and Senawang.
- Send the groundwater sample to Department of Chemistry to test out the sample for the respective parameter (e.g.: ***Biochemical Oxygen Demand*** and ***Chemical Oxygen Demand***)


JABATAN ALAM SEKITAR MALAYSIA
Stesen Pemantauan Kualiti Air Tanah
JABATAN ALAM SEKITAR
KEMENTERIAN SUMBER ASLI DAN ALAM SEKITAR
LEVEL 1-4, PODIUM 2 & 3
WISMA SUMBER ASLI NO. 25
PERSIARAN PERDANA, PRECINT 4
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62574 PUTRAJAYA, MALAYSIA
STESEN ID : MW(7)-N5-1-7.55
N -2° 39' 53.62"
E - 101° 49' 46.36"


Stesen Pemantauan Kualiti Air Tanah
JABATAN ALAM SEKITAR

2. INDUSTRIAL TRAINING ACTIVITIES

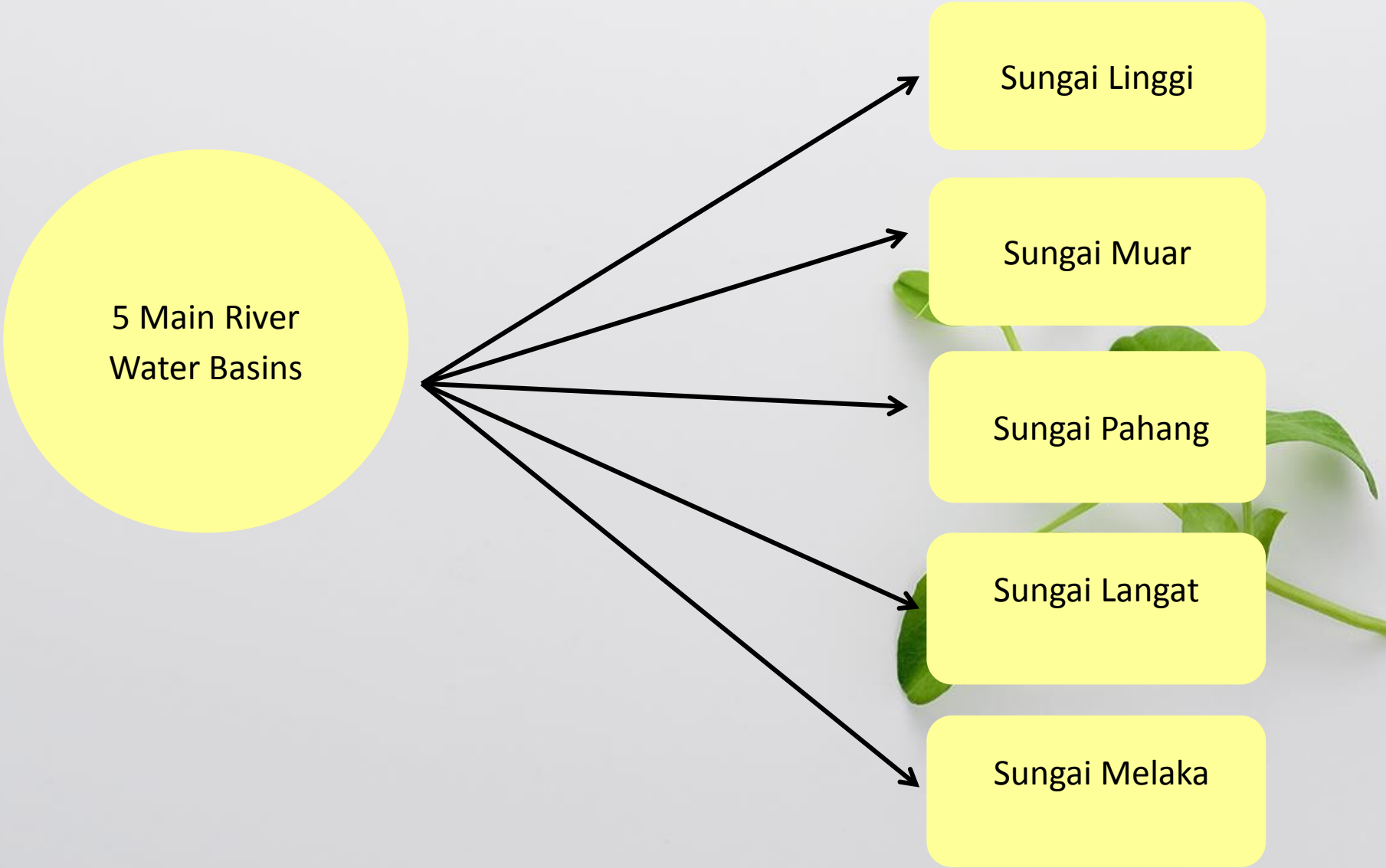
WEEK 7 ➡ WEEK 8

- Transferred to ***Negeri Sembilan Utara (NSU) Unit***.
- Going for collection of industry effluent together with Negeri Sembilan Barat (NSB) and send the effluent sample to the Department of Chemistry.
- Register and submit the application of new members of Rakan Alam Sekitar (RAS).
- Going for river water modelling and collect the river water sample at each point along the river.
- Going for surveying the topography and the surrounding area together with ***EIA Unit*** for the opening of new quarry.
- Going and visited some of the facilities present in Kualiti Alam Sdn Bhd such as ***clinical waste treatment centre***, ***physical-chemical treatment plant***, ***solidification plant*** and ***secured landfill*** for the purpose of license renewal.

INTRODUCTION TO INDUSTRIAL TRAINING MINI PROJECT

(RIVER WATER QUALITY INDEX STATUS IN NEGERI SEMBILAN)

3. INTRODUCTION TO INDUSTRIAL TRAINING MINI PROJECT



WATER QUALITY INDEX CLASSIFICATION

4. WATER QUALITY INDEX CLASSIFICATION

PARAMETERS	UNIT	CLASSES				
		I	II	III	IV	V
Ammoniacal Nitrogen ***(NH_3N)***	mg/l	< 0.1	0.1 - 0.3	0.3 – 0.9	0.9 – 2.7	> 2.7
Biochemical Oxygen Demand ***(BOD_5)***	mg/l	< 1	1 - 3	3 – 6	6 – 12	> 12
Chemical Oxygen Demand ***(COD)***	mg/l	< 10	10 - 25	25 – 50	50 – 100	> 100
Dissolved Oxygen ***(DO)***	mg/l	> 7	5 - 7	3 – 5	1 – 3	< 1
pH	-	> 7	6 - 7	5 - 6	< 5	> 5
Total Suspended Solid ***(TSS)***	mg/l	< 25	25-50	50 - 150	150 - 300	> 300
Water Quality Index (WQI)		≥ 92.7	≥ 76.5 < 92.7	≥ 51.9 < 76.5	≥ 31.0 < 51.9	< 31.0
Category		Very Clean	Clean	Slightly Clean	Polluted	Very Polluted

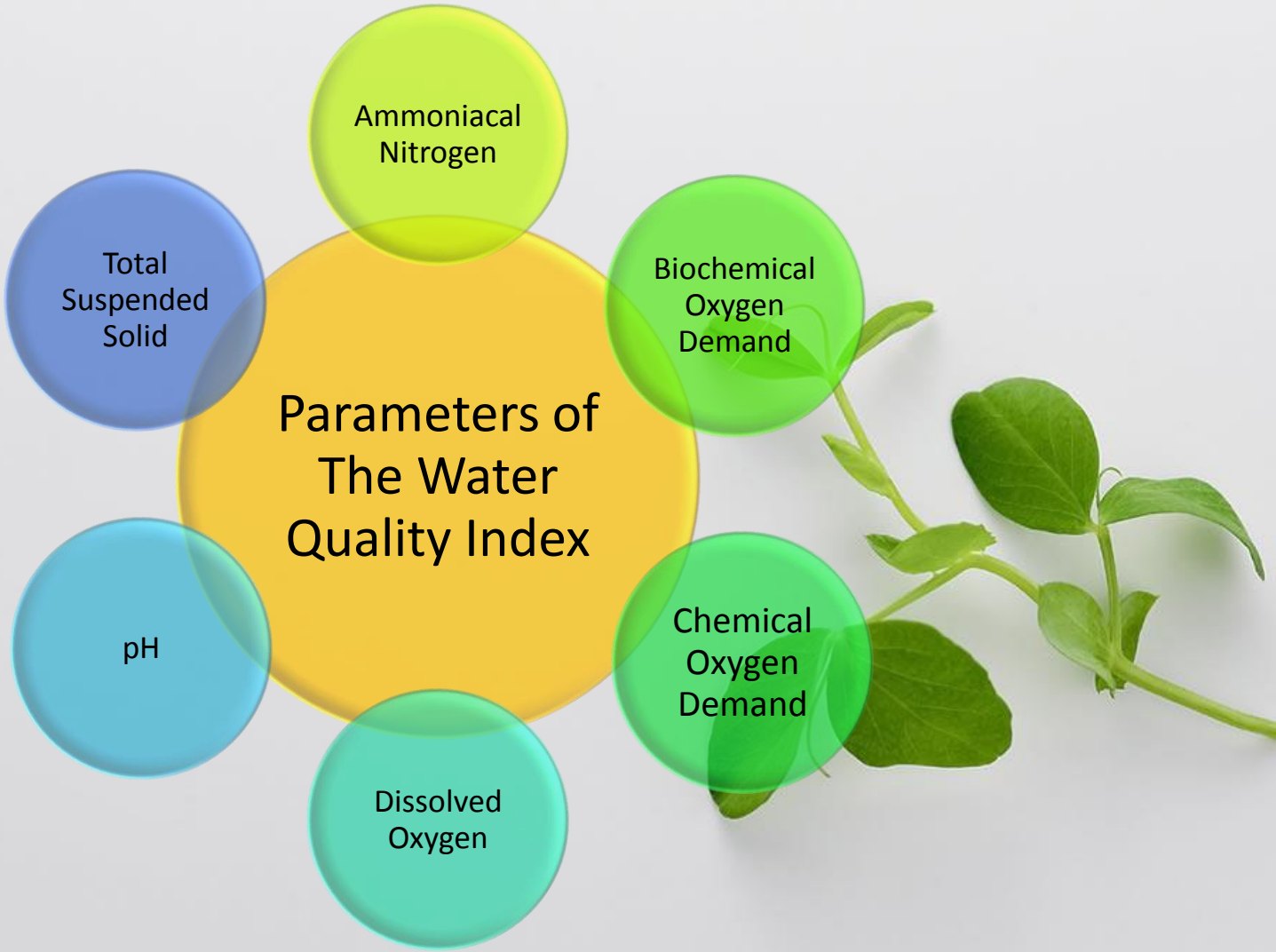
USES OF THE CLASSES OF WATER

5. USES OF THE CLASSES OF WATER

CLASSES	USES
I	• Conservation of natural environment • Water supply I – Practically no treatment necessary needed • Fishery I – Very sensitive aquatic species
II	• Water supply II – Conventional treatment required • Fishery II – Sensitive aquatic species • Recreational uses with body contact
III	• Water supply III – Extensive treatment required • Fishery III – Common of economic value, and tolerant species; livestock drinking
IV	• Irrigation
V	• None of the above

PARAMETERS OF THE WATER QUALITY INDEX

6. PARAMETERS OF THE WATER QUALITY INDEX



6. PARAMETERS OF THE WATER QUALITY INDEX

Ammoniacal Nitrogen

- A compound which consists of the combination between ***NH_3*** and ***N*** molecule
- Measure for the ***concentration of nitrogen*** in water.
- A toxic pollutant that can be found in:
  I. Landfill leachate
  II. Waste product such as sewage and animal manure

Advantages of ammoniacal nitrogen:

- Essential component for the formation of proteins for cell growth

Disadvantages of ammoniacal nitrogen:

- May lead to eutrophication
- Might cause methemoglobinemia in infants

6. PARAMETERS OF THE WATER QUALITY INDEX

Biochemical Oxygen Demand

- Refers to the amount of dissolved oxygen needed for the breaking down of organic material present by an aerobic biological organism.
- Indicate the amount of putrescible organic matter (e.g.: **sugar, cellulose, sewage** and **food waste**) in water.

BOD Level (in ppm)	Water Quality
1-2	**Very good** (There will be not much organic waste present in water)
3-5	**Fair : Moderately Clean**
6-9	**Poor : Somewhat polluted** (Indicates organic matter is present and bacteria is decomposing the waste)
100 or greater	**Very Poor : Very Polluted** (Contains organic waste)

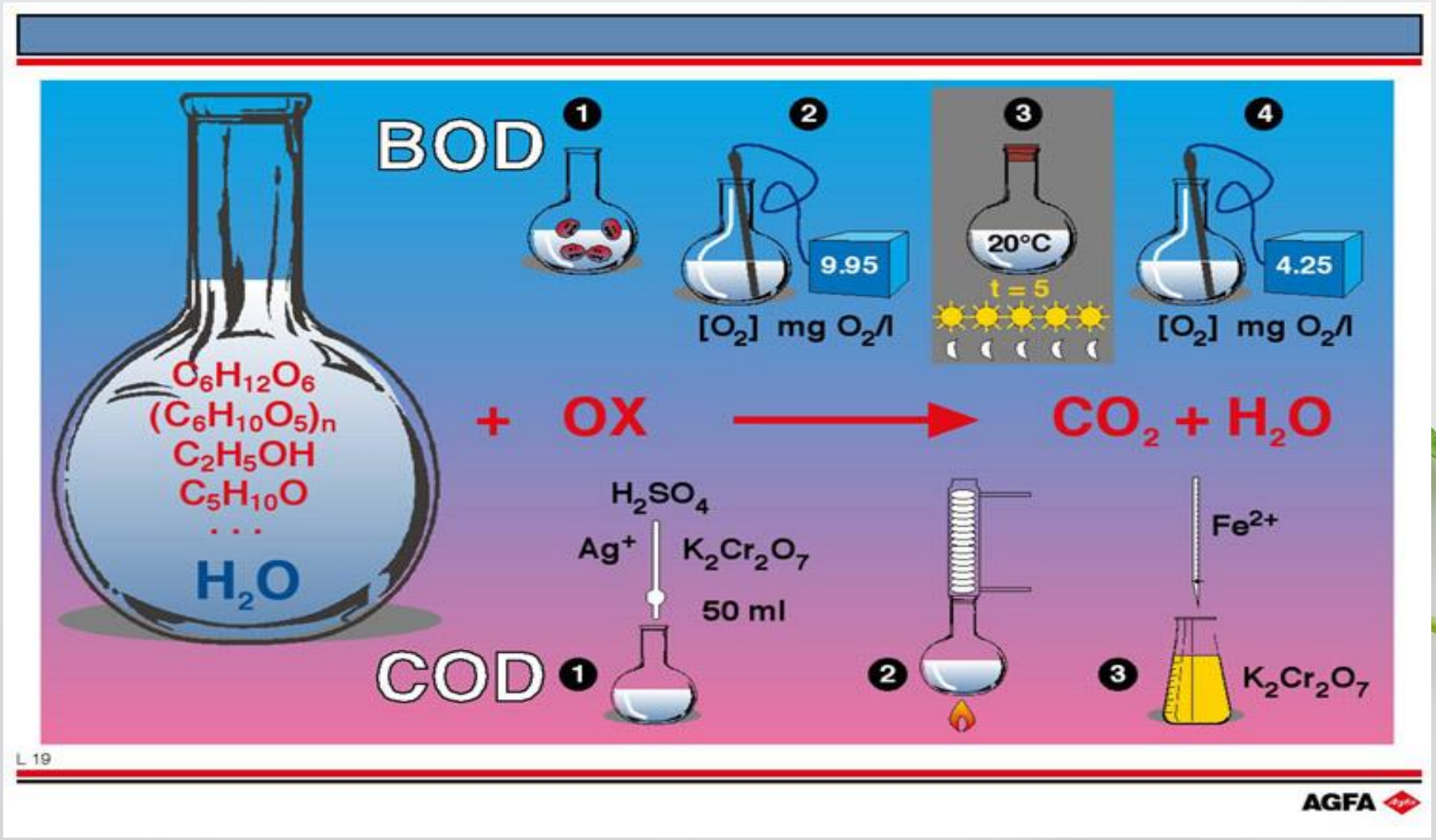
(Source: www.polyseed.com/misc/BODforwebsite.pdf)

6. PARAMETERS OF THE WATER QUALITY INDEX

Chemical Oxygen Demand

- Refers to the capacity of the water to consume oxygen during
  I. Decomposition of organic matter
  II. Oxidation of inorganic matter such as ammonia (NH_3) and nitrite (NO_2^-)
- It is measured by a standard laboratory assay in which
  I. The closed water sample is **incubated.**
  II. Strong oxidizing agent such as potassium dichromate ($K_2Cr_2O_7$), potassium iodide (KI) or potassium permanganate ($KMnO_4$) is mixed together with boiling sulfuric acid (H_2SO_4) in **acidic** condition.
  III. The organic and inorganic matter present is determine by calculating the amount of oxidizing agent left
  IV. t = 2-3 hours

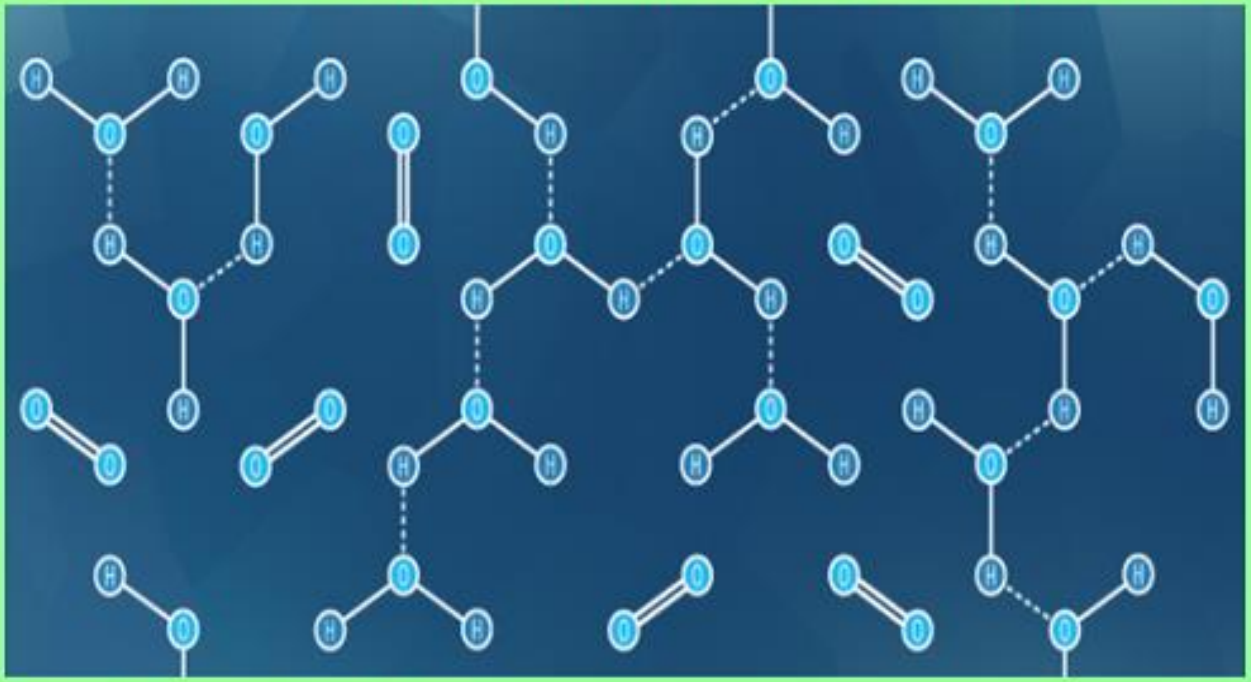
6. PARAMETERS OF THE WATER QUALITY INDEX



6. PARAMETERS OF THE WATER QUALITY INDEX

Dissolved Oxygen

- Refers to the level of free and non-compound oxygen present in water sources.



- An indication of how polluted the water sources.
- Dissolved oxygen is necessary for aquatic organisms such as **fish**, **invertebrates**, **bacteria** and even **plants**.

6. PARAMETERS OF THE WATER QUALITY INDEX

Dissolved Oxygen

- Dissolved oxygen enters the water by two main medium:
  I. Air
  II. Photosynthesis

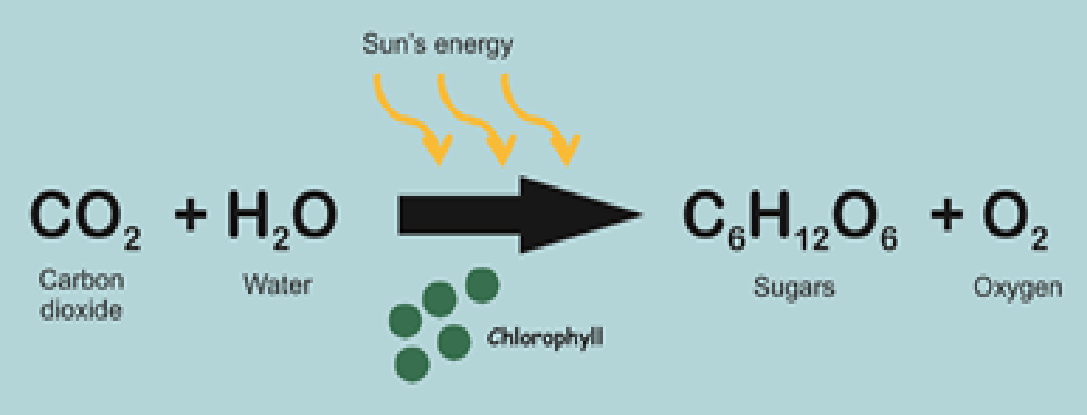
Dissolved Oxygen from Air

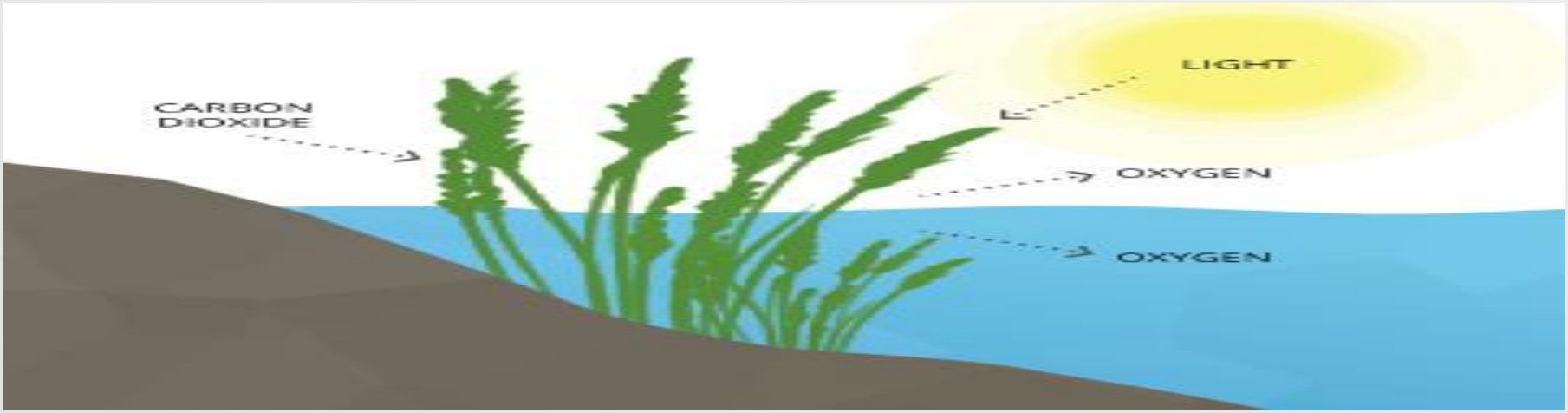
- Dissolved oxygen penetrates the water by air consists of two routes which is from the **atmosphere** as well as from **aeration.**
- Oxygen slowly diffuses across the water's surface from the atmosphere.
- Oxygen diffuses through aeration can be mixed together with water either through **man-made** (**hand-turned waterwheel** or **dam**) or **natural** (**rapids** and **waterfall**).

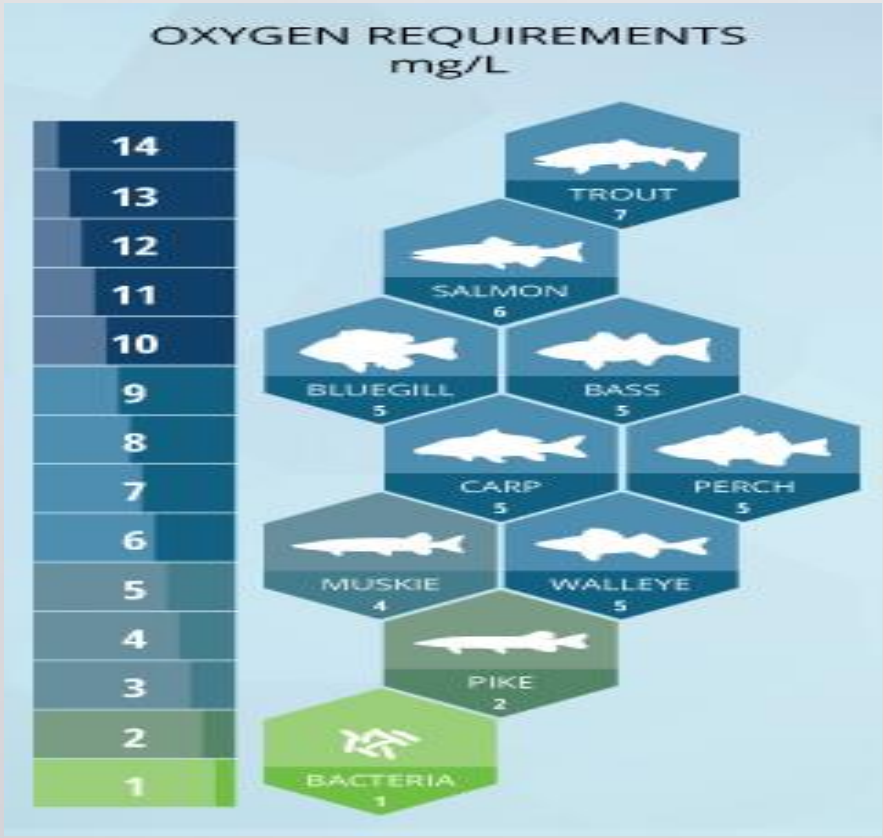
6. PARAMETERS OF THE WATER QUALITY INDEX

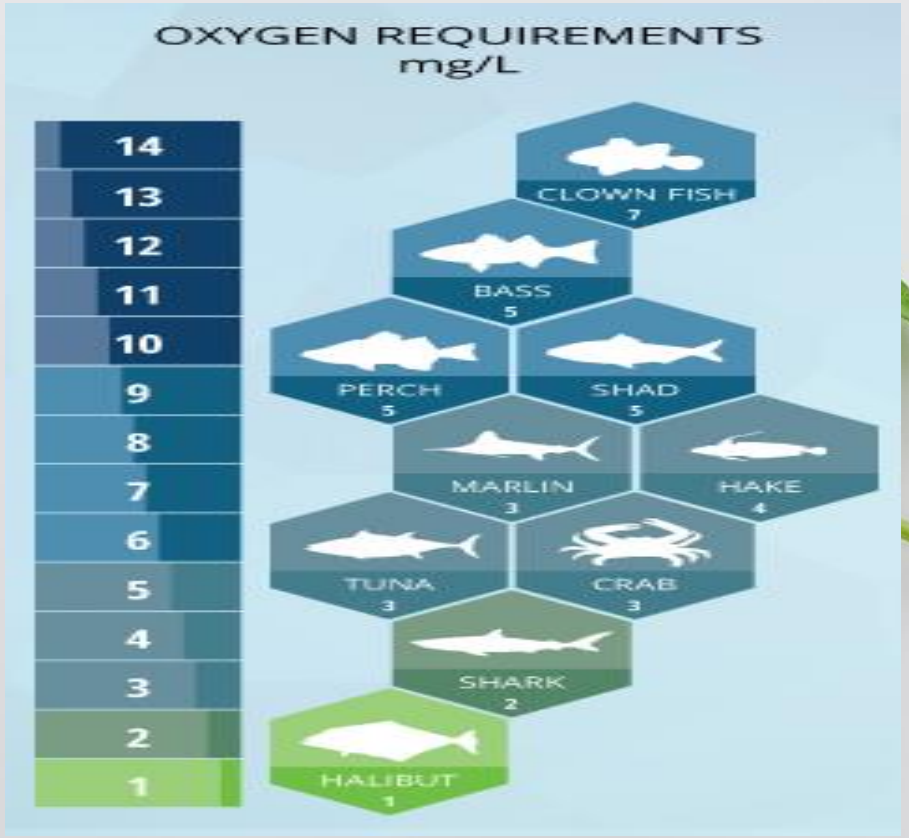
Dissolved Oxygen from Photosynthesis

- Photosynthesis can take place at the **surface of water** (by **shallow water plants** or **algae**) as well as **underwater** (**seaweed** and **phytoplankton**).
- Carbon dioxide (CO_2) which is mainly very soluble and readily absorbed in water produced oxygen (O_2) as the by product.
- The basic equation for photosynthesis is as follow:




CARBON DIOXIDE
LIGHT
OXYGEN
OXYGEN


OXYGEN REQUIREMENTS
mg/L
14
13
12
11
10
9
8
7
6
5
4
3
2
1
TROUT 7
SALMON 6
BLUEGILL 5
BASS 5
CARP 5
PERCH 5
MUSKIE 4
WALLEYE 5
PIKE 2
BACTERIA 1

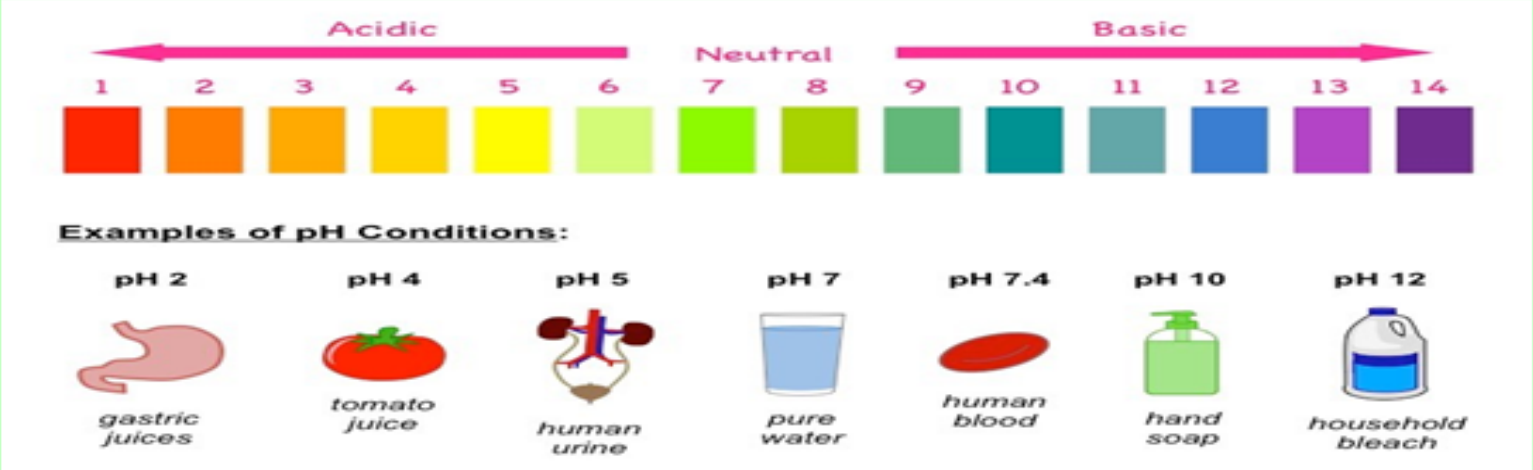

OXYGEN REQUIREMENTS
mg/L
14
13
12
11
10
9
8
7
6
5
4
3
2
1
CLOWN FISH 7
BASS 5
PERCH 5
SHAD 5
MARLIN 3
HAKE 4
TUNA 3
CRAB 3
SHARK 2
HALIBUT 1

6. PARAMETERS OF THE WATER QUALITY INDEX

pH

- Refers to the **potential of hydrogen ions, H^+** in a substance typically in aqueous substances.
- Indicate the **acidity** or **alkalinity** of a substance.
- Acid = Have a higher concentration of H^+ than OH^-
- Alkali = Have a lower concentration of H^+ than OH^-
- The equation for calculating pH is as follow:

$$pH = -\log_{10} [H^+]$$



6. PARAMETERS OF THE WATER QUALITY INDEX

Total Suspended Solid

- Refers to any **solid material** made up of **inorganic** and **organic compound** that are **suspended** and **larger** than **2 microns** in water.
- Example of suspended solid:

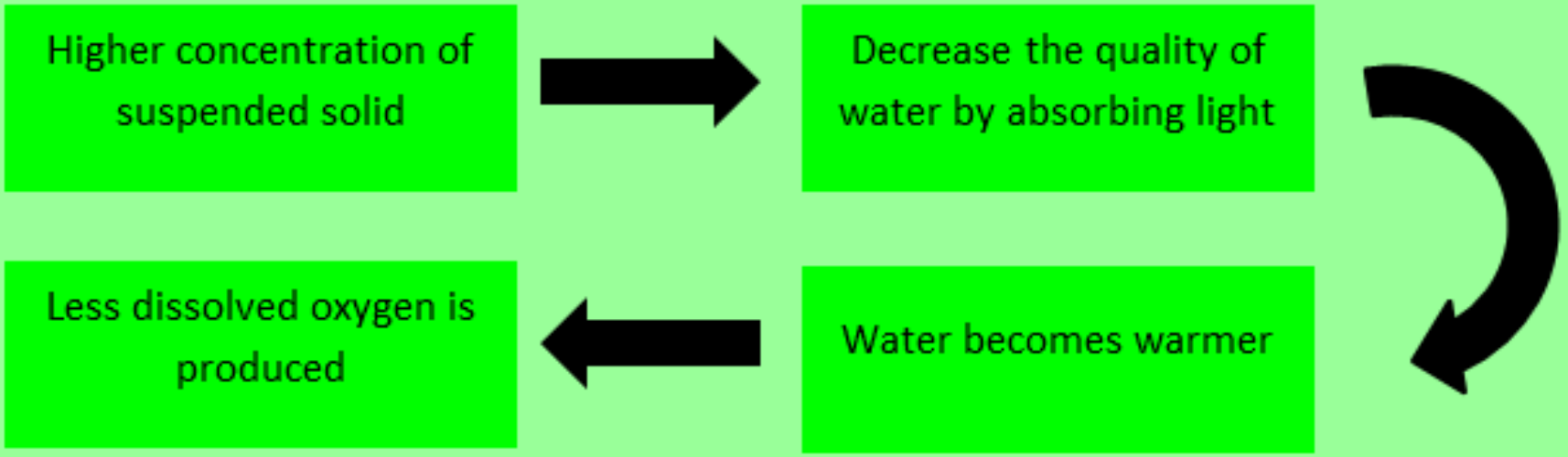
6. PARAMETERS OF THE WATER QUALITY INDEX

6. PARAMETERS OF THE WATER QUALITY INDEX

Disadvantages of Suspended Solid

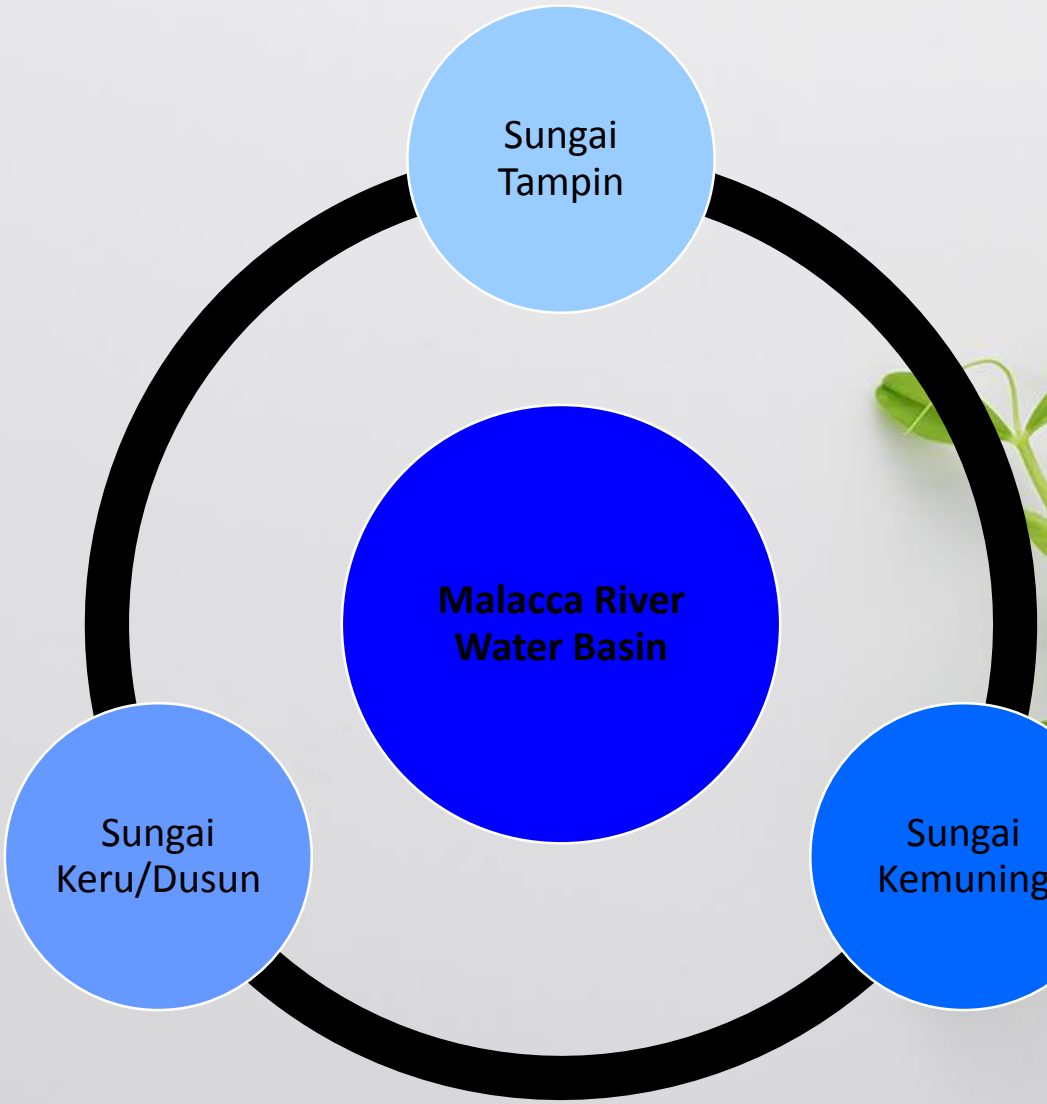
- There are several disadvantages of the presence of suspended solid in higher concentration that has been listed out such as:
  I. Clog fish gills and reduced its growth rate
  II. Smother fish eggs and aquatic insects
  III. Prevent egg and larval development

Effect of the Presence of Suspended Solid



INTRODUCTION TO MALACCA RIVER WATER BASIN

7. INTRODUCTION TO MALACCA RIVER WATER BASIN



LOCATION OF THE MALACCA RIVER WATER BASIN

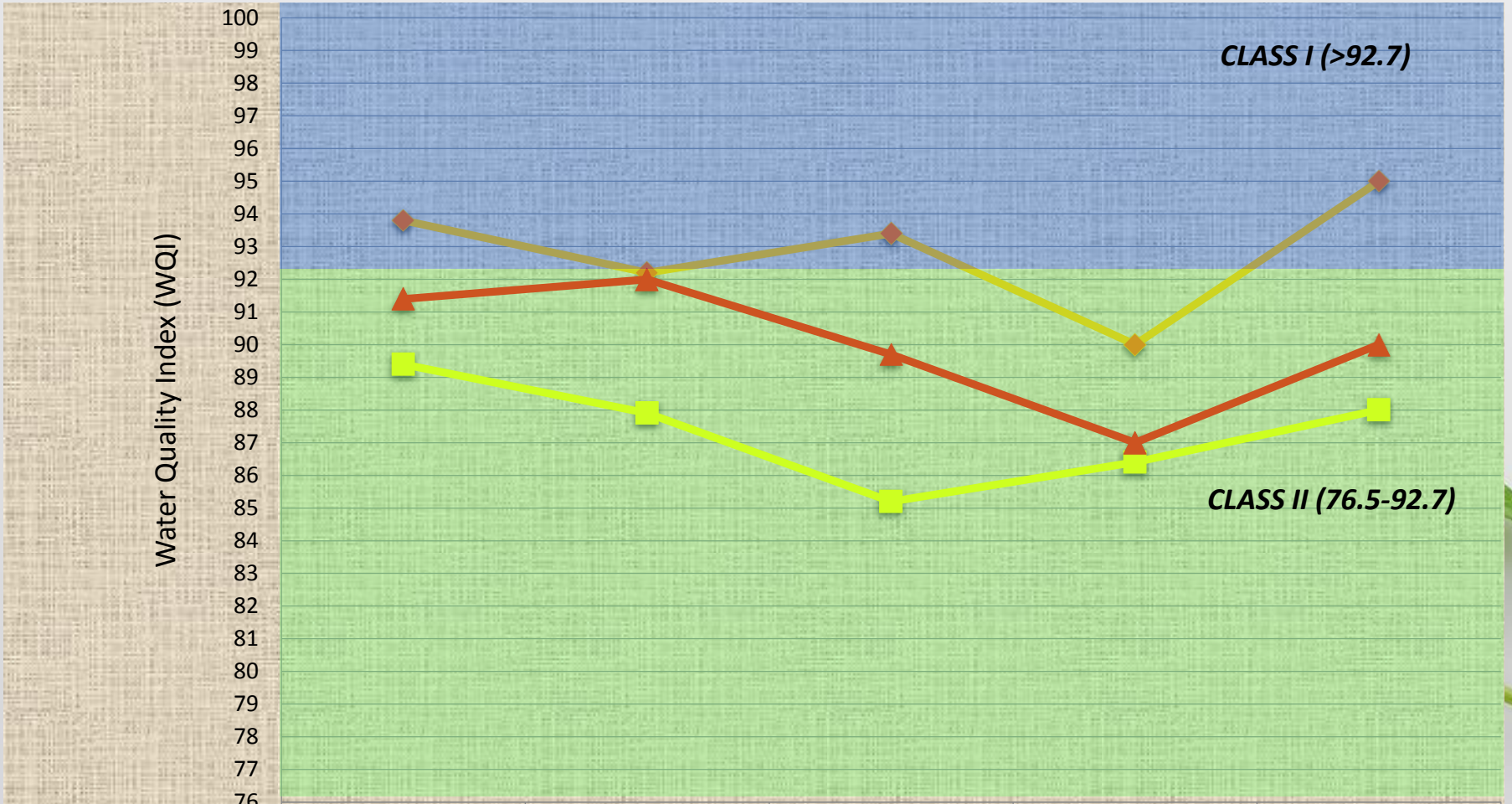
8. LOCATION OF THE MALACCA RIVER WATER BASIN

River Water Basin	River	Location	Longitude	Latitude
Malacca	Tampin	Hutan Rekreasi Gunung Tampin	E 102° 13.139′	N 02° 29.412′
	Kemuning	Jambatan Kampung Kemuning	E 102° 16.229′	N 02° 26.940′
	Keru	Jambatan Kampung Keru	E 102° 15.664′	N 02° 17.762′

TREND OF THE WATER QUALITY INDEX PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)

9.

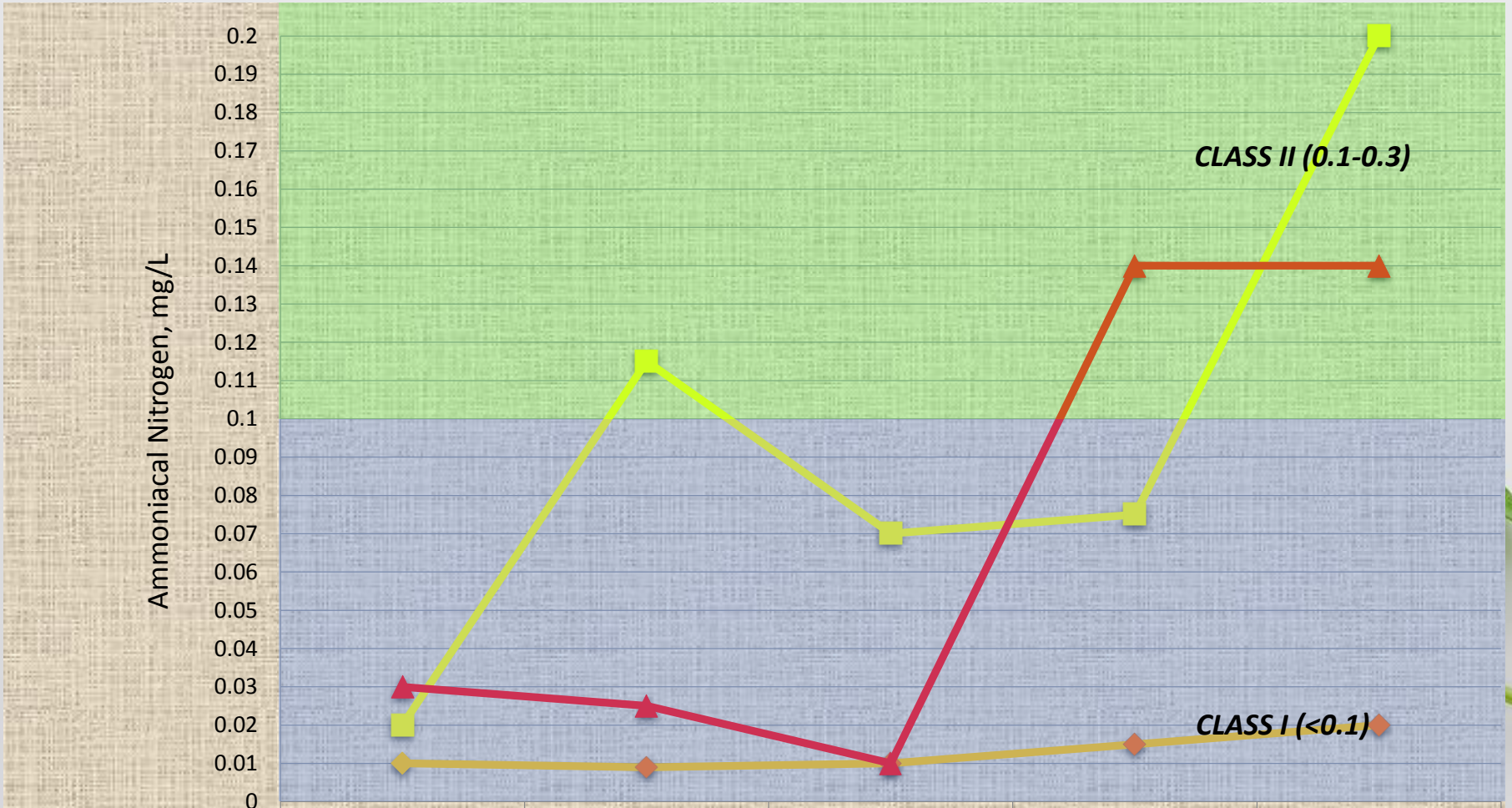
TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	93.8	92.2	93.4	90	95
Sungai Kemuning	89.4	87.9	85.2	86.4	88
Sungai Keru/Dusun	91.4	92	89.7	87	90

9.

TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	0.01	0.01	0.01	0.02	0.02
Sungai Kemuning	0.02	0.115	0.07	0.075	0.2
Sungai Keru/Dusun	0.03	0.025	0.01	0.14	0.14

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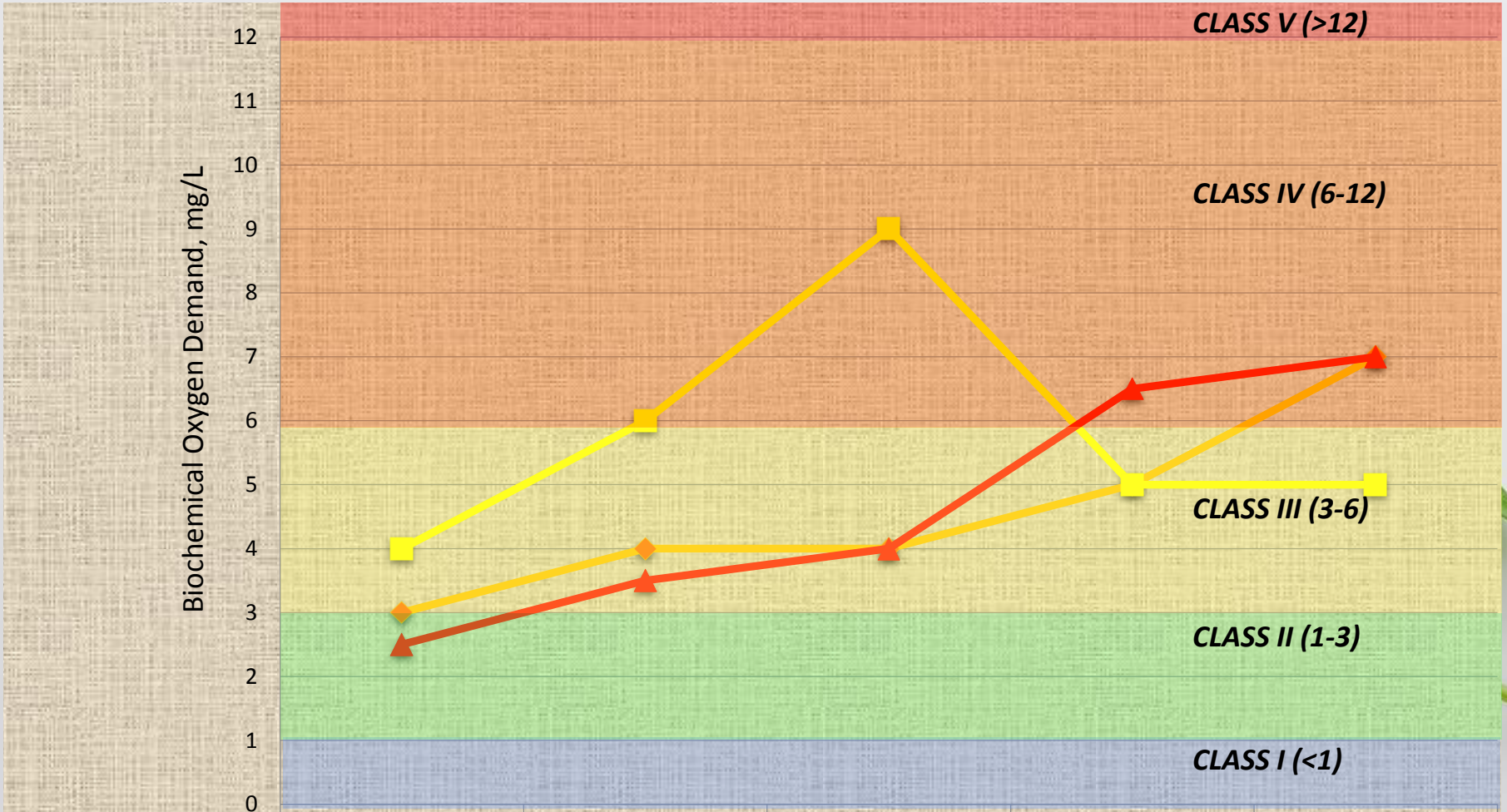
TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	3	4	4	5	7
Sungai Kemuning	4	6	9	5	5
Sungai Keru/Dusun	2.5	3.5	4	6.5	7

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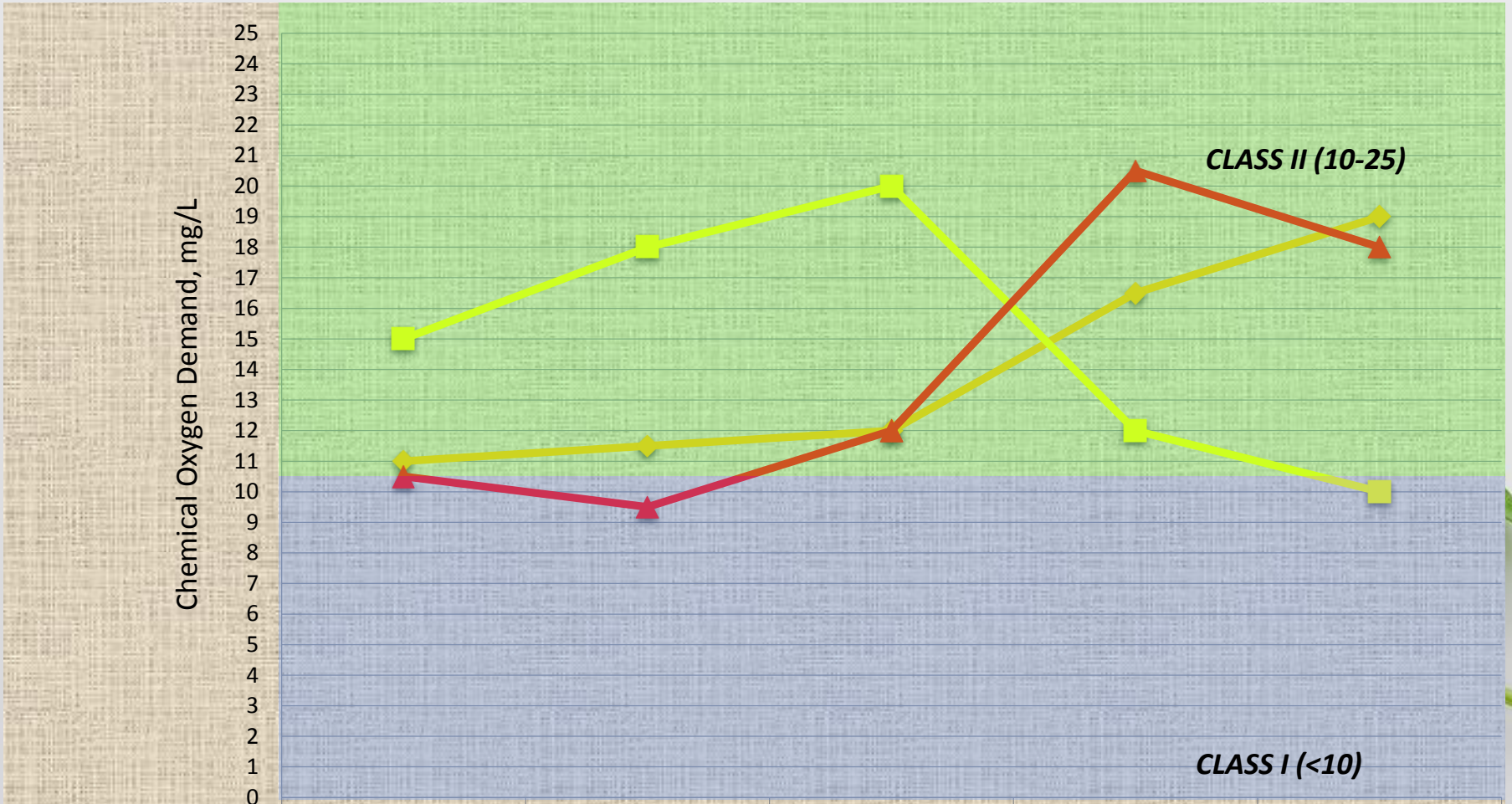
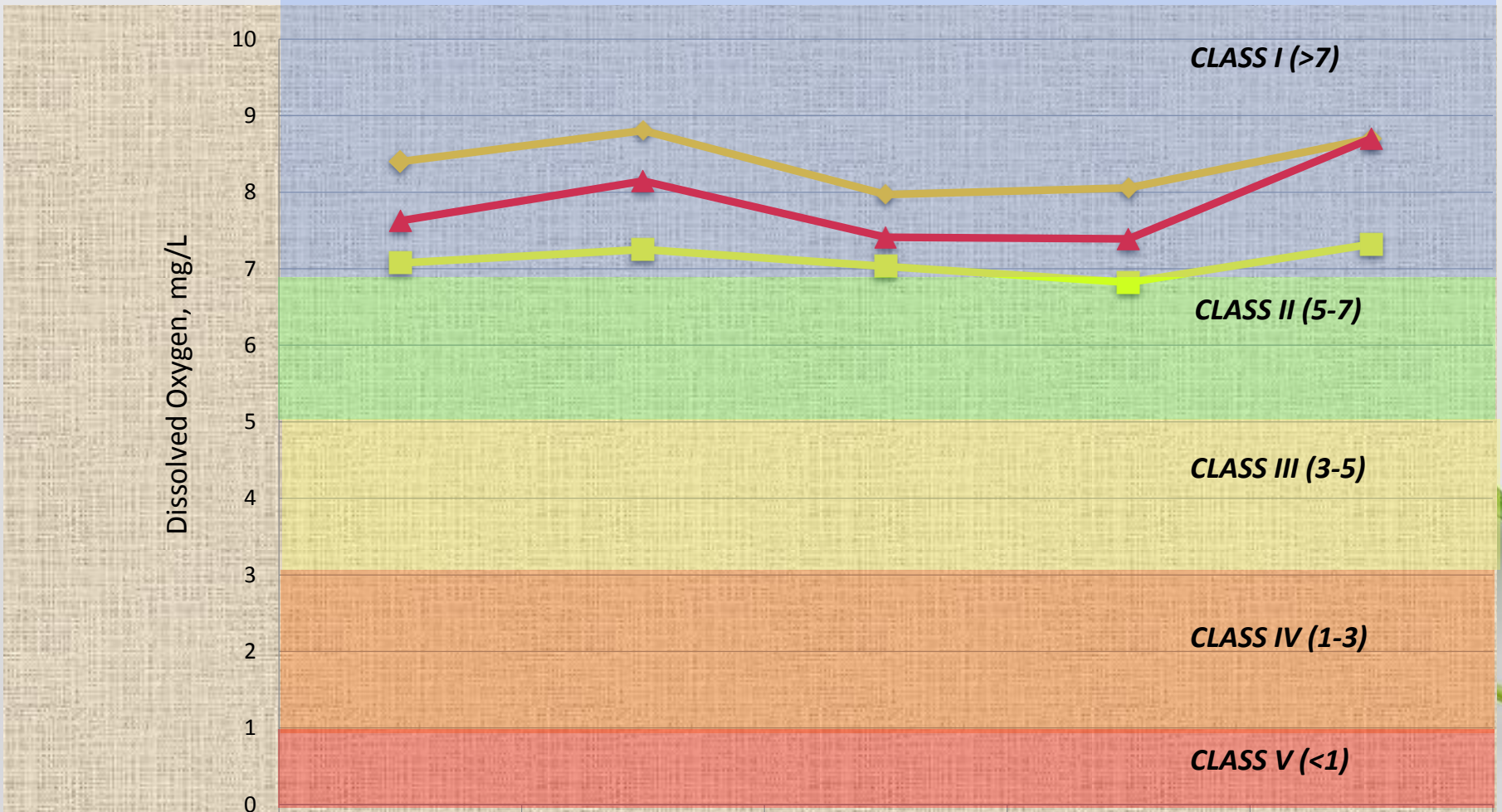
TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	11	12	12	16.5	19
Sungai Kemuning	15	18	20	12	10
Sungai Keru/Dusun	10.5	9.5	12	20.5	18

9.

TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	8.4	8.805	7.97	8.055	8.7
Sungai Kemuning	7.075	7.25	7.03	6.82	7.32
Sungai Keru/Dusun	7.625	8.145	7.41	7.39	8.7

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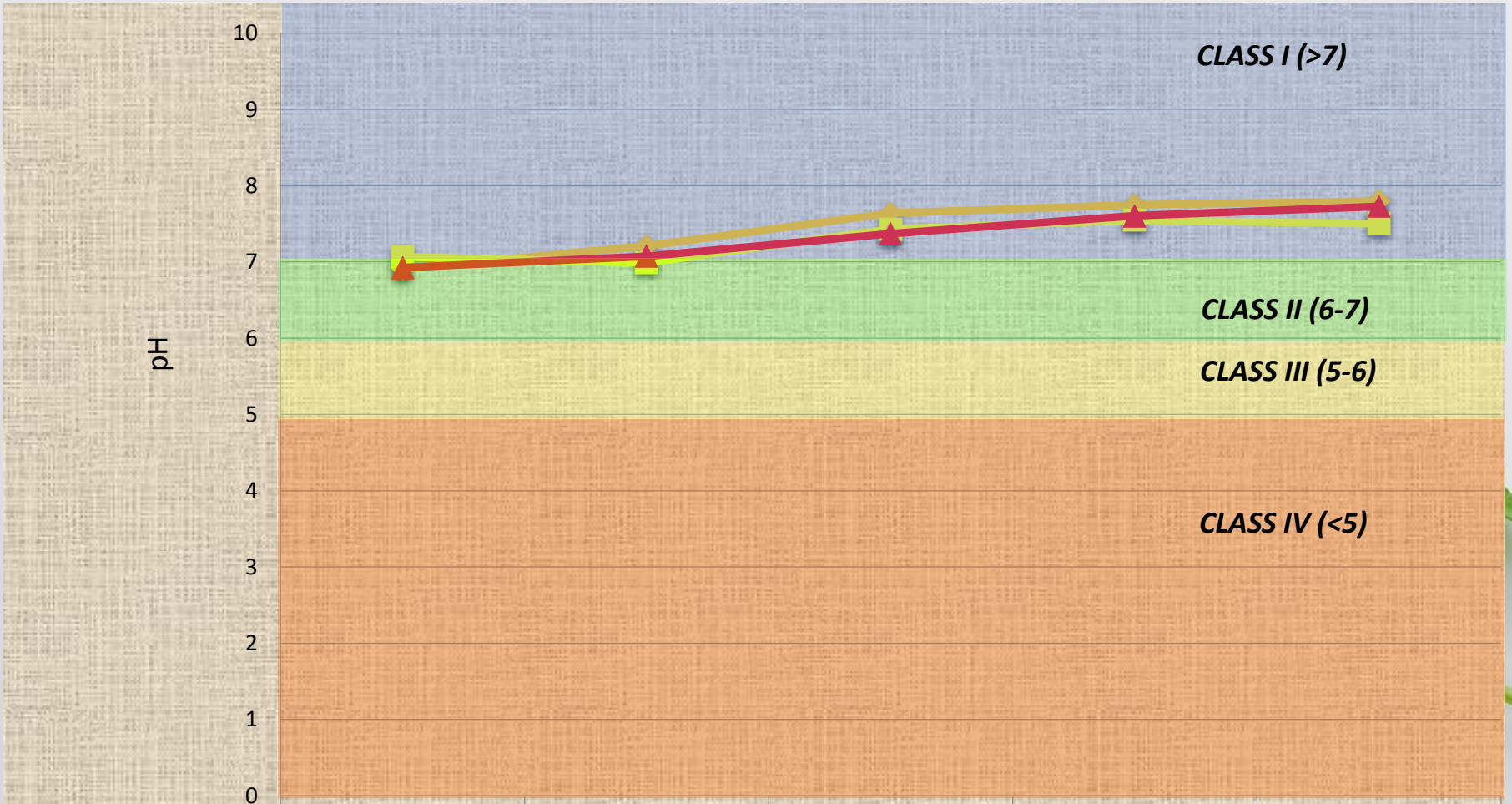
TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	6.91	7.21	7.64	7.75	7.80
Sungai Kemuning	7.065	6.99	7.43	7.545	7.5
Sungai Keru/Dusun	6.925	7.075	7.37	7.605	7.73

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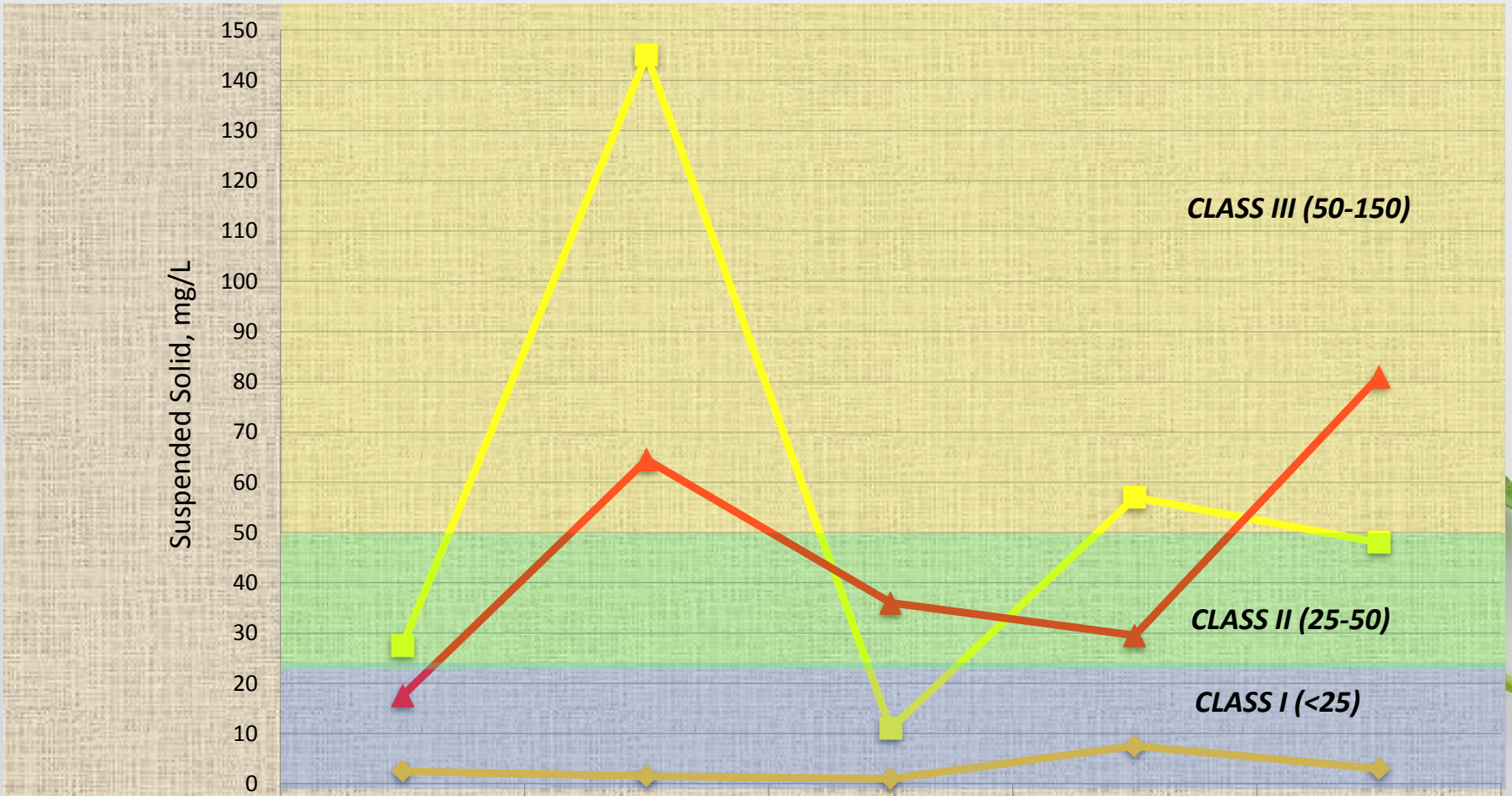
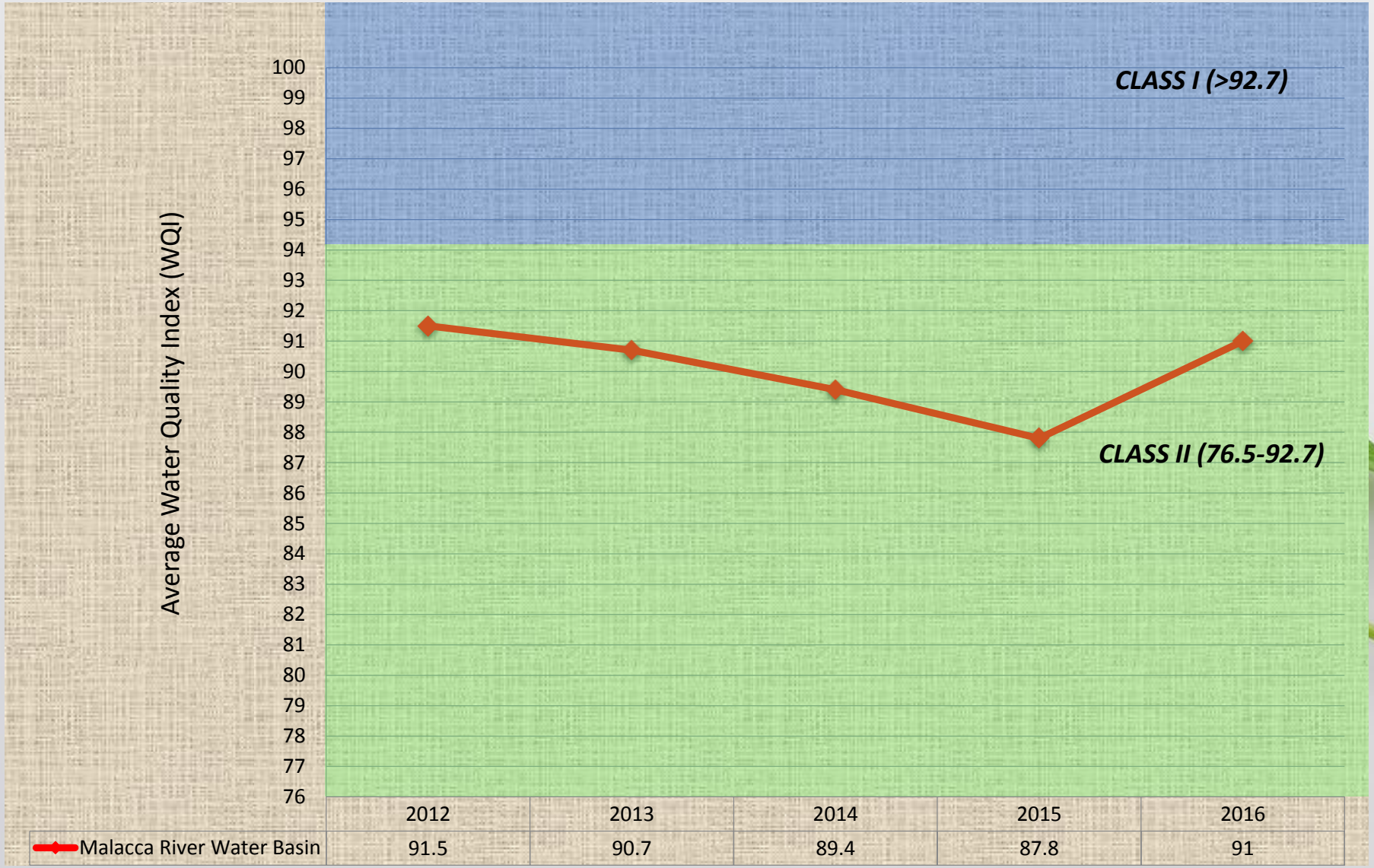
TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Sungai Tampin	2.5	1.5	1	7.5	3
Sungai Kemuning	27.5	145	11	57	48
Sungai Keru/Dusun	17.5	64.5	36	29.5	81

9.

TREND OF THE WQI PARAMETERS FOR MALACCA RIVER WATER BASIN (2012-2016)



	2012	2013	2014	2015	2016
Malacca River Water Basin	91.5	90.7	89.4	87.8	91

THE END

THANK YOU