WATER QUALITY MONITORING IN INDONESIA

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PUSARPEDAL
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INTRODUCTION

Pusarpedal best known as EMC (Environmental Management Center), was established in August 12, 1993 granted by JICA (Japan International Cooperation Agency); with the main function as a reference environmental laboratory

EMC role as a reference laboratory was certified by accomplishing certificate of accreditation (KAN) as a testing laboratory from KAN (National Accreditation Body) on February 7, 2001 and re-accreditation on September 29, 2005

EMC has responsibility to develop and enhance the capability of other environmental laboratories in Indonesia, and also as a center for environmental quality monitoring. Besides, EMC is expected to become a professional laboratory to provide public services in environmental laboratory fields

EMC ACTIVITIES

- Environmental quality monitoring, research and study on environmental problems in Indonesia, which output as recommendation for policy decision maker
- Measurement of environmental quality parameter specifically in waste water, solid waste, emission and ambient air
- Technical assistant for environmental laboratory and implementation of quality system referred to SNI 19 – 17025 – 2005
- Provision of guidelines and reference method for laboratory testing, environmental monitoring, and maintenance & calibration laboratory equipment

Environmental Monitoring Program

- The rapid of industrialization and population growth in Indonesia will increase environmental pollution and it will decrease the environmental quality (especially water pollution) therefore it is necessary the integrated environmental management (national and local government also all of stakeholders)
- One of important aspect in environmental management is to implement the quality monitoring program continually
- The monitoring program will be effective if it is supported by good laboratory and competent personnel to get the valid and accountable data
- Before 2003 monitoring program is done by each institution partially (local and national) so that it is difficult to get the National environmental quality database

Integrated Water Quality Monitoring Program In Indonesia

- Started in 2003, EMC (Pusarpedal)-MoE initiated to conduct national river water quality monitoring workshop with 30 provinces and produced some agreements such as:
  - There are informal agreement between EMC and all provinces in Indonesia to implement the monitoring. There were 30 provinces participated in those program and every provinces followed water quality monitoring rule and guidance which is prepared by EMC, including monitoring technique, parameters, frequency, data need, ect.
  - MoE also contributed small amount of budget for stimulated provinces to implement river water monitoring in their administration area.
  - Since 2006 monitoring program are developed with 33 provinces include air quality monitoring with pasive sampler methode

Integrated Water Quality Monitoring Program In Indonesia

- Based on Environment Ministry Reg No. 22/2008, MOE delegated its authority to 32 provinces for implementing river water monitoring and also prepared Financial for river water monitoring activities (dekonsentrasi budget)
- Provinces have obligation to inform the monitoring data to EMC-MoE periodically
- EMC collect and process the water monitoring data from 33 provinces and send the data to Deputy Assistance of Environmental Data and Information-MoE for preparing the Indonesia Status of Environment Report (SoER)

Objectives

1. To build environmental quality data base, local and national.
2. To improve the capabilities of local government for environmental quality monitoring and surveillance
3. To improve laboratory management based on ISO/IEC-17025: 2005 and Environmental Minysterial Regulation No 06/2009 regarding the Environmental Laboratory
4. To decrease the environmental pollution

Rules for Implementation of river water monitoring in Indonesia.

- Government regulation No 82/2001 regarding The Water Quality Management and Water Pollution Control
- Environment Ministerial Decree No 115/2003 regarding the Guidance of Water Quality Status.
- Environment Ministerial Regulation No. 06 /2009 : Environmental Laboratory

Criteria of Water and the Usage (Gov Regulation o 82/2001)

Class	Intention of Usage
First Class	Drinking water or any other use with the similar requirements
Second Class	Service water, recreational, gardening or any other use with the similar requirements
Third Class	Fresh water agricultural, farming and any other use with the similar requirements
Fourth Class	Irrigation and any other use with the similar requirements

Water Quality Status (Storet Method)

- To compare between water quality and water quality standard according to the suitable using.

Score of Water Quality Status (storet method)

- Class A : score = 0 fulfil standard
- Class B : score = -1 ~ -10 lightly polluted
- Class C : score = -11 ~ -30 polluted
- Class D : score = ≤ -31 heavy polluted

Parameter requirement for water quality monitoring in 33 Provinces (min. 18 parameter)

Field Parameters :
pH,
Temperatur,
TDS , DHL
DO

Biologycal Parameters :
fecal coli,
total coliform

Parameter lab :
TSS,
BOD,
COD,
NO2,
NO3,
NH3,
T- P
Free clorine,
phenol,
Oil & grease,
Detergent

"Bila memungkinkan
disarankan melakukan pemantauan parameter
lain sesuai dengan yang tercantum dalam PP 82/2001"

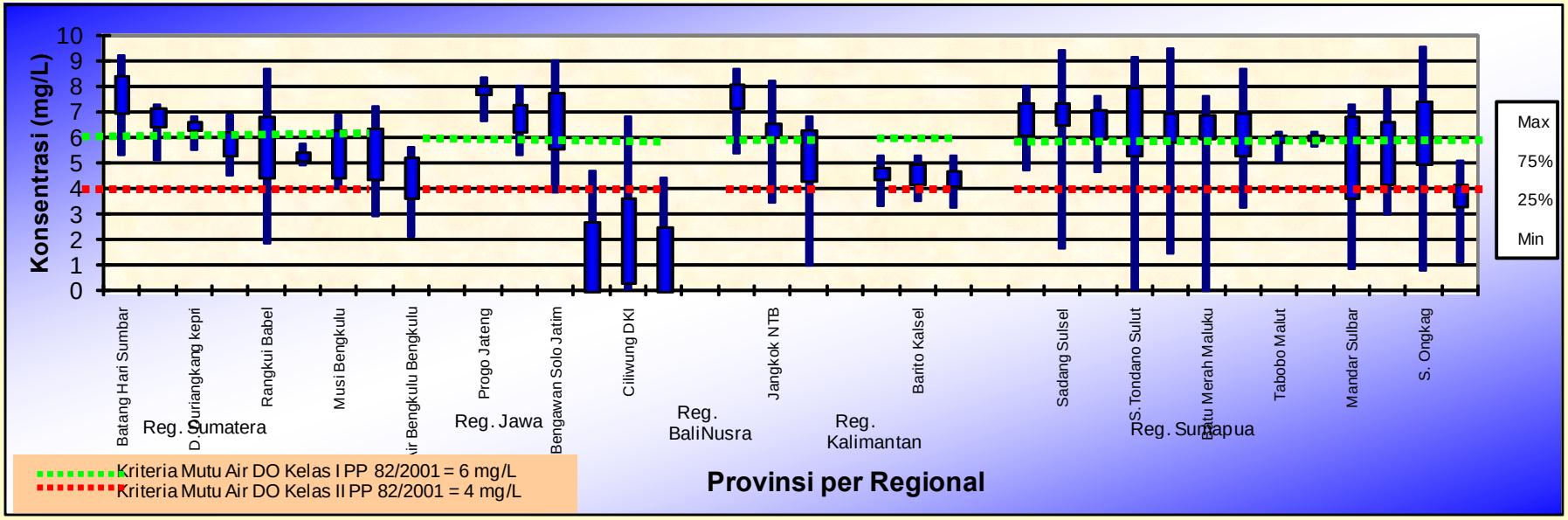
Range of River Water Quality Status 2008
(Based on Stored Method & Second Class of Water Quality Criteria, Govt. Regulation no 82/2001)

PROV	NAMA SUNGAI	FREK	JUMLAH TITIK SAMPLING	JUMLAH DAN JENIS PARAMETER KESEPAKATAN YANG TIDAK DIANALISIS		JUMLAH & JENIS PARAMTER TAMBAHAN YD DIANALISIS		KISARAN SCORE STORET	KISARAN STATUS MUTU AIR (METODE STORET & KMA KELAS II PP 82/2001)
NAD	Krueng Aceh	5	6	**5**	DHL, pH, Temp, TDS, **DO**		-	-41 s/d -52	**cemar berat**
Sumut	Percut	5	6	**2**	TDS, **fenol**	4	Fe, Mn, Pb, Cd	-16 s/d -63	**cemar sedang s/d cemar berat**
Riau	Kampar	5	10	**0**	-	16	Cl^-, Cl_2, H_2S, Fe, Mn, Zn, Hg, Pb, Cd, Cu, As, CN, Se, B, F, Co	-42 s/d-66	**cemar berat**
Sumbar	Batanghari	5	6	**0**	-	4	Zn, Hg,Cu, As	-13 s/d -26	**cemar sedang**
Jambi	Batang Hari	5	12	**0**	-	6	Cl^-, Fe, Mn, Hg, Pb, F,	-16 s/d-33	**cemar sedang s/d cemar berat**
		7	10	**4**	DHL, Temp, **fecal coli, Total Coliform**	5	Cl^-, Fe, Mn, Pb, F,	-21s/d-30	**cemar sedang**
Bengkulu	Air Bengkulu	5	3	**1**	**Fecal Coli**	1	Fe	-12 s/d -44	**cemar sedang s/d cemar berat**
	Musi	5	3	**1**	**Fecal Coli**	1	Fe	-4 s/d -29	**cemar ringan s/d cemar sedang**
Sumsel	Musi	5	8	**3**	DHL, Temp, **DO**	1	Cl^-	-28 s/d-40	**cemar sedang s/d cemar berat**
Lampung	Way Mesuji	3	6	**2**	**Fecal Coli, Total Coliform**	7	Fe, Mn, Zn, Pb, Cd, Cu, CN.	-28 s/d -30	**cemar sedang**
Babel	Batu Rusa	5	6	**-**	-	3	Zn, Pb,Cu	-37 s/d -48	**cemar berat**
Banten	Cirarab	5	8	**-**	-	4	Zn, Hg, Cd, Cr (VI)	-58s/d-107	**cemar berat**
DKI Jakarta	Ciliwung	5	6	**-**	-	2	F, Zn	-78 s/d 95	**cemar berat**
Jabar	Citarum	5	9	**-**	-			-67 s/d -98	**cemar berat**
Jateng	Progo	6	6	**6**	DHL, M&L, MBAS, SO4, **Fecal coli, Total**	7	H_2S, Zn, Pb, Cd, Cu, Cr(VI), CN.	-22 s/d -39	**cemar sedang s/d cemar berat**
DIY	Progo	5	7	**-**	-	6	Cl^-, Fe, Mn, Cd, Cu, Cr(VI).	-45 s/d -88	**cemar berat**
Jatim	Bengawan Solo	4	22	**3**	DHL, TDS, SO_4	1	Cu	-30 s/d -53	**cemar sedang s/d cemar berat**

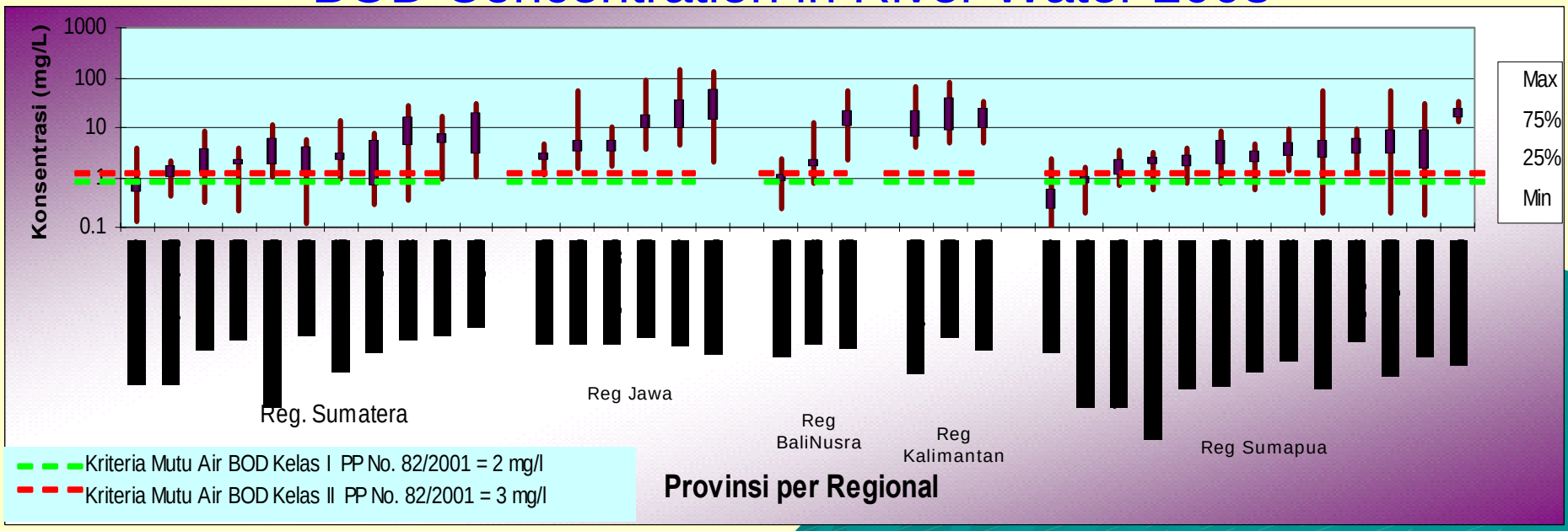
Range of River Water Quality Status 2008
(Based on STORET Method & Second Class of Water Quality Criteria, Govt. regulation no 82/2001)

PROV	NAMA SUNGAI	FREK	JUMLAH TITIK SAMPLING	JUMLAH DAN JENIS PARAMETER KESEPAKATAN YANG TIDAK DIANALISIS		JUMLAH & JENIS PARAMTER TAMBAHAN YD DIANALISIS		KISARAN SCORE STORET	KISARAN STATUS MUTU AIR (METODE STORET & KMA KELAS II PP 82/2001)
Bali	Tukad Badung	5	6	-	-	5	Fe, Pb, Cd, Cu, F	-60s/d 109	**cemar berat**
NTT	Noelmina	5	6	**6**	DHL, NO2, NH3, **T-P, fenol**, MBAS,			-2 s/d -8	**memenuhi s/d cemar ringan**
NTB	Kali Jangkok	5	6	**1**	**fenol**	4	Fe, Zn, Pb, Cu	-34 s/d -59	**cemar berat**
Kalteng	Barito	5	6	**-**	-	1	Hg	-39 s/d -51	**cemar berat**
Kalsel	Barito	5	2	**4**	Temp, TDS, SO4, MBAS	4	Fe, Hg, Pb, Cd	-56 s/d 57	**cemar berat**
	Martapura	5	6	**4**	Temp, TDS, SO4, MBAS	4	Fe, Hg, Pb, Cd	-41 s/d-61	**cemar berat**
Sulut	S. Tondano	5	6	**3**	DHL, NO2, **T-P**	2	Hg, CN	-45s/d -56	**cemar berat**
	Ongkag Dumoga	5	6	**3**	DHL, NO2, **T-P**	2	Hg, CN	-48 s/d -63	**cemar berat**
	D Tondano	5	6	**3**	DHL, NO2, **T-P**	2	Hg, CN	-17 s/d -39	**cemar sedang s/d cemar berat**
Gorontalo	Paguyaman	5	6	**1**	Temp	2	Hg, Pb	-20 s/d -31	**cemar sedang s/d cemar berat**
Sulsel	Saddang	5	6	**3**	DHL, **fenol**	8	Cl^-, H_2S, Fe, Mn, Zn, Pb, Cd, Cu	-43 s/d -63	**cemar berat**
	Jeneberang	5	6	**3**	DHL, **fenol**	8	Cl^-, H_2S, Fe, Mn, Zn, Pb, Cd, Cu	-55 s/d -66	**cemar berat**
Sultra	Konaweha	5	6	**1**	**fenol**	6	Cl^-, Fe, Mn, Zn, Pb, Cd	-18 s/d -20	**cemar sedang**
Maluku	Air Besar	5	2-3	**3**	DHL, NH3, **fenol**	4	Fe, Mn, Zn, Cu	-45 s/d -47	**cemar berat**
	Batu Gajah	5	3	**3**	DHL, NH3, **fenol**	4	Fe, Mn, Zn, Cu	-56 s/d -84	**cemar berat**
	Batu Merah	5	3	**3**	DHL, NH3, **fenol**	4	Fe, Mn, Zn, Cu	-57 s/d -87	**cemar berat**
Maluku Utara	Tabobo	5	6	**3**	DHL, **fenol**, M&L,	16	Cl^-, Cl_2, H_2S, Fe, Mn, Zn, Hg, Pb, Cd, Cu, As, CN, Se, B, F, Co	-18 s/d -40	**cemar sedang s/d cemar berat**
	Tanjung Buli	5	6	**3**	DHL, **fenol,** M&L,	16	Cl^-, Cl_2, H_2S, Fe, Mn, Zn, Hg, Pb, Cd, Cu, As, CN, Se, B, F, Co	-10 s/d -32	**cemar ringan s/d cemar berat**
Sulbar	Mandar	5	6	**2**	TSS, **fenol.**			-10 s/d -15	**cemar ringan s/d cemar sedang**
Kep. Riau	D. Duriangkan	5	6	**1**	SO4	3	Fe, Mn, Zn	-18 s/d -24	**cemar sedang**

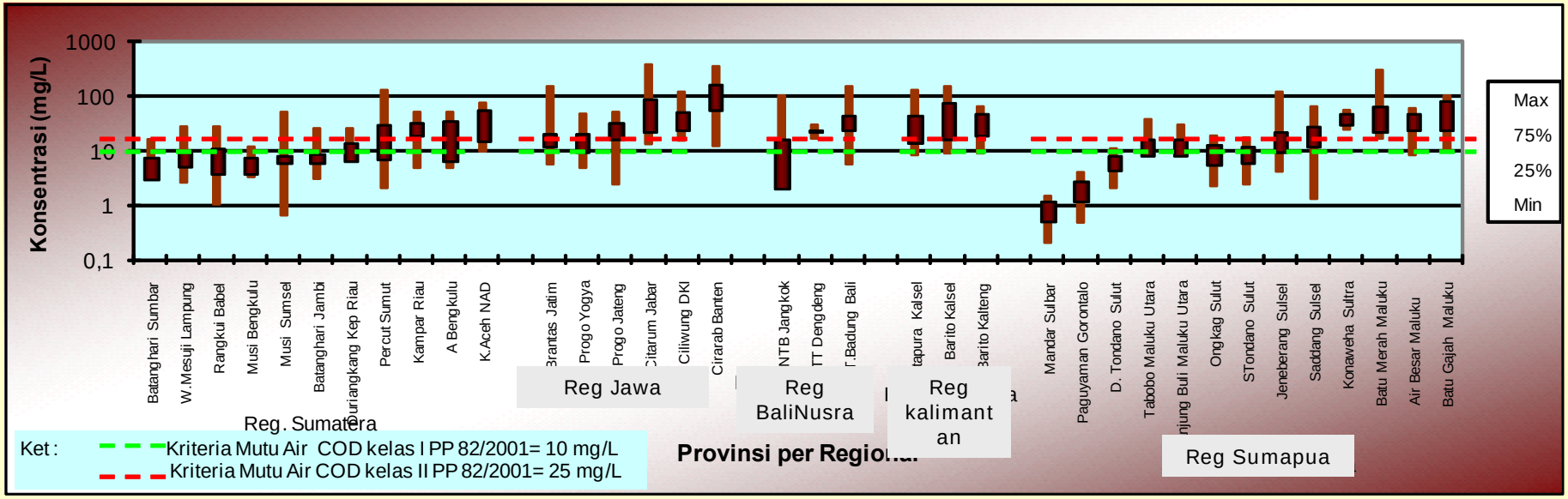
DO Concentration in River Water 2008



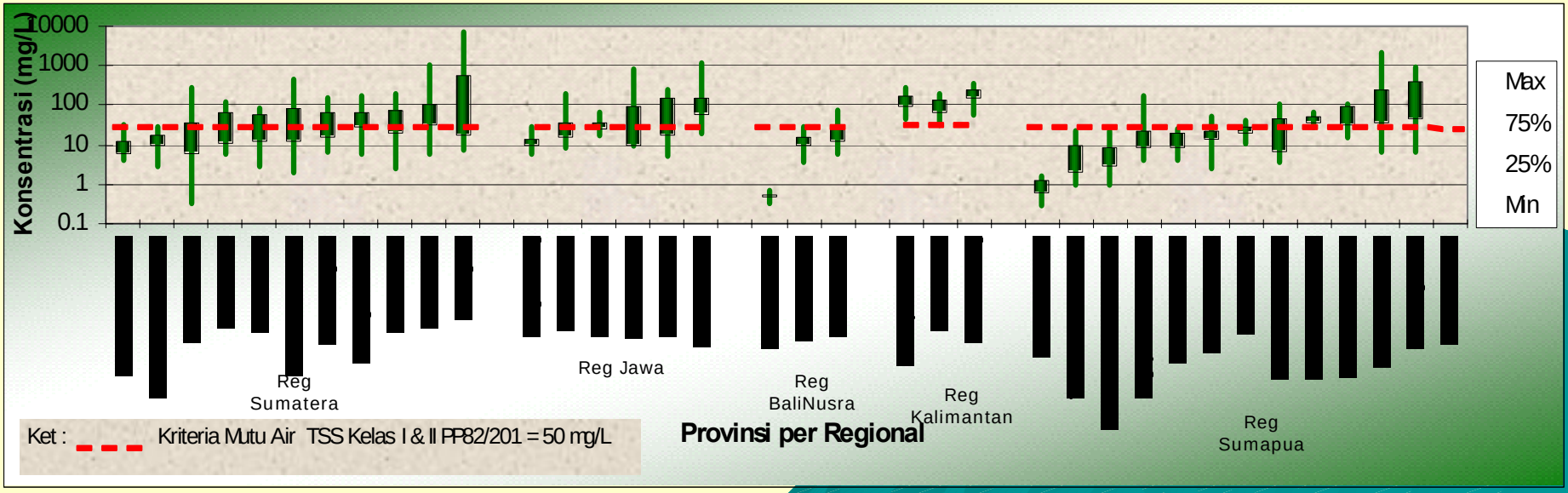
BOD Concentration in River Water 2008



COD Concentration in River Water 2008



TSS Concentration in River Water 2008



Conclusion

- **Base on storet method and second class of water quality criteria, Gov Regulation no 82/2001, majority river water have been monitored in Indonesia 2008 were in heavy polluted condition. Other rivers were in slightly polluted to polluted condition.**

- **BOD, COD,DO, phenol, fecal coli & total coliform parameters give significant contribution to the river water pollution in Indonesia. TSS and T-P also contribute to river water pollution.**

- **Necessity of Integrated environmental monitoring Program among stakeholders throught periodicly of Water Quality Monitoring activities**

Recomendation

- **Improving coordination among stakeholder (central and local govt) relating to the integrated program for implementation of water monitoring in indonesia.**

- **Increasing capacity building including human resources and laboratory facilities for implementing water monitoring through technical training (planning, sampling, analysis, data pocessing ect)**

Thank you