Introduction of Water Quality Monitoring Standards in Lancang-Mekong Countries →Thailand

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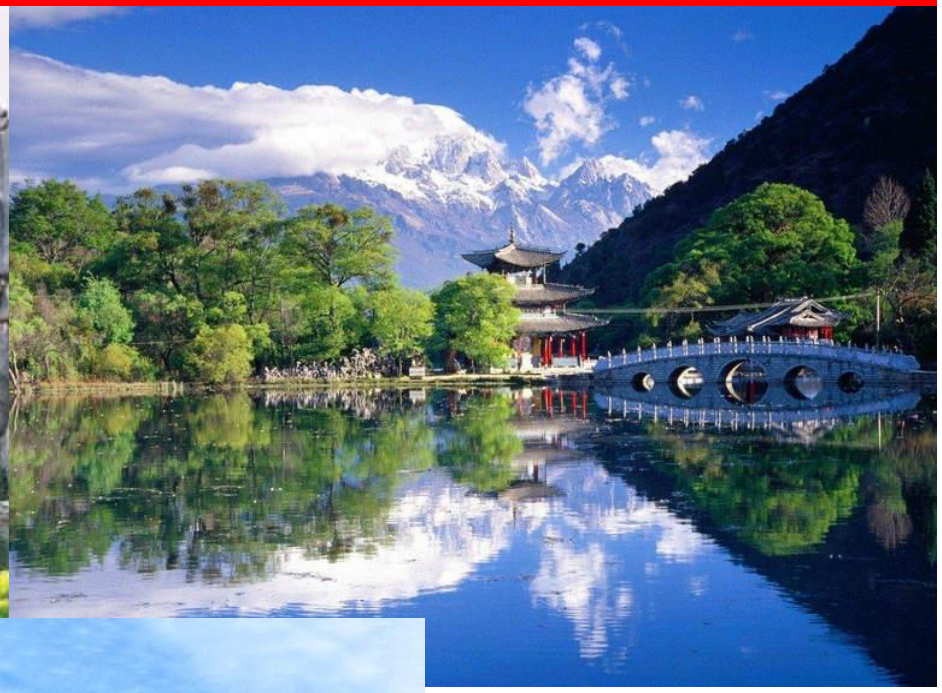
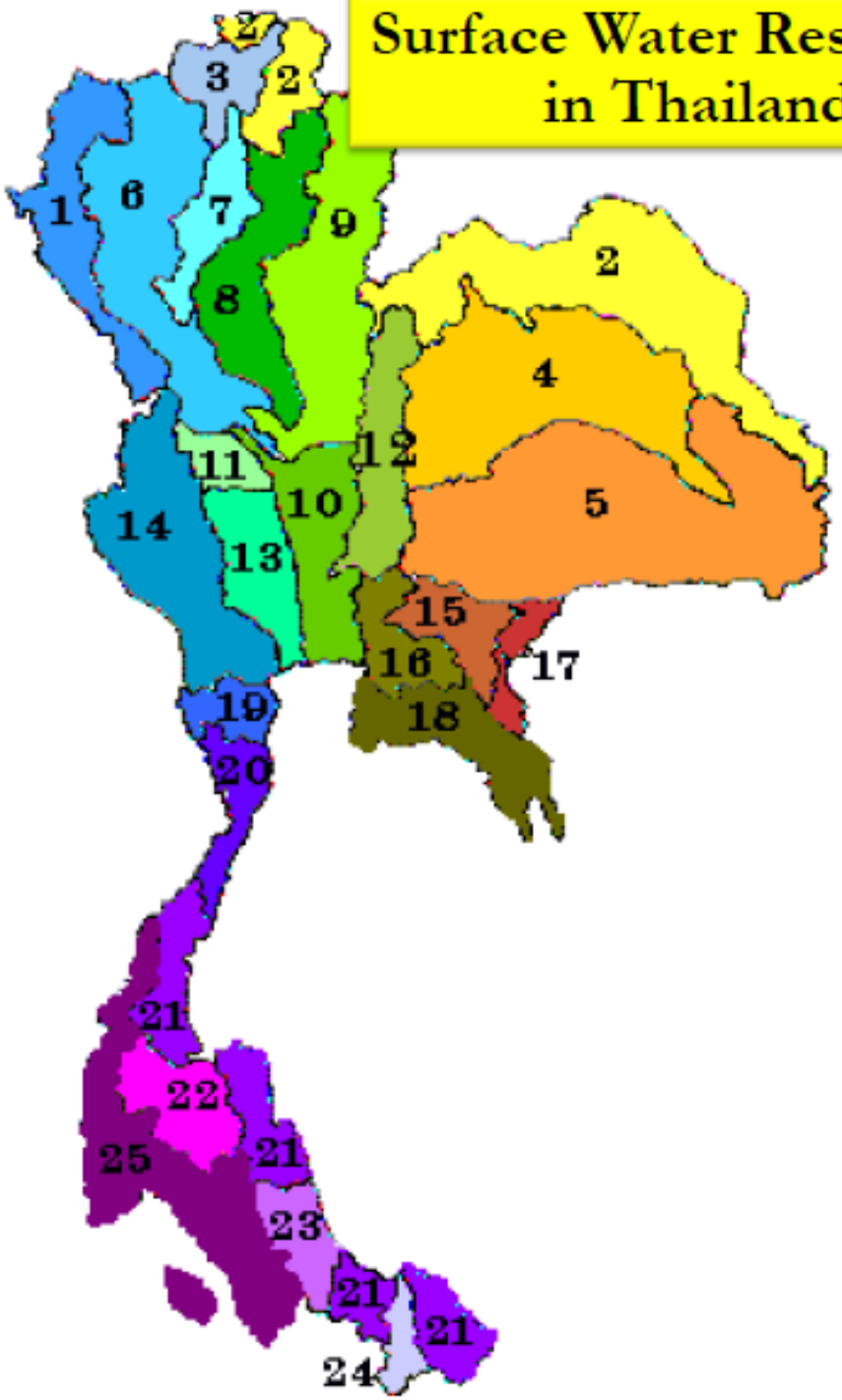
สวัสดี 你好 Nǐ hǎo หนี่ห่าว



Surface Water Resources in Thailand



Surface Water Resources:
can be divided into River 25 Basins

1. Salaween
2. Khong
3. Kok
4. Chi
5. Mun
6. Ping
7. Wang
8. Yom
9. Nan
10. Chao Phraya
11. Sakae Krang
12. Pasak
13. Tha Chin
14. Mae Klong
15. Prachinburi
16. Bang Pakong
17. Tonele Sap
18. Eastern Coast
19. Phetchaburi
20. Western Coast
21. South-East Coast
22. Tapi
23. Songkhla Lake
24. Pattani
25. South-West Coast

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1. Objectives of Water Quality Monitoring

- Information of water quality for public
- Information for water quality management
- Trend of water quality
- Evaluation of management scenarios

2. Surface Water Quality Standard

Parameter	Units	Statistic	Standard Value for Class***				
			1	2	3	4	5
1. Colour, Odour and Taste	-	-	n	n	n	n	-
2. Temperature	C	-	n	n'	n'	n'	-
3. pH value	-	-	n	5-9	5-9	5-9	-
4. Dissolved Oxygen	mg/l	P20	n	6	4	2	-
5. BOD (5 days, 20 C)	mg/l	P80	n	1.5	2.0	4.0	-
6. Coliform Bacteria			n	5000	20000	-	-
- Total Coliform	MPN/100ml	P80	n	1000	4000	-	-
- Faecal Coliform	"	P80	n		5.0		
7. NO - N	mg/l	Max.allowance	n		0.5		
8. NH -N	"	"	n		0.005		
9. Phenols	"	"	n		0.1		
10. Cu	"	"	n		0.1		
11. Ni	"	"	n		1.0		
12. Mn	"	"	n		1.0		
13. Zn	"	"	n		0.005*,0.05**		
14. Cd	"	"	n		0.05		
15. Cr (hexavalent)	"	"	n		0.05		
16. Pb	"	"	n		0.002		
17. Hg (total)	"	"	n		0.01		
18. As	"	"			0.005		
19. CN^-		"	n		0.1		
20. Radioactivity		"	n		1.0		
- Gross α	Becqurel/l	"	n		0.05		
- Gross β	"	"					

Surface Water Quality (Continue)

Parameter	Units	Statistic	Standard Value for Class*** 1	2	3	4	5
21. Pesticides(total)		"					
- DDT	µg/l	"	n		1.0		
- α BHC	"	"	n		0.02		
- Dieldrin	"	"	n		0.1		
- Aldrin	"		n		0.1		
- Heptachlor & Heptachlor epoxide	"	"	n		0.2		
- Endrin	"	"			none		

Note : P = Percentile value
n = naturally
n' = naturally but changing not more than 3 C
* = when water hardness not more than 100 mg/l as $CaCO_3$
** = when water hardness more than 100 mg/l as $CaCO_3$
*** = Water Classification

Source : Notification of the Ministry of Science, Technology and Energy (B.E. 2538 (1985.)), published in the Royal Goverment Gazette, vol. 103, No.60, dated April 15, B.E. 2529 (1986)

Classification	Objectives/Condition and Beneficial Usage of Surface Water
Class 1	Extra clean fresh surface water resources used for : (1) conservation not necessary pass through water treatment process require only ordinary process for pathogenic destruction (2) ecosystem conservation where basic organisms can breed naturally
Class 2	Very clean fresh surface water resources used for : (1) consumption which requires ordinary water treatment process before use (2) aquatic organism of conservation (3) fisheries (4) recreation
Class 3	Medium clean fresh surface water resources used for : (1) consumption, but passing through an ordinary treatment process before using (2) agriculture
Class 4	Fairly clean fresh surface water resources used for : (1) consumption, but requires special water treatment process before using (2) industry
Class 5	The sources which are not classification in class 1-4 and used for navigation.

3. Water Quality Parameters

- **Physical Properties**
  - **Temperature, turbidity, suspended solids**
- **Chemical Properties**
  - **Dissolved Oxygen (DO), pH, Biochemical Oxygen Demand (BOD), Nutrients**
- **Biological Properties**
  - **Bacteria**

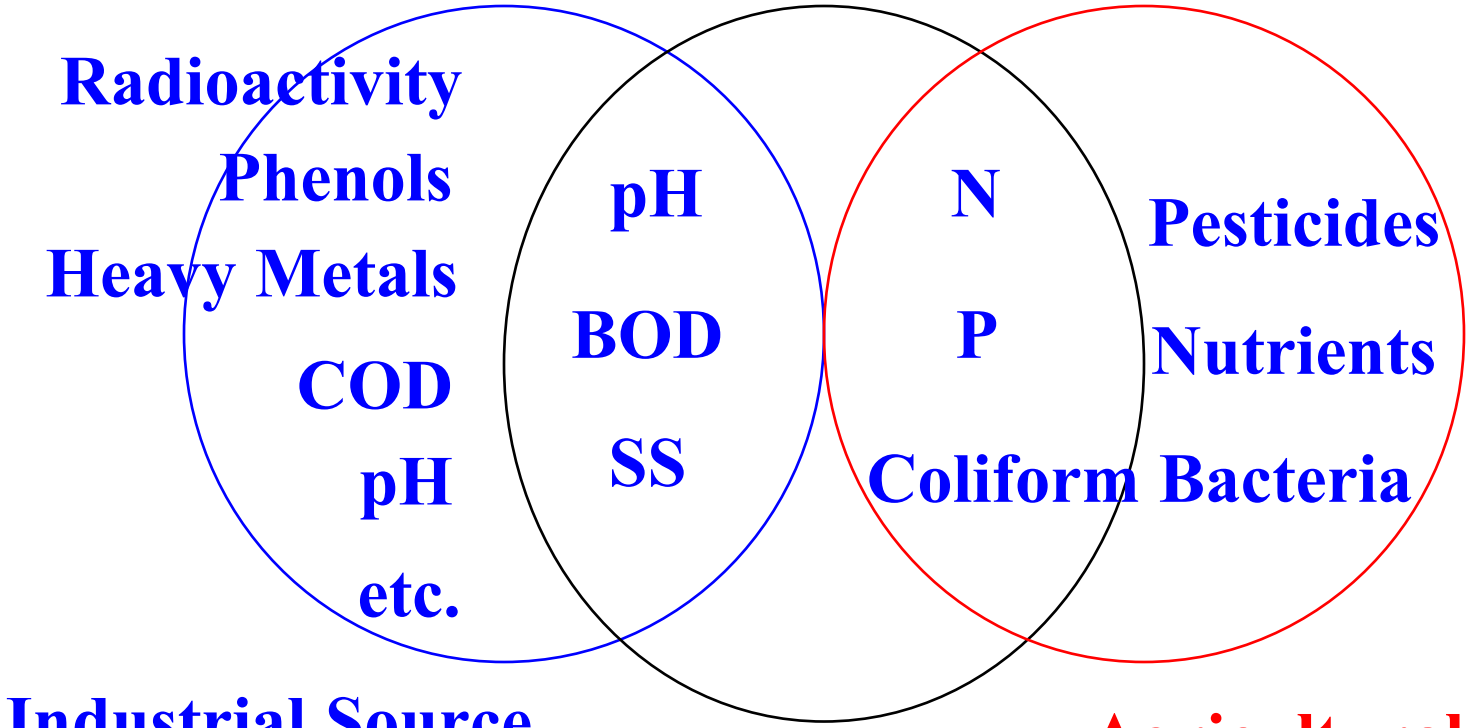
3.1 Field Measurement

- Water Temperature
- pH
- Conductivity
- Salinity
- Turbidity
- Dissolved Oxygen
- River Flows
- Land Uses
- Weather Condition
- etc.

3.2 Laboratory

- BOD, COD
- Ammonia nitrogen
- Phosphorus
- Coliform Bacteria
- Total Solids, Suspended Solids
- Heavy Metals (Cd Cr^{+6} Cr^{+3} Cu Fe Mn Pb Zn Hg)
- Pesticides

4. Effluent Standards Parameters



5. Water Quality Sampling

5.1 Grab Samples

- water supply, surface water, well …not much change over space and time

5.2 Composite Samples

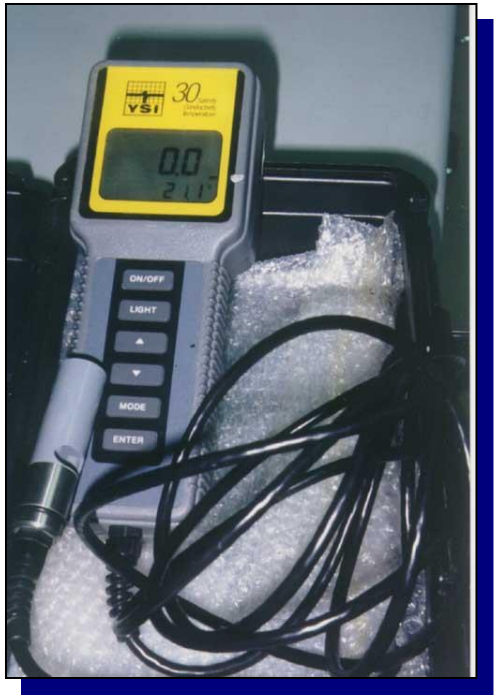
- domestic and industrial wastewater ...change over space and time

6. Water Quality Sampling Factors

- Container
- Volume of sampling
- Label (station name, parameters, date/time, preservation)
- Frequency (2-4 times a year)
- Sampling technique of each parameter

7. Equipment of Field Measurement

DO meter



S-C-T meter

Sounder

(dept)

8. Water Sampling Sources

- Tap water
- Well
- Pond and Resorvour
- Groundwater
- River, Stream and Canal
- Point source

Field Sampling and Measurement

Pond

River

Pollution Sources

Domestic

Pig Farm

Agriculture

Industry

Effluent Sampling

Pond Treatment

Sewer System

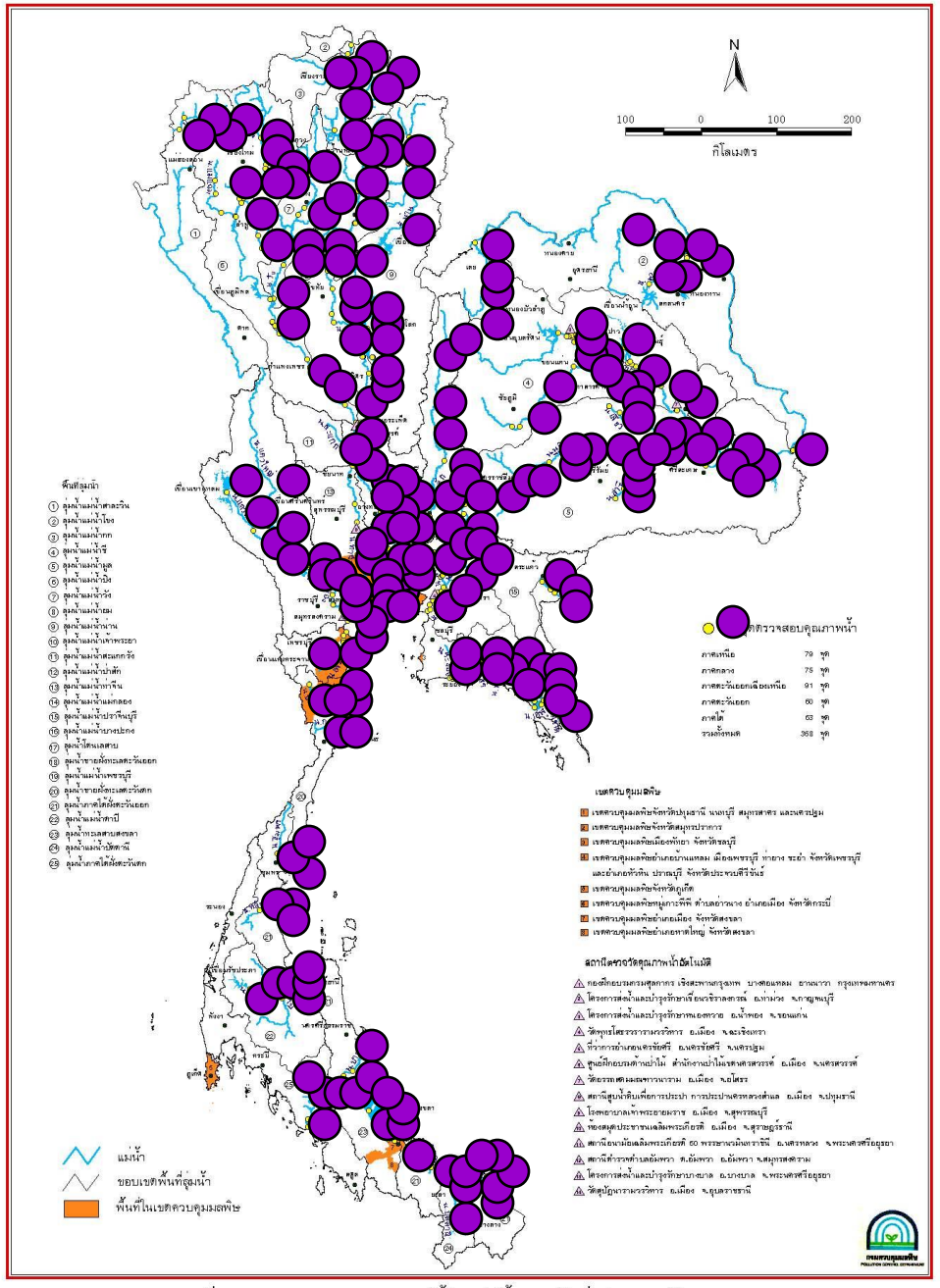
9. Inland Water Quality Monitoring

9.1 Monitoring by PCD staffs

9.2 Automatic Stations for Water Quality Monitoring

9.1 Monitoring by PCD staffs

- **50 major rivers**
  - Central Region (12 rivers)
  - Northern Region (10 rivers)
  - Eastern Region (10 rivers)
  - Northeastern (10 rivers)
  - Southern Region (8 rivers)
- **4 reservoirs**



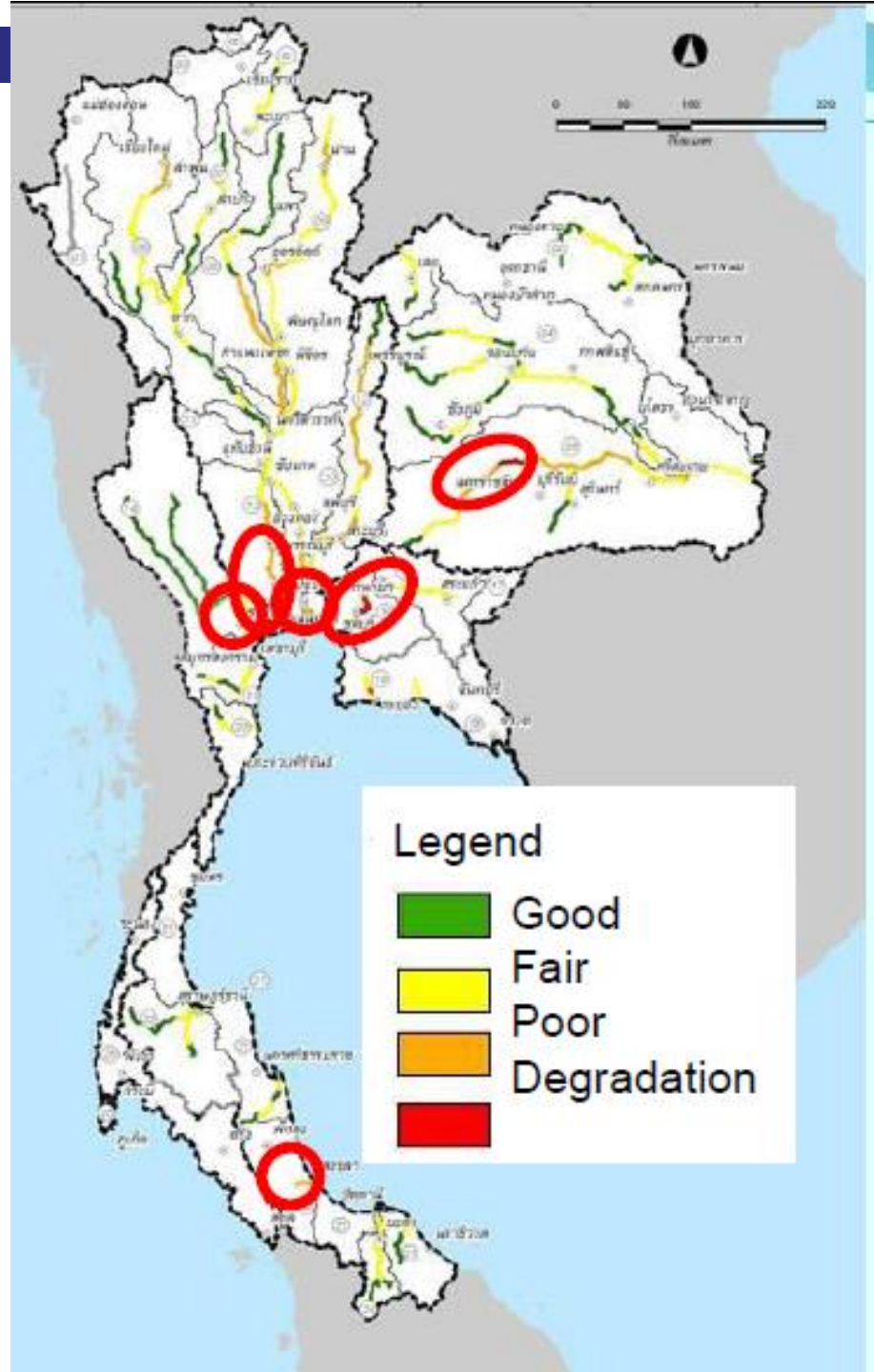
แผนที่แสดงจุดตรวจสอบคุณภาพน้ำในแม่น้ำสายหลักทั่วประเทศ ปี พ.ศ. 2542

500 Monitoring Points

50 Rivers
4 Lakes

Frequency 4 times per year

Water Quality

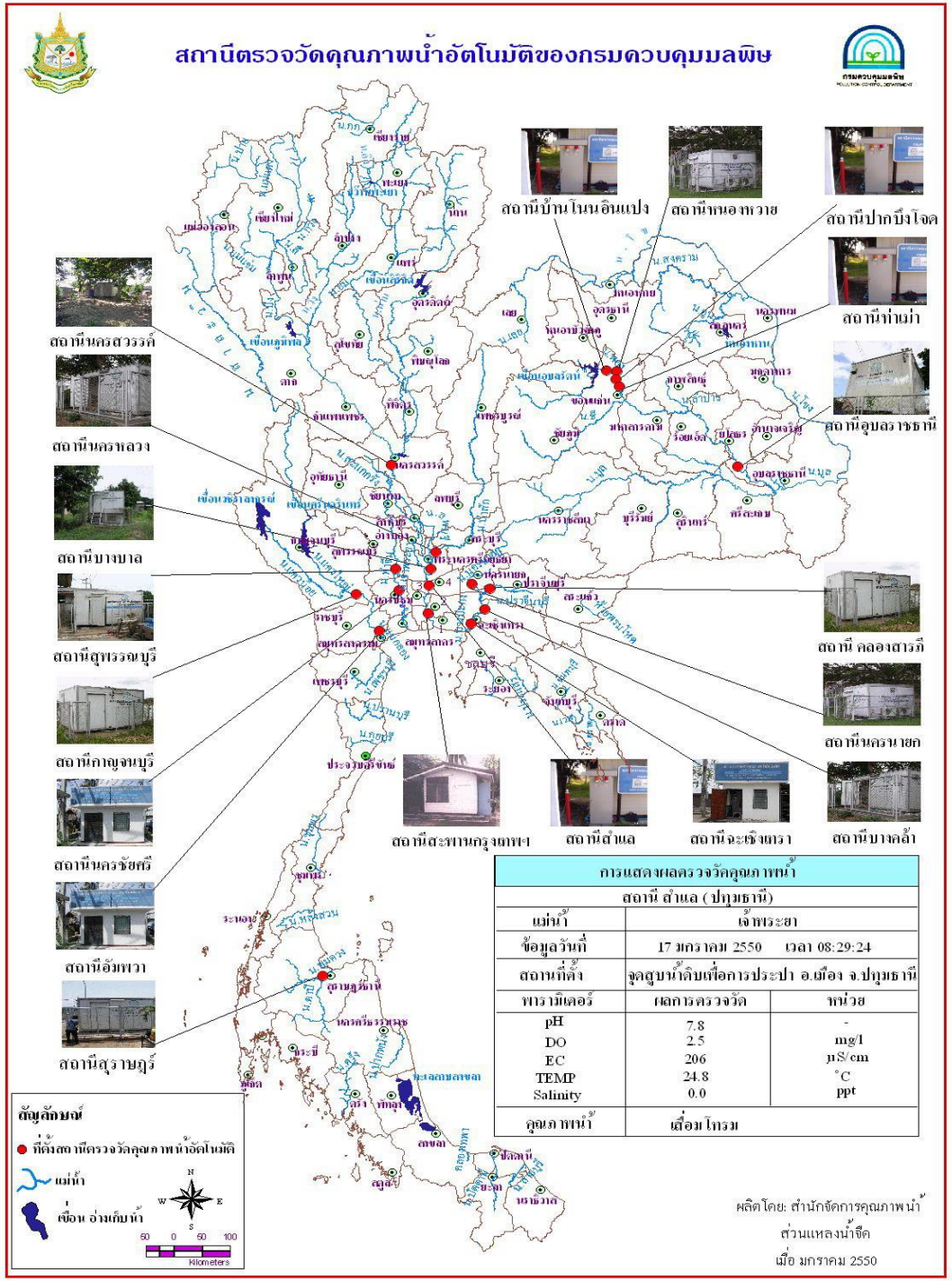


River Basins with critical water degradation

- Thachin
- Bang Pakong
- River mount of Chao Phraya
- Lower Lam Takong
- Songkhla Lake
- Mae Kong

9.2 Automatic Stations for Water Quality Monitoring

- Currently, Ministry of Natural Resources and Environment has 98 automatic water quality monitoring stations covered 33 rivers.
- Automatic stations are situated in: **North** Ping, Wang, Yom, Nan, Kwan Phayao; **Central** Chaophraya, Pasak, Noi, Sakaekrang, Thachin, Maeklong, Nakhonnayok, Klong Damnuansaduak, Klong Pradu, Pranburi, Kuiburi; **Northeast** Pong, Chi, Moon, Lamtakong, Huailuang; **East** Prachinburi, Bangpakong, Rayong, chanthaburi, Trat, Prapong, Klong Takuan; **South** Tapee, Chumphon, Langsuan, Pakphanang.
- There are 6 parameters being monitored; Temperature, pH, Dissolved Oxygen, Electro conductivity, Salinity, and Turbidity. Some stations have a BOD/COD probe.



- 2006 --- 20 stations
- 2007 --- 9 stations
- 2008 --- 10 stations
- .
- .
- 2016 ---
  Total 98 stations

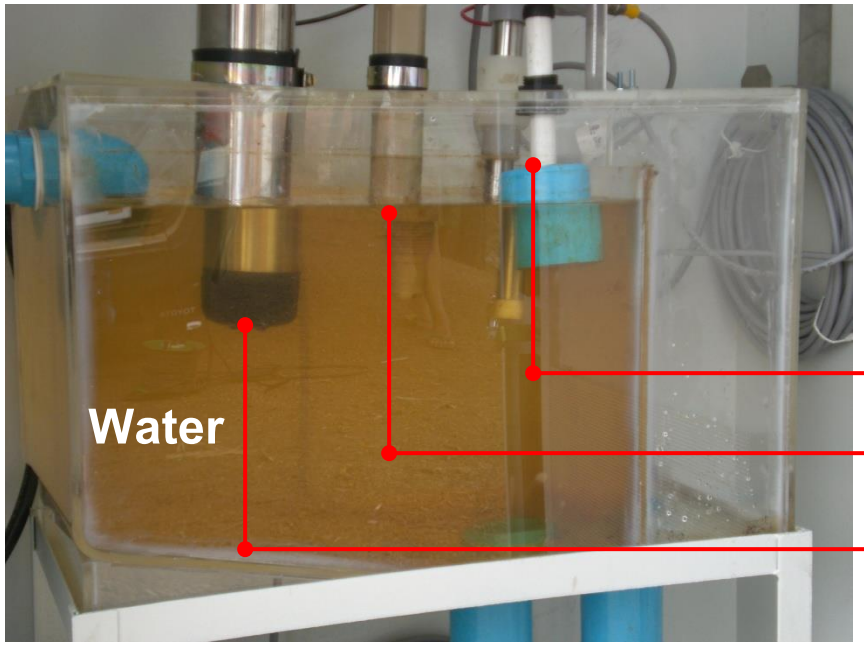
Location

สถานีตรวจวัดคุณภาพน้ำอัตโนมัติ
สำนักจัดการคุณภาพน้ำ
กรมควบคุมมลพิษ
โทร. 02-2982256

Functions

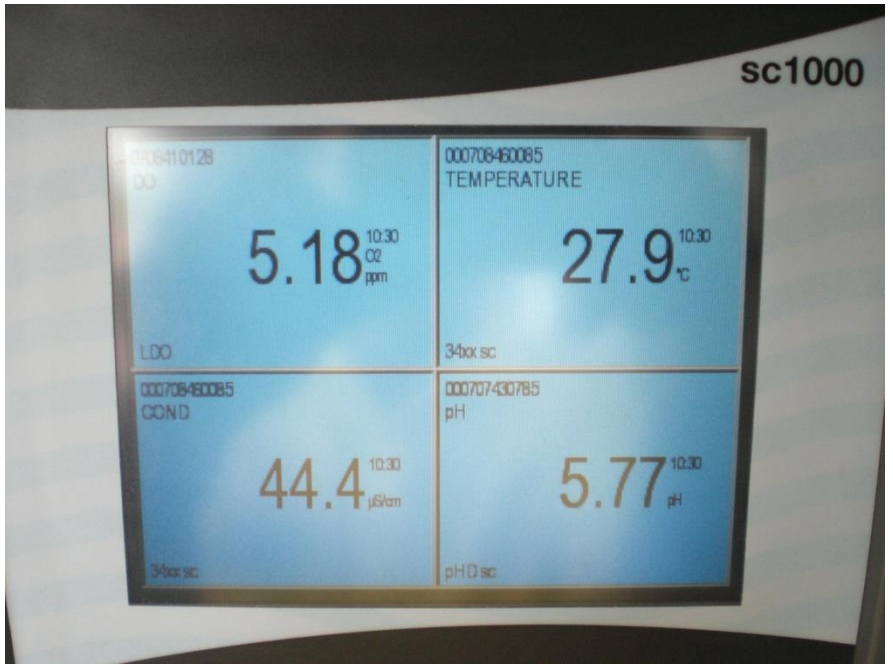
- **1. Measurement:** Controller is programmed to pump the river water into station cabinet every 30 minutes continuously. Then water quality sensor probes (temperature, pH, dissolved oxygen, conductivity, and turbidity) will measure and record the value.
- **2. Data storage and export:** Water quality data will be stored in the data logger and automatically sent to the internet database server at Pollution Control Department (PCD) through General Packet Radio Services (GPRS).

Equipment



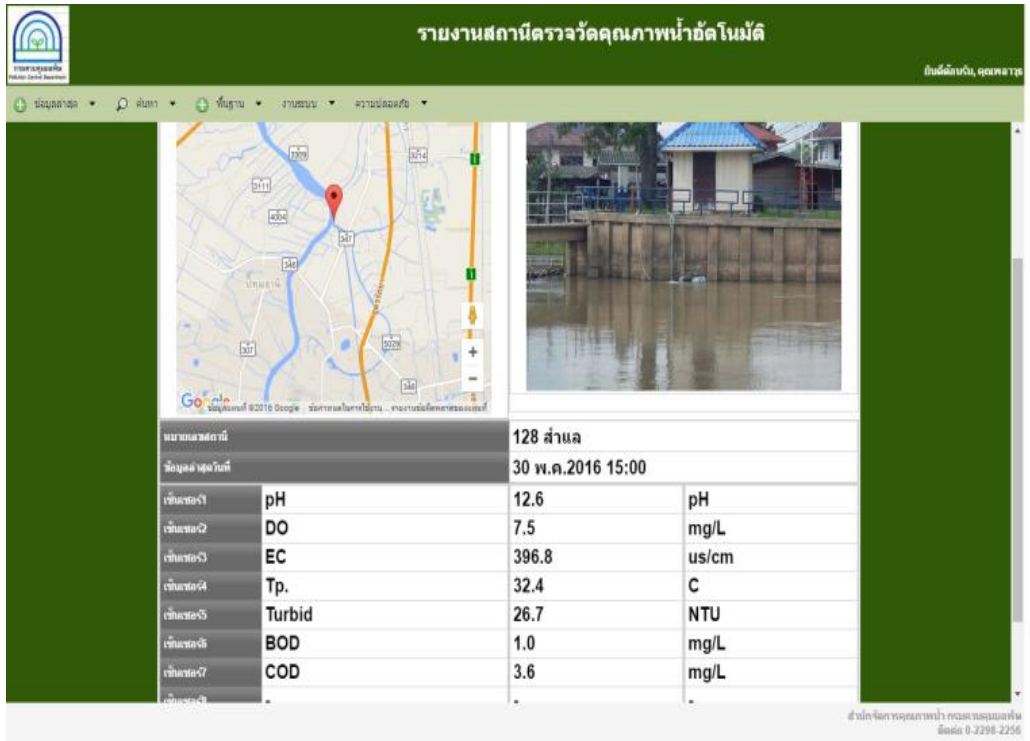
1. EC & Temperature prop
2. pH meter
3. DO meter

Controller

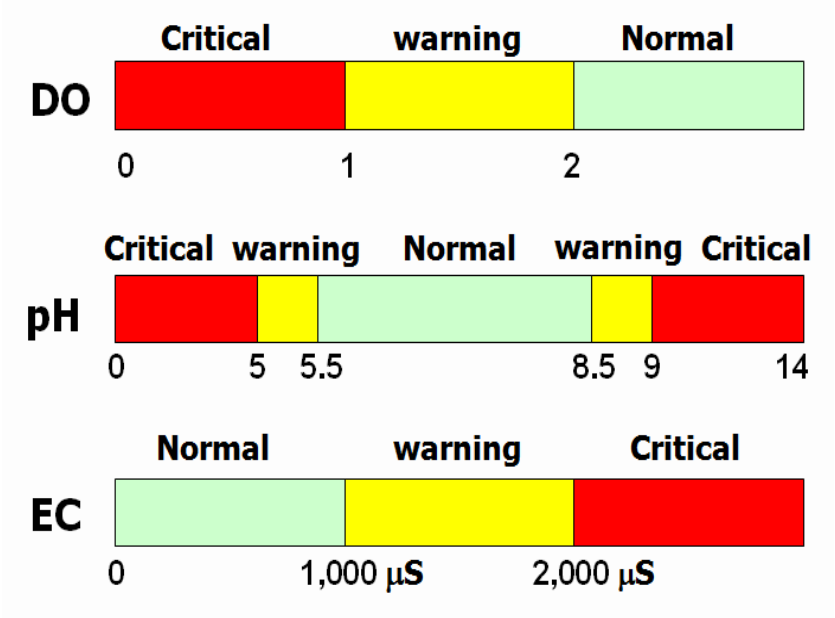


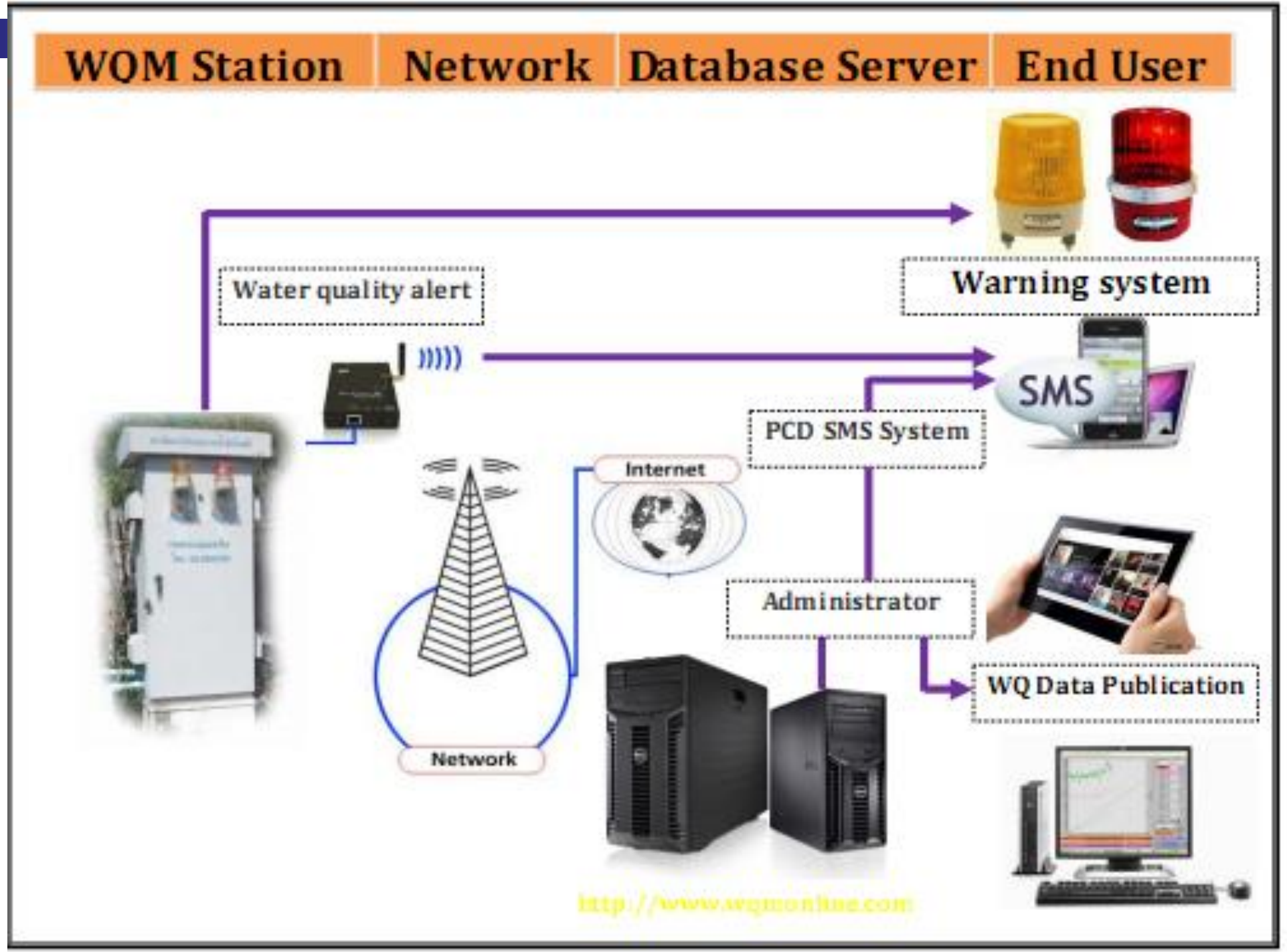
Monitor Screen

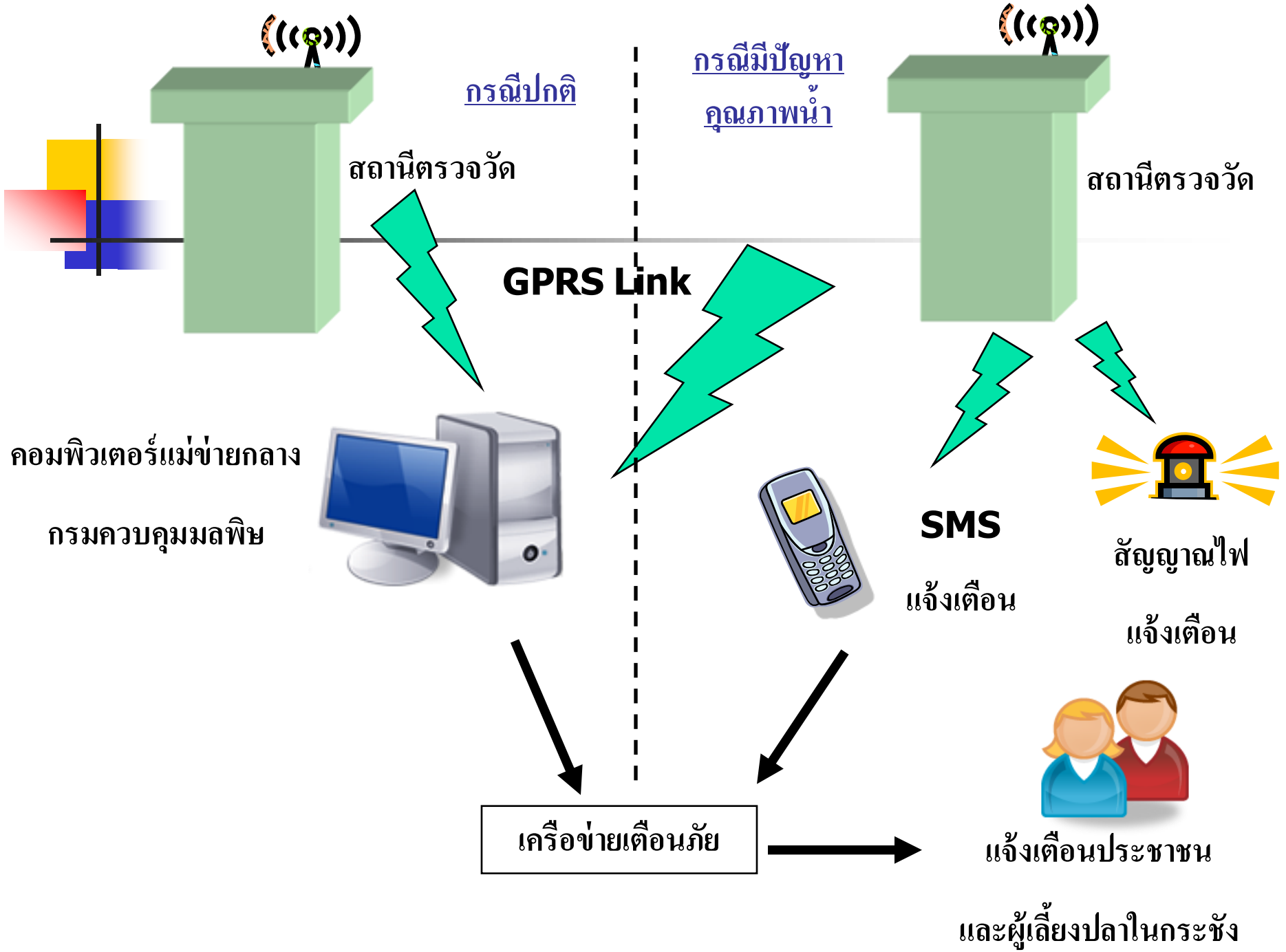
- **3. Information Services:** Water quality data stored in database server can be view near real-time data and historical data from AWQMS website (http://www.wqmonline.com) and Inland Water Quality Information System(IWIS) website (http://iwis.pcd.go.th).



- **4. Water Pollution Warning:** Controller is programmed to send out a short message (SMS) to the mobile phones directly and will give out yellow light and red light as an alert level. The yellow light indicates that the water quality in the surveillance. The red light indicates that the water quality in the crisis.




WQM Station
Network
Database Server
End User
Water quality alert
Warning system
SMS
PCD SMS System
Internet
Administrator
WQ Data Publication
Network
http://www.wqmonline.com


กรณีปกติ
กรณีมีปัญหาคุณภาพน้ำ
สถานีตรวจวัด
สถานีตรวจวัด
GPRS Link
คอมพิวเตอร์แม่ข่ายกลาง
กรมควบคุมมลพิษ
SMS
แจ้งเตือน
สัญญาณไฟ
แจ้งเตือน
เครือข่ายเตือนภัย
แจ้งเตือนประชาชน
และผู้เลี้ยงปลาในกระชัง

Light Signal

warning **critical**

SMS

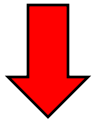
** DO – WARNING LEVEL **

MONITORING STATION

" TA-MAO", 19/01/2007 09:57

pH = 7.5 , **DO = 2.8 mg / L** ,

EC = 98.3 µS



** DO – CRITICAL LEVEL **

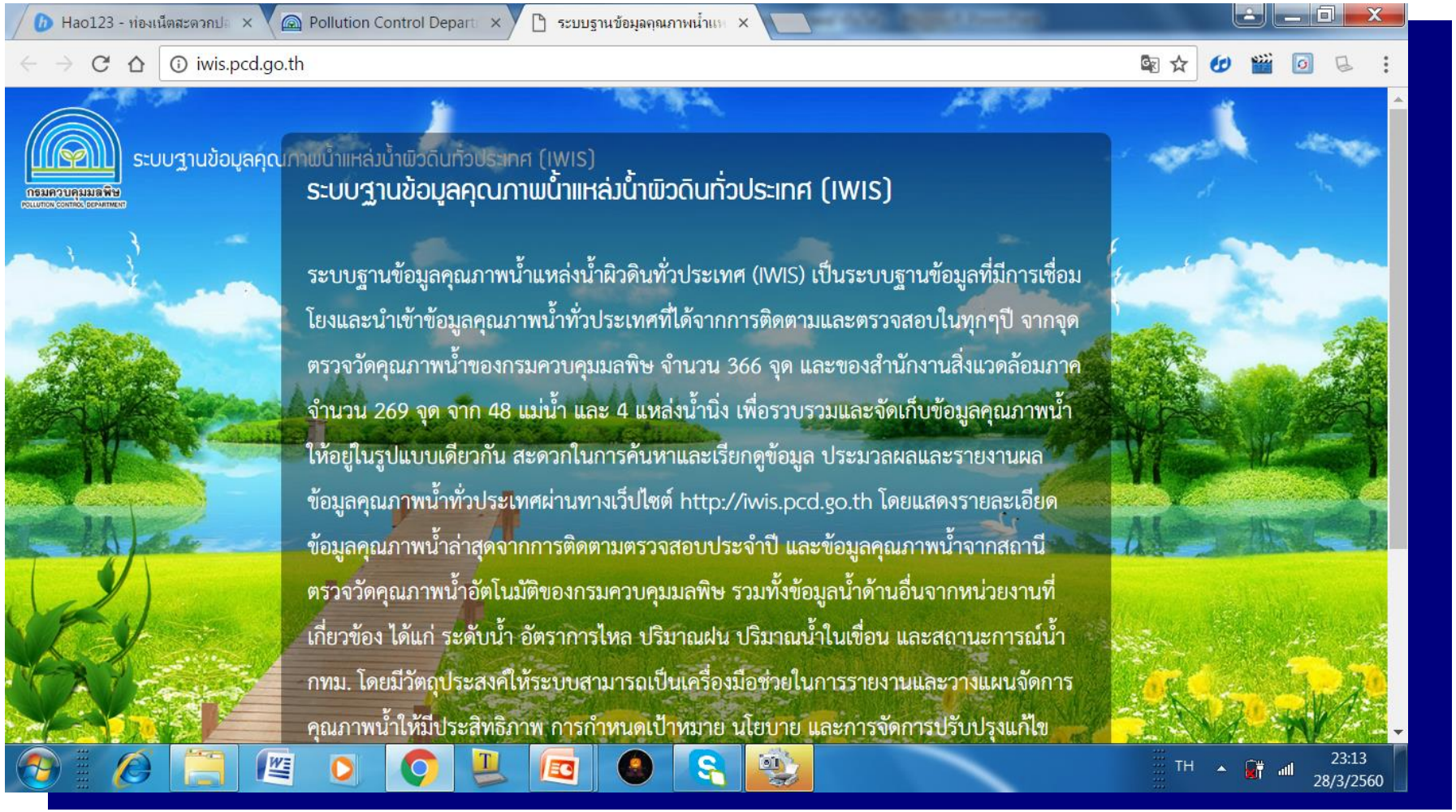
MONITORING STATION

" TA-MAO", 19/01/2007 12:30

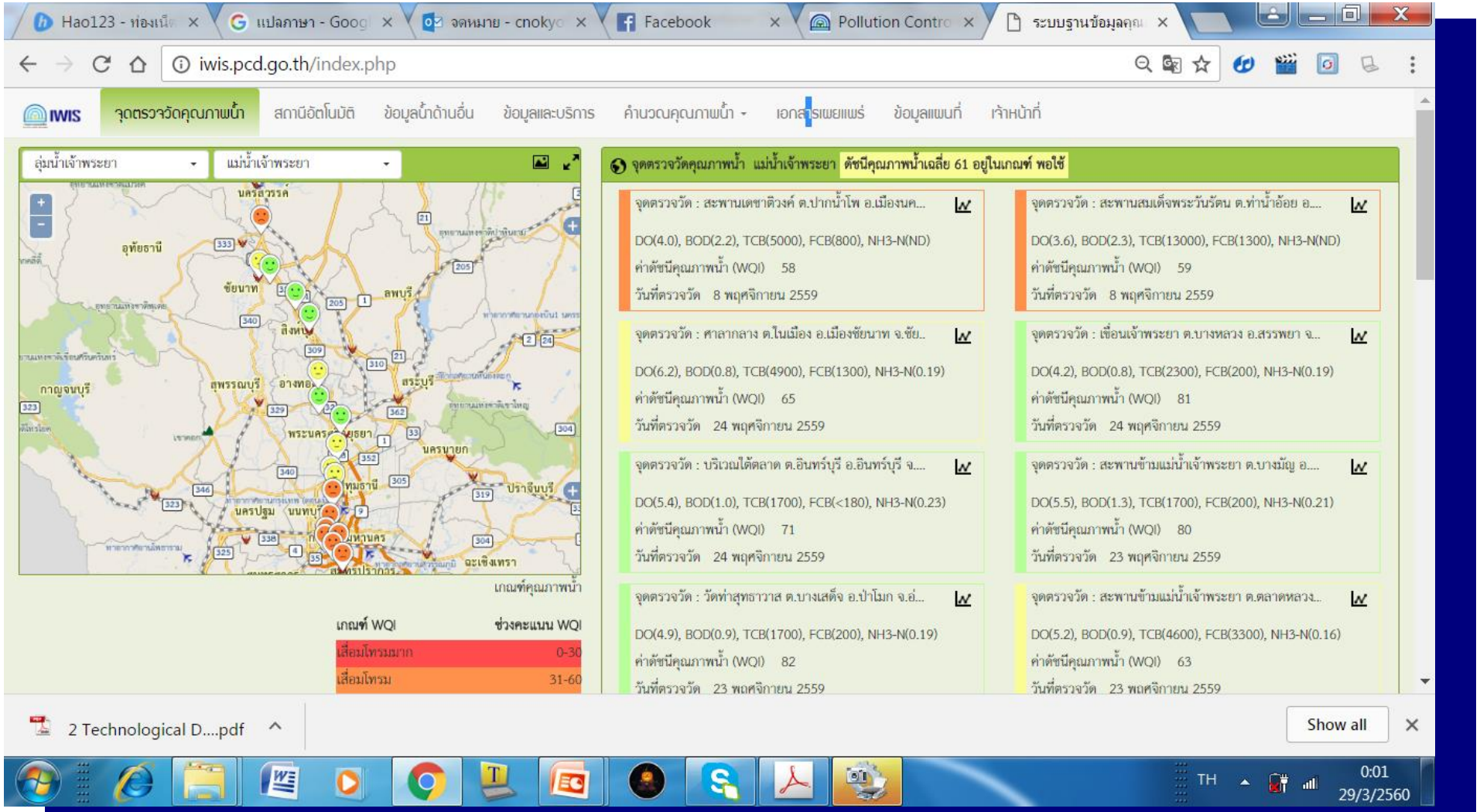
pH = 7.2 , **DO = 0.8 mg / L** ,

EC = 100 µS

10. Inland Water Quality Information System



http://iwis.pcd.go.th/


Hao123 - ท่องเน็ต
แปลภาษา - Google
จดหมาย - cnokyo
Facebook
Pollution Control
ระบบฐานข้อมูลคุณ
iwis.pcd.go.th/index.php
IWIS
จุดตรวจวัดคุณภาพน้ำ
สถานีอัตโนมัติ
ข้อมูลน้ำด้านอื่น
ข้อมูลและบริการ
คำนวณคุณภาพน้ำ
เอกสารเผยแพร่
ข้อมูลแผนที่
เจ้าหน้าที่
ลุ่มน้ำเจ้าพระยา
แม่น้ำเจ้าพระยา
เกณฑ์คุณภาพน้ำ
เกณฑ์ WQI
ช่วงคะแนน WQI
เสื่อมโทรมมาก 0-30
เสื่อมโทรม 31-60
จุดตรวจวัดคุณภาพน้ำ แม่น้ำเจ้าพระยา ดัชนีคุณภาพน้ำเฉลี่ย 61 อยู่ในเกณฑ์ พอใช้
จุดตรวจวัด : สะพานเดชาติวงศ์ ต.ปากน้ำโพ อ.เมืองนค...
DO(4.0), BOD(2.2), TCB(5000), FCB(800), NH3-N(ND)
ค่าดัชนีคุณภาพน้ำ (WQI) 58
วันที่ตรวจวัด 8 พฤศจิกายน 2559
จุดตรวจวัด : สะพานสมเด็จพระวันวัดน ต.ท่าน้ำอ้อย อ....
DO(3.6), BOD(2.3), TCB(13000), FCB(1300), NH3-N(ND)
ค่าดัชนีคุณภาพน้ำ (WQI) 59
วันที่ตรวจวัด 8 พฤศจิกายน 2559
จุดตรวจวัด : ศาลากลาง ต.ในเมือง อ.เมืองชัยนาท จ.ชัย..
DO(6.2), BOD(0.8), TCB(4900), FCB(1300), NH3-N(0.19)
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วันที่ตรวจวัด 24 พฤศจิกายน 2559
จุดตรวจวัด : เขื่อนเจ้าพระยา ต.บางหลวง อ.สรรพยา จ...
DO(4.2), BOD(0.8), TCB(2300), FCB(200), NH3-N(0.19)
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วันที่ตรวจวัด 24 พฤศจิกายน 2559
จุดตรวจวัด : บริเวณใต้ตลาด ต.อินทร์บุรี อ.อินทร์บุรี จ....
DO(5.4), BOD(1.0), TCB(1700), FCB(<180), NH3-N(0.23)
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วันที่ตรวจวัด 24 พฤศจิกายน 2559
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วันที่ตรวจวัด 23 พฤศจิกายน 2559
2 Technological D....pdf
Show all
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29/3/2560

กรมควบคุมมลพิษ
POLLUTION CONTROL DEPARTMENT

THANK YOU VERY MUCH FOR YOUR ATTENTION

多谢

Duōxiè

ตัวเซี่ย

ขอบคุณมาก