

THAILAND GROUNDWATER MONITORING SYSTEM



Thanyarat Srikamma, Wasana Sartthaporn

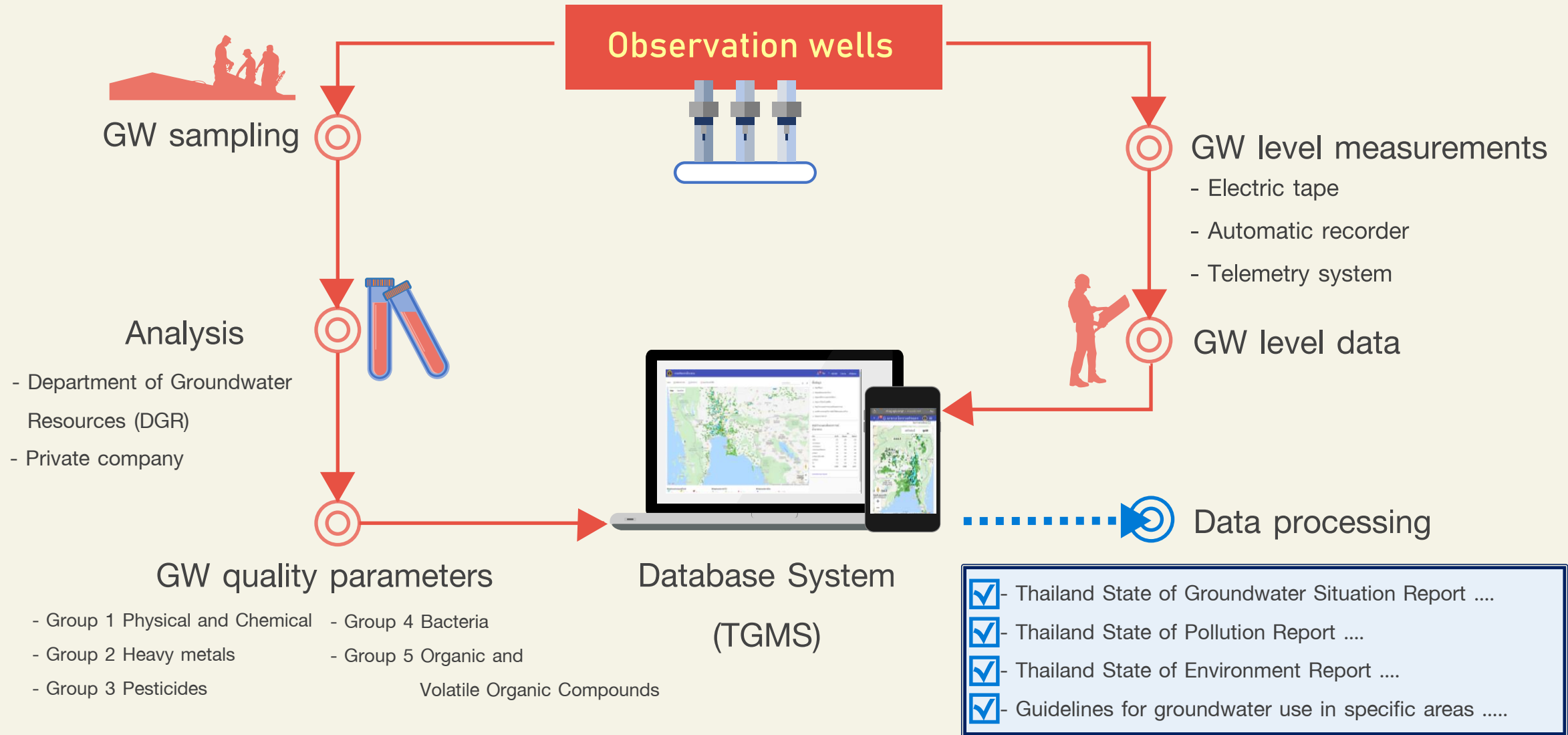
Department of Groundwater Resources
Bureau of Groundwater Conservation and Restoration

August 2022

OUTLINES

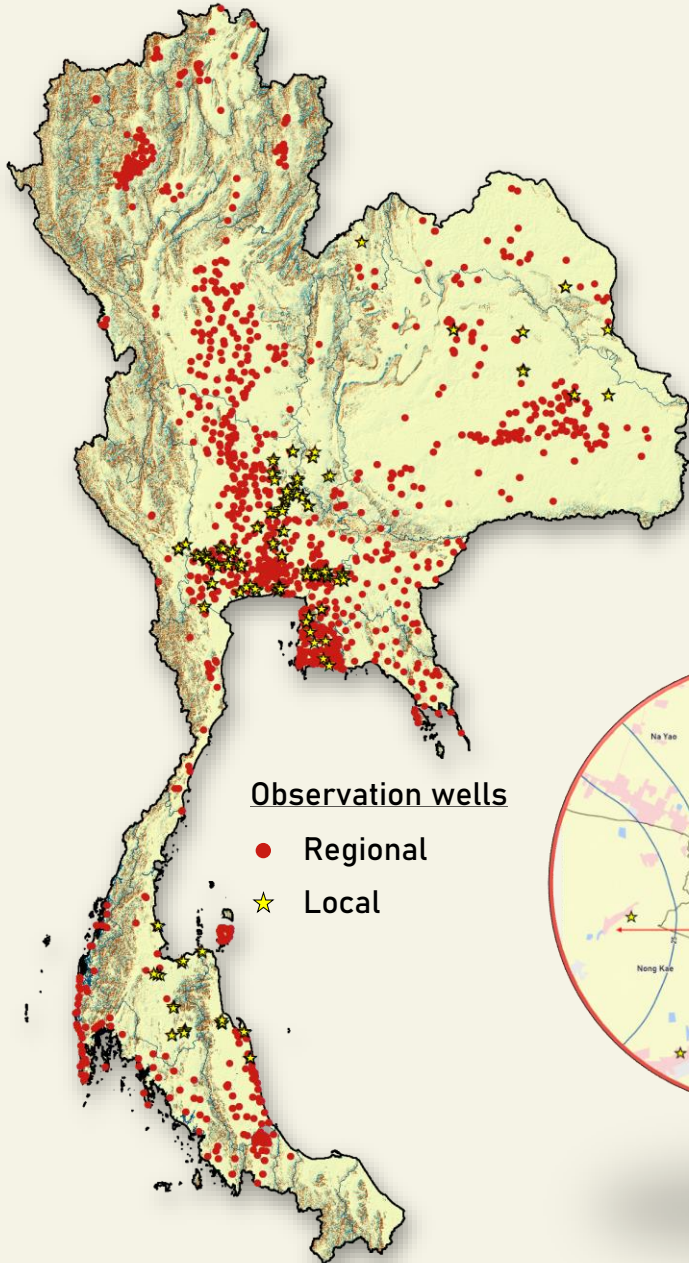
- 01 Groundwater Monitoring Network Design
- 02 Groundwater Monitoring Measurement
- 03 Groundwater Sampling
- 04 Thailand Groundwater Monitoring System (TGMS)
- 05 Analysis of Groundwater Level and Groundwater Quality
- 06 Groundwater Monitoring Data Utilization

Thailand Groundwater Monitoring System





Groundwater Monitoring Network Design



Observation wells

● Regional

★ Local



01 Regional Groundwater Monitoring Network

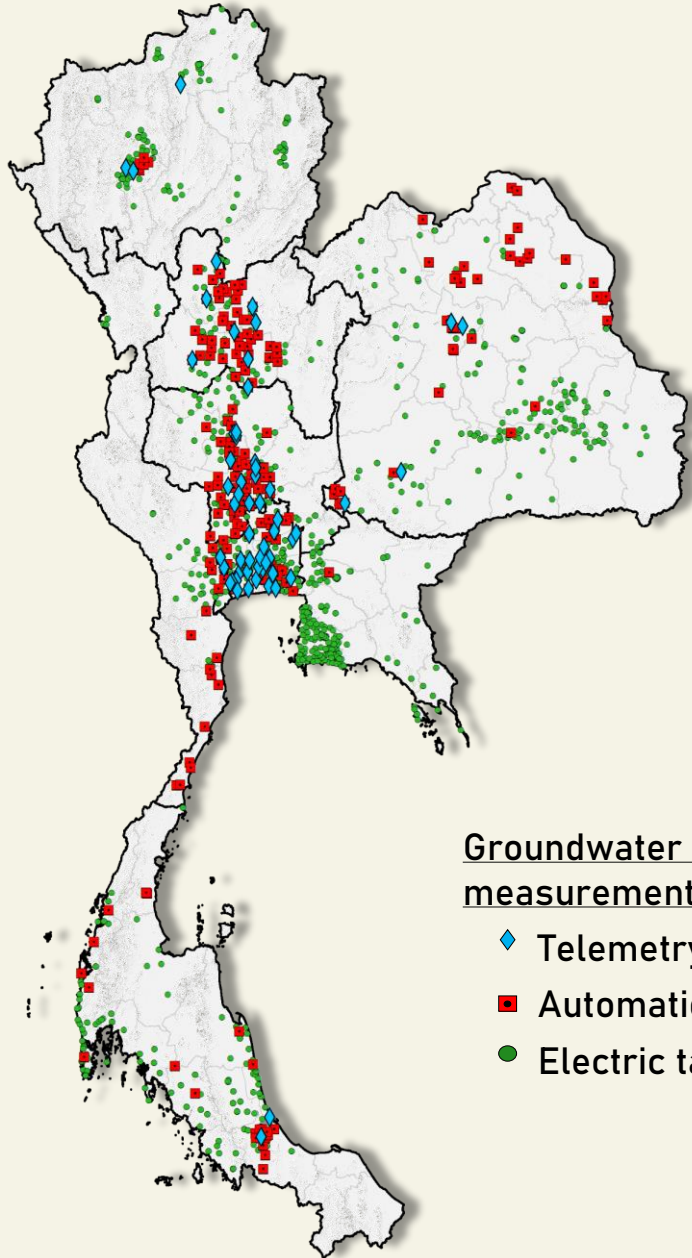
- Covering 27 groundwater basins.

02 Local Groundwater Monitoring Network

- Risk area of contamination such as landfills, industrial waste disposal areas.



Groundwater Level Measurement



Groundwater level measurement

- ◆ Telemetry system
- Automatic recorder
- Electric tape



Electric tape

- Collected twice a year



Automatic recorder

- Collected data every 1 hour
- Manually download via laptop



Telemetry system

- Collect data every 1 hour
- Deliver the data as automatic real-time to database system (TGMs)



Groundwater Sampling

- Groundwater quality are conducted once a year.



Parameters	Common area	Risk of GW contamination area
Physical and Chemical	✓	✓
heavy metals	✓	✓
Bacteria	✗	✓
Organic and Volatile Organic Compounds	✗	✓



Thailand Groundwater Monitoring System (TGMS)

Website access

- Department of Groundwater Resources website : <http://www.dgr.go.th/th/home>
- Thailand Groundwater Monitoring System : <http://tgms.dgr.go.th/#home>

<http://www.dgr.go.th/th/home>

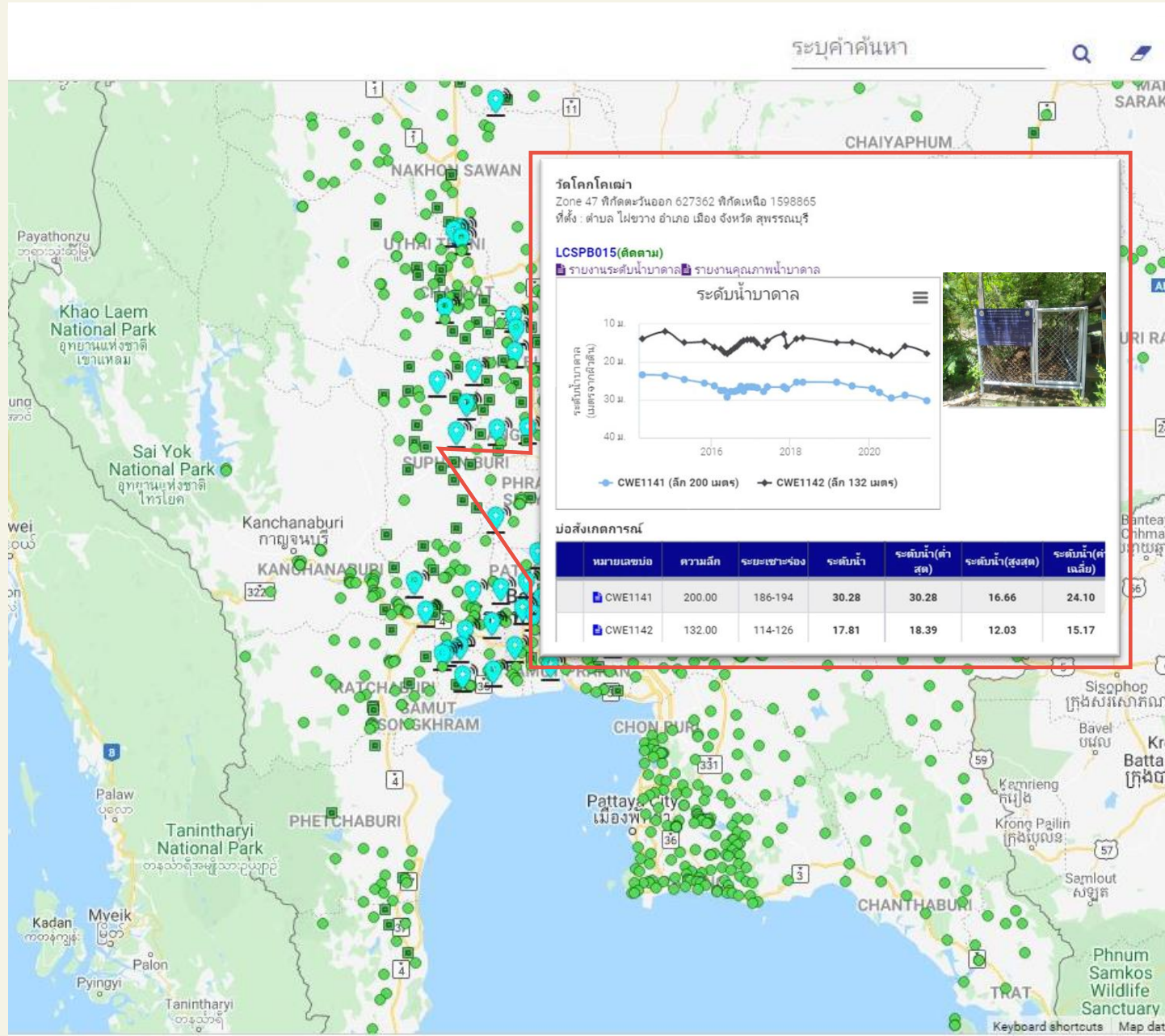
The screenshot shows the homepage of the Department of Groundwater Resources. At the top, there is a navigation bar with the department's name in Thai and English, and a search bar. Below the navigation bar is a large banner with a cartoon character wearing a yellow hard hat and a blue uniform, holding a clipboard. The banner text in Thai reads: "ประกาศกรมทรัพยากรน้ำบาดาล เรื่อง รายชื่อผู้ให้บริการฝึกอบรมเชิงปฏิบัติการภาคสนาม วัน เวลา และสถานที่ สำหรับการฝึกอบรม หลักสูตร "ช่างเจาะน้ำบาดาล" ระดับ 1 รุ่นที่ 25". To the right of the banner is a QR code. Below the banner is a row of five service icons: 1. A water tap icon labeled "จุดจ่ายน้ำรับงาน บริการประชาชน" (Water supply point for public service). 2. A water treatment tank icon labeled "ที่ตั้งโครงการ" (Project location). 3. A water drop icon labeled "บ่อสังเกตการณ์" (Monitoring well), which is highlighted with a red box. 4. A pie chart icon labeled "สรุปผลการช่วยเหลือ ประชาชนในสถานการณ์ภัยแล้ง" (Summary of assistance to people in drought conditions). 5. A water tap icon labeled "ความรู้ในการเติมน้ำใต้ดิน" (Knowledge in groundwater recharge).

<http://tgms.dgr.go.th/#home>

The screenshot shows the homepage of the Thailand Groundwater Monitoring System (TGMS). It features a map of Thailand with numerous green and blue dots representing monitoring wells across the country. The map is titled "Thailand" and includes various geographical labels in Thai and English. The website header includes the department's name and a search bar. The map interface includes a "Map" and "Satellite" toggle, a search bar, and a scale bar at the bottom.



Thailand Groundwater Monitoring System (TGMS)



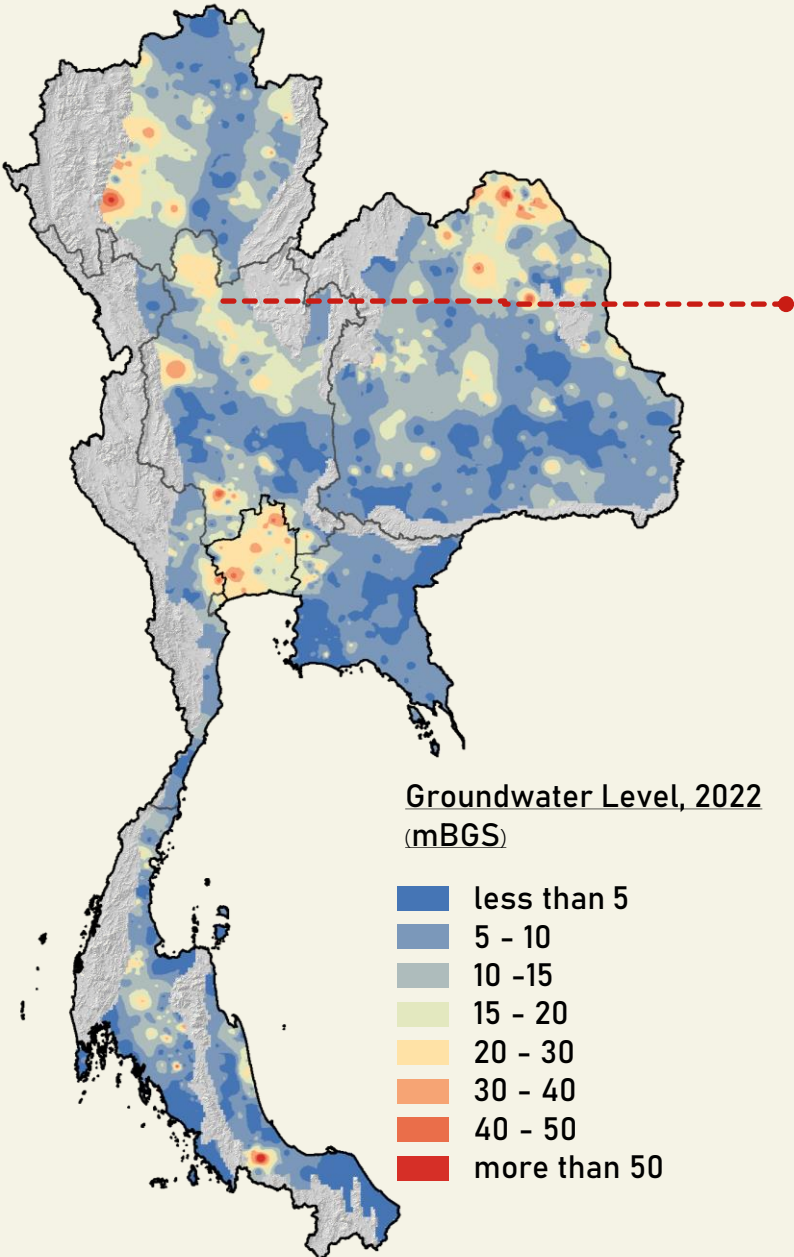
เลือกปี: 2565

CWE1141 เลือกจุดตรวจวัด เลือกวันที่ตรวจ ค้นหา ส่งออก

บ่อ	ดัชนีคุณภาพน้ำ	ค่าตรวจวัด	หน่วย	ผลวิเคราะห์
2565	ค่าความเป็นกรด-ด่าง (pH)	8.1000		อยู่ในเกณฑ์
2565	ค่าการนำไฟฟ้า (EC)	532.0000	µS/cm	n/a
3	ความขุ่น (Turbidity)		NTU	อยู่ในเกณฑ์
4	สี (Colour)		ADMI	อยู่ในเกณฑ์
5	แคลเซียม (Calcium)	25.0000	mg/l	อยู่ในเกณฑ์
6	แมกนีเซียม (Magnesium)	12.0000	mg/l	อยู่ในเกณฑ์
7	โซเดียม (Sodium)	79.0000	mg/l	n/a
8	โพแทสเซียม (Potassium)	5.0000	mg/l	n/a
9	เหล็ก (Iron)	0.2000	mg/l	อยู่ในเกณฑ์
10	แมงกานีส (Manganese)	0.0000	mg/l	อยู่ในเกณฑ์
11	ซัลเฟต (Sulfate)	12.0000	mg/l	อยู่ในเกณฑ์
12	คลอไรด์ (Chloride)	22.0000	mg/l	อยู่ในเกณฑ์
13	ฟลูออไรด์ (Fluoride)	1.8000	mg/l	เกินเกณฑ์อนุโมลสูงสุด
14	ไนเตรต (Nitrates)	< 0.9000	mg/l	อยู่ในเกณฑ์
15	ปริมาณสารทั้งหมดที่ละลายได้ (Total Dissolved Solids)	346.0000	mg/l	อยู่ในเกณฑ์

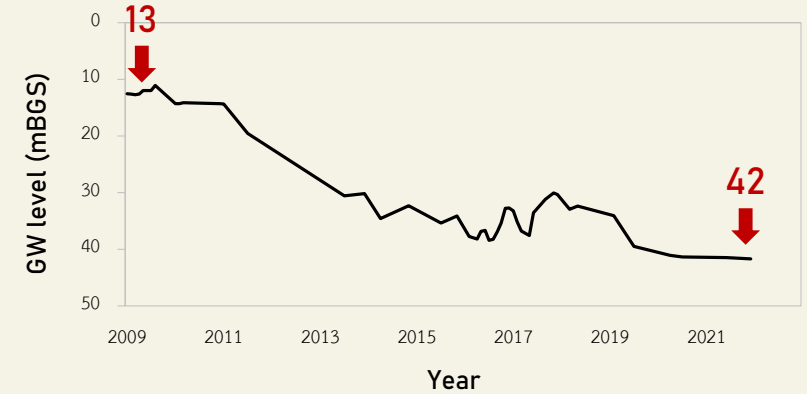


Analysis of groundwater level

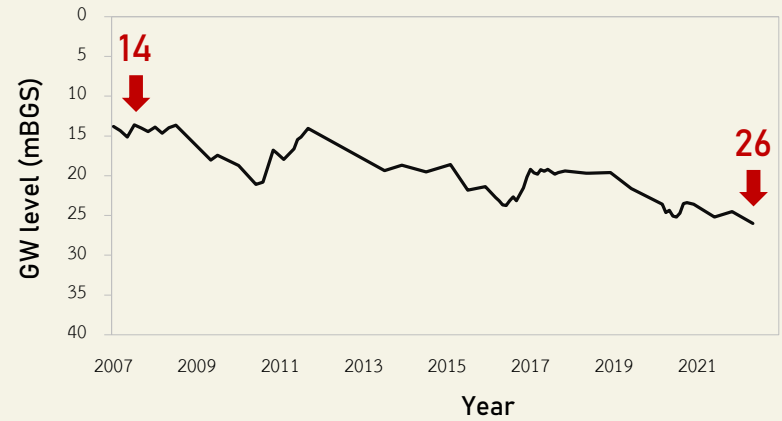


Central Thailand

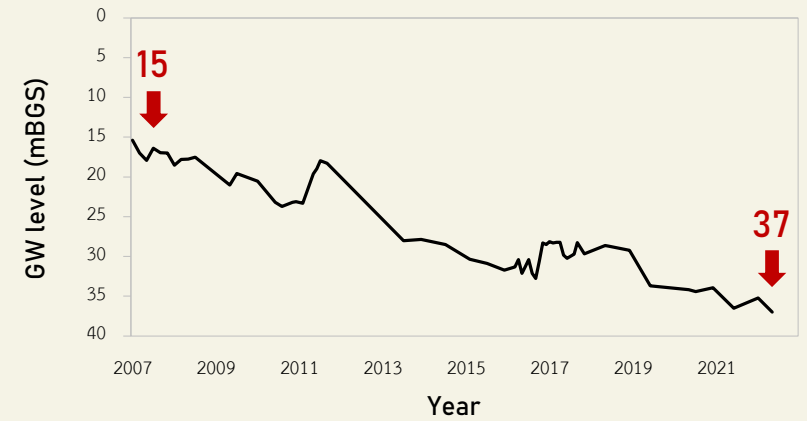
Nong Ya Sai District, Suphan Buri Province



Sawankhalok District, Sukhothai Province



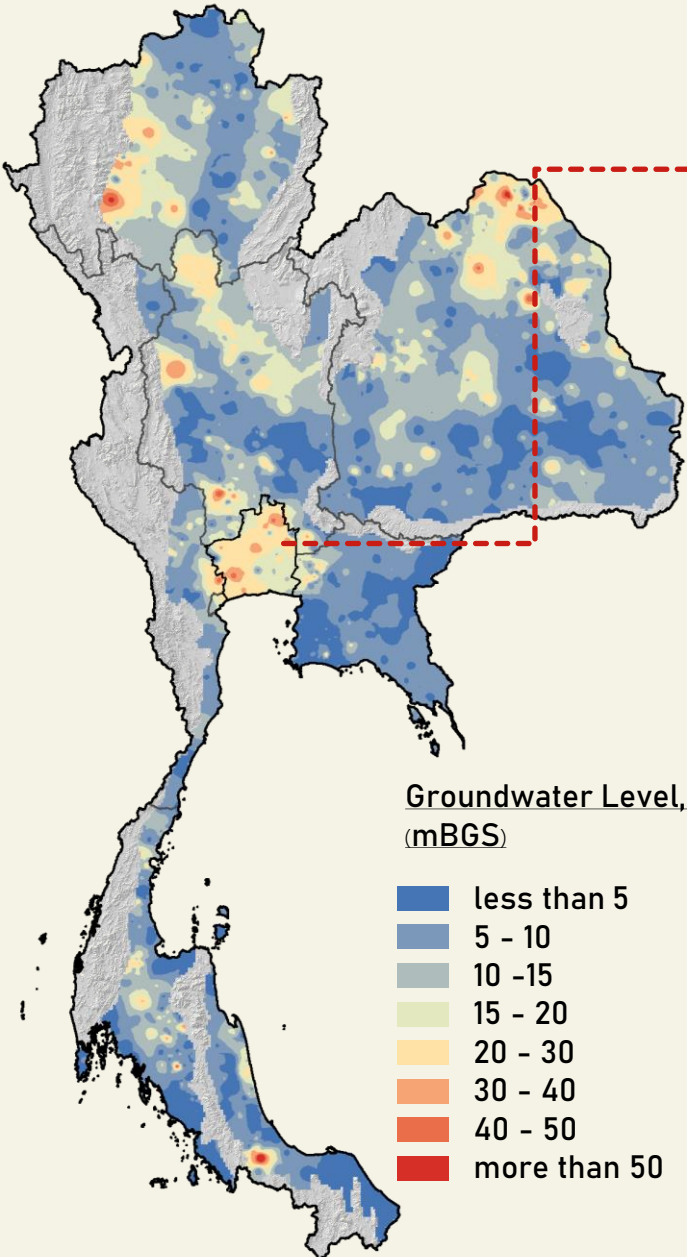
Si Samrong District, Sukhothai Province



mBGS : Groundwater level expressed in meters Below the Ground Surface



Analysis of groundwater level

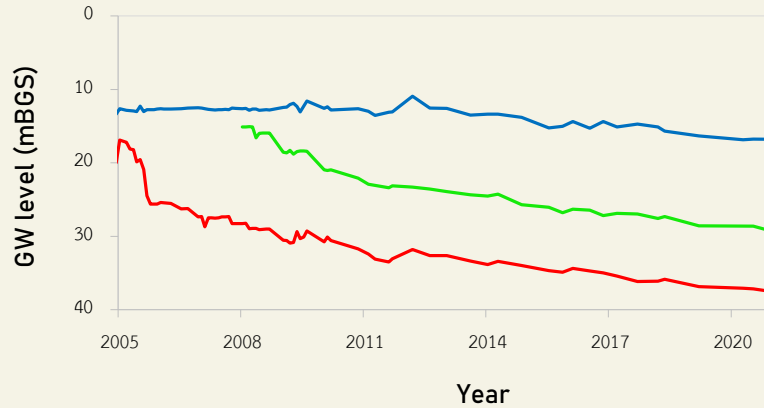


Bangkok and Vicinity area

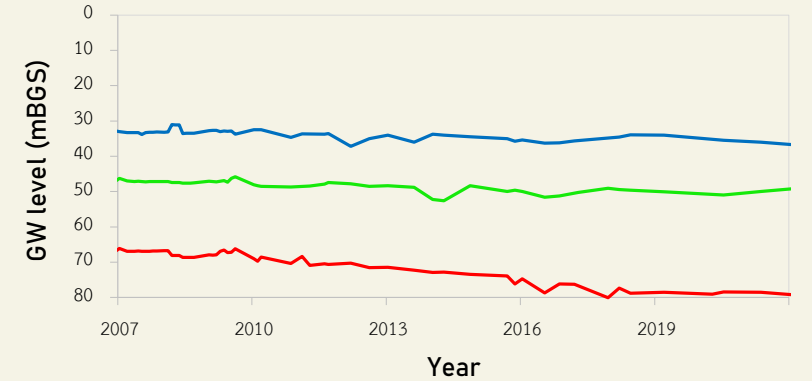
Groundwater level (mBGS)

- Phra Pradaeng Aquifer (100 m. zone)
- Nakhon Luang Aquifer (150 m. zone)
- Nonthaburi Aquifer (200 m. zone)

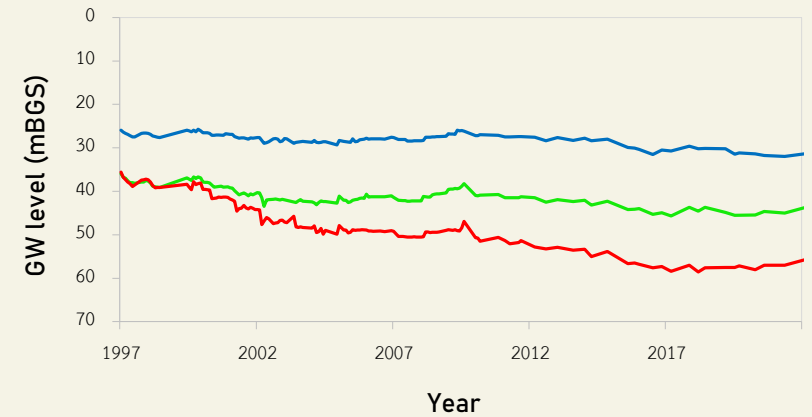
Uthai District, Phra Nakhon Si Ayutthaya Province



Ban Phaeo District, Samut Sakhon Province



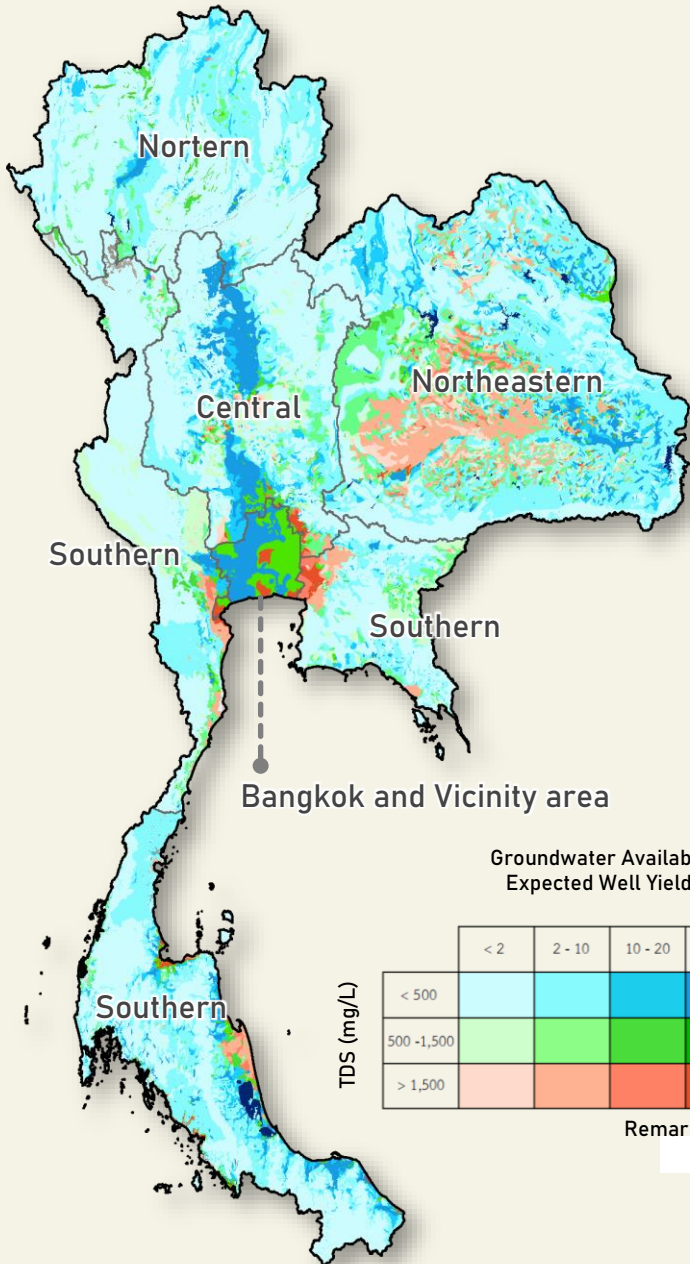
Mueang Nakhon Pathom District, Nakhon Pathom Province



mBGS : Groundwater level expressed in meters Below the Ground Surface



Analysis of groundwater quality



Saltwater upconing

➤ Northeastern Thailand

Saltwater intrusion

➤ Bangkok and Vicinity area

➤ Southern Thailand

Groundwater contamination

➤ Landfills

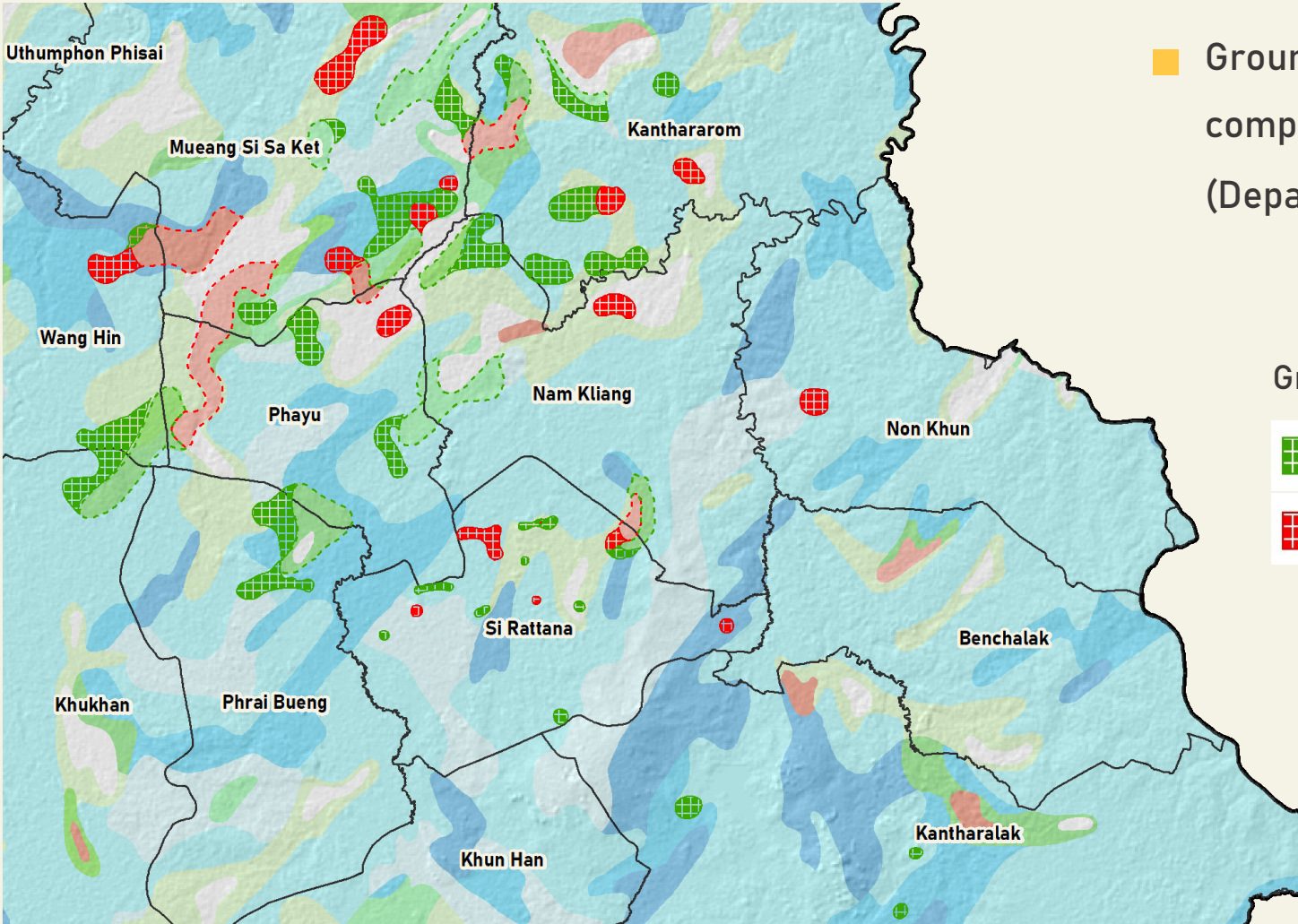
➤ Industrial waste
deposal area



Analysis of groundwater quality

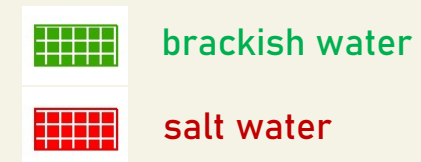
Northeastern Thailand

Groundwater quality change in Si Sa Ket Province



Groundwater quality from survey in 2021 compare with Groundwater Map in 1990 (Department of Mineral Resources, 1990)

Groundwater quality from survey in 2021



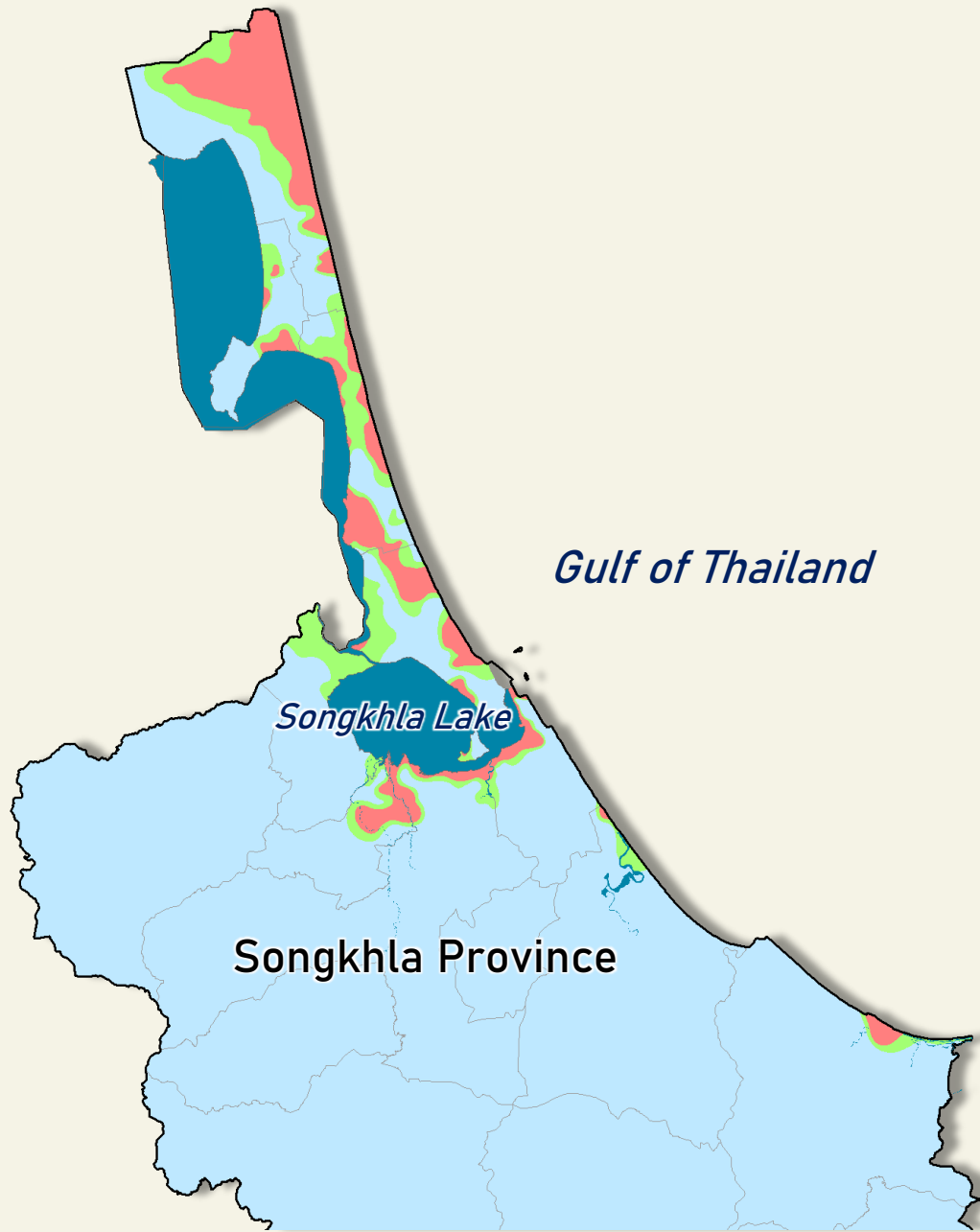
Groundwater Availability index
Expected Well Yield (m³/hr)

	< 2	2 - 10	10 - 20	20 - 30	> 30
< 500					
500 - 1,500					
> 1,500					

Remark : < Less Than
> More Than




Analysis of groundwater quality



Southern Thailand

Distribution of chloride concentration in the groundwater, Songkhla Province.

Chloride concentration (mg/L)

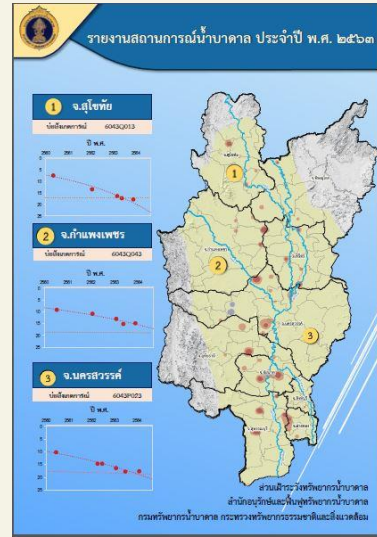
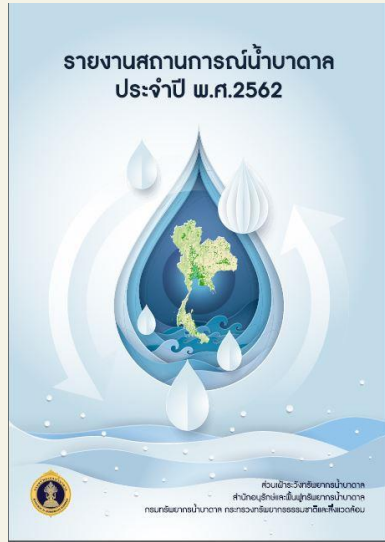
 < 250

 250-600

 > 600

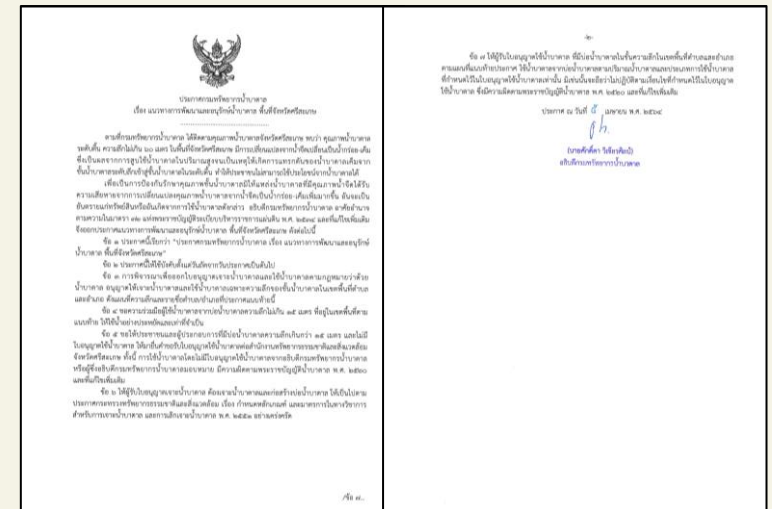


Groundwater Monitoring Data Utilization



- The annual report has been prepared for describing the groundwater situation.
 - Thailand State of Groundwater Situation report
 - Thailand State of Pollution report
 - Thailand State of Environment report

- Guidelines for groundwater development and conservation.
 - in specific areas, e.g., Si Sa Ket Province
 - Songkhla Province



Thank you

Thanyarat Srikamma

Thanyarat720@gmail.com

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