

Relationship between groundwater, hydrology and water use in lower north region of Thailand

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I. INTRODUCTION

From the study result by the Department of Groundwater Resources of Thailand, it was found that in the lower north region covering Sukhothai, Phitsanulok and Phichit provinces during the recent decade, the groundwater levels decline continuously on the average of **0.10 – 0.25 m./year.**

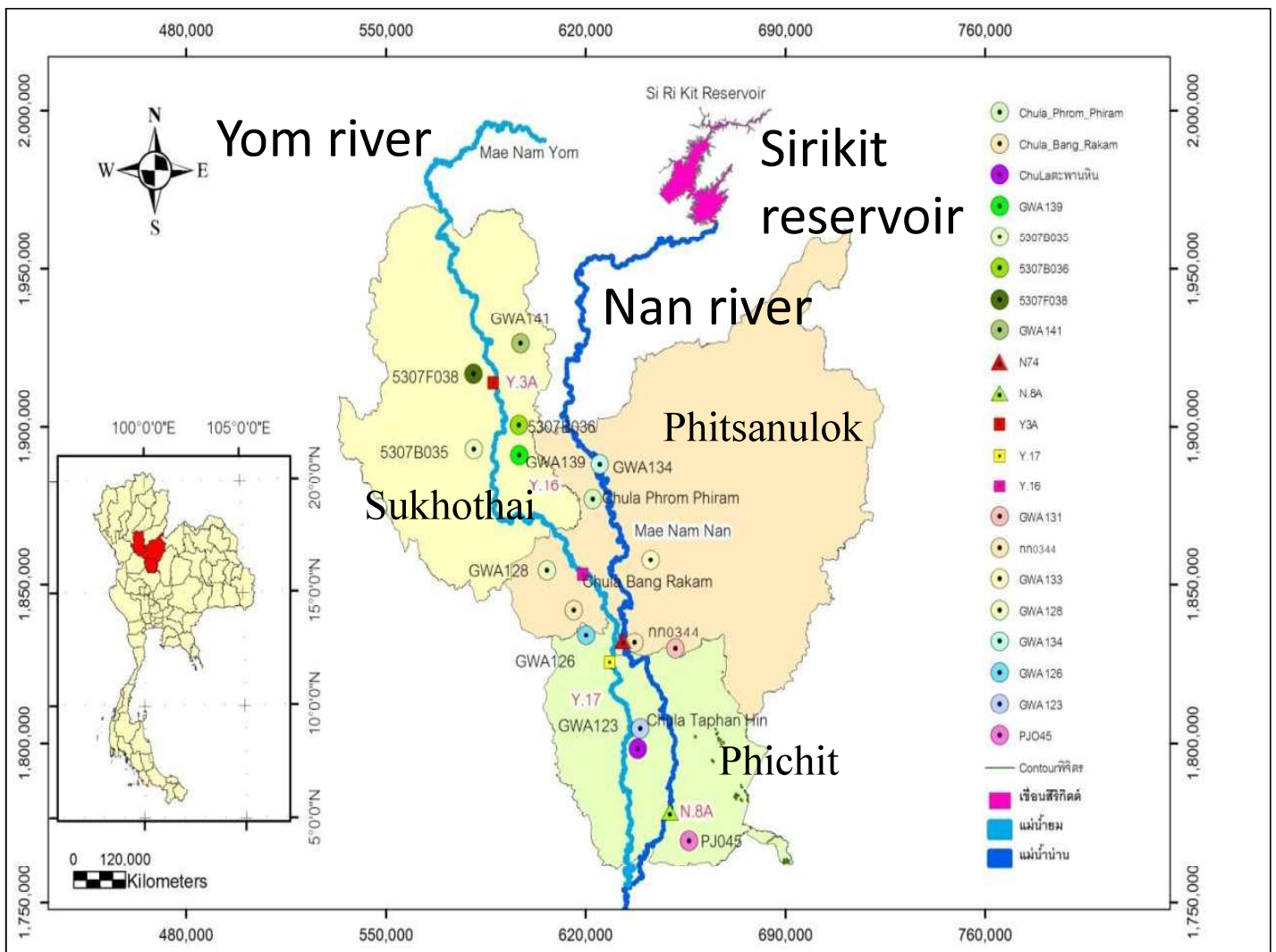
I. INTRODUCTION

The groundwater level decline causes the groundwater levels in the critical areas to be the depth of more than **8 m.** below the ground surface and then affects the cost of pumping groundwater.

II. OBJECTIVES

The objectives of this study are to determine

1. the statistics and trend of groundwater levels
2. the relationship between the groundwater levels and Yom and Nan river levels
3. the relationship between the groundwater levels and the groundwater uses

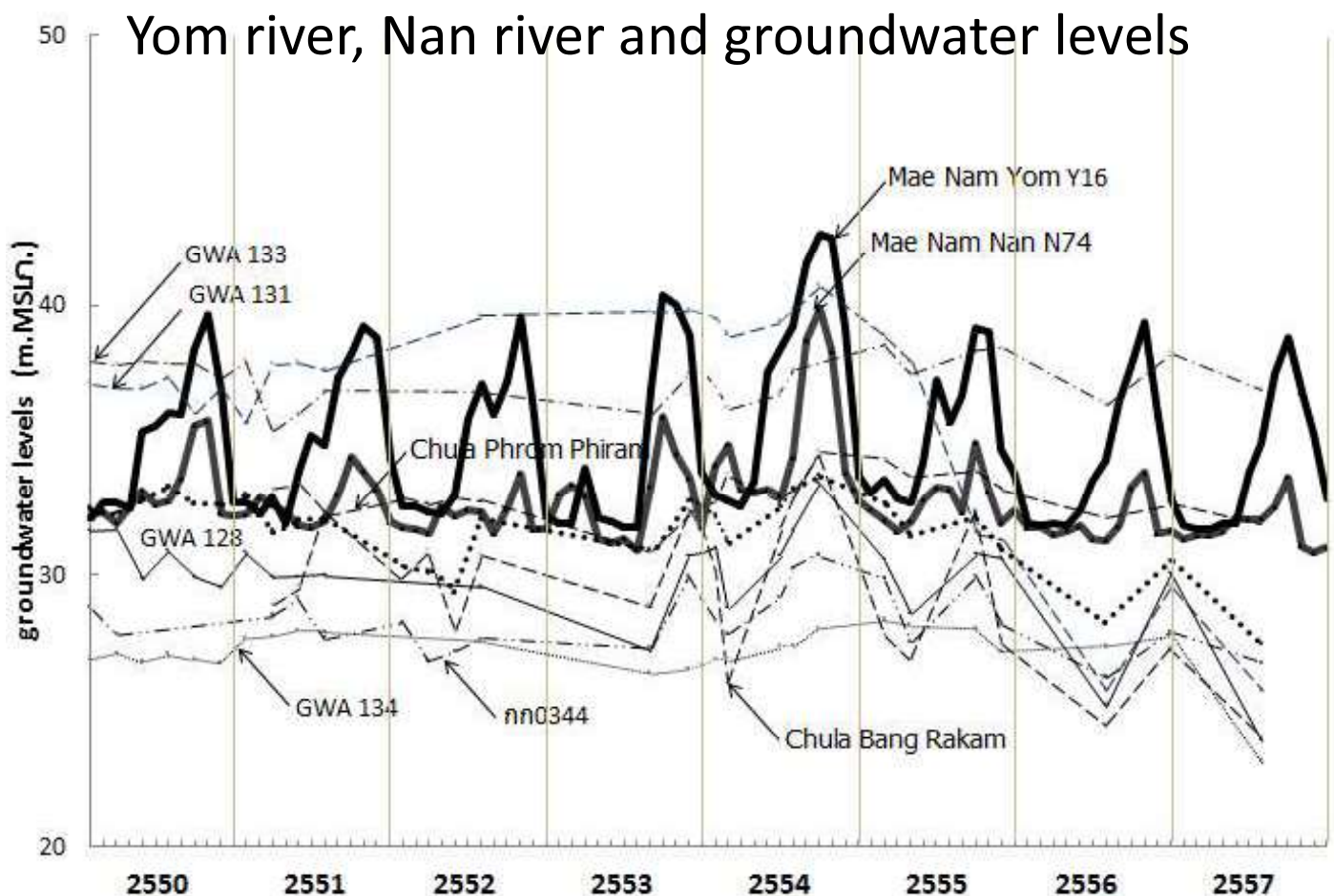


IV. METHODOLOGY

1. The water uses were determined in four sections such as agriculture, ecology, industry and consumption.
2. The water resources were determined in three sources such as effective rainfall, surface water resource and groundwater resource.
3. The data were analyzed in monthly time scale during the years 2007 - 2014.

V. RESULT AND DISCUSSION

- A. Statistic and trend of groundwater levels
- B. Relationship between the groundwater levels and Yom and Nan river levels
- C. Relationship between the groundwater levels, groundwater drawdown, and groundwater uses



No	item	Sukhothai	Phitsanulok	Phichit
1	groundwater depth below ground surface in year 2013 (m)	18.27	9.90	12.17
2	annual groundwater drawdown (m/year)	2.95	2.64	3.37
3	annual groundwater recovery (m/year)	2.14	1.77	3.06
4	rate of groundwater level decline (m/year)	-0.69	-0.37	-0.46

Proportion of water use section

Section Province	agriculture (million cum.)	ecology (million cum.)	consumption (million cum.)	industry (million cum.)	Total (million cum.)
Sukhothai	869	198	85	11	1,163
Phitsanulok	1224	276	114	8	1,622
Phichit	743	167	66	4	980
Total	2836	641	265	23	3765
proportion(%)	75.4	17	7	0.6	100

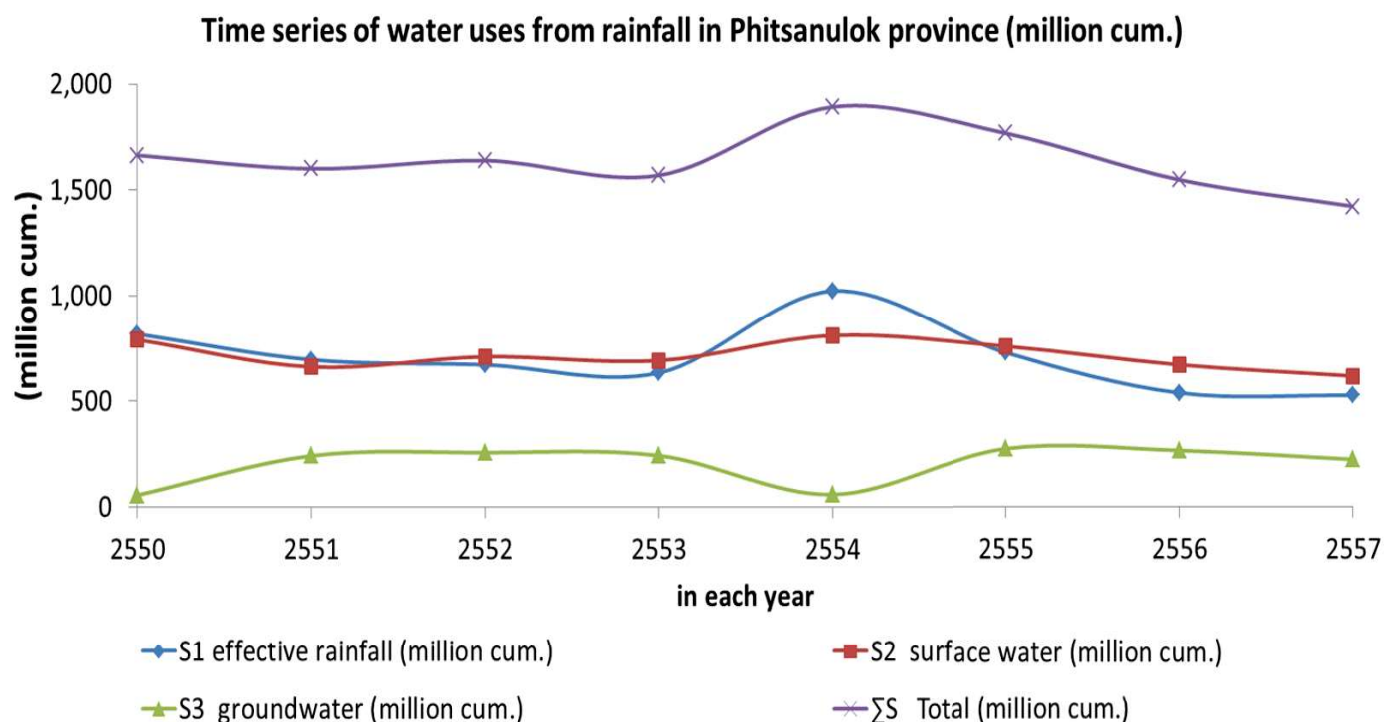
Proportion of provincial water use

no	province	%
1	Sukhothai	30.9
2	Phitsanulok	43.1
3	Phichit	26
Total		100

Proportion of water use section

no	water use section	%
1	agriculture	75.4
2	ecology	17
3	consumption	7
4	industry	0.6
Total		100

Annual water resources for uses in Phitsanulok



Proportion of water use resources

Water source Province	effective rainfall (million cum.)	surface water (million cum.)	groundwater (million cum.)	Total (million cum.)	proportion(%)
Sukhothai	507	482	174	1,163	30.9
Phitsanulok	704	715	203	1,622	43.1
Phichit	430	412	138	980	26
Total	1641	1609	515	3765	100
proportion(%)	43.6	42.7	13.7	100	

Proportion of water resource

no	water resource	%
1	effective rainfall	43.6
2	surface water	42.7
3	groundwater	13.7
Total		100