Methods for the Implementation of Total Water Pollution Management(TWPM) in Chungnam Province, Korea

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I. Introduction

- The total water pollution management (TWPM) system seeks to harmonize conservation and development.

- It allowing regional development to be carried out in an environment-friendly manner and within the scope of achieving and maintaining the desired water quality

I. Introduction

- Conventionally water quality management in Korea has been enforced by the concentration-based regulation.

- There are no proper measures for the prevention of an excessive pollutant load over an environmental capacity.

II. Current Status

1. Background of adopt in Chungnam Province

- Located in the heart of Korean peninsula, Chungnam is rapidly growing due to its geographic accessability and proximity to Northeast Asia.

II. Current Status

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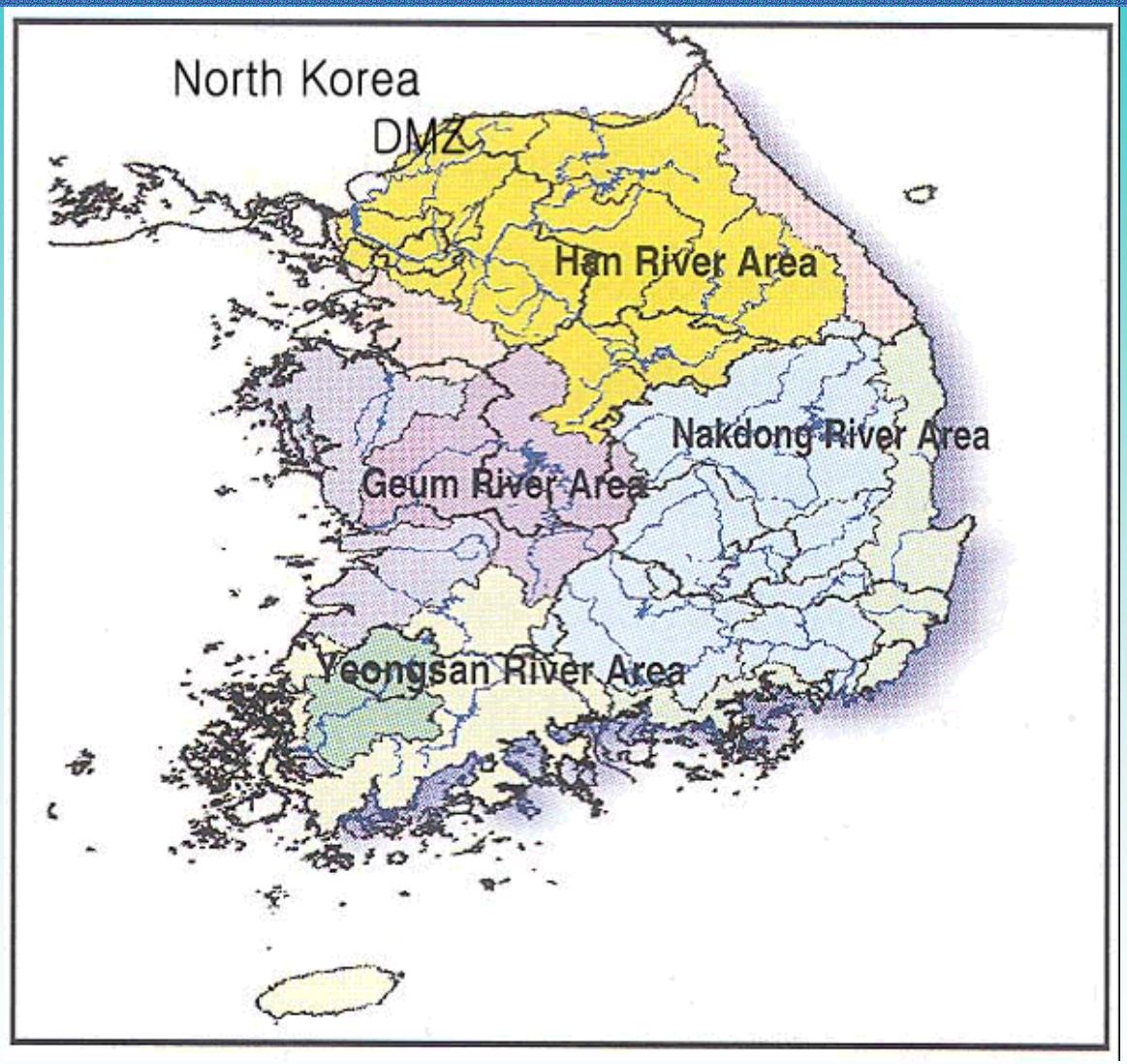
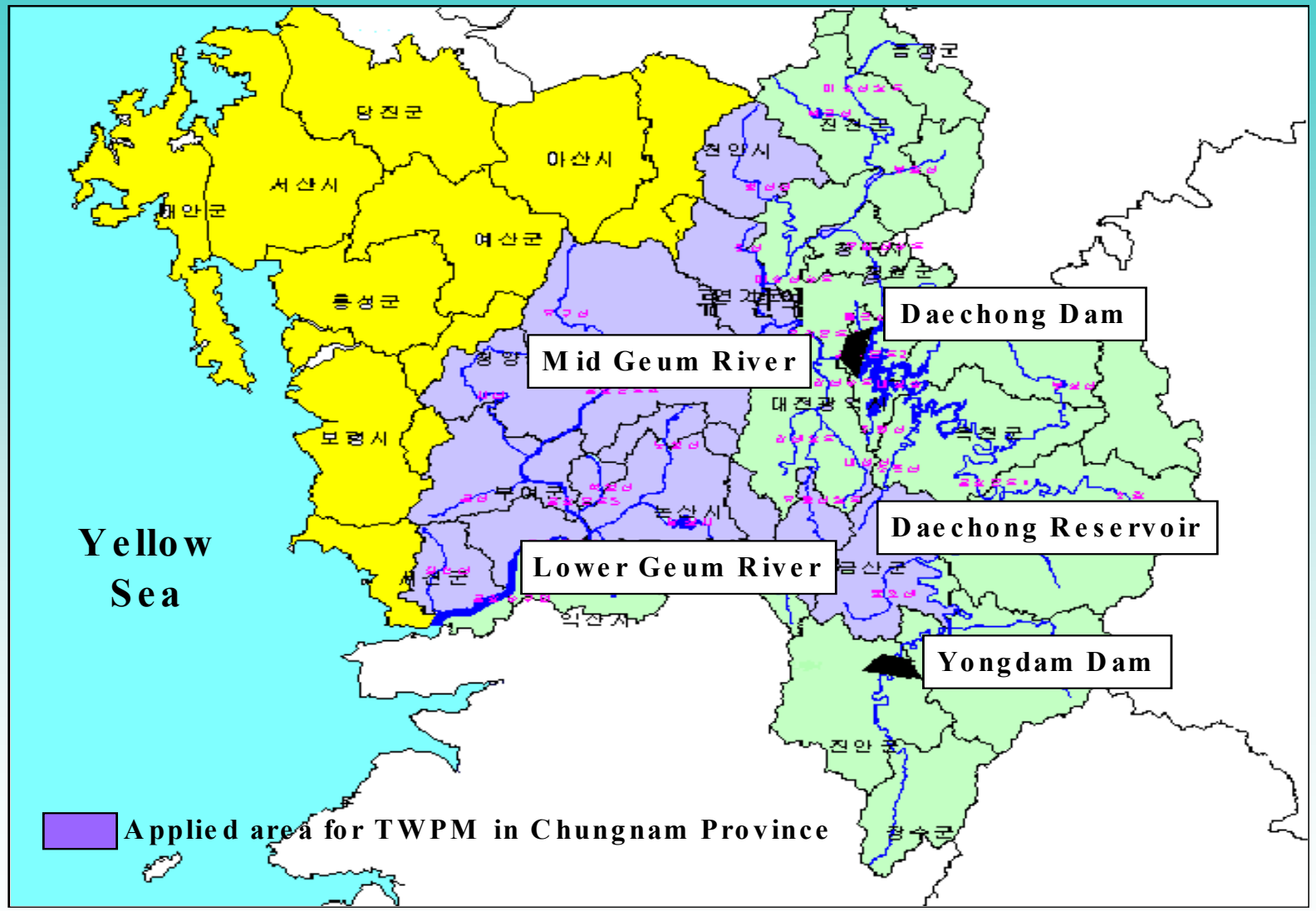


II. Current Status



2. Scope of planning

❖ Scope of time

- Standard for the survey of pollutant sources : December, 2002
- Standard for the survey of environmental data of watershed : December, 2002
- Measurement of water quality and flow : September, 2003 ~ May, 2004

2. Scope of planning

❖ Scope of area and contents

- Survey of environmental data in the watershed

  (meteorology, water resources, streams and reservoirs)

II. Current Status

❖ Scope of area and contents(cont)

➢ Survey of pollutant sources in the watershed

- population, water use, livestock, fish farming,
- land use and its regulation, landfill leachate,
- environmental treatment facilities,
- influent quantity and quality,
- effluent quantity and quality,
- use of pesticide and fertilizer,
- domestic and industrial water supply

II. Current Status

❖ Scope of area and contents(cont)

- Estimation of water pollution load
- Survey of flow quantity and water quality
- Modeling of water quality
- Establishment of reduction plan and regional development plan by city or county
- Allocation of waste load and setting the target quality by stream reach
- Questionnaire survey and public involvement presentation
- Making establishment guideline for implementation plan

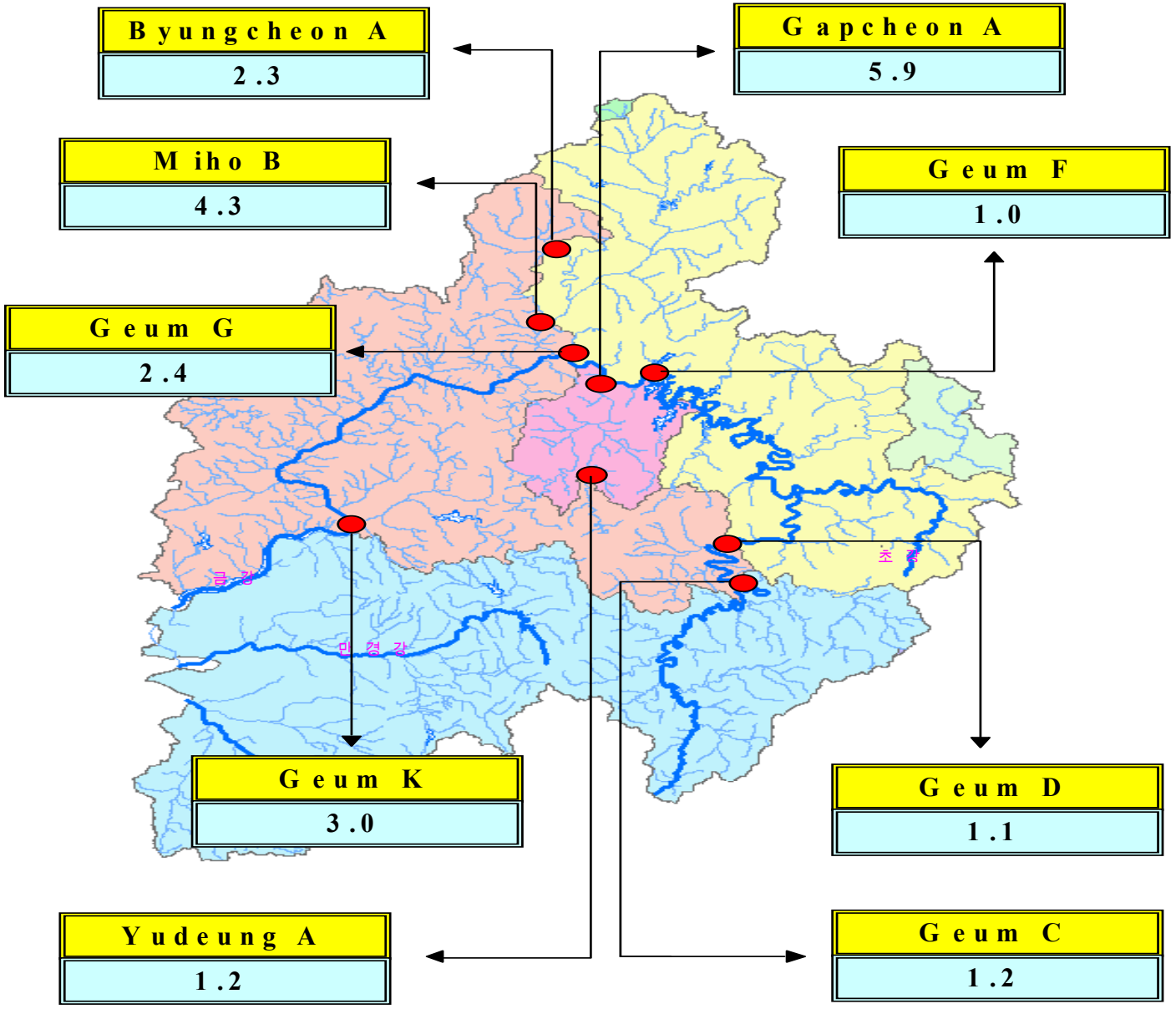
III. Enforcement Framework on TWPM

1. Set Water Quality Target

Watershed segment	C	D	F	YT	GT	G	BT	MT	K
Draft target	1.0	1.0	1.0	1.1	5.9	2.3	2.0	3.6	2.2
Adjusted target	1.2	1.1	1.0	1.2	5.9	2.4	2.3	4.3	3.0

- Remark : Unit of target quality is set by BOD5(mg/L)

Target water quality in the boundary points of Geum River Watershed(BOD5)



III. Enforcement Framework on TWPM

2. Basic Guidance for TWPM

By the Act Relating to Water Resource Management and Community Support for Geum River, the Guidance stipulates basic method for enforcement including objective materials, survey on pollutant sources and estimation of waste load, as well as establishment of basic and implementation plan initiated by local autonomous government.

III. Enforcement Framework on TWPM

- **Objective material for TWPM**
  - The 1st planning period(2004~10) : BOD5
  - The 2nd planning period(2011~15) : unsettled at present

III. Enforcement Framework on TWPM

- **Allocation of waste load by unit watershed**

Allotment = target water quality×standard flow

(quantity of low flow for 10 years)

III. Enforcement Framework on TWPM

- **Allocation of waste load by unit watershed**

Minimize $Z=\sum GPi \cdot Xi$

Constraints $\sum GPi \cdot (1-Xi) \cdot Dij + BODj \leq BOD(g)j$, $0 \leq Xi \leq 1$

where, GPi : generation of total BOD pollutant in point i

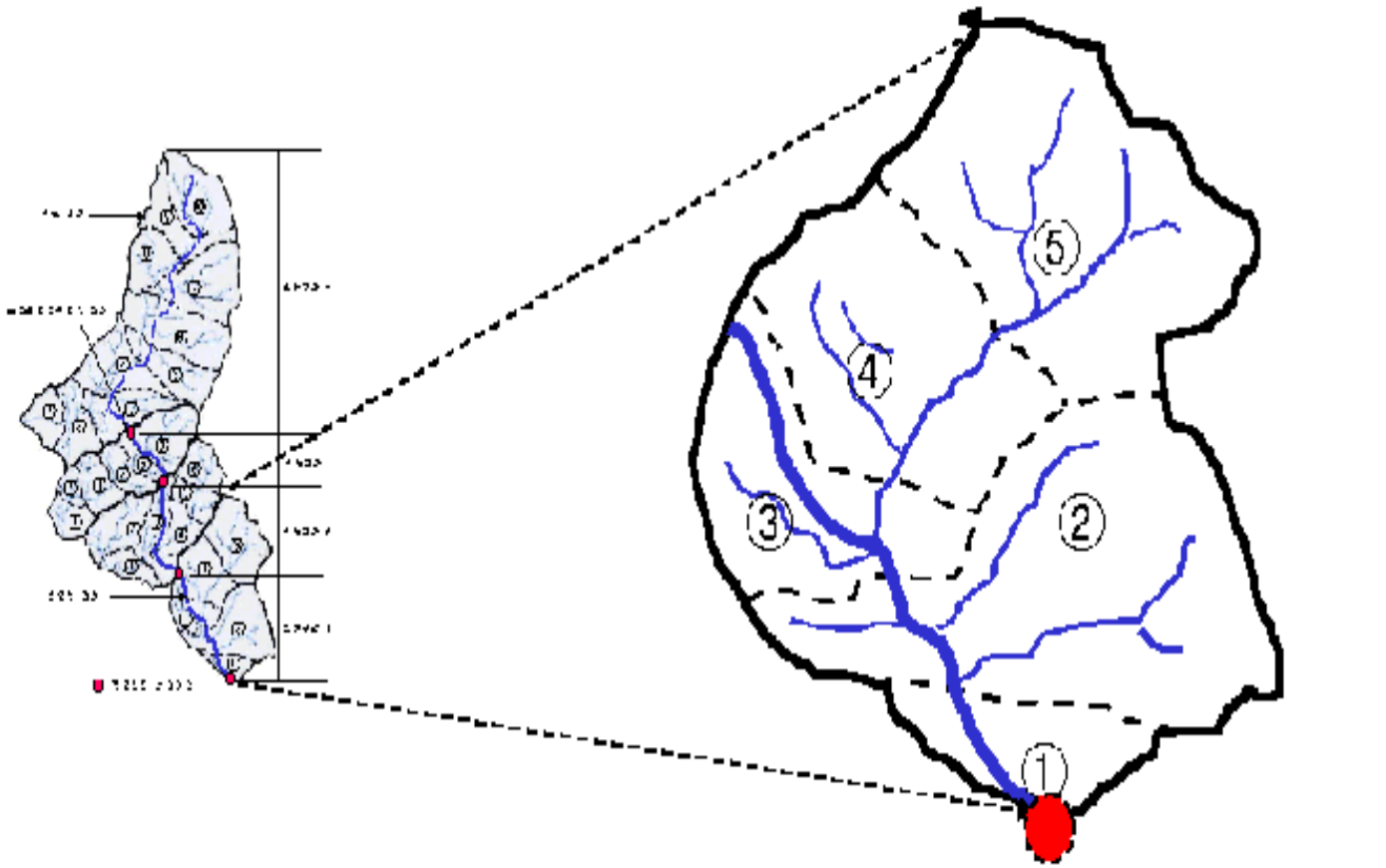
BOD(g)j : target BOD load in point j

BODj : basic BOD load in point j

Dij : marginal BOD increase unit by emission from point i to j

Xi : reduction rate in point i

III. Enforcement Framework on TWPM

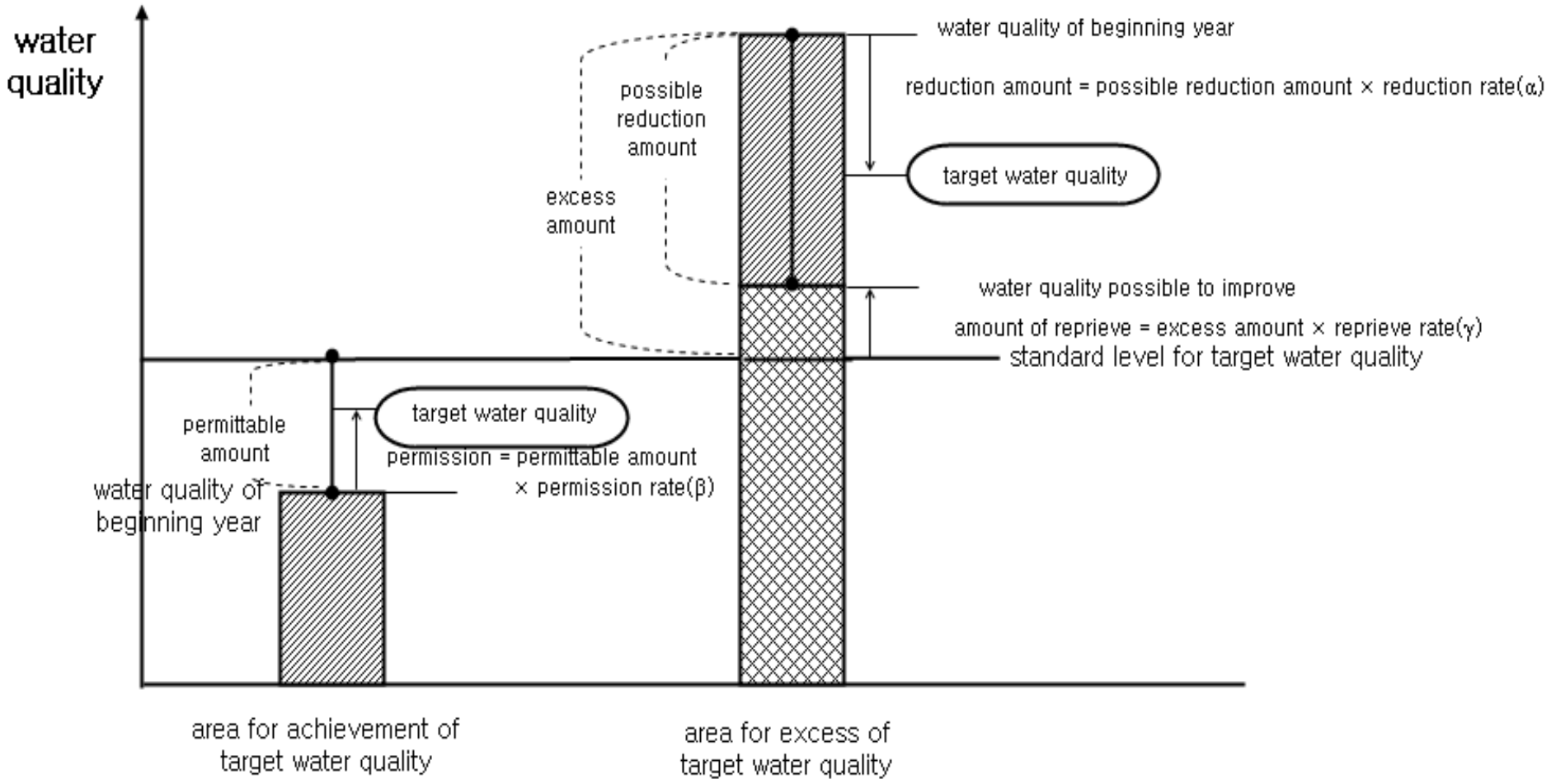


III. Enforcement Framework on TWPM

- **Establishment of basic plan**
  - Dividing the unit watershed in small scale
  - Allotment of waste load by local autonomy : Total load of allotment by small watershed controlled over its own administrative district.

    Allotment = calculated value by modeling×(1-MOS)

III. Enforcement Framework on TWPM



III. Enforcement Framework on TWPM

3. Basic plan

Main contents :

Distinguish of TWPM unit area by small scale section. Survey of required data for planning such as land use, pollutant sources and environmental status of watershed is made by the basic Guidance for unit watershed and small scale section.

III. Enforcement Framework on TWPM

4. Implementation plan

- **Criterion of judgment for exceeding the set target**

If measured data for 3 years exceeded two times consecutively, then that area is determined as an objective unit watershed for the enforcement of TWPM and announced to the relevant administrative autonomy.

III. Enforcement Framework on TWPM

Period for application of implementation plan

applied area	applied period
metropolitan and city area	August, 2005~December, 2010
counties in the area of Daecheong Reservoir watershed	August, 2006~December, 2010
other area of counties	August, 2008~December, 2010

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- 道不同 不相爲謀

- Men who differ in their principles can not help each other in their plans.

(Confucius)

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CHUNGNAM,

Province of Warmheart!

See you in Chungnam!