GEUM RIVER BASIN

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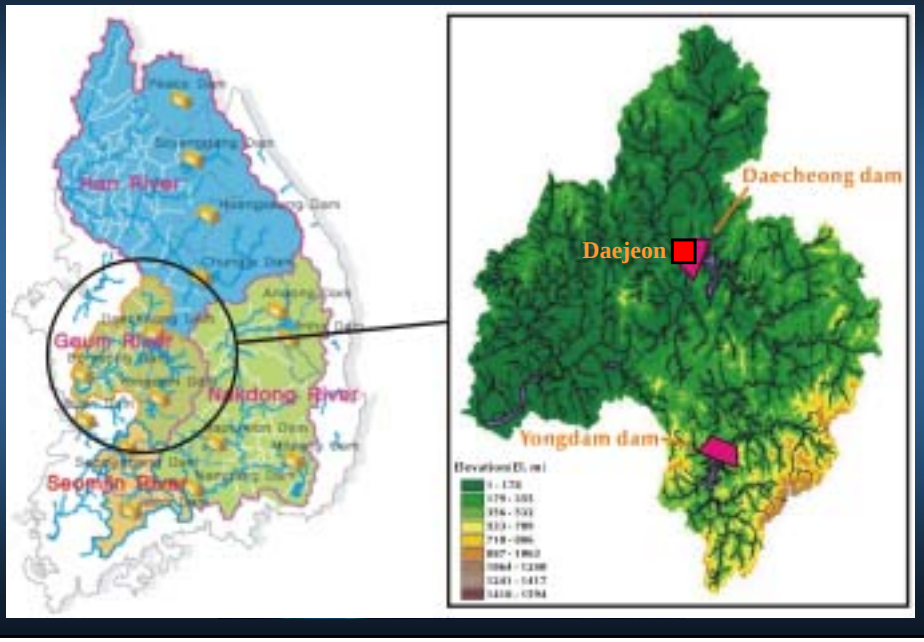
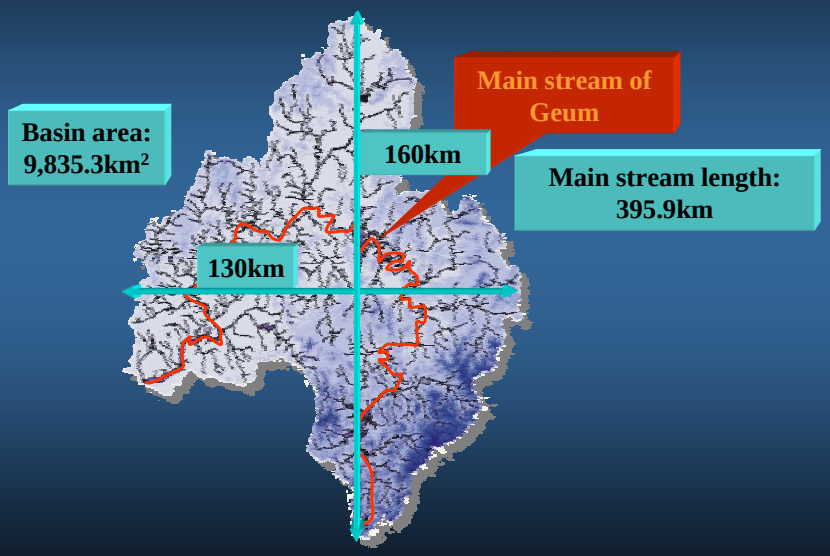
Location and Topography (1)



Location and Topography (2)



Climate and Weather

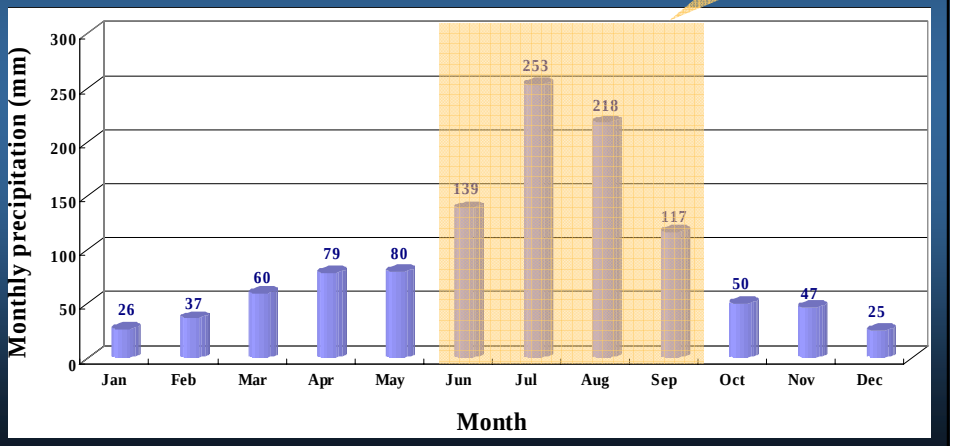
- Continental climate in winter and the oceanic climate in summer
- Climate of the Geum river basin is the typical pattern of Korea because it is situated almost in the middle of the country.

Month	Temperature (°C)			Relative Humidity (%)	
	Mean	Maximum	Minimum	Mean	Minimum
Jan	-2.3	14.5	-17.8	64.3	12.0
Feb	-0.5	21.7	-16.2	63.4	6.0
Mar	4.6	24.6	-11.8	61.8	9.0
Apr	11.8	29.4	-5.0	59.6	8.0
May	16.8	31.0	2.3	63.9	11.0
Jun	20.9	33.5	7.5	72.7	13.0
Jul	24.0	36.8	11.5	81.7	24.0
Aug	24.3	35.6	11.5	81.8	30.0
Sep	19.1	32.7	4.1	78.8	14.0
Oct	13.1	29.1	-3.6	72.0	11.0
Nov	6.2	25.3	-10.7	69.2	12.0
Dec	0.1	17.9	-17.2	66.5	10.0
Mean	11.5	27.7	-3.8	69.6	13.3

Hydrologic Characteristics (1)

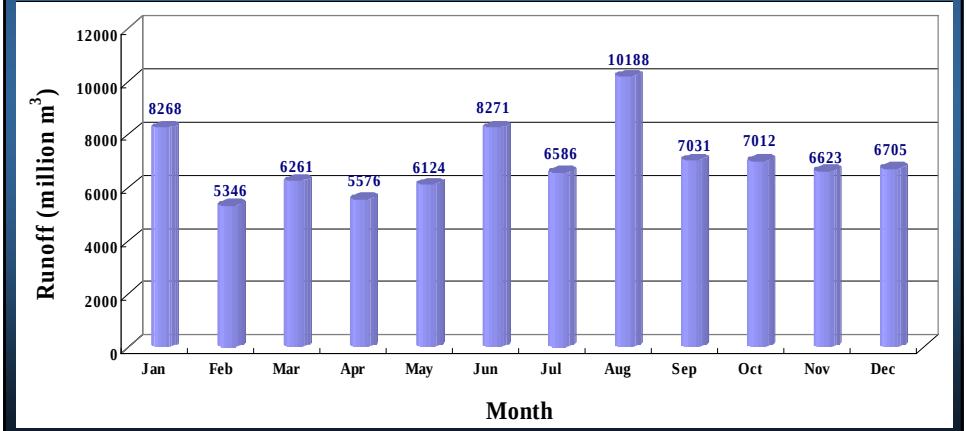
- **Precipitation (1966-1996)**
  - Annual mean precipitation: **1,130.7mm**
  - Its fluctuation is wide.

64% of annual precipitation



Hydrologic Characteristics (2)

- **Runoff (1983-2001)**
  - Annual mean runoff: **7 billion m^3**
  - Its ratio: **58.3%**



Water Use (1)

◎ Water use in Korea (1998)

	Amount (billion m^3)	
Potential Water Resources	127.6	
Total Water Use	33.1	(100%)
Domestic Use	7.3	(22%)
Industrial Use	2.9	(9%)
Agricultural Use	15.8	(48%)
Instream Flow	7.1	(21%)

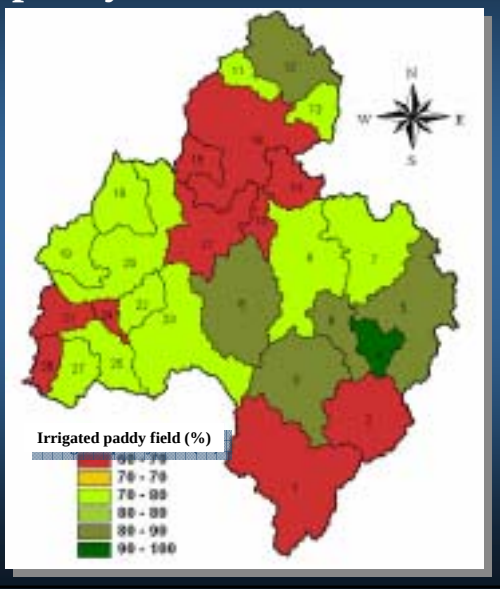
Water Use (2)

◎ Water use in Geum river basin (2001)

Water use	Amount (billion m^3)	Rate (%)
Domestic water	0.9	14
Industrial water	0.3	5
Agricultural water	4.0	61
Maintenance water	1.3	20
Total	6.5	100

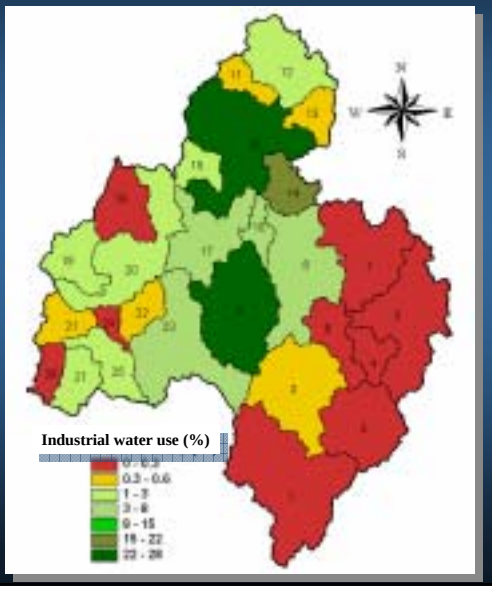
Water Use (3)

- Irrigated paddy field for each sub-basin



Water Use (4)

- Industrial water for each sub-basin



Water Supply (1)

- **Surface water**
  - The Geum river has low streamflow for most of the dry season, but drain flood flows immediately after storms in the summer season
  - Mean annual streamflow of the whole Geum river basin for the period of 1983 to 2001 is 222.0 m^3/sec.

	Rainfall (mm)	Rainfall ($\times 10^9 m^3$)	Streamflow ($\times 10^9 m^3$)	Runoff coefficient (%)
Mean	1,130.7	11.1	7.0	58.3
Maximum	1,714.6	16.8	11.3	67.3
Minimum	670.7	6.6	3.1	47.0

Water Supply (2)

- **Groundwater**
  - Groundwater development is naturally limited to the alluvial plain.
  - Groundwater storage in the alluvial plains totals some 81.0 million m^3 and annual fluctuation is some 135 million m^3.
  - Groundwater supply is considered to be a supplementary means, and surface water supply is taken into account.

Area of alluvial plains (km^2)	Storage ($\times 10^9 m^3$)	Available groundwater ($\times 10^9 m^3$)
3,029	8.1	3.0

Two Multipurpose Dams (1)

- **Daecheong dam**
  - First multipurpose dam constructed in 1980
  - It is located at 150 km upstream from the Geum river
  - Daecheong = Daejeon city + Cheongju city

General
Location: Geum river
Purpose: Multipurpose
Catchment area: 4,134 km^2
Dam type: CF&RF
Construction period: 1975-1981
Owner: KOWACO

Reservoir
Flood water level: EL. 80.0 m
Normal high water level: EL. 76.5 m
Restricted water level: EL. 76.5m
Low water level: EL. 60.0 m
Gross storage capacity: 1,490 Mm^3
Effective storage capacity: 790 Mm^3
Flood control capacity: 250 Mm^3
Reservoir area: 72.8 km^2

Dam
Height: 72.0 m
Length: 495.0 m
Volume: 1.234 Mm^3
Dam crest elevation: EL. 83.0 m

Power Generation
Installed capacity: 90,000 kW
Annual energy output: 196-240 GWh
Rated head: 38.7 m
Maximum turbine discharge: 264 CMS

Water Supply
Annual water supply: 1,649 Mm^3
- Municipal & industrial: 1,300 Mm^3
- Irrigation: 349 Mm^3

Two Multipurpose Dams (2)

- **Yongdam dam**
  - This dam was constructed recently in 2001 at upstream of Deacheong dam to supply water to Jeonju area
  - About 500 Mm^3 of water per year solving water deficit problem until 2003.

General
Location: Geum river
Purpose: Multipurpose
Catchment area: 930.0 km^2
Dam type: CF
Construction period: 1992-2001
Owner: KOWACO

Reservoir
Flood water level: EL. 265.5 m
Normal high water level: EL. 263.5 m
Restricted water level: EL. 261.5 m
Low water level: EL. 228.5 m
Gross storage capacity: 815 Mm^3
Effective storage capacity: 672 Mm^3
Flood control capacity: 137 Mm^3

Dam
Height: 70.0 m
Length: 498.0 m
Volume: 2.225 Mm^3
Dam crest elevation: EL. 268.5 m

Power Generation
Installed capacity: 24,400 kW
Annual energy output: 198.5 GWh
Rated head: 147.1 m/46 m
Maximum turbine discharge: 17.5 CMS

Water Supply
Annual water supply: 650.4 Mm^3
- Municipal & industrial: 492.7 Mm^3
- Irrigation: 157.7 Mm^3

Hydrological Monitoring Network

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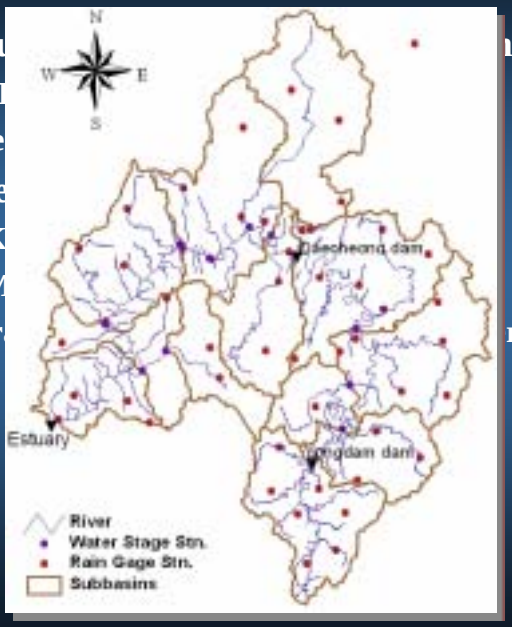
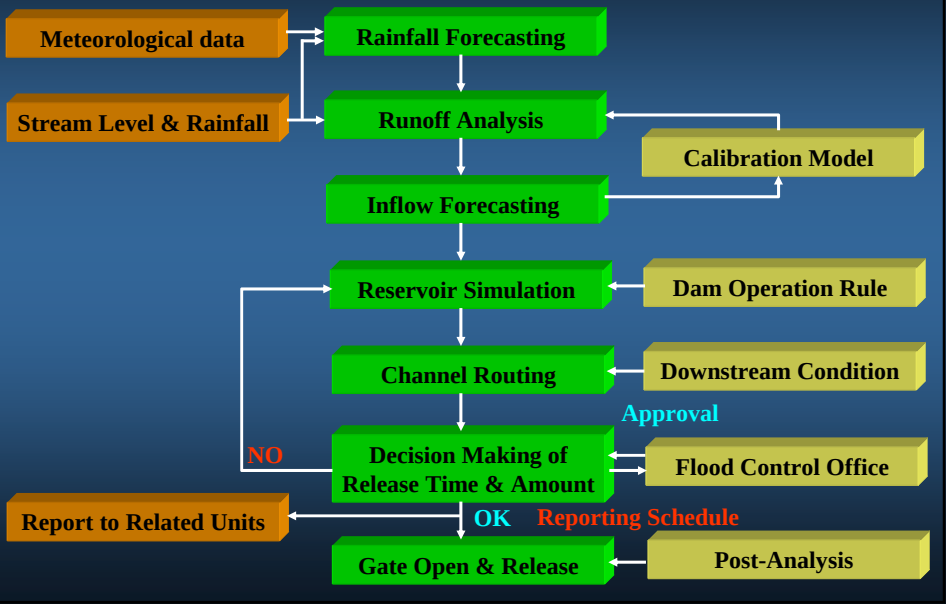
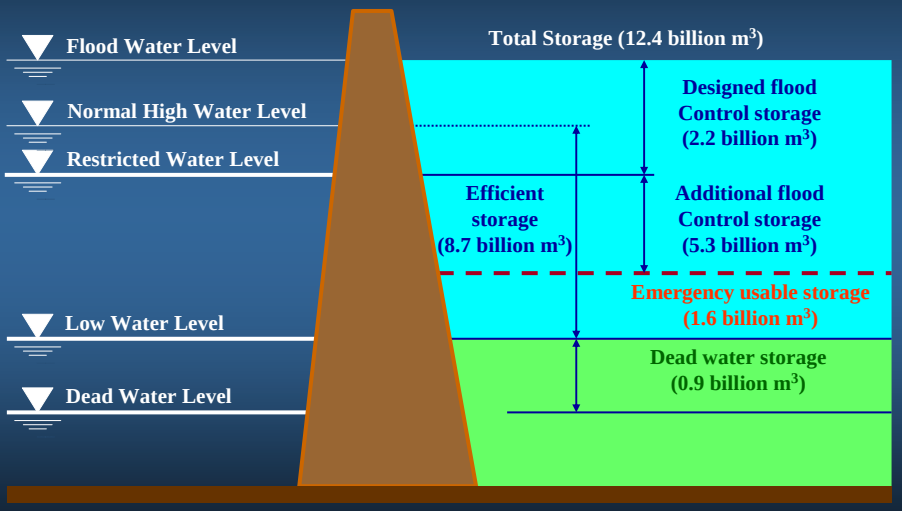


General Procedure for Flood Control (1)

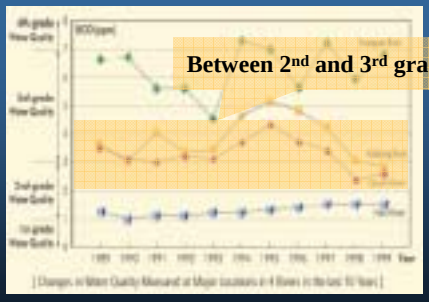


General Procedure for Flood Control (2)



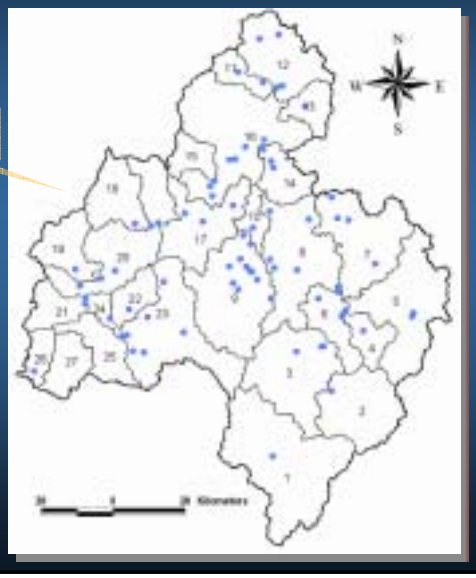
Water Quality Management (1)

- Since big cities are located in the midstream and downstream of river basins, the water quality of those areas deteriorates
- Water conflicts among them of river basins also occur over the right to acquire Clean Water



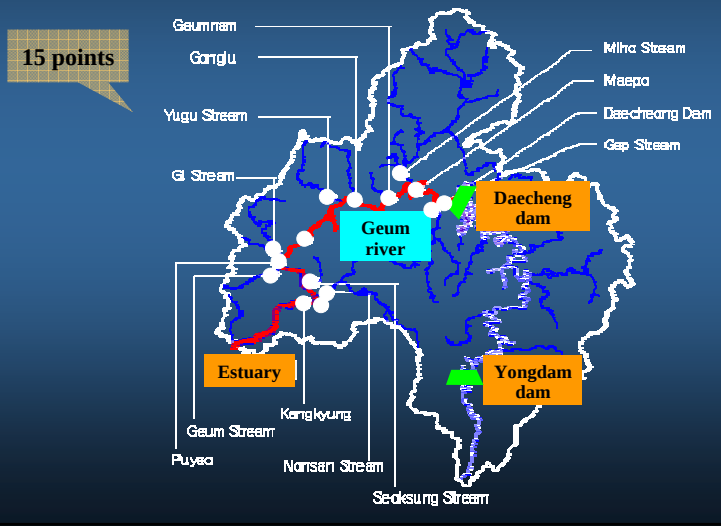
Water Quality Management (2)

- Data collection points in the Geum river basin



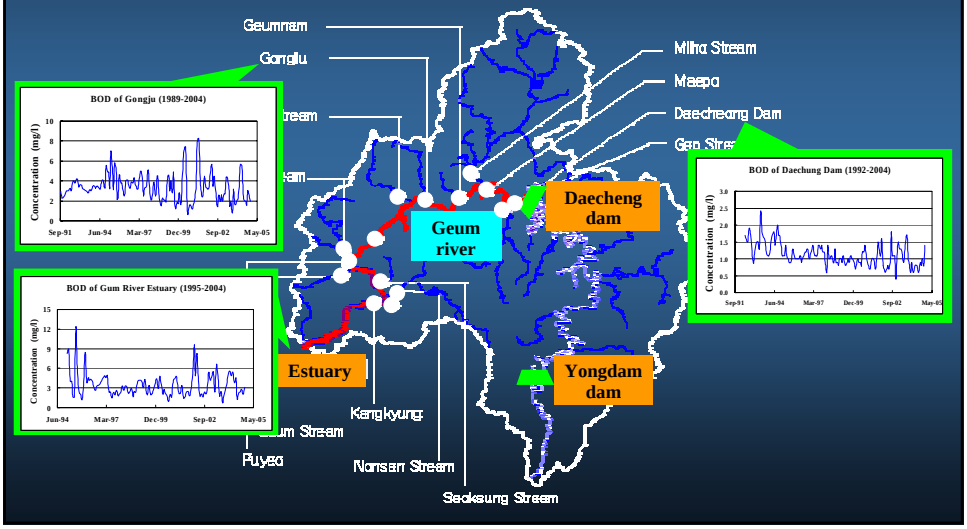
Water Quality Management (3)

- Data collection points in the tributaries downstream of the Daecheong multipurpose dam



Water Quality Management (3)

- Monthly water quality constituents
  - BOD, DO, NH_3-H, TP, TH etc.



Thank you !