Generation Characteristics of the Floatable Debris in the Geum River Watershed

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Ⅰ. Introduction

Background

- Much quantity of floatable debris are putting into streams and estuaries all at once during the heavy rain, and they bring upon the water pollution and landscape deterioration.
- Systematic counter-measure among the stakeholders in upper & lower autonomies for reduction of floatable debris and establishment of collection to disposal
- Unclear situation in generation, collection, disposal and burden sharing
- After understanding the generation then structuring framework for collection, treatment, sharing expenses and collaboration within the stakeholders

Ⅰ. Introduction

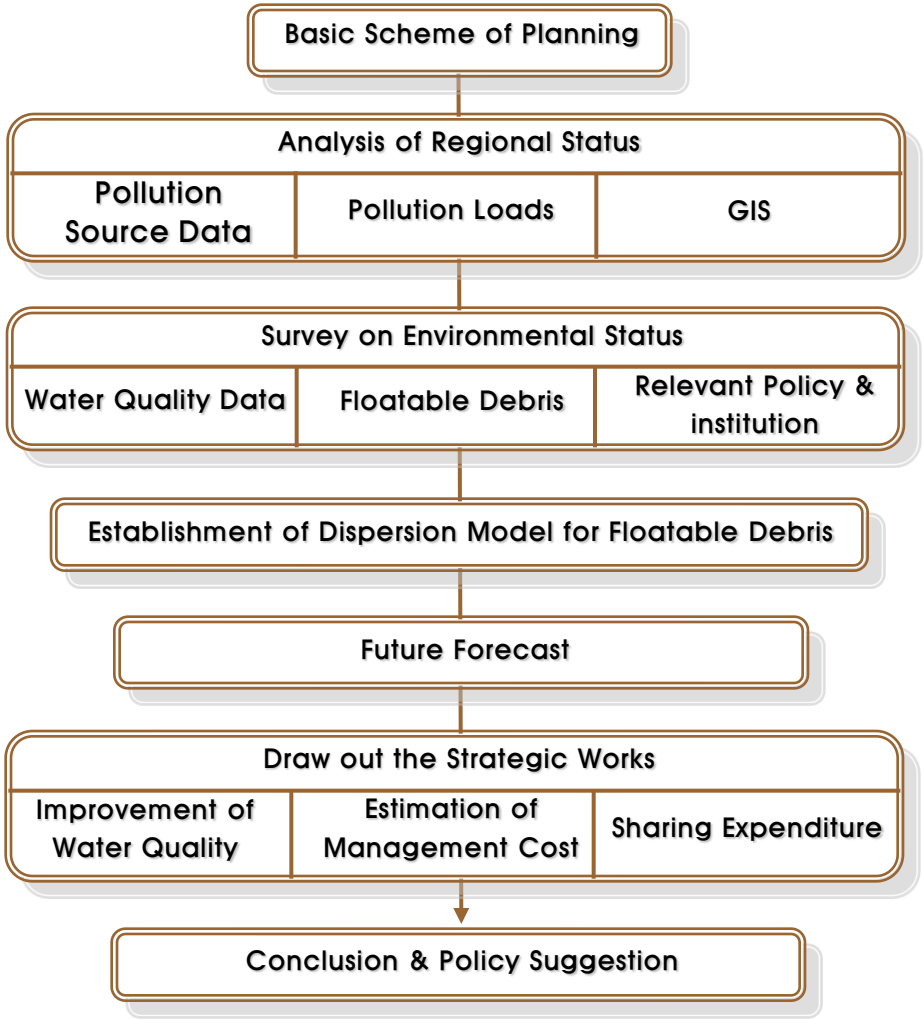
Methods

- Structuring the TMDL system for water quality management
- Using GIS base map by the regional status
- Target area: The Greater Geum River Watershed
- Pollution source data : Basic Plan for Water Environment Management (2006.9, MOE)
- Generation of Floatable Debris : 11 main points

Range of Contents

- Survey on regional environmental status
- Generation of Debris attendant upon precipitation event
- Prediction of the future generation by the change
- Environmental collaboration among the stakeholders
- Expense sharing for disposal

Flowchart of Research



Ⅱ. Analysis of Present Status

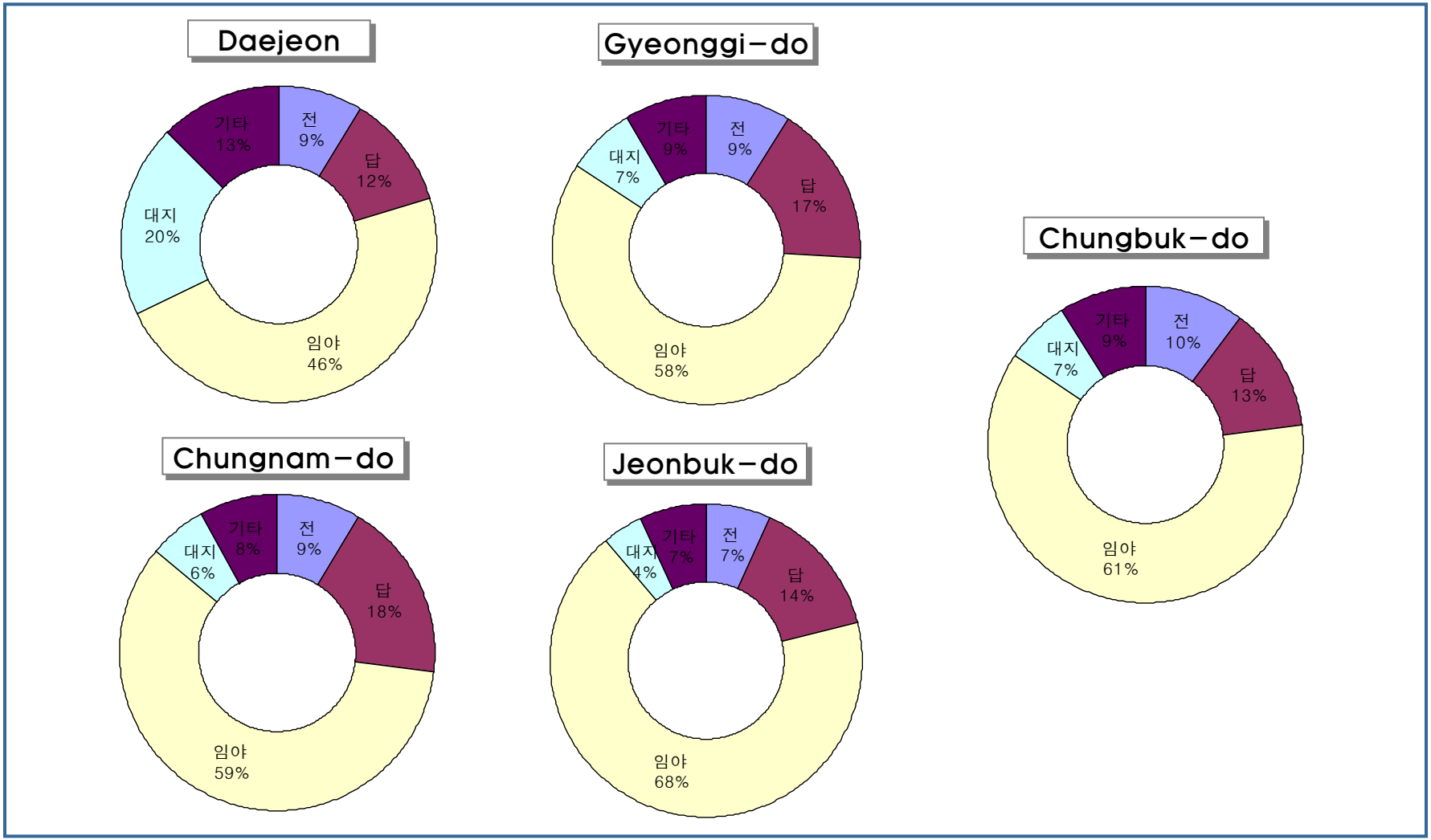
1 Target Watershed

Geum River

Sapkyo River

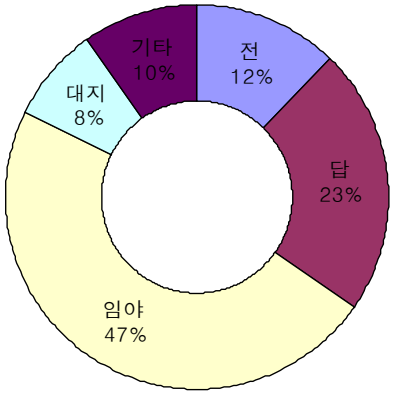
Anseong River

2 Land use classification by service in the Geum River Watershed



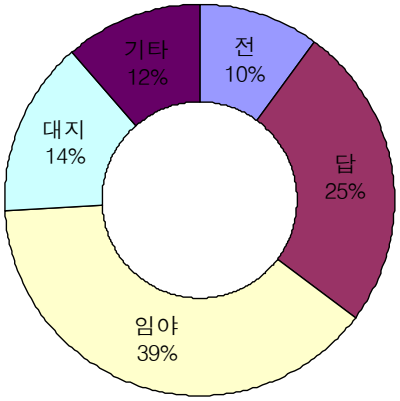
3 Land use classification by service in the Sapkyo River Watershed

Chungnam-do

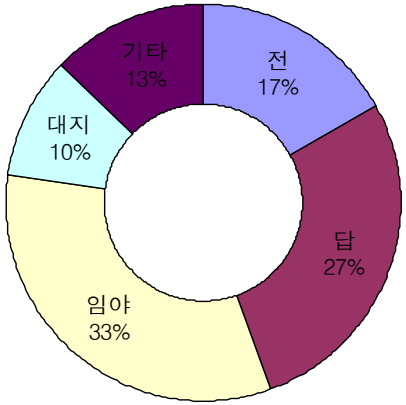


4 Land use classification by service in the Anseong River Watershed

Gyeonggi-do



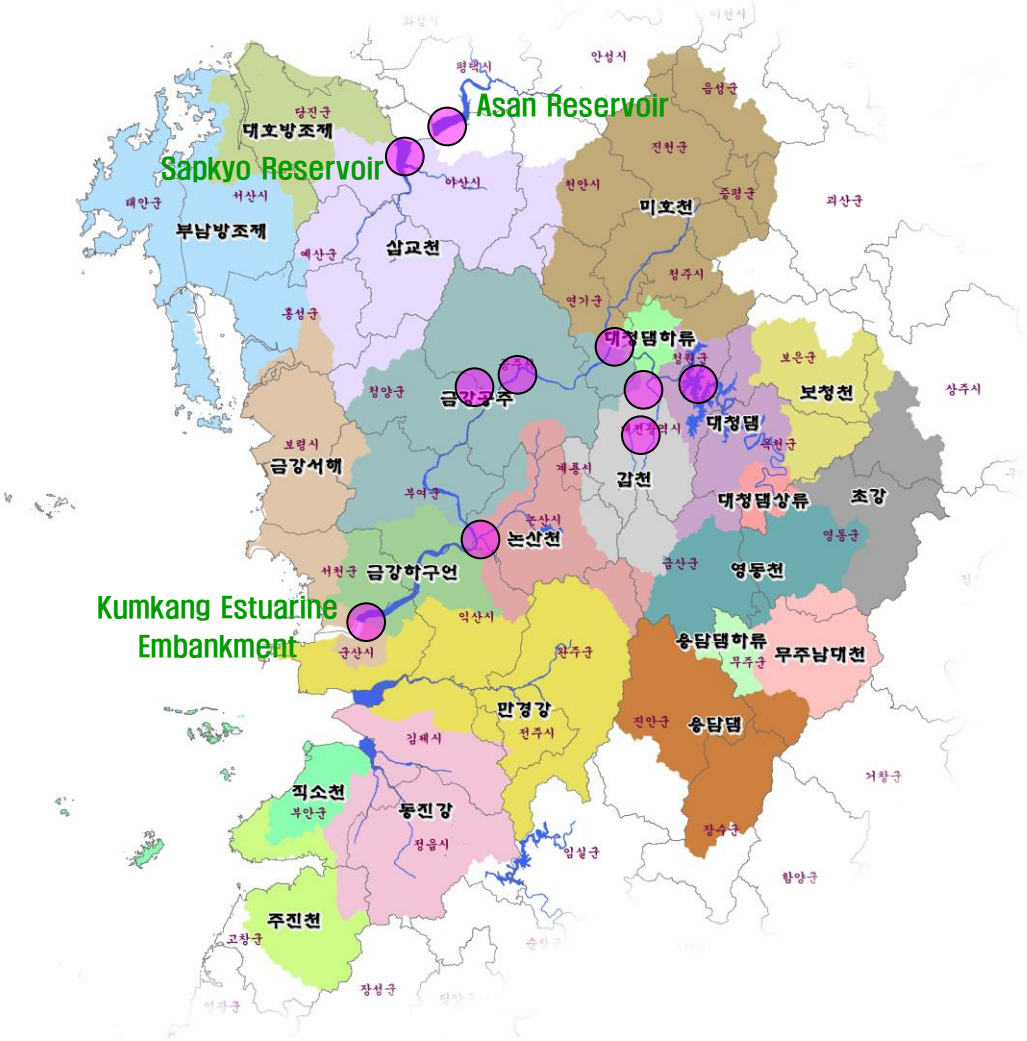
Chungnam-do



Ⅲ. Survey on Environmental Status

1 Survey on Characteristics of Floatable Debris

Survey sites for Floatable Debris



2 Results of Survey of Floatable Debris

2008. 8. 13

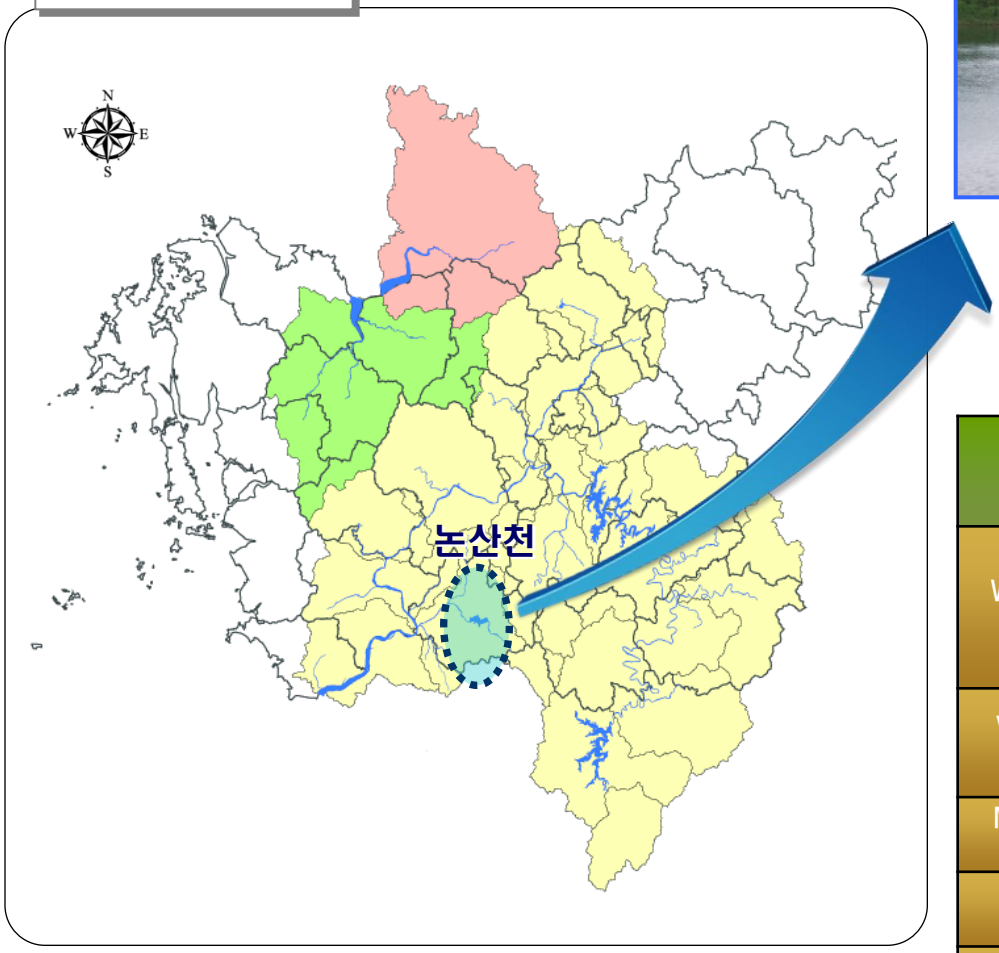
Kumkang Estuarine Embankment

class	weight (kg)	ratio (%)	items in detail
Wood & grass	314.0	84.7	grass 120kg Wood (panel, box, scrap) 126kg Log (diameter 10cm, length 4.8m, wet weight 17kg×4) 68kg
Vinyl & plastic	42.8	11.5	vinyl 11kg plastic 31kg styrofoam 0.8kg
Metal & glass	8.0	0.2	bottle 4kg Agri-chemicals 2kg can 2kg
refuse	6.0	0.2	Leather & textiles 6kg
total	370.8		

2 Results of Survey of Floatable Debris

2008. 8. 21

Nonsan Stream



class	weight (kg)	ratio (%)	items in detail
Wood & grass	17.0	81.3	grass 11kg wood(panel, box, scrap) 6kg
Vinyl & plastic	2.5	12.0	vinyl 11kg plastic 1kg styrofoam 0.5kg
Metal & glass	0.8	3.8	bottle 0.5kg can 0.3kg
refuse	0.6	2.9	rubbish 0.6kg
total	20.9		

2 Results of Survey of Floatable Debris

2008. 8. 15

Geum River main Stream

class	weight (kg)	ratio (%)	items in detail
Wood & grass	27.0	82.8	grass 12kg wood(panel, box, scrap) 8kg log(diameter 6cm, length 3m, wet) 7kg
Vinyl & plastic	2.4	7.4	vinyl 11kg plastic 1kg styrofoam 0.4kg
Metal & glass	2.2	6.7	bottle 1kg Agri-chemicals 0.2kg can 1kg
refuse	1.0	3.1	rubbish 1kg
total	32.6		

2 Results of Survey of Floatable Debris

2008. 9. 2

Miho Stream

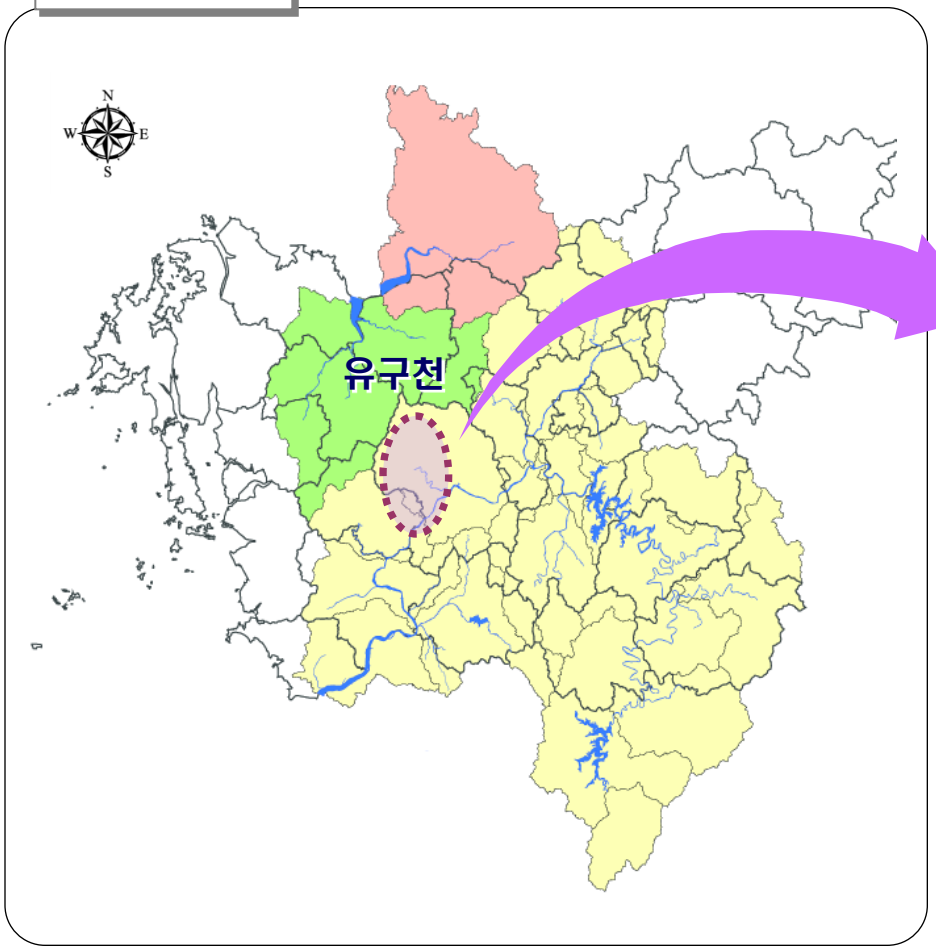
There is no buildup of debris in the confluence point of the Miho Stream to the main Geum River.

2

Results of Survey of Floatable Debris

2008. 9. 2

Yugu Stream

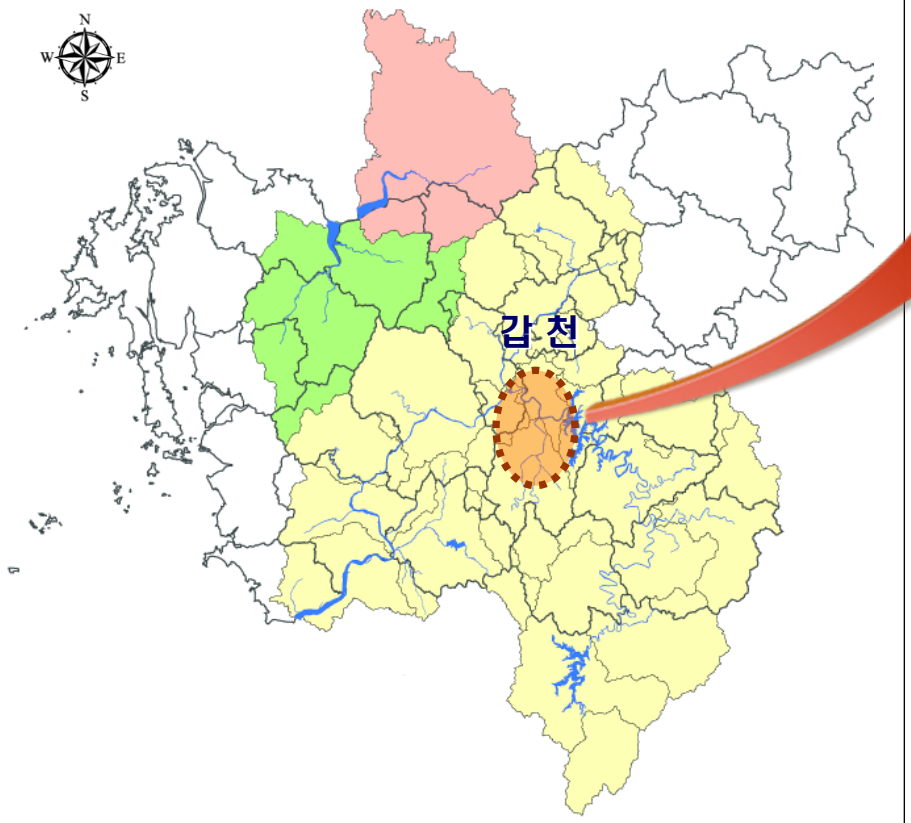


There is no buildup of debris in the confluence point of the Yugu Stream to the main Geum River.

2 Results of Survey of Floatable Debris

2008. 8. 10

Gap Stream



class	weight (kg)	ratio (%)	items in detail
Wood & grass	12.0	75.9	grass 7kg wood(panel, box, scrap) 5kg
Vinyl & plastic	0.9	5.7	plastic 0.6kg styrofoam 0.3kg
Metal & glass	2.4	15.2	bottle 1.6kg Agri-chemicals 0.1kg can 0.7kg
refuse	0.5	3.2	rubbish 0.5kg
total	15.8		

2 Results of Survey of Floatable Debris

2008. 8. 16

Yudeung Stream

class	weight (kg)	ratio (%)	items in detail
Wood & grass	16.0	84.7	grass 13kg wood(panel, scrap) 3kg
Vinyl & plastic	1.3	6.9	plastic 0.8kg styrofoam 0.5kg
Metal & glass	0.8	4.2	bottle 0.6kg can 0.2kg
refuse	0.8	4.2	rubbish 0.8kg
total	18.9		

2 Results of Survey of Floatable Debris

2008. 8. 10

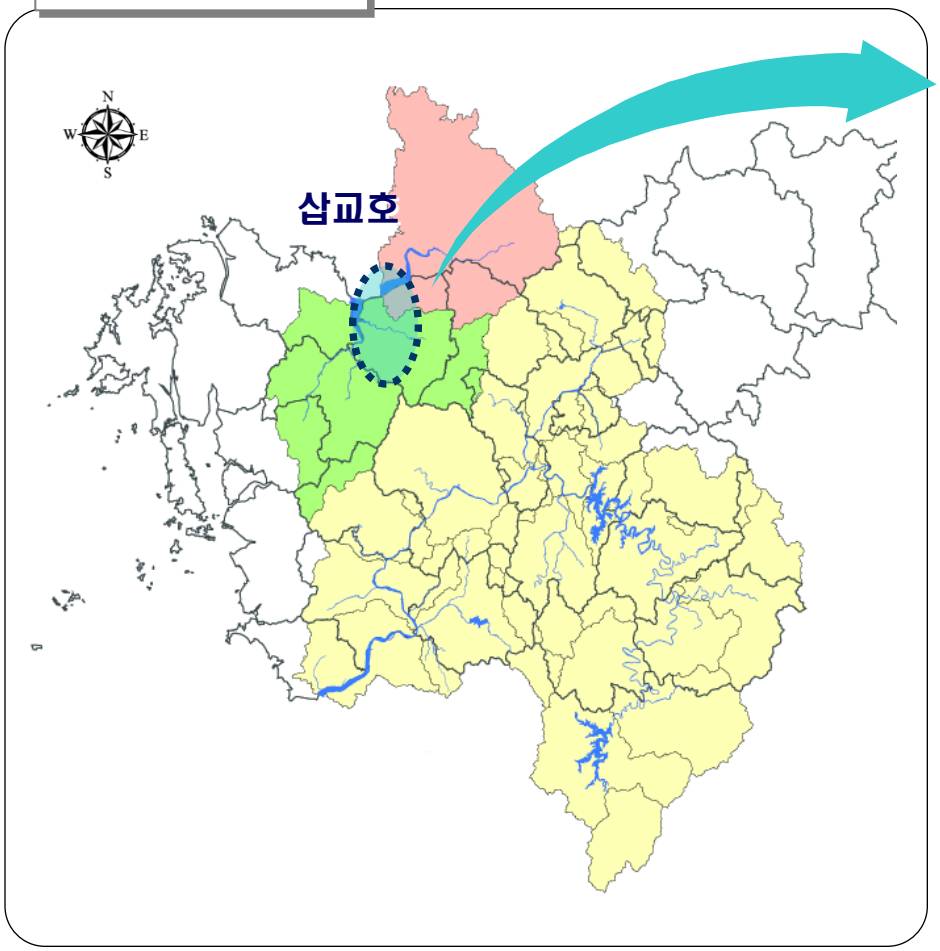
Daecheong Reservoir

There is no buildup of debris in Daecheong Reservoir.

2 Results of Survey of Floatable Debris

2008. 8. 17

Sapkyo Reservoir

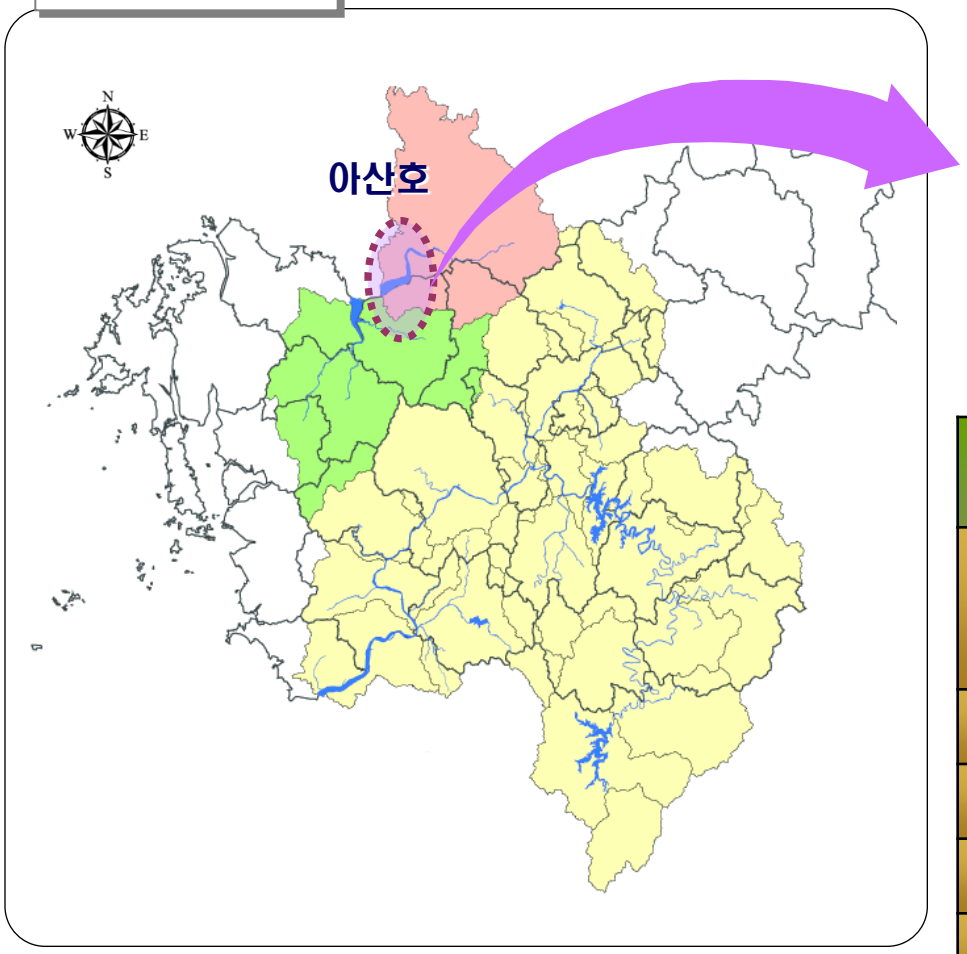


class	weight (kg)	ratio (%)	items in detail
Wood & grass	17.0	82.9	grass 5kg log 12kg
Vinyl & plastic	1.6	7.8	plastic 1.2kg styrofoam 0.4kg
Metal & glass	1.3	6.3	bottle 1kg can 0.3kg
refuse	0.6	2.9	rubbish 0.6kg
total	20.5		

2 Results of Survey of Floatable Debris

2008. 8. 17

Asan Reservoir



class	weight (kg)	ratio (%)	items in detail
Wood & grass	26.0	58.6	grass 15kg Wood palette 11kg
Vinyl & plastic	3.7	8.3	plastic 3.2kg styrofoam 0.5kg
Metal & glass	2.7	6.1	bottle 2kg can 0.7kg
refuse	12.0	27.0	barrel(big) 12kg
total	44.4		

3. Generation of Floatable Debris

• Generation Factor of Floatable Debris

- Contribution by sources → Land use by service, Precipitation and intensity, Watershed area
- Urban Area → Population

  (Relation between collection quantity and population: Proportional in log scale)

• Contribution Factor of Floatable Debris

- Possession of MSW, Population, Forest with weighted mean

Contribution by the Province in Lower Geum Watershed

source factors	region / class	Daejeon		Chungnbuk-do		Chungnam-do		Jeonbuk-do	
		possession (%)	contribution (%)	possession (%)	contribution (%)	possession (%)	contribution (%)	possession (%)	contribution (%)
house-hold	population (capita)	48.99		29.59		19.97		1.44	
	watershed area (km^2)	7.72		25.61		60.31		6.35	
	municipal solid waste (ton/day)	45.03		35.07		18.66		1.23	
	applied mean value	33.91	6.14	30.09	5.45	32.98	5.97	3.01	0.54
wood & grass	forest area (km^2)	6.52	5.34	23.56	19.29	64.77	53.05	5.16	4.22
sum			11.48		24.74		59.02		4.77

Contribution by the Province in Asan Reservoir Watershed

source factors	region / Class	Gyeonggi-do		Chungnam-do	
		possession (%)	contribution (%)	possession (%)	contribution (%)
household	population (capita)	94.56		5.44	
	watershed area (km^2)	82.17		17.83	
	municipal solid waste (ton/day)	94.00		6.00	
	applied mean value	90.25	16.33	9.75	1.77
wood & grass	forest area (km^2)	84.50	69.20	15.50	12.70
sum			85.54		14.46

Save Our Sea from Sea of Trash