Korea Environmental Policy Bulletin

Water Environment Management Master Plan Outline (2006~2015)
- Clean Water, Eco River 2015 -

1. Introduction

The Water Environment Management Master Plan proposed by the Ministry of Environment (MOE) presents the government s policy directions for the next 10 years (2006~2015). It aims to promote ecologically healthy water environment to ensure high quality water which breaks away from a policy that has been geared almost solely toward existing point sources of conventional pollutants deteriorating water quality, including BOD.

The plan presents programs that encompass the management of water quality in small streams, estuaries and coast, in addition to the upper areas of water supply sources and mainstream of rivers that have been accorded greater priority to date. It also enables the systematic management by changing the management unit from 194 rivers and streams into 4 major river basins, 117 mid-level basins, and 840 unit basins. This master plan will serve as guidelines for the execution of water quality preservation plans which must be integrated and implemented by the regional environmental offices, cities, gun s and gu s nationwide.

The mater plan presents policy directions for eight areas, including the promotion of ecologically healthy water environment . The plan mirrors the transformed conditions following the promotion of comprehensive measures for the water quality in the four major river basins while accommodating the public s need for healthy water environment as revealed in a recent public opinion poll. Constant expansion of environmental infrastructures by the government contributed to a notable reduction of point sources. Yet,

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nonpoint pollution from the roads, urban areas and rural areas are increasingly affecting the water quality. A recent opinion poll (November, 2005) conducted over the phone, with respect to the government s policy on Water Environment Management in the next 10 years, revealed that 61% of respondents believe it is necessary to restore high value ecologically sensitive streams and protect water quality against harmful substances.

To meet the expectations of citizens, the MOE aims to promote aquatic ecosystem restoration projects and water quality-based toxic control projects for public waters in a systematic manner. Implementation of these projects will enable the MOE to closely link the concept of its Water Environment Management programs with existing aquatic ecosystems. The highest priority and attention will be aligned toward to the above-mentioned projects for the next 10 years.

2. Significance of the Water Environment Management Master Plan

2.1 Significance

This master plan presents a blueprint for the government s Water Environment Management policy . It focuses on the 10 year Water Environment Management plan, (2006~2015) developed based on the results of the comprehensive water quality management measures for four major rivers , which have been promoted to date. The master plan is a legally recognized framework for implementing national water quality management programs under the Water Quality Conservation Act. The plan is the highest government plan to secure and preserve water environment and aquatic ecosystem.

2.2 Roles

The master plan will serve as:
• the framework for planning a nationwide Water Environment Management policy to secure a safe water environment, encompassing the rivers, lakes, estuaries and coast.
• the guidelines concerning to the other water environment plan established by other governmental bodies and water environment management plan of smaller management unit.

2.3 Scope (management unit)

This plan encompasses the management of water quality in small streams, estuaries and coast, upper regions of water supply sources and mainstream of rivers that have been prioritized to date.

The plan enables the systematic management by changing the management unit from 194 rivers and streams into 4 major river basins, 117 mid-level basin, and 840 unit basins.

<Table 1> Systematic management unit

Category	Affecting areas	Laid down by	Planning Period
4 major basins	Basins affecting large river areas	Environment Minister	Every 10 years
117 mid-level basins	Basins affecting medium-size areas	Directors of environmental offices responsible for the environment of their river basin or local community.	Every 5 years
840 unit basins	Basins affecting small-size areas	Mayor or heads of cities, gun s and gu s.	Every 5 years

3. Objective and Directions: National Policy on Water Environment Management

3.1 Policy Objective

< The Plan s Objective and Vision >

◆ To create clean water environment where our children can swim with fish
- ecologically healthy water environment and secure water quality against harmful substances -

3.2 Government policy directions

The government s water quality policy will now focus more on the restoration of impaired aquatic ecosystems and water quality hazard control, breaking away from policies that have been geared solely toward the management of existing point sources deteriorating water quality, including BOD.

The new policy will encompass the management of water quality, even in small streams, estuaries and coast that have been poorly managed due to the government s water quality policy focusing almost solely on the upper regions of water supply sources and mainstream of rivers.

The water quality policy geared toward nonpoint sources and pollution from livestock farms will be appointed with higher priority and attention. Both efficiency and equity, in the area of environmental investment, will be enhanced.

3.3 Core indicators for the Water Environment Management plan

• Maintaining the nationwide quality of 85% of the water at high levels under the revised Water Quality Conservation Act.
• Restoration of 25% of non-natural streams (21,800 km) into natural streams.
• Creating 30% of the buffer zones purchased in the upper streams of water supply sources as Riverine Ecobelt.
  ※As of Dec. 2005, the total area of buffer zones purchased was 5 million Pyong .

• The basic criteria for public health will be increased from 9 items to 30.
  – The criteria for dealing with specific water quality hazard will be increased from 17 items to 35.

4. Contents of the Major National Policies on Water Environment Management

4.1 Creation of ecologically healthy water environment

(1) A framework for assessing the health of aquatic ecosystem shall be created through:

• Conducting basic surveys of aquatic ecosystem (2007) regarding the current condition of aquatic ecosystem and the status of riverine development.
• Developing indicators that enable the assessment of the health of aquatic ecosystem.
  – Bioindicators including attached seaweeds, fish, large aquatic invertebrates and sediment control creteria will be expressed in numerical indices.

(2) Recovery of the health of aquatic ecosystem through the stream corridor restoration

• Aquatic ecosystem restoration guidelines will be applied by joint project teams of relevant government agencies.
• Model projects for a 3 year restoration project of aquatic ecosystem beginning in 2007 will be developed.
  Example: Anyang river water purification project (6 streams stretching in 31 km, a 10 year project for 50 billion Won).

(3) Development of a buffer zone management master plan to manage the buffer zones systematically

• Mid and long-term management measures (for the period up to 2007) will be implemented,

including directions for buffer management, purchases of high priority lands, and buffer creation programs, etc.

- The current condition of buffer zones (including areas requiring restoration and preservation), pollution control measures, high priority lands to be purchased, buffer zone creation programs, etc.

(4) Creation of Riverine Ecobelt

• The Riverine Ecobelt shall be created using purchased lands and it will connect water body and buffer zones to enhance the health of aquatic ecosystem.
• 30% of the purchased lands in the upper area of water supply sources will be converted into Riverine Ecobelt .

- Native plants with high capacity of water purification and fostering moisture will be planted.
- Buffer zone creation schemes and model projections for the Riverine Ecobelt (2006~2009) will be developed.

(5) Creation of a framework for the appropriate management of buffer zones and the reinforcing post-management
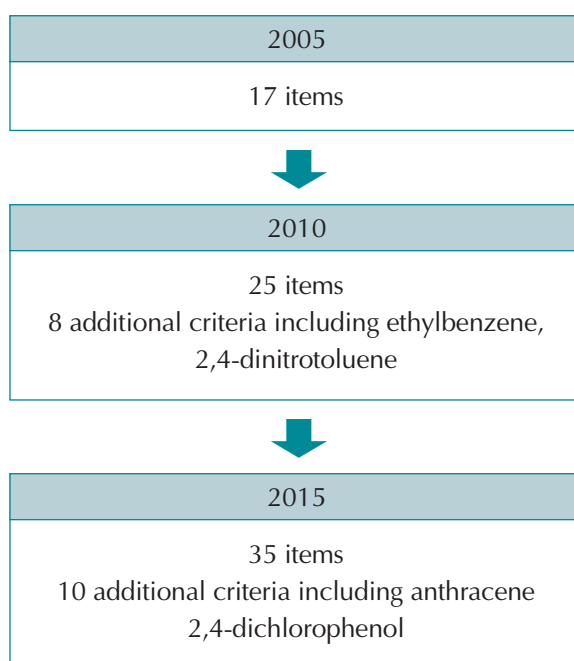
• A corporation specializing in land management shall be established to achieve efficiency in land purchases as well as its management.

- A corporation specializing in land management shall be organized for the Han River Basin Environmental Office, an organization that deals with most of the purchased lands.
- Organizing a corporation (tentatively called the Buffer Zone Management Corporation) independent of the above corporation will be considered, following the application of the specialized buffer zone corporations to the other 3 major river basins.

4.2 Protection of water quality against harmful substances

(1) Construction of a database for toxic substances affecting aquatic ecosystem

• Estimating the amounts and list of chemical substances (over 350 types) emitted to water using TRI data (2006).
• A Water Quality Hazards Control Manual will be prepared.

(2) Increase the number of criteria for specific water quality hazard to the level set by EU (2015)

2005
17 items

⬇

2010
25 items 8 additional criteria including ethylbenzene, 2,4-dinitrotoluene

⬇

2015
35 items 10 additional criteria including anthracene 2,4-dichlorophenol

(3) Introduction of the Whole Effluent Toxicity (WET) methods

• Whole effluent toxicity criteria will be set as effluent limit of industrial wastewater by using fish and water flea to reflect the toxicity from all harmful substances of wastewater to determine permissible levels of toxic substance emissions.
• For this purpose, whole effluent toxicity assessment methods will be developed using various organisms, and the whole effluent toxicity test agencies will be promoted (2006~2010).

(4) Application of advanced industrial wastewater control systems

• An inventory of pollutants will be prepared based on the results of actual condition surveys of wastewater discharged from each industry (82 industries) and treatment technologies in use (2006~2009).
• Various methods of evaluating best wastewater treatment technology will be developed and used for each industry.
• A framework for determining effluent limits of pollutants will be created based on the characteristics of each industry.
   - Developing guidelines to determine the permissible levels of discharge for each industry or facility, taking into account the characteristics of industrial wastewater, best wastewater treatment technology, use of water, the total water pollution load system, etc. (2010).
• A modified national wastewater permit system will be applied to facilities discharging industrial wastewater (2010).
   - Granting up to a 10-year term for permits; mandating the application of best wastewater treatment technology at the time of permit renewal.
   - Introducing technical diagnostics for wastewater treatment plants every 5 years.

4.3 Application of advanced water quality standards and assessment methods

(1) Reinforcement of human health water quality standards

• Reinforcing, up to twice the current level, water quality standards for criteria items such as lead and cadmium (among the current 9 criteria), considering the permissible levels of drinking water in Korea and the levels recommended by the WHO.
• 5 new items will be added to the existing human health water quality criteria by the year 2007.
   - 43 human health water quality criteria, will be considered and implemented within the next 10 years by stage.

(2) Introduction of various water quality assessments using bioindicator species

• Providing bioindicator species depending on water quality levels, other than organic pollutants and harmful substances, as well as their living environments.
   - The habitation of organisms is determined by various water quality conditions, including water flow, temperatures, in addition to water quality. Therefore, bioindicator species that appear frequently in a given area will be designated.

(3) Setting the fecal coliform group, among total coliform groups, as a criteria item, which is highly dependent on water pollution of excrement

• Using the fecal coliform group in addition to total coliform group for better protection of public health.

(4) Making water quality standards more comprehensible and systematic

• Using descriptive expressions of water quality grades, along with numeric expression, in addition to characters that distinguish pollution levels from another.
   ※ 7 grades ranging from Very Good to Very Poor
• The Class II waters that encompass over 45% of total stream areas will be divided into limits of 2mg/L or less and 3mg/L or less .

(5) Adjusting required limits for each grade of COD_{Mn} in a lake; Chl-a will be applied.

• The current COD_{Mn} standard is overly strict. Therefore, setting a realistic goal is necessary to effectively control COD_{Mn}.
   ※ Without artificial pollution sources, the relatively clean Milyang dam, Hwancheon dam and Buan dam maintain a detection limit of 1.3mg/L, 2.0mg/L, 2.3mg/L respectively, all exceeding the limit of 1.0mg/L.
• Chlorophyll-a can be used as a criteria item to know the degree of occurrence for algal bloom, in addition to total phosphorus and nitrogen that measure excess nutrients.

(6) Providing a characteristic description and the use of each water quality condition to enhance public understanding

• Characteristics of ecosystems and their uses will be described based on oxygen level and degree of water quality.

(7) Laying down a comprehensive assessment strategy that takes into account ecosystem characteristics, physicochemical aspects, and the use of water

• Developing techniques that enable comprehensive assessments of overall river water quality, taking into account physicochemical aspects, ecosystem characteristics and their weight.

4.4 Reinforcing the national water quality policy for the lakes, coast and estuaries

(1) Water Environment Management plans that take into account lake environment assessment

• Completing basic surveys for all lakes by 2010.
• Designating high priority lakes and developing lake preservation measures considering the use of lakes, pollution sources and their ecological sensitivity (2012).

(2) Environmentally friendly management of lakes losing original purpose to promote their multiple use

• Lakes that are no longer supplying water will be designated and managed as a green zone and converted into an ecological space.
• Multipurpose uses of reservoirs for agriculture will be reviewed as water supply sources and augmented river water sources.

(3) Reinforcing the management of pollutants deteriorating the water quality in upper basin of water supply source lakes

• Introducing chemical process to treat phosphorus to wastewater treatment facilities in upper basin of water supply source lakes and tightening effluent water quality limits.
• Installing Pre-Dam to improve the quality of water in transient areas of lakes where pollutants can accumulate to promote the integrity of ecosystem in the upper basin while improving the quality of water in the main lakes.
• Increasing the surface area of lake ecosystems by creating waterweed cultivation islands.
• Reinforcing the implementation of the algal bloom forecast system

<Table 2> Proposed schedule for the expansion of the algal bloom forecast system

Category	Lakes currently applied to	2008 (scheduled)
Water supply sources in metropolitan areas	10 lakes including Paldang Lake, Daecheong Lake, Juam Lake and Chungju Lake	8 additional lakes including Okjeong Lake, Buan Lake, Boryeong Lake, Milyang Lake and Imha Lake
Water supply sources in local areas	Yet to be determined	93 lakes (due to be determined after investigating contributors of water pollution)

- Applying the algal bloom forecast system to all water supply source lakes in the metropolitan area after investigating the causes of water pollution.

(4) Tightening the control of water pollution originating from the upper basin into half-closed bays

• Revising water quality standards for facilities discharging wastewater in special wastewater control areas including the Masan and Gwangyang bays.
‐ Adjusting the required level of water quality from class B to grade A or as areas designated Clean Zone , for factories emitting wastewater to contaminated coastal areas.
• Increasing the rate of the sewerage supply in coastal areas to the average nationwide level.
  - Giving greater priority to half-closed bay, such as the Masan and Jinhae, when selecting BTL projects.
  - Giving great priority to wastewater treatment plants in areas encompassing the comprehensive master plan of the Ministry of Maritime Affairs and Fisheries (2006~2010).
• Expanding the application of the total water pollution load management system to coastal areas including Masan bay.

(5) Conducting basic surveys and developing an integrated modeling system that considers characteristics of estuaries

• The first stage: Conducting basic surveys for 329 streams officially categorized as a local Class II river (2006~2008).
• The second stage: Creation and operation of water quality monitoring networks for the estuary having the transient characteristics of fresh water and sea water.
• The third stage: Developing an integrated estuary management model to support estuary management programs in a scientific manner (2009~2015).

(6) Implementing model projects for improving esturine water quality

• Giving greater priority to the promotion of Seomjin River Basin Project , the nation s first model project.
  - After conducting feasibility study of the model project which will encompass the enhancement of water quality in the Seomjin River, securing fish migration routes, restoration of waterways and ecosystem in 2006, the implementation projects will be finalized in 2007.

4.5 Full-scale implementation of the total water pollution load management system (TWPLMS)

(1) Applying the system to all rivers and streams

• Revising the Han River Basin Act (2006) to mandate the TWPLMS; positioning implementation plans (2009) for cities and gun s that have failed to attain minimum levels of water quality.
• Applying the TWPLMS (Hyungsan River, Taehwa River, Anseong River) that are not labeled as a major river basin.
• Applying the TWPLMS to special coastal management areas as well, including Masan and Gwangyang bays.

(2) Increasing target criteria items for their application to the TWPLMS in next stage

• Increasing the target criteria including BOD, total phosphorous during the second stage (2011~2015) for the 3 major river basins.

(3) Creating a framework to introduce tradeable permit system

• Analyzing the socioeconomic effects by introducing a trading system (2011~2012).
• Developing guidelines for the implementation of the trading system (2013)
  - Developing guidelines for the application of the tradeable permit system including trading areas, target criteria items and credit,

conditions constituting the trade, and its legal effects within the context of relevant laws.
• Implementing model projects for watersheds where applicable, under the guidelines within the year (2014~2015) when the second-phase implementation is achieved.
  - Implementing model projects for effluent BOD in the Nakdong River basin.

4.6 Focusing the management of nonpoint sources and pollutants coming from livestock farms

(1) Developing best nonpoint source control models applied to representative model watersheds

• Installing various nonpoint source pollutant reduction facilities that perform with optimal efficiency in reducing pollution for each type of land use in small model basin and monitoring the efficiency in long-term.
• Joint teams from relevant government agencies, the Ministry of Construction & Transportation and the Ministry of Agriculture, will promote nonpoint control programs reviewing adequacy models, site selection, facility installation and operation.

(2) Promotion of surveys and research projects to tighten the control of nonpoint source pollutants originating from upland

• Developing best nonpoint source control methods; Raising perennial alternative crops and determining the optimal quantity of fertilizer

• Mandating the installation of nonpoint source control to new roads, including large highways and main roads and expand to existing roads.

(4) Promoting fundamental measures to reduce the consumption of fertilizer and the production of livestock excretion

• Introducing the regional total nutrient control system (2007)
  - Determining the appropriate quantity of nutrients to allow in a given area, taking into account the total amount of fertilizer and farm area for each local government.
• Control the number of livestock to an appropriate level
  - Control the total number of livestock to prevent the excess supply of fertilizer made from livestock excretion by investigating the required amount of fertilizer for cropland.

(5) Expansion of public livestock excretion treatment facilities and increasing its efficiency

• Financial support from the government will be provided to a given area containing large amounts of pig excrement without excretion recycling facilities.
  ※ About 176 billion Won (based on a facility with the capacity to treat 80 tons per day) will be required to meet the needs of excretion treatment for 22 local governments.
• An integrated regional livestock excretion management system will be developed.