

Chapter 4-6

Water Quality Monitoring

Abstract

Surveys of the quality of water in Lake Biwa and inflow rivers are performed regularly to monitor the extent to which environmental standards are being met and to provide an understanding of changes in water quality. Grasping the status of water quality is important in gaining an understanding of changes not only in water quality, but also in the ecosystem. Surveys are effectively used to provide basic data for the safe utilization of the waters of the Lake Biwa-Yodo River System.

Keywords: Monitoring, Surface/Water monitoring at various depths, River water monitoring

1. Water Quality Targets

As a target for promoting water quality conservation of rivers and lakes, Environmental Quality Standards are enacted by the national government based on the "Environmental Basic Law." Water quality is regulated by "Environmental Water Quality Standards for Protecting of the Human Health (Health Items)" and "Environmental Water Quality Standards for Protecting the Living Environment (Living Environmental Items)." As well as environmental quality standards, "Required monitoring items" and "Other items" are also specified.

2. Surface Water Monitoring in Lake Biwa

In order to monitor the status of the achievement of Environmental Standards in Lake Biwa and to gain an understanding of changes in water quality, the Shiga Prefectural Government implements monthly Lake Biwa Surface Water Monitoring at a total of 51 different points (31 points in the North basin, 20 points in the South basin) in cooperation with the Kinki Regional Development Bureau (Ministry of Land, Infrastructure Transport and Tourism) and Japan Water Agency.

Table 4-6-1 Monitoring items

Monitoring items	Monitoring items
General items	Ambient temperature, Water temperature, Transparency, Water color
Living Environment items	Hydrogen ion concentration(pH), Dissolved oxygen(DO), Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Suspended solids(SS), Number of colitis germ legions, Total nitrogen (T-N), Total phosphorus (T-P), Total zinc
Health items	Cadmium, Total Cyanogen, Lead, Hexavalent chromium, Arsenic, Total mercury, Alkyl mercury, PCB, Trichloroethylene, Tetrachloroethylene, Carbon tetrachloride, Dichloromethane, 1,2-dichloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2-dichloroethylene, Cis-1,2-dichloroethylene, 1,3-dichloropropane(D-D), Toxaram, simazine(CAT), Thiobencarb(Benticocarb), Benzene, Selenium, Boron, Fluorine, Nitrate nitrogen and nitrite nitrogen, 1,4-dioxane
Required Monitoring items	Nickel, Molybdenite, Antimony, 1,1,2-dichloroethylene, 1,2-dichloropropane, p-dichlorobenzene, Isosaxathien, Diazinon, Fenitethion, Isopropiolane, Oxime-Cu, Chlorofalonil, Propyzamide, EPN, Dichlorvos, Fenobate, Iprathion, Chlorantranil, Toxane, Xylene, Phthalic acid diethylhexyl, Vinyl chloride monomer, Epichlorohydrin, Total manganese, Uranium, Chloroform, Phenol, Formaldehyde,
Other items	Ammonia nitrogen, Organic nitrogen, Phosphate ion, Silicic acid, Chlorophyll(a,b,c), Pheophytin, Chloride ion, Number of Fecal-coliform group, Dissolved COD, Dissolved total organic carbon, Particulate total organic carbon



Symbol	Point	Measured by
⊙	Environmental reference point	Shiga Prefectural Government
●	Environmental reference point for nitrogen and phosphorus	Shiga Prefectural Government
■	Environmental reference point for aquatic biota conservation	Shiga Prefectural Government
□	Research point	Ministry of Land, Infrastructure Transport and Tourism
△	Research point	Japan Water Agency

Fig. 4-6-1 Monitoring points



Fig. 4-6-2 Research boat "Mizusumashi II"

3. Water Monitoring at Various Depths in Lake Biwa

Because Lake Biwa is a deep lake with a maximum depth of about 103 m, its water quality varies depending on the depth.

In order to survey water quality in the vertical direction of the lake, water monitoring at various depths is conducted monthly at 4 different points in the North Basin (off Imazu shore with a depth of about 90 m and off Minami-hira with a depth of about 60 m) and in the South Basin (off Karasaki shore with a depth of about 4 m and off Yabase-kihan shore with a depth of about 14 m).

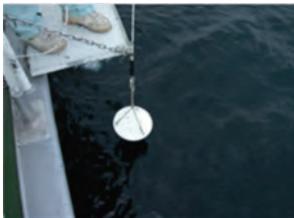


Fig. 4-6-3 Measuring transparency



Fig. 4-6-4 Van Don Water Sampler for sampling water at various depths

4. River Water Quality Monitoring

About 460 rivers of differing sizes flow into Lake Biwa. Apart from the manmade Lake Biwa Canal, there is, however, only one outflow: the Seta River.

River water quality monitoring is implemented by the Kinki Regional Development Bureau, Otsu City Government and the Shiga Prefectural Government at a total of 25 rivers comprising 24 main rivers flowing into Lake Biwa and the Seta River. In terms of river water quality, the inflow load to Lake Biwa has decreased due to countermeasures such as the development of sewage systems.

(Lake Biwa Policy Division,
Shiga Prefectural Government)

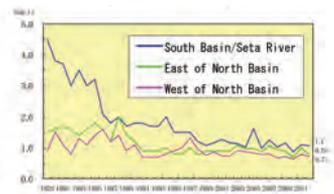


Fig. 4-6-5 Annual changes in inflow river water quality (BOD)

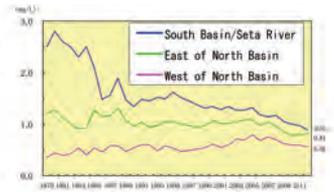


Fig. 4-6-6 Annual changes in inflow river water quality (T-N)

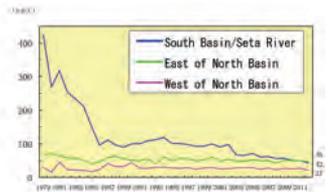


Fig. 4-6-7 Annual Changes in inflow river water quality (T-P)
Kinki Regional Development Bureau
→<http://www.kkr.mlit.go.jp/en/>
Japan Water Agency
→<http://www.water.go.jp/honsya/honsya/english/>