

# Chapter 4-7

## New Challenges of Lake Biwa

### Abstract

Environmental policies for Lake Biwa to date have been centered on “water quality conservation” and measures to reduce inflow and outflow loads through improvements in drainage systems have resulted in improvements in the lake’s water quality and major reductions in the number of days on which red tides appear. On the other hand, new challenges have emerged including the thick growth of water plants in the South Basin, divergence of BOD and COD and changes in types of plankton. In the future, while continuing the implementation of these measures, initiatives would need to be promoted to conserve and restore the ecosystem of the Lake Biwa basin and the relationship between daily life and the lake.

**Keywords:** Thick growth of water plants, Refractory organic matter, Changes in the ecosystem

### 1. New Challenges Relating to the Water Quality and Aquatic Environment of Lake Biwa

#### 1.1 Overview

As described in Chapter 4-4, “History of Water Quality Conservation” and Chapter 4-5, “Changes in Water Quality,” the implementation of diverse measures to prevent eutrophication such as improvements of drainage systems and regulation of wastewater have led to improvement of the water quality of Lake Biwa, reduction of the incidence of red tides and suppression of eutrophication.

On the other hand, however, new challenges have emerged that relate not only to water quality, but also the ecosystem, such as (1) increases in organic matter in Lake Biwa that is resistant to decomposition, (2) reduction in the amount of fish and shell caught, (3) thick growth of water plants on the South Basin, (4) changes in types of plankton and (5) reduction in the concentration of dissolved oxygen in the deep layers of the lake. It is giving rise to the need for the comprehensive conservation of Lake Biwa in line with “Conservation and Restoration of the Ecosystem of Lake Biwa basin” and “Restoration of the Relationship between Daily Life and the Lake,” initiatives that reflect the direction of the Mother Lake 21 Plan.

In addition, these problems are ranked as major issues in the 6th Lakes Water Quality Conservation Plan (Period covered by the plan: 2011 – 2015) and the implementation of measures is underway.



**Fig. 4-7-1** Thick growth of water plants  
(Taken near Lake Biwa Bridge in 2011)

#### 1.2 Increases in Organic Matter Resistant to Decomposition (Refractory Organic Matter) in the Water of Lake Biwa

As the inflow load from the basin decreases, the trend of declining levels of BOD continues in Lake Biwa, while COD remains unchanged.

While COD and BOD are both indexes that show volumes of organic matter, a divergence between the two is taking place. Since BOD indicates the volume of or-

ganic matter capable of decomposition by micro-organisms, it is surmised that the divergence phenomenon may be indicative of increases in organic matter undetectable by BOD, in other words, organic matter that is resistant to decomposition (refractory organic matter).

## 2. Remaining Challenges Relating to Water Quality and the Aquatic Environment

The promotion of point source measures to address issues such as wastewater from factories and companies and domestic wastewater has produced fixed results. However, this has led to corresponding proportional increases in pollutant load by substances discharged from non-point sources such as agricultural land, urban land and forests and substances discharged from the atmosphere. For example, polluted water discharged from paddy fields during the plowing, irrigation and planting season still remains problematic. Wide-ranging undertakings will need to be implemented to reduce the pollutant load from such non-point sources.

(Lake Biwa Policy Division,  
Shiga Prefectural Government)



**Fig. 4-7-2** Scenes of polluted agricultural water draining into Lake Biwa (Photo by Yoshihiro Azuma)



**Fig. 4-7-3** Water quality conservation project (Purification of agricultural wastewater by means such as polishing ponds and water plants to reduce the pollutant load discharged from agricultural land)



**Fig. 4-7-4** Project to purify wastewater discharged from urban land (Purification of wastewater from urban land such as residential areas and roads by means such as capturing wastewater, sedimentation, plants and soil)



**Fig. 4-7-5** River purification project (Measures for rivers draining into the Lake) (Purification by means such as temporary reservoirs and water plants before water drains from rivers into Lake Biwa)