

Chapter 4-4

History of Water Quality Conservation

Abstract

The water quality of Lake Biwa and adjacent rivers significantly deteriorated in 1960s due to the population growth in the catchment area of Lake Biwa. In 1977, Lake Biwa experienced the first outbreak of a large-scale freshwater red tide. Although the water quality of Lake Biwa and adjacent rivers was improved through the subsequent enactment of ordinances and the installation of sewage systems, there are emerging problems including ecosystem issues such as the declining native fish populations and the abnormal increase of waterweed.

Keywords: Eutrophication, Freshwater red tide, Blue-green algae

1. Pollution Control Measures

Prompted by the rapid growth of the economy and the urban development in 1960s which led to the deterioration of the water quality of public bodies of water including rivers and oceans, the Japanese government enacted the Water Pollution Control Law in 1970.

The Shiga Prefectural Government enacted an ordinance that called for a higher standard of water quality than that stipulated in the Water Pollution Control Law, and revised the Pollution Control Ordinance in 1972 in order to reinforce regulation of industrial effluent, a major cause of water pollution.

2. Eutrophication Control Measures

2.1 Eutrophication

Eutrophication is a condition where bodies of water such as lakes are inundated with high levels of nutrients containing nitrogen and phosphorous. Excessive eutrophication causes abnormal increases in phytoplankton which results in outbreaks of freshwater red tide or blue-green algae.

The oxygen deficiency caused by phytoplankton that consume a great amount of oxygen inhibits the growth of other living organisms and sometimes causes serious malodors.

2.2 Freshwater Red Tide

Lake Biwa experienced a large-scale freshwater red tide for the first time in

1977, and such outbreaks continued up to the 1990s. Recently, however, the number of days during which red tides occur and affected areas have decreased.



Fig. 4-4-1 Freshwater red tide in Lake Biwa

2.3 Blue-green Algae

Blue-green algae first appeared in Lake Biwa in 1983 and has continued to appear almost every year since then.

2.4 Countermeasures to Eutrophication Issues

It was found that one of the causes of the freshwater red tide was phosphorus contained in synthetic detergents. This prompted local residents to launch an initiative called the "Soap Movement," calling for the use of powdered soap for washing clothes instead of synthetic detergents containing phosphorous. This movement

led to the enactment of the Ordinance for the Prevention of Eutrophication of Lake Biwa (The Lake Biwa Ordinance of 1979).

In accordance with the “Act Concerning Special Measures for Conservation of Lake Water Quality” enacted by the national government in 1984, the prefectural government established the first “Lake Water Quality Conservation Plan” in 1987 to promote comprehensive water quality conservation measures including the installation of sewage systems.

the lake itself. As the first step in this process, the “Reed Colony Conservation Ordinance” was implemented in 1992. The “Ordinance Concerning the Appropriate Leisure Usage of Lake Biwa” was also enacted in 2002, and includes regulations for limitation of catch-and-release of invasive fish.

(Lake Biwa Policy Division, Shiga Prefectural Government)

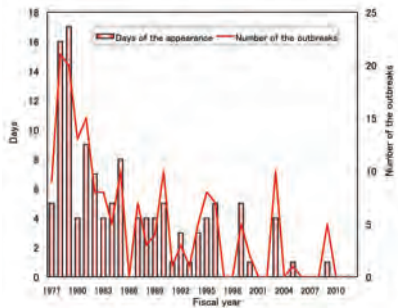


Fig. 4-4-2 Changes in outbreaks of freshwater red tides

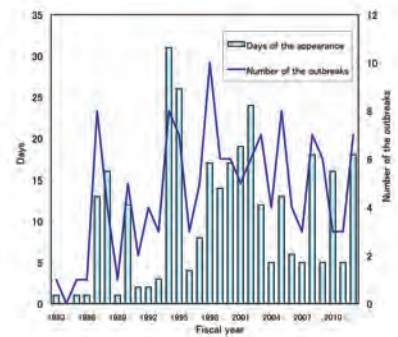


Fig. 4-4-3 Changes in outbreaks of blue-green algae

3. Conservation of Ecosystems

In order to restore Lake Biwa to a healthy state, it was necessary to reduce inflowing substances that cause pollution and focus on the natural mechanisms of

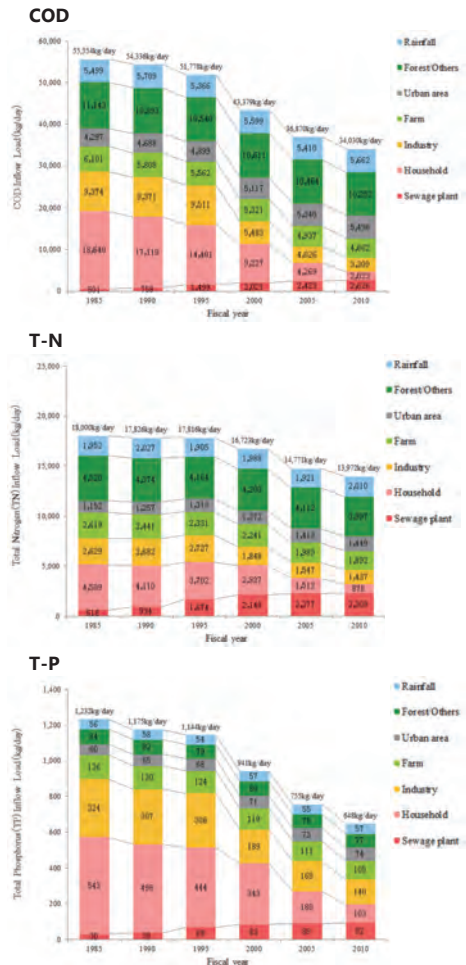


Fig. 4-4-4 Changes in the Lake Biwa inflow load