WATER MANAGEMENT SYSTEM ON LAKE BIWA

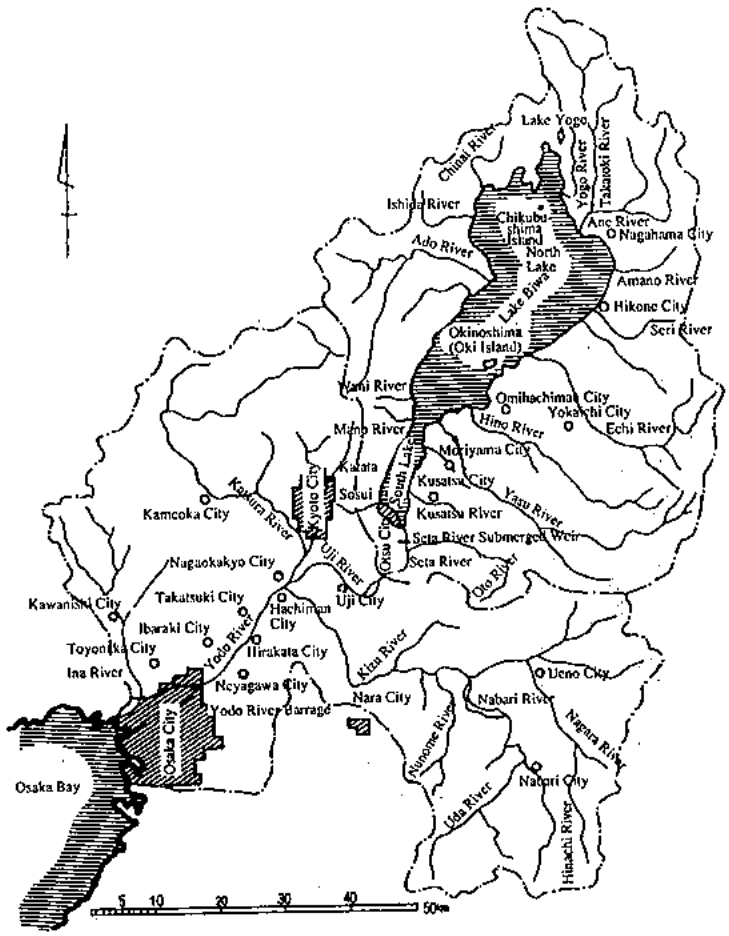
1. Lake Biwa

As the largest freshwater lake in Japan with a vast storage volume, Lake Biwa has since ancient times played an important role in the lives of the people in the region. Having made major contributions to the industrial and cultural development of the nearby areas, it today provides a valuable source of water for the Kyoto-Osaka-Kobe conurbation.

Lake Biwa's catchment area of 3,848 km^2 accounts for approximately 50% of the total area of the Yodo River Basin and covers 96% of Shiga Prefecture. Of the fifty municipalities in Shiga Prefecture, twenty-one border directly on the lake and its importance cannot be underrated.

Lake Biwa is well known for its beautiful scenery and was made the first quasi-national park in Japan in 1930. It is today one of the best-known tourist and recreational areas not only in the Kinki Region, but in the whole of Japan.

The water level on Lake Biwa is controlled at Setagawa Weir, and this weir plays an important role in flood control in the Yodo River System and in utilisation of water resources in the Kinki Region.



(Yodo River System)

The significance of Lake Biwa in various fields is summarised below.

a) As a Water Source

With its abundant and stable supply of water, Lake Biwa provides a valuable source of water used in the everyday life and industrial activities of the people not only in Shiga Prefecture but also in the Kyoto-Osaka-Kobe area, and plays a crucial role as the source of water used for various purposes by the nearly 13 million people living in the Kyoto-Osaka-Kobe area.

b) As a Natural Regulating Reservoir

With a large lake surface area of 674 km^2 and a vast storage capacity of 27,500 million m^3, Lake Biwa has an important role to play in flood control and flow regime adjustment.

c) As a Fishing Ground

Lake Biwa is one of the most important fishing grounds for freshwater fisheries in Japan, and supplies nearly 70% of all ayu (sweetfish) seed in the country.

d) As a Recreational Area

The natural and scenic beauty of Lake Biwa is well known throughout the country and the lake provides areas for various recreational activities. As many as 18 million people visited the Lake Biwa Quasi-National Park in 1983, and the importance of Lake Biwa as a tourist/recreational zone with an abundance of historical heritages, water and greenery is expected to increase in the future.

e) As an Area of Academic Study

Lake Biwa is said to be the third oldest lake in the world. It is home to a large number of rare species of plants and animals, as well as to a host of prehistoric sites and cultural and historical heritages, and as such is of great significance for academic studies.

f) As a Local Symbol

Lake Biwa has a crucial role to play as a symbol for Shiga Prefecture, whose old provincial name of Omi is derived from "awaumi," a word meaning "freshwater sea," and which even today is often called the "Lake Province." Lake Biwa also provides a symbolic presence for the whole of the Kyoto-Osaka-Kobe region, which derives numerous physical and non-physical benefits from the lake.

(Lake Biwa)

Item	Scale etc.	Remarks
Lake area	Approx. 674 km^2	Approx. 1/6 of the area of Shiga Prefecture, slightly larger than Awaji Island (593 km^2)
Lakeshore line	Approx. 235 km	Equivalent to the distance between Otsu and Hamamatsu on the Tokaido Line
Length	63.49 km	Between Shiotsu in Nishi-Azai Town (northern end) and Tamanoura in Otsu City (southern end)
Maximum width	22.80 km	Between Shimosakahama in Nagahama City and Aiba in Shin-Asahi Town
Minimum width	1.35 km	Between Yasugawajiri in Moriyama City and Imakatata in Otsu City
Maximum depth	103.58 m	Off the estuary of Ado River
Average depth	North Lake: 43 m South Lake: 4 m	
Storage volume	27,500 million m^3	Equivalent to approx. 15 years' potable water demand for the 13 million people living in the Kyoto-Osaka-Kobe region
Catchment area	3,848 km^2	Accounts for approx. 53% of the catchment area of the Yodo River System upstream of Hirakata (7,281 km^2)
Water surface elevation	($O.P._B$ + 85.614 m) (T.P. + 84.371 m)	Reference water level at Toriigawa Water Level Observation Station
Annual inflow	5,300 million m^3	Average inflow over 110 years from 1875 to 1984
Annual rainfall	1,909 mm	Average rainfall over 93 years between 1894 and 1986
Influent rivers	121 rivers	Class A rivers

2. Runoff Characteristics of Lake Biwa and Yodo River

(1) Flood Characteristics

1) Reduction of flood discharge on Yodo River due to storage in Lake Biwa

The catchment area of Lake Biwa (3,848 km^2) accounts for approximately 53% of the total catchment area of the Yodo River upstream of its reference point at Hirakata (7,281 km^2).

The vast surface area of Lake Biwa (approx. 674 km^2) means that a rise of mere 0.3 m in the lake water level corresponds to an increase of approximately 200 million m^3 in the storage.

The resulting regulatory capacity of Lake Biwa makes it possible to handle the flood discharge with river channels around half the widths that would otherwise be required on the Yodo and Uji Rivers that lie downstream of Lake Biwa.

Catchment Areas above Hirakata

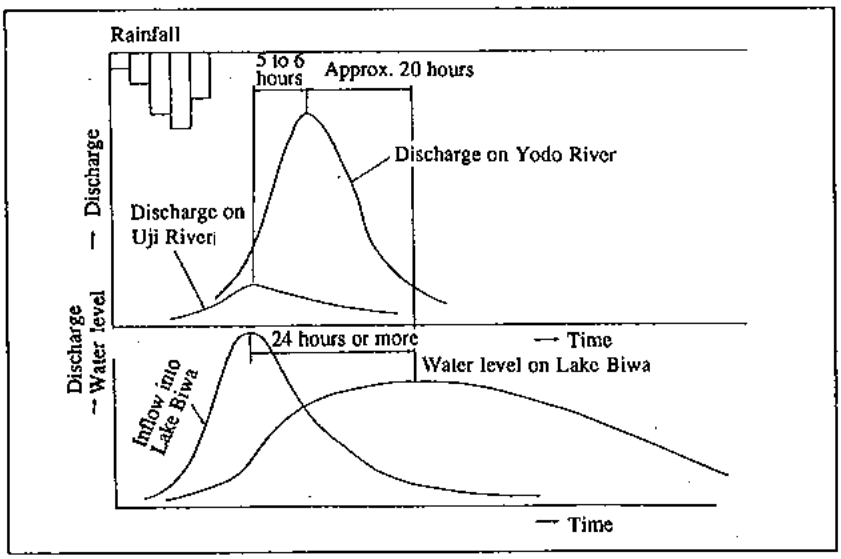
Basin	Catchment area (km^2)		Ratio (%)
Lake Biwa	3,848	(lake surface area: 674)	52.9
Uji River	506	(catchment area above Amagase Dam: 352)	6.9
Kizu River	1,596		21.9
Katsura River	1,100		15.1
Yodo River (main channel)	231		3.2
Total	7,281		100.0

2) The peak water level on Lake Biwa is observed approximately one day after the peak discharge on the main channel of the Yodo River.

While the total inflow into Lake Biwa often exceeds 10,000 m^3/s during floods, the maximum discharge from Lake Biwa, even when Setagawa Weir is fully open, is around 1,000 m^3/s. Since this means that the inflow exceeds the outflow by a factor of ten or more, the water level on Lake Biwa often continues to rise for long periods after the peak inflow is observed.

The water level on Lake Biwa reaches its peak, when the inflow is already on the wane and is balanced by the outflow via the Seta River.

During past floods, the water level on Lake Biwa has been observed to reach its peak approximately one day after the peak discharge at Hirakata on the main channel of the Yodo River.



Time Lag between Peak Water Level on Lake Biwa and Peak Discharge at Hirakata on Yodo River

3) The flood discharge from the Kizu River is the dominant factor in causing major floods on the Yodo River.

The Yodo River gathers its waters from the Uji, Katsura and Kizu Rivers, and the floods on the main channel of the Yodo River are the results of the combinations of flood discharges on these three rivers. Of these three rivers, the catchment area of the Kizu River accounts for approximately 50% of the remaining total catchment area of the Yodo River when that of Lake Biwa is excluded, and major floods are often observed on the main channel of the Yodo River when heavy rainfall occurs in the catchment area of the Kizu River.

Maximum Discharges during Recent Major Floods on Yodo River

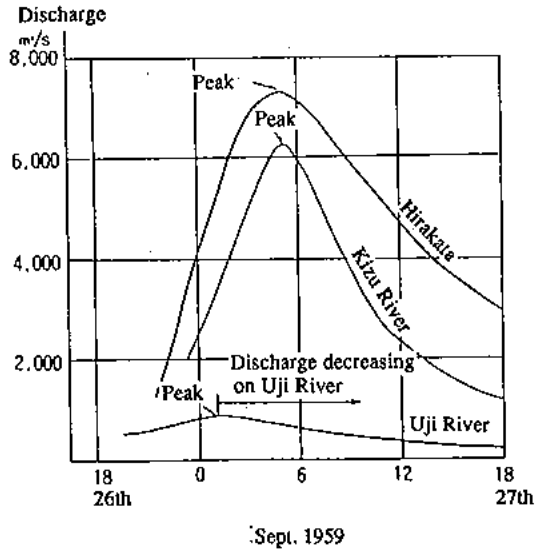
(unit: m^3/s)

Rank	Flood (date)	Yodo River (Hirakata)	Kizu River (Kamo)	Katsura River (Katsura)	Uji River (Yodo)
1	25th Sept. 1953	8,650	5,800	2,700	1,780
2	28th Oct. 1961	7,800	5,400	2,100	1,000
3	27th Sept. 1959	7,200	6,200	1,700	885
4	17th Sept. 1965	6,870	5,170	2,500	900
5	14th Aug. 1959	6,800	3,700	2,500	1,270

* While the discharge peaks at Kamo, Katsura and Yodo do not always coincide with those at Hirakata, the peak discharges at Kamo come close to those at Hirakata.

4) The discharge on the Uji River is on the decrease when the flood discharge reaches its peak on the Yodo River.

While the Uji River has a length of only around 35 km, the Kizu River has a length of 120 km. The result is that when the flood discharges reach their peaks on the main channel of the Yodo River and on the Kizu River, the discharge on the Uji River has already passed its peak and is on the decrease.



Flood Wave Forms on Yodo, Uji and Kizu Rivers (example)

(2) Drought Characteristics

1) Balance of flow regimes between Lake Biwa, Kizu River and Katsura River

The catchment areas of Lake Biwa and the Kizu and Katsura Rivers each have their own peculiar climatic characteristics. While the catchment area of the Kizu River is subject to heavy rainfall due to typhoons, rainfall due to fronts predominates in that of the Katsura River. The southern part of the catchment area of Lake Biwa and that of the Uji River receive heavy rainfall in the summer during the June-July rainy season and the typhoon season, while the northern part of the catchment area of Lake Biwa see significant amounts of snowfall in winter.

In the Yodo River Basin, different parts of the river basin supplement the discharge at different times of the year, producing a stable flow regime in the downstream areas. It is when this balance is disturbed that the flow regime becomes unstable and droughts are caused.

Yearly Average Discharges

River	Reference point	Wet-year discharge (m^3/s)	Normal discharge (m^3/s)	Low-water discharge (m^3/s)	Drought discharge (m^3/s)	Average discharge (m^3/s)	Annual total discharge (100 million m^3)	Observation period
Yodo	Hirakata	287.96	199.44	149.80	108.68	275.33	86.87	1952-1990
Uji	Yodo	195.83	138.86	102.40	76.62	178.14	56.20	1955-1990
Katsura	Nouso	47.17	31.46	22.80	15.77	47.96	14.56	1955-1990
Kizu	Yawata	48.13	29.27	19.96	11.72	51.11	16.11	1956-1990

2) Lowering of the water level on Lake Biwa and its effects on the Yodo River

During droughts the discharge from the Uji River accounts for around 70% of the total discharge on the main channel of the Yodo River. This is due to the presence of Lake Biwa above the Uji River, and gives an indication of how the storage function of Lake Biwa contributes to the stabilisation of the flow regime on the Yodo River downstream. When, however, the rainfall is low in the catchment area of Lake Biwa and the water level in the lake is lowered, as this may have adverse effects on the fisheries and other industries in Shiga Prefecture, restrictions are placed on the discharge from the lake, causing problems in water intake from the Yodo River downstream.

Droughts normally occur in the period from autumn to winter in the Yodo River Basin. This is attributable to the fact that, even if the rainfall is low during the summer-autumn period, the discharge can be maintained through use of the regulatory effect of Lake Biwa, but with the subsequent lowering of the lake water level the decrease in the discharge on the Yodo River cannot be avoided.

3. History of Flood Control and Water Use on Lake Biwa

Since time immemorial, the area around Lake Biwa has suffered from floods whenever there was heavy rain. While as many as 121 rivers, counting only those registered as Class A rivers, flow into the lake, which is surrounded on all sides by mountains, the Seta River provides the only outlet from the lake. Since this Seta River had a low discharge capacity, the river channel being narrow, as well as being shallow, once floods occurred, the water level in the lake remained high for long periods, frequently resulting in inundation of the areas along the lakeshore. Although the peasant communities along the lakeshore made frequent petitions to the Shogunate to dredge the Seta River during the Edo Period (17th to 19th C.), no radical improvements were made here, out of considerations for flood control in areas further downstream.

This was because an increase in the discharge capacity of the Seta River would result in increased discharge on the Uji and Yodo Rivers that lay downstream of Lake Biwa, leading to an increase in flood damage in those downstream areas. The problem, in other words, lay in the contradicting interests of those on the upper and lower reaches of the river. The interests were also contradictory from the point of view of water use, since an increase in the discharge from Lake Biwa would mean that, while those living downstream would benefit during droughts from the increased discharge, the resulting lowering of the water level on the lake could have serious adverse effects on water use and industrial activities along the lake.

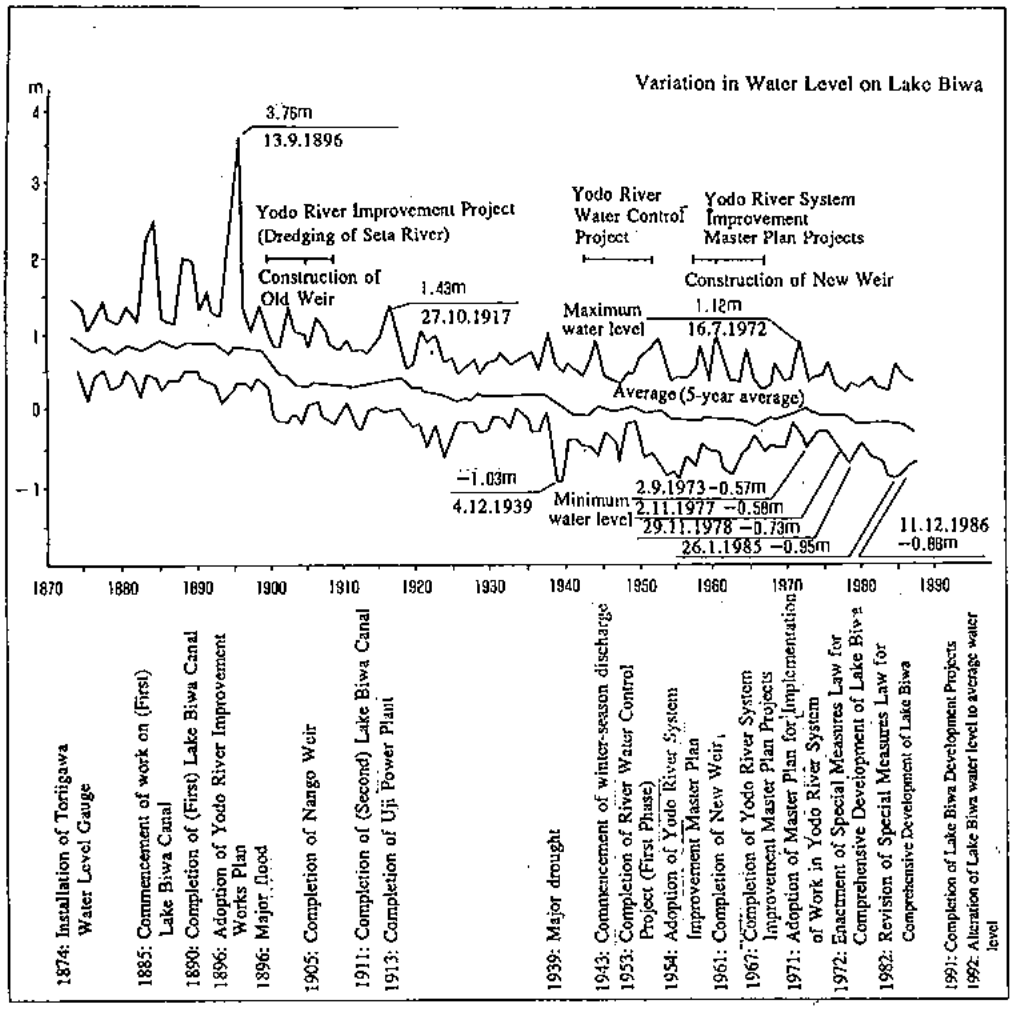
A further consideration, relating to the flood runoff characteristics of the Yodo River System, was that when the flood discharge reaches its peak on the Yodo River, the water level on Lake Biwa is still at a relatively low level, reaching its peak approximately one day later.

It was under the circumstances outlined above that the construction of a weir on the Seta River was planned as a means of solving the problem of contradicting interests between those on the upper and lower reaches of the river. By keeping the weir closed during floods on downstream sections and opening it when the worst of the flood has passed, the flood damage in downstream areas could be reduced even if the discharge capacity of the Seta River were to be enlarged. For the purposes of water use too, appropriate adjustment of the discharge through the operation of the weir would contribute to efficient utilisation of the water resources both in the upstream and downstream areas.

The improvement work on the river began in 1900 with such projects as the construction of the Nango Weir (the old weir) and full-scale dredging of the Seta River, implemented as flood control measures by the national government. These projects led to an increase in the discharge capacity of the Seta River and a major reduction of the flood damage around Lake Biwa, and at the same time to a reduction of the flood discharges on the Uji and Yodo Rivers downstream.

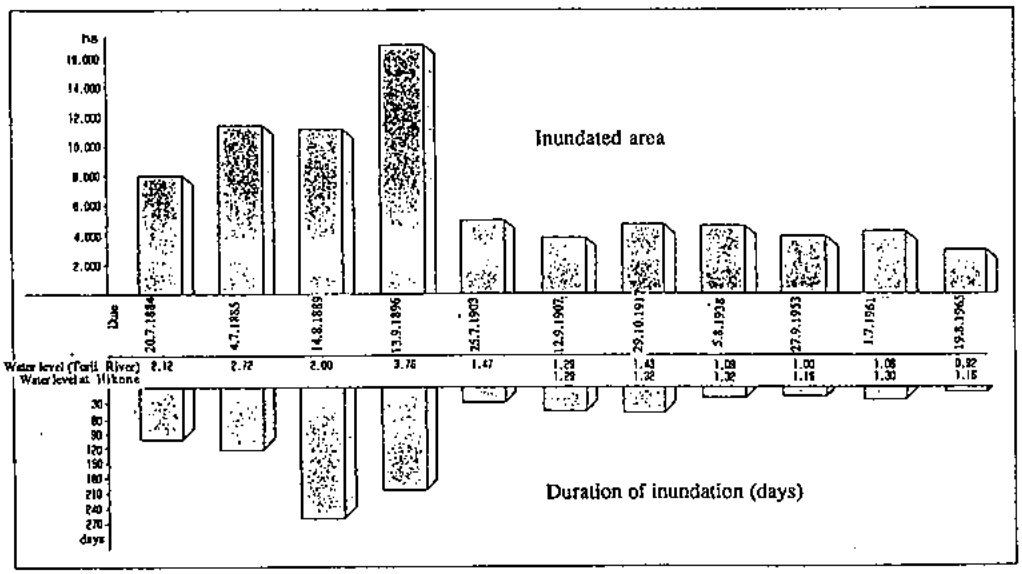
During the subsequent years, the increasing needs for projects relating to water use, along with those for flood control, have led to the implementation of various flood control and water use projects on the river, while ensuring a coordination between the interests of the upstream and downstream areas. The history of these projects is outlined below.

(Variation in Water Level on Lake Biwa)



The average of the water levels taken at five observation stations dotted around Lake Biwa (Katayama, Hikone, Omizo , Katata and Mihogasaki) is used as the Lake Biwa average water level.
The reference water level is T.P. + 84.371 m (O.P.B. + 85.614 m), and the water levels on Lake Biwa are given as figures relative to this elevation.

(Effects of Improvement on Seta River)



(1) Improvement Work during Meiji Era (1900-1909)

The middle years of the Meiji Era (1868-1912) saw the spread of the railway and a decline of transportation by water. This, together with the frequent occurrence of floods led to an increasing demand for implementation of flood control projects.

The major flood of 1885, in particular, caused unprecedented damage in Osaka and had a serious impact also in the areas around Lake Biwa, leading a heightening of the demand for dredging of the Seta River among the residents of these areas.

Under these circumstances, the national government began improvement work on the Seta River as a part of the project for the improvement of the Yodo River System. The projects implemented included the dredging of the Seta River and the opening of a new channel at Dainichiyama Hill, which presented a bottleneck, which were aimed at increasing the discharge capacity of the Seta River. The project also involved the construction of a weir on the Seta River (completed in 1905), which was aimed at providing a solution to the problem of contradicting interests between the upstream and downstream areas concerning flood control, through the maintenance of the water level on Lake Biwa and adjustment of the downstream discharge. These projects resulted in an increase in the discharge capacity of the Seta River, when the water level on Lake Biwa was 0 m, from 50 m^3/s to 200 m^3/s.

(2) Yodo River Water Control Project (First Phase) (1943-1952)

The rapid growth of the Japanese economy beginning in the Meiji Era led to major increases in the demand for water, for use in power generation and as potable and industrial water. At the same time, the legal framework for the implementation of flood control projects had been provided by the enactment of the River Law in 1892 and the subsequent enactment of related legislations, and the number of flood control projects being implemented was gradually increasing.

Under these circumstances, the "Master Plan for Water Control on Yodo River" was adopted in 1940 as the first plan covering the aspects of both flood control and water use. Under this plan, the flood season water level on Lake Biwa was to be maintained at 0 m, and it was allowed to rise to +80 cm for the purposes of flood control and to drop to -1.80 m for the purposes of water use. This would lead to an increase in the water use capacity from 80 m^3/s to 145 m^3/s, or 90% of the average inflow into the lake of 160 m^3/s.

The war, however, made it financially difficult to implement all of the projects envisaged under this plan, and it was decided that only those projects with the greatest impacts should be implemented.

These projects comprised the first phase of this plan, and were aimed at allowing a fluctuation of the lake water level between +0.30 m and -1.00 m, providing a water use capacity of 120 m^3/s under normal conditions, corresponding to 75% of the average inflow into the lake.

The projects implemented included compensatory measures relating to the lowering of the water level, such as the installation of intake facilities, and further dredging of the Seta River.

The completion of these projects resulted in an increase in the discharge capacity of the Seta River to 400 m^3/s, when the lake water level was 0 m.

(3) Master Plan for Improvement of Yodo River System (1957-1967)

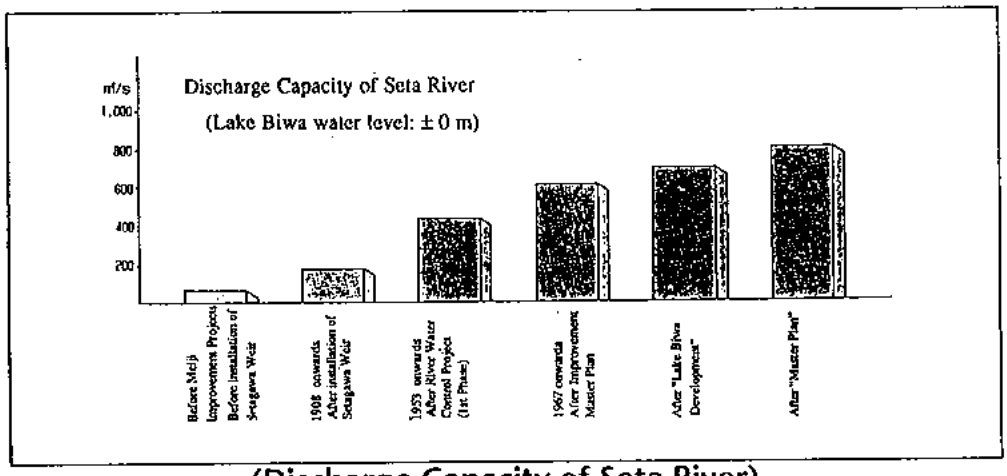
Typhoon No. 13 of 1953, occurring immediately after the completion of the first phase of the Yodo River Water Control Projects, caused serious damage along Lake Biwa and the remaining parts of the Yodo River Basin. At the same time, the rapid advances in dam technologies had led to an increase in the construction of multipurpose dams, whose aims included power generation. It was under such circumstances that the "Master Plan for Improvement of Yodo River System" was adopted, the plans envisaged under which included the construction of multipurpose dams.

Under this plan, the Seta River was dredged to provide it with a discharge capacity of 600 m^3/s when the lake water level was 0 m, and the facilities on Setagawa Weir were renovated to allow mechanical operation, leading to a marked reduction of the operation time (from 1 to 2 days to around 30 minutes), and allowing the implementation of efficient river management both for purposes of flood control and water use.

(4) Master Plan for Implementation of Work in Yodo River System (1971-)

In the wake of the damage wrought, among others, by the floods due to Typhoon No. 24 of September 1965, the "Master Plan for Implementation of Work in Yodo River System" was adopted to further raise the level of safety against floods. This plan envisaged the improvement of the river channels to provide a discharge capacity of 800 m^3/s when the water level on Lake Biwa was 0 m and of 1,200 m^3/s when it was 1.0 m, with the aims of lowering the pre-flood water level on Lake Biwa and of reducing the duration of inundation.

This master plan was reflected in the Project for Comprehensive Development of Lake Biwa, which was begun in 1972.



(Discharge Capacity of Seta River)

4. Project for Comprehensive Development of Lake Biwa

The rapid growth of the Japanese economy during the period starting around 1960 resulted in a rising demand for urban water in the form, among others, of potable water necessitated by the concentration of the population in the Kyoto-Osaka-Kobe area on the lower reaches of the Yodo River and by the rising standards of living, and of alternative sources of industrial water required to prevent ground settlement in coastal areas.

At the same time, Shiga Prefecture, where Lake Biwa, the water source, was located, was a relatively underdeveloped area in economic terms within the Kinki Region, and expectations were being placed here on investment in social capital as a basis of future development.

It was under these circumstances that the "Project for Comprehensive Development of Lake Biwa" was begun in 1972 with the aims of developing the area around Lake Biwa and implementing flood control measures, as well as of developing water resources, while ensuring the conservation of the environment on and around the lake.

The basic aim of the project lay in the appropriate and effective use of the resources on Lake Biwa, while ensuring the conservation of the rich natural environment in and around Lake Biwa and the restoration of the water quality whose gradual deterioration was observed. The promotion of these comprehensive measures for the conservation, development and management of Lake Biwa and the surrounding areas was intended to contribute to the welfare of the local residents and to the sound development of the Kinki Region. The Project for Comprehensive Development of Lake Biwa is made up of the "Projects for Flood Control and Water Resources Development on Lake Biwa (Lake Biwa Development Projects)" implemented by the Water Resources Development Public Corporation (WARDEC), and the "regional development projects" implemented by the national, prefectural and municipal governments.

Of these, the "Lake Biwa Development Projects" entailed the implementation of the following measures for flood control and provision of 40 m^3/s of new sources of water, while ensuring environmental conservation.

(1) Construction of lakeshore dykes and inland water drainage facilities for protection against floods due to rising water levels on Lake Biwa

(2) Dredging of the Seta River to provide it with a discharge capacity of 800 m^3/s (lake water level: 0 m) above Setagawa Weir

(3) Construction of a water channel bypassing Setagawa Weir to allow supply of water with certainty to downstream areas at times of low water

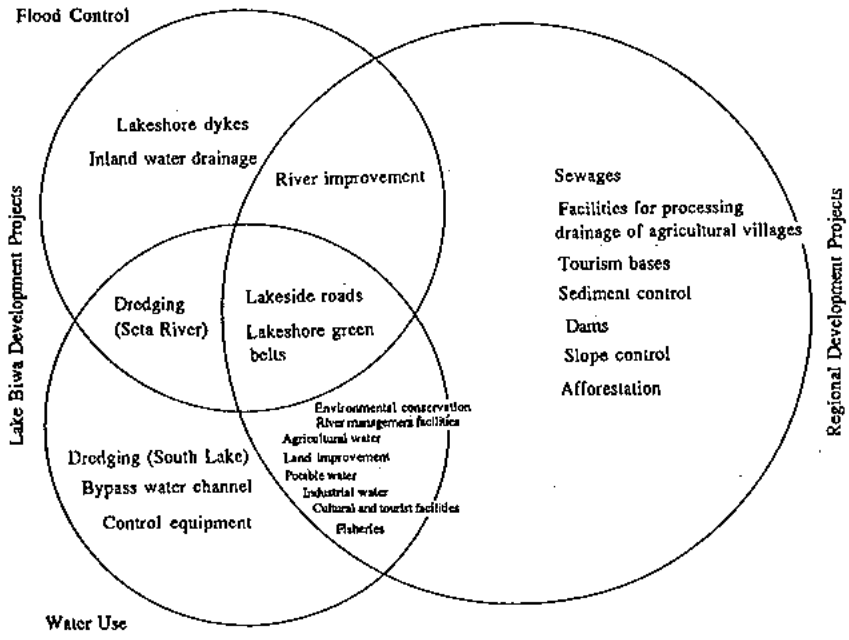
(4) Dredging of the South Lake, as a measure against obstruction to navigation and deterioration of the natural environment at times of low water

(5) Renovation of intake facilities (for potable water, agricultural water etc.), port facilities, fishing harbours, piers etc. to allow them to function as before when the water level was lowered

The regional development projects implemented include projects aimed at the conservation of the natural environment and restoration of water quality, such as those for creation of green belts around the lake, sediment-control, slope-control and afforestation projects and development of the sewerage network, as well the measures for flood control in the form of construction of dams and improvement works on river channels, and the projects aimed at aiding regional development, such as those for road construction, land improvement, development of potable and industrial water facilities and development of fisheries.

The Project for Comprehensive Development of Lake Biwa was originally intended to last for ten years up to 1982. With the subsequent changes in the social circumstances, the target date has since been postponed twice and, as it stands today, is a 25-year project, aimed at completion in 1996.

The "Lake Biwa Development Projects" implemented by WARDEC were completed in 1991, meaning that the projects envisaged for flood control and water use on Lake Biwa have now seen their completion.



(Composition of Project for Comprehensive Development of Lake Biwa)

5. Water Management System on Lake Biwa

In the Yodo River System, the catchment areas of the influent rivers, such as the Kizu and Katsura Rivers, with their differing climatic conditions, supplement the discharge in the main channel at different times of the year (snow-melt season, June-July rainy season, typhoon season) to provide a stable flow regime throughout the year. It is, however, the presence of Lake Biwa, functioning as a natural regulating basin with its vast water resources, which makes this river system unique among the river systems in Japan. The Seta River provides the only outlet from this Lake Biwa, and it is clear that appropriate control of the discharge on the Seta River is of extreme importance in water management on Lake Biwa, as well as in the discharge adjustment in the river system as a whole.

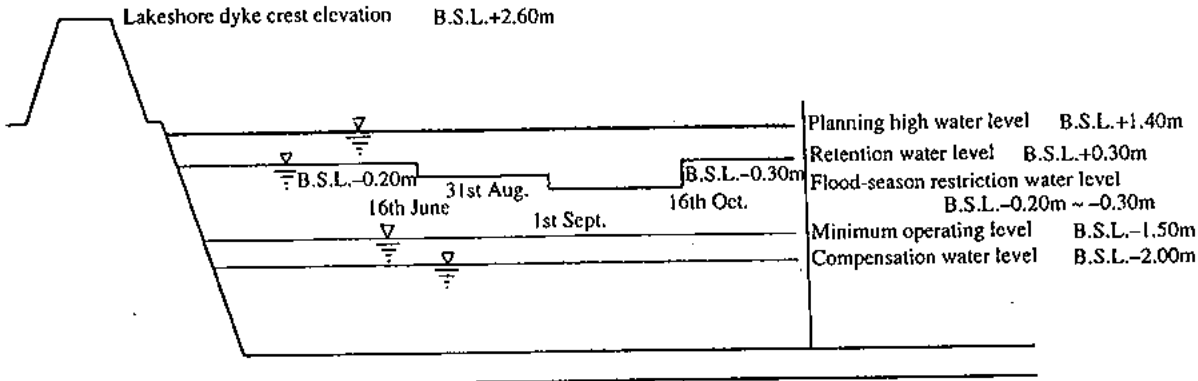
(1) Operation of Setagawa Weir

The operation of Setagawa Weir, which controls the water in Lake Biwa, the largest lake in Japan, has a variety of aims, including the protection of the area around the lake from floods, maintenance of the water level in the lake, reduction of the flood discharge and maintenance of the functions of the river water on the Yodo River downstream of the weir, and supply of potable and industrial water.

For the purpose of achieving these aims, under the operation rules adopted in March 1992, Setagawa Weir is to be operated in such a way as to maintain the water level +0.30 m above the reference water level in the lake during the non-flood season, and to lower this water level to -0.20 m and -0.30 m in preparation for floods during the flood season to reduce the maximum flood levels reached, while ensuring the provision of the water required in the Yodo River downstream through use of the capacity down to -1.5 m.

At times of floods, a use is made of the peculiar runoff characteristics of the Yodo River System, which produces a time lag between the peak discharges from Lake Biwa and on the main channel of the Yodo River. The discharge from Setagawa Weir is restricted or even completely suspended to protect the downstream areas from floods during preparatory discharge from Amagase Dam located downstream and at times of floods on the Uji and Yodo Rivers, and Setagawa Weir is fully opened once the flood downstream have subsided to minimise the water level rise on Lake Biwa.

At times of normal and low water, the discharges required along the lower reaches of the Yodo River are supplied from the weir. The volumes of water to be supplied from Lake Biwa are determined and adjusted each day by apportioning the total downstream demand to Lake Biwa and the group of dams on the Kizu River in proportion to the remaining storage in these respective sources. In the operation of Setagawa Weir, the discharge is determined each day from this demand, with considerations also for the maintenance of the water level in Lake Biwa.



Note: B.S.L. Lake Biwa reference water level(T.P.+84.371 m)
Planning high water level Water level used in flood control plans
Retention water level Full water level under normal conditions
Flood-season restriction water level Level to which water is lowered in preparation for rainy and typhoon seasons
Minimum operating level Water level used for purposes of water use
Compensation water level Water level after compensation for water level lowering

(Water Level Management on Lake Biwa)

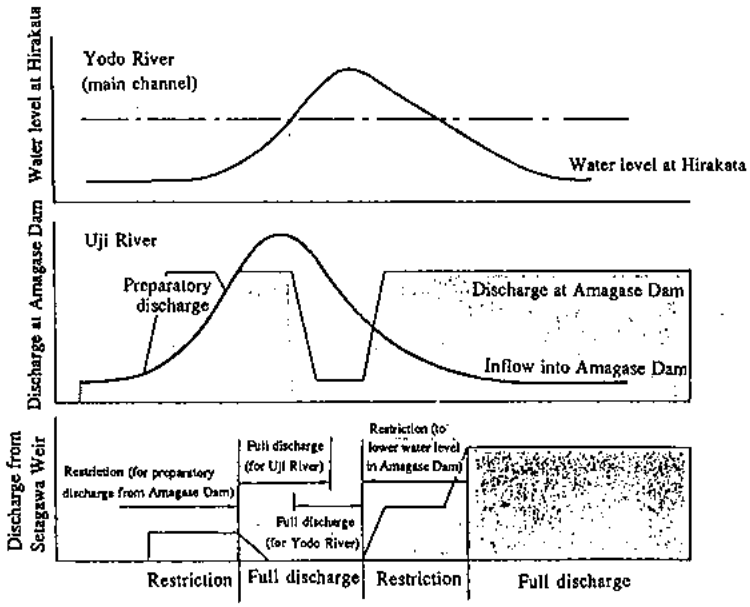
(2) Equipment for Water Management on Lake Biwa

1) The operation of Setagawa Weir in the manner outlined above requires the appropriate acquisition of information on the meteorological and hydrological conditions in the catchment area of Lake Biwa and in the Yodo River Basin as a whole. Improvements have been made for this purpose on the discharge control equipment and information systems through the installation of rainfall and water level telemeter stations on Lake Biwa and the Seta River, and through the installation of an operation at the weir for integrated management of the information supplied from the observatories and other relevant organisations.

2) With a view to ensuring a more appropriate assessment of the water level on Lake Biwa, the average of the water levels taken at five observation stations dotted around Lake Biwa is now being used instead of the water level at the Toriigawa Water Level Observation Station.

3) An exhibition centre, named "Aqua Biwa" has been opened near Lake Biwa Construction Works Office as a centre for providing information to the public on the management of Lake Biwa.

   "Aqua Biwa" has been provided with an audiovisual hall and various models and panels for giving information on the nature in and around Lake Biwa and on the flood control and water use on Lake Biwa and the Yodo River.



Operation of Setagawa Weir

6. Future Tasks

Setagawa Weir, which has the function of maintaining a constant water level on Lake Biwa and of providing the required discharge on the Yodo River downstream, is being used for these purposes today in accordance with the new rules for its operation adopted in March 1992.

The management of Lake Biwa should not, however, be seen simply in terms of the management of water levels and discharges. An intensive use has for long been made of the water in Lake Biwa as potable, industrial, agricultural and power generation water by those living around the lake and along the Yodo River downstream and the lake has an indispensable role to play in the high-level economic and social activities in the Kinki Region.

Furthermore, the area around the lake has in recent years been seeing the development of housing for commuters to the Kyoto-Osaka-Kobe area and of tourist facilities.

The situation today calls more than ever before for the implementation of comprehensive management, that caters for environmental considerations, such as the improvement of water quality, in addition to the improvement of the levels of safety against disasters and procurement of water resources, and there is a need today for the implementation of an appropriate management of Lake Biwa through cooperation and coordination between the various agencies concerned.

It was from such a standpoint that the "Foundation for Water Quality Conservation on Lake Biwa and Yodo River" was established in October 1993 by the governments of the relevant prefectures as an institution for carrying out research and technological development relating to the conservation of water quality in the Yodo River System. The situation today calls for further implementation of such measures through cooperation between the national and local governments, between those on the upper and lower reaches of the river and between the public and private sectors.