



Kanagawa Prefecture

Miho Dam

Sakawa River Comprehensive Development Project Overview



View of Miho Dam from downstream

Project Overview

The Sakawa River is a Class B river with a mainstream length of 46 kilometers and a catchment area of 582 square kilometers. The river originates at Kawanishi in Yamakita-machi where the Ayuzawa River (originating in Gotemba City at the foot of Mount Fuji) and the Kochi River (originating in the western Tanzawa Mountains) meet, and flows south through the Ashigara Plain before emptying into Sagami Bay.

The purpose of the Sakawa River Comprehensive Development Project was to construct a multipurpose dam on the Kochi River (a Sakawa River tributary), at Kamioda in Yamakita-machi for flood control and power generation purposes, and to install a water intake weir at Iizumi in Odawara City (about 2.3 kilometers upstream from the river's mouth) to meet water demand in the prefecture, including securing water for drinking.

Miho Dam is a rock-fill embankment dam with a height of 95.0 meters, a length of 587.7 meters, and a total water storage capacity of 64.9 million cubic meters. It was an eight-year project from 1971 to 1978, constructed at a cost of 82.3 billion yen, and began operations on February 28, 1978. The reservoir the dam created was named Lake Tanzawa, which has a circumference of 21.5 kilometers and an area of 2.18 square kilometers.

Construction of the water intake facility (Iizumi intake weir) began in May 1971, and was completed in August 1973, at a total cost of 4.5 billion yen. Operations began in April 1974.

This water is supplied to the waterworks of Kanagawa Prefecture, Yokohama City, Kawasaki City, Yokosuka City and Odawara City.

Kanagawa Prefecture Public Enterprise Agency carried out the dam construction work, which was commissioned by the river administrator (the governor of Kanagawa Prefecture), the Kanagawa Water Supply Authority (comprising Kanagawa Prefecture, Yokohama City, Kawasaki City and Yokosuka City) and Tokyo Electric Generation Company.

■Chronology of the project

Date	Details
April 1, 1961	• Sakawa River Comprehensive Development Basic Survey Begins
April 1, 1969 August 16, 1969 December 23, 1969	• The Miho District Dam Countermeasures Council is formed • Displaced Landowners' Council is formed • The Sakawa River Comprehensive Development Project Countermeasures Headquarters is established
March 25, 1970 April 1, 1970 May 11, 1970	• Basic agreement concluded on the construction of a dam and the Iizumi water intake facility (Kanagawa Prefecture, Kanagawa Water Supply Authority) • Construction consignment agreement concluded (Kanagawa Prefecture, Kanagawa Prefecture Public Enterprise Agency, Kanagawa Water Supply Authority) • Onsite survey (flood line survey) begins
May 31, 1971 November 16, 1971	• Iizumi water intake facility groundbreaking ceremony • Displaced personal compensation outline signed
March 11, 1972 December 21, 1972	• Survey of actual conditions for compensation begins • Sakawa River fishery compensation signed
May 1, 1973 August 31, 1973 December 19, 1973	• Outline of land compensation signed • Iizumi water intake facility completed • Dam compensation unit agreement concluded
April 1, 1974 May 17, 1974	• Iizumi water intake facility begins operations • Dam groundbreaking ceremony
October 16, 1975 December 2, 1975	• Temporary diversion channel for dam begins to divert water • Embankment construction begins
April 1, 1976	• Tokyo Electric Generation Company joins project
July 1, 1977 November 6, 1977 December 26, 1977	• Proposed regional development plan submitted to local municipalities • Embankment construction completed • New prefectural roads opened to traffic
February 28, 1978 April 1, 1978 April 26, 1978 July 28, 1978 November 24, 1978 December 11, 1978	• Dam begins operations • Dam management office established • Tanoiri Power Plant (Tokyo Electric Generation) begins operations • Dam completion ceremony • Reservoir water level reaches maximum level • Dam completion inspection

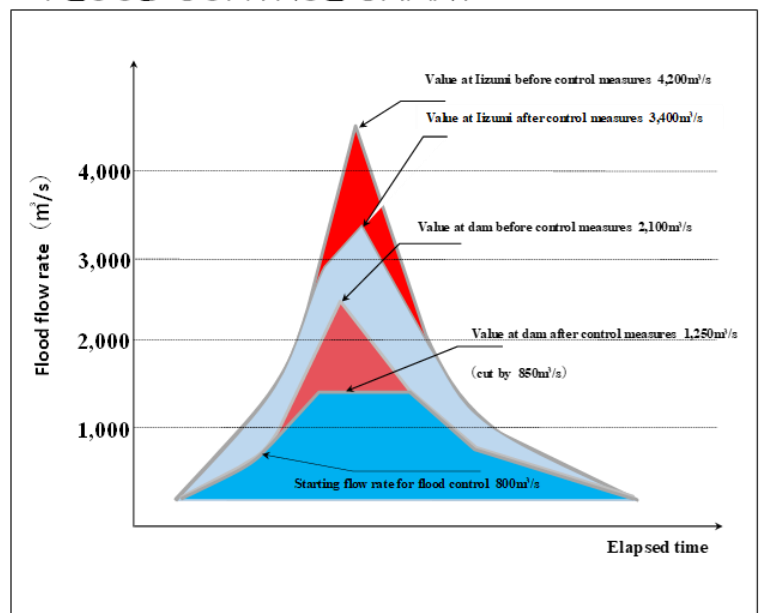
Purpose of the project

Flood control

Although flood control for the Sakawa River had been conducted through a planned flood discharge of 3,400 cubic meters/second at Iizumi at the river's mouth since 1949, the dam was constructed upstream to improve flooding-related safety in line with the development situation in various parts of the catchment area.

At Miho Dam, the reservoir's water level is lowered by 4.7 meters from the maximum capacity (321.5 meters above sea level) to reduce flood damage downstream during the flood season (June 15 to October 15). Using the resulting 1,000-cubic-meter capacity, 850 cubic meters per second of the total planned flood discharge of 2,100 cubic meters per second is controlled at the dam.

■ FLOOD CONTROL CHART



Tap water

To secure water for use in Kanagawa Prefecture as well as to ensure the flow rate of existing water rights downstream from the dam, water is discharged from the dam, and a maximum of 1,809,500 cubic meters per day is taken from the Iizumi water intake facility, which is 27.7 kilometers downstream from the dam.

This water is supplied to members of the Kanagawa Water Supply Authority and to Odawara City.

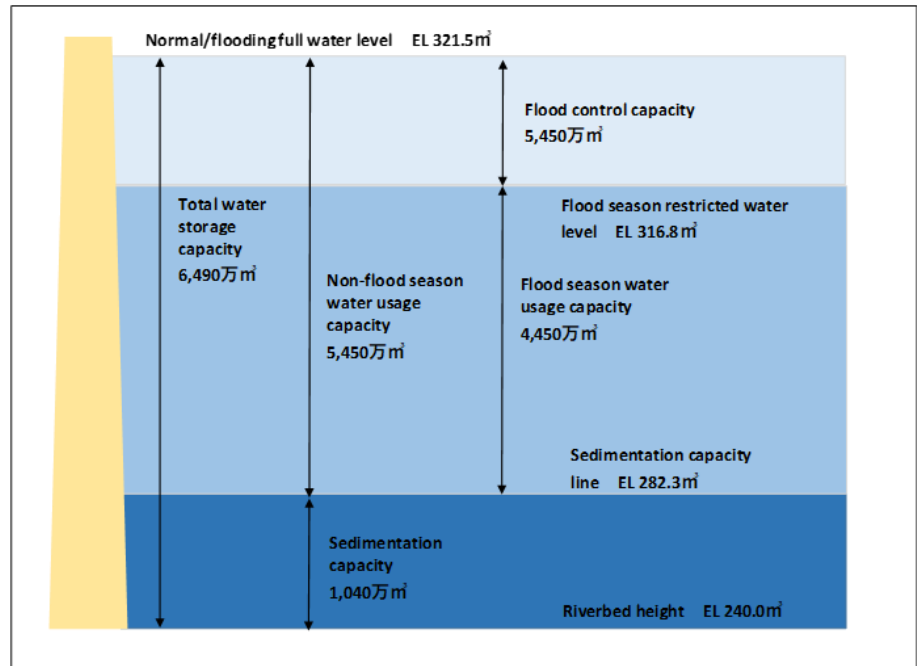
■ Water distribution by organization

Organization		Per second (m^3/sec)	Per day (m^3/day)
Authority Members	Kanagawa Prefecture	4.71	406,600
	Yokohama City	7.01	605,200
	Kawasaki City	6.16	532,500
	Yokosuka City	0.23	20,000
	Total	18.11	1,564,300
Odawara City		2.84	245,200
Total		20.95	1,809,500

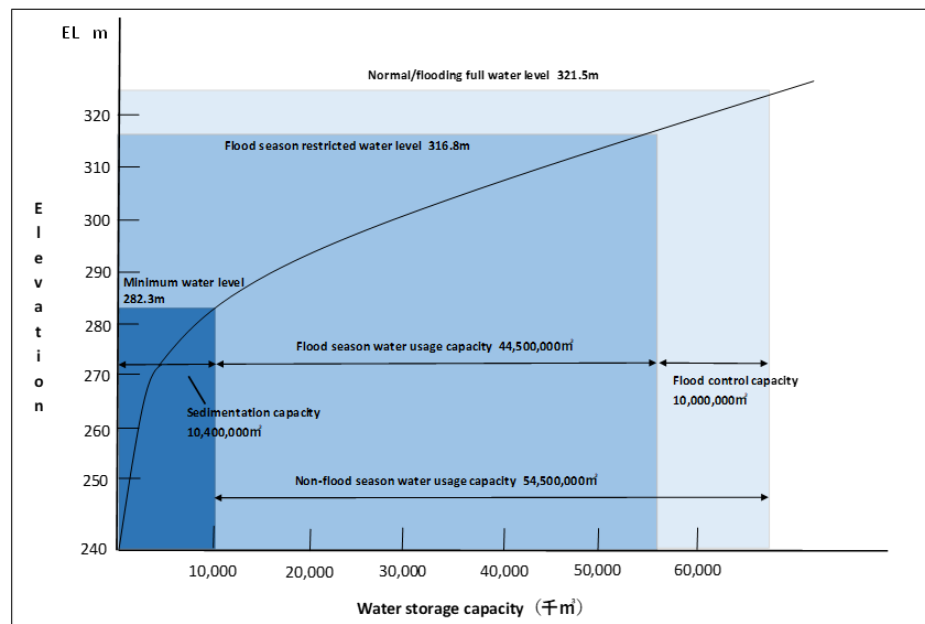
Power generation

The Tanoiri Power Plant was built alongside the dam using the dam's regular discharge facilities as a way to make more effective use of hydroelectric power and ensure a stable supply of electricity to the local area. It uses up to 12 cubic meters of water per second from the water released downstream to generate a maximum of 7,400 kilowatts.

■ Dam capacity distribution



■ Dam water level capacity curve

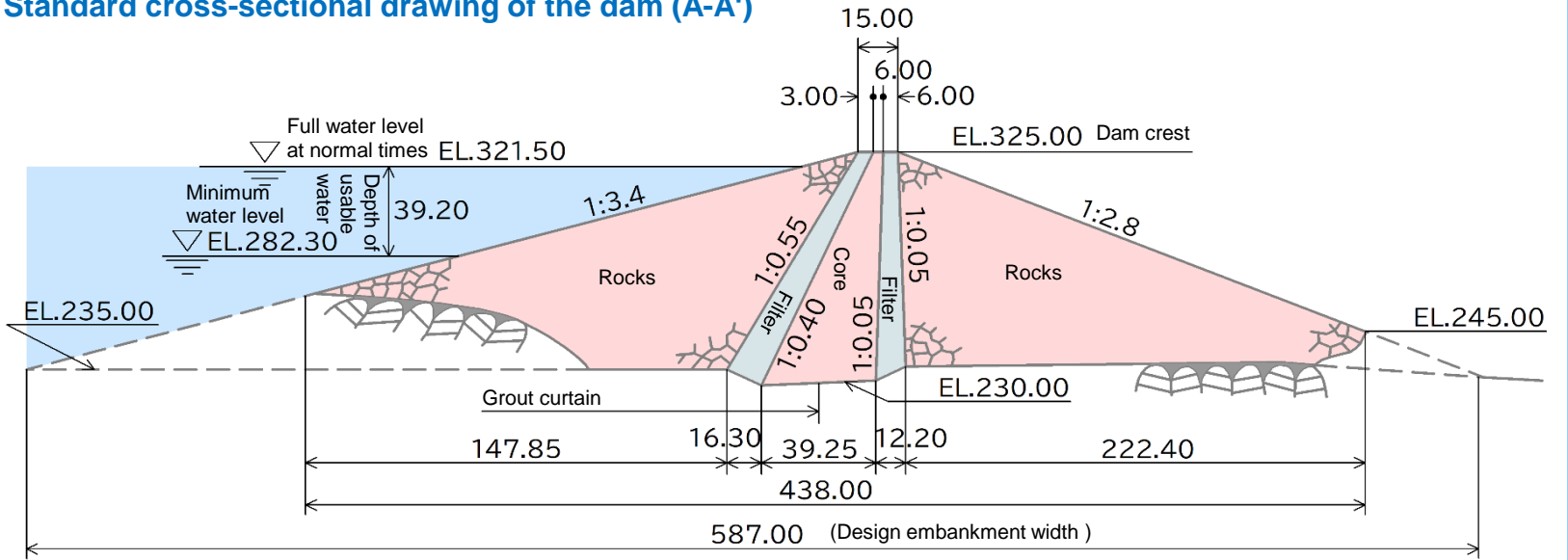


1. Water storage facilities

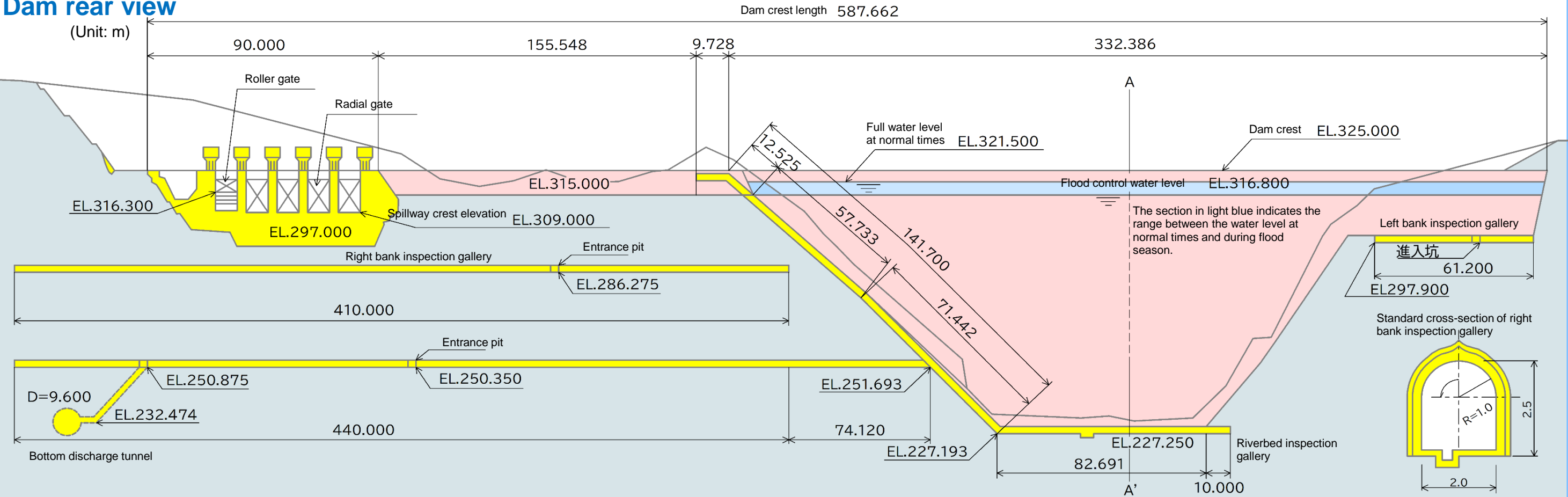
1 Dam	2 Reservoir
Name Miho Dam	Name Lake Tanzawa
Location Kamioda, Yamakita-machi, Ashi	Catchment 158.5 km ²
Type Rock-fill embankment dam	Reservoir 2.18 km ³
Embankment height 95 m	Total water storage 64.9 million m ³
Dam crest length 587.7 m	Usable water 54.5 million m ³
Embankment volume 5,816,000 m ³	Maximum water level EL321.5 m
Non-overflow EL325 m	Flood control (Jun. 15 to Oct. 15) EL316.8 m

Spillway Normal floodgates (Radial gates)Height 13.1 m x width 9.0 m x 4 gates
(Roller gate) Height 6.0m x width 9.0 m x 1 gate
Emergency floodgate (free overflow of the spillway)..... Overflow depth 2.0 m x width 29.0 m

Standard cross-sectional drawing of the dam (A-A')



Dam rear view





Discharge from the flood discharge gate seen from downstream



- ①Miho Dam Floor Plan
- ②Bottom discharge equipment
- ③Spillway
- ④Miho Dam main body
- ⑤Dam Park
- ⑥Parking lot
- ⑦Water level observation tower
- ⑧Miho Dam management office
- ⑨Water diversion tank
- ⑩Power plant
- ⑪Regular discharge equipment
- ⑫Intake tower

2. Regular discharge facilities

Intake Facilities

Surface intake gate (two-stage roller gate): Height 15.5 m x Width 5.0 m x 1 gate

Bottom intake gate (roller gate): Height 2.9 m x Width 4.9 m x 1 gate

Inspection gate (roller gate): Height 6.6 m x Width 6.6 m x 1 gate

Dust remover: Height 18.0 m x Width 8.0 m x 1 unit



Regular discharge equipment

Main gate (jet flow gate) $\phi 900\text{mm}$ x 2 units

Spare gate (ring-follower gate) $\phi 900\text{mm}$ x 2 units



Bottom discharge equipment

Main gate (jet flow gate) $\phi 1,200\text{mm}$ x 1 unit

Spare gate (ring-follower gate) $\phi 1,200\text{mm}$ x 1 unit



Power Generation Facility

Name: Tanoiri Power Plant (Tokyo Electric Generation Company)

Maximum output: 7,400 kw

Maximum water usage: 12.00 m³/s

Water turbine type: Vertical-shaft Francis turbine

Effective head: 71.871 m

Generator type: Vertical-shaft rotating field magnet 3-phase synchronous AC generator



Management System Overview

The Kanagawa Miho Dam management office handles flood control operations for the dam, while the Sakawa River Dam management office of the Kanagawa Prefecture Public Enterprise Agency handles water usage operations. The staff of these offices are concurrently employed, and management operations are in the process of being integrated.

To monitor the overall status of the Sakawa River system, information such as rainfall (from 9 locations), river water levels and flow rates (from 15 locations) is collected every 15 minutes via wireless network. In addition, meteorological information receivers (MICOS, etc.) are used to monitor weather changes during rainfall, and this data is used to ensure proper water management.

When water is discharged from the flood discharge gates, staff and discharge warning stations (in 19 locations) provide warnings to those using the rivers downstream and residents living near the coast.

Monitoring and operations are conducted to carry out these tasks on a 24-hour basis.

System management office

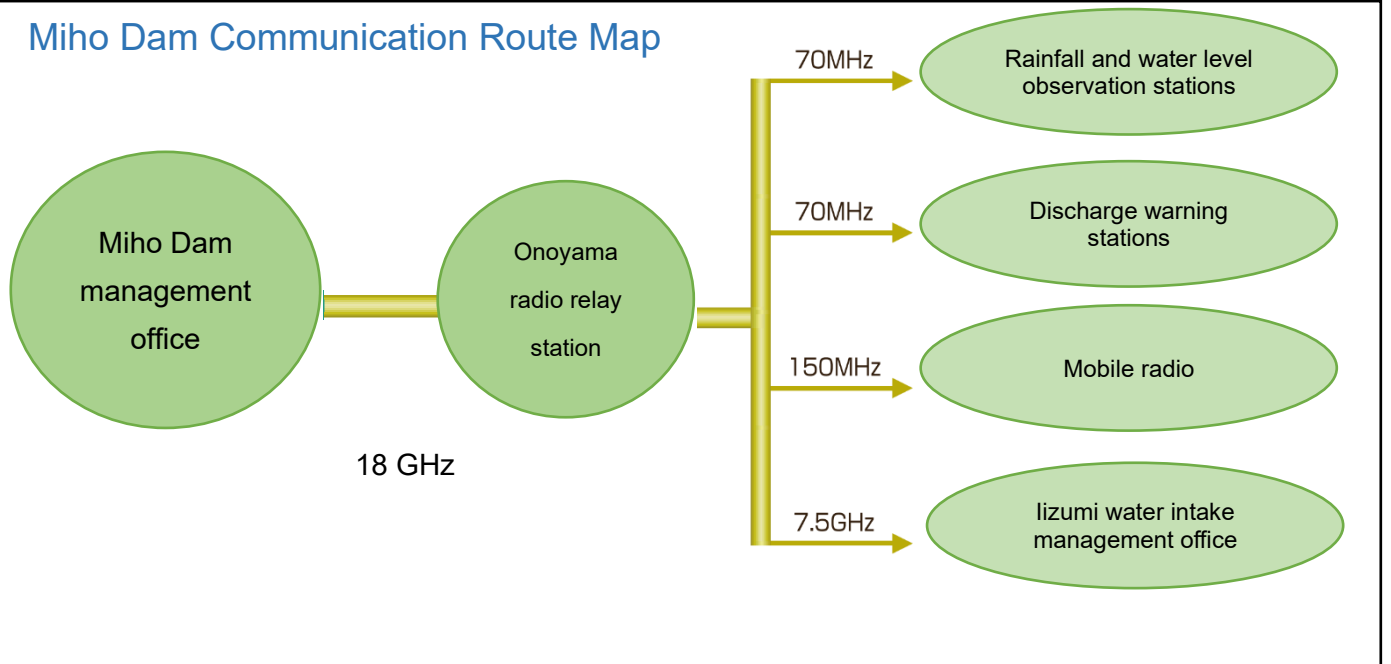


Computer room

The computer system is used to ensure that an appropriate and effective downstream standard flow rate is maintained for tap water. If flooding occurs, the system is also used to ensure that the dam operates in accordance with all rules and regulations.



Miho Dam Communication Route Map



Hirayama water level observatory



Onoyama radio relay station



Okuchi bridge discharge warning station

Compensation Overview

The areas flooded as a result of the Miho Dam construction included Kamioda, Yozuku, Yakezu and Daibutsu in Miho; all areas in Kurokura; and Kaminawa areas within Yamakita-machi. As a result, there were 223 submerged households and 1,026 residents who had to relocate. There were also public facilities such as elementary and junior high schools, nursery schools and government branch offices in the area that are now submerged. An overview of these is shown in the table below.

Category	Type	Number	Category	Type	Number
Households	Submerged areas	Kaminawa: 2 Kamioda: 39 Yozuku: 101 Yakezu/Daibutsu: 48 Kurokura: 33	Buildings	Residences	221
		Total: 223		Non residences	502
	Landowners	Living in submerged area: 70 Living outside of submerged area: 66	Public facilities	Schools	2
Population	Relocated residents	1,026		Nursery school	1
				Municipal offices branch	1
Land	Rice paddy fields	6.02 ha		Post office	1
	Farmland	20.96 ha		Police box	1
	Residential land	122,300 m ²		Agricultural cooperative branch office	1
	Cemetery	2,309 m ²		Public halls	7
	Forest	187.18 ha		Other	8
	Other	40.81 ha		Temples	3
Standing trees/bamboo	Timber forest	171,322		Shrines	2
	Fuelwood forest	83.47 ha	Roads	Prefectural roads	11,014 m
	Bamboo forest	1.36 ha		Town roads	5,493 m
			Special compensation	Fishing rights	1
				Power plants	2
				Telephone exchange	1

Facilities Around the Dam

Public facilities

- Lake Tanzawa Reinforced concrete, three stories, total floor area: 828m²
- Miho-no-le Old private house and barn: total floor area: 165m²
- Parking lot Ozaki..... Total of 76 parking spaces, toilets, greenery
Dam Park..... Total of 95 parking spaces
Around the lake..... Total of 11 locations; total parking spaces: 265

Recreation facilities

- Dam Park 55,000m², open space, artificial hill, pond (1/50 scale model of Lake Tanzawa), greenery, toilets, drinking fountains, gazebo
- Chiyonosawa Observatory (With a view of Mount Fuji)
- Promenade Around Lake Tanzawa: 1.7 km
- Parks Ten around Lake Tanzawa; total area: 6,600m², benches, gazebos, greenery

Lake Tanzawa Memorial Hall and Miho-no-le



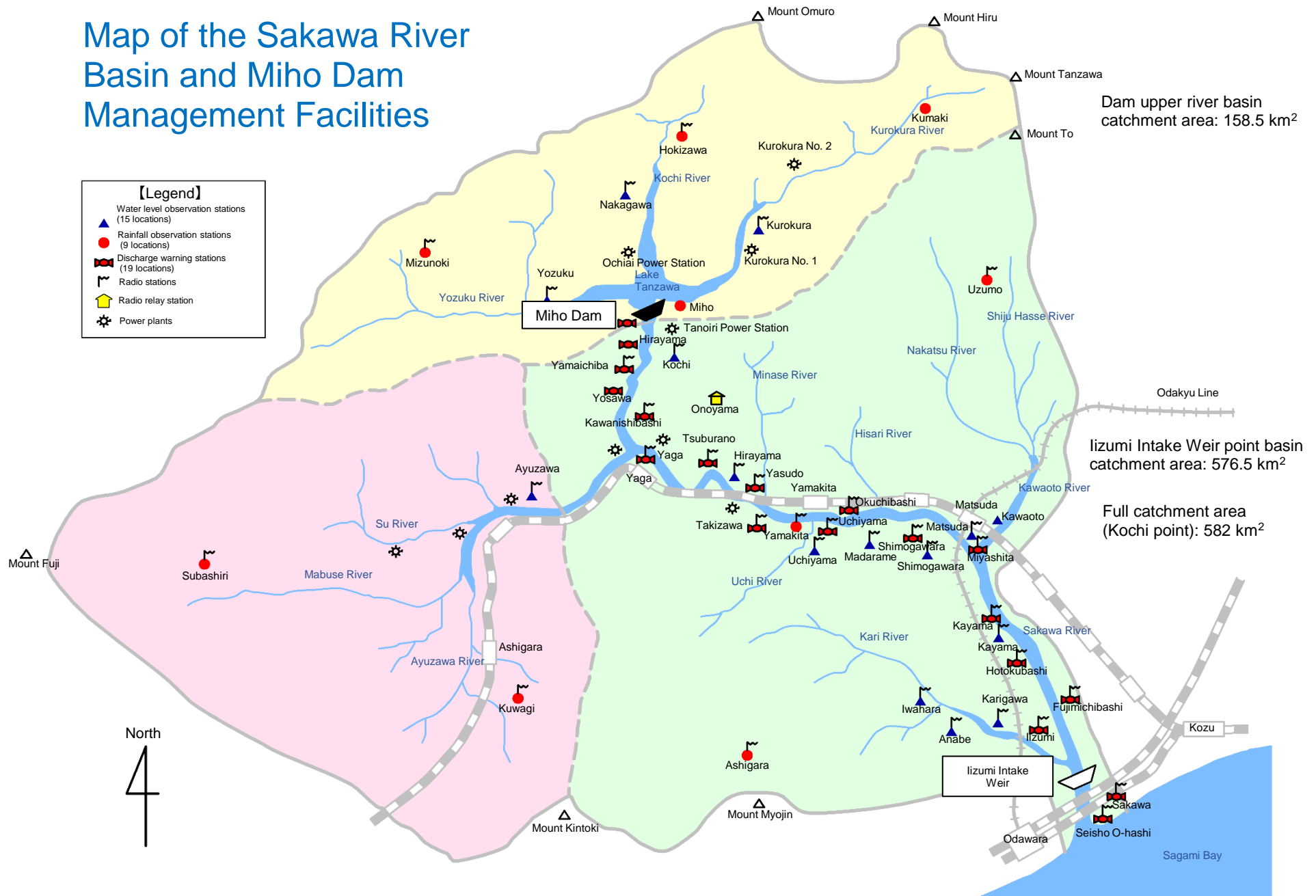
View from Chiyonosawa



Dam Park



Map of the Sakawa River Basin and Miho Dam Management Facilities



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 Public Enterprise Agency website: <https://www.pref.kanagawa.jp/cnt/f8018>