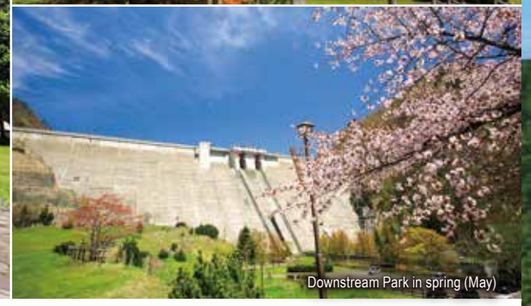

Okappa (bobbed-hair girl) bronze statue (June)


Jozankei Dam early in the evening in winter (January)


Jozankei Dam in early summer (June)

Monument to Commemorate the Completion (June)


Downstream Park in autumn (October)


Downstream Park in spring (May)


Lake Sapporo before sunset (August)

北海道開発局

Jozankei Dam Management Office, Toyohira River Integrated Dam and Reservoir Group Management Office, Sapporo Development and Construction Department,
Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism
Tel.: 011-598-4095 8-ku, Jozankei, Minami-ku, Sapporo 061-2310

March 2022

Sapporo, Hokkaido

Jozankei Dam

The Four Seasons at Jozankei Dam

Spring

Sargent cherry blossoms in bloom at Downstream Park *Spring*

May

Autumn

The dam site, also famous for fall foliage *Autumn*

October

May

June

August

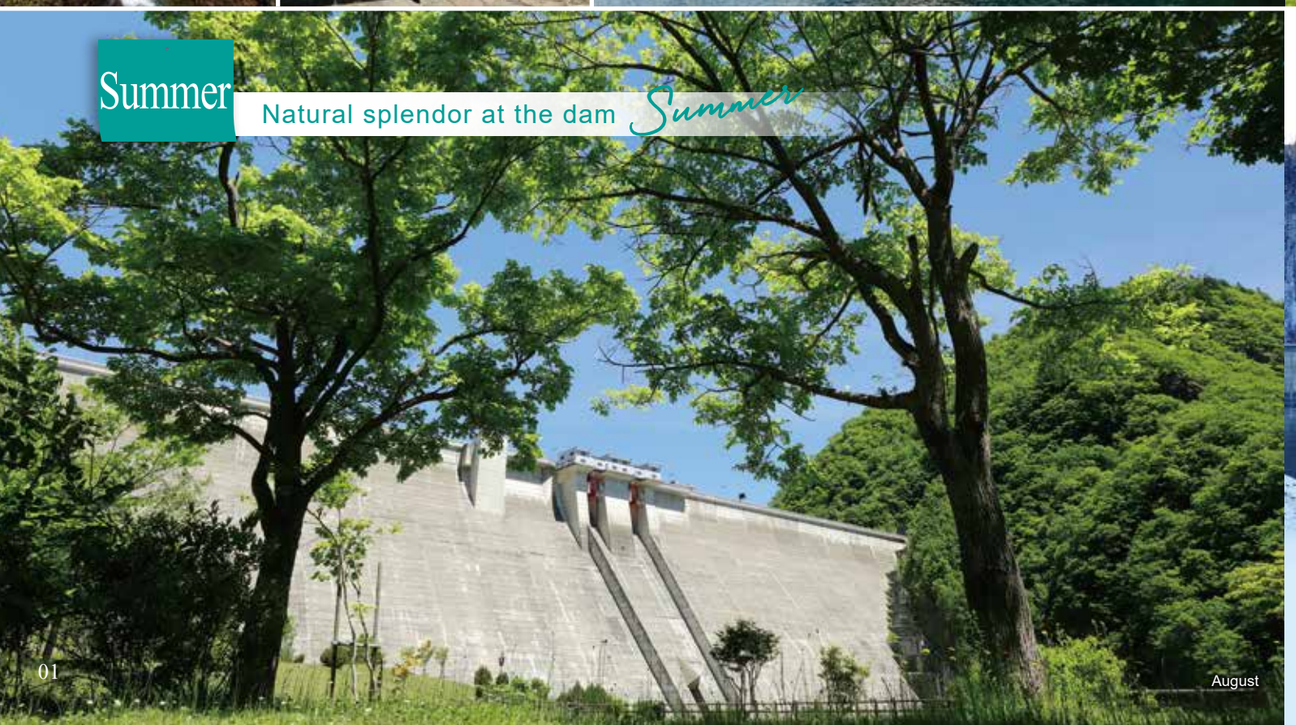
September

October

January

Summer

Natural splendor at the dam *Summer*



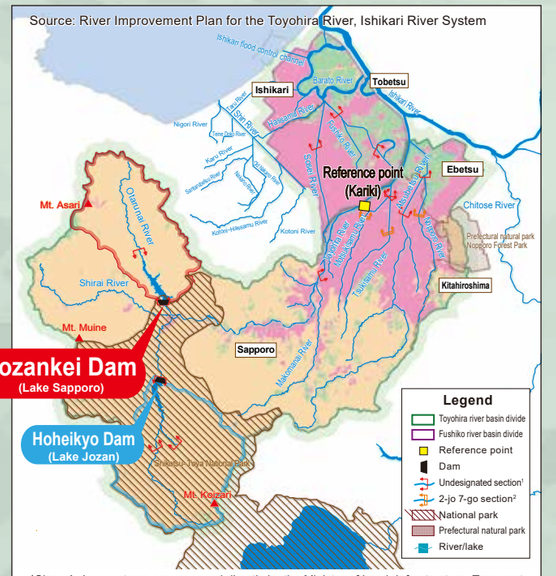
August

Winter

Snow on Lake Sapporo *Winter*

Toyohira river basin

The Toyohira River, where Jozankei Dam is located, is a tributary of the Ishikari River and runs through downtown Sapporo. Bridges, subway lines and many other facilities cross the river.

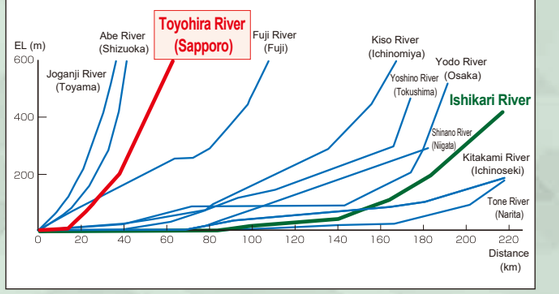


¹Class A river systems are managed directly by the Minister of Land, Infrastructure, Transport and Tourism. Especially important trunk rivers are called “undesignated sections” (ministerial management sections).
²Designated sections of Class A rivers (sections managed by the governor of Hokkaido) where improvements need to be conducted integrally with work by the national government (Hokkaido Regional Development Bureau) on undesignated sections are called “2-jo 7-go sections.”

Riverbed slope of the Toyohira River

*The inclination of the river bottom in the flow direction is called the riverbed slope.

The Toyohira River is one of the steepest urban rivers in Japan.



The Toyohira River and downtown Sapporo

Catchment area	**: 902.4 km²**	**Flood-susceptible area**	**: 247 km²**
Trunk river channel length:	**72.5 km**	**Population in the flood-susceptible area:**	**approx. 1.04 million**
River basin population:	**approx. 1.517 million**	**Related municipalities**	**: 4 cities and 1 town**
		Sapporo, Ebetsu, Kitahiroshima, Ishikari and Tobetsu	

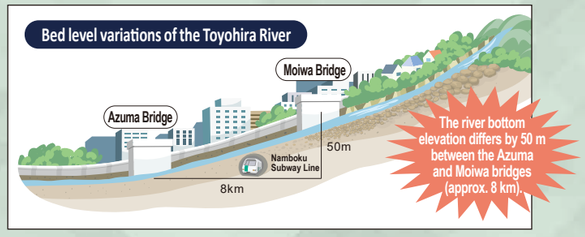
*The river basin population, flood-susceptible area and population in the flood-susceptible area include those in the Fushiko river basin.

A levee breach near Minami 19-jo Ohashi Bridge (approx. 17 km upstream of the Toyohira River’s confluence with the Ishikari River) is assumed.

Video simulation of flooding on the Toyohira River:
YouTube https://www.youtube.com/watch?v=rPysJzBTGqY

Source: Flood map of the Toyohira River, Ishikari river system

Bed level variations of the Toyohira River



Major floods of the Toyohira River before the completion of Jozankei Dam

On the Toyohira River, flood damage serious enough to cause levee breaches occurred many times in the Meiji and Taisho eras.
Large floods continued to occur frequently in the Showa era, prompting the development and revision of flood control plans.

1898 — Flood (typhoon) in September
Flow rate: unknown (levee breach), inundation area: 1,500 km²

1904 — Flood (typhoon/front) in July
Flow rate: unknown, inundation area: 1,300 km²

1911 - 14 — **Flood control survey on the Toyohira River**
Design high-water level at the Kariki point: 2,000 m³/s

1913 — Flood in August
Flow rate: unknown (levee breach), inundation area: unknown

1953 — **Development of an overall plan for the Ishikari River in September**

1961 — **Flood (low pressure/front) in July**
Flow rate (Kariki): 874 m³/s, inundation area: 523 km²

Incidents that prompted the construction of Jozankei Dam

1962 — **Flood (typhoon/front) in August**
Flow rate (Kariki): 1,358 m³/s, inundation area: 661 km²

1965 — **Development of the basic plan for the implementation of construction in April**
Basic high-water discharge (Kariki): 2,650 m³/s
Design high-water discharge (Kariki): 2,000 m³/s

1972 — **Completion of Hoheikyo Dam in September**

1975 — Flood (typhoon/front) in August
Flow rate (Kariki): 1,241 m³/s, inundation area: 292 km²

1981 — Flood (low pressure/front/typhoon) in early August
Flow rate (Kariki): 647 m³/s, inundation area: 614 km²
Flood (front/typhoon) in late August
Flow rate (Kariki): 1,417 m³/s, inundation area: 57 km²

1982 — **Revision of the basic plan for the implementation of construction in March**
Basic high-water discharge (Kariki): 3,100 m³/s
Design high-water discharge (Kariki): 2,000 m³/s

1989 — **Completion of Jozankei Dam in October**

Levee breach on the Toyohira River (Nakajima Park)

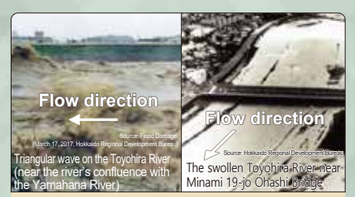
The levee breach on the Toyohira River caused the downtown to be inundated (flooding 3,696 houses) and Toyohira Bridge to be washed out.


Inundation in the Higashi Yonesato area (Shiroishi Ward, Sapporo)

The flow rate at the Kariki point was 1,358m³/s, and 41,200 houses in the Ishikari river basin were damaged. The design high-water discharge was reconsidered after this flood and was reflected in the basic plan for the implementation of construction.


Inundation on the Sosei River | Barato/Shinoro area (Barato River)

The flow rate at the Kariki point was 1,241 m³/s, and 20,600 houses in the Ishikari river basin were damaged.



Triangular wave on the Toyohira River (near the river’s confluence with the Yamahana River) | The swollen Toyohira River near Minami 19-jo Ohashi Bridge

Record-breaking heavy rainfall, the worst since the end of World War II, caused serious damage. During a flood in late August, the flow rate at the Kariki point reached 1,417 m³/s and 12,200 houses in the Ishikari river basin were damaged. This flood led to the revision of the design high-water discharge.

History of the dam project

A new water source of Sapporo

The dam was constructed to protect Sapporo from flooding and to meet increases in water demand from population concentration, as the urbanization of the city continued to progress after the completion of Hoheikyo Dam in 1972.

History of the Jozankei Dam construction project

The construction of Jozankei Dam commenced in 1978 and was completed in 1989.

1971	A feasibility study on dam construction begins.
1974	Surveys for dam construction begin.
1978	Dam construction begins.
1980	Dam foundation excavation begins.
1982	Dam concrete placement begins. A cornerstone ceremony[1] is held.
1988	Dam concrete placement finishes. The Lake Line[3] road opens.
1989	Test impoundment[2] begins. Lake Sapporo is created. A completion ceremony is held.
1990	Dam management begins.

[1]A ceremony to pray for the safety of construction and the long-term stability of the dam
[2]A water storage test to confirm the safety of the dam
[3]The Otaru–Jozankei Route of Prefectural Road 1 that was replaced at the time of dam construction


Riverbed foundation excavation (1981)

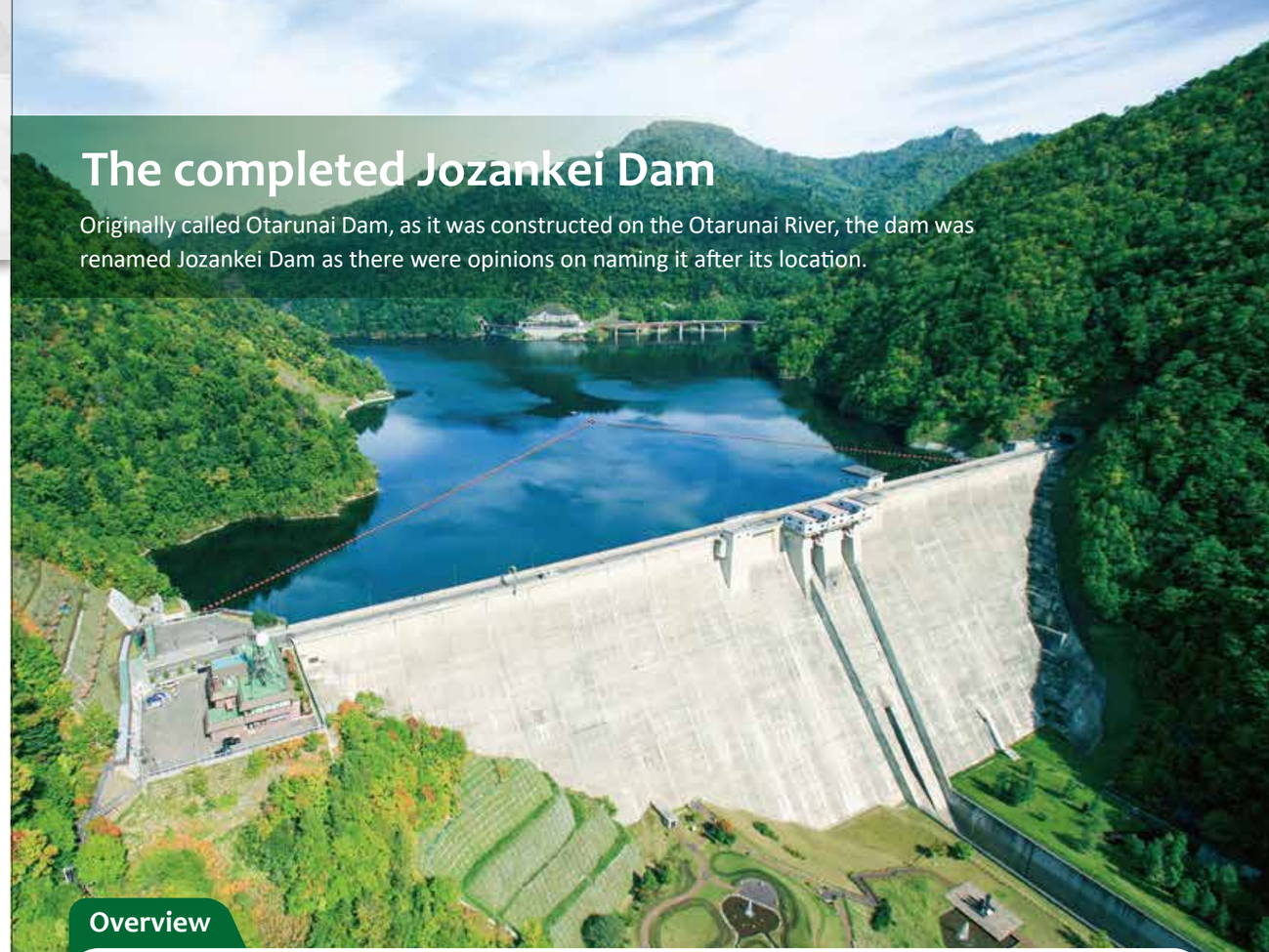

Commencement of dam concrete placement (1982)


Dam concrete placement (1985)


Opening of the Lake Line road (1988)


Test impoundment (1989)


Commencement of dam management (1990)



The completed Jozankei Dam

Originally called Otarunai Dam, as it was constructed on the Otarunai River, the dam was renamed Jozankei Dam as there were opinions on naming it after its location.

Overview

[Type]
Concrete gravity dam
The dam resists water pressure from the weight of the dam itself. This is the most common type of concrete dam in Japan.

[Dam specifications]

River system/river	Ishikari river system/Otarunai River
Dam type	Concrete gravity dam
Purposes	Flood control, water supply, power generation
Dam site geology	Quartz porphyry, dacite
Dam height	117.5 m
Crest length	410.0 m
Dam volume	1,185,000 m³

[Reservoir specifications]

Catchment area	104.0 km²
Water surface area	2.3 km²
Total pondage	82,300,000 m³
Effective reservoir capacity	78,600,000 m³
Normal water level	EL 381.50 m
Lowest water level	EL 325.30 m

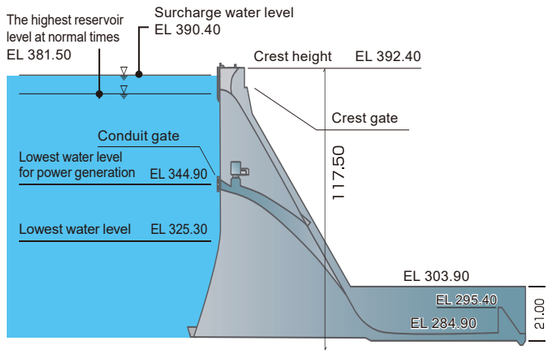
[Discharge facilities]

Regular spillway	Conduit gate	H2.4 m × W2.4 m × 1	Max. discharge 140 m³/s
Emergency spillway	Crest gate	H7 m × W7 m × 2	Max. discharge 535 m³/s
Discharge pipe for sightseeing	Max. discharge: 10 m³/s		

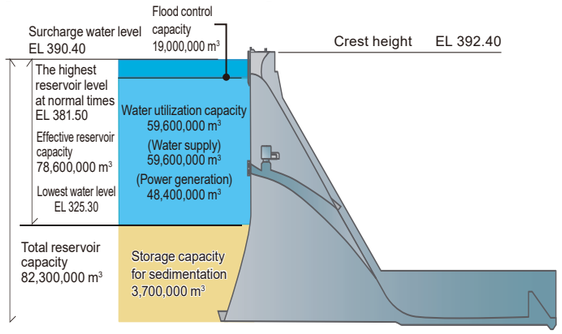
[Water utilization]
City water intake (daily maximum): 375,000 m³/day (4,338 m³/s)

[Power generation]
Otarunai Power Station: 7,000 kW (maximum output)

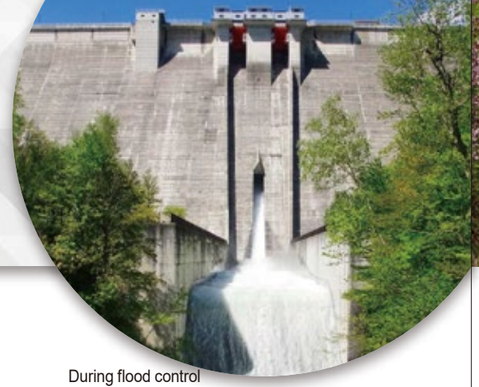
[Typical cross section]



[Reservoir distribution chart]



The roles of the dam



During flood control

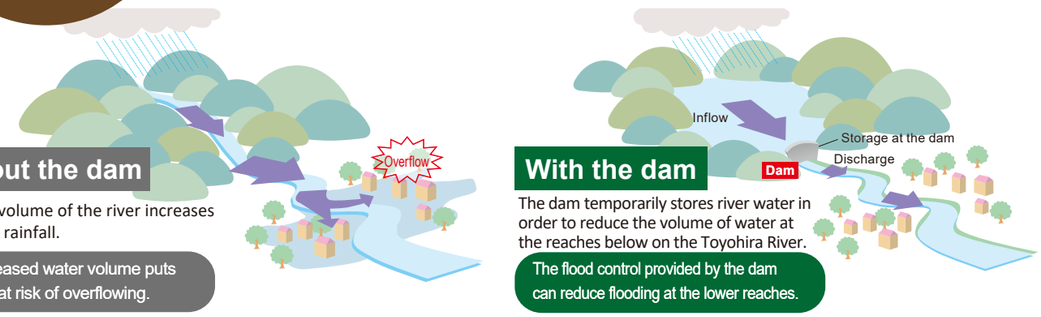
Jozankei Dam's three purposes

Jozankei Dam is a multipurpose dam that supports the lives of Sapporo residents by fulfilling the three roles of flood control, city water supply and power generation.

Flood control — The dam controls the amount of water discharged to the reaches below.

The water level of the river is at risk of increasing, and overflows may occur with heavy rainfall in the basin.

The dam temporarily stores the increased river water flowing into it and controls the volume of water flowing in the river in order to reduce flood damage at the reaches below.



Without the dam

The water volume of the river increases with heavy rainfall.

The increased water volume puts the river at risk of overflowing.

With the dam

The dam temporarily stores river water in order to reduce the volume of water at the reaches below on the Toyohira River.

The flood control provided by the dam can reduce flooding at the lower reaches.

Domestic water supply — The dam supplies water, which is essential for people's lives.

The dam stores water when the discharge is high and supplies it when there are water shortages.

It plays a role in securing a stable supply of domestic water throughout the year.

Jozankei Dam can supply 375,000 m3 of water per day.

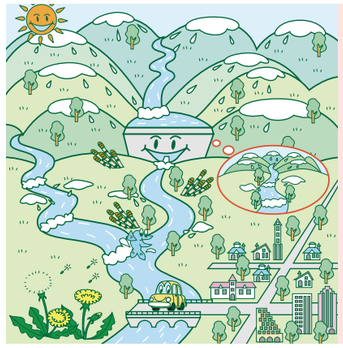
Hydropower generation — Water stored in the dam reservoir is used effectively for power generation.

The Otarunai Power Station can generate 7,000 kW of electricity, which is sent to homes and other facilities in Sapporo.

Hydropower is an important natural, ecofriendly energy source.

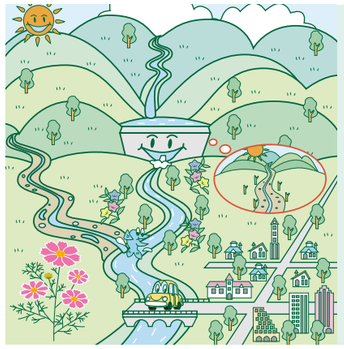
The dam adjusts the volume of river water throughout the year.

The flood control capacity of Jozankei Dam is adjusted seasonally.



Spring

As there are large amounts of snowmelt in spring, the dam controls flooding while storing water for use in summer.



Summer

Hokkaido has no rainy season, so water stored in spring is discharged from the dam to mitigate the effects of water shortages on domestic water supply and the river environment.

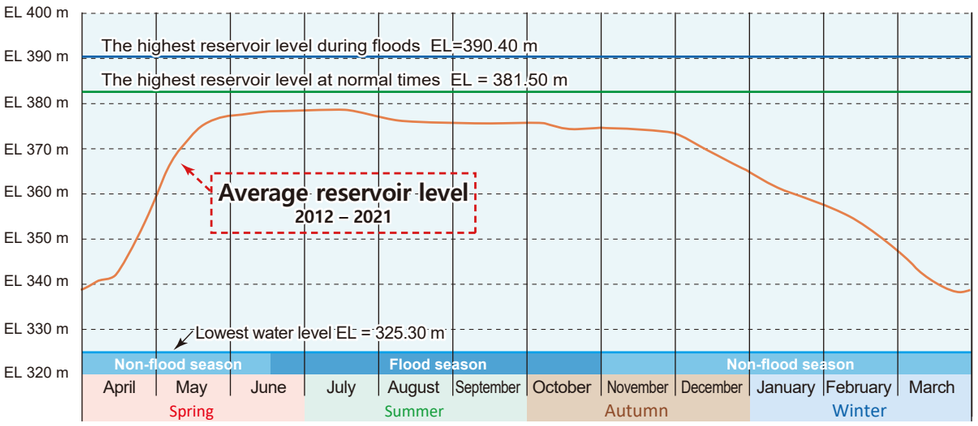
Autumn

At times of typhoons and other extreme rainfall events, the dam stores water and prevents flooding at the lower reaches.

Winter

The dam supplies water for domestic use and other purposes by discharging water, and this also prepares the dam for the spring thaw.

■ The reservoir level at Jozankei Dam



Effects of the dam

The implementation of flood control measures, and their effects

From 1989, when Jozankei Dam entered operation, until 2020, the dam helped to mitigate damage at the lower reaches by implementing flood control procedures 33 times.

Flood control effect

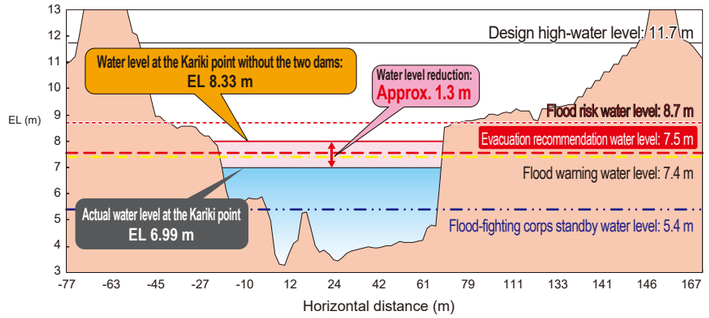
Hoheikyo and Jozankei dams work together to control flooding. The effects of the two dams at the time of the flood in September 2018 were as follows.

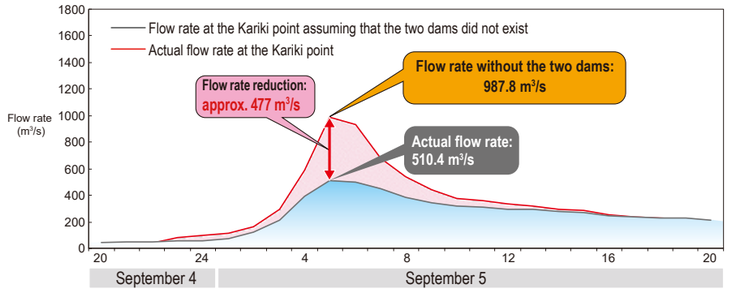
Water level reduction	Approx. 1.3 m
Flow rate reduction	Approx. 477 m³/s

The flood warning water level would have been exceeded on the Toyohira River without the two dams.

■ Water level reduction at the Kariki point (flood of September 5, 2018)

*The Kariki Observation Station, 11.0 km upstream of the Toyohira River's confluence with the Ishikari River





Flood risk water level: the water level at which a serious disaster may occur due to inundation, flooding, etc.

Evacuation recommendation water level: the water level used as a guide for municipalities to issue an evacuation recommendation and as a reference for residents to make the decision to evacuate

Flood warning water level: the water level at which slope failure, scouring, water leakage and other damage may occur

Flood-fighting corps standby water level: the water level used as a guide for putting the flood-fighting corps on standby

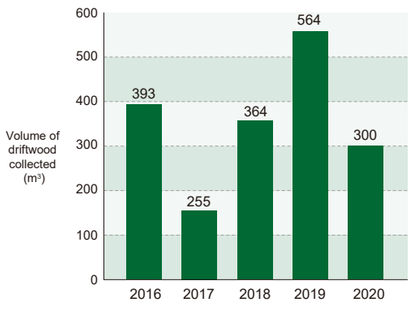
Driftwood

Driftwood that flows from mountains into the reservoir at times of typhoons and other extreme rainfall events is removed, as it hinders management of the dam reservoir. The removed driftwood is given away for free and is used in craft-making events for the effective use of resources and the reduction of disposal costs.

Collection of driftwood in the dam reservoir

Driftwood giveaway

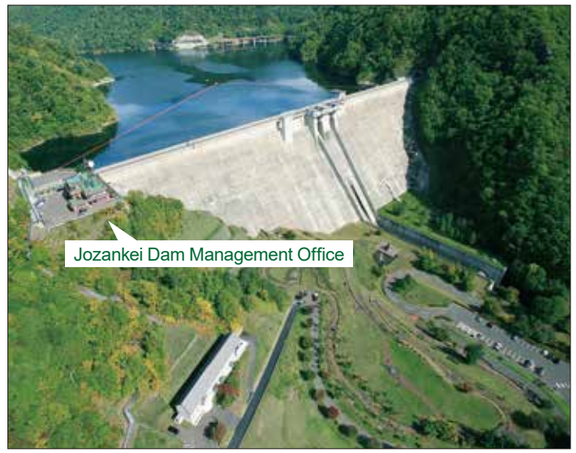
■ Volume of driftwood collected at Jozankei Dam (2016 – 2020)



The volume of driftwood collected includes voids.

Dam management

Efficient management of the two dams



The Toyohira River Integrated Dam and Reservoir Group Management Office manages Hoheikyo and Jozankei dams in an integrated manner and provides information on optimal dam operations and the like to the Jozankei Dam Management Office.

Toyohira River Integrated Dam and Reservoir Group Management Office

Jozankei Dam Management Office

Management work

Discharge facility operation

The dam is operated based on information conveyed from the management office.

Discharge facility inspection

Inspection and maintenance are conducted regularly so that appropriate measures can be taken at times of floods.

Facility inspection in the inspection gallery

Various facilities are inspected from the inspection gallery in the dam body.

Dam reservoir management

The riverbank condition, water quality, driftwood condition and other conditions are checked using a patrol boat.

Precipitation/water level observation facilities

These facilities have been established to observe the amount of rain falling upstream of the dam and the amount of river water flowing into the dam.

Discharge warning facilities

These have been established at seven locations downstream of the dam to give release warnings.

Water quality surveys

These surveys are conducted from year to year to monitor the water quality in the Lake Sapporo reservoir and its surrounding rivers.

Natural environment surveys

Surveys are conducted on the distribution of flora and fauna in and around the Lake Sapporo reservoir and its surrounding rivers and on the status of their habitats and growth.

Natural environment

Flora and fauna are found in great variety around the dam.

■ Wildlife around Jozankei Dam

Ezo red squirrel
(mammal)
This squirrel lives in Hokkaido.

Ezo salamander
(amphibian)
This species, endemic to Hokkaido, is often seen in damp places.

Crested kingfisher
(bird)
As the Japanese name yamasemi (mountain kingfisher) suggests, this kingfisher lives near mountain streams and ponds.

Black woodpecker
(bird)
In Japan, this bird's range is limited to Hokkaido and northern Tohoku.

■ Insects around Jozankei Dam

Chequered blue
(Scolitantides orion)
This butterfly, which is endemic to Hokkaido, takes its Japanese name *(Jozan shijimi)* from its discovery at Jozankei.

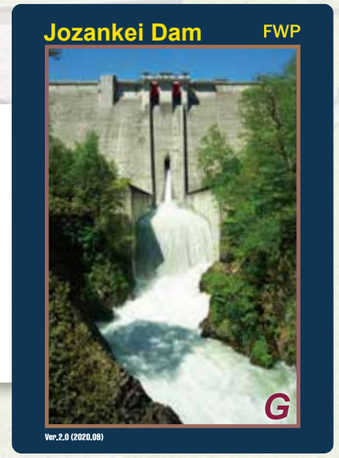
Mukashi tombo
(Epiophlebia superstes)
This dragonfly lives in places with clean water.

Specimens of other insects are displayed in the dam museum.

TOPICS

Distribution of the "dam card"

The "dam card", with a photo of the dam on the front and condensed basic information of the dam on the back, is distributed at the Jozankei Dam Management Office. For details, see the Jozankei Dam Management Office website.



Events

Events involving the dam are held.

A festival to enjoy forests, lakes and the dam

It is held in the "period to enjoy forests and lakes" every July.

Dam tour

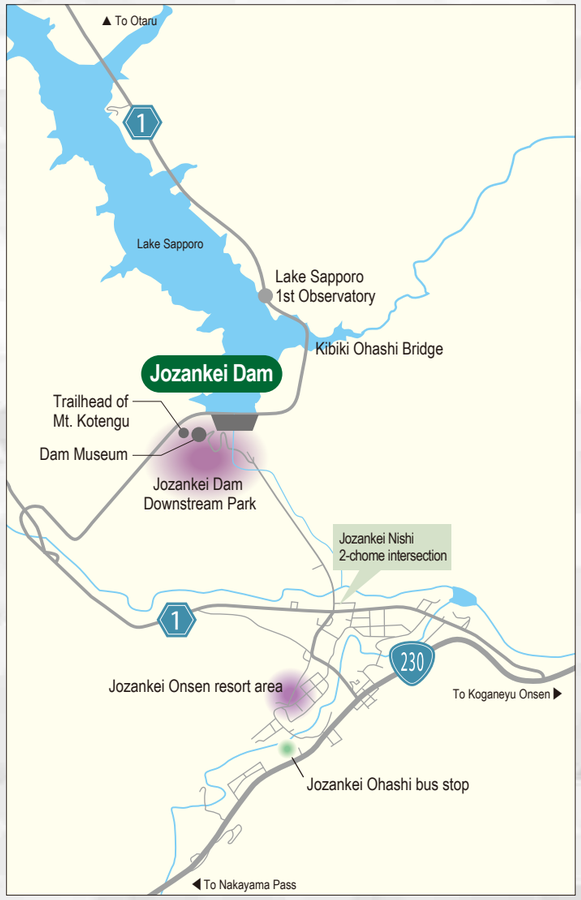
Visitors can walk through the inspection gallery used for dam management to observe dam facilities.

Boat ride on Lake Sapporo

A boat ride can be enjoyed on Lake Sapporo, a lake that is usually closed to visitors.

Below the dam, Downstream Park is part of Shikotsu-Toya National Park.
The park features colorful seasonal views of cherry blossoms, fresh greenery and fall foliage, and it is the site of the museum, the cross gallery and other highlights.

Access



Bus

Sapporo Ekimae Terminal
Jotetsu Bus (Approx. 80 min.)
Get off at the Jozankei Ohashi bus stop
Take a walk (Approx. 30 min.)
Jozankei Dam Downstream Park

Private car

Follow Route 230 toward Jozankei
Turn to Prefectural Road 1 toward Otaru
At Jozankei Nishi 2-chome intersection, turn to right and continue for approx. 1.7 km
(Approx. 80 min.)
Jozankei Dam Downstream Park

Outdoor exhibition area

The exhibits include part of the self-erecting mast of the climbing crane used for dam construction.

Dam Museum

The museum displays a diorama of the dam's construction and panels of the surrounding natural environment.
Hours: 9:30 – 16:00

Dam crest trail

Visitors can walk up the steps of the trail to the dam crest.

Jozankei Dam Downstream Park guide map

Period: late April to early November
Hours: 9:00 – 17:00

Picnic Square

This square, covered with a lush lawn, commands a full view of the dam.

Symbol Square

Looking up from below, one gets a real feeling of the dam's great size.

Rest area

The small pond at the rest area has a fountain where visitors can touch the water.

Cross Gallery

Panels presenting the dam's roles are displayed in the dam observation corridor.
Hours: 10:00 – 16:00