



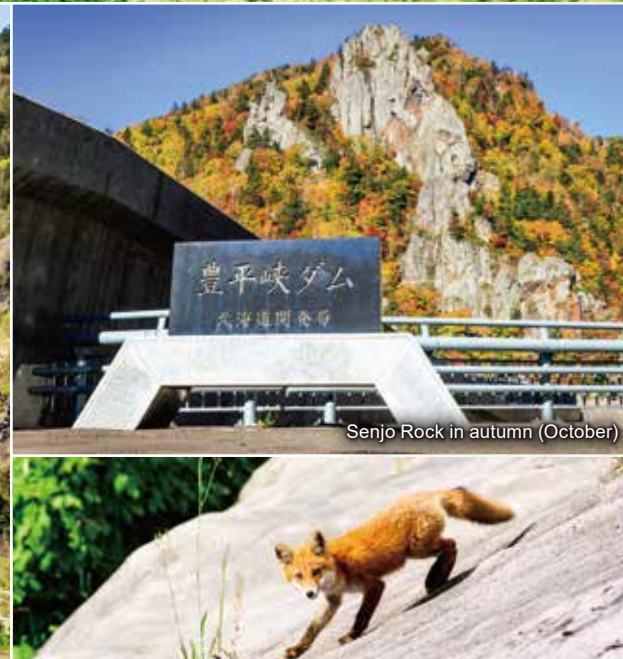
Hoheikyo Dam in autumn (October)



Discharge for sightseeing (July)



Hoheikyo Dam in spring (May)



Senjo Rock in autumn (October)

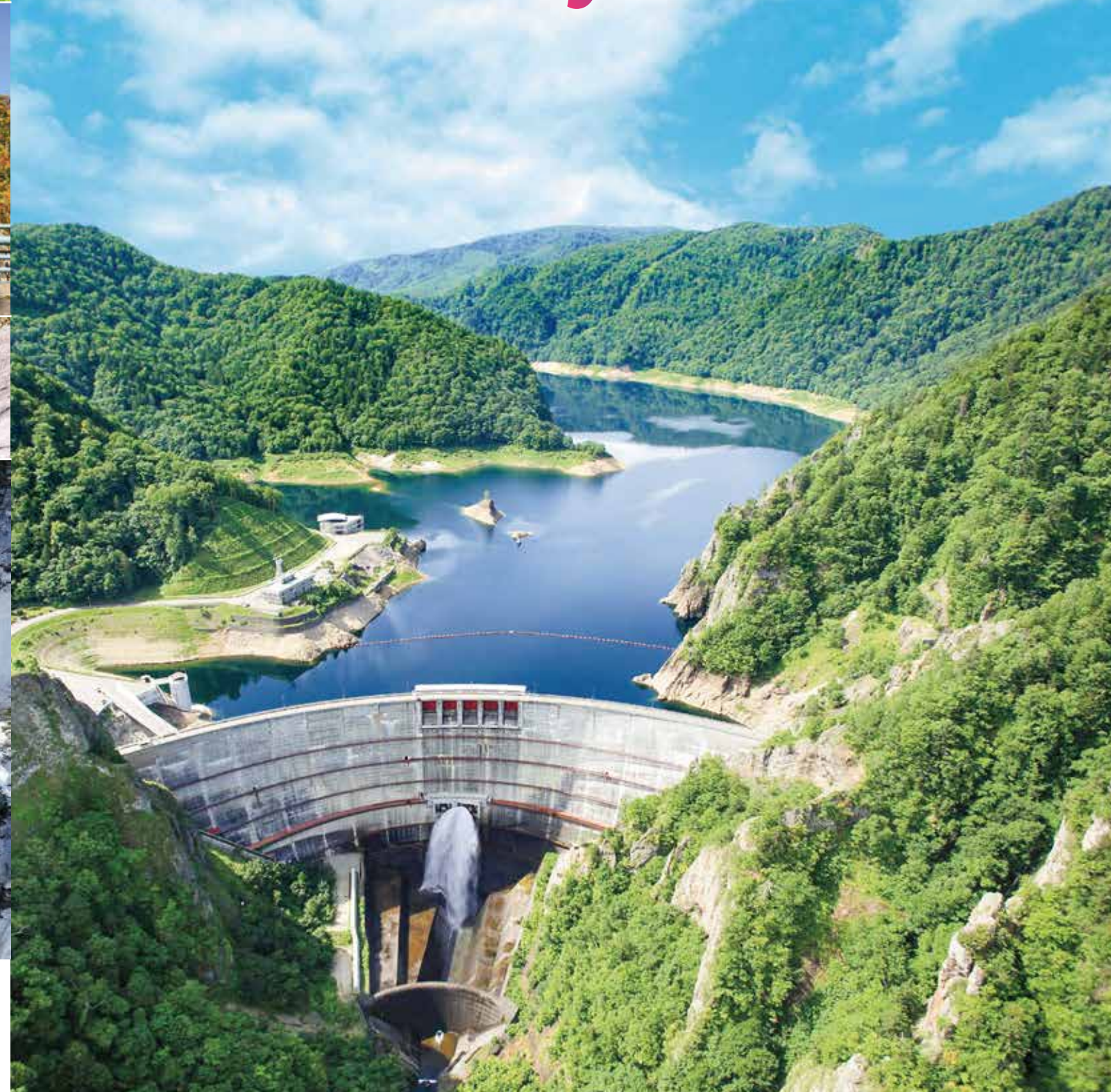


Hoheikyo Dam in winter (March)

Sapporo, Hokkaido



Hoheikyo Dam



The
Four Seasons
at Hoheikyo Dam



Spring

The contrast of cherry blossoms and the reservoir

Spring

May



Autumn

The fall foliage, an annual highlight

Autumn

October



May



May



July



October



October

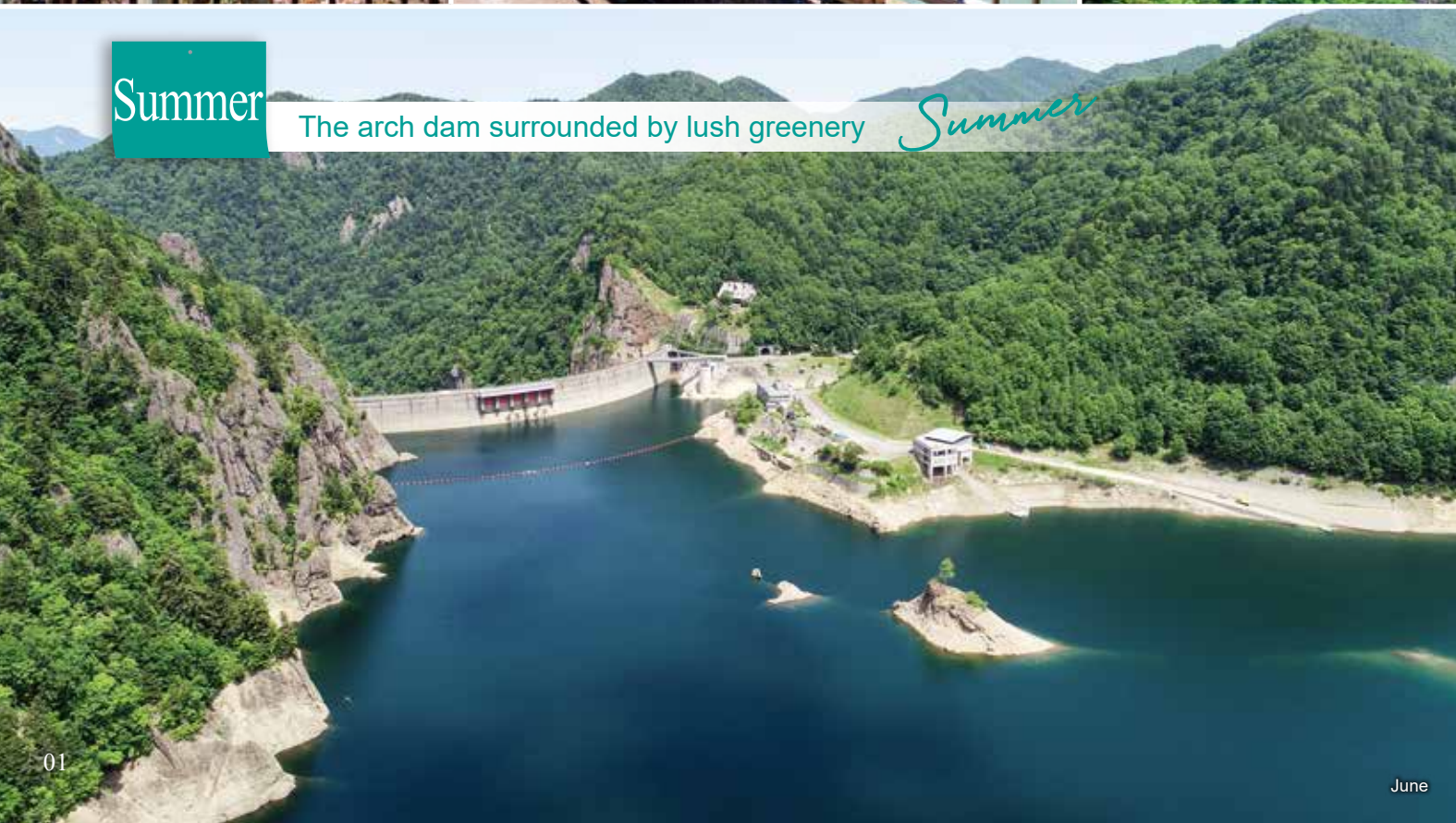


March

Summer

The arch dam surrounded by lush greenery

Summer

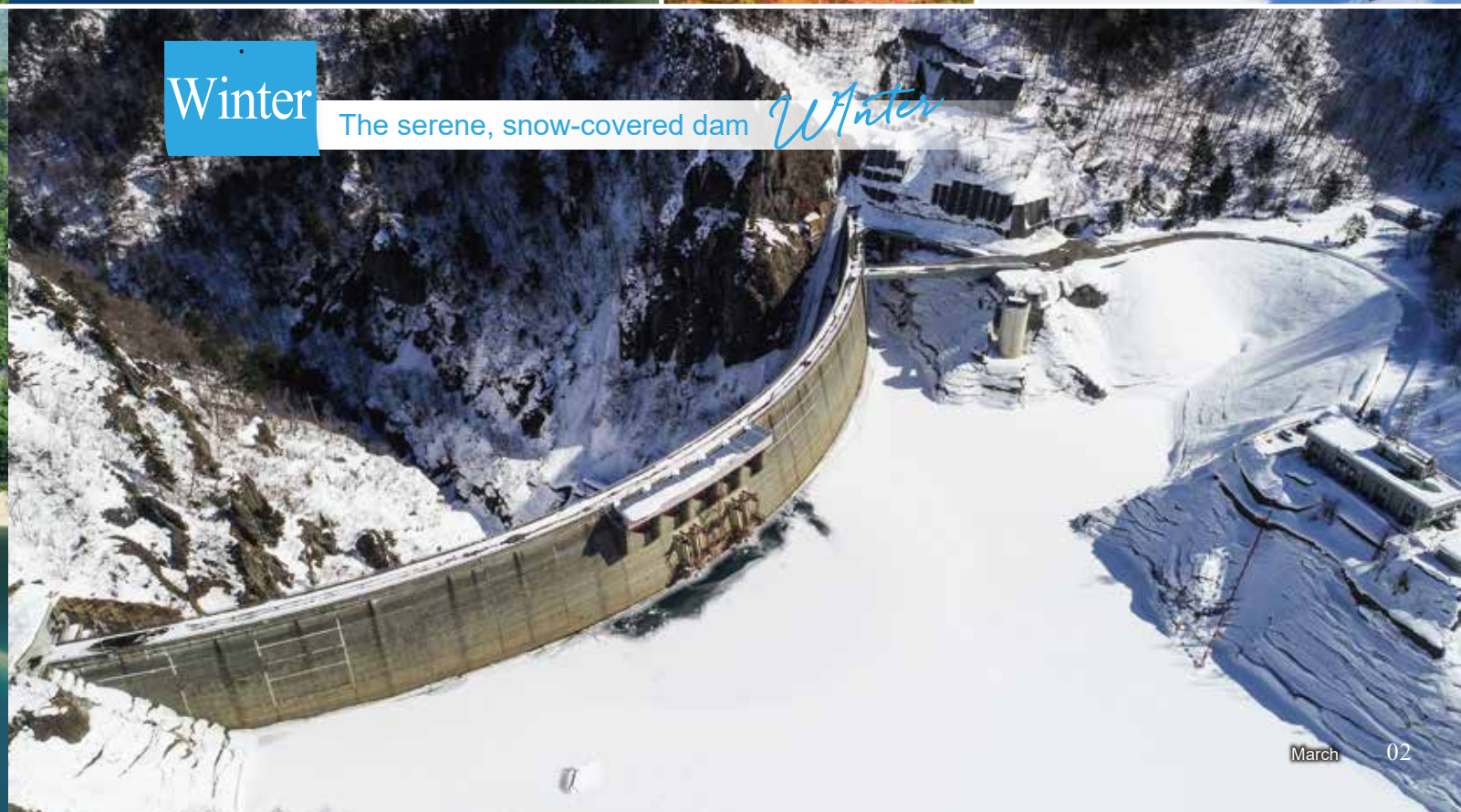


June

Winter

The serene, snow-covered dam

Winter



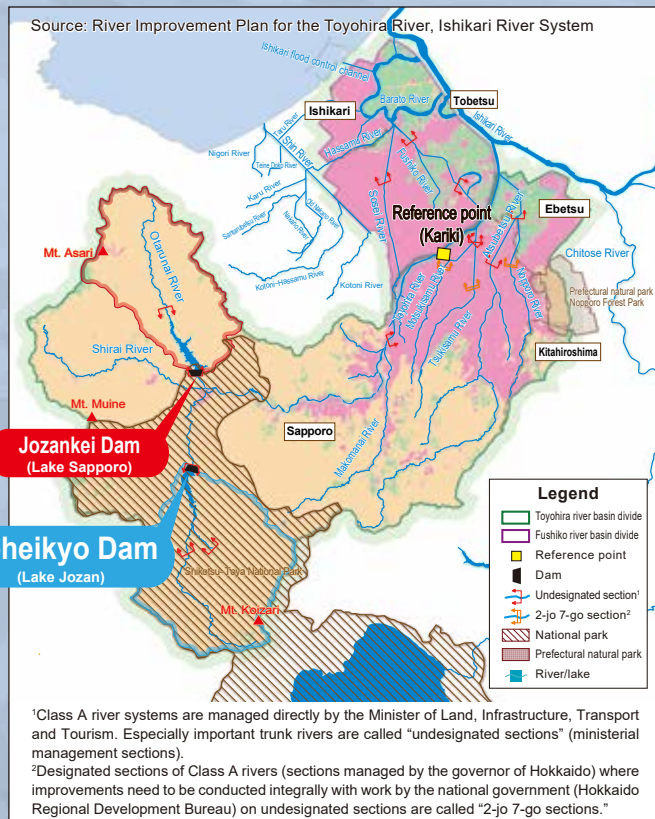
March

02

01

Toyohira river basin

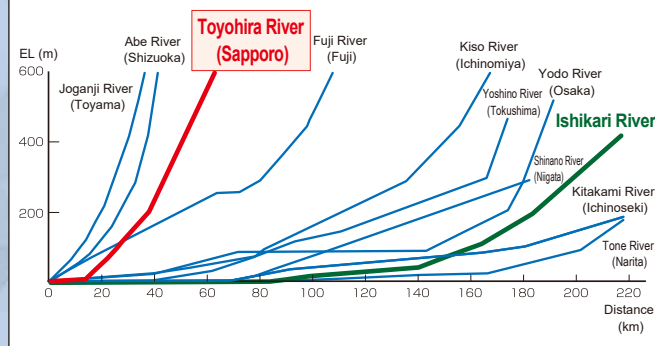
The Toyohira River, where Hoheikyo Dam is located, is a tributary of the Ishikari River and runs through downtown Sapporo. Bridges, subway lines and many other facilities cross the river.



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



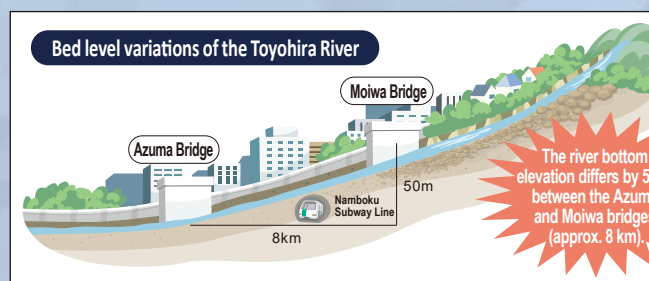
Catchment area : 902.4 km² Flood-susceptible area : 247 km²
 Trunk river channel length: 72.5 km Population in the flood-susceptible area: approx. 1.04 million
 River basin population: approx. 1.517 million Related municipalities : 4 cities and 1 town
 Sapporo, Ebetsu, Kitahiroshima, Ishikari and Tobetsu

*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



Major floods of the Toyohira River before and after the completion of Hoheikyo 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 Hoheikyo 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



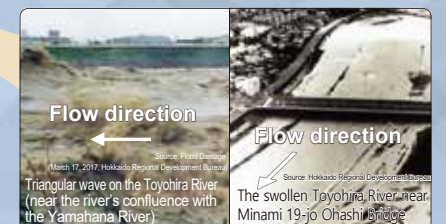
The levee breach on the Toyohira River caused the downtown to be inundated (flooding 3,696 houses) and Toyohira Bridge to be washed out.



The flow rate at the Kariki point was 1,358 m³/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.



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



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 water source of Sapporo

Hoheikyo Dam was constructed to protect the city from floods and to meet the demand for water and power.

History of the Hoheikyo Dam construction project

The construction of Hoheikyo Dam began in 1967 and finished in 1972.

1964	Survey for dam construction begins.
1967	Dam construction begins.
1968	Dam foundation excavation begins.
1969	Dam concrete placement begins.
1972	A cornerstone ceremony ^{*1} is held.
	Dam concrete placement finishes.
	Test impoundment ^{*2} begins.
	Lake Jozan is created.
	A completion ceremony is held.
	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



Mortar spraying on the dam body (1969)



Commencement of dam concrete placement (1969)



Dam concrete placement (1971)



Diversion tunnel construction (1967)



Dam foundation excavation (1968)



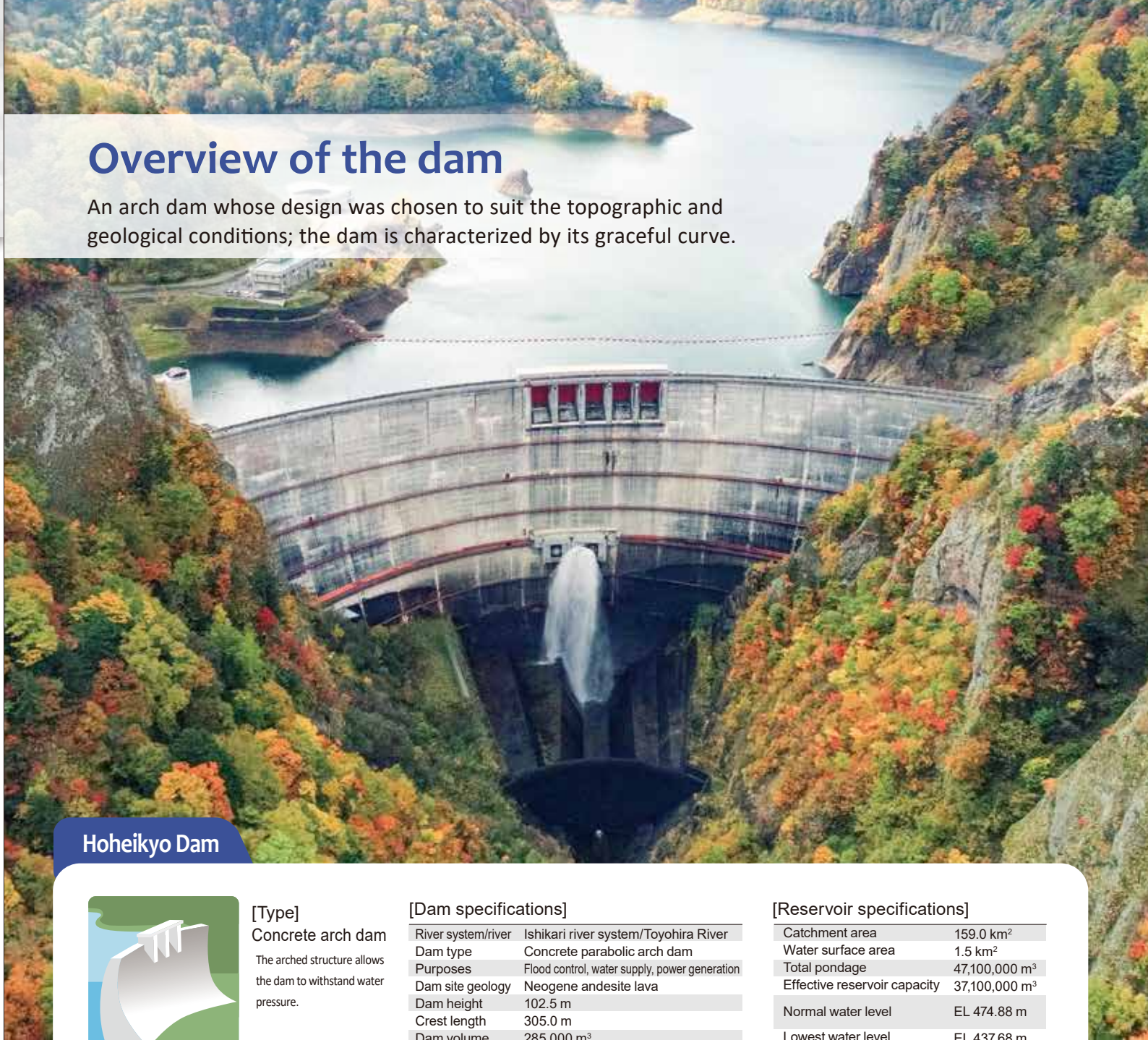
Commencement of test impoundment (1972)



Wiring for a management facility (1972)

Overview of the dam

An arch dam whose design was chosen to suit the topographic and geological conditions; the dam is characterized by its graceful curve.



Hoheikyo Dam



[Type]
Concrete arch dam
The arched structure allows the dam to withstand water pressure.

[Dam specifications]	
River system/river	Ishikari river system/Toyohira River
Dam type	Concrete parabolic arch dam
Purposes	Flood control, water supply, power generation
Dam site geology	Neogene andesite lava
Dam height	102.5 m
Crest length	305.0 m
Dam volume	285,000 m ³

[Reservoir specifications]	
Catchment area	159.0 km ²
Water surface area	1.5 km ²
Total pondage	47,100,000 m ³
Effective reservoir capacity	37,100,000 m ³
Normal water level	EL 474.88 m
Lowest water level	EL 437.68 m

[Discharge facilities]

Regular spillway	Howell-Bunger valve	φ2.1 m × 2	Max. discharge volume: 140 m ³ /s
Emergency spillway	Steel roller gate	H6.3 m × W6.0 m × 5	Max. discharge volume: 880 m ³ /s
Discharge pipe for sightseeing	Howell-Bunger valve	φ0.45 m × 1	Max. discharge volume: 2 m ³ /s

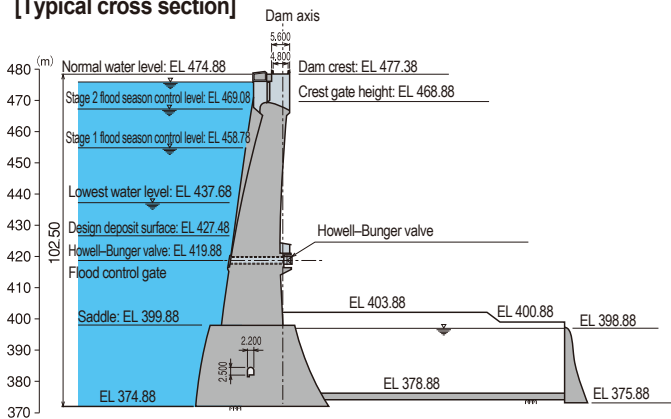
[Water utilization]

City water intake (daily maximum): 528,000 m³/day

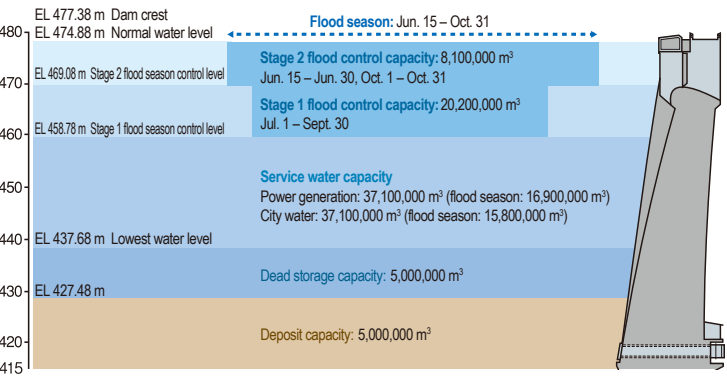
[Power generation]

Hoheikyo Power Station: 51,900 kW (maximum output)

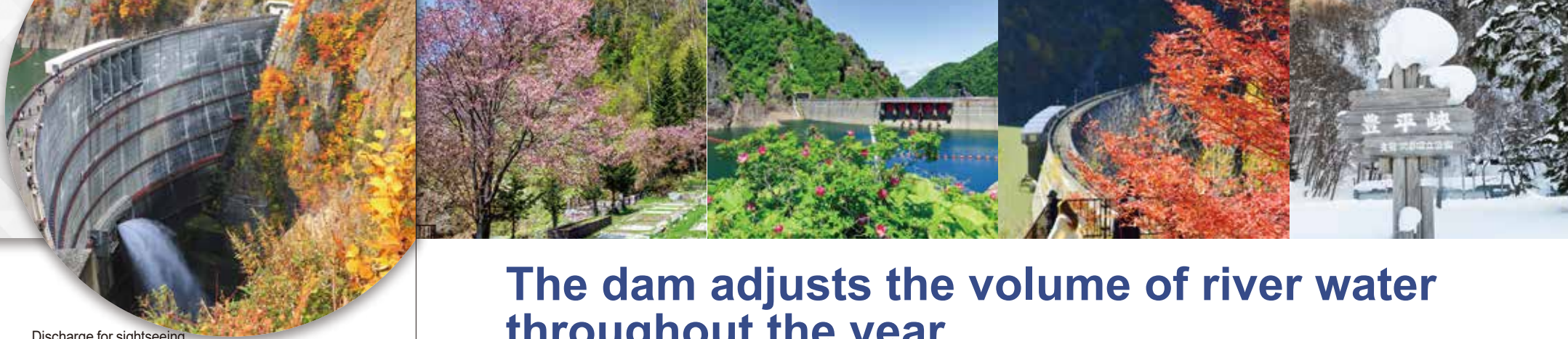
[Typical cross section]



[Reservoir distribution chart]




The roles of the dam



Hoheikyo Dam's three purposes

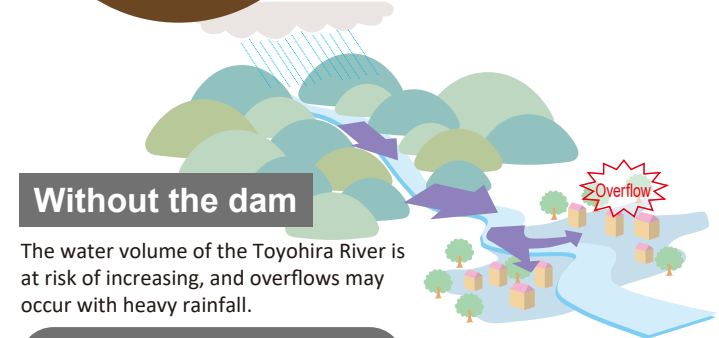
Hoheikyo Dam is a multipurpose dam that supports the lives of Sapporo residents by fulfilling the three roles of flood control, city water supply and power generation.



Flood control

The dam controls the amount of floodwater discharged to the reaches below.

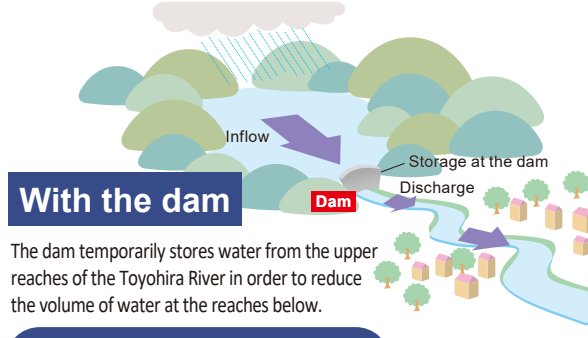
Heavy rainfall in the river basin increases the water volume of the river and may cause flooding. When water flowing into the dam increases, the dam controls the volume of water by temporarily storing water in the dam reservoir in order to reduce flood damage at the lower reaches.



Without the dam

The water volume of the Toyohira River is at risk of increasing, and overflows may occur with heavy rainfall.


The increased water volume puts the Toyohira River at risk of overflowing.



With the dam

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

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



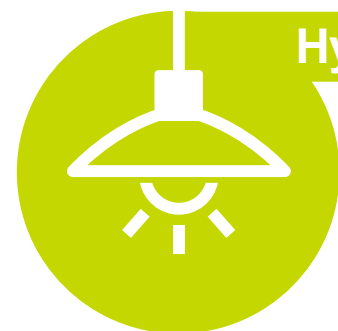
Domestic water supply

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

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

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

Hoheikyo Dam can supply 528,000 m³ of water per day.



Hydropower generation

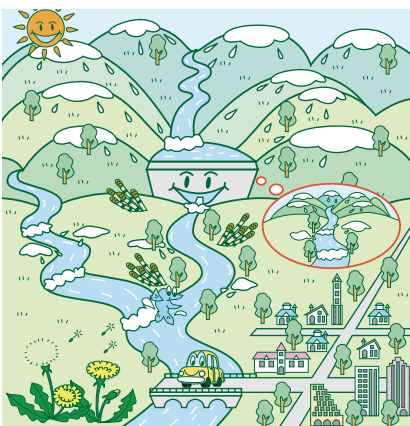
Water stored in the dam reservoir is used effectively for power generation.

The Hoheikyo Power Station can generate 51,900 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 Hoheikyo 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.



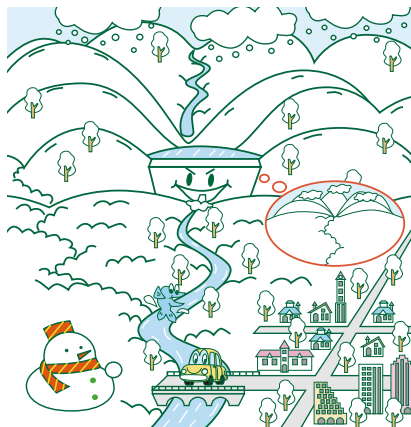
Summer

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

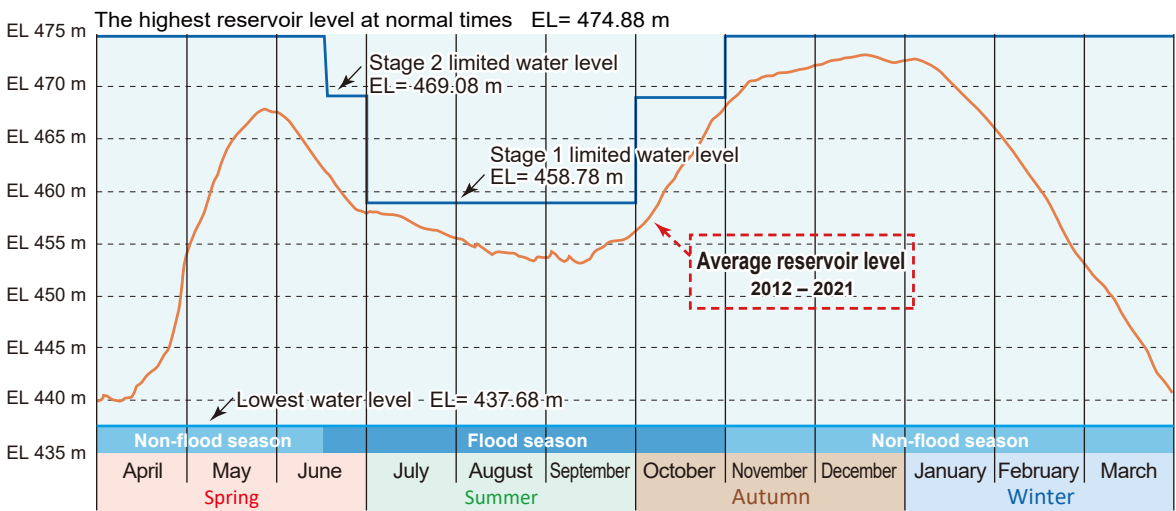
The dam water level is low due to water use in summer. At times of typhoons and other extreme rainfall events, the dam stores large amounts of water and prevents flooding at the lower reaches.

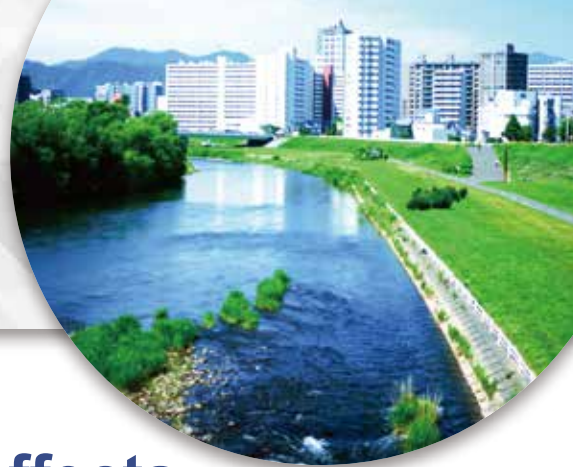


Winter

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

■ The annual reservoir level at Hoheikyo Dam





Effects of the dam

The implementation of flood control measures, and their effects

From 1972, when Hoheikyo Dam entered operation, until 2020, the dam helped to mitigate damage at the lower reaches by implementing flood control procedures 189 times.

Flood control effects

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 m ³ /s

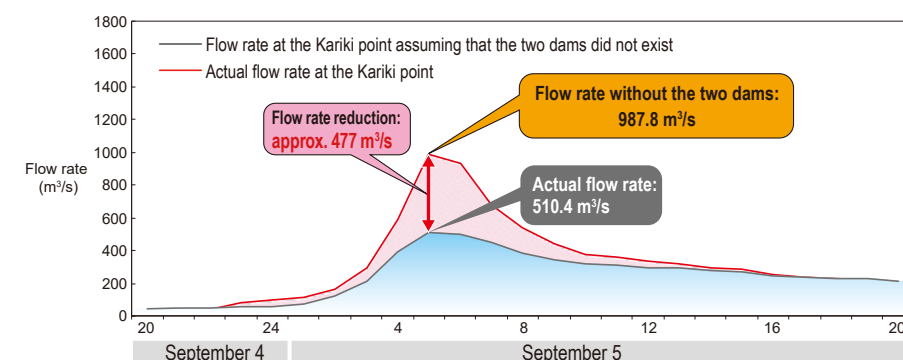
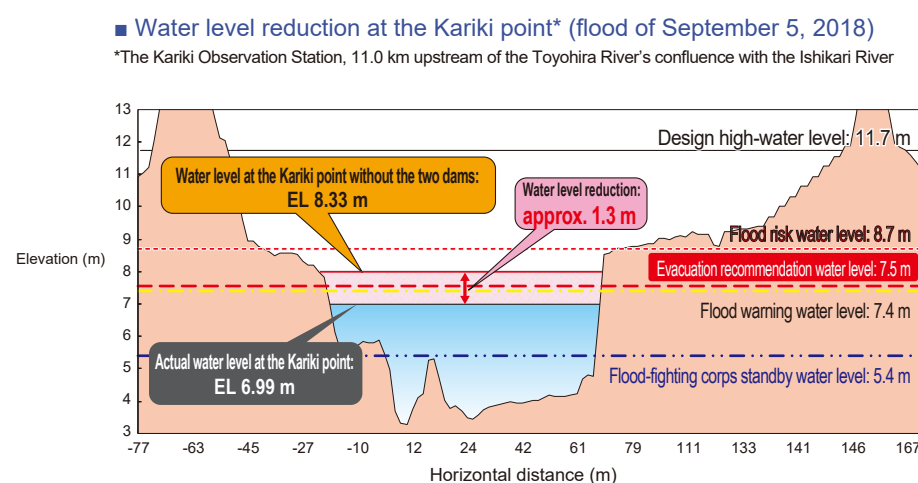
The flood warning water level would have been exceeded without the two dams.

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

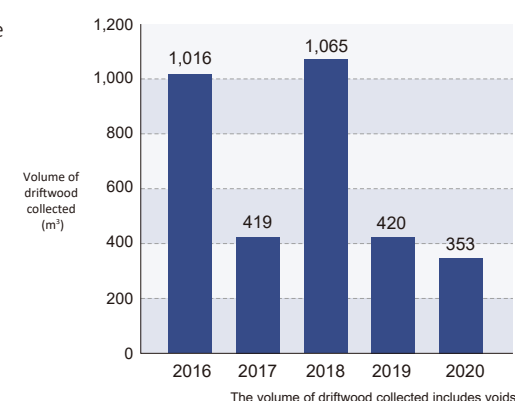
Flood-fighting corps standby water level: the water level used as a guide for putting the flood-fighting corps on standby



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.

■ Volume of driftwood collected (2016 – 2020)



Collection of driftwood in the dam reservoir



Driftwood giveaway

Dam management



Facility inspection

Efficient management of 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 Hoheikyo Dam Management Office.



Toyohira River Integrated Dam and Reservoir Group Management Office



Hoheikyo 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

The facility is used to observe the amount of rain that falls upstream of the dam and the amount of river water that flows into the dam.



Discharge warning facilities

These have been established at eight 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 Jozan reservoir and its surrounding rivers.



Natural environment surveys

Surveys are conducted on the distribution of flora and fauna in and around the Lake Jozan reservoir and on the status of their habitats and growth.

Natural environment

Flora and fauna are found in great variety around the dam, which is in a national park.

Wildlife around Hoheikyo Dam



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



Siberian flying squirrel (mammal)
This nocturnal species, which is endemic to Hokkaido, spends most of its time in trees.



Mandarin duck (bird)
The summer bird flies to lakes and marshes throughout Hokkaido, and it nests in tree hollows.

Insects around Hoheikyo Dam



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



Jozan midori shijimi (*Favonius taxila*)
This butterfly is similar to the chequered blue. The upper surface of the wings of the male has a beautiful metallic blue-green luster.



Oruri osamushi (*Damaster gehini*)
This ground beetle, which is endemic to Hokkaido, has a metallic gloss over its body and varies in color by region.

Specimens of other insects are displayed in the dam library.

Flora around Hoheikyo Dam



Purple loosestrife (*Lythrum salicaria*)
This pink-flowered perennial plant is called *Ezo-mishanga* in Japanese, as it is commonly found in Hokkaido (Ezo) and was used for *misogi* (purification ceremonies).



Orange stonecrop (*Premiuns kamtschaticus*)
This perennial succulent, native to Hokkaido, bears five-petaled yellow flowers in a ring shape. The best time to see the flowers is between May and July.



Wild grape
This climbing deciduous shrub in the grape family can be eaten raw or used to make fruit liquor, as well as wine, jam and juice.

TOPICS

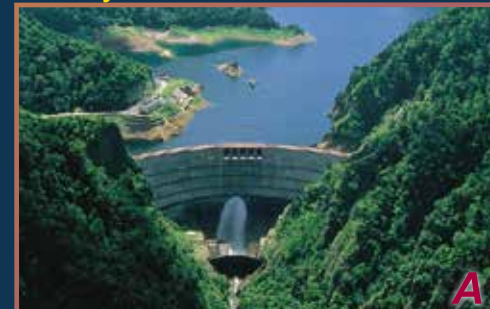
Distribution of the "dam card"

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



Hoheikyo Dam

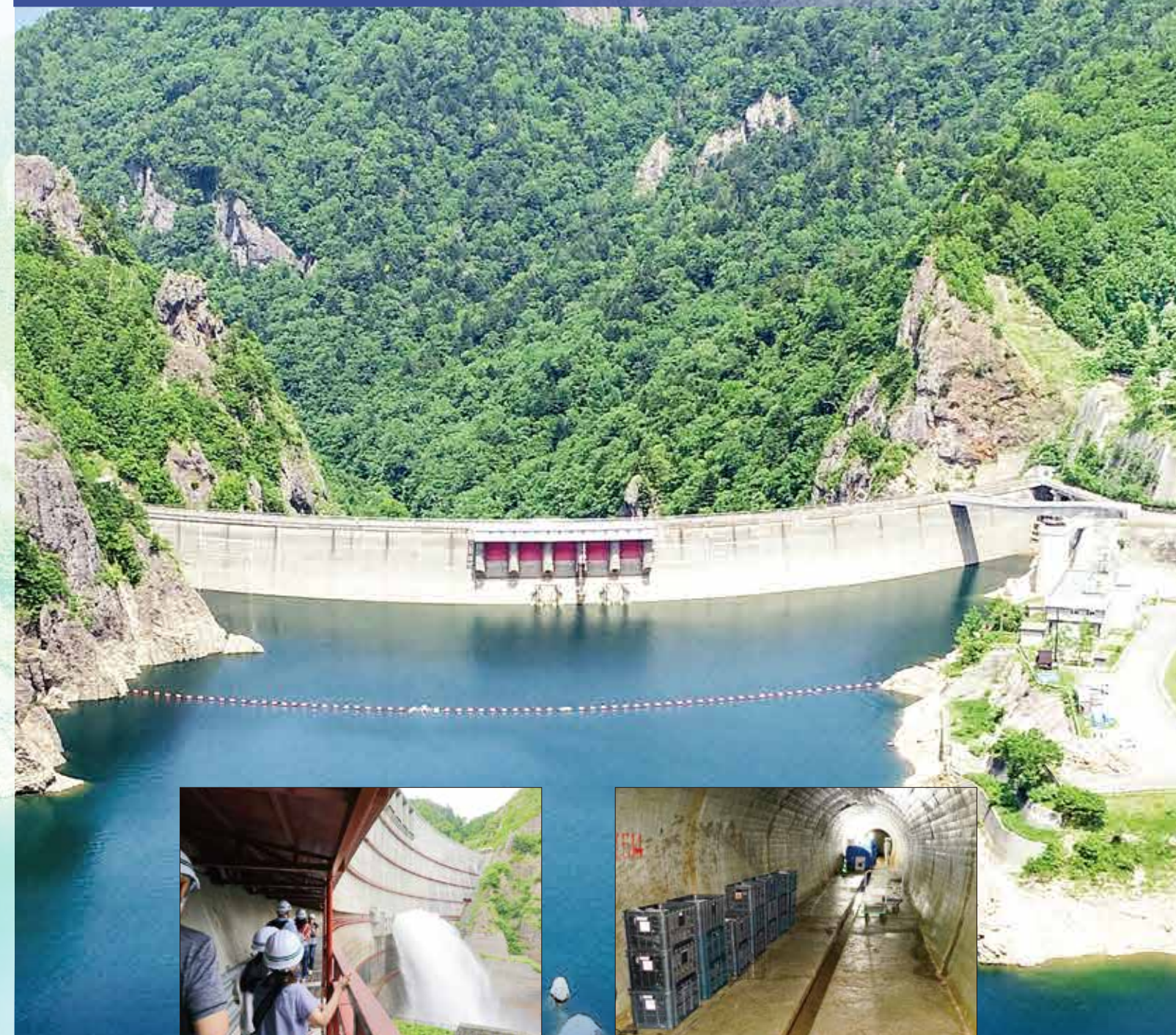
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Events

Dam-related events are held.



Dam tour day

This event is held every July during the Ten-day Campaign to Familiarize People with Forests and Lakes. Visitors can see the dam discharge up close by walking through a passage that is usually open only to authorized personnel.



Storage experiment

As part of efforts to promote the region, an experiment on the storage of wine and Japanese tea leaves is conducted in a working tunnel.

TOPICS

Dam Award

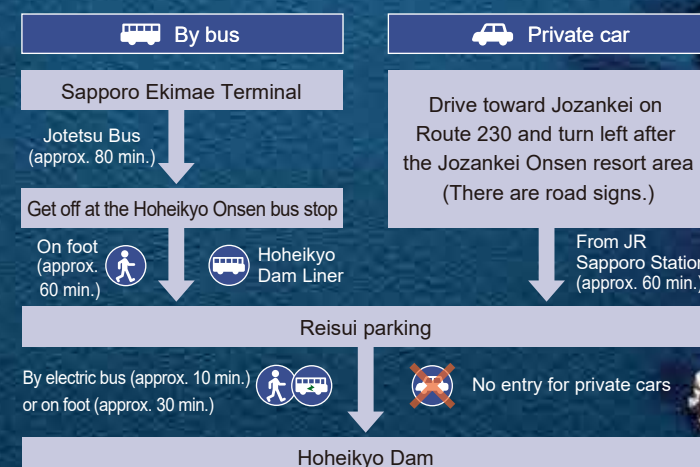
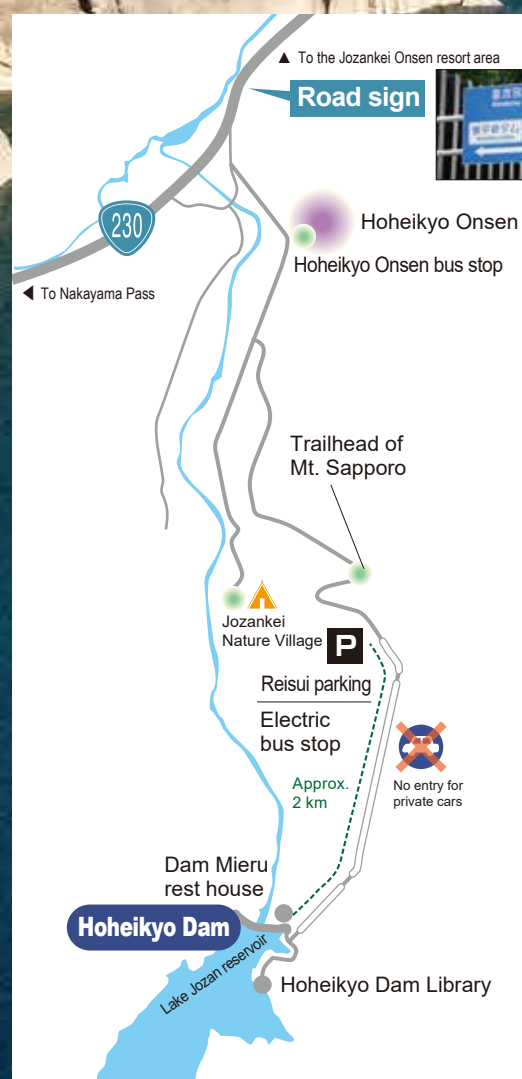


The Dam Awards are given by the Japan Dam Award Selection Committee, which was established by dam enthusiasts in 2013. Dams that played the most active roles in the year are selected from throughout the nation. Hoheiko Dam won the Event Award at the 2014 Japan Dam Awards in Odaiba, Tokyo, on December 27, 2014.

Enjoying
Hoheikyo Dam
Ways to enjoy
Hoheikyo Dam

Hoheikyo Dam, which is set amidst great natural splendor, is a scenic site known for its valley views and fall foliage.
The observatory at the Dam Mieru rest house commands magnificent views of the dam and of natural landscapes that showcase seasonal colors.

Access



• Hoheikyo Dam Liner
Jozankei Tourist Information Center – Hoheikyo Dam parking
Visit the website of the Hoheikyo, “A reservoir that reflects fresh verdure and fall foliage.”
<http://www.houheikyoyou.jp/english/>

Facility information



Discharge for sightseeing

Water is discharged for the amazement of sightseers between 9:00 and 16:00, from June 1 to October 31. It's worth seeing the water vigorously gush from the discharge outlet.



Hoheikyo Dam Library

The library displays panels on the history of Hoheikyo Dam and the Toyohira River and the surrounding natural environment. Visitors can also enjoy panels presenting an overview of the dam, displays of insect specimens and views of reaches upstream of the dam reservoir. Admission is free.

■ Open 9:00 – 16:30 on weekdays between early May and November 3



Hybrid electric bus

Hybrid buses run between the Reisui parking and the dam.

■ Hoheikyo Electric Vehicle (late April to early November)
Tel.: 011-598-3452



Dam Mieru rest house

“Hoheikyo Dam curry,” which suggests autumnal colors, is available in fall foliage season (early September to late October). The rest house is popular for its *jingisukan* (lamb barbecue) set, which visitors can enjoy while appreciating the beautiful scenery of trees in their autumn splendor.

Visit the website for details. <http://www.houheikyoyou.jp/english/>

Nearby

tourist spots

Visit the Jozankei Tourist Association website for details. <https://jozankei.jp/en/>



Jozankei Onsen resort area

This leading hot spring resort in Hokkaido is visited by 1.5 million people annually. Jozankei Ohahi Bridge here is a scenic spot from which to enjoy beautiful autumn colors.



Hoheikyo Onsen

Hoheikyo Onsen is among the few hot springs in Japan that use water flowing directly from the hot spring source. The only spa in Sapporo whose waters flow directly from the ground without the need for storage tanks, Hoheikyo Onsen is highly rated for its unadulterated water and beneficial effects.



Futami Suspension Bridge

This bright red bridge in Futami Park overlooks the Toyohira River and Kappa-buchi Stream. It is a popular spot that attracts many tourists in the fall foliage season.