SHIRAKAWA DAM
白川ダム・寒河江ダム
SAGAE DAM
事業概要
国土交通省 東北地方整備局
最上川ダム統合管理事務所
Maintaining a safe and secure way of life through flood control activities and the provision of rich water resources for the home and field.

About the Mogamigawa river

The Mogamigawa river originates in Nishi-Azuma-yama mountain and winds its way down across the Okitama, Murayama and Shonai plains through all regions of Yamagata Prefecture. A river of the first order in Japan, Mogamigawa stretches 229 kilometers to the Sea of Japan and covers a total area of 7,040 square kilometers. 80% of the population of Yamagata Prefecture lives in the river's valleys. For centuries, it served as a major local waterway for transporting rice and saltwater to the major urban centers at that time, which in turn brought many goods and urban culture to the region. Legendary writers and poets such as Basho Matsuo, Shiki Masaoka and Mokichi Saito have all left a plethora of works paying tribute to this "Mother River" of Yamagata. Naturally, the Mogamigawa river serves as the foundation for the region's culture, society and economy, and plays an extremely significant role in the environment, irrigation works and flood control.

Song for the People of Yamagata (publicly posted March 31, 1960)

Mogamigawa River

Lyrics by the Showa Emperor
Music by Akatsuki Shinnosuke

Through spacious fields the Mogamigawa flows
Its water clear as crystal to the sea.

The above-song was recited during the Showa Emperor's visit to Yamagata Prefecture in 1935. It was regarded as the official song of the prefectoral citizens of Yamagata on March 27, 1982.

Summary and History of Operations

The Mogami River Dam Group Management Office is in charge of management operations for the Shirakawa and Suga dams, planned and constructed as an upstream dam cluster under the Mogami River Water Control Development Project. The Management Office has played an important role in turning Yamagata Prefecture's largest and most treasured river into a regional reservoirs for flood control, provision of agricultural water, tap water and hydroelectricity generation.

Shirakawa Dam was completed on November 2, 1968 at a cost of 1.33 billion yen and took 18 years to build from the establishment of the Shirakawa Dam Survey Office in Suga City back in May 1952. At a height of 112 meters, and a water storage capacity of 190 million cubic meters, it is one of the country's largest control dam type rockfill dam and was built with an important role to play not only flood water control but also for generating power, and providing running tap water to the Watarase region.

Both dams were subsequently operated individually by the Shirakawa Dam Management Office and Suga Dam Management Office until May 1996 when they were unified together in a Mogami river dam cluster with their operation and management consolidated by the newly established Mogami River Dam Group Management Office.

Control plan of high water discharge of the Mogami River

Operating Expenses

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Initial Estimate (in million yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
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</tr>
<tr>
<td>2004</td>
<td>294</td>
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<td>2005</td>
<td>544.2</td>
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Shifts in Operating Expenses (initial operating expenses)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Initial Estimate (in million yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
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<tr>
<td>2000</td>
<td>34.0</td>
</tr>
<tr>
<td>2001</td>
<td>34.0</td>
</tr>
</tbody>
</table>

General Affair Section
- Accounting Section
- Management Division
- Economic Communication Section
- Information Section

Mogami River Dam Group Management Office

Administrative personnel: 7
Technical personnel: 11

Mogami River Dam Group Management Office

- Mogami River Dam Group Management Office
- Shirakawa Dam Management Branch Office
- Suga Dam Management Branch Office
The Dam's Functions

**Flood Control Record**

The design flood discharge of 1,400 m³/s was adjusted to 300 m³/s at the point of the Shirakawa dam, reducing volumetric flow rate at the confluence of rivers with a bed mobility of Nagai city from 3,800 m³/s to 3,400 m³/s, protecting downstream regions from flood damage.

**Agricultural Water**

The water used to the approximately 4,800 hectares of farmland in the region. Kawanishi and Yonezawa have traditionally been known for their numerous rice paddies, all of which are drying up due to urban encroachment. Moreover, since natural flow volumes of the Inakawa and Kurosawa rivers are poor, the region is susceptible to drought. Water in the Shirakawa River system is drawn from Shirakawa dam discharged water over the Nishi-Takamuku and for the Inakawa and Kurosawa water systems, water is drawn by tunnel from a large dam installed within the Shirakawa dam reservoir, providing support for agricultural production.

**Power generation**

At the Shirakawa Electrical Power Plant of the Yamagata Prefecture Public Enterprise Bureau was built at the same time as the Shirakawa dam and generates a maximum output of 2,800 kW of electricity to support the power needs of the community.

**Industrial Water**

The Shirakawa dam supplies approximately 10,000 m³ per day for use by an industrial zone located in Yonezawa, thereby promoting the town's industrial development.

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*Notes:

The Shirakawa dam has undergone flood control adjustments 12 times during the 30-year period between completion of the dam in 1980 through 2000, and has contributed to reduction of flood damage in downstream regions.*
Flood Control Record

The design flood discharge of 2,000m³/s was adjusted to 3,000m³/s at the point of the Sagae dam, reducing downstream flood rates at the confluence of the upper Shimotawa dam and Naoji dam with a maximum rate of 4,000m³/s, protecting downstream regions from flood damage.

Municipal water supply

The Sagae dam provides drinking water for approximately 60,000 people in the cities of the Murayama district, including Yamaigawa City and Tsurumaki City. The Water Office is responsible for the supply of drinking water to these areas.

Agricultural Water

The Sagae dam provides specially designated irrigation water for 5,000 hectares of farmland within the Murayama district, as well as to neighboring prefectures, supporting rice growing areas.

Power generation

The newly built, subterranean Honda Electric Power Plant operated by the Honda Electric Power Co., Ltd., generates a maximum of 5,000 MW of electricity at the Murayama Power Plant.

River Environmental Preservation

To preserve the original natural environment of rivers, water is supplied from the Sagae dam during dry periods.
Management Outline

Shirakawa Dam

To prevent deterioration of water quality due to large scale related to storage reservoir, such as drought, evaporation, and sediment build-up, the Shirakawa Dam is maintaining water quality and ecosystem preservation measures. While water quality assessment measures are executed to ascertain the effects that sand, particularly silt, entering the storage reservoir has on water quality, a level of verifiable deterioration in water quality for each item measured following water filling is less than 10%.

**Storage Reservoir Conditions**

**Water Quality**

- BOD
- COD
- SS
- DO

**Sand accretion volume**

- Water quality conditions at dam inlet

**Sagae Dam**

The source of the Sagae river is found in the Gannan and Asahi peaks and its water is cold due to the heavy snowfall in the region. In addition, the Sagae Dam’s basin contains high concentrations of plants and animals through the use of natural volcanic activity since ecosystem degradation on the northern slope of Daisen mountain, where water is stored in a catchment area, has resulted in a decline in river water quality. The Sagae Dam's water was designated as the Environmental Quality Standard (EQS) for rivers with Class 1 A, and has been monitored for water quality preservation measures. However, some deterioration in water quality for each item measured following water filling has led to flat results. Sand accretion volume for the reservoir is approximately 1.47 million m³, and represents a slight increase with regard to the designed volume.

**Storage Reservoir Conditions**

**Water Quality**

- BOD
- COD
- SS
- DO

**Sand accretion volume**

- Water quality conditions at dam inlet

**Flash Discharge**

Work in the upstream area building flexible dam management as an effective water measure for existing dams. Considered an environmental improvement effort, these effects are underway downstream of the dam such as conducting flash floods for the purpose of improving the river environment over a 5-km stretch downstream of the dam where river levels have dropped after dam construction. These efforts have taken the lead in a nationwide mandate to make dam management flexible and establish effective measures for existing dams.

**Cost Reduction (Recycling of driftwood that flows in the dam lake)**

Previously, driftwood and fish that flowed into the dried lakeshore were accumulated and managed due to the damage they could cause. Currently, however, efforts are being made at both the Shirakawa and Sagaie dams to utilise the driftwood materials and reduce the cost of driftwood disposal, such as by turning driftwood into wood chips.

1. Collection of driftwood
2. Drying
3. Delivery to recycling plants and separation
4. Turning driftwood into wood chips
5. Recycled products & Case study

A machine is used to break up driftwood into wood chips.
Dam Environmental Works

Shirakawa Dam

A Relaxing Synthesis of Abundant Greenery and Water

The Shirakawa Dam Environs

Under a scenic principle of creating beautiful lake recreation and outdoor sporting facilities, a great effort has been made to enhance the lakeside environment. The Shirakawa Dam reservoir, which is also known as the "Shirakawa no moto", is connected to the Nagano Prefecture. Together, the two environmental regions house campgrounds and hotels including one that is designed with an aesthetic for a physically and spiritually refreshing area that is growing in popularity.

Check Dam

In addition to controlling the pace of flood water, the storage reservoirs were effective in many other ways such as improving the environment in the summer at the upstream end of the lake, increasing the water surface area available for use and offering a fully equipped camping site.

Genryu no mori

The Genryu no mori is a large wooded play area around the headfield and is a popular spot. Children can experience the world of the sea, enjoy sports and recreation, and gain a sense of nature. This spot is located on the main road and is a recreational facility.

A dam that is both functional and beautiful.

Sagae Dam

A large monument to water against sacred peaks welcomes you.

The Sagae Dam Environs

Sagae Dam is located in the mountains in Nagano Prefecture, and it's connected to the ancient mountains of the nearby Nagano and Yamanashi regions. The Gusuon Dam observation deck offers a panoramic view of both the dam structure and the mountainous Minakami region. Golfing and tennis and other activities are available at the Honchou Spa. This town is built around its water (Nishikawa-machi).

A town built around its water (Nishikawa-machi)

Shiretoko Park

The snow-capped peaks of Shiretoko Park are a popular destination for winter sports.

Trend in Use of Lakes in the Shirakawa Dam Environ

<table>
<thead>
<tr>
<th>Year</th>
<th>Use of Lakes</th>
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</thead>
<tbody>
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<td>1980</td>
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<td>1985</td>
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<tr>
<td>1990</td>
<td>30%</td>
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<td>40%</td>
</tr>
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A recreational facility at the Genryu no mori.

The Honchou fishing competition on the Gusuon River.

Gusuon Hot Springs

Shiroyama Park

The snow-capped peaks of Shiroyama Park are a popular destination for winter sports.

Trend in Use of Lakes in the Sagae Dam Environ

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Events at the Dams

Shirakawa Dam

A Multitude of Events to Meet

- Shirakawa Dam Lakeside Marathon

Midsummer Snow Athletic Meet
("Snow Egg Festival")

Dam Encounter Day
("Get Familiar with Lake and Forest")

Nakatsugawa Snow Festival

Sagae Dam

Event to Meet and Know Your Dam

- Sagae Dam Ona-Day Manager

Special Dam Tour Days
("Get Familiar with Lake and Forest")

Gasean Lake Summer Festival
("Fireworks")

Olsawa Snow Festival