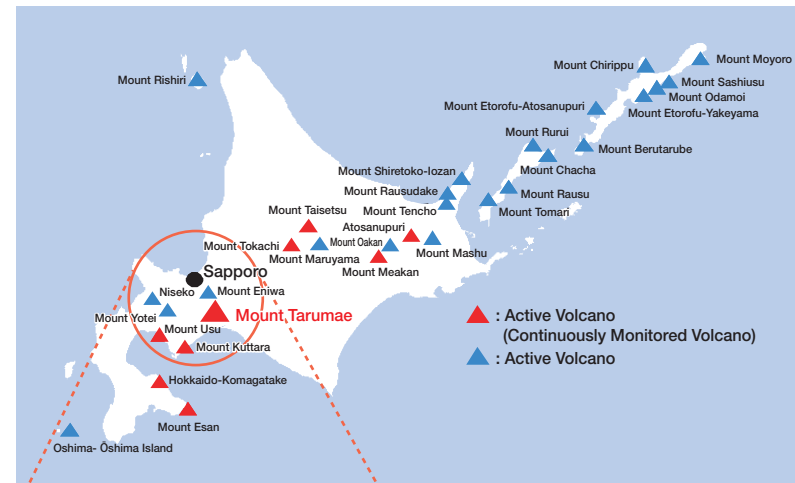


Volcano Sabo at Mount Tarumae



Overview of the Directly Managed Tarumae Volcano Sabo Project





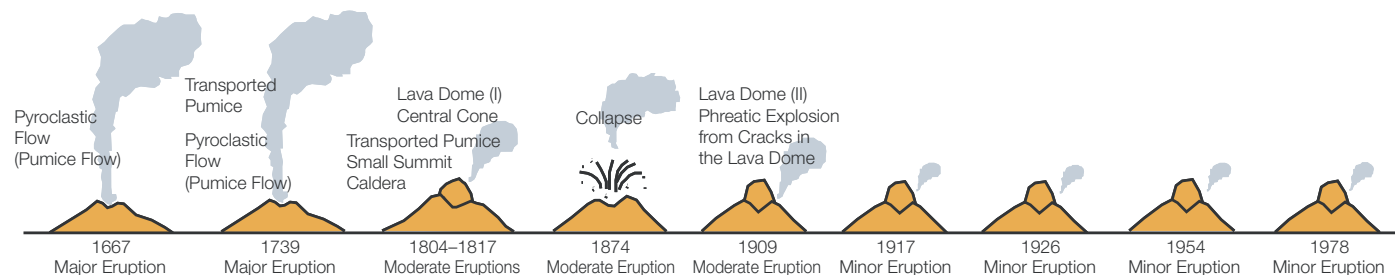
Mount Tarumae (1,041 m above sea level) is located southeast of Lake Shikotsu and is one of Japan's most active volcanoes. The summit lava dome was formed during the 1909 eruption, and the present-day landscape, together with Lake Shikotsu, Mount Fuppushi, and Mount Eniwa, was shaped by volcanic activity. These geological processes have created fertile land and a rich natural environment around Mount Tarumae, providing many benefits to local communities.

At the same time, Mount Tarumae remains an active volcano capable of erupting at any time. To protect the people living at its foot from volcanic mudflow hazards, the national government has been implementing the Directly Managed Tarumae Volcano Sabo Project since FY1994.

1	History of Mount Tarumae	1
2	Mount Tarumae Hazard Map and Volcanic Alert Levels	3
3	Initiatives of the Directly Managed Tarumae Volcano Sabo Project	5
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1 History of Mount Tarumae

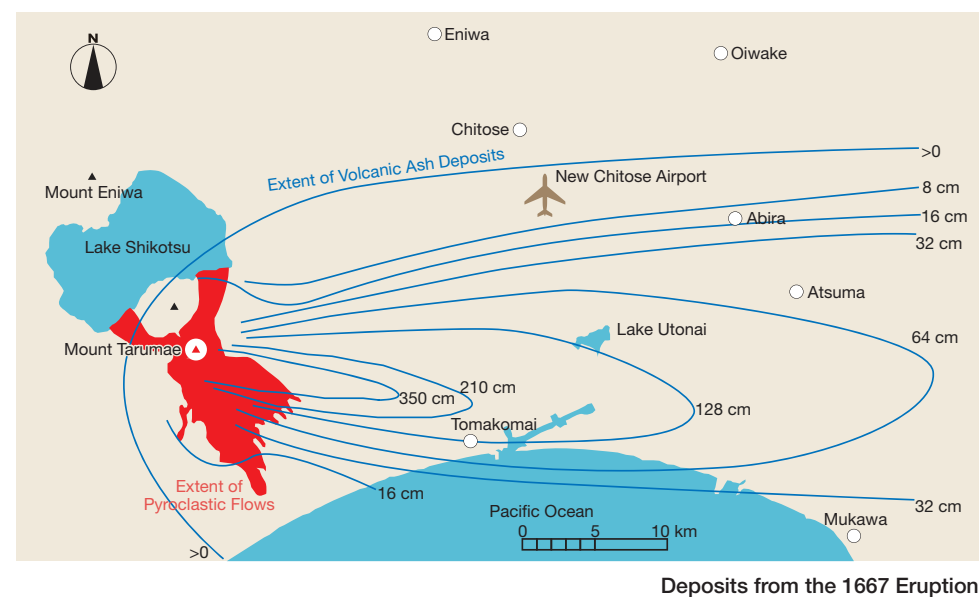
Mount Tarumae is an active volcano that formed after the eruption of the Shikotsu Volcano approximately 40,000 years ago and began its own volcanic activity around 9,000 years ago. Large-scale eruptions occurred in 1667 and 1739, ejecting enormous amounts of pyroclastic material. The volcano has remained active since then, with more than 70 eruptions recorded since the 19th century. More recently, Mount Tarumae has experienced a series of small-scale eruptions, and although the last eruption in 1978 was very minor, elevated temperatures within the crater and ongoing crustal deformation have continued to be observed.



Major Eruption

1667 Mount Tarumae's Largest Recorded Eruption

This is believed to have been the largest eruption in Mount Tarumae's recorded history. A series of explosive eruptions ejected enormous volumes of pumice and volcanic ash from the crater. Ashfall was carried eastward by the prevailing westerly winds, reaching as far as eastern Hokkaido. During the latter stages of the eruption, repeated pyroclastic flows swept down the mountain slopes over a wide area. Historical documents also record that the sounds of the eruption were heard as far away as the Tsugaru region of present-day Aomori Prefecture.



1739 1 m of Ashfall at Present-Day New Chitose Airport

According to historical records, the eruption was preceded by earthquakes and continued for 12 days. Ashfall was so heavy that it turned daytime into darkness. Pyroclastic flows also occurred, sweeping down the mountain slopes. Volcanic ash and pumice were carried by southwesterly winds and fell over northeastern Hokkaido. At the present-day site of New Chitose Airport, approximately 1 m of volcanic ash was deposited. The summit landform known as the outer rim was formed during this eruption.

Moderate Eruptions

1874 Approximately 10 cm of Ashfall Along the Pacific Coast Duration of Activity: Approximately 9 days (around February 8-16, 1874)

The eruption began on February 8. Volcanic rocks were ejected beyond the crater rim formed during the 1739 eruption, known as the outer rim, reaching the middle slopes of the mountain. The eruption continued for three days, depositing approximately 10 cm of volcanic ash along the Pacific coast. A further eruption occurred on February 16, and ashfall was observed in Sapporo.

1909 Formation of the Summit Lava Dome Duration of Activity: Approximately 4 months (around January 11-May 15, 1909)

The eruption began on January 11. Loud volcanic rumbling echoed around the mountain as repeated eruptions produced ash plumes and recurrent ashfall. By March 30, volcanic blocks were also being ejected. On April 12, a major explosion sent a towering black ash plume into the sky, accompanied by thunder. Between April 17 and 19, the present-day lava dome was formed over a period of two days.

Following another eruption on May 15, which breached the southern side of the lava dome, volcanic activity subsided.

Minor Eruptions

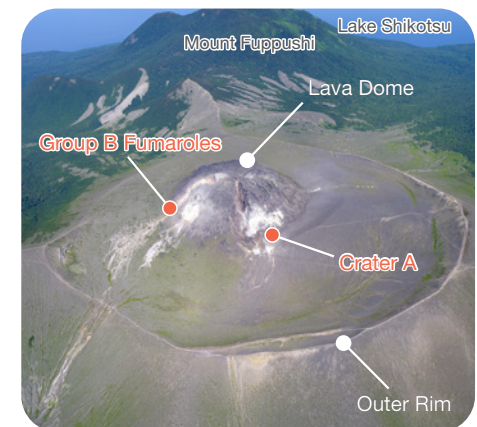
Repeated Eruptions Throughout the 20th Century

Following the formation of the summit lava dome during the 1909 eruption, minor eruptions occurred almost every year during the first half of the 20th century. In the latter half of the century, the frequency of eruptions gradually declined. Although volcanic blocks and ash were occasionally ejected, they were generally confined to the summit area and had little impact on the surrounding foothills.

Major Volcanic Activity at Mount Tarumae over the Past 100 Years

Period of Activity	Scale	Summary of the Eruption
1909	Moderate Eruption	Rumbling, ash plume, ashfall were observed. Ballistic ejecta, volcanic sand, volcanic lightning, and a dark ash plume were observed. Formation of the present lava dome.
1917	Minor Eruption	Ashfall occurred, and cracks developed in the lava dome. Rumbling, ash plume, and explosion sounds were observed. Three craters formed on the lava dome.
1926	Minor Eruption	Rumbling, explosion sounds, ash plume, and ashfall were observed. New cracks developed in the lava dome.
1954	Minor Eruption	Explosion sounds, ashfall, a small mudflow near the crater, volcanic earthquakes (Intensity 2 in Tomakomai), explosion sounds, and air shocks were recorded.
1978-1981	Minor Eruption	Ashfall occurred. This was followed by a series of very small-scale eruptions.
1996	Increased Fumarolic Activity	Fumarolic activity intensified along a fissure on the southeastern side of the lava dome. Felt earthquakes (Intensity 2 at the shore of Lake Shikotsu and Marukoma Hot Spring) were recorded.
1999	Increased Fumarolic Activity Earthquake Swarm	Fumarolic activity was observed from the southwestern crater of the lava dome. Crater temperatures increased. A swarm of volcanic earthquakes occurred.
2003	Increased Fumarolic Activity Earthquake Swarm	The highest temperature in the southwestern fumarole group on the lava dome reached approximately 500°C. Molten sulfur, burning sulfur, and sand-like ejecta were observed. A swarm of volcanic earthquakes occurred.

Mount Tarumae Crater



1909 Eruption
Photo courtesy of Hokkaido University Library

2 Mount Tarumae Hazard Map and Volcanic Alert Levels

To Mitigate the Impacts of Volcanic Eruptions

It is impossible to predict exactly when Mount Tarumae will erupt. When an eruption appears imminent, rapid evacuation is the most important measure for protecting lives. To help people prepare for such an event, the Mount Tarumae Volcanic Disaster Management Council has developed the Mount Tarumae Hazard Map.

(Source: <https://www.city.tomakomai.hokkaido.jp/kurashi/bosai/jishin/handbook.html#kouzui>)

Mount Tarumae Volcanic Alert Levels

The Volcanic Alert Level system for Mount Tarumae was introduced on December 1, 2007.

Category	Information Issued	Area Covered (keyword)	Level	Volcanic Activity	Recommended Actions for Residents, Climbers, and Visitors	Expected Phenomena, etc.
Emergency Warning	Volcanic Warning (for Residential Areas) or Volcanic Warning	Residential areas and areas closer to the crater	5 (Evacuate)	A volcanic eruption causing, or expected to cause, severe impacts in residential areas is occurring or imminent.	Evacuation from hazardous residential areas is required.	● A major eruption occurs, with pyroclastic flows reaching residential areas, or such an eruption is imminent. ● A moderate to major eruption during the snow season generates a snowmelt-induced volcanic mudflow that reaches residential areas, or such an eruption is imminent.
			4 (Evacuate the Elderly, etc.)	A volcanic eruption expected to cause severe impacts in residential areas is expected (or the likelihood of such an eruption has increased).	Older adults and other people requiring assistance should evacuate from residential areas where caution is required. Other residents should prepare to evacuate.	● Frequent moderate eruptions indicate that a major eruption capable of generating pyroclastic flows reaching residential areas is expected. ● A minor eruption during the snow season intensifies, and snowmelt-induced volcanic mudflows are expected.
			3 (Do Not Approach the Volcano)	A volcanic eruption causing, or expected to cause, significant impacts in areas close to residential areas (where entering the area would pose a threat to life) is occurring or expected.	Residents may continue their normal daily activities. Depending on the situation, preparations should be made for the evacuation of older adults and other people requiring assistance. Climbing is prohibited, and entry into hazardous areas is restricted.	● A moderate eruption occurs, with large volcanic blocks being ejected to within approximately 3 km of the crater, or pyroclastic flows descending along valleys. ● Increased seismic activity or ground deformation indicates that a moderate eruption is likely.
Warning	Volcanic Warning (Crater Area) or Crater Area Warning	Crater area	2 (Do Not Approach the Crater)	A volcanic eruption affecting the area around the crater (where entering the area would pose a threat to life) is occurring or expected.	Residents may continue their normal daily activities while monitoring volcanic activity. Access to the area around the crater is restricted.	● A minor eruption occurs, with large volcanic blocks being ejected within and around the summit crater. ● Increased seismic or thermal activity indicates that a minor eruption is likely.
			1 (Potential for Increased Activity)	Volcanic activity is generally calm. Depending on the level of activity, emissions of volcanic ash and other phenomena may occur within the crater (where entering the crater would pose a threat to life).	Residents may continue their normal daily activities. Depending on the situation, they should monitor volcanic activity, review evacuation procedures, and participate in disaster preparedness drills, etc. Access to the crater and its immediate vicinity may be restricted as necessary.	● Volcanic activity is generally calm. Depending on conditions, eruptions affecting the summit crater and its immediate vicinity may occur.
Forecast	Volcanic Forecast	Within the crater, etc.				

(Source: Japan Meteorological Agency, "Volcanic Alert Levels for Mount Tarumae")

Note 1) "Large volcanic blocks" refer to ballistic volcanic ejecta generally 20–30 cm or larger that travel on ballistic trajectories with little influence from the wind.

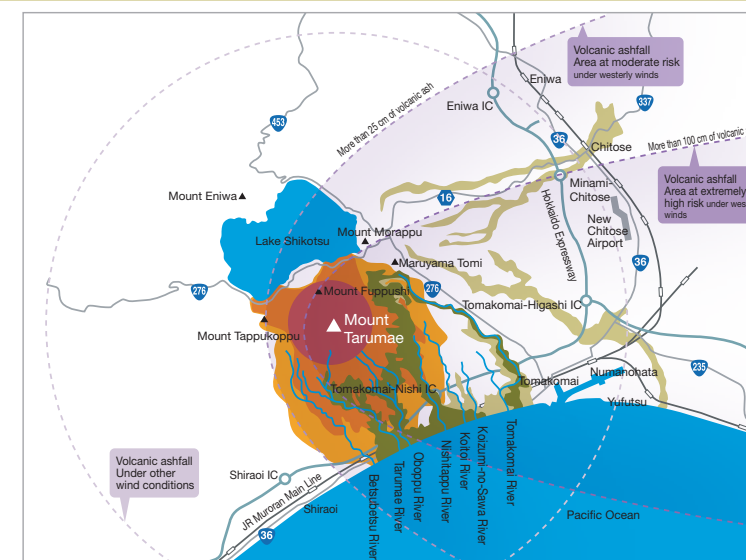
Note 2) A major eruption is an eruption in which the ash plume rises to 10,000 m or higher, pyroclastic flows spread over a wide area, and associated snowmelt-induced volcanic mudflows are generated.

Note 3) A moderate eruption is an eruption in which the ash plume rises to several thousand meters, large volcanic blocks are ejected 2–3 km from the crater, and small pyroclastic flows and associated snowmelt-induced volcanic mudflows may occur.

Note 4) A minor eruption is an eruption in which the ash plume rises to less than 1,000 m, and large volcanic blocks are ejected within and around the summit crater.

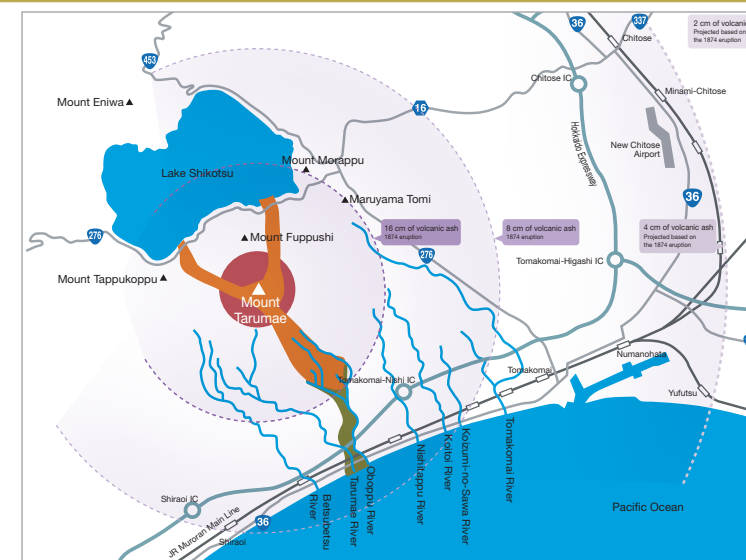
Major Eruption Assuming an eruption comparable to the 1739 eruption

Volcanic Ashfall	Area at extremely high risk under westerly winds	Area with a high likelihood of more than 100 cm of volcanic ash accumulation
	Area at moderate risk under westerly winds	Area with a high likelihood of more than 25 cm of volcanic ash accumulation Volcanic ashfall may also occur outside these areas
	Under other wind conditions	Areas where more than 100 cm of volcanic ash may accumulate, depending on wind direction Volcanic ashfall may also occur outside these areas
Volcanic Ejecta (Volcanic Blocks)	Area at extremely high risk	Area with a high likelihood of volcanic blocks exceeding 1.5 m in diameter
Pyroclastic Flows	Area at extremely high risk	Area with a high risk of being engulfed by the main pyroclastic flow
	Area at high risk	Area with a high risk of being engulfed by the pyroclastic surge
Volcanic Mudflows and Debris Flows	Area at extremely high risk (under snow-cover conditions)	Area with a high risk of snow being melted by a pyroclastic flow, generating volcanic mudflows that may inundate the area
	Area at high risk (where volcanic ash accumulates under westerly winds)	Area with a high risk of volcanic mudflows and debris flows during rainfall As hazardous areas vary depending on the distribution of volcanic ash deposits, valleys other than those shown may also be at risk



Moderate eruption Assuming an eruption comparable to the 1874 eruption

Volcanic Ashfall	Area at moderate risk	Area with a high risk of volcanic ash accumulation exceeding 16 cm
	Area at moderate risk	Area with a high risk of volcanic ash accumulation exceeding 8 cm
	Area at moderate risk	Area with a high risk of volcanic ash accumulation exceeding 4 cm
	Area at moderate risk	Area with a high risk of volcanic ash accumulation exceeding 2 cm
Volcanic Ejecta (Volcanic Blocks)	Area at extremely high risk	Area with a high likelihood of volcanic blocks exceeding 1.5 m in diameter
Pyroclastic Flows	Area at extremely high risk	Area with a high risk of being engulfed by the main pyroclastic flow or the pyroclastic surge
Volcanic Mudflows and Debris Flows	Area at extremely high risk (under snow-cover conditions)	Area with a high risk of snow being melted by a pyroclastic flow, generating volcanic mudflows that may inundate the area



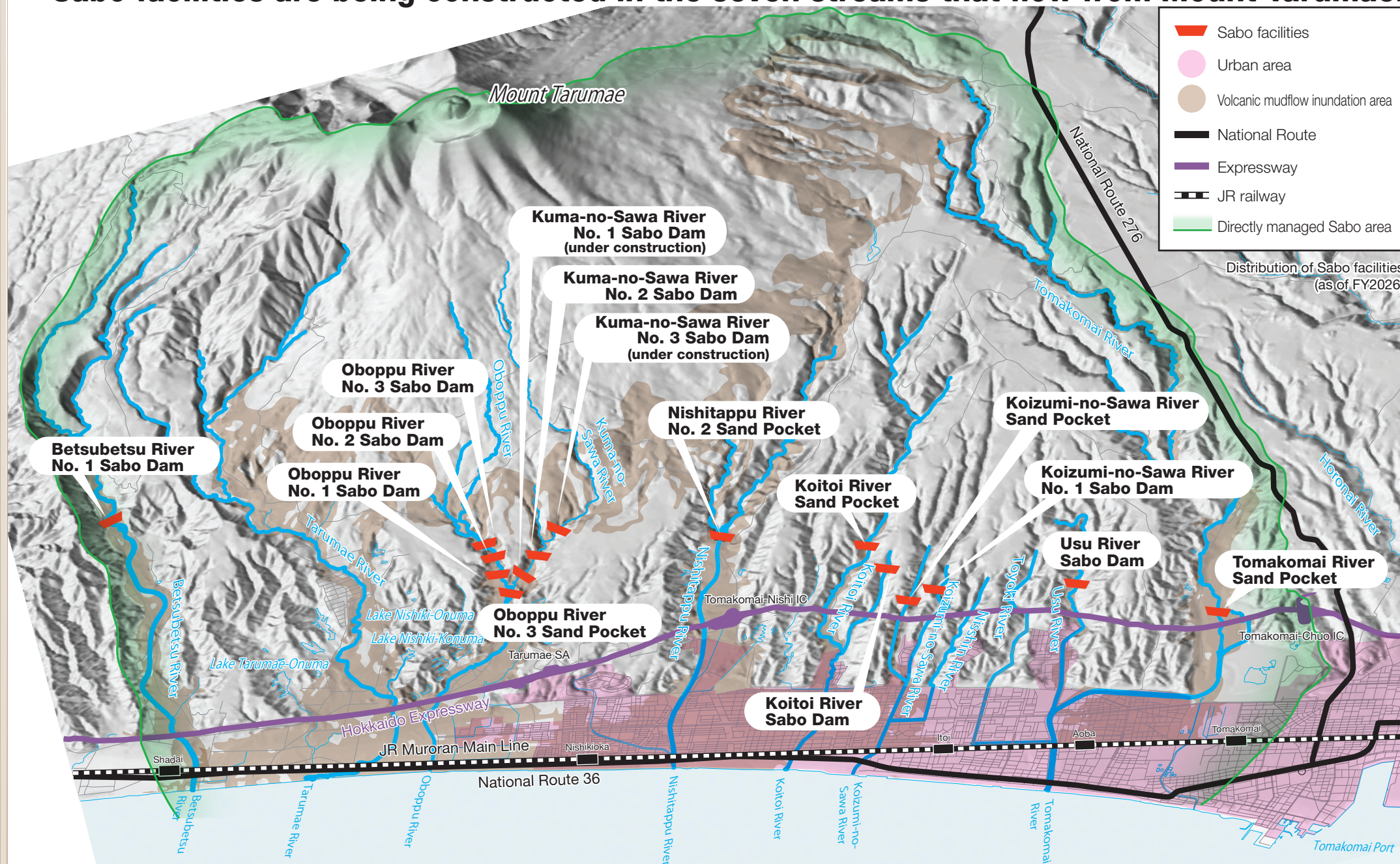
Hazard maps distributed to: Tomakomai City, Chitose City, Eniwa City, Shirai Town, Abira Town, Atsuma Town, and Mukawa Town

3-1 Initiatives of the Directly Managed Tarumae Volcano Sabo Project

Project Overview

At the foot of Mount Tarumae lie the urban areas of Tomakomai City and Shiraoi Town, together with major transportation infrastructure, including the Hokkaido Expressway, National Route 36, and the JR Muroran Main Line, as well as key logistics hubs such as New Chitose Airport, the Tomakomai Port, and the Tomakomai Coastal Industrial Zone. An eruption of Mount Tarumae could therefore have severe consequences not only for the lives of local residents and the regional economy, but also for Japan's economy and society as a whole. To mitigate damage from volcanic mudflow disasters triggered by volcanic eruptions, the Directly Managed Tarumae Volcano Sabo Project was launched in FY1994. Since then, sabo facilities have been developed and improved to reduce the impacts of such disasters.

Sabo facilities are being constructed in the seven streams that flow from Mount Tarumae.



Name of Sabo Facilities	Oboppu River No. 3 Sand Pocket	Oboppu River No. 1 Sabo Dam	Oboppu River No. 2 Sabo Dam	Oboppu River No. 3 Sabo Dam	Kuma-no-Sawa River No. 1 Sabo Dam	Kuma-no-Sawa River No. 2 Sabo Dam	Kuma-no-Sawa River No. 3 Sabo Dam	Nishitappu River No. 2 Sand Pocket	Koitoi River Sand Pocket	Koitoi River Sabo Dam	Koizumi-no-Sawa River Sand Pocket	Koizumi-no-Sawa River No. 1 Sabo Dam	Usu River Sabo Dam	Tomakomai River Sand Pocket
Structure	Steel cell / Steel double-wall	Steel cell	Steel cell	Steel cell	Steel cell	Steel cell	Steel cell	Steel cell / Steel double-wall	Steel cell / Steel double-wall	Steel double-wall	Steel cell / Steel double-wall	Steel double-wall	Steel cell / Steel double-wall	Earth embankment
Dam length	480 m	342 m	235 m	220 m	277 m	244 m	241 m	570 m	176 m	45 m	95 m	76 m	187 m	1074 m
Dam height	14.5 m	14.5 m	14.5 m	14.5 m	14.5 m	14.5 m	14.5 m	14.5 m	6.0 m	4.5 m	5.0 m	4.5 m	6.5 m	3.0 m

Effectiveness of Sabo Facilities

Without Sabo Facilities

Without sabo facilities, large volumes of sediment from volcanic mudflows and debris flows could surge into urban areas, potentially resulting in sediment-related disasters.



With Sabo Facilities

Sabo facilities, including sabo dams and sand pockets, help reduce damage to urban areas from sediment-related disasters caused by volcanic mudflows and debris flows.



Design Eruption: Equivalent to the 1739 eruption (Dense Rock Equivalent (DRE) magma volume: 0.7 km³)
Design Volcanic Mudflow Volume : Snowmelt-Induced Volcanic Mudflow: 32.14 million m³
 Rainfall-Induced Volcanic Mudflow: 2.97 million m³

Types of Volcanic Mudflows

Snowmelt-Induced Volcanic Mudflow

A phenomenon in which snow is melted by the heat of pyroclastic flows and other volcanic materials, causing large volumes of water and sediment to combine and flow downstream at high speed.



Damage Caused by a Snowmelt-Induced Volcanic Mudflow (Mount Tokachi, 1926)
 (Courtesy of the Kamifurano Town Local History Museum)

Rainfall-Induced Volcanic Mudflow

A phenomenon in which fresh deposits, such as volcanic ash and pyroclastic flow deposits, blanket the ground surface, making volcanic mudflows more likely to occur even during relatively light rainfall.



Damage Caused by a Rainfall-Induced Volcanic Mudflow (Mount Unzen-Fugen)
 (Courtesy of Shimabara City)



Nishitappu River No. 2 Sand Pocket



Kuma-no-Sawa River No. 2 Sabo Dam

3-2 Initiatives of the Directly Managed Tarumae Volcano Sabo Project

Steel Cell-Type Sabo Dam

The area surrounding Mount Tarumae is underlain by soft ground consisting of thick deposits of volcanic ash (Shikotsu pyroclastic flow deposits). If conventional concrete sabo dams were used, extensive ground improvement would be required to stabilize the foundation, significantly increasing construction costs.

In contrast, the steel cell-type sabo dam can be constructed even on soft ground. In addition, locally excavated soil and sediment can be effectively reused as fill material within the steel cell, helping to reduce construction costs.



Construction of a Steel Cell-Type Sabo Dam



Construction Progress of the Steel Cell-Type Sabo Dam on the Oboppu River

◆ Features of the Steel Cell Structure

[1] High Resistance to Volcanic Mudflow Impact

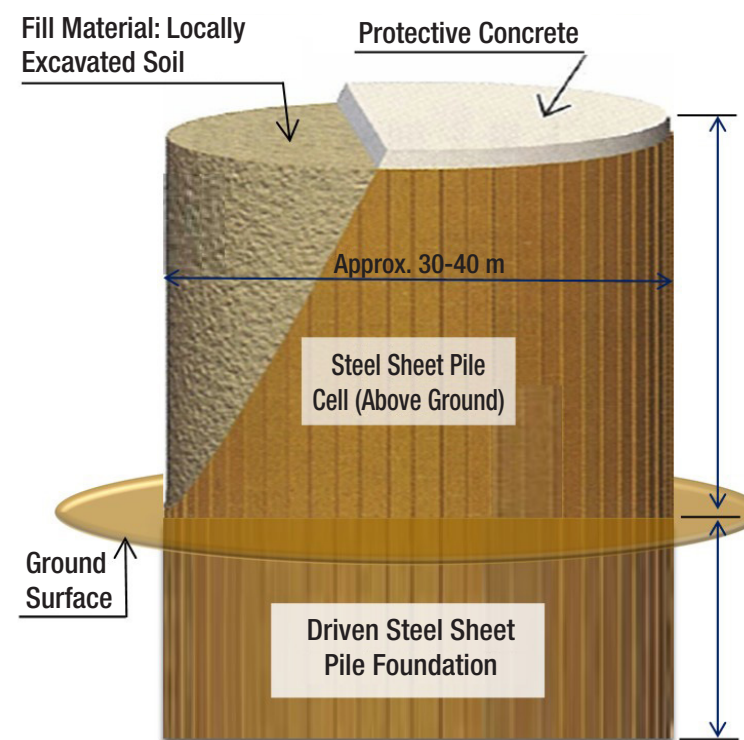
Because the steel sheet piles are interconnected to form an integral structure similar to a single plate, the dam can withstand the impact forces generated by volcanic mudflows.

[2] Construction Method Adapted to Soft Ground Conditions

Where the ground is soft, long steel sheet piles are driven down to a stable bearing layer. Steel sheet pile frames are then added above ground and integrated with the embedded foundation section to stabilize the structure.

[3] Cost-Effective Construction Method

Construction costs can be reduced by using soil excavated during the work as fill material.



Conceptual Diagram of the Steel Cell Structure

Construction Procedure for a Steel Cell-Type Sabo Dam



[1] First, long steel sheet piles are first driven into the ground until they reach the firm bearing layer (foundation ground).



[2] Shorter steel sheet piles are then added to build the steel cell.

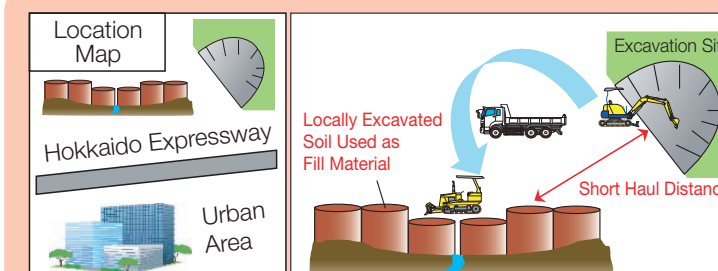
[3] Soil is placed inside the cells.



[4] The placed soil is spread evenly and compacted.



Steps [2] to [4] are repeated until the required height is reached, after which the top of the structure is covered with concrete.



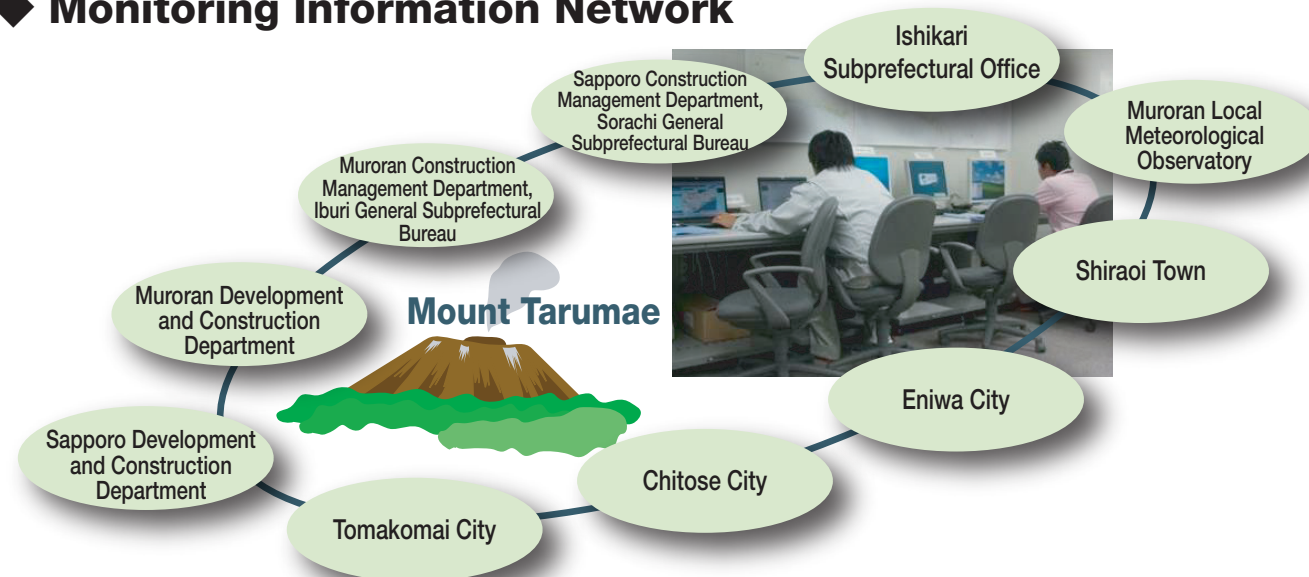
By effectively reusing locally excavated soil as fill material within the steel cells, construction costs are reduced. In addition, because there is no need to transport fill material from distant locations, the number of construction vehicles travelling through urban areas is minimized, helping to reduce the project's impact on the surrounding environment.

3-3 Initiatives of the Directly Managed Tarumae Volcano Sabo Project

Sharing Volcanic Disaster Prevention Information

At Mount Tarumae, volcanic activity and sediment-related hazards are continuously monitored and studied. Critical monitoring data and live surveillance images are transmitted to relevant organizations in real time, enabling a rapid response should an eruption become imminent. By sharing this information, the organizations work together to implement coordinated measures to reduce disaster risk.

Monitoring Information Network

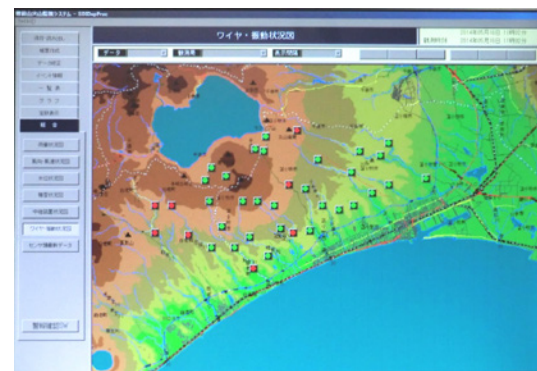


Monitoring and Observation of Mount Tarumae



Surveillance Cameras

Surveillance cameras installed at the summit and the foot of the mountain provide continuous visual monitoring of conditions at Mount Tarumae.



Mount Tarumae Monitoring System

The system displays data from rain gauges, wire sensors, and other monitoring equipment to track rainfall conditions and detect the occurrence of volcanic mudflows.

Tarumae Volcano Disaster Management Center

Located in Shiraoi Town, the Tarumae Volcano Disaster Management Center serves as the on-site disaster response headquarters when volcanic activity at Mount Tarumae intensifies. It functions as a base for collecting disaster information and coordinating emergency disaster risk reduction measures. During normal times, the facility is also used as a community center for disaster prevention education.



Exterior View of the Facility



Used as the On-Site Disaster Response Headquarters During Emergencies

Emergency Disaster Risk Reduction Plan for Volcanic Eruptions

The Emergency Disaster Risk Reduction Plan for Volcanic Eruptions is designed to enable a rapid and effective response even in the event of a sudden volcanic eruption. By implementing emergency disaster risk reduction measures, including both structural and non-structural measures, the plan makes effective use of limited resources to minimize damage as much as possible, thereby contributing to the creation of safer and more resilient communities.

Source: Based on the Guidelines for Preparing Sabo Plans for Emergency Disaster Risk Reduction in Response to Volcanic Eruptions (Sabo Department, Ministry of Land, Infrastructure, Transport and Tourism, March 2023).

Tarumae Volcano Emergency Sabo Plan for Disaster Risk Reduction

The construction of sabo facilities at Mount Tarumae requires a considerable amount of time. To prepare for the possibility of a volcanic eruption before these facilities are fully completed, the Tarumae Volcano Emergency Sabo Plan for Disaster Risk Reduction has been developed. The plan provides for emergency structural and non-structural measures that can be implemented according to the progression of volcanic activity, with the aim of reducing damage from sediment-related disasters triggered by volcanic eruptions.

The plan consists of two components: **emergency measures to be implemented during a volcanic emergency** and **preparedness measures carried out during normal times**.

Measures Implemented During Emergencies

If volcanic activity intensifies and there is a risk of damage, the following emergency measures are implemented:

- ◆ **Emergency Structural Measures** (including temporary embankments, diversion levees, excavation works, and sediment removal from existing sabo dams)
- ◆ **Emergency Non-Structural Measures** (including the emergency installation of monitoring equipment)

Preparedness Measures During Normal Times

To ensure that the emergency measures can be implemented rapidly and effectively, thereby maximizing their disaster risk reduction benefits, the following preparedness activities are carried out during normal times:

- ◆ **Disaster Response Drills**
- ◆ **Stockpiling of Emergency Equipment and Supplies**

Inspection of Sabo Facilities Using UAVs

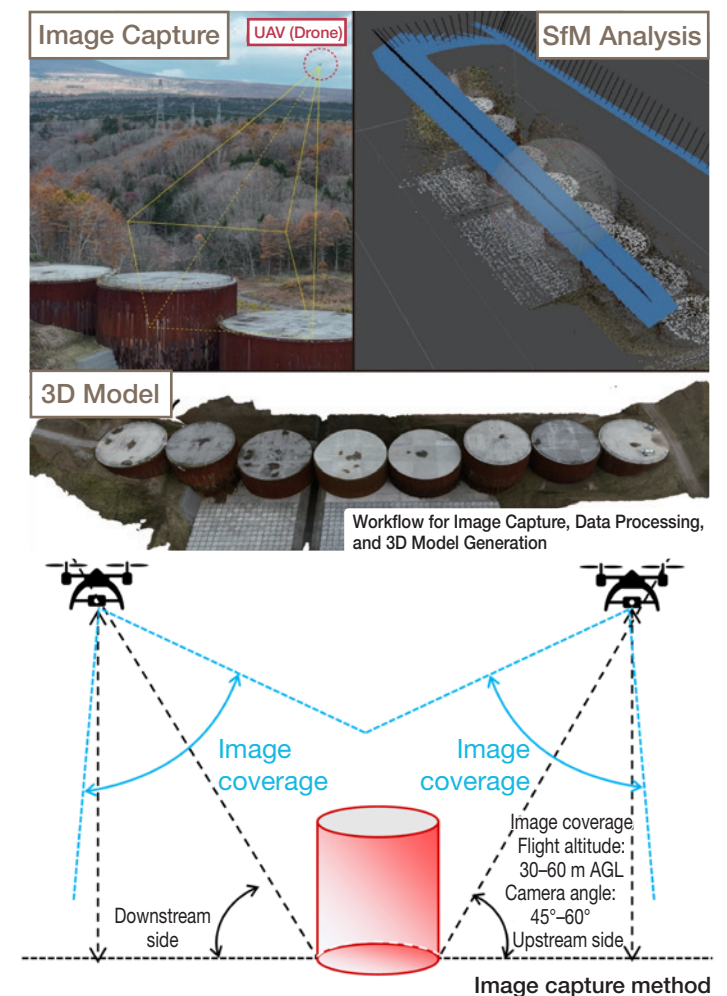
Since FY2025, inspections of sabo facilities have been carried out using a combination of autonomous UAV flights and visual inspections, improving both the efficiency and quality of facility inspections.

During UAV-based inspections, aerial images captured by the UAV are processed using Structure-from-Motion (SfM) analysis to create three-dimensional models, enabling the condition of the facilities to be assessed remotely.

Where UAV surveys are not feasible, the facilities are inspected visually on site. By combining these advanced techniques with conventional inspection methods, inspections can be carried out more effectively.



Inspection Status



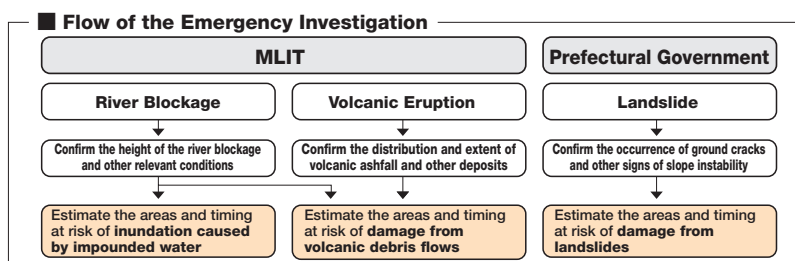
Response to Large-Scale Sediment Disasters

Emergency Investigation under the Sediment Disaster Prevention Act

When large-scale sediment disasters, such as river blockages or volcanic debris flows triggered by volcanic eruptions, are imminent, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) conducts emergency investigations of sediment disasters requiring particularly advanced technical expertise. The results, including information on the areas and timing of anticipated impacts, are provided to the relevant municipalities to support appropriate decisions on issuing evacuation orders, and disseminated to the public.

Emergency Investigation

MLIT conducts emergency investigations of sediment disasters requiring particularly advanced technical expertise, such as river blockages (natural dams) and volcanic debris flows triggered by volcanic eruptions. Emergency investigations of landslides are conducted by prefectural governments.

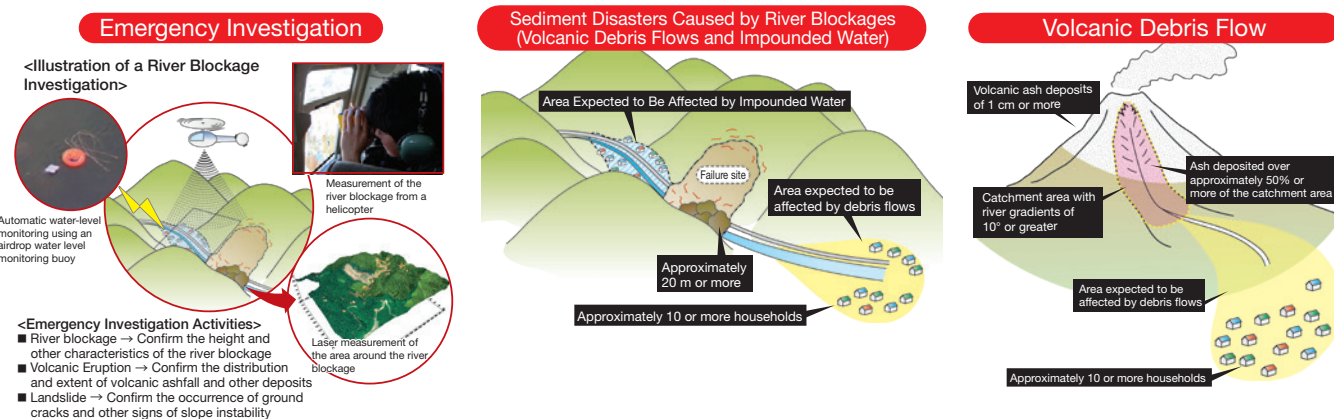


Sediment Disasters Caused by River Blockages (Volcanic Debris Flows and Impounded Water)

- The river blockage (natural dam) is approximately 20 m or more in height.
- Damage is expected to affect approximately 10 or more households.

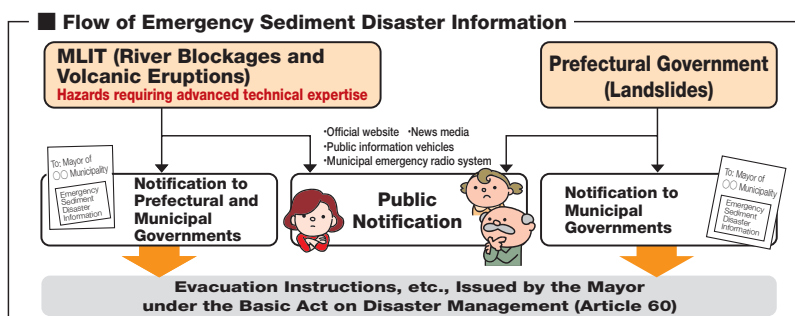
Volcanic Debris Flow

- Volcanic ashfall or other deposits of at least 1 cm have accumulated over approximately 50% or more of the catchment area where the river gradient is 10° or steeper.
- Damage is expected to affect approximately 10 or more households.



Emergency Sediment Disaster Information

Based on the results of the emergency investigation, MLIT or the relevant prefectural government provides the municipalities concerned and the public with information on the areas and timing of potential sediment disaster impacts (Emergency Sediment Disaster Information).



Collaboration with Local Communities and Technology Development

Enhancing Community Disaster Resilience

To promote understanding of disaster prevention projects and emergency response, and to strengthen community disaster resilience, disaster prevention seminars and outreach lectures are held for local residents and students. Community-based study sessions are also organized through neighborhood associations.



On-site Outreach Lecture for University Students

Coordination with Relevant Organizations

The Mount Tarumae Volcanic Disaster Management Council has been established to facilitate information gathering, communication, and coordination in the event of a disaster involving Mount Tarumae. Through the council, comprehensive coordination is carried out in cooperation with the relevant organizations. Tabletop exercises simulating an eruption of Mount Tarumae are also conducted jointly with these organizations.



Tabletop Exercise

Tarumae Volcano Emergency Sabo Plan for Disaster Risk Reduction Mount Tarumae Volcanic Disaster Risk Reduction Action Working Group

The Mount Tarumae Volcanic Disaster Risk Reduction Action Working Group works to establish and maintain a continuous disaster management framework to ensure the effective implementation of emergency volcano disaster risk reduction measures in the event of an eruption. To this end, the Working Group conducts regular information sharing and coordination with the relevant organizations during normal times.



Joint Field Survey by the Mount Tarumae Volcanic Disaster Management Council

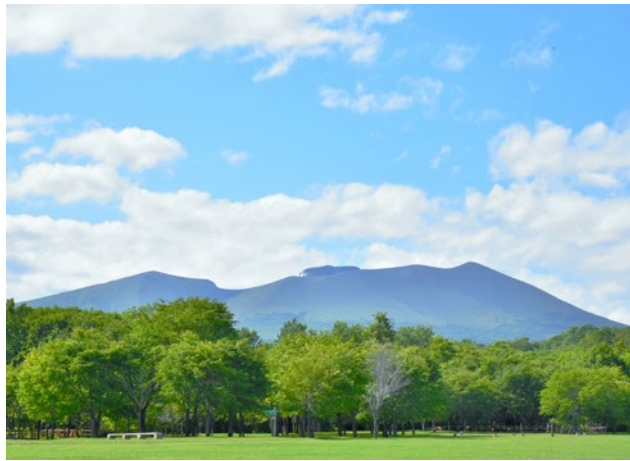
Technology Development

Technology development is underway to establish investigation methods using small unmanned helicopters (UAVs) that enable rapid on-site surveys following a volcanic eruption. These methods are used to assess conditions around the crater and monitor volcanic activity, providing information that supports the Mount Tarumae Emergency Volcano Sabo Plan and other disaster prevention measures.



Survey Using a Small Unmanned Helicopter (UAV)

* In addition to issuing Emergency Sediment Disaster Information, MLIT and the prefectural governments provide, as appropriate, information obtained through emergency investigations to the relevant local governments. MLIT provides such information to the relevant prefectural and municipal governments, while prefectural governments provide it to the relevant municipal governments on an ongoing basis.



Building Tomorrow with the Wisdom of the North

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