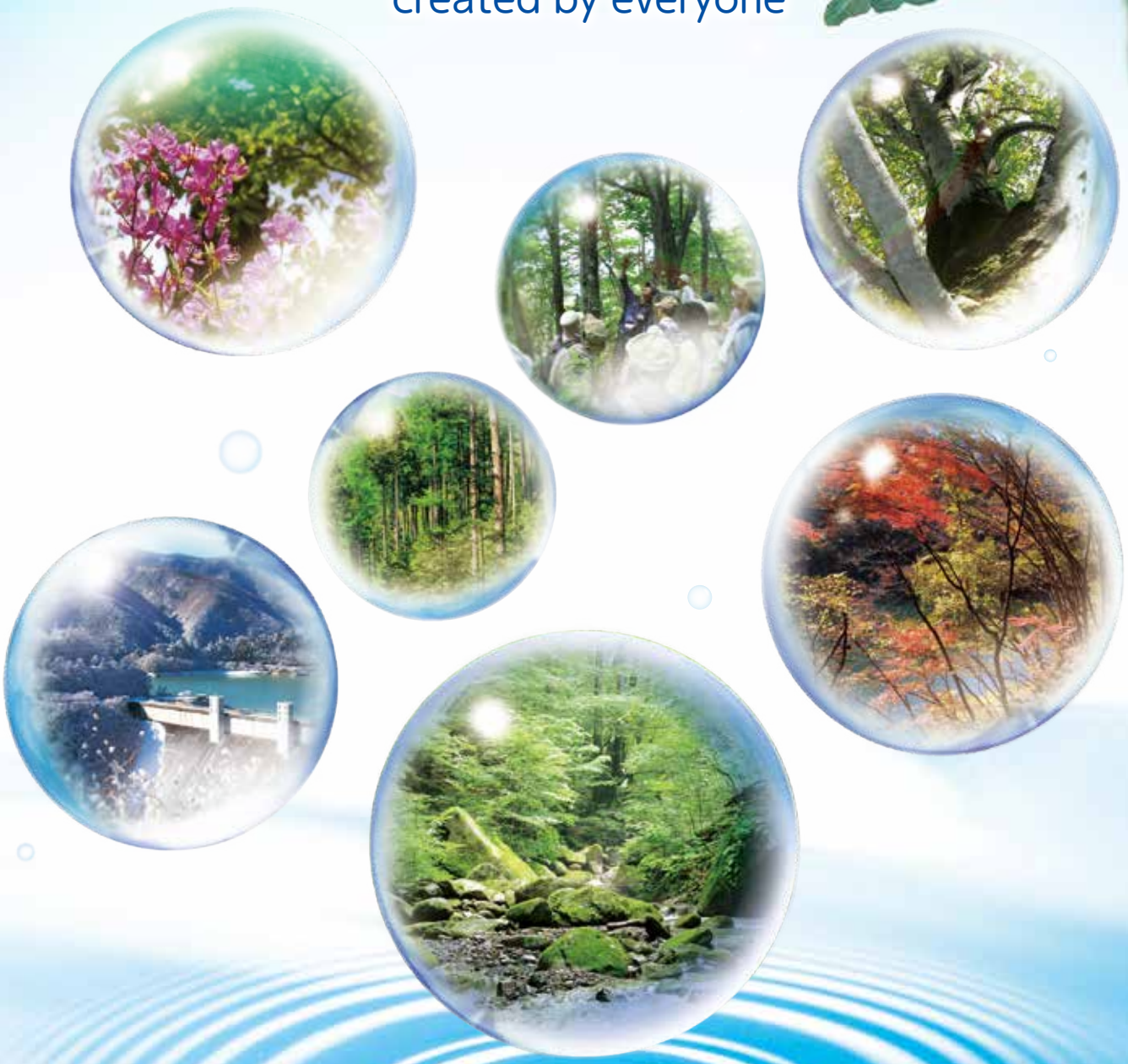
The Water Conservation Forest

Lush Water Resources Forests
created by everyone



Bureau of Waterworks
Tokyo Metropolitan Government

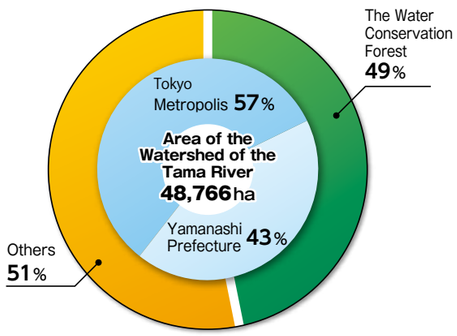
1. Spread of The Water Conservation Forest

The Tama River, Tokyo's own water resource, rises in Yamanashi Prefecture, runs through the Metropolis and flows into Tokyo Bay.

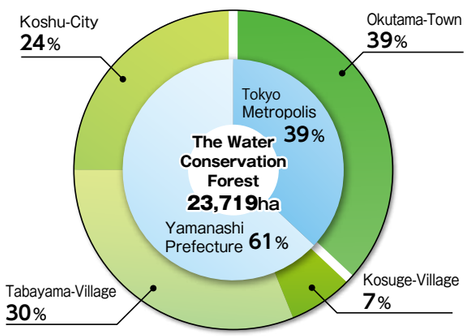
In order to ensure the stable streamflow of the Tama River and to conserve Ogouchi Reservoir (Lake Okutama), the Bureau of Waterworks has been managing forests spreading in the watershed of the Tama River on the upstream of Hamura Intake Weir as water conservation forests since 1901 (Meiji 34).

The Water Conservation Forest stretches over Okutama-Town in Tokyo Metropolis, Kosuge-Village and Tabayama-Village and Koshu-City in Yamanashi Prefecture, and their area extends 30.9 kilometers from the east to the west and 19.5 kilometers from the north to the south with a total area of approximately 24,000ha.

It accounts for about 50% of the total forest area spreading in the watershed of the Tama River, and it is the largest forest area managed by a single water utility in Japan.

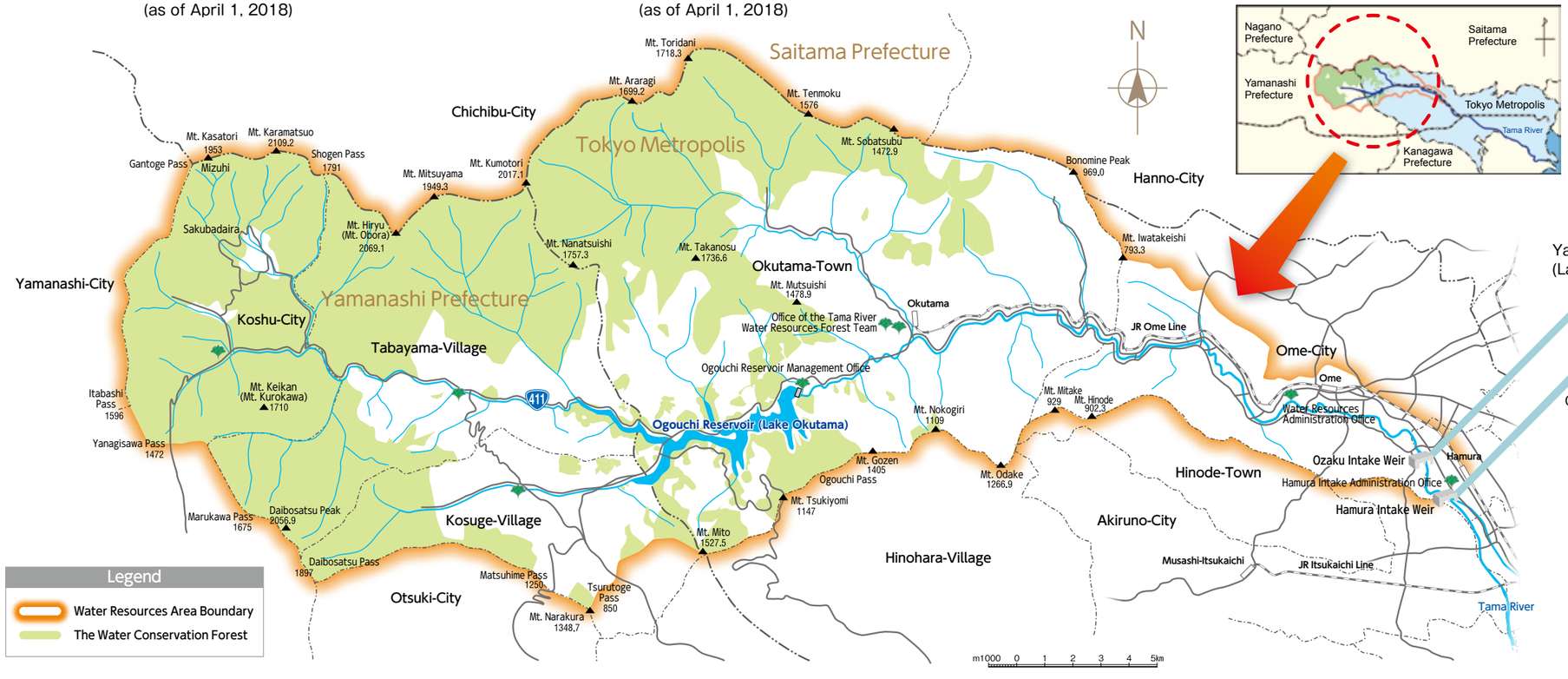


Area of The Water Conservation Forest in the Watershed of the Tama River (as of April 1, 2018)



Area of The Water Conservation Forest by Location (as of April 1, 2018)

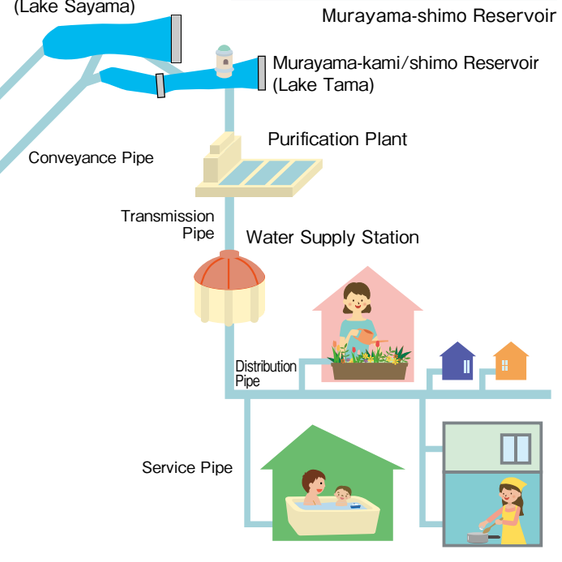
Ogouchi Reservoir and The Water Conservation Forest



Map of the Watershed of the Tama River (as of April 1, 2018)

Route of Tap Water to Customers

Murayama-shimo Reservoir



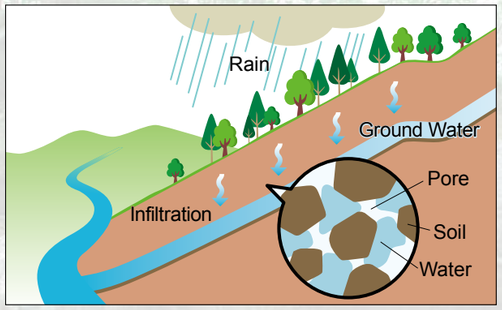
2. The Water Conservation Forest effect

Water Conservation Function
—to store water—

In healthy forests, high water-retaining soil that contains numberless small spaces like a sponge is being generated due to activities of soil microbes that decompose fallen leaves and others.

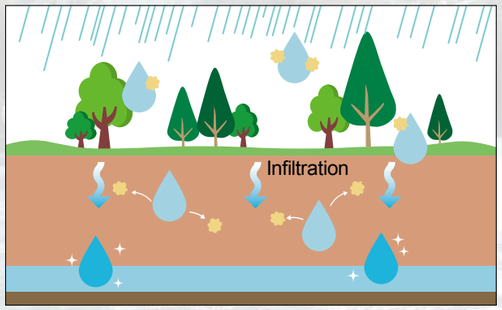
Rainfall water in the forests infiltrates deep into the earth through this fluffy soil and stored, then turns into ground water and flows slowly to the river.

By such function, forests alleviate floods and droughts by adjusting the amount of water flowing through the river, and thus, they are also called “green dams”.



Purification of Water Quality Function
—to make water clean—

In healthy forests where the good soil is formed, while the rain water infiltrates slowly into the ground, dirty objects such as dust stuck in the air are removed and the water becomes clean.

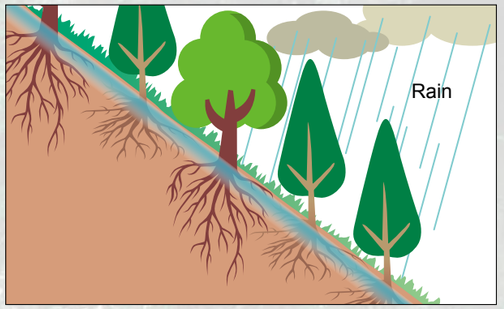


Prevention of Soil Erosion Function
—to prevent soil erosion—

In healthy forests, branches and leaves of trees, undergrowth and fallen leaves play the role of a cushion to protect surface soil from being directly hit by rain.

Rain water infiltrates into the fluffy soil quickly so that the soil prevents itself from running off with rain water.

In addition, as the roots of trees hold the soil firmly, sediment disaster becomes less likely to occur.

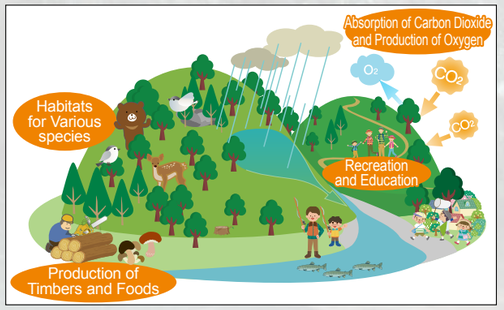


Other Functions

Trees in the forests absorb carbon dioxide and produce oxygen by photosynthesis and thus, play the great role in mitigating global warming.

Forests provide habitats for various species and contribute to conservation of biodiversity.

They also have the multifunctional role such as welfare and recreation function as resorts, or production of timbers and foods.



We are committed to manage the water conservation forest appropriately and fully functionalize above mentioned functions in order to stably provide the residents in Tokyo with clean and safe water from the watershed of the Tama River.

3. Management of The Water Conservation Forest

The Bureau of Waterworks is currently managing the water conservation forest appropriately based on the 11th Water Conservation Forest Management Plan (Period of the Plan: FY2016–FY2025) in order to implement time-consuming forest growing works systematically.

The 11th Water Conservation Forest Management Plan

Objectives

To ensure the stable streamflow of the Tama River and to conserve Ogouchi Reservoir through growing and managing forests comprehensively in the watershed of the Tama River.

To pass on the rich natural environment to the next generations and to build public trust in Tokyo Waterworks through popularly known water conservation forests.

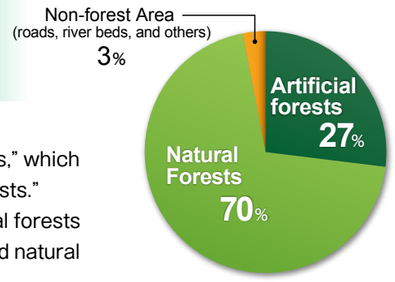
Basic Policy

(1) To promote forest management to further enhance the functions of forests such as water conservation, prevention of soil erosion, and purification of water quality, etc. in the watershed of the Tama River.

(2) To promote understanding on the importance of water resources area's conservation and waterworks business through dissemination of information about the water conservation forest and communication with many people.

(3) To contribute the environmental conservation such as mitigation of global warming through proper management of the water conservation forest.

Current Situation of The Water Conservation Forest



▲ Area Ratio

The water conservation forest is consisting of "artificial forests," which are grown from seedlings planted by humans, and "natural forests."

The area of artificial forests is approx. 6,600ha and the natural forests is approx. 16,500ha. Among the forest in total, artificial forests and natural forests account for 27% and 70% respectively.

Natural Forests

Natural Forests are mainly consisting of broadleaf trees such as beech, Japanese oak and Japanese maples.

Artificial forests

As the water conservation forest is located mostly at high altitude areas, most of artificial forests are consisting of larches and Japanese cypresses, both of which are suitable for cold environment.

Conservation of the forest

As forest conservation projects, the Bureau of Waterworks promotes maintenance of forests in accordance with the situation of natural forests and artificial forests, measures against damages by wild animals, disease and harmful insects, maintenance of forest facilities such as hiking trails in order to conserve the healthy water conservation forest.

1. Proper Management of Natural Forests

In principle, we leave natural forests to natural succession for stabilizing forests, aiming for the most stable forests for their areas (climax forests) in the long term.

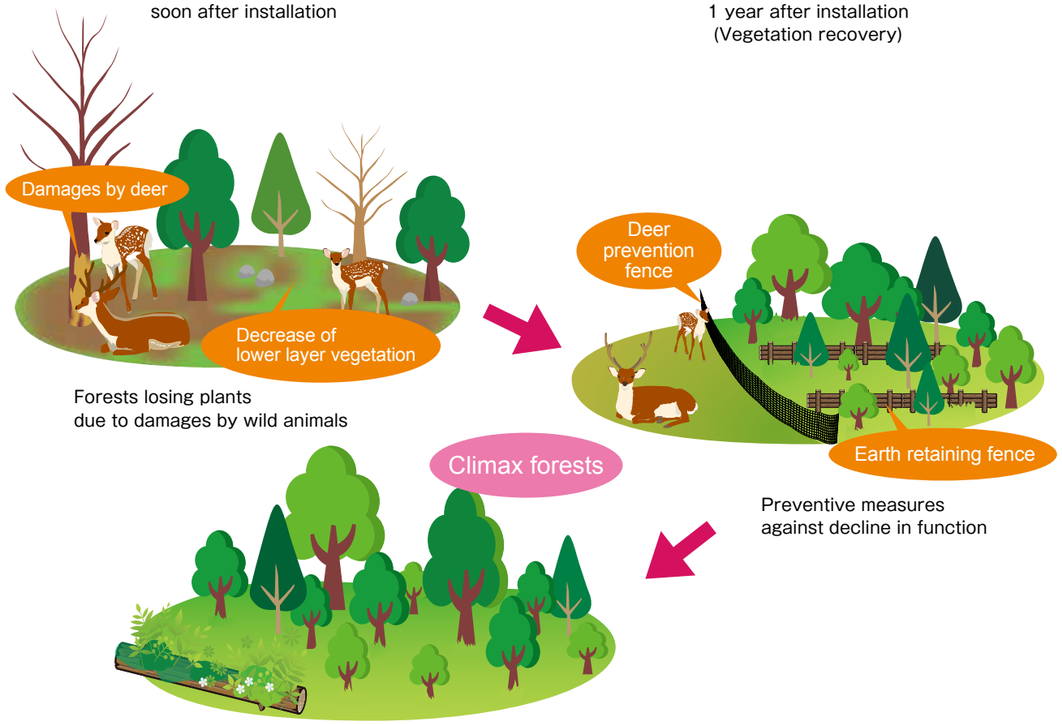
For natural forests which trees and undergrowth were damaged and degraded by deer and have risks such as soil erosion, we support transition to climax forests by artificial methods proactively.

Prevention of decline in forests' function

Implementation of thinning and installing of earth retaining fence and deer prevention fence

soon after installation

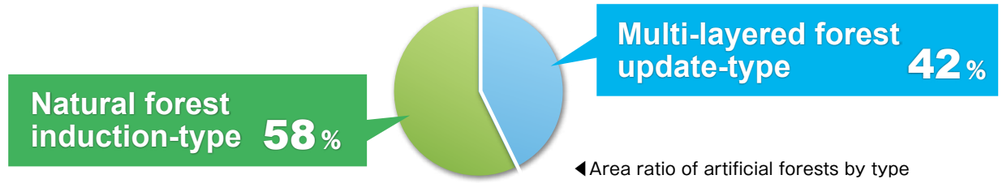
1 year after installation
(Vegetation recovery)



2. Managements for healthy artificial forests

Artificial forests are being managed by dividing them into “multi-layered forest update-type” and “natural forest induction-type.”

The area of the former is approx. 2,800ha and that of the latter is approx. 3,800ha, accounting for 42% and 58% respectively out of total artificial forests.



◀Area ratio of artificial forests by type

1) Multi-layered forest update-type

Artificial forests of which the planted trees grow well and which are located near forest roads and suitable for carrying out logged trees are being managed as regenerating forests in which new seedlings are planted after cutting trees.

In the water conservation forest when cutting trees for regeneration, we leave a certain amount of healthy and well grown trees with large diameter without cutting and plant seedlings for the next generation in vacant spaces. By managing forests as “multi-layered forests” consisting of two generation trees and keeping them in such a situation the trees are always growing, we can prevent the forests from declining their functions.

In addition, in order to conserve soil in the forests, naturally grown broadleaf trees in the forests are also protected and grown.

Multi-layered forests where coniferous trees and broadleaf trees are moderately mixed

Through regeneration works, forests maintain their condition to absorb carbon dioxide actively, which contributes to the mitigation of global warming.

multi-layered forest update-type

Management method

Trees of former generations

Forest before regeneration cutting

Plant seedlings of the next generation and promote multi-layerization of the forests

Regenerating works — 2 to 3 years

Regeneration cutting
To make spaces for planting new seedlings, leave some good and healthy trees only and cut the rest of others.

Clearing ground
Before planting seedlings, clean up branches and weeds in the forest.

Planting
Plant seedlings of the next generation.

Maintenance works — 7 years (7 times) / Around 40 years (thinning: 6 to 8 times, pruning: 3 times)

Weeding
Remove weeds and shrubs which inhibit growth of planted seedlings.

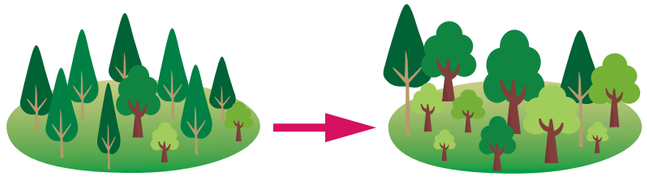
Thinning
Thin out trees to adjust the number of planted trees per unit and stimulate the growth of remaining trees.

Pruning
Cut unnecessary branches to brighten the forest and promote the growth of plants.

2) Natural forest induction-type

Some of the artificial forests are located in bad terrain and geological conditions. It is hard to carry out regenerating works because of collapse risks or carrying out logged trees from those forests. We induce them to become similar to natural forests consisting of diverse tree ages, heights and species in order to fully demonstrate the multiple functions of the forest.

By allowing sun to shine into the forest through thinning and pruning repeatedly, we promote broadleaf trees to grow naturally in empty spaces and maintain them with coniferous trees.



Forests similar to natural forests consisting of diverse tree ages, heights and species

Management method

Growing broadleaf trees with planted trees

Maintenance works

Thinning

Pruning

Working status

Introducing broadleaf trees

Maintenance works give the remaining trees and forest floors more space and light, and so broadleaf trees grow up from the space.

natural forest induction-type

3. Measures against Damages by wild Animals, Disease and Harmful Insects

Damages to the forests by wild animals have been getting serious since around 2003. Therefore, various measures have been taken in accordance with the extent of the damages.

Measures against damages by deer

Damages by deer (feeding damages) are a series of damages such as tree withering by bark eating or whole undergrowth consumption which eventually leads to soil erosion. We are taking the following three measures against these issues:

1) **Deer prevention fence:** Fences are installed around the areas where seedlings are planted in order to prevent deer from approaching.
2) **Nets for individual trees:** Well-grown tree trunks are covered by nets individually in order not to let deer bite or scratch directly.
3) **Managed capture:** We conduct managed capture of deer in cooperation with local authorities, hunting associations/clubs and others in order to adjust the population of excessively increased deer.


Feeding damages by deer


Nets for individual trees and deer prevention fence

Measures against damages by bears

Damages by bears means the damages that planted trees are barked by bears. In order to prevent the occurrence of barking, we are taking measures such as branch collection (piling up pruned branches and other materials around the roots of planted trees) and winding protective materials around planted trees.


Damages of barking


Branch collection


Winding protective materials

Measures against disease and harmful insects damages

We are promoting propagation of wild birds which prey insects by putting up nest boxes in the forests in order to prevent outbreak of diseases transmitted by insects in the forests or mass generation of specific insects.


Wild bird nesting in a nest box

4. Management of forest facilities

Maintenance of paths

Paths are essential for forest surveys, conservation works, and emergency such as forest fire. We are maintaining them for safe passage.


Path

Maintenance of fire line

Belt-shaped fire lines are prepared at major mountain ridges and maintained through regular mowing, etc. in order to prevent expansion of fire or catching fire from surrounding mountains in case of fire.


Fire line

Recovery from small scale collapsed area

In case that small scale collapse occurs due to natural disasters such as localized torrential rain, we prevent expansion of collapse by constructing log fences utilizing thinned wood, etc. of that area.


Before construction


Just after construction

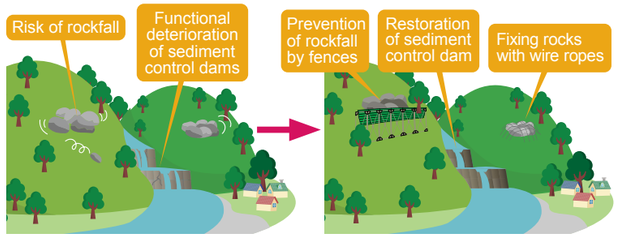

1 year after construction

Prevention of and recovery after mountain disasters

For the purpose of improving the function of water conservation and preventing soil erosion into Ogouchi Reservoir, we will develop structures such as rockfall protection fences and sediment control dam to prevent natural disasters and recover collapsed areas.

When constructing structures, we will proactively apply the construction methods considering biodiversity and scenery along with effective use of thinned wood from forest conservation projects.

1. Erosion prevention project




Prevention of rockfall by erosion prevention work

2. Erosion recovery project

recovery from collapses


Before construction


Just after construction


10 years after construction

Forest management infrastructure

In infrastructure development projects, “forest roads” which is the foundation of effective forest management are being developed and managed.

In addition, in order to effectively manage the water conservation forest with a lot of steep slopes, we installed and manage “single-track railways” for the purpose of shortening the transit time in the forest and reducing the burden on workers.


Single-track railway (so-called “Mori-rail”)

Establishment of forest roads


Before construction


After construction

4. Communication with the Society through Water Resources Area

We will try to communicate with various actors more actively through introduction and utilization of water resources area, disseminate information on the water conservation forest realize friendly water conservation forests and promote understanding to potable delicious water supply.

Citizens of Tokyo

Communication with citizens of Tokyo in the water resources area

"The Water Conservation Forest Hiking Tour" is held at the hiking trail "Suigenchi-fureai-no-michi," developed within the forest.

In this event, people actually walk in the forest with guidance of our staff to deepen under standing of relation between forests and water as well as the significance of the forest.

Besides, we raise a fund from public for the forest conservation by "Tokyo Waterworks - The Water Conservation Forest Fund".

The Water Conservation Forest Hiking Tour

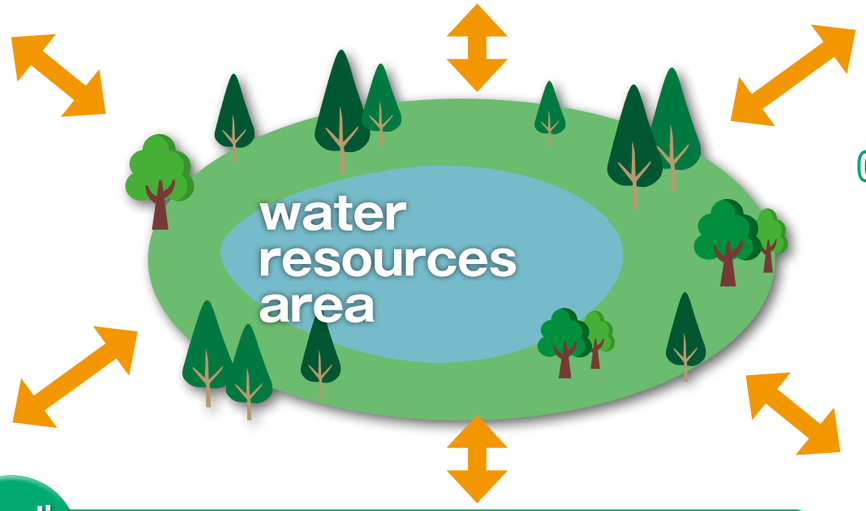
Enterprises

Forest conservation projects with enterprises

We conduct the "Tokyo Waterworks - Corporate Forest (Naming Rights)" that sets naming rights areas in part of the water conservation forest and provide some of forest conservation activities.

In addition, we also conduct the "Corporate Sponsorship Scheme" to promote forest management with enterprises.

The Forest conservation activity "Planting"



Universities

Field research at the water conservation forest

We are conducting field research at the water conservation forest for "visualization" of multiple functions of the forest in cooperation with universities and other research institutions. Results of research will be also utilized for better management of the forest in the future.

And we conduct forest conservation activities for university students to promote understanding of water resources area's conservation.

Field researches by university students

Forest conservation activities by university students

Local communities

Promotion of the water resources area in cooperation with local communities

Cooperation with local communities is essential for management of the water conservation forest. Therefore, we are strengthening cooperative relations with local communities as well as promoting the forest through participating in events organized by local authorities, etc.

Volunteers

Forest conservation activities with volunteers

(The Tama River Water Resources Forest Team)

In order to regenerate unkempt private artificial forests located in the watershed of the Tama River into lush forests, we are conducting forest conservation activities in cooperation with volunteers.

Domestic and abroad

Promotion of the water conservation forest for domestic and abroad

In order for those unfamiliar with water resources area and forests to deepen understanding of water conservation forests and get familiar with them, we are making our efforts in promoting the water conservation forest such as sending e-mail newsletter, organizing promotion events and distribution of original goods made of thinned wood.

Moreover, taking opportunities such as international conferences and events held in Tokyo, we widely disseminate information on the efforts in the forest to domestic and foreign visitors to Tokyo.

Acceptance of visitors from abroad

Goods made of thinned wood

Educational institutions

Support to environmental education

To support education on such themes as water resources area and environment in elementary schools, we developed teaching support materials for 4th graders in elementary schools and distributed to the schools who are requesting them.

Staff of the Bureau of Waterworks also visits schools by themselves to deliver lecture to explain about the roles and importance of the water conservation forest.

In addition, we also implement forest conservation activities in water resources area for junior and senior high school students.

Delivery of lecture

5. Regeneration of Private Forests

In the watershed of the Tama River, there are private forests of which the area is almost equal to that of the water conservation forest.

Some of unkempt private forests are increasing due to the decline of the forestry for a long time and other causes. It may lead to soil erosion, thus may have a negative impact to Ogouchi Reservoir.

Therefore, the Bureau of Waterworks is conducting purchase and rearranges those private forests in order to regenerate them into lush forests through forest conservation activities by volunteers.

Purchase of private forests

In order to conserve the water resources area in a good condition in the future, the Bureau of Waterworks purchases private forests of which the owners are willing to sell due to the lack of capacity to manage. And we are going to conserve them as the water conservation forest to enhance their multiple functions.

Particularly in the areas of steep slopes facing major inflowing rivers and around Ogouchi Reservoir, there is a risk of soil erosion into the reservoir.

Therefore, we actively purchase and restore those areas as priority purchase area, around 2,000ha.

Just after purchase

After making a path and thinning

The Tama River Water Resources Forests Team

The Tama River Water Resources Forest Team was established in July 2002 to regenerate unkempt private artificial forests in the watershed of the Tama River into lush forests by volunteers.

The team is performing forest conservation projects including making paths, weeding, thinning and pruning in the forests of which the owners agree to let the team work.

In performing activities, experienced instructors give careful guidance to volunteers in accordance with their experience level and skills.

Pruning

Making paths

6. Implementation Plan of the "Water Resources Forests created by everyone"

We have developed Implementation Plan of the "Water Resources Forests created by everyone". The plan describes specific actions for "Active purchase of private forests" and "Forest conservation with various actors". These two projects should be conducted rapidly and intensively in the 11th Water Conservation Forest Management Plan.

○Plan period ; from April 2017 to March 2020, 4 years

Management of private forests in Tama river watershed area

Object region	Specific Actions
Within private forests priority purchase area	○Active purchase of private forests ○Measures against private forests that is in difficult situation to be purchased
Outside of priority purchase area	○Purchase of private forests from public offering (continuation)
Whole area	○Forest conservation activities by the Tama River Water Resources Forest Team (continuation) ○Regeneration of purchased forests

Forest conservation with various cooperators

Cooperators	Specific Actions
With Tokyo residents	○Tokyo residents supporting system ○Tokyo Waterworks - The Water Conservation Forest Fund ○The Water Conservation Forest Hiking Tour ○The Tama River Water Resources Forest Team
With enterprises	○Tokyo Waterworks - Corporate Forest (Naming Rights) ○Corporate Sponsorship Scheme
With universities	○Collaboration research with universities ○Forest conservation activities by students
With local governments and pertinent organizations	○Holding of collaborative events with local governments ○Creating of opportunities to contact with local cultures ○PR of the attractive water resources area ○Cooperating with NPO and other organizations

7. History of The Water Conservation Forest

Japanese Calendar	Western Calendar	Event	Owner	Remarks
Edo Era	–1867	Almost all forests in the watershed of the Tama River were owned by Tokugawa Shogunate, while local residents had rights of common[1] and were allowed to harvest forest products necessary for their living. In addition, "Otomeyama," directly controlled by Tokugawa Shogunate, were designated in various places mainly at Mt. Osutaka and soundly maintained.	Tokugawa Shogunate	Jouou 3 (1654) Tamagawa Josui was completed.
Meiji 1–30	1868 –1897	Since forests in the watershed of the Tama River were incorporated into public forests by "Public/private Division of Forests and Plains," and then into Goryorin[2], then the rights of common became restricted and thus, forests at places such as the most upstream of the Tama River were getting degraded.	Forest Bureau, Ministry of Agriculture & Commerce, etc.	Meiji 11 (1878) Tokyo Prefectural Officer Hiroyuki Yamashiro confirmed the headwaters of the Tama River (Mizuhi).
Meiji 34	1901	Concerned about degradation of the water resources area, Tokyo Prefectural Government received the transfer of approximately 8,140ha of Goryorin in Tabayama and Kosuge Villages in Yamanashi Prefecture and approx. 320ha of Goryorin at the watershed of the Nippara River in Tokyo Prefecture and started managing them by itself. At the same time, 5,100ha of public/private forests at the Nippara River basin were incorporated into protected forests.	Tokyo Prefectural Government	Meiji 26 (1893) Santama Region was incorporated into Tokyo Prefecture from Kanagawa Prefecture.
Meiji 41–42	1908 –1909	Asserting that restoration of degraded the water conservation forest should be promoted by Tokyo City, which was responsible for water supply to the citizens rehabilitated, Yukio Ozaki, Mayor of Tokyo, conducted a research and formulated a draft water resources area management plan.		Meiji 30 (1897) Forest Act was promulgated.
Meiji 43	1910	The above mentioned plan was approved by Tokyo Municipal Council and Water Conservation Forest Office was opened in October. Besides, Tokyo Municipal Government received the transfer of approx. 700ha of Goryorin in Tokyo Prefecture and started active management of the water conservation forest.	Tokyo Municipal Government	
Meiji 45	1912	Tokyo Municipal Government received the transfer of approx. 5,610ha of Prefectural Onshirin [3] at Hagiharayama: current Koshu City in Yamanashi Prefecture and approx. 8,460ha of prefectural forests of Tokyo.		
Taisho 2–15	1913 –1926	Tokyo Municipal Government purchased approx. 610ha of privates forests in Yamanashi and Tokyo Prefectures and the total area of the forests under its management reached approx. 16,250ha including 870ha of profit sharing forests[4] with public/private forests in Tokyo Prefecture.		
Showa 8	1933	Tokyo Municipal Government purchased 4,780ha of private forests at the watershed of the Nippara River.		
Showa 25	1950	Tokyo Metropolitan Government purchased approx. 190ha of forests including approx. 90ha of profit sharing forests and approx. 100ha of village-owned forests in old Kori Village: current Okutama Town.	Showa 18 (1943) Tokyo Metropolitan Government	Showa 32 (1957) National Parks Act was abolished and Natural Parks Act was enacted.
Showa 42	1967	560ha of forests around the dam purchased at the time of construction of Ogouchi Dam was transferred from Ogouchi Reservoir Administration Office and the water conservation forest became almost similar to their present form. After several transactions such as sales and exchanges, the total management area reached approx. 21,634ha.		Showa 32 (1957) Ogouchi Dam was completed.
Heisei 2	1990	For unified management of water resource facilities in the Tama River basin, Water Conservation Forest Office was reorganized to Water Resources Administration Office, and the water conservation forest was to be managed as one of the water resource facilities along with Murayama/Yamaguchi Reservoirs and Ogouchi Reservoir.		
Heisei 13	2001	Bureau of Waterworks celebrated its 100th anniversary of the start of the water conservation forest management.		
Heisei 14	2002	The Tama River Water Resources Forest Team was established.		
Heisei 25–30	2013 –2018	Tokyo Metropolitan Government purchased approx. 2,089ha in total of 55 private forests under the Private Forests Purchase Project and the total management area reached approx. 23,719ha as of April 1, 2018.		

Footnote

(1) Right of Common: Right of farmers to communally collect and use living material such as wood for fuel

(2) Goryorin: Forest managed by the Imperial Household

(3) Prefectural Onshirin: Forest granted to a prefecture by the Imperial Household

(4) Profit Sharing Forest (Forest under Profit Sharing Contract): Forest privately owned or owned by a village or town, on which a superficies were established and which was managed by Bureau of Waterworks

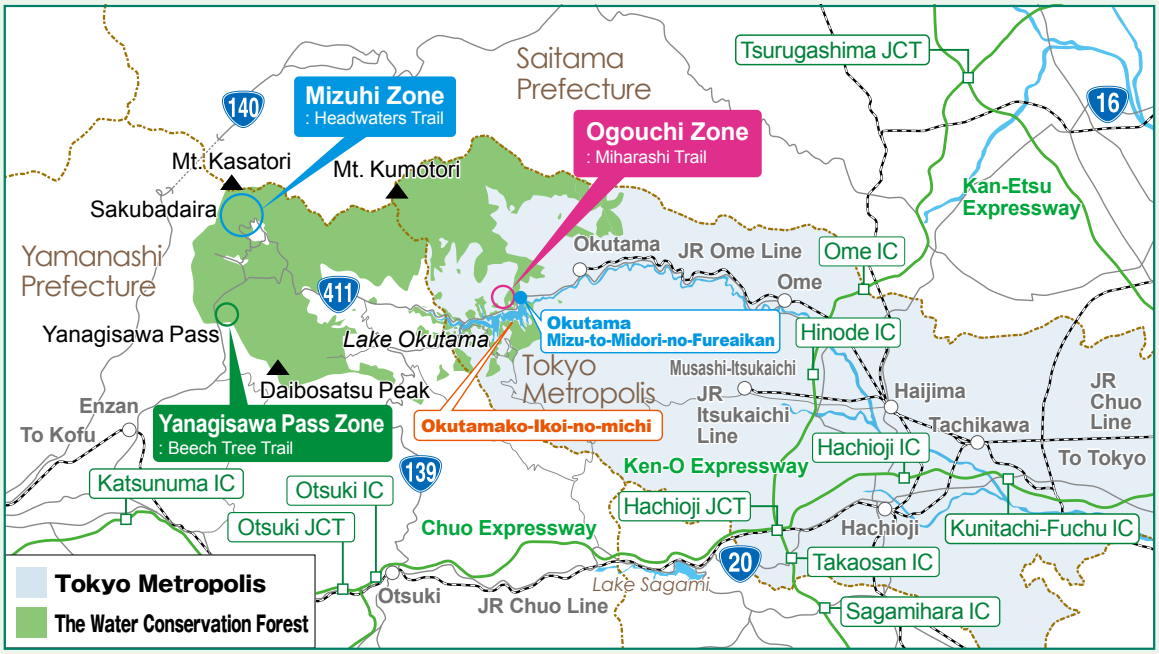
The changing landscape of Mt. Kasatori

Late Taisho Era

Approx. 30 years after planting

Present (September 2015)

Please come and visit the water resources area of the Tama River.



Suigenchi-fureai-no-michi
(Water resources area Hiking Trail)

3 courses of the hiking trail, called "Suigenchi-fureai-no-michi," were prepared so that many people can become familiar with the water conservation forest.

By visiting "Mizuhi Zone," which leads to the headwaters of the Tama River, "Yanagisawa Pass Zone," where there are beautiful beech and Japanese maple trees, and "Ogouchi Zone," where you can enjoy the view of Lake Okutama, you will be able to get familiar with nature as well as understand the role and importance of forests that nurture water.

Please come and walk in the forests and commune with rich nature of the forest that nurtures water.

Yanagisawa Pass Zone: Beech Tree Trail

Mizuhi Zone: Headwaters Trail

Okutama Mizu-to-Midori-no-Fureaikan
(Water and Green Museum)

You can learn about Okutama's nature and the relationship between water and forests through experiencing them. (closed on Wednesdays)

[Contact Information]

5 Hara, Okutama-Town,
Nishitama-gun, Tokyo

Tel 0428-86-2731

Okutamako-Ikoi-no-michi
(Lake Okutama Valley Trail)

This is the trail with the total length of 12 kilometers from Ogouchi Dam to the natural park facilities "Yama-no-furusato-mura (Mountain hometown village)." You can learn and feel the role of the water conservation forest and Ogouchi Reservoir while enjoying the view of Lake Okutama. (Opening period: from the 3rd week of April to November)

[Contact Information]

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Ogouchi Reservoir
Management Office

Tel 0428-86-2211

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