



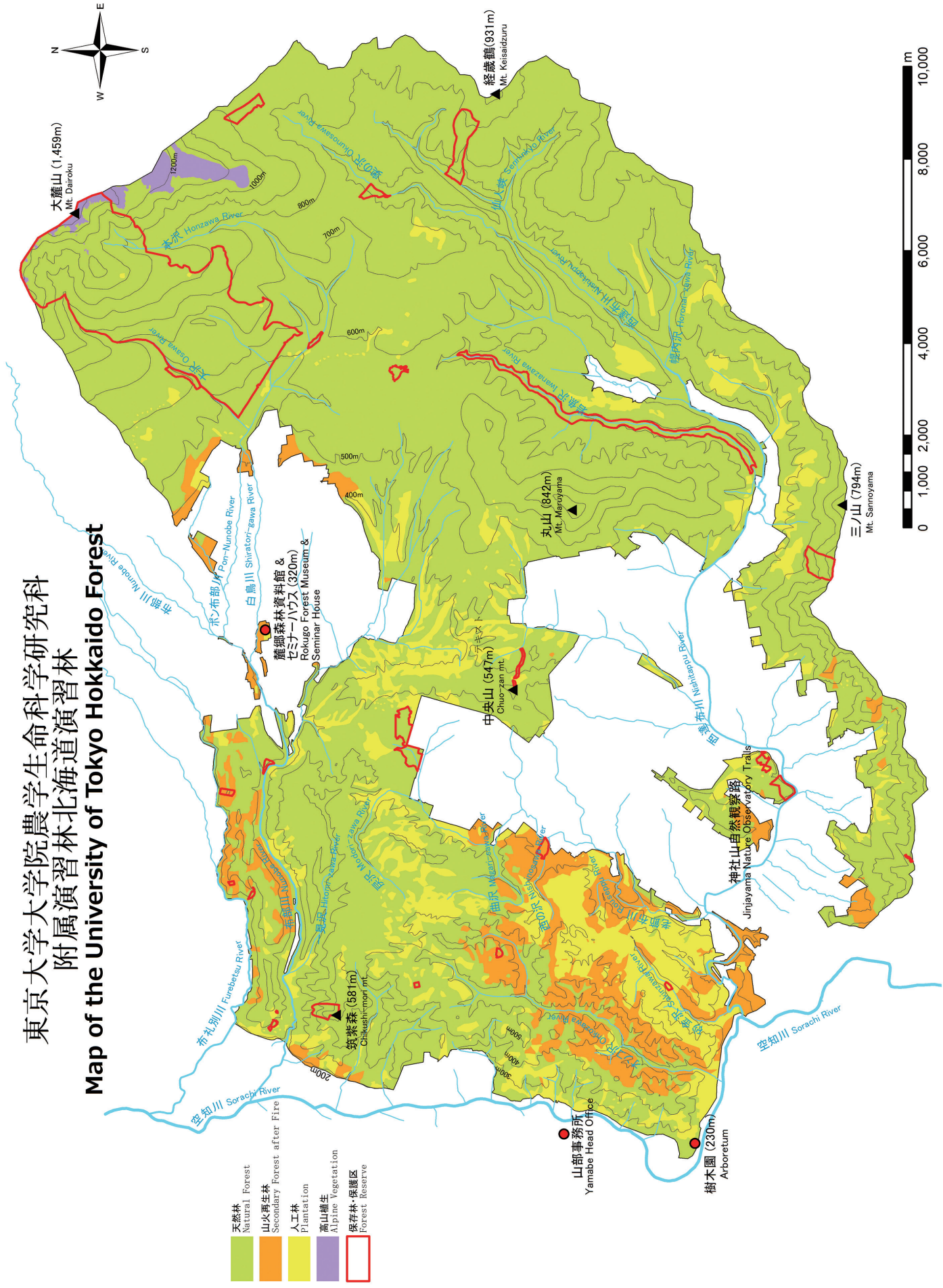
The University of Tokyo Hokkaido Forest

2023

Graduate School of Agricultural and Life Sciences, The University of Tokyo



東京大学大学院農学生命科学研究科 附属演習林北海道演習林 Map of the University of Tokyo Hokkaido Forest



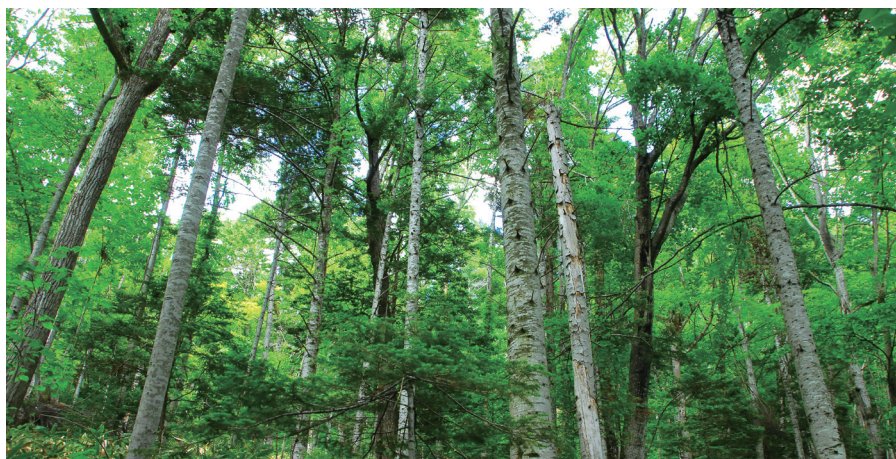
The University of Tokyo Hokkaido Forest

1. History and overview

The University of Tokyo Hokkaido Forest (UTHF) was established in 1899 when 23,597 ha of national forest was transferred from the Ministry of Home Affairs for northern forestry and forestry research and education, and the site was established as a field test site for the College of Agriculture, Tokyo Imperial University. After additional forest transfers and acquisitions, conversion to cultivated land, and land sales, the forest area stood at 22,717 ha in April 2023. A business-scale experiment of the stand-based silvicultural management system (“Rinbun Segyo-ho” in Japanese) has been continuously conducted for more than 60 years, starting in 1958. The 14th plan for education and research (2021–2030) is aimed at contributing to natural forest management both in Japan and around the world, and includes a diverse range of educational and research activities.

2. Location and environmental characteristics

UTHF is located in the center of Hokkaido Island, situated southwest of the Tokachidake mountain range in the upstreams of the Sorachi river within the Ishikari river system (43°10′–21′ N, 142°23′–41′ E). The area comprises two main river basins, Nunobe river in the northern half and Nishitappu river in the southern half, and the basin boundary runs east to west through its center. Elevation ranges from 190 m at the lowest point of the Nunobe area at the north-west end to 1,459 m at the highest point of Mt. Dairoku at the north-east end. The terrain has a mostly gentle slope, but some steep slopes have appeared as the result of erosional dissection. The geological features are the result of eruptions from the Daisetsu mountain system during the Quaternary Period, which covered the area from Mt. Dairoku in the north-east to the central part of UTHF. The left part of UTHF is covered by metamorphic rocks from the Hidaka mountains in the south and sedimentary rocks, such as pillow lava, chert and sandstone, from the Yubari mountains in the west. The majority of the soil in the conifer-broadleaf mixed forest zones at altitudes of 700 m or lower is Brown forest soil, while Black soils occur at higher altitudes, with podzols found in some areas. The climate is continental, with large seasonal temperature variation, and is often influenced by the climate from the Sea of Japan. The mean temperature at the arboretum



Photograph 1 Mixed conifer-broadleaf forest dominated by Sakhalin fir
This forest type is representative of mid-to-low altitude areas of UTHF and is a mixture of boreal evergreen conifers and cool-temperate deciduous broad-leaved trees.

(230 m) is 6.6 °C, with maximum and minimum temperatures of 35.9 °C and –25.7 °C, respectively, (10-year mean from 2011 to 2020). The mean annual precipitation is 1,196 mm, with a mean maximum snow depth of 85.6 cm. Snow cover usually appears at the end of November and lasts until the beginning of April.

3. Forest characteristics

UTHF, located in the central part of Hokkaido, is situated in a hemiboreal mixed conifer-broadleaf forest zone, which is a transitional area from deciduous forests in the cool-temperate zone to coniferous forests in the boreal zone. Areas along the streams and on flat areas of the UTHF, at altitudes of 650 m or less, are covered by broadleaf forests, mainly comprised of Manchurian ash (*Fraxinus mandshurica*), Japanese elm (*Ulmus davidiana* var. *japonica*), Japanese alder (*Alnus japonica*), and willow trees (*Salix* spp.). The mountain slopes are covered by mixed conifer-broadleaf forest mainly comprising of Sakhalin fir (*Abies sachalinensis*) and cool-temperate deciduous broad-leaved trees. The vegetation changes as the altitude increases, from coniferous forests dominated by Yezo spruce (*Picea jezoensis*) and Sakhalin fir mixed with cool-temperate broadleaves and Erman's birch (*Betula ermanii*, from 650 to 900 m), to forests mainly comprising Yezo spruce, Sakhalin fir, and Erman's birch (from 900 to 1,100 m), to sparse forests with a mixture of Erman's birch, Sakhalin fir, and Sakhalin spruce (*Picea glehnii*, from 1,100 to 1,250 m), and finally to alpine vegetation comprising Dwarf Siberian pine (*Pinus pumila*, altitudes of 1,250 m and above). As of the end of 2013, 806 species of angiosperms



Photograph 2 Communities of Dwarf Siberian pine mixed with scattered Sakhalin spruce trees deformed by wind near the summit of Mt. Dairoku, and the surrounding area includes dwarf shrub communities, such as rhododendron (*Rhododendron aureum*), Lingon berry (*Vaccinium vitis-idaea* L.), crowberry (*Empetrum nigrum*), and bog bilberry (*Vaccinium uliginosum*). Forest reserves encompassing 1,540 ha were established in UTHF to preserve a variety of nearly virgin forest vegetation, as well as five special plant protection zones.

(including 161 species of woody plants), 8 species of gymnosperms, and 80 species of ferns and fern allies, naturally occurring vascular plants have been identified, totaling 415 genera and 894 taxa. Other predominant tree species include Japanese linden (*Tilia japonica*), painted maple (*Acer pictum*), Monarch birch (*Betula maximowicziana*), Japanese oak (*Quercus crispula*), elms (*Ulm* spp.), and castor aralia (*Kalopanax septemlobus*).

Man-made plantations were established in 1907 and now extend over 3,300 ha, incorporating mainly Sakhalin fir, as well as Yezo spruce, Sakhalin spruce, eastern white pine (*Pinus strobus*), European spruce

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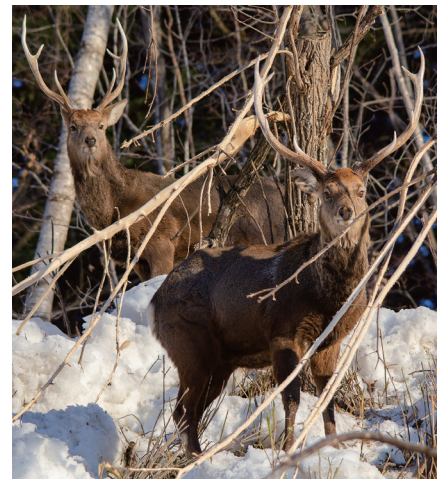
Photograph 3 Old-growth planted forest of European spruce

This forest was planted to restore the area destroyed by a forest fire in 1911. In these planted forests, efforts are made to develop nursery technology to promote natural regeneration and the establishment of multi-storied mixed forests.



Photograph 4 Secondary forest, after fire, dominated by Monarch birch

The forest cover after forest fires regenerated to up to 1,050 ha; some of this area is dominated by Japanese oak. Efforts are being made to develop technologies to cultivate high-quality large broad-leaved trees by adjusting tree density and promote regeneration of successor trees.



Photograph 5 Yezo deer in early spring

The population density of these deer has increased in recent years, resulting in obvious forest damage. An important task of UTHF is to elucidate the ecology of wild animals and their roles in forest ecosystems, as well as to explore better symbiotic relationships between humans and wild animals.



Photograph 6 Black woodpecker being fed

The Black woodpecker, a nationally protected species, lives in natural forests with abundant large trees, which it needs for nesting and foraging. The species has become endangered due to the decline of natural forests in its habitat range. UTHF provides a safe habitat for these rare species, thereby balancing the conservation and use of forest resources.

(*Picea abies*), and Japanese larch (*Larix kaempferi*). Regenerated forests, mainly comprising Monarch birch established at forest fire sites in 1911 and 1914, are representative forest types in this area.

4. Facilities

The base facilities for this university forest are the Yamabe office in the Yamabe district of Furano city, lodging facilities, arboretum, and nursery, as well as a seminar house and a Forest Museum in the Rokugo district. The

Yamabe office functions as the headquarters for education, research, management and administration, and is also equipped with a lecture room and laboratory. The arboretum manages a sample forest of various tree species, produces seedlings of major conifers for planting, and is equipped with greenhouses. The seminar house, a facility for training, is equipped with classrooms and lodging facilities.

5. Education

UTHF offers "General Practice in

Forest Science" for two forest-related majors in the Faculty of Agriculture at the University of Tokyo, is available as a training center for the Japanese Association of University Forests, and provides training for undergraduate and graduate students both inside and outside the university. UTHF promotes field experience-based education, such as University-Wide Experience Seminars for the Faculty of Liberal Arts (first- and second-year students), Hands-on Activities held by the headquarters, as well as distance



Photograph 7 Processing through harvesting by staff
Approximately 24,000 m³ of trees are felled in the UTHF each year, which are used for lumber and paper manufacturing. Harvesting of approximately 1,000 m³ of these trees is processed by the staff of UTHF. During logging, the current state of the forest is surveyed and the silviculture policy is considered for each forest stand. The harvesting business is also a place for developing new forestry techniques and marketing methods.



Photograph 8 The high-quality hardwood Monarch birch
High quality hardwood trees in the natural forests, including mainly Monarch birch, castor aralia, Japanese oak, Japanese linden, and Manchurian ash, are managed individually. Work is underway to systematize management of these trees, and develop long-term cultivation methods.



Photograph 9 University-Wide Experience Seminar
Hoofprints of Yezo deer in the snow are tracked to observe their use of the forest. A diverse range of educational programs is being developed, making use of the abundant natural resources and forests created through forest management as well as expertise accumulated over many years.



Photograph 10 Public seminar
Various efforts are underway to promote public knowledge on University Forests activities while promoting familiarity with forests and nature.

education, which provides a simulated field experience through ICT. UTHF also cooperates with projects promoting science and mathematics education in high schools and with specialist courses.

6. Research

The main themes of the 14th plan for education and research are “Hemiboreal Forest Ecosystems” and “Natural Forest Management.” Systematic research activities are being conducted for three research fields: forest ecology, forest management, and forest ecosystem management.

In the **field of forest ecology**, we work on topics elucidating the regenerative and maintenance mechanisms of forests, ascertaining the genetic characteristics of trees and conserving genetic resources, describing and monitoring the dynamics and biodiversity of wild animals, and determining ecosystem responses to climate change to identify the structure and dynamics of forest ecosystems in northern coniferous-broadleaf mixed forest zones.

In the **field of forest management**, we work on topics enhancing the scientific and technological basis of

the stand-based silvicultural management system, establishing natural forest regeneration technology through forest renewal and nurseries, developing methods to manage and cultivate high-quality broad-leaved trees, developing a diverse range of planted forest management techniques, developing efficient forest operation and civil engineering technology, and creating added value for forest products and developing marketing methods to provide empirical and exemplary theories and methods for the sustainable and adaptive management of mixed conifer-broadleaf forest zones in East Asia, including Hokkaido.

In the **field of forest ecosystem management**, we work on topics evaluating the impact of forest operations on ecosystem processes, evaluating the forest recovery process after large-scale disturbance, establishing methods for conserving rare species and managing invasive alien species, and evaluating ecosystem services such as carbon fixation and streamflow regulation to provide methods for the management and conservation of boreal forest ecosystem functions, while using the forest resources.

UTHF is also extensively utilized as a research field for various researchers, undergraduate students, and graduate students at the University of Tokyo and other universities and research institutions.

7. Extension

Various efforts are being made to promote regional exchange and extension. Various public events and resources are provided, such as open seminars, the Mt. Dairoku hiking event, Jinja-yama Nature Observation Trail, Forest Museum, Mt. Shiratori walking path, and arboretum, which provide spaces for experiencing the forest and nature and disseminating related information. UTHF is working on creating and implementing forestry study programs for local elementary and junior high schools in collaboration with Furano city. Furthermore, UTHF actively accepts training of forest engineers from various public institutions and organizations to promote the communication of the latest research results and technical information.

8. Others

Sustaining the power of the forest ~ The stand-based silvicultural management system by the UTHF ~

UTHF manages natural forests with a unique method, i.e., the “stand-based silvicultural management system,” which classifies forests based on various factors, such as the density, species, and size of the trees, and the status of natural regeneration (Figure 1). This method is highly acclaimed both in Japan and overseas as a method to harmonize economic functions using renewable timber resources while conserving the forest

ecosystem.

At first glance, Photograph 11 appears to be an untouched forest, but has in fact been exposed to six events of selection cutting over the past 60 years. Once every 10 to 15 years, selected trees are harvested (corresponding to 7–17% of the growing stock [stem volume of trees that comprise the forest]). In 1969, the growing stock of this forest was 301 m³ per hectare. In 2018, this increased to 417 m³, demonstrating that the growing stock of the forest had increased despite repeated harvesting (Figure 2). This is assumed to be

because moderate tree removal improves the light environment in the forest, which promotes tree regeneration and growth.

The stand-based silvicultural management system is known to be an effective method for sustainably and adaptively managing diverse and complex forests. In addition to accumulating scientific knowledge on forest ecosystems, stand-based silvicultural management system practices are supported by experienced UTHF staff (Photograph 12) and advanced spatial information technology.

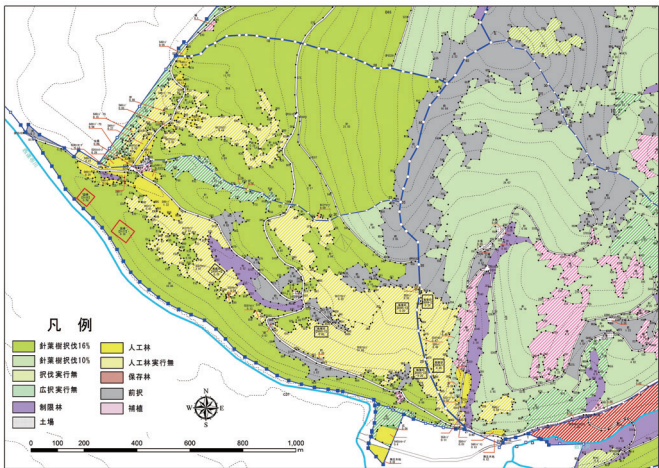
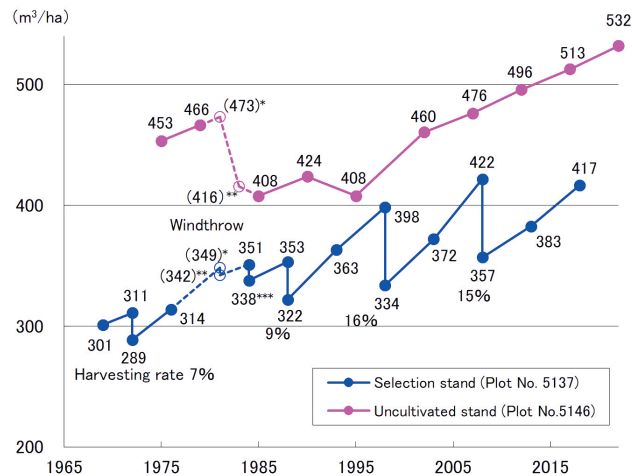


Figure 1 Forest type classification map (forest compartment 51).



Photograph 11 A natural forest that has undergone repeated single-tree selection cutting (forest compartment 51). Refer to the natural forest silviculture test site (P5137) in Figure 2 for the change in the growing stock of this forest stand.



*Estimated from the growth rate of the previous period
**Estimated from the growth rate and the volume of dead trees due to the windthrow.
***Salvage logging was carried out after the windthrow.

Figure 2 Change in forest biomass in forest compartment 51 with selection cutting (Plot No. 5137). The change in the growing stock of an uncultivated forest (Plot No. 5146), which has not been logged since 1927, is shown for reference.



Photograph 12 Data input in the field using a tablet terminal.

User guide

Points to note for us

UTHF may be used for surveys, research, practical training, exercises, and training.
Advance application is required to enter the forest, regardless of the purpose of the visit.
Please submit the Use Application Form to the UTHF General Affairs Team (Yamabe office).
The Use Application Form can be downloaded from the UTHF website.
Please note that we may not be able to support the application, depending on the content.

Lodging facility

UTHF Yamabe lodging facility

Capacity: 12 people
No meals provided - self-catering

UTHF Seminar House

Capacity: 32 people
Meals provided
Closed during winter (November to April)

Address and access

Yamabe office, Yamabe lodging facility

9-61 Yamabe Higashimachi, Furano, Hokkaido, 079-1563, Japan
TEL +81-167-42-2111 FAX +81-167-42-2689

Access

- Asahikawa airport - (Furano Bus Lavender 1 hour) - Furano station - (JR Hokkaido 15 minutes or Furano Bus 30 minutes) - Yamabe station / Yamabe (Yamabe Ekimae) Bus stop - (5-minute walk) - Yamabe office
- Sapporo station - (JR Hokkaido or Chuo Bus approx. 2.5 hours) - Furano station - (JR Hokkaido 15 minutes or Furano Bus 30 minutes) - Yamabe station / Yamabe (Yamabe Ekimae) Bus stop - (5-minute walk) - Yamabe office

Arboretum, Sample forest, and nursery

Daiichi-Byoho Yamabe, Furano, Hokkaido, 079-1582, Japan
TEL +81-167-39-6017 FAX +81-167-39-6017

Access

Yamabe (Yamabe Ekimae) bus stop - (Furano bus 10 minutes) - Nursery (Byoho) bus stop - (1-minute walk) - arboretum

Rokugo Seminar House, Forest Museum, classroom

Rokugoshigaichi 1, Furano, Hokkaido, 076-0161, Japan
TEL +81-167-42-2111 FAX +81-167-42-2689 (Yamabe office)

Access

Furano Station - (Furano Bus 40 minutes) - Rokugo bus stop - (5-minute walk) - Seminar House

Terms of use

Facility Fees (yen per person per night)

Lodging facility	University of Tokyo		Other universities		Other	Students still attending compulsory education
	Students	Faculty and staff	Students	Faculty and staff		
Yamabe lodging facility	0	1,100	550	2,200	3,300	0
Seminar House	0	2,200	550	3,300	4,400	0

Fees for meals and other expenses (yen per person)

Lodging facility	Meal fee		Laundry fee for each stay		Daily miscellaneous fee	Daily heating fee
	Breakfast	Lunch	Up to 4 nights	5 nights or longer		
Yamabe lodging facility	—	—	700	1,400	300	400
Seminar House	900	1,500	700	1,400	300	400

* Students from the University of Tokyo are exempt from miscellaneous and heating fees.

* The heating fee applies to use between October and April.

<Range of classification>

Students of the University of Tokyo: University of Tokyo undergraduate students, graduate students, research students, students of affiliated secondary schools

Staff and faculty members of the University of Tokyo: Staff and faculty members of the University of Tokyo, registered members of University Forests volunteer groups

Students of other universities and educational institutions: Students attending universities, technical colleges, vocational schools, high schools, other students

Staff and faculty members of other universities: Staff and faculty members of universities, technical colleges, vocational schools, high schools, elementary and junior high schools, kindergartens, and staff of public institutions, such as examination centers

Other: People not applicable to the above categories

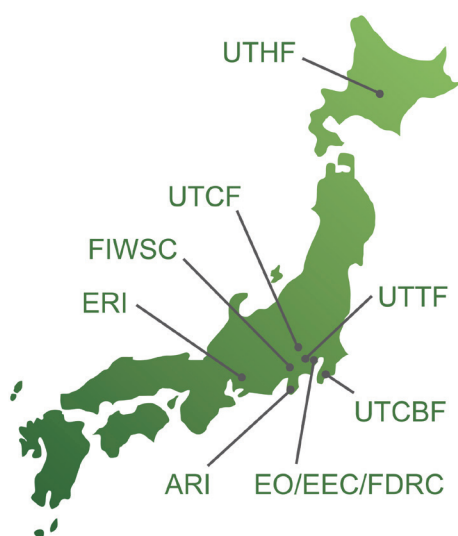
Students still attending compulsory education: Children and students at elementary and junior high school, and kindergarten



The University of Tokyo Forests,
Graduate School of Agricultural and Life Sciences,
The University of Tokyo



UTFs website



UTCBF: The University of Tokyo Chiba Forest
UTHF: The University of Tokyo Hokkaido Forest
UTCF: The University of Tokyo Chichibu Forest
UTTF: The University of Tokyo Tanashi Forest
ERI: Ecohydrology Research Institute
FIWSC: Fuji Iyashinomori Woodland Study Center
ARI: Arboricultural Research Institute
EO: Executive Office
EEC: Education and Extension Center
FDRC: Field Data Research Center

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E-mail: hokuen@uf.a.u-tokyo.ac.jp

Cover photo: "Jukai" (sea of trees) in early autumn

The view of Mt. Dairoku (1,459 m above sea level), the highest peak in the UTHF, and the Tokachi Mountain Range. The colors that have begun to change in early autumn clearly show the hemiboreal mixed forest with summergreen deciduous trees and evergreen coniferous trees.