Ministry of the Environment Project to Promote Monitoring of Important Ecosystem Surveillance Areas (Monitoring Site 1000)

Monitoring Site 1000: Forest and Grassland Surveys

Manual on Core Site Setting and Tree Census

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This manual is an English translation of the Japanese version and has not been reviewed by experts. Some technical terms and expressions may not exactly capture the intended nuances.

Introduction

This is a manual for setting plots in the core sites and conducting tree census within the Monitoring Site 1000: Forest and Grassland Surveys. If you have already set a survey site, please refer to this Manual and review how to set the survey site and conduct the survey. All methods mentioned in this Manual are not always the best option, because there still remain items to be added. We hope to continue to improve this Manual by incorporating your opinion. However, please be reminded that long-term monitoring should be conducted in a unified manner beyond the convenience of each site or personal preference. We appreciate your cooperation.

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1. Purpose and significance of survey

An tree census reveals **the species composition, structure, and biomass** of the forest. This data is important not only for figuring out the volume of carbon accumulation but also for scientifically revealing the relationship between forest conditions and water resource recharge capabilities or forest-dependent living organisms. Their interannual variances are also revealed by conducting surveys on a continuous basis. Moreover, we can obtain important data to estimate **population dynamics of constituent tree species** by tracking life and death as well as growth of trunks and stocks of individual tree species.

2. Basic design

- The core plot area should be, in principle, 1 ha (**100 m x 100 m**) (Fig. 1).
- Take a survey of the whole core plot area and pile stakes every 10 m in a horizontal distance.
- In cases where a seed/litter trap survey is conducted, install 25 seed/litter traps within this 1 ha area (See the Manual on Litter/Fallen Seed Survey). The density is one trap per 20 m square lot.
- Place an aluminum tag on each tree whose perimeter at breast height is over 15 cm and measure it ever year (Figure 2).

3. Land survey

3.1 Area and shape

The area and shape should be 1 ha (100 m x 100 m) for the reason of easy comparison with other core plots.

3.2 Surveying method

A survey should be conducted using a transit compass of Kantum Ushikata Co., Ltd.) or a compass with higher precision. Make sure to pile stakes every 10 m in a horizontal distance. Set the point of origin to be (0,0), and write X and Y coordinates (Example: 10,30) by the meter on a stake with a black marker or black paint (Fig. 1, left). In doing this, make sure to direct the X axis to the right in the direction of the Y axis from the point of origin (avoid the shape described in Fig. 1, right).

Moreover, create a figure describing the shape of the survey site and how to set coordinates as shown in Fig. 1. Make sure to create a figure especially in cases where the shape is not 100 m x 100 m or a method of setting coordinates is particular. The figure created should be submitted to the Network Center together with tree census data.

3.3 Record of GPS information

Measure and record the latitude and longitude (World Geodetic System (WGS84)) of the 4 corners of plot with the same GPS (optional).

4. Tree census

Data of the first tree census and that of the second and subsequent surveys is entered separately. Please be reminded that the format of ledgers used is slightly different. The Network Center takes the responsibility of collectively purchasing aluminum tags (Fig. 3), steel tape measures (Fig. 4), stainless nails (Fig. 5), and stainless wires for tree census and sending them to each site. Each site should purchase other necessary consumable goods or use existing goods.

4.1 Method of first tree census

- An tree census is conducted by square lot of 10 m x 10 m.

- All trunks whose perimeter at breast height is over 15 cm are measured. If the minimum diameter at breast height is 5 cm, the minimum perimeter at breast height becomes 15.7 cm. However, **the minimum perimeter at breast height is set to be 15 cm** taking into account measurement error and for reason of simplicity.

- Firstly, hammer stainless nails, and then hang down aluminum tags from the stainless nails with stainless wires. It is important that the lower end of these aluminum tags comes to the breast height (1.3 m) from the mountain side of the trunk (Fig. 6). However, a method of hanging down an aluminum tag with a stainless wire is not suitable to heavy snowfall areas. It is recommended to place a tree number using a method suitable for environmental conditions of each place. Optionally, it is possible to reinforce a tag by covering its hole with an aluminum eyelet in a site where tags are worn out quickly due to strong winds (Fig. 3, right).

- Measure and record the perimeter of the lower end of this aluminum tag (Breast height: 1.3 m) by mm using a steel tape measure (Tajima Engineer Pocket, 10 m). **Don't use a diameter tape measure or caliper measure**. Since this steel tape measure's initial station (0) starts from a position about 10 cm from the tip, it is possible to accurately read a value of the perimeter at breast height on the 0 line when it is looped around the tree (Fig. 7). However, when two measures are crossed, make sure to check which comes top or bottom, because it is not possible to accurately read a value under the 0 line (Fig. 8). Measure the perimeter after roughly scraping tree barks and moss which can crumble easily, causing an error. After completing measurement, spray a thin line on the measurement position about halfway with red (Fig. 7). Make sure to spray the measurement position with red especially in cases where the measurement was made away from the breast height (1.3 m) due to tree's thickness (perimeter: 100 cm), trunk deformation, knot, or branching.

- Identify tree species and fill in the survey ledger together with its perimeter at breast height. If it is difficult to identify tree species, make sure to identify it by taking a sample, and preserve the sample.

- Measure the X and Y coordinates at the trunk's root within the 10 m square lot (3.1 m, 2.6 m) and fill in the ledger. In cases where terrain is complex, it is easy to check the trunk's position by pulling 10 m of a regular 50 m tape measure to the X-axis direction.

- The unit of measurement at a site of tree census is not tree but trunk. Therefore, if a tree has two or more trunks whose perimeter at breast height is over 15 cm like a clump type tree, place aluminum tags on all of them and measure their perimeter at breast height. Then, **enter a representative number of the clump in the column of "Individual Tree Tag Number"** to indicate that these trunks belong to the same tree. For example, in the case of Chengiopanax sciadophylloides described in A3, A4, and A5 of the first individual tree ledger (Table 1) below, enter "A3, A3, A3" in the column of "Individual Tree Tag Number" of each trunk. Also, enter a comment that these trunks belong to the same tree, just in case, like "same tree as A3" in the "remarks" column of the survey ledger.

- If the perimeter at breast height can only be measured with vines due to coiled vines, please write a comment in the remarks column. For example, you can write, "including vines."

- In cases where inclined or fallen trunks are alive, follow the same procedure for measurement at 1.3 m from the root (Fig. 6) and place tags. In that case, make sure to write a comment in the remarks column such as "inclined" or "fallen".

4.2 Example of entry format of the first tree census

Table 1 First tree census ledger

								Date	Name of investigator
X coordinate of 10 m-square lot	Y coordinate of 10 m-square lot	Trunk tag number	Individual tree tag number	X of trunk	Y of trunk	Name of species	Perimeter at breast height (cm)	Remarks	Date
0	0	A1		3	2	Japanese beech (*Fagus crenata*)	130.7	Including vines	20040514
10	10	A2		8	7	Mongolian oak (*Quercus crispula*)	89.3		20040514
10	10	A3	A3	0	8.5	Koshiabura (*Chengiopanax sciadophylloides*)	19.2	Same tree as A3	20040514
10	10	A4	A3	0	8.5	Koshiabura (*Chengiopanax sciadophylloides*)	25	Same tree as A3	20040514
10	10	A5	A3	0	8.5	Koshiabura (*Chengiopanax sciadophylloides*)	33.6	Same tree as A3	20040514
10	20	A6		3	5.5	Painted maple (*Acer mono*)	48.9		20040514
10	20	A7		4	4	Japanese beech (*Fagus crenata*)	189	Trunk half withered	20040514
10	20	A8	A8	8	1	Japanese blue beech (*Fagus japonica*)	45.3	Same tree as A8	20040514
10	20	A9	A8	3	2	Japanese blue beech (*Fagus japonica*)	56.2	Same tree as A8	20040514

The X and Y coordinates in a 10 m-square lot here express each 10 m-square lot with the X and Y coordinates at the bottom left of the 10 m-square lot (corner near the point of origin). Therefore, a total of one hundred 10 m square-lots from (0,0) to (90,90) are surveyed (make sure that the X and Y coordinates of a square lot of 10 m x 10 m fall between 0 and 90 instead of from 10 and 100). In case where two or more trunks belong to the same tree, you need to enter “same as A3” in the column of A3 trunks. Please be reminded that it is difficult to calculate the number of trees afterwards if you fail to enter this data. In the remarks column, please enter any information you notice such as moth and broken tip” (See also 4.6 Requests at the time of entering data). Make sure to write down information especially on vines which affect measurement values (whether the value includes vines or not, etc.), trunk hollows, and withered tree barks. Moreover, **make sure to include a comment in cases where**

tree barks are stripped off by deer, etc. (don't simply put "feeding damage" to distinguish tree bark stripping and feeding damage of branches and leaves).

4.3Method of second and later tree census (remeasurement)

When a second or subsequent survey is conducted, aluminum tags should already be attached. Therefore, measure the perimeter at breast height by mm in each 10 m-square lot as in the 1st survey. The red spray line marked in the first survey can serve as your landmark. Place a new aluminum tag on a trunk whose perimeter at breast height has grown to 15 cm or more. Please select an easier method of registering this new tree (trunk), for example, by entering a comment outside the column or on the same sheet used in the first survey. The check of new trees (trunks) must be conducted by 10 m-square lot. Once you finish to check one square lot, move on to next square lot.

Check if all information is entered, because the tree position will be lost in the next tree census without the X and Y coordinates in a 10 m-square lot and that of new trees (trunks).

When an aluminum tag is lost, place a new tag and enter this information in the tag and remarks columns. Moreover, if an aluminum tag hole is worn out due to abrasion by the nail or wire, please replace the tag. If a nail sinks down, unnail it if possible and hammer it again. When any materials are required, please contact the Network Center so that they will be sent to you.

A person who enters data in the ledger should compare the perimeter measurement values in the last survey and the new measurement values on the spot to check if there is any abnormal value.

In the remarks column, you should enter a comment on any event that affects measurement values such as "trunk half withered" and "trunk broken at 5 m". If a tree is confirmed dead, enter its cause. As far as you know. In cases where is broken at a height higher than the breast height (or tree trimming), continue measurements until the trunk below that height is confirmed dead. A break at a height lower than the breast height should be determined as dead. If a perimeter at breast height of a new trunk that started to spring after that reaches 15 cm, it should be registered as a new tree.

Table 2 Tree census ledger for remeasurement

X coordinate of 10 m-square lot	Y coordinate of 10 m-square lot	Trunk tag number	Tree census tag number	X of trunk	Y of trunk	Name of species	Perimeter at breast height of the last survey (cm)	Perimeter at breast height (cm)	Remarks of the last survey	Remarks	Date of survey
0	0	A1		3	2	Japanese beech (*Fagus crenata*)	130.7	131.0	Including vines		
10	10	A2		8	7	Mongolian oak (*Quercus crispula*)	89.3	90.8			
10	10	A3	A3	0	8.5	Koshiabura (*Chengiopanax sciadophylloides*)	19.2	20.4	Same tree as A3		
10	10	A4	A3	0	8.5	Koshiabura (*Chengiopanax sciadophylloides*)	25		Same tree as A3		
10	10	A5	A3	0	8.5	Koshiabura (*Chengiopanax sciadophylloides*)	33.6		Same tree as A3		
10	20	A6		3	5.5	Painted maple (*Acer mono*)	48.9				
10	20	A7		4	4	Japanese beech (*Fagus crenata*)	189		Trunk half withered		
10	20	A8	A8	8	1	Japanese blue beech (*Fagus japonica*)	45.3		Same tree as A8		
10	20	A9	A8	3	2	Japanese blue beech (*Fagus japonica*)	56.2		Same tree as A8		

4.4 Survey tools

Ledger (A4), ledger clipboard, pencil (make sure to use a pencil or mechanical pencil of strong lead. A fountain pen or felt marker is not allowed), hammer, stainless nails, aluminum tags, working waist bag, steel tape measure (Tajima Engineer Pocket 10 m), red sprays, tape measure (20 m ~ 50 m)

Recommended products/specifications

- Steel tape measure: Tajima Engineer Pocket 10 m (EPK-10). Fig. 4. **Please use this product!**
- Ledger clipboard: PLUS A-size clipboard with A4 cover, similar product can be used
- Stainless nails: Stainless screwing nail, flat head #12 x 50 mm (Fig. 5), similar products can be used
- Stainless wires: Diameter around 0.56 mm, about 24 cm for one aluminum tag (Fig. 3)

- Aluminum tags: Racetrack Aluminum Tags, Numbered Tags 1-1000, Forestry Supplies Inc. (Fig. 3), similar products can be used. Note: Put an alphabet before the numbers using a punch.

The Network Center takes the responsibility of ordering the above materials and sending them to each site. If other materials have already been used at a site, it is not obliged to replace them. Moreover, please send a proposal to the Network Center if there is any product or specification better than those mentioned above.

4.5 File format

Please use files convertible to CSV format such as Excel and ACCESS. If possible, enter data in Excel files designated by the Network Center.

4.6 Requests at the time of entering data

The Monitoring Site 1000 aims to collect data from many sites for a long period of time and discloses and analyzes data obtained. Therefore, it is required that data is entered under the same rules as much as possible so that anyone can understand even 50 or 100 years later.

To this end, follow the instructions below as much as possible when entering data (See Table 3). (If a site has followed different rules for a long period of time, it is not obliged to follow the instructions below. However, please notify the Network Center of that effect).

- Firstly, make sure that there is no input error. Enter the latest data next to the past data to reduce input errors.
- If a measurement error is suspected (Gbh has increased or decreased significantly compared to the previous year), enter “possible measurement error” in the remarks column (it is also possible to distinguish it from input error).
- Enter “nd” in Gbh for tree not measured.
- Enter “d” in Gbh at the time of death for dead tree.
- Enter a value with “vi” at the beginning of data, if measurement was made including vines at this survey, although measurement was made excluding vines in the past (e.g. vi36.7).
- Enter a value with “vn” at the beginning of data, if measurement was made excluding vines at this survey, although measurement was made including vines in the past.
- In cases where species cannot be identified definitely, enter “unidentified” in the species name column. Enter additional information (deciduous tree or evergreen tree), higher taxonomic groups (family name/generic name), and a candidate species in the remarks column.
- Describe any of the following events using the same or similar expression below.

Broken trunk, dieback, uprooting, tree bark stripping, fed branches or leaves, moth, broken tip, including vines, same as “---" inclined, fallen, replacement (former “---")

- In cases where tags are replaced all at once, make sure to leave older tags identifiable before they were replaced by leaving the row of older tag numbers.
- Describe survey records (on a sheet separate from data, Table 4). In addition, make sure to record who measured what and how and for what purpose (in a way that you leave information for total strangers so that anyone can understand 50 years after).

- **As for a precision of records (standard) of “tree bark stripping”, enter a rough precision in the survey record (Table 4). Even if “tree bark stripping” was not confirmed, record that information.**

Table 3 Example of data entry

10m方形区X座標	10m方形区Y座標	幹タグ番号	個体タグ番号	幹のx座標	幹のy座標	種名	胸高周囲長〔cm〕			備考			調査日		
							2008	2009	2010	2008	2009	2010	2008	2009	2010
mesh_xcord	mesh_ycord	tag_no	indv_no	stem_xcord	stem_ycord	spc_japan	gbh08	gbh09	gbh10	note08	note09	note10	s_date08	s_date09	s_date10
0	0	A12	A12	3.4	5.3	シナノキ	38	37.8	37.9	na	na	na	20071106	20081201	20091016
0	0	A25	A25	6.5	9.6	アオダモ	na	15.1	15.5	na	新規	na	20071106	20081201	20091016
0	0	A23	A23	7.5	6.3	ハシドイ	16.2	d	na	na	幹折れ	na	20071106	20081201	20091016
0	10	A4	A4	4.1	2.3	アサダ	16.3	16.3	26.5	na	na	測定エラーの可能性あり	20071106	20081201	20091016
0	10	A20	A20	8.6	5.4	アオダモ	82.6	82.7	nd	na	na	測定もれ	20071106	20081201	20091016
0	10	A24	A24	9.1	8.2	シナノキ	15.5	15.7	d	na	na	立ち枯れ	20071106	20081201	20091016
0	20	A30	A30	5.5	14.6	ハルニレ	41.1	41.3	41.6	na	na	樹皮はぎ	20071106	20081201	20091016
0	20	A31	A31	1.1	18.6	サワシバ	48.7	48.8	48.5	傾き	傾き	傾き	20071106	20081201	20091016
0	30	A33	A33	1.2	9.7	ハルニレ	20	20.1	20.1	na	根返り	倒れ	20071106	20081201	20091016
0	30	A11	A11	9.7	9.0	ハルニレ	34.1	vi36.7	36.6	na	ツル込み	ツル込み	20071106	20081201	20091016
10	0	A14	A14	6.5	9.6	アオダモ	46.3	46.3	vn44.4	ツル込み	ツル込み	ツル抜き	20071106	20081201	20091016
10	10	A5824	A5824	4.0	9.6	ハルニレ	24.6	25.6	25.6	na	na	付け替え（元A8）	20071106	20081201	20091016
10	10	A17	A18	20.3	2.9	ハシドイ	16	16	16.2	A18と同株	A18と同株	A18と同株	20071106	20081201	20091016
10	10	A18	A18	20.3	2.9	ハシドイ	47.2	47.5	47.4	A18と同株	A18と同株	A18と同株	20071106	20081201	20091016
10	20	A27	A27	4.9	12.4	未同定	12.8	13	13	落葉樹？	落葉樹？	落葉樹？	20071106	20081201	20091016
10	20	A9	A9	4.1	9.0	アサダ	25.1	25.2	25.1	na	na	ハルニレよりアサダに樹種変更	20071106	20081201	20091016
10	20	A28	A28	4.4	12.0	シナノキ	18.4	19	19.1	na	na	na	20071106	20081201	20091016

表内用語

10m 方形区 X 座標：X coordinate of 10 m- square lot

10m 方形区 Y 座標：Y coordinate of 10 m- square lot

幹タグ番号：Trunk tag number

個体タグ番号：Tree census tag number

幹の x 座標：x of trunk

幹の y 座標：y of trunk

種名：Name of species

胸高周囲長：Perimeter at breast height (cm)

備考：Remarks
調査日：Date of survey
シナノキ：Linden (*Tilia japonica*)
アオダモ：Ash (*Fraxinus lanuginosa*)
ハシドイ：Lilac (*Syringa reticulata*)
アサダ：Japanese hop hornbeam (*Ostrya japonica*)
ハルニレ：Japanese elm (*Ulms japonica*)
サワシバ：Bigleaf hornbeam (*Carpinus cordata*)
未同定：Unidentified
傾き：Inclined
ツル込み：Including vines
A18 と同株：Same tree as A18
落葉樹？：Deciduous tree?
新規：New
幹折れ：Broken trunk
根返り：Uprooting
測定エラーの可能性あり：Possible measurement error
測定もれ：Missing measurement
立ち枯れ：Dieback
樹皮はぎ：Tree bark stripping
ツル抜き：Excluding vines
付け替え（元 A8）：Replacement (former A8)
ハルニレよりアサダに樹種変更：Change of species from Japanese elm to Japanese hophornbeam

Table 4 Example of survey record entry

Year	Commencement date	End date	Name of investigator(s)	Precision/criteria for tree bark stripping survey	Special note	Remarks
2007	20071120	20071121	Moni Taro	Tree bark stripping was not surveyed.		
2008	20081127	20081130	Moni Taro, Moni Hanako	Tree bark stripping over 4 cm in width was checked, but no tree bark stripping was observed.	A typhoon passed on 2008/10/30.	
2009	20091125	20091128	Moni Taro, Moni Hanako	Tree bark stripping over 4 cm in width is recorded.	A plague of gypsy moths occurred in summer 2009.	

5. Landscape photo shooting

5.1 Purpose

Please take landscape photos for the purpose of capturing changes in forest landscapes which are difficult to be identified by tree census. Changes in forest landscape include changes in the foliage season and the tree species structure due to climate change, decline of forest floor plants due to the increase in deer, and massive death of trees (e.g. Oak wilt disease). The first purpose is to record qualitative changes in forests, but photos can be used for quantitative evaluations using image analysis. Moreover, photos can be utilized for public relations activities.

5.2 Timing of photo shooting

Please take photos, if possible, when leaves are most widely open (especially in cases of deciduous broad-leaved forests) and in the same period every year. However, there is no problem in taking photos at each tree census in cases where you go to a survey site every few years such as quasi-core sites. It is also allowed to take photos a couple of times per year such as the leaf unfolding period and leaf fall period.

5.3 Spot of taking photos (Fixed point)

Please select one spot where photos of a representative landscape in the plot can be taken and make sure to take photos at the same spot every time. It is recommended to use landmarks such as stakes for fixed points. In cases where such a landmark cannot be set due to any circumstance of the site, take photos using natural objects such as standing trees or rocks in a way that future users can see that they are taking photos at almost the same spot. In addition to a fixed point, it is allowed to take photos at an arbitrary spot.

5.4 Shooting method

Photos should be taken at about eye height. In cases where vegetation such as bamboo grass obstructs the sight, take photos at a height little higher than vegetation without cutting it to avoid any modification of the survey site. Photos inside the plot should be taken radially (360 degrees) in the horizontal direction from the fixed point in a way that each photo overlaps slightly. Then, take photos of the forest canopy to the north viewing directly overhead. By taking photos of 360 degrees, panoramic photos can be created using image analysis software for higher availability. The model of camera or the type of lens is not specified. You can use your digital camera.

When taking photos, use a single pipe for photo shooting or an unipod or tripod to maintain the photo shooting height uniform every year. If it is not possible to prepare such equipment from the perspective of burden for survey and availability of equipment, you can handhold a camera to take photos.

Although it is desirable to store images in RAW format (*See Note), other file formats such as JPEG are acceptable if a file size is too big or your camera is not compatible to RAW.

(*Note)

RAW: An image before it is compressed to JPEG or another format. Since it is not compressed by or modified by the camera, a difference in photo data is minimum between different models of camera.

Therefore, it is possible to analyze images in a unified manner later. However, a file size tends to be large, because one photo has about 20 MB.

5.5 Collection of photos taken

Please send photos you took to the Network Center together with their meta data (See 5.6). These photos and meta data can be sent by mail in the form of CD or DVD or through an online uploading service.

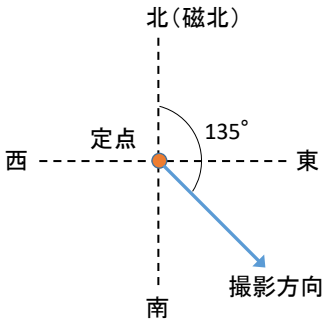
5.6 File combining meta data (additional information on data)

Send a meta data file in csv format after entering the file name of photos, photographer, date, position (coordinates), and direction. In addition, please include precautions about copyright and disclosure and a description method at the time of use in the same file. In cases where the person who took photos uses them for data analysis, state clearly that the photos used were obtained for the Monitoring 1000 project in accordance with the guidelines on the use of data obtained from tree census, etc. Contact the Network Center in cases where any result of such data analysis was announced at an academic conference presentation or in an academic journal.

(Example of entry of meta data file)

#Name of survey site: Tomakomai, mature forest

File name	Photographer	Date	Place (coordinates)	Direction (North is **0 degree,** see the following figure)
F0001.jpg	Moni Taro	20101015	(100, 100)	Horizontal 45 degrees
F0002.jpg	Moni Taro	20101015	(100, 100)	Horizontal 135 degrees
F0003.jpg	Moni Taro	20101015	(100, 100)	Horizontal 225 degrees
F0004.jpg	Moni Taro	20101015	(100, 100)	Horizontal 315 degrees
F0005.jpg	Moni Taro	20101015	(100, 100)	Directly above



撮影方向が水平135° の場合

北（磁北）：North (magnetic north)

定点：Fixed point

西：West

東：East

南：South

撮影方向：Photo shooting direction

撮影方向が水平 135° の場合：In cases where the photo-shooting direction is horizontal 135 degrees.

5.7 Criteria for disclosure

When the Ministry of the Environment discloses (uses) any photo provided by a photographer, we plan to contact the photographer in advance to seek his/her consent and include the photographer's name. However, it is not always possible to do so. Therefore, please select your preference for "prior notice", "photographer's name (cache)", and "post fact notice" (See also "7. Handling of personal information" below). In cases where the criteria for disclosure are changed due to a replacement of the representative of site or for any other reason, please notify the Network Center.

Item	Options
Prior notice	1: I don't need a prior notice.
	2: I need a prior notice.
Photographer's name (cache)	1: I authorize the disclosure of photo without my name.
	2: I want my name to be hidden.
	3: I always want my name to appear.
Post fact notice	1: I don't need a post fact notice.
	2: I need a post fact notice.

6. Description of survey site information

When a survey site is set, please describe the following information on the survey site.

Name of site: Tomakomai
Name of survey site: Tomakomai, mature forest
Latitude (World Geodetic System WGS84): 42.7111
Longitude (World Geodetic System WGS84): 141.5664
Tertiary mesh code (World Geodetic System WGS84): 6441-0455
Tertiary mesh code N (Former Geodetic System): 6441-0455
Prefecture: Hokkaido
Name of branch office: Iburi
Height: 80 m
Area: 1 ha
Shape: 100 m x 100 m
Subject of on-site survey: Tomakomai Experimental Forest, Hokkaido University
Representative of site: Tsuyoshi Hiura
Year in which the survey started: 2004

Survey site type: Core site
Tree census: 2004-
Litter trap: 2004-
Pitfall: 2004-
Bird species: 2006-
Environmental data: Amount of precipitation, temperature, humidity, amount of solar radiation, day length, ground temperature, wind direction, and wind speed at a spot about 500 m away from the plot
GPS positioning of the plot: No
Others (designation of national park/quasi-national park, protected area, etc.):
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7. Handling of personal information

As a general rule, data obtained from the Monitoring Site 1000 will be disclosed. In this case, records of the investigators and photographers may be disclosed. In cases where there is any inconvenience in disclosing a personal name, please describe to that effect clearly when submitting data.

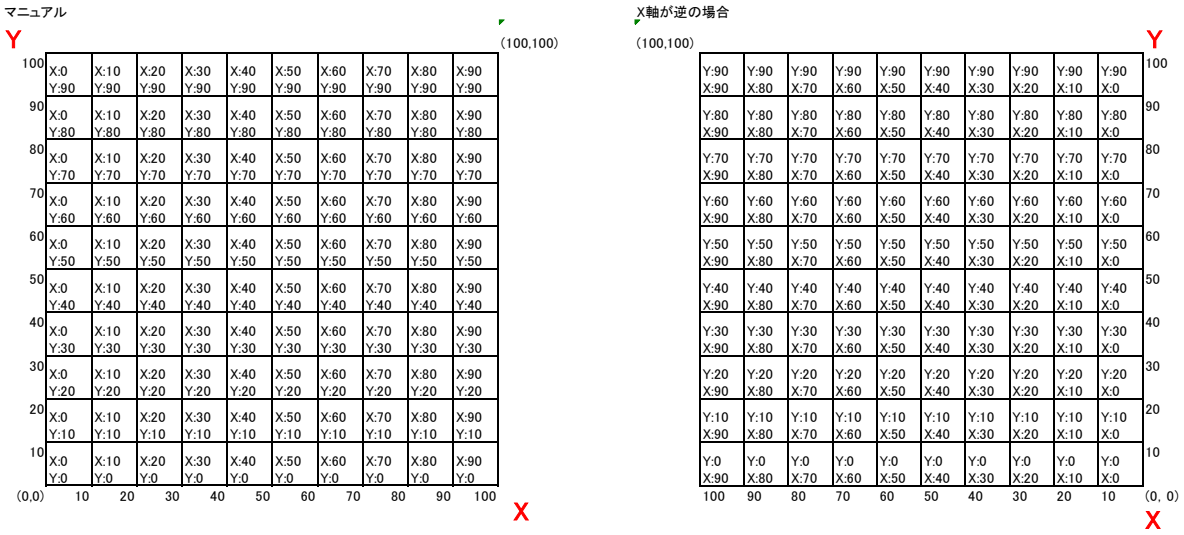


Fig. 1: Shape of survey site and method of setting coordinates

マニュアル：Manual

X 軸が逆の場合：In cases where the X axis is inverted



Figure 2: Example of putting an aluminum tag

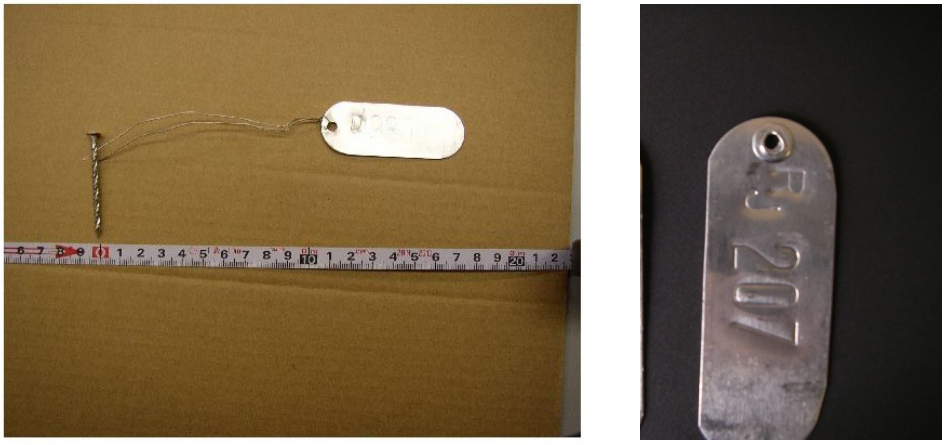


Figure 3: Aluminum tag

Right: Example of reinforcing the tag with an eyelet



Figure 4: Steel tape measure



Figure 5: Stainless nails

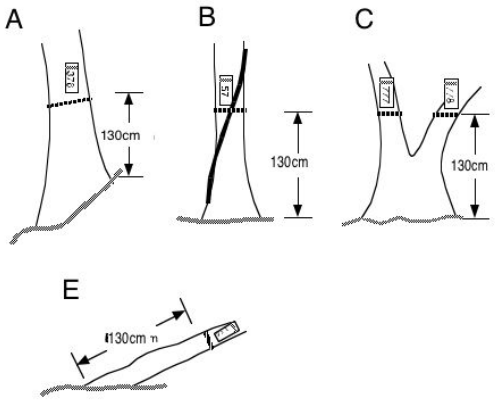


Figure 6: Method of determining the measurement position

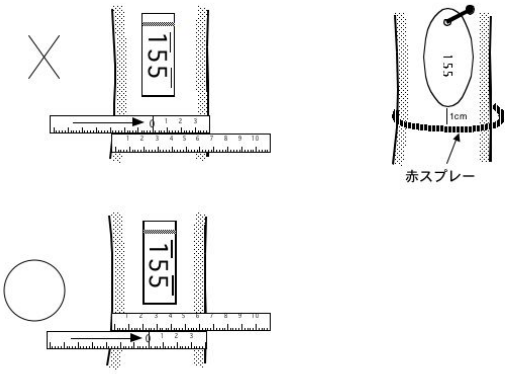


Figure 7: Method of measurement of perimeter at breast height

図7

赤スプレー：Red spray

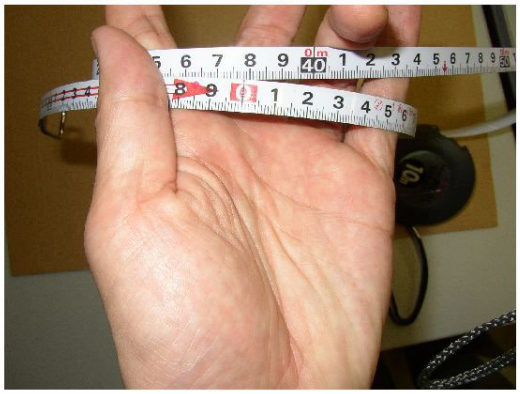


Figure 8: How to read a steel tape measure
In this photo, the reading is 37.8 cm.

Monitoring Site 1000: Forest and Grassland Surveys
Manual on Core Site Setting and Tree census

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