

3 Line Transect Census of Breeding Land Birds

Zoological Museum, Finnish Museum of Natural History
Line transect census / Zoological Museum
P. Rautatiekatu 13
SF-00100 Helsinki

1. BACKGROUND AND AIMS. The goal of line transects is to record the pair numbers, densities and yearly changes in populations of breeding land birds in different habitats. This rapid one-census method is economical for taking an even sample of the land bird fauna in large regions. So far about 2400 line transects have been censused in Finland, most of these in the 1940s, 1950s, 1970s, and, more recently, in 1987–89. The national monitoring of annual population changes in fixed lines was started in 1978.

Some methodological novelties have been added to these instructions in order to make the data more useful for studying the structure of bird populations in different habitats and to elucidate the effects of human activity on the environment. However, comparability with the censuses made during the last 50 years remains.

2. EQUIPMENT, TIME NEEDED AND PREPARATIONS. Good skills in bird identification, including a knowledge of songs and calls, is a prerequisite. Field forms (3D; a writing-pad is recommended), pencil and binoculars are needed. Each transect is planned beforehand on a survey map (e.g., scale 1:20 000). If the transect is to be repeated in the following years, it can be marked in the field with plastic tape or streamers etc. A compass is needed to follow the planned route. It takes about 4–5 morning hours to census one transect.

Before any censusing is done, one should practice classifying forest site types (Appendix III) and estimating the height of trees so that defining these becomes routine. Both the productivity (= site type) of the forest and the average height of the trees have great influence on the species composition and density of the breeding birds. In sunny weather tree height is easily estimated by the following method: divide the length of the shadow of the tree with

the length of the shadow of a one metre long stick. The average height of the tree layer is estimated with an accuracy of five metres (5, 10, 15 m etc.). Well-trained observers may, however, give more accurate estimates.

3. CHOOSING A TRANSECT. A transect should be planned in advance with a map, using field experience to ensure that all major terrestrial habitats (forests, mires, fields etc.) are included in proportions approximately characteristic of the region. It is not advisable to combine the census with other field work, such as visits to nest-boxes, because too many hole-nesting birds would be included. Usually the route is a rectangle with sides measuring 1–2 km. It is possible to census a 5–6 km route if bird densities are relatively low. Check that the transect is not biased towards easy terrains, but also includes more difficult habitats (mires, dense shrubs). One should follow the transect, not easy winding paths, while censusing.

4. CENSUS PERIOD. The transect is censused once during the breeding season. The recommended census dates are 1–17 June in southern and central Finland and 10–30 June in northernmost Finland.

5. TIME OF DAY. Censuses are made in early morning from 04:30 to 09:00 all over Finland. In the north one can start a little earlier. After a cold night it is advisable to start the census a little later, but in no case should it be continued past 10 a.m. When the weather is hot the census should be started and finished an hour earlier than usual, as singing periods may be shorter.

6. WEATHER. Censuses should not be made if rain or wind interferes appreciably with the intensity or audibility of bird song.

7. **FIELD WORK.** The observer should walk slowly, counting his paces, use a map and a compass, and stop often to observe birds and to record observations. If the walking speed is too fast, many birds may pass unnoticed, whereas walking too slowly increases the risk of double counts. It is recommended that 1 km is censused in 45 to 60 minutes, depending on the density of birds. It is not advisable to stop very close to a highly alarmed bird, because alarm calls (mobbing) attract neighbouring birds. In order to minimize disturbance, line transect censuses should be carried out alone.

Only the birds observed in front or on either side of the observer are recorded, those behind are not. (Omission of birds observed behind decreases the risk of double counts.) Where the transect ends, birds beyond the end point are not counted. If there are sharp turns in the transect, each new direction is treated as a new start to the transect; thus there will be overlap on one side, whereas a sector on the other side will not be censused. In open habitats distant birds only detectable using binoculars are not especially searched for. Crossbills not identified to species level are marked LOXSP.

Pairs are recorded on two lists: (1) the pairs observed within 25 m of the transect line, i.e. within the main belt (MB, which is 25 + 25 m wide), and (2) all pairs beyond 25 m as far as they can be detected, i.e. the birds of the supplementary belt (SuB). Together, the two belts form the survey belt (SB). The distance of a bird (from the transect, not from the observer) is estimated from the place where the bird was first observed. A bird flying across the main belt belongs to the supplementary belt, even if first detected above the main belt. A flying bird may also belong to the main belt, e.g. a Skylark in song flight above the main belt or a bird flying towards the observer along the main belt.

An inexperienced observer may have difficulties in estimating the distance of 25 m. It is a common error to underestimate distances, resulting in far too many pairs being recorded in the main belt. Naturally the opposite mistake is also possible. The observer should check estimates of distances obtained by pace counting in sufficiently varied terrains and then check so many distances to singing birds that this becomes a routine matter. The ability to make correct estimates generally develops rapidly. Even experienced censusers should, however, check their estimates every now and then.

In typical Finnish habitats 15–25% of the observations are from the main belt. In areas with low bird density (e.g. barren parts of Forest Lapland) the proportion may approach 5%, because most of the singing birds are in the supplementary belt. In exceptionally lush areas in South Finland the proportion of main belt observations may approach 40%, because the many birds singing near the transect prevent the observer hearing distant singers. If the main belt percentage tends to differ from the average, the observer should check her or his method of estimating distances. The following list gives examples of average main belt percentages:

	South Finland	North Finland
All land birds	23.6%	18.1%
Spotted Flycatcher	46.9%	38.2%
Whinchat	39.7%	21.5%
Meadow Pipit	35.0%	24.0%
Chaffinch	24.4%	16.3%
Willow Warbler	21.4%	15.0%
Brambling	20.8%	15.9%
Wood Sandpiper	13.0%	17.5%
Curlew	4.0%	8.6%
Cuckoo	3.7%	4.2%

All notes are recorded on Field Form 3D. There is one form for every 500 m.

Main belt habitat information (page 3E) can be used to study habitat proportions in different regions and the habitat preferences of different bird species. The habitat code has three parts, the last of which is reserved for the estimate of the average height of the tree layer or, outside forests, for the average size of the open area. Both the age of the forest and the size of the open area strongly affect the composition of the bird community. Although describing the habitat may seem complicated at first, it soon becomes routine. The most common codes should be learnt in advance so that recalling them does not delay the census. An accuracy of 50 metres is recommended in defining the boundaries of each habitat. More detailed classification may be advisable, e.g., for a patch of lush forest with a clearly higher density of birds than in the surrounding barren pine forest.

If there are clearly two habitat types on a section of the main belt, draw a sketch of their distribution on Field Form. The following example shows how such information is coded on

Form 3C: The transect runs 200 metres along the edge of a clearing so that about one quarter of the main belt belongs to the forest and the rest to the clearing. Fifty metres of the main belt is then coded to be forest (all forest birds are marked here) and 150 m to be clearing (all birds of open habitats are marked here).

Twelve frequent bird species are marked with two-letter codes (Form 3D). Approximately half of all the observations come from these species. For other species, the observer may freely use abbreviations of her or his own on Form 3D, as long as the codes are unambiguous.

It is important to report the type of each pair observation, because it is possible that in the future the accuracy of density estimates may be improved by taking into account seasonal and other variation in detectability. The type of the observation is recorded when the pair or bird representing it is detected for the first time.

The habitat of each observation is recorded if possible. Although the pairs observed in the main belt in principle belong to the respective main belt habitat, the habitat type is coded separately for the main belt observations in Form 3C. This gives an opportunity to report small patches of habitat where a territory is located. For example, if the habitat of the main belt is K3H15 (a mesic spruce stand, height about 15 m), one could record a pair observation there as w AT Hh A2 (a Tree Pipit uttering alarm calls in a clear-cut area smaller than 0.1 ha; note that such tiny patches are usually not reported as actual main belt habitats).

8. INTERPRETING OBSERVATIONS. A pair, not an individual, is the censused unit. A singing or otherwise observed male is interpreted as one pair. If a male is not observed, a female, a group of fledglings or an inhabited nest is also interpreted as one pair. Certain species (in Finland e.g. crossbills and Starlings) breed so early that they are commonly observed in flocks during the censuses. An average brood (two adults and the average number of young in a brood) is interpreted as one pair (see Sect. 8 of the point count instructions in the Manual).

9. FILLING IN SPECIFICATION FORM 3C AND LINE TRANSECT CENSUS FORM 3A. Records from Field Forms 3D are transferred to Specification Form 3C, from where the num-

bers of pairs are copied to Line Transect Census Form 3A. The instructions for filling in the forms are on the back of Line Transect Census Form (3B). It is recommended that forms 3A and 3C be filled in just after the census, in order to supplement details that possibly were left out from Field Forms.

10. REPEATING THE CENSUS. If line transect data are used to study annual population fluctuations, fixed lines are censused identically each year:

- use the same census date in relation to the breeding season (with a maximum difference of seven days from the census day of the first year)
- use the same census time, observer, speed and observing method.

Return the line transect forms to the Museum before the end of August!

SELECTED REFERENCES

- Hildén, O. & Väisänen, R.A. 1986: Population monitoring of Finnish land birds in 1984–85 by using point counts and line transects (in Finnish with English summary). – *Lintumies* 21:115–125.
- Järvinen, O. & Väisänen, R.A. 1976: Finnish line transect censuses. – *Ornis Fennica* 53:115–118.
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- Järvinen, O. & Väisänen, R.A. 1981: Methodology for censusing land bird faunas in large regions. – *Stud. Avian Biol.* 6:146–151.
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- Järvinen, O. & Väisänen, R.A. 1983b: Correction coefficients for line transect censuses of breeding birds. – *Ornis Fennica* 60:97–104.
- Routasuo, P. & Väisänen, R.A. 1990: Population monitoring of Finnish land birds in 1988–89 (in Finnish with English summary). – *Lintumies* 25:76–79.
- Väisänen, R.A., Hildén, O. & Pulliainen, E. 1989: Monitoring of Finnish land bird populations in 1979–88 (in Finnish with English summary). – *Lintumies* 24:60–67.

LINE TRANSECT CENSUS FORM				MB = Main Belt, SB = Survey Belt (main belt + supplementary belt)											
3A	Version VII/1990	Zool. Museum Univ. Helsinki		MB SB			MB SB			MB SB					
Transect number MB SB censused				Per api			Del urb			Cor rax					
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0 = No 1 = Yes				Cir cya			Ant tri			Stu vul					
Transect name				Acc gen			Ant pra			Pas dom					
K A A V I K A R S I K K O V A A R A				Acc nis			Ant cer			1 2 6 7 Fri coe					
km (0.1) MB width m <input type="text"/> <input type="text"/>				But but			Mot fla			1 3 Fri mon					
Observer number <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>				But lag			Mot alb			1 Car chl					
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Started h min Finished h min <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>				Lag mut			Lus lus			6 Lox pyt					
COORDINATES N lat. E long. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>				Tet rix			Lus sve			6 Car ery					
NATIONAL GRID 10 - km square S - N W - E <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>				Tet uro			Pho pho			3 Pin enu					
Natural history province <input type="text"/>				Pha col			Sax rub			3 Pyr pyr					
Ornithogeogr. region <input type="text"/>				Gru gru			Oen oen			8 Cal lap					
Botan. region (Ahti et al.) <input type="text"/>				Cha dub			Tur mer			8 Ple niv					
Botan. region (Kalliola) <input type="text"/>				Cha hia			Tur pil			Emb cit					
Mire region <input type="text"/>				Eud mor			Tur phi			Emb hor					
				Plu apr			Tur ili			Emb rus					
				1 Van van			Tur vis			Emb sch					
				Cal tem			Acr sch			ADDITIONAL SPECIES					
				Cal alp			Acr dum			MB SB (3+3 letters)					
				Lim fal			Acr ris			1 LOC NAE					
				Phi pug			Acr sci								
				Lym min			Hip ict								
				Gal gal			Syl cur								
				1 1 Sco rus			Syl com								
				Num pha			Syl bor								
				Num arq			Syl atr								
				Tri ery			Phy des								
				Tri tot			Phy sib								
				Tri neb			Phy col								
				1 Tri och			Phy lus								
				Tri gla			Reg reg								
				Act hyp			Mus str								
				Pha lob			Fic par								
				Ste lon			Fic hyp								
				Col liv			Aeg cau								
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				Cuc can			Par cri								
				Asi fla			Par ate								
				Apu apu			Par cae								
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3B HOW TO FILL IN THE LINE TRANSECT CENSUS FORMS

The forms should be filled in with clear hand-writing using a pencil and BLOCK LETTERS. All numbers are written so that they end at the right margin (e.g. transect length, date). Alphabetic data are started from the left margin (e.g. transect name). Boxes with black corners are filled in at the Museum.

TRANSFERRING DATA FROM FIELD FORM 3D TO SPECIFICATION FORM 3C

The TRANSECT NUMBER is filled in at the Museum. The observer marks the RUNNING NUMBER OF THE FORM (the first Specification Form is no. 2) and an abbreviation of the name of the transect. The DATE and NAME of the observer are needed only in the first Specification Form of the transect.

The code of the MAIN BELT HABITAT has three parts (see page 3E). STARTING POINT means the place where the habitat marked in the beginning of the row starts on the main belt, counted in metres from the beginning of the transect (an accuracy of 50 m is recommended here, but tiny patches of important habitats may be reported more accurately). If there are no birds recorded at the habitat section under study, the rest of the row is left empty and a new main belt habitat is started from the next row. Otherwise the first pair recorded is written at the row. The SPECIES is coded by 3+3-letter codes (see Appendix 1 in the Manual; the two letter codes for the most common species are listed on page 3D). The TYPE OF THE PAIR OBSERVATION is reported with the following codes: 1 = singing, 2 = other calls, 3 = sighting (3M = male, 3F = female, 3P = pair, 3N = nest), 4 = flying bird, 5 = flying flock transformed into pairs (if this results in more than one pair, each pair is coded on a separate row). The BELT is reported in the following way: M = the pair was observed on the main belt (within 25 m from the transect), Su = the pair was noticed on the supplementary belt (outside of the main belt).

HABITAT OF THE PAIR OBSERVATION means the main habitat where the bird was when it was first noticed. Here one can also present a specification code of the habitat (see page 3E), sometimes also the height of the trees or the area of the habitat. If the main habitat cannot be identified reliably, the space is left empty. REMARKS may, for example

All the pair observations from the same habitat section are written on successive rows without repeating the data of columns to the left of the species code. At least the TYPE and BELT should be presented for each observation. To make sure that all observations are transferred to Specification Form 3C, encircle the records on Field Form 3D.

TRANSFERRING DATA FROM SPECIFICATION FORM 3C TO LINE TRANSECT CENSUS FORM 3A

TRANSECT NAME contains the 6-letter code of the municipality (see Appendix 2 in the Manual) and the name of a place close by (leave one empty space between these). Usually both the MAIN BELT (MB) and the SURVEY BELT (SB) are censused, thus code 1 is marked in each box. Zero indicates that the observations of the main belt were not separated from the survey belt (MB = 0, SB = 1), or that the main belt was censused but the supplementary belt was not (MB = 1, SB = 0).

TRANSECT LENGTH is given with an accuracy of 0.1 km. MAIN BELT WIDTH is usually 50 m. The OBSERVER NUMBER is given by the Museum. COORDINATES of the central point of the transect are presented with an accuracy of one minute and the NATIONAL GRID COORDINATES with an accuracy of one 10-km square (see general instructions in the Manual). Weather is reported if it was in some way unsuitable for censusing.

The following data are transferred from Specification Form to Line Transect Census Form:

- column MB = pair numbers in the MAIN BELT
- column SB = pair numbers in the SURVEY BELT (= MAIN BELT + SUPPLEMENTARY BELT). When you check the numbers please note that there must be at least as many birds on the survey belt as on the main belt in each species!

On Line Transect Census Form, 126 ORDINARY SPECIES are listed. ADDITIONAL SPECIES are marked to the right using 3+3-letter codes (note that water birds are not reported). If there are more than 99 pairs of a species, the extra pairs are reported in the column for additional species (where two letter codes should not be used).

3B HOW TO FILL IN THE LINE TRANSECT CENSUS FORMS

The forms should be filled in with clear hand-writing using a pencil and **BLOCK LETTERS**. All numbers are written so that they end at the right margin (e.g. transect length, date). Alphabetic data are started from the left margin (e.g. transect name). Boxes with black corners are filled in at the Museum.

TRANSFERRING DATA FROM FIELD FORM 3D TO SPECIFICATION FORM 3C

The **TRANSECT NUMBER** is filled in at the Museum. The observer marks the **RUNNING NUMBER OF THE FORM** (the first Specification Form is no. 2) and an abbreviation of the name of the transect. The **DATE** and **NAME** of the observer are needed only in the first Specification Form of the transect.

The code of the **MAIN BELT HABITAT** has three parts (see page 3E). **STARTING POINT** means the place where the habitat marked in the beginning of the row starts on the main belt, counted in metres from the beginning of the transect (an accuracy of 50 m is recommended here, but tiny patches of important habitats may be reported more accurately). If there are no birds recorded at the habitat section under study, the rest of the row is left empty and a new main belt habitat is started from the next row. Otherwise the first pair recorded is written at the row. The **SPECIES** is coded by 3+3-letter codes (see Appendix 1 in the Manual; the two letter codes for the most common species are listed on page 3D). The **TYPE OF THE PAIR OBSERVATION** is reported with the following codes: 1 = singing, 2 = other calls, 3 = sighting (3M = male, 3F = female, 3P = pair, 3N = nest), 4 = flying bird, 5 = flying flock transformed into pairs (if this results in more than one pair, each pair is coded on a separate row). The **BELT** is reported in the following way: M = the pair was observed on the main belt (within 25 m from the transect), Su = the pair was noticed on the supplementary belt (outside of the main belt).

HABITAT OF THE PAIR OBSERVATION means the main habitat where the bird was when it was first noticed. Here one can also present a specification code of the habitat (see page 3E), sometimes also the height of the trees or the area of the habitat. If the main habitat cannot be identified reliably, the space is left empty. **REMARKS** may, for example,

All the pair observations from the same habitat section are written on successive rows without repeating the data of columns to the left of the species code. At least the **TYPE** and **BELT** should be presented for each observation. To make sure that all observations are transferred to Specification Form 3C, encircle the records on Field Form 3D.

TRANSFERRING DATA FROM SPECIFICATION FORM 3C TO LINE TRANSECT CENSUS FORM 3A

TRANSECT NAME contains the 6-letter code of the municipality (see Appendix 2 in the Manual) and the name of a place close by (leave one empty space between these). Usually both the **MAIN BELT (MB)** and the **SURVEY BELT (SB)** are censused, thus code 1 is marked in each box. Zero indicates that the observations of the main belt were not separated from the survey belt (MB = 0, SB = 1), or that the main belt was censused but the supplementary belt was not (MB = 1, SB = 0).

TRANSECT LENGTH is given with an accuracy of 0.1 km. **MAIN BELT WIDTH** is usually 50 m. The **OBSERVER NUMBER** is given by the Museum. **COORDINATES** of the central point of the transect are presented with an accuracy of one minute and the **NATIONAL GRID COORDINATES** with an accuracy of one 10-km square (see general instructions in the Manual). Weather is reported if it was in some way unsuitable for censusing.

The following data are transferred from Specification Form to Line Transect Census Form:

- column MB = pair numbers in the **MAIN BELT**
- column SB = pair numbers in the **SURVEY BELT (= MAIN BELT + SUPPLEMENTARY BELT)**. When you check the numbers please note that there must be at least as many birds on the survey belt as on the main belt in each species!

On Line Transect Census Form, 126 **ORDINARY SPECIES** are listed. **ADDITIONAL SPECIES** are marked to the right using 3+3-letter codes (note that water birds are not reported). If there are more than 99 pairs of a species, the extra pairs are reported in the column for additional species (where two-letter codes should not be used).

LINE TRANSECT SPECIFICATION FORM

3C

Version
III/1990Zool. Museum
Univ. Helsinki

Transect number Form number 2 Transect name KAABI, KARSIKKOVAARA Date 11 6 1990 Observer _____

	MAIN BELT HABITAT	STARTING POINT	SPECIES	PAIR OBSERVATIONS		REMARKS
				TYPE	BELT	
1	Va A4	0	DEL URB	3	A	Am
2			FC	1	A	
3			MOT ALB	4	A	
4			FIC HYP	1	A	
5			AA	3	P	=MB
6			CARERY	1	A	
7			TURPIL	2	A	
8			FM	1	A	
9			SB	1	A	
10			PT	1	A	
11			TI	1	A	
12			SYL COM	1	P	PLK3
13			TURPIL	4	A	
14	L4K8	150	ACRDUM	3P	P	=MB
15			TI	1	A	
16			TURPIL	2	A	
17			PARMAJ	2	A	=MB
18			EC	1	A	
19	V2A4	200	SAXRUB	3	A	X
20			AA	3	P	=MB
21			PRU MOD	1	A	
22			CARERY	1	A	
23			AT	1	A	L3K10
24			LOC NAE	1	A	=MB
25			EC	1	A	L3K10
26	K3K20	290	TURPHI	3	P	=MB
27			TURPHI	1	A	
28			AT	1	A	
29			FC	2	A	
30			ER	1	A	

HAB. RUINED BUILDING WITH
DECIDUOUS BUSHES

LINE TRANSECT FIELD FORM 3D Version V/1990		Transect name <u>KARSIKKOVAARA</u>	Date <u>11 . 6 1990</u>	Observer _____
SUPPLEMENTARY BELT 500 xScwr xER 450 400 350 xAT 300 xEC 250 x AA x Sub (runs+bushes) 200 x O 2 Adum 150 x Scwr (PLK3) 100 x Flug 050 x FC 000 O Durb 2 Am	50 M WIDE MAIN BELT OTphi x O 2 Adum	SUPPLEMENTARY BELT x Peri v FC x Tphi xEC PLL3K10 x AT X Lmae VaA4 PLL3K10 x Cery x Pmaj xEC x Pmaj x Tpil x Tpil x TI x TI x PT x SB x FM x Tpil x Cery	MAIN BELT HABITATS 500 Rr K10-15 Nm A3 400 K3K20 300 L3K10 250 dense shrub 200 L4K8 150 100 050 VaA4 (small fields:ditches only on edges) 000	

No. of the first km = 0, second = 1, etc. No. of km 0 Time 4.25 - 5.05 Notes for 500 m. Start from the lower margin

CODES OF OBSERVATION TYPES: x = singing, v = other calls, o = sighting (possible specifications: ♂ ♀, ♀, or NEST), ♂ = flying (arrow shows the direction; e.g. 5 ♂ = a flock of 5).

SPECIES CODES. Use two-letter codes for the following 12 species:
 AA = Skylark ER = Robin PT = Willow Warbler FC = Chaffinch

3E HABITAT CODES IN LINE TRANSECT CENSUSES. The habitat code has three parts. A CAPITAL letter indicates the main habitat and the following number or letter specifies it. After these write the average height of the trees in wooded habitats and the approximate area of the open area in open habitats. When a new habitat begins in the main belt draw a horizontal line on Form 3D and write the habitat code in the habitat column on the right.

HABITAT	SPECIFICATION	TREE HEIGHT or AREA
K SPRUCE FOREST (spruce dominating)	1 very barren	Hxx = average tree height, if uniform tree cover exists (e.g. H20 = 20 m)
M PINE FOREST (pine dominating)	2 barren	
S MIXED FOREST (coniferous and deciduous trees about equally)	3 mesic	
L DECIDUOUS FOREST (deciduous trees dominating)	4 nutrient rich	
	5 rich	
P SCRUB (< 5 m; mountain birch forests are regarded as forests regardless of height)	h coniferous saplings	Hxx = average height of saplings and bushes
	s coniferous saplings and deciduous bushes	
	l deciduous bushes	
H CLEAR-FELLED FOREST	h not ploughed	Ax = area class of the area (e.g. A4 = 1-10 hectares)
	a ploughed	
R PINE MIRE (peatland growing pines); ditched pine mires are often included in scrub. Spruce mire is marked as K, S or L depending on dominating trees.	r natural condition	Hxx = average tree height
	o ditched	
N OPEN MIRE	n "ordinary" open mire	Ax = area class of the mire
	m "wet" (with pools)	
	k "dry" mire	
V ARABLE LAND (and shore meadows)	a open ditched field	Ax = area class of a field or a shore meadow
	s field with subsurface drainage	
	r shore meadow	
A SETTLED AREA	m rural	Hxx = average height of trees
	t villages, suburbs	
	k urban (many-storied buildings)	
	p park	
T MOUNTAIN	n heath	Ax = area class of the moor, mire or stony ground
	s mire	
	k stony ground	
X OTHER (describe)		

Area classes (in parenthesis the measurements of a square showing roughly the upper limit):

A1 = less than 0.01 ha (10 x 10 m) A4 = 1-10 hectares (300 x 300 m)
 A2 = 0.01-0.1 ha (30 x 30 m) A5 = 10-100 hectares (1000 x 1000 m)
 A3 = 0.1-1 ha (100 x 100 m) A6 = over 1 km² (over 1000 x 1000 m).

Height classes (average height of dominating trees, ignoring individual high trees):

H5 = 2.5-7.5 m H15 = 12.5-17.5 m H25 = 22.5-27.5 m
 H10 = 7.5-12.5 m H20 = 17.5-22.5 m H30 = 27.5-32.5 m