

FOLIA FORESTALIA 186

ETSÄNTUTKIMUSLAITOS · INSTITUTUM FORESTALE FENNIAE · HELSINKI 1973

JAATINEN ESKO

RECREATIONAL UTILIZATION
OF HELSINKI'S FORESTS

- No 134 Aarne Reunala & Ilpo Tikkanen: Metsätilanomistajat metsätalouden edistämistoiminnan kohteena Keski-Suomessa.
Non-farmer forest owners and promotion of private forestry. 4,—
- No 135 Pentti Hakkila & Olavi Saikku: Kuoriprosentin määrittäminen sahanhakkeesta.
Measurement of bark percentage in saw mill chips. 1,50
- No 136 Ukko Rummukainen: Vesakontorjunta-aineiden ja rikkakasvinhävitteiden käytöstä metsänviljelyaloilla Suomessa vuosina 1969—1970.
On the use of brush and weed killers on forest regeneration sites in Finland in 1969—70. 4,—
- No 137 Eino Mälkönen: Näkökohtia metsämaan muokkauksesta.
Some aspects concerning cultivation of forest soil. 1,50
- No 138 P. J. Viro: Die Walddüngung auf finnischen Mineralböden. 2,50
- No 139 Seppo Kaunisto: Lannoituksen vaikutus istutuksen onnistumiseen ja luonnontaimien määrään rahkanevalla. Tuloksia Kivisuon koekentältä.
Effect of fertilization on successful planting and the number of naturally born seedlings on a fuscum bog at Kivisuo experimental field. 1,50
- No 140 Matti Ahonen & Markku Mäkelä: Juurakoiden irrottaminen maasta pyöräkuormaajilla.
Extraction of stump-root systems by wheel loaders. 2,50
- No 141 Yrjö Vuokila: Taimiston käsittely puuntuotannolliselta kannalta.
Treatment of seedling stands from the viewpoint of production. 4,—
- No 142 Pentti Koivisto: Kainuun ja Pohjanmaan talousmänniköiden kehityksestä.
On the development of Scots pine stands in central Finland. 2,—
- No 143 Matti Huovinen, Soini Silander, Paavo Tiihonen & Juho Yli-Hukkala: Hakkuumiehen määrittämään runkolukuun perustuva leimikon pystymittaus.
Stichprobenweise Massenermittlung am stehenden Holz eines ausgezeichneten Bestandes auf Grund von Stammzahlaufnahme durch den Holzfäller. 2,—
- No 144 Esko Leinonen: Puutavaran mittaus kuorma- ja otantamenetelmillä.
Measurement of timber by the load and sampling methods. 4,—
- No 145 Esko Leinonen: Tilavuuspaino-otanta sahatukkien mittauksessa.
Green density sampling in sawlog scaling. 1,50
- No 146 Markku Mäkelä: Kanto- ja juuripuun kuljetus.
Transport of stump and root wood. 2,50
- No 147 Pentti Hakkila, Jouko Laasasenaho & Kari Oittinen: Korjuuteknisiä oksatietoja.
Branch data for logging work. 2,—
- No 148 Pertti Mikkola: Metsähukkapuun osuus hakkuupoistumasta Suomessa.
Proportion of waste wood in the total cut in Finland. 2,—
- No 149 N. A. Osara: Some trends in world forestry with respect to Finland.
Eräitä metsä- ja puutalouden kehitysilmiöitä maailmassa ja Suomessa. 1,—
- No 150 Ole Oskarsson: Suomalaiset plusmännyn ja pluskuuset.
Finnish plus trees of Scots pine and Norway spruce. 14,—
- No 151 Pertti Harstela & Paavo Valonen: Työn tuotos, työntekijän fyysinen kuormittuminen ja tärinäaltistus pelkässä kaadossa.
Work output, physical load of the worker and exposure to vibration in feeling. 5,—
- No 152 Kari Keipi: Lannoituskustannukset ja tuottojen käsittely metsän lannoituksen kannattavuuslaskelmissa Norjassa, Ruotsissa ja Suomessa.
The concept of forest fertilization returns in Norway, Sweden and Finland. 4,—
- No 153 Hannu Vehviläinen: Palkkaus ja työolot metsäkonetöissä syksyllä 1971.
The working conditions and earnings of forest-machine operators in autumn 1971 in Finland. 9,—
- No 154 Paavo Tiihonen: Kiintokuutiometrin käyttöön perustuvat männyn, kuusen ja koivun kuitupuutaulukot.
Massentafeln mit dem Festmeter als Masseinheit für Kiefern-, Fichten- und Birkenfaserholz. 7,—
- No 155 Paavo Tiihonen: Kiintokuutiometrin käyttöön perustuvat männyn ja kuusen tukkipuutaulukot.
Massentafeln mit dem Festmeter als Masseinheit für Kiefern- und Fichtenblochholz. 2,50
- No 156 Eljas Pohtila: Tulokset Perä-Pohjolan valtionmailla vuosina 1930—45 tehdyistä kuusiviljelyistä.
Results of spruce cultivation from 1930—45 on state-owned lands in Perä-Pohjola. 1,50
- No 157 Eino Mälkönen: Hakkuutähteiden talteenoton vaikutus männikön ravinnevaroihin.
Effect of harvesting logging residues on the nutrient status of Scotch pine stands. 1,50
- No 158 Kaarlo Kinnunen & Erkki Lähde: Kylvöajankohdan vaikutus kennotaimien kehitykseen ensimmäisen kasvukauden aikana.
The effect of sowing time on development during the first growing season of seedlings grown in paper containers. 2,50
- No 159 Pentti Hakkila: Oksaraaka-aineen korjuumahdollisuudet Suomessa.
Possibilities of harvesting branch raw material in Finland. 2,—
- No 160 Kullervo Etholén: Männyn viljelyn tulos Pohjois-Suomessa ja siemenen alkuperä.
The success of artificial regeneration of Scots pine in Northern Finland and origin of seed.
Состояние культур сосны в Северной Финляндии и происхождение семян. 3,—

Esko Jaatinen

RECREATIONAL UTILIZATION
OF HELSINKI'S FORESTS

FOREWORD

This work is part of a larger study the purpose of which is to clarify, amongst other things, factors affecting demand for recreation forests, evaluations regarding the recreation environment in these forests, and the ideal structure of recreation forests. A working group consisting of SEPPÖ KELLOMÄKI, LASSE LOVEN, and TIMO KAUPPI under the guidance of professor PÄIVIÖ RIIHINEN planned the general hypotheses and compiled the empirical material with the financial aid of the National Agricultural and Forestry Research Council.

This part of the study used material obtained by this working group. A working arrangement was also established between the Institute of Forest Economics of Helsinki University and Helsinki City Planning Department, with the financial support of the latter.

The Finnish report was published by Helsinki City Planning Department In April in 1973 (Esko Jaatinen: Helsingin metsäisten ulkoilualueiden virkistyskäytön sosiaaliset taustatekiöt). This paper is constructed on the basis of that report with certain modifications and corrections in the department of Forest Economics of the Finnish Forest Research Institute.

LASSE LOVEN tested the compiled data and guided the computer calculations. LAURI HEIKINHEIMO, VELI-PEKKA JÄRVELÄINEN, MATTI PALO and HEIKKI JUSLIN criticized the English manuscript. ASHLEY SELBY checked the translation. My thanks to those mentioned and unmentioned persons who helped in the preparation of this study.

Helsinki, September 1973.

Esko Jaatinen

CONTENTS

	page
1. INTRODUCTION AND STUDY OBJECTIVES	4
2. SAMPLE	4
3. ANALYSIS	5
4. RECREATION AREAS UNDER STUDY	6
5. VISITORS TO THE RECREATION AREAS	6
5.1 Number of visits	6
5.2 Socio-economic background to forest recreation	7
5.2.1 Demographic information	7
5.2.2 Social status	8
5.2.3 Place of residence during childhood	12
5.3 Choice of recreation companions and recreation activities	12
5.4 Places of residence of the recreational participants	13
6. RECREATIONAL UTILIZATION	14
6.1 Analysis of the recreation activity on the individual level	14
6.2 Analysis of the recreation activity on the environmental level	17
7. SUMMARY	21
8. TULOSTEN TIIVISTELMÄ	22
9. BIBLIOGRAPHY	25
10. APPENDICES	26

LIST OF TABLES

	page
Table 1. Distributions of visitors' immediate previous visits to the recreation areas.	6
Table 2. Sex distributions of the visitors to the recreation areas and the population of Helsinki (15 years age and over)	7
Table 3. Age distributions of the visitors to the recreation areas and the population of Helsinki (15 years age and over)	8
Table 4. Marital status of the visitors to the recreation areas and the population of Helsinki (15 years age and over)	8
Table 5. Education of the visitors to the recreation areas and the population of Helsinki (15 years age and over)	8
Table 6. Income level per household of the visitors to the recreation areas and the population of Helsinki (15 years age and over)	9
Table 7. Possession of cars and summer cottages per household among the visitors to the recreation areas and the population of Helsinki (15 years age and over)	10
Table 8. Occupational status of the visitors to the recreation areas	10
Table 9. Classification of the visitors to the recreation areas into four social groups and the corresponding groups of Helsinki's population (15 years age and over)	11
Table 10. Place of childhood residence of visitors to the recreation areas (15 years age and over)	12
Table 11. Recreation companionship in the recreation areas	12
Table 12. Recreation activities pursued in the recreation areas during different seasons and during the whole study period	13
Table 13. Distribution of outdoor recreation participants in Helsinki city district	13

	page
Table 14. Relative number of outdoor recreationists from the city districts (‰ from the population of each district)	14
Table 15. Distribution of outdoor recreational participants according to the distance of place of residence and the recreation area	14
Table 16. Visitors to the recreation areas classified according to the time lapsed since the previous visit	15
Table 17. Regression models of the frequency of visits to the recreation areas and the correlations between the dependent variable and the independent ones used in the models	16
Table 18. Rotated principal components of the environmental factors	19
Table 19. Regression models of the mean visit frequencies to Keskuspuisto and Luukka per sections of Helsinki and correlations between the mean visit frequencies and the independent variables of the models	19
Table 20. Correlation and regression coefficients between the visit frequency and the distance from the recreation area to a user's place of residence (individual level) and the correlations between the average visit frequency and average distances from the recreation area to the sections of the city (environmental level)	21

LIST OF FIGURES

	page
Figure 1. Age distributions of the visitors to recreation areas and the population of Helsinki (15 years age and over)	7
Figure 2. Income distributions of the recreationists and the population of Helsinki (15 years age and over)	9
Figure 3. Occupational status of the recreationists and the social grouping of the recreationists and the population of Helsinki (15 years age and over)	11
Figure 4. Visit frequencies to Keskuspuisto and Luukka	15
Figure 5. Correlation between the outdoor recreation activity and the distance from the place of residence to the recreation area	17

1. INTRODUCTION AND STUDY OBJECTIVES

The demand for recreational utilization of nature has a close relationship with the structure of society and its changes. Recreation becomes an institution when society has a structure such that there are needs for recreation and possibilities to satisfy them. Rapid industrialization and urbanization are typical features of our changing society. The growth of production and consumption, and automation are typical characteristics of industrialized societies. These developments increase productivity and material well-being, tend to decrease working-time and so increase time available for leisure.

When society changes, manual outdoor work decreases and indoor sedentary work increases. The earning of one's living no longer satisfies the need for physical exercise. At the same time places of work and residence often are centred in a worse environment than earlier, which increases the need for a healthy leisure environment. Therefore we can suppose that the potential need for outdoor recreation is greatest in the large densely-populated areas. The rapid growth of these urban areas creates a need to provide outdoor recreation areas.

An attempt is made to keep land use within the control of regional planning, likewise, regional plans try to establish and conserve outdoor recreation areas. The outdoor recreation areas situated in the city or in its immediate vicinity satisfy the daily demands of people living in the city (Seppänen, 1967). The outdoor recreation areas further away from the city satisfy more the demands created by

weekend and vacation leisure time. Further, there are the areas of national parks, and vacation settlement areas, the demands on which are based largely on annual leisure time. (Seppänen, 1967).

This paper seeks to examine the visitors and the nature of recreational utilization of Keskuspuisto and Luukkaa, two of Helsinki's forest recreation areas. Keskuspuisto lies inside the city boundary whilst Luukkaa is located about 20 kilometres outside the city. The population participating in outdoor recreational activities is described, and a comparison made between the visitors to each area.

The locations of these areas place each in a different social environment which should be reflected in each case by *the social backgrounds of the visitors*. This should be so in terms of access, and also to *the hypothesis* that Keskuspuisto serves a daily demand and Luukkaa a weekend demand for recreational space. Furthermore *differences* between the visitors to both recreation areas and the population of Helsinki (reference group) are studied. *Relationships between the recreational activity and aspects of the socioeconomic* (age, sex, income, education etc.) *and environmental* (air pollution, noise, density of population, amount of park areas etc.) *background factors of visitors are studied*. As access to these areas clearly differs each area is supposed to fulfill different needs. These needs are considered from socioeconomic and environmental viewpoints.

2. SAMPLE

A working group consisting of Seppo Kellomäki, Lasse Loven, and Timo Kauppi under the guidance of professor Päiviö Riihinen (Department of Social Economics of Forestry), planned the general hypotheses and compiled

the empirical material during the year 1971 by *interviewing* visitors to Keskuspuisto and Luukkaa. Environmental valuations concerning the different places of interview, information about the recreation activities and visit fre-

quency were, amongst other things, inquired. A questionnaire, sent later to the interviewed persons, sought information, for instance, regarding assessment of the forest environments for recreation, opinions concerning the area in question, and the social background of the recipient. The author was not a member of the working group, and did not take part in the compiling of the data.

The study period extended over the four seasons and the interviews were made on Saturdays and Sundays. There were eight places of interview in Keskuspuisto and five in Luukkaa. The interviewed persons were selected by interviewing every third passer-by over the age of 15 years. Visitors moving in groups, when chosen for interview, selected their own spokesman, who then ceased to represent the group and was considered on an individual basis.

This method may cause a possible sample error, because it can be supposed that the representative selected by a group are more often older than younger persons of a group (for instance father or mother of a family). According to the sample of this study 75 % from the visitors to Luukkaa and 52 % from the visitors to Keskuspuisto were estimated to move in groups during the study period. Therefore the older age classes may be over-representative in the sample. Neither the existence nor the magnitude of this possible sample error can be estimated because age distributions of the visitor groups were not recorded during interview.

Altogether 1582 interviews were made during weekends in Keskuspuisto and Luukkaa. The questionnaire gave 969 complete answers from the interviewed visitors in Keskuspuisto and

356 complete answers from the interviewed persons in Luukkaa. The number of incomplete and nonreturns was 259. The valid returns can therefore be considered as being 84 %.

The interviewed persons who suitably answered the questionnaire (1325 persons) form the sample used in this study. The weekend visitors over the age of 15 years to Keskuspuisto and Luukkaa form the sample population of the study. The population over the age of 15 years of Helsinki was used as a reference population. Although the best available statistics from the socio-economic background of Helsinki's population were used, their comparability with the material compiled for this study is not always good, because the statistics of Helsinki have been compiled at different times, on different grounds, and for different purposes. Making information from different sources comparable to each other is often very difficult and always creates danger of erroneous conclusions. The possible over-representation of the older age classes in the sample of this study, mentioned earlier, may also upset the comparisons of socioeconomic background factors between outdoor recreation participants and the population of Helsinki.

The total number of visitors to the two study areas during the period of data collection is not known and consequently the *representativeness* of the sample cannot be calculated. The size of the sample used is, however, considered sufficiently large for the purpose of this study. The reliability of the empirical data was found to be quite high by Kellomäki, 1973 (unpublished manuscript).

3. ANALYSIS

The analytical goal of this study is to describe the outdoor visitor population and to explore statistical relationships between recreational utilization and the socio-economic and environmental background factors of these visitors. The description of the outdoor visitors and comparisons with the population of Helsinki is made using *tabulating techniques*. The testing of differences between the estimated

distributions is made with the X^2 -test. Statistical significance in this analysis is defined by the 5 % risk level, and statistically very significant by the 1 % risk level. Where the level of risk is greater than 5 % the statistical value is regarded as not significant, and if used the actual level of risk is stated.

The statistical relationships between the variables used in this study are studied using

correlation and linear regression analyses. With regard to regression analysis *principal component analysis* is applied in order to eliminate linear correlations between the independent variables. However, it must be remembered

that the above mentioned methods of analysis do not necessarily reveal the causal relationships between the factors (cf. Eskola, 1967, pp. 310–312, 258–259).

4. RECREATION AREAS UNDER STUDY

Although the physical features of the recreation areas, which possibly affect the demand on them for recreation, are excluded from this study, some information about the areas is necessary.

Keskuspuisto is a forest recreation area of about 900 hectares which is located wholly inside the city boundary and which extends from the city centre to the northern boundary. *Keskuspuisto* has several sub-divisions of differing nature connected by a dense net work of paths, and ski-trails in winter. In this study skiing means crosscountry skiing.

The *Luukkaa* outdoor area is situated about 23 kilometres north-west of Helsinki. It consists of about 620 hectares of recreational forest, with many paths, and ski-trails in winter. *Luukkaa* has lakes which have good swimming beaches and several camping areas.

A comparison of *Luukkaa* and *Keskuspuisto* shows that their physical features are very similar, offering the same opportunities for the elementary outdoor activities (walking, running, skiing, swimming and cycling). The areas differ from each other in that some special outdoor activities, such as horseriding, archery, and facilities of the sport centre in *Pirkkola* are available in *Keskuspuisto*, and activities associated with water are available in *Luukkaa*. The different location of the areas with respect to Helsinki is regarded as the most important separating feature in this study. Because of the different locations there is an important difference in the

nature of the demand on the areas: *Keskuspuisto* located in the city district satisfies the demand for both weekend and daily outdoor recreation; *Luukkaa* is more able to satisfy weekend demands (see p. 4). Table 1 shows the distribution of visitors' immediate previous visits to the study areas.

Table 1. Distributions of visitors' immediate previous visits to the recreation areas.

previous visit to the area	Keskuspuisto Luukkaa	
	%	%
during the weekend of interview	21	9
the preceding Friday	11	2
" Thursday	5	1
" Wednesday	4	1
" Tuesday	2	1
" Monday	5	3
earlier	52	83
	100	100
	(n = 969)	(n = 354)

In *Keskuspuisto* 48 % and in *Luukkaa* 17 % of the former visits have taken place during the same weekend and during weekdays of the former week. The relative number of visits having taken place during the weekdays of the week preceding the weekend of interview was in *Keskuspuisto* 27 % and in *Luukkaa* only 8 %.

5. VISITORS TO THE RECREATION AREAS

5.1 Number of visits

There are very few reports on the number of visits to *Keskuspuisto*, but it has been

estimated that there were about 2 million visits to *Keskuspuisto* in the year 1970 (*Keskuspuiston osayleiskaava*, 1971).

In *Luukkaa* the number of visits has been

counted since the year 1965 and they are as follows (Urheilun ja ulkoilulautakunnan toimintakertomukset 1967–70):

year	number of visits
1965	85 000
1966	130 000
1967	160 000
1968	170 000
1969	230 000
1970	195 000

These numbers show the increasing demand on recreation in the forest environment. Monthly statistics show a heavy concentration of visits during the summer months, for example over 70 % of visits took place during the period June–August in 1969. The proportion of the Helsinki population interested in recreation in a forest environment cannot be estimated because of the anonymous nature of the statistics.

5.2 Socio-economic background to forest recreation

5.2.1 Demographic information

Sex. Sex has been found to be an important variable in physical exercise in many studies. Men are, in general, found to be more active than women (ORRRC study Report 20, 1962, pp. 14–15, 27–28). In a Swedish outdoor recreation report (Friluftslivet i Sverige, 1964, p. 37) it was found that although there were activity differences between sexes in different outdoor recreation activities the significant differences between sexes in outdoor recreation activity in general were not found.

Table 2. Sex distributions in the recreation areas and the population of Helsinki (15 years age and over).

	% of visitors to Luukkaa	% of visitors to Keskuspuisto	% of Helsinki's population (1970) ¹⁾
men	58	64	44
women	42	36	56
	100 (n=352)	100 (n=967)	100

1) Source: Helsingin tilastollinen vuosikirja 1970

Table 2 shows the differences between sexes in the utilization of forest recreation areas.

Compared with the population of Helsinki the difference between sexes is statistically significant only in Keskuspuisto. The relative number of women would seem to increase when Luukkaa is considered. But the difference between the sex estimates of the two areas is not, however, statistically significant.

Age. ¹⁾ Age has often been found another important variable in outdoor recreation. In general it has been found that outdoor recreation decreases as age increases (Kämäräinen, 1970 pp. 81–83, Friluftslivet i Sverige, 1964 pp. 42–47, ORRRC Study, Report 20, 1962, pp. 15–24, 28). The comparisons have been made on the basis of the different extents of outdoor recreational activity and so the interest in outdoor recreation within each age class has remained unknown.

1) The age distributions and figure 2 in the Finnish report (Jaatinen, 1973, pp. 14–15) are incorrect because of a age data classification error. This error did not affect the analysis of recreational utilization for which unclassified age distributions were used.

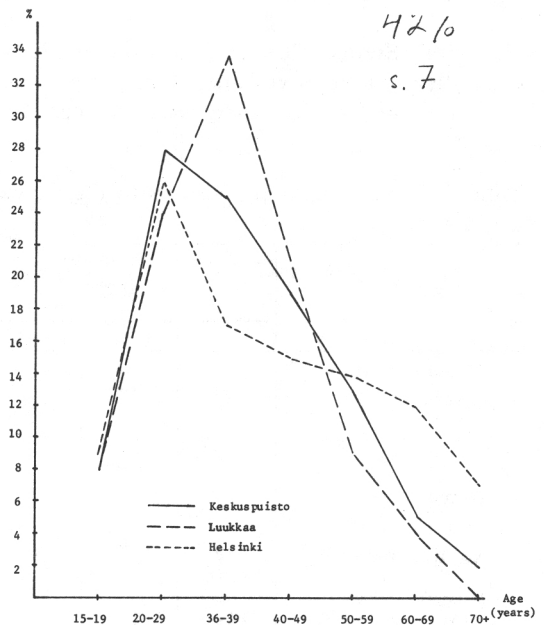


Figure 1. Age distributions of the visitors to the recreation areas and the population of Helsinki (15 years age and over).

Table 3. Age distributions of the visitors to the recreation areas and the population of Helsinki (15 years age and over).

age-class	% of visitors to Luukkaa	% of visitors to Keskuspuisto	% of Helsinki's population (1970) ¹⁾
15-19	8	8	9
20-29	24	28	26
30-39	34	25	17
40-49	21	19	15
50-59	9	13	14
60-69	4	5	12
70-	0	2	7
	100 (n=352)	100 (n=967)	100

1) Source: Helsingin tilastollinen vuosikirja 1970.

From the estimates of the age distributions in table 3 it can be seen that outdoor recreation interest increases until age-class 40-49 years and then increasingly decreases with age in the age-classes above 40-49 years. There are more persons belonging to young and old age classes among visitors to Keskuspuisto than among visitors to Luukkaa. No differences were found in the estimates of age distributions between sexes. The age distributions are represented in figure 1.

Marital Status. The estimates of marital status distributions of visitors to both recreation areas are similar. Compared with the corres-

ponding distribution for the city, no statistically significant difference was found.

Table 4. Marital status of the visitors to the recreation areas and the population of Helsinki (15 years age and over).

Marital status	% of visitors to Luukkaa	% of visitors to Keskuspuisto	% of Helsinki's population (1970) ¹⁾
unmarried	38	38	33
married	57	57	54
others	<u>5</u>	<u>5</u>	<u>13</u>
	100 (n=336)	100 (n=908)	100

1) Source: Helsingin tilastollinen vuosikirja 1970.

5.2.2 Social status

The influence of income, education and occupation on participants in outdoor recreation in forest environments is reflected in the education and income level and possession of some durable commodities of the visitors to recreation areas. By using the classification of occupations (Rauhala, 1969) into nine different social classes, the above mentioned variables are compensated with one variable describing social status. The classification of Rauhala has been made on the ground of statuses of different occupations and it has a strong correlation with income.

Table 5. Education of the visitors to the recreation areas and the population of Helsinki (15 years age and over).

Education	% of visitors to Luukkaa			% of visitors to Keskuspuisto			% of Helsinki's population (1965) ¹⁾		
	all	male	female	all	male	female	all	male	female
- elementary public school	37	42	30	42	45	35	68	69	68
- intermediate school	26	22	31	24	21	30	17	14	19
- student (maturiculation examination)	37	36	39	34	34	35	15	17	13
- from which academic degree	$\frac{(19)}{100}$	$\frac{(19)}{100}$	$\frac{(21)}{100}$	$\frac{(17)}{100}$	$\frac{(19)}{100}$	$\frac{(14)}{100}$	$\frac{-}{100}$	$\frac{-}{100}$	$\frac{-}{100}$
	(n=343)	(n=180)	(n=161)	(n=948)	(n=607)	(n=339)			

1) Source: Helsingin kaupungin tilasto VII: 4, 1968.

Education. Compared with the education distribution of the population of the city the visitors to both recreation areas have very significantly higher education (table 5). Although the visitors to Luukkaa may have a better education than the visitors to Keskuspuisto the differences in the estimated distributions are not statistically significant. The estimated education of female visitors to both Keskuspuisto and Luukkaa is significantly higher than the estimated education of male visitors. This indicates that the statistical relationship between education and outdoor recreation may be stronger among women than among men.

Income and durable commodities. The income level in this study is the monthly income of a person and his household before taxes. Information regarding income was inquired in the questionnaire (appendix 9) by the question: "Could you estimate your summed disposable monthly income (mk/month) before taxes?" Because of the unclear form of the question it is possible and even probable that some persons gave information regarding only their own individual income in spite of possible income of other members of their household and others gave information regarding the summed income of their whole household. Therefore the income figures in this data are probably smaller than the real income figures summed for the whole household. For this reason the comparison of income distributions with the income distribution of households in Helsinki is not wholly reliable. Because the income classification of the households of Helsinki used in this study was made according the value of money in

1969, the class boundaries of income classification were deflated with the cost of living index (1951=100) onto the level of money value in 1971. (For the method of compiling the income information of the households of Helsinki and the reliability of this information, see Helsingin kaupunkiseudun liikennesuunnittelun koordinoitointoimiston julkaisu 4/1971.)

Statistically significant differences were found between the estimated income distribution of visitors to Luukkaa and their households and estimated income distribution of visitors to Keskuspuisto and their households as well as between the estimated income distribution of visitors to Luukkaa and their households and income distribution of Helsinki's households. The low income class (≤ 1600 Fmks) is under-representative, the middle income class (1601–2600 Fmks) is proportionally representative and the high income class (>2600 Fmks) is over-representative among the visitors to Luukkaa compared with the population of Helsinki. Among the visitors to Keskuspuisto

Table 6. Income level per household of the visitors to the recreation areas and the population of Helsinki (15 years age and over).

Income Fmk	% of visitors to Luukkaa	% of visitors to Keskuspuisto	% of households of Helsinki's population (1969) ¹⁾
(0)	(2)	(6)	—
1–1600	39	48	57
1601–2600	26	25	25
2601+	33	21	18
	<u>100</u>	<u>100</u>	<u>100</u>
	(n=262)	(n=765)	

1) Source: Helsingin kaupunkiseudun liikennesuunnittelun koordinoitointoimiston julkaisu n:o 4/1971.

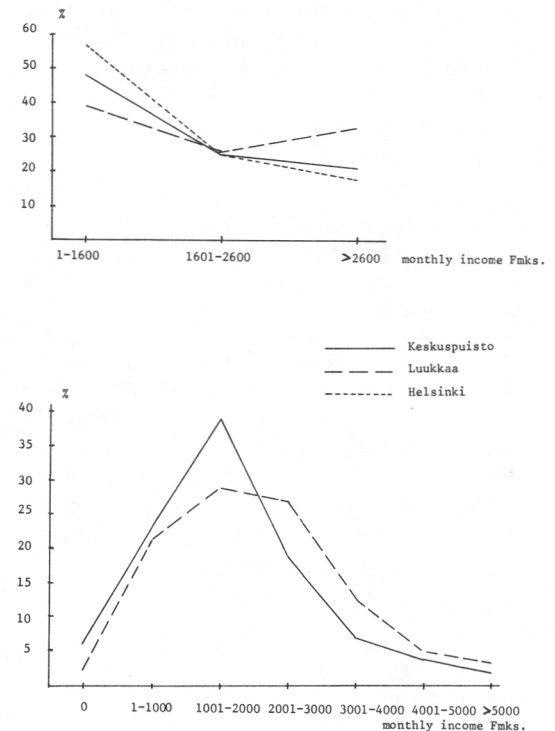


Figure 2. Income distributions of the recreationists and the population of Helsinki (15 years age and over).

all income classes are proportionally representative compared with Helsinki's population.

The location of Luukkaa about 20 kilometres outside the city (see p. 6) can be presumed to have a relationship with the differences in income levels mentioned above. The possession of a private car may be an important prerequisite for getting to Luukkaa and it may restrict the visits of people belonging to low income classes. According to this hypothesis owners of private cars can be expected to be relatively more represented among visitors to Luukkaa than among visitors to Keskuspuisto. The income distributions of visitors to the recreation areas and the population of Helsinki are represented in figure 2.

The ownership of cars and other durable commodities were inquired by the question: "Do you own some of the following durable commodities?" Because of the form of this question it remains unclear if it is meant an individual ownership or ownership per household, although it can be generally assumed that individual ownership and household ownership in a family control will coincide. But it is possible that the comparability of these ownership figures with the ownership figures per household of the corresponding durable commodities in the statistics of Helsinki (table 7) is not wholly satisfactory.

Table 7. Possession of cars and summer cottages per household among the visitors to the recreation areas and the population of Helsinki (15 years age and over).

	% of visitors to Luukkaa	% of visitors to Keskuspuisto	% of households of Helsinki's population (1970) 1)
have car	68	46	34
have no car	32	54	66
	<u>100</u>	<u>100</u>	<u>100</u>
	(n=321)	(n=869)	
have summer cottage	21	24	18
have no summer cottage	79	76	82
	<u>100</u>	<u>100</u>	<u>100</u>
	(n=292)	(n=835)	

1) Source: The statistical office of the City of Helsinki (oral inquiry).

The estimated ownership of cars is significantly greater among the visitors to Luukkaa than among the visitors to Keskuspuisto. The difference between the distributions of Helsinki and Keskuspuisto is not statistically significant. This gives support to the above mentioned supposition that a private car is more necessary for travelling to Luukkaa than for travelling to Keskuspuisto because of the different locations of these areas (see p. 6). Accordingly low income groups, who are less likely to own a car may be restricted in their visits to Luukkaa, and thus the hypothesis regarding the influence of income differences between visitors to the two study areas cannot be rejected.

According to table 7 there are no statistically significant differences with respect to the estimated possession of summer cottages. On the grounds of the differences in the level of income (see table 6) we could suppose that the possession of summer cottages is greater among the visitors to Luukkaa than among the visitors to Keskuspuisto. Because there are no differences it would seem to suggest that the summer cottage is a good competitive alternative to the outdoor recreation area, the demand for which is mostly based on weekend leisure time.

Occupational status and social group. The classification of occupational status by Rauhala (1969) can be seen to connect the above mentioned variables to one variable describing the social status.

Table 8. Occupational status of the visitors to the recreation areas.

class of occupational status	% of visitors to Luukkaa	% of visitors to Keskuspuisto
1-2 (high status)	5	4
3	17	14
4	21	17
5	27	29
6	17	16
7	8	9
8	1	4
9 (low status)	4	7
	<u>100</u>	<u>100</u>
	(n=344)	(n=937)

According to the estimated distributions of occupational status in table 8, 35 % of visitors to Keskuspuisto and 43 % of visitors to Luukkaa belong to the four highest classes. The estimated

mean value of Luukkaa distribution is 4,8. In Keskuspuisto it is 5,1. The differences are statistically significant at the 10 % risk level.

Because there is no corresponding occupational status distribution for the population of Helsinki, the nine classes of Rauhala were connected to four social group classes which roughly correspond to the distribution used in the statistics of Helsinki (Helsingin kaupungin tilasto VII:4. 1968). The latest available statistics are from the year 1965 which may weaken the comparability of the distributions.

According to the statistically significant differences between the estimated distributions in table 9 interest in outdoor recreation is highest within the second social group. The first social group is also over-representative compared with its size in general. The third and fourth social groups are clearly under-represented. Persons belonging to the second and first social group are mostly intellectual workers who mostly have sedentary indoor jobs. Persons belonging to the third and fourth social groups are mostly manual workers who, because of their work, may get sufficient physical exercise.

Table 9. Classification of the visitors to the recreation areas into four social groups and the corresponding groups of Helsinki's population (15 years age and over).

Social group	(corresponding classes of Rauhala)	% of visitors to Luukkaa	% of visitors to Keskuspuisto	% of Helsinki's population (1965) ¹⁾
I highest class	(1-3)	22	18	15
II	(4-5)	48	46	22
III	(6-7)	25	25	41
IV lowest class	(8-9)	5	11	17
unknown		—	—	5
		100	100	100
		(n=344)	(n=937)	

1) Source: Helsingin kaupungin tilasto VII:4. 1968.

The classification of visitors to the recreation areas, by occupational status and by social groups is represented in figure 3.

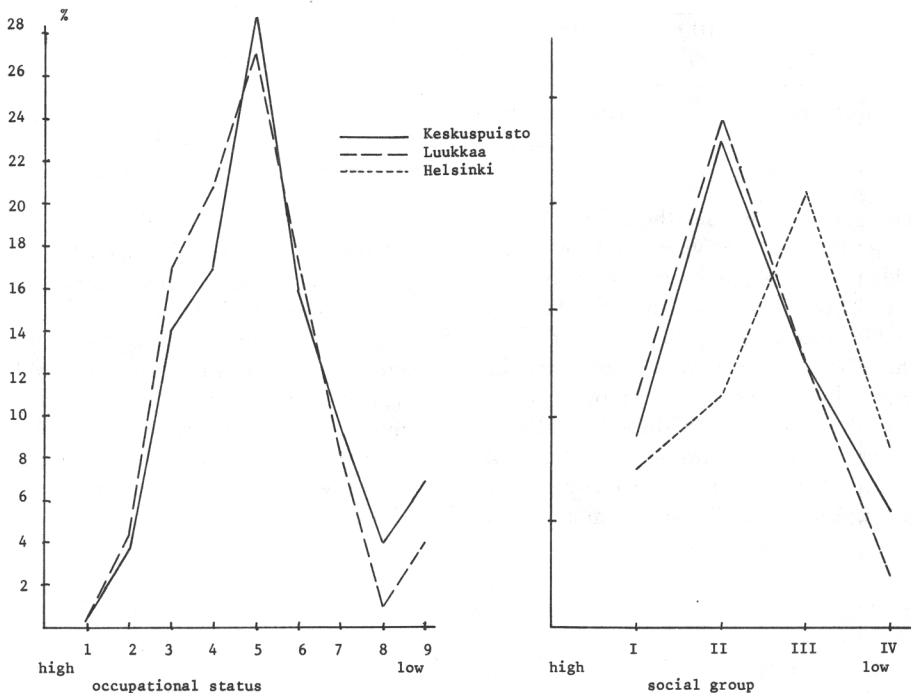


Figure 3. Occupational status (Rauhala) of the recreationists and the social grouping of the recreationists and the population of Helsinki (15 years age and over).

5.2.3 Place of residence during childhood

The place of childhood residence has been thought to affect the rise of leisure time interests directed towards nature. It is supposed that the closer the contact with nature during childhood the greater the probability that adult leisure time activities will be directed towards nature. Here only the type of place of childhood residence, without information about the possible stimuli during childhood, can be examined.

Table 10. Place of childhood residence of visitors to the recreation areas (15 years age and over).

Place of childhood residence	% of visitors to Luukkaa	% of visitors to Kesku- puisto	% of Hel- sinki's popu- lation (1965) ¹
country- side	48	47	34
Helsinki	23	31	31
other urban areas	29	22	35
	<u>100</u>	<u>100</u>	<u>100</u>
	(n=353)	(n=956)	

1) Source: Tilastollisia kuukausitietoja Helsingistä 1971.

For comparison purposes the population of Helsinki of the age 15 years and over has been divided into people born in Helsinki and those not. Those not born in Helsinki have been divided according to the type of place from which they have moved. However, the place from which a person has moved is not necessarily the place of childhood residence, but a rough picture regarding the places of childhood residence of Helsinki people may be obtained. The statistics are from the year

1965 which may further weaken comparability. According to table 10 countryside as the place of childhood residence would seem to increase the probability of leisure time interests directed towards outdoor recreation. Statistically significant differences between estimated distributions are to be found only at the 10 % risk level.

5.3 Choice of recreation companions and recreation activities

When recreation companionship is studied, it is found that the significance of the family and social contacts in general seem to increase with respect to the weekend demands of outdoor forest recreation (table 11).

Table 11. Recreation companionship in the recreation areas.

companionship	% of visitors to Luukkaa	% of visitors to Kesku- puisto
alone	14	48
with members (a member) of the family	46	29
with acquaintances	40	23
	<u>100</u>	<u>100</u>
	(n=352)	(n=964)

Recreational interests consist of mainly elementary activities of low costs and ease of participation. Walking, running, skiing, swimming and cycling form 98 % of all estimated recreation activities in Kesku- puisto during the study period. For Luukkaa the corresponding number is 88 %, the remaining 12 % consisting of different interests like camping, fishing, scenery walks, sun bathing, and taking sauna (table 12).

Table 12. Recreation activities pursued in the recreation areas during different seasons and during the whole study period.

	% from activities pursued in Keskuspuisto						
	running, sport	walking	skiing	cycling	swim- ming	others	
winter	11	27	59	1	—	2	(100) (n=272)
spring	28	55	—	14	—	3	(100) (n=231)
summer	29	44	—	22	—	5	(100) (n=227)
autumn	44	38	—	10	2	6	(100) (n=236)
whole study period	27	40	17	11	1	4	(100) (n=966)
	% from activities pursued in Luukkaa						
winter	4	—	57	—	—	39	(100) (n=58)
spring	36	56	—	2	2	4	(100) (n=66)
summer	25	36	—	2	24	13	(100) (n=162)
autumn	35	49	—	2	—	14	(100) (n=68)
whole study period	28	40	5	2	12	13	(100) (n=324)

5.4 Places of residence of recreational participants

In addition to the social background factors the home addresses of the visitors were also collected. The addresses gave the distributions of recreational participants and the relative amounts of outdoor recreation participants could be studied in relation to city districts.

Table 13. Distribution of outdoor recreation participants in Helsinki city district ¹⁾.

City district	number of the city district	% of visitors to Luukkaa	% of visitors to Keskuspuisto
centre	1-5	5	6
southern central city	6-9,20,52,53	2	3
western central city	13-18	25	9
eastern central city	10-12,19,21,22	14	7
northern central city	23-27	3	3

(city core total)

western suburbs 29-33,46

northern suburbs 28,34,35

north-western suburbs 36-41

eastern suburbs 42-45,47-51,53

(suburbs total)

other districts

(49) (28)

23 23

18 7

1 6

2 7

(44) (43)

7 29

$\frac{100}{(n=969)}$ $\frac{100}{(n=354)}$

1) The classification of the Statistical Office of the City of Helsinki.

About the same proportion of the visitors to Keskuspuisto were found to live in the centre and in the suburbs (table 13). Only one third of the visitors to Luukkaa lived in the centre while two thirds lived in the suburbs. Nearly one third of the visitors to Luukkaa lived outside the city borders. The largest part of them lived in the densely populated suburban areas quite close the city boarders.

Table 14. Relative number of outdoor recreationists from the city districts (‰ from the population of each district).

City district	Luukkaa (‰)	Keskuspuisto (‰)
Centre	0.46	1.15
Southern central city	0.47	0.83
Western central city	0.59	4.17
Eastern central city	0.35	1.87
Northern central city	0.47	1.28
City core total	0.46	2.14
Western suburbs	0.85	2.30
Northern suburbs	0.64	4.77
North-western suburbs	0.47	0.28
Eastern suburbs	0.23	0.17
Suburbs altogether	0.53	1.51

The proportion of the visitors to Keskuspuisto living in the central city is much greater than the proportion of the visitors living in the suburbs (table 14). The largest proportion come from the areas immediately adjacent to Keskuspuisto (Western central city, Northern and Western suburbs). Although the visitors to Luukkaa live mostly in the suburbs in absolute terms, their proportion is as large from the central city as from the suburbs. The largest proportion comes from the Western and Northern areas of the city and the lowest proportion comes from the Eastern areas of the city. One reason for this is probably the western location of Luukkaa in respect to Helsinki.

Visitors to the recreation areas were asked to estimate the distance between their place of residence and the recreation area in question in the interview (appendix 8). Estimation was made in hundreds metres in Keskuspuisto and in thousands metres in Luukkaa. The distance

Table 15. Distribution of outdoor recreational participants according to the distance of place of residence and the recreation area.

Distance to the recreation area (to Keskuspuisto in 100 metres) (to Luukkaa in 1000 metres)	% of visitors to Luukkaa	% of visitors to Keskuspuisto
0	1	3
1-5	3	33
6-10	7	16
11-15	9	6
16-20	23	12
21-25	32	2
26-30	18	7
31-35	3	1
36-40	2	5
41+	1	15
	100 (n=347)	100 (n=963)

expresses more the experienced distance than the real one.

Of the visitors to Keskuspuisto 3 % live in the area of Keskuspuisto. 36 % come from a distance of less than half a kilometre and over 50 % come from a distance less than one kilometre (table 15). 70 % of the visitors to Keskuspuisto live at a distance of two kilometres from it. These numbers indicate the strong connection between distance and recreational utilization. The corresponding distribution in Luukkaa accumulates in the classes between 16-30 km which are the distances between Luukkaa and different areas of Helsinki. The average distance of visitor-residence from Keskuspuisto is 2.3 km (deviation = 2.7 km) and from Luukkaa 22.9 km (deviation = 11.4 km).

6. RECREATIONAL UTILIZATION

6.1 Analysis of the recreational utilization on the individual level

Stepwise regression analysis was used to examine the individual background variables so as to explain recreational activity. Stepwise regression analysis selects the independent vari-

ables which best explain the statistical variation of a dependent variable (Roos 1971, pp. 90-91). One very important supposition in the interpretation of the regression analysis is that there are no intercorrelations between independent variables. The intercorrelations of the independent variables in this analysis are con-

sidered to be low enough for the application and interpretation of the stepwise regression analysis (see appendix 6 and 7).

When the analytical goal is to study statistical connections between a dependent variable and many independent variables stepwise regression analysis is useful in that it is statistically based on the partial correlations with which the effect of other independent variables are held constant, thus the net effect of every independent variable on the dependent variable can be studied. This method has some weaknesses, most important of which are the arbitrary scaling of the nominal scale variables and the linearity assumption (Valkonen 1971, pp. 16–22).

Recreation activity was measured by the frequency of visits to the recreation areas. The frequency of visits was measured both in Keskuspuisto and Luukkaa by asking the interviewed people for an estimate of the time lapsed since their previous visit to the same recreation area. The shorter the time lapsed since the previous visit the larger the intensity of concerned outdoor activity. There are eleven classes in the intensity of outdoor activity variable used: class 0 represents the highest of activity and class 10 the lowest of activity

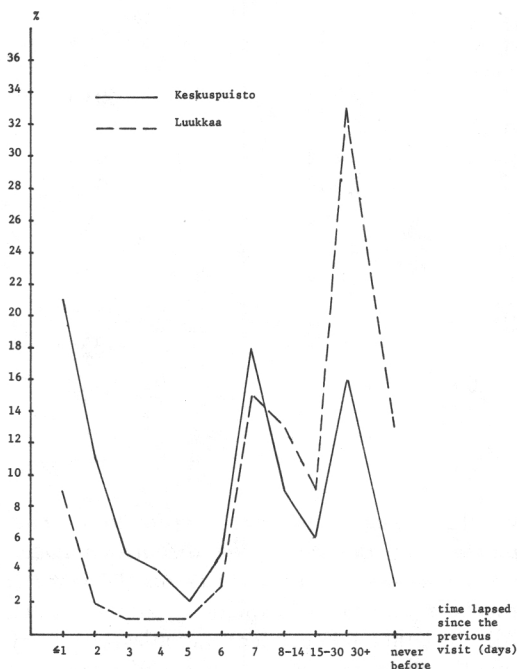


Figure 4. Visit frequencies to Keskuspuisto and Luukkaa.

Table 16. Visitors to the recreation areas classified according to the time lapsed since the previous visit.

the number of the class of the outdoor activity	visited the recreation area in question	% of visitors to Keskuspuisto	% of visitors to Luukkaa
0	during the same day or 1 day ago	21	9
1	2 days ago	11	2
2	3 days ago	5	1
3	4 days ago	4	1
4	5 days ago	2	1
5	6 days ago	5	3
6	7 days ago	18	15
7	8–14 days ago	9	13
8	15–30 days ago	6	9
9	more than 30 days ago	16	33
10	never before	3	13
		<u>100</u>	<u>100</u>
		(n=969)	(n=356)

intensity. The visit frequencies to Keskuspuisto and Luukkaa are represented in figure 4.

The socio-economic background factors of the recreational visitors and the distances between home and recreation areas estimated by visitors are used as the independent variables in the analysis. The distance variable used in this analysis expresses more the experienced distance than the real one. The nominal scale variables such as sex, possession of durable commodities, marital status have been changed for the analysis into the dichotomous dummy variables (Valkonen, 1971, p. 22). The occupation status variable was built on the ground of Rauhala's classification (see pp. 8 and 10–11). The possession of durable commodities is a sum variable which was built as follows: the visitor has no durable commodities mentioned above, or he has tv + car + summer cottage + boat or any combination of these commodities. When the regression model is interpreted it must be remembered that the visit frequency decreases as the variable measuring the visit frequency increases.

The value 2.0 of the F-test was chosen as the criterion for the selection of the independent variables into the model. The value 2.0 of the F-test corresponds the level of uncertainty of 25 % in this study material.

Table 17. Regression models of the frequency of visits to the recreation areas and the correlations between the dependent variable and the independent ones used in the models.

Regr.models	Regr.coeff.	Standard deviation of coeff.	significance % of coeff.	Loss in explanatory power of model by deletion (%)	R	R ²
KESKUSPUISTO						
– distance from Keskuspuisto	,031	,004	99,9	5,76		
– sex	–,939	,229	99,9	1,59		
– poss. of durable commodities	–,241	,098	98,0	0,57		
– occupation status	–,190	,079	98,0	0,54	,304	,093
– marital status	,522	,027	95,0	0,39		
– education	–,095	,063	75,0	0,21		
LUUKKAA						
– distance from Luukkaa	,041	,009	99,9	4,91		
– distance from the nearest outdoor recreation area	–0,11	,005	95,0	1,21	,254	,065
Correlations				Keskuspuisto	Luukkaa	
– The distance between home and the recreation area in question				.236	.229	
– The distance between home and the nearest recreation area				.088	–.124	
– sex (man 1, woman 0)				–.141	–0.62	
– possession of durable commodities				–.107	–.004	
– The occupation status according to Rauhala				–.024	.013	
– Marital status (married 1, others 0)				.102	–.020	
– Education				.005	.063	
– Income				–.055	.003	
– Living area per dwelling (m ² /inhabitant)				.001	.040	
F-value (Keskuspuisto) = 16.38				(n=969)	(n=354)	
F-value (Luukkaa) = 12,09						

The above regression models are, according to the F-test, statistically very significant. The model for Keskuspuisto explains only about 9 % of the statistical variations of the visit frequency. The explanatory power of the Luukkaa model is still smaller – about 6 %. The models however "reveal" some interdependencies between the dependent and independent

variables. *The frequency of visits to Keskuspuisto decreases when the distance between home and Keskuspuisto increases.* Distance is the best individual "explainer" of the model. All the other independent variables have very small explaining capacity, and whilst they add little to the explanatory power of the model the regression and correlation coefficients ex-

press some statistically significant relationships. The visit frequency of men is larger than the visit frequency of women. The visit frequency increases as the possession of durable commodities (tv, car, summer cottage, boat) increases. The visit frequency decreases as the occupational status increases. The visit frequency of unmarried people is smaller than the visit frequency of people belonging to other marital statuses.

The visit frequency to Luukkaa decreases as the distance between home and Luukkaa increases and the distance between home and the nearest outdoor recreation area decreases. There is no corresponding interdependence in Keskuspuisto because Keskuspuisto is probably the nearest recreation park for many people living in Helsinki.

The connection of recreational activity utilization and the distance between a visitor's home and the recreation areas are represented graphically in figure 5. The curve for Keskuspuisto has been drawn from visual interpolation of the scattered diagram. Regarding the analysis of both study areas, the deviation of distances is so large that a logarithmic model has not significantly better explaining power than a linear model. The variation of the scattered

diagram for Luukkaa has been adjusted by regression mathematics. Theoretically, it could be expected that for Luukkaa a curvilinear relationship should arise as daily visits for leisure (classes 1-4) are probably shorter than weekend visits.

As the models explain only 6 % and 9 % of the statistical variations of the measure of recreational activity used in this study, there must exist other, more relevant factors than the ones measured by the variables of this analysis. The finding and measuring of these factors will occupy future studies.

6.2 Analysis of recreation utilization on the environmental level

It can be expected that *the place of residence and environmental factors have some influence on the utilization of a given recreation area.* The opportunities for outdoor recreation vary considerably in the districts of Helsinki, because the green areas suitable for outdoor recreation utilization are not uniformly located with respect to the different parts of the city.

People living in the suburbs have the best chances for outdoor recreation, whereas in the

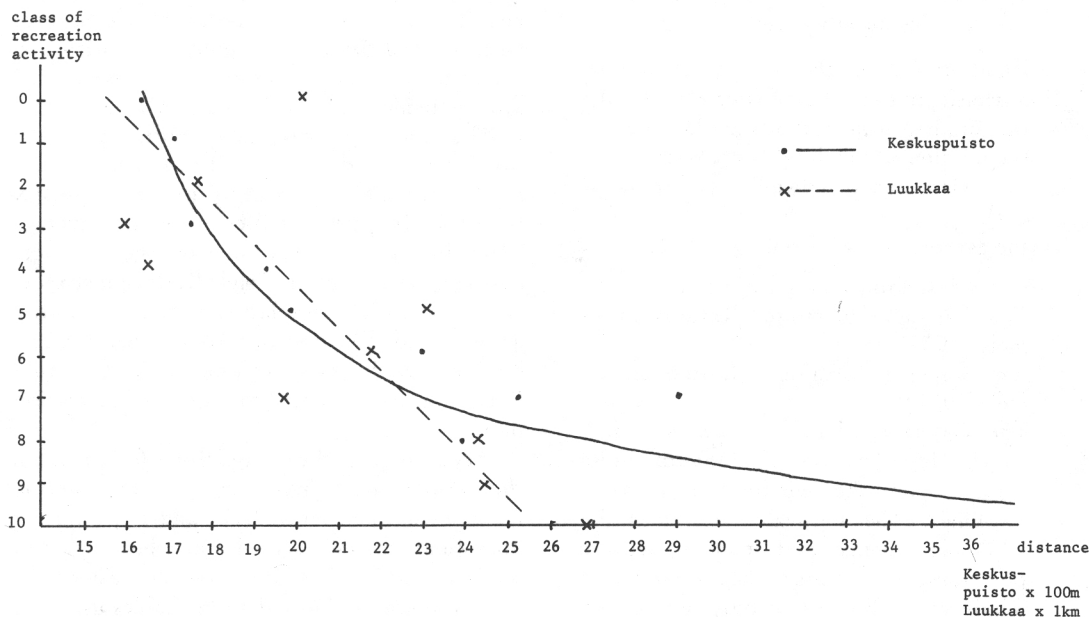


Figure 5. Correlation between the outdoor recreation activity and the distance from the place of residence to the recreation area. Source: Tables 15 and 16

central areas of the city the only places available for outdoor recreation are often streets and squares and a few parks. These areas are not often suitable for outdoor recreation as they are crowded, noisy, and dirty. Due to these facts it can be expected that the need for outdoor recreation is large in these areas. We can expect that noise and dirtiness will encourage people to seek a more peaceful and natural environment.

Keskuspuisto is thus the only place suitable for daily outdoor recreation for many people in Helsinki. It can also be expected that the demand for recreation utilization of Luukkaa, based on the weekend leisure, changes according to the environmental factors of the place of residence of outdoor recreationists. In the following analysis some general characteristics of the sections of Helsinki are used as environmental variables. The environmental variables can be classified as follows:

A. independent variables

- variables describing the chances for outdoor recreation:
 - the average distance between recreation areas and the sections of the city
 - the area of public parks per capita by sections of the city (Helsingin ulkoilu ja urheilupalvelukset v. 1969)
- variables describing the density of population (Helsingin tilastollinen vuosikirja 1970):
 - the number of inhabitants per hectare
 - the number of inhabitants per room
 - the living area per dwelling (m^2 /inhabitant)
 - the average area of dwelling (m^2 /flat)
- variables describing amount of noise:
 - the TNI-value of noise (Katuliikenteen melu 1972)
 - the L_{10} -value of noise (Katuliikenteen melu 1972)

The TNI-value of noise is a noise index, which describes the amount of noise acting upon the window surfaces of dwellings. The L_{10} -value describes the 10 % permanence level of noise. Because the number of noise measurements is relatively small (there is only one or two measurement in many sections of the city) the noise indexes are only rough variables.

- variable describing pollution of air:
 - Työterveyslaitos (Laamanen, Rantanen, 1969) has studied the amount of falling particles in air (g/material/month). There are many measurement points in the city centre and only a few in the suburbs. On the other hand the variation in pollution measurements is probably smaller in suburbs than in the centre.

B. dependent variables:

- the relative city sectional number of visitors to Keskuspuisto and Luukkaa (counted by the total population in each section of Helsinki)
- the mean visit frequencies to Keskuspuisto and Luukkaa counted by sections of Helsinki. This variable is constructed by calculating the mean value of visit frequencies of the recreation visitors in every section of the city.

The initial analytical operation was to calculate the correlation matrices of the above mentioned variables (appendices 6 and 7). The following statistically significant correlations were found in respect to *the relative number of visitors to recreation areas per city section*: the relative number of visitors to Keskuspuisto per city section decreases as the average distance increases and the relative number of visitors to Luukkaa per city section increases as the average living area per dwelling increases.

The following statistically significant correlations were found in respect to *the average visit frequency per city section in Keskuspuisto*: the visit frequency increases as the average TNI-value of noise and the average distances between city sections and Keskuspuisto decrease. The high correlation between visit frequency and the distance to the nearest recreation area is probably due to the fact that Keskuspuisto is often the nearest recreation park.

According to the correlations for Luukkaa *the average visit frequency per city section* increases as the average TNI- and L_{10} -value of noise and the average distance between city sections and Luukkaa decrease. Because of the high intercorrelations of the variables used, the above mentioned relationships are not "pure" in the sense that the effect of other variables is not controlled.

Table 18. Rotated principal components of the environmental factors.

	Factor loadings				squares of loadings
	I	II	III	IV	
- Public parks (m ² /inhab.)	.635	-.103	.015	.667	.859
- The number of inhab./ha	.142	-.061	.736	-.548	.866
- The number of inhab./room	-.396	.853	.094	-.047	.896
- The area of flat/number of inhab. (m ² /inhab.)	.938	.050	.246	.105	.953
- The mean area of flat (m ² /flat)	.893	.220	-.060	.031	.850
- The TNI-value of noise	.342	.833	-.159	-.021	.836
- The L ₁₀ -value of noise	.316	.858	.276	.016	.913
- Pollution of air (g/falling material/month)	.026	.142	.941	.099	.916
The sum of squares of loadings					7.088

Table 19. Regression models of the mean visit frequencies to Keskuspuisto and Luukkaa per sections of Helsinki and the correlations between the mean visit frequencies and the independent variables of the models.

Regr.models	Regr.coeff.	Standard deviation of coeff.	Significance % of regr. coeff.	Loss in explanatory power of model by deletion (%)	R	R ²
KESKUSPUISTO						
- distances between sections of the city and Keskuspuisto	.062	.010	99.9	36.82		
- park area suitable for outdoor recreation (constant term .259)	-.007	.003	95.0	5.23	.782	.611
		F-value = 12.27				
LUUKKAA						
- distances between sections of the city and Luukkaa	.021	.003	99.9	43.81		
- air pollution	.004	.003	90.0	2.34	.819	.672
- park area suitable for outdoor recreation (Constant term .721)	-.004	.003	75.0	1.65		
		F-value = 15.95				
Correlations:		Keskuspuisto		Luukkaa		
- distances between sections of the city and the recreation areas		.732		.791		
- space of flat		.050		.205		
- noise		.255		.284		
- pollution of air		.046		.142		
- park area suitable for outdoor recreation		-.417		-.302		
		(n=45)				

The analysis was continued by "fixed" regression analysis where every independent variable is compulsorily included. The fixed model is used because the magnitude of the net effects of the independent variables on the dependent variable are needed for the analysis of every individual independent variable.

Because the intercorrelations between the independent variables were found rather high they were for the regression analysis (see p. 14) eliminated by the principal component analysis. Four independent principal components were built with the principal axis method and rotation was carried out by varimax-rotation.

The constructed principal components (see table 18, p. 19) cover 88.6 % of the variation of the data. The first component is, by virtue of the heaviest loadings, interpreted to describe the *space of flat*. The second component is interpreted the *component of noise*, because the noise variables have big loadings and because we can expect that the amount of noise increases as the number of inhabitants per room increases. The third principal component is interpreted the *component of air pollution* on the grounds of the heavy loading of the pollution variable and because we can expect that pollution increases as the number of the inhabitants per hectare increases. The last principal component is interpreted the *component of the park area suitable for outdoor recreation*, because the relative area of parks decreases as the relative number of inhabitants increases. In addition, one important independent variable used in the analysis is the *average distance between every section of Helsinki and the recreation areas under study*. The distance variables were not used in the principal component analysis because their classification is not the same for both recreation areas (the distance was classified in Keskuspuisto in hundred metres and in Luukkaa in thousand metres) and there are no significant intercorrelations with other independent variables.

Statistically significant regression models were calculated for *the visit frequency* both in Keskuspuisto and Luukkaa (see table 19, p. 19).

In the model of Keskuspuisto only the regression coefficients of the distance variable describing park area suitable for outdoor recreation deviate significantly according to the t-test from zero. In the model of Luukkaa only the regression coefficient of the distance variable

deviates significantly from zero. The calculated regression model "explains" 61 % from the variations of the dependent variable in Keskuspuisto and 67 % in Luukkaa. The "explaining" capacities of the models are thus quite high. In both cases *the visit frequency decreases very significantly as the distance increases. When the area of parks suitable for outdoor recreation increases the visit frequency significantly increases* in both areas. This is shown clearly by the correlation coefficients for both areas, and also for Keskuspuisto by the regression coefficient: This may be due to common outdoor recreation activity which seems to be largest in the areas having the best outdoor recreation possibilities. The participation in outdoor recreation activities in a forest environment would thus seem to be a result of environmental stimulus which is itself best provided in those areas of easy access. The other environmental independent variables have no statistically significant "explaining" capacity in the models. It may be surprising that the distance variable is so important in Luukkaa model, but it must be remembered that the differences in distances between the sections of the city and Luukkaa can be nearly 20 kilometres. Besides there are many other competitive recreation areas near Helsinki.

The models "explaining" variations in the other dependent variable the *relative city sectional number of visitors to Keskuspuisto and Luukkaa* – were not statistically significant according to the F-test. The correlations between independent variables and dependent variable are as follows:

	Keskus- puisto	Luukkaa
– average distances		
of city sections from		
the recreation area	–.445	.230
– space of flat	.027	.290
– noise	.021	.088
– pollution of air	.105	–.091
– park area suitable		
for outdoor recreation	.036	.107
	(n=45)	

The only statistically significant correlation in Keskuspuisto is in respect of the distance variable: *when distance increases the relative number of outdoor visitors decreases*. The only

Table 20. Correlation and regression coefficients between the visit frequency and the distance from the recreation area to a visitor's place of residence (individual level) and between the average visit frequency and average distances from the recreation area to the sections of the city (environmental level).

	Keskusuisto		Luukkaa	
	individual level	environmental level	individual level	environmental level
– correlation coeff. between visit frequency and distance	.236	.732	.229	.791
– regression coeff. (standardized) between visit frequency and distance	.651	.745	.240	.222

statistically significant correlation in Luukkaa is between the relative number of visitors and the space of flat: *when the space of flat increases the relative number of outdoor recreationists increases.*

When we compare the analysis made on the individual level with the analysis on the environmental level we notice that the correlation between the visit frequency and distance becomes much stronger while moving from the individual level to the environmental level. (table 20)

This is due to the fact that when the information of the individual level is summed up a great part of the random variation of this information disappears. It can be seen that the regression coefficients are in the same order of magnitude; the dependence on the environmental level is probably only a technical consequence arising from the corresponding dependence on the individual level (Valkonen 1971, p. 52).

7. SUMMARY

The recreation participants and the recreational utilization of two forest recreation areas of Helsinki are studied in this work. While planning recreation areas capable of satisfying the needs for outdoor recreation of a population in a densely populated area, they can, in principle, be located either inside or outside of that area. Therefore it is important for the planners to know what kind of people are interested in outdoor recreation in forest environment and what kind of influence the location of recreational areas has on the recreation utilization of areas and between the visitor groups to these areas.

– Keskusuisto located within the city satisfies the need for outdoor recreation in the forest environment based on both daily and weekend leisure. Luukkaa located outside the city satisfies more the demand for outdoor recreation based on weekend leisure and it is then a competitive alternative to the summer cottage.

– Outdoor recreationists are predominantly male. The difference between the sexes is especially large in Keskusuisto.

– Outdoor recreationists are predominantly young and middle age people. Age classes 30–39 and 40–49 years are relatively over-representative among visitors to the recreation areas. The younger age classes are proportionally represented but in the case of the older age classes the older the age class the greater is its under-representation. There are more persons belonging to young and old age classes among visitors to Keskusuisto than among visitors to Luukkaa.

– The marital status distributions of outdoor recreationists correspond with that for the population in Helsinki.

– Users of the recreation areas are more in the second highest and highest social class (mostly intellectual workers) when using a four-class social group classification. In the two lowest social classes (mostly manual workers)

the visitors to the recreation areas are under-representative. The visitors to Luukkaa have a higher social status than the visitors to Keskuspuisto.

– The relative number of outdoor recreationists is found to increase with increasing education and income. The visitors to Luukkaa have a higher education and income level than visitors to Keskuspuisto. The positive correlation between education and recreation is stronger among women than among men. The ownership of private cars is higher among visitors to Luukkaa than among visitors to Keskuspuisto.

– The significance of the family as recreation company and the significance of social contacts in general increases over the daily demand when considering the weekend demand for outdoor forest recreation.

– Walking, running, skiing, swimming and cycling which belong to the elementary outdoor recreation activities make up 98 % of all activities estimated in Keskuspuisto and 88 % of all activities estimated in Luukkaa during the study period.

– The relative number of the visitors to Keskuspuisto from the central city is much larger than those from the suburbs. The number of visitors to Luukkaa from the central city is nearly as large as those from the suburbs.

– In the regression analysis of the intensity of outdoor activity the following statistically significant relationships were found:

Analysis on the individual level:

Keskuspuisto model

– Visit frequency decreases when the distance between home and Keskuspuisto increases.

– Visit frequency of men is bigger than visit frequency of women.

– Visit frequency increases as the possession

of durable commodities (tv, car, summer cottage, boat) increases.

– Visit frequency of unmarried people is smaller than visit frequency of married people.

– The distance variable is the best individual "explainer" of the model, the other variables improve the explanatory power of the model very little, but their relationships with the dependent variable are statistically significant according to the regression and correlation coefficients. The model explains only about 9 % of the statistical variations of the visit frequency.

Luukkaa model

– Visit frequency decreases as the distance between home and Luukkaa increases and the distance between home and the nearest outdoor recreation area decreases.

– The model explains only 6 % of the statistical variations of the visit frequency.

Analysis on the environmental level (information of the environmental level is formed by summing up information of the individual level):

The models of Keskuspuisto and Luukkaa

– Average visit frequency of outdoor recreation participants living in the same city section decreases very significantly as the average distance between the recreation area and the city section concerned increases.

– When park area in a city section suitable for outdoor recreation increases the average visit frequency from the city section concerned increases to both recreation areas, according to the correlation coefficients for both areas and also according to the regression coefficient for Keskuspuisto.

– The model of Keskuspuisto explains 61 % of the variations of the visit frequency. The corresponding number is 67 % for the Luukkaa model.

8. TULOSTEN TIIVISTELMÄ

Tässä työssä *tutkittiin Helsingin sijainniltaan erilaisten metsäisten ulkoilualueiden virkistyskäyttäjii ja virkistyskäyttöä*. Tutkimus rajoittui yli 15-vuotiaisiin ulkoilijoihin. Tutkimuksen

kohteena olevista alueista KESKUSPUISTO sijaitsee kaupunkialueella ja LUUKKAA noin 20 km kaupungin ulkopuolella. Erilaisen sijainnin ja saavutettavuuden takia alueiden käyttäjien

oletettiin eroavan toisistaan *sosiaalisen taustansa* suhteen. Eri alueiden käyttäjien keskinäisen vertailun lisäksi ulkoilijoiden sosiaalisia taustatietoja verrattiin Helsingin koko väestön vastaaviin tietoihin. Ulkoilijoiden sosioekonomisten taustatietojen kartoittamisen lisäksi tutkittiin *virkestyskäytön intensiivisyyttä. Yksilötasolla* tutkittiin *ulkoiluaktiivisuuden ja ulkoilijoiden sosioekonomisten taustatietojen välisiä yhteyksiä*. Yksilötason tietoja yhdistelemällä ja eri tilastolähteitä käyttämällä siirryttiin Helsingin eri kaupunginosia kuvaaviin keskimääräisiin tunnuslukuihin. *Kaupunginosittaisella analyysitasolla* tutkittiin *ulkoiluaktiivisuuden ja erilaisten ympäristötekijöiden välisiä yhteyksiä*. Ko. analyysissä käytettyjä ympäristötekijöitä olivat esim. kaupunginosittaiset asumisahtautta, viheralueiden määrää, liikenteen melun voimakkuutta, ilman puhtautta ja etäisyyttä tutkittaviin ulkoilualueisiin kuvaavat muuttujat. Tutkimus antoi seuraavia tietoja:

– Kaupunkialueella sijaitseva Keskuspuisto tyydyttää kaupunkilaisten sekä viikonloppuvapaaseen perustuvaa että päivittäistä virkestyskäytön kysyntää. Kaupunkialueen ulkopuolella sijaitseva Luukkaan ulkoilualue soveltuu lähinnä helsinkiläisten viikonloppuvapaaseen perustuvan virkestyskäyttökysynnän tyydyttämiseen ja on tällöin huvilan kanssa kilpaileva vaihtoehto.

– Ulkoilijoita on suhteellisesti enemmän miesten kuin naisten keskuudessa. Erot ovat suuret varsinkin Keskuspuiston alueella, mutta pienenevät Luukkaalle siirryttäessä.

– Ulkoilijoita on suhteellisesti eniten 30–49 vuotiaiden keskuudessa; nuoremmat ikäluokat ovat vahvuutensa mukaan edustettuina ja yli 50-vuotiaat ovat ulkoilijoissa selvästi aliedustettuina. Keskuspuiston ulkoilijoissa on enemmän aivan vanhoihin ikäluokkiin kuuluvia henkilöitä kuin Luukkaan käyttäjissä.

– Ulkoilijoiden siviilisäätyjakautumat noudatavat likimäärin Helsingin vastaavaa jakautumaa.

– Ulkoilualueiden käyttäjiä on suhteellisesti eniten 4-luokkaista sosiaaliryhmäjakoa käytettäessä toiseksi ylimmässä ja ylimmässä sosiaaliluokassa (enimmäkseen henkisen työn tekijöitä). Kahdessa alemmassa sosiaaliluokassa (enimmäkseen ruumiillisen työn tekijöitä) ulkoilijat ovat selvästi aliedustettuina. Luukkaan ulkoilijat ovat keskimäärin hieman korkeammassa sosiaalisessa asemassa kuin Keskuspuiston ulkoilijat.

– Sosiaalisen aseman selvittämisen yhteydessä ulkoilijoiden suhteellisen määrän havai-

taan lisääntyvän koulutustason ja tulostason noustessa. Luukkaan ulkoilijat ovat keskimäärin hieman paremmin koulutettuja ja suurempituloisia kuin Keskuspuiston ulkoilijat. Autonomistusprosentti on Luukkaan ulkoilijoiden keskuudessa huomattavasti suurempi kuin Keskuspuiston käyttäjien keskuudessa.

– Luukkaan alueella on eniten perheen jäsenen kanssa ulkoilevia; Keskuspuistossa taas yksin ulkoilevat muodostavat suurimman ryhmän. Luukkaassa ulkoillaan useamman hengen ryhmässä kuin Keskuspuistossa.

– Perusliikuntamuotoihin kuuluvat kävely, lenkkeily, hiihto, uinti ja pyöräily käsittävät tutkimusajanjaksona estimoiduista ulkoilijoiden harrastamista toiminnoista Keskuspuistossa 98 % ja Luukkaassa 88 %.

– Keskuspuiston ulkoilijoita on lukumääräisesti yhtä paljon sekä kantakaupungista että esikaupunkialueilta. Luukkaan ulkoilijoista lähes puolet on esikaupunkialueelta. Suhteellisesti Keskuspuiston ulkoilijoita on huomattavasti enemmän kantakaupungista kuin esikaupunkialueilta. Luukkaan ulkoilijoita on suhteellisesti lähes yhtä paljon kantakaupungista kuin esikaupungeista. Keskuspuiston ja Luukkaan käyttäjiä on suhteellisesti eniten ko. ulkoilualueita mahdollisimman lähellä sijaitsevista kaupunginosista.

– Ulkoiluaktiivisuuden monimuuttujaisessa regressioanalyysissä löydettiin seuraavia tilastollisesti merkittäviä yhteyksiä (ulkoiluaktiivisuudella tarkoitetaan tässä käymisuseutta, jota mitattiin tutkimuksessa kunkin ulkoilijan edellisestä käyntikerrasta ko. ulkoilualueelle kulu- neen ajan pituudella):

Yksilötason analyysi:

Keskuspuisto

– Käymisuseus vähenee asuinpaikan ja Keskuspuiston välisen etäisyyden kasvaessa.

– Miesten käymisuseus on suurempi kuin naisten käymisuseus.

– Käymisuseus suurenee kestokulutushyödykkeiden (auto, huvila, vene, tv) omistuksen lisääntyessä.

– Naimisissa olevien käymisuseus on suurempi kuin muihin siviilisäätyihin kuuluvien.

– Etäisyysmuuttuja on käymisuseuden tilastollista vaihtelua ylivoimaisesti parhaiten selittävä yksityinen muuttuja. Muiden muuttujien regressiomallille antama selityslisä on hyvin pieni. Malli selittää vain n. 9 % käymisuseuden tilastollisesta vaihtelusta.

Luukkaa

– Käymiseus vähenee asuinpaikan ja Luukkaan välisen etäisyyden kasvaessa sekä asuinpaikan ja sitä lähinnä olevan ulkoilualan välisen etäisyyden pienessä.

– Regressiomalli selittää vain n. 6 % käymiseuden tilastollisesta vaihtelusta.

Kaupunginosittaisen tason analyysi:

Keskuspuisto ja Luukkaa

– Samassa kaupunginosassa asuvien ulkoilajoiden keskimääräinen käymiseus vähenee

hyvin merkitsevästi ulkoilualan ja kaupunginosan välisen etäisyyden kasvaessa.

– Kaupunginosittaisen keskimääräisen ulkoiluun soveltuvan puistopinta-alan kasvaessa käymiseus lisääntyy molemmilla ulkoilualueilla korrelaatiokertoimien ja Keskuspuiston osalta myös regressiokertoimen mukaan. Keskuspuiston regressiomalli selittää 61 % keskimääräisen kaupunginosittain lasketun ulkoiluaktiivisuuden vaihtelusta. Luukkaan regressiomallin osalta vastaava luku on 67 %.

9. BIBLIOGRAPHY

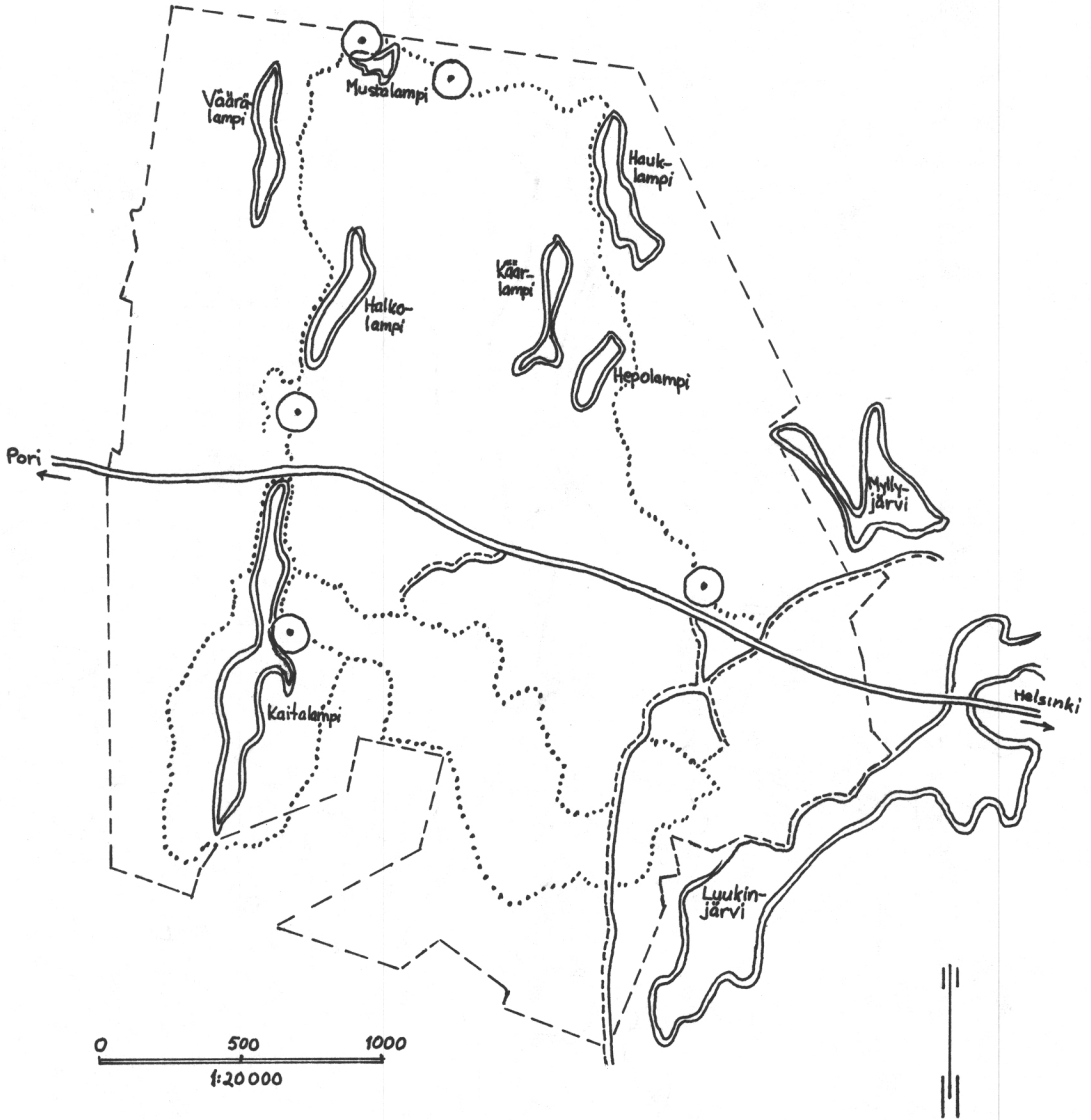
- BURCH, W.R. Jr. and WENGER. 1967. The Social Characteristics of Participants in three Styles of Family Camping. U.S. Forest Service Research Paper PNW -48.
- CLAWSON, M., KNETSCH, J. 1966. Economics of Outdoor Recreation. Baltimore.
- ERONEN, M. – PAAVOLA, P. 1970. Opetusministeriön urheiluluetutkimus. (Ennakkotietoja).
- ESKOLA, A. 1962. Sosiologian tutkimusmenetelmät I. Porvoo.
- ESKOLA, A. 1967. Sosiologian tutkimusmenetelmät II. Porvoo.
- Friluftslivet i Sverige. Del 1. Utgångsläge och utvecklingstendenser. Års 1962 fritidsutredning. Statens offentliga utredningar 1964: 47. Stockholm 1974.
- HARMAN, H.H. 1960. Modern Factor Analysis. Chicago.
- Helsingin kaupunkisuunnitteluviraston ja ulkoilu- ja urheilulautakunnan toimintakertomukset vuosilta 1967–1970.
- Helsingin kaupungin tilasto VII: 4. 1968. Erikoistutkimukset. Otantaväestölaskenta Helsingissä vuonna 1965. Helsinki.
- Helsingin kaupunkiseudun asukas-, ruokakunta-, työpaikka-, tulostaso- ja autokantatiedot 1.1.1970. Helsingin kaupunkiseudun liikennesuunnittelun koordinoitujen toimiston julkaisu n:o 4/1971. Helsinki.
- Helsingin tilastollinen vuosikirja 1970. Helsingin kaupungin tilastotoimiston julkaisu. Helsinki 1971.
- Helsingin ulkoilu- ja urheilupalvelukset vuonna 1969. Kaupunkisuunnitteluviraston yleiskaavaosaston moniste 11.11.1969.
- HYLPS, Käyttäjän käsikirja 1971. Helsingin yliopiston laskentakeskus.
- JAATINEN, E. 1973. Helsingin metsäisten ulkoilualueiden virkistyskäytön sosiaaliset taustatekijät. Kaupunkisuunnitteluviraston yleiskaavaosaston moniste 19.4.1973. Helsinki.
- Katuliikenteen melu. Liikennesuunnitteluosaston julkaisu n:o 2/1972 Helsingin kaupunkisuunnitteluvirasto.
- KELLOMÄKI, S. 1973. Ulkoilijan metsikköarvostukset. Unpublished manuscript. Institute of Conservation. Helsinki University.
- Keskuspuiston osayleiskaava. 1971. Helsingin kaupunkisuunnitteluvirasto. Helsinki.
- KÄMÄRÄINEN, K. 1970. Kaupunkilaisten vapaa-ajan käyttö. Kaupunkiliiton käsikirjoja ja tutkimuksia. C 6. Helsinki.
- KÄMÄRÄINEN, K. ja ERONEN, M. 1968. Lyhennetty työviikko ja lisääntyvä vapaa-aika. Kaupunkiliiton käsikirjoja ja tutkimuksia. C 1. Helsinki.
- LAAMANEN, A. ja RAUTANEN, Y. 1969. Helsingin ilman saasteisuustutkimus v. 1967-1968. Työterveyslaitoksen tutkimuksia n:o 51. Helsinki.
- Liikuntapalvelujen suunnittelun perusteita. 1970. Virkistysaluetoimikunnan välimuistio 20.1.1970.
- Outdoor Recreation Resources Review Commission. 1962. Participation in outdoor Recreation: Factors Affecting Demand Among American Adults. ORRRC Study Report 20. Washington D.C.
- Outdoor Recreation Resources Review Commission. 1962. The Future of Outdoor Recreation in Metropolitan Regions of the United States, ORRRC Study Report 21. Washington D.C.
- PUROLA, T. ja KALIMO, E. 1970. Sairastuvuuden ammattialoitainen vaihtelu työvoima- ja eläkepoliittisena ongelmana. Sosiaaliturvan tutkimuslaitos. Kansaneläkelaitoksen julkaisusarja M:14/1970. Helsinki.
- RAUHALA, U. 1969. Suomalaisen yhteiskunnan sosiaalisten kerrostumien määrälliset vahvuudet. Sosiaalinen aikakauskirja 6/1969. Helsinki.
- ROOS, J.P. 1971. Monimuuttujamenetelmien perusteet. Helsingin yliopiston sosiologian laitoksen tutkimuksia, n:o 1. Helsinki.
- SEPPÄNEN, P. 1967. Liikunnan suunnittelun sosiaaliset edellytykset. Helsingin yliopiston sosiologian laitoksen tutkimuksia, n:o 83. Helsinki.
- Tilastollisia kuukausitietoja Helsingistä 1971. Helsingin kaupungin tilastotoimisto. Helsinki 1971.
- VALKONEN, T. 1969. Individual and Structural Effects in Ecological Research, teoks. M. Dogan; Jan S. Rokkan. : Ecological Analysis in the Social Sciences. Cambridge.
- VALKONEN, T. 1971. Haastattelu- ja kyselyaineiston analyysi sosiaalitutkimuksessa. Helsinki.

10. APPENDICES

- Appendix 1. The map of Luukkaa
- Appendix 2. The map of Keskuspuisto
- Appendix 3. The variables used in the study
- Appendix 4. Correlation matrix for Keskuspuisto
- Appendix 5. Correlation matrix for Luukkaa
- Appendix 6. Correlation matrix for Keskuspuisto environmental level analysis
- Appendix 7. Correlation matrix for Luukkaa environmental level analysis
- Appendix 8. Interview form
- Appendix 9. Questionnaire

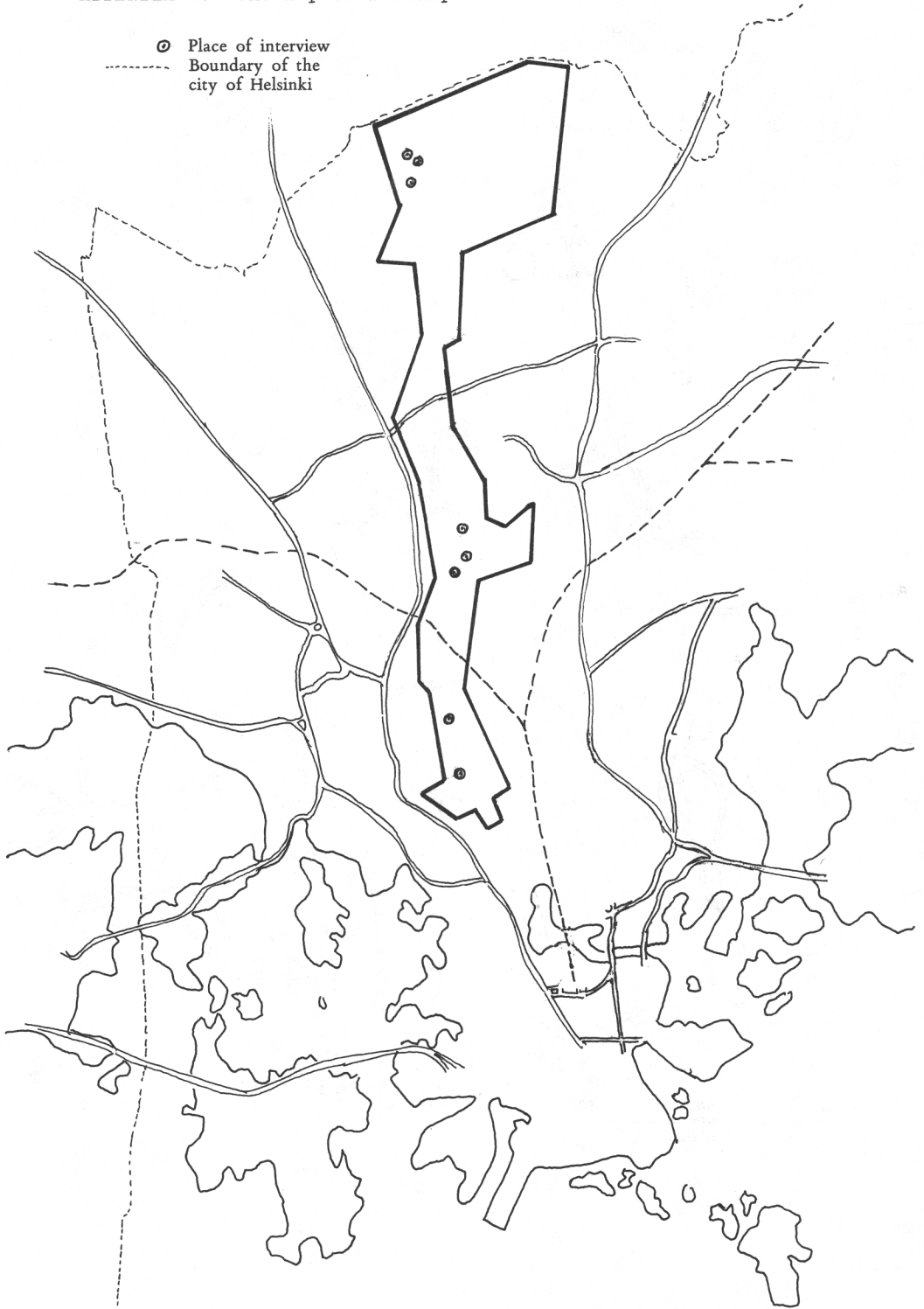
APPENDIX 1. The Luukkaa outdoor recreation area

- path
- place of interview



APPENDIX 2. The map of Keskuspuisto

- ⊙ Place of interview
- Boundary of the city of Helsinki



APPENDIX 3.

Variables used in the study for the individual level analysis.

- 12 Sex (dummy variable man 1, woman 0)
- (17 Time spent in the recreation area)
- (18 Distance walked in the recreation area)
- 19 Distance between home and the nearest recreation area
- 10 Distance between home and the recreation area in question
- 26 Frequency of visits to the recreation area in question
- 68 Classification of occupational status (Rauhala, 1969)
- (70 Work strain (Purola, Kalimo, 1970))
- 71 Age
- 72 Place of residence during childhood
- 170 Possession of cars (dummy variable 0 no, 1 yes)
- 171 Possession of summer cottages (dummy variable 0 no, 1 yes)
- (173 Physical hardness of work)
- (174 Mental hardness of work)
- 180 Monthly income before taxes
- (181 Enjoying of the work)
- 182 Education
- 185 Number of rooms/number of inhabitant
- 186 Living area per dwelling (m²/inhabitant)
- 187 Sum variable of the possession of durable commodities
- 196 Marital status (dummy variable 1 unmarried, 0 others)
- 197 Marital status (dummy variable 1 married, 0 others)

Variables used in the study for the environmental level analysis.

- 3 Relative number of users of Keskuspuisto counted by population in each section of Helsinki (‰ from inhabitants)
- 4 Relative number of users of Luukkaa counted by population in each section of Helsinki (‰ from inhabitants)
- 6 Average visit frequency to Keskuspuisto counted by sections of Helsinki
- 7 Average visit frequency to Luukkaa counted by sections of Helsinki
- 11 Average area per capita of public parks by sections of the city
- 12 Average number of inhabitants by sections of the city
- 13 Average number of inhabitants per room by sections of the city
- 14 Average living area per dwelling (m²/inhabitant) by sections of the city
- 15 Average area of dwelling (m²/flat) by sections of the city
- 16 Average TNI-value of noise by sections of the city
- 17 Average L₁₀-value of noise by sections of the city
- 18 Average distance between Keskuspuisto and the sections of the city
- 19 Average distance between Luukkaa and the sections of the city
- 20 Average distance to the nearest park or recreation area (visitors to Keskuspuisto)
- 21 Average distance to the nearest park or recreation area (visitors to Luukkaa)
- 22 Pollution of air

APPENDIX 6. Correlation matrix for Keskuspuisto environmental level analysis. (See appendix 3 for the names of variables)

	11	12	13	14	15	16	17	18	20	22	3	
6												
11	1.000											
12	-.120	1.000										
13	-.325	.028	1.000									
14	.627	.220	-.316	1.000								
15	.494	-.020	-.119	.816	1.000							
16	.166	-.055	.491	.301	.399	1.000						
17	.096	.157	.598	.429	.436	.724	1.000					
18	-.228	.031	.171	-.045	.182	.213	1.37	1.000				
20	-.131	-.067	.252	-.137	.065	.152	.042	.584	1.000			
22	-.010	.543	.154	.278	.058	-.016	.378	-.050	.022	1.000		
3	-.069	-.036	-.133	.079	-.137	.084	.141	-.445	-.238	.131	1.000	
6	-.259	.251	.184	.011	.140	.295	.228	.732	.485	.049	-.148	1.000

APPENDIX 7. Correlation matrix for Luukkaa environmental level analysis. (See appendix 3 for the names of variables)

	11	12	13	14	15	16	17	19	21	22	4	
7												
11	1.000											
12	-.120	1.000										
13	-.325	.028	1.000									
14	.627	.220	-.316	1.000								
15	.494	-.020	-.119	.816	1.000							
16	.166	-.055	.491	.301	.399	1.000						
17	.096	.157	.598	.429	.436	.724	1.000					
19	.035	.156	.198	.268	.280	.330	.282	1.000				
21	-.196	.004	.352	-.228	-.161	.266	.012	.418	1.000			
22	-.010	.543	.154	.278	.059	-.016	.378	-.034	-.098	1.000		
4	.249	-.070	.000	.294	.222	.149	.131	.230	-.095	-.088	1.000	
7	-.109	.265	.179	.231	.188	.290	.349	.791	.391	.131	.308	1.000

APPENDIX 8.

The outdoor recreation area study
(Interview form)

- .
.
.
16 Male 1 Female 0
.
.
.
21 How long did you think of staying in this area to day _____ hours
22 How far do you consider walking here
1-2 3-4 5-6 7-8 9-10 11-12 13-14 15-16 17-18 19-km
0 1 2 3 4 5 6 7 8 9
23 How far is it from your home to the nearest park or outdoor recreation area _____ km
23 How far is it from your home to this area _____ km
25 Are you walking here now
0 alone
1 with a member of your family
2 with acquaintances
.
.
.
26 The size of the group _____ persons
Could you describe the activities in which you are interested in this time in this area?
28 _____
29 _____
1. Running sport
2. Walking
3. Skiing
4. Taking a child for a walk
5. Taking a dog for a walk
6. Cycling
7-9. Others, which? (Answers (2 units) are marked on the lines above)
30 When was your previous visit to this area _____ day and night
.
.
.
The name of the interviewed person _____
Address _____
Post number _____

APPENDIX 9.

The outdoor recreation area study
(Questionnaire)

- 1 Are you 0 single
 1 married
 2 widow, widower of divorced person
- 2 What is your occupation _____
- 3 If you are younger than 15-years old, what is the occupation of your parent/guardian

- 4 On the basis of your employment into which of the following occupation groups do you belong?
 - 0 do not work
 - 1 temporarily unemployment
 - 2 employed in agriculture and forestry
 - 3 entrepreneur in the agriculture or forestry
 - 4 entrepreneur in industry or handicraft
 - 5 employed in technical industry
 - 6 employed in science or art
 - 7 employed in administration
 - 8 employed in transport or traffic
 - 9 waged employed in machine or forest work
 - 10 employed in electrical work
 - 11 employed in building work
 - 12 employed in wood and painting work
 - 13 waged employed in other industrial work
 - 14 employed in the service industries
 - 15 employed in miscellaneous work and in loading and storage work
 - 16 entrepreneur in transport and traffic
 - 17 entrepreneur in technics, science or administration
 - 18 entrepreneur in commerce
 - 19 other, which _____
- 5 In which year were you born _____
- 6 In what kind of district did you live most during the first 15 years of your life?
 - 1 scattered rural habitation
 - 2 rural church village
 - 3 incorporated village or town under 5 000 habitants
 - 4 incorporated village or town over 5 000 habitants
 - 5 Helsinki
 - .
 - .
 - .
 - .
- 100 Do you own some of the following durable commodities?

TV	0 no	1 yes
car	0 no	1 yes
summer cottage	0 no	1 yes
boat	0 no	1 yes

How does your present work strain you?

	very much	much	little	very little
101 mentally	4	3	2	1
102 physically	4	3	2	1

- 103 How many rooms do you have in your dwelling _____ rooms
- 104 How many persons live in these rooms _____ persons
- 105 What is your disposable floor area? _____ m²
- 106 Do you live in
- 1 a detached house
 - 2 a terraced house
 - 3 a block of flats
 - 4 other
- 107 Is your residence
- 1 your own
 - 2 mainrented
 - 3 subrented
 - 4 other
- 108 Could you estimate what is your summed disposable monthly income? _____mk/month before taxes
- 109 What satisfaction do you get from your present work (if you have no work you need not answer)
- 1 very much
 - 2 much
 - 3 fairly much
 - 4 adequate
 - 5 fairly little
 - 6 little
 - 7 very little
- 110 What education have you had?
- 1 elementary public school
 - 2 elementary public school and continued education
 - 3 intermediate school
 - 4 intermediate school and continued education
 - 5 matriculation examination
 - 6 matriculation examination and continued education
 - 7 academic degree

Please, check out that you have answered all the questions

Thank you for your answers

- No 161 Olavi Huuri: Eräiden kloorattujen hiilivetyjen vaikutuksesta männyn taimien alkukehitykseen.
The effect of some chlorinated hydrocarbons on the initial development of planted pine seedlings. 2,50
- No 162 Veijo Heiskanen, Antero Kuronen & Paavo Tiihonen: Rinnankorkeusläpimitaan ja tukkilukuun perustuvat sahapuiden kuutioimistaulukot.
Volume tables for saw timber stems based on the breast height diameter and the number of log per stem. 1,50
- No 163 Ilkka Kohmo: Nykymetsiköiden kasvuprosentti Suomen pohjoispuoliskossa vuosina 1969—70. 1,50
- No 164 Jouko Laasasenaho & Yrjö Sevola: Havutukkien latvamuotolukujen vaihtelu.
The variation in top form quotients of the coniferous logs. 2, —
- No 165 Metsätalastollinen vuosikirja 1971.
Yearbook of forest statistics 1971. 10,—
- No 166 Terho Huttunen: Suomen puunkäyttö, poistuma ja metsätase vuosina 1970—72.
Wood consumption, total drain and forest balance in Finland in 1970—72. 5,—
- No 167 Paavo Tiihonen: Rinnankorkeusläpimitaan ja pituuteen perustuvat uudet puutavaralajitaulukot.
Auf Brusthöhendurchmesser und Höhe gestützte neue Sortimententafeln. 1,50
- No 168 Lorenzo Runeberg: The future for forest-industry products in the United Kingdom. Ison-Britannian metsäteollisuustuotteiden käytön tulevaisuus. 8,—
- No 169 Veijo Heiskanen: Pinon kehysmitan mittaus ja tyhjän tilan vähennys sekä niiden tarkkuus.
Measurement of the gross volume of a pile and deduction for empty space and their accuracy. 5,—
- No 170 Veijo Heiskanen: Pinotiheysluvun ja pinotiheystekijäin arviointi ja sen tarkkuus.
Evaluation of the solid content and the solid content factors and its accuracy. 3,—
- No 171 Veijo Heiskanen: Hylkypölkkyjen osuuden arviointi pinomittauksessa.
Estimation of the share of waste bolts in pile measurements. 2,—
- No 172 Metsäntutkimuslaitoksen päätös puutavaran mittauksessa käytettävistä muuntoiuvuista ja kuutioimistaulukoista 2 päivänä toukokuuta 1969 annetun päätöksen muuttamisesta. Skogsforskningsinstitutets beslut angående ändring av beslutet av den 2 maj 1969 om omvandlingskoefficienter och kuberingsstabeller för virkesmätning. 10,—
- No 173 Matti Palo & Esko Pälä: Markkinapuun alueittaiset hankintamäärät ja kulkuvirrat vuonna 1970 (1964, 1967).
Removal and flow of commercial roundwood in Finland during 1970 (1964, 1967), by districts. 5,—
- No 174 Jorma Riikonen: Kuitupuun kuoren kutistuminen metsävarastoinnissa.
The volumetric shrinkage of pulpwood bark. 1,50
- No 175 Lauri Heikinheimo, Matti Heikinheimo & Aarne Reunala: Earnings of forest workers in Scandinavia, especially in Finland.
Metsätyömiesten ansiot Suomessa ja muissa pohjoismaissa. 8,—
- No 176 Matti Palo & Mikko Tervo: Hakkuumäärien lyhytjaksoinen ennustaminen.
Short-term forecasting of cut in Finland. 5,—
- No 177 Olavi Huuri: Taimitarhanoston suoritustavan vaikutus kuusen ja männyn taimien alkukehitykseen.
The effect of nursery lifting methods on initial development of spruce and pine transplants.
- No 178 Matti Leikola & Jyrki Raulo: Tutkimuksia taimityyppiluokituksen laatimista varten III. Taimien morfologisten tunnusten muuttuminen kasvukauden aikana.
Investigations on the basis for grading nursery stock III. Changes in morphological characteristics of nursery stock during the vegetation period. 2,—
- No 179 Paavo Valonen & Matti Ahonen: Vajaakarsinta ja silmävarainen apteeraus kuusisaha-puun teossa.
The partial limbing and ocular marking for crosscutting in the preparation of spruce sawlogs. 4,—
- No 180 Pentti Rikonen: Havusahatukkien latvamuotoluvut erilaisia läpimittaluokituksia käytettäessä. 1,—
- No 181 Veijo Heiskanen: Havusahatukkien kapeneminen ja latvamuotoluku Kainuussa ja Pohjois-Pohjanmaalla.
Taper and top form factor of coniferous sawlogs in Kainuu and North Ostrobothnia regions. 2,—
- No 182 Veijo Heiskanen & Jorma Riikonen: Kuitupuun kehysmitta ja pinotiheys autokuljetuksen eri vaiheissa.
Piled measure and solid volume content of pulpwood piles in various phases of truck transportation. 2,50.
- No 183 Heikki Nikkilä: Kylkitiheysmenetelmä kuitupuupinon kiintomitan määrittämisessä.
The pile face density method in measuring the solid volume of a pulpwood pile. 4,—
- No 184 Olavi Saikku: Lannoituksen vaikutuksesta männyn kuoren määrään kangasmaalla.
The effect of fertilization on the amount of the bark of Scotch pine in forest land. 1,50

- No 185 Kaj Asplund, Erkki Lähde & Erkki Numminen: Vajaasti kypsyneen männyn siemenen kehitys käpyjen varastoinnin aikana.
On the development of incompletely ripened seeds of Scots pine in cones under storage. 1,50.
- No 186 Esko Jaatinen: Recreational Utilization of Helsinki's Forests. 4,—.

Myynti — Available for sale at: Valtion painatuskeskus, Annankatu 44, C0100 Helsinki 10, p. 645 121
Merkintä ODC tarkoittaa metsäkirjallisuuden kansainvälistä Oxford-luokitusjärjestelmää