



State Forest Service, Latvia



**Joint Stock Company
"Latvian state forests"**



**Regional Forestry Board
of Östra Götaland, Sweden**

MANAGEMENT OF WOODLAND KEY HABITATS IN LATVIA

FINAL REPORT

**RIGA
2005**

SUMMARY

The Final Report is worked out following the tripartite agreement made in January 2003 for implementing the project “Management of Woodland Key Habitats in Latvia”. This is the third progress report prepared within the project period. It briefly summarizes the activities carried out between 30.01.03 and 30.09.04, covering in greater detail the activities between 01.10.04 and 20.12.05. The Final Report gives also an analysis of the WKH concentration areas identified in the fieldwork, including also the related synergy effects. Between 01.10.04 and 20.12.05 the major project activities concerned the data summaries for the WKH concentration areas identified and ensuring their protection (working out the software).

A lot of work is done also for the WKH management, for instance, controlled burning, using the demonstration sites for the WKH management. In the second half of 2005 seminars were held on the demonstration sites to provoke discussions on the WKH management; as a result a better understanding was reached on some points to be included in the proposed WKH management manual. Concurrently, work was under way for shooting a video film on the WKHs and their management, as well as on a pamphlet for the conservation of the WKH biological values.

During the whole project period a lot of effort went for the assessment of forest biological diversity in Latvia. A vast body of information was summed up to identify the reference conditions for Latvia, as well as assess the current situation regarding the high conservation value forests. It must be pointed out that the analysis was done for the country as a whole, for the forests held by the LVM, and for other ownership (private) forests. Just this part of the project aroused the interest of the forestry specialists of Latvia as it would help find the answer to the question what proportion of the forest areas in the whole country were to be protected and what the situation was at present.

When evaluating the project outputs, it is concluded that new forest areas of high conservation value (the WKH concentration areas) are identified, as well as new knowledge and experience, including knowledge on WKH conservation (WKH management). However, the nationwide discussion on the situation with biological diversity and the required proportion of protected forests is believed to be the greatest gain of the project. The project outputs, expressed in terms of concrete data and figures, offer a sound basis for making decisions on the amount and types of forest to be put under protection.

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Appendix 1. Maintaining forest biodiversity in Latvia's forests – are there gaps in the amount of different forest vegetation types?

Appendix 2. Management manual for woodland key habitats in Latvia

Appendix 3. Survey method “Woodland key habitat concentrations”

1. BACKGROUND

At the end of 2002 a project proposal “Management of Woodland Key Habitats in Latvia” was worked out and submitted for consideration to the Swedish Environmental Protection Agency (SEPA). With the SEPA approval for the project obtained, in January 2003 a tripartite agreement between the State Forest Service (SFS), Joint stock company “Latvijas valsts meži” (LVM) and the Regional Forestry Board of Östra Götaland, Sweden, was concluded for project implementation. The project period was from January 31, 2003 to December 31, 2005.

As it follows from the WKH inventory results, over a period from 1997 until the spring of 2004 in Latvia 43,420 ha of forests were identified as woodland key habitats (WKH), and 13,690 ha - as potential woodland key habitats (PWKH), which totally make 57,110 ha of biologically high-value forests.

The major objective of the project “Management of Woodland Key Habitats in Latvia” to demonstrate how to manage WKHs and their surroundings (buffer zones) in the best way to conserve or increase the biological values found there. In many cases no management is most favourable for the WKH biodiversity conservation, but in other cases management is strongly needed to maintain the biodiversity. The preliminary analysis of WKH inventory results show that approx. 30% of the WKHs needs some management or a buffer zone at least to conserve the biological values.

The project objectives are as follows:

1. To develop and demonstrate methods for the best management for the biodiversity values in a number of WKH types.
2. To evaluate the ecological protection status of the known WKHs and optimise their long-term protection.
3. To raise the interest and knowledge in WKH management and forest conservation in general among the professional foresters, private forest owners and ecologists, NGOs and the public.

2. PROJECT ORGANIZATION

Project leaders:

1. The project manager from Sweden is Mr Bo Thor, Regional Forestry Board, Östra Götaland, Sweden.
2. The operative project leader from Sweden is Mr Tommy Ek, Östra Götaland County Board of Forestry, Sweden.
3. The project leaders from Latvia are Ms Laila Šica (LVM) and Mr Raimonds Bērmanis (SFS)

The following persons actively participate in project planning, drawing up documents, and implementing activities: Ms Liene Suveizda (SFS, Head of the Department of Environmental Protection till 01.07.2004.), Mr Aigars Kalvāns (SFS, Senior Officer of the Department of Environmental Protection), Mr Jānis Buņķis (LVM, specialist of environmental protection). The data base VATSLBIO is kept and improved by Mr Mareks Razgals (SFS computer specialist). Mr Thomas Johansson (Kalmar County Board of Forestry, Sweden) participates in establishing demonstration objects for WKH management by communicating the Swedish experience, developing Management Manual for Woodland Key Habitats, organizing seminar in Kalmar (Sweden) "Prescribed burning as WKH management method". Mr Per Angelstam (Swedish University of Agricultural Sciences and Örebro University) is contributing to the project by developing the method for the assessment of forest biological diversity (Latvian gap analysis), lead the seminar „Assessment of forest biological diversity". Mr Jānis Uzulis (SFS data base specialist) prepared needed information from Forest state register regarding gap analysis. Mr Tommy Ek (Östra Götaland County Board of Forestry, Sweden) conducts the work on identifying and assessing the WKH concentration areas, and is working out changes and additions for the method "WKH concentrations", including the related training for the practical application of the method. The Swedish expert Tommy Ek contributed to the final stage of the assessment of the biological diversity for Latvia (gap analysis). He proposed a model for calculating the current amount of high conservation value forests in Latvia and made recommendations how to avoid drawbacks in the gap analysis. The translations required are done by Mr Andrejs Lasmanis (SFS).

3. PROJECT ACTIVITIES

3.1. General project management

3.1.1. Start-up seminar

The project start-up seminar was held on 6.03. – 7.03. 2003 at Tukuma raj., Milzkalne, Šlokenbekas muiža. To make the seminar more efficient, it was planned for two days.

The first day of the seminar on 06.03.2003 was attended by the SFS specialists in environmental matters from the regional forest districts (27 participants), LVM environmental specialists (8 participants), and also Raimonds Bērmanis, Aigars Kalvāns, Andrejs Lasmanis, Liene Suveizda, Ieva Zadeika (SFS), Laila Šica (LVM), Tommy Ek (Östra Götaland County Board of Forestry, Sweden) and Thomas Johansson (Kalmar County Board of Forestry, Sweden).

The main topics were the co-operation partners involved in the project “Management of Woodland Key Habitats in Latvia” and the distribution of duties and obligations. The project component “Assessing the WKHs and optimising their protection”, including the valuable habitat concentrations in particular, were discussed in greater detail. Information was also given on the activities concerning the project component “Management of Woodland Key Habitats” - choice of the objects to be put under management, and the objectives to be achieved. Discussions were focussed also on the methodological aspects for implementing the above project components, on project objectives and the activities to be carried out.

On the second day on 07.03.2003 the final seminar for the WKH inventory project was held; the afternoon session was devoted to presenting the project “Management of Woodland Key Habitats in Latvia”. It must be pointed out that organisationally it was efficient – informing at first of what had been completed and then presenting new tasks.

The seminar was attended by the head foresters of the SFS regional forest districts and specialists in environmental matters (totally 37 participants), the LVM environmental specialists (8 participants), the employees of the central office of the SFS and LVM (9 participants), the participants from Sweden were Tommy Ek, Per Angelstam (Swedish University of Agricultural Sciences and Örebro University), Thomas Johansson, Bo Thor (Regional Forestry Board of Östra Götaland, Sweden), as well as people from the Latvian government organisations and NGOs: the Latvian Fund for Nature, the Latvian Ornithological Society, the project “EMERALD”, UNDP (United Nations Development Programme), the Gauja National Park, the Ķemeri National Park, the Nature Protection Board under the Ministry of Environment, the Forest Faculty of the Latvian University of Agriculture, the WWF Latvia, the Northern Vidzeme Biosphere Reserve.

The seminar participants were informed of the objectives, major activities and co-operation partners for the project “Management of Woodland Key Habitats in Latvia”. Because of the presence at the seminar of key persons from the SFS, and the LVM, the role of the specialists of these organisations in the project was discussed, including possible involvement of the experts from the Latvian Forestry Research Institute “Silava” (LFRI “Silava”). Discussions were also about possible impacts of project activities on other environmental values under protection (black stork, for example).

3.1.2. Final seminar

The final seminar for the project “Management of Woodland Key Habitats in Latvia” was held on 01.12.2005 at the Jaunmokas Castle in the Tukums region. Totally 86 persons attended the seminar, representing the following organisations: the SFS (engineers in environment protection, head foresters of the regional forest districts, Director General, employees from the Forest Research Station, from the SFS Environment Protection Department and other employees from the SFS Head office); the LVM (specialists in environment conservation and staff members of the Central Administration); Östra Götaland/Kalmar County Board of Forestry of Sweden; the WWF Latvia; the Latvian Ornithological Society; the Latvian Forest Research Institute “Silava”; the Ministry of Environment; the Riga Forest Agency; the Nature Protection Board. The aim of the seminar was to acquaint a variety of stakeholder groups with the project outputs and provoke debate among the participants. The major outputs of the project: the method of evaluating the WKH concentration areas and the results of the related field survey; management guidelines for the WKH management and the practical work carried out on some demonstration sites; assessment of the forest biological diversity in Latvian woodlands. The communications were presented by R. Bērmanis (SFS), L. Šica (LVM), J. Donis (LFRI “Silava”), T. Ek, and T. Johansson (Östra Götaland/Kalmar County Board of Forestry). At the end there was a discussion on the results achieved during the project period and the tasks for the future. The seminar participants from the Nature Protection Board made a few communications on the situation in environment conservation and the results achieved in this effort.



Fig.1. The final seminar for the project “Management of Woodland Key Habitats in Latvia”.

3.2. WKH management

3.2.1. Selection of demonstration sites

In July 2003 R. Bērmanis, J. Buņķis and T. Johansson worked out the criteria for selecting WKH demonstration objects, comprising both the general criteria and specific criteria for each WKH type. The general criteria were following: good condition WKH, except prescribed burning in PWKH; in stand specific key elements and IS, BSS for the given WKH are present, WKH obviously need management; compact stand, 2 ha or bigger. If stand is less 2 ha, than close to it is other WKH, similar to WKH stand; no other specially protected values – rare species, nests for specially protected birds, capercailie; no special cultural or historical significance; stand is not the best WKH of that type in the given area.

Survey and assessment of demonstration sites done by SFS and LVM environmental specialists, R. Bērmanis (SFS), L. Šica and J. Buņķis (LVM) resulted in totally 44 objects selected: in Ziemeļkurzeme region 4 objects; Austrumvidzeme region – 7; Dienvidkurzeme region – 4; Vidusdaugava region – 6; Zemgale region – 8; Dienvidlatgale region – 4; Ziemeļlatgale region – 4; Rietumvidzeme region – 7.

The type of WKH management the total number of the sites selected is as follows:

1. Reduction of invading spruce in pine rich forest – 10 sites, each approx. 1 ha large.
2. Reduction of invading spruce in black alder forest – 2 sites, each approx. 1 ha.
3. Reduction of invading spruce in aspen forest – 1 site approx. 1 ha large.
4. Reduction of invading spruce in broadleaved forest – 1 site approx. 1 ha.
5. Clearing around giant pine – 6 sites, each approx. 1 ha.
6. Clearing around giant oak in old forest – 7 sites, each approx. 1 ha large.
7. Clearing around giant oak in younger forest – 1 site, each approx. 1 ha large.
8. Establishment and management of buffer zones when final felling is made in surrounding stands – 9 sites, each approx. 1 ha large.
9. Establishment and management of buffer zones in younger surrounding stands – 1 site approx. 1 ha.
10. Prescribed burning – 6 sites, each approx. 1 ha large.

In all cases the selected stands are at least 2 ha, but only approx. 1 ha is planned for management, but the rest of stand left intact for monitoring control.

3.2.2. Working out Management Manual for Woodland Key Habitats, the method “Prescribed burning”

The work on the Management Manual for Woodland Key Habitats (Manual) started already in the second half of 2003. Thomas Johansson did the work. In November 2003 he came to Latvia and in meetings with the local experts and specialists discussed the first draft of the Manual. The discussions were focused on the need for WKH management and the practical aspects of management, including a number of site visits. The second draft of the Manual was ready in January 2004. It was sent for references to the members of the project advisory group and other stakeholders. After analysing the references submitted and making the necessary improvements the final version of the Manual was ready in spring 2004. The major sections of the Manual are as follows:

Introduction; How to use this management manual

Management types

1. Prescribed burning
2. Reduction of invading spruce
 - a. in pine rich forest
 - b. in broadleaved forest
 - c. in aspen- or other deciduous forests
3. Conserving giant trees
 - a. of pine
 - b. of oak (or other broadleaved trees)
 - c. of oak (or other broadleaved trees) when final felling is made
4. Establishment and management of buffer zones
 - a. when final felling is made in neighbouring stand

- b. in younger neighbouring stands
5. Clearing and re-introduction of grazing or haymaking

Acknowledgements; References

As not all the specialists and experts involved in the project have a good command of English in spring 2004 A. Lasmanis and R. Bērmanis (SFS) translated the Manual into Latvian and sent it to all the SFS and LVM specialists concerned with environmental matters. They had an opportunity to study the Manual before the seminar on 10-14.05.2004 at Rude. The seminar was also used to discuss the moot points in the Manual and get answers to the questions that have arisen.

To provide more detailed information on a variety of aspects of forest fires in July 2004 an agreement was reached with Agris Šūmanis, the SFS expert on forest fires, on working out a document covering the following aspects of forest burning: thermal energy transfer during burning, factors affecting burning, preparing the stand and timing the burning, contingency measures and preparatory work for prescribed burning, carrying out the burning. The document was distributed among the participants of the Kalmar seminar for comments and discussion. Agris Šūmanis has visited all the sites chosen for prescribed burning, consulting on the preparatory work regarding safety aspects and the burning itself. The expert in fire safety Agris Šūmanis worked out for each site the fire safety guidelines, which cover the following: site description, access to the site by fire engines, distance to the closest places for drawing water, factors which increase the fire hazard, preventive measures to increase fire safety (arranging mineralized fire lines, removing spruces and wind-thrown pines).

The Manual was widely discussed at the seminar “WKH management planning” Rude, 10-14.05.2004 and also at the seminar “Prescribed burning as WKH management method” Kalmar, 18-20.08.2004 in Sweden. Based on these discussions, in spring 2005 Thomas Johansson worked out additional material for the Manual, which in summer 2005 was included in the Latvian version of the method. The amendments in the Manual refer to the following:

1. Prescribed burning: the section is restructured; more accurate arguments are presented for choosing the sites where similar management is applied; management on the stand level; management on the landscape level;
2. Reduction of invading spruce in pine-rich forest: the content of the section is made more to the point;
3. Reduction of invading spruce in black alder forest: the content of the section is made more to the point; better reasoning for the choice of management methods and their positive and negative aspects; the methods for removing spruce are made more to the point;
4. Clearing out unwanted trees around giant oak: the content of the section is restructured; the description of forest and meadow oaks is made more precise; the management methods for the stands comprising biological trees are made more accurate; more accurate management prescriptions for the biological trees found in the area where clearcutting is envisaged.

On 11.07.2005, the amended Manual was sent for reference to the SFS ecologists and the LVM environmental specialists. At the seminar “WKH management planning” (Jaunjelgava, 4-7.10.2005) the discussions were with the focus on the proposed amendments in the Manual proceeding from the practical experience gained in the WKH management. The seminar participants agreed on the following:

1. General for all types:

- The process of making decisions must be recorded and the reasons for a particular decision explained. Specialist for each case should prepare like statement.
- The goals to be achieved by the management like this should be included in statement.
- Assessment of the management actions in relation to other values found in the respective stand. This also should be included on statement.

2. Management of giant trees of broadleaved species:

- At first stage it is necessary to remove (cut) or girdle (ring barking) all the trees, which are likely to damage the biological tree mechanically.
- Girdling (ring barking) is practiced in case the felling of the trees, which suppress the giant tree may damage it.
- Hazel and other shrubs next to the giant tree partly are preserved
- Before girdling (ring barking) of spruces it is necessary to carefully assess the risks of bark beetle multiplication and the losses and gains for biodiversity.

3. Management of dry pine forest WKH (cohort forests)

- When removing (cutting) spruces, some stems of spruce or pine (diameter above 20 cm) are cut and left on the site to create deadwood. Girdling (ring barking) may also be done on pines
- When removing spruces, some patches of stand are retained without management to create a mosaic-like stand
- Slowly growing spruces are retained
- Branches resulting from the removal (cutting) of spruces are piled in heaps around pine trees; burning of branches is done when the fire sensitive season is over so as to make burned scars on pine stems or make the pines perish
- When planning controlled burning in WKH, it is necessary to assess how it matches the given forest site type conditions
- When removing trees around the giant trees of pine, the branches must be collected in heaps and burned after the fire sensitive season is over

4. Management drained black alder WKH

- Additional research and experiments are needed (including raising of groundwater level) for drained black alder WKHs management.
- When removing spruces, retained are all biologically old spruces and those whose age is the same as that of black alder
- When removing spruces, actions must be considered to raise the water level, if its possible and reasonable.

All the conclusions and proposals were assessed to decide on the feasibility of their inclusion in the Manual; the final decision regarding the amendments was taken on end of November, also needed amendments integrete in Latvian Manual version.

3.2.3. Monitoring of the demonstration sites

In order to carry out the monitoring of the WKH demonstration sites under management, in May 2003 an agreement was made between the LVM and LFRI “Silava” on developing the monitoring method for assessing the management efficiency on WKH, evaluating the demonstration areas before the management experiment is started and working out the instruction for practising the monitoring method. The method is developed jointly by the following specialists: Ms Baiba Bambe (LFRI “Silava”), Mr Jānis Donis (LFRI “Silava”), Mr Arvīds Barševskis (Daugavpils University), Ms Diāna Meiere (Nature Museum of Latvia), Ms Digna Pilāte (Nature Museum of Latvia) and Mr Alfons Piterāns (Faculty of Biology of the University of Latvia).



Fig.2. Tree with number in the monitoring plot.

Testing of the monitoring method, implying assessment of the impact of management activities (BACI - Before - After – Control – Impact), was done on the trial plots established in the LVM and the FRS forests.

Use was made of some six or eight trial plots of 500 m² large (total area 0.3-0.4 ha), of which 3 (4) are the control, and 3 (4) are put to management. To assess the changes on the sample plot the bryophytes, lichens, vascular plants, molluscs and insect activities was accounted. When analysing the forest structures, totally 12,500 trees were measured, including 1,200 pieces of deadwood, dead stand, and high snags.

The recording of bryophytes and vascular plants was done on 24 sites. Recording of lichens was done on 25 sites; four indicator species were most commonly found. Polypores were recorded on 20 sites. The average index of polypore species found was 3.1 (maximum 10); indicator or habitat specialist species were found in separate cases only. The beetles were recorded on 13 sites and molluscs were recorded on 16 sites.

On the sites offered for the study by the SFS and LVM ecologists the indicator and habitat specialist species were found in limited number only. Thus, it is believed that assessing the efficiency of WKH management by the presence of these species only is insufficient. To assess the impact of management activities with greater precision a detailed recording of species (and species complexes) is required, which is labour-consuming and requires the involvement in the monitoring of the respective specialists.

It is therefore suggested that in some aspects the method should be simplified (to reduce the labour consumption) and give over the monitoring to the respective specialists.

On some sites where it is planned to release the biological trees of oak and pine from the shade of competing trees, species requiring definite air or substrate humidity or a partial shade at least are found on pines and oaks or in their vicinity. Exposing the tree to light will adversely affect these species. For these reasons it is necessary to resume the discussion on the management of some WKH types in a wider context. Monitoring in the demonstration sites is done based on agreement between LVM and LSFRI „Silava”, (May, 2003), on LVM costs.

During 2005 the Latvian Forestry Research Institute “Silava” (LFRI “Silava”) continued observations on the sample sites: complex recording of epiphytic lichens by using the line method at two heights on 8 to 32 trees on the sample site; recording of bryophytes and vascular plants was done on 24 sample sites using the Brown-Blanquet method. On some sample sites epixylous bryophytes on same fallen deadwood and epiphytic bryophytes on tree stands; recording of molluscs was done on 15 sites, polyphores – on 19 sites. Recording of beetles was done on 4 sites by using traps from June till October. On managed sites where trees had been felled recording was done for remaining trees. On the site where controlled burning was done soil analyses was made. The research will continue by using the funds of the LFRI “Silava”.

To have sufficient grounds for assessing the WKH management impact on the biological values, monitoring for assessing the management efficiency in WKH should be continued when the species and structures start showing the changes achieved by management activities.

3.2.4. Training in WKH management

Three seminars were organized to create joint understanding on WKH management, based on the manual worked out, and achieve closer cooperation between the SFS and the stock company “Latvijas valsts meži” (LVM) specialists. The objective of the seminars was to gain new knowledge on WKH management, discuss and share experience.

Seminar “WKH management planning” Rude, 10-14.05.2004.

The goal of the seminar was to present the Manual and show how to use it in planning WKH management, and also discuss the general problems of WKH management.

The seminar participants 52 were the SFS and LVM specialists in environmental matters, the LVM contractors, officials of the SFS central office and the LVM central bureau. From the Swedish side Tommy Ek of the Östra Götland County Board of Forestry and Thomas Johansson of the Kalmar County Board of Forestry attended the seminar. The seminar was organized in two sessions with one and the same programme covered in each.

In the opening part of the seminar Thomas Johansson presented the Management Manual for Woodland Key Habitats, and explained the importance of monitoring the demonstration sites. The fieldwork on planning the WKH management was on the following day. A number of WKH sites were visited which required some or another management: prescribed burning in pine forest, establishing a buffer zone around wetland black alder forest, reducing the admixture of spruce in pine forest, conserving biological trees of oak in mature forest. The fieldwork at the seminar was organized on the basis of the demonstration sites for WKH management selected in the Ziemeļkurzeme region.



Fig. 3. The fieldwork in the seminar “WKH management planning”.

According to the participants’ evaluation the seminar was well organized and helped improve the knowledge on WKHs and their management.

Seminar “Prescribed burning as WKH management method”

The seminar on prescribed burning as a WKH management method, organized by the Kalmar County Board of Forestry, was held on Aug. 18-20 in Sweden. The seminar was necessary for the SFS and LVM specialists to gain experience how to carry out prescribed burning. Totally 30 persons participated in the seminar: eight from the SFS, 20 from the LVM, the interpreter Andrejs Lasmanis and Janis Donis from the LSFRI „Silava”.

On the first day of the seminar the participants were acquainted with the management of the biological trees of oak in Great Alvar on the Oland island. The next day was devoted to lecturing on prescribed burning (Mats Niklasson, Erik Nordlind, Lars-Ove Wikars), covering different aspects of the subject. When visiting the demonstration sites during the field work the following features were demonstrated: a cutover where burning had been done with some trees and groups of trees retained; forest site prepared for prescribed burning, including safety belts, plan of burning, contingency measures planned, etc.

On another site the participants were shown a forest stand which historically had suffered in forest fires several times as proved by the fallen deadwood, snags, scars on the trees, etc.



Fig. 4. The fieldwork in the seminar “Prescribed burning as WKH management method”.

According to the participants’ evaluation the seminar was very valuable, giving new knowledge on prescribed burning, post-fire management of the sites, and scientific research on forest fires. The specialists believe pilot prescribed burning can be carried out in Latvia, supported by scrupulous research.

Seminar “WKH management planning” Jaunjelgava, 4-7.10.2005.

The objective of the seminar was to acquaint the participants with the activities of the project “WKH Management in Latvia” and discuss the experience gained in WKH management.

The seminar participants included engineers in environment conservation of the SFS regional forest districts, environmental specialists and contractual workers of the LVM, representatives from the Head Office of the SFS and LVM, representatives from the Latvian Fund of Nature (LFN), the LFRI “Silava”, and the Forest Faculty of the Latvian Agricultural University. The work was divided into two sessions with the same agenda for the both groups of the participants. In the first group there were 16 participants from the SFS and 5 from the LVM, 3 from the LFN, 1 from “Silava”, as well as the deputy dean Ms Inga Straupe of the Forest Faculty. In the second group there were 16 members from the SFS and 5 from the LVM, 3 from LFN and 1 from “Silav”. R. Bermanis (SFS), L. Šica (LVM) and V. Lārmanis (LFN) conducted the seminars.

On the first seminar day different topical problems were discussed as changes and improvements in the WKH management guidelines. J. Donis ("Silava") informed of the results of the assessment and monitoring of the sites chosen for the WKH management. V. Lārmanis (LFN) explained the importance of WKH management in the overall context of environment conservation. The specialists of SFS and LVM told about their experience in WKH management and the problems encountered. V. Lārmanis informed the seminar participants of the topicalities and objectives of the LFN project "Conservation and Management of the North Gauja Valley". In the afternoon there was a site visit to the biological tree of oak. This biological tree is in the Jēkabpils regional forest district, Ābeļi forest district, compartment 13, and sub-compartment 17. At the site visit the discussions were with the focus on management methods and intensity as well as which trees to choose for removal. On the site visits on the next day the problems discussed were the management of the biological tree of pine, controlled burning and removing spruce in the habitats of pine and black alder. The sites were located in the Aizkraukle regional forest district, Taurkalne forest district, compartment 23, and the Ērberģe forest district, compartment 141. At the site visits discussions were with a focus of management issues. At the end of each day a summary was made of the seminar results were evaluated.



Fig. 5. The fieldwork in the seminar "WKH management planning".

The main lessons learned at the seminar: girdling of the trees, which suppress the giant tree, is practiced in cases the felling of unwanted trees may damage the giant tree while slowly growing spruces are retained. The lessons learned at the seminar were used to improve the WKH management methods.

3.2.5. Created demonstration sites

The management of demonstration sites was planned jointly by the SFS engineers-ecologists and the LVM staff (environment specialists and heads of the forest districts). In planning, use was made of the WKH management guidelines and the conclusions made at the seminars.

At first, feasibility of management activities and the potential impact of management on the biological values in each demonstration site was assessed. Marked out were all the trees to be removed and also retained. Out of 44 sites previously intended for management the actual

management was done on 18 sites only, which is less than a half of the number of sites originally planned. This was because the storm of January 2005 hit four out of totally eight LVM forestries. In these forestries during the first eight months of 2005 the priorities were salvage logging rather than cutting standing trees, let alone the WKH management. On the demonstration sites, for which the management activities were planned but not carried out, the respective jobs will be done during the winter season of 2005/2006. The majority of sites where the management was done are located in the Vidusdaugava and Dienvidlatgale forestry.

Summary of the jobs done on the demonstration sites (see Table 1):

- Reducing the admixture of spruce in pine forests– in 5 sites;
- Controlled burning – in 1 site;
- Management on a biological tree (removing the trees supressing the biological tree):
 - For pine – in 3 sites;
 - For oak – in 6 sites;
- Establishing a buffer zone in mature stands at final felling – in 1 site;
- Reducing the admixture of spruce in drained black alder forest – in 1 site.

The demonstration sites are not evenly distributed all over the country. The majority of them are in Kurzeme (west) and Vidzeme (northeast) with no sites in Latgale (east) (see Fig. 6). The highest number of demonstration sites is in the administrative region of Limbaži and Valka.

Table 1.
Summary of the jobs done on the demonstration sites

1. Ziemeļkurzeme region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Ventspils	Usmas	58	27, 28	reduction of invading spruce in pine rich forest and prescribed burning	Marked trees, not managed
2.	Talsi	Stendes	101	15	clearing around giant pine	Marked trees, not managed
3.	Talsi	Andumi	51	5, 6, 7	clearing around giant oak in old forest	Marked trees, not managed
4.	Talsi	Talsi	217	7, 8	establishment and management of buffer zones when final felling is made in the surrounding stands	Marked trees, not managed

2. Austrumvidzeme region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Valka	Vijciems	244	31	reduction of invading spruce in pine rich forest	managed
2.	Valka	Vijciems	269	10, 11	clearing around giant oak in old forest	managed
3.	Valka	Mežole	126	2	reduction of invading spruce in pine rich forest	Marked trees, not managed
4.	Valka	Vijciems	500	41	prescribed burning,	Marked trees, not managed
5.	Valka	Mežole	126	7	clearing around giant pine in younger forest	Marked trees, not managed
6.	Valka	Mežole	95	9, 15	establishment and management of buffer zones in younger surrounding stands	Marked trees, not managed
7.	Valka	Palsmane	52	14	establishment and management of buffer zones when final felling is made in surrounding stand	Marked trees, not managed, was cut wind falling trees.

3. Dienvidkurzeme region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Kuldīga	Skrunda	413	7	reduction of invading spruce in pine rich forest	Marked trees, not managed
2.	Kuldīga	Vārme	196	17	reduction of invading spruce in aspen forest	Marked trees, not managed
3.	Kuldīga	Kurmale	313	22	establishment and management of buffer zones when final felling is made in surrounding stands	Not managed, grow was destroyed – illegal cutting
4.	Kuldīga	Rudbārži	317	14	clearing around giant oak in younger forest	managed

4. Vidusdaugava region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Aizkraukle	Ērberģe	141	3, 4	reduction of invading spruce in black alder forest	Managed
2.	Aizkraukle	Ērberģe	396	9	clearing around giant oak in old forest	managed
3.	Aizkraukle	Ērberģe	186	26, 27, 33	establishment and management of buffer zones when final felling is made in surrounding stands	Marked trees, not managed
4.	Aizkraukle	Taurkalne	23	6	prescribed burning	managed
5.	Aizkraukle	Taurkalne	23	16	clearing around giant pine in old forest	managed
6.	Aizkraukle	Taurkalne	25	1	reduction of invading spruce in pine rich forest	managed

5. Zemgale region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Jelgava	Garoza	40	6, 14	reduction of invading spruce in pine rich forest	managed
2.	Jelgava	Garoza	37	32	clearing around giant pines	managed
3.	Tukums	Engure	190	5, 6, 7	reduction of invading spruce in pine rich forest	Marked trees, not managed
4.	Tukums	Engure	88	2, 5	clearing around giant pine, prescribed burning	Marked trees, not managed
5.	Dobele	Benkava	15	7, 9	clearing around giant oak in old forest	managed
6.	Dobele	Benkava	16	2	management of buffer zones when final felling is made in surrounding stands	managed
7.	Tukums	Aizupe	208	15	clearing around giant oak in younger forest	managed
8.	Tukums	Kaive	410	11	establishment and management of buffer zones when final felling is made in surrounding stands	Marked trees, not managed

6. Dienvidlatgale region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Jēkabpils	Viesīte	360	12	reduction of invading spruce in pine rich forest	managed
2.	Jēkabpils	Viesīte	364		clearing around giant oak in younger forest	managed
3.	Jēkabpils	Viesīte	358		establishment and management of buffer zones when final felling is made in surrounding stands	managed
4.	Jēkabpils	Ābeļi	13	17	clearing around giant oak in old forest	managed

7. Ziemeļlatgale region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Balvi	Žīguri	193,	9, 10	reduction of invading spruce in pine rich forest	Marked trees, not managed
2.	Balvi	Žīguri	474	14	clearing around giant pine	Marked trees, not managed
3.	Balvi	Žīguri	172	15, 16	prescribed burning	Marked trees, not managed
4.	Balvi	Žīguri	472	5	establishment and management of buffer zones when final felling is made in surrounding stands	Marked trees, not managed

8. Rietumvidzeme region following WKH management activities:

No	RFD	FD	Compartment	Sub compartment	Management type	Remarks
1.	Limbaži	Avotkalns	36	4	reduction of invading spruce in pine rich forest,	Managed
2.	Limbaži	Avotkalns	36	4	prescribed burning.	Marked trees, not managed
3.	Limbaži	Katvari	266	2	clearing around giant oak in old forest	Marked trees, not managed
4.	Limbaži	Katvari	308	10	reduction of invading spruce in broadleaved forest	Marked trees, not managed
5.	Limbaži	Aloja	196	42	clearing around giant pine	Marked trees, not managed
6.	Limbaži	Aloja	196	50, 51	establishment and management of buffer zones when final felling is made in surrounding stands	Marked trees, not managed
7.	Limbaži	Liepupe	273	3	reduction of invading spruce in black alder forest	Marked trees, not managed

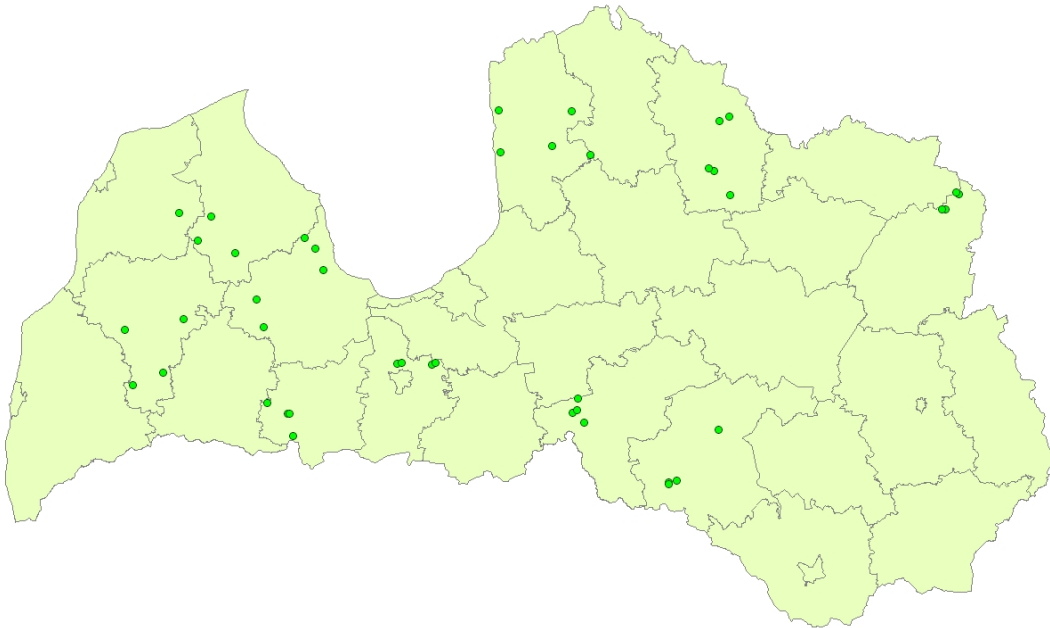


Fig. 6. Location of demonstration sites

The demonstration sites are all over the country, but their distribution is uneven. The highest number is in Kurzeme (west) and Vidzeme (northeast) with no demonstration sites in Latgale (east) (see Fig.6). The distribution of sites is relatively compact in the administrative regions of Limbaži, Valka, Aizkraukle, and Jēkabpils.

3.2.6. The total need of WKHs management

According to the VATSLBIO database as of the end of 2005, some management (reduction of the admixture of spruce) is needed on a total (P)WKH area of about 6,000 ha. The removal of spruce is needed for 9.3% of WKH and 13.5% of PWKH. The biggest amount of management work is needed for conifer forests – 4,953 ha. However, when rated on a percent basis, some management is needed for 42.6% of biological trees. According to the field data, no management is needed for the following WKH types: ravine forests; spring-influenced forests; calcareous forests and fens; and biologically important beaver activity areas.

A buffer zone is needed to reduce the negative impact of clear-fells made in the WKH vicinity. The estimates show that the buffer zone is needed for 25.7% of WKH and 18.9% of PWKH, which makes a total of 14,066 ha. The bulk of the (P)WKH sites where a buffer zone is needed refer to wetland common alder forests – 5,600 ha. When rated on a per cent basis, 76% of spruce and mixed spruce wetland forest need a buffer zone.

The above data are derived from the Field Inventory Sheets filled in at the site visits during the survey. However, it must be admitted that by the time the fieldwork was done the surveyors' experience in WKH management was inadequate and this information needs reassessment with a view to the current state of knowledge.

Considering the conclusions made at the seminar, the buffer zone is absolutely essential for the following WKH types: wetland broadleaved, aspen, common alder, spruce, as well as spring influenced and ravine forests, and in separate cases also for other (P)WKH types. The knowledge gained during the project period on arranging buffer zones is sufficient to apply it in routine forest operations.

Sufficient knowledge is gained also on such WKH management practice as releasing a biological tree from shading and unwanted competing trees.

When reducing the admixture of spruce in pine forests, the need of it should be carefully considered and the management practices prescribed with great caution and care.

The existing knowledge is still inadequate on such management practice as the reduction of the admixture of spruce in deciduous forests. Additional research is needed on (P)WKH management in drained common alder wetland forests, combining the management with restoring the water level.

3.2.7. Investigation of the legal situation for WKHs management

Analysis of the (P)WKH management following the existing legal framework in forest management and utilisation revealed no essential contradictions. However, a number of problems were identified:

- (P)WKH management in protected areas: in some cases the proposed management regime may contradict the protection goals and/or the management regime prescribed for the given area as there may be other values, which would be endangered by managing the habitat; the regulatory acts determining the protection regime for the area, which include a ban on a number of activities, make the (P)WKH management virtually impossible
- It is not possible to arrange a buffer zone for the stand, which has not as yet reached the parameters for the main felling (age or stem diameter), since the law does not allow clearfelling in similar stands
- The law does not clearly specify the controlled burning as a means for conserving and enhancing the forest biological diversity
- The law does not clearly specify the girdling of individual stems as a means for conserving and enhancing the forest biological diversity
- In carrying out WKH management (removing unwanted spruces) provisions of the Cabinet of Ministers Regulations No 217 “Regulations on Protective Measures and Declaring an Emergency Situation in Forests” must be observed; the said regulations provide that in cutting down unwanted spruces and leaving them on the site, the stems felled must be bucked into one meter long sections and the volume of logging slash must not exceed 5 m³/ha.

3.2.8. Booklet “Conservation of Biological Values in Woodland Key Habitats”

To build awareness among the forestry professionals and the public on the WKHs, at the end of 2005 a booklet “Conservation of Biological Values in Woodland Key Habitats” was issued. It deals mainly with three types of WKH: pine cohort forests on dry site types, biological trees, common alder wetland forests. The text and illustrations give an understanding of the

major management methods as removing the admixture of spruce and arranging a buffer zone. The computer typesetting and printing was done by the firm *Jelgavas tipogrāfija*. The total issue is 9,000 copies, of which 1,000 in English and 8,000 in Latvian. Most of the copies will be given over to the SFS forest districts and the LVM regional forestries.

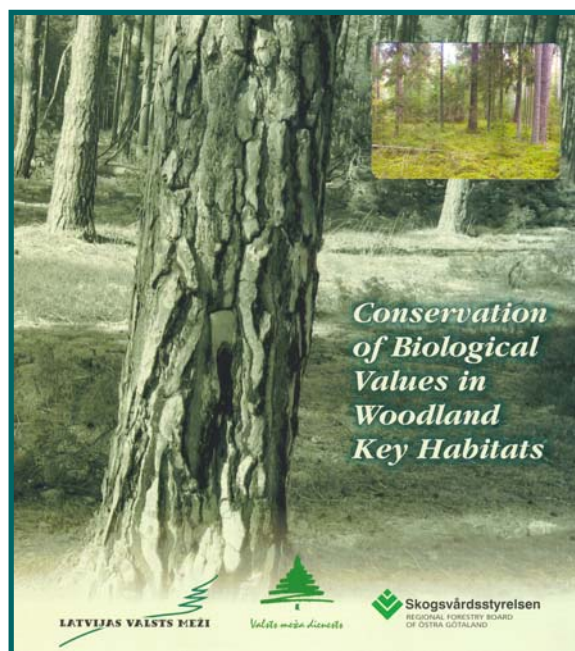


Fig. 7. Booklet “Conservation of Biological Values in Woodland Key Habitats”

3.2.9. Film “Woodland Key Habitats”

In the beginning of 2005 a contract was made between the Regional Forestry Board of Östra Götaland of Sweden and the SIA “Vides filmu studija” on shooting a video film about the WKH management. The film is intended for awareness building among the forestry professionals and the public on WKH management. The film, in Latvian and in English, is of XDCAM format, running time 26 min.; the number of DVD copies is 500. The copies will be given to the SFS forest districts, the LVM regional forestries, and other stakeholders concerned. The film features four WKH types: pine cohort forests on dry site types; common alder wetland forests; broadleaved forests; aspen forests. The shooting of the film, done in a number of places all over Latvia, started early in spring.

- 23.03.2005. Shooting of the film in the Aizkraukle regional forest district. Shooting was done on 2 sites. The first site was in the Ērberģe forest district. Shooting was done on wet black alder forest, which is WKH, and the ditch, where there was a lot of spruce. The focus was on the spruces, which should be removed in WKH management. Shooting was done also for structures and species typical for black alder forests: high snags with the traces of woodpecker activities; lichens *Thelotrema lepadinum*.
The second site was in the Taurkalne forest district. Shooting was done on dry site pine WKH, which has been managed. Shooting was done on that part of the stand where spruces were removed to uncover pine stands, using a forwarder. Also, shooting was done on the unmanaged part of the stand.
- 27.04.2005. Shooting was done in the Ogre regional forest district on two sites. The first was in the Ogre forest district. It was a typical broadleaved forest WKH – ash

stand with a lush vegetation of *Allium ursinum* in the ground cover. Also some elements increasing the habitat diversity were filmed: oxbows, small rivers, huge old trees, fallen deadwood, also some species typical for broadleaved forests: *Homalia trichomanoides*, *Neckera complanata*, *N. pennata*, *Anomodon sp.*

The second site was in the Suntaži forest district. Shooting was done on aspen forests. Focus was on large dimension aspen trees, large amount and different dimension fallen deadwood, high snags with the signs of woodpecker activities, also some species typical for aspen forest as *Lobaria pulmonaria*, *Oxyporus corticola*, *Collema sp.*



Fig. 8. Shooting process in the Ogre regional forest.

- 12.05.2005. The shooting was done in the Jēkabpils regional forest district. Shooting took place in two sites. The first site was in the Ābeļi forest district. Shooting was done of huge oak trees (biological trees) in an old growth stand. In one habitat it was shown how spruces had been removed around the old trees. Shooting was done also on biological tree where spruces were not removed. Some spruces were growing into the canopy of oak tree. The second site was in the Viesīte forest district. Shooting concerned removing competing spruce trees around oak.
- 09.06.2005. Shooting was done in the Talsi regional forest district on three sites. Two of the sites were in the Talsi forest district. Shooting was on the buffer zone around black alder forests. The focus was on the significance of the buffer zone to maintain microclimate in the black alder stands. The second site was the area of beaver activities. Shooting was to show the most typical features of such area – lots of dead trees, aquatic vegetation etc. The last site was in the Stende forest district. Shooting was on ravine forest, featuring relief, brook, huge broadleaved trees, deadwood.
- 22.07.2005. Shooting was done in the Balvi regional forest district on 4 sites: wetland spruce forest, wetland black alder forests, area of beaver activities, and wetland pine WKH. The focus was on the structures typical for similar habitats – hummocks, trees with the signs of woodpecker activities, lots of deadwood, burned scars, etc., vegetation and also habitat specialist and indicator species.

- 18.08.2005. Shooting was on two sites in the Aizkraukle regional forest districts. In each site two parts of stands were filmed - the managed and unmanaged. The first site was drained black alder WKH. The focus was on the conditions of light in the stand as well as on the presence of spruces, and which case the spruces are removed in which cases not. Also were shown typical species for black alder forests as *Bazzania trilobata*.
On the second site, which was dry pine WKH, shooting was done on the managed and unmanaged part of the stand. In one part of the stand the spruces were removed, in the other part the spruces were removed and controlled burning applied.
- 15.09.2005. Shooting was done in the Auces Forest research station (Benkava forest district of the Dobeles regional forest district). It concerned the oak as a biological tree, both on which management was done and an unmanaged tree used as a control. Management of the site was done with great care, lightweight equipment was used for removing the timber felled. Shooting was done also of the nearby buffer zone set up for a common alder wetland habitat. Later on the same day shooting was done in the Engure forest district of the Tukums regional forest district on a buffer zone of common alder wetland habitat and on dry site pine forest.

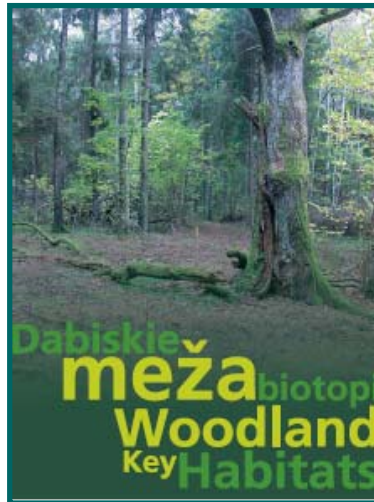


Fig. 9. Film “Woodland Key Habitats”

In shooting the film totally 15 persons participated - 5 from the film company “Vides filmu studija”, and the others were engineers in environment conservations of the regional forests districts of Aizkraukle, Balvi, Dobeles, Jēkabpils, Ogre, Talsi, and Tukums, including the district manager from the LVM Vidusdaugava Forestry and the head and senior specialists from the SFS environment conservation department. In shooting in Auces participate also the local SFS forest ranger.

3.3. WKH concentrations

3.3.1. Selection of potential WKH concentration areas

Before starting fieldwork on identifying WKH concentration areas the specialists are concerned with selecting the sites to be visited, guided by the manual „Woodland Key Habitat Concentrations”. In selecting the sites the following information is used: WKH inventory data, information regarding the sites and habitats of specially protected species, forest stand

maps, data of the State Register of Forests, topographic maps, etc. The objective is to identify forest areas showing a high proportion of WKHs, old-growth forests, specific topography, and low management impact. Both the SFS and the LVM specialists do this work. The related fieldwork is distributed so that the SFS specialists carry out 60% of the total amount of work with the remaining work done by the LVM contractors. The LVM staff selected 313 sites as potential WKH concentration areas of the total area about 15,000 ha. The SFS staffs have selected 342 potential WKH concentration areas with the total area for survey 14,000 ha. During the field surveys the SFS specialists covered 41,000 km, spending totally 4,000 manhours. Recalculated per one WKH concentration site found, it makes 120 km and 12 manhours, respectively. Out of the total number of potential WKH concentration sites 64% were assessed as meeting the criteria for a concentration site.

3.3.2. Working out the method “Woodland Key Habitat Concentrations”

To carry out the project component “Woodland Key Habitat concentration identification and assessment”, in May-June 2003 Tommy Ek and Raimonds Bērmanis jointly worked out a survey method “Valuable habitat infrastructures”. The survey method was developed in consultations with the LVM, the Latvian Fund for Nature and other organisations concerned. It comprises the following sections: Ecological Background, Some Results from the WKH Inventory, Practical Survey Instruction, Creating the Valuable Habitat Infrastructures, including Appendix 1 – Field inventory sheet 1 and Appendix 2 – Field inventory sheet 2. To work out the survey method, information from the database VATSLBIO was summed up and analysed by Aigars Kalvāns and Mareks Razgals (SFS). In August 2003 the consultations concerning the survey method were made with the experts Normunds Priedītis, Mārtiņš Lūkins (WWF Latvia), Ilona Jepsena (The Head of the Department of Nature Protection under the Ministry of Environment), as well as with the SFS specialists in environmental matters from regional forest districts, and the LVM environmental specialists. The expert proposals and comments were summed up, and in the beginning of 2004, supported by valuable habitat concentration inventory field results already obtained, were taken into account in amending and improving the survey method “Valuable habitat infrastructures”.

In spring, 2004, discussions started for amending the method “Valuable habitat infrastructures”, taking into account the results of the 2003 inventory of WKH concentration sites and the comments and suggestions made by the forest sector stakeholders. Discussions on amendments were for the following: the heading of the method is changed from *valuable habitat infrastructures* to *woodland key habitat concentrations*; some terms are changed; more precise explanation of the infrastructure type „Succession forests”, amendments and improvements in the section „Preparatory work, Field work, Gains and biodiversity goal with the Woodland Key Habitat concentrations, How to describe the areas that did not qualify as Woodland Key Habitat concentrations”; for the section on creating the valuable habitat infrastructures examples regarding the creation of WKH concentrations are improved and the size of a WKH concentration site is specified; additions to the section on general thinking for creating the infrastructures – a working hypothesis for Infrastructure 1 – pine cohort forests; annex 8 “Creating a green infrastructure” is added.

The following experts discussed the amendments and made decisions: Tommy Ek (Östra Götaland County Board of Forestry, Sweden), Laila Šica (LVM) and Raimonds Bērmanis (SFS), in consultations with the Latvian expert on assessing biodiversity Normunds Priedītis.

3.3.3. Training “Assessing WKH concentration sites”

To train the SFS and the LVM specialists in assessing the WKH concentration areas and build up a joint understanding of the problems involved, two seminars were organized, one in 2003 at Koknese, the other in 2004 at Rude.

Training seminar under a heading “Assessment of valuable habitat concentration sites” was held in Aizkraukles raj., Koknese, at the facilities of the LVM Vidusdaugava Forestry from 25 to 27.06.2003 and from 30.06 to 2.07.2003. Taking into account the high number of persons to be involved in training, the seminar was organised in two stages with one and the same program covered for each group.

The objective of training was to acquaint the seminar participants with the project component “Assessment of valuable habitat concentration sites” and train them in applying the survey method “Valuable habitat infrastructures”. The seminar was attended by the SFS (32 participants), from the LVM (24 participants) and Tommy Ek (Östra Götaland County Board of Forestry, Sweden).

In the beginning of each training session the participants presented the results of a try-out survey done earlier. The problems related to practical field work were discussed, followed by teaching the survey method “Valuable habitat infrastructures”; the essence and importance of identifying habitat concentration sites, principles for their selection and analysis. The second day of training was devoted to the following issues: components of valuable habitat infrastructures, filling in the field inventory sheet. The third day of training was devoted to discussing the results of the fieldwork on valuable habitat concentration site assessment. Ms Liene Salmiņa (Latvian Fund for Nature) made a presentation on “The protected forest habitats in EU and the related forest site types and woodland key habitats in Latvia”. Finally, information was given on other project activities: choice of the WKHs for applying management activities to them, etc. In their evaluation of the seminar the participants pointed out good organisation of the whole event and an excellent opportunity to consolidate co-operation between the SFS and LVM.

The seminar “Assessing WHK concentration sites” took place in Rude on 10-14.05.2004. The objective of the seminar was to acquaint the SFS and LVM specialists with the amendments in the method „Woodland Key Habitat Concentrations” and recapitulate the experience gained during the inventory of WKH concentrations. As it is already proved by experience, similar seminars are an excellent opportunity to discuss the problems that have emerged and find acceptable solutions.

The seminar participants were from SFS (21 persons), LVM (22 persons) and Sweden (Tommy Ek, Thomas Johansson). The seminar was organized in two sessions with one and the same programme covered in each.

On the first seminar day topical problems of the inventory of WKH concentrations were discussed and the concentration sites analysed. Then the amendments in the method of Woodland Key Habitat concentrations were discussed. The seminar participants pointed to the drawbacks in the database „VATSLBIO” which make difficult feeding in the inventory data. The experts also talked of the problems that had emerged during fieldwork. On the second day of the seminar there was practical work in the field on WKH concentrations. Each participant was given a task to assess a WKH concentration site and fill in the field sheet. The

second part of the day was devoted to analysing the data entered in the field sheets and the discussions.

According to the participants' evaluation the seminar was well organized and helped improve the knowledge on WKH concentrations inventory and assessment.

It must be pointed out that the seminar "Assessing WKH concentration sites" and "WKH management planning" were held in a single session, with one seminar day devoted to the WKH concentrations and one and a half day to the WKH management planning. It was an economy of both the experts' working time and the funds.

3.3.4. Database "VATSLBIO" for WKH concentrations

By Feb. 5, 2004 the software for feeding into the database the data of the field sheets following the method "WKH concentrations" was ready and disseminated among the major users – the SFS regional forest districts, and the regional forestries of the LVM.

To help the user get used to the software and make the work easier the software is developed so that the procedure is the same as for feeding in the WKH data and the actions to be taken are arranged in the same sequence as in the field sheets.

In the second part of Field sheet 1 there is a table under a heading *Informācijas apkopojums* (Data summary), where all the data on 20 WKHs/(P)WKHs found on the given concentration site are summarized. By pressing the key *Informācija* one can automatically get all the data on the extension areas, buffer zones, and enclosures in the respective concentration site (the forest stands for which Field sheet 2 was filled in). Thus, for Field sheet 1 there is no need to feed in the data on the extension areas, buffer zones, and enclosures.

Recently improvements in the database were made after the suggestions made by the ecologists. It was because of the need to feed in the second part of Field sheet 1 data on more than 20 (P)WKHs. For this reason two more rows were added. In one of them the total (P)WKH area, which did not fit into the reserved 20 places, is shown; in the second row in writing the following information for the respective (P)WKH is specified: compartment number, sub-compartment, area, habitat type, etc. To help the users understand the changes in the software the information how to act is additionally displayed when placing the cursor on these fields.

Two new reports were also created: „*Izdalītās biotopu koncentrācijas vietas*” (Habitat concentration sites identified) in Field sheet 1 and „*Izdalītās buferjoslas, paplašinājumi un ieslēgumi*” (Buffer zones, extension areas and enclosures established) in Field sheet 2.

The data of Field sheet 1 are stored in the files *bkv<mežn.kods>.dbf*, on Field sheet. 2 – in *mbkv<mežn.kods>.dbf*; all these files are in C:\Vatslbio\Vdati, that is in the same place where the WKH files *vab<mežn.kods>.dbf* and *jab<mežn.kods>.dbf*.

The data are fed into the database by the ecologist of the regional forest district or the respective LVM specialist. Afterwards the data are sent to the respective forest district (*mbkv<mežn.kods>.dbf*). On the national level, Mareks Razgals, senior specialist of the SFS Forest Resources Register Department, summarizes the data. To ensure data exchange

between the SFS and the LVM, on 23.09.2005 the SFS sent a letter to the LVM and a CD, showing the (P)WKH and the WKH concentration areas in Latvia.

In May 2005 Mareks Razgals worked out software providing for the protection of the WKH concentration areas and sent it to the regional forest districts. The ecologists of the regional forest districts sent it to the forest districts. The software provides that in issuing a cutting permit for a particular forest area the data on the WKH concentration areas show up, including the management restrictions imposed. Because of the ongoing reform of the system of SFS regional organisations, resulting in a merger of a number of forest districts, the software was accordingly restructured.

3.3.5. Results

According to the data summaries, during the project period totally 418 WKH concentration areas of the total area 18,000 ha are identified. The SFS engineers-ecologists, the LVM environmental specialists, and the specialists employed on a contract basis carried out the survey of WKH concentration areas. The total amount of work done by the respective groups of surveyors is distributed as follows: SFS specialists identified 222 WKH concentration areas of the total area 9,586 ha; the LVM specialists – 196 areas and 8,231 ha respectively.

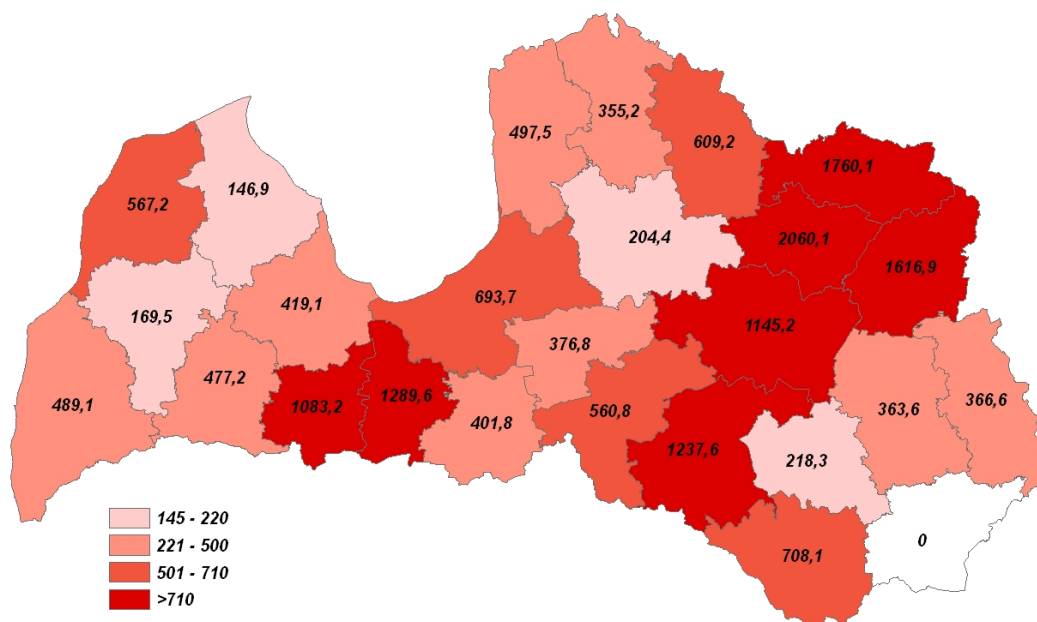


Fig.10. The WKH concentration areas (ha) in regional forest districts.

The biggest share of the WKH concentration areas refers to the northeast of Latvia (Gulbene, Alūksne, and Balvi region). In these regions, the WKH concentration areas identified account for over 5% of the total forest area. Big WKH areas are identified also in the administrative regions of Cēsis, Rīga and Tukums – 4.1, 5.1 and 6.7% of the total forest area in these regions, respectively. However, in these regions the amount of WKH concentration areas is small. This may be explained by the fact that the WKH concentration areas were not

identified for the territories of the Gauja and the Ķemeri National Parks, noted for large areas of the WKHs. In the Krāslava region, no WKH concentration areas are identified. In this region the total WKH area is also the smallest for the country – only 1.7% of the total forest area with the existing WKHs highly dispersed. Relatively few concentration areas (<200 ha) are identified in the two administrative regions of Kurzeme (Talsi and Kudīga) (Fig.10).

Table 2.

WKH concentration areas following the types of ecological infrastructure.

Type of infrastructure	Area, ha				%	Number of sites
	Total	Min	Max	Average		
Pine cohort forests (1)	4671,5	6,9	368,9	46,3	26,3	101
Succession forests (2)	3299,9	5,4	268,7	37,1	18,5	89
Forests with gap-phase dynamics (3)	9393,8	2,6	230,9	50,0	52,7	188
<i>Spruce wetland forests (3a)</i>	806,7	6,4	73,5	35,1	4,5	23
<i>Black alder wetland forests (3b)</i>	3630,1	6,7	216,4	43,7	20,4	83
<i>Broad-leaved forests (3c)</i>	2539,5	2,6	230,9	45,3	14,2	56
<i>Mixed forests (3abc)</i>	2417,5	7,8	166,0	49,3	13,6	49
Geologically supported linear habitats (4)	452,5	5	89,3	26,6	2,5	17
Total	17817,7			42,6	100	418

The amount of WKH concentration areas is highest for the forests with gap-phased dynamics (188 concentration areas of total area 9,394 ha). This is over a half of the total area of WKH concentration areas (52.7%). For this forest type the average size of the concentration area is also the highest (50 ha). The amount of WKH concentration areas is smallest for the geologically supported linear habitats – only 17 concentration areas of the total area 453 ha, which accounts for 2.5% of the total area of WKH concentrations. The biggest concentration area refers to pine cohort forest in the Balvi region, Žīguri forest district of the Žīguri Regional Forest District – 368.9 ha. When comparing with different types of WKH, there appears a similarity because most of the WKHs identified refer to the type conifer forest. On the national level, the smallest WKH concentration area (2.6 ha) refers to the type of infrastructure - broadleaved forests (Table 2).

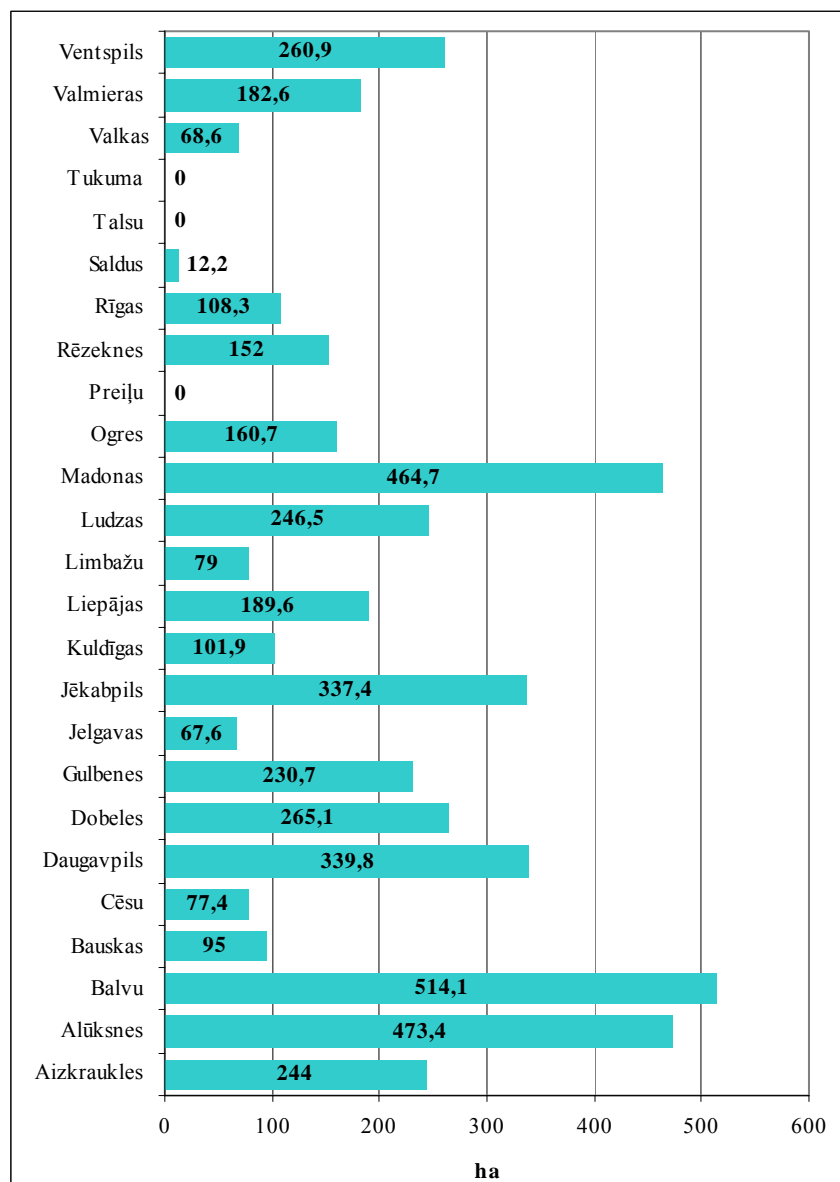


Fig. 11. The area of WKH concentration infrastructure pine cohort forests in different regional forest districts.

The analysis shows the highest amount of WKH concentration areas to belong to the type of infrastructure - pine cohort forest (more than 400 ha) in the regional forest districts of Balvi, Alūksne and Madona. In these three regional forest districts totally 1,452 ha of this category of concentration areas are identified, which account for 1/3 of the total area of pine cohort forests. The said type of concentration areas has not been found in the regional forest districts of Preiļi, Talsi and Tukums (Fig. 11). It must be pointed out that there is a very contrasting situation as to the total WKH area of this type and the respective concentration areas of it identified during the fieldwork. This WKH type is strongly represented exactly in the regional forest districts of Talsi and Tukums. For Tukums, it may partly be explained by the fact that no WKH concentration area survey was done in the territory of the Ķemeri National Park.

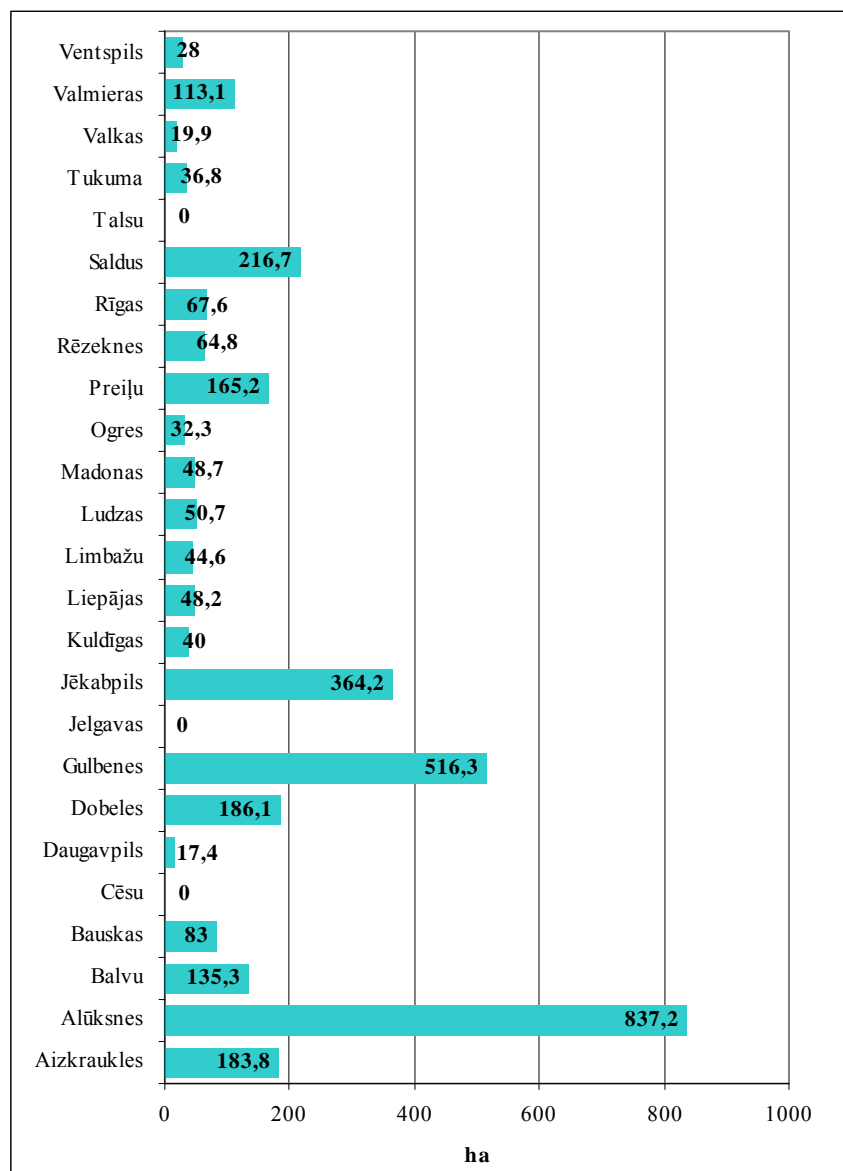


Fig. 12. The area of WKH concentration infrastructure succession forests in different regional forest districts.

The analysis of the survey data shows the highest concentration areas of succession forests to be in the Alūksne Regional Forest district (over 800 ha). In three more regional forest districts – Gulbene, Jēkabpils and Saldus, this figure is above 200 ha (Fig. 12). For this WKH type the area of concentration areas partly agree with the total WKH amount identified in these regional forest districts. No WKH concentration areas of this type were found in the regional forest districts of Cēsis, Jelgava and Talsi.

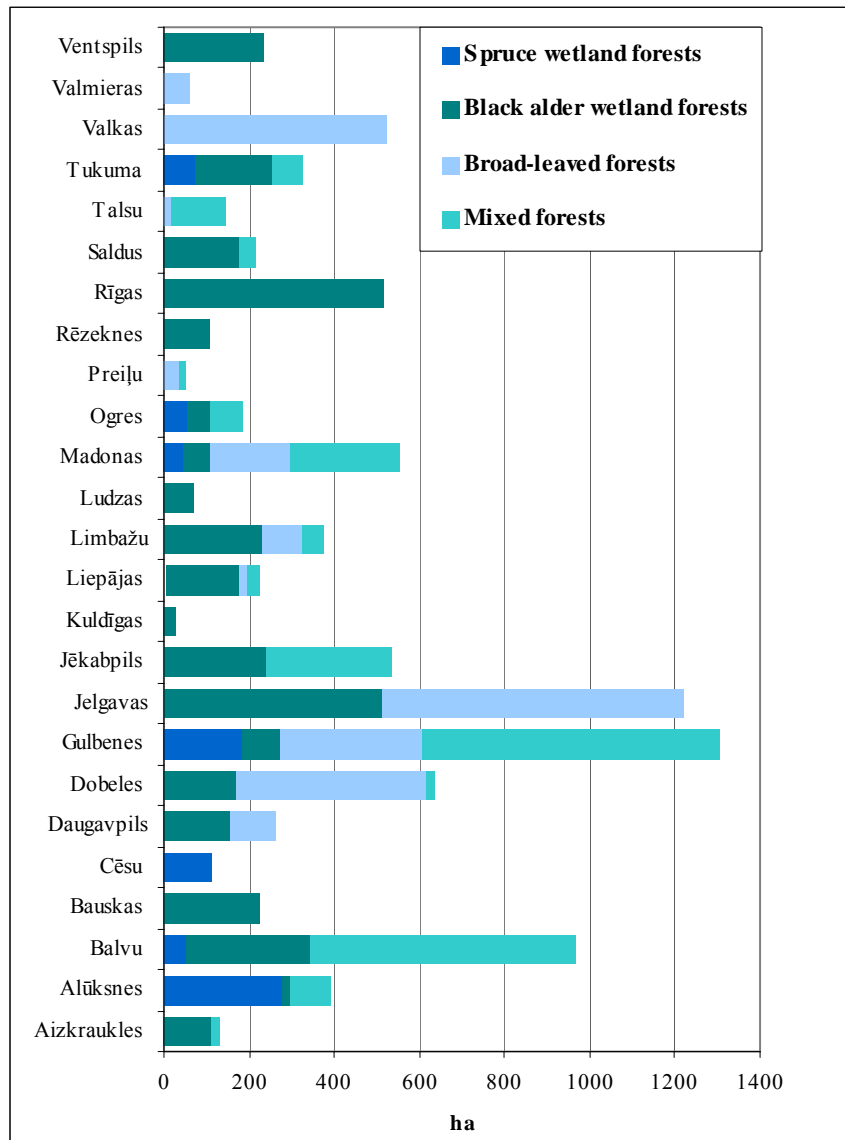


Fig. 13. The area of WKH concentration infrastructure forests with gap-phase dynamics in different regional forest districts.

The analysis of the WKH concentration areas for the forests with gap-phased dynamics shows them to be found in all the regional forest districts. The highest amount (over 1,000 ha) is found in the regional forest districts of Gulbene and Jelgava. However, small concentration areas are found in the regional forest districts of Kuldīga, Ludza, Preiļi and Valmiera. When analysing the subtypes of the gap-phase dynamics (spruce wetland forests, black alder wetland forests, broad-leaved forests, mixed forests) it is found that the given subtypes are identified only in the regional forest districts of Gulbene and Madona. The highest amount of spruce wetland forests is in the regional forest district of Alūksne, and broadleaved forests - in the Jelgava regional forest districts. For Gulbene regional forest district, the WKH concentration areas of mixed forests predominate, and broadleaved forests - for the Jelgava regional forest district (Fig. 13).

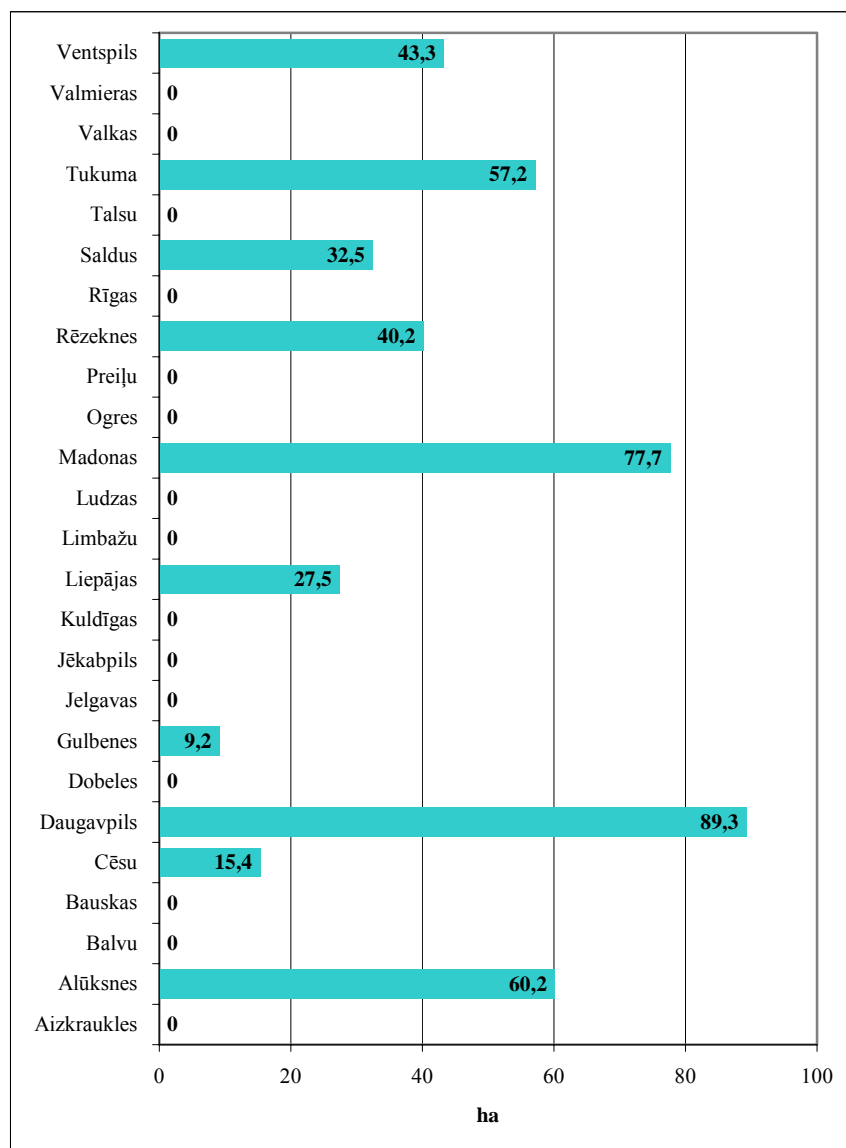


Fig. 14. The area of WKH concentration infrastructure geologically supported linear habitats in different regional forest districts.

The analysis of the WKH concentration areas surveyed shows that the smallest amount is for the infrastructure type of geologically supported linear habitats. This type is found only in 10 regional forest districts and in none of them the area exceeds 100 ha with the biggest area (89.3 ha) in the Daugavpils regional forest districts. The situation is very much the same for the WKH type of costal forests. During the survey slightly more than 500 ha of this type is identified. It only proves that the forests of this type are rare and take up small areas.

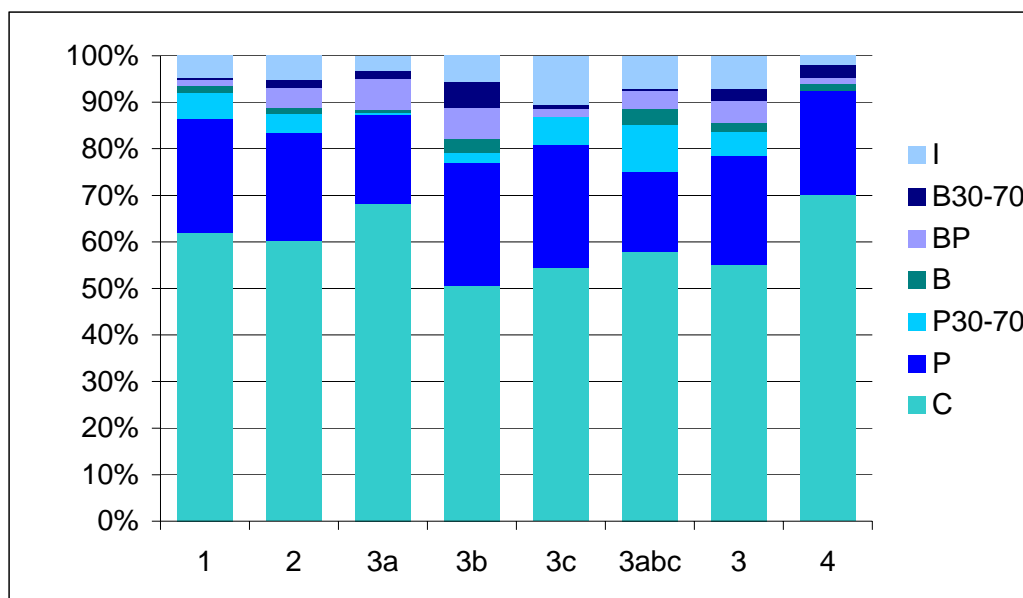


Fig. 15. The WKH concentration areas in percent terms.

When analysing the stands included in the WKH concentration areas it is concluded that for all the concentration area types the core areas (WKH and PWKH) take up more than 50% of the total. This percent in terms of area is the highest for geologically supported linear habitats (70%), but the lowest for black alder wetland forests (50%). For other types of infrastructure this indicator, when taken separately for each category, is not higher than 30%. The extension area with no management activities is the highest for broadleaved forests (27%), the lowest - for mixed forests (17%). The areas where some management activities are admitted are relatively small- P30-70 and B30-70.

Table 3.

Infrastructure components of different WKH concentration area types.

Type of infrastructure	Status of the stand							Total
	C	P	P30-70	B	BP	B30-70	I	
Pine cohort forests (1)	2872,1	1137,4	259,6	71,9	61,2	14,7	221,4	4671,5
Succession forests (2)	1985,9	759,6	139,6	43,7	141,3	49,5	173,2	3299,9
Forests with gap-phase dynamics (3)	5144,7	2189,4	480,8	194,1	428,8	248,1	666,4	9393,8
<i>Spruce wetland forests (3a)</i>	549,5	153,1	5,4	4,8	53,4	14,3	25,6	806,7
<i>Black alder wetland forests (3b)</i>	1814,8	947,2	80	104	244,7	194,8	203,7	3630,1
<i>Broad-leaved forests (3c)</i>	1382,9	672,6	147,9	5,7	39	23,5	267,9	2539,5
<i>Mixed forests (3abc)</i>	1397,5	416,5	247,5	79,6	91,7	15,5	169,2	2417,5
Geologically supported linear habitats (4)	317,5	100,6	0	7,5	5,9	12,1	8,9	452,5
Total	10320,2	4187	880	317,2	637,2	324,4	1069,9	17817,7

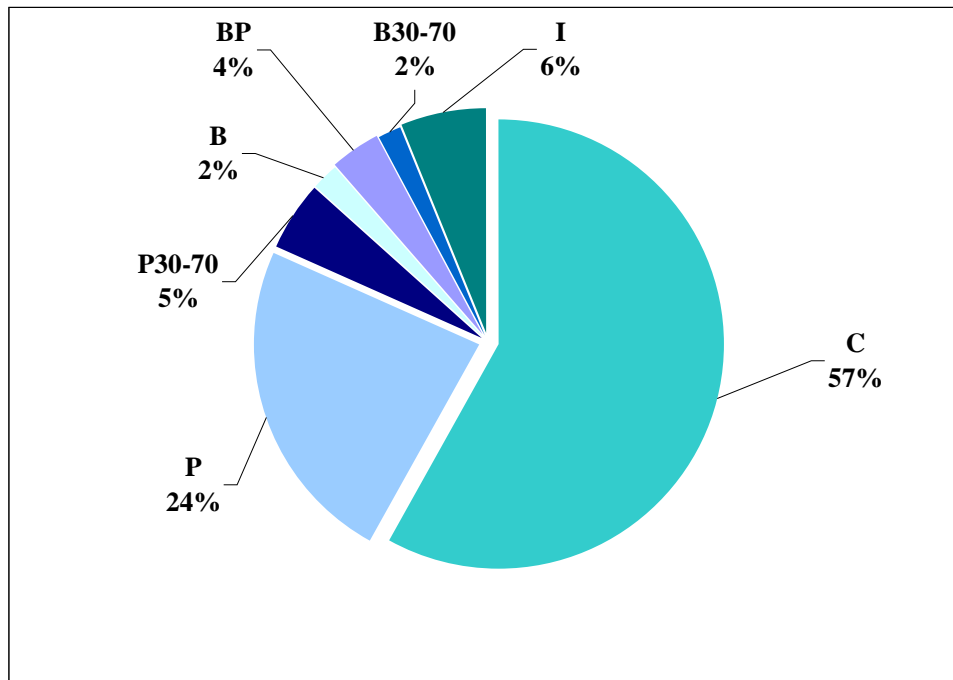


Fig. 16. Components of WKH concentration areas in percent terms.

When analysing the distribution in percent terms of the components of the WKH concentration areas, it is found that the core area takes up more than a half of the total (57%). No management activities are admitted (C, P, B, BP) in 87% of the total area of the WKH concentration areas. Some management activities (removal of 30 – 70% of the standing volume) is admitted in 7% of the total WKH concentration areas. No management restrictions refer to the enclosures (6% of the total area) (see Fig. 16).

When analysing how the WKH concentration areas agree with the areas under protection it was found that 29.6% the concentration areas P, PB, and B fall within the stands where there is a ban on management activities, the main felling, or the main felling and thinnings. On the other hand, 9.9% of P, PB, and B are in the areas, where clearfelling is banned.

3.3.6. WKH find during WKHs concentrations survey

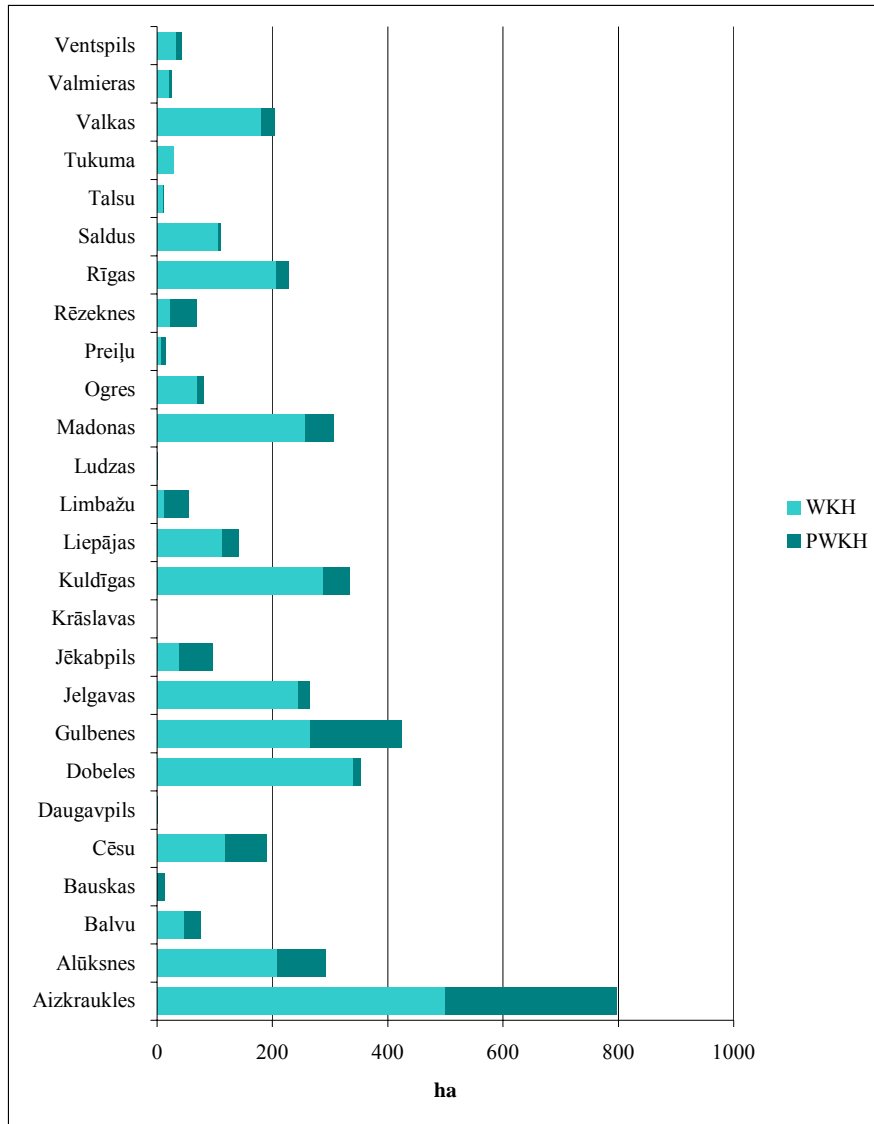


Fig. 17. The total area of (P)WKH after the survey of the WKH concentration areas.

Between 2003 and 2005, in the state-owned forests additional (P)WKHs of the total area 3,596 ha were identified. Out of these 75% were identified as WKH. The highest area – 796 ha were in the Aizkraukle region. In other administrative regions the area of identified (P)WKHs is less than 500 ha. No (P)WKHs or a small area (<10 ha) was found in three administrative regions - Daugavpils, Krāslava and Ludza. When comparing these data with the WKH concentration areas identified, some regularities were observed. In the Gulbene region big areas are identified as WKH concentration areas, while the areas of (P)WKH have increased considerably. However, in the Balvi region the situation is quite reverse: the total area of WKH concentration areas is high, but the increase in (P)WKH areas is very slight. It may be explained by the fact that there are few new habitats around the existing WKHs. As a result of the WKH concentration area survey in state forests on the average 64% of the (P)WKHs are identified.

At present, out of the (P)WKHs identified in the LVM forests only a small proportion is in protected forest areas. This proportion is even less in the areas with some management restrictions: only 9.8% of (P)WKHs are in the areas where final felling and final felling and thinnings are banned, and 5.7% - in the areas where clear-felling is banned.

3.4. Gap analysis

At 2003 the work were started on assessing the amount and types of historical forests in Latvia, comparing them with the currently existing forest biodiversity, forest distribution and their types - Assessment of forest biological diversity in Latvia (Latvian gap analysis). As a result it is expected to develop guidelines on potential gains in forest biodiversity conservation by establishing different protected forest areas. In March 2003, the Swedish expert Per Angelstam presented a report "Data and tools for conservation, management and restoration of northern forest ecosystems at multiple scales". The aim of the report was to present and discuss the methodological approaches for the regional gap analysis. For the needs of this research effort about 100 pages of the H. Strods book "Latvijas mežu vēsture" (History of Forest in Latvia) were translated into English.

3.4.1. Consultations with local experts

From Dec 01 to 03, 2003 Professor Per Angelstam of the Swedish University of Agricultural Sciences and the Örebro University came to Latvia to continue working on the method for the assessment of forest biological diversity (Latvian gap analysis). In meetings with the Latvian experts different aspects of the method were considered. The following Latvian specialists were involved in the discussions: Normunds Priedītis (Company „Vides projekti”), Oļģerts Nikodemus (Faculty of Geography and Earth Sciences), Jānis Donis and Māris Laiviņš (LFRI „Silava”), Jānis Priednieks, Viesturs Lārmanis and Jānis Gailis (Latvian Fund for Nature), Imants Liepa and Inga Straupe (Forest Faculty), Jānis Rozītis and Mārtiņš Lūkins (WWF Latvia) and Aija Melluma (expert of landscape planning). The Latvian experts showed great interest in the method and suggested improvements in it. As a result of this visit an agreement was reached that the SFS specialists would analyse the Latvian forests, using the data of the State Register of Forests. In Jan. 2004, Normunds Priedītis, Māris Laiviņš and Oļģerts Nikodemus presented a map, showing the division of the territory of Latvia into landscape areas.

For the needs of gap analysis information of the Latvian specialists was also summed up. For instance, on October 15, 2004, Oļģerts Niokodemus presented information on forest site types following the soil type according the national taxonomy and the FAO taxonomy.

Per Angelstam's other visit to Latvia was between 23.11 and 30.11.04. During this visit the discussions were about the need for additional data from the State Register of Forests for the assessment of forest biological diversity in Latvia. When meeting the Latvian experts, the proposed research work and the expected outputs were explained. Before starting the analysis Per Angelstam visited Latvia also on 07.02.05. to have continuing consultations with the local experts.

3.4.2. Seminar “Assessment of forest biological diversity”

Professor Per Angelstam was on another visit to Latvia from April 19 to 21, 2004. The objective of the visit was to make more detailed conclusions regarding the analysis of the data of the State Register of Forests, discuss the results achieved, and present them to the SFS and LVM specialists.

The seminar on assessing the forest biological diversity was held on 20.04.2004 in Sigulda. The objective was to acquaint the seminar participants with the work done on the method of assessing forest biological diversity, get the feedback and discuss the practical application of the method. The knowledge gained at the seminar will be useful also for other purposes, for example at the seminars organized at the regional forest districts to discuss the course of forest growth and the natural disturbances in it.

Totally 43 persons attended the seminar – engineers-ecologists of the regional forest districts, the SFS and LVM environment specialists and officials. Professor Per Angelstam delivered a lecture.

In his lecture Prof. P. Angelstam discussed the history of forest utilization and the balance between a diversity of interests in forest management (social, economic, nature conservation). Establishing the boundary values, at which the respective species continues to exist or else it would get extinct, are essential for conserving the biological diversity. These boundary values are established in gap analysis. The essence of gap analysis consists in finding answers on three points: how much forest there used to be in the past, how much it is at present, and how much is sufficient. Following the major disturbances the forest growing conditions typical for Latvia the woodlands are divided into three categories: pine cohort forests; succession forests (with deciduous species in the pioneer phase); the forest with gap dynamics. In the respective forest types the forest age class distribution is also analysed. However, the method of gap analysis has its drawbacks, too: lack of a definite reference point in the history; the farmlands are in many places where originally there had been forest; it is difficult to establish the goal we should strive for (which is a political decision); whether we have sufficient protection areas or they should be increased.

During the visit of Prof. Per Angelstam it was agreed that SFS central bureau specialists would make additional analyses of the data of the State Register of Forests.

3.4.3. Calculations for gap analysis

In June and July 2004, data of the State Register of Forests were analysed with the summaries made for the following:

1. Disturbance regime for state forests on regional forestry level: separately sum for non-drained and drained forest site types – cohort, succession, gap-spruce, gap-broadleaved, gap-wet deciduous.
2. Disturbance regime for private forests on regional forestry level: separately sum for non-drained and drained forest site types – cohort, succession, gap-spruce, gap-broadleaved, gap-wet deciduous.
3. Age distribution in state forests on regional forestry level: sum of area for each age class (decades).
4. Age distribution in private forests on regional forestry level: sum of area for each age class (in decades).

The calculation method for amount of today's forests (B) was worked out by Tommy Ek (Östra Götaland County Board of Forestry), Bo Thor (Regional Forestry Board of Östra Götaland) and Raimonds Bērmanis (SFS of Latvia) on September, 2005.

The SFS and the LVM staff were actively involved in preparing the data needed for the gap analysis. In September and October 2005, the senior specialists of the SFS Forest Resources Register Department J. Uzulis and M. Razgals, and also the senior specialist of the SFS Environment Protection Department A. Kalvāns made an analysis in order to identify how the WKH concentration areas agree with the national level protection areas. The forest stands falling within the WKH concentration areas (P, BP, B) following the type of management restriction, infrastructures and regions where analysed in terms of the ban on management activities, on the main felling and the main felling and thinnings, and also a ban on clearfelling. Similar data were also obtained for the forest stands of the concentration areas having the status P 30-70, B 30-70.

In June 2005, J. Uzulis sorted out the forest stands having some management restrictions: management activities, main felling, main felling and thinnings, clearfelling. These data were broken down for the forests held by the LVM, other ownership forests, as well as for the ecological regions, infrastructures, and age classes established for the needs of the research work within the given project.

In September 2005, J. Buņķis of the LVM analysed the (P)WKHs within the LVM forests in terms of the management restrictions, identifying how much of the (P)WKHs were in the areas where according to other regulations there was a ban on management activities, on the main felling, on the main felling and thinnings, and also on clearfells.

3.4.4. Results

The aim of gap analysis is to present a systematic and scientifically founded analysis with respect to what is required in terms of the amount of protected, managed and restored forest in the long term for the implementation of the ecological dimension of SFM. The analysis includes both Latvia's State Forests and private forests. The method used is regional gap analysis, which is a strategic planning tool used to provide policy-makers with an evaluation of the occurrence of potential gaps in the amount of different representative vegetation types for the maintenance of forest biodiversity, including species, habitats and ecosystem processes.

Using a step-wise approach we first (1) estimate the *reference conditions (A)* for Latvia's different representative forest ecosystems. The forest vegetation types of Latvia are defined based on their characteristic site types, disturbance dynamics, tree species composition and associated age class distributions. Next, we describe (2) the status of *today's forests (B)* using forest management data. Then (3) we compare today's forests with the with the natural reference conditions (A-B). By (4) formulating *performance targets (C)* based on the requirements of specialised focal species and processes, and combining this information with the reference conditions (A) we (5) present estimates of the gaps in the quantity of different habitat networks, and discuss their functionality. Finally, (6) the estimated long-term area needs are related to the existing amount of forest areas needing protection or active management, the need for restoration, and how present and future management trends are

likely to affect the level of protection. The results are presented for the main types of forest disturbance regimes for each of 5 main ecoregions in Latvia.

Ecologically, the Latvian forests have three broad types of natural disturbance dynamics to which species have evolved. These are: (1) succession after large-scale intensive disturbance such as intensive fire or wind, usually followed by a deciduous phase and sometimes ending with conifer-dominated old-growth, (2) cohort dynamics with frequent low-intensity disturbance (such as dry pine forest); (3) gap dynamics with spruce forest, broad-leaved forest or wet deciduous forests. Additionally, remnants of the pre-industrial cultural landscape with wooded grasslands may be of importance.

The starting point was to evaluate the degree to which Latvia's different site types have been subjected to disproportionate losses to other forms of vegetation and land use than forest. By combining digital maps of soil types and today's forest cover we conclude that the situation for different forest types varies considerably among different forest vegetation types and different ecoregions.

By combining the information about the amount of sites favouring the three main forest disturbance regimes and their age class distribution under the influence of natural disturbance regimes, the historic age class distribution was estimated both for the potential forest land, and today's forest land. This was then compared with the age distribution in today's forests as revealed by analyses of the forest management data at the scale of the 26 Latvian forest management regions, and summarised for state and private forests in five broad regions. Next, the age distribution was estimated for each of the three types of disturbance regimes on both drained and not drained land.

A suite of focal species representing the main forest vegetation types was identified and threshold values were derived from literature reviews, and interviews with experts in Latvia and Estonia.

For forests exceeding the highest final felling age, the comparison between the estimated natural and today suggests that 19% remain for state forests, and 7% for private forests.

In order to assess the current protection gaps, or surpluses, for High Conservation Value Forests (HCVF) with high level of naturalness we have compared the estimated amount of HCVF needed according to the gap-analysis with the amount of HCVF forest presently set aside for nature conservation in Latvia. In the latter we have included both areas protected by legislation, and voluntary set aside areas including woodland key habitats, potential woodland key habitats and woodland key habitat concentrations including extension areas, enclosures and needed buffer zones.

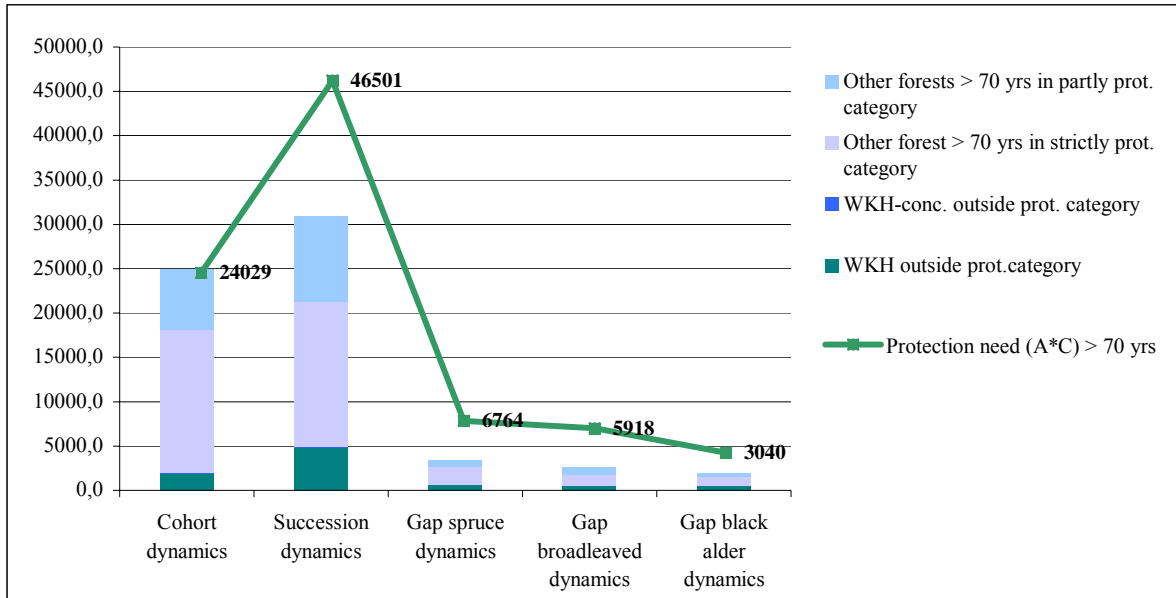


Fig. 18. Protection gaps and surpluses for High Conservation Value Forests of different disturbance regims in all forests in the region Western Latvia.

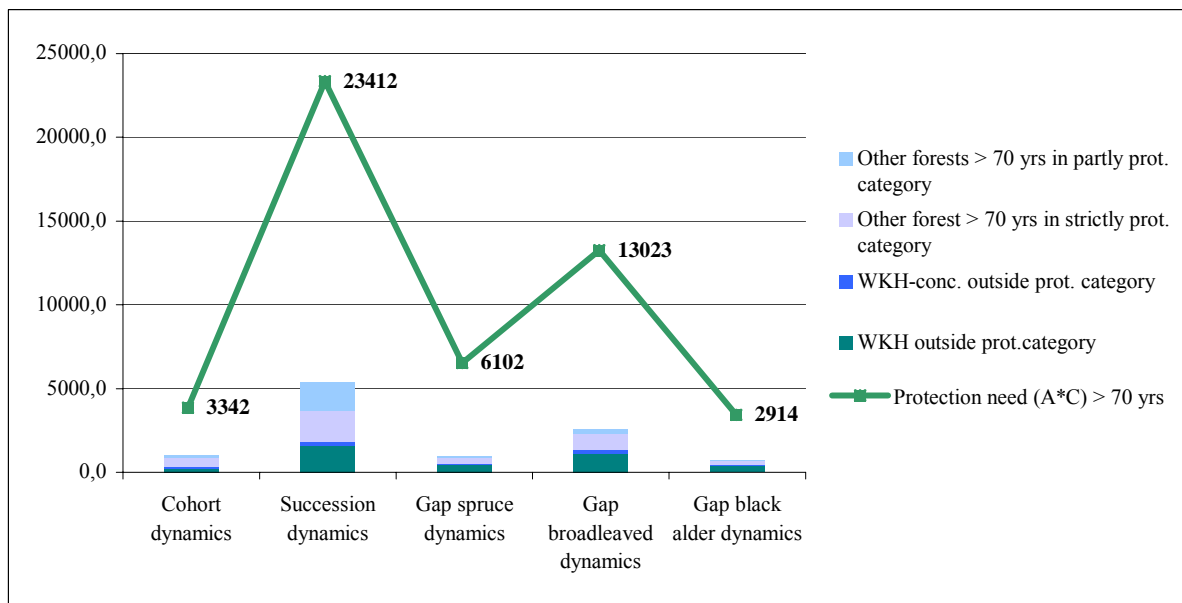


Fig. 19. Protection gaps and surpluses for High Conservation Value Forests of different disturbance regims in all forests in the region Zemgale.

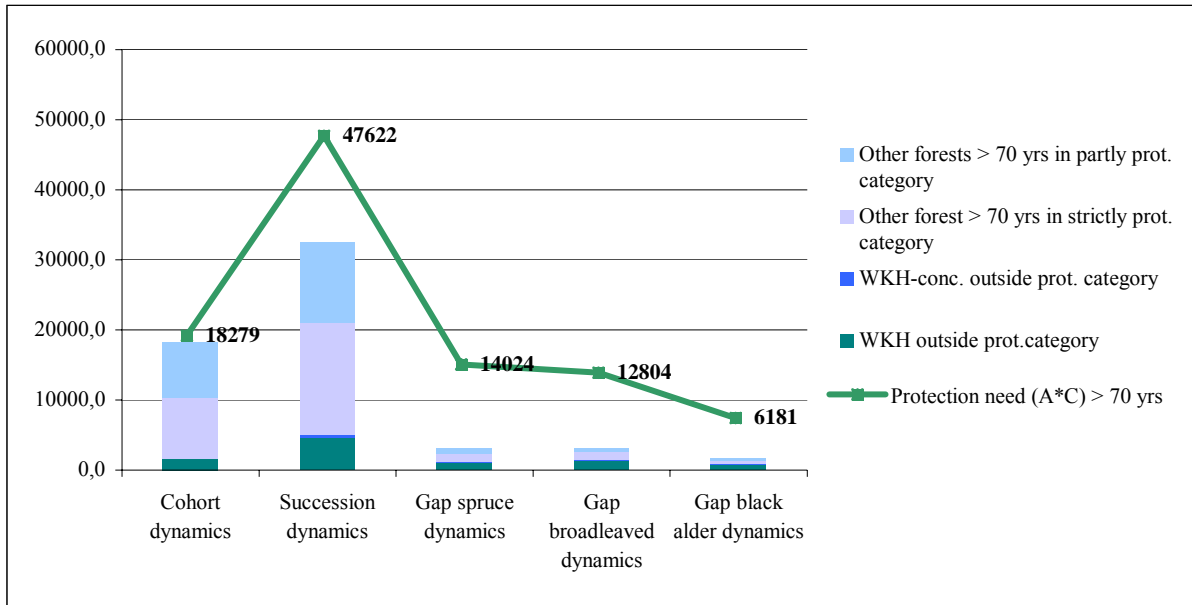


Fig. 20. Protection gaps and surpluses for High Conservation Value Forests of different disturbance regims in all forests in the region Riga and Vidzeme.

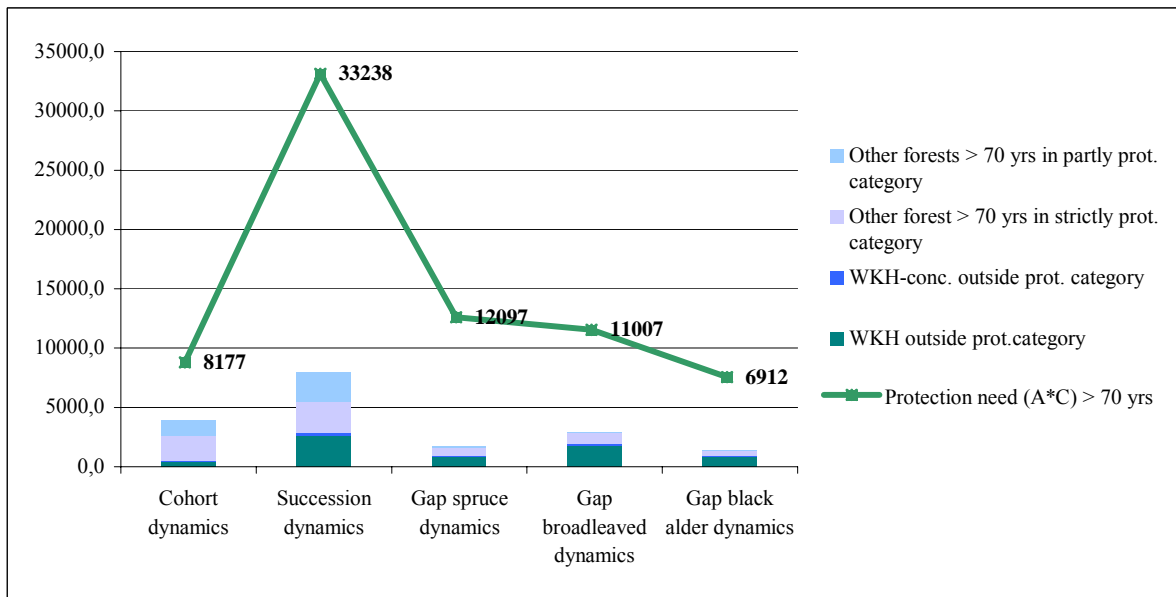


Fig. 21. Protection gaps and surpluses for High Conservation Value Forests of different disturbance regims in all forests in the region South-eastern Latvia.

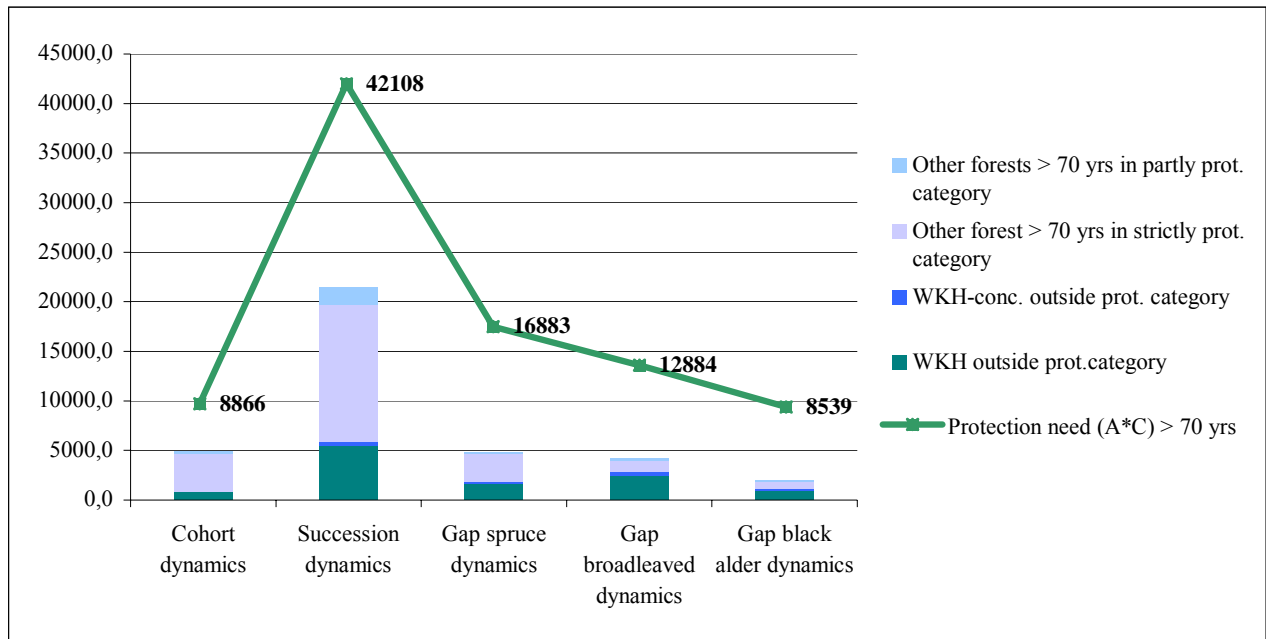


Fig. 22. Protection gaps and surpluses for High Conservation Value Forests of different disturbance regimes in all forests in the region North-eastern Latvia.

The protection situation is generally good for cohort forests, especially in region Western Latvia and region Riga and north Vidzeme. This is because the large amount of protection for the Scots pine forests along the Baltic Sea and the location of Slitere, Kemeru and Gauja national parks in these regions. More protection of pine forests in these regions is of low priority. Nevertheless it is important to evaluate the quality of these protected forest areas. Regarding succession forests the protection situation is reasonable in region Western Latvia and region Riga and north Vidzeme and for LVM forests the situation is good in region North-eastern Latvia. In the other regions there are considerable gaps. Finally, the protection situation for the three infrastructures of forests with different kinds of gap phase dynamics is generally much weaker than for the above mentioned forest types. The reason for this is the quite extensive amelioration works that have transformed large areas of wet forests into drier forest types. For broad-leaved forest on dry ground the reason is transformation into other forest types in earlier centuries. This means that the existing HCVFs of these infrastructures need both to be maintained, and be complemented with restored stands.

A general conclusion of paramount importance is that if the required set-aside of forests as identified in the strategic level gap analysis should be met, all currently known HCVFs are needed in order to maintain a functional habitat network. To evaluate this functionality also spatially explicit analyses are needed.

3.5. Continuation of the WKH inventory

3.5.1. Additional training in WKH inventory

To train new specialists in WKH inventory and acquaint them with the work done so far, there was a seminar in Šlokenbeka from March 29 to April 2, 2004. The training of new WKH surveyors is an opportunity to raise the level of awareness of the representatives of different institutions on the WKH issues, the environment protection in general, and an opportunity to

disseminate the information about the activities of the project “Management of Woodland Key Habitats in Latvia”.

The total number of participants was 29, representing the following organizations: SFS, LVM, Nature Conservation Board, Slītere National Park, Ķemeri National Park, Latvian Fund of Nature, SIA “Stora Enso Mežs, Forest Owners’ Advisory Centre, Riga Forest Agency.

In classroom work at the seminar the following topics were covered: the course and results of the WKH inventory; the WKH inventory method; the WKH types; the indicator and habitat specialist species in WKH inventory; the role of WKH inventory in biodiversity conservation. In the fieldwork on the next day the following topics were covered: wetland broadleaved forest and wetland spruce forest; forest and bog mosaic; filling in the field sheet and how to feed the data into the database VATSLBIO; identification of lichen species. Each seminar participant had to assess a WKH site and fill in the field sheet. On the third day the following WKH types were covered: oak as a biological tree; wetland pine forest; spring-influenced forest; wetland black alder forest; coniferous forest; identification of bryophytes. The WKH types covered on the fourth day: pine as an ecological tree; wetland black alder forest; spring-influenced forest; broadleaved forest; identification of the molluscs, polypores, beetles and vascular plants. The last seminar day was devoted to pine wetland forests and also and checking how the participants had mastered the knowledge gained at the seminar. The seminar participants had to assess independently a WKH site, fill in the field sheet, and recognize a number of species.



Fig. 23. The training of new WKH surveyors

3.5.2. Maintaining of WKH data

Regardless of the WKH inventory completed, the SFS specialists continue updating the WKH database. Rearranging numbering of the forest compartments and subcompartments after the most recent forest inventory data is one of the main jobs related to the updating. Also, the data on the recently identified WKH and (P)WKH are fed into the database. The updated information is sent to the respective LVM forestry and the SFS forest district. Besides, the SFS Head Office makes the WKH data summaries and check-ups of the data accuracy.

3.5.3. New WKH found in state forests

The majority of the newly found WKHs and PWKHs were identified during the inventory of the WKH concentration areas. Section 3.2.6. considers in greater detail the (P)WKHs found during the inventory of the WKH concentration areas. Many WKHs are also found in reassessing specially protected forest compartments (SPFC). In case the SPFC meets the criteria of WKH, the SPFC status is abolished and the site receives the protection status of micro-reserve. In the LVM forests reassessing the SPFC is done also by other organizations. Starting with 2003, in this way micro-reserves of the total area 1,448 ha were established, comprising also the WKHs found by the SFS specialists. Some SFS specialists are also concerned with re-assessing the situation with the SPFC in the LVM forests. During 2003 – 2005, totally 5000 ha of forests is surveyed (2043 compartments), of which 160 compartments of the total area 402 ha are recognised as WKH, with the same figures for PWKH 44 compartments and 88 ha, respectively. The total input of labour was 1652 man-hours, the distance travelled during field work – 20,690 km.

The survey and re-evaluation of specially protected forest compartments in the LVM forests was done also by surveyors from other organisations. Since the beginning of 2003 in these forests microreserves of the total area 1,448 ha are established with the WKHs found by the SFS specialists included in this protection category, too.

In the spring of 2003, the WKH inventory was done also in the Krustkalni Nature Reserve, which is in the Madona region in the central part of Latvia. The inventory costs were covered by the administration of the nature reserve. Totally 23 compartments of the total area 57 ha were identified as WKH, with the same figures for PWKH 27 compartments and 37 ha, respectively.

3.5.4. WKH inventory in private forests

A similar reassessment of the SPFC is done also in private forests, putting the WKHs found in this way under the protection category of microreserve.

During 2003 – 2005, totally 4180 ha of forests of this category are surveyed (3558 compartments), of which only 333 compartments of the total area 534 ha are recognised as WKH. The total input of labour was 4364 man-hours, the distance travelled during fieldwork – 53111 km.

Starting with 2003, in the private forests (in commercial forests and already protected forests) the WKHs of the total area 594 ha are converted into microreserves.

3.5.5. Additions to the national list of WKH experts

In the spring 2004, after the training WKH inventory during the seminar in Šlokenbeka, each participant received a certificate, attesting his/her level of competence in the given field of knowledge. The criteria for granting the qualification were the results shown at the knowledge check-up on the closing day of the seminar concerning both the procedure of inventory and the habitat specialist species and indicator species. The qualification certificate received, a number of persons applied to the Ministry of Agriculture with a request to include them in the national list of WKH experts. A higher number of authorized experts on WKH is in the interests of the SFS specialists as it helps reduce their workload. After considering the

applications submitted a decision was made to add new experts on the list of national experts, eligible to make conclusions on establishing a microreserve. Thus, in the list of national experts were included representatives from the following organizations: the State Forest Service, Ķemeru National Park, SIA "Stora Enso Mežs", Latvian Fund for Nature and Riga Forest Agency.

3.6. Supplied information

3.6.1. Seminars, meetings

- On April 24, 2003, at the Daugavpils University Tommy Ek and Raimonds Bērmanis took part in the Second International Conference "Research and Conservation of Biological Diversity in the Baltic Region" and made a presentation "The Results of the Woodland Key Habitat Inventory in Latvia – How can the results be used in forest ecological research and examples on needed forest ecological research?". Some SFS specialists in environmental matters and the LVM environmental specialists also attended the conference.
- On October 2003, within the frame of the project "Implementing the National Biodiversity Programme: Institutional Development and Competence Increasing in Latvia" a seminar "Practical WKH Management and Monitoring" was held in Sigulda. At this seminar Raimonds Bērmanis made a communication "Management of Woodland Key Habitats in Latvia", which was received with interest and lot of questions were asked. Representatives from the Nature Protection Board under the Ministry of Environment, Latvian Fund for Nature, Department of Nature Protection under Environmental Ministry, Regional Environment Protection Boards, Ķemeru National park, Gauja National park, and the LVM attended the seminar.
- On October 10, 2003, at the SFS central office SFS specialists in environment matters attended a seminar where the recent amendments in the regulatory acts on environment protection were discussed. At the seminar R. Bērmanis gave information on the activities of the project "Management of Woodland Key Habitats in Latvia" and present the final report in Latvian for the project "Inventory of Woodland Key Habitats in Latvian State Forests". The situation with choosing the demonstration objects for the WKH management and the work on selecting the WKH concentration sites and their assessment were also discussed.
- Information WKH management planning and the identification of WKH concentrations and the results achieves was given in seminar on 18-19 Dec. 2003, where the recent developments in nature conservation were discussed. The Environment Protection Board organized the seminar. Among the participants were the SFS specialists in environmental matters, the LVM environmental specialists, officials from the State Environment Inspectorate and the Environment Protection Board.
- On Apr. 14, 2004, briefing on the project "Management of Woodland Key Habitat in Latvia", its objectives and the results achieved was given to the part-time students of the Faculty of Geography and Earth Sciences.

- Information about work on the method for the assessment of forest biological diversity (Latvian gap analysis) included in project “Management of Woodland Key Habitat in Latvia”, ideas, background was presented in meeting on Dec 3, 2003 in the Forest Sector of the Ministry of Agriculture. The officials present at the meeting were Mr Arvids Ozols, Deputy State Secretary of Forestry, Jānis Birģelis, Director of the Forest Policy Department, Per Angelstam, Professor of the Swedish University of Agricultural Sciences and Örebro University, and Raimonds Bermanis of the State Forest Service. At the meeting Mr. Arvids Ozols expressed support to the gap analysis done for Latvia and described it as a logical and necessary step.
- In Russia, in Pushinskie Gory on Oct. 6 – 9, 2004 there was a seminar under a heading “High Conservation Value Forests and Woodland Key Habitats: Methods of Inventory, Conservation and Protection”. The objective of the seminar was to acquaint the participants with the projects under way in a number of countries regarding the inventory and management of high conservation value forests and woodland key habitats. The seminar participants were totally 71 from the following countries: Armenia, Denmark, Estonia, Russia, Latvia, Lithuania, Norway, Finland, Ukraine, and Sweden. At the seminar two presentations were also from Latvia: senior specialist A. Kalvāns of the SFS Environment Protection Department reported on the results of the WKH inventory completed in Latvia; the other communication was done jointly with the Swedish expert T. Ek on the preliminary results of the inventory of WKH concentration areas and the method of WKH management. The subject for the third day of the seminar was “Forest Conservation: How? Where? How much?” The conservation and protection of high conservation value forests is one of the major problems, which show up as soon as the inventory is completed. Forest certification, which envisages also environmental care in forest operations, including the care for WKHs, is believed to be one of the ways to solve these problems. It was also pointed out by many speakers that the WKH inventory results could be used as the basis for introducing new protected areas. On the last day of the seminar in a field trip to Struous Krasnīje a number of WKHs were visited.
- On May 18, 2005, briefing on the project “Management of Woodland Key Habitat in Latvia”, its objectives and the results achieved was given to the part-time students of the Faculty of Geography and Earth Sciences.
- On Nov. 15, 2005. briefing on the project “Management of Woodland Key Habitat in Latvia”, its objectives and the results achieved was given to the private forests owners in seminar about nature protection, in cooperation with WWF Latvia.
- On Dec. 08, 2005, the information about results from assessment of Latvian forest biological diversity was presented to SFS head forester meeting on Riga. The information was in short, to mention the main results – the gap or surplus in all forests in Latvia for different forest types.

3.6.2. Publications

On March 28, 2003 the newspaper “Meža vēstis” carried an article “Cik biotopu jau Latvijā” (How many habitats are there in Latvia?). The article covers the start-up seminar at Šlokenbeka on 07.03.2003 and the WKH inventory results in the Latvian state forests as well as the goals and tasks of the project “Management of Woodland Key Habitats in Latvia”.

In September 2003, the newspaper “Meža avīze” published information on the “Inventory of Woodland Key Habitats” prepared by R. Bērmanis, SFS. It provides information on the WKH inventory results, the project “Management of Woodland Key Habitats in Latvia” and other activities concerning the WKH.

Angelstam, P., Ek, T., Laestadius, L., Roberge, J.-M. 2004. Data and tools for conservation, management and restoration of forest ecosystems at multiple scales. – In: Stanturf, J.A. and Madsen, P., editors. Restoration of boreal and temperate forests. Lewis Publishers, Boca Raton, FL, in press. This report describes the logic for how different kinds of WKH, if needed, should be managed and how a gap analysis is made.

In July 2004, a press release was prepared, which was published in the newspapers “Meža avīze” and „Meža vēstis”. It covers the major activities and results achieved in the project “Management of Woodland Key Habitats in Latvia”, prepared by R. Bērmanis, SFS.

In October 2004, R. Bērmanis prepared information about prescribed burning as one of WKH management activities. The article tells about the importance of forest fires from the biological diversity viewpoint, explains the intentions of the SFS regarding prescribed burning, and the plans to carry out the first trials in some WKH types in 2005. The article was published in spring of 2005 – in journal “Baltijas koks” No. 5.

The latest information and results from the WKH inventory are available on the SFS home page – www.vmd.gov.lv, including the final reports “Inventory of Woodland Key Habitats in Latvian State Forests” in Latvian and English. On the SFS home page there is information about the project “Management of Woodland Key Habitats in Latvia” – the project objectives, main activities and the results achieved.

3.6.3. Presentation about WKH concentrations

To explain better the basic principles for identifying WKH concentrations and their role and significance, in Dec. 2003, a visual aid was worked out in the version of MS PowerPoint. It summarizes the method for identifying WKH concentrations and demonstrates how to use the reference data (WKH inventory data, topographical maps) for selecting the sites to be visited in fieldwork, build up the WKH concentration, etc. For the illustration to meet the actual situation in the field, a good quality WKH concentration area in Ogre regional forest district is used.